Arizona Department of Mineral Resources
Mineral Building, Fairgrounds
Phoenix, Arizona

Frank P. Knight, Director

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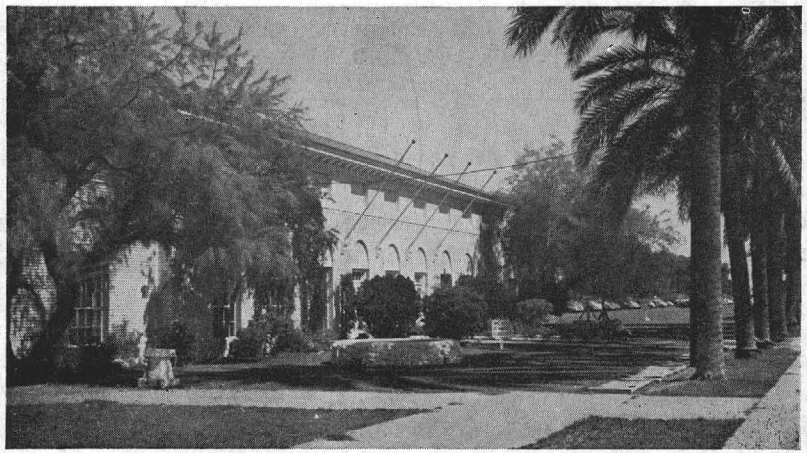
# ROCKS
## and
# MINERALS

By A. L. FLAGG



MINERAL MUSEUM, PHOENIX

Our Earth is composed principally of rock. We find rock in the very deepest part of the ocean as well as on the tops of the highest mountain peaks. Just a little more than a quarter of the earth's surface as we see it is made up of land which is rock and soil. The other nearly three-quarters is water. Underneath these the rest of the earth is a huge mass of rock.

Everything we use, eat and wear comes directly or indirectly from rocks. Stones, brick and concrete with which we build come from the rocks. Iron, copper, aluminum, zinc, lead, tin and many other metals used to manufacture railroad cars, engines, ships, automobiles, tools for peace and weapons for war all come from rocks. The gold, silver, copper and nickel which we use for money come from rocks.

Rocks containing valuable metals are called ores, and are dug from mines, some of them deep, others just huge open pits on the surface. The metals are taken out of the ores by different methods then go to the factories to be made into things we use. Machinery made from metals, driven by engines made of metal, operated by men make these things in different kinds of factories.

The way we get what we eat and what we wear from the earth is not quite so simple. What we eat comes to us from plants. They do their own mining. The roots take up the minerals and water they need and, with the help of sunlight which is the power, make fruit, vegetables, and grains. Some of the things we eat go through more than one of nature's factories. For example milk: one factory makes the food the cows eat, then the cow makes milk and beef. There are two factories to make sugar: one is the plant called sugar cane—the cane is harvested and taken to a mill where the juice is all squeezed out and made into snow-white sugar.

One of the greatest mysteries of all Nature is how various plants take from the soil just the special minerals they need to make each different kind of fruit, vegetable, etc. Different parts of the same field may bear citrus fruits, cotton, a variety of vegetables, grains and alfalfa. In addition the field may have a border of trees all around it. All of these plants grow in the same soil, have the same water and get the power to make their different products from the sun. We too need the light and heat from the sun to live.

In the minds of most people all stones are rocks. If we wish to be correct we should know and understand the difference between a mineral and a rock. The difference is not in color, shape or where the stone is found. It all depends on what the stone is made of.

Every mineral is made up of several chemical elements, always combined in the same proportions. They are always the same in many other ways. Some are always heavy, some are always light; some are soft and never hard; others very hard and never soft. They may be rough or have a very regular shape. The regular shapes are called crystals. A few always break in a certain way leaving a smooth surface at each break. All these and more are characteristics which are always the same for any one material.

When two or more minerals occur together, all mixed up, we have a rock. If each mineral could be taken out of the rock away from the rest it would have its own proper characteristics. A good way to get the idea of the difference between a rock and a mineral is to make believe that a carrot, an onion, a potato and a piece of leftover meat are all minerals. If we take these make-believe minerals, chop them up and mix them, we have hash. That would be a rock, only a rock is a natural mixture of minerals. But if we mix sand, rock, cement and water to make concrete, that is not a rock for it is not done by Nature.

For every mineral there is a story—what it is made of, the form it takes, why it is colored, why it breaks either rough or smooth, why it is heavy or light, why it is hard or soft and what it can be used for. There are over three thousand different minerals of which perhaps one hundred are common, while the rest are rare. All of them are interesting and collecting minerals is an entertaining and educational hobby.

There are about three hundred different minerals known in Arizona. The most valuable mineral in all the world is water. Of all the rest, those minerals in which copper occurs are the next most valuable and abundant. Arizona for more than fifty years has produced more copper than any other State from more than sixty different copper minerals. Gold, silver, lead, zinc, mercury and uranium are also mined in Arizona besides many stones which do not contain metals but do have something else of value in them.