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## Title Page

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## CAVES

Man's interest in caves dates back perhaps to prehistoric times. He probably used them as homes in his very earliest history. It is in caves that we find bones believed to be of primitive man. As he became civilized he developed and prepared for himself houses to live in and his interest in caves has taken on an entirely different aspect. They have become a source of curiosity or a field for scientific study. As a home, men did not penetrate to their depths as he does because of the newer aspect. Owing to their ramifications and many pitfalls, exploring and investigation to any great extent was impossible until some of the more recent methods of lighting were employed.

These investigations make possible various classifications. For the sake of this discussion we will consider them under the following heads: fissure caves, erosion caves, and lava caves. This classification is based largely upon their cause or origin. Many however are a result of two or more of these causes.

In the folding movements of the earth's crust frequent cracks and shifts in the layers of rock leave large cavities. Many of these extend to the surface. The water of melting glaciers and the rainfall upon the earth has found its way into and through these cavities and has eroded them in some places and filled them up in others. In this way many of them have been at some time in their history underground rivers. Erosion marks are as plainly noticeable on their sides as on the rock walls of some of our surface rivers.

Some caves from their location and structure give no evidence of starting from fissures. In some way the water has gotten started in an underground channel in an easily erod-

ed strata and worn it out to its present form. In some localities this erosion is still in progress by the streams running through them. In some caves no origin or outlet of the stream is known as they have not yet been able to explore the caves to their limits. In some the outlet is well defined and the origin unknown, the origin probably being from the assembling of many little cave streamlets similar to our river systems. The erosion is made possible by two main factors. One is the sediment and debris carried by the water thus wearing away rock material. The other is the solvent action of carbon dioxide in the water and the organic acids dissolved by the water as it passed through the vegetable material on the ground. This latter process is also the source of the materials and coloring matter that are now being deposited in the caves as stalactites, stalagmites, and other fantastically shaped forms with varied colors.

Another type of erosion cave is found along the sides of rivers and canyons. These are sometimes caused by the river eroding a soft layer of rock from beneath a harder upper layer. As the bed of the river has become lowered these are left as caves, or, the wind blowing the sand and dust against the side of a canyon has cut away a softer layer between two hard layers thus forming a cave. These two types of caves have figured largely as human habitats. Good examples of this are found in our own country in the cave dwellings in the southwest part of the U. S.

The lava caves are usually quite independent of fissure or erosion markings. In the great lava flows beds covering hundreds and thousands of acres the surface has cooled and hardened to rock and the lava still molten has run in streams be-