BULLETIN

NUMBER SEVEN

of the

In this Issue:

WASHINGTON, D. C.

BULLETIN
OF THE
NATIONAL SPELEOLOGICAL SOCIETY

Issue Number Seven **December 1945** **1000 Copies. 88 Pages**

Published intermittently by The National Speleological Society, 510 Star Building, Washington, D. C., at $1.00 per copy. Copyright, 1945, by The National Speleological Society.

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PRINTED BY WASHINGTON COLLEGE PRESS, TAKOMA PARK, MARYLAND

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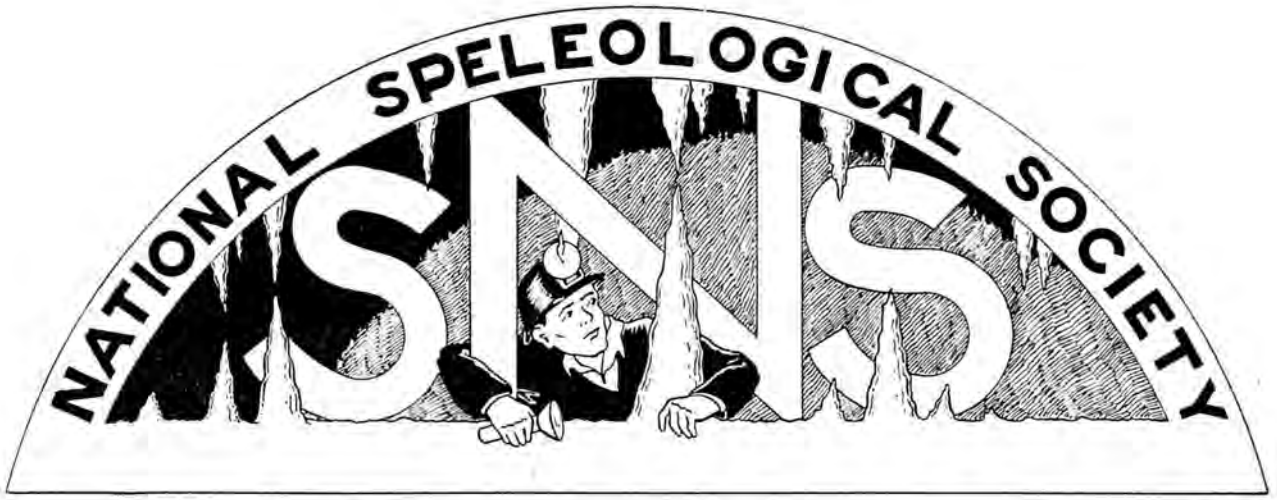


Number Seven December 1945

FROM MY CAVE NOTEBOOKS

By ALEXANDER WETMORE*

* This article was actually a letter to Robert Morgan, author of "Caves in World History," *Bulletin Number Five* of the N.S.S. Its interest seemed so general, however, and the data so extensive that its presentation as a special article in this issue seemed entirely warranted.

The list of caves carried in BULLETIN 5 of the Speleological Society has been interesting to me, as while not a speleologist I have visited a good many caves, principally in search of bats and other creatures. This moves me to offer you the following information on caves in Puerto Rico which I note is omitted in your recent list from the West Indies.

Dr. H. E. Anthony, in his "Mammals of Porto Rico, Living and Extinct," published in the Scientific Survey of Porto Rico and the Virgin Islands, Volume 9, Part 1, by the New York Academy of Sciences, 1925, pp. 9 and 10 gives the following information.

LIST OF CAVES WHERE MATERIAL WAS COLLECTED

San Germán	Cave of Monte Grande.
	Two Caves at Peños Lejos.
	One unnamed cave.
	Only bats and a very few scraps of Isolobodon secured at San Germán.
Cabo Rojo	Shell-mounds only; fragments of Isolobodon.
Utuado	Fourteen caves located at varying distances from the town. Many of these caves are unnamed, but a few have local designations.
	Caves of Caguana.
	Cueva de las Golondrinas.
	Cueva de la Ceiba, on Hacienda Jobo.
	Cave on property of Don Gervacio Toraño—an important cave for fossils.
	Cave on property of Don Sexto Lago.
San Juan Region	Cueva de Fari, near Pueblo Viejo—important for bats.
	Cueva de Trujillo Alto—a good bat cave.
	Piedra de la Cueva, Old Loiza, home of *Noctilio*.
Quebradillas	Two nameless caves.
Lares	Cueva de Pajita.
Corozal	Cueva de Corozal—a bat cave.
Morovís	Thirteen caves visited, eight of them nameless.
	Cueva Lucera.
	Cueva de Achatillo.
	Cueva de Miguel.
	Cueva Clara—an important cave.
	Cueva de Catedral—an important cave.
Cayey	An unnamed cave with many bats.

Circumstances beyond our control have combined to make Bulletin Number Seven late in publication. It is to be hoped that the value and interest of the contents, however, will somewhat make up for that fact. And for such incongruities as may be found, here and there, due to the War having terminated while the publication was in press—have a good grin at them with us, in the knowledge that, thank God, it is all over.

The EDITOR

To summarize results, it might be stated that the Utuado and the Morovis regions were by all odds the richest in fossil-bearing caves. Bats were most abundant and varied in species in the San Juan region. In all, some 54 caves were explored.

I am giving you also the enclosed information from my notebooks regarding certain caves that I have visited myself on that island.

CUEVA DE MOLLFULLEDA
NEAR TRUJILLO ALTO, PUERTO RICO

December 26, 1911

The cave had a small opening in the side of the hill and descended almost vertically for twenty feet or more. At the entrance was a rather large, well-lighted chamber with dark lanes going off on either side. The ceiling was from ten to thirty-five feet high, and had small circular openings a foot across and a foot or more deep, perfectly cylindrical in shape. A stream of water flowed through and the total length was perhaps 200 feet; at either end were chambers which were partially open above.

Immediately on entering I noticed the peculiar musky odor of bats and saw several large ones darting about the roof with a great chattering and a loud fluttering of wings. I shot one after several attempts and it proved to be *Artibeus jamaicensis*. They were seen in no other part of the cave, and I succeeded in getting only the one.

It was dark in here so I went on back to a house, borrowed a lantern, and then came back to do some more exploring. A stone thrown into one of the dark corridors produced a great flapping so I went on out there, wading through a few inches of water to get around a point of rock. Here were quite a number of the large *Brachyphylla cavernarum*. They clung to rough places on the wall and fluttered back and forth with a loud chattering and a flapping of their wings which they appeared to strike together in some way. These too were confined to this part of the cave, over the water.

In a chamber at the farther end were great numbers of small bats. They were fluttering about with much squeaking and I shot a number of them. I had 35 bats and was packing them up to go home when I noticed quantities of droppings coming out of a hole immediately over me. At a shot in there bats fairly rained out. I picked up sixty all told and no doubt others escaped me.

AGUAS BUENAS

January 12, 1912

The cave was about two hundred feet above a valley and in a cliff of white limestone. The river that had formed it was not running out in the valley having found a lower exit. The cave itself was dry as it drained below, and I had hard work at first to get enough water for my acetylene light. There were a number of long galleries connected by narrow passageways. One was so small that I could just wriggle through by lying down.

Bats were common here but they were all of one species, *Artibeus jamaicensis*. I shot about thirty-seven all told and could have gotten any number of others. They hung singly or in bunches head down from the roof, and getting them with the acetylene light was an easy matter as it threw a bright circle of light showing everything.

In one pool of water I found a large crab that was eating a bat and thought it worthwhile taking as it was in the deepest portion far from any light. It had the bat in the water and had eaten about half of it. It was well able to climb and might possibly have captured the animal itself.

A peculiar cricket was common here also. It was the size of an ordinary cricket, light brown in color and had antennae from five to nine inches long. These it vibrated continually to tell when it was near some object. In jumping, and the insect made enormous leaps with its strong hind legs, they might serve to apprise it of an approaching obstacle so that it would be prepared to light. Their note was a low cree-cree-cree and could be heard on every side though the insects themselves were hard to find.

EAST BASE OF EL YUNQUE DE LUQILLO

March 4, 1912

The Rio Mameyes below the Hacienda Catalina had a rapid fall and ran down over enormous boulders with many waterfalls. Back about two miles it forked, and I went up the west branch. There was one fall here about 100 feet high. Here was a cave too, a small one perhaps seventy feet long and eight feet high.

In the cave were a great number of *Artibeus;* fifteen were collected. They hung from the roof as usual in squeaking bunches, fluttering back and forth. It was too close quarters to shoot so I killed them with the flat of a machete. After going the length of the cave twice they all left and did not return. The entrance to the cave was in a stream, and guano, soft from the water,

was knee deep; the whole cave was very dirty, showing long occupancy.

LA IGLESIA DE LA MORA, NEAR COMERIO

July 30, 1912

The cave was at an altitude of about 1200 feet in a limestone formation near the summit of a hill. The slopes leading to it were steep and the trail winding, while the entrance was a small hole above a slippery surface of worn limestone. A narrow passage led upward to a series of three small chambers. At one side an opening admitted a view of the valley and on the other an arched opening led into three huge domed chambers of great size. The first one was lighted by an opening in the roof but the other was pitch dark.

The three small chambers at the entrance showed many signs of Indian occupancy. A weather worn projection of rock was rudely sculptured into a lizard two and a half feet long, so old however that the detail of the eyes, feet, etc. had disappeared, if there had ever been any, leaving only the general form. On one wall were figures representing an eye and a U, while another place had a rude human figure and near it a cross with many other designs that were indistinct.

One of the most curious things was a large stone at the end of a passage to the outside that was supported between two others in such a way that when struck it rang like a bell; this is supposed to be an ancient signal. One of the small rooms, almost circular in shape, had the peculiar quality of magnifying all sounds so that a cockroach running on the wall made a loud rustling, and talking below became almost deafening. The scratch of a match cracked like a revolver.

In the outer one of the large chambers, going out even to where it was light, were many of the large bats *Artibeus* living in little pot-holes in the roof.

In the inner chamber where it was pitch dark were thousands of the big bat *Brachyphylla cavernarum* that did not venture out in the light at all. The rustle of their wings made a loud roaring, and their squeaking, shriller and higher than that of *Artibeus*, added to the noise. They hung in large bunches on the roof and shooting without particular aim I always got five or six at a shot.

L'ACUIL, HAITI

April 4, 1927

We drove this morning to a point three miles west of L'Acuil between Miragoane and Petit Goave where there was a cave in a limestone cliff two hundred and fifty yards north of the road. The cave was fifty feet above the level of the little valley and ran in for a distance of 100 feet. The floor sloped so abruptly that there was considerable wash in it with no pockets that I could find to hold old bone deposits. As we entered I flushed a barn owl that flew back in and then came out over my head. Beneath one ledge was a considerable deposit of pellets where I gathered a series to show the food preference of the bird.

A few feet away we dug a hole two feet in diameter down to rock at a depth of eighteen inches. The soil was mixed with bat guano and was black. At the depth of a foot I found a few bones but as these included the lower jaw of *Rattus* I considered them of no importance. Other holes yielded nothing.

A few good sized bats fluttered about or clung to the roof where they were protected in deep pot holes. I noted their skulls in the owl pellets but in the deeper holes they would be safe. They had a scent gland on the forehead beneath a fold of thin translucent skin that exuded an oily fluid.

MORNE LA SELLE, HAITI

April 15, 1927

With two young Haitians I went up to investigate the sink hole above camp that the natives call "Trujin." This is near the base of Morne La Visite at about 6500 feet altitude.

The sink has abrupt walls fifty feet high and is 50 feet wide by 150 feet long. Its center is spanned by an arch so that above it is divided into two parts. There are extensive stalactitic formations along the side walls. Great tree ferns grew on the bottom and there were several species of ferns on the walls.

We cut a small pine growing nearby with numerous branches, trimmed off the branches a foot from the trunk and lowered the trunk into the hole. The branches formed a ladder that made descent easy. I was the first one to go down, with Dr. Ekman second. To my surprise the Haitian boys followed us. The floor of the sink was of rough limestone boulders concealed beneath decaying ferns and was difficult. I moved carefully because of the possibility of a hidden cavity. It all proved however to be solid.

Below the stalagmite where I had seen an owl resting I found a considerable deposit of bones from pellets and farther down discovered a nest containing two young in a little cavity leading out from the floor. Adjacent were many more bones. I collected a considerable number but found only rats and an occasional bat skull among mammals. There were a small number of birds including remains of crossbills and the cloud swift.

After making this collection I had started out when my attention was drawn to a hollow thirty inches long by a foot wide behind some hanging stalactites six feet from the floor in such a position that it was completely sheltered. Climbing up to this a weathered skull caught my eye, and on picking it up I discovered that it was that of one of the extinct rodents for which I had been searching. Careful digging revealed many other bones, among them several skulls of *Nesophontes*. I picked out some of the better material and scooped out practically all of the earth into two sacks and brought it along. This material was all at the surface as the soil was nowhere more than three inches deep and in most places was less. *Nesophontes* lay exposed at the surface. The material, however, was all extremely old and was very fragile. It was without question an ancient owl's nest site though I found nothing to indicate definitely whether it had belonged to the extinct giant barn-owl *Tyto ostologa* or to the smaller *T. glaucops*. The soil was all loose and the bones were not brecciated. The bones were in such condition that I am satisfied that they are not modern in the sense that they must have lain in their present situation for more than 100 years. The sink itself is wet so that digging in the bottom showed nothing. The mere chance of the elevated site preserved the bones that I collected.

My supposition from later study has been that the old nest site described above may probably have been that of the extinct species. (See, "The Birds of Haiti and the Dominican Republic," U. S. Nat. Mus. Bull. 155, 1931, pp. 236-239.)

L'ATALYE, NEAR ST. MICHEL, HAITI

April 21, 1927

Returned taking a side road to the caves near St. Michel. To find these we followed the map given me by Mr. G. S. Miller, Jr. which was very accurate. We climbed up a slope over a limestone ridge through hot, dry scrub past a small cave, and then to a larger one. The rough opening lay in a slight depression beset with harsh stones.

On entering the air was cool and pleasant. Stalagmitic columns divided the cavern, known as the Grotte San Francisco, into two parts. One projecting point had a crude resemblance to a seated human form on a pedestal and was a Voodoo shrine. On the rock beside it were two small calabashes, one two and one-half and the other three inches in diameter, filled with clear water, and scattered near were seeds and other small articles.

The soil in the cave was reddish ochre in color and very loose. In digging it rose in a powder. At the far end was a chimney admitting light with fig tree roots descending through it. At one side was a ledge on which owls had rested giving us their prey in the form of bones. Miller's excavation lay below this. The original digging of the Geological Survey explorers was near the center. I examined the place with the greatest of interest as the type locality of my *Tyto ostologa*, and in imagination saw this great bird resting on the ledge, or flying on soft wings up through the chimney, to range the nearby hillsides and savannas in search of its prey.

(Parties from the Smithsonian Institution later explored the bone deposits in this cave thoroughly.)

BASSIN ZIME, NEAR HINCHE, HAITI

April 24, 1927

We rode across the level Savane where shoots of green are beginning to show, and entered a series of gullies where we passed at times along narrow, crooked, fenced ravines between fields. After two or more miles we came to the Samaná River, a stream of moderate size that at this point comes down over a great, smooth rock surface at a steep pitch for a distance of 150 feet to empty into a pool 50 yards across.

We climbed up one side into a large, chambered cave that harbored numerous bats and a colony of cliff swallows. One narrow, nearly perpendicular cleft led down to the water below, and was filled with bats. Water flowed through the cave, and it was wet throughout, so that we found no bones. The entrance was large and was artistically decorated with growing ferns.

Above was a narrow gorge for the river with a small natural bridge of rock. The water had peculiar greenish white color due to lime content apparently, and below 8 feet was opaque to vision. I saw two kinds of fish, and was told that they grew to fair size. Natives have a superstition, I am told, that he who enters the Bassin never leaves, as he is pulled under by a spirit. However, we enjoyed a swim and came out greatly refreshed by it.

SAN LORENZO, DOMINICAN REPUBLIC

March 11, 1927

From the sea the line of hills on the south side of Samana Bay is even in altitude clear through to San Lorenzo Bay. From a distance the shore line also appears even, but on nearer approach it is found that it is composed of innumerable projecting shoulders, separated by tiny bays, some with sandy beaches in front, with groves of coconuts, and others, lower,

covered with mangroves. In many places erosion has left little islands behind, so that the whole coast line is dotted with islets rising fifty to one hundred feet in the air. Islands and rocky coast line are undercut by waves, with a bench five feet from high water with a second line of undercutting above it. The second comes evidently from storms. The rock is limestone. Wherever there is soil there is abundant vegetation. The entire coast line is one of the most picturesque imaginable.

At San Lorenzo Bay I found William Simmons, colored, of Samaná, with two other men, living in a large cave near the entrance to the bay. Simmons spoke fair English, and when I complimented him on it said "Yes, sar, I Amurrikan from Samaná." Simmons has worked here for many years, and told me that he knew of 28 caves in this immediate vicinity, so that the whole area seems to be honeycombed. I was in three of large size and two smaller ones. Near the entrance in two near the sea were great deposits of shells and crab remains, very evidently old Indian kitchen middens. The shells were small conchs and clams. In one cave I saw such deposits six feet thick in an excavation which had not yet reached bottom. There is room here for much interesting archeological investigation. In the cave at the entrance of the bay I found a few fragmentary small bones which I collected but secured nothing of great importance.

(Subsequently I arranged to have the archeological sites thoroughly explored by H. W. Krieger of the National Museum. Mr. and Mrs. Gerrit S. Miller, Jr., worked the area for animal bones.)

TECHNIQUE OF CAVERN PHOTOGRAPHY

By GEORGE F. JACKSON*

One of the most unusual, interesting and exciting branches of photography, and one that offers a multitude of perplexing problems peculiar to itself, is the taking of pictures in the various caves of this country. Often partially filled with beautiful and curious forms of crystalline limestone, they contain handsome calcite deposits and other lovely, weird, or eons-old formations common only to these underground river channels.

Most of the caves of the world occur in regions underlaid by limestone, and are the result of a very slow chemical and geological process. Despite the belief of many, volcanoes, wind, geysers, or earthquakes do not form caves of any extent. In the beginning there may have been a few drops of rain water filtering through a tiny crevice in the surface rocks. From air and soil these rain drops gathered carbonic acid (carbon dioxide) which, acting on the limestone, dissolved and ate it away. In time a small stream may have entered the crack through the rocks and thus added the cutting and abrasive action of running water to the solvent action of the carbonic acid. Gradually, after the passage of years, a cave was formed, its size depending almost entirely upon its age and the hardness of the limestone in which it was formed.

Many of the older caverns possess curious crystalline formations that are the result of the slow, constant drip of water for perhaps centuries. Water, seeping through the rocks above a cave roof, becomes charged with calcium carbonate, and when it comes slowly, a drop at a time, through a ceiling, it hangs suspended therefrom and begins to evaporate. Finally, it falls, leaving behind it on the roof a tiny particle of carbonate, which crystallizes there, eventually forming an icicle-like pendant or stalactite. When the drops of water fall to the floor, they also deposit there some of their carbonate. These, in time, produce the formations usually found rising from the floors of caves, stalagmites. These are almost always more rounded and squat than the stalactites above.

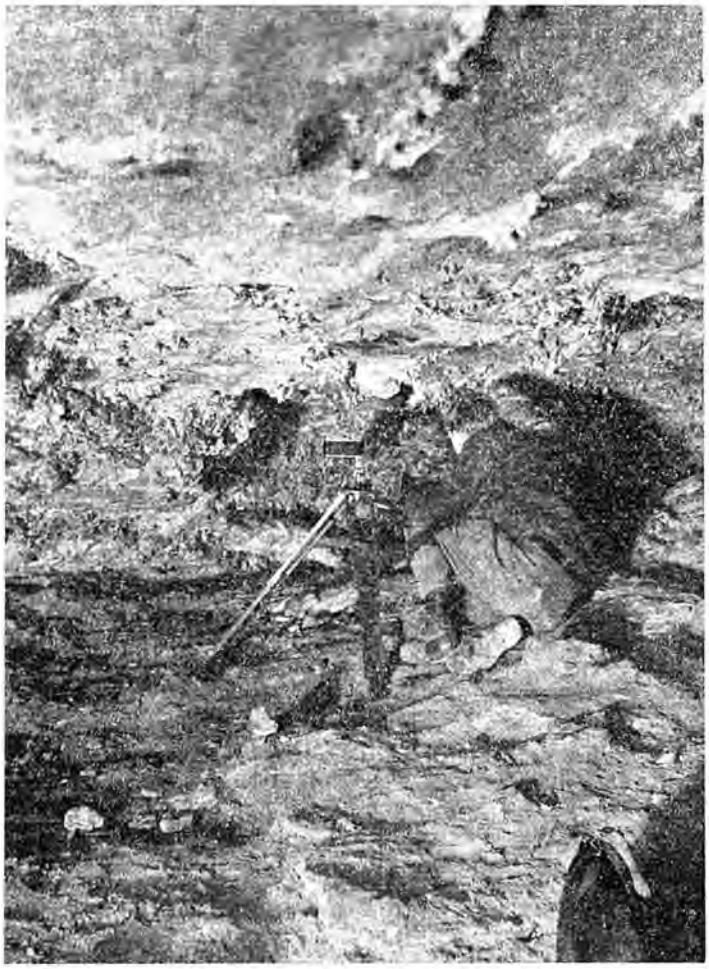
The size of formations is sometimes thought to be a clue to their age, and if the reader wishes to do a little mental arithmetic along this line let him consider the "Pillar of Constitution" in Wyandotte Cave, Indiana, said to be the largest true stalagmite in the world. It is 35 feet high and 75 feet in circumference, and the rate of growth is estimated to be about one cubic inch a century!

After their formation stalactites and stalagmites often meet to form pillars, or columns, and if the growth continues long enough it may eventually fill completely the entire cave room.

There are many picturesque and magical variants of the more common calcite formations, but lack of space will not permit their discussion here since they are all, strictly speaking, either stalactites or stalagmites.

As for the actual taking of cave pictures any fairly good camera will do. I have used all kinds, from inexpensive box cameras to the very best miniatures. One of the miniatures, a Leica, was used for Kodachrome work. This was the first time color had been tried in a cave as far as I am aware. Most of the time I use a 9 x 12 cm. with a good lens, because it is about as versatile as any camera yielding a good-sized negative. Except for close-up work the ground glass is seldom used, but when needed is quite an advantage, although

*All photographs taken by the author in Wyandotte Cave, Indiana



Setting up the Leica for a Kodachrome shot. The formations in the background are highly-colored helictites, a rare form of stalactite. Data: Camera, Recomar 33, 9 x 12 cm. Panatomic-X film pack, one teaspoon flashlight powder used for illumination.

critical focusing is distinctly difficult under the poor lighting conditions encountered.

Perhaps contrary to popular belief, photoflash bulbs are not nearly as efficient as loose flashlight powder. Most of my cave pictures have been taken with a normal grade—smokeless isn't as actinic—flashlight powder, chiefly because it is easier to transport enough for a good many shots in a very small container, while the equivalent amount of flash bulbs would take up a great deal more space than any cave photographer can afford to spare. True, sometimes the smoke from one flash will spoil any other pictures one may wish to take in the same room or passageway, but the advantages of powder more than make up for its disadvantages.

As an illustration, consider an exploring trip in which I participated, through the so-called "Unexplored Regions" of Wyandotte Cave, Indiana, one of the truly big caves in the world. This part of the great cavern is not entirely unexplored, but it is so difficult of access that even those hardy souls calling themselves "explorers" seldom see it. The trip lasted twenty hours, and at times, went up sheer walls, through holes not over fifteen inches high, over deep pits on two-inch ledges, and required a 75 foot climb down a wet rope (carried for that purpose). Imagine trying to carry several dozen flash bulbs, unbroken, through places like that!

Besides the camera and lighting material, equipment for cave photography is quite simple. A tilt-top tripod is a helpful aid, although at times, very irksome because of its rigidity; while panchromatic film, both because of its color sensitivity and speed is almost a necessity.

Most of my cave shots are taken at f/11 or f/16 in order to secure the necessary depth of focus and yet admit as much light as possible to the negative. However, the kind of illumination being used, and other factors, sometimes calls for wide differences in lens apertures.

Focusing in a cave is not the easy task it usually is out-of-doors in the sunshine, for there is seldom enough light to use either ground glass or other types of finders very easily. Most of the time the outlines of the picture must be framed by someone holding a hand flash or other bright light while the photographer adjusts his camera accordingly.

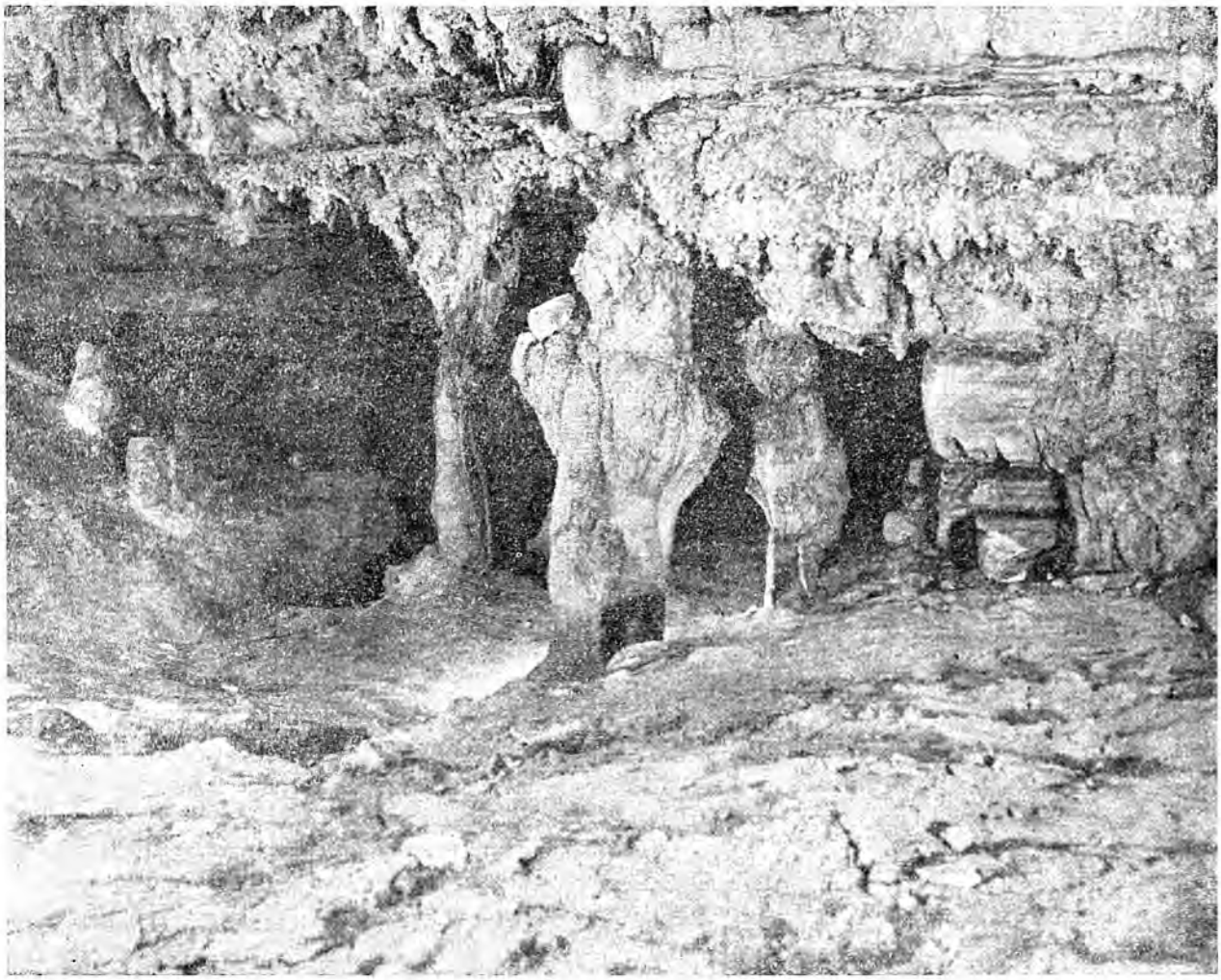
Coupled range finder focusing is almost an impossibility even in well-lighted chambers, or electrically-lighted caves, for it requires more light than the average photographer imagines to see accurately the small image in that type of finder.

"Straight" cave photography calls for the flash to be placed behind and slightly above the camera, and so that the spread of light from it will not enter the lens, but many and varied are the weird pictures secured by placing the flash in other, unorthodox positions. For example, a secondary flash behind a large pillar, stone, or other formation in the picture will outline it to perfection. Or, illumination sources above and in front of the camera (shielded from the lens, of course), or far to one side, or below, will yield surprisingly eerie results. One of the best pictures I have ever seen taken in a cave was merely a distorted shadow on a wall. Another peculiar shot was made by pointing the camera straight up a high dome. The possibilities for unusual photographs in a cave are limited only by one's imagination.

In caves where an electric system is used for display

of the beauties of the under-world, photography is much simpler, sometimes merely requiring the plugging in of a flood light into the cave's lighting system. But, in these caves, as elsewhere, the best and most interesting shots are secured by leaving the beaten path and going into the less frequented by-ways.

Once underground and aware of all the foregoing, it would seem that actually manipulating the camera would end the matter of cave photography. But natural phenomena being what it is, there are many complications. For example, optical illusions are frequent in a cave of any extent, and features that would be slight outside take on measureless proportions. A hole a few feet deep becomes a vast pit, a small pool of water seems a huge lake, a moderately-sized chamber looks like an immense cavern. Apparently the absolute blackness surrounding the light makes one lose all sense of proportion, hiding things ordinarily used for purposes of comparison. Exaggeration runs rife in any cave, and an explorer honestly trying to estimate accurately heights and distances usually finds he has, quite unconsciously, added considerable to the actual dimensions. Tyros exaggerate beyond all reasoning without knowing they are doing so. The blackness, the optical illusions, the various fears that lurk in the back of one's mind, the uneasy sensation of being in an unknown world, all tend to multiply greatly both distance and time, and even experts in such matters do not rely upon their judgment but take careful measurements.



"Pillared Palace": The formations hanging from the ceiling are stalactites, those coming up from the floor are stalagmites. When the two meet they form a stalactite-stalagmite, column, or pillar. Data: Camera; Recomar 33, 9 x 12 cm., f/4.5 lens. Stop: f/11, "open-flash-shut" method used: one mustard teaspoon of normal grade flashlight powder on each side of camera and gasoline lantern behind pillar in foreground. Film: Superpan Supreme, developed in Agfa 47.

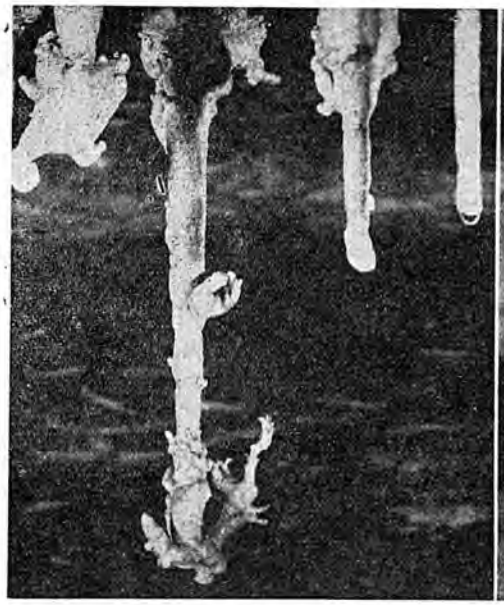
This isn't a group of worms or a batch of pretzels gone haywire, but a mass of the rare stalactitic formations known as "helictites." It was taken with the camera pointed straight up at the formations. This enlargement shows them in their actual size.

A common, and usually humorous, experience is that of stepping into a pool of water unexpectedly. Cave streams and springs are so clear and transparent and free of reflections that they give no sign of their presence. This, however, is true of shallow water only, deep water underground being discernible some distance away.

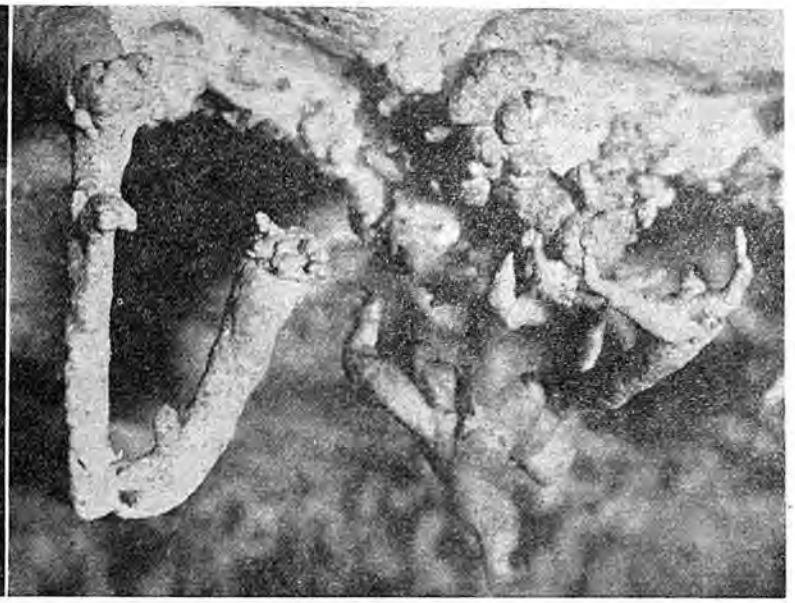
At the risk of shattering a lot of illusions, let me assure the reader that neither snakes, reptiles of any kind, nor hideous creatures live in caves. First, the temperature of all caves is too cool for reptiles; and, secondly, the average animal seems to be as helpless as a man in the total blackness found in any underground cavity. A cave without a light is one of the darkest places on the earth, or rather, under it. Neither bats, owls, nor cats can see any better than you can in a cavern without a light. It is true that mud is found in many places. It would be strange to find water without it, but many caves, or parts of them are perfectly dry, and you may emerge from these with no more damage than dusty shoes.

Cavern scenery has no rival for sheer beauty, for delicate formations of disconcerting and fairylike loveliness abound, and daring and fantastic stalactites and stalagmites are colored every conceivable shade. Cave photography and cave exploration require talents in everything from archeology to mineralogy, natural history, physics, geology, chemistry and so on in an endless list.

Many photographers have told me that they would not consider risking the loss or damage of their valuable equipment by taking it into a cave. Undoubtedly



Close-up of helictite formations, showing drops of water on ends of several. Formations are made when water, charged with carbonate of lime, seeps slowly through cavern roof, then drops to floor, leaving behind a few particles of lime carbonate. When the water flows fast, it does not make a formation but carries the sediment away with it. The approximate rate of growth for these formations in Wyandotte Cave is estimated at one cubic inch a century.



These helictites are a rare form of stalactite in Wyandotte Cave, Indiana. These formations are in the "New Discovery," found early in 1941.

some of them would shudder in horror if they could see the spots into which I have dragged a 9 x 12 and a Leica, but there is an old saying that "familiarity breeds contempt." However, the kind of cave, or part of cave to be explored often decides the kind of cameras to be carried.

It is foolish, of course, to risk valuable lenses and cameras in a wet muddy crack, or over a deep pit, where an accidental fall may mean a complete loss, possibly of the photographer along with the camera. So, if you try cave photography, use some judgment in the kind of tools you carry.

Last fall, in exploring a little-known cave which was reached after a 125-foot climb down a free hanging rope, we carried only one small folding camera, and secured excellent results with it. I hardly dare mention the fact that we had to be hauled out of this hole by the manipulation of a block and tackle after about two and one-half hours spent in a vain attempt to shinny back up the rope. It was worth it, though, for the thrill of the experience, and the pictures we knew no one would duplicate!

"Subterranean Wonderland," by Dorothy Ferrell Hayden, in AMERICAN FORESTS, for April 1945 (p. 170). An Atlanta, Ga., writer and photographer, the author describes (accompanied with exquisite illustrations) the "grandeur beneath the forest floor of Lookout Mountain," near Chattanooga, Tenn.

Underground glaciers have been found under the ancient lava beds of Modoc, Calif.

COMPOSITE OBSERVATIONS ON CAVE LIFE

(with Special Reference to Blind Fishes)

By JAMES H. BENN

We humans, who place ourselves highest among the animate creatures because of our mental ability for observation, reasoning and conclusions, look out into our universe and realize that our own world is an insignificant unit in the great cosmos of many universes. In coming back to earth, we see her as a comparative universe with many lesser worlds, some of which may be seen only with the aid of the microscope. All these lesser worlds, though related, function as complete units of environment for the creatures which exist therein. Such a world and such a unit of environment, with its positive and negative characteristics, is the cave; a

little world, related to and yet so different from the world to which we are accustomed.

Frequently this world within a world is connected with but a single passage to the sunshine and air of the world above. Along this passage, there is a rapid change from external to internal environment, a region of darkening twilight through which all creatures must pass before entering the stygian fields within. It is true that the majority of surface creatures never get beyond the twilight region, but those that have done so form a most remarkable and fascinating group to the student of nature.

In the absence of sunlight, there are no green plants, consequently no direct food-producing activity. Therefore, all food which reaches the inhabitants of caves must be imported directly or indirectly. As a result, the abundance of the fauna in different caves depends wholly upon the ability of the passage or openings to admit food to their various recesses.

Another striking condition of caves is the constancy of temperature (though this may vary considerably in different caves), and their independence of severe seasonal changes in the outside world. There are some caves in which ice is present in both winter and summer and others in which ice never forms.

Cave Environment

In the deep subterranean recesses, the environment is characterized by the lack of severe air currents and the absence of rain and snow. However, if moving water is at hand, this may perceptibly disturb the atmosphere. It has been found that in the caves of Mitchell, Indiana, a current of air enters with a stream of water and escapes through its outlet three-quarters of a mile below. In Mammoth Cave, air disturbances are not noticeable except near the top of the dome. Here a current enters, following a cascade to the lowest part and ascends, escaping about half-way up by means of a side corridor. The greatest air movements may be noticed at the entrance to caves, the intensity of the movement being proportional to the size of the entrance, size of the cave and to the rapidity and severity of outside barometric changes. In small caves, air movements are not strong about the openings, but in a great cave, where the entrance is small, a slight current may become an inrushing or outrushing gale, if there is a rapid increase or decrease of barometric pressure or a sudden rise or fall of subterranean waters. At other times, the inside and outside pressures may be so balanced as to cause no perceptible air movement.

What is true of light, heat and plant growth in caves likewise applies in general to underground water, except that the volume of subterranean rivers may change with comparative rapidity, corresponding with freshets or drought in epigean (surface) waters. Underground stream temperatures change but not commensurately with the variations that take place among surface waters.

With an environment such as this—an environment of little change, no light, no extreme temperatures, limited food supply (and consequently no over-population) and the absence of enemies except for parasites, disease and old age—it is no wonder that related cave creatures have a tendency to look alike. The usual differences between species, such as protective coloration, decoration and other recognition marks are absent and their identification may be made only by thorough detailed examination.

Life in the Twilight Region

Before going further with a discussion of those denizens of the most remote and eternally darkened regions of caves, let us first give attention to the inhabitants of the twilight region. As may well be understood, life is most abundant at the opening of any cave. This is reasonable because of the fact that surface animals, both large and small, seek the shelter of caves as a haven to escape their enemies, to protect themselves against weather and to rear their young in a quiet, undisturbed place. The numbers and variety of such animals are many, among them being rodents, foxes, weasels, bears, some small birds, insects, reptiles (by chance), bats, raccoons, cats and others, including early man. With the exception of a few species, none of the foregoing animals shows any particular adaptation for life in caves and few are of permanent residence. It is interesting to note here that great numbers of both fossil and recent remains of epigean animals have been trapped in natural pitfalls of caves, for instance, the Pleistocene cave deposits of Cumberland, Maryland, where the bones of peccary, cave-bear, wild dog, etc., have all been found in an intricate mass, and a cave on Charles Island in the Galapagos Archipelago, which operated as a death trap for centuries in capturing the giant land tortoise (*Testudo galapagoensis*).

About the entrances to caves may be found the usual flora of the region. These, however, give way to moss, lichens and mold as the gloom deepens farther from the entrance.

Animal life, likewise, lessens in number and variety as light gives way to darkness. The fauna of this border region begins to show adjustment to twilight existence by the increase in size of the eyes. Bats are an exception in this case, having but minute eyes, some of which are totally sightless. This lack of conformity may result

from the fact that they merely use caves as a shelter during the day and go forth at night to secure their food. Perhaps a better exception to the rule is the cave mouse (*Peromyscus leucopus tornillo*) found in the Carlsbad Caverns of New Mexico. This small rodent lives its entire life, from birth to old age, in the dark recesses of the great cavern. It differs only from the white-footed mice outside in its larger, heavier body and shorter tail. Its eyes are apparently normal for it can see well when brought into the light. It is thought by some authorities that these animals have not been restricted to cave life sufficiently long to have developed important physiological changes. A mystery of their existence is how they find their way about, locate their food, mate and attend their young in the darkness of the cavern.

Although there are blind lizards and snakes which burrow in the ground, there are none of these reptiles which take up a life in caves by choice, nor do the reptiles possessing sight. It is true, as already alluded to in the case of the Galapagos tortoise, that reptile remains have been found in caves but these instances are not numerous. The writer, on several occasions, has found the bones of snakes in small limestone caves of the Catskill Mountains but with no other evidence of living representatives in the caves, the assumption arose that the remains were deposited there by chance. The dead bodies may have been carried there by rodents. Another supposition is that the creatures may have ventured too far into the gloom while on an ill-fated hunting expedition and sought thereafter, in vain, for the entrance.

Salamanders, unlike the above reptiles, have been found existing as true cave animals. Their natural habitat being what it is—a life in damp earth beneath rocks and decaying logs, it is quite reasonable that they should seek the environment of caves where often such conditions are found. Strange to say, two salamanders, namely *Spelerpes maculicauda* and *S. stejnegeri*, found in North America, have apparently normal eyes; the former is found in Indiana, Kentucky and Missouri, and the latter in southwestern Missouri. Two other salamanders, with decidedly degenerate eyes, existing in caves are: *Typhlotriton spelaeus*, from southwestern Missouri and *Typhlomolge rathbuni*, from the caves of Texas. Unlike the reptiles, there are no blind epigean salamanders.

We shall now leave the last borderland of the twilight region with its many interesting inhabitants and grope our way down into the limbo of abysmal blackness where dwells one of nature's greatest mysteries—the blind fish.

Blind Fishes

The blind fishes are by no means strictly confined to caves nor are they all of fresh water environment. Along the coasts of Southern and Lower California lives a blind fish, the goby. This creature inhabits the burrows of crustaceans beneath rocks that lie embedded in sand between high and low tide and in the deep, dark pools between crevices of projecting rocks along the main shore. Some authorities have advanced the thought that the goby exemplifies the origin of the cave fish.

In the fresh water caves of Cuba, there are two blind fishes which belong to a marine family, the Brotulidae. This family is represented in various parts of the globe, and a number of its members are blind or with very minute eyes. Aside from those of the fresh water caves of Cuba, the only other representatives of this family found in the vicinity of America are two marine dwellers. *Aphyonus mollis* and *Alexeterion parfaiti*, which have been found at 955 fathoms and 2,736 meters respectively.

Other blind, or partly blind, fishes living in the depths of oceans bordering the American continents are: *Ipnops murrayi* and *Ipnops agassizii*. The first-named has been taken at depths of from 955 to 2158 fathoms, and the latter at a depth of 1360 fathoms. Eigenmann states that *Ipnops* is the only vertebrate in which no eyes are found. This is most curious and leads one to speculate as to whether *Ipnops* is an example of absolute and final degenerative evolution or whether the creature was just made that way. To the creationist, the last speculation would suffice but to the individual who looks for a cause of the effect, this problem must still remain open.

A discovery pertaining to blind fishes is that of Carl L. Hubbs of the University of Michigan, who in 1922 took three blind fish (*Lethops connectens*) new to science, both as to genus and species, from deep crevices in the rocks of the intertidal area of the California reefs. One of the specimens was an adult; the other two were half-grown. This genus appears to be more closely related to the blind goby (*Typhlogobius californiensis*) which occurs among the rocky reefs of the mainland shore of southern California, than any other yet found.

The relation of *Lethops* to *Typhlogobius* is interesting in that the blind gobies are brought into alignment with all reef fishes and suggests their origin in the deep tidal areas of the reefs. It also suggests strongly that nearly all the species have been derived from species inhabiting the reefs beyond tidal limits and not from

the hole-inhabiting gobies of the bays and estuaries of the upper tide levels.

With the discovery of *Lethops connectens*, there are further indications that the blind goby originated from a crevice-seeking form in which the eyes had already become reduced. The eyes of *Lethops*, both in the half-grown and in the adult, show superficially a distinction between pupil and iris, and a trace of free orbital border. The eyes of the adult exhibit no apparent differentiation of structure; however, the tactile sense organs of the head are highly developed and larger than in the half-grown specimens.

In comparing *Typhlogobius* with *Lethops*, it has been found that the young have developed eyes but in the adult there is apparent differentiation in that the vestige of the eye is hidden beneath the skin. The tactile sense organs of the adult head, however, are exceedingly well-developed as in *Lethops*.

Agassiz on Blind Fishes

Prof. Agassiz, on a tour of the South Central states to the Great Lakes region and to New York and Massachusetts, makes comment on the fishes related to the blind cave fishes: "I have been successful in collecting specimens, especially fishes, of which I have brought home not less than sixty species, mostly from the great southern and western rivers. Some of these are particularly interesting. I would mention foremost a new genus, which I shall call *Chologaster*, very similar in general appearance to the blind fish of Mammoth Cave, though provided with eyes; it has like *Amblyopsis* the anal aperture far advanced under the throat, but is entirely deprived of ventral fins, a very strange and unexpected combination of characters. I know but one species, *Ch. cornutus* Ag. It is a small fish, scarcely three inches long, living in the ditches of the rice fields in South Carolina. I derive its specific name from the singular form of the snout, which has two hornlike projections above."

Further comment on *Chologaster* is found in the description of *Typhlichthys subterraneous*—Girard. This blind fish taken from a well near Bowling Green, Kentucky by J. E. Younglove, resembles in general appearance and in chief structural traits a blind fish occurring in Mammoth Cave (*Amblyopsis spelaeus*). It is interesting to note also that the blind fish from Mammoth Cave resembles *Chologaster cornutus*, a fish which has fully developed eyes and is found in the ditches of the rice fields in South Carolina.

The common traits of structure possessed by all three of these genera are: a body covered by cycloid scales, a dorsal and anal fin opposed to one another, a rounded caudal fin and position of vent anterior to base of the pectoral fins.

Characters of Blind Fishes

The general characters which identify these fish are: in *Amblyopsis*, the want of eyes and the presence of ventral fins; in *Typhlichthys*, the want of eyes and ventral fins also; and in *Chologaster*, the presence of eyes and the want of ventral fins. It will be noted that *Typhlichthys*, being eyeless and deprived of ventral fins, holds an intermediate position between the other two genera. The eyes of *Typhlichthys* exhibit no visible traces of their presence, the orbit being filled by a muscular tissue. The shape of the mouth and the dentition of all three genera are in all probabilities alike.

Recently there has been brought to notice a new blind fish (*Anoptichthys jordani*) from a subterranean stream in Southeastern San Luis Potosi, Mexico, in a region drained by the Rio Tampaon of the Rio Panuco system, southwest of Valles.

These fish are apparently hardy and have descended from rather warm water inhabitants. Although blind, this species of the Characin group have great appetites and take mosquito larvae, as well as dry food, with much readiness. Mr. Innes has made their feeding habits quite clear:

"They sense the sides of the aquarium rather well, for when excited they only bump the sides occasionally and in a state of calm usually turn away about an inch from the glass. They were kept alone a few days to insure them getting food, but it was later found that they eat better in a community tank. Almost immediately they sense the placing of food in the aquarium, and learn quickly into which end of it the food is dropped. A little splashing at the surface has become the dinner bell to the blind fish, which at once become excited at the sound, dash about, come to the surface for a time to feed on particles still floating, then scour around on the bottom for the food that has sunk. They really get more to eat than the other fishes in the tank, for they stuff themselves as though they did not know when a new opportunity to feed would present itself. They eat almost any kind of fish food, including the cereal preparations that most characins reject."

It seems strange that the cat-fishes are not more greatly represented among the blind cave fishes; the eyes are not highly organized nor are they adapted for finding food. It has been found by Herrick that most cat-fishes detect their food by means of the senses of touch and taste through organs situated over the body and in the barbels. However not many cat-fishes are met with in caves and few are permanent residents. There

is a species, *Gronias nigrilabris* Cope, which has been found in a cave near Philadelphia and two described from caves in Brazil.

Among the blind cave fishes of North America, the most well-known are the Amblyopsidae. This family constitutes eight genera, five of which have mere vestiges of eyes and six genera living permanently in caves.

DEDUCTIONS FROM THE FOREGOING OBSERVATIONS

As has no doubt been true during the flood state of the Mississippi Valley (1937), many fish have at times been swept into caves, but so far as evidence shows, none have been able permanently to establish themselves. To do so, cave fish must have already established peculiar habits and methods for feeding and mating without waiting for chance to place them in such an environment.

Fish, such as the crevice and hole fishes of California, after many generations may develop certain aptitude for life in darkness and in so doing prepare themselves for continued existence in caves if and when the occasion should arise. However, the positive adaptive habit does not account for the negative degenerative changes that have taken place among cave fishes. It would seem, then, that the positive habit of the dark-seeking fish and their negative degenerative changes are the results of not a single cause, but a combination of many causes which go parallel with the development of the environment itself.

Blind cave fish, viewed from this standpoint, are not new inhabitants of the present subterranean streams, but are creatures, already adapted by habit, left from the fauna of the river when it still flowed above ground. The cave, with its fauna, developed together and the absence of all other epigean forms points to the conclusion that the main factor for underground existence is a negative reaction to light.

Fish which depend on light to secure food are at a disadvantage and can never become permanent cave dwellers. Some epigean fishes, which are annually carried into cave regions, when found are always in poor condition and are unable to establish themselves in such an environment. It is strange that more of the fishes which detect their food by the senses of touch and smell have not adapted themselves to cave life.

Where and how the ancestor of the blind fishes originated cannot be spoken of in other than a speculative manner without foundation of fact. In this paper, it has been the desire of the writer merely to bring under one heading certain observations upon which he makes his deductions.

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CAVE OF THE RIVER STYX

By CAPT. JACK PREBLE*

It has been the pleasure of one of the founders of The National Speleological Society to make the highly interesting trip to the famous River Styx, or "the River of Forgetfulness."

Although the writer's knowledge of ancient Greek and Roman mythology is practically non-existant, there still remains some vestiges of forgotten lore absorbed from time to time from sources unknown or forgotten. There is a hazy recollection, however, of an ancient named Plinius, or Pliny, who conducted a weekly column in one of the old Roman newspapers entitled "Adventures Out of Doors." Sometimes this scribe wrote history, politics, or of exploration.

Plinius is not to be misunderstood when he writes, "Not far from the town (Benghasi) is the River Lethe and the holy wood where the Gardens of Hesperid are situated." Many other historians of his period agree with him: Benghasi has been known to both ancient and modern times as Euhesperis, and to the natives as El Uheisci.

From the town of Benghasi we started in an army jeep. Knowing nothing whatsoever of the River Styx, I had volunteered my services as guide and historian. Any little question concerning the famous river had to be answered: for was I not the official representative of

*Our Publicity Chairman, on "leave for the duration," sent this one in, which came, officially stamped "Passed for Publication—Field Press Censor."

the National Speleological Society of Washington, D. C.? Wasn't I supposed to know all about caves, here and there?

So off we started. Captain Jimmy Nuttall of Baltimore, Md., our flight surgeon; Captain Jack Goehry of Brewster, Wash., one of the best heavy-bomber pilots that ever skylarked over enemy territory; and myself. Past the suburbs of Benghasi, past the domed graves of saints and shieks, the *rendavels* of the Askaris, and past the bomb-battered Agricultural Institute. Then through streets with eucalyptus trees lining both sides and past a park which was formerly a game reserve containing all types of small game, gazelles, hyenas, jackals, and birds of prey. Then on to the open veldt or desert. The desert here is yellow and sandy with outcroppings of limestone highly suggestive of sink holes and caverns. Then to the opening in the ground that marked the site of the famous River Styx.

I JUMPED

Facts of Life, *by H. W. Hanemann (Farrar & Rinehart, Inc., New York, MCMXXX). Ch. VII—A Kubla Great Boys . . . Richard Halliburton Plays Polo . . . Marco and Kubla Khan Visit Cavern: "Absolutely Measureless to Man," says Kubla. "I'll bet I can measure them!" says Marco . . . "Four thousand parasangs, 862 metres, and 9 feet!" (Double-jointed thumb under camera proves bell-diver is not J. S. Petrie. Ed. note.)*

Those members of the Society who have been fortunate enough to have visited Schoolhouse Cave in Pendleton County, West Va., can form a mental picture of the entrance to the River Styx. Substitute a level desert floor for the green clad hills surrounding the Schoolhouse Cave and you have a perfect picture of the entrance to the River of Forgetfulness. Yet, the area leading to the cave proper is ten times as great and forms a tilting, oval bowl. In this bowl we found growing fig trees, cactus, date palms, and other plants we could not identify.

The opening into the River Styx is similar to the Schoolhouse Cave. Substitute golden yellow limestone for the gray-green Greenbrier (or Helderberg—what is it?) and you have it. The opening is possibly 100 feet wide and 7 or 8 feet high. You enter and proceed for 200 feet before the roof juts down and you are forced to stoop to miss it, as it drops alarmingly to barely four feet overhead.

Again we advance and you can soon stand erect. We leave the zone of twilight and enter the zone of absolute darkness where we hear the soft ripple of water. Then the river! Well, hardly a river but a good-sized "crick." Our rubberized boat, handily borrowed from a heavy bomber, was inflated, and flashlights and gasoline lamps switched on or lighted. Away we go! Into the darkness and gloom! There is something terrible and mysterious about our whole trip of exploration. It has never been thoroughly explored. Just as a rock curtain in the Sinks of Gandy Creek blocks off all further exploration in high water, so did a rock curtain here curtail our journey. It is not known whether the River Styx is a river or a lake. It will take some of the human tadpoles from Martinsburg, West Va., to crawl under that rock curtain and find out. But . . . there is, close to the sea some miles away, a salt-water lagoon fed by a healthy spring gushing pure, sweet water from the rocks nearest shore. We believe the River Styx finds its outlet in this saltwater lagoon.

Fortunately for this writer, a brief description has been unearthed which deals with the River Styx. It has been translated from the German and reads in part:

"One knows today that water is absorbed by rock formations and over long distances, again slowly fills up wells, etc. This originated the birth of legends. Who does not know of the water of Lethe which so many would like to drink? Here the souls of the dead used to drink forgetfulness before they had to enter the world of the dead, as the Greek myth tells us. Only Odysseus and Orpheus—the one driven by adventure and the other by love—crossed the river but came back without achieving forgetfulness.

All my longings, all my thoughts
Will I sink in the still stream of the Lethe.

How many would like to drink of the water of the Lethe today, to forget certain dreads and things? I did not do so. How easily might I suddenly have forgotten also the pleasant and beautiful things. And what then?

"Being famous, however, has always two sides. Hardly had the Cyrenaican Lethe become well known (so famous that Herodotus made a pilgrimage to the place) when other places claimed they were the original Lethe. Our river, however, passed with honors. Nevertheless it was rather painful that other rivers Lethe were found in Thessalia, Lydia, and other places.

"Immediately adjoining the place of unlimited forgetfulness, only a few minutes away, there are the gardens of unlimited youth, unlimited life, the Hesperides Gardens. The entrance to the World of the Dead next to the Garden of Eden. The ancient world also had its contrasts.

"Here Hercules broke the Golden Apple which Mother Earth had presented on the wedding day of Zeus and Hera. Unlimited life, which they desired, she gave with it. But this was not so easy. For that one had to be a strong man and even Hercules did not dare to keep and had to hand them back. The apples grew in one of God's gardens guarded by the Daughters of the Night, the Hesperides, with the ugly, hundred-headed dragon Ladon.

"Today here is built the tasteful little castle of the Governor of the province, surrounded by a wealth of vegetation. (Note: This castle was Gen. Rommel's Headquarters a few months ago.)

"If one had not known that the Hesperides Gardens used to be in this vicinity nobody would have arrived at the unlikely idea of looking for them here. I can only admire the Englishman who, in 1821, re-discovered the Hesperides Gardens and the "Dechech el Kebir," or "the big hole" as the Arabs called the entrance to the River Lethe, or Styx. Even the ancient peoples had searched for the place before it was known that they were situated somewhere in Cyrenaica. The Continent had been explored without success. They were thought to be on a Morrocean Island, later in the Canaries which already were called the "lucky islands." Also in the Atlantic, where some like the Romans, used to believe one could hear the sizzling of the sun as it set into the sea." (End of translation).

So, thus ended our first venture at cave exploration in a foreign land. Never has it been possible for a speleologist to have such a wealth of historical and mythological material at hand and discard it, due to lack of devil-may-care spirits who delight in crawling through and under mud and rocks. In the words of Hester Raines, "I'd give a purty penny—" to have some of the wild and untamed spelunkers I love and admire here with me now, and we would take another crack at this River Styx. It shouldn't be so tough for those boys!

PRELIMINARY REPORT ON A CAVE SURVEY OF MARYLAND

By MARTIN H. MUMA

In December 1941 the author began a survey of Maryland with the intention of locating, exploring, studying and recording all of the caves of the state. At the present time several caves have been located and cursory examinations have been made. Although the work has not progressed beyond the preliminary stages, a report of the findings at this time seems in order as military obligations may force a temporary discontinuation of the study. This report must then be considered necessarily incomplete and inadequate and to fulfill merely the requirement that all caves and cave trips be reported to the society.

For the sake of simplicity the caves have been divided into two types, deep caves, those extending to total darkness regardless of size; and shallow caves, those not extending to complete darkness. All animal life found will be or has been reported by the fauna committee.

DEEP CAVES

Nine caves have been found in the state that fall into this group.

Athey's Cave

A small but interesting cave located on the Athey farm about one mile east of Rush in Allegany County. The entrance is about 300 feet southeast of the road, steeply inclined and hardly larger than a ground hog hole. It is not more than 200 feet in length and is composed of four cone-shaped rooms averaging 30 feet in height, 10 feet in diameter and are connected by small passages. Each occurs on a different level.

Deposits consist mainly of flowstone in the form of draperies, blankets and bacon, although the first two rooms contain an abundance of the formation known as cave coral.

Crystal Grottoes

This, the only commercial cave of the state, lies one mile south of Boonesboro in Washington County. It is quite nicely decorated. Mr. Petrie has reported this cave in his log of commercial caves.

Dead Horse Cave

The smaller of two caves located on the farm of Austin Twigg at Twiggtown in Allegany County was given this name because of the unfortunate accident of a farm animal. It is located about ¼ mile south

of the farmhouse with the vertical entrance at the bottom of a small sink. The cave is quite small being approximately 100 feet long and contains no rooms of any size beyond the entrance room which is about 15 feet wide, 30 feet long and 8 to 10 feet in height. The back and upper parts of the cave are nicely decorated with flow and dripstone but the first room is barren.

Devil's Den

This cave is located about one mile south of Flintstone in Allegany County and lies 150 yards east of the road. The entrance is vertical and the cave's only room is four feet in height, 10 feet wide and 20 feet long and located about 70 feet from the entrance. Air currents indicate further possibilities which are blocked off by a travertine covered clay choke in the back end of the room.

Formations consisting mainly of flowstone exist on the walls and floor of the passage and room.

Goat Cave

A small cave inside the city limts of Cumberland in Allegany County. The small horizontal entrance is on the right side of Paca Street extended going out of the city. It is about 150 feet long and occurs in two levels; most of the dimensions are crawling or sliding. Air currents indicate more cave which is partially blocked by wet clay fills.

The only deposits in the cave are flowstone on the walls of the vertical passage connecting the two levels.

John Friend's Saltpeter Cave

Two reports have been made of this cave which is located on the farm of John Friend 3 miles northwest of McHenry in Garrett County. The first report was made by Mr. W. J. Stephenson in BULLETIN No. 4, pages 9-10. The other by the author and his wife in BULLETIN No. 5, page 48.

Mt. Aetna Cave

An excommercial cave 1½ miles north of Smithburg on Route 34 in Washington County. It is highly decorated and was reported by Mr. Stephenson in BULLETIN No. 3, page 36.

Snively's Cave

A cave 1½ miles east of Keedysville on the Snively farm in Washington County. It was reported by Mr. Earl Beardsley in BULLETIN No. 5, page 54.

Twiggtown Cave

This is the largest cave known in Maryland. It is located on the Twigg farm at Twiggtown in Allegany County. The vertical entrance lies about 200 yards south of the farm house. A report of this cave was made by the author in BULLETIN No. 4, page 24.

SHALLOW CAVES

Six caves of this group have been found in the state. Archeological material has been taken from three.

Beaver Run Cave

A small refuge type cave located on the north bank of Beaver Run about 5 miles east of Alesia in Baltimore County. The cave runs back about 20 feet to partial darkness and consists of an entrance 3 feet high and 2 feet wide leading into a room about 10 feet by 10 feet and 3 to 4 feet high.

Archeological material excavated from the talus at the entrance has been turned over to the archeological committee.

Camel's Den

This is a refuge cave ½ mile southeast of Daniels in Howard County. It is about 15 feet deep, 6 to 8 feet high and 6 feet wide.

Natives have known of the cave for some time and have used it for beer and card parties on rainy days for many years according to the owner. Archeological material is supposed to have been removed from the cave by two different groups at an earlier date; however, the artifacts have never been reported to the author's knowledge.

Cavetown Quarry Cave

This cave which is located in a quarry at Cavetown in Washington County has been completely reported by Mr. W. J. Stephenson in BULLETIN No. 3, page 15.

Murley's Branch Cave

The entrance to this cave is on the left side of the road 1 mile south of Rush in Allegany County. It is visible from the road as a stream which flows more than 1000 gallons a minute emerges from a rock face. The cave divides 5 feet inside the entrance; the left branch which is dry runs about 20 feet perpendicular to the entrance and is lined with flowstone, the right branch runs about five feet parallel to the entrance and then dips down to the surface of the water. As the stream deepens at this point it is believed that the cave may continue but diving equipment would be necessary for exploration.

Round Top Cave

This cave is located within 100 feet of the top of Round Top Mountain at Hancock, in Washington

County. The entrance is on the left of the road that runs up the mountain and is vertical with the single room at the bottom of the 30 foot drop 15 to 20 feet long, tapering out at both ends.

There is a moderate amount of flow and dripstone on the walls and floor of the room.

Sand Cave

Located about 4.4 miles S. E. of Loch Lynn in Garrett County this, the largest refuge cave in the state, is developed in sandstone. The entrance is approximately 100 feet long and varies from 1 to 5 feet in height; the room is about 100 feet deep, 125 feet wide and varies in height from 1 to 15 feet. A small stream flows out of a crevice in the back end of the room and disappears under the floor.

Minute stalactic formations, believed by Dr. Holden to be siliceous were found in several places on the ceiling.

Archeological material excavated from the floor has been turned over to the archeological committee.

Several other caves, 2 in Garrett County, 3 in Allegany County, 1 in Carroll County, and 1 in Anne Arundel County have been brought to the author's attention, but have not as yet been visited.

SPRING CREEK CAVE

By S/Sgt. W. R. Zieg

While stationed in Fort Leonard Wood, Missouri, I had the good fortune to discover several localities along the Big Piney and Gasconade rivers which were fruitful Indian artifact hunting grounds.

While on a fishing trip a few miles from the camp, I discovered some small bird arrows on a rather high bench at the mouth of the Spring Creek where it empties into the Big Piney river. The field had been planted in corn but the crop was very late, and this left the field barren and in fine condition for exploring Some 65 or 70 perfect bird arrows were taken from this small field of not over an acre.

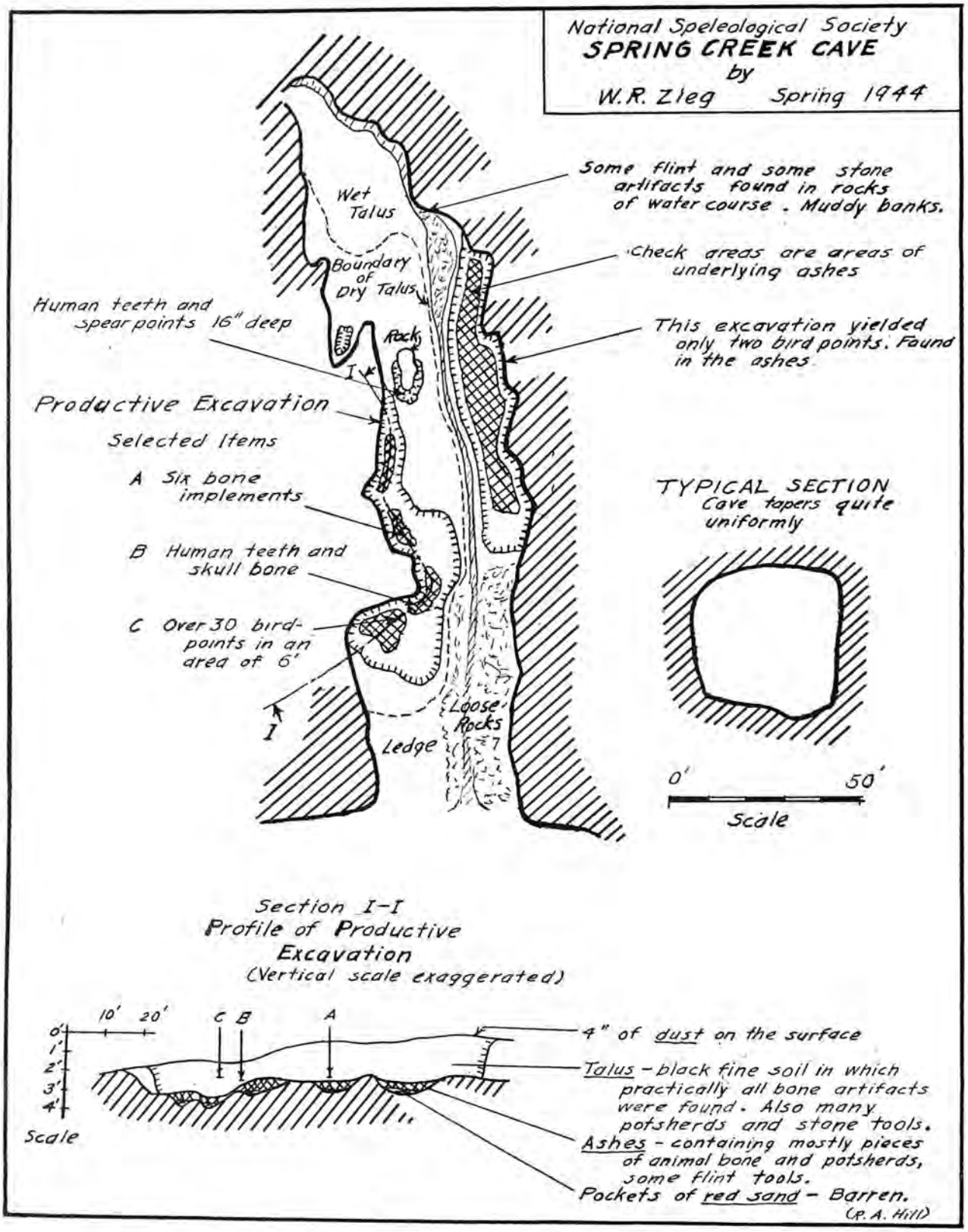
Directly to the east of the small field is a high bluff. About 325 feet above the present creek bottom located in the side of this bluff, is the Spring Creek Cave. The opening of the cave is approximately 40 x 40 feet. The explorable part does not extend far back into the cliff. Other openings too small to admit a man may lead to larger room further back. It might be well to mention here that about 300 feet from the opening of the cave, in the roof of one of the tunnels, we found a vein of hematite, and some fine crystallization of this mineral was noted.

The floor of the cave is covered with debris to a depth of 42 inches in the deepest spot yet explored. (This debris is made up of bat guano, mussel shells, bones of small animals, ashes, burned earth, and some recent nut shells evidently carried in by rodents. It was in this deposit where the artifacts were found.) We measured back 30 feet at a time, marked the floor with white lime strips, and then worked the floor out in 10 foot square areas. (Some places we could not get the full 10 foot width because of the wet area next to the water seepage. We noted the average depth of the debris, and I have prepared a small map showing the variation of the solid rock floor and the depth of this debris and where the artifacts were encountered.)

The actual depth of the debris where artifacts were found varied from 8 to 23 inches. The first four inches of debris was a fine dry dust and contained nothing. The fire pits seemed to be very close to the rock bottom of the cave and, in some cases, directly on the rock. In some of the lower spots, we found a red sand in some cases 8 inches deep. It was here where we were especially careful to examine it very closely for signs of artifacts, but none was found at this depth. The majority of the finds were in the dark layer of soil and debris, and scattered pretty well through it at no average depth. Some burned pieces of animal bone were evident in the fire places. Many jaw bones, which we took to be of fox or perhaps wolf, were found in the talus.

At the left side of the cave floor (facing the cave), is the only part of the floor that is workable since, to the right, there flows a small spring which soaks the floor making it very difficult to work. We did work in one area of this wet material, however, but nothing was found except two small bird points covered heavily with a calcium deposit.

The artifacts found in the cave were identical to all those I have thus far found on all the fields in this territory. I'm speaking of stone artifacts. The bone tools we found were highly polished and, in each case, were very similar if not exactly like those found in the Miller cave described in the Bulletin 76 Bureau of American Ethnology by Mr. Fowke. He examined this cave in 1922 but took a test of the floor only at 20 feet back. (I have met Mr. Miller upon whose place this Miller cave is located, and he told me that Mr. Fowke took over 700 pounds of material from this cave. Miller said Mr. Fowke at that time did not consider the cave worth spending much time on, as he considered the debris too shallow to hold much material. Spring Creek or Pillman cave he calls it in his summary).


National Speleological Society
SPRING CREEK CAVE
by
W.R. Zleg Spring 1944
Some flint and some stone artifacts found in rocks of water course. Muddy banks.
Check areas are areas of underlying ashes
This excavation yielded only two bird points. Found in the ashes.
Wet Talus
Boundary of Dry Talus
Human teeth and spear points 16" deep
Rock
I
I
Productive Excavation
Selected Items
A Six bone implements
B Human teeth and skull bone
C Over 30 bird-points in an area of 6'
Loose Rocks
Ledge
TYPICAL SECTION
Cave tapers quite uniformly
0'
50'
Scale
Section I-I
Profile of Productive Excavation
(Vertical scale exaggerated)
10' 20'
C B
A
0'
1'
2'
3'
4'
Scale
4" of dust on the surface
Talus - black fine soil in which practically all bone artifacts were found. Also many potsherds and stone tools.
Ashes - containing mostly pieces of animal bone and potsherds, some flint tools.
Pockets of red sand - Barren.
(P. A. Hill)

The following list is a complete record of the artifacts I found in the cave:

26 spear points 2½ to 3 inches long
31 bird points (some notched the full length of the point; some very small, ⅜ of an inch long)
2 stone awls (perfect)
16 bone awls (highly polished and complete)
6 broken bone awls
2 bone needles (none with eye)
1 bone needle (Large end of bone has hole through it but would have had to have been used on a large weave to get it through the material)
1 bone fishhook (perfect, not barbed)
40 flat stone scrapers and knives (show work on both sides of blade)
21 rejects (mostly spears and knives)
109 broken parts of artifacts (knives, awls, scrapers, etc.)
1 box of potsherds 18 in. deep, 16 in. long and 14 in. wide. (The pottery is mostly of a black, coarse material showing clearly the markings of the reeds on the outer surface. Some pieces are red, however. It is of varying thicknesses up to over ½ inch in some cases. No complete pots were found, and thus far few pieces have been found that fit together. In no case have more than 7 been found that fit together. Some of the potsherds are smooth on both surfaces.)
8 human teeth.
1 jawbone with three teeth (human)
Several pieces of human skull. (We were especially careful not to destroy any of the pieces of the skulls we found, but they all seemed to be scattered pretty much through the debris; no two pieces were found close together, nor were they near the teeth or jawbones we found. Hundreds of pieces of turtle shell and mussel shells were in the debris.)
3 complete spoons made of mussel shell and well shaped.
2 hammer stones
1 hematite celt (perfect)
1 large mill stone
4 well-worked grinding stones
12 turtle-back scrapers with curved underside
1 highly polished bone bead
1 ornament made of deer horn
2 ornaments made of soft stone with hole bored in one end
Numerous broken pieces of bone, and hundreds of small animal bones and teeth. One very large molar was found resembling a bear tooth.
Several pieces of broken bone tools which cannot be identified

None of the material taken shows the slightest resemblance to Folsom or Yuma artifacts. In my own mind I am convinced that this is all rather recent material, and no traces of the older cultures are present.

I have these artifacts stored in boxes at my home in Alliance, Nebraska, and will suitably display them when I return. I am stationed in an organization which will not draw overseas duty. Each artifact is labeled as to where it was found, and a complete history is in my possession of all my amateur findings in the state of Missouri. I also have a large collection of artifacts from the area surrounding my place of residence. I expect at some day to turn this collection over to the Nebraska Museum at Morrill Hall, University of Nebraska.

MORE SUBTERRANEAN ADVENTURES

By L. E. WARD*

Foreword

This large rock-bound room still remains a great mystery to those who have endeavored to explore therein. Nature thus far has successfully guarded its secrets beyond the breakdown that has sealed the main avenue at this point. The physical appearance of the dead-end section of this chamber has been changed several times by the removal and repiling of rock, during the past 7 years, as new exploration projects were started and old ones abandoned. During this period Mr. Parke and the writer have managed to spend one or two weeks of our annual vacations each summer at the "diggings," and thus have been in a position to carefully follow these interesting developments. It is now believed that present operations will soon result in a successful penetration through the break-down, but at a lower level and at a different location, recently discovered.

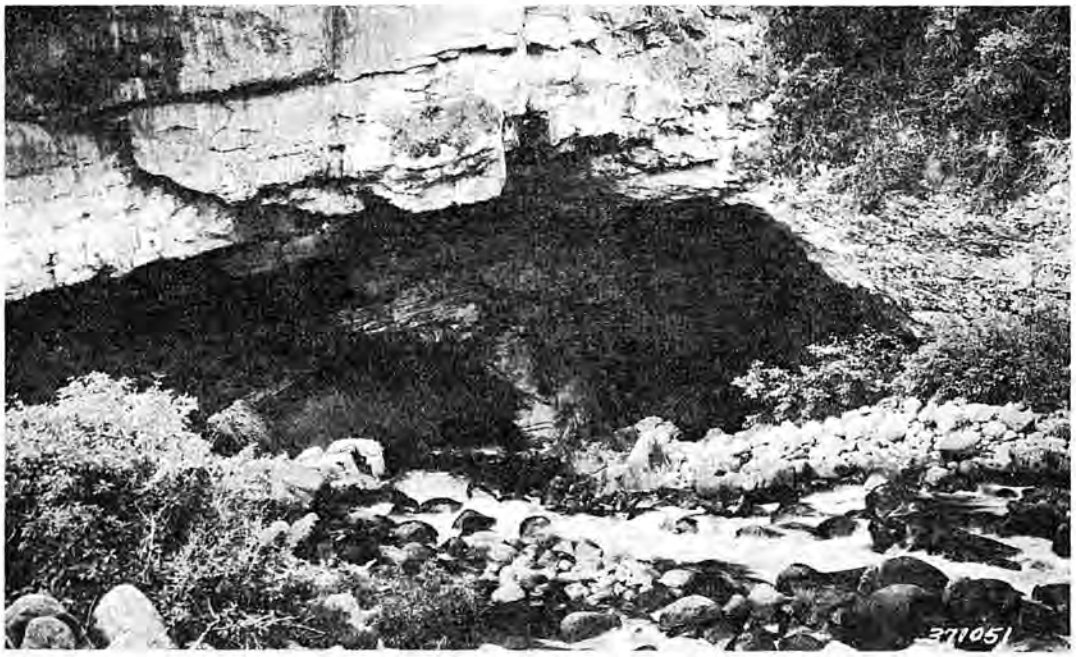
EXPLORATION

During the summer of 1936 an attempt was made to connect with the main avenue on the "other side" of the break-down, by forcing through a passageway near the ceiling at the top of the barrier in Rock Hall. Great quantities of rock and "bastard limestone" were removed, but no opening was found, and work on this particular project was finally stopped.

In 1937, a crawlway through the right cave wall, at the base of Rocky Mountain, was entered into, which

*Continuing "A Subterranean Adventure in Diamond Caverns," *Bulletin Six*, N.S.S., July 1944.

resulted in the discovery of a large room, with a beautiful water-carved ceiling. A small opening, not over 2 feet in diameter, led to an adjoining avenue, turning sharply to the left, and with a low ceiling that slanted downward to meet the floor to our right. Another small opening at the end of this last chamber, but at a higher elevation, invited inspection. One of the men managed to squeeze his head and shoulders through this hole. His flash light revealed a high dome-room, with large jagged rocks that pointed downward to the place of his entrance. Further inspection or exploration was discouraged when a boulder became dislodged from an overhanging ledge and struck the flash light from the upraised hand of our startled friend. It was then decided that it was impractical to make any further attempts to "go around" the break-down in this direction, due to the element of extreme danger involved.



Legend: The Popo Agie River Sink, on Washakie National Forest, near Lauder, Wyoming. The river disappears underground to come out in large springs some distance downstream. Cavern unexplored

The Pit

Further work was done in this last-mentioned room during the summer of 1938, when it was decided to go "downward" in an attempt to follow an indicated passageway that might take us under the break-down to an avenue beyond. During that year and extending into the late summer of 1939, excavation activities proceeded with great vigor as each succeeding operation held forth its promise of immediate success. Shale rock and limestone taken from the ever-lowering floor of this room, was deposited in the large adjoining chamber, and by the time the lowest level was reached, that room had been completely filled with the material thus excavated and it was necessary to build a track and move the balance of the rock on a dolly to the main avenue of the cave, where it was deposited at the foot of the break-down. At the end of this particular operation, the once level floor had been lowered to a depth of 40 feet at the center, thus creating a deep pit embracing the entire area of the room. A block and tackle arrangement was used to haul out large boulders from the bottom, and while the development still held some promise of success, it was finally necessary to abandon this exploration project due to the ever present danger of a cave-in. During the last stages, while following a small opening downward, it was necessary for several "watchers" to keep close observation of the sidewalls and overhanging rocks, in order to detect the slightest movement, so that the man working in the bottom of the pit would have time to make his escape before larger rocks started to fall into the cavity. This particular room and the large adjoining avenue, have now been sealed at a point just below the head of the "Dinosaur" in Rock Hall, the site of the entrance to the original crawlway that leads to these two rooms.

Dynamite Hole

In 1940 it was decided to try to enter into the main avenue beyond the subterranean break-down in Rock Hall, by following the downward passageway of a sink hole on the surface. An air compressor was moved to the site and a lateral tunnel blasted through

the limestone from the bottom of a 30 foot natural shaft, which followed a water course that eventually turned sharply to the left. Several hundred charges of dynamite were exploded as new holes were drilled in the limestone, and the blasted material hauled to the surface by means of a windlass. But once again Nature thwarted all efforts to gain entrance to the avenue below, and these tunnelling operations were finally abandoned.

Sand Tunnel

In the meantime, back in the main avenue of the cave, a lower room was discovered through an opening in the floor near the right cave wall, about 30 feet south of the concrete structure beneath Subterranean Natural Bridge. Beyond this room, at a higher level, a large tunnel-like passageway, filled by sand, and with a perfect cave ceiling, came into view. Eight or ten men were put to work cleaning away the sand from the end of the tunnel as its course was followed to the right. This compacted material was hauled back to a large pit and there deposited. As this tunnel lengthened, many difficulties were encountered, especially the problem of "bad air," due to lack of circulation, and disposal of sand over a long haul. A track and dolly arrangement was finally installed in order to speed up these operations, and in the fall of 1941, after the tunnel had attained a length of over 300 feet, the pick of one of the workmen broke right through the end, and a "new avenue" was discovered, running at right angles to the main cave. This long avenue follows the course of a waterway for a distance of about 600 feet. Its high creviced ceiling and water markings are most interesting and considerable exploring remains to be done therein, especially at the far end of the avenue. A great amount of work was done in widening and extending one crawlway at a point where the avenue sharply turns to the right. In August of 1942 this development was temporarily suspended, due to a new discovery that was made in Rock Hall, and which demanded immediate attention.

A New Avenue

Due to the fact that all attempts to go over, under and around the break-down at the far end of Rock Hall by following the right cave wall ended in failure, it was decided to grade and terrace the mountain of rock and clay at this location, so that visitors might ascend to a high level and view this interesting room from that vantage point. Before these last operations were started, an indescribable chaos of huge rocks greeted the eye, evidence of formidable disturbances which were produced at some undetermined period in the distant past. After the rock had been cleared away at certain points, graveled walkways were laid out and iron hand rails cemented into place. In doing this work, considerable material was pulled away from the left cave wall, at a lower level, and in so doing, a "Natural Avenue," approximately 8 feet in width and 7 feet high, was discovered. This passageway was completely filled with layers of compacted stone and clay from the floor to the flat limestone ceiling. Tunnelling operations were started immediately and the excavated material deposited elsewhere in Rock Hall. Mr. Parke and the writer visited the owner of these caverns during the latter part of August, 1942, when this avenue had been opened for a distance of 55 feet, and we took a hand in these operations for several days. A lot of good exercise and sore muscles was our only reward, for when it was time for us to leave, Nature was still stubbornly "holding out." Tunnel work continued in this passageway for a period of approximately two weeks after our departure, when I was informed that excavation work had been stopped; that the avenue was then about 80 feet in length; that a number of interesting domes and some formation had made their appearance in the ceiling and that prospects looked better than ever, but that it would be necessary to build tracks and haul the excavated material away in a dolly because it was impossible to continue carrying the clay and limestone back through the long tunnel-avenue by hand.

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Inspecting Exploration Avenue

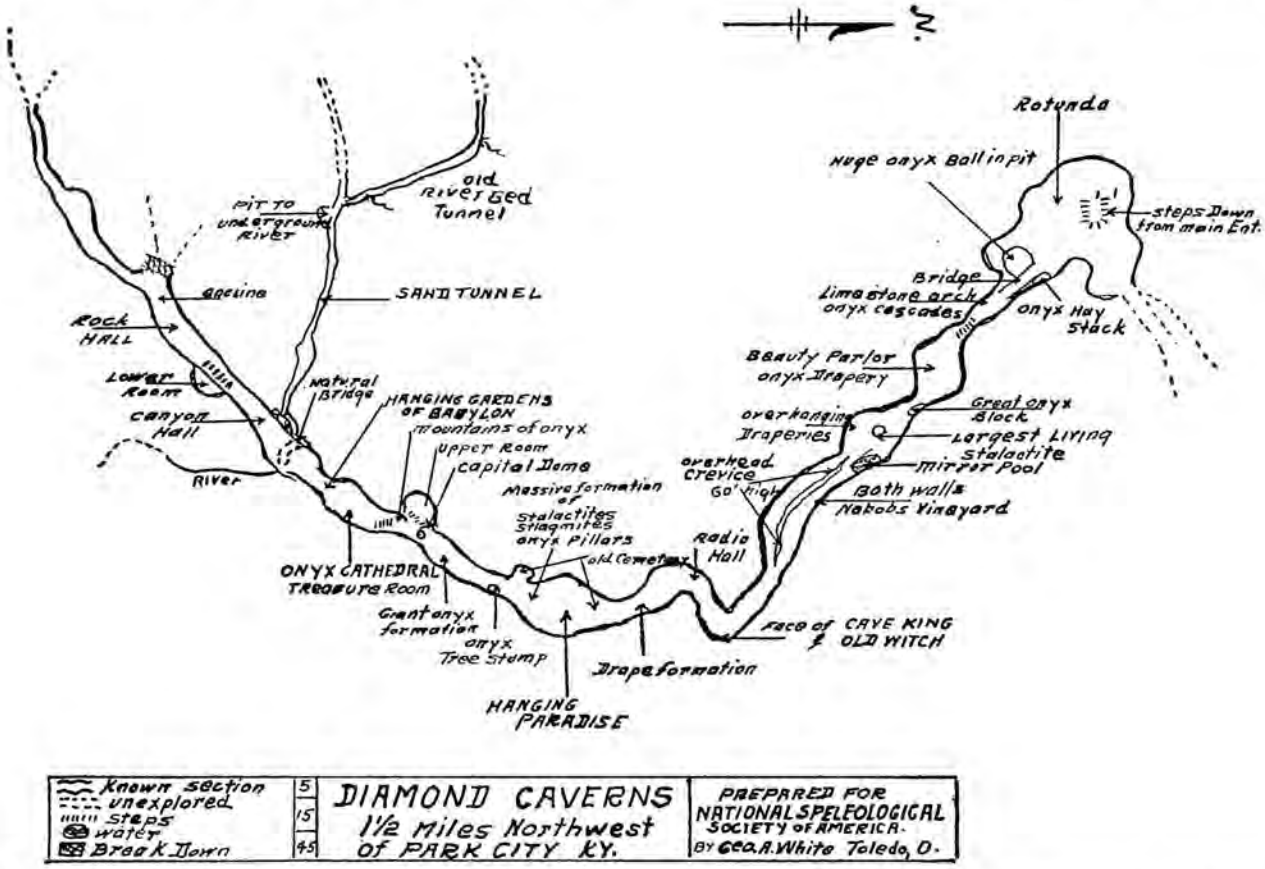
And this brings us to the time of the main narrative part of this story, as the members of our party were making ready to enter and inspect the new discovery passageway that undoubtedly connects with the main cave avenue around and beyond the break-down called "Rocky Mountain."

The need for cave clothes, and especially old shoes, became immediately apparent, for during the last two days previous to the halting of these operations, a frantic attempt was made to break through the barrier at the end of the avenue, and in so doing, the excavated material was thrown back promiscuously and not taken away. As we made our way through this long rock-bound hall, it was necessary to stop several times in order to assist a "fallen brother" in extricating one or both feet from the thick layer of sticky clay that covered the floor; in fact one of the boys lost a shoe that had not been securely tied, and this involved complications beyond description.

At the end of the passageway

A number of times we stopped to examine small

domes in the otherwise flat limestone roof; also small clusters of formation on either cave wall at ceiling level. At the end of this avenue, 80 feet from the entrance, it was noted that the general floor and ceiling elevation had not materially varied. However, the passageway appeared to be turning slightly to the right, which would indicate that the large break-down at the rear of



Rock Hall was being by-passed. As we stood there gazing at the scene of the last hurried attempt to break through the end of this weird tunnel-like avenue, a number of heated arguments resulted from several expressed opinions concerning geological theories with reference to the existence of this natural hallway, its probable course, together with conflicting speculations relative to the "unknown" that always lies just ahead of and only a few feet beyond the reach of the explorer's pick. It is believed by the management of Diamond Caverns that this passageway will connect with a "cross avenue" and that they will junction not too far from where excavation work will be resumed during the summer of 1943. In that event, several additional miles may be added to the caverns, as surface studies indicate the presence of an avenue that surrounds the entire wooded section across the way from the cave entrance building; also another avenue that turns left and goes up under a high hill in the opposite direction, where it is anticipated rooms of enormous proportions will be discovered.

A new adventure planned.

By this time the members of our party had become quite acclimated to the 54° temperature of the cave; our clothes were a little dirty and our shoes could hardly be recognized as such. This happened, of course, before rationing went into effect. It was suggested that some good tough "cave crawling" would warm us up, so we started back to the mouth of this exploration passageway in Rock Hall; thence back through the cave to a point just beyond the concrete bridge near "Monkey Mountain," where we entered a new avenue under a ledge in the left cave wall, leading to Sand Tunnel.

The River Cave

A brisk walk in this long narrow tunnel-avenue, one city block in length, had an invigorating effect on each one of us. Upon entering the new cave at the end of Sand Tunnel, some time was spent in examining an

opening in the floor of the river bed. There is a 15 foot drop in the floor of a sub-avenue below, from which point an underground river winds its way through a natural tunnel for several hundred feet, the full extent of which has not as yet been explored. For some distance we then followed the left cave wall, while walking on a ledge that projects over the watercourse in this main subterranean river cave avenue; thence to the opposite side, on a similar ledge, until we reached a point where the channel turns to the right, where an inspection was made of the crawlway that had been opened last August for a distance of approximately 60 feet, but later temporarily abandoned in order to expedite exploration work in the newly discovered passageway leading from Rock Hall.

Onward

Lou Klewer asked, "Where do we go from here?" I informed him that the answer was: "Just as far as it is physically possible for you to travel!" And so he was selected to lead the party onward. For several hundred feet the going was comparatively easy, with only a few overhanging limestone ledges to dodge in the otherwise high creviced ceiling overhead, as we slowly made our way over the rough stones along the river bed.

Crawlways and Squeezes

Then, as though by an act of the magic hands of nature, the wide avenue suddenly began to narrow, until sidewalls eventually scraped our shoulders; the ceiling started to lower and we soon found ourselves in a very tight place. At this point I informed my companions that two courses were open, if they cared to go farther. One was by way of a long tight crawl underneath a ledge directly ahead of us—the other being an "overhead" parallel route through a passageway carved by underground rivers in the limestone, both of which were explored by George Parke and the writer in the late fall of 1941. At that time I selected the lower crawlway, and my experience therein caused me to suggest that we try the "elevated" passageway recommended by George. By this time Lou was again leading us a merry chase, followed by Hinkleman, the writer, Wood and White. At times we found relief by coming to places in the narrow rock-bound passage channel where we could make it on our hands and knees, but as we progressed onward, the journey required, more and more, that we employ the crawling "technique" of a reptile. Finally we dropped down through a small opening to a lower level, which formed a junction with the crawlway that was avoided on this trip. From this last mentioned point, it was possible to walk upright, until the passageway became so narrow that we were finally forced to quit.

Turning back

Lou said he believed that by breaking off some sharp vertical ledges, we could go ahead farther, and possibly come into a large avenue. However, we had all taken a pretty bad beating, some of our clothing was torn and a number of bruises had been physically endured; also we had not brought with us the necessary tools for such an undertaking. And so, with reluctance, it was agreed that we "call it quits," so far as this trip was concerned. We were all tired, and the cold inescapable fact that we faced a long torturous journey in making our way back to civilization, influenced, to no small degree, our arriving at this decision.

Our return trip was interrupted from time to time by casual inspections of "exploration possibilities" enroute, which were duly noted for consideration at some later date. It was a weary, though happy group of explorers that finally made their way, single file, from sand tunnel to the main avenue of the caverns. In fact we were all glad to lie down for a rest on a pile of soft sand before continuing our trip back to the outside world. Once we were back on the surface, however, a short period of relaxation was interrupted by the query: "Time's a wasting—where do we go from here?" And so we were soon on our way again, our aches had disappeared and the urge to explore was once more upon us. Several other caves were visited during our two days' stay in the region and many interesting and thrilling experiences were enjoyed, but the memory of our adventures in Diamond Caverns and the wondrous beauty of its colorful formation-filled avenues still lingers with us and silently urges that we return another day, when a new chapter in its development will have been written through the patient efforts and abiding faith of some intrepid explorer.

MYSTERY CAVE

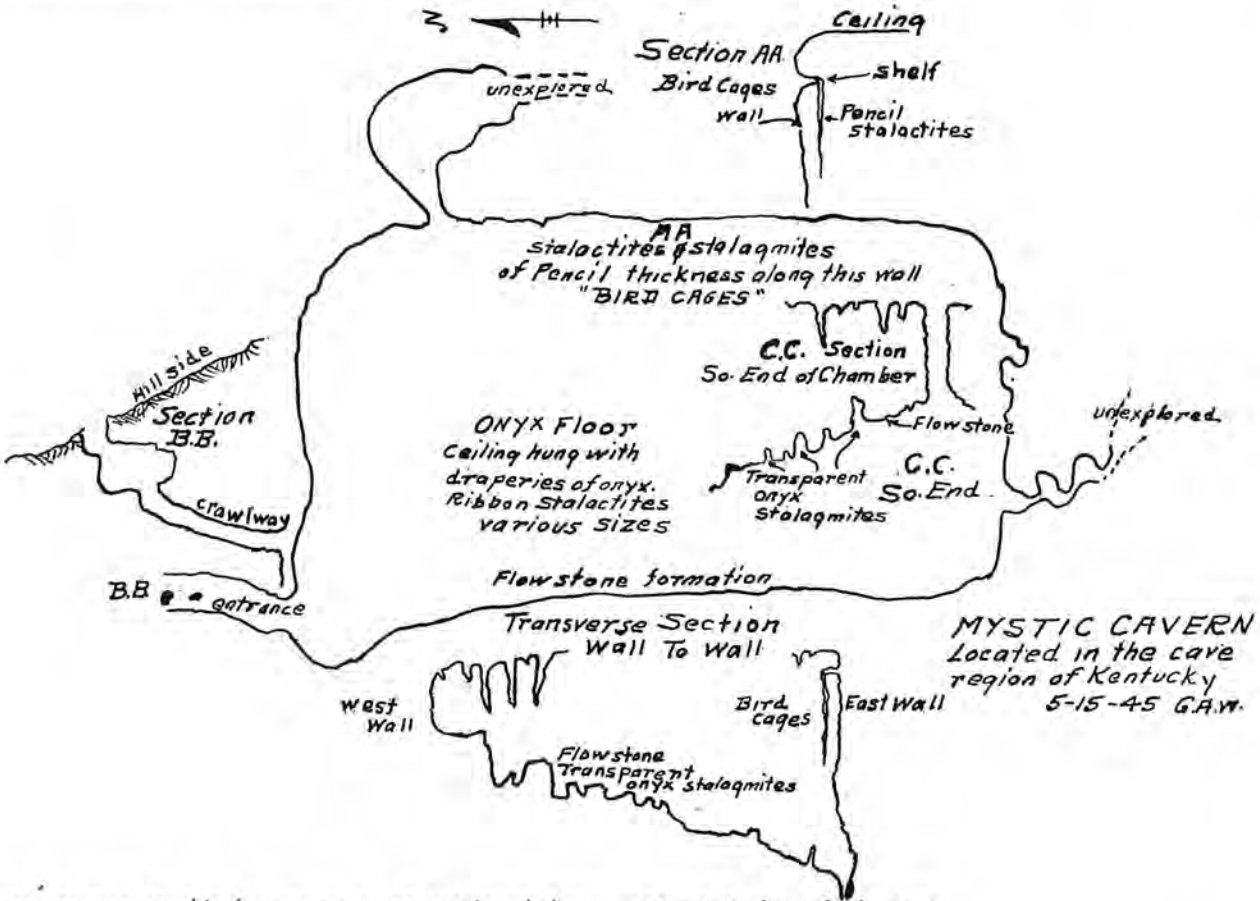
At 3 p.m., October 10th, 1943, after our combined inspection and exploration trip in Diamond Caverns, and while still in our cave clothes, it was decided that we visit Sand Cave on Route 70, where Floyd Collins was trapped many years ago. Some time was spent beneath the high cliff and on the grounds where 100,000 people gathered at the height of the excitement, when the last futile efforts were being made to reach that lone explorer. This place is now closed to the public, all signs indicating its location have been removed, and the trap door over the 80 foot vertical shaft, leading to the sandstone crawlway below, is now

securely locked. Up until several years ago, visitors were brought to the foot of and taken beneath the cliff by a guide, where they were shown the narrow, slippery crawlway through which Collins made his dangerous descent—never to return. They were then taken to the site of the man-made shaft, the trap door was thrown open and a powerful gas light lowered to the level of the crawlway, from which his body was removed and later taken to Crystal Cave, where his last remains may be seen through the glass top of a metallic casket. This place—that made the "front page headlines" of the Nation's newspapers for many days, is now deserted and its location practically forgotten.

One of the members of our party had never been to Mammoth Cave, and expressed a desire to see the old "Historic Entrance." After a short drive, our friend's wishes were satisfied. After inspecting the great natural entranceway to this famous cave, we continued downward over a steep narrow road to Green River, where spacious picnic grounds have been developed by the Park Authorities. The scenic beauty of this river, with its steep, densely wooded banks, hundreds of feet high, presents a living picture that would test the skill of the most skillful artist to duplicate.

A new adventure planned.

It was now late in the afternoon and starting to get dark. Previous arrangements had been made to meet a friend of mine at Cave City, who agreed to take us through a "New Cave" that evening. We arrived at Cave City about 6:15, where we ate our supper. The gentleman we were expecting made his appearance at seven o'clock and we were on our way once more, driving through the darkness to a destination that was unknown to all the members of our party, except the writer and our guide. I had been telling the boys about this new cave earlier in the day and they were all very anxious to see it. The same guide had accompanied George Parke and the writer, with two other men, on an earlier trip in July, and I was therefore quite eager to surprise them with a new adventure—long to be remembered.



Our trip through the cave.

This thrilling experience can better be told by quoting the following from an article prepared by Lou Klewer and published in his "Outdoors" column of the Toledo Blade on October 13th, 1942, several days after our return to Toledo:

"Six of us left the car on a lonely road in the cave region of Kentucky last Saturday night and headed across the field. There were Lyle Ward, George White, Elmer Hinkleman, Harland Wood and I following our guide, with only the unerring sense of the native to lead us to our destination.

"We had heard of this secret cave we were headed for, but only Lyle had ever been in, and his tales of its beauty and its magnificent formations had filled us all with a desire to see it. Only seven persons in the history of the world had ever been in this cavern and while it may be opened to the public after the war, at the present time its location is being kept a dark secret.

"It was an adventurous hike down a long hill, across the valley and up through the woods. The stars were out in full force but only our flashlights kept us from stumbling along the path. Then suddenly the guide made a little turn and knelt down before a pile of rocks. He removed them carefully and finally disclosed a small opening just large enough for a man to wiggle through.

"We got down flat on our stomachs and crawled into the opening. The first thing we saw was a nest of a ground squirrel with nearly a peck of acorns and wild grapes piled around it. Then some more crawling, being careful not to disturb the nest, and about 10 feet farther on, through another small opening, we saw the light of the guide.

A tight squeeze.

"This was a tight squeeze around a large stalagmite and suddenly we were in a large room, a cave indescribably beautiful. The floor of the cave was covered with onyx. The ceiling was hung with draperies of onyx, huge ribbon stalactites, ordinary stalactites of all sizes and descriptions, ranging from tiny, pencil-like stalactites five feet in length, to those that measured six feet through where they were attached to the ceiling.

"One of the most unusual sights to greet our eyes was along one side of the wall where there was a shelf about 18 inches below the ceiling. Here, stalactites and stalagmites, of pencil-thickness, had joined together to give an appearance of a long bird cage with the colors of the bars ranging from a pure alabaster to the reddish-brown of that clay region.

"On the way to the far end of this cavern, there were mounds of flowstone, where the onyx dripping slowly for thousands and thousands of years, had covered up the limestone and the far end of the cavern turned into a series of cascades, covered with the same flowstone. Here and there were stalagmites, short and stubby, of a beautiful, transparent onyx that glowed like fire when our flashlights were placed behind them.

Dante's Inferno.

"Now and then one of us would cut loose with a gasp of amazement as the flashlights would disclose more breath-taking beauty, but on the whole, we were quiet, drinking in the marvel of that geological fairyland as only true cave crawlers can. Before we left, we lit some red railroad flares that showed us much more of the cathedral-like cavern, giving the huge 190-foot vault an eerie, Dante's Inferno touch that was awe-inspiring in its grandeur.

"It was a silent group that finally snaked its way out of that mystic cavern. We had visited other caves during that week-end trip, including several sessions in beautiful Diamond Caverns and visits and exploring trips to Dynamite Cave, Little Crappo, Dead Goat Cave, and large Doyle Cave, the Passenger Coach and others, but the highlight of the entire trip was that after dark jaunt into the woods to see the mystic cavern whose existence has only been known for a little more than a year."

In conclusion, it is needless to say that as a result of our first day's strenuous caving activities, little time was wasted in "hitting the hay" upon arriving at our cottages around 10:30 that evening, nor is it necessary to explain why none of us awoke before nine o'clock the next morning—the beginning of another day, filled with new and thrilling experiences.

SHORT CAVE

After eating our breakfast at Park City, Kentucky, on the morning of October 11th, it was decided that we strike out over the hills in a southeasterly direction from Diamond Caverns, for the purpose of visiting Short Cave; to study the general topography of the land in that vicinity, and to examine some of its numerous sink holes and geological outcroppings.

We walked along the abandoned railroad bed of the old Mammoth Cave Railway for some distance; then turned to the left and followed a "wagon trail" through a natural gully that took us up over a large wooded hill to level land. From there on, it was simply a matter of following instructions that George Parke had written from memory covering a previous trip, which he called the "short route." When it was becoming apparent that we were not going in the right direction, after following our written instructions for nearly a mile over hills and deep valleys that gradually ceased to appear familiar to me or to George White, who had also made the trip to Short Cave several times in the past, our "caravan" back-tracked for a distance of approximately a quarter of a mile, when Mr. White

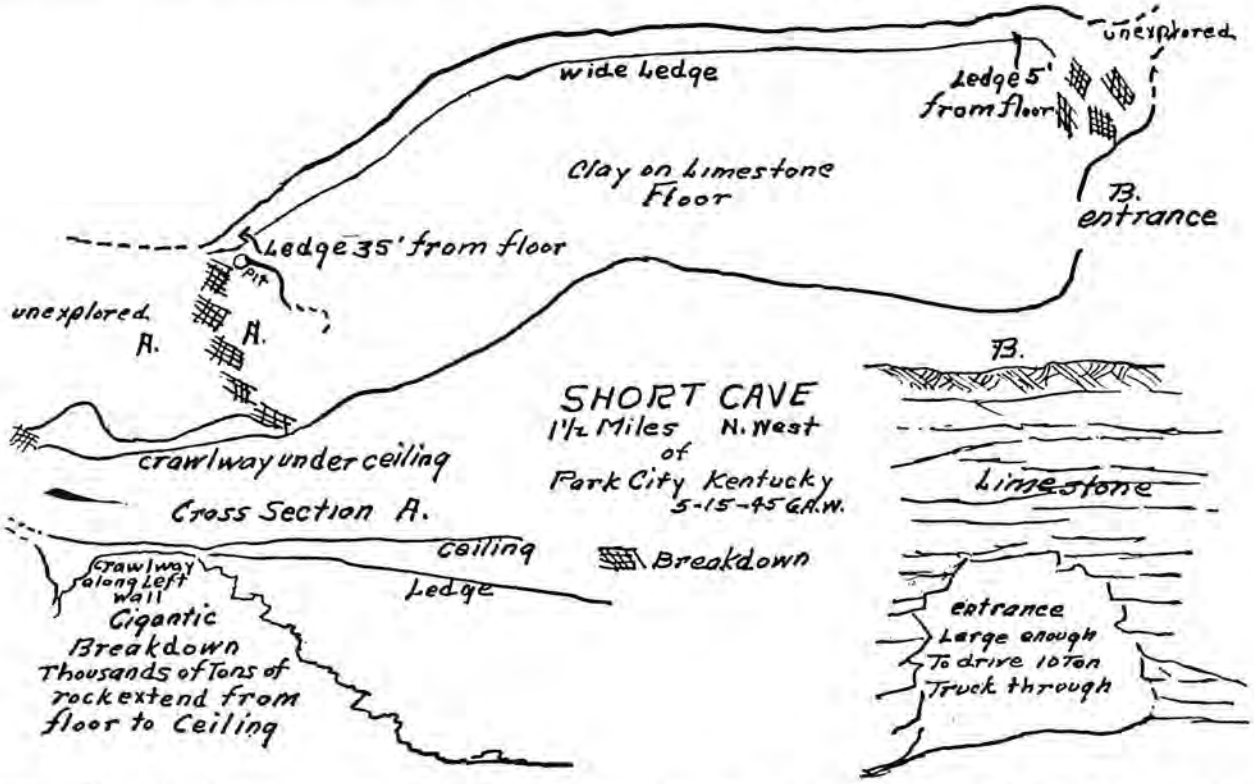
assumed the responsibility of leading our party to the cave we wanted to inspect. This happened when he exclaimed: "Here is where we should have turned to the left, instead of going straight ahead!"

From then on, with White as our guide, the rest of us proceeded to enjoy the autumnal scenery as we swung along, in a care-free manner, stopping here and there to examine interesting sink holes in the hope of discovering a new cave. One of the boys looked at his watch and calmly remarked that we had been walking for nearly an hour, and so it was agreed that we must have circled past Short Cave and were probably somewhere beyond that cavern. By this time it was realized that we were lost, so far as finding our intended point of destination was concerned, and thereupon a halt was called in order to enjoy a short rest period. Lou

A TRIP THROUGH SHORT CAVE

A number of expeditions to this cave have been made by the writer, the last one taking place in the fall of 1941, when Parke, Earl Siemens and myself, from Toledo, together with a local man, passed through its large entranceway to inspect this large subterranean avenue. The mouth of the cave, by the way, enters the side of a steep hill, and is large enough to drive a 10-ton truck through, without touching either the top or sides of such a vehicle.

The difficulty in finding this entrance lies in the fact that it is completely hidden from view by a thick growth of trees and vegetation, and it is entirely possible that we may have passed by without recognizing the location; in fact we have always experienced some trouble in this respect when visiting Short Cave, except



Klewer had insisted upon carrying a large coil of rope, which by this time had become quite heavy, and he, like the rest of us, was more than willing to sit down and rest for a while. Hinkleman then stated: "Inasmuch as we aren't going to see Short Cave on this trip, I move that we let Ward tell us about it." This I endeavored to do by giving them the following information at that time, while we were all stretched out on the grass—so near and yet so far from the object of our search:

when guided by a "native" from that immediate locality.

The floor of the cave is flat, and, for the most part, covered with a layer of clay from wall to wall. Its average width is approximately 45 feet and the average height throughout is about 40 feet, with small plus and minus variations at various points for its entire length of approximately 1500 feet, or three double city blocks. The temperature remains constant at 54°, and the humidity is not many points short of "rain fall."

I am informed that at one time, before the days of refrigeration cars, the L. & N. Railway used this cavern for the storage of fruits and vegetables; also that mushrooms were raised therein a number of years ago under ideal climatical conditions, and, further, that it was used as a "cave home" by an old "recluse," a man with a "hermit complex," who set up housekeeping near the entrance and lived there for several years. An old stove, rusty bed springs and other miscellaneous items bear mute witness to the confirmation of this story.

At the bend

Several hundred feet from the entrance, this cave makes a gradual turn to the left, the reflected light from the outside suddenly fades into total darkness, and from that point on progress is entirely dependent upon illumination from flashlights and lanterns. For the entire length of the cave, a wide ledge follows and is a part of the right cave wall; its surface continues at elevations varying from 5 to 35 feet, and upon which two members of our party walked from the end of the cavern back to the entranceway on our return to the outside.

The break-down

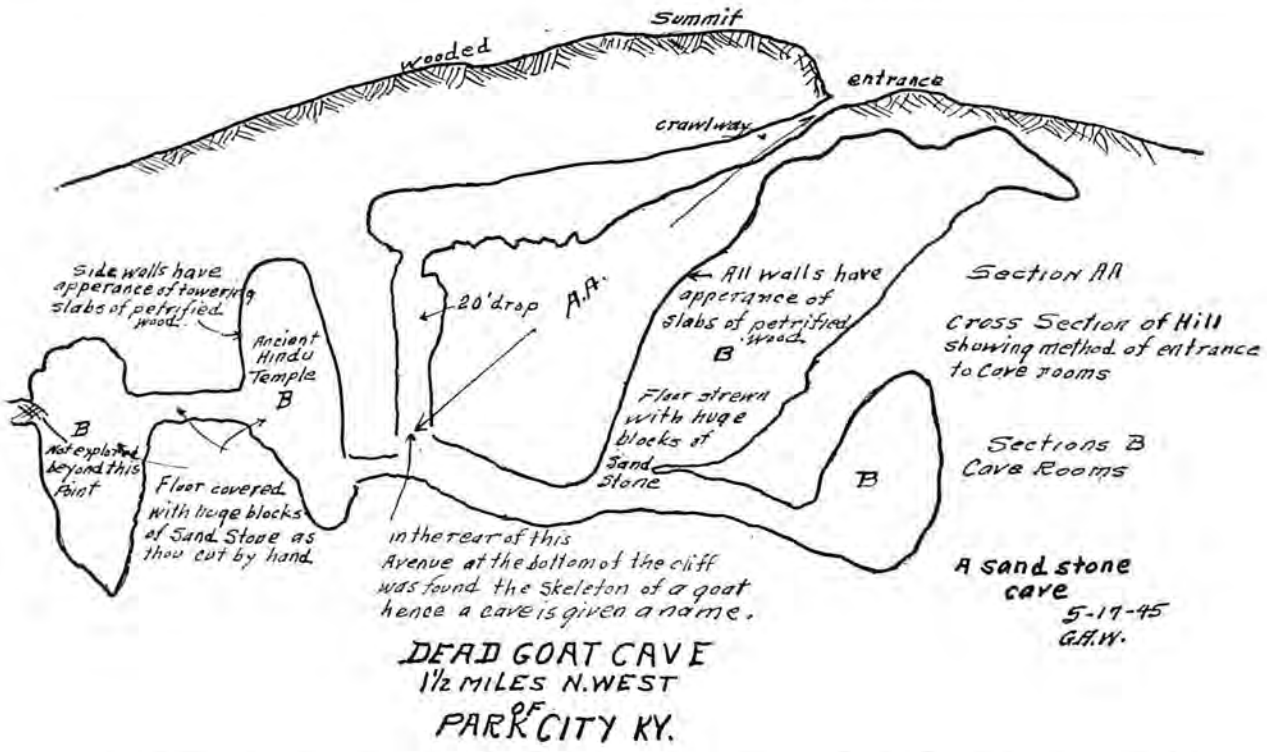
Our journey through this great underground hall was suddenly brought to an abrupt stop. A gigantic break-down, composed of thousands of tons of rock, extends from the floor to the ceiling, like the side of a steep hill, and completely blocks the main avenue. There are a number of interesting crawlways in the back end of this cave, some of which have been explored. On one occasion, during the summer of 1940, George Parke, Walter Stevenson, Charles Neville and the writer, entered a crevice in the right cave wall near the break-down. A small water-carved opening in the floor invited an inspection, which necessitated the use of a rope in order to reach a platform-like ledge about 12 feet below. From that point we made our way downward by scaling the wall of a canyon-shaped crevice that brought us to a level many feet beneath the floor of the main cave, where a number of weirdly formed chambers were explored. One of the remarkable features in connection with this cave is the flat, even surface of the high limestone ceiling, wherein only a few broken depressions are noted, that would indicate past internal disturbances. Having once visited this great subterranean avenue, one never ceases to ponder over the strange, violent manner in which nature has sealed the far end of this cavern, nor can you help wondering about the mysterious passageways that undoubtedly extend for many miles beyond the other side of the break-down.

After listening to my verbal description of and tales about Short Cave, the members of our party arose from their respective resting places, and we started on our way back to Diamond Caverns. After walking a short distance, we stopped at a farm house in order to check our directions, but found no one at home, so we made our "calculations" by observing the position of the sun at that time of the day and following a course that we believed would eventually lead us to the main highway.

A new cave

Another half hour's walk brought us to the side of a steep hill, overlooking a ravine, at the bottom of which a long wall-like limestone outcropping was followed for some distance, when George White and Lou Klewer called back to the rest of us with the startling news that they had found a "new cave." It didn't take long for all of us to assemble at the site of their discovery. We were now looking into a type of cave entrance that is produced by the downward cutting of surface erosion, whereby cave passages are thus intersected. A few steps brought us to a lower level, under a high natural archway, at the top of which considerable formation was noted. The avenue from this point, leading directly under a steep hill, proved to be most interesting because of its weird limestone water carvings. Our enthusiastic expectations, however, were brought to a sudden end, when, after walking about 30 feet, we came to a small circular room with a rather high ceiling dome and a pit that appeared to be filled with debris at the base of the cave wall facing us. There was little doubt in our minds regarding the existence of a passageway under this cave wall, but being without the necessary equipment to remove the loose material that choked its opening, we were forced to abandon further efforts to explore therein. There was nothing that could be done about this situation, except to resolve that the next time we were in this vicinity, an attempt would be made to open a passageway beneath the cave wall in the hope of entering an avenue beyond.

After we were once more back on the surface, we continued our long journey in the general direction agreed upon when it was originally decided to turn back. All of the members of our party were getting rather tired, and some of us were starting to become a little doubtful as to whether we would ever find the main highway that afternoon, when, much to our relief, a field of corn stalks was sighted at the top of a hill we were climbing. Our spirits were even higher when we came to the far edge of the hill beyond the corn field, for



we were then looking down upon a beautiful valley, the main highway we were seeking could be plainly seen, and, still more important—the entrance buildings of Diamond Caverns were also included in this most welcome panoramic view.

Little time was wasted in getting back to the caverns, it was nearly three o'clock in the afternoon on the second and last day of our visit in this region and two other caves were yet to be explored.

DEAD GOAT CAVE

About three o'clock in the afternoon, on October 11th, after returning to Diamond Caverns from our long walk over the beautiful Kentucky hills in the vicinity of Short Cave, the members of our party expressed a desire to visit a cave located at the summit of the largest hill in the district, from which, on a clear day, the town of Glasgow some 20 miles distant, can be seen. This high, wooded hill is situated just northeast of the cave entrance buildings, across from the "old road."

Chinese Walls

A number of interesting sink holes were examined as we approached the base of the hill; also, further on, weird cypress limestone "outcroppings" that resembled long, irregular Chinese walls, made their appearance. These peculiar "walls," several feet in thickness, varied in height from 1½ to 4 feet, and their unexplainable presence only added to the mysterious surroundings as we slowly made our way upward, through a dense growth of underbrush, tangling vines and closely planted trees.

At the summit

Upon reaching the top of this mountainous hill, the writer was bluntly asked by some of the members of our group if I really "knew" where the cave entrance was actually located; while others expressed the fear that perhaps this trip might turn out to be a repetition of our expedition to Short Cave earlier that day. They were informed that if they would just follow me through the woods for a short distance, their desire for the unusual would be quickly satisfied. This prophetic assurance was soon substantiated as they were led to a clearing, in the center of which we stopped at the edge of a sink or depression in the land surface. An opening under a limestone ledge directly ahead of us furnished the silent answer to the question: "Where do we go from here?"

Entering the cave

After lighting our lanterns and checking over our flashlights, I informed the boys that the best way to enter this cave was to start in "backwards," and then proceeded to illustrate by leading the way in this manner, which brought us, single file, downward through a narrow crawlway into a long avenue. After

traveling "on all fours" for some distance we were able to walk upright over the rough, irregular rock-bound floor. At the far end of this "elevated" subterranean chamber our progress forward was brought to an abrupt stop, for we were now standing at the edge of a perpendicular shaft-like opening.

A lower avenue

An exclamation from Harland Wood was soon forthcoming: "Here is where the rope that Lou Klewer has been carrying will come in handy!" After securely anchoring one end around a huge rock, the coiled rope was promptly thrown over the side of the steep cliff and fell with a dull thud to the floor of the cavern below, a distance of about 20 feet. Because of my previous experience in this "unique" cave, it was decided by my companions that I should lead the way; that if I reached the lower level safely, they would have someone down there to guide them in finding convenient "foot holds" while hanging onto the rope. After I had made a safe landing, this suggested procedure was followed until all the members of our party were assembled in this lower crevice-like avenue, which was about four feet in width. There were no foot-holds or ledges in either of the steep limestone sidewalls for a distance of about 7 feet above the floor and this portion of our descent was made entirely with the assistance of the rope, which seems like a great distance when your feet are dangling in mid-air and you can't see where you are going.

An Ancient Temple

After making our way through this narrow avenue for some distance, which necessitated our climbing over huge rocks and passing through a number of tight squeezes, one of the boys remarked that the passageway appeared to be circling to the left. This was true. The sidewalls of the avenue had now taken on the appearance of towering slabs of petrified wood, of various colors, and the entire scene gave us the strange feeling that we were walking through an Ancient Hindu Temple. This illusion was further completed when we finally came to a small natural "doorway," in front of which was strewn a great number of limestone blocks of various lengths and sizes, resembling the handiwork of stone-cutters. Upon passing through this small opening, we found ourselves in a large cathedral-like room, at the top of which was a beautiful water-marked dome, while ahead of us, about 20 feet above the floor, the cave wall formed a vertical cliff, beyond which a large "upper room" invited our attention.

Exploration

Lou Klewer then made the observing remark that inasmuch as we were in a cave at the "top" of a hill, there wasn't much use trying to find an "extending" avenue at that high level; unless a passageway could be discovered that would lead to subterranean chambers at a lower level. This question was answered when I called their attention to an opening under a ledge at the bottom of the left cave wall where we were standing. One of the men remarked: "That's an opening, without a doubt—but what is that large boulder doing in it? It would take a derrick to get it out!" I informed them that several years ago another party was in this very same room, which included Walter Stevenson, George Parke, Charles Neville and the writer; that at that time this large rock only partially choked the entrance to the opening, and one of my companions was able to squeeze his head and shoulders in far enough to throw a light downward, revealing a small continuing passageway in that direction. In our haste to lift and roll back the obstructing boulder, the rock got away from us and fell to its present resting place, and no further attempts have been made to remove it. It is reasonable to believe that this passageway may lead to a large subterranean chamber at a much lower level; perhaps connecting with a ceiling crevice or dome opening at the top of a huge room a hundred or more feet in height. It is also possible that a cave at a still lower level might be discovered, which would eventually join and become a part of Diamond Caverns, in view of the fact that surface indications point to the existence of a large avenue running from the entrance buildings in the general direction of this high hill; also another avenue leading to this hill from a point just beyond the present end of Diamond Caverns, and which may be "intersected" when exploration activities off Rock Hall have been completed. The lack of both equipment and time necessitated our leaving this mysterious room, but with the high resolve that we would come back to this place some other time and attempt to remove the boulder from the passageway just described.

A Cave Is Named

On our return trip to the outside, several interesting side avenues were entered into and explored, and after we had all reached the first level of the cave with the aid of the rope that had been left hanging over the canyon wall, a number of railroad flares were thrown over the cliff and to the far end of the avenue, which illuminated the first and second levels with a dazzling brightness. In that instant, one of the boys called our attention to the presence of a skeleton in an adjoining pit, with the remark: "That looks like the last remains of a dead goat! It must have wandered in here and fell to its doom in the pit." Lou Klewer then exclaimed: "We

will call this 'Dead Goat Cave'!" I informed them that inasmuch as no name had ever been given the cavern, that one would do as well as any other.

Red Light and Smoke

By this time the white light of the flares had changed to a brilliant red, which illuminated in an awesome manner the strange, dead-like appearance of the water-carved columns of rock which extended from the lower level upward, to form the further wall of the opening to the avenue below, resembling great jagged shafts of petrified timbers. Then one of the boys cried: "It's time to get out! Here comes the smoke!" He was referring to dense clouds of smoke coming from the flares, which had already partly engulfed us as we stood there looking backward at the beautiful sights thus revealed. And so ended our visit to Dead Goat Cave, as we beat a hasty retreat to the entrance at the top of this mysterious hill, wherein nature has carved a most unusual cavern.

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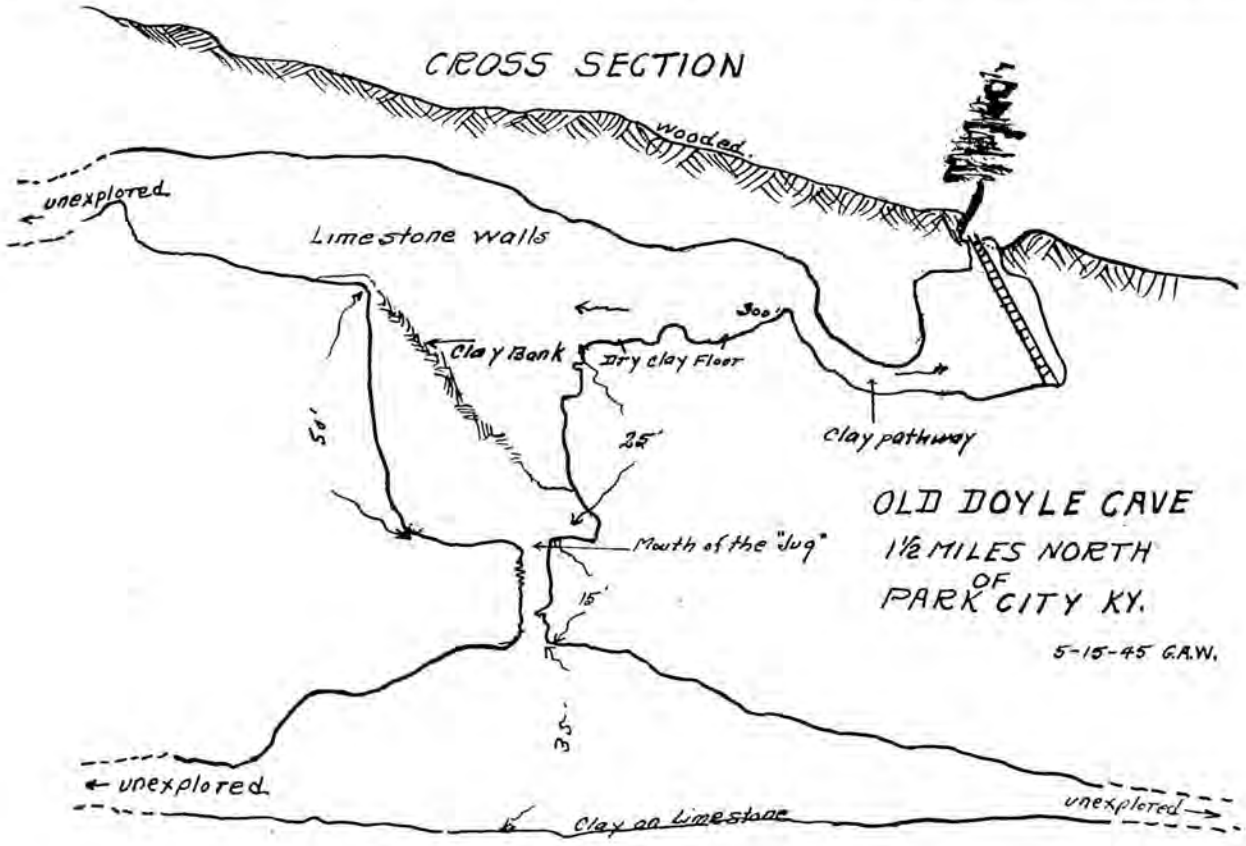
It was late in the afternoon when we returned to Diamond Caverns, and little time was lost in preparing for our next and final adventure—a trip into an unexplored cave, several miles away. The owner of this cave had agreed to meet us at Park City and guide us to the place where he promised us we would be thrilled by a great experience.

THE OLD DOYLE CAVE

It was late in the afternoon, on October 11th, when we arrived at Park City, Kentucky, after having driven from Diamond Caverns following our trip through Dead Goat Cave. Our guide, John Vance, by pre-arrangement, was waiting for us, and we were soon on our way—driving on Route 31-W north for a distance of about one and one-half miles, when we were directed to turn left. An unimproved road was followed for some distance into the hills and through a woods, until it seemed that the condition of the roadway would no longer permit further progress—when, much to our relief, we came to a typical Kentucky farmhouse, situated on a clearing. There we were joined by a man by the name of Tom, who accompanied us as we made our way through the woods to visit a cave that Vance had been telling us about, in most glowing terms, and which he described as "A great cave!"

Our two guides

Our No. 1 Guide, John Vance, then asked his partner, Tom, if the ladder leading down into the "break-down,"



or cave entrance, was in good condition. We were a little startled to hear him reply that he wouldn't "guarantee" it, and even more disturbed when Vance remarked: "I wouldn't go down on that ladder for a million dollars, but I know that these boys from Toledo are all heroes and they will go into the cave with you." "You can show them the way!" Tom replied: "I don't know—I'm no cave man myself, but if your friends are willing to risk it, I will go with them." Such was our preliminary introduction to this cave as we approached its entrance. Vance was wearing an ordinary business suit and a black derby hat, while Tom was dressed in overalls, all of which confirmed the arrangements that Vance evidently had in mind before we arrived at the site.

Our two native friends were questioned concerning the name and history of the cavern, but all that we could get from them was the fact that it had originally been discovered years ago by a man named Doyle; that it was known as the Old Doyle Cave, and that a number of years previous to our visit, they had done some exploring therein, but that no one had been in it since that time.

The Entrance

Our pathway had now led us to the edge of a small sink hole near a clump of trees, and we were informed that this was the entrance to the cave below. George White took one look at the inky blackness of the cavity and asked: "How are we supposed to get down to the bottom?" "On that ladder," Vance replied, "if it will hold you. It is only about 22 feet to the floor of the first level, and I don't think the ladder is too rotten. One of you can test it and the rest of you boys will then know it is O.K. I wouldn't go down there for any money myself, but you fellows are all fearless explorers. Tom, you lead the way, and be sure to show them the 'jug'!"

The Ladder

Lou Klewer and White volunteered to test the ladder, which consisted of two long tree poles, to which had been nailed old wooden boards for crossbars. After our two "human guinea pigs" had made a successful landing on the cave floor below, they called up to us with the advice that the ladder was safe, provided we were careful not to place our entire weight on any one crossbar, and further suggested that it would be advisable to hang onto both supporting poles at the same time.

When our entire party had at last assembled on the cave floor of a large, semi-circular room, Vance was still stubbornly "holding out," and when asked if he wouldn't change his mind and go along with us, shouted down to us from the edge of the opening above: "I'll go into this cave with you on your next trip to the cave region, after we have built a new ladder! Tom will show you the way. I will just sit up here and smoke my pipe and wait for you fellows!"

A Long Avenue

Our new guide informed us that it had been a long time since he was last in this cave; that he thought an avenue went to the left from where we were standing. A short walk in that direction, however, brought us to a blank wall of limestone, so we made our way back to the ladder and followed an upward trail to the right, which took us around a great bank of clay, extending from the top of the left cave wall to the narrow pathway over which we were walking. Then our trail took us down a rather steep incline and into a large avenue, about 30 feet in width and 45 feet in height, the ceiling and floor of which were fairly flat, the latter being covered by a heavy layer of dry clay. This made our trip easy and our party swung along at a fairly rapid pace for a distance of approximately 300 feet, when the avenue suddenly made a sharp turn to the left, which we followed for a short distance and then stopped. We had to stop, for we had come to the edge of a steep cliff, with a sheer drop of about 25 feet. Another one of Vance's "ladders" was propped against the edge of this perpendicular limestone wall, leading to the base of a huge mountain of clay, that extended from the bottom of the wall below where we were standing, upward and at an angle of nearly 45 degrees, for a distance of approximately 50 feet before leveling off to form the floor of an upper avenue, 10 feet below the high ceiling, far above and beyond us, on the other side of the precipice.

The Jug

Harland Wood expressed a desire to explore the upper avenue. Tom had been telling us about making a trip into that avenue several years ago; that he had traveled in it until he was afraid he would lose his way, when he became panicky and retreated back to its entrance. One of the boys then remarked that all that separated us from the other side was the pit below where we were standing, and then proceeded to cautiously place the weight of one foot on the top rung of the ladder, which promptly fell into many pieces. Tom then explained that it was a good thing we found out that the ladder was not safe, for directly below it was a large circular opening in the limestone floor at that level, into which one of us might have fallen. He further explained that this was the mouth of

the "jug" John Vance had mentioned. "What do you mean by a 'jug'?" asked Klewer. Tom then told about going into the opening, with the aid of a rope ladder, stating that the opening was shaped like the mouth of a jug, and extended downward for a distance of about 15 feet; that it then suddenly opened into a large, circular vault-like room, like the bottom part of a jug, the floor of which was about 35 feet below the point where the chamber widened out on either side of the small passageway above; that several side avenues were noted, coming into this room like the spokes of a wheel. We asked him if he explored any of those avenues. He replied: "No, my rope ladder wasn't long enough to reach the bottom. It was spooky down there, and I was alone—I took a good look with my flashlight, and got out of the place as quick as I could!" We asked him what equipment we would need to explore it, and he replied that we would have to have a 50-foot rope ladder.

Exploration possibilities

After Tom's dramatic description of the "jug," Hinkleman got quite curious, and crawled out on a projecting ledge directly over the opening below. One of the boys grabbed him by a foot and pulled him back. He was then told that some day we would come back and go into the lower chamber, but with a rope ladder; that we were not desirous of fishing him out of the "jug," especially from that height. It was noted that by constructing a long ladder, of safe design and structure, two purposes would be accomplished. It would take us safely down to the mouth of the subterranean vault; also that it would enable us to reach a high ledge above our heads to the left of where we were standing, and that this ledge would take us to the further end of the avenue and at a high elevation, near the ceiling, thus furnishing a walk-way connecting with the "extension avenue" at the summit of the great mountain of clay ahead of us. We were told that much formation was found in the avenue when Vance and Tom explored a small portion thereof, and it was agreed that arrangements would be made to bring the proper equipment with us the next time we visited this cave, as the possibilities for exploration seem to be limitless.

Upon reaching the surface we found Vance patiently waiting for us, and after a great deal of explaining why we didn't do more exploring, he shook his head sadly and stated that the next time we were down, the ladders and other equipment would be on hand.

Passenger Coach

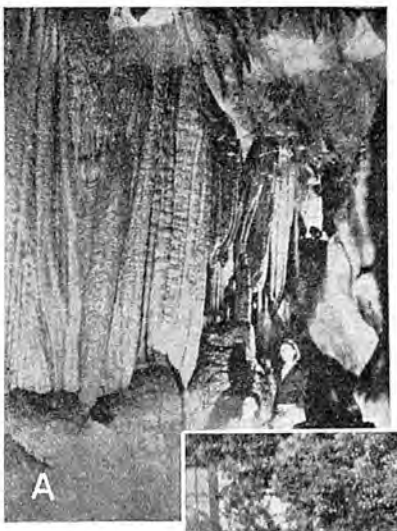
It was starting to get a little dusk, and Vance wanted to know if we wanted to make another crawl before

(*Continued on page* 56)

Lou Klewer, in full caving regalia.

Onyx Falls

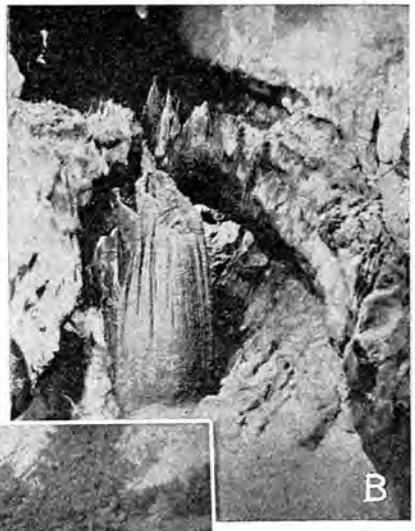
Cathedral Room

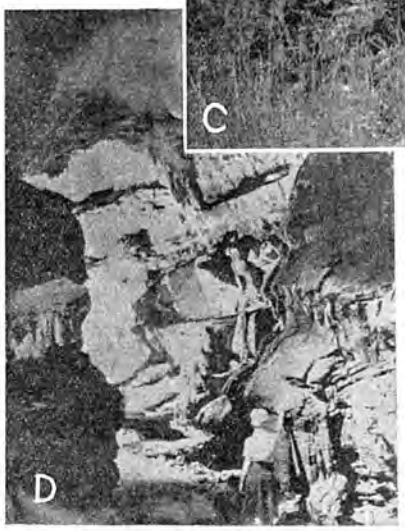


A—*Sampson's Pillar, in "Hanging Paradise"*

B—*Mammoth Stalactite (and no letters, please: I know it! Ed.)*

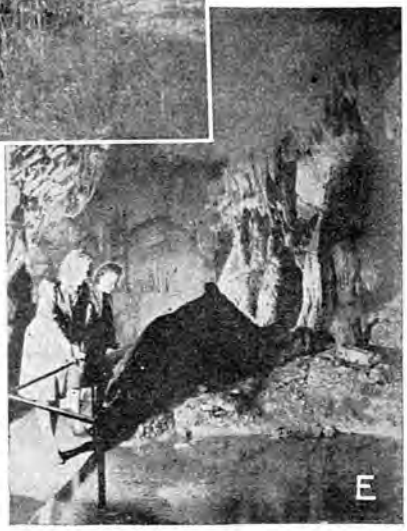
C—*Group picture, taken just before we started out, at the Caverns. Standing, left to right, Harland Wood, L. E. Ward, Elmer Hinkleman, John King, Supt.; kneeling, Lou Klewer, and George White (who took the interior cave pictures and sketched the maps).*

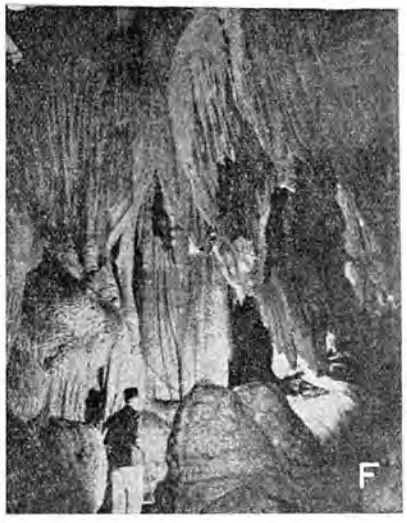




D—*Subterranean Natural Bridge*

E—*Subterranean Pool*





F—*Drapes, in "Hanging Paradise"*

G—*Hanging Gardens of Babylon*

H—*Beauty Parlor*

Editorial . . .

POTHOLE

☞ Through the contacts of Frank Solari, N.S.S. member from England who is likewise affiliated with several English caving societies, our library has received, among other publications, copies of *Dan-Yr-Ogof* Caves, Swansea Valley (Wales), *Official Guide*, an excellent 30-page illustrated handbook of the type we should have more of for our own caves in this country; and copies of *The British Caver*. This latter is the unique speleological journal edited, printed, published—and mostly written—by G. Platten, at Rotherfield, Fernhill Lane, New Milton, Hants, England. Platten's bulletin is worth a loan from our library; it is a completely fascinating volume. Incidentally, we have sent him a set of N.S.S. *Bulletins*, and —at his request—an article for his magazine on the Society, its aims and work.

Under "Object of the 'British Caver' ", Platten has a plea we cannot resist reprinting. "It is desirable that all discoveries on caves should be recorded and *available* to all interested; yet we must all acknowledge and regret that this is far from being realised: as many of the reports of past and recent researches and discoveries in Caves are only found in the pages of Journals of Learned Societies, half-forgotten books or even in the pages of newspapers. The *B.C.* is an attempt to collect, and give to all interested, all these scattered accounts, and so keep the sport of Caving alive . . . . *Now Cavers* pull together and send me your NEWS." (Echo of sorrow from *Bulletin* Editor that so many members publish cave notes and stories elsewhere—$ or ?) ☞ We are now, legally, *The National Speleological Society*. A certificate of incorporation was obtained in the District of Columbia in March of this year. ☞ The OWI, Motion Picture Division, is collecting data for a so-called "theatrical short" on Picturesque Caves of the U. S. A. ☞ Editor learns from 2/45 Newsletter about *Magazine Digest* article "20th Century Cavemen", by Edith Sterns. But what issue of that magazine? ☞ *Please*—when you or anyone you know gives a talk or lecture with or without slides anywhere or any time, on speleology, send a brief note of it to the Editor. ☞ Under heading of "Speleols Print", *The Fortean* magazine again gives the Society and its *Bulletin* a plug—a nice plug. Quotes dates, price, size, description, how to order, and calls it "a valuable number—if you care for caves . . . . (containing) . . . . maps, diagrams and photos of the approaches to Hell." ☞ Back in June '44 the W.F.A. converted a 75-year-old limestone mine near Atchison, Kansas into a natural refrigerator or "warecave," for Government-held lard, eggs, and other perishables. (U.S.D.A. Clipsheet, 9/23/44.) N.S.S. has been nagging Federal officials about such underground potentialities since the war started. Use of caves for food storage is not new: the Louisville and Nashville R.R. used several in the Mammoth Cave region for this purpose prior to advent of modern refrigeration; some food was stored experimentally in Luray Caverns at the time of the last World War. ☞ Dr. Holden wrote us: "The old issues of the *Bulletin* . . . . abounded with maps and sketches. (More recently) I have missed the maps . . . I feel (we should) publish the maps of all caves of which detailed descriptions are published." Any comments? ☞ For shame . . . Out of 278 active, life, and student members of the Society sent ballots to vote for 1945 officers, *only 75* were returned marked. Not that your Editor would have had the results any different; but that's a hell of a note in his opinion, when so small an organization turns in so feeble a vote. ☞ *Wanted to Buy*: *"Ten Years Under the Earth, by Norbert Casteret. (L. W. Foote, RFD #1, Middlebury, Conn.)* ☞ Members publishing articles relating to speleology are requested to advise the Editor in advance so that reprints may be ordered if they are of general interest. ☞ Clay Perry writes (5/14/44) of a cave (*not* Secret Caverns, he says, but neglects to say *what* one then) "in Schoharie County, the one with the 'nameless waterfall'.

"Dr. Stone wrote me that he had seen it. Did you know that they turn the waterfall on and off by electricity? It used to dry up and, for a time, they had a rope leading up to a pulley and attached to a watergate. You just 'pulled the chain' to get a waterfall . . . . A nice cave, nevertheless." ☞ The Society will pay 50¢ each for any *Bulletins* (Especially #1, 2, 3) in reasonably good condition. Copies are badly needed for Libraries and new members requesting them. Write or send direct to Corresponding Secretary. ☞ *Fauna*, the natural history magazine published by the Philadelphia Zoo, has a wonderfuly illustrated article in the March 1945 issue by our member Charles E. Mohr which you frankly shouldn't miss. It's called "Descent to the Underworld." It's excellent; as is also his map-feature (much data from NSS files) called "Caves—Where They Are and How They Form." ☞ We want someone *who can write it authoritatively*, to contribute an article on "Speleophobia and What to Do About It." Treat claustrophobia in caving scientifically, and then tell how to overcome it, *what to do when lost in a cave*. (If you wish to tackle this one, write the Editor: he has something already written on the underlined part which you can have for the asking.)

We want also an authentic story of "Caves in the History of Consumption." To include, of course, that story of the group of English (?) consumptives who built those stone houses in Mammoth Cave, and what came of their attempt at cures . . .

Other suggestions for articles: saltpeter manufacture and caves; caves in American, English, or other nations' literature; caves in the Bible; caves used as "underground railway" hiding places before the Civil War; that whole country, Loessland, in China, which lives in caves; most famous American speleologists and their feats; authenticated cases of people lost in caves; and round-up of classic legal cases in which caves have figured (for which we give you Stark v. U.S. 44 Fed. (2nd) 946, in which "evidence held not to show that cave searched without warrant ever constituted defendant's home," as a starter); etc., etc.

The Editor

Dr. Martin H. Muma spoke in Baltimore, on January 25 last year, before the Maryland Natural History Society, on "The Timber Ridge Caves (of Md.) and Their Fauna." His new book COMMON SPIDERS OF MARYLAND, was recently published.

L. E. Wilson gave an illustrated talk on "Cave Photography" at the January 12, 1944 meeting of the Army Map Service Photographic Society. John Meenehan's color slides, shown at this meeting, received many compliments.

Science News Letter for September 30, 1944, p. 217, has item of interest for speleologists. . .

Try to get the best known local spelling of caves always, but do not let inconsistencies bother you. Standardization in this matter is yet to come. (On this subject, see Introduction to *Lawrence of Arabia*. . .)

Colonel Strother (Porte Crayon, pseud.): "a mediocre artist and author," Officer in Secession Army. M., Miss Hunter, of Charleston. (See BULLETIN Number 3, N.S.S., p. 37: "A Visit to the Virginian Canaan. . .")
Frank Leslie's Illus. Newsp.: 6/22/61, p. 82.

Acknowledging up to 19th Scratch of V.P.I. Grotto *Grapevine*. Keep it going. . .

ANNUAL REPORT OF THE PRESIDENT

(1944)

In spite of the difficulties of maintaining a society such as ours intact during the present war, I take pleasure in reporting that our society has not only managed to maintain its existence during the past year, but has been able to actually constructively grow. This growth has been evidenced to some degree in all aspects of the society. Our active membership has increased to 247, including 22 Life Members, besides 28 Student members at last report still at V.P.I. (with over 50 ex-student members in the service) and 1 Institutional Member (Alabama Geological Survey). This total of 247 includes 16 members over $3 in arrears in dues (owing back of 1944) and 17 others not known to be in the service owing for all or part of 1944 dues. During the year 58 new active members have been obtained, including 7 Life members. One active member, Lt. Robert McKee, and one ex-student member, Don Covey, have been reported killed in action in the war theater.

Our organization has been substantially improved. The Board of Governors is now functioning efficiently and has arranged its work so that a minimum number of meetings is now required. Our committees are still our weak spot in our organization but we are gradually finding the right men to head the committees, and the functioning of many of them has shown improvement.

This year we have established our Newsletter on a firmer footing and we have at last a capable editor. The question of good mimeographing still remains to be solved. The improvement in the BULLETINS speaks for itself. Though our Editor has moved from Washington, he expects that with the aid of the entire membership in furnishing good material he will furnish us with constantly improved BULLETINS.

Our field work has been continued and though on a reduced scale its quality appears to be constantly improving as our members become aware of the advantage and satisfaction that comes from doing a good job in the field instead of merely taking a cave-sight-seeing trip.

Our effort to develop proper cave technique and safety measures has borne fruit in an absence to date of serious accidents while working underground.

Our Society has grown outside of our own country by the addition of two new members from Venezuela and four from England. Our Grotto organization has become stronger with the continual growth of the Richmond Grotto and the V.P.I. Student Grotto and the establishing of a Cleveland Grotto. Plans are now under way for an active Grotto in D. C. The V.P.I. Grotto now publishes its own grotto paper, "The Grapevine" which should be an inspiration to all other grottos. The Richmond Grotto has perfected a system whereby a small fee is placed on each activity, making it self-supporting. This should go far towards solving problems of Grotto financing.

During the last year the Commercial Cave operators established a trade organization "Cave Men of America." Plans for cooperation are being worked out and we both look forward to friendly, mutual cooperation as there is no conflict of interests between their organization and our Society.

This past year the Bylaws were amended to provide for institutional membership and Alabama University became our first institutional member. They were also completely revised in a clear copy incorporating all previous amendments. Copies will be available for members within the next month.

This Annual meeting with its ambitious program of Dinner, Entertainment, and Education, was a fitting climax for the year.

Respectfully submitted,
W. J. Stephenson,
President

"Marble Cave (Colo.) is in an old crater. To enter where circular hole begins, it is necessary to crawl 60-70 feet through old gas vent. When approached through this vent, the cave is about 60 feet below surface level and is entirely sealed over the circular hole that is about 500 feet in depth vertically. Cave is dry until one gets down 30 feet—then some little seepage.

"The cave, a volcanic fissure, is on the San Isabel National Forest, 12 miles southwest of Westcliffe (Colo.), at elevation of 11,000 feet. Contact to be made with Casper Hendrich, of Westcliffe, who can furnish saddle stock for ride up mountain to cave—4 miles from Hendrich ranch."

Paul Gilbert, District Forest Ranger,
Gardner, Colo.

(Ranger Gilbert, who discovered this cave in 1920, made extensive investigations in it a decade later. About 1932, the Denver *Rocky Mountain News* carried an account of his trip.)

Paea, Island of Tahiti, in French Oceania, has cave with "cool, underground lake." (From "Mr. Bolton's Birthday," by James Norman Hall. *Atlantic Monthly*, v. 173, no. 6, p. 71f.)

ELEMENTAL SPELEOLOGICAL EQUIPMENT

By W. J. STEPHENSON*

II—PARTY EQUIPMENT

As most all cave work is done or should be done by a party, there will be various items used which each individual does not need but yet are needed for successful cave work. Only those usually required in the average party will be discussed in any detail.

A partial list of such party items includes ropes, rope ladders, photographic equipment, mapping equipment, collecting equipment, miscellaneous scientific instruments such as thermometers, hydrometers, etc., miscellaneous general items, picks, geologist's hammers, etc., first aid equipment, and last but not least—food. (Water is usually no problem if one has been innoculated for typhoid and is not adverse to drinking from the clear pools and streams which are usually present in abundance. If the cave is known to be dry, then water must also be added; one canteen per party should, however, be ample.)

This party equipment can be divided up or all carried by one man. Both procedures have their advantages and the one chosen must depend in a large measure on the size and composition of the party and the objects desired to be achieved. It is recommended that all party equipment be carried in separate knapsacks and not carried on the person. Extra equipment carried on the person not only interferes with climbing and crawling but is more easily lost by falling out of pockets, etc.

Any ordinary knapsack slung over the back will generally serve all right as a carrying means, but when one often has to crawl, such a knapsack is a tremendous burden. All packs will often have to be taken off and pushed forward or dragged behind when crawling. Probably the most desirable type of pack for general cave work is a pack which can be slung over the shoulder by a single strap. Before the war, gas mask bags could be bought which were very suitable. If such packs are not well sealed (zippers are preferable) the things may drop out when the bags are pulled or pushed during a crawl. Someone behind you would find your camera and so on. A suitable single pack for a single person may have only one pocket and a large flap. Such a pack can carry flash bulbs, lunch and several other things. One disadvantage if each man has to carry his own bag is that each person is burdened. The Society has tried to design a bag for cave work and we hope after the war to have them made up in quantity. The author has experimented with a bag with six or seven pockets of varying sizes for various items and a main pocket. Generally this bag is far too big and heavy for the average party. It was designed for a three man party and probably would be more suitable for a party of five. It has the advantage, however, that only one man has to carry it at a time, thus leaving the other people relatively free. The bag designed by the Society is a smaller bag, approximately 12 inches long, 6 to 8 inches deep, 3 to 4 inches wide with 3 or 4 pockets, all closed with zippers. This bag should serve two or three men.

Most of the usual party items are very specialized. For photographic equipment one is referred to the article by John Meenehan in BULLETIN 1. Mapping equipment will be covered by a special article in the near future. Collecting equipment will vary dependent on the purpose of the collecting. In general, each party should have some small bottles of alcohol or other preservative together with a few canvas sacks of varying sizes. A small rigid container with absorbent cotton is desirable for carrying delicate specimens. Each party should also have at least one small camera, a supply of flash bulbs, compass, tape, and a notebook.

Ropes and rope ladders cannot be carried very well in the pack. However, various rope holders have been tried and all have some merit. Unless the cave is known to contain large drops or pits, a 100 to 150 foot coil of rope (usually carried over the shoulder) is sufficient for the average party. Such a rope is always desirable unless the cave is known in advance not to require it. Other ropes and ladders depend solely on the cave. They should not be added to the party equipment unless there is good reason to believe they will be needed. The same goes for all special items such as picks, tools, etc.

Food should also be taken in only when definitely required. All food carried should be as light and nourishing as possible. One does not go into caves for the purpose of picnicking so that taste and quantity are secondary items in food. If food is brought on a trip it is usually better to leave it outside to eat upon emerging and carry iron rations on the trip in the cave for emergency purposes only.

First aid equipment is a very controversial problem. Some members of the Society who are M.D.s generally substantiate the belief that it is not necessary to carry any first aid equipment in caves. One is either going to have a bad accident and an ambulance will be needed, or will have very minor accidents that can wait till one gets out. The accidents that are most likely to occur

* Continuation of article from p. 34 in *Bulletin* Number Six, July 1944.

are sprained ankles, broken bones, or minor abrasions. Sprained ankles from jumping on rocks can usually be treated on the spot by tying or bracing so that the person can get out. A man so injured can be assisted out by limping along supported on someone's shoulder. Broken bones need splints and probably a stretcher, except a minor break of the arm or rib. To always carry enough splints and material to make a stretcher and carry the man out is generally an impossibility. Tourniquets can always be improvised if needed. If a serious accident occurs, the best procedure is probably to have some of the party remain with the injured while the rest go after proper help and aid. Complete first aid equipment such as splints, stretchers, etc., should be carried in the cars but in view of all present experience it is thought needless to carry such equipment into a cave on a routine trip. Probably the only exception to the general rule for not taking first aid equipment into the cave is in the case of stimulants and pain relieving drugs. Morphine or its equivalent would be invaluable in case of a serious accident while waiting for help and getting the patient out. Though it could be easily carried, it encounters problems of first aid and medical rules that at present preclude it from being listed as standard equipment. Stimulants have in many instances been found most desirable and useful. Cases of severe fatigue often present, especially where the exploration has caused partial or total immersion in cold cave water, may be temporarily or fully relieved by judicious use of stimulants. However, stimulants should never be used unless the party is definitely on the way out and the end of the trip is near.

If there is excess room in the pack one can take along adhesive tape and bandages for blisters, etc. Outside of this and stimulants or pain relievers, there is thought to be no need for first aid equipment in the party.

It is hoped that this brief article will encourage more thought and study on the problems of equipment and that it will also encourage our members to write down their ideas either in the form of an article for publication or as a memorandum to the Equipment Committee to help them in the task of preparing on some further date, a complete manual on this subject.

"Cave Men of America" Organize

Early in 1944, Samuel L. Riely, Manager of Wyandotte Cave (Ind.), hatched an idea that he'd been setting on for years—and an association of cave-owners and managers came into being. It was named, appropriately, Cave Men of America.

"I had thought for years of such a trade organization," said Riely, in a letter to W. J. Stephenson, President, NSS., "and found, after organizing the CMA, that several others had had such an idea. But no one had gone into action. I was greatly encouraged by the results and knew that we can accomplish much—especially after the war, when we can get together in large numbers."

Correspondence with Stephenson, who offered the new association the full cooperation of the NSS, indicates that many Society members are listed among the CMA's membership; also, that several new NSS members have come in through CMA, having heard of the Society for the first time through newsletters from the new cavemen's group. Riely, incidentally, is one of the latter.

"The CMA," Riely further explains, "is really a trade organization of commercial operators, the last among business men to organize a trade association. Its purpose is to try to do jointly a number of things that none of us can do singly, and to further fellowship and cooperation among its members.

"It in no way conflicts with your group (NSS). There are several ways in which we can cooperate, however—one of which is making people cave conscious."

Initial meetings of the Cave Men took place at Wyandotte on April 5 and 6 of last year. The following news story appeared soon after, heralding formation of the group:

"Cave men were the first people in America to organize for reasons of collective security and now, centuries later, they are just about the last group of people with a mutual interest to organize in a modern sense of the word.

"Managers of the nation's largest caves yesterday completed at Wyandotte Cave, near Corydon, Ind., organization of the Cave Men of America—a group dedicated to the furthering of the lure of caverns in the postwar period.

"Representatives of seventeen caves in thirteen states attended the organization meeting at the Wyandotte Hotel and elected I. E. Smith, of the Ohio Caverns, West Liberty, Ohio, as the first president of the group. J. Frank Campbell, Chattanooga, Tenn., manager of the Cave of the Winds, Colorado, was elected vice president, and Sam. L. Riely, manager of the Wyandotte Cave, was elected secretary.

"Riely, instigator of the movement, said yesterday that the organization of cave managers had been under consideration for several years, and that the purpose of the body 'will be, like that of any other trade organization, to further plans of mutual interest and to benefit in a national manner the postwar period.'

"Directors of the newly organized group include H. H. Galloway, Burnett, Texas, manager of the Long Horn Caverns, Texas; Virgil Clymer, manager of the Howe Caverns, New York; Charles M. Reis, St. Louis, Mo., manager of the Onondaga Cave; Mrs. W. P. Cox, manager of the Great Onyx Cave, Kentucky; John T. Menisee, manager of the Lookout Mountain Caverns, Tennessee; and Dr. Robert Pohl, manager of the Mammoth Onyx Cave, Kentucky.

"States represented at the meeting were Indiana, Kentucky, Ohio, Missouri, Texas, Florida, New York, Virginia, South Dakota, Wisconsin, Maryland, Tennessee and Colorado."

On November 15, 1944 the minutes of this first meeting were sent to CMA members. A "Spring Letter—1945," from Riely, dated April 1, indicates

the organization is growing in size and interest to cave-owners, and carries a wealth of trade gossip that makes good speleological reading.

At the moment of writing, the Purposes of Organization of CMA are set forth as follows:

"For the purposes of forming an association of 'Cave Men' or operators of American Caverns, as stated below, and because for some time many of us have had in mind such an organization, the association, hereafter called 'Cave Men of America' was born.

"To unite for the purposes of furthering things of mutual interest and benefit in a national sense.

"To get to know each other personally and in a social way and by so doing, create better understanding of problems that may affect us all.

"That by uniting, we may be of mutual help in that we can, at times, accomplish things of mutual benefit that as a single operator we would be unable to do.

"That in time we may be able, as a body, to convince the public and the government that caves are educational rather than a mere attraction such as picture shows, amusement parks, etc., with which we naturally have to compete and should be separated from, in the general mind.

"That, without giving another cave any secrets or so-called tricks of operation that we may use or that have become a part of our stock in trade, we may swap experiences and talk shop, to our mutual help and advantage.

"That, without binding by agreement, any cave or section, or by any entangling alliance in way of adjusting rates or mode of operation or ethics, we can, by united effort and fraternizing as a national body, and with no idea of interfering with any sectional rivalry or conditions, be of mutual aid.

"That, although we feel from the experience of some, that cooperation pays, yet it is not the intention of this association to meddle into the sections where animosity may exist between local members, which must be worked out according to their desires, unless the association is called in to help settle some situation, by all concerned.

"That although with a war on, some may think this rather premature, we feel that by starting now with a nucleus, growing from year to year, that by the war's end we will have developed into a more perfect organization, that will be in full bloom then, and be ready to function to a better degree in solving postwar problems that may affect us all mutually.

"That by the reaction, so far, all have seemed heartily in favor of such a group and although some are delaying membership until later, until the real purposes are clear, we feel the organization is mutually one that can go far in fellowship and service to us all.

"That no membership fee be levied, except for the one dollar agreed upon to cover postage and printing of a secretary in getting out quarterly reports, so as to leave no idea that this is a project by any one major group for personal gain.

"That in future, annual meetings be arranged, at least in a regular way, after the war and cessation of rationing, agreeable with invitations received each to pay his way, except for cave trip, perhaps or such other entertainment as operator may want to provide."

Suggestions for Setting Up Funds

The form letter that I had in mind sending to the Finance Committee together with the questions to be answered should have explanation.

In studying the problem of Society finances, I have tried to conceive what the Society should be to take its place in a scientific world, and what the Society should do if it is to carry out the purposes for which it was organized. It is perhaps needless to say we should think of it as carrying on indefinitely for many years to come. If so, we should of course take a long-term viewpoint in laying a program for the Society. The programs of the various committees of their own accord weave into one another and are interdependent. The Finance Committee we recognize as a key committee.

The Finance Committee must consider the attitude of the public to the Society, the attitude of prospective grantors, the members' reaction to finance matters, and many other relative considerations. We must think of it as a long-term organization which in time will require large sums of money as it uncovers scientific evidence and makes it available. In solving the current problems we must not lose sight of the broader ones.

The purpose of the form letter was to tap a new source of revenue. Many members would contribute toward a "Fund" in preference to publishing the BULLETIN. Members feel they are entitled to the BULLETIN as a right of membership, and may object to paying for it twice. A number of "Funds" could be started, each for a definite purpose, but care should be taken not to confuse the purposes to the members.

Your suggestion to call the Fund an "Endowment Fund" or "Reserve Fund" is good. "Surplus" would indicate an amount set aside from earnings as extra or a surplus and, as you say, we do not have any extra now. An Endowment Fund could be one from which only the income was used, and a Reserve Fund in which the principal was usable. One type of Fund would appeal to some members, and another type to other members. I feel that we should finance not only our current expenditures, but also start building a Fund for future use. If the membership takes such a long-term view, as I think they will, we can expect outside contributions to such a Fund. The effort should come from inside the Society first.

As further inducement to build up an Endowment Fund, names could be given to each individual account: viz., "The Wm. J. Stephenson Endowment Fund," or "The J. S. Petrie Endowment Fund." The separate gifts could be published in the BULLETIN or even the total contributed by each, as an incentive to other members and as encouragement to the contributing member. Competition would make it interesting to the members and profitable to all.

Perhaps the BULLETIN could be used for the "educational purpose" referred to in the form letter. If so, it should be held to strictly educational lines so that it will serve that purpose. The value of the BULLETIN is fully appreciated, and we should make every effort to publish it. My reference to the printing of photographs and copy to go with it, was simply this: if we found it

impossible at this time because of cost to print photographs in the BULLETIN, to publish a leaflet with one or more photos with copy, as supplementary to the BULLETIN. The leaflets could be punched for insertion in a ring-binder, the pictures made suitable for albums or for framing. In this way we would be producing something of interest to the public as well as to members, which would be informative and educational. This is something that could be prepared and handled by a separate committee. If you wish me to clarify this suggestion, I can make up a sheet with a photo and copy and send it to you.

It is not my intention to make more work, as I know it must be a big task to publish the BULLETIN, but to present evidence of what we are doing and what we plan for the future, when we make an appeal for outside assistance. I want to be able to say, "Here is the evidence and we want your support." $10,000 is not too large an amount to ask for, if we need it, but our appeal should be as "air tight" as possible.

Le Roy W. Foote, Chairman,
Finance Committee (1943)

Several of the caves in Yellowstone National Park are veritable lethal chambers, being filled with poisonous gases which rise from the raging fires below. One of these, aptly named The Devil's Kitchen, has been boarded up for safety. (Remember the melodramatic ending of Seton's *Autobiography of a Grizzly?*

Caverse Corner

EACH NEW GROTTO

By Jay Espy

Find thee more spacious caverns, O my soul,
As the swift seasons roll;
Leave thy low-vaulted past;
Let each new grotto, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length art clear,
Leaving thine out-grown niche
To Time, and yester-year.

July, 1944

Adapted from Holmes' "The Chambered Nautilus"

CAVE MAN

By Dr. Geo. S. Duncan*

I do not doubt that the Cave Man,
Despite his flare for fights,
Was brave and bold, and good as gold
According to his lights.

He was not like our gangsters
So handy with his gat,
But guns were not so lightly got
Where he was living at.

The Cave Man was abstemious,
He looked not at the wine;
Nor yet rejoiced all night to hoist
The large and foaming stein.

But it must be remembered
That in those early years,
The world was dry, men could not buy
Such drinks as wine and beers.

No doubt he had his virtues
And merited high praise,
The rough old lad may well have had
Some very fetching ways.

Still it seems rather futile
His worth to dwell upon,
For since B. C. ten thousand three
He has been dead and gone.

* Professor at American University, Washington, D. C.

Contributed by R. W. Stone

Cave Card Developed for Files

At a recent meeting of the V. P. I. Grotto it was decided that the notes we have been collecting on caves have not been entirely satisfactory. In an effort to correct this, I was appointed to get a standard form that could be filled out by at least one person in every cave we enter. I found that we already have such a form in our files; but it has not been used for some time, and Dr. Jackson suggested that some changes may have beeen made since it was written.

I would appreciate any information that you could send me about this. Either a sample form or a list of the information that you consider most valuable would be very helpful.

Emmett Jefferson,
Blacksburg, Va. (1944)

The suggestion of the V. P. I. Grotto to have one member fill in a blank at each cave to completely describe that cave is excellent. The Society has been working on this problem for quite a period of time, but has as yet been unable to obtain any satisfactory blank for universal use. I myself favor an elaborate blank of the type which Dr. Jackson found for you in his files, especially if one person is to be made responsible for filling it in. I am enclosing several samples of

shorter blanks. The ones on the 5 by 7 inch card, and half sheet of paper, have been designed more for a filing system than for use in the field.*

I suggest that the V. P. I. Grotto undertake as a grotto project the designing of suitable blanks for field use. I think that a short blank and a long blank both should be made up. They should be sufficiently complete to allow full information for the society's files to be gathered from them. I suggest, also, that a committee of the student members, and Dr. Holden and Dr. Jackson, meet and design both a short and long blank for field use, that you mimeograph or type a few of them, and try them in the field. Then from your experience revise them and submit the revised ones to the board of Governors for approval as our standard field blank. When this is done these forms can be mimeographed or printed in quantity for the entire membership. They should either be filled in, in duplicate (it is clear that the field notes should be recopied), or made in duplicate by use of a carbon, one copy to be returned to the Grotto, and the other could be forwarded to N. S. S.

Let me again express my appreciation for the constructive work that the V. P. I. Grotto is doing. I hope that you will take up the designing of this blank and keep us informed of your progress.

William J. Stephenson

*As a result of this and other similar letters, the following 5 x 7 inch card was developed and 4000 printed up for use in our permanent files. The field data sheet is in the process of preparation. It is hoped that an article on recording of cave data will be available for BULLETIN No. 8.

NATIONAL SPELEOLOGICAL SOCIETY

WASHINGTON, D. C.

Cave Name (s) ..... State ..... County .....

Location ..... Lat.-Long. .....

Owner ..... Address .....

Manager ..... Address .....

Cave Type: Known length ..... Depth ..... Pattern .....

Safeness ..... Wet ..... Dry ..... Other .....

SPELEOLOGICAL INTERESTS:

Archeology .....
Bibliography .....
Biology .....
Folklore .....
Formations .....
Geology .....
Hydrology .....
Mineralogy .....
Paleontology .....
Photography .....

Statistics: Visited ..... Explored ..... Mapped .....

Previously reported ..... Photographed ..... Other .....

Material collected .....

Other information .....

(Use back if necessary)

Reported by ..... Date .....

For Index symbols see Master card.

Museum at Richmond

At a meeting in March 1944 of the Virginia Archeological Society, reported by Errol E. Emshwiller, it was indicated that a subsequent one would be held together with members of both the State Conservation Committee and the N. S. S. to discuss the possibilities of a permanent and temporary State Museum at Richmond to house archeological exhibits, and appointment of a State Archeologist to be curator of them.

A follow-up to this report, still hopeful, is contained in the following excerpt of a letter in December from E. B. Sacry, Secretary of the Virginia Archeological Society:

"Our Society plans to publish a bulletin as soon as conditions return to normal. We are collecting information from various members in the form of a survey of aboriginal sites, and will have this on hand to start. This information will be very valuable to the State of Virginia, when the state gets an archeologist, which we don't have now.

"There are plans being made for a new Museum of History, National History, Science and Archaeology. On December 21, our Society and the N. S. S. will hold a joint meeting, arranged with Mr. Faust of the Richmond Grotto. Incidentally, Mr. Robert Morgan has joined our Society, and he is a fine fellow. The purpose of our joint meeting is to get to know each other better, and try and work together since the work the N. S. S. is doing will dovetail with our own work. We have also invited the Richmond Chapter of the Archeological Institute of America to meet with us."

Nothing further in this direction has been reported. Such a museum, however, should it occupy temporary headquarters in the State Finance Building as presently contemplated, or have built for it a new and permanent building, is much to be desired. State collected and privately donated archeological exhibits MUST, sooner or later, find museum status or their values are lost.

Klewer Awarded Medal

From the October 1943 issue of *Scouting* recently sent to us, we are advised that our erstwhile Publicity Committee chairman, Louis A. Klewer (now overseas), is more noted than we knew. An article, "Hornaday Gold Medal Award Made," reads:

"The National Executive Board at its meeting on September 15th approved the presentation of the Hornaday Award for Distinguished Services to Wild Life to Louis A. Klewer, veteran Scouter of Toledo, Ohio. This is only the sixth time in the history of the Boy Scouts of America that the Gold Medal award has been made.

"Following are some of Mr. Klewer's outstanding services:

"Assisted in planting 14,000 trees and helped improve Boy Scout Reservation from 1917 to present time. This included release of 2000 rabbits and 3000 pheasants and 100,000 fish in conjunction with game protectors.

"Aided in creating a fish hatchery near Monclova, Ohio.

"Built and maintained 50 feeding stations.

"Made 500 talks on conservation, bird life, wild life, to Boy Scout Troops, school nature clubs and public audiences, totalling 60,000 people.

"Assisted federal and state game protectors and served as a Deputy Game Protector for Lucas County from 1924 to present time.

"Wrote a daily outdoor column for Toledo newspapers for 20 years, advocating conservation of wild life and of natural resources."

Amen to This

I feel we should keep the organization going although our thoughts are and should be primarily on the grim business of war. We must continue to give our utmost support to our country and the men and women struggling to bring victory.

However we are sure that brighter days are ahead, and that with peace will come a new and greater interest in our work in exploring "America's last frontier."

Archie K. Cameron,
Mgr. Mark Twain Cave, Hannibal, Mo. (1943)

I wish to state my appreciation of the sentiments expressed in your letter. It is the unanimous opinion both of the Board of Governors and myself that everything must be subrogated to winning the war. We feel, however, nearly a sacred duty to devote all of our remaining efforts to keeping the Society intact so that when our members in the Armed Forces return they will be able to continue their cave work where they left off. In spite of the war, I believe the scientific aspect of the Society is being maintained even though our field work is necessarily suffering.

The President.

Commercial Caves

CACAHUAMILPA CAVE, MEXICO

By VICTOR S. CRAUN

When speaking of caves, the size seems to be the main point of interest of comparison. In making these comparisons, two well-known caves are generally referred to—the Mammoth Cave and the Carlsbad Caverns. These two caves are distinctive in themselves; but, by using them as mediums of comparison, little definite information can be acquired of benefit. These caves are generally considered the largest caves known. Mammoth is not the largest cave in the world, as it is thought to be, if the comparison is made as to its pits and domes; but, if as to length of open cavities, it is the longest cave known, having approximately 150 miles of open cavities. If Carlsbad Caverns is used for comparative purposes, the Big Room is supposed to be the largest underground cavity known; but, as to the length of the known open cavities, other caves have been explored far greater distances.

A good picture of the Cacahuamilpa Cave could not be presented by following closely to a comparison with other caves. Every cave is different, and must be described for its own distinctive features.

The cave is 96 miles south of Mexico City, and is reached over the beautiful Acapulco highway via Cuerna Vaca. About two miles of Cacahuamilpa is shown to visitors. Through the entire length of the cave shown, one can trace the bed of the enormous subterranean river which was the abrasive agent that helped to cut out the primary cavern. The other agent was erosion by acidulated waters. Both agents played a great part in forming the cave, first the erosion followed by the abrasive agents.

The cave has never been thoroughly explored, but the length is estimated to be 25 miles. This is by no means an off-hand guess. The cave is a strike and joint plane type; and, at Taxco, 25 miles southwest (the general direction of the cave), this same strike and joint characteristic and the same subterranean river bed, have been reported.

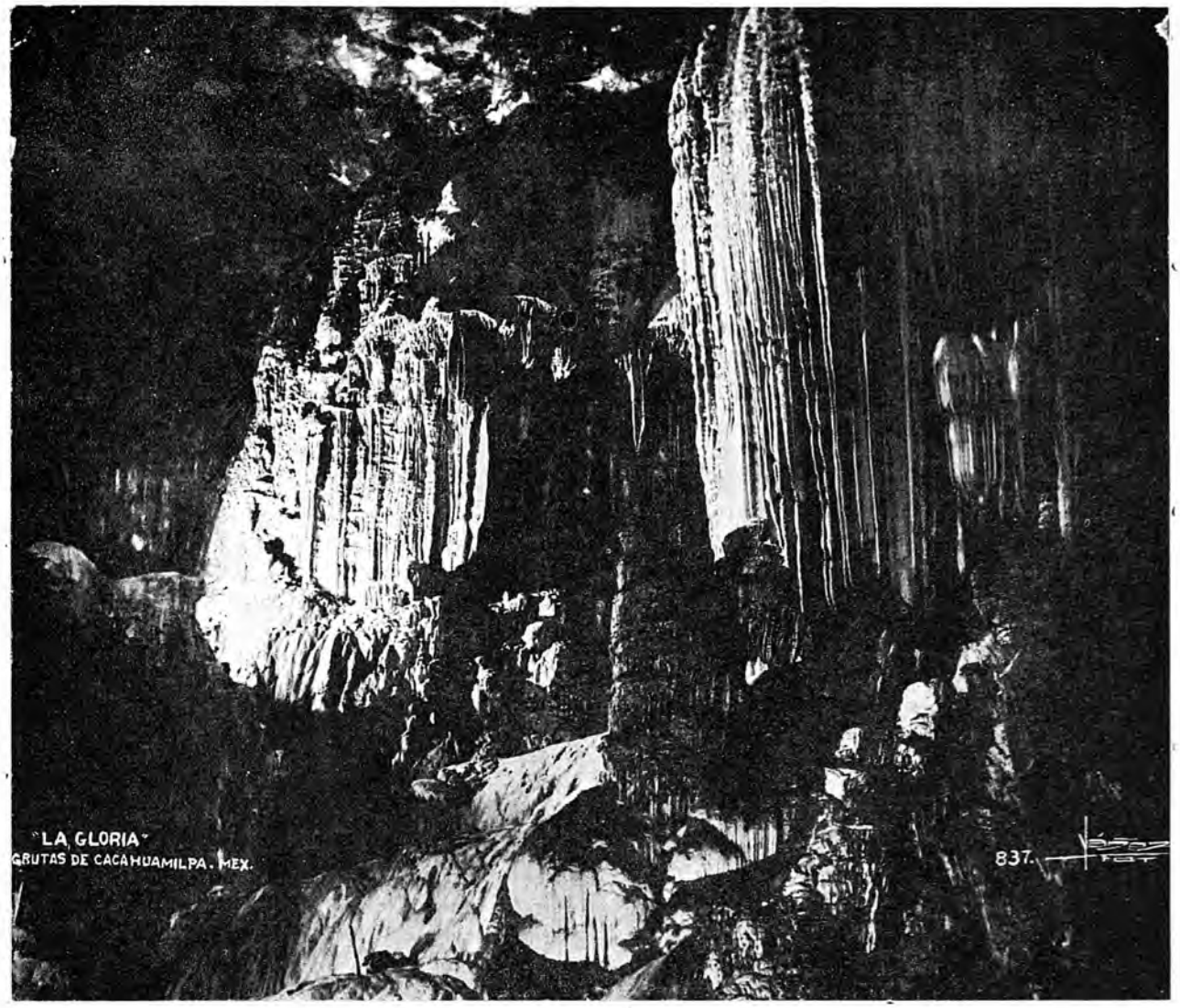
Until a few years ago, to reach the cave entrance it was necessary to drop down into a deep ravine, following an old trail or path, by holding to shrubbery on the side of the canyon, then ascend by the same method by the trail to the mouth of the cave. Now, an easy grade, several stairs, and a high suspension bridge, make the approach easy.

Whether the cave was used by the Aztecs and Toltecs is not definitely known. But after close examination of the cave one may conclude that it may have been used by both. A major indication lends proof of this, namely, the artificially closing of the mouth of the cave. Thousands of tons of debris, possibly coming from the interior of the cave, has been deposited in the mouth of the cave, filling it to within 8 or 10 feet of the top of the opening.

When entering the cave from the opening, one must descend by stairs to the cave level 100 feet below. On the outside, from the embankment, one can see the old river bed below at about the same level as the cave floor. This enormous fill could have been made by the Toltecs for protection against their common enemy, the Aztecs. These protective measures were not uncommon with both the Aztecs and the Toltecs to protect their monuments (pyramids) and their culture. This is shown where gigantic tasks have been performed to cover their pyramids to make them appear as common buttes and mounds. This is the record of most of the pyramids in Mexico. The Teopanzolco pyramids, 2 miles out of Cuerna Vaca, are a fine example of concealment. The pyramids were so well covered that they were only discovered by accident. During the revolution in 1914, soldiers were digging into a high mound to set a piece of artillery to be used in shelling Cuerna Vaca, and struck a series of steps of the pyramid. Ten years later a government scientist excavated one of the pyramids; others are still to be excavated.

However, no Aztec or Toltec artifacts have been reported found in the cave. The cave was quite inaccessible, yet these early people were brilliant scientists,

The fountain, in Mexico's giant Cacahuamilpa Cave, a beautiful flowstone formation as lighted for visitors.



La Gloria, Fantastic pendants, flowstone, and "rapids" in Mexico's famous Grubas De Cacahuamilpa.

living in areas near the cave, and no doubt knew the cave thoroughly. The earliest modern record of any visitors to the cave is that of three Mexican generals who inscribed their names in the 3rd salon from the entrance, in 1776. Many other names can be found of later dates.

The present mouth of the cave is not the original entrance. It may have been a few miles down the canyon or at the mouth of the barranca. It appears that the entire canyon was at one time a part of the cave, the roof having fallen in, the sides weathered, and the talus carried away by water. Along the canyon walls, stalactitic material and calcite crystal can be observed as part of the walls.

The four distinctive features of the cave are: the general direction of the cave; the massive stalactites and stalagmites of the secondary fill; the vast cavities; and the temperature.

The cave follows a straight course southwest as far as it has been explored, and the floor is practically level in all of the 21 salons except where large piles of debris have fallen from the ceiling. Most of the salons are large, with many massive formations. Unlike many other caves, it does not honey-comb or meander through the entire distance, but follows one great channel varying in width from 100 to 400 feet, with ceilings from 100 to 300 feet high. By comparison, the largest room in Carlsbad Caverns is the Big Room, approximately 300 by 700 feet. The Big Room is not really a clear cavity but has a great amount of secondary fill; the largest room in Cacahuamilpa may not be quite so large, but it is an open cavity, the ceiling

estimated to be over 300 feet. Skyrockets have been set off from the floor but did not reach the ceiling.

At one time, in the formation of the cave, the stalactites had a much faster growth than the stalagmites. This was before the canyon roof caved in, and when the temperature of the cave was approximately 56 degrees. Since the cave has been in its present form, the growth has been almost entirely on the stalagmites. This condition was due to the different water volume precipitation from the cap rock, and the change in the cave temperature during the two different stages of formation, before and after the canyon roof had fallen in.

Even though with the mouth of the cave 90 percent closed at present, the temperature is 10 degrees higher than the average of other caves, being 64°F. With the mouth of the cave unobstructed, as it was millions years before the debris was placed there, the temperature would be 5 to 8 degrees higher, the ideal temperature under which the massive stalagmites were formed. Due to the rapid dripping of the water through the cap rock, little was retained on the ceiling to form the stalactites, and practically all was solidified on the floor forming stalagmites due to high temperatures and the equalization of the atmospheric pressure.

It is not unusual to find stalagmites 20 feet in diameter and 100 feet in height in many of the salons. A great many stalactites which were formed before the canyon roof caved in, and which have fallen from the ceiling, caused by some seismic disturbance, are of great size. A part of a stalactite measuring 14 feet in diameter and 40 feet long is lying on the floor. Since its fall from the ceiling, a stalagmite four feet in diameter and 20 feet high has grown on the fallen stalactite. Another fallen stalactite 16 feet in diameter is known as the Aztec Calendar stone, as the distinct climactic period rings showing in the formation give the calendar effect. Most of the cave is dead, that is, no water is coming through the cap rock to continue the building up of the secondary formations, except in a few salons. In these salons there is the rapid dripping—almost a stream at some places—building up the stalagmites as it has been doing for millions of years.

Another feature, although not peculiar to this cave alone, are the fine marine floors. They are found in large areas in several of the salons. Another unusual feature is the Paleozoic river bed. Several places along the route, a strata of river stones and sand, not solidified, three or four feet thick is interstratified between thick, sedimentary rock hundreds of feet below the surface. This Paleozoic river had nothing whatever to do with the cutting out of the primary cave.

The evidence of the active subterranean river is easily noticeable throughout the cave. Outside the cave the river can also be traced. Under the suspension bridge one crosses to reach the entrance to the cave, is the dry river bed which was one of the outlets to the subterranean river. Its elevation is approximately the same as that of the cave level. The other outlet is the river bed at the bottom of the fill in the mouth of the cave.

The old subterranean river sought a lower level; and, from the mouth of cave one may observe, 200 feet below, the roaring torrent of the Amacuzac river rushing down the canyon, reaching the old cave level before the roof of the canyon had fallen in. From the cave one can follow a newly completed trail, one-half mile to Dos Bocas or "Two Mouths", the name given to the place where two subterranean rivers emerge and meet to form the Amacuzac river. How far these subterranean rivers run into the mountain no one knows, but it is possible that they may connect with cavities and the Devil's Throat, the bottomless pit of horror, near Taxco.

Very little coloring is found in the cave because of the purity of the limestone cap rock. Most of the formations are pure white calcite, but occasionally well-colored onyx can be observed. However, these white calcite formations are covered in many places with a black substance which looks like soot, but its identity was not determined. Where the cave is alive, the water has kept these secondary formations perfectly clean and white.

Like other caves, many of the formations have been given names; but too great an emphasis has been placed on historic characters, and one ruins his imagination and temper in trying to decipher them.

Many features found in other noted caves can be duplicated in Cacahuamilpa cave. Marvelous flowstone cascades blanket the walls in many of the salons. It has its organ and drum, each with magnificent volume and resonance. Its lakes and fountains are worthy of mention, and lend fine atmosphere to the surroundings. The cave also has its legends of tragedies and romances, all of which gives the proper cave feeling to the visitor.

Reference:

"A la Caverna de Cacahuamilpa en Automóvil" by Salazar Salinas, Mexico Geological Institute, Universidad Nacional De Mexico, Mexico City, D. F. Price: $1.00 American. Do not send currency unless $2.00 bills.

Reprints . . .

ON THE FORMATION OF STALACTITES AND GYPSUM INCRUSTATIONS IN CAVES

By GEORGE P. MERRILL,

Curator of the Department of Geology, U. S. National Museum

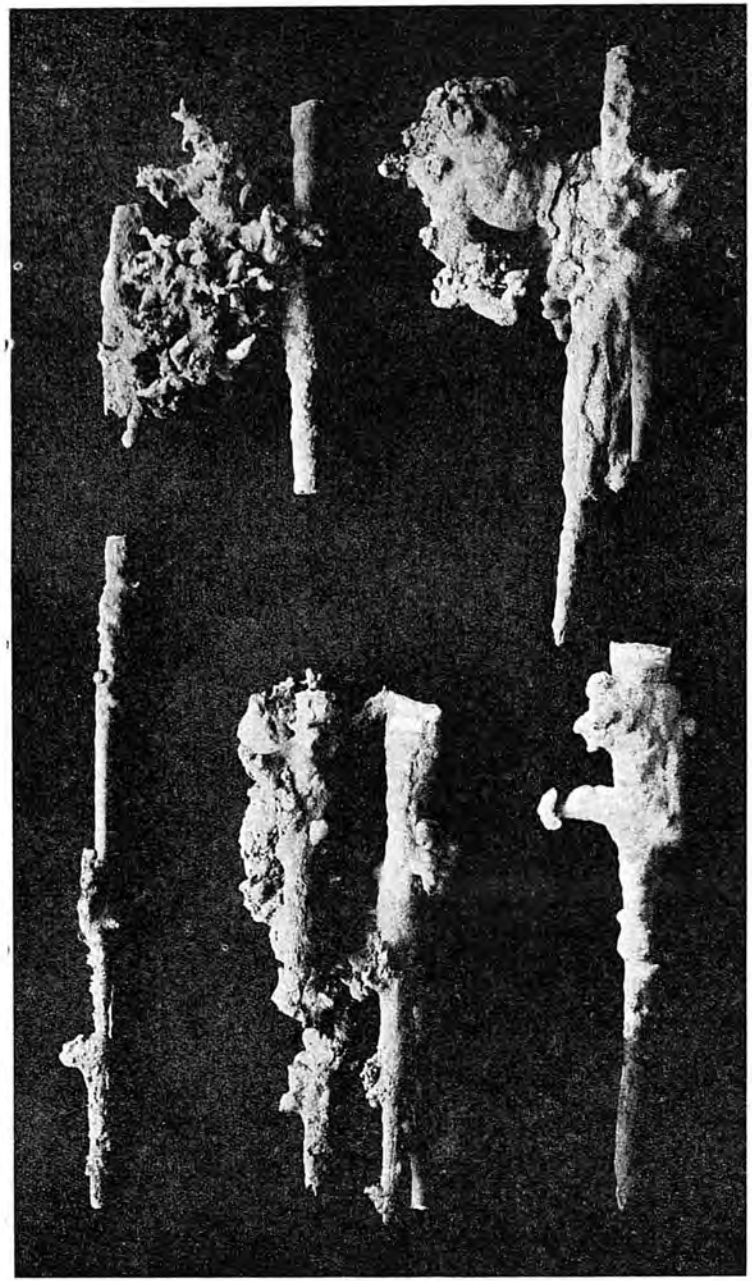
During the season of 1893 work in connection with the World's Columbian Exposition took the writer into a considerable number of the limestone caverns of the eastern United States and afforded him opportunity for observations regarding the methods of formation of the interesting deposits noted in the title. The results of these observations are given herewith,* it having seemed to me that, while no new principle is involved, the subject as a whole has not received all the attention it deserves.

Stalactites.—The manner in which the carbonate of lime in the form known as stalactite and stalagmite is deposited is, in brief, as below: Water filtering through the roof of a limestone cavern, is, in virtue of the carbonic acid it contains, enabled to dissolve a small amount of the lime carbonate, which is again deposited when the excess of carbonic acid escapes either through relief from pressure or the evaporation of the water. Conditions favorable to either process are furnished by the water filtering through the roof and dripping slowly to the floor beneath. In cases where the water filters sufficiently slowly, or evaporation is correspondingly rapid, the deposit of lime carbonate from the roof takes at first the form of a ring around the outer portion of the drop, a natural consequence of the evaporation of a suspended drop of liquid, as may readily be shown by laboratory experiments. This process may go on until the ring becomes prolonged into an elongated cylinder, or tube, the diameter of which may not exceed five millimeters, though usually ranging from five to ten, and of all lengths up to 50 cm. In exceptional cases this length may be exceeded, but owing to the delicacy of the material, the stalactite usually breaks of its own weight and falls to the floor before a length of even 100 or 150 mm. is reached, to become imbedded in the stalagmitic material there forming. Lengths of even these dimensions are comparatively rare for the reason that the tube becomes shortly closed, either at its upper or lower end, usually the upper, and all growth from the extremity alone ceases, subsequent deposition being wholly exterior, and taking place in the form of concentric coatings of the carbonate on the outer surface and at the same time from the top. There is thus formed around the original tube a compact cylindrical mass, in its typical form constricted at point of attachment but thickening rapidly, and then tapering gradually into an elongated cone. The material of the stalactite is not always wholly carbonate of lime, but in some cases thin intervening coats of iron disulphide are met with; these are rarely more than a millimeter or so in thickness. Such forms have been found in the caverns of Luray, in Virginia. The presence of a magnesian carbonate in these deposits has not been detected in any amount. Through a crystallization which must be nearly contemporaneous with deposition, or at least while the stalactite is still saturated with the carbonated waters, the mass of the material undergoes an arrangement which is sometimes distinctly fibrous (aragonite), the fibers radiating from the center outward, and not infrequently being curved downward—that is, curved in such a manner that when the stalactite is broken across it shows a concave and convex fracture, the concavity being uppermost—toward the top of the stalactite. In other cases the structure is granular throughout, through the development of calcite rhombs. In the stalactites from Weyer's Cave, Shendun, Virginia, the entire center is sometimes occupied by large (10 mm.) rhombs of clear calcite, from which radiate horizontally elongated forms of the same mineral. It is safe to assume that such crystallizations are wholly secondary.

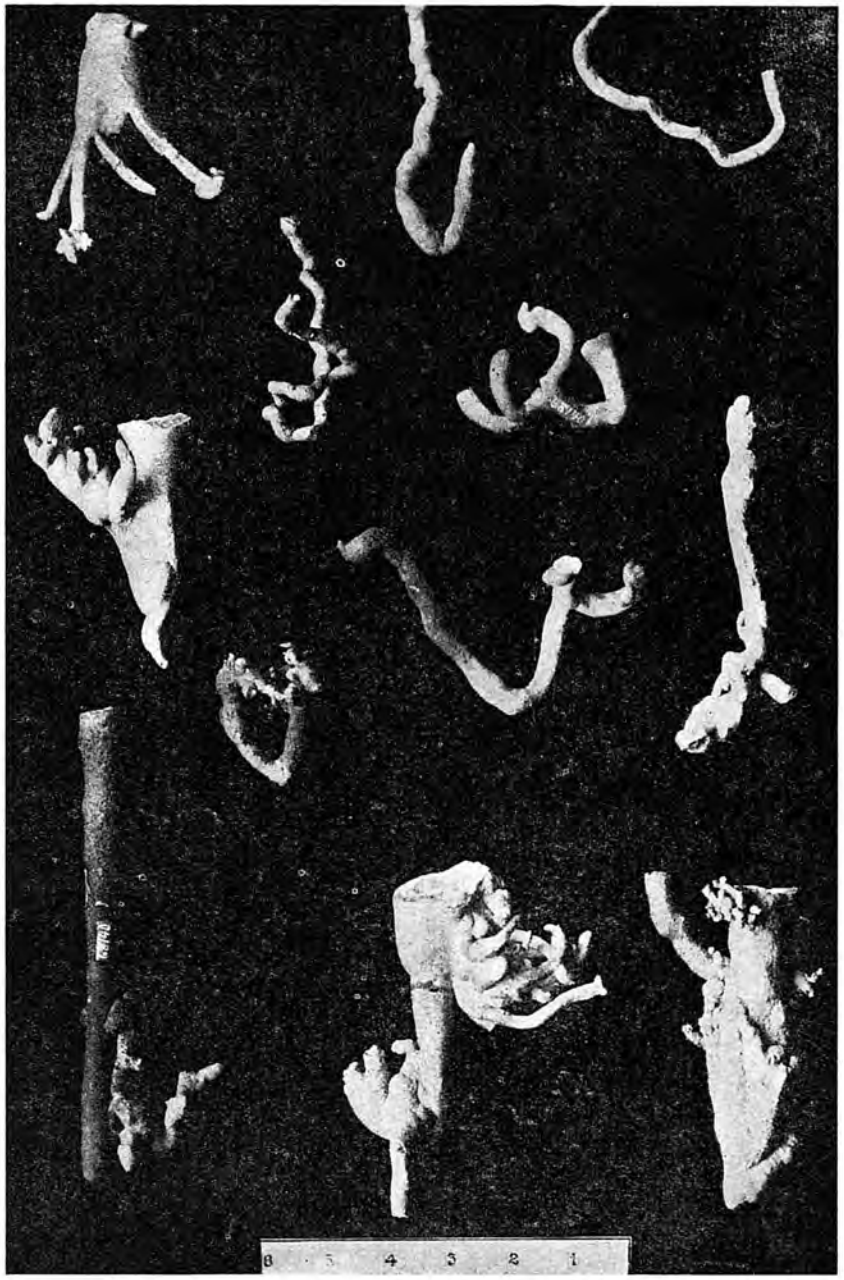
It is a natural consequence of their method of deposition that stalactites of the type described above are as a rule nearly straight, and hang approximately perpendicularly from the roof. Exceptions to this rule will be noted below.

In the Wyandotte Cave, and to a less extent in some others, a peculiar vermiform stalactite is found which is quite at variance with those described above. They occur in clusters or groups both on the walls and ceiling and are remarkable for their peculiar fantastic twistings and turnings, which in extreme cases are almost Medusa-like. Their appearance can best be understood by reference to Pl. I, the scale being in inches. This shows a number of detached stalactites both simple and branching. The point of attachment is uppermost in the figures, with but one exception. In order that there be no misunderstanding I have placed the numbers always at the broken end. It will be observed that the processes of deposition already described fail to satisfactorily account for these forms, in which the law of gravity seems to have been set at defiance.

*Proceedings National Museum, Vol. XVII—No. 985



Pl. III—Irregular Stalactites, Luray Caves, Page County, Virginia



Pl. I—Irregular Stalactites, Wyandotte Cave, Indiana.

In fig. 2, it will be noticed, the stalactite after growing irregularly downward for about 4 inches turned upward and grew in this direction for half its length. No. 3 grew downward for an inch or so, and then in a nearly horizontal and upward direction for three or four inches. Number 4 is a singularly contorted form, having turned on itself and grown irregularly upward till its free, growing end, was within an inch and a half of the starting point, or point of attachment. This stalactite weighs, entire, only some 21 grms. Number 5, after growing downward a short distance turned to the left for about the same distance and then threw out three branches, which, when the specimen was collected, had grown upwards until they nearly touched the roof.

In the caverns of Luray, Virginia, are likewise occasionally found peculiar distorted forms, though of a nature quite different from those of Wyandotte, as may be observed by reference to Pl. III. These lack entirely the vermicular forms characteristic of the last named, and may be best compared with the peculiar wart-like excresences and knurly branches which sometimes appear on trees, as a result of injury from insects. Such have been called helictites (from the Greek *heliks* a spiral.)

The cause of these singular distortions of form has not, so far as I am aware, been satisfactorily determined. Dr. Hovey, in his Celebrated American Caverns (p. 185) ascribes the Luray forms to "lateral outgrowths, having fungi for starting points," or, in other cases to crystals shooting from the side of a growing stalactite thus transforming it into some grotesque shape. In his later writings he has seemed to incline more to the view of considering them as "tricks of crystallization." Dr. C. S. Dolley* was inclined to regard these horizontal off-shoots as due to spider webs. He says:

"After some time spent in a vain search for an explanation of this anomalous structure, we happened to notice two specimens, the incipient branches of which were directed toward one another; stretched tightly between the branches, and entering the hollow tip of each, was a delicate thread, bearing a string of dew-like drops glistening brightly in the candlelight. Further search revealed numerous specimens in which the lime water trickling down the stalactite met a similar filament, and being partially diverted had formed a drop at point of junction; about this drop beautiful aragonite spicules were forming the hollow horizontal branch, the drop of water in the end being retained in position by the filament piercing it and upon which it gradually pushed along as evaporation deposits the lime behind it."

Dr. Brezina in his "Wie Wachsen die Steine" describes distorted forms as due to currents of air, but inasmuch as those of Wyandotte Cave radiate in every direction, it is obvious that they can not be thus accounted for. Prof. Collett in describing these last, in 1878, speaks of their growing from the bottom outward,† an error which can, I think, be accounted for only on the supposition that at the time of writing his thoughts were fixed upon the peculiar gypsum efflorescences (to be described later) and which are thus formed.

It is probable that the various forms of distortion and departure from the straight tubular forms are to be accounted for in several ways. An examination of the Medusa-like forms of Wyandotte reveals the fact that they occur not as dependents from the naked limestone of the roof, but are offshoots from a stalactitic crust which forms first, and which varies from a mere film to several inches in thickness. They occur sometimes singly, but more commonly in groups, or clusters of several, ranging in sizes from 3 to 10 mm. in diameter. Closer inspection reveals the fact that while in most cases tubular, the tube itself is of almost microscopic proportions, being as a rule less than half a millimeter in diameter. So small is it, in fact, that capillarity, not gravity, is the controlling principle in giving direction to the lime-carrying solution. A small spicule of calcite crystalizing 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 deposit takes place, for a time, more rapidly on one side than on the other, perhaps partially closing the orifice or giving it a different direction. The essential fact is, however, that it is to capillarity, and not to gravity, that is due the peculiar vermicular forms. Why, at the outset, the stalactite should begin to form through many small capillary tubes rather than through one larger, as is ordinarily the case, I will not pretend to say. It is to be noted, however, that in Wyandotte, the roof forming limestones are nearly horizontal, while in Luray and many other caves they are highly tilted. This results in a more even percolation of the water in the first instance, the roof being more homogeneous. It is possible, therefore, that the water gathers in drops of smaller size, and very likely in smaller amounts. I have no other than hypothetical data for this last assumption, however.

The peculiar warty and distorted forms shown on pl. III, from Luray, I believe to be also due to the action of capillarity. In this case, however, the side excrescences are of secondary growth, the stalactite having first

* Proc. Acad. of Nat. Sciences, 1886, p. 351.

†"The Pillared Palace is entered by a broad doorway, flanked by stalacto-stalagmites, while within, ceiling, cornices, and shelves are fringed with stalagmites and frosted with a never ending medley of strange, crooked, writhing, twisting unsymmetrical sprigs of white limestone, pushed out of the solid rock, and still growing by propulsion from the bottom; one cluster is a realization in stone of the horrible, snaky tresses of Medusa." John Collett, in Rep. Geol. Sur. of Ind., 1878, p. 475-76

formed, in part at least, in the ordinary way. Through a 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 being met, it paused long enough for the necessary precipitation to take place. Such forms are, in brief, but "tricks of crystallization" due to capillarity.

Gypsum incrustations and rosettes.—As is well known, Wyandotte and Mammoth Caves yield in their older, dry, chambers, not stalactites of carbonate of lime, but incrustations of gypsum in botryoidal masses, acicular crystals, and sometimes in the form of beautiful snow-white rosettes composed either of thin blades or acicular crystals of gypsum grouped around a common center and curving outward. The individual blades are rarely more than a few inches in length, six and eight inches being the maximum of the single curved blades. The method of growth of these forms is plainly by additions to the bottom, or more properly, to the end attached to the wall. They seem to have grown outward precisely as does the hoar frost in loose soil, where the moisture, rising by capillarity, freezes as soon as a certain level is reached, so that the older and first formed portions are ever pushed upward so long as the supply below is continued. As in the formation of hoar frost, particles of earth are lifted upon the tops of the ice spicules, so here the growing gypsum having begun forming in a crevice not infrequently forces off pieces of the limestone of considerable size. The last formed crystals having pushed the first formed nearly an inch out of place, the line of separation between old and new being indicated by the smaller size of the later formed spicules. As the crystals form and are pushed outward they are in most cases in a condition of strain, which causes them to curl and twist in a remarkable manner. The individual blades or spicules are but slightly attached to the walls of the cave, and except under very favorable circumstances it is nearly impossible to remove a rosette in a condition at all satisfactory.

THE CAPTIVES OF ABB'S VALLEY

A Legend of Frontier Life

by

The Rev. James Moore Brown, D.D.

Printed for the Author by The McClure Co., Inc., Publishers, Staunton, Virginia. 1942

(p. 17) "If they (frontier families in Abb's Valley southwest of Bluefield, West Virginia) formed an isolated community, there is full evidence that a dense population had at one time occupied this valley. Near the place where Mr. Moore built his cabin, there are found clear indications of an Indian village. The stone hatchets, flint arrowheads, and broken pieces of their rude pottery have been found there in abundance. But besides these, there are found in the country, caves that seem to have been either places for depositing the bodies of the dead, or of depositing their bones after the flesh had decayed. It is said that some of these bones are of an extraordinary size, and some have supposed that they belong to an extinct race that once dwelt in this region. Of the great numbers of skeletons in these caves, some idea may be formed from the following remarks, written in 1849, by a gentleman who had passed through the country:

"There is in Tazewell a cave, discovered not many years since, which contains a large number of human bones. I am sorry that I can not give the dimensions of the cave, as this would enable us to form some estimate of the number of skeletons it contains. I was not informed of its existence until after I had left its vicinity. This is my only apology for failing to examine in person this gloomy cavern of the dead. When first discovered, the cave's mouth was walled up with stones, on the removal of which the entrance was easy. One who had been in it, told me it was crammed with bones filled up all around. Many of the skulls and other bones were whole at that time. His impression was that there had been tons of bones in it." (1)

"NOTE 1. A stone fort, of great size, stood in Abb's Valley in Tazewell County, Virginia, and has but recently been removed. It would be an endless task to give a description of half the caves to be found in the county. There is much sameness about them. They are frequently the receptacle of vast numbers of human bones, of an extraordinary size, and thought to be those of an extinct race, formerly inhabiting this region. —G. W. L. Bickley, 1852. It looks like Dr. Brown had read Bickley.

"If this had been a favourite hunting-ground, or a favourite residence of the Indians, and the sepulchres of their fathers were there, it is not to be wondered that those who first settled there did not find it a safe home. Almost every year, and often more than once in the year, they were alarmed by reports that the savages were approaching."

Random Notes . . .

SCIENTIFIC

Note on Collecting Cave Spiders

The problem of the collection of cave fauna is one requiring different techniques for the several animal groups. Often specialists on one group will vary, each developing individual methods.

In collecting cave spiders the equipment consists simply of three vials (homeopathic or shell) and a small water-color paint brush. The three vials, one for each of the three cave zones, should be about half full of seventy percent ethyl alcohol. However, substitutes including propyl, methyl, and butyl alcohol may be used for temporary preservation.

True cave spiders as a whole are small, often less than a quarter of an inch long, and vary in color from a pale, reddish brown to a light yellow. Exceptions are found in the cave orb-weaver and its near relatives, which are one-half inch or more in length and dark colored. Specimens found at the entrance or in the zone of partial darkness often are more heavily pigmented than those in total darkness.

The small size and pale color of most species necessitate close observation to detect their presence. Such places as overhanging ledges, stalactite clusters, and the lower surfaces of cave lumber are more productive than smooth walls and flowstone formations. Moisture is also generally required, although dry rooms or passages are often inhabited.

When a spider is located, several methods of capture may be used. If the specimen is large it may be picked up by hand and placed in the vial. If it is small, and is resting on the ceiling or lower surface of a ledge, cave timber, or formation, the vial may be placed over the spider and then moved slightly to one side causing the specimen to drop into the alcohol. Small spiders on the walls or back in among stalactites may be most easily taken by wetting the brush in the alcohol and touching the specimen. If this is done carefully no injury will result: the spider simply sticks to the wet brush and may easily be transferred to the vial by redipping the brush in the alcohol. Many disappointing attempts may be avoided by the knowledge that most species will, upon being disturbed, immediately drop to the floor.

M. H. Muma

Long-eared Bats Like Cold

In Sinnit's Cave, near Thorn Creek, W. Va., we found long-eared bats hibernating with the room temperature at 42°F. Apparently these bats like it cold, and like relatively high elevations.

I have never seen these bats in caves having an entrance below the 2000′ contour, and they seem to be in nearly all caves above that.

W. J. Stephenson,
(letter to Charles E. Mohr, 2/21/45)

Notice and Description of Fossils in Caves and Crevices of the Limestone Rocks of Pennsylvania.

"Crevices, depressions, and caves of rocks communicating with the outside become receptacles of the debris of the surrounding country. The debris gradually accumulates more or less rapidly or slowly during a long period of time, according to the readiness of access and other circumstances. The materials mainly consist of the soil with fragments of rocks of the vicinity together with the remains of plants and animals of the region, which may have fallen or worked in from above or have been conveyed in by various means through lateral openings. . . .

"The accumulation of material in caves, being less liable to disturbance and the effects of the weather, than when exposed outside, is in a condition favorable to preservation for an indefinite period of time; and the subsequent examination of such accumulations has often led to the discovery of numerous remains of animals, which have given us more information of the character of the early inhabitants of the neighboring country than we have ascertained from other sources. In view of the knowledge thus obtained, it is of the utmost importance that whenever such remains are found they should be carefully collected and submitted to those who are qualified to determine their nature and relations. It is especially in the limestone that caves and crevices occur in which animal remains are deposited, and it is therefore to be particularly noted that in the quarrying of limestones such accumulations are to be looked for."

Joseph Leidy,
Annual Report of the Geological Survey of Pennsylvania for 1887, p. 1.

Eye Degeneration of *Nesticus Pallidus* Emerton in Luray Caverns

The following observation is based on the variation of the eyes of twenty-five spiders collected from Luray

Caverns, Luray, Virginia. Thirteen were taken on March 14, 1942, five on February 20, 1944 and seven on February 27, 1944. Five of the specimens were immature, eighteen were adult females and two were adult males.

Specimens of the cave spider *Nesticus pallidus* Emerton often exhibit degenerate eyes. Occasionally a spider lacks the anterior median eyes. No information is available, however, concerning the manner in which the eyes reduce in size and disappear. The spiders taken from this cave while not completely lacking the anterior median eyes often have them reduced in size. As the anterior lateral eyes seemed fairly equal in size throughout the series a comparison was set up using these as the constant. The anterior median eyes were checked on this basis and the results are given in Table 1 below.

Since 24% of the specimens had one eye larger than the other it appears that reduction of the two anterior median eyes is not simultaneous. Reduction in size apparently begins with the right eye as it is the smallest on all specimens having eyes of unequal size. This variation in size and number of eyes indicates that this species is in the process of adapting itself to a troglic existence and therefore may not be considered a true troglobite.

The data given above can be considered valid only for spiders taken from this cave as the eyes of those from other caves vary considerably. For example, a young male from Fountain Cave, Grottoes, Virginia has the right anterior median eye smaller than the left while a female from Mt. Etna Cave, Cavetown, Maryland has the left anterior median eye missing.

The author wishes to acknowledge the assistance and cooperation of the management of Luray Caverns during the course of this study.

SPECIMENS	A.M.E.[1] more than ¼ size of A.L.E.[2]	Left A.M.E. more than ¼ size of A.L.E. and right less	A.M.E. less than ¼ size of A.L.E.	Right A.M.E. missing
Males			1	1
Females	9	5	4	
Young Males	3			
Young Females	1	1		
Total	13	6	5	1

[1]A.M.E. = Anterior Median Eyes
[2]A.L.E. = Anterior Lateral Eyes

Martin H. Muma
Berwyn, Md. (1944)

On the Collection of Cavern Insects

"I. Collecting Instruments. . . . a word concerning the clothing to be used in cavern-work. . . . a sort of overalls of coarse linen, made in a single piece, fastened at the ankles, the wrists, and the neck, and protecting the whole clothing. A cord in an inner casing gathers the overalls in at the waist. The great pockets of the garment, and in case of need, its bosom can be made to hold all contrivances which can be used under such circumstances. When the search is over, the hunter lays it aside as the butterfly puts off the skin of the chrysalis, the protected garments having escaped all injury from the work in the cavern. It is even well to have this garment lined with leather on those parts which cover the knees, the elbows, and the seat, so that these parts may be soiled without danger of abrading them upon rough surfaces. In certain cases, where one is obliged to be upon wet surfaces, this improvement will serve to arrest the danger of wetting the body. If I had not read of this prevention I should have had my knees and elbows severely injured, as were those of a fellow-traveller, in certain caverns where it is necessary to travel for several kilometres in a crawling position."

(He lists, as "instruments for collecting," only three: "a lever, a spade, and a grappling iron.")

Elzear Abeille De Perrin,
Memoirs of the Geological Survey of Kentucky,
Vol. II, Part VIII. 1877. P. 6.

Warning to Cavemen

In a clipping sent us, U. of Texas' Dr. V. T. Schuhardt, bacteriologist and researcher, says the tick *ornithodorus turicata* causes the rare malady relapsing fever. Further, that the ornithodores, which cause the disease, "are found in shallow, limestone caves or animal burrows, where they lie in wait to fall on or cling to animals or persons who enter."

For this reason, wandering hikers, Boy Scouts, and we add speleologists, are particularly likely to contract the fever. He advises: "Beware of ticks; make sure the insects do not cling to the skin."

CAVE NOTES

Caves of West Virginia

I have spent considerable time in checking cave material in West Virginia, particularly in counties of Pendleton, Randolph, and Tucker. I believe that a very interesting trip could be arranged for the National Speleological Society to visit caves and points of interest

in the southern part of Tucker County and northern part of Randolph County, West Virginia. The group could make Davis, West Virginia their headquarters for the trip, since I understand that the accommodations there are very excellent. From my search through the tomes at the Library of Congress, I would suggest that the following material be investigated by the society:

(1) *Jordan's Cave.* The records in the Library of Congress are not clear as to the exact location of this cave, although it would appear to be located in the vicinity of Gladwin which is a small town on the Dry Fork of Cheat River a few miles below the town of Hendricks. This cave is believed to be well known, as several references have been found in the Library of Congress as is indicated on the papers which I have given to you. Jordan's Cave is apparently not large (about one-half mile) although it has been stated to be very interesting.

(2) *Falling Spring.* Falling Spring is described as a stream which falls into a chasm and disappears. From one of the references I have read, the stream falls into a cave which is sufficiently large for a person to enter. The spring is described as being located across Dry Fork from Jordan's Cave which would place it on the west side of the river.

(3) *Limestone Mountain Cave.* Limestone Mountain is located in the northeast corner of the Parsons Quadrangle of U. S. Geological Survey map and is not far from the town of Parsons, West Virginia. Inquiry would have to be made concerning the location of this cave since it is not given in the references I have found in the Library of Congress. The references I have noted state that the cave is quite extensive. Apparently we would have to travel on State Highway 72 which is shown to be passable but not improved.

(4) *Blowing Cave.* This cave is described as being located at the head of Elk Creek. I have not been able to locate this creek with accuracy on the maps although I have noted an "Elklick Run" flowing into Dry Fork at Hambleton, West Virginia, and another "Elklick Run" flowing into Dry Fork at Elklick, West Virginia. In all probability the cave is near one of these runs and, since they are not far apart, the cave could be found by talking with some of the people living around Hambleton, Hendricks or Gladwin. [Mr. Pillars' letter is actually dated 8-5-41. Ed.]

While in the vicinity of Dry Fork, I believe that it would be worth while to visit Tory Camp Run (Randolph County) since references have been found which state that there is evidence in the run which perpetuates the memory of the Revolution. I understand that during the Revolution, Tories banded together in this location to protect themselves from the Whigs. In 1916 remains of their camp could still be seen in this run. You will recall that the Tory factor sided with Britain during the Revolution and the Whigs stood for separation from the mother country. Tory Camp Run flows into the Dry Fork a few miles below the town of Harmon, West Virginia. Inquiry in this vicinity may throw some light on the location of Tory Cave. Incidentally, I have not been able to find a reference in the Library of Congress to Tory Cave and I am beginning to think that it is merely a legend. If some of my other leads don't turn up some information, I'm inclined to forget the whole thing.

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1. Attention is directed to the book entitled: THE GREAT CAVE OF CHEAT RIVER by Prof. George Jordan. Published 1855 by Hanzsche & Co., Baltimore, Maryland.

In view of the possibility that this cave would be worthwhile to visit on a field trip of the Speleological Society, the book has been examined in detail and further references to the author have been found in the Library of Congress. The preface of the book entitled THE GREAT CAVE OF CHEAT RIVER states as follows in part:

"While traveling in the western part of Virginia, I fell in company with a gentleman who informed me of a prodigious cave, situated not far from a river called the Black Water, being a fork of the Cheat River, in the county of Randolph, Virginia, about 40 miles from Beaverly and 76 from Romney."

It is difficult to get an accurate understanding concerning the exact location of the cave from the above meagre description. Presumably the town referred to as Beaverly is now known as Beverly and by talking with the natives in and around this town the location of the cave could be ascertained with accuracy. I do not have a Geological Survey map of this general section of West Virginia although I believe that the location of the cave could be found with fair accuracy on such a map.

The book goes into great detail concerning the author's explorations and the names he gave the many rooms which he found. I believe that a note concerning this publication and cave should be made in the records of the National Speleological Society. It is possible that this cave is one of the commercial caverns now operating although its location would not seem to agree with any commercial cave about which I know. The author is

very enthusiastic about the cave and states as follows:

The wonders of the cave "places this cave among the greatest natural curiosities of the Union, if not one of the greatest in the world."

The book is very interesting reading and if the author's description can be considered as fairly truthful, I believe that we should make an effort to find the true location of the cave and make plans to explore it.

The first paragraph of the book is as follows:

"Now we start on our subterraneous journey. On the 18th of March 1855, about ten o'clock A.M., being completely equipped for a long tour underground, having all the necessaries of life such as provisions, bedding, clothes, oil, lamps and matches; as well as working instruments, a hammer, pick, ropes, and many other useful articles, and many of our implements by the fact we found to be very troublesome to our backs, long before we arrived at the end of our journey. Hence we were well prepared for our great explorations of the lower regions as a large company of emigrants, who were bound for a long journey to the far West, and across the wilds of the Rocky Mountains, or Sir John Franklin for exploring the unknown cold regions of the North, and nearly or quite as perilous an undertaking as either of them. In giving a full description of this cave, we commence at the mouth of it, by stating it to be 10 or 12 feet high, and 15 or 20 broad, and so continues for a short distance; then the ceiling falls very gradually for a few yards, and the passage becomes narrow, then it suddenly opens into a large avenue, which leads into a very spacious room, the ceiling of which cannot be less than fifteen to twenty feet high and from twenty to twenty-five feet wide."

Additional information gleaned from reading THE GREAT CAVE OF CHEAT RIVER by Prof. George Jordan:

(1) The cave was entered and fully explored by the author and Mr. Samuel Walker in the spring of 1855.

(2) "The direction that the cave runs, is southwest, and so continues nearly or quite to the end."

(3) River or stream in cave—". . . it disappears by running through a great fissure in the solid rocks, on the left side of the cave, and is seen to move; but it runs either into the Dry Fork or the Gleady Fork of Cheat River."

In a much later publication found in the Library of Congress reference is found both to the Jordan publication of 1855 and "The Great Cave of Cheat River" although in this later publication the cave is listed as *Jordan's Cave*. Attention is directed to the following publication: HISTORY OF TUCKER COUNTY, WEST VIRGINIA by Hu Maxwell; published in 1884 by the Preston Publishing Co., Kingwood, W. Va.

Pages 130 to 138 refer to "Mountains and Caves" and on page 136 the following reference is made to Jordan and his publication:

"JORDAN'S CAVE—On the other side of the river, almost opposite Falling Spring (Falling Spring is described as a spring which falls into a chasm and disappears into what is believed to be a cave. Falling Spring is stated to be located on the Dry Fork road, some fifteen miles from St. George) is a large cavern called Jordan's Cave." The author of the History of Tucker County indicates that Jordan's publication was not well considered by the natives living around the cave by quoting from the Biography of Abe Bonnifield who was an old-time resident of that section and a contemporary of Jordan. In part, the quotation is as follows:

"On the west side of Dry Fork there is a cave, frequently called Jordan's Cave. . . . Jordan's book is as destitute of elegance and correct composition as the narrative which it contains is of truth. It would be but justice to his pamphlet to say that for falsehood, nonsense and absurdity it has few equals and no superiors. . . . Reports say that Jordan has since gone crazy. . . ."

The author of the History of Tucker County does state, however, that more recent explorations (they were before 1884 which was the publication date of the book) indicate that Jordan's cave is about one-half mile in length and contains some beautiful formations.

Other notes taken from the HISTORY OF TUCKER COUNTY by Hu Maxwell are as follows:

(1) "Falling Spring"—On the Dry Fork road, some fifteen miles from St. George.

(2) Blowing Cave—At the head of Elk Creek—It is called Blowing Cave, because in warm weather a strong current of cold air flows from it. This cave has been explored to the distance of 900 feet.

(3) The book makes reference to a Cave on Limestone Mountain and states that it is said to be very extensive.

(4) "Tucker County, West Virginia, was formed from Randolph County, March 6, 1856. The people had long felt the inconvenience of going so far to court, as Beverly was the seat of Justice."

Attention is also directed to the HISTORY OF HARRISON COUNTY, WEST VIRGINIA, by Henry Haymond, published in 1910 by Acme Publishing Company, Morgantown, W. Va., in which the following reference is made:

"Indian Cave. This cave is located on Two Lick Run, a tributary of the West Fork on the west side above Milford in Union District, on a small stream called

Campbells Run." It appears that this is a small shelf cave on the walls of which appear Indian sign writings.

2. Book entitled HISTORY OF HAMPSHIRE COUNTY, WEST VIRGINIA by Hu Maxwell and H. L. Swisher published 1897. L. of C. call No. F 247; H_2M_4. Notes: Page 418 makes reference to "Cave on Milslagle Farm on Timber Ridge" Hampshire County. The cave was explored in part prior to 1897 by William Offcutt.

3. Book entitled HISTORY OF RANDOLPH COUNTY by Dr. A. S. Bosworth published in 1916. L. of C. call No. F 247; R_2B_7. Notes: The following statement is made which may give some lead as to the location of "Tory" cave.

"Big and Little Tory Camp Runs are the only two objects in Randolph that perpetuate the memory of the Revolution. Little Tory Camp Run is a tributary of the Dry Fork on the east side about a mile above the town of Harmon. Big Tory Camp Run is a tributary of the same stream on the same side about two miles farther south and a short distance below the village of Job."

4. Book entitled HISTORY OF RANDOLPH COUNTY by Hu Maxwell. L. of C. call No. F 247; R_2M_4. Notes: I think that this is the same book which you showed me in the Patent Office today. There is reference to a large number of caves in the book. In particular, I have noted Mingo Cave. This cave is near the source of Mingo Run, a tributary of Tygarts' Valley River and about 3 miles from Elk River in Randolph County.

Notes of interest: The State of West Virginia was cut off from Virginia during the Civil War and was admitted to the Union on June 19, 1863. As originally constituted it consisted of 48 counties; subsequently, in 1866, it was enlarged by the addition of two counties, Berkely and Jefferson, which were also detached from Virginia.

Miles D. Pillars,
Washington, D. C. (1941)

Montana Caves

From some old unidentified clippings dug out of the files at the Montana state historical library at Helena: Inscription and Ghost caves near Billings, and New Year cave.—The latter is also called Crystal cave and opens off the main shaft of the New Year Mine in the Judith Mountains in Fergus county. Partially explored, according to what little data I had been able to find, but I do recall Bruno Petsch, "ex" of Morrison Cave, saying he was to do as complete a survey as possible at the time I got the Morrison material, just two years ago this time. Main chamber is 300 feet across and about 100 feet high—"a sparkling showroom full of endlessly varied rock crystals."

Somewhere in this state is a cave which was gone over with a fine tooth comb for unusual Indian writing and relics—one of the eastern universities had an exploring party out here several years ago to do the work (Harvard or Yale)—just enough information to be tantalizing.

More Montana Caves

Pryor Mountain caves (45 miles south of Billings).—There are four caves, two large and two small ones, that are definitely known. Claims have been made that there are still others, either in the same section or farther south by the Big Horn river, which are much larger and extend for long distances, but these reports have never been substantiated.

The caves are located in limestone reefs which form walls along several sides of the mountain, somewhat similar to the rimrock cliffs about Billings, except that they are of calcareous instead of sandstone origin. One of the large caves and the two small ones are on the east side of the mountain at the top of the reef above Crooked Creek, while the other is across the divide to the north on a similar slope above Sage Creek.

The largest and best known cave on the Crooked Creek watershed is entered by a round opening about the size of a window. It leads into a round room about 60 feet in diameter and 8 or 9 feet high in the center, the roof being dome shaped and continuous with the sides. The floor slopes downward, and at the back of the roof is a passageway large enough for a man to crawl through. This passage leads almost straight down and ends in another cavern similar in size and shape to the first. In one corner of this room is another opening which may lead to still another subterranean room, but it is too small to permit anyone to crawl through.

The floors of these caverns and the walls of the passage are covered with ice, from which they have been termed "ice caves." Stalactites have formed on the roof of the cavern. These are from 6 to 12 inches long and about as big around as a lead pencil, but slightly larger at the base.

One of the interesting things about the caves are the air currents noticeable when one enters. In the principal cavern, this current appears to come from the depths of the earth and to blow outward. In one of the caves, however, the direction of the air current is exactly the opposite. It is probable there is a second opening to the exterior much lower down the sides of the slope through which the air enters. If this theory is correct, there is probably a series of caverns, one above the

other, and connected with passages too small to be entered which lead down to the level of the creek.

There is no evidence of such rapid disintegration of rock in Pryor Mountain caves as seems to be in the case of Kentucky caves. Rock slides appear impossible.

(Supervisor of Beartooth National Forest, U. S. Forest Service might be able to furnish more material.)

Zortman country caves, Little Rockies
(east of Great Falls)

Following material from unidentified clippings—

"Three Indian caves, inhabited so long ago that not even a legend of their history remains among the early white and Indian settlers, two of them having sign writing on the walls and with several rooms, have been discovered near Zortman by W. A. Armstrong, ranger in charge of the Little Rockies district.

"Much discussion has arisen as to whether northern tribes of Indians were in the habit of decorating the caves and cliffs with sign writing or whether this was the work of a wandering southern tribe. Mr. Armstrong quotes an Assinniboine Indian who identifies the writing as the work of the Blackfeet tribe, but refuses to translate it because he says it is 'bad medicine' and the work of the 'Great Spirit.' "

"Not to be outdone by the Dry Wolf and Tenderfeet districts, the Little Rockies announces the discovery of Indian caves within its boundaries. There are three caves along the southern boundary, one of them about ¾ mile west of Grouse Gulch, and two about ¼ mile east of that point. The cliffs are almost perpendicular and rise to 200 feet. Two caves are easy to enter, the other having entrance 30 feet from base of cliff.

" 'During the summer of 1920, I noticed the most westerly cave entrance and thought it only a seam in the rock, as it is rather long and narrow and faces toward a spur of rock and away from the south. But on going up to it I discovered an outer chamber in which large fires had evidently been burned. In digging in the ashes, many bones of buffalo and other animals were found. This outer chamber is enclosed on three sides and affords a very fine view of country for miles.

" 'A rather narrow opening from this chamber leads to inner cave, 30' in diameter. It is probably 100 feet high and the floor is 6 to 8 feet below the entrance. Remains of ladder found there. On the walls and roof of outer chamber and on walls of passageway between two chambers are found many strange drawings and characters in some kind of red paint, some of which are very plain and distinct.'

"One of the caves was found to have signs painted in it while the other had none. Neither white nor Indian settlers had any recollection of these. One Indian, The Boy, a member of Assinniboine tribe, remembered hearing of legends handed down for generations of a war between his tribe and Blackfeet for possession of hunting grounds south of the Little Rockies.

"As a result of the Indian war the Blackfeet, who had at one time claimed the sole right to hunting there, were driven west into Big Rockies. According to The Boy, a small band of Indians once lived in these caves where they could spy on Assinniboine hunting parties. If parties were not too large, the Blackfeet swooped down, killing braves and stealing their horses and supplies. Fortress caves were finally stormed by the Assinniboines and Blackfeet, who escaped from the battle and fled west.

"The Boy was reluctant to talk about the signs for he said they were bad medicine, and that bad luck would follow him if he talked too much. Said only medicine men could read them properly.

"He identified the signs as Blackfeet because the drawing of a turtle was used, a sign which was never used by Assinniboines. Evidence of a large Indian village on the creek beneath the caves was found by The Boy, who said it had been the home of the Blackfeet because circles of rock, used only by that tribe, as a method of fastening the edges of the tepee, were found."

Lick Creek Cave, Little Belt Mountains
(45 miles out of Great Falls)

This cave is about 45 miles from Great Falls on the left-hand side of the Lick Creek road, half a mile from Logging creek in the Little Belt mountains.

The entrance is at the top of the ridge and has no feature to mark its gateway. The doorway is a small hole and opens into a room of average size.

Following a downhill slope of 35 degrees, the cave can be followed for 2000 feet. First large room narrows down into smaller ones with adjoining chambers. Three hours of steady and difficult going should bring you to a sheer drop of 60 feet which can be negotiated by rope.

At bottom of drop is a veritable underground cathedral—a room 200 x 300 feet, so lofty the ceiling cannot be seen. Stalactites drip from ceiling in huge icicle formation. Crystal and other types of formations abound in the color of coral along walls and floor.

Cave is accessible from improved road. Forest Service was going to provide markers, etc. for tourists.

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From an old unidentified newspaper, about an unidentified cave:

"A brand new room, 25 feet square, was discovered by Forest Giddings, and proved to be the most beautiful of all underground areas explored to date.

"Snow white and rich, cream-colored stalactites and stalagmites abound in queerest of shapes, hanging from ceiling like fantastic icicles and rising from white crystal floor in stump and mound formations. The room is a regular gem set among the darker-colored surrounding halls and passages. Over in one corner is a wide niche, about waist high, with a trickling fountain pool of the clearest water imaginable in it, which shows almost pure white over its lime crystal bed."

Dale White
Butte, Mont. (1944)

High Rocks Fissure Cave

On the left hand or east side of Route 220 from Cumberland, Maryland to Keyser, West Virginia, about three miles north of Keyser, a pinnacle of rock may be seen high on the mountain side. The rocks may be reached by going through Keyser toward Fort Ashby, taking a dirt road behind the mountain, and walking approximately three-quarters of a mile over the mountain.

At the base of these rocks is a small fissure cave. The entrance is easy and traverse simple. The cave extends for approximately 150 feet and is completely dry. It is definitely a water worn cave, however, as is ascertained by the erosion marks along the walls of the passage. There is very little ornamentation other than a few small groups of tiny stalactites.

As far as fauna is concerned a bat, *Pipistrellus subflavus subflavus*, was seen on the ceiling; several spiders of the species *Meta menardii* were noted in notches and crevices on the side walls; and droppings of the Allegany wood rat, *Neotoma pennsylvanica*, were found on the floor.

The cave is quite small, but the view from the mouth of the cave and from the rocks above as well as the cave itself make the trip to High Rocks well worthwhile.

Katherine E. Muma
Berwyn, Md. (1944)

New River Cave Trip

We recently surveyed 731′ of the high passage where we had looked, but didn't dare go, on a previous trip. There are blocks of ceiling 50′ x 50′ covered with helictites up there. We have already surveyed and plotted up the other high passage that comes back down to the creek. Hess surveyed on up the creek 1100′ from point 0, the last point explored, to the waterfall—the prettiest thing I ever saw in a cave. About half of that creek comes out of the top of a room and falls a good 80′ to the floor.

There is another big passage leading off near the falls that hasn't been touched. We did not have time to go in it. I am pretty sure that there is another entrance somewhere, as the wind was so strong in one hole that it blew some of our lights out near the falls.

We are going to have to start all over and draw that map to a larger scale to get the detail, and then reduce it to something we can work with. At present we have about 6000′ of passages surveyed with an overall length of something over 2600′. This time we used Brunton pocket transits and chains.

R. T. Watts
Blacksburg, Va. (1943)

Sewer Cave

Going north from Lexington on U. S. 11, I took the right hand road, just across the bridge. Following this road .7 of a mile I came to a series of sinks. All but one had been filled in with rock. From the number and position of these sinks, it would seem that a large cavern might exist. At the bottom of the sink on the right side of the road I found an entrance large enough to admit a large man. The entrance also admitted a 6-inch pipe line from a near-by house. Without a close examination, I had no difficulty in finding that the pipe carried sewage. It was mainly because of this evidence and the fact that I had on my uniform at the time, which caused me to make no further exploration. I list this cave as of future interest, however.

(*The conditions found in this cave are a glaring example of practices which the Society is trying to have permanently stopped throughout the country. A report of any instances where sewage is dumped into a cave will be appreciated by the Hydrology Committee. Ed.*)

J. Showalter (1943)

Bottomless Pit

Owner: Natural Bridge Co. Visited: June 6, 1943

From Jct. of US 11 and State 249 at Natural Bridge go north (toward Lexington) 0.6 mile on US 11. Turn on State 743 on right (old road to Lexington) and go

0.9 mi. to school on right. (1.5 mi. north of Nat. Br.) Park in back of school and head from east to 120° across field. Enter woods and bear to left toward crest of hill (cave near foot of tallest tree on ridge). Woods are 145 yds. from school yard.

Cave is at nearly exact crest of hill hidden in the woods. At cave the hill slopes gently off in all directions, cave being just a few yds. east of center of crest of hill and a few yds. north of crest in nearly flat land and heavy woods. Is a small hole not over 8' in diameter. Though easily missed, can not help being found by diligent search of the crest. Is 310 yds. in the woods, or 455 yds. from school yard.

Buck Hill Cave

Owner: Natural Bridge Co., Va. Visited: June 5, 1943

From Jct. of US 11 and State 249 (to Lynchburg) at Natural Bridge head north on US 11 (toward Lexington). At 0.6 mi. turn into remains of old Pike on right (State 743) and after 50 yds. bear sharp around to the right good 0.2 mi. and park just front of Rev. Mr. Tucker's house (on left). Cave is reached by taking old log road (on left and to the east). This road starts in back of a trash dump 50 yds. past Mr. Tucker's house and can be reached by following Mr. Tucker's south fence line (by garage to east corner) and then cutting through wood up hill and general SE until old road is intersected. Follow up this old wood road until there is a sharp bend to the right nearly at the top of the hill. Cave is in a sink on left 15 yds. off road and nearly straight ahead at this bend. Distance from road where car is parked to cave entrance is approximately 375 yds. approximately due east.

Bell Cave

Visited: June 6, 1943.

From bridge over North River on US 11 just north of Lexington go 2.5 mi. east on State 631. Turn in at gate to right on trail across field, direction 200°; go .25 mi. to old barn. Cave now lies at 220° to sinkhole entrance; 235° to house (shack) entrance, and .15 mi. on past barn (same direction, 200°) brings one directly abreast of caves. Park car here. There is a small entrance (short, steep, slippery slide to pit with overhanging edge unexplored) about 25 feet from where car is parked. Other entrances are about 200' and 350' on directions 290° and 250° respectively. From sinkhole entrance to house entrance is 160' at 225°.

W. J. Stephenson

Note on Howe Cave

Following is quoted from a letter of November 9, 1943, from D. C. Robinson, Knox Cave, Altamont, N. Y. in regard to Howe Caverns, New York:

" 'Cave "List" of 1859,' Page 16, of the last N.S.S. BULLETIN, lists this cavern but not Howe Cave. Lester Howe found Howe Cave in 1842 and opened it to the public in 1845. Mr. Howe took in Ramsey and others to form an association and was then 'Taken in by being frozen out.' He said that he knew of a better cavern which would drive the association out of business but died before telling of it. Part of it is now open as Secret Caverns.

"The association went broke on this idea. Clay in the cave was easily moulded so they decided to mine it for brick. They went to expense of railroad into cave, kilns, and everything for big business. Brick were burnt and sold and were very nice until exposed to water when lime caused them to slack and crumble. One of the chimneys made of these brick was on the farm where I grew up. Limestone caverns clay can be made suitable for ceramics or for modeling but by extra processing It would be better to dry, press, and wax it against moisture for souvenirs."

(*Continued from page 32*)

leaving. Klewer cried: "Let's go!" So we walked through the woods quite a spell and came to another break. This, John informed us, led to what he called "The Passenger Coach"—said it was a long room with a roof shaped like a railroad coach, and with plenty of onyx in it. Said we would be welcome to take out all we wanted. This time Klewer and Hinkleman went in. Vance said the crawlway was very tight and was about 50 feet long. We had a fifty-foot rope with us and Hinkleman made a bet with John that the tunnel was longer than 50 feet, and to prove it, they dragged the rope in with them. Klewer stated afterwards that they went 30 feet beyond the end of the rope before the avenue opened up; that it was, as Vance described it, shaped like a Passenger Coach, and that there was considerable onyx formation therein.

And thus came to an end, the last of a number of interesting experiences during our two days' stay in the Cave Region of Kentucky. On our way back to Toledo the next day, plans were made for one more trip—on the 14th of the following month—a visit to Seneca Caverns in Ohio. We had a lot of laughs going over our experiences during these two days of Kentucky Caving, and the memory of this most successful expedition will live in our minds for a long time to come.

Committee Reports

REPORT OF THE FINANCE COMMITTEE

By LeRoy W. Foote, Chairman

As we review the short life span of our young organization and see it emerge from comparative obscurity to the brighter outlook it now enjoys, we are inclined to look toward the immediate future where post-war plans will unfold themselves and a fuller enjoyment of privileges will be possible.

The financial growth of the Society is so linked up with the growth in memberships that it is difficult to comment on the financial future without encroaching on the field of the Membership Committee and activities of those responsible for the Society's rapid growth. Shortly after the Society was organized on a national scale, memberships began to spring up in various parts of the country, each one of which became a potential nucleus for a Grotto or as a center of local interest for the Society. Where memberships have increased and interest and activity have inspired the move, Grottoes have been formed; and through their activities other members have joined, thereby adding to the Society's growth and income.

Trips made by the Richmond Chapter last year have been the source of many new memberships. As a result of these productive trips and numerous additions elsewhere we experienced the greatest growth in 1944 than for any previous year. This added income has more than offset the losses due to members entering the armed forces, for whom dues are waived for the duration. Our income from dues, as shown by the Treasurer's Annual Report, has greatly exceeded our expectations.

Quite recently we have added new members to our rolls who reside outside the United States. We have inquiries from England at hand, from persons seeking membership in the Society, and plans are being made to facilitate the handling of these international memberships. Speleology is of universal interest and we are glad to extend the privileges of membership to any who wish to join the Society. This rapid growth at home and the added prospects abroad enable us to foresee the possibilities of a greater expansion in memberships. The increased revenue resulting therefrom will permit the Society to function much more satisfactorily in the interest of the members.

The Society is dependent almost entirely upon membership dues, and it is from these that we have been able to publish the BULLETIN at intervals of nine or ten months. At the present rate of growth and with the expected renewed interest at the close of the war, it is most certain that we will be able to publish BULLETINS more frequently. It is quite possible that within two or three years the income of the Society will permit us to publish two or three copies annually. This is simply an estimate made after a careful study of the present trend and the prospects as they appear now. The quality of the BULLETIN is being improved with each issue, and plans are being made now for even greater improvement as income of the Society increases.

When it again becomes possible for more of us to visit caves, it is expected there will be a demand for good caving equipment. The Society is planning to acquire various kinds of useful and much needed equipment which will be made available to members desiring it. The amount of funds on hand for that purpose will determine the quantity and variety of equipment we can purchase.

The Society is continually adding to the privileges of membership. Two years ago a plan for Life Memberships was offered and it became popular almost immediately. There are twenty Life Members at present, and new ones are being added to the list each year. The dues for this year being $45 and the cost for a new member becoming only $10 greater each year than for the previous year until the cost reaches $100, makes the plan most attractive. The earlier one takes out a Life Membership, the less it will cost him. One-half of Life Membership dues are deposited on the Reserve Account. This additional income is helping the Society at a time when it is most needed. It is hoped that more members will take advantage of the plan while the annual fee is still low.

The Society is operating on a budget, and our budget seems to work about as successful as budgets do anywhere—at least we come fairly close on some items. The financial outlook for the Society is bright, and reports from the Financial Secretary are most encouraging. We can expect a continued increase in income for the year ahead of us.

REPORT OF THE MEMBERSHIP COMMITTEE

By Sam Allen, Chairman

We have as yet obtained but one member through correspondence alone—through Dr. Stone's recommendations. Our experience would seem clearly to indicate the personal approach is best.

As to work with younger members . . . I have been

deliberately dealing in futures. A question I always ask myself concerning a prospective member is: "What will he probably have to offer the club in the future?" He may have but a short time for membership before having to leave for armed service; but, when he comes back—what will he have to offer?

For instance, there is one young man leaving for the Service next month. He has had afternoon and vacation work experience in maintenance and repair of automatic equipment in a telephone exchange. He hopes to be assigned to radar work or Signal Corps work. I am especially interested in what he may learn about communication equipment that may meet our needs. I hope that he may somewhere be in a position to be on the lookout for this type of equipment that we can use —perhaps even do a little experimenting while in the Service aimed toward perfecting something of value in speleological work.

As to obtaining members who have already developed scientific interests . . . we are not interested simply in obtaining a large number of members on paper, or persons with impressive titles. We are keenly interested, however, in men and women who will be actively interested in the work of the Society—if not in actual field trips, then in other phases of the work.

Probably the most valuable approach to such persons is through recommendations of one who is personally acquainted with the prospect, and who believes he would be a valuable member. It will help also if suggestions may be received through the person making the recommendations as to the reaction of that person to our formal invitation to membership. We may thus improve our approach to prospective members.

We should set up a schedule so that an article concerning membership will appear in all newsletters and BULLETINS, and thus keep before all members the need for searching out valuable new members.

REPORT OF THE COMMITTEE ON BIBLIOGRAPHY AND LIBRARY

By Virginia Bray, Chairman

In the past four months that I have been caring for the library, we have only had four requests for books. It seems to me that the library is fairly extensive and includes much practical material, and also some extremely interesting reading along many lines. It should certainly be more in use. Also, the fact that I am not in contact with a library and the new books in the field, means that your library is a static thing while the society is growing ahead.

In line with overcoming these two problems, I would like to suggest something along these lines:

1. That a copy of the library's list of publications (we already have printed in separate form) be sent to each group in the Society, also to unusually active members.
2. At the same time, a letter explaining the library and emphasizing the fact that it belongs to all members of the Society.
3. To stimuate interest, ask each Grotto or group for suggestions on new books. Each issue of the BULLETIN could contain the name of the book chosen for the library from these lists, also credit to the group suggesting it. It would stimulate interest and perhaps enough rivalry to get it started. (Perhaps a small book-review in a column headed, "In our library" or "Spelio bibliographia" — something catchy anyway.)
4. A regular fund should be set aside for adding to the library. If the plan of having suggestions didn't work we could, through libraries, get suggestions. The suggestions from members is infinitely better, as it arouses interest and may maintain it.
5. From time to time, a book from the library should be sent to a responsible person in each group without charge since we send our selection. Groups which didn't use the library might be stimulated in this way.

These are only suggestions and I know you can improve on them. It does seem a shame to have such good resources go unused.

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————The Origin of The Blind Goby of the California Reefs, Reprinted from the American Naturalist, Vol. LXI, May-June, 1927

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Resser, Charles E. Faunal Content of the Maryville Formation, Publication 3676, February 13, 1942, Smithsonian Institution, Washington, D. C.

Rickard, Chauncey. The Old Stone Church and Fortress, 1933, Schoharie County Historical Society, Schoharie, New York

Sloane, Roscoe C. and Montz, John M. Elements of Topographic Drawing, 1943, McGraw-Hill Book Co., Inc., New York and London

Studebaker, Bert. Smoke Hole—A Wisconsin Man Travels East, The Highway Traveler, Vol. XV., August-September 1943, No. 4

Ueno, Masuzo. Subterranean Crustacea from Kwantung, Zoological Society of Japan, Zoological Institute, Tokyo Imperial University

Wilmarth, M. Grace. Lexicon of Geological Names of the United States (including Alaska) part 1 and 2, 1938, Geological Survey, Bul. 896, U. S. Dept. Interior

REPORT OF THE COMMITTEE ON PALEONTOLOGY

By Dr. Alfred Burrill, Chairman

My reports* on this year's (1944) work are in three parts. The last part, because we are a little bit behind on it, is the extracting from the large body of literature, materials about cave fossil discoveries which are only slowly available from libraries near here.

First part of the report consists of a scrapbook of local cave clippings from Missouri papers. This is part of the Museum files; but you have people interested in cave stories and history, in their fauna and geological beauties; and too, most of the national organization may not ever see what comes out here, so I include them.. These clippings are mounted on sheets in a ring binder so that they may be removed by swinging the rings around to open at articles you want to take out and send to those members or chairmen whom you think will most benefit. If some are to be photostated for the society library, or for or by the Library of Congress, or re-printed in the society BULLETIN, as you decide, this may be done with our permission.

Second part of report is also a binder devoted to leaflets and clippings about caves in other states and foreign countries, as picked up in travel literature. I would send this straight to Robert Morgan, but think you may find some other chairman may want to see. Part of this list is a check-up on such books and pamphlets, not in this sending, which appear to be already listed either by Mr. Morgan, or by the Librarian in BULLETIN no. 5 of the Society.

The lists of fossils, and of caves where cave earth is so deep that it needs further excavation, and some lists of cave literature from members of my committee

*Dr. Burrill's reports were sufficiently extensive as to be requested for study also by the fauna, archeological, and records committees! It is regretted that lack of space prohibits the publication of these reports in full until a later issue of the BULLETIN.

are included as part three of my report. I consulted H. H. T. Jackson of the old Biological Survey as to common names, when stuck; but perhaps you will let my committee advisers Drs. Bassler and Clark see them, if they wish to.

REPORT OF THE COMMITTEE ON FLORA

By Carroll E. Cox, Chairman

The Flora Committee was authorized by the Board of Governors of the National Speleological Society six months ago.

The objectives of the committee have been (1) to prepare a bibliography on cave flora, (2) to maintain a collection of cave plants, (3) to see that cave plants collected by members of the society are identified and properly preserved, and (4) to publish lists of cave flora from time to time.

By way of accomplishments to date a Bibliography has been started and the collection contains seven specimens of cave flora, two of which have been identified.

The specimens on hand are as follows:

		Collector	*Source*
1.	3 fungi	Stephenson, Muma	Salt Peter Cave
2.	1 fungus	Stephenson	Eagle Cave
3.	1 fungus	Muma	Fountain Cave
4.	1 fungus	Muma	New River Fault
5.	1 fungus	Stephenson	Potter Cave
6.	1 moss	Muma, Fowler	Luray Caverns
7.	1 moss	Fowler	Grand Caverns

A fungus growing on bat droppings, collected by Stephenson in Salt Peter Cave has been identified as a species of *Phycomyces;* and another fungus found growing on decaying wood in Eagle Cave in Lang Mountain near Monterey, Virginia, was identified as a species of *Xylaria* by Dr. John Stevenson of the U.S.D.A. The latter specimen is deposited in the collection of the National Museum; all other specimens are in the hands of the chairman of the Flora Committee.

The greatest need at this time is for more collecting. As to what to collect and how to collect it little can yet be added to the suggestions given on page 48 of BULLETIN Number 6. Sketches of the plants in the habitat in which you find them, or better still, clear photographs, would be very valuable. As the collection grows we will learn what to expect to find in caves and we can give more detailed directions on how to preserve and ship cave plants. In the meantime cavers should collect everything they find, following such directions as have been given and forward them to the Committee chairman at 7501 Hopkins Street, College Park, Maryland.

Cave Log . . .

NEWCASTLE MURDER HOLE

The Virginia Polytechnic Institute and the Grotto at Blacksburg were host to the speleologists from Washington, D. C. and Richmond, Virginia, the last two days of October, 1943. Two carloads from Washington traveled about all night to get to Blacksburg Saturday morning, October 30th. Those in this group were: Dr. and Mrs. J. Morrison and Mr. and Mrs. Robert Bray; and Don Bloch, Dr. Martin H. Muma, Walter Weed, James Fowler, and Hugh Stabler.

After most of the ladies had their fill of "caving," the men left them at Blacksburg and went on themselves to explore more of the many caves in that vicinity.

Three auto loads left Richmond Saturday, the last leaving about 3 P.M. and getting to Blacksburg about 10 P.M., where accommodations for the ladies were found in tourist and other homes. The men were put up army style in one of the rooms in the cadet barracks in Memorial Hall at the V.P.I.

Those from Richmond included: *Stephenson's car,* William Stephenson, president of the N.S.S., J. Petrie, Jones, Katherine Harper, J. Drysdale, and Al Guttag; *Turner's car,* Ray Turner, E. Porter, Betty Jo Kurtz, Mabel Turner, Benny Holloway and Bertha McCloskey; *Brown's car,* Mr. and Mrs. Eldon Brown, Errol and Mac Emshwiller, Burton Faust, and W. Foster.

The Richmond men got settled in these barracks about midnight and were peacefully reposing, each man in his favored upper or lower berth of a double-deck bunk when, about 2:30 in the morning, the Washington men came in from their explorations making only a little more noise than an air raid over Berlin. When this eruption and the greetings of mutual friends had died down all retired once more and slept peacefully except yours truly who snored, and the editor of the N.S.S. BULLETIN who couldn't stand it. Morning came all too soon.

After breakfast, the local and visiting speleologists assembled in front of the Geology building of V.P.I. for the trip to the cave. So the visitors would have someone to guide them to the cave to be explored and also to get the groups intermingled and mutually acquainted, some of the V.P.I. men rode in the visitors' cars and some of the visitors rode with the rest of the local members in the V.P.I.'s big field-trip truck. Thirty-five miles of pleasant driving through the Virginia countryside brought us to the cave a few miles

south of Newcastle. The exact location is in the files of the N.S.S., but for various reasons the information as to these caves is not now being released in general publications.

Upon arriving at the site of the cave, most of the 70 people on the trip ate the lunch they had with them while awaiting their turns to go into the cave. This cave is called "The Newcastle Murder Hole" and has an entrance reminiscent of a doddlebug's trap. The downwardly-extending entrance is shaped like a huge funnel, the upper flaring part being a conical sinkhole, and the lower part being a straight well about 20 feet in diameter and 46 to 50 feet deep. Those descending went down with safety ropes around them, using a rope to aid them in their descents of the sloping portion, then going down a safety-rope ladder attached to the end of that first rope for the vertical portion of the descent. Two of such rope-and-ladder combinations doubled the rate by which the parties were lowered.

The explorers of the cave were divided up into eight or nine parties each under an experienced and capable leader who was responsible for all the members of his party. There was one party devoted to surveying part of the remaining unsurveyed portions of the cave; another party paid particular attention to the cave geology; a third party was for those interested in cave biology; and the remaining parties were just general exploring groups. The parties went down and went through the cave as units, so the less-experienced were always under the guidance and supervision of trained cave-explorers and with the company and numbers that made the trip as safe as possible.

At one side of the bottom of the entrance funnel was the entrance to the cave proper. A generally straight, somewhat inclined passageway led off for several hundred feet from this entrance. The rock at one side of this passageway was of entirely different nature from that at the other side; so the original opening was probably a fault line between two relatively shifted masses of rock, which line had been widened out and opened up by water action through the course of years and centuries. The strata being tilted in the rock—as is common in this mountain region—steeply inclined passages extended laterally from the first passage where the water had worn its way between two layers of rock. The largest of these and the first large one encountered—although not the "toughest"—was known as the "100-foot elevator" and led down to a lower level passage roughly parallel to the first passage. A rope was run down this elevator to help the climbers up and down it and half or more of the whole number who entered the cave went down to the lower level by way of this elevator.

Just beyond the entrance to this elevator the first passageway had its worst well in it. This well was too wide to straddle, and the ledge went on but one side of it. This ledge varied from 1½ to 4 feet in width; and the rock overhung it so the person going along on it had to crawl with a 30 or 40 foot drop into the well right beside him. Nevertheless, about half the total party, including several women, successfully passed this difficult way and continued on to the rear of the cave.

Other wells and elevators or inclined laterals, connect the first passage with the lower levels at this rearward portion of the cave. Several hardy explorers took both the trip up and down the 100 foot elevator and the trip by the first passage to the rear of the cave with the resultant explorations of laterals and other levels. Most of the party found that one of these trips was sufficient for one speleological day, however, and some were content to go just to where these two ways parted. (I was.)

The cave is not beautiful, being neither spacious in width nor richly ornamented. The walls are of a hard, non-porous rock; so, except where water has seeped through the few small cracks, there are few stalactites and stalagmites, and the few there are remain small and unimpressive. There is but little water in the cave, but it offers experience with about every kind of caving technique that can be used. There are wells, ledges, chimneys, inclined laterals, and about every kind of narrow passageway one could expect except long, horizontal laterals which, of course, would not be apt to be found in the decidedly inclined strata at the cave.

Little biological material was noted. A little white cave moss looking something like thistledown, and a white and brittle cave millipede or two, with one or two bats, were all to which my attention was called. The reports of the surveying, geological, and biological groups will naturally go into the details of these matters. A thorough exploring of only a part of the cave was a task for anyone save an experienced cave-explorer or mountain-climber.

By the time twilight was coming on, all the groups except Dr. Crabb's party were out of the cave. They had made their way back up the elevator or through the horizontal passageway around the wells and thence out the entrance passage, straddling once more the well in the middle of the exit way. Alongside this well, some careful souls had now provided a safety "handrail" of rope stretched between two blocks of stones; moreover, beside it a safety rope was now secured, also, which

each person in turn fastened about him as he went over. They had gone up the entrance shaft, hauled up the rope ladder by weary if willing hands on the safety ropes, until each one crawled up the sloping sides of the funnel mouth and got clear out of the "doodle-bug" hole.

A couple of minor accidents to the members of the group had delayed Dr. Crabb's party. Mr. Faust had his feet slip out from under him and set him down hard on the unyielding rock floor of the cave, receiving a severe shock; and Dr. Crabb himself slipped and gashed his knee. Neither of these injuries was serious, but they delayed the progress of the party and made a couple of the girls in it extremely nervous.

The Washington group and those in Turner's car from Richmond set out for home when out of the cave. Mr. Stephenson took a number of the R.O.T.C. back to Blacksburg to stand retreat. As Faust was in the party in Brown's car, Mr. and Mrs. Brown and the rest of their group waited with the rest of the V.P.I. people and their big truck until all were out of the cave. Faust and the upset girls of Dr. Crabb's party were taken to Blacksburg in Brown's car. After everything was set aright around the cave the truck carried the remainder of the expedition back to V.P.I.

The trip back after dark was made in good spirits in spite of the coolness of the air, the party keeping songs going most of the way. Arrangements were made for getting excuses for those who were supposed to be checked in before the truck had got back. Dr. Crabb and Mr. Faust were rather lame for a couple of weeks, but all were right soon.

The Stephenson and Brown cars left Blacksburg for Richmond some time after 11 o'clock Sunday evening, getting home in time for most of the passengers to report to work at the Patent Office Monday morning. Everyone had an interesting time; and most of those on the trip have made or have expressed a desire to make other cave trips.

The Blacksburg Grotto and the V.P.I. handled the trip very well, and the expedition passed off very nicely, especially considering the size of the total party, 70 persons.

Errol E. Emshwiller

KELLOGG'S CAVE NEAR CHATHAM, N. Y.

On our trip to "No Bottom Pond" Cave, three of us went along: Leo Lincoln; Paul Myers, a new member who had never been in any cave previously; and myself. The three of us drove over to the town of East Chatam, N. Y., and got our directions from there. The cave entrance was located about four miles east of this town. It had no particular name so we gave it one: it is now called Kellogg's Cave, the name being suggested from the fact that a Col. Kellogg lived in the farmhouse across from the cave in the late 1700's.

The entrance to this cave contained the skeletons of several cows—very inviting indeed. The cave itself seemed to be located above ground. Maybe I had better explain that a bit. Spread out along the roadside was a very large meadow; and in the middle of it, there was a ridge of rocks raised about 15 feet above the meadow proper, about 75 feet wide and perhaps 500 feet long. The original entrance was a symmetrically round hole starting at ground level and dropping about 6 feet to the floor of the cave. We found that this opening had been closed up by silt washing in from the surface, but there was another opening farther down.

It was about 1:15 p.m., October 10 when we started in. At the entrance we discovered a single bat hanging from the ceiling, plus a few spiders. Farther along in the cave we found another bat "reclining" in the same position; and right near it on a shelf, were the skeletons of two other bats. This must have been our day for skeletons. All through the entire length of the cave, we ran across hundreds of "daddy long-legs." They must have been blind, living so far underground. Believe it or not, sitting by the wayside basking in the light from our flashlights was a lone cave cricket. This cave did not have any flowstone or stalactites at all, but was very beautifully carved out by water. The walls and ceiling for the most part consisted of dark blue-black "marble" interspersed with white and sprinkled in between there were streaks of reddish orange coloring.

There was considerable crawling and several "lemon squeezers." The total length that we covered was 270 feet horizontally. It would have been possible for us to have gone farther had we had the time to do some excavating. There was a small stream of water trickling through one end of the cavern, but it did not amount to much. The reason that we felt that the cave passageways were located for the most part about the general ground level was the fact that the floor of the cave had practically no slope and also some quite large roots of trees extended right through the cave ceiling.

Our new member enjoyed his first cave experience so much that he wants to go again as soon as it is convenient to do so. The weather was perfect, and the coloring of the foliage was something to write home about. Of course, you probably have seen the Berkshire Hills in the fall and know just how beautiful they can be at that time of the year.

Well, that concluded our cave crawling for the year of 1943, our first and last trip at the same time. There's a war on . . . When I get a chance, I'll try to write up my trip to Carlsbad Caverns last October.

William F. M. Gray, EM 2/C
Pittsfield, Mass.

EARL CAVE ("PIG HOLE")

Several of us went recently to Smoke-Hole and came back full of a thrill of accomplishment that is hard to describe: the thrill that comes from having gone to (and returned from) a place that no one has ever gone before, and returned. I think the thrill comes from those last two words. But enough of how it feels. I'll tell you the whole story.

The Saturday after last Thanksgiving four of us went out to the Smoke-Hole cave beyond Newport. As we were loading up the car to come back, after a day underground, a car drew up alongside us. In it was Louis Lucas, an adjoining landowner. It seems that his uncle was one of the party of three men who had previously been the only people ever known to go through the Smoke-Hole, and we told him about our trip. He was quite pleased to hear about it, and told us how he wished we could go into another one, "Earl's Cave," that was a mile or two up the mountain.

It was utterly impossible, however, to go into this one. It was a shaft of unknown depth, and the only way in was to fall in. It was pretty well rumored that several people had gone in, inadvertently, but unfortunately had never come back. We really got interested then, and he promised to show us sometime where the entrance was. With that we had to be content, for it was late.

On the way home we discussed the possibilities of the Earl cave all the way in. We had heard just enough to be very interested, and planned to go out immediately, if not sooner. But one thing or another prevented, and the Christmas holidays came and left, and we still had not been able to go out there. Consequently, when a chance presented itself, we were pretty anxious to go and look the terrain over and see if a real expedition were warranted. And just in case it seemed possible to go in it a little, we took along 600′ of ½″ manila rope and a couple of snatch-blocks. It was right interesting to watch the people's faces when we would ask our way out there. They would tell us and ask why. And on our reply that we wanted to go in, you never saw such face falling and shaking of heads. We were discouraged, but refused to be stopped, and went on. One man, however, did ask us to check by and let him know if and when we got out, so that he could rest easy. Finally we were at the end of the road and a quarter mile from the cave. We stopped at the cave owner's house before going farther. The owner, Mr. A. B. Porterfield, very graciously gave us his permission to fool around, but was frank to admit that he did not think we would want to try it. He went with us to see.

The cave is situated near the top of a high hill and is apparently nothing more than a small sink hole surrounded by trees, the whole in the middle of a pasture. But at the sides you sort of catch your breath! A section of land, oval-shaped, about 150′ by 75′, slopes in on a fairly even slope for perhaps 25′. Then it falls precipitously for another 35′, And all you can see below this is a crack, with a black void beneath it. This crack is perhaps 20′ wide, and 50′ long.

We scouted around the entrance and climbed down in it a little way, but we could not go below the first 25′ of slope. It was too steep below that. We were all thrilled by the possibilities (when you dropped a rock in, it fell soundlessly a long way, hit with a crash, and rolled much farther), and wanted to see what we could see. So we rigged a set of blocks on a tree at one end of the crack, and lowered Tommy Watts into the hole. When he dropped over the edge we all held our breaths: Dr. Werner Husmann, Dr. Herbert Jackson, T. J. Wright, Ralph Hess, Bill Bradley, and myself. A few seconds after Tommy disappeared there floated up the words, "I'm swinging in space!" "How deep is it?" we asked. "I can't see the bottom!" And then in a few moments came a sizzling curl of smoke (oral) and a few appropriate comments about rigging that fouled on the lip of the crack. The falls from the top block were twisted and fouled on the rock edge. We worked hard; but in spite of our efforts, it was about 45 minutes before Tommy could go farther. By this time he had informed us, pointedly, of most of the damage that a rope sling could do to a 200-lb. man if he sat in it for a period of time.

In a little the welcome words, "On the bottom," floated up. We all were relieved.

Then we re-rigged the rigging and the rest very graciously permitted me to go next. I went down without event. Half-way down I got a funny feeling when Tommy announced that he had found a corpse. I felt much better when he continued that it was that of a pig. But let me tell you something: the thrill that comes when you hang into space on a rope, with nothing beneath you but a black void and the flare of a carbide lamp looking like a match-flame at a distance, is one that is hard to beat. I must confess that when I

could at last see bottom, I got a squeamish feeling because I was so high above it. Later measurements showed it to be almost an even 160′ beneath the surface.

Two more men came down shortly, and we made a hurried inspection trip. Then Tommy and I went up and let two more down for a look-see. Bill did not go down. Said he didn't think he was that interested, and had surely not lost anything there. Werner's comments when he looked beneath him in the first space-swing won't bear repeating, but will always be remembered. In a few minutes we were all out, deeply thrilled, and full of a resolve to go back and really see it.

When riding the sling down, it gives one a funny feeling to see a leaf come floating gently past you, and watch a rock go streaking by with the speed of light. When preparing to go up I was standing in the middle of the hole when one about the size of a football came down. I just saw it miss me by a foot as it whizzed by, to hit at my feet and explode in a million pieces. Makes the insufficient protection of a hard hat feel mighty good, though. Also when going up I had a new experience—the only accident of the trip. I, like a fool, straightened the rigging after calling "hoist away." Got my little right finger caught in the lower block and was hoisted up 2′ with it bent backward around the pulley. Have damaged it some, but not severely, I hope.

After such a thrilling beginning Saturday afternoon it was decided to combine further exploration with the regular trip, on Sunday, of the VPI student grotto of the National Speleological Society. The grotto was making an all day outing of it and was going to re-explore two caves: Tony's and Smoke-Hole, both at the foot of the mountain in which the "Pig Hole," as we have decided to call it, lies. It was planned to split off a small party of experienced men and let them go through the Pig Hole, the main party coming to the entrance to see it and let us down, and returning at night to get us out.

Accordingly, yesterday morning about 9 we set out about 30 strong. Arriving at the Pig Hole, everybody oh'ed and ah'd, and expressed a firm determination to go in whether or no. But only the planned party of seven men were allowed in. These included Watts, Hess, Wright, Dorn, Barnes, Fulture, and myself. By the time we had our rigging fixed, we had quite an audience from the neighborhood gathered at the entrance. They didn't think it was possible to get in, and were afraid of what we'd find if we did (there are lots of stories about people disappearing apparently into the hole). Finally we went down to the tune of many witty (?) remarks. We left our rigging in the capable hands of Dawn Owens, Keith, and Bill Badger, with instructions to let us all in, fix the ropes, and to return for us at 5:30 p.m. With us into the cave, we took extra clothes, lunches, cameras, surveying instruments, and plenty of carbide.

To get to the cave from Blacksburg, go to Newport on the Bluefield highway, turn left on the surfaced road to Mountain Lake summer resort, and near the top of the mountain turn left on road (?) marked by the State Highway as "Gate Road No. 608." This road leaves the highway at the second house above the church. Follow this road to the second house (Mr. Porterfield's) leave your car and walk up to the top of the pasture hill. You can't miss it.

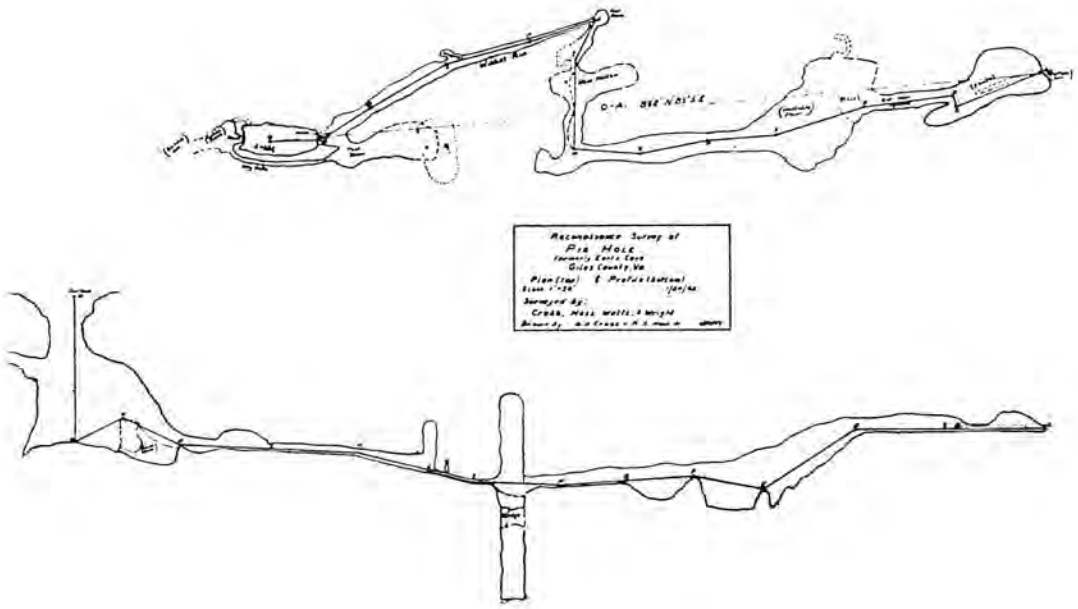
The entrance room of the cave is long and oval, runs east and west for about 100′, and is perhaps 45′ wide at the bottom. Loose rock and debris is piled on the southern wall to a height of possibly 20′. In the extreme east end of this room, still going down, but on a slope now, is the pig. Go past it and down into a cat-hole about 3′ x 3′ and drop 15′ more. Then there is a vertical climb of about 40′, and you reverse direction and come out on a ledge well up in the side of the entrance room. From this room you can go two ways. We went back for a little ways, then took off on our old eastern course and walked along a perfectly smooth tube in the rock for a couple of hundred feet still climbing. Then we dropped rather steeply for about the same distance to a pool room. This smooth tube we came through was floored with highly organic earth, and sounded hollow. In fact it was caving in in places. We walked lightly. In this tube we found droppings from a fairly good-sized animal. Made us wish we had my gun with us instead of with the lunch at the door. In this pool room we came to, we found the first formations of any moment we had found, except for a nest of nice cave pearls and petrified bat bones combined. Here were bacon rind, stalactites, drip pools, etc. All were rather new, as were all of the few formations we found in the cave. From here you took a belly-buster crawl for a hundred feet to the south east and came to a precipitous slide into a large room (perhaps 125′ by 40′) running north and south. Thank goodness, for inadequate light! If we had had flood lights not a man of us would have tried that climb. Yes, we could see bottom 30 or 40 feet below us, so we did it. But that bottom was a bridge from one side to another of a chasm. Standing on this bridge with all our lights turned up, and a flashlight helping, we could not see the top. Nor could we see the bottom on either side. If we

had missed the bridge, it would have taken 3½-4 seconds for us to fall the rest of the way; we timed it with rocks.

In this room of the bridge, now called Hess's Hollow, was shown the sheerest piece of intestinal fortitude I have seen in some time, unless it was Tommy's going into the entrance for the first time. Hess, being lightweight, volunteered to be dropped off the bridge on a rope, for we had an idea that another lead might come into the chasm. We rigged him in a parachute sling on the end of a 100-foot safety rope and let him down. When he passed from view I really felt funny. But not "Rudy." He dropped down slowly, making and calling notes, on geology, formations, descriptions, etc., as calm as you please. After awhile he informed us he had about 30′ more to go. This happened 3 times in the final 50′ of rope. Finally at 90′ he hit the high part of the bottom and got off his rig (tying it down so that we could not leave him) and walked around. He described it as a chamber going nowhere but on down. There was another drop-off down which he could see about 50′ and did we want to come on down. We thanked him and said not, and pulled him on up.

bridge, and went over into a series of large rooms filled with huge boulders. These boulders were all covered from 2″ to 1′ with bat droppings. From these rooms a great many passages went downwards, some of which were explored to a certain degree and others which were ignored. The rooms opened into each other, still holding their east-west direction, and worked towards the surface. Finally we got to one or two rooms that seem to be from 5-15′ deep in guano, and almost to the surface. Both barometer and formations said SURFACE in capital letters. We even tried digging a particularly favorable spot, but no luck. Here we turned back. This point was approximately 1050′ east of the entrance of the cave. We surveyed our way back, but did not try for detail.

Back at the entrance ledge we tried the other lead and found it to fork. The left fork parallelled the main lead we had just returned from, and apparently came out higher up on the side of Hess's Hollow. We abandoned this and took the right fork. This dropped down, and then went up the most difficult and treacherous climb of the whole cave, bearing more and more west. After much sweat and quite a few gray hairs, I saw (I was



In this room we found a very peculiar earth formation. It was apparently an ordinary mass of very cohesive, tough cave clay, dark yellow in color. But upon breaking it open and kneeding it, it got brighter in color and very sticky and almost the consistency of syrup. Very chalky in taste.

From the bridge we retraced our steps up the climb and skirted the high room, which I am convinced is 250-300′ from floor to ceiling, crossed another dirt

leading the climb) daylight! Never have I ever seen it under sweeter circumstances! And I saw people, too. Then it came to me. We had circled the entrance and come out on a ledge high up on the west wall. I couldn't believe it, though. Then the people saw my light away down there, and were they glad! They were local inhabitants who had gathered around expecting to see us given up for lost. We messed around in this upper level for quite a while trying to find a way out, but no soap.

So we returned to the entrance and waited for the party to come and pull us out, it being time for them to come around.

We have a rather unique system of accounting for all members of a party underground. Before going under, the party numbers off, and each man remembers his number. When underground, simply call "Call off" and the men call their number in turn, and roll is quickly called. When we at last came out in the entrance room we called off and went up in that order. I was the last number, and I wished I wasn't. If you want to feel uncomfortable just be at the end of a day's caving, cold and tired, sitting 160' underground alone. It is one heck of a lonesome feeling. But at last we were all out, counted off on the surface and pulled our equipment up. There were at least 150 people from the neighborhood waiting around to see if we would come up alive or dead.

The other parties had had an enjoyable day in their caves with only one untoward event. Al Burner had gotten himself caught under a rock and strained his back rather painfully but not seriously. We all piled into the truck and headed back to school each trying to make his story of the cave the best and stick to the truth. This one is entirely unvarnished; in fact, it is mostly a complete understatement if you can imagine that coming from me.

We are now going to send out an emergency call to the Society for them to please send us what they have in the way of winches preferably with steel cable on one, long ropes, and particularly rope ladders. If we could get a good winch with steel cable and brakes for the descent at the entrance, 200 or 300 feet of good rope, and a couple hundred feet in rope ladders, we could really set about exploring that cave properly, fully, and safely. We are bending over backwards in regards to safety, for without a doubt this is the most dangerous cave I have seen, and I have seen and been intimate with quite a few.

George A. Crabb,
Blacksburg, Va. (1943)

"PIG HOLE"—FOSSILS, GUANO, PEARLS

The entrance to this cave is enough to keep out any person with more brains than mine. None of the local farmers have ever been in it because the entrance looks like dark void going into—well, Hell itself. Some of the more hardy residents in the vicinity would have gone in if they had had enough rope and block and tackle, and someone to let them down.

I have to admit I was a little afraid as I slipped first my arms and then my legs into the sling and said, "Lower away," as I peered down into the depths. The top of the hole was approximately 12 ft. in diameter. But after warding off the wall for a drop of 20 ft., the hole opened up into about 30 ft. wide. That was a strange feeling swaying there 100 or more feet from the bottom with no walls around to hold on to. I think it was one of the most thrilling moments in my life.

As we stood on the bottom I examined it closely. On one wall there was a layer of crystallized calcite; it seemed to be stuck on a wall of mud and rock. In the far end there was a large crack extending back as far as I could see and about 30 feet high but only 81 inches wide. At the other end there was an exit from the lobby. As we scrambled down the rock slide, we passed the body of the hole's namesake. The stench is very strong.

We walked in mud and past mud walls and saw mud-streaked, new stalagmites that are still growing; and over our heads was a solid rock ceiling that was gouged out by some stream years ago. It was smooth and a gray color. The corridor we walked through resounded with every footstep, and it felt as though the floor was hollow—we were careful not to stamp our feet. The corridor narrowed to about 3 feet width, and we went down a 45° slope to reach a room which had a little stream in one corner. The stream was more like a mud puddle and seemed to have no current. We went on and came to a large room we called Hess's Hollow, for there is where we stood on a mud bridge and lowered Hess 90 feet to another room. All around us the walls either went straight up or straight down. There was a little water dripping off the ceiling (about 75 ft.). Hess said the place he had been lowered to could stand more exploring.

We saw only one direction to go in after we had Hess up. It was over a ridge of mud and rock about 10 ft. long and 3 ft. wide, sloping toward a void on one side, and an 8 ft. drop to the mud bridge we had been standing on, on the other side. This lead went into a large room of broken rocks and jagged boulders. The floor was none too firm. Watts almost fell through but flattened himself out in time. Underneath this floor was a drop of about 10 or 15 feet. The lower floor showed several leads, but all going straight down.

We continued along the upper floor and walked over rocks that were covered with something we could not

understand, until Crabb told us it was guano. The rocks were covered with it. We would go to grab a seemingly strong boulder and a large chunk of guano would break off in our hands. After traversing a pointed rock floor covered with guano, we came to a long corridor we named "Broadway." It was 30 feet wide and 300 feet long (approximately). This street was paved with a full 18 inches of guano. There were stalagmites of guano 5 ft. high under bat holes in the ceiling. The roof was covered with fossils of fish bones and shells. There was, and still is, one perfect fish backbone and also a small crab's shell. We were afraid to try and move them for fear of destroying them. You can even see the eye sockets in the crab shell. I think they could be chiseled off very nicely with the proper tools. This street, Broadway, ended in a mud slide where mud had washed down from the surface. This end could not have been more than 15 feet from the surface, because the hill the cave was on sloped down in this direction.

Down the 160-foot drop—off into the Pig Hole.

On the way out we found cave pearls, and petrified bat bones with a hard white substance formed on them. The corners of the cave were strewn with bat bones; we could reach down and scoop up handsfull of them. There was a place in the ceiling of one of the rooms where the rocks had come together in a fissure and squeezed out quartz crystals projected from this ½-inch fissure for its entire length of 50 feet.

While waiting for six o'clock when the party was to come back for us, we looked for some easier way to get out. There was one tunnel that circled around the lobby and got us on a ledge about one-third the way to the top. A lead off this brought us very close to the surface where we saw opossum tracks, but there was no exit.

This cave is the most dangerous cave I have ever been in: the rocks are all very loose; the floor and the walls are mud; only the ceiling is solid. I would like to go in again, but not unless we have plenty of rope and rope ladders to explore those promising downward leads. I am sure there must be a stream down there some place.

C. G. Dorn

NEGOTIATING TWO WATERFALLS IN WEST VIRGINIA CAVES

We had a very successful trip over July 4th (1943). We picked up Jim Beard in Washington, Pa., and joined the Snells and the George Dare party (at Worden's) Saturday night. Snell had a furlough. He and his wife and the Dare party had been "on location" a day or two, and had explored the large passage of Blowhole Cave beyond the point reached by our party on the Decoration Day trip. They found a mass of fallen rock, boards, and rusty iron hoops which seemed to corroborate the old story about the chicken coop and the barrel of rum which disappeared overnight so many years ago.

Sunday morning Robert Lutz and Eugene Perkins (from Elkins) joined our party at the point where the Teterton road leaves the highway about a mile above Mouth of Seneca. We had planned further exploration of Blowhole Cave, but as this had been already accomplished we decided on further investigation of Mystic Cave. When last in Mystic I had followed a small passage which starts from above the pool in the last big room at the end of what I take to be the south wing. This passageway seemed to me to have possibilities, but on that previous occasion we had been stopped by a waterfall which came out of a hole in the ceiling of a beehive shaped room (about a 12-foot drop).

On the way down the south wing George Dare was in the lead. Somewhere he had picked up a pole 3 or 4 inches in diameter at the large end. When we came to one of the deep pools, George carefully placed the pole along one wall with the near end on the bottom of the pool and the far end on a muddy, sloping shelf on the far side of the pool. Balancing himself against the wall, George cautiously crossed the pool by walking on the pole which was mostly under water. He then stood near the edge of the muddy shelf and braced the end of the pole with one foot. (This end of the pole had threatened to slide off the shelf while George was crossing). As each person crossed, George kept up a continuous flow of advice—"Watch out for that hold! The rock is loose. Take the one above to the left. Careful!"

It seemed to me that George was overly concerned about the difficulties of this crossing even though many members of the party were in a cave for the first time. He kept up his flow of cautioning advice even for experienced members of the party. Sly George! It was all a build-up, an infernal trap! And John Wingfield stepped into it all unsuspecting. He cautiously took the holds as advised by George. At the crucial moment John lost his footing as the pole suddenly shifted. Some witnesses say that George's foot slipped off the end of the pole. Others aver that his foot actually accelerated the motion of the pole. We do not have an actual confession from George, and the lighting conditions were poor; but the important fact is that John lit spread-eagle with a resounding splash in what appeared to be the deepest part of the pool. And so the affair of the collapsing bed was finally brought to a close.

When we reached the waterfall which had stopped us before, George decided to try the climb using friction holds. There were a few anxious moments just before George squirmed through the hole in the ceiling. We tossed him the end of a rope which he fastened securely around a projecting rock. Rope climbing conditions were not what you would call ideal, what with the rope being wet and muddy. Most of us burned some of the hairs off our hands with our lamps as we tried unsuccessfully to avoid swinging under the icy waterfall. But everyone made it safely. A short distance above the waterfall the passageway became low and narrow, requiring that we crawl. Our progress slowed and stopped. Conflicting reports filtered back, "Can't make it!", "Johnny's gone through!"

It was at this point that our group was sorted into two groups according to size in the middle. Somehow we managed to squeeze against the wall enough to let the larger members pass after they turned back. Up ahead there was many a groan as someone squirmed through the final squeeze. The compass in my shirt pocket had to be shifted around before I finally pulled through the squeeze. The cave was dry at this point and the passageway rapidly opened up again. Ralph Bowman, John Ford, Tom Kiefer, Robert Lutz, Eugene Perkins, Robert Trost, John Wingfield and yours truly continued in what I took to be a southerly direction, while the rest of the party descended through the waterfall and went out the way we had come in.

The passageway opened up rapidly to a 6 to 20 foot ceiling. Within two or three hundred feet we saw daylight and could see that we could easily get out. For half an hour or so we continued to explore some of the other passageways, but we had neither the energy nor the time to do much more. It was a strange experience to step out of the cave and not recognize any landmarks. I judge that the entrance from which we had come was something over a half mile south of the main entrance to Mystic Cave. Our efforts to obtain food and lodging at Mouth of Seneca and at Harmon were unsuccessful, so we returned to Davis for a good meal and a welcome rest.

Monday Bowman, Lutz, Perkins, Smail and myself set out again while the rest of the party rested. We were looking for a stream coming out of a stone quarry south of Hendricks, as described by Jim Beard. Hambleton (3 or 4 miles south of Parsons) is easily identified by signs at the edge of town. It is nine-tenths of a mile from the center of Hambleton to the center of Hendricks which might easily be mistaken for a part of Hambleton as there is no means of identification except asking. Red Run (identified by service station and store, bridge, nicely-kept log cabins for tourists, and a house set back a hundred feet or so from the road on the left) is 4.1 miles from Hendricks. Less than one tenth of a mile from the bridge a slag driveway runs down to the right to follow an old railroad right of way. At .7 of a mile from the bridge at Red Run, a small stream flows from the left from an opening at the base of a face of rock which has been worked as a quarry.

Entrance to the cave, which we refer to as Red Run Quarry Cave, is a crawl through the stream. The quarry faces in a southwesterly direction and the passageway runs in a generally southeasterly direction. We crawled on hands and feet through 2 to 4 inches of briskly flowing water for about 200 feet. Then the passageway opened up with ceiling up to 20 feet. Some small formations were observed. About a quarter of a

mile from the entrance we heard the sound of a waterfall. We could soon see daylight ahead. We found that water and daylight poured into the passageway down a chimney-shaped shaft of elliptical cross-section which measured about 15 feet across the long way and 10 feet the short way, and was somewhat smaller at the top some 25 feet up. To look into this chimney was almost like looking into a small courtyard into which rain was falling heavily. It would be very difficult to climb these perpendicular, and in some places overhanging, walls through that continuous downpour without the aid of a rope. The main passageway continues on beyond the chimney, but very soon becomes a crawl and is choked off by fallen rock and soil. Directly opposite the chimney, however, a small tunnel bears steeply upward to the surface, a muddy, slippery climb, but not overly difficult.

Our next stop was at the Bowden Cave. The well, for which we had no rope on our previous visit, was negotiated without difficulty. But the intriguing passageway leading off from the bottom of the well came to an end barely 30 feet away.

The following persons participated in our expedition: Ralph Bowman, 'Shy' Matchett, Joe Smail, and Sam Allen from Steubenville; Jim Beard from Pittsburgh; Alden and Frances Snell from Chicago; Robert Lutz and Eugene Perkins from Elkins; and George Dare, LeRoy Frazier, Tom Kiefer, George Mann, Art Pines, Robert Trost and John Wingfield from Charleston; and John Ford from St. Albans.

Sam H. Allen

FURTHER NOTES ON WITHERO'S CAVE

Withero's Cave, Bath Co., Va., has always been a favorite among many of our members in the Washington area. While this cave has no outstanding amount of decoration or formation, its size, complicated pattern of passages and chambers, and diversity of cave conditions have made it the object of many repeated visits.

Four separate maps have been prepared of this cave as new portions have been discovered. The finding of a permanent stream on a field trip in May 1941 opened up a field for additional work in this cave; and interest was further heightened when Dr. Joe Morrison found that the stream supported a colony of blind snails.

From early explorations it was thought all water which enters the cave (and there is plenty after hard rains) ran through the cave in a general northerly direction and disappeared or left the cave through drainage channels in the north or northwest corner. The slant of all passages in the explored portions of the cave also seems to indicate a general northern drainage in both the old upper and the lower levels. As the cave leads directly back into a hill of considerable size, and as the country to the north rose considerably, the question of where the cave drained out to the surface became quite puzzling. A rough line of levels run to the far point in the cave in the fall of 1939, showed the lowest point in the cave to be about 80' below the cave entrance, while the level of the nearest surface drainage (a wet-weather stream about 300 yards to the west) was only 70-75' below the entrance to the cave. As this surface drainage was toward the southwest, it was clear that there could be no points on the surface to the north of the cave low enough to allow for the cave's water to drain to the surface. The problem of where the cave waters would go was therefore an unsolved mystery until the discovery of Morrison's stream.

The stream's discovery, however, did not immediately clear up the mystery of where the cave drainage went. In fact, for a time it complicated it. At its point of discovery, the stream was flowing nearly south. Subsequent studies have now shown that all the water which flows north through the cave passages are probably collected at the north ends of the cave and taken across the westernmost passage of the cave by a series of small, flat transverse crevices or channels. From the north end of the western passage, the water probably enters the stream directly by a syphon-like tunnel.

The finding of the stream solved the problem of the apparent northern course of the cave drainage, but a bigger problem was raised as to where the stream came out. Could this cave stream flow all the way underground down to Blowing Cave some three miles to the south? The strata of rock in which Withero's Cave is found is an anticline in the upper part of the New Scotland series of the Helderberg limestone. In this locality the Oriskany sandstone is practically absent, though the upper 10 to 20 feet of the limestone becomes very sandy. The limestone, for all practical purposes, is capped directly by shale, the exact name of which is not now known. The axis of this anticline is also 30°, or nearly the same as the general direction of the main cave passages. There are reports of caves existing in this same anticline both above and below Withero's Cave. The surface stream previously referred to, which ran southwest, had its bed in the overlying shale, so there appeared to be little likelihood of Morrison's stream breaking through this shale layer so as to come out as the surface stream. Under these conditions, Morrison's

stream might well flow for a great distance underground.

On Nov. 17, 1942 a party composed of Clements, Drysdale, Mr. and Mrs. Emshwiller, Morgan, Hannah Hamlet, Selzer and son, Behrens, and Stephenson revisited this cave and again ran a line of levels into the cave, this time down to Morrison's stream which turned out to be 87½′ below the level of the mouth of the main entrance. Again the line of levels was run down to the valley on the west which carries the local surface drainage. As found on the previous survey, this valley was only 70′ below the cave entrance and appears to have a shale floor. Careful reexamination, however, disclosed that the line of jointure between the limestone and the shale occurred at the exact bottom of the valley. The line of levels was continued southwesterly down the valley. Between elevation 90-95′ below the main entrance, water was found to collect in the stream beds, and at 100′ elevation, to become a surface stream of the approximate size of Morrison stream in the cave. Without doubt this must be Morrison's stream. Where it emerges is approximately 500′ west of its position in the cave, and 500′ south of that position. This is thought to completely destroy any notion or theory that this stream flows underground to Blowing Cave. This also infers that there is little hope of finding much cave by forcing passage down the stream bed, especially in view of the fact that the stream seeps to the surface through a number of crevices rather than by a definite open channel. A short way on Morrison's stream must either therefore form a closed pool to ceiling level to give pressure needed to force the water westward across both the dip and strike of the rocks, or branch in a multiplicity of extremely small passages that gradually work westward to the surface.

This work now clears up most of the mysteries of Withero's Cave. Its limits have probably been pretty well defined, though subsequent exploration may probably produce a few rooms and passages of limited size. However, the portion of this cave that lies southeast of the entrance has not yet been entered. If entry into these portions can be effected, it may be that great discoveries can yet be here made.*

W. J. Stephenson

SMOKE HOLE

The cave is entered through a hole in a hillside, about 150′ above Sinking Creek. A steeply inclined passage leads down to a stream, in a drop of approximately 120 feet. Cave crickets, large spiders and mosquitoes occur here in abundance. A gray rat and two rat nests were seen by Frank Gaddy's party a week before our trip. These animals had brought in all sorts of green leaves, etc., and a large number of horse-chestnuts.

The stream at the bottom is about 5 feet wide and 2 feet deep. Further progress is possible only by wading. Downstream, the ceiling comes down to water level; 100′ upstream, this almost occurs, but there is enough room to get through. This "trap" opens into a small, low-roofed chamber. A similar trap leads from this into another chamber, into which the stream descends in a small waterfall. A rock fall has here blocked the stream; but by working up through the debris one comes into a room with various branches, all of them probably dead ends. In one branch there occur some delicate straw stalactites, 6-8″ long, and a small dry "pan" full of gorgeously glistening ochre-colored splash-stone. By working through the debris, the stream is encountered above the obstacle and may be followed through a broad but low-roofed passage for possibly 500 feet. Here cold air is blowing downstream against the explorer. Progress through the passage is mainly by crawling, on hands and knees, often in the stream. Locally, large upward passages and chimneys lead off the stream, but they appear to be blocked by rock falls.

In the main passage there occur some interesting and unusual formations. One is a corkscrew stalactite, standing at some angle; another an inclined stalactite with an oppositely inclined stalagmite growing upon it. These are small. There are some large examples of ribbon stalactites or "bacon rind," which show an unusual structure. They are exceedingly thin and are composed of one layer of long crystals, which are growing in a horizontal or even slightly upward direction. The terminations of these crystals are irregular and give a serrate edge to the ribbon stalactite.

At the upward end of this passage, the main stream comes in through a canyon on the southeast side; straight ahead lies a chamber, from which comes a smaller stream. This chamber is extensive, with a strikingly low and flat roof. The floor is covered with clay and dry rimstone. Following the small stream, it was found to enter the chamber on the east side, where it flows through a series of gorgeous pools, 6 feet across and up to 3 feet deep, formed by rimstone deposits. The stream cannot be followed.

The main passage, now dry and clay-floored, leads out of the chamber on the northeast side. Chimneys lead upward, but seem to end blind. The passage continues for several hundred feet, and broadens into a small room, beyond which lies a large chamber, termed

*Since this was written, another entirely new section of the cave has been discovered.

the bat-room, high and several hundred feet long. The floor is covered with great clay deposits. Drainage from this room runs to the far end, into several small passages, which were followed as far as possible. Cold air wells in through these distributary tunnels, but no light was seen at the far ends, where loose rock and clay blocked exploration. In the chamber were found (1) a beaver skull, which has been sent to the U. S. National Museum for specific identification; and (2) the bed of a large animal, including dry feces, possibly of racoon or bear. While there are bats (*Myotis* and *Pipistrellus*) throughout the cave, they were abundant only in this last chamber.

An attempt was made to follow up the main stream. A rock fall, through which the water came gushing, forced the party into a chimney which was followed upward to where rocks became loose and the clay so abundant that further climbing appeared too hazardous. It may be that this chimney has surface connections. An attempt was made to get down to the stream above the blocked point, but met with no success.

Location of cave: Lat. N 37° 18′ 10″. Long. W 80° 30′ 35″. Pearisburg Quadrangle, Va.-W. Va. Giles County, Va. Drive west from Newport, Va., for 2 or 2.5 mi., take first road to right (Mt. Lake road), cross Sinking Creek on covered bridge, continue up Sinking Creek, ½ mi. beyond point at which Mt. Lake road turns left. Cave near butternut tree on hillside, W. of first house on N. side of road.

Notes on Fauna

Two weeks ago, one banded specimen of the little brown bat, *Myotis lucifugus*, was collected in Tony's cave. It turned out that it was one of a lot of 500 that had been banded there in November 1940, by a Mr. Llewellyn, at that time graduate student in the biology department. Last week-end we found six more banded *Myotis* in Tony's cave. Also we managed to seine a number of minnows (*Cyprinidae*), where we caught the Miller's thumb on that recent memorable trip, and another Miller's thumb (*Cottus*) in the Smoke Hole.

In a recent *Time* Magazine was a good article about recent results of bat banding. In this connection it is interesting to note that the banded bats we found in Tony's cave were apparently banded there, and that no banded bats were found by us in the Smoke Hole, though the latter is only a fraction of a mile from the former.

Alfred G. Fischer

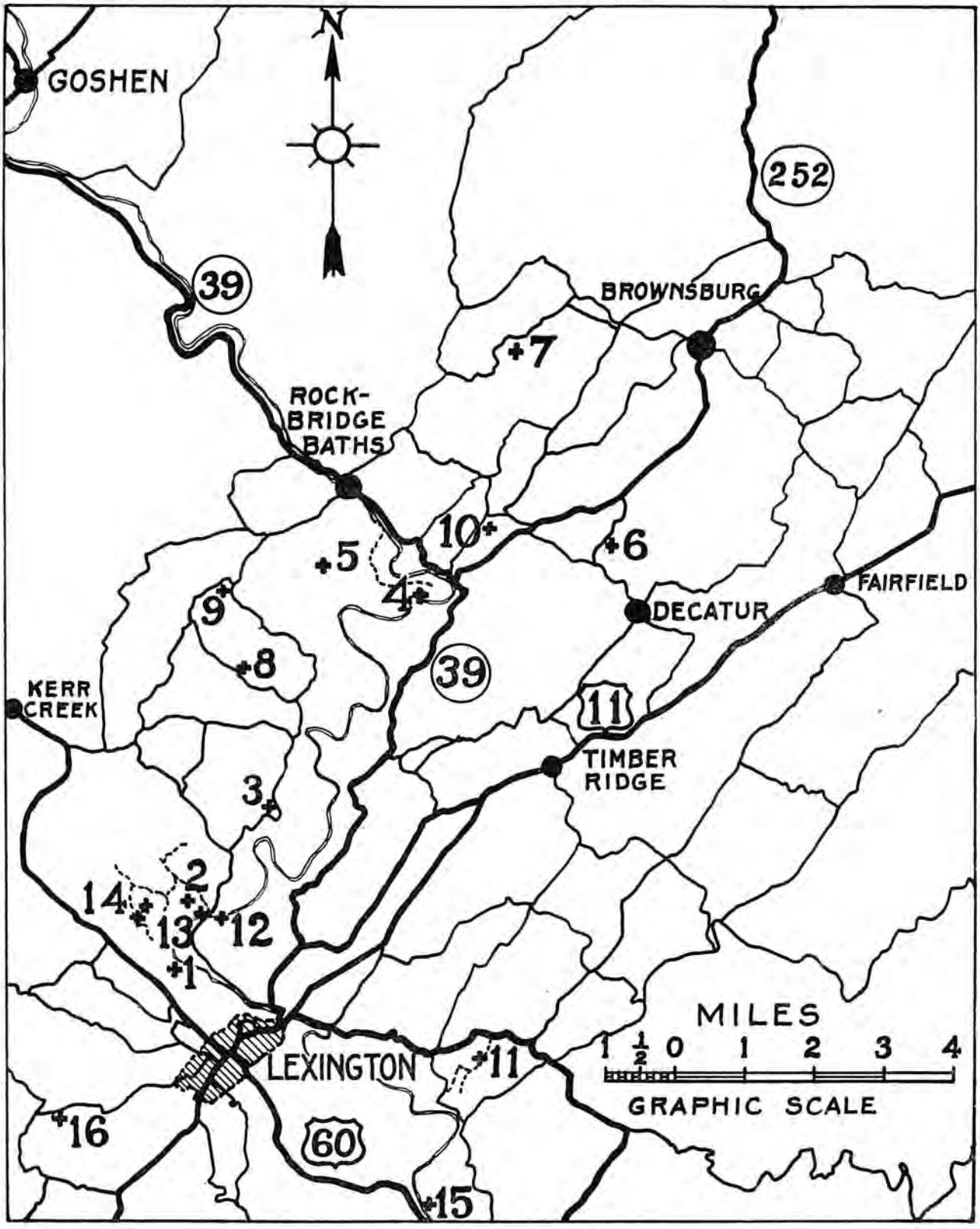
CAVES FOUND IN THE AREA OF THE LEXINGTON, VA. QUADRANGLE

The N. S. S. is attempting to keep a master file showing the location of all caves for which we have any reliable location data. One of these files consists of U. S. Geological Survey Quadrangle Maps (when such are available) with the caves located thereon as accurately as the location data permit.

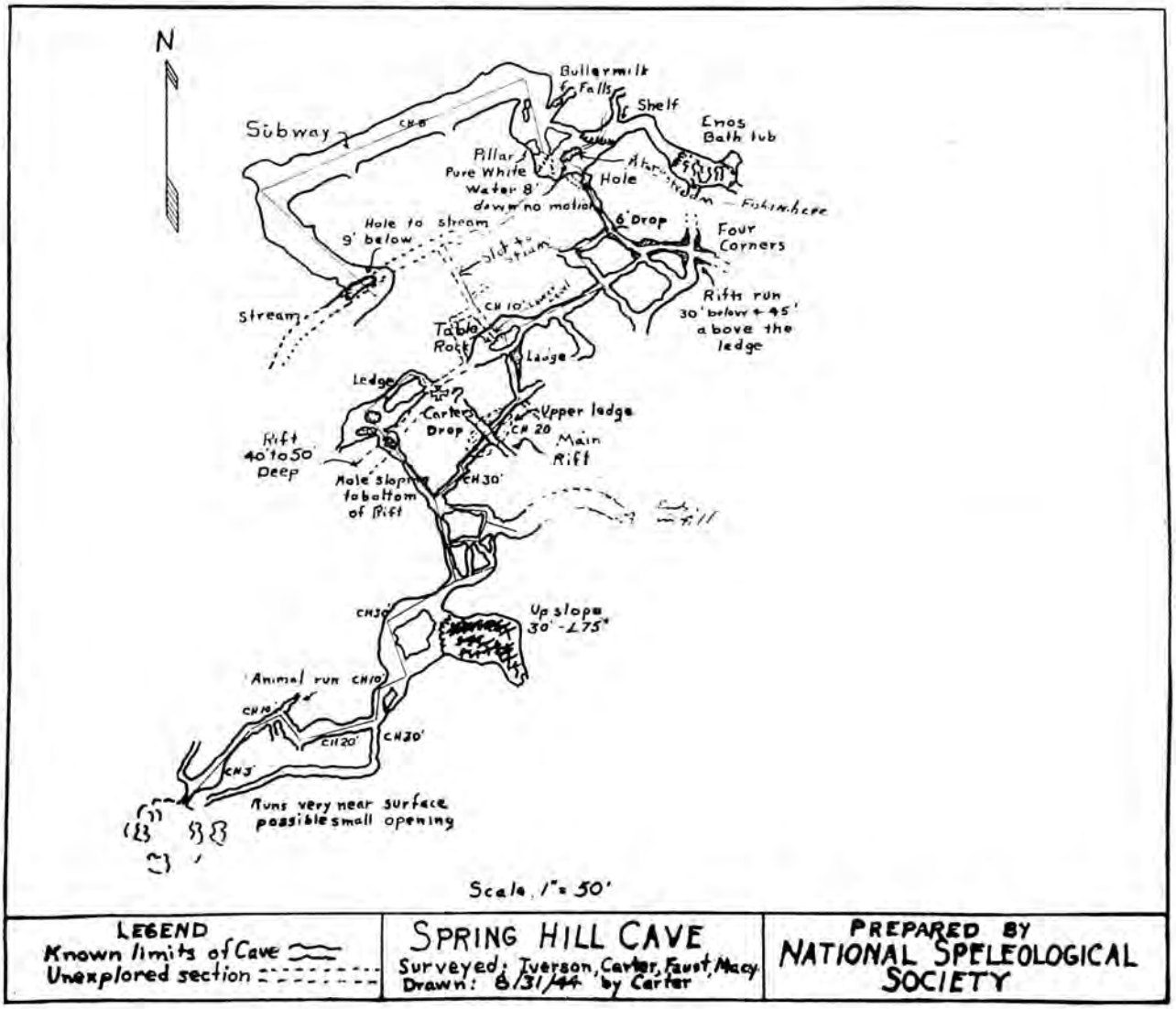
The Lexington quadrangle serves as a good illustration of the procedure which is now being followed by the Society. We already have some twenty caves spotted on this single quadrangle, (see map, 1, showing first 16 caves) and it is highly probable that this number will be doubled within the next year. When the existence of a cave is ascertained, the cave is spotted on the map by pencil or other erasible marking and a number placed beside it on the map itself. These numbers are then also listed on the margin of the map in numerical order together with the cave name, preferably in waterproof ink. Until the cave has actually been located and visited by a party of the Society, its location is kept in pencil, usually with a question mark opposite its name in the margin. When a cave has been actually located so that its existence and proper location have been verified, its marking on the map is changed to permanent India ink.

The value of this system is that caves which have not been definitely located can be seen at a glance and distinguished from those which have been properly verified. The pencil markings also may be erased: this is of special value when, as is often the case, it is found that the original report was in error either as to existence or exact location.

The caves now spotted in the Lexington quadrangle are as follows: 1. Spring Hill Cave. This is the largest cave known to us on this quadrangle. (See map, 2) It is also known locally as Geology Cave, due to its use by geology classes of both Washington and Lee, and Virginia Military Institute. It has also been referred to as Bather's and White's Cave, both of which names are thought to be in error, especially Bather's, which is believed to be the name of another cave on the opposite side of the river. Spring Hill Cave has been written up to some extent in BULLETIN No. 1. The Society has not done any extensive work in this cave, since considerable work has been done by the geology departments of the schools above referred to, and the time does not appear to be ripe for its extensive study and exploration. We have done sufficient work, however, to definitely suspect as a myth stories of one being able to enter and leave the cave proper by way of the spring and passage at the opposite side of Spring Hill,


N
GOSHEN
252
39
BROWNSBURG
7
ROCK-
BRIDGE
BATHS
10
6
5
4
9
8
DECATUR
FAIRFIELD
39
KERR
CREEK
11
TIMBER
RIDGE
3
2
14
13
12
1
MILES
1 1/2 0 1 2 3 4
GRAPHIC SCALE
LEXINGTON
11
16
60
15

or by way of the river. One party under the leadership of Dr. Welsh followed the spring passage back in excess of 200′ until further progress was blocked by what appeared to be solid walls, probing underneath the water surface disclosed no opening sufficiently large to permit one to duck under the surface and come up in some



other room. Attempts to communicate with a party in the main cave resulted in failure.

The cave should be worked only by a fully equipped party. It has several dangerous pits and crevices which require use of a rope for at least the purpose of safety. It has so many interconnecting passages that one might easily become lost. People with considerable experience in this cave have been lost for as long as eleven hours before being found by a searching party.

2. Limekiln Cave. A rather small but interesting cave with a large and impressive entrance. The main cave stops in a breakdown after 200′ or more. The cave contains a running stream and it may be possible that exploration along the stream will disclose more cave. It has been observed (by Petrie and party of N.S.S.) filled completely to its portals after flood (Oct. 1941), thus accounting for the thick layer of mud found throughout the cave.

3. Turkey Hill Cave. A relatively small cave with one main room which terminates in a 150′ crawl down a slope, at the bottom of which is a beautifully decorated medium size room or passageway which is said to end after 100′ or more. When visited by the Society party it was found that the atmosphere in this room would not support combustion so exploration was terminated as dangerous at this point.

3-A. Turkey Hill-A. A small cave on the opposite side of the road from Turkey Hill Cave. Believed to be about one-third the size of Turkey Hill Cave, and reputed to be connected therewith at one time, though no actual connection is now known.

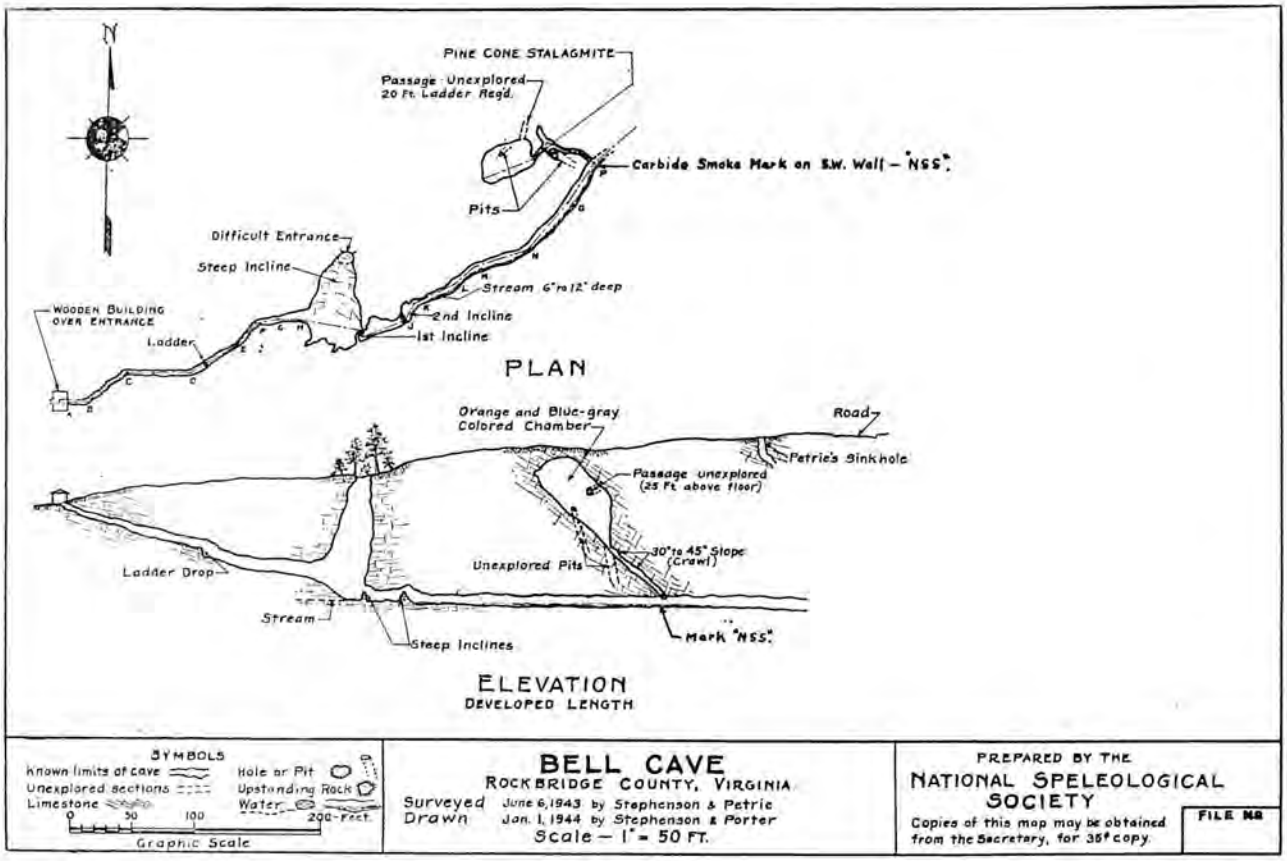
4. Riverside Cave. Not yet positively located. May prove to be quite extensive, as supposed to be in cliff adjacent to the river. Past experience with similar caves in this area have shown these caves either to be disappointingly small or of considerable size.

5. Big Hill Quarry Cave. While not yet located has exceptional promise due to size of hill in which it is reported.

approximate alleged location as marked on the map.

10. Watt's, or Cave in Field. Primarily a long tedious crawl with several enlargements, with end not reached. The cave is reputed to extend at least two miles to nearest river. This is doubted since ground surface is cut by a deeply entrenched stream less than ¼ mile from cave entrance and it is not believed the cave could extend past the stream.

11. Harris Page or Bell Cave. A medium-sized cave as yet known. Of considerable interest as its end has not yet been found. Main extent lies along stream bed with numerous interesting passages leading upwardly. Has at least two entrances, one of which has



6. Miller Cave. A passage cave enlarging after 100' or more into two dead-end passages, one containing a pool and interesting rimstone formation. The cave is of no extensive interest.

7. Bob Little Cave. Nothing more is known than reported existence.

8. Widow Stewart Cave. Appears to be fairly well-known locally and as such may have something worth investigating.

9. Unnamed No. 1. All known of this cave is its

been developed with a protecting house built over it. Requires a well-organized and equipped, experienced party to explore further, because of existence of pits with rope work required, further handicapped by lack of space at mouths of the pits. Interesting fauna recently taken.

12. Bather's Cave. In upper third of cliff overlooking well-known swimming beach. Reputed to run back considerable distance with another entrance, ¼ mile or more back in field away from river. Exact

location of neither of these entrances yet ascertained.

13. Cliff Cave. Believed to be merely small holes in cliff over river. Should be investigated before checking off as of no interest. This type always has possibility of disclosing Indian artifacts. Entrances can be allegedly seen from road.

14. Tolley's Cave. Cave about 700′ in length, cut entirely through ridge. Blocked in center for about 50′ requiring work from both ends. Lower end most interesting, being well decorated, while upper end contains the larger rooms. Temperature studies should be made as temperature in the two sections in summer (1943) appeared to be decidedly different, the upper section being decidedly warmer of the two.

15. Railroad Cave. Can be seen in railroad cut across river from U. S. 60. To reach one must swim river. Not yet visited by the Society.

16. Showalter Cave. Small, but exceedingly interesting, because of intermittent lake system following flooding, and particularly gooey mud. Has been explored to present known end; believed to be fast filling with mud, as it is completely flooded after each heavy rain. Rich in fauna.

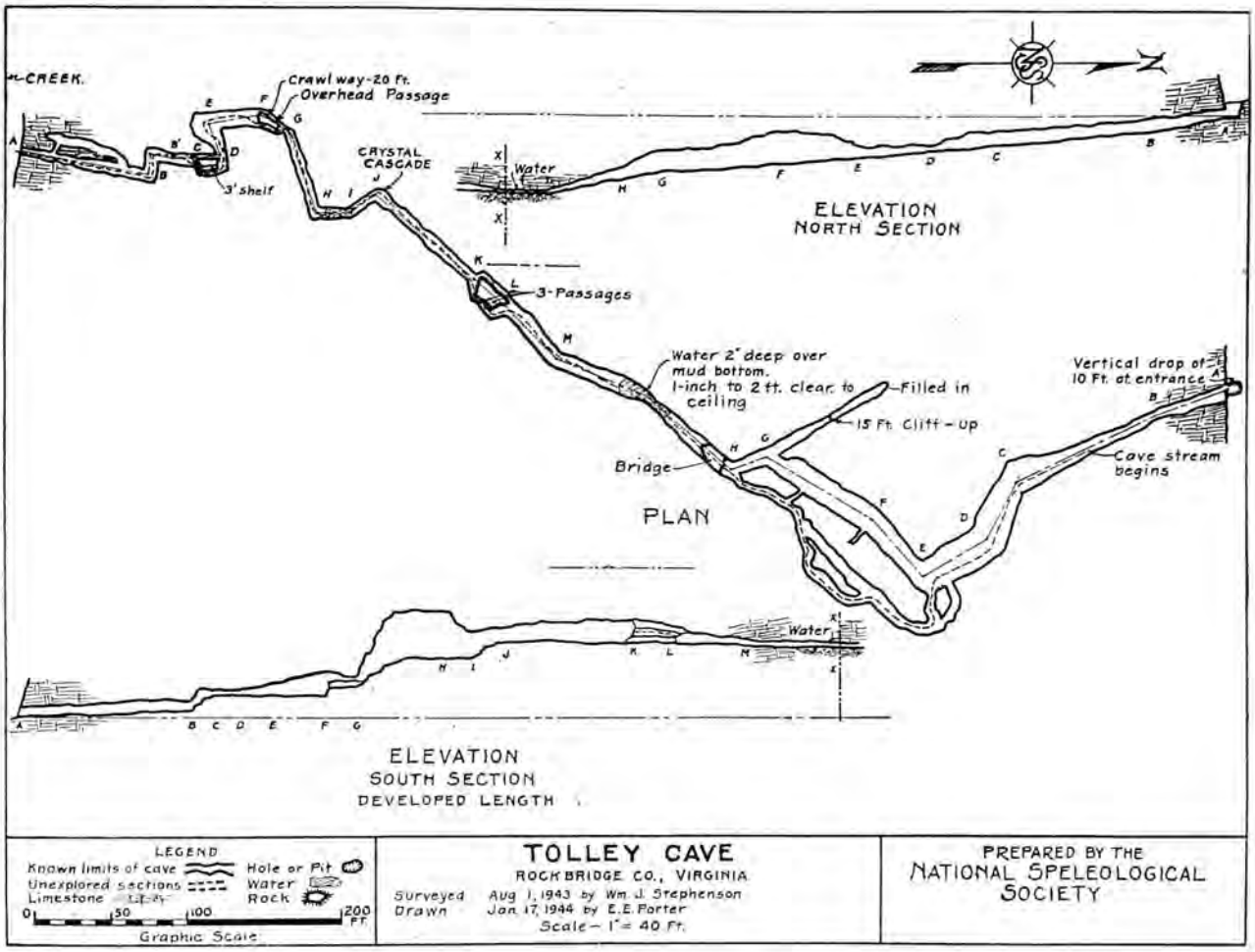
17. Fox Cave. Name and existence only reported.

18. Unnamed No. 2. Existence only reported.

19.———

20. Cow-bear Cave. Name and existence only reported.

21.———



22. Unnamed No. 3. Reported existence only.

23. Sewer Cave. Entrance only located. Sewage discharged into cave.

24. Bare Cave. Small cave of little interest.

25. Blackwell's Cave. Entrance is now blocked by debris. Could be entered by clearing debris. Not known to have been previously explored.

W. J. Stephenson (1943)

CAVES FOR WHICH SOCIETY HAS MAPS

	Tracing	Blue	Pr.Photostat	VanDyke
Baldwin's	*	*		
Beaty's	*			
Blowing	*	**		
Boonsboro No. 1	*	*		
Brown, John	*	***		
Cedar Hill	*	****		
Clark's	*	**		*
Cochran, Clyde	*	*		
Crystal Grotto	*	****		
Dead Dog	*	**		
Dyer's	*	**		
Fifth Quarry	*	**		
Gandy Sinks			**	
Hell Hole	*	*	**	
Higgenbottom	*			
John's	*	**		
Lincoln Caverns	*	*		
Madden's	*	**		
Mohler's	*			
Peacock (Geol.S)	*	*		
" (N.S.S.)	*			
Rhea's	*	**		
Rockhouse	*	**		
Rumbling Bald		**		
Ruddle		**		
Schoolhouse		*	*	
Siler's	*	**		
Showalter's	*			
Skyline	**		*	
Smokehole		*	**	
Withero's No. 1	*	**		
" No. 2	*	****		
" No. 3	*			
" No. 4			*	

Letters from Our Files

To all intents and purposes, these letters are—as in newspapers and other magazines—"To the Editor." That is to say, they are the free expression of anyone who cares to write us, on any matter pertinent to the subject of speleology.

They do not necessarily reflect the policy of the Society; nor does the Society accept any responsibility for the truth or accuracy, necessarily, of the sentiments or statements expressed therein.

They are published—when *they are published—because they have been judged interesting enough to warrant the procedure, for one reason or another. They may even be deliberately designed as a hoax. (Remember Poe's "The Descent Into the Maelstrom"!)*

They promote good-neighborship, we believe, stimulate exchange of ideas, and serve the useful purpose of providing an outlet in print for those who are peculiarly inarticulate unless they are "writing to somebody."

FROM OUR MEN IN UNIFORM—

Georgia Cave and a Legend

A few weeks ago I took a trip to northern Georgia and visited a cave called Cove Cave near Jasper, Georgia. The local people there claimed that it had never been fully explored, and that people had been lost in it for days; but, as usually is the case, it was not a large cave and only took a few minutes to go through the whole thing. My friend, whose home is near there, insists that there must be another cave as he had heard stories about it for years; but we hiked all over and didn't find another one.

The cave is located at the bottom of an old marble quarry which has not worked for over 40 years. It was discovered about Civil War time when they blasted in the quarry and my friend's grandfather said he worked there about 40 years ago. It is quite probable that at one time the cave was much more extensive but the passages are now filled with clay. There are a few formations in the cave and many of them near the entrance have been hacked off.

S/Sgt. George H. Pooler,
Herbert Smart Airport,
Macon, Ga. (1944)

— . . .

On 7/17/44, from New York City, John Meenehan writes: "I wonder what those nylon glider tow-ropes are like. Do you think we could use them for climbing and rock work? There ought to be tons of that stuff lying around after the war. We could also use helmet liners for helmets in cave work and K and C rations would be nice to carry on extended cave tours. Think of sitting down after eight hours in Schoolhouse Cave, setting up one of those little portable stoves the army puts out, and having a hot meal! We could do all this without adding much weight to our load.

"I had an interesting experience recently. I've been going up to the Hayden Planetarium and have scraped acquaintance with one of the lecturers. He expressed an interest in cave work and so I brought up a handful of slides. We rigged up a makeshift carrier for their projectors and showed the pictures on the dome of the planetarium where the stars are projected. So now you can boast that you've been projected with the stars."

Henry C. Allnutt writes (10/12/44) from France, sending $10 for membership and "contribution." Thanks, Hank, and—wish we had more "millionaire" members like you!

Ideas for Exploring

I've got a lot of ideas I have picked up in my Intelligence work in the Air Service that will come in handy after the war in our cave exploring. One of them is that someone should go over all the locations of the caves and locate them accurately on the map according to latitude and longitude. That should be easy with the U.S.G.S. quadrangle maps. This thing of locating them near Davis or in Randolph county is not so good. Will be glad to help on the W. Va. caves, if I can.

Another thing is this; briefing the cave explorers the night before an exploration. Telling them where the cave is, how to get there, time of rendezvous at certain spots, what to look for in certain caves (snails, rock formations, bats, spiders, crickets, etc.)—and all that stuff. We could have a sort of a form made out in blank and all the information sifted down and filled out on the form which could be filed for future record. I've got the idea all down in my head, and I think it can be worked out on a more scientific basis.

This country is honeycombed with caves and sink holes. In fact, our camp sewers all drain into an underground river some 50 feet below the ground. I have found underground creeks by the score, but can't crawl in them as the roof seems to be always broken down. There are quite a few developed caves, or grottos (as they call them over here) quite a few miles away. I'll try and get to them in a few weeks, and any literature I can pick up on them I will send to you if I can get it past the censor. I guess he would let it go through to a scientific society. Quite a few small undeveloped caves I have been warned to keep out of. Same as back in Africa. The anti-personnel German Teller mines have not yet been lifted from them. I am just as much afraid of land mines as I am of cows. Back in Africa I once "hunchukkers" in a mine field but didn't know it until I got through o.k. Then I felt rather sick.

My health is o.k. now. Just too much of Sunny Italy in the winter time with the cold, the rain, and the mud. If it hadn't been for my mountain and cave climbing I'd never been able to make it.

Capt. J. W. Preble, Jr.,
Somewhere in Egypt (1944)

Tommy Watts writes (7/21/44) from "England" that he is in "limestone country," has a motorcycle, has seen some large fossils, and possesses a vast yen to go a-caving.

Major Paul Price, assigned to a British Army outfit as Mineral Resource Specialist, writes on 6/19/44 from somewhere in England—as one of the V-type flames by overhead!

The following sequence of letters from T. Perry, J. Wilson, and F. Ruocco are of general, as well as speleological interest. To your EDITOR, they had a broader significance, as indicating what our men are thinking of—war's end and home, with home including a long, quiet spot of caving. . .

From Thornton T. Perry

In Engand,
May 16, 1944

I received a fine letter from Frank Solari—I think he listed every cave in England, and there must be hundreds, possibly thousands, especially in Yorkshire. I haven't had time to look around about caves, working seven days a week—very exciting.

When I was in the Ohio Caverns I found the old guide much interested in caves, but the management was apathetic. They charged me to go in even when I showed my card, but I didn't mind. The cave needs more exploration, and has dozens of leads they have never been in. In the old days it had another entrance, still open, which has possibilities. The cave they use is in the shape of a huge hill which goes on back, but what you see is all close to the slope. I believe some leads will disclose much more cave back under the hill . . . It's a lovely location for a picnic. . . you'd never dream a cave was there—no sinks or outcropping of stone.

Glad you still hear from Stevens in Baltimore. He is a cave man at heart and loves to prowl in them.

Must get going for the day—sleeping on a cot, straw tick and 5 blankets it's so cold at night. I am always glad when day comes.

I see General Tito has his headquarters in caves. An interesting article on the use of caves in wartime for hiding—headquarters, air protection, and even in tactical war like at Cassino—could be written. . . but not by me.

London,
September 4

Sure have wished for a deep cave often here. . . they'd be handy with buzzbombs which don't go deep, but blast hell around them.

The tubes (subway) here are 150 feet underground in places. . .

I haven't had a minute to look into caving yet. . . Been here about four weeks and may be for some time yet. Was on coast before. War may be over soon. . .

London,
October 1

I have never had time or been close enough to the caves Solari sent me. Hope to, though, in the future—one or two.

A few more clippings (Ed. Perry has sent the Society scores of these clippings, some of which will appear in BULLETIN No. 8, all of which are preserved in the Society's clipping books.). . . Some day, if I get the time and opportunity, I will try to run down to Dover and see at first hand the famous caves in the chalk cliffs which protected those people so well.

So much of this man's warfare has gone on under the earth, in man- as well as God-made caves, not to mention sewers, catacombs, the tubes here, cellars, tunnels, etc., and even those working under cover referred to as "the Underground". . . Caving should gain great impetus after this war, and prove a great outlet for young men who still have adventure in their souls.

The buzzards still come over here, and I'll be darn glad when they have hunted the Hun to earth and found all his lairs of destruction for London. They are devilish things—I've been under real bombing and strafing planes—but these . . . well, I frankly prefer the airplane bombings. Some day the whole story of London, a front line city, can be told. We can't now. Censorship.

Hope you are still exploring, and that you will have a few nice ones, well explored, into which an old, tottering troglodyte, such as self, can take in. Keep the home-caving fires burning. . .

London,
November 22

First of all—Merry Christmas and a Happy and Successful New Year!

Some more clippings. . . nothing exciting about them, except that half this war is just about being fought underground. Every town taken in Germany and those before, in France, tell of people hiding in caves and cellars. Here, we rush to the cellars when buzz-bombs come over, and thousands of people sleep each night in the subways here. They are very deep—some even 200 feet underground. The forces, too, are supposed to have great underground headquarters.

When the buzzers come over, which they still do, with considerable regularity, and other things, too, I often wish for a cave as deep as Carlsbad.

Sure hope it ends soon, so I can be back and have some nice, quiet week-end caving drives. . .

From Jack Wilson

In England,
August 15, 1944

We are pretty well restricted, and there is no opportunity to survey the local speleological situation. In the little traveling I have been able to do, I have observed some rather startling outcroppings of limestone in land that seemed to be otherwise free of rocky soil. I know nothing of the geologic structure of England, and it may be that there are caves all about and yet out of sight. For that matter, practically all the roads are bordered by high hedges so you can't see much of anything.

In spite of all the limitations and restrictions imposed, the trip has proved interesting in many ways. We are on double daylight time, and it stays light until 11 o'clock. Then it starts getting cold, and our blankets are needed. Of course we are outdoors, in tents, but I have slept out in the mountains back home lots of times and not been as cold.

This English beer is scarce, and not much good—certainly not worth waiting in a long line to get. The monetary system takes a little cogitation at first, but is not really difficult. . .

France,
October 14

Have been in France a couple of months, and spent shorter periods of time in two other countries. Anyway, I like France better than the others if for no other reason than that their beer tastes like ours, they drink it cold and sell it for two francs a glass, or about four cents of our money. Further, there is plenty of it.

Have seen quite a bit of this country. It's all pretty and well cared for except where somebody has been fighting battles and knocked everything down. Some of the towns we have come through are just about obliterated, but in other places you can drive for miles and miles and see nothing but pretty countryside and prettier women. The enemy abandoned lots of towns without doing any damage except some looting. Often you will find only one or two wrecked tanks or guns or a few foxholes and maybe some graves on the outskirts of a fairly large town. Of course, where they could blow up bridges, the Germans did a pretty thorough job of it, but they even left plenty of these.

Have had ample opportunity to check up on stories I heard about the weather in France during the other war. It hasn't changed a bit, and all the weather man has to do each day is wake up long enough to predict rain and his work is then done. With a lot of heavy

trucks and other equipment rolling around, the mud just gets deeper and deeper. It is of an especially rich and gooey variety, superior in many respects to that found in the slimiest caves we have ever explored. Even if the sun does come out for a while, the mud just stays. What amazes me though, is that with all this rain there are very few streams in the country, and even the big name rivers would hardly rate as a first class West Virginia creek.

We have pitched camp in almost a dozen localities and, up to the last one, it was always with pup tents—sometimes digging in and putting the tent over the trench, and sometimes just finding places under trees. If properly put up, the pup tent will keep you dry; but putting them up in a blackout at midnight with a pouring rain coming down is something of a problem, especially if you have been riding all day in an open truck and all your blankets and everything else are soaked through.

Now I am temporarily on duty with this battalion headquarters and living indoors. Indoors happens to be the second floor of an old stone barn that was once a chicken coop. We shoveled the dirt and feathers out, and are now quite comfortable when rolled up on the floor in our blankets and shelter halves. Our "office" is a very old chateau that is about worn out. There is no heat in the place except fireplaces, and they are either sealed up or have defective flues. There are three refugee families living on the second floor and, if we build a fire in our room, they get the products of combustion and let us know about it.

It would seem that anyone building a house as big as this would build a sidewalk leading up to it; but, no, they let it float in a sea of mud.

Doubtless I will have had enough of the rugged life by the time I get home, but after resting up will be ready to take off to Schoolhouse Cave or the Hellhole with you again.

France,
November 10

I did not get a chance to even think very much about caves while in England, although the part of the country I was in appeared to be limestone and looked like probable cave territory. Being a Pfc in the infantry gives you about as much liberty as goldfish in a bowl. About as much privacy, too. For the three weeks I spent in England I had one pass, starting at around seven in the evening and running until eleven the same evening. I did manage to spend a few other evenings in a nearby town, but always as potential bait for the MP's. As far as getting out in the day time, there just wasn't any such thing. We lived in a field with a fence around it, just like any good prize cattle.

Have had a couple of letters from John Meenehan wherein he mentioned Frank Solari. Also, he says he visited LeRoy Foote up in Waterbury, Conn., and is going back up there to give a lecture on speleology.

In France, of course, the restrictions are even more severe, inasmuch as there is a war going on down the road a ways. However, we do get a six-hour pass once a week, but cannot get started earlier than about 12:30 and it gets dark around five o'clock now. If caught out after dark in the blackout, it is all but impossible to get a lift because the drivers can't see you, and also you are usually lost anyway.

This part of France is somewhat mountainous, and all the roads twist around and nobody knows where anything is. It's bad enough getting back in the daytime, but we are all getting pretty good at remembering landmarks, etc. Being late in getting back is liable to cost money all out of reason with the seriousness of the offense. Military justice, they call it.

The weather has been pretty foul ever since I have been in France; in fact, it has rained almost every day, and the rivers have been in flood. Last night it snowed for a while, but no evidence of it this morning. These French don't go in for pavement and sidewalks as much as we do, and everything is mud except in the cities. Where trucks and armor have plowed it all up you can just about drown in it.

All in all it looks like I will have to forget speleology for the duration, but will be anxious to take it up again as soon as possible.

From Frank Ruocco

Oahu, Hawaiian Is.,
February 26, 1944

I received several of your cards, the last one from your trip to Blowing Cave. Wished it were possible to have gone there again. By the way, have you ever gone to Trout Cave again. . .

The Hawaiis are quite a place for sightseeing. . . I am on Oahu, and as yet have not been to any of the other islands. I'd like to see the old volcanoes . . . heard so much about them in the past.

The climate is ideal, as the temperature never goes down to freezing and rarely up to 90°. It is winter now, and compares to June weather at home—no need for a coat or any woolen clothing at all.

Hope to send a few snapshots soon; took some of the scenery, really look pretty good. Films are kind of hard to get anywhere, but once in a while a batch comes in. . .

Oahu, Hawaiian Is.,
March 21

I am still, more or less, enjoying my stay in the Hawaiians. As the islands are comparatively small and communication and transportation not readily available, I continue to spend most of the time on Oahu. Surrounded by hills and mountains, I have so far been unsuccessful in locating natural caves of any kind or size whatsoever. They probably do not occur in rock formations of the kind we have on the islands; so, for the time being, I'll have to read about them from your trips.

The Newsletter was forwarded from Camp Livingston and arrived last week. . . The present list of members is surprising—hasn't the membership increased by about 50%? Remember when the Society was first organized with a dozen or so members. I recognized a few names on the list, and hardly believed they could have been interested. I guess one trip changed their minds. . .

I had intended sending photographs of interest taken here, but never got around to it. On account of censorship, it's hard to get anything through the mails, but I soon will send a few. One interesting point is Diamond Head, the big cliff jutting out of the ocean which can be seen for miles out. Directly below lies a pass leading to the water. From above, the scene is magnificent—it reminds one of the Shenandoah from Skyline Drive. Can't keep from thinking about home. . .

New Guinea
July 31

Quite a bit of time has passed since I last wrote to you. Now I have a little time to myself and catching up on a little correspondence. I have moved again and taken a nice long ride. The boat was crowded and uncomfortable as ever, not being a pleasure cruise. The temperature rose higher and higher as we reached the equator; now I am on the other side of the world and standing on my head. On this side people are a day older than in the states; the date line was crossed a way back; we are one day ahead in time. The seasons are just the opposite from home, too.

On the way to New Guinea, the boat passed quite a number of atolls and small islands in the middle of the ocean. Some of them are so small that it would take but five minutes to travel from one end to the other. Most of them seem not to be inhabited.

Met up with a dust storm which as so thick it was impossible to see very far ahead; worse than nighttime; seems like some volcano erupted—at least, that's what the story was.

Life out this way is pure and simple; none of the refinement and comfort of home. Barely living on necessities. We are living in tents and out in the open; no human life at all besides the soldiers and a few primitive natives. There is not much water except for drinking purposes; the rest comes out of wells and is muddy—that is used for washing. The old elbow grease and a bar of G. I. soap does the job of washing clothing.

The terrain is very hilly and, in some spots, levels off a little; jungle and undergrowth covers practically the whole section; rainfall is very heavy and, I suppose, accounts for the heavy growth. Quite a few birds in the vicinity: some of them look like white parrots; others come in all different colors, and make quite a bit of noise in the nighttime.

The comforts taken for granted at home now are luxuries and, even at that, almost unknown; about all the boys have are cigarettes and a movie on a small screen once in a while. You can't borrow or beg a drink of ice-water, much less a bottle of beer or a coke. The cots used for sleeping are hard, and the only substitute for a mattress is a blanket and almost anything for a pillow. It is fortunate that a human being becomes accustomed to all kinds of living. The Red Cross out here does quite a job. When we landed on the beach they gave us coffee and cake, which was very welcome; they also handed out cigarettes. There is a canteen nearby, and every afternoon they have coffee and lemonade, even though it is necessary to stand in line for maybe a half hour. Tastes pretty good. . .

The fighting in this section was pretty heavy; equipment and ammunition lays all over the place; it's hard and tough on account of the jungle. The brush is so dense that it is impossible to see in front. Quite a few pillboxes were taken by flame throwers—lucky to have them. To see all the cemeteries out here makes one think about what the price was. Reading in the papers about some of those animals going on strike sure makes a person mad.

Have you taken any trips recently, or found any new caves?

(New Guinea)
November 2

I am getting tired of this place, and would like to leave for other parts. The environment does not possess any atmosphere of welcome or even any subject of interest—merely an abundance of brush, heat, insects,

and dust. A little way off is a belt of mountains which look a little different.

The nearest point of civilization lies a thousand miles away. The caves you mentioned are not found in these parts; in fact, I have not heard nor seen any so far, as it is difficult to get around. Neither is there much time to spare. . . Perhaps in the future I may be fortunate enough to come across some of those caves you write about.

Had a bit of bad luck coming across, but pulled out OK. Enclosed (following this letter) is a newspaper account of what happened. Can't explain in detail at this time, but it will give you an idea of what happened.

The days are much hotter now; soon as the sun rises, the heat starts, and does not let up till dark— and even then the nights are not as cool as they used to be. Wish it were possible to get a good night's sleep— the cots here are hard as a board floor and not very big either to stretch out on. A comfortable seat or chair is a luxury. Anyhow, a pump has been put into operation and a shower rigged up. A good cleaning up after the day is over feels good. . .

TROOPSHIP GROUNDS IN VOLCANO GALE

The hitherto undisclosed story of an eerie volcanic storm which trapped a big American troopship and drove her onto a South Pacific coral reef was learned by the *Call Bulletin* here today.

Hundreds of troops aboard the transport were evacuated into Liberty and LCI's without a single reported casualty, according to official accounts of the incident. The vessel, after more than two days aground, was backed off the reef with the aid of Liberties and LCI's and with only minor damage to her hull.

First ominous hint of trouble came one afternoon when officers aboard the transport sighted huge, billowing black clouds moving toward them. The clouds were formed by a pumice ash storm, resulting from a volcanic eruption. By midafternoon, the transport was forced to turn on her navigational lights. A little later, one officer reported "day was turned into night and the sky was black and visibility nil." Blinding, stifling ash dust enveloped the vessel, sifting into machinery, blotting out all visible and navigational aids.

The big transport, groping for a safe anchorage to ride out the weird storm, slid onto a reef a little before nightfall, smoothly, without even a jar. All night long her officers and crew tried to back her off— without success. The ash dust from the volcano was so thick that eye shields from gas masks carried by the troops were supplied to members of the transport's crew who needed them. The ash settled on the ship coating her decks with a quarter inch of dust.

With visibility at zero and the transport still on the reef, the officers decided to put off the troops. Two Liberty ships and five LCI's, along with a Navy Auxiliary vessel, a couple of salvage tugs and an Australian ship were standing by. Chaplains moved among the men, praising the calmness of the ship's master and allaying any fears the soldiers might have had as to the ship's safety. The soldiers were put aboard Liberty ships to continue toward their destination.

Meanwhile, four LCI's, aided by a Naval Auxiliary vessel, succeeded in pushing the transport back off the reef after she had been aground for two full days and nearly six hours. An Australian Navy Officer, who visited a nearby island after the storm, reported later that, "dust was thick on the ground and bushes, trees and shrubs were weighted down with it."

AND OTHERS . . .

A Word from Carlsbad

I have been compiling a brief article on the National Speleological Society to be included in each issue of the *White City News*, as I knew that it would bring the Society to the attention of many people interested in caves and caverns, some of whom might be interested in joining your Society.

Incidentally, I want to thank you for the latest copy of the BULLETIN sent me. I think you are especially wise to *print* it; and I assume many persons, like myself, will not only enjoy reading it, but will find it as a convenient reference book. I have cuts and mats which can be loaned to you and which might be proper for inclusion in future bulletins.

When Dr. William Gray recently visited the Carlsbad Cavern, I accompanied him on part of the trip and assisted him in taking some kodachrome pictures. He may plan to give you an article on the Carlsbad Cavern, but I doubt if the information obtained by him on his brief visit would be sufficient to satisfy most of your members. I was sorry I did not get to make the full trip with Dr. Gray, but he was one day behind schedule and for that reason I was deprived of the opportunity of being with him the full day.

I am especially pleased at the last paragraph of your letter stating that you hope to visit Carlsbad (I assume you mean Carlsbad Cavern) after the war and sincerely hope that this Greatest of Caverns will live up to your expectations. I have visited the Gruta de Cacahuamilpa in Mexico, but failed to check the statement that it surpasses Carlsbad Cavern in any respect.

Thomas Boles, Superintendent,
Carlsbad Caverns National Park,
Carlsbad, N. M. (1942)

Another "Endless Cave"

I hear of a cave outside of Bedford, Indiana. Go from Bedford one mile on the old road to Burns City (a new road is being built), until you are 300 yards from the White river, and about 300 yards from a bridge which crosses the White river, until the road makes an extremely sharp left turn. The cave entrance is directly under the road in the bend of the turn, in a little gully.

The cave entrance has been barred by wood, as a couple of kids were lost in it for two days a year or two ago. Local reputation is that it is "endless." Two houses and a service station are near by, and the story and directions can be had from them.

I miss the cave trips considerably, and hope to be back with you after the war.

Possibly this cave is already known. The new issue of the magazine—which is excellent—lists several caves in Lawrence Co. I understand that this cave is in that county.

William W. Welch, M.D.
Rockville, Maryland (1943)

Data from Montana

I received my copy of the NSS BULLETIN and have been getting a great deal of pleasure out of it. Thanks for the article on Morrison Cave which appears in it. On page 46 there is listed the New Year Cave at Lewisburg. Would you have that changed to Lewistown; apparently it is an error in printing. The New Year Cave is under development and the Central Chamber of Commerce of Lewistown plans to have it operating this coming season. I am going to make another trip over soon to give them a little help and map the cave. The cave was discovered by a mining company while they were driving a prospecting tunnel in search of gold. The cave is in the Judith Mountains. I hope it can be listed in the Guide to Commercial Caves which the Society is preparing.

The Research Projects mentioned in the BULLETIN are of interest to me. Morrison Cave has a precise transit survey through it, and all bench-marks have altitudes to a hundredth of an inch, and latitude and departure.

The Physics department of Montana State College measured the radium activity along the cave trails; there are three places where radium emanations are quite pronounced. The Department of Entomology collected several kinds of insects and described them. I have sent for another copy of the data which I will forward to the Committee on Fauna of the Society. I am glad to know of all those committees and hope there is something I can do to help somewhere. I will send pictures of both Morrison and New Year as soon as I get a good set, because I want them on file with Miss Whitley of the Records Committee.

The Montana School of Mines at Butte is preparing for me a photograph of an ideal section of a stalactite. We sawed a few sections off and polished one quite thin, and you will be surprised what that one looks like under the microscope. There are a few rings which are complete; most are made up of groups of half moons.

Further data which we have on Morrison: The U. S. Bureau of Mines measured the temperature, air-flow, oxygen content, humidity, and the safety of it.

Bruno Petsch, (Mont.) State Forestry,
Morrison Cave State Park,
Whitehall, Mont. (1942)
Clyde A. Malott,

Bleeding Formations?

We have heard a little about some caves in the vicinity of Elkins. One, about 4 miles or so east of Elkins, contains formations (allegedly) which give off a blood-red liquid on fracture; another cave—"over the mountain a piece"—runs right through the mountain.

Sam H. Allen,
Steubenville, O. (1943)

Caves on "The Other Side"?

It was thoughtful of you to send me the card from Blowing Cave. When I saw your name at the bottom of the message, there flashed through my mind a mental picture of an unseen though very real friend at the other end of a safety-rope that guided and later "lifted" me when I assumed the character of an acrobat on a rope ladder while leaving the "jug" in Doyle Cave. That was a great experience.

I would have liked to have been with you on your latest trip. When you speak of cave mud, I certainly get the old "urge." Once a "caver"—always a "caver"—it gets in your blood and only death can stop the malady. I'll bet when we get to heaven the first thing we will ask for is a good deep cave to explore in. Well, why shouldn't we expect only the "best" on the other side?

George White, Parke, Wood, my brother-in-law, Louis Klappich, and the writer, visited Seneca Caverns Armistice Day. We didn't go down to the 8th level this

time, for the water has risen 30 feet. Explored around a little and had a fine time.

I thought the last BULLETIN was very good. Wrote Steve to that effect; also suggested a possible method of increasing the "circulation" of the BULLETIN, in an educational campaign that would enlarge the influence and scope of the Society's work. He will undoubtedly write me regarding the "reaction" to my suggestions.

L. E. Ward,
Toledo, O. (1943)

Now, About that Onyx . . .

That onyx thing has been bothering me ever since I wrote that column about visiting the new cave in Kentucky. I figured that some of the experts on cave exploration must think I'm a sap when I talked a lot about floors covered with onyx. Anyway, that was what the natives called it; and while I've learned through the years that natives can be very wrong, especially on history and nature lore of all kinds, occasionally you have to take their word for things until you have learned differently from some recognized authority. I checked with all the authorities I could find, but I couldn't get to first base on that onyx question. I've been studying new terms every night until now I can talk like an old salt for, believe it or not, I'm still hoping to get into service. I passed my physical for a Navy commission some time ago. Recently the Detroit Office of Naval Officer Procurement wrote me and told me that they had approved all my papers and recommended me for a commission, sending all the information to Washington. So now I'm sliding into home and, unless somebody tags me out at the plate, I'm going to score after the fifteenth separate and distinct effort. I've got more rejection letters than Diamond cavern has stalactites. We've got a couple more crawlers signed up in Toledo, and a couple more enthusiastic "head bumpers" nibbling. I believe that, before too long, we may have enough for a Toledo grotto, and I'm hoping we have it before the war is over, too.

Lou Klewer,
Toledo, O. (1943)

Paul Price Reports

I have enjoyed very much the last BULLETIN of the Society. The new items I like very much and think the idea is good.

It looks as though I will not get an opportunity to do much as Chairman of the Geology Committee because I soon will be in the Army. I have been commissioned Major, Specialist Reserve, Mineral Resources, Military Government. This will, I am sure, give me an opportunity to apply some geology in foreign fields. When we get to Europe, I will be sure to visit a cave so as to be able to report on it upon my return.

I am very pleased at the amount of interest and activity that is being maintained in the speleological work. It speaks well for you and your enthusiasm.

Calvin Price has had a letter from Jack Preble, and he was in the Near East at that time.

Paul H. Price, State Geologist,
Geological and Economic Survey,
Morgantown, W. Va. (1943)

Beard Brings Us Wissahickon

I just assumed that you would like to know how we of the Wissahickon Nature Club appreciate your fellow member James N. Beard of Pittsburgh.

On October 31, 1943, Mr. Beard took over a day's program in our cabin and educated our members in the "gentle" art of cave exploration. He festooned the rafters with hundreds of feet of manila rope, permitting the boys to try his safety belt, and displayed his clothing and his equipment to great advantage.

After a lecture on equipment and safety measures, he showed the effect of a carbide lamp in the darkened room and then proceeded with his kodachrome slide lecture. I believe he obtained some followers for on the succeeding Sunday morning bird hike one fellow wanted to investigate a hole in the ground which turned out to be a broken fresh water sewer in our park.

We honor Mr. Beard to this extent, that we have given him leadership in a group called the Speleological group to match up with our ornithological, geological, botanical, entomological, biological, photographic, astronomical, and zoological groups.

We who knew his friend Mr. Gage regret his absence because of the war.

The Wissahickon Nature Club is a field organization operating as an avocational association of adults in Riverview Park, Pittsburgh. The subjects of the groups outlined above are studied in groups in field and laboratory, and every Sunday some group puts on a formal lecture in our Wissahickon Nature Museum. I see no reason why Mr. Beard cannot form a nucleus of cave explorers here, and with his contact within our club, expand his own horizon in the study of geology, zoology, and such like, for the mutual assistance of the National Speleological Society and the Wissahickon Nature Club.

H. Clinton Kyle, Executive Secretary,
Pittsburgh, Pa. (1943)

Inside Story . . .

Your letter, by courtesy of the editor of *The Highway Traveler*, at hand. I am gratified to know that you found the Smoke Hole article published in that magazine interesting.

In reply to your inquiry for more information on the caves mentioned, I am sorry I am unable to give you their exact location. In explanation, let me say that because of lack of time while on a brief eastern trip, which I sincerely regretted, I did not personally visit the caves mentioned, but wrote the article from such authentic information as I was able to gather on the trip, supplemented by more upon my return home.

It was my privilege, however, to stand upon the summit of North Mountain and to climb the fire-tower there, from which vantage point several miles of Smoke Hole may be seen. I felt the region good for a story and, upon my return home, contacted several authentic sources of information, with gratifying results. These included Mr. Averill, supervisor of forest-ranger work in Monongahela National Forest; Roscoe Sites, guard at North Mountain tower who interviewed Andy Ayers, eldest resident of Smoke Hole at that time; THE SMOKE HOLE AND ITS PEOPLE, a Federal Writers' Project, of West Virginia; also a friend of Moorefield, West Virginia.

Regarding the caves of Wisconsin, I have been privileged to visit but two: Eagle Cave, of Richland County, about 8 miles northwest of Muscoda, Grant Co.; and The Cave of the Mounds, Blue Mounds, Dane Co., about 30 miles west of Madison. Both are caves of importance and well worth visiting.

At the present time I have another article ready for submission to *The Highway Traveler*, on the origin and discovery of Cave of the Mounds, together with excellent interior photographs. The editor advises me, however, that he will not be able to use it for some time, even if acceptable; therefore, it may be some time before it appears.

I shall be pleased to be of service to you and to the Society at any time.

Bert Studebaker (Free Lance Writer),
Madison, Wis. (1943)

New Jersey Jumps into Cave List

I have just read with interest the complimentary copy of BULLETIN No. 5 of your Society and, of course, the first thing I noticed was that in Mr. Morgan's "Partial Index of All the Known Caves of the World" there is no mention of any caves in New Jersey.

Let me be the first to say that I do not know of any comparable in size and beauty to many of those in other states, yet it should be recorded that at least four caves are known. These four are:

1. A small cave on the north bank of the outlet which flows from Pines Lake down to the Ramapo River. The cave is shallow and exposed only a few feet above stream level. My recollection is that it is about a third of a mile below Pines Lake.

2. A small cave at the base of the rather abrupt small hill on the south side of the highway, about a quarter of a mile east of McAfee station on the Lehigh and Hudson River Railroad in the northern end of the State.

3. A cave named "The Faery Hole Rock Shelter" by the Indian Sites Survey, a W.P.A. archaeological project. This cave is at the northern end of Jenny Jump Mountain in the extreme northern corner of Independence Township, Warren County. It is about 4 miles east and a little north of Hope, New Jersey. It is located in a heavily-wooded valley about 400 feet from the road which skirts Jenny Jump Mountain on the east side. The cave occurs at the foot of a rocky cliff about 35 feet from the floor of the adjoining valley. It is 15 feet wide, 30 feet long, and 6 feet high at the entrance which is roughly semi-circular. It narrows considerably about 15 feet from the entrance; and 24 feet from the entrance it makes practically a 90° turn to the right where it terminates by two shafts running upward at angles of 45° and 70° respectively.

4. Moody's Cave is situated about one mile southwest of the central square in Newton, Sussex Co., New Jersey. The cave's entrance is at the intersection of four fields where a tree nearly conceals the entrance. I do not have any description of this cave other than the bare statement that it does not contain any stalactites and is rather dangerous.

I regret that this information was not made available to Mr. Morgan prior to the publication of his index.

Meredith E. Johnson, N. J. Geol. Survey (1943)

We're Waiting for This One . . .

I plan to write an article on ultra-violet light displays in caves as an added feature on a cave trip, but have not had time to do anything about it, and must also do some experiments on it for data. We have the equipment here in the survey office for them, and I will try to get it out this fall.

Bruno Petsch, Vermillion, S. D. (1943)

What Do YOU Think Speleology Should Be?

From the standpoints of the different members of the Speleological Society there must be a wide variety of interests. Some of this is scientific and some of it is more or less popular. The scientific side alone is so broad that I will not attempt to list its various forms. I will merely cite some items in the biological and the geological. Under each of these, I might cite many heads, a few of which under biological would be the faunal, the floral, and the ecological; under the geological the genetic, the hydrologic, and the economic. Under the popular we will find variations as wide as there are diversities in human mentality and it is useless to try to catalogue these phases.

The success of the Speleological Society must necessarily depend on the recognition of all of these factors and no one phase emphasized to the exclusion of the others. From the standpoint of the scientist the non-scientific and semi-scientific interest might be considered unworthy. It is given only to a few to revel in the dry-as-dust of the scientific attitude. If one were to be strictly scientific and take no steps until the true approach had been attained, we would get nowhere. If we were to do nothing until we had what we thought a strictly scientific attitude, it is bound to be wrong. Later workers might marvel at our assurance but would not have much respect for our judgment. Science is worthwhile by itself, yet it requires considerable financial nourishment. We must grant that the commercial application of science may justify much scientific investigation, but the support of science by popular interest is essential.

The limitations of the human mind are such that scientific perfection is only approximate and is approached by trial and error. We are told that Juno sprang full fledged from the brow of Jove. Be this as it may, there is no scientist whose brow has given genesis to a new science. No science has been thus born and cave science is not going to be the grandest conception of some giant intellect. Chemistry had its beginning in alchemy; medicine with the witch doctor; geology with cosmogonists; and the early beginnings of other sciences are no less striking. If speleology started with troglodytes, it still has possibilities.

Perhaps scientists are a bit wary of speleology. Perhaps the ermines of their sacred robes might be spotted. Perhaps their dignity might be impaired. Purge speleology of its enthusiasts, let none but the simon pure within its sacred folds, desiccate to complete anhydrosity and classify it to perfect order and then—it will be dead.

If anyone hesitates about the quality of a new science, let me commend to him the reading of the early numbers of the *American Journal of Science*. Verily American science had inauspicious beginnings.

Pending the coming of the millennium, let's do something. Sample endeavors may be listed as follows: the psychology of the first cave trip, the story of blind beetles, the significance of the presence of photophilous fish in cave streams, the paragenesis of cave aragonite, troglodític farming. The total of these and many other items together gives the composite of speleology.

R. J. Holden, Professor of Geology,
V.P.I., Blacksburg, Va. (1943)

One thing: encourage the youngsters! Schoolboys who used to join me in explorations fifteen and sixteen years ago are the backbone of the Association today. True, they are scattered all over the world today, but I get letters every week from some of them. All are looking forward to the day when they can once more "grovel" down under. But this younger generation guarantee your future; they are your material who will carry the Society into the next generation, and see it is carried forward to the next after that.

One thing I would impress upon you is the Social side: aim at one happy family. We started off years ago very Academic, and it failed dismally. I was warned by none other than Martel that it would not work. He had tried it in France, and found it a failure—somehow the Academics get their heads so high in the clouds that their feet never touched *terra firma*. They can and do serve a very useful purpose; but if possible keep them off all administrative posts, is my advice from experience of over 40 years of caves and cavemen.

You will meet also a lot of folks who join the Society for what they can get out of it. We impress our members that the success of the Association does not rest on what they can take out, but what members put in.

Forgive me if the above may seem trivial; but, as Martel warned me years ago, I hand on same; for we here in Britain have only one desire—to see the N. S. S. become an unqualified success.

E. Simpson, Pres.,
British Speleological Association (1944)

BULLETIN NUMBER SEVEN

Contents

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