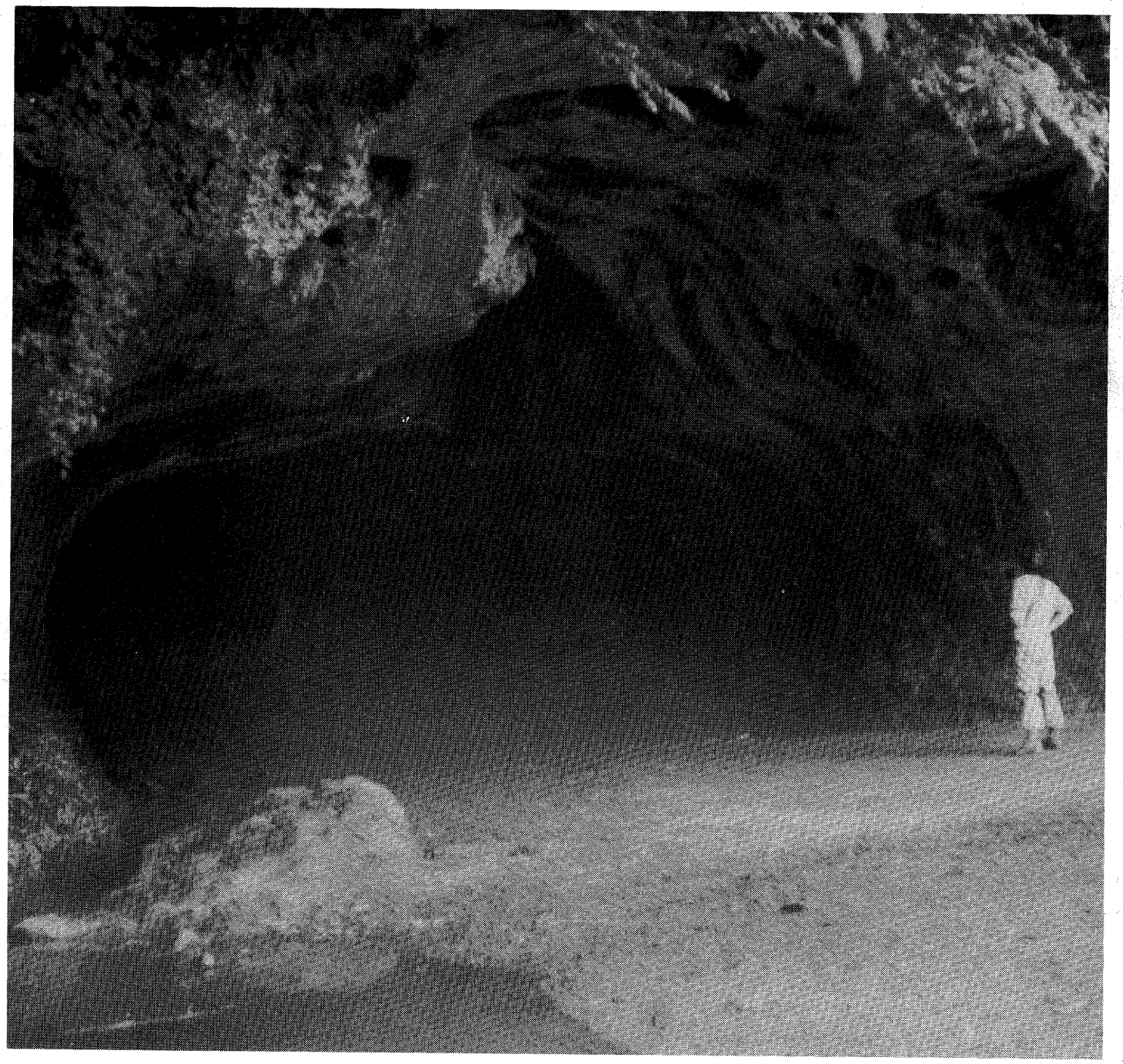
PHOLEOS

WITTENBERG UNIVERSITY

SPELEOLOGICAL SOCIETY

Volume 1(1&2) **1981**



PHOLEOS

THE WITTENBERG UNIVERSITY SPELEOLOGICAL SOCIETY NEWSLETTER

Volume 1, Numbers 1 & 2 March 1981

GROTTO ADDRESS

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SUBSCRIPTION RATE

1 volume $3.00 (2 issues)
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Send to Grotto address.

EXCHANGES
Exchanges with other grottos and caving groups are invited. Please mail to Grotto address.

MEETINGS

Second Wednesday of each month, 7:30 p.m., Room 206, Science Building, Wittenberg University, Springfield, Ohio.

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HISTORY OF THE WITTENBERG UNIVERSITY SPELEOLOGICAL SOCIETY

Wittenberg University is a small liberal arts school located in Springfield, a city of about 60,000 people in southwestern Ohio. Founded in 1845 as a private institution, Wittenberg is affiliated with the Lutheran Church in America and maintains an enrollment of approximately 2,300 students.

The Wittenberg University Speleological Society traces its roots back to a small group of students who became interested in caving during the spring of 1977 through the influence of Dr. Horton Hobbs (then completing his first year of teaching at Wittenberg and now the faculty advisor of W.U.S.S.). Dr. Hobbs had exposed these students to the sport and science of speleology as part of his course in limnology.

Interest in the "Caving Club" grew as time went on, and soon officers were elected in order to provide for better organization of the group. By winter 1979 the club had grown to the point where its members felt the next logical step would be to achieve Grotto status, and in April 1980 the Wittenberg University Speleological Society became an internal organization of the N.S.S.

In the past, members of W.U.S.S. have explored caves in Indiana, Kentucky, Virginia, and of course, Ohio. Several hardy groups even managed to get into several caves on San Salvador and Andros Islands in the Bahamas!

One of the early goals of W.U.S.S. became the systematic survey of the caves and cave fauna of Ohio--an ambitious goal to be sure, but one toward which much progress has been made to date and will continue in the future. A second project, now in progress, was initiated in winter 1981 to survey the caves of Carter Cave State Park, Carter County, Kentucky.

Michael Flynn

LETTER FROM THE EDITOR

Welcome to the first volume of PHOLEOS (Which means 'cave' for all you non-Greek majors). This volume is larger than should be expected because we have combined both our semiannual issues into this first volume. In the future the Society will publish one issue in the fall and another in late spring.

As previously mentioned, our goal is the systematic survey of the caves and cave fauna of Ohio. Dr. Hobbs and Mike Flynn made a great effort towards our goal last summer when they surveyed nearly 40 caves for the Ohio Biological Survey. We attempt a "surveying weekend" at least once a term, during which we map, sample the fauna, and record all data possible for the cave as we continue our survey. We are now also engaged in the survey of the caves in Carter Cave State Park, Carter County, Kentucky. We just recently returned from a surveying trip to Carter County last term and our data will be the topic of our next issue. Moreover, the Society was recently awarded money from SGA to fund the purchase of helmets, lamps, rope, rappeling gear, and carbide for our trips, and this newsletter. Hopefully from this annual allotment we will add to our equipment each year as interest in the Society continues to grow.

As editor of our first volume I would like to take this opportunity to thank all of you who have contributed to its success in any manner. We owe a great deal to our graduate members and we hope they find the results of their early labors, acknowledged herein, suitably rewarding. Lastly, on behalf of all the members, I would like to thank Dr. Hobbs who has inspired each of us through his constant dedication to the club and its goals.

Steven Campbell
Editor

GEOLOGY OF OHIO WITH REFERENCE TO CAVES

Steven Campbell

The State of Ohio lies in the Central Lowland, Interior Low Plateau and Appalachian Plateau provinces of the United States (Hunt, 1967). Generally though, Ohio is characterized by a monotonous, almost parallel landscape, which is a direct reflection of the horizontal strata which underlie the area.

In Ohio, the strata record a period of geologic time spanning 290 million years from the beginning of the Cambrian period to the end of the Permian. These rocks rest upon the Precambrian granitic rocks that constitute the southern extension of the Canadian shield (Bates, 1979). Following is a short chronological discussion of Ohio's geologic history and the relationship the geology has with the caves of Ohio.

The Precambrian basement rocks are covered throughout the entire state by the younger Paleozoic sediments. Well cores that have sampled these older rocks reveal that they are very similar to the Precambrian material of the Canadian Shield (Rocque and Marple, 1966). The Precambrian rocks probably are the remains of mountains that once rose over the whole state of Ohio, but have since been eroded to a nearly horizontal level in the great period of Precambrian time (Bates, 1979).

The beginning of the Cambrian period found Ohio as a low peneplained region. Well cores reveal that near the close of the period, Cambrian seas covered Ohio and deposited a series of sandstones that are the oldest sediments of Ohio (Rocque and Marple, 1966; Bates, 1979). These sediments do not outcrop on the surface as they are overlain by the younger Paleozoic formations. Although these sediments are inaccessible they undoubtedly record, in fossil form, the life of the Cambrian period. Lastly, these sandstones contain scattered oil reserves which are economically exploited throughout the state.

Ohio's Ordovician rocks, thin-bedded limestone and shales, are well exposed in the Cincinnati area. These rocks contain such a representation of fossil life that they are known as the "type" section for the Upper Ordovician system in North America. The trends from Cambrian sandstones to Ordovician limestones and shales reveal a change of environments from terrigenous deposition to carbonate production. The Ordovician sediments indicate Ohio seas became a more tropical environment favorable for carbonate production (Rocque and Marple, 1966). Moreover, the abundant fossil diversity of brachiopods, trilobites, bryozoans, molluscans and other phyla in this period represents the increased pace of evolution.

During early Silurian time Ohio was once again a low land mass. As time went on the seas again encroached on the state and deposited more shales, limestones and evaporites. However, the most abundant rock type from the Silurian is dolomite. Dolomite, a calcium magnesium carbonate, formed from the compression of the calcareous shell remains of the Silurian life forms. Dolomite, along with limestone, is used for lime, fertilizer and fill stone. These two rock types, along with the evaporites, are an important source of economy for the state (Rocque and Marple, 1966; Bates, 1979). Lastly, life also continued to develop as evidenced by the appearance of tabulate corals in the Silurian period.

The Devonian period saw a rapid rise in the evolution of life. Commonly called "The Age of Fishes," Devonian time was another period of deposition for Ohio. As in the previous periods, warm shallow seas laid down a series of limestones, shales, and dolomites (Bates, 1979). One shale in particular, the Huron Shale, has yielded several specimens of "plated fishes" and is also an important fuel source of oil and gas (Geol. Sur. Ohio, pp. 14-17, vol. 3).

Mississippian time continued to be a depositional period for Ohio. Black shales were being deposited in northern Ohio and graded into shallower, sands and gravels, toward the southeast (Rocque and Marple, 1966). These deposits have become very economical for Ohio. The Berea and Black Hand sandstones are quarried for a number of uses throughout the eastern portion of the state. Moreover, the Mississippi sediments contain isolated patches of oil and natural gas.

Life continued to evolve rapidly during this period, but because the waters were muddier than previous seas, fossil remains are not as extensive as earlier periods (Bates, 1979). Since no late Mississippian sediments are present in Ohio, the land must have emerged from the shallow Mississippian seas before the end of the period or the sediments have been subsequently eroded away (Rocque and Marple, 1966).

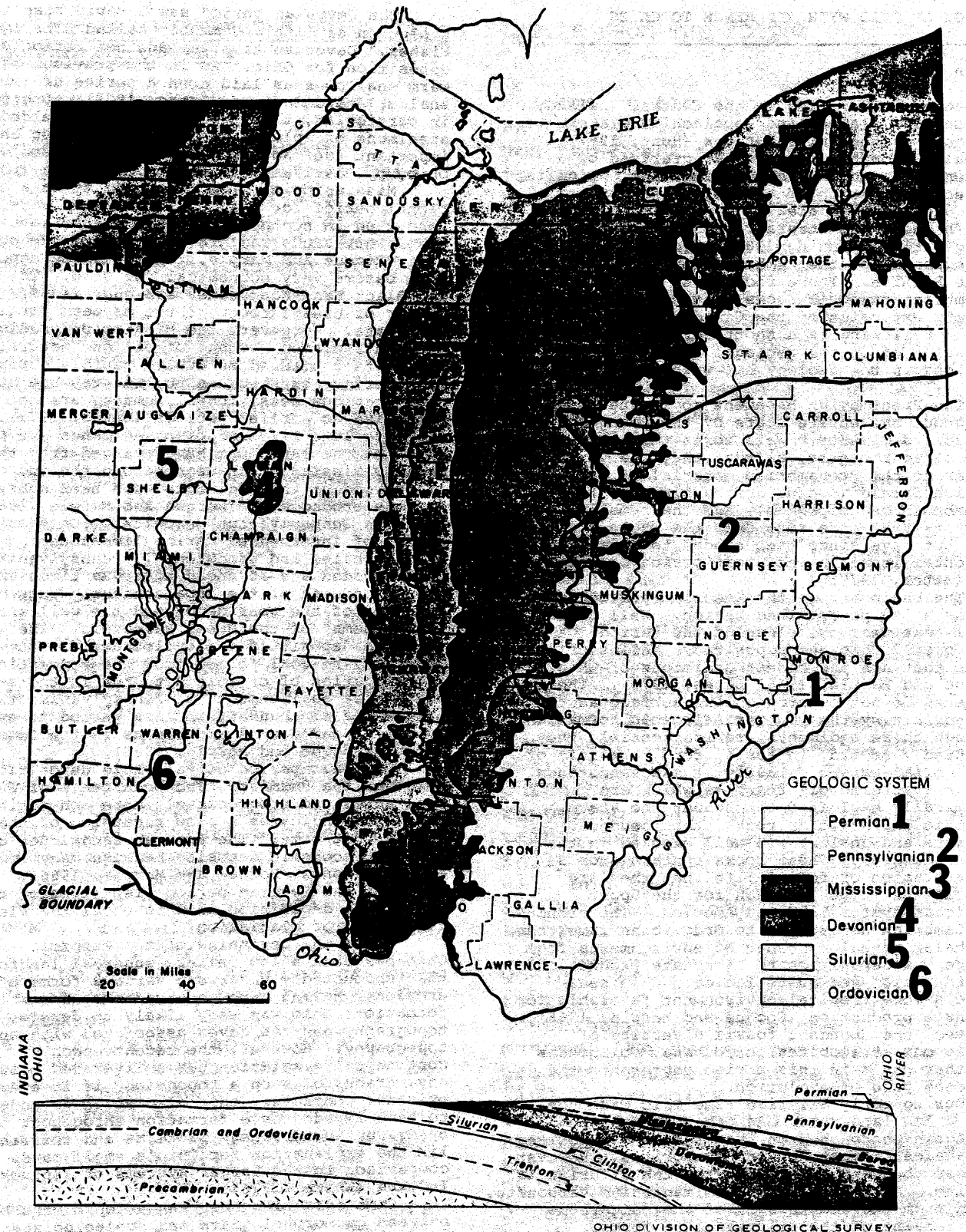
The Pennsylvanian deposits of Ohio are a series of interbedded marine limestone and non-marine shales and sandstones. Pennsylvanian seas receded and advanced numerous times onto the low lands west of the Appalachians. These cyclic advances of the seas deposited the well-known "cyclothems" of the Upper Paleozoic. The most economic deposit of the cyclothems are the coal layers. The coal formed from the compaction and lithofication of organic detritus in the swampy near-shore environments of Pennsylvanian time. Life was also abundant in this period as evidenced by the appearance of amphibians in the fossil record (Rocque and Marple, 1966).

The last period of Paleozoic deposition in Ohio was the Permian. The occurrence of Permian coal seams and progressively more non-marine sediments indicates a slow recession of the sea during that time. The Permian sandstones are the most economic deposits because many are used as grindstones (Rocque and Marple, 1966). The close of the Permian period also signaled the end of the deposition in Ohio until the Pleistocene epoch of glaciation.

Since the beginning of the Mesozoic era Ohio has been a low relief, subareal landform that undoubtedly underwent various forms of erosion. Having such an abundance of carbonate formations Ohio was very likely to develop karst topography and the caves associated with such topography. However, the recent epoch of continental glaciation has obliterated most, if any, traces of such a topography if it ever existed. Moreover, this glaciation is considered to have impeded cave formation throughout the state by disrupting drainage patterns and therein may lie the explanation for Ohio's small caves in comparison to the larger systems of Kentucky and Indiana (White, 1926).

Cave formation has been a topic of controversy between geomorphologists and speleologists for many years. Perhaps the best recognized and most easily defended theory is the process of solution in areas of carbonate strata. In the presence of water, calcite will dissolve into Ca^{+2} and $CO3^{-2}$ ions

$$CaCo_3 \rightarrow Ca^{+2} + CO_3^{-2}$$
$$(s)$$



OHIO DIVISION OF GEOLOGICAL SURVEY

GEOLOGIC MAP AND CROSS SECTION OF OHIO

Meteoric waters are commonly charged with some dissolved carbon dioxide which causes the production of carbonic acid.

$$CO_2\ (dis) + H_2O \rightarrow 2H^+ + HCO_3^{-2}$$

Ions from the dissolved carbonate combine with the hydrogen ions to produce more carbonic acid.

$$CO_3^{-2} + H^+ \rightarrow HCO_3^{-2}$$

These reactions continue to the right of each equation as long as the ions are carried away in solution and a source of hydrogen is present. This continued process also produces a pressure imbalance of CO2 in the water, with the atmosphere, hence more CO2 becomes dissolved in the water. The entire reaction may be generalized with the following equation.

$$CaCO_3 + H_2O + \overset{CO_2}{\underset{CO_2}{\rightleftharpoons}} Ca^{+2} + 2HCO_3^-$$

Although this is the common form of chemical weathering in Karst regions, it is only one of the forms of cave formation.

Beyond the obvious influences of solution, the other forces important in cave formation are the corrasive action of terrigenous material in flowing subterranean waters, the relationships of joint sets with fracture patterns, changes in lithotype throughout the unit, plus height and fluctuation of the water table have all been cited as forces responsible for cave formation (Jennings, 1971).

As mentioned previously, Ohio has an abundance of limestone and dolomite ($CaMgCO_3$) for possible cave development. The strata occur as flat-lying beds that dome up in the Cincinnati area. Hence, the oldest limestones exposed are the Ordovician beds of Cincinnati and the rock units become increasingly younger traveling away in any direction (see Ohio geologic map).

Most of Ohio's caves occur in a 40-mile-wide track of land aligned north-south through the middle of the state (Brucker, 1979). This area is underlain by the massive limestones and dolomites, favorable for cave formation, of the Silurian and Devonian periods. To the west lie the unfavorable thin-bedded limestones and shales of the Ordovician (White, 1926). To the east lie the unfavorable terrigenous formations of the Upper Paleozoic.

White (1926) recognizes two major types of caves in Ohio. The first and most frequent is the fissure type of caves. These caves form by the solution processes described earlier along zones of fractures in the host rock. These fractures would enlarge through time to produce the cave. Moreover, most of the fissure type caves probably antedate the recent epoch of glaciation (see White, 1926: 116). Examples of fissure type caves in Ohio are Zane's Cavern, Ohio Caverns, Kessler's Cave, and the Rocky Fork Caves.

The second type of cave is best described as a saline wedged cave and is referred to as Put-in-Bay type of cave (White, 1926; Verber and Stansberry, 1953). This type of cave has a floor and roof that appear to match like two pieces of a puzzle. Supposedly the cave formed when a salt in the host formation hydrated and the expansion caused the upwelling and splitting of the strata. Subsequent solution of the hydrated salt would produce a cavern structure. This hydration process is common in nature in the form of anydrite hydrating to gypsum.

$$\underset{\text{(anhydrite)}}{CaSO4} + 2H2O \rightarrow \underset{\text{(gypsum)}}{CaSO4 \cdot 2H2O}$$

Later, collapse of the raised surface has destroyed some of the original caverns and produced other caves along the sides of the first one (Verber and Stansberry, 1953). Examples of this type of cave are the Put-in-Bay caves of South Bass Island, the Caves of Crystal Rock Park (see Kindt's I Cave description in another part of this publication).

Perhaps the best place to observe karst topography and cave development by solution is in Adams County in southern Ohio. Most of the caves are developed in the lower Silurian limestones or dolomites which outcrop in the county (Luther, 1972). Erosion has stripped away beds spanning the time interval from the mid-Silurian through the lower Mississippian (Stout, 1941). Interestingly, the majority of the caves are located south of the Illinoian glaciation line. The abundance of caves in the unglaciated region of Adams County compared with the relative paucity of caves in the glaciated region of the county - or the state for that matter - lends support to the assumption that the periods of glaciation affecting Ohio either destroyed, buried or inhibited the formation of caves wherever the ice encroached.

One final type of cave evident in Ohio is the sandstone caves of Hocking County. Better described as overhangs, these "caves" occur in Mississippian sandstones and were produced by the swirling and pothole action of streams and by differential erosion of the sandstone units (Steeg, 1947; Hansen, 1975). Ash Cave illustrates the pothole erosional theory best because the water still flows over the overhang and erosion still continues. Rock House occurs in the Black Hand sandstone (Carman, 1946). This "cave" is the result of differential erosion along two perpendicular joint-sets in the sandstone. This weathering has produced a "cave" approximately 200 feet long and 25 feet wide. Along the side of the cave weathering has enlarged the joints so as to produce doors into the cave itself. These are separated by mammoth sandstone pillars giving a gothic look to the cave (Steeg, 1947). These natural formations, among the most scenic in the state, have been designated as state parks and are the topic of a recent guidebook by the state geological survey (Hansen, 1975).

In summary, the geology and geologic history of Ohio play major roles in determining where caves form within the state. Carbonate deposition early in the Paleozoic era deposited favorable units for cavern development. Continued deposition later in the Paleozoic of terrigenous sediments until the Mesozoic era left a blanket of strata overlying the carbonates in many areas. Erosion from the crustal uplifting, of the Cincinnatian Arch, has removed the blanket of sediment and surely aided in the solutioning process. The ice ages of the late Pleistocene have subsequently destroyed, buried or inhibited cave development within the state. Perhaps, had it not been for these ice ages, Ohio would have developed the karst topography and associated cave systems of unglaciated, southcentral Indiana or Kentucky. Nevertheless, Ohio can be an exciting and challenging experience for the eager speleologist.

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One of the many caves in Carter County, Kentucky. A description of caves in this county will appear in the second volume of PHOLEOS. (Photo by Hobbs)

A BOOK REVIEW

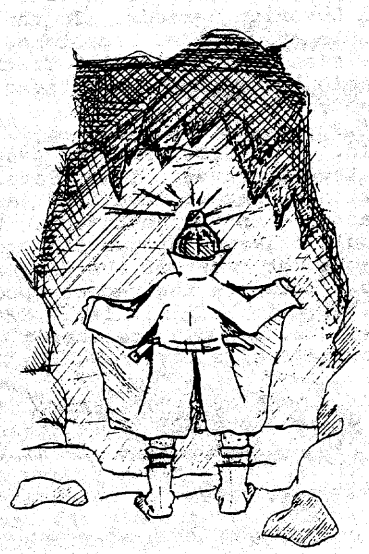
Dave Valentine

Trevanian, 1979. Shibumi. Ballantine Books, New York, N.Y., 440 pp.

"Shibumi"-Japanese for a state of personal excellence and effortless perfection- is the lifetime goal of Nicholai Hel. He lives for its pursuit in subdued grandeur, he kills for a living with calculated precision and certainty, and he spelunks for a hobby in the most improbable of caves. Every facet of his life is a reflection of his quest.

Trevanian (almost certainly a spelunker himself judging from the accounts he relates) is nothing short of a genius as an author. His narrative never drags, and the imagery throughout is as vivid as it is fascinating. His wit is often subtle, yet brilliant. As if these weren't enough to insure its reading, the underlying theme of Shibumi is the mediocrity of the masses (America); it is both novel and thought provoking, even depressing. Trevanian is no fan of American technology or philosophy.

Finally, Nicholai Hel is a truly remarkable character. Not only is this the story of a thrilling cave adventure, but it is also a tale of international intrigue.



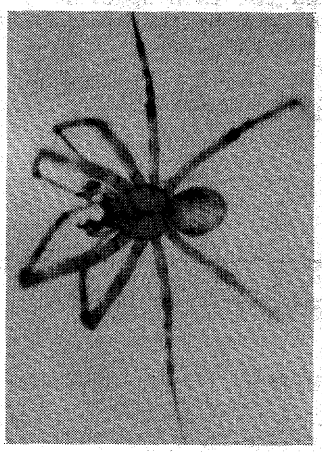
" Expose Yourself to CAVING! "

THE CAVE FAUNA OF OHIO

H. H. Hobbs III and Michael F. Flynn

The fauna of the caves and rock shelters of Ohio has been virtually unknown until recent years. Currently the caves of the state are being investigated by the authors and the work is coordinated by the Wittenberg University Speleological Society.

Approximately 88 species and subspecies of invertebrates and 49 species and subspecies of vertebrates are recorded from 70 caves in 19 counties and are summarized numerically by taxonomic group in Table 1. Additional species of invertebrates have been collected but have not been studied adequately to warrant their inclusion in a specific count. Only four (approximately 3% of the total cave fauna) are troglobites (obligatory cavernicoles); of these, one species is aquatic and three are terrestrial. Twenty-three species (17% of total) are troglophiles (facultative cave species). Trogloxenes (species often occurring in caves but that are incapable of completing their life histories within caves) are represented by 78 species (57% of total). Accidentals are surface species which accidentally find their way into caves and can exist there only temporarily; 30 species (22% of total) are placed into this category. Phreatobites are those forms which inhabit the upper layers of ground waters and demonstrate the same morphological modifications as do troglobites and are more often found in slowly moving interstitial ground water habitats than in the more open ground waters present in caves. A single species is tentatively assigned to this category as well as being considered a troglobite. Edaphobites are species that normally live in the soil, and may occasionally penetrate into caves. Several unidentified earthworms will be placed into this grouping.



TWO SPECIMENS from Indian Trail Cavern in Wyandot County, Ohio: Meta menardi (Latreille), and right Scoliopteryx libratrix Linnaeus. (Photos by Hobbs)

It is noteworthy to indicate that, of the total number of species of invertebrates, 71 (81%) are terrestrial while only 17 (19%) are aquatic.

Table 1: Numerical Distribution of Ohio Cavernicoles by Taxonomic Group.

Taxonomic Group	Number of Species
Annelida	
Oligochaeta	1+
Mollusca	
Gastropoda	13
Pelecypoda	1
Crustacea	
Amphipida	3
Isopoda	
Aquatic	3
Terrestrial	8
Decapoda	1
Chilopoda	4
Diplopoda	11
Insecta	
Collembola	10
Thysanura	1
Ephemeroptera	1
Orthoptera	9
Plecoptera	1
Hemiptera	1
Coleoptera	2
Trichoptera	2
Lepidoptera	2
Diptera	5
Arachnida	
Pseudoscorpionida	3
Opiliones	3
Araneae	3
Amphibia	
Urodela	9
Anura	4
Reptilia	
Squamata	6
Aves	2
Mammalia	
Chiroptera	6
Insectivora	2
Lagomorpha	1
Rodentia	13
Carnivora	6
TOTAL	137

Table 2 is a list of Ohio caves arranged alphabetically by county from which cavernicoles have been identified. All known alternate cave names are placed in parentheses following the currently accepted cave name and each cave is assigned a number by which it is referred to in the faunal list. Figure 1 shows the generalized location of each cave; descriptions and maps of some of these caves appear in another section of this publication.

Table 2: Ohio Caves From Which Faunal Collections Have Been Made.

County	Cave
Adams	1. Black Run (Keenii, Haunted)
	2. Cave Hill
	3. Cedar Fork
	4. Davis State Memorial
	5. Devil's Den
	6. Fern
	7. Freeland's (Freeman's, Freeland Hollow)
	8. Hawkin's
	9. Lost Pack
	10. Morrison's (Sammy Groom)
	11. Preston I
	12. Preston II
	13. Preston III
	14. Stanbury
	15. Stout Run
	16. Waggoner Ripple (Waggoner Run)
Clark	17. Ferncliff
	18. Keith's Fracture
Delaware	19. Olentangy Indian (Olentangy Caverns, Lawrence)
Fairfield	* Panther
Franklin	20. Snow
	21. South Indian Run
Gallia	22. Alum
	23. Bandy's
	24. Carter
	25. Double
	26. Saltpeter
Geauga	27. Chesterland
Greene	28. Spider
Highland	29. Dry
	30. Hillsboro
	31. Kessler's
	32. Lawrie (Laurie)
	33. "Seven"
Hocking	34. Ash
	35. Bat
	36. Clear Creek
	37. Old Man's
	38. Rock House
	39. Saltpeter
Jackson	40. Canters (Indian)
Meigs	41. Bennet
	42. Bunker Hill (Lizey's Hole)
	43. Horse
	44. Partlow
	45. Pencil
	46. Vineyard (Kibble's)
	47. Warner (Warnek)
Miami	48. Painter Creek
	49. Thompson (Stillwater)
Ottawa	50. Coil's
	51. Crystal (Strontium)
	52. Duff's I
	53. Kindt's I
	54. Mammoth, (Daussa's, Danssa's)
	55. Sky Inn
	56. Victory
Pike	57. Cave near Byington
	58. Frost (Cave Lake)
	59. Sunfish Creek (Walleyed)
Ross	60. Buckskin I
	61. Buckskin II
	62. Reif's
	63. Skull (Three Entrance, Fisher Farm Tunnel
	64. Trimmer's (Fisher's)
Seneca	65. Seneca (Good's)
Vinton	* "sandstone cave," at McArthur
Wyandot	66. Fredritz Pit (Kibblers Quarry?)
	67. Indian Trail (Indian Caverns, Wyandot Indians, Wyandot Caverns)
	68. Underground River

*Not located in Figure 1.

*Not located in Figure 1

The following phylogenetic faunal list includes all of the species that are known to have been collected and identified from Ohio caves. Many of the species are still inadequately known concerning their distribution, life history, and ecology and their strict placement into one of the above ecological-evolutionary categories should be considered tentative until further data are available. The following abbreviations have been placed after the organisms' names: TB = troglobite; TP = troglophile; TX = trogloxene; ED = edaphobite; PB = phreatobite; Ac = accidental. Also included in the list for each species is the author of the species, all of the known state cave records listed numerically in accordance with Table 2, and all literature references concerning previous state listings. Records not found in the references cited for each species are new records by us or provided by the specialist acknowledged at the end of the paper.

PHYLUM ANNELIDA
Class Clitellata
Order Oligochaeta

Family Lumbricidae
unidentified species (ED)
OHIO: 18, 58, 62, 66, 67

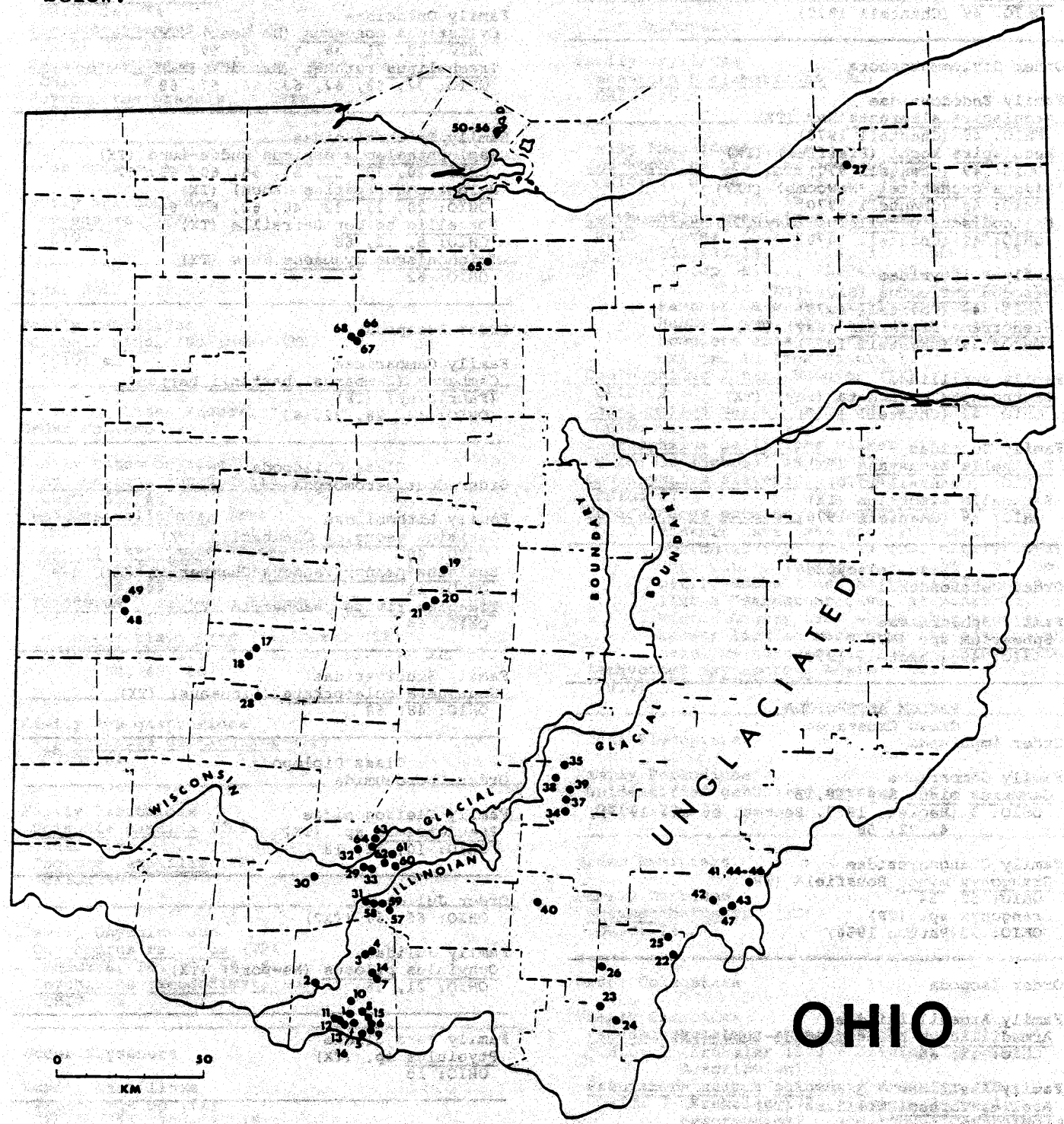
PHYLUM MOLLUSCA
Class Gastropoda
Order Basommatophora

Family Lymnaeidae
Fossaria sp. (AC)
OHIO: 49 (Chantell 1970)

Order Mesogastropoda

Family Bulimidae
Pomatiopsis lapidaria (Say) (AC)
OHIO: 49 (Chantell 1970)

Figure 1: Map of Ohio showing glacial boundaries and generalized locations of caves referred to below.



Family Pleuroceridae
Goniobasis livescens (Menke) (AC)
OHIO: 49 (Chantell 1970)

Family Viviparidae
Campeloma sp. (AC)
OHIO: 49 (Chantell 1970)

Order Stylommatophora

Family Endodontidae
Anguispira alternata Say (TX)
OHIO: 49 (Chantell 1970)
Anguispira kochi (Pfeiffer) (TX)
OHIO: 49 (Chantell 970)
Discus cronkhitei (Newcomb) (TX?)
OHIO: 49 (Chantell 1970)
Helicodiscus parallelus (Say) TX)
OHIO: 49 (Chantell 1970)

Family Polygyridae
Mesodon inflectus (Say) (TP)
OHIO: 49 (Chantell 1970)
Stenotrema fraternum (Say) (TX)
OHIO: 49 (Chantell 1970)

Family Pupillidae
Gastrocopta contracta (Say) (TX)
OHIO: 49 (Chantell 1970)

Family Zontidae
Retinella binneyana (TX)
OHIO: (Chantell 1970)
Retinella electrina (TX)
OHIO: 49 (Chantell 1970)

Class Pelecypoda
Order Heterondonta

Family Sphaeriidae
Sphaerium sp. (AC)
OHIO: 49 (Chantell 1970)

PHYLUM ARTHROPODA
Class Crustacea
Order Amphipoda

Family Gammaridae
Gammarus minus Say (TP,TB?)
OHIO: 3 (Beckett 1977, Beckett et al. 1977), 4, 32, 58

Family Crangonyctidae
Crangonyx minor Bousfield (TP)
OHIO: 52, 54
Crangonyx sp. (TP)
OHIO: 33(Patton 1956)

Order Isopoda

Family Armadillidiidae
Armadillidium nasatum Budde-Lund (TX)
OHIO: 11, 66

Family Asellidae
Asellus forbesi Williams (TP)
OHIO: 21
Caecidotea stygia Packard (TB,PB)
OHIO: 3 (Fleming 1972, Beckett 1977, Becket et al. 1977, Bowman and Beckett 1978, Hobbs 1979, 1980), 6, 31, 58, 62
Lirceus fontinalis Rafinesque (TX)
OHIO: 28, 32, 62, 63

Family Ligiidae
Ligidium sp. (TP)
OHIO: 62, 63

Family Oniscidae
Cylisticus convexus (De Geer) (TP)
OHIO: 18, 21, 30, 53, 58, 59
Trachelipus rathkei (Brandt) (TX)
OHIO: 32, 58, 62, 63, 66, 67, 68

Family Trichoniscidae
Haplophthalamus danicus Budde-Lund (TX)
OHIO: 20, 32, 51, 53, 55, 60, 63, 67
Hyloniscus riparius (Koch) (TX)
OHIO: 20, 21, 32, 48, 62, 63, 64
Porcellio scaber Latreille (TX)
OHIO: 5, 12, 68
Trichoniscus pygmaeus Sars (TX)
OHIO: 62

Order Decapoda

Family Cambaridae
Cambarus (Cambarus) bartonii bartonii (Fabricius) (TP)
OHIO: 14, 28, 32, 63

Class Chilopoda
Order Scutigeromorpha

Family Lithobiidae
Garibius georgiae Chamberlin (TX)
OHIO: 60
Sozibius pennsylvanicus Chamberlin (TX)
OHIO: 11
Tidabius tivius Chamberlin (TX)
OHIO: 66

Family Scutigeridae
Scutigera coleoptrata (Linnaeus) (TX)
OHIO: 48, 68

Class Diplopoda
Order Chordeumida

Family Cleidogonidae
Pseudotremia sp. (TX)
OHIO: 10, 12, 13

Order Julida
OHIO: 66, 67 (TX?)

Family Julidae
Ophyiulus pilosus (Newport) (TX)
OHIO: 21, 66

Family Parajulidae
Ptyoiulus sp. (TX)
OHIO: 15

Order Polydesmidae

Family Polydesmidae
Euryurus leachii leachii (Gray) (TX)
OHIO: 31
Nannaria terricola (Williams and Hefner) (TX)
OHIO: 16, 31
Pseudopolydesmus sp. (TX)
OHIO: 32, 63
Pseudopolydesmus serratus (Say) TX)
OHIO: 3, 58
Scytonontus granulatus (Say) (TX)
OHIO: 20

Order Spirobolida

Family Spirobolidae
Narceus sp. (TX)
OHIO: 59

Order Spirostreptida

Family Cambalidae
Cambala minor (Bollman) (TX)
OHIO: 63

Class Insecta
Order Collembola

Family Entomobryidae
Lepidocyrtus curvicollis (TP)
OHIO: 55, 68
Pseudosinella aera (TP)
OHIO: 10
Sinella cavernarum (Packard) (TP)
OHIO: 2, 6, 7, 10, 29, 31, 32, 52, 53, 64, 66, 68
Tomocerus bidentatus Folsum (TP)
OHIO: 10, 14, 59
Tomocerus flavescens (Tullberg) (TP)
OHIO: 9, 10, 11, 12, 13, 15, 16, 29, 31, 33, 60, 62, 66

Family Hypogastruridae
Hypogastrura denticulata (TP)
OHIO: 64

Family Isotomidae
Folsomia candida (TP)
OHIO: 15
Isotoma natabilis (TP)
OHIO: 59

Family Onychiuridae
Onychiurus reluctus (TP)
OHIO: 6, 10, 29, 60, 62
Onychiurus pseudofimetarius (TP)
OHIO: 64

Order Thysanura

Family Machilidae
Pedetontus sp (TX)
OHIO: 11, 12, 13, 15

Order Ephemeroptera

Family Baetidae
Unidentified genus and species (AC)
OHIO: 62

Order Orthoptera

Family Gryllidae
Oecanthus exclamationis (AC)
OHIO: 20

Family Rhaphidophoridae
Ceuthophilus brevipes Scudder (TX)
OHIO: 2, 8, 10, 14, 15, 20, 22, 29, 30, 31, 32, 33, 34, 48, 58, 59, 62, 63, 64
Ceuthophilus gracilipes (Haldeman) (TX)
OHIO: "caves" (Smith 1953), 1, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 33 (Hubbell 1936), 39 (op. cit.), 41, 43, 46, 59, 62, 63, 64. This species is also reported from Panther Cave in Fairfield County by Hubbell (op. cit.); however, lacking more complete data on its location, we have omitted it from Figure 1.
Ceuthophilus latens Scudder (TX)
OHIO: 2
Ceuthophilus meridionalis Scudder (TX)
OHIO: 28
Ceuthophilus pallidipes Walker (TX)
OHIO: 33 (Hubbell 1936), 37
Ceuthophilus silvestris Bruner (TX)
OHIO: 67
Euhadenoecus puteanus (Scudder) (TX)
OHIO: Panther Cave (see above) (Hubbell and Norton 1978), 23 - 26 (op. cit.), 38-39 (op. cit.), 40 (op. cit.), 41 - 47 (op. cit.), Hubbell and Norton (1978) also list a "sandstone cave" at McArthur, Vinton County from which this species is known; lacking more complete data on this cave, we have not included it in Figure 1.
Tachycines asynamorous Adelung (TX)
OHIO: 17

Order Plecoptera

Family Perlodidae
Unidentified genus and species (AC)
OHIO: 28, 32

Order Hemiptera

Family Gerridae
Rheumatobates sp. (AC)
OHIO: 28

Order Coleoptera

Family Carabidae
Pseudanophthalmus krameri Krekeler (TB)
OHIO: 2 (Krekeler 1973 - original species description)
Pseudanophthalmus ohioensis Krekeler (TB)
OHIO: 7 (Krekeler 1973 - original species description). Additional carabids as well as staphylinids have been collected from various caves but have not been studied sufficiently to include in this faunal list.

Order Trichoptera

Family Hydroptilidae
Unidentified genus and species (AC)
OHIO: 58

Family Psychomyiidae
Polycentropus sp. (AC)
OHIO: 31

Order Lepidoptera

Family Geometridae
Eudule mendica (TX)
OHIO: 29

Family Hydriomedidae
Scoliopteryx libratrix Linnaeus (TX)
OHIO: 3, 4, 18, 21, 67

Order Diptera

Family Culicidae
Anopheles punctipennis (Say) (TX)
OHIO: 14, 18
Culex pipiens Linnaeus (TX)
OHIO: 3, 14, 18, 28, 48, 67, 68

Family Heleomyzidae
Amoebaleria defessa (Osten-Sacken) (TP)
OHIO: 3, 14, 20

Family Mycetophilidae
Unidentified genus and species (TX)
OHIO: 3, 14

Family Sphaeroceridae
Unidentified genus and species (TX)
OHIO: 14

Class Arachnida
Order Pseudoscorpionida

Family Chernetiidae
Hesperochernes sp. (TX)
OHIO: 7, 10, 60, 63, 64

Family Chthoniidae
Apochthonius sp. (TB)
OHIO: 60

Chthonius tetrachelatus (TX)
OHIO: 9, 64

Order Phalangida

Family Phalangiidae
Leiobunum bicolor Wood (TX)
OHIO: 3, 4, 11, 12, 13, 14, 29, 31, 58, 59, 60, 61, 62, 63, 64
Leiobunum flavum Banks (TX)
OHIO: 37 (Walker 1928)
Leiobunum nigripes (Weed) (TX)
OHIO: 37 (Walker 1928)

Order Araneae

Family Argipidae
Meta menardi (Latreille) (TP)
OHIO: "caves" (Barrows 1918), 5, 9, 11, 14, 15, 18, 28, 29, 30, 32, 48, 59, 60, 61, 62, 63, 64, 67, 68.
Pisaurina undata (Hentz) (TX)
OHIO: "a cave" (Barrows 1918)

Family Nesticidae
Nesticus pallidus Emerton (TP)
OHIO: 56 (Beatty 1971)

PHYLUM CHORDATA
Class Amphibia
Order Urodela

Family Ambystomatidae
Ambystoma maculatum (Shaw) (TX)
OHIO: 57 (Seibert and Brandon 1960)
Ambystoma opacum (Gravenhorst) (TX)
OHIO: 34 (Seibert and Brandon 1960)

Family Plethodontidae
Desmognathus fuscus fuscus (Rafinesque) (TX)
OHIO: 34 (Seibert and Brandon 1960), 37 (op. cit.)
Eurycea bislineata ravicola Mittleman (TX)
OHIO: 34 (Seibert and Brandon 1960), 38 (op. cit.)
Eurycea longicauda longicauda (Green) (TP)
OHIO: 63
Hemidactylium scutatum (Schlegel) (TX)
OHIO: 37 (Seibert and Brandon 1960)
Plethodon cinereus cinereus (Green) (TX)
OHIO: 34 (Seibert and Brandon 1960)
Plethodon glutinosus glutinosus (Green) (TP)
OHIO: 16, 34 (Seibert and Brandon 1960), 37 (op. cit.), 38 (op. cit.)

Family Salamandridae
Notophthalmus viridescens viridescens (Rafinesque) (TX)
OHIO: 34 (Seibert and Brandon 1960)

Order Anura

Family Bufonidae
Bufo americanus americanus Holbrook (AC)
OHIO: 10, 37 (Walker 1946)
Bufo woodhousii fowleri Hinckley (AC)
OHIO: 34 (Walker 1946)

Family Hylidae
Pseudacris brachyphona (Cope) (AC)
OHIO: 37 (Walker 1946), 40 (op. cit.)

Family Ranidae
Rana pipiens Schreber (AC)
OHIO: 62

Class Reptilia
Order Squamata

Family Colubridae
Coluber constrictor Linnaeus (AC)
OHIO: 49 (Chantell 1970)
Elaphe obsoleta obsoleta (Say) (AC)
OHIO: 40 (Conant 1938)
Lampropeltis getulus Linnaeus (AC)
OHIO: 48 (Chantell 1970), 49 (op. cit.)
Opheodrys aestivus (Linnaeus) (AC)
OHIO: 40 (Conant 1938)

Family Natricidae
Natrix sipedon sipedon (Linnaeus) (AC)
OHIO: 34 (Conant 1938)

Family Viperidae
Crotalus horridus horridus Linnaeus (TX)
OHIO: "Ottawa County caves" (Conant 1938), "caves" on South Bass Island (Langlois 1964), 48 (Chantell 1970), 49 (op. cit.)

Class Aves
Order Falconiformes

Family Cathartidae
Cathartes aura septentrionalis (Wied) (TX)
OHIO: "caves" of the Sugar Grove Region in Fairfield and Hocking counties (Coles 1944), 13

Order Passeriformes

Family Tyrannidae
Sayornis phoebe (Latham) (TX)
OHIO: 5, 48, 61

Class Mammalia
Order Chiroptera

Family Vespertilionidae
Corynorhinus macrotis (LeConte) (TX)
OHIO: 16 (Smith 1953, Goslin 1954)
Eptesicus fuscus fuscus (Beauvois) (TX)
OHIO: 35 (Bole and Moulthrop 1942), 36 (op. cit.), 49 (Chantell 1970)
Myotis keeni septemtrionalis (Troussart) (TX)
OHIO: 19 (Bole and Moulthrop 1942), 35 (op. cit.)
Myotis lucifugus Lucifugus (LeConte) (TX)
OHIO: 3, 14, 19 (Bole and Moulthrop 1942), 27 (op. cit.), 35 (op. cit.), 50 (op. cit.), 52 (op. cit.), 56 (op. cit.)
Pipistrellus subflavus (Cuvier) (TX)
OHIO: "Caves in Adams Co., Ohio" (Ashely and Rabalais 1980), 1, 2, 7, 13, 16, 29 (Bole and Moulthrop 1942), 31, 35 (op. cit.), 58, 62, 65 (op, cit.)
Plecotus sp. (TX)
OHIO: 49 (Chantell 1970)

Order Insectivora

Family Soricidae
Blarina brevicauda kirtland Bole and Moulthrop (TX)
OHIO: 27 (Bole and Moulthrop 1942, 49 (Chantell 1970), 62, 67
Sorex fumeus fumeus Miller (AC)
OHIO: 27 (Bole and Moulthrop 1942)

Order Lagomorpha

Family Leporidae
Sylvilagus floridanus (Allen) (AC)
OHIO: 10, 67

Order Rodentia

Family Cricetidae
Marmota monax (Linnaeus) (TX)
OHIO: 62
Microtus pennsylvanicus pennsylvanicus (Ord) (AC)
OHIO: 27 (Bole and Moulthrop 1942)
Microtus sp. (AC)
OHIO: 49 (Chantell 1970)
Napaeozapis insignis insignis (Miller) (AC)
OHIO: 27 (Bole and Moulthrop 1942)
Neotoma floridana (Ord) (TX)
OHIO: "caves" of the Sugar Grove Region in Fairfield and Hocking counties (Coles 1944), 10, 13
Peromyscus leucopus (Rafinesque) (TX)
OHIO: 10, 27 (Bole and Moulthrop 1942), 58, 64
Pitymys pinetorum scalopsoides (Audubon and Bachman) (AC)
OHIO: 27 (Bole and Moulthrop 1942)
Synaptomys cooperi cooperi Baird (AC)
OHIO: 27 (Bole and Moulthrop 1942), 49 (Chantell 1970)
Tamias striatus (Linnaeus) (AC)
OHIO: 49 (Chantell 1970)
Tamias striatus rufescens Bole and Moulthrop 1942 (TX)
OHIO: 27 (Bole and Moulthrop 1942 - original subspecies description). The type-locality for this species is a series of small, expanded, joints developed in the Sharon conglomerate and does not qualify as a true "cave." Therefore, the designation of this species as a "trogloxene" is not to be taken in the strictest sense.

Family Muridae
Rattus norvegicus (Berkenhout) (TX)
OHIO: 49 (Chantell 1970)

Family Sciuridae
Glaucomys volans (Linnaeus) (AC)
OHIO: 49 (Chantell 1970)
Sciurus carolinensis Gmelin (AC)
OHIO: 49 (Chantell 1970)

Order Carnivora

Family Canidae
Urocyon cineroargenteus (Schreber) (TX)
OHIO: 2

Family Felidae
Lynx rufus (Schreber) (TX)
OHIO: 49 (Chantell 1970)

Family Mustelidae
Mephitis mephitis (Schreber) (TX)
OHIO: 10
Mustela frenata Lichtenstein (TX)
OHIO: 49 (Chantell 970)

Family Procyonidae
Procyon lotor (Linnaeus) (TX)
OHIO: 32, 49 (Chantell 1970)

Family Ursidae
Ursus americanus Palls (TX)
OHIO: 3

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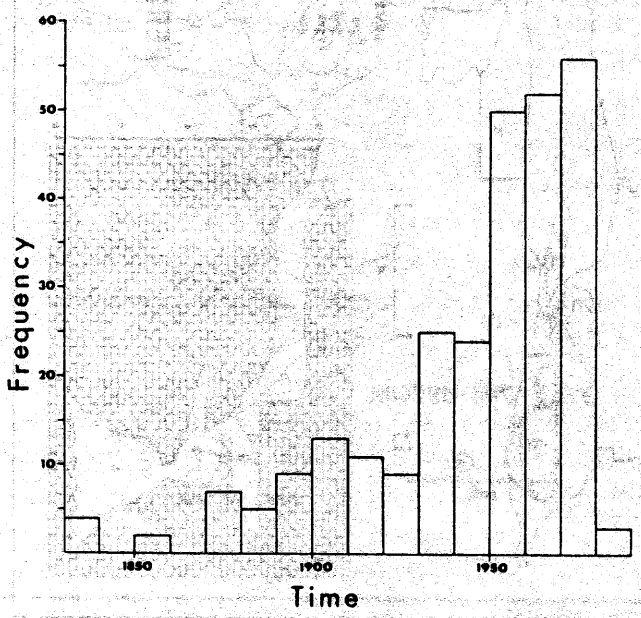
SELECTED OHIO CAVES

H. H. Hobbs III and Michael F. Flynn

The fifteen caves treated in the following descriptions are included in this issue of Pholeos as an introduction to the variety of solution caves that are found in the state of Ohio. Although the caves are small, there are many interesting features that can be observed in each cave. Most of the caves referred to below were mapped during the summer of 1980 as part of a long term project to study the caves of the state.

A search of the literature to date reveals that the first mention of Ohio caves was in 1838, when three authors published four articles (Atwater, Hildreth, and two papers by Locke). However, it was not until 1895 that any systematic approach was made (Moorehead, 1895). In 1916 Hills presented a detailed description of Reames Cave (Ohio Caverns in Champaign County) and ten years later White (1926) published his Master's thesis (White, 1925) which was the first systematic account of solution caves in Ohio. Various workers explored, unearthed archeological remains, and sporadically mapped some of the caves and overhangs. In 1952 "The Ohio Cave Survey" was established for the purposes of gathering data on the "general description of the caves, their locations, and a discussion of the geological features of the caves" (Smith, 1953:325). The Survey has experienced periods of quiescence and activity since its inception. Verber and Stansbury (1953) published descriptions of caves in the Lake Erie Islands and others (e.g. - Herel 1967, Riopelle 1968, Luther 1972a,b, 1973; Lynch 1974, and Simpson 1975) periodically continued exploration. The following graph depicts the number of papers that have appeared which report on the caves and shelters in the state. A gradual increase through time is apparent and a distinctive peak of activity occurred from 1950 to 1979.



Organisms inhabiting these caves are not listed in the following descriptions, however, this information can be obtained from the article treating Ohio's cavernicoles which appears in this same issue of Pholeos.

The Wittenberg University Speleological Society is continuing to study systematically the caves of the state and future issues of Pholeos will report these findings. Also in future issues will appear maps and descriptions of the caves in Carter County, Kentucky.

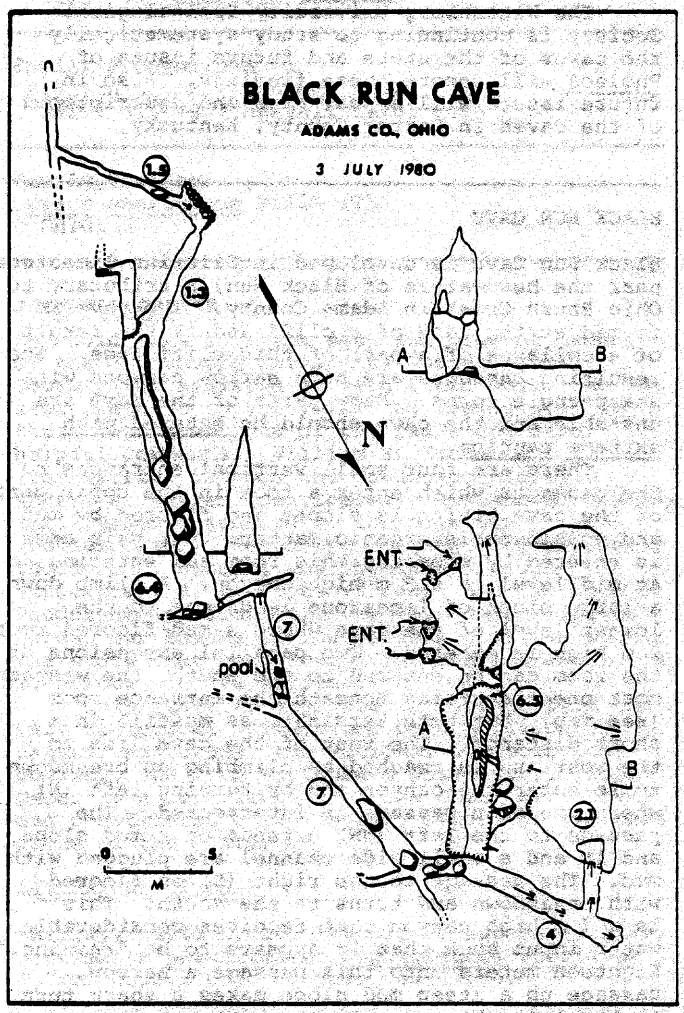
BLACK RUN CAVE

Black Run Cave is developed in Silurian limestone near the headwaters of Black Run, a tributary to Ohio Brush Creek in Adams County. The cave is formed at the base of a cliff and is the result of a collapse of a part of this cliff face. The resulting passages are high narrow canyons with sharp-angle turns. Many parts of the cave are unstable and the cave should be entered with extreme caution.

There are four small vertical entrances to the passages which enter a room in the upper part of the cave, which is sloped and floored by mud and considerable organic matter. The main cave is entered by crossing this room and entering, at mid-level, a 6.5 m high canyon. A climb down a large block of limestone leads one to the lowest level of the cave where a mud-floored room 2 m high is entered. Two parallel extensions of the room can be entered to the south, the western-most one traversing beneath the entrance room (see map), but both terminate as mudfill in a short distance. The rest of the cave lies to the west and is reached by climbing up breakdown to re-enter the canyon and by turning left (N), where the main passage is intersected. The passage to the left (NW) extends up a mud slope and it and a small side channel are plugged with mud. The passage to the right (E) is floored with breakdown and turns to the south. This is a 7 m high canyon that receives considerable water input such that it appears to be "raining." Eighteen meters into this passage a narrow passage up a steep mud slope makes a sharp turn to the left (W) and a tight chimney brings one into a wider canyon extending in a southerly direction. This passage has some flowstone and is floored by large blocks of breakdown. This passage extends for 15 m and then splits. The left hand passage quickly becomes too small to negotiate, however, the lower, right hand passage continues as a low, tight cavity which makes a sharp bend to the southwest. The right hand wall and floor are loose breakdown. The cave from this point is extremely small and tight and gradually progress is stopped by the narrow route.

This may be the cave referred to by Evans and Stivers (1900) as "The Haunted Cave." They indicated that during "pioneer days it was the dwelling place of desperadoes who preyed on the fleets of emigrant boats as they floated down the Ohio to the Gateway of the Virginia Reservation and the Northwest Territory. It is a tradition that the notorious James Girty, a brother of Simon Girty, made this cavern the place of rendezvous of this band of savages and desperadoes prior to the settlement of the whites in that region...The cavern, which consists of numerous large rooms in one of which is a sparkling stream of water, is entered by means of a ladder down to the outer chamber, and was accidentally discovered by old Jonathan

Waite while exploring the craigs and crevices of the region for a traditional lead mine in the early part of the last century" (Evans and Stivers, 1900: 424).



FERN CAVE

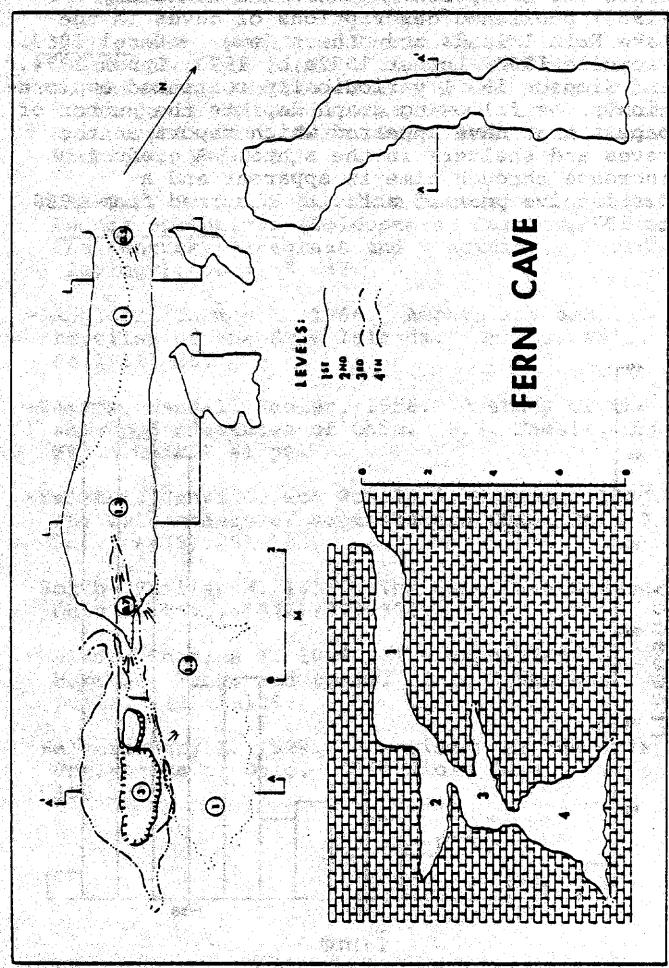
Fern Cave is located in southeastern Adams County, Ohio. The cave is small (total horizontal cave is 18 meters) and possesses four separate levels (see map), making Fern Cave the most complex cave vertically in Adams County to date.

The entrance to the cave opens from the bottom of a prominent sinkhole east of Blue Creek Road between Southdown Fork and Copperas Rock Hollow, at an elevation of 230 meters (670 feet). The cave derives its name from the dense growth of ferns within the sinkhole. Fern Cave may be considered dry only in the sense that no stream occurs there. It is a "wet" cave by virtue of the considerable drip input to the cave and by the presence of small rimstone pools. The fact that the entrance is situated at the bottom of a sinkhole suggests that the cave takes on water draining into the sink during storms. There is no significant development of speleothems in Fern Cave.

The cave trends in a southeasterly direction, with a crawlway entrance 0.3 meters high and 0.5 meters wide. Immediately inside the entrance, the floor of the cave slopes downward slightly, increasing passage height to one meter. Passage width increases also to one meter. The passage from this entrance continues to enlarge slightly and extends six meters before sloping down into the second level of the cave, at which point the passage height is increased to 1.5 meters. The right (SW) side of the first two-thirds of the passage in level 1 is composed almost entirely of mud fill.

Approximately one meter beyond the entry into level 2, an opening occurs in the southwest side of the passage which allows entry into level 3, a drop of 0.7 meters. A short distance beyond the entry into level 3 the edge of a three meter pit is reached. At the bottom of the pit (level 4), small filled rimstone pools are seen which contain the blind isopod, Caecidotea stygia. Level 4 continues northwest and southeast before becoming too narrow for further penetration.

In general, the northeast and southwest sides of the cave are formed in rock of distinctly different nature. The northeast sides of the passages are composed of thick, solid material while the southwest sides are composed of extremely thin-bedded, crumbly material. The apparent unstable characteristics of the rock forming the southwest sides of the cave indicate a potential danger and the cave should therefore be regarded with caution.



At the time of our visit, no evidence was found which would indicate prior entry into the cave by man.

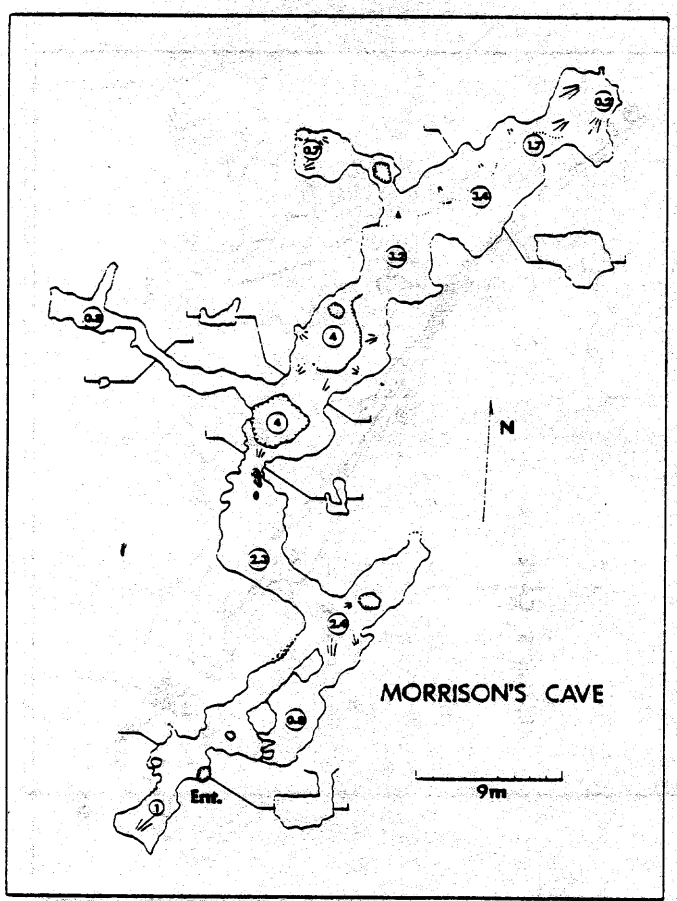
MORRISON'S CAVE

Morrison's Cave is located near the top of a ridge in Adams County overlooking Ohio Brush Creek to the east. The single entrance at an elevation of 265 m (875 feet), is located in one of the numerous sinkholes found in the wooded area. A three-meter climb down the pit entrance places one in a small chamber with the main cave continuing to the north and a small, mud-floored passage, which ends in 7 m, extends to the south.

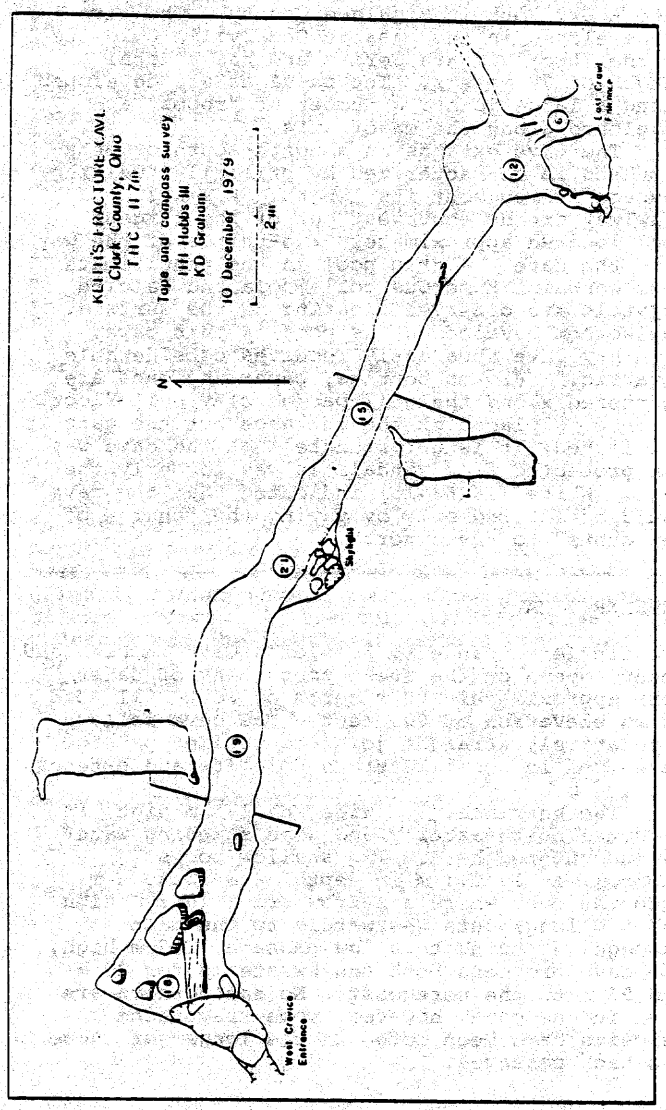
The main cave is large enough to walk through in its entirety, although two small passages branch off to the west and are crawlways. Continuing into the main passage from the entrance brings one into a small room which is floored with mud, as is most of the cave. A small sink is in this room and several small windows that look into a dry, slightly elevated room are observed. The cave continues as a narrow passage; on the left (west) wall an active flowstone formation covers the wall and entrance can be made on the right into the slightly elevated dry room. This "room" is 0.8 m high and numerous pseudoscorpions can be observed beneath small rocks in the dry soil. Continuing north out of this passage brings one to a point where the main cave turns to the left (W) and a small passage continues to the north for 6 m before it terminates. The main cave is traversed and slopes downward to a mud-floored room with a plugged pit on the west side. A climb up and around the pit brings one to a small crawlway off the main passage which terminates in 16 m by the mud floor rising to the ceiling. From the pit the main cave continues for 13 m, where a prominent stalagmite (dubbed the "sentenel" or the "Fireplug") is observed. A pit, also plugged with mud, lies to the west and a crawlway leads to a small chamber (see map). The end of the cave is reached by continuing from the stalagmite in a northeasterly direction for 15 m where the floor slopes up toward the celing and light can be seen through a sinkhole.

The cave, undoubtedly, is part of a much larger subterranean system which at one time (and may still) existed in this area, as is evident by the numerous sinkholes occurring in the environs. Some of the sinkholes have openings which may be entered for a short distance but are soon filled with dirt.

The owner requests that the cave not be entered without seeking permission.



KEITH'S FRACTURE CAVE



Keith's Fracture Cave in Clark County is developed in massive Cedarville Dolomite and is a small (total horizontal cave 12 m) fracture cave. It appears the cave formed as the result of a block of dolomite separating from the massive bluff face, although some solution has subsequently occurred as can be attested by the presence of a few popcorn formations and dripstone.

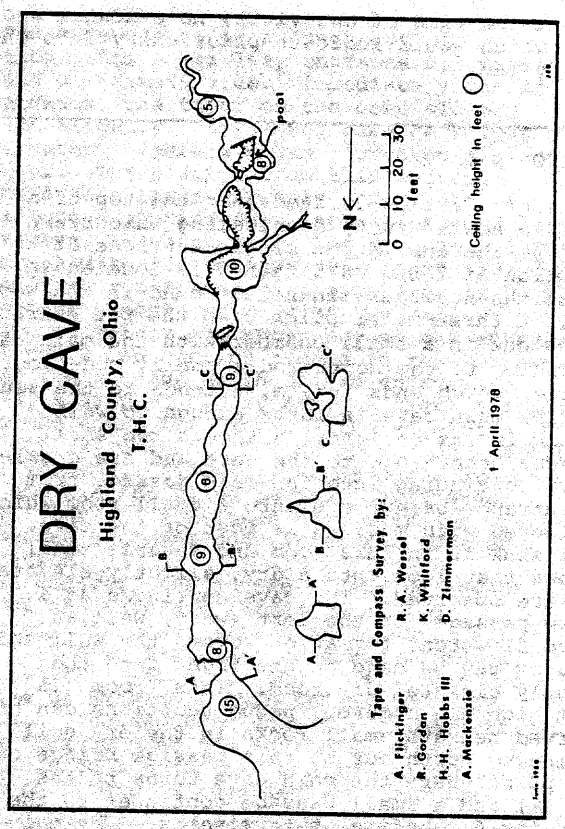
The entrances (two) are located in an outcrop of dolomite on the north side of Mad River, 200 m north of the river. The East Crawl entrance is 0.5 m wide and 0.6 m high and leads into a small expanded area which continues into the main cave. A "skylight" is located halfway through the cave where the passage reaches a maximum height of approximately two meters. The West Crevice entrance is a vertical opening from the top of the bluff which leads into the cave from the west. An accumulation of litter, logs, and organic debris is located at this point.

DRY CAVE

The entrance to Dry Cave is situated on the south side of a small tributary which flows into Rocky Fork in Highland County. The cave is developed in the massive Cedarville Dolomite of the lower Niagara Series and has a total length of 70 meters. The passages are developed along a large joint; a number of "rooms" are developed along the major axis.

The cave extends in a north-south orientation and is characterized by primarily "walking-passage" throughout its length. A small crawlway trends southwest out of the largest room located approximately two-thirds of the way into the cave. A drip pool in the penultimate room contains numerous collembola and calcite crystals are observed floating on the surface. Speleothem development is poor in this cave.

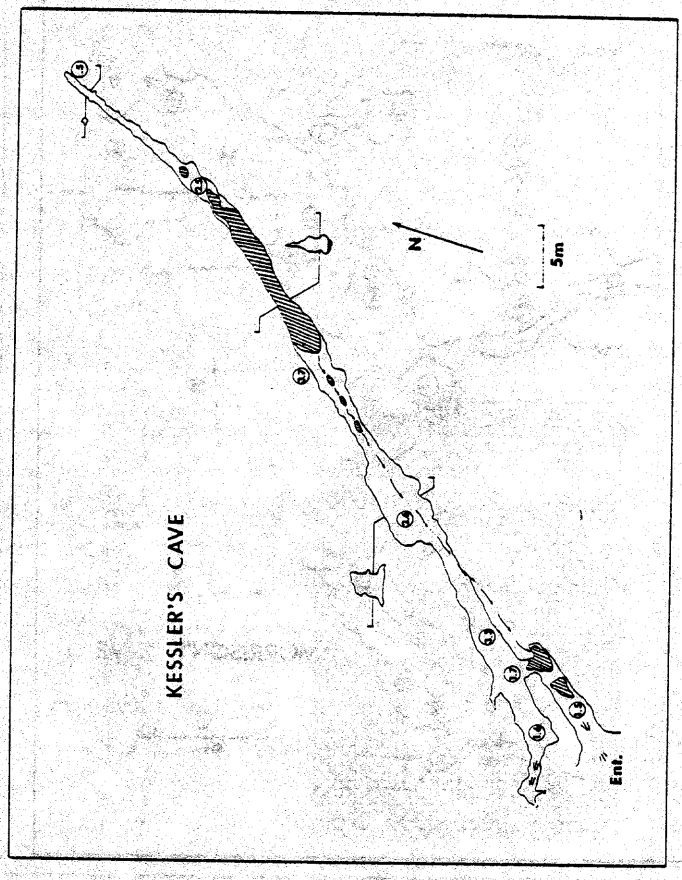
Dry Cave apparently receives considerable "traffic." Broken bottles, paper and cans are scattered along the well-packed clay soil floor. A fence is placed at the entrance but the gate is not locked; it is unfortunate that the cave was not protected from vandals as was formerly the case. White (1926:115) indicated that the cave could be entered only by paying the "charge of ten cents" to the owner.



KESSLER'S CAVE

The single entrance to Kessler's Cave in Highland County opens on the steep south bank of Baker Fork approximately 50 m north of Fort Mill Road at an elevation of 900 feet. The cave follows a relatively straight joint-controlled passage developed in fossilliferous dolomite and extends for 128 m.

The entrance, 3 m wide and 1.5 m high, is directed northeasterly and some standing water is encountered here. Two shallow pools (approximately 0.1 m in depth) are found 5 m into the cave where a narrow crawl (0.5 m high and 2 m long) cuts westwardly to the main passage. Opening to a low passage, 1.7 m high, the cave projects both southwesterly for 20 m and 95 m to the northeast. No speleothems are seen in the cave, however, some travertine deposits have been noted in the longer of these two back passages.

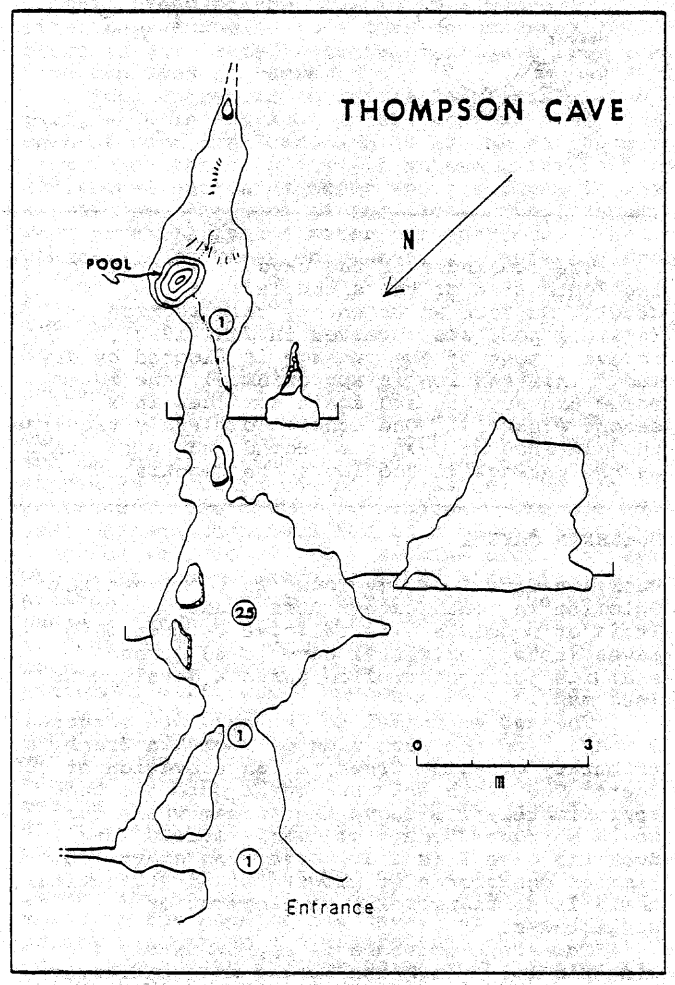


Muddy conditions are found from approximately 50 to 75 m into the back passage of the cave where ceiling heights reach 3.7 m. Some standing water is also present in this area and completely covers the floor for 11 meters. Beyond this muddy section, the cave continues for 20 m where it apparently ends. In the shorter, southwesterly passage, the cave ends with two small inpenetrable crawls that undoubtedly are blocked by collapse from the surface (see map).

THOMPSON CAVE

Thompson Cave is a small cave developed in the Cedarville Dolomite of the Niagara series at an elevation of 264 m in Miami County. It has a total length of 15 meters and is developed along a joint in the massive bedrock.

The 1.5 m square entrance is located on the east of the Stillwater River approximately 30 m from the stream bank. The cave consists of a single entrance and a simple, straight passage with a small "room" located approximately three meters from the entrance. The cave continues in a southeasterly direction for an additional 12 meters before the passage becomes too low for further penetration.



White (1926:102) reported the cave to be dry in 1925; however, presently a small "waterfall" enters the passage from the ceiling joint 12 m from the entrance. This water is apparently entering directly from a septic tank originating in a residence situated approximately seven meters immediately above the cave passage. In addition to the septic conditions that exist in the back portions of the passage (small pool beneath falls drains across the passage and disappears under the south wall two meters from its source) the ceiling is somewhat unstable as breakdown has wedged into the ceiling joint.

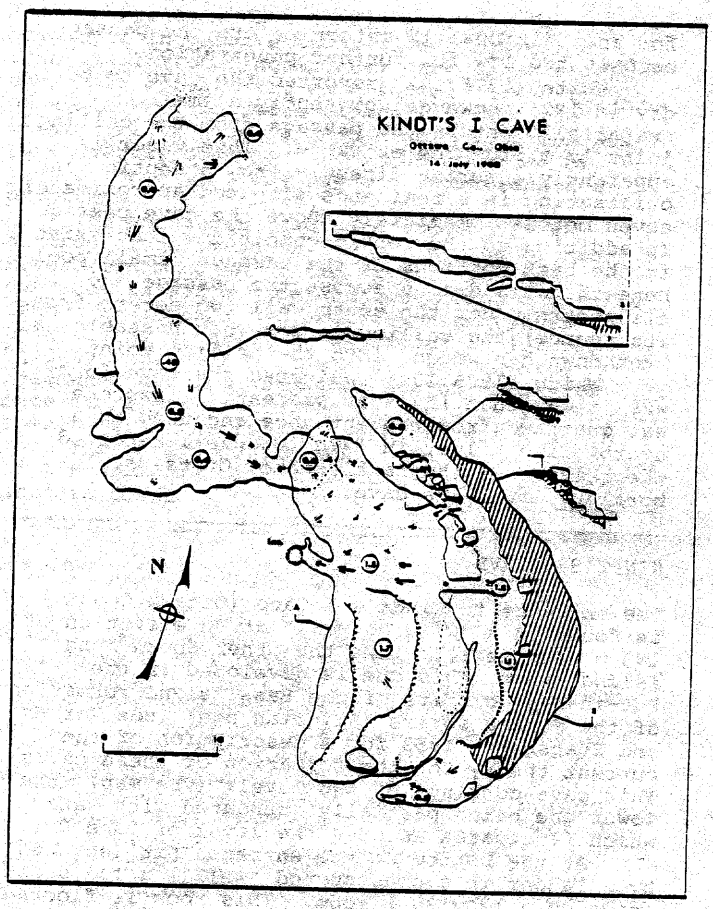
White (1926:102) indicated the cave formerly was longer than it is at present. Limestone was quarried from the entrance and used in a nearby lime kiln. In 1970, Chantell reported the remains of the rattlesnake, Crotalus horridus, from the cave.

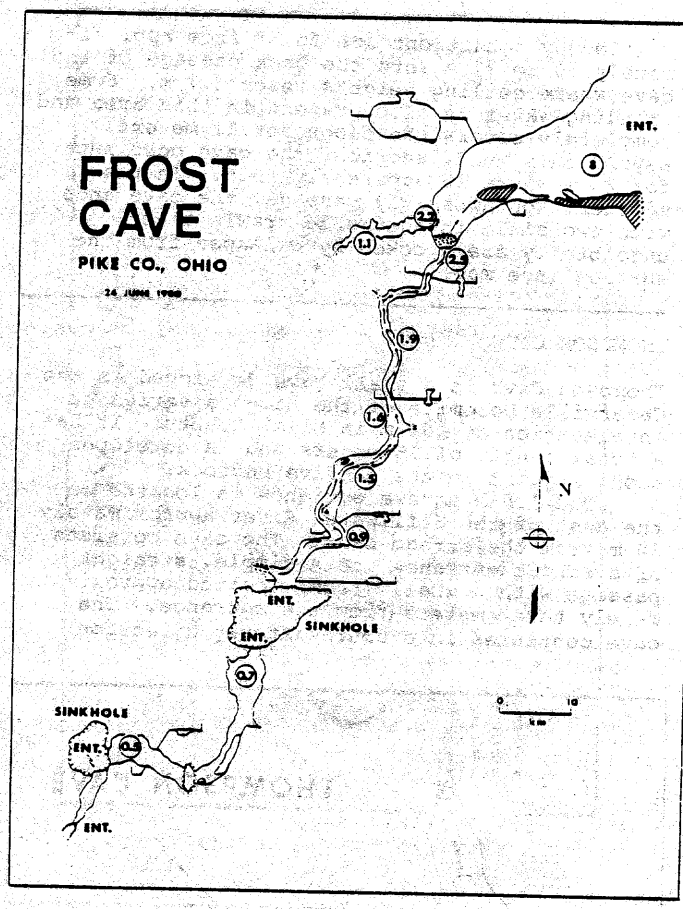
KINDT'S I CAVE

The entrance to Kindt's I Cave (Ottawa County) is found in a "wishing-well" at an elevation of 183 m (605 feet). Like the other South Bass Island caves, this one is developed in the Put-in-Bay dolomite of the Bass Island formation of the Monroe series (Silurian age) (see Verber and Stansbery, 1953 for a description of the current theory for the formation of these caves). This cave consists of two levels (see map), the lower one being partially inundated with water which fluctuates as does the level of Lake Erie.

At the bottom of the entrance pit (entered by a ladder in a constructed "well") a mud slope leads to a 12 x 30 m room. This room is floored by breakdown, and mud and the western part is sloped, the eastern part being more level. In the southeastern portion of the room are found the only significant formations of the cave. Here many small stalactites and "soda straws" as well as small stalagmites and flowstone are found. A narrow sloping corridor in the center of the passage leads down to the lower level (this level can also be reached by crawling through breakdown from an opening in the northeast corner of the room). This "Lake Room" is C-shaped and is nearly 50 m long. To the north the passage is low and is covered with breakdown; the remainder of this level is slightly higher than 1 m and water covers most of the passage. At the far wall the passage is undercut and the inundated passage continues for an undetermined distance. This submerged part of the cave has been dived (Sandusky Register, 1 November 1962, p. 12) but the findings of the dive are not known.

Leading out of the northwest corner of the room in the upper level is a crawlway which extends in a westerly direction for 12 m and then gently slopes downward in a northerly direction for nearly 40 m. This section of the cave averages 8 m in width and 0.4 in height and is floored with slabs of breakdown.





FROST CAVE

The entrance to Frost Cave is in a 10 m bluff (Monroe Limestone) on the south side of Cave Lake (dammed Sunfish Creek) in Pike County. This entrance is one of the largest and most picturesque of all Ohio limestone caves, being oval in cross-section (8 m high and 17 m wide and having a small stream issuing from it. The passage extends approximately 28 m in a southwesterly direction where a small waterfall is encountered, water flowing down a flowstone slope. A hole in the ceiling leads to a small (16 m long) upper level passage that can be entered by a precipitous traverse off the main passage at the top of the falls. The main stream passage is developed along joints and continues in a southwesterly direction for 61 m before coming to a sinkhole entrance. The floor is pitted in the front part and becomes covered with pebbles and larger rocks as the first sinkhole is approached. The ceiling is flat (a bedding plane) and the floor gradually rises with a passage height varying from 2.5 m in the front to less than a meter in the rear. Immediately before the first sinkhole is encountered the small stream enters from the west, the remainder of the cave being dry. Formations in this front part of the cave are not overly abundant, however, active flowstone is abundant on the walls and some small soda straws hang from the roof.

The remainder of the cave is entered on the south side of the sinkhole as a low, dry crawl. Surface water enters this section (a small pool was observed in June 1980), however, most of the passage is floored by dry mud. This section is approxiamtely one meter below the surface and again surfaces in a second sinkhole. One cannot completely traverse the distance between the second and third sinks as the passage is too low to be negotiated.

BUCKSKIN CAVE I

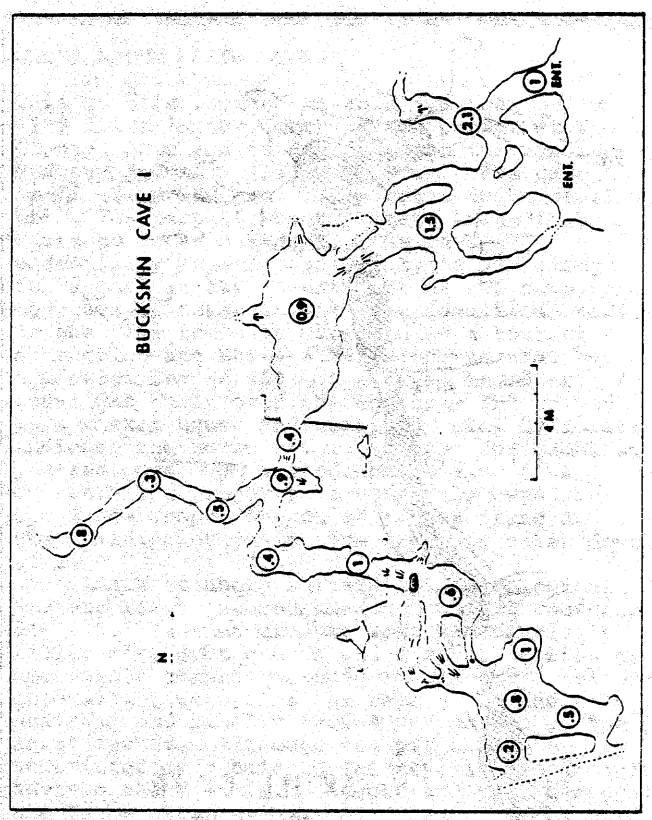
Buckskin Cave I is developed in the Greenfield Dolomite in southwestern Ross County, Ohio. It is of moderate size relative to most Ohio caves (total horizontal cave is 83 m) and exhibits joint controlled passage development (see map).

The two entrances to the cave are situated 2 m apart on the west side of Buckskin Creek, a tributary of Paint Creek, at an elevation of 750 feet. The south entrance opens onto the bank approximately 1 m above the stream while the north entrance occurs at nearly stream level. Buckskin Cave I is a dry cave, and apart from limited occurrence of flowstone and stalactites, there is no significant development of speleothems.

The south entrance is approximately 2 m wide and 1.5 m high and is the main entrance to the cave. The width and height of the north entrance are 1.2 m and 1 m, respectively. The passage from this entrance enters the main

passage after approximately 3 m. The passage from the main entrance extends for 8 m to the SW at which point the passage opens into a small room 6 m in width (0.9 m ceiling height). The passage trends in a southern direction from this room and is intersected from the west by a short passage, after which the cave makes a right angle turn to the east. This narrow crawlway continues for approximately 6 m, turns to the south, and sloping upward, terminates in a low, wide room. Numerous rodent (?) skeletal remains are seen here. The room connects with additional passage running SW; however, low ceiling height prevents entry into this area.

Of the fauna known to inhabit Buckskin Cave I, only one undescribed species, a pseudoscorpion of the family Chthoniidae, is a highly specialized obligate cavernicole (troglobite).



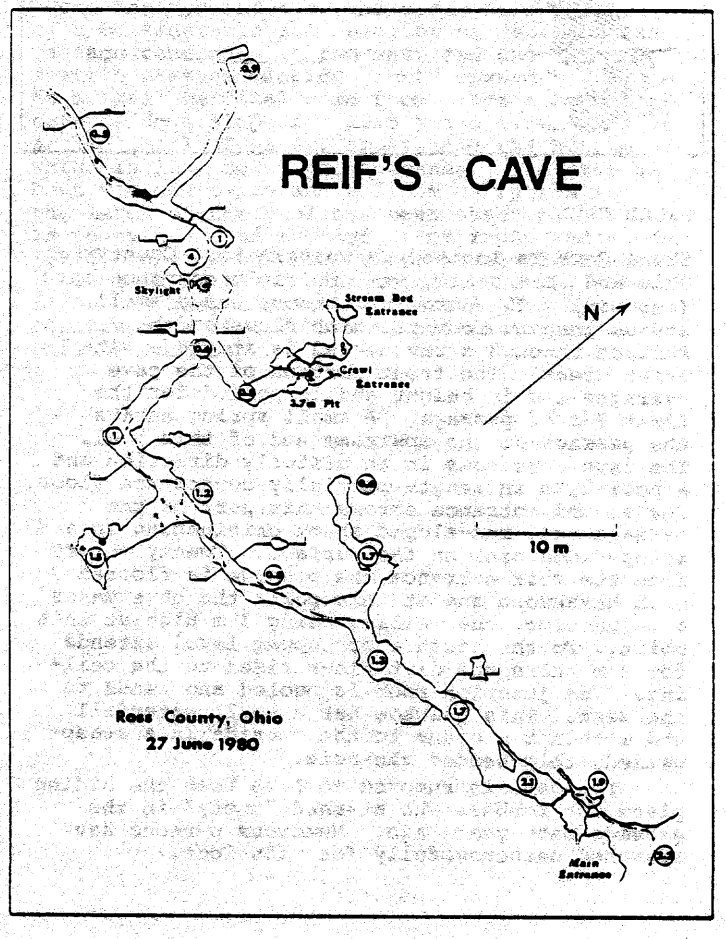
REIF'S CAVE

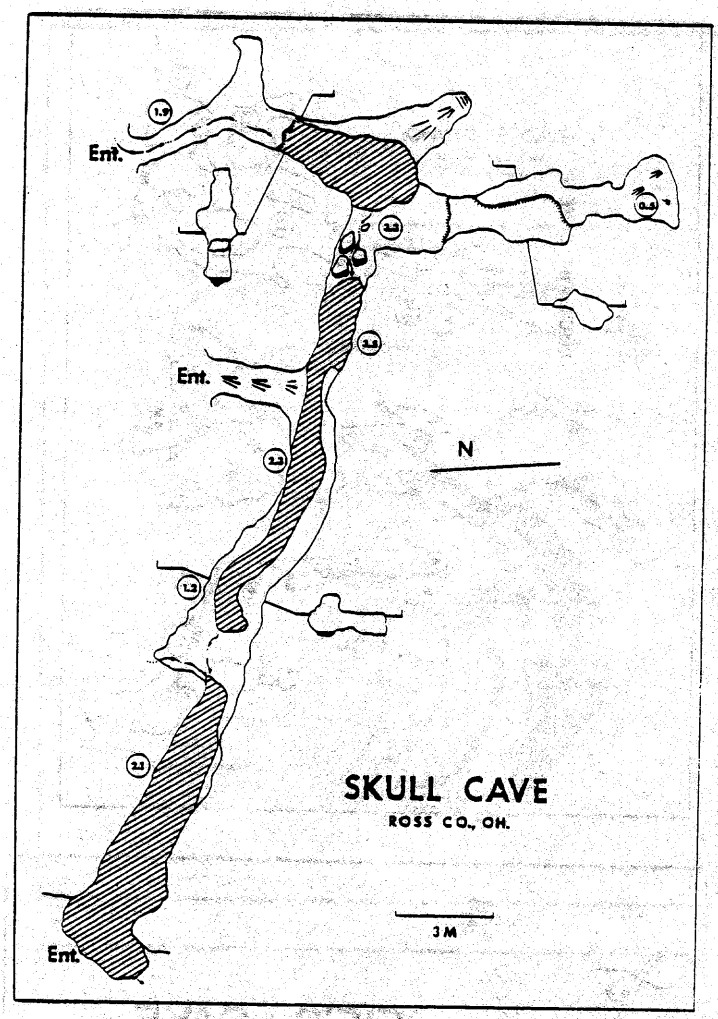
Reif's Cave is developed in the Cedarville formation of the Niagara Dolomite in Ross County, Ohio. The cave is moderately extensive relative to many Ohio caves, having approximately 145 meters of total horizontal cave (see map). The general trend of the cave is in a westerly direction, changing to a more northwesterly trend in the latter passages (furthest from the Cove Run Road entrance).

Four entrances to Reif's Cave exist. The main, walk-in entrance occurs approximately 3 m west of Cove Run Road, and it is the entrance from which the cave's small stream exits. Three additional entrances occur and are found in the westernmost passages of the cave. The furthest west of these is a 4 meter pit entrance. The others are crawlway entrances, one entering from a stream bed, and one entering from a hillside above the stream bed. The latter entrance leads immediately to a steep slope followed by a 3.7 m pit.

The main passage from the Cove Run Road entrance extends 53 m WSW before turning north for 10 m. At this point the passage splits, one branch continuing in a northwest direction and the other extending east. The two crawlway entrances occur in the east passage; the pit entrance in the northwest passage. The northwest passage continues for 13 m before another junction is reached. One passage proceeds west while the other trends in a NNW direction, extending 15 m before terminating. The west passage extends for several meters after which it continues as a very low crawl in pooled water, making further penetration of the cave extremely difficult. However, in dry weather and with some digging it may be possible to penetrate beyond this point. Such an effort could prove to be worthwhile in that the passage appears to open into a room several meters beyond the point of present penetration, and the apparent sound of a stream can be heard coming from the room.

Most of the main passage is floored by gravel and cobble through which a small stream meanders for much of the cave. At several points the stream disappears into the gravel, only to reappear at some point down-passage. Speleothems are scarce, mostly flowstone and only a few live stalactites.





SKULL CAVE

Skull Cave is located in western Ross County, Ohio and is a small, wet, multiple entrance cave (see map). The largest entrance has a small stream issuing from it which flows on the surface through a ravine and is at grade with Paint Creek. The front section of the cave averages 2 m in height and is pooled for the first 7 m of passage. A small spring enters the passage at the upstream end of this pool. The cave continues in an easterly direction and a pool 11 m in length partially covers the floor. The second entrance enters this part of the passage as a mud-sloped shoot originating in a steep-sided sink on the surface. Twenty meters from the main entrance the passage is floored with breakdown and at this point the cave makes a T-junction, the ceiling being 3 m high at this point. To the south a dry upper level extends for 9 m where the dirt floor rises to the ceiling. The junction room is pooled and bends to the west. This passage has a small waterfall and within 5 m opens to the outside in a steep-walled, thin-bedded sinkhole.

The cave is rumored to have been the hiding place for robbers who stashed "booty" in the passage many years ago. Numerous persons have searched unsuccessfully for this loot.

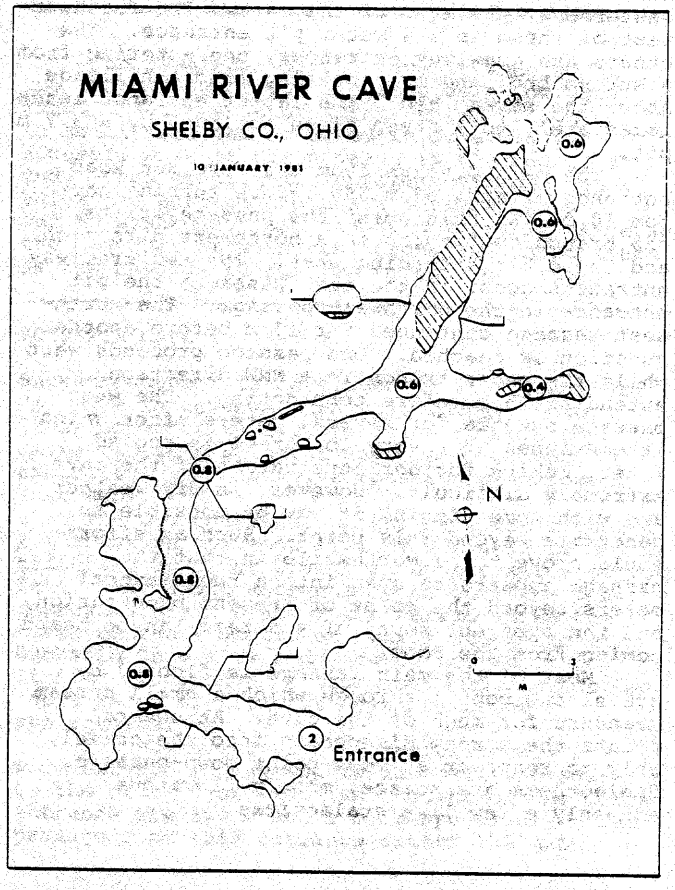
MIAMI RIVER CAVE

Miami River Cave is developed in the Niagaran bedrock of Shelby County and is located on the west bank of the Miami River. This is a relatively small cave (total horizontal cave 54 m) formed by solution along joints in the limestone.

The entrance is located in an outcrop approximately 1 m above the normal water level of Miami River at an elevation of 271 m (895'). The arch-shaped entrance is approximately 1 x 2 m in dimension and the passage extends in a northwesterly direction for 6 meters where the ceiling height is reduced to 0.8 m. The passage continues in a northeasterly direction for 6 m and then angles to the east for another 7 m to a "junction room" 0.6 m high. A small, low cavity floored with mud and water is found to the south and a 5 m long mud and pool-floored passage extends to the east. The main cave continues from the junction room, eliptical in cross-section, for 8 meters in a northeasterly direction and is covered by shallow water for most of its length. The cave terminates in a series of small crawlways branching from the main passage.

The cave has very little speleothem development and receives flood waters from the Miami River.

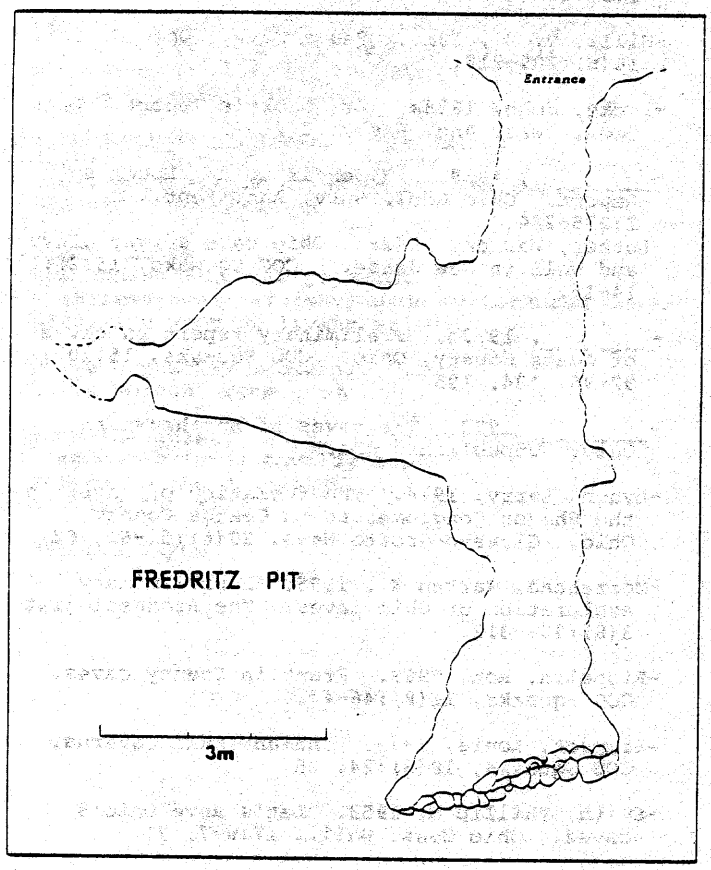
The fauna of the cave consists of crickets, spiders, amphipods, and Diptera (not yet identified to species).



FREDRITZ PIT

Fredritz Pit is located in northwestern Wyandot County, Ohio and has formed in the Niagara dolomite of Silurian age. The pit is 10 m deep and a tree adjacent to the entrance provides a good rigging point for the rope. At the bottom of the pit the floor is covered completely with breakdown and further penetration is prohibited. Four meters off the floor a side passage extends up a gentle slope in a easterly direction. The passage continues but is too small to negotiate. A sinkhole several meters east of the pit has been plugged but is rumored to have connected to this side passage in the pit.

Winchell (1873) reported a "Kibbler's Quarry Cave" in the same vicinity and this may be the same as Fredritz Pit.

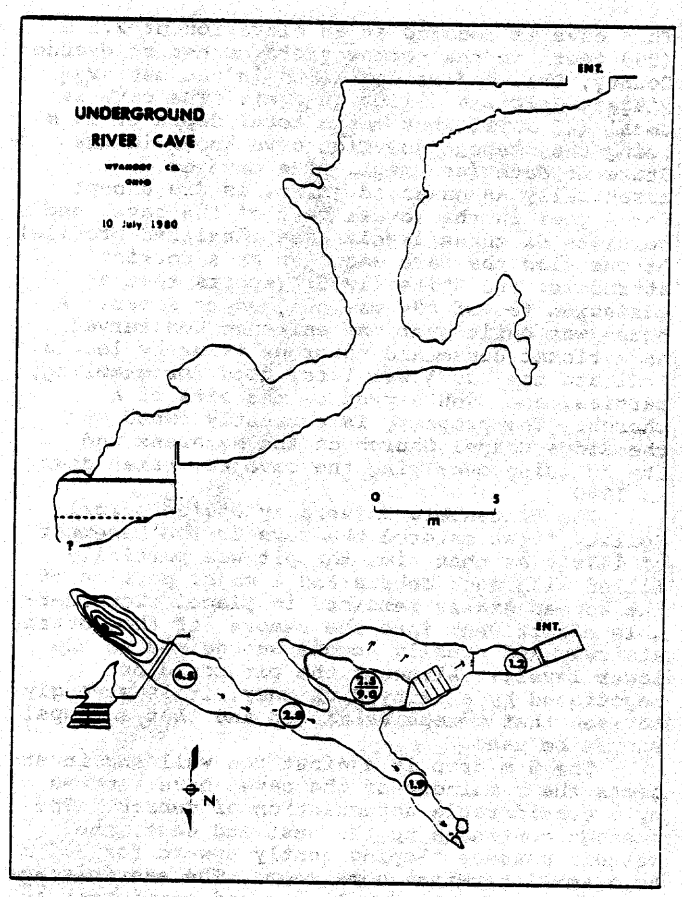


UNDERGROUND RIVER CAVE

This cave is located at an elevation of 275 m (900 feet) in the northwestern corner of Wyandot County, Ohio and is developed in the massive Niagara dolomite (Silurian age). The cave is small (31 m THC) but has a total depth of 19 m, being the deepest solution cave known in the State to date (see map). The cave is essentially an enlarged joint, is dry except for a pool in the lowest part of the cave, and consists of three levels (see idealized profile). At one time the cave was open as a tourist attraction and White (1925) reports that an admission fee of 40¢ was charged to enter. A house was built over the entrance and served as a ticket house and numerous tales by locals indicate the house was later used for gambling, parties, and even served as the site of a church. The property is currently owned by the Ridge Chapel Church of the Nazarene and the building overlying the cave was taken down in 1980.

The Wittenberg University Speleological Society first entered the cave during December of 1979. At that time the pit was partially filled with much debris and a major portion of the wooden stairs remained in place. Considerable effort went into the removal of the rotten stairway and finally access was gained to the lower levels. Although the pit could be negotiated by a belayed chimney, it is strongly advised that a rope be rigged and that a rappel should be used.

The 9 m drop is against the wall and intersects the remainder of the cave, here floored by a considerable accumulation of debris. The passage continues to the west and east, the western passage sloping gently upward for 6.5 m to a small terminal dome room. The east passage extends down slope for 12.5 m and terminates at a clear pool of water, apparently the bottom of which is 19 m below the entrance. The cave has been visited twice and a 1.5 m variation in the level of the pool has been observed. There is no evidence of surface water input and White (1925) reports that the water level fluctuates as much as 31 feet (approximately 10 m). The floor has been elevated above the pool by the construction of a rock wall and is topped by a railing (see map).



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DOWN

Hidden gateway to darkness beyond,
down we slither through the narrow throat.
Warm carbide glow,
black curtain of night nudged aside.

Silken dry dust billows up with each movement,
parched throat and watered eyes.
Course air rasps deep through my lungs,
teeth grinding gritty.

Bats hang benignly from their hard rock niches,
water trickles sweetly far off,
muffled through thick walls.
And deeper we push.

Down, deep down,
deep in the bowels of this cave,
air lies still and heavy.

Moisture laden vapor
flows thickly through nostrils.
Breath issues forth like fog
with each exhausted gasp.

Clammy wetness permeates the walls,
seeping coolness through layers of clothing.
Moist clay clings slimy to flowing rock,
and still we crawl on.

Eight inches low,
our bodies fill the passage.
Countless tons lay heavy upon my tortured body,
enfolding womb of living stone.

Up we corkscrew squeeze,
up to volcano room above.

From the guts of earth we burst forth.
Fragrant breezes envelop me,
I breathe the moonlight,
I drink the air.

Michael Flynn

INNER VOICES

Lights extinguished,
we stand motionless in the darkness.
Silence at first, but
then come the sounds.
Sweet sounds of lightly flowing water,
dancing,
filling our ears with songs of clear crystal.
Chandelier crystal,
chiming in harmony.

Deep sounds of massive torrent,
rumbling far off.
I feel it.
The pressure beats upon my skin,
sounds of blood pulsing,
unrelentless, unceasing.

Someone slaps the side of the boat.
The cave shouts with a roar,
great huge cannons,
Echoing, resounding.
Boom, Boom, Boommm,
racing through the caverns,
speeding through every passage,
on and on.

Low rumble like thunder far off,
muffled,
on and on.

Michael Flynn