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Caves

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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 eroded 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 laver 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 flow 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-

neath and when the supply of lava ceased the stream ran dry and left long and extended cavities or tubes as they are called. In some cases the lava seems to have just settled away from the hardened crust above leaving large cavities. In many places the crust or roof has broken and fallen in leaving them exposed as caves.

Caves are quite generally scattered over the United States. However there are regions where the large and more interesting erosion caves may be found. Starting in the Shenandoah Valley region of Virginia we find a number of large interesting caves. West from this is the Mammouth Cave region of Kentucky. Farther west is the cave region of the Ozarks in Arkansas. Still farther to the southwest are the caves in the Carlsbad region of New Mexico and Arizona. Some investigators express the idea that these are all connected by underground passageways but the geology of the country hardly warrants the statement.

The general features of these caves are quite alike but each one has curious structures peculiar to itself. It may be depth below the surface of the ground; the size of the caverns; the narrow walled passage ways; the formations found within; or the coloring of these formations.

Some of the caves are owned as private property and exploited for gain. However many of the best ones are under the control of the state as state parks, or by the federal government as national parks or national monuments. The federal holdings is a slower process of development but will result in the more permanent preservation of their natural beauty.

Having visited about forty different caves I shall select a few of them and mention some of the interesting features of each. The Endless Caverns of Virginia are entered about half way up the mountain side. The passageways are generally narrow widening out in places to larger rooms. The stalactites are quite long and not so large around. Many are quite white and a few are varied in color. This being a more recently explored cave and is now electrically lighted, the formations are not blackened by smoky torches as is frequently found in the older caves such as Luray which is close by.

The Mammouth Cave region in Kentucky is probably the most widely known of any. It is claimed that many miles of routes have ben explored. There are numerous entrances under different names. Recently a large section of this region including the old Mammouth Cave has been made a national park. In the Old Mammouth Cave the rooms are large and long. As compared with other caves there are not many stalactites or stalagmites. There are distinct erosion markings giving evidence of its having been an underground river at one time. In fact there is a small river called Echo River still flowing in one of its lower rooms 360 feet below the surface. On this they usually give visitors a boat ride of about a half mile depending upon the height of the water. This river is affected in its height and quantity of water by the stage of water in Green River which flows above ground a few miles distant. The walls of the cave have been badly blackened by smoky torches and in places defaced by names written by the many visitors. About seventy-five years ago large quantities of potassium nitrate were taken from the cave for military purposes. Remains of this work are still evident and have defaced the natural beauty of the cave in some places. Near by Mammouth Cave is Great Onyx Cave recently opened up and explored. It is electrically lighted. The caverns are narrower and more winding than in Mammouth Cave. The walls and ceilings are covered with beautiful onyx formations from large stalactites to frost like accumulations. It also has a stream in one of its lower levels. Visitors to this region can have the opportunity to visit these and many other caves.

Diamond Cave in Arkansas has a touring passageway of about three miles now opened up. There are many caverns and rooms not yet explored. Here there are many large rooms connected with narrow openings. In this cave are found very large stalactites and stalagmites and pillars, probably measuring ten feet in diameter and perhaps fifty feet

high. Some very large stalactites which have fallen have had built upon them large stalagmites. Guides tell us it takes thousands of years to lay down an inch of material on the outside of one of these stalactites. This shows the great age of the cave because the cutting out of the caverns took place before the depositing of the stalactites began. In this cave as in others the peculiar formations have given rise to fantastic names such as "Chamber of Adam and Eve," "Storks Nest," "Auditorium of Rome," and "Fat Man's Agony," a very narrow passageway connecting two large rooms. The coloring in the cave is not so varied as in some, it being generally of a yellow color, toward the red.

Sequiota Park Cave in Missouri has one feature of special interest. From the side of the mountain a stream of water is constantly flowing. It is large enough so that they can go in for about a fourth of a mile boat ride. Some twenty years ago an enterprising citizen raised mushrooms along the banks of this stream because of the even temperature, dampness and darkness. As you pass along they point out the many ridges or beds prepared for them.

Carlsbad Cavern in southeastern New Mexico on the side of the Pecos valley in the Guadalupe mountains is perhaps one of the largest caves in the world. But little was known of it fifteen years ago. It was made a national monument in 1923 and is being developed by the government. About six miles of its twenty-one miles of known passage ways have been opened to tourists, nearly five hours are used for the touring of it. It is now electrically lighted, thus bringing out the matchless beauty of its formations. The scenery change is so marked from room to room that one's interest never lags. The "Big Room" is a great sight, six hundred and twenty-five feet across and three hundred feet high and is about seven hundred feet below the surface of the ground above. The ceiling is completely hung with varying sized and colored stalactites from the length of pins to many feet in length and of large diameter. The floor is covered with stalagmatic formations of great variety. The coloring is exquisite being brought out by the artificial lights. Other rooms are known as "The Palace," "The Queen's Chamber," "The Wigwam," and so on, each given its name from some peculiarities of structure or formations found within. Some of the stalactites are enormous, measuring perhaps one hundred feet long. And where a stalactite and a stalagmite have grown together they form a pillar measuring one hundred and fifty feet in length and twenty feet in diameter. Guides tell us that it is estimated that some of these have been sixty million years in forming. Another feature of great curiosity here is the bat cave. One of the chambers is occupied by bats. At 7:20 each evening the bats start to flying out and for an hour and a half there is a constant stream of them emerging until hundreds of thousands of them fly out. They scatter over the country for a hundred miles around feeding on the flying insects and bugs they find. At four o'clock in the morning they begin to return, darting into the cave at about the same rate they went out. The entrance is an oval opening about thirty by fifty feet in size. The bats hang down from the ceiling in strings by clinging to one another, during the day. An excellent description of Carlsbad Cavern may be found in the National Geographic Magazine of January 1924.

Wind cave in the Black Hills of South Dakota is of interest for its long and winding routes and especially for the strong current of wind which comes from the entrance so much of the time. It is evidently a fissure cave eroded out by stream action.

The Oregon Caves in southern Oregon are high up on the side of the mountain and give evidence of fissure origin. Still there is evidence of stream erosion which must have taken place during the glacial period or before the uplift of that region. There are many beautifl stalactite formations found here.

In our own state, Iowa, are several caves of considerable interest. Near Decorah at Glenwood Springs is a cave from which a stream of water flows part of the year. It is large enough so that a boat can be operat-

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of mud per annum to the sea, i. e., one square mile, about 240 feet deep, for the manufacture of new continents, we should realize that a great many thousand million tons of that flood-borne silt is simply the debris from the workshop of the Geomidae."

A remarkable remark, indeed! A river carrying that much silt would be something like a mud pie, for 400 billions of tons of silt, allowing a ton to the cubic yard, would make roughly about 75 cubic miles instead of the one twentieth of a cubic mile which he postulates. And since he attributes a good share of this sizeable heap to the industry of the gophers, they are surely an indefatigable and hard-working group.

Two friends once engaged in a heated altercation, until one called the other a liar. "I do not call you a liar," replied his friend, "but you tell what isn't so." A great man once said: "Scientists are often wrong, but they don't mean to be."

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CAVES

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ed on it most of the time and one can take a ride of five hundred feet into the side of the hill. It is very similar to Sequiota Park in Missouri. In Maquoketa State Park is a splendid example of an erosion cave where a stream has tunneled its way under the ground and rock for about four hundred feet. On either side of this is a deep canyon like valley. There are two natural bridges here standing one hundred feet above the canyon floor. The highway passes over the main cave stream.

In Mesa Verde National Park in Southwestern Colorado are found some of the best examples of wind or river erosion caves along the side of canyons. Especially so since these caves have been the homes of a prehistoric race. Remains of their dwellings and samples of their craft work are still to be found in some of these caves. Many of the caves are accessible only by ladders or by narrow winding trails along the side of the cliff, many of which are two thousand feet high. Some caves which were used as homes are only large enough for one family, others were occupied by villages. In one cave three hundred feet long and fifty feet back and thirty feet high a village has been explored having two hundred rooms and twenty-three kivas, which were used as places of worship. They have arranged these homes as safety places from natural and human enemies. From these they would go out and till the semi arid soils on the mesa above or in the valley below, also to hunt or gather nuts and fruits from the scanty vegetation around them. These were a primitive people leaving records only in the form of a little picture writing on the cliffs or on their pottery. When they occupied these caves as homes is only conjectural. There is abundant evidence that it has not been during the last five hundred years. Some would place it one or two thousand years ago. The arid climate has kept the structural timbers in a good state of preservation. Scattered over the Southwest mainly in Colorado, New Mexico, and Arizona are found hundreds of such cliff dwellings. Some of the best known are Mesa Verde, Montezuma Castle, Puye and Black Walnut Canyon.

The lava caves present no peculiarities excepting the underground stream like feature and the characteristic markings or spines formed where the viscous lava settles away from the ceilings and sides. The lava flow of the Craters of the Moon National Monument in southern Idaho, because of its recent formation, has a large number of these caves that are open so that one may explore them. One can ill afford to miss seeing this interesting region of caves and volcanic craters when touring from Yellowstone Park to Salt Lake City.

In three of these lava caves, one in Craters of the Moon National Monument and two in central New Mexico south of Gallup, ice is found the year round. This phenomena is hard to explain. None of them are artificially lighted so it is difficult to explore them to any extent.

In respect to ice caves Iowa is not to be left out as we have two such caves. One is at Decorah which has ice in it during the forepart of the summer. The other is in Bixby State

Park near Strawberry Point and has ice the year round. These are both evidently fissure caves. Neither of them are very large. The cold freezing winds of the winter blowing through the fissures in the hills freeze them. Then in the summer the currents of air reverse and the freezing cold air from within freezes the water at the entrance of the caves.

O. B. Read.

CONSIDER THE SPARROW

Most of the birds which you and I know best are fair-weather friends. That is to say, they stay with us just so long as the sun is warm and food is plentiful, but when winter comes, they forsake us. Nearly all of our common birds behave thus, which must mean, if birds are anything like humans, that it is our climate and not ourselves that they like. True, a number of our game birds such as the quail and the pheasant stay all the year round, and although they occasionally come into our barnyards to eat with the hogs and chickens, they do so because of the food, and not because of any liking for us. The jay and the crow and the cardinal remain also, but neither of them is fond enough of mankind to stay very near. But the little fellow I am thinking of, like the poor, is with us always; he will not be rebuffed by our coldness, he likes us and we cannot help it.

He is no larger of body than a hulled walnut; short of beak and wing and leg; plain of feather and humble of taste. But what are such handicaps to a fighter like him? For seek him where you will, he is there,—rural, urban, suburban. No farm or town is too large or too small for him; on roof of city warehouse or country cowshed, he is equally at home. In the streets of New Orleans, on the wheat shocks of Manitoba, around the towers of New York, or in the alleys of Chinatown in Frisco, he flits his sooty wings and chirps his strident song. He is the very spirit of the explorer and the pioneer. He is the English Sparrow!

Watch him as you feed your hogs on the farm or your poultry in the back yard. Watch him get his share of the grain, yet always managing to keep out of the way of the hogs' jaws or the beaks of the stingy hens. Watch him in the streets as he picks up the edible things too small for your eye, but always avoiding the wheels of traffic, always just keeping from beneath your feet. He never hops or flies further than necessary to get out of danger; you can almost pick him up, but never quite. Try it, and he will hop just out of your reach; pass on, and he will go back to where the picking was good. He is a bird who lives with man, and in spite of him. He'd like to be friendly, but if man won't be friendly—well, he is going to remain with him anyhow. I don't know of any other wild bird like that.

When he takes up his abode around farm or city home, few other birds come near, partly because they fear him, partly because there is no room—the available quarters are already fully occupied by sparrows. To the martin or bluebird it must be very much like staking out a claim on land already homesteaded. For the sparrow is a great 'squatter' and once he gets the notion to settle down in a place, the inhabitants thereof generally leave in disgust, because they know the sparrow has come to stay.

He resents competition. Let some robins or bluebirds come near a sparrow dwelling, and the whole population immediately hold an indignation meeting to discuss ways and means of ousting the unwanted guests. The affair usually ends with a sparrow victory, for why, in sparrow logic, should red-vested or blue-coated interlopers such as robins or bluebirds, who are going to remain only a few months at best, be allowed equal hotel privileges with a bird who stays all the year round?

His food is largely grain gathered from shocks, corn-cribs, elevators, and the streets; he eats but few insects. He crowds his nests of feathers and straw into every accessible crevice, sometimes using a bushel of trash for one nest. He roosts everywhere, and the farmers pretty generally hate him for fouling stored grain and machinery. He is continually brawling and creating noise and disturbance; he flies from farm to farm, and has been accused of