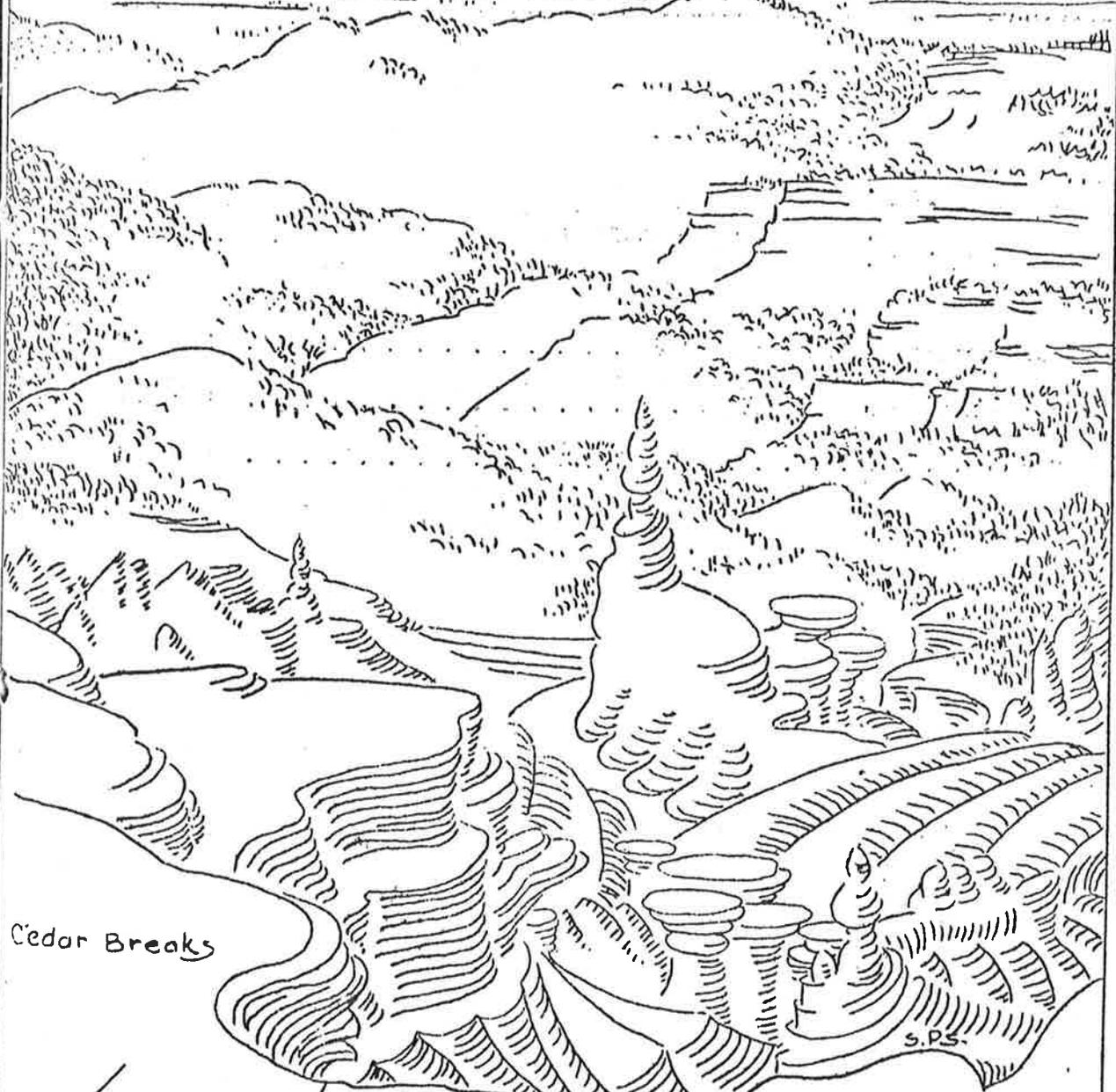


Zion and Bryce Nature Notes



Cedar Breaks

S.P.S.

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DEPARTMENT OF THE INTERIOR
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This bulletin is issued monthly for the purpose of giving information to those interested in the natural history and scientific features of Zion and Bryce Canyon National Parks. Additional copies of these bulletins may be obtained free of charge by those who can make use of them by addressing the Superintendent, Zion National Park, Utah. PUBLICATIONS USING THESE NOTES SHOULD GIVE CREDIT TO ZION-BRYCE NATURE NOTES.

P. P. Patraw, Superintendent

C. C. Presnall, Park Naturalist

TABLE OF CONTENTS

Geological Factors of Timpanogos Cave	Page 36
Cedar Breaks National Monument	Page 38
Lehran Caves	Page 41

GEOLOGICAL FACTORS OF TIMPANOGOS CAVE

By Thomas A. Walker

Timpanogos Cave is one of the outstanding examples of the limestone caverns that are commonly found throughout the world. It is located in American Fork Canyon, Utah, a country of broken rock strata, where there are numerous faults, foldings and twistings of the rock layers caused by the shrinking process of the earth's surface. In this readjustment of the earth's surface there were left in some places ragged wounds or fissures extending along the line of the faults, Timpanogos Cave being formed in one of these. According to estimates made by geologists, the Timpanogos Cave must be well over 100,000 years old.

The formations in the cave are composed of calcium carbonate in practically pure form. This has been carried into the cave and deposited by water seepage from the surface above. The water coming down through the limestone ledges dissolves the lime and reaches the cave saturated with that substance. Then a slow evaporation takes place, reducing the amount of water volume and the amount of lime which it can hold in solution, thus gradually making a deposit on the surfaces of the cave and walls. (*) Greater quantities of water collect in some places than in others, due to the irregularities in the rock surfaces, thus causing a greater deposit of lime where the largest volumes of water collect, starting the projections known as stalactites. As the water accumulates and drops from the ceiling to the tip of the stalactite, it deposits more of this lime solution where it hits the floor, thus forming a stalagmite.

These two types of formations are often found in pairs, the stalactite extending down from the ceiling and the stalagmite extending upward from the floor, the one directly under the other. When the building process has gone on long enough, these two formations meet and form what is called a pillar, extending from ceiling to floor.

It is probable, according to Dr. George P. Merrill of the United States National Museum, that the various forms of distortion and departure from the straight tubular forms of the stalactites are to be accounted for in several ways. An examination of these spectacular Medusa-like forms found in other caves by government geologists has revealed the fact that they occur not as dependents from the naked limestone of the cave roof, but as offshoots from a stalactitic crust which forms first, and varies

(*) Escape of CO₂ from the water is undoubtedly the chief factor in lime deposition. C.C.P.)

from a mere film to several inches in thickness. They appear sometimes singly but commonly in groups ranging in size from 3 to 10 mm. in diameter. Close inspection has revealed that while in most cases these formations are tubular, the tube itself is of almost microscopic proportions, being as a rule less than one-half mm. in diameter.

So small is it that capillarity, and not gravity, is the controlling principle in giving the direction to the lime-carrying solution. A small spicule of calcite crystallizing on the extremity is as likely to point any other direction as downward; the direction of the next drop is controlled in part by the first, where the same process is repeated. Or, on the assumption that the stalactite increases in length by constant additions to the tube, on all sides, it is easy to imagine that the deposits take place more rapidly, for a time, on one side than another, perhaps partially closing the orifice or giving it a different direction. The essential fact is that to capillarity, and not to gravity, is due the peculiar vermicular formations.

Why at the outset the stalactite should begin to form through many small capillary tubes rather than through one large one, as is ordinarily the case, is not certain. It is possible, however, that this condition is influenced by the irregularity of the roof, and of the substance of which it is composed in the beginning.

The peculiar warty-like and distorted forms seem to be due likewise to the action of capillarity. In this case, however, the side excrescences are of secondary growth, the stalactite having first formed, in part at least, in the ordinary way. Through the closing of the tube at the lower extremity, the water either oozed through the wall or perhaps ran down over the outer side until some slight irregularity was met, it paused long enough for the necessary precipitation to take place. Such forms in brief are but "tricks of crystallization" due to capillarity.

Perhaps one of the most outstanding characteristics of this cave is the coloring that appears in the formations, ranging in tints from dark brown, buff and cream to pure white, with shades of green, blue, lavender and red blended here and there. The conclusion has been reached by W. D. Bonner, Professor of Chemistry at the University of Utah, that this coloring is due to the presence of iron. It is probable that the brown deposits such as the "Chocolate Fountain" owe their coloring to ferric iron, likely ferric oxide, and the greens are possibly due to ferrous carbonate. The other colors are due to combinations of this iron in varying amounts of each.

During recent years man has aided nature in this beautiful coloring by electric lighting systems which have been installed. Much of the delicate coloring has been emphasized and some very beautiful effects made by colored lights. Among the outstanding ones are The Great Heart of Timpanogos, The Jewel Box, and the Chocolate Fountain.

CEDAR BREAKS NATIONAL MONUMENT

By Gordon Y. Croft

"The Breaks in back of Cedar City" was the pioneers reference to this great spectacle (it is very misleading as far as the average tourist is concerned) and out of this term the name Cedar Breaks has originated. "Where are the cedar trees?" is the common question, and they are politely informed that the Breaks was named in honor of Cedar City and not from the trees that supposedly grew along the rim. The Breaks are vastly different from the cane breaks of the south. Here it is the rock that breaks away under the masterful forces of nature which has produced this great erosional amphitheater 2,500 feet deep.

Cedar Breaks consists of a vast amphitheater enclosing a great number of smaller amphitheaters eroded from the Pink Cliff formation of the Markagunt Plateau. Here for many centuries the action of rain, wind, and frost has cut the pink limestone into fantastic castles, cathedrals, temples, pinnacles, and spires. There are columns of soldiers with the captain taller than the rest out in front, a perfect bust of Abraham Lincoln, a priest with his congregation before him, Felix the Cat sitting alone on a high pinnacle, Old Scar Face the grizzly bear, a golden eagle, and the Great Arch of Triumph, larger than any erected during the great war. The north slope of the canyon with its array of colors makes a wonderful design by a Navaho blanket that the Indians could have copied and used as the original design for their blankets. Jacob's Well, and the Walls of Jerico, the draw bridge into the Moorish Castle, and others too numerous to mention, are the workings of this great master sculptor.

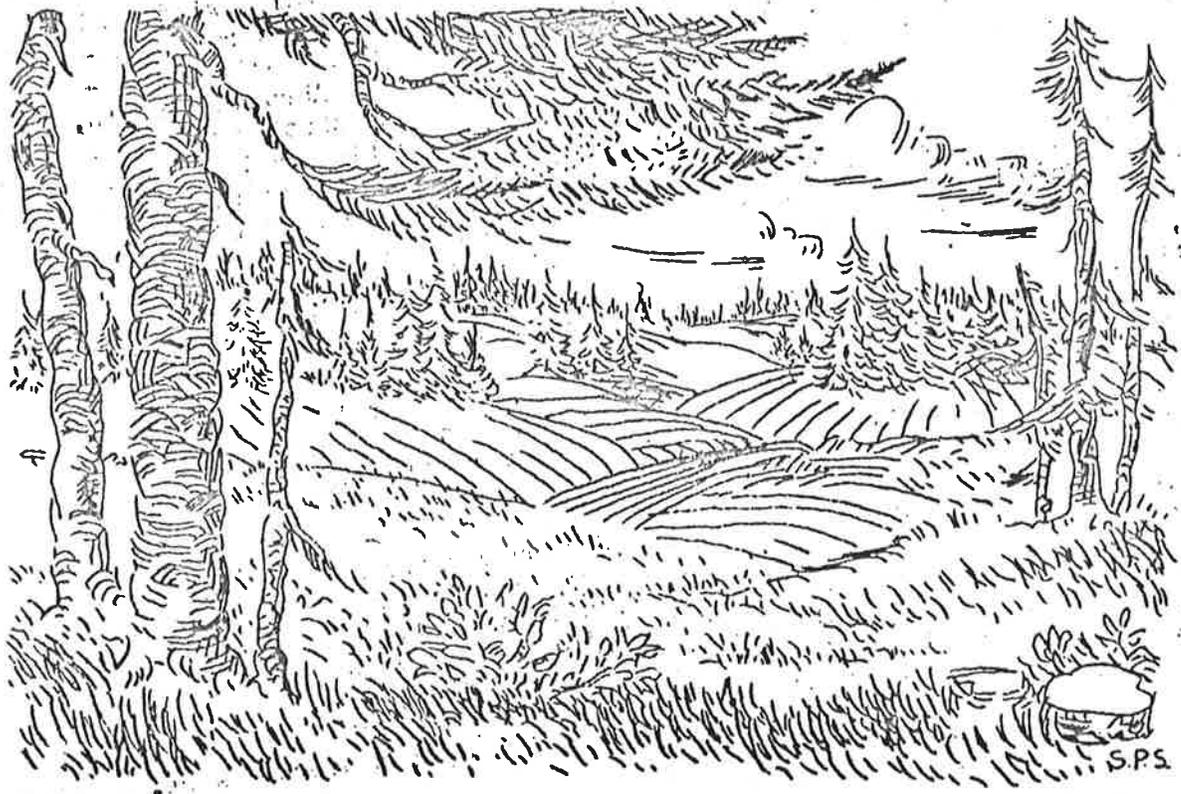
Cedar Breaks must be seen to be appreciated, for no artist or photographer can reproduce on canvas or color plates the great array of colors displayed here. An artist, it is said, counted over sixty different shades of color.

Equal in magnitude is the high alpine plateau country which surrounds the Breaks, where there is a magnificent forest free from underbrush, with mountain meadows, grassy parks, small lakes, and clear running streams. Rising gently to the north is Brian Head, 11,315 feet above sea level, the highest peak on the southern plateau, which pushes its rocky slopes above timber line. Like other peaks of this region, it is of volcanic origin. From this landmark one can see into the far distant word desert.

To the south the great box canyon of Zion National Park, to the west the block mountains of the Great Basin and the Nevada deserts, to the east Long Valley, Paunsaugunt Plateau, Red Canyon, part of Bryce Canyon National Park, Escalante Mountain, and on a clear day the Navajo Mountain, far to the southeast and on the other side of the Colorado River.

Scattered through this great forest of fir and spruce are masses of lava, mute evidence of a once molten mass seething with gasses, seeking to escape, and, finding it where the solid rock yielded to stresses and strains, bursting out upon the surface with explosive fury, throwing high into the air rock fragments and rock dust or ash, some of which fell back near the vent to build the familiar volcanic cones, and some of which spread out like a giant sheet destroying everything before it. Although many thousands of years have passed since this eruption, the great masses of lava stand out today in the green forest nearly as barren of vegetation as the day they erupted.

On this high alpine region one can enjoy the comforts of a cool Canadian north woods. From the hot burning desert with the temperature hovering around 100 degrees, in one short hour one can reach this upland paradise, where the summer temperature never goes above 70 degrees in the daytime and seldom below 40 degrees at night.



Here are found the same types of animals characteristic of the far north. For the lover of birds it stands supreme. Fifteen species of birds have been seen in one small valley only a few yards long. It is the home of the blue grouse, white-crowned sparrow, cross-bill, rufous humming bird, rocky mountain pine grosbeak, long crested jay, rocky mountain jay, pine siskin, gray headed junco, audubon warbler, pigmy nuthatch, kinglet, western tanager, and townsend solitaire.

With plenty of woods for protection, clear running water and numerous springs, with food in abundance and very few natural enemies, this area makes an ideal bird sanctuary. Grasshoppers abound in the open parks and on one occasion fifty robins and ten long-crested jays were seen feeding on them.

Wild animals of any kind are always a major feature of any national park or monument; equal in importance with the birds are the mammals of this high country. It is here that the marmot, porcupine, pine squirrel, coyote, coney, wildcat, mountain weasel and lynx make their home. Bear once roamed the area and occasionally one passed through. Mule deer are found in considerable numbers and under protection will soon be very common.

The beautiful forest of spruce and fir with aspen groves, shades and protects a velvet carpet of alpine flowers wonderful to behold. Columbines, bluebells, larkspur, monkshood, Indian paintbrush, fringed gentian, and penstemons grow in abundance and are a sight that a lover of wild flowers should never miss.

All in all this area only ten miles square is one of nature's condensed laboratories where anyone who loves the great out of doors can find peace and contentment, joy and entertainment to their hearts content.

During the past year the expansion of the National Park Service has resulted in the acquisition of many areas heretofore administered by other bureaus and departments. In many cases these newly acquired areas have been placed under the administration of the most strategically located Park Service official. Hence it is that the Superintendent of Zion and Bryce Canyon National Parks now has charge of three other areas: Cedar Breaks, Timpanogos Cave, and Lehman Caves - all national monuments formerly under the Forest Service. These monuments have great educational value, hence each of the three men assigned to them is necessarily both custodian and naturalist. These men have contributed to this issue of Nature Notes, making it a National Monument number which is being mimeographed in double the usual number of copies, so as to give publicity to the new areas, and the newly enlarged scope of the National Park Service.

C.C.P.

LEHMAN CAVES

By Otto T. W. Nielson

An equine, performing the laborious task of dragging wood down a hillside, floundered as his foot broke through the limestone. Mr. Lehman, the owner, interested primarily in extricating the animal, at first thought little of the incident except for the welfare of the horse. Later through curiosity, he enlarged the opening made by the horse's foot, and thus a fairyland of intricate beauty became accessible - Lehman Caves.

That was half a century ago. Roads were mere trails and wagon tracks. People in isolated places traveled with difficulty, hampered with inconveniences. Today the conditions are different. Splendid highways reach in all directions and modern transportation makes it possible to reach the once remote regions. Lehman Caves can be reached on good graveled roads six miles west of Baker, Nevada. Baker is on the highway between Milford, Utah, and Ely, Nevada. Also the highway between Delta, Utah, and Ely is about five miles from the Caves. A very short distance from the entrance to the Caves are quaintly sequestered among the junipers and pinons several cabins and a lodge. A system of cool pure water for culinary purposes has been installed. The cool breezes which waft from the adjacent Mt. Wheeler (over 13,000 feet) in the evening and during the early night are conducive to the best of sleep whether one is in the campgrounds or in the cabins.

Out of a mountain of limestone, a nature's agent, water, has performed its marvelous work. It has eaten its way through crevices and fissures, carved out spacious chambers, made hallways and corridors, created chasms and gorges, and alluringly adorned them all with myriads of fantastic stalactites and stalagmites. It has deftly and with infinite slowness produced an enchanting labyrinth of exquisite beauty, charm, and bewilderment. Such is Lehman Caves.

A trip through the Caves is an experience most stimulating. There is variety enough to gratify all, regardless of their walks in life. The dreamer can be stimulated to realms of joy; the technically trained will be awed by the symmetry and exactness; the philosopher will have ample opportunity to deduct; the artist will have reason to see beauty and form; the musician might perhaps see it as a complete symphony; and to all a journey through it will leave a most pleasant memory. The chambers contain representations of many of the famous and the glorified. There are depicted objects pertaining to music, art, drama, and nature, as well as statues in likeness, pillars of renown, obelisks, minarets, spires, gargoyles, pipe organs, and many of the things in life - formed in unbelievable verisimilitude. The Caves abound in crystalline splendor but

the formations are preponderantly incrustated with lime. However, there are exposed surfaces of vari-tinted crystallizations - opaque, translucent, and pellucid. Layers of onyx resting on marble make the Caves more interesting. Here you see nature's work - ages in the making and skillfully wrought. It is interesting to scrutinize and spectacular to gaze upon.

Trips through the Caves can be made without experiencing any particular difficulty or inconvenience. The trails have been sanded and places where crawling or excessive stooping was necessary have been eliminated by excavation and splendid trail building. Chambers which hitherto had been inaccessible are now opened and can be reached with considerable ease. In all it is a most pleasant trip on trails which are dry, with no excessive exertion.

A few of the attractions seen during an hour or two spent in the Caves are mentioned with the intent that an interest may be created and not with the idea that a graphic picture of them can be portrayed. Words are inadequate to convey a mental picture of the designs, forms, and beauty of the formations throughout the caves - their gossamer fineness and sheer delicacy.

There is for instance the "Fairy Rosebush" - a stalagnite, realistic in form and lifelike in contour, with the sword of Damocles suspended from above and numerous pendants about it stretching down with needle-like points - waiting, perhaps, for the day when they might touch clusters below so indicative of blossoms. The "Washington Column", a massive monument of ghastly white and millions of years in the making, supports the domed ceiling and stands in majestic greatness very much in keeping with its namesake. There is the "Gothic Palace", a great profusion of formations. Hundreds of layered stalagnites of varying sizes reach up and continually strive for supremacy in beauty against their mates above them.

The "Suspended Python", the "Chandelier", the "Queen's Canopy", so elaborate with tassels and what-not, silently beckon the passerby to pause for at least a moment and admire them in their naturalness and realistic forms. It is a thrill to see the "Bridge Lamp" - a lamp rather large yet beautifully and elaborately wrought. The "Coral Reefs", "Profile of Lincoln", "Socrates", "Santa Claus", and the columns for the three martyred presidents draw an exclamation of surprise. A most interesting alcove harbors the "Natural Altar" where a couple was married. There is a "Little Church Around the Corner" - miniature and decidedly alluring. The kiddies love to loiter about the birthday cake and marvel at the layers and count the candles on the top as high again as their heads.

A surprise is in store when one reaches the "Music Hall". A gigantic pipe organ ribs one wall. The guide taps the towering pipes - he plays a tune. Sometimes the tourists sing while he accompanies them on the organ. No less wonderful are the "Chimes" - realistic and melodious. And this from rock. "The Lonesome Pino", life-like in form spreads its branches in profusion and canopies the trail below it. "Indian Tom Toms" echo weirdly about the caverns.

In a unique setting the "Little Theatre" with actors galore and scenery in delicacy, captivates ones attention beyond words. The modernistic "Totem Pole", a "Shark's Fin", the "Indian Elephant", and Washington's "Writing Desk" contribute freely to an otherwise highly adorned room. The "Palm" is almost a replica, while the "Thatched Cottage" reposes below a huge waterfall with a sky of beautifully tinted tassels above it. The "Lace Portiers" with drapes on either side grace an archway. The "Elephant's Ear" is a sheet of translucent red. The "Side Saddle", the "Pillar of Pompoii", the "Seal Head", "Old Fashioned Bee Hives", and the "Vegetable Garden" are obvious and need no imaginative effort.

The "Convention Hall" (so called because various organizations have held their meetings in it) is indeed spacious, yet it contains the formations of beauty so characteristic of the Caves, such as the "Fairy Harp", the "Eagle", the "Chinese Writing", "Adam and Eve", numerous images and plaque walls of delicate design. The "Slice of Bacon", "Navajo Blanket", "Devil's Bathtub", "Buddah", "Chinese Pagoda" and "Panama Canal" are most interesting in their uncanny reality.

There is variety at every turn and surprises enough for all ages. The "Inscription Chamber" has its "Razed City", the "Dog Show", "Popcorn Pile", and a "Shadowed Cowboy" portrayed within an opaque wide ribbon of calcite. The "Cypress Swamp" with its alligator seems real. "Daniel's Lion Den", "Angel's Wing", "Castles on the Rhine", "Fountain of Youth" are a few more outstanding sights. It is hopeless to enumerate all.

And thus on leaving the Caves, it seems that one has experienced a trip into a different world - a fairyland of beauty where cares and mundane worries of life are excluded.

