THE CASCADE CAVER

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WINDY CREEK CAVE

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C O M I N G E V E N T S

Field trip coordinator: Geary Sanders, 763-0361. If you want to be able to afford caving trips with the current price of gas, organize your carpooling through Geary.

April 4-6, Easter Weekend. Azores, vulcanospeleological reconnaissance. Contact Halliday.

Eastern Washington trip, Albright and McLaughlin Canyon Caves areas. Meet Saturday morning 10-noon at the Okanogan County Courthouse in Okanogan.

April 12, Saturday. North Chuckanut Caves, Bellingham area. Contact Clyde Senger in Bellingham, 734-1360.

April 15, Tuesday. Regular monthly meeting at the Hallidays', 1117 36th Ave. E., Seattle, 8:00 PM; doors open at 7:55. Program: NSS slide show.

April 19-20. Annual Grotto Littoral Caving Trip, this time to the Strait of Juan de Fuca and Hood Canal. Details to be arranged at meeting. Contact Rod Crawford, 543-9853. (If you can't reach me, call Sanders.).

April 25, Friday. Eastern Washington Unit Meeting at 8 PM at the Kennedy Library on the EWU Campus in Cheney. Program: NSS slide show.

April 25-27. Possible trip to Mt. Adams lava tube area. Contact Clyde Senger (Bellingham) or Rod Crawford (Seattle).

May 3-4. Vancouver Island trip. Contact Bob Brown, (206) 569-2724.

May 10, Saturday. "Mountain Loop" trip to Big Four Glacier Cave, Bonanza Queen Mine, VICEG Cave, with possible limestone scouting. Postponed from an earlier date. Details to be taken up at the April meeting.

May 20, Tuesday. Regular monthly meeting, time and place as above. Program: NSS slide show.

May 23, Friday. Eastern Washington Unit Meeting, time and place as above. Program: NSS slide show.

May 23-27, including Memorial Day Weekend. Cave hunting trip in the limestone deposits of northern Pend Oreille County. Contact Bob Brown (Elbe), (206) 569-2724, or Craig Hansen (Cheney), (509) 448-0748.

SOME RECENT NEW MEMBERS

Gary Herron (R), 13765 56th Ave. S #C109, Seattle WA 98168.
Phones (home) 241-0307, (work) 237-7632.
Frank G. Haynes (R), 15516 NE 53rd Pl., Redmond WA 98052, phone 883-1080.
Chris Hurlburt (R), 9756 Dinsomore N, Seattle WA 98103, phone 525-6882.
Robert J. Schoenay, 31929 Mercantile Way, Abbotsford B.C. V2T 4C3,
(R) phones: home (604) 859-3779, work (604) 853-9427.
Jim Knibb (R), 12824 NE 104th St, Kirkland WA 98033, 822-2187
Chris Erikson, 6312 147th Ct. NE, Redmond WA 98052, 885-6883. (R)
Steve Petersen (R), 541 14th Av. W, Kirkland WA 98033, 822-9096.

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Cover: Mapping the Clay Complex in Windy Creek Cave. Drawing by Carlene Allred.

PHYSICAL CHARACTERISTICS OF WINDY CREEK CAVE

by Kevin Allred and Rod Crawford

Introduction

During the period July through October, 1979, Kevin and Carlene Allred went on trips to Windy Creek Cave nearly every weekend, pushing leads and surveying. They began with 1200 feet of previously mapped passage (largely mapped under the leadership of Chuck Coughlin). Progress was very slow because of the usually difficult access to the cave and cold and muddy cave conditions. Aiding in the endeavor were John Hart, Bill Halliday, Grant Bailey, Rod Crawford, Walter Bosshart, Chuck Coughlin, and Eckart and Wolfie Schmidt.

Among their accomplishments were the discovery of Black Bear and Pika skeletons, and the exploration of some 1000 feet of virgin passage. Three interesting new dome pits were found.

Most leads in the cave were surveyed giving a current mapped length of 3,057 feet (932 m) and vertical extent of +129 feet (+39 m).

The following report was compiled as a basic organized collection of observations and facts compiled during this project, and is not conclusive. More study of this interesting area would certainly be even more revealing and rewarding.

Climate

The cave is located at an elevation of about 3770 feet in what might be termed a sub-alpine environment, though timberline is some 700 feet higher. This area is seldom completely free of snow, and is reasonably snow-free only in early fall. By a fortunate chance we have snow data for the area, because snow depth was measured for a six-year period at about the same elevation on a mountain about one mile away [1]. This data follows:

Date	Average Snow Depth
Feb. 1	88 inches
Mar. 1	132 "
Apr. 1	158 "
May 1	152 "

Vegetation on the landscape overlying the cave is open fir woods and miscellaneous low brush with huckleberry being very abundant. Various types of mushrooms and fungi thrive with a variety of wildflowers. Thistle, Devils Club, and alder thickets are common on steep open boggy slopes. The cave site receives the equivalent of about 110 inches of rain per year [1], perhaps half of which is snow.

Extrapolating from weather stations in other parts of the northwest Cascade Mountains [5] gives an average annual temperature for the cave site of about 39-40° F. (4° C.). The only actual temperature measurement for the cave is an air temperature of 33° F. (0.56° C.) taken just outside the Ex-Pool on August 10, 1975. The air at this point has passed through a long stream

*A reading of 30° F. was taken in the Twin Domepits on Oct. 6, 1979, but since the water there was not frozen, we assume this was inaccurate.

passage and perhaps has been cooled by some effect of the water. Though not actually measured, air temperatures in the upper levels of the cave feel considerably warmer.

Whenever the cave has been visited, the entrance has been blowing cold air. This might appear puzzling until one realizes that Danner's Cave, a small sinkhole cave in the overlying karst, and probably other sinkholes with connecting fissures nearby, suck in the warmer outside air. This phenomenon in Danner's Cave has been noticed by several cavers at different times of the summer. Probably a "chimney effect" is involved [3]. In summer, the air cooled in the stream passage rushes out of the entrance (which is the lowest point in the cave) and on down the mountain because it is denser than the warmer outside air. The lost air is replaced through the impassable connections to the karst some 173 vertical feet above. Probably in cold winter weather the procedure is reversed, but this will be difficult to confirm because the cave is inaccessible at that time.

Geology

Windy Creek Cave is formed in Early Pennsylvanian limestone of the "Red Mountain Sequence". The major limestone stratum had a thickness of 239 feet (72.8 m) in a measured streambed section [4]. There are thinner limestone beds both above and below, separated by shale interbeds. Since no shale is exposed in the cave (129 feet vertical extent), we may assume that it is developed entirely within the major stratum. Perhaps there is a shale bed interposed between the cave and the karst surface. This would explain the lack of upper entrances.

The 239 foot thickness is broken down as follows (reading from the top of the stratum downward):

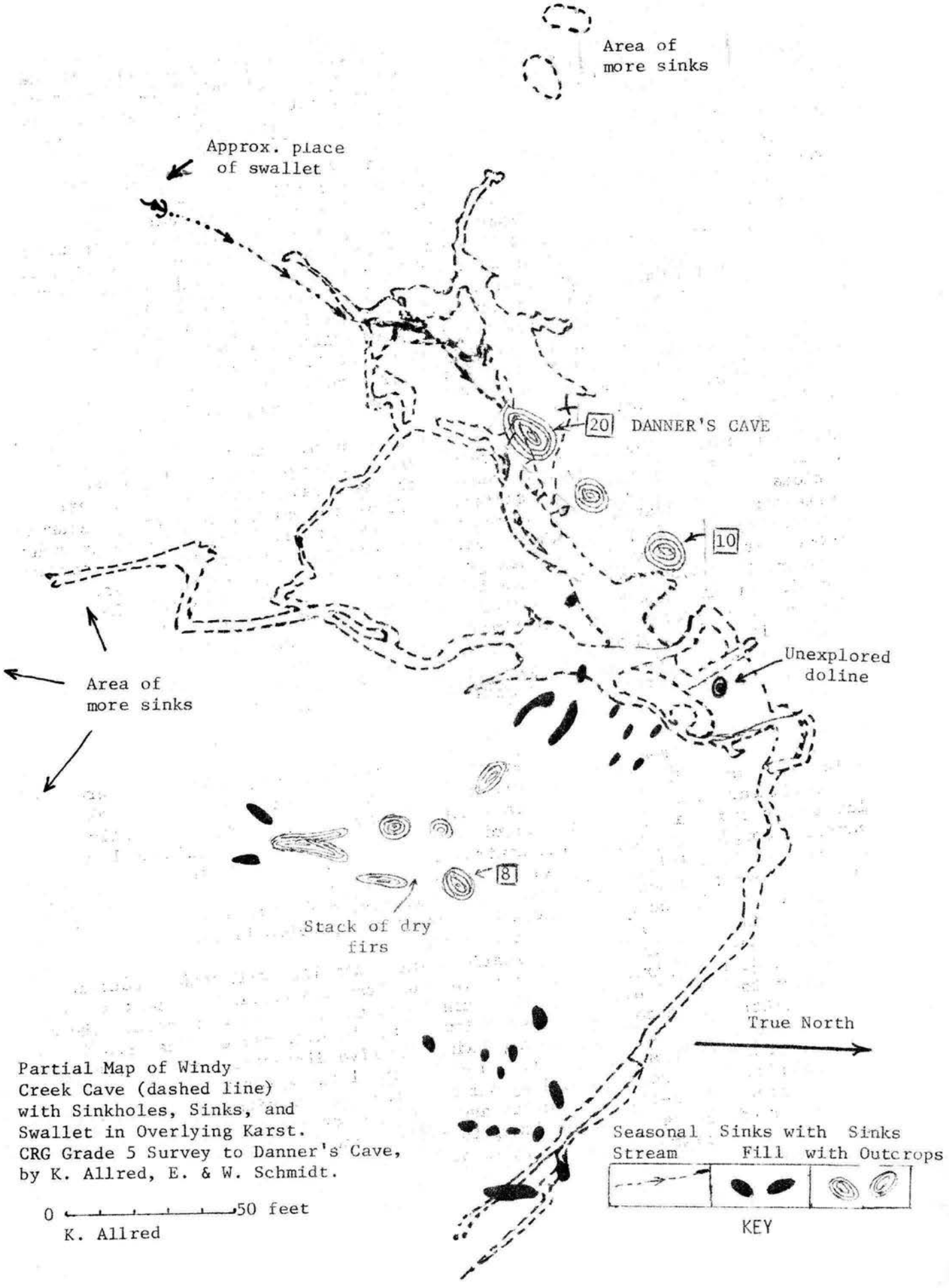
Oolitic crinoidal limestone	10 ft.
Oolitic limestone, crystalline matrix	35 "
Oolitic limestone; shaly to flaggy bedding; dolomite matrix	55 "
Black clastic limestone	10 "
Crinoidal limestone	60 "
Oolitic black limestone	8 "
Crinoidal limestone	34
Light blue gray crinoidal and cherty limestone	27 "

This may explain in part the differing appearance of the rock in different parts of the cave. No attempt has been made to compile data on distribution of different limestone types in the cave; such a study might prove very enlightening. Water, however, is also a factor in the rock's appearance. The limestone is a light gray color when dry and darker gray with white calcite banding apparent when damp or wet.

Bedding in the entrance portions of the cave dips consistently 38-40° to the northwest. A crinoid stem was noted in a cave wall.

Karst Development and Hydrology

Windy Creek Cave underlies a broad saddle between two mountains, which exhibits a well-developed karst topography. "Here are numerous sinkholes up to 30 feet in depth, many of which were still snow-plugged as late as October 4th. The karst topography is developed on a gently rolling surface over an



Partial Map of Windy Creek Cave (dashed line) with Sinkholes, Sinks, and Swallet in Overlying Karst. CRG Grade 5 Survey to Danner's Cave, by K. Allred, E. & W. Schmidt.

area 1200 feet long east-west and 1000 feet wide." [2] The majority of the karst features are concentrated in the eastern half of this area. Unfortunately all known sinkholes are plugged by fill, but the area has so far been only partially explored. Danner's Cave, in one of the sinkholes, is very small.

There is very little surface water on the karst, and Windy Creek Cave receives water from at least some of the known swallets. The western half of the saddle (the ridge trends north-south) is beautiful with scattered fir skirting a large meadow containing a shallow pond with still water stream channels. The water overflow from this meadow area follows a stream bed east to the karst surface, where it is captured by a swallet. A quick surface survey revealed that Danner's Cave overlies the Cairn Room by about 80 feet and the swallet (just west of Danner's Cave) is near the furthest western passages of Windy Creek Cave where there are two crawlways which end in clay fill. On a mapping expedition during a heavy rainstorm (Sept. 8, 1979), water flowed from these crawls at an estimated 10 gallons per minute, where normally there would be just a trickle. Much organic debris (leaves, sticks, etc.) is carried into the cave at such times.

The source of the main cave stream is not known. Known surface streams in the area could not contribute anything like the large and relatively constant volume of water in the cave. Moreover, the main cave stream does not carry noticeable amounts of organic matter. Most of the water rises from a natural "artesian well" near the end of the main stream level, flowing (probably under pressure) from a deep pool whose bottom is nearly as low as the cave's entrance level. Probably this is regional groundwater rather than captured surface water. However, this hypothesis also has its problems. The cave is only a few hundred feet from the top of a mountain ridge some 1500 feet wide, and therefore the source aquifer must be relatively small--unless the water is forced up between impervious strata from the lower ground to the west.

A resurgence about 85 feet from the cave entrance is almost certainly where the main stream emerges. It is capable of accommodating a very impressive flow.

Speleogenesis

As can be seen from a glance at the map, Windy Creek Cave contains three main divisions. The first zone, from the entrance to roughly the Ex-Pool, is a rectilinear maze. The second is a long vadose streamway almost totally lacking in side passages. The third is a large area of both horizontal and vertical complexity where joint control is not so clear-cut. The first zone can also be identified in two other caves in the vicinity; unfortunately both are too short to reach the second zone. Clearly, different factors were at work in the speleogenesis of the three zones; the problem is too complex to examine in detail in a report of this kind.

Much of Windy Creek Cave is phreatic joint controlled with vadose modification. The joint controlled factor is obvious from the rectilinear pattern of many of the cave's passages, particularly in the entrance maze zone. There is very little evidence of passage following the bedding plane. Passages in the third zone have developed on approximately five different levels, probably associated with successive lowerings of the local water table. There is a wide variety of passage including phreatic tubes, dome pits, three-dimensional mazes, narrow canyon-like stream passages, and so forth.

All four of the cave's known domepits are at about the same vertical level, suggesting some common factor in their origin.

Some pendants and gravel false floors were noted. No regularly spaced scallops were seen.

Most of the upper level passages contain abundant quantities of clay, silt, and smooth rounded rocks; in fact, several potential leads are mostly or completely plugged with clay. Lower and wetter passages are, for the most part, washed clean of smaller particles. In the Cairn Room at the base of the Black Chimney is a splendid five-foot high bank of stratified clay, sand and silt; a remnant of a more extensive fill now eroded away by invading surface waters. The origin of this fill material needs to be investigated. One intriguing possibility is that it is a remnant of the last glaciation of the area.

Mineralogy

In several localities (notably the Black Chimney), always associated with flowing or seeping water, is a black or very dark brown coating, which when wet has a mushy and crumbly consistency similar to white moonmilk. On the floor it makes for very slippery walking. A small sample of this material taken from the main stream passage was analyzed by Carl MacFarlane of the state Division of Geology and Earth Resources, who reported the presence of limonite and dolomite.

Moonmilk also coats walls in some parts of the cave.

Speleothems, which are small and few in number, include stalactites, stalagmites, columns, mud stalagmites, rimstone dams, flowstone, helictites, and spathites. Some speleothems were accidentally broken by careless cavers during the first few visits to the cave, but no noticeable damage has occurred recently.

References Cited

1. Cooperative Extension Service, Washington State University, 1966. Washington Climate for these Counties: Clallam, Jefferson, Island, San Juan, Skagit, Snohomish, Whatcom. E.M. 2626, 64 pp.

2. Long, William A., 1976. Report of Geologic Investigation. Cascade Caver, 15 (11-12): 127-128.

3. Senger, Clyde M., 1977. Thoughts on Cave Microclimate. Speleograph, 13 (10): 125-128.

4. Smith, C.L., 1961. Stratigraphy of the Red Mountain Formation (lower Pennsylvanian?) of northwestern Washington. University of British Columbia M.S. Thesis, 96 pp.

5. U.S. Environmental Data Service, 1978. Climatological Data, Annual Summary, Washington 1977.

T R I P R E P O R T

Windy Creek Cave
October 12-14, 1979

by Eckart and Wolfie Schmidt

Participants: Kevin Allred, Eckart Schmidt, Wolfie Schmidt. (Saturday: Wally Bosshart, Alan Lundberg, Baron Lundberg.)

When we started out that day, we were prepared for a weekend of drudgery. Armed with a long list of seventeen "nit-picky" things to do and a fair amount of determination, we hit the trail.

This was my first trip to Windy Creek; Kevin has long since lost count. The trail really wasn't bad, but they tell me it had been worse. We made it in 1 3/4 hours, which is good time with a 30 pound pack on your back. As soon as we pitched camp (which involved digging a ledge into the 45° slope), we headed in for our first trip.

The first trip involved surveying parts of the entrace maze that the first surveyor ignored. Then we headed for the dig that potentially headed for Roberts Cave. We crammed ourselves into the crack-crawlway just off the Flatworm Pool, and pulled 20 pound rocks out of the ceiling. Kevin got caught in a few rockfalls, but he finally broke through. We were---in the main passage. "Garbage!" said Kevin. That about summed it up.

The next day we did an overlying passage which gave us 75 feet. Then we went to the passage past Mitch's Mud Room to check out a hole in a dome pit. No dice--it was way up there. On the way back out, we met Wally and the Lundbergs, who later tried it and found it to connect with a small hole in Mitch's Mud Room.

That evening, Kevin got "psyched up" and ready for crawling around in six inches of water in the lower end of the stream passage. When he came out, we had every nook and cranny of Windy Creek Cave surveyed, with over half a mile of passages.

In between the second and third trips into the cave, we went up top to survey sinkholes. Some of those suckers were 25 feet deep. Then we checked out the virgin karst to the south. We found a hole that looked a lot like a limestone cave, but was in dirt. Another consisted of two sinkholes with a rock ridge between them, which had a little hole between the two sinkholes, and a hole in the breakdown [this sounds like Unnamed Cave A--editor]. We also found another one, but we won't tell you what and where it is. That's our secret.

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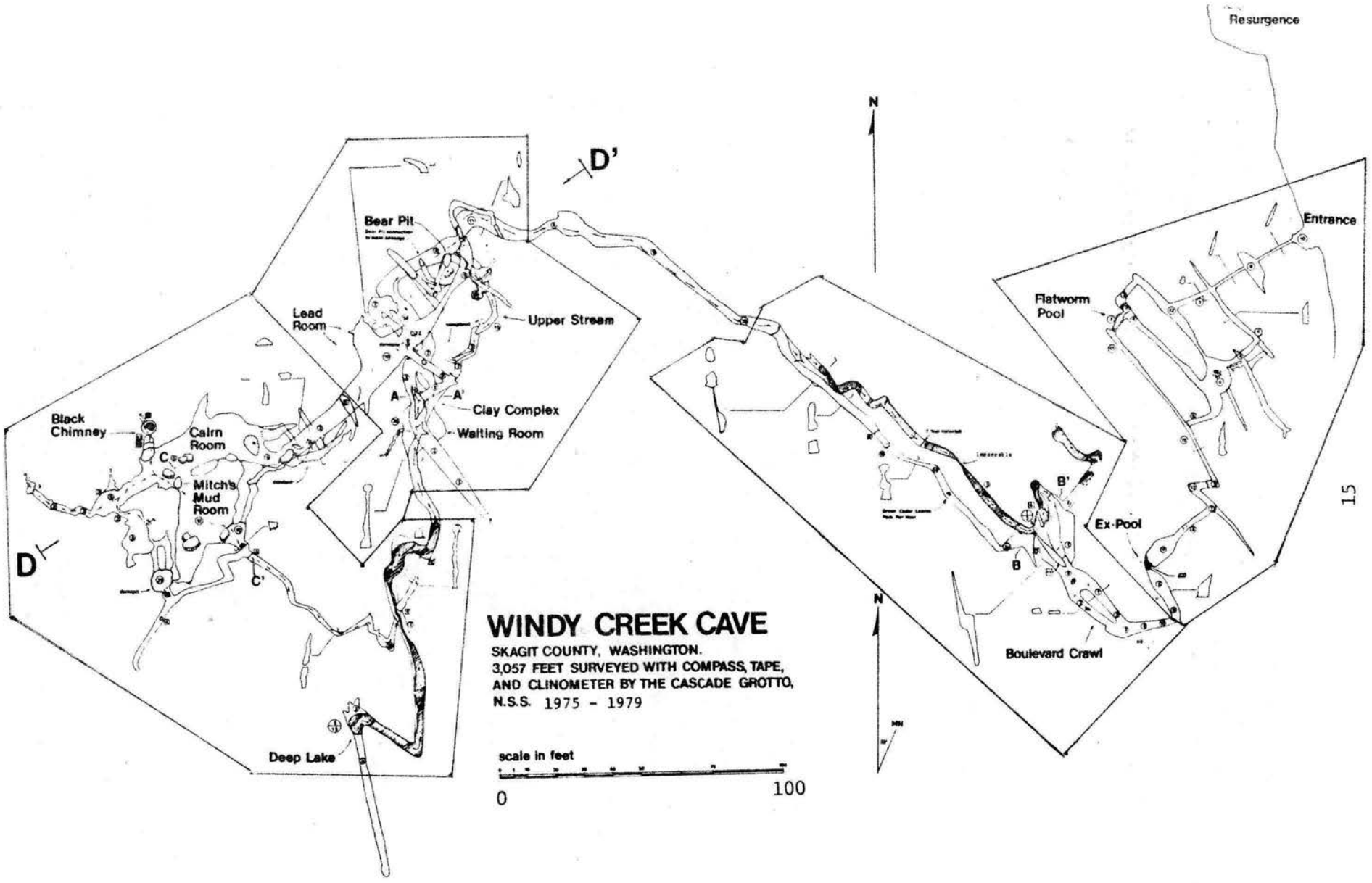
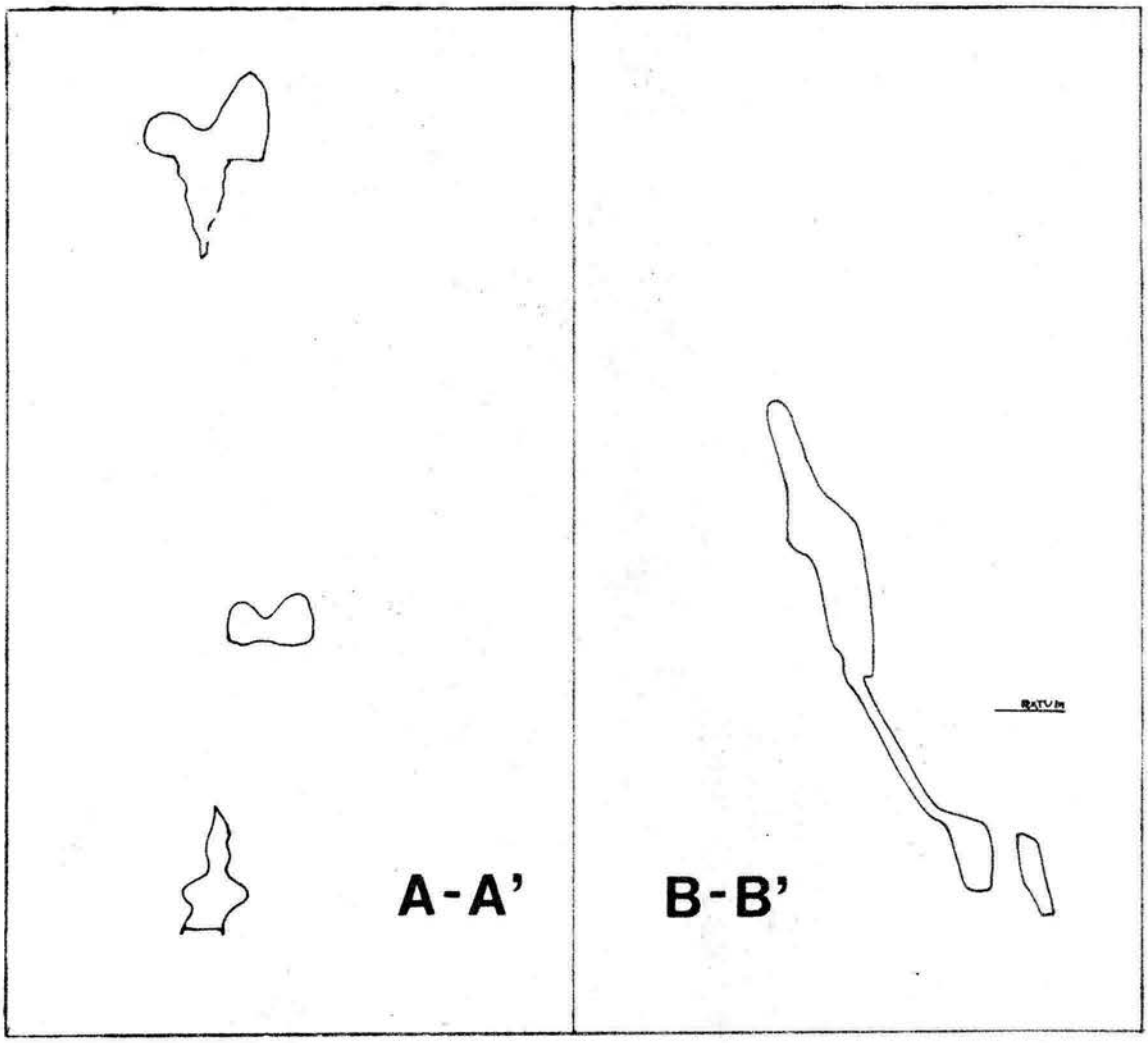
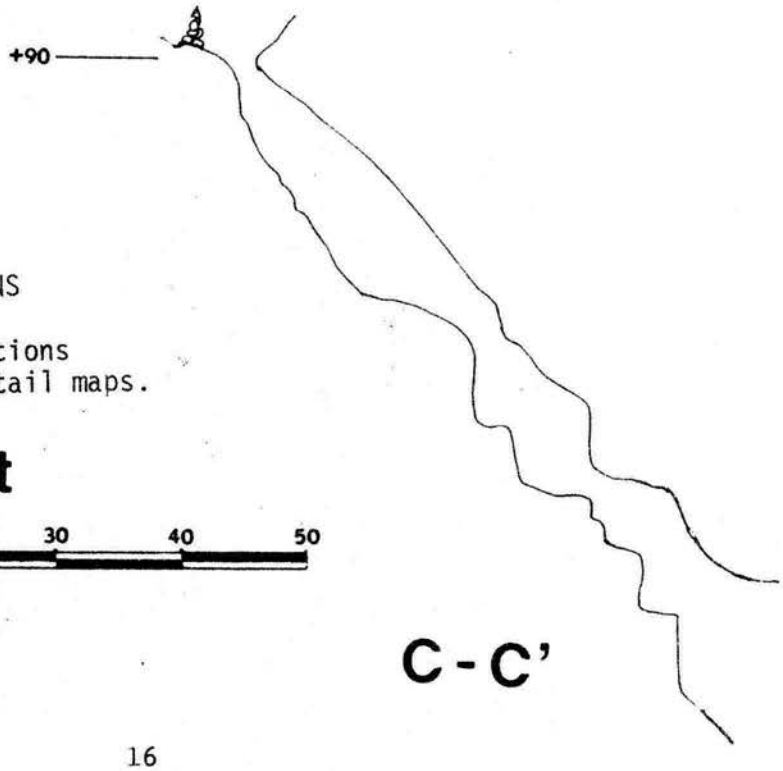
WINDY CREEK CAVE - MAP AND SECTIONS

The next seven pages (pp. 15-21) present the current map of Windy Creek Cave, of which roughly the first 1200 feet was drafted by Chuck Coughlin and the remainder (up to the present total of 3057 feet) by Kevin and Carlene Allred.

The greatly reduced index map on p. 15 will serve as an index to the lettered sections on pp. 16-17 and the numbered detail maps on pp. 18-21. The dimensions of the index map are roughly 0.2 times those of the original.


Resurgence
N
D'
Bear Pit
Lead Room
Upper Stream
A
A'
Clay Complex
Waiting Room
Black Chimney
Cairn Room
C
Mitch's Mud Room
D
C'
Deep Lake
Entrance
Flatworm Pool
B'
Ex-Pool
B
Boulevard Crawl
N
WINDY CREEK CAVE
SKAGIT COUNTY, WASHINGTON.
3,057 FEET SURVEYED WITH COMPASS, TAPE,
AND CLINOMETER BY THE CASCADE GROTTO,
N.S.S. 1975 - 1979
scale in feet
0
100



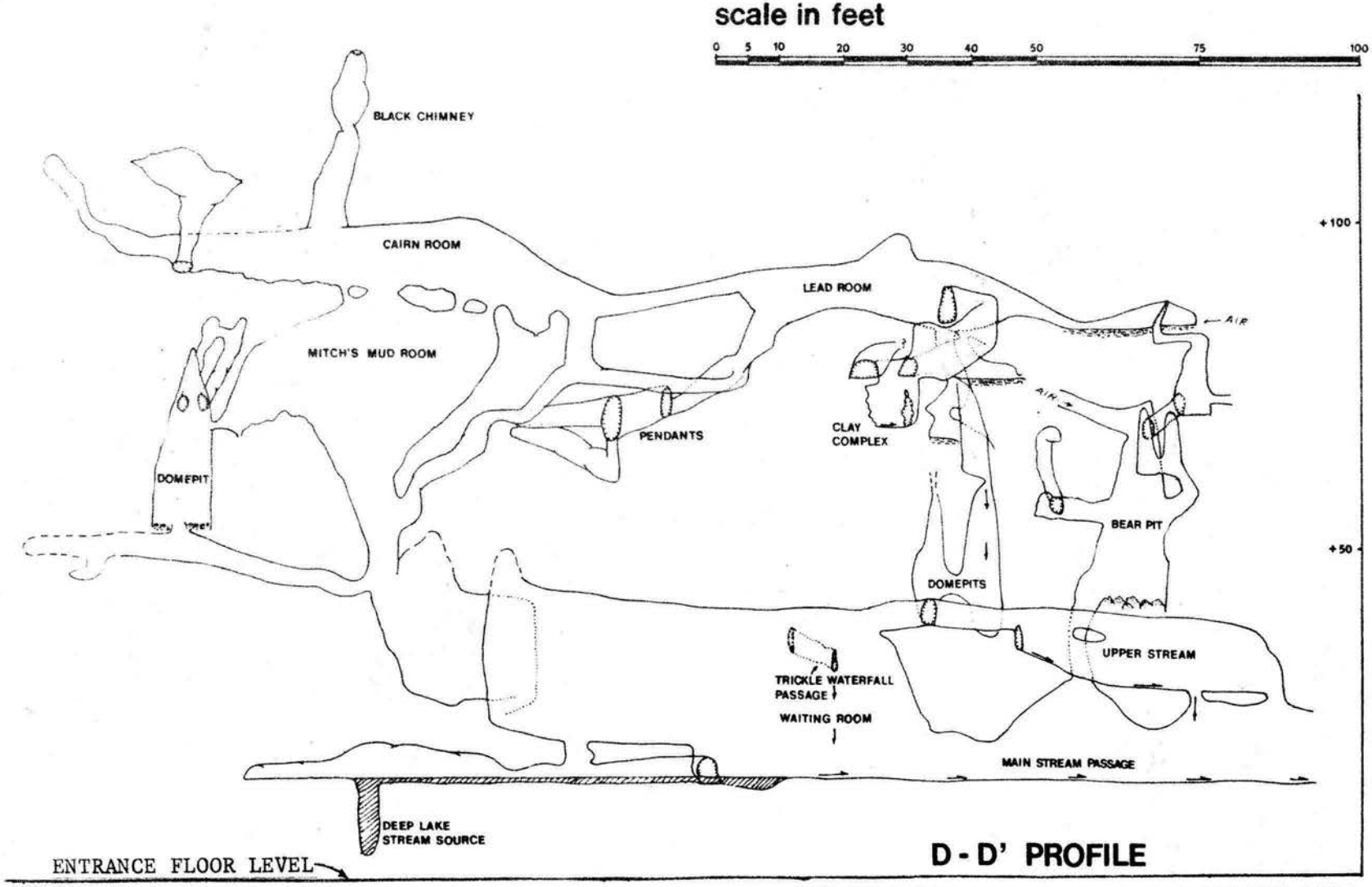


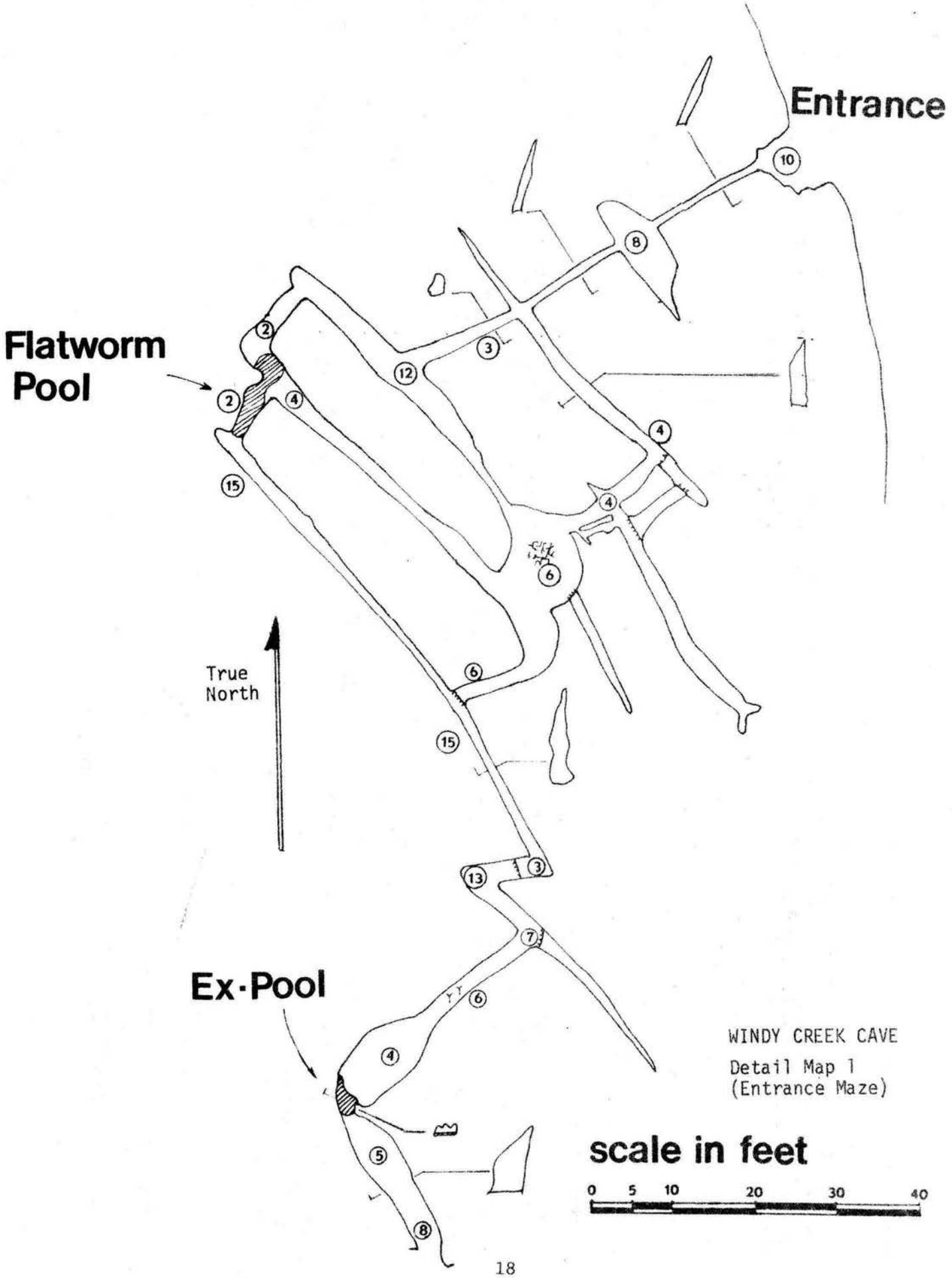
WINDY CREEK CAVE
LETTER CODED SECTIONS

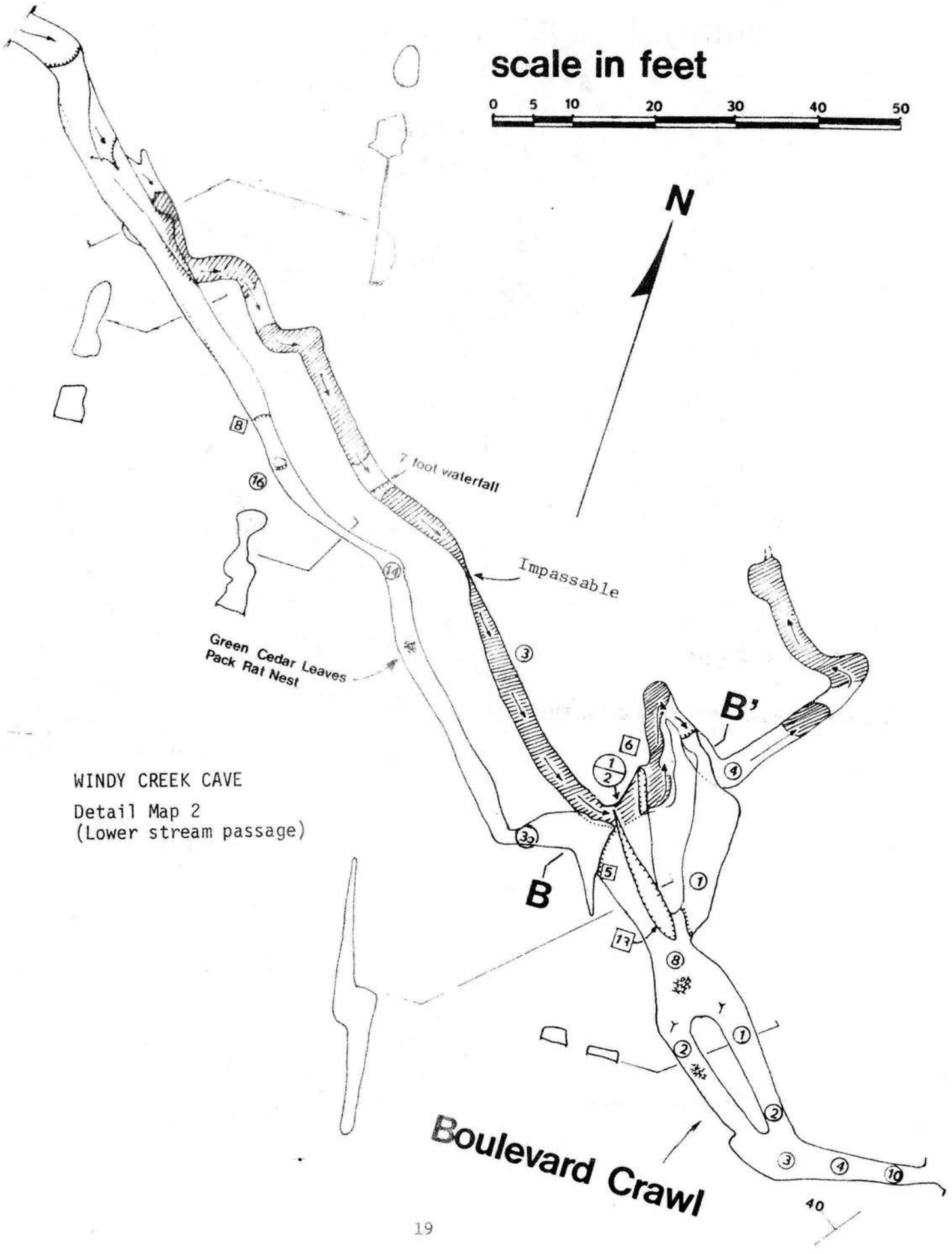
For location of sections
refer to main or detail maps.

scale in feet

0 5 10 20 30 40 50

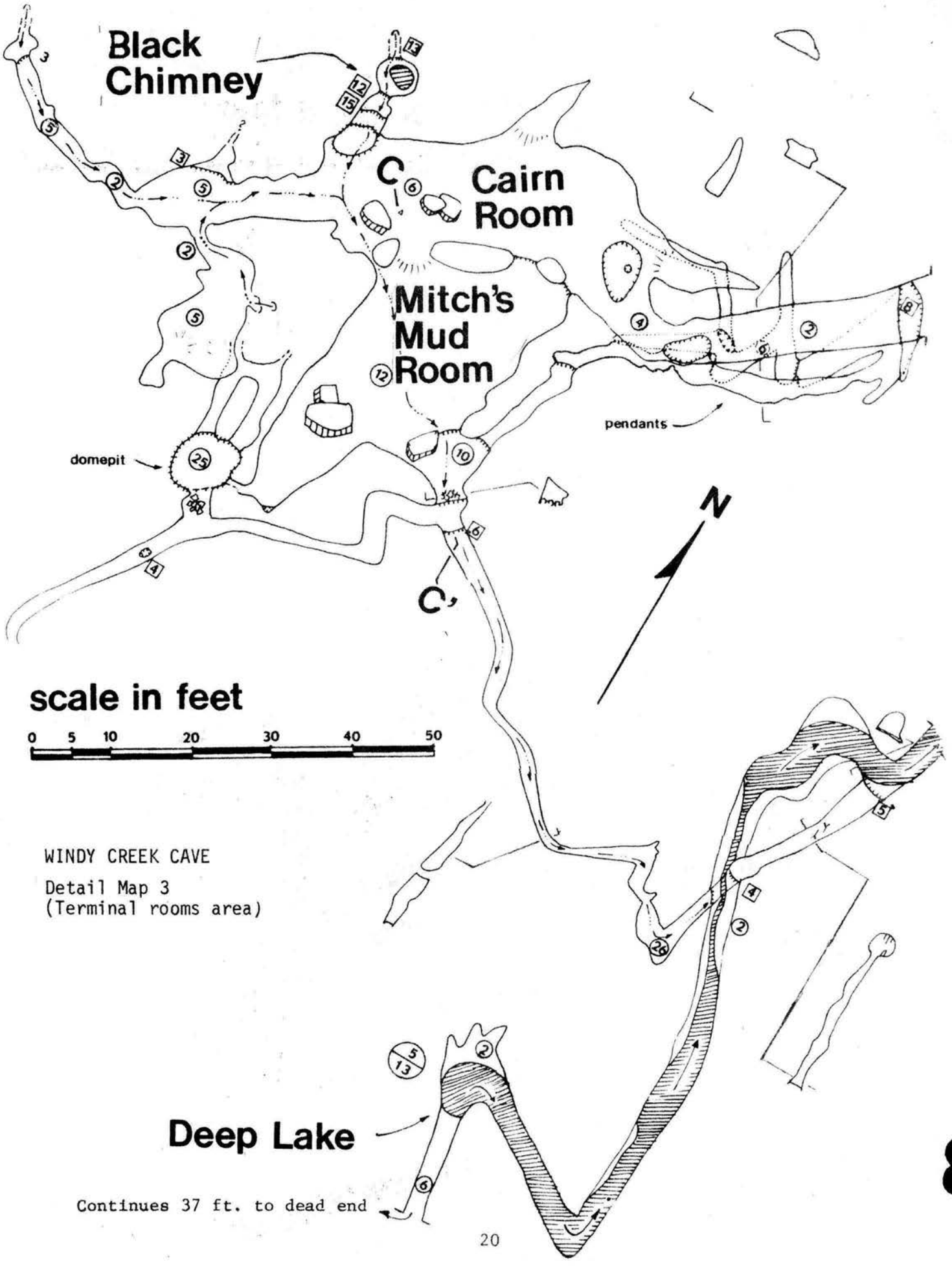

scale in feet
0 5 10 20 30 40 50 75 100
BLACK CHIMNEY
CAIRN ROOM
LEAD ROOM
MITCH'S MUD ROOM
PENDANTS
CLAY COMPLEX
AIR
AIR
DOMEPIT
BEAR PIT
DOMEPITS
UPPER STREAM
TRICKLE WATERFALL PASSAGE
WAITING ROOM
MAIN STREAM PASSAGE
DEEP LAKE STREAM SOURCE
+100
+50
ENTRANCE FLOOR LEVEL
D - D' PROFILE
VERTICAL AND HORIZONTAL SCALES ARE THE SAME


Entrance
Flatworm Pool
Ex·Pool
True North
WINDY CREEK CAVE
Detail Map 1
(Entrance Maze)
scale in feet
0 5 10 20 30 40



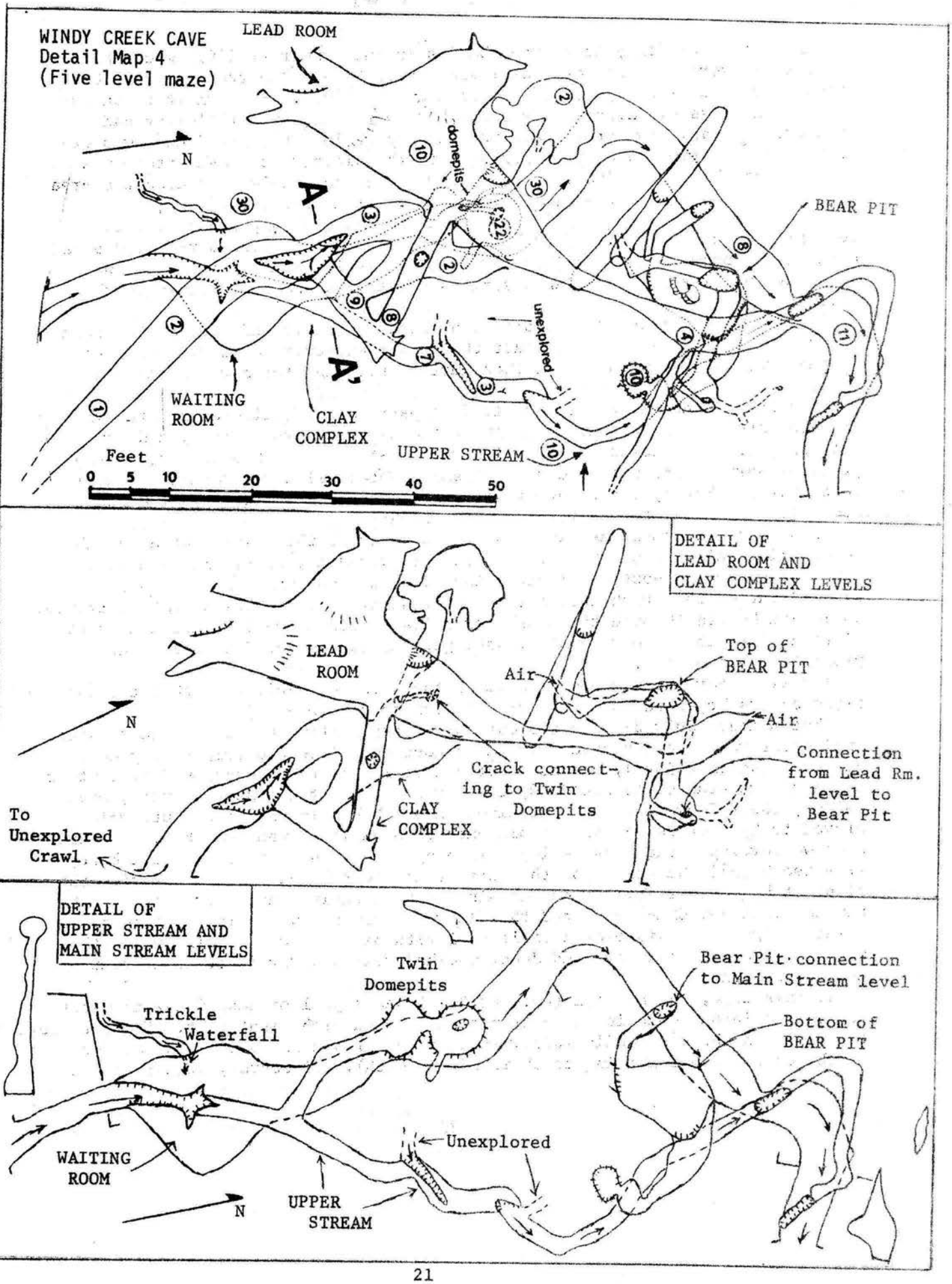
WINDY CREEK CAVE

Detail Map 2
(Lower stream passage)



WINDY CREEK CAVE

Detail Map 3
(Terminal rooms area)


WINDY CREEK CAVE
Detail Map 4
(Five level maze)
LEAD ROOM
N
A
A'
domepits
BEAR PIT
unexplored
WAITING ROOM
CLAY COMPLEX
UPPER STREAM
Feet
0 5 10 20 30 40 50
DETAIL OF LEAD ROOM AND CLAY COMPLEX LEVELS
LEAD ROOM
Air
Top of BEAR PIT
Air
Connection from Lead Rm. level to Bear Pit
Crack connecting to Twin Domepits
CLAY COMPLEX
To Unexplored Crawl
DETAIL OF UPPER STREAM AND MAIN STREAM LEVELS
Twin Domepits
Bear Pit connection to Main Stream level
Trickle Waterfall
Bottom of BEAR PIT
Unexplored
WAITING ROOM
UPPER STREAM
N

HISTORICAL SKETCH OF WINDY CREEK CAVE

by Rod Crawford

The history of Windy Creek Cave begins in the summer of 1969, when the karst area overlying the cave was investigated by Jan Roberts, Dave and Kathy Mischke, and Maurice Magee, all of the Cascade Grotto. This visit to an extremely inaccessible area was preceded by several attempts foiled by bad weather. A small cave previously reported by geologist W. R. Danner was explored at this time, and the resurgence of the Windy Creek Cave stream was noted by Jan Roberts. Due to lack of time, Jan was unable to search the area of the resurgence, and thus just missed discovering the cave [1, 2].

Some time later, possibly in 1970 or 1971, Jan Roberts, Bob Brown, and Ron Pflum returned to the area and discovered the small secondary karst area containing Unnamed Cave A. They did not closely investigate the sinks where this cave was later found; Jan describes the trip as being more picnic than cave scouting [2].

The inaccessibility of this promising karst area, in the heart of a medium-sized trailless area, plus the fact that this particular mountain seems to attract rain like a magnet, deterred further scouting for several years to come.

Finally, on Saturday, July 19, 1975, a party of two climbed and brushwhacked into the area: Jan Roberts, veteran of the previous expeditions, and Dave Walker, a relative newcomer to caving who had joined the Cascade Grotto the previous April. The two discovered a small waterfall cave (Unnamed Cave A), which Dave explored, drenching himself in the process. Then, after doing some more scouting, they retired for the night.

Thus dawned a momentous day! Jan led the way to the resurgence area; the two carried only flashlights (they felt this would assure finding a cave). Sure enough--only about 50' further than Jan had gone in 1969, Dave Walker stepped out of the brush into a seven-foot high, briskly blowing cave entrance. While Jan hunted through the brush for a lost canteen, Dave explored a short distance into the cave with his flashlight, as far as the "Ex-Pool", then prudently turned back.

A smaller cave nearby was discovered the same day (July 20), then the two tired cavers began the seven-hour hike back to the road [3].

That Monday, July 21, was the Cascade Grotto meeting and the scene of some excitement when the new discovery was announced. A return trip (fully equipped) was immediately planned, but naturally had to be postponed by weather.

On the weekend of August 9-10, three weeks after the discovery trip, Dave Walker, Chuck Coughlin, John Torkelson, and I hiked in on a new route which proved to be just as bad as the old one, in beautiful sunny weather. On this hike we developed the brushy-slope climbing method known as the "Huckleberry traverse." [5]. We camped on the karst (sans tents) and of course during the night it began to rain. Sunday morning four slightly damp cavers entered the new cave. I and Chuck explored the Flatworm Passage, where in a virgin crawl I was delighted to discover a small pool with pale flatworms swimming on the surface. We rejoined Dave and John, who had followed Dave's original route, at the Ex-Pool.

At this time, the Ex-Pool (not yet "Ex") was a pool of near-freezing water about four inches deep in the bottom of a 10 inch high tight spot. First through the pool was Chuck's poodle Tuffy, whom it had proved impossible to keep out of the cave (we had nothing to chain him up with). Of course, at this point

we had no way of telling that this was not the sort of cave you take a dog into. Chuck and Dave followed Tuffy after some digging. Both complained loudly as their chests hit the water. John and I both expected that this would prove to be a typical Washington cave (not worth getting wet for) and remained behind.

While we waited, Chuck, Dave, and Tuffy explored the main stream passage of the cave. Tuffy finally had to be left behind on a ledge in the Waiting Room (which thus got its name) with a candle. How he got even this far, I'll never know. Chuck and Dave reached the Cairn Room, where they established the cairn. About 1 1/2 hours later, two wet men and one wet dog, all shivering with incipient hypothermia, emerged from the cave and warmed themselves at a fire in the entrance.

After hiking several rainy, brushy hours down the mountain, the four of us stopped on the way home at the Cascade Pizza parlor in Burlington, where Windy Creek Cave was named after the wind and creek which it contains. Roberts Cave, the small cave 50 feet farther south, was also named at this time. Dave Walker was responsible for both names. [4].

On September 27, 1975, a mapping party consisting of Jerry Broadus, Bob Brown, Chuck Coughlin, and Bill Capron of the Cascade Grotto entered the cave. This time dogs were kept outside (one had to be escorted out). Mappers Jerry and Chuck (Jerry with a wetsuit top, Chuck with a garbage bag) plunged through the Ex-Pool again, getting slightly less wet than before. Bob and Bill stayed behind and managed through digging and dam-building in the mud floor to channel the pool's waters elsewhere, thus giving the Ex-Pool its name, then proceeded through in a relatively dry condition. On this trip the side passage and dome pit to the south of Mitch's Mud Room were partly explored. The mappers mapped the main route through the cave not quite as far as the Waiting Room (550.5 ft., 167.8 m) before becoming too cold to continue [6].

On July 3, 1976, a Cascade Grotto party led by Chuck Coughlin attempted to pioneer a new, easier route into the cave area from the south (previous trips had been from the east or west). Coincidentally, a group from Xanadu Grotto appeared in the area on the same day, and Chuck led both groups on what proved to be a wild goose chase down the wrong road. On July 9th Chuck returned to this route with Russ Turner and the first non-Cascade Grotto member to visit the cave, Dave Mischke of Xanadu Grotto. On this visit the Flatworm Passage loop was surveyed by Chuck and Russ, bringing the cave's length to 830 ft. (253 m). Chuck explored parts of the Lead Room and Clay Complex area [7].

By this time a problem in the exploration of Windy Creek Cave had become apparent to all visitors: accidental damage to speleothems by cavers. Some explorers had little or no experience in caves with fragile speleothems along main routes of travel; others, perhaps, were carried away with the exuberance of exploring virgin cave. Whatever the reason, some six or seven small to medium length stalactites had been accidentally broken in the outer part of the cave, particularly in the Boulevard Crawl where they were somewhat difficult to avoid. This is hardly to the credit of Washington cavers. However, once the extent of the problem was realized we instigated a policy of much greater caution, and no damage has occurred since mid-1976.

At about this time Mitch's Mud Room was named by the cave's discoverer, Dave Walker, for a caver Dave met in West Virginia, under a reciprocal agreement ("I'll name a room after you if you'll name one after me.").

On October 2, 1976, Chuck Coughlin and Bill Capron mapped the remainder of the main route to the cairn in the Cairn Room, bringing the mapped length to 964 ft. (294 m). Also on this trip were myself and Tom Sheehan, a visiting

caver from Iowa. A register was placed just inside the Ex-Pool crawl [8].

The map of the cave to this point was published in the November-December, 1976 issue of the Cascade Caver [9].

During 1977 there were five Cascade Grotto visits to the cave, but relatively little new exploration and mapping. On June 13, Chuck Coughlin, Bill Capron, and one other mapped part of the passage to the southernmost domepit, and part of the complex at the downstream end of the Stream Passage [11]. On July 26, Stan Pugh, Joyce Thompson and I penetrated partway into the lower level passage leading to the stream source pool [10]. This passage was explored to the end by Chuck Coughlin on September 5th [11]. Finally, on September 25th, John Hart and I mapped 80 feet from the cairn into the Lead Room passage. This brought the mapped passage to about 1200 ft. (367 m) [11].

During 1977 the cave register bore informative fruit. Through July of that year the cave had been visited only by Cascade Grotto parties. However, the register indicates that on August 6 the cave was visited by an independent party of three from Kent, Washington, who learned the cave's location from "a friend." On September 18 and 19, two different parties of three, led by local residents, signed forms. Both learned the location from "a friend," in this case probably one of the local U.S. Forest Service rangers, though one mentioned acquaintance with a member of Xanadu Grotto. Information of this sort gives some indication of how word of a new cave spreads, and is one of the most valuable rewards of maintaining a cave register[12].

1978 was a low ebb in Cascade Grotto activity, and the cave was not visited even once, even by non-Grotto cavers to judge by the register. But on July 18, 1979, Kevin and Carlene Allred, newly arrived from Utah, paid a brief visit to the entrance section [13]. This heralded a new era in the exploration of Windy Creek Cave.

The first Allred mapping trip occurred on August 25, 1979, when the Allreds, accompanied by John Hart, mapped part of the Lead Room area. Kevin pushed a small fissure near the end of the Lead Room and discovered the thirty-foot deep Bear Domepit with its mysterious Black Bear skeleton [14].

On Saturday, September 1, the Allreds mapped part of the Cairn Room area; Kevin moved some rocks on the floor of the Bear Pit and opened a connection to the main stream passage, some 25 feet below. The bear skeleton was identified. By this point the mapped length had reached about 1820 ft. (555 m) [15, 16].

On September 8, Kevin and I mapped the alternative route from Mitch's Mud Room to the Lead Room. We noted that at least one bone had washed down into the stream passage due to the previous weeks's disturbance of rocks in the Bear Pit. On the hike out, we were almost run down by an elk.

On September 15, Kevin and Wally Bosshart mapped many side passages, including the Black Chimney and the Bear Pit connection with the stream passage, to a total of roughly 300 feet. This trip brought the mapped length to over 2000 feet accessible from one entrance, Washington's first and only limestone cave to achieve this figure [14].

On September 29, both Allreds and I returned and mapped over 300 feet, including the rest of the Bear Pit and Lead Room passages, the Clay Complex, and the passage leading to the Deep Lake. In a short virgin crawl I noted a barely passable fissure leading down. Kevin descended this and discovered the first of the Twin Domepits but could not descend it. On October 6, Carlene Allred returned with Wally Bosshart and vertical gear. The two descended the new pit, discovered and mapped the second pit and the Upper Stream Passage for about 200 feet, bringing the total to 2352 ft. (717 m). Both were nearly

trapped in the cave due to difficulties in ascending the fissure and attrition of their light sources. They reported in barely in time to forestall a rescue attempt [17].

On the last visit of the year, October 12-14, Kevin Allred and Eckart and Wolfie Schmidt mapped over 600 feet including all remaining explored passages. Extremely wet passages which had been bypassed earlier were mapped without a wetsuit. Kevin was unsuccessful in making a connection to nearby Roberts Cave. A rough surface survey was run as far as Danner's Cave in the overlying karst [14, 18].

At the Cascade Grotto meeting on Tuesday, October 16, the Allreds announced their final figures: Windy Creek Cave had been mapped to 3,057 ft. (932 m), just 224 feet short of a kilometer. It will likely hold a pre-eminent position among Washington's limestone caves for some time to come.

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Note: volume, issue, and page references are to the Cascade Caver.

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Biology of Windy Creek Cave

by Rod Crawford

Windy Creek Cave might appear to be an uninviting place to live. It is cold, wet, muddy, drafty, and dark. However, there is life there if you look for it.

Most of the cave's inhabitants belong to the ecological category of "troglo-xene." These animals spend part of their lives inside the cave, whether resting, overwintering, or whatever, and part outside. The only species found to date which apparently spend their entire lives underground are the beetle Quedius spelaeus and an unidentified flatworm.

Such cave-dwelling animals depend for their survival on organic food brought in from outside. In Windy Creek Cave there are three major sources of such material: first, the trogloxenic animals which enter and leave through the entrance, their byproducts and material they bring in; second, organic debris washed in from the karst surface through sinkholes and swallets; and third, organic matter dissolved in seepage and groundwater. This would tend toward a concentration of biota at the upper and lower ends of the cave. To date, only the lower end has yielded much.

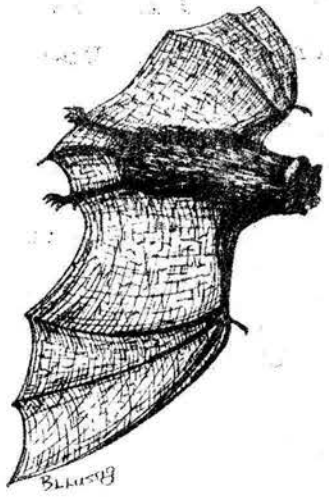
There is too little data on hand for a more extensive consideration of Windy Creek Cave's ecology, so what follows is mainly a discussion of the fauna known to date.

Mammals

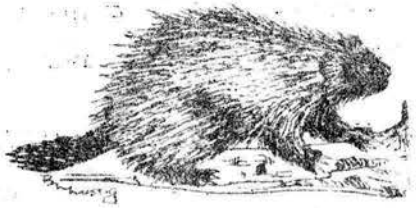
Bats in flight (unidentified) were noted in the Cairn Room - Mitch's Mud Room area by Bill Capron and party on Sept. 29, 1975. On November 12, 1976, Curt Black and Anne Ruggles noted two bats in the entrance maze, a hibernating Plecotus townsendi and a Myotis sp. which was still somewhat active.

Apart from bats, the cave's mammal inhabitants include the "3 P's" which occur in most caves in the Cascades: Pikas, porcupines, and pack rats.

On September 5, 1977, a pika (Ochotona princeps) squeaked at four cavers (myself included) who were suiting up in the entrance, apparently from among the rubble in the entrance alcove. Pika scats have been seen in various parts



Bat, Myotis sp.



Porcupine,
Erethizon dorsatum

Pack Rat,
Neotoma cinerea

Pika,
Ochotona princeps

of the entrance maze. Apparently pikas do not penetrate beyond the Ex-Pool. They are common inhabitants of the talus slopes in the surrounding area. A pika skeleton was found in the Upper Stream Passage above the Waiting Room; this animal may have entered through a pika-sized, or subsequently filled, entrance on the karst surface.

A substantial deposit of porcupine (Erethizon dorsatum) scats is present on the floor of the entrance passage from about 40 feet to 60 feet inside. There have been no fresh additions since the cave's discovery in 1975, so evidently the porcupine is no longer in residence. Probably the cave served as a winter den; the only scats noted were of the hard, oval winter type.

Pack rat (Neotoma cinerea) sign has been noted only where indicated on the map, in the dry upper level of the first stream passage section. The remains of a stick pile are on the floor; possibly a nest was once here, but the site has been much trampled. Fragmentary scats are present nearby. If any pack rats remain in the cave they are few; their characteristic odor is faint or absent.

Possibly the frequent human visitation has led porcupines and pack rats to abandon the cave.

The Bear Skeleton

The skeleton of an adolescent Black Bear (Ursus americanus) was apparently buried in clay fill in one of the upper level passages leading into the Bear Pit. The fill in this passage is being eroded by water from the karst surface, and a number of bones have washed out and fallen down the pit; others are still embedded. The skeleton is younger than 11,000 years, but its minimum age cannot be established without radiocarbon or pollen dating.

How the bear reached this point in the cave must be a matter for conjecture. My guess would be that the bear came through a former entrance in the karst surface, now filled. However, the spot where the bear is embedded is already about 100 vertical feet below the surface.

Invertebrates

An unidentified species of Triclad flatworm occurs in the waters of Windy Creek Cave. Living specimens are about 1-2 centimeters long. There are no visible eyespots, and although the color is a pale tan or beige, this may be an obligate groundwater species. An alternate possibility is that the subterranean waters here have been colonized by surface-living flatworms washed in through the karst swallets. Flatworms are occasionally seen swimming on the surface of the Flatworm Pool, a seep-fed pool in the entrance maze. In this pool they evidently feed on the bodies of drowned fungus gnats which are always to be found floating there. The remains of one such gnat, collected from the pool when flatworms were present, consisted of a mere shell with soft parts digested away.

I have observed the Flatworm Pool on nine occasions--once in June, twice in July, once in August, four times in September, and once in October. I have seen flatworms in the pool only twice--on August 10, 1975, and on September 5, 1977. Possibly their occurrence there is seasonal, and limited to late summer.

Other invertebrates so far found in the cave are limited to arachnids and insects:

An unidentified mite (see figure) was collected in the entrance maze on August 10, 1975.

Two species of fungus gnat regularly enter the cave. One belongs to the true fungus gnat family (Mycetophilidae); the other is one of the "Dark-winged fungus gnats" (Sciaridae), which are smaller and can usually be identified by their pointed abdomen. They probably do not breed in the cave, but their reason for entering is not known for certain. If the cave ever sucks air, many might be drawn in from swarms hovering in the entrance. They are found in the entrance maze as far in as the beginning of the Boulevard Crawl in late summer and fall. Individuals drowning in the Flatworm Pool provide food for the flatworms. Several have been seen caught in moonmilk.

One female Staphylinid beetle, Quedius spelaeus, was collected from the wall just beyond the Ex-Pool on September 8, 1979. This species is a known troglophile widespread in the Pacific states. It is probably a permanent inhabitant of the cave, and most likely feeds on gnats.

A few Brown Tissue Moths, Triphosa haesitata, overwinter in the cave. These moths occur in caves throughout the western United States, and a related species in caves in Europe. One was collected in the entrance maze on September 25, 1977.

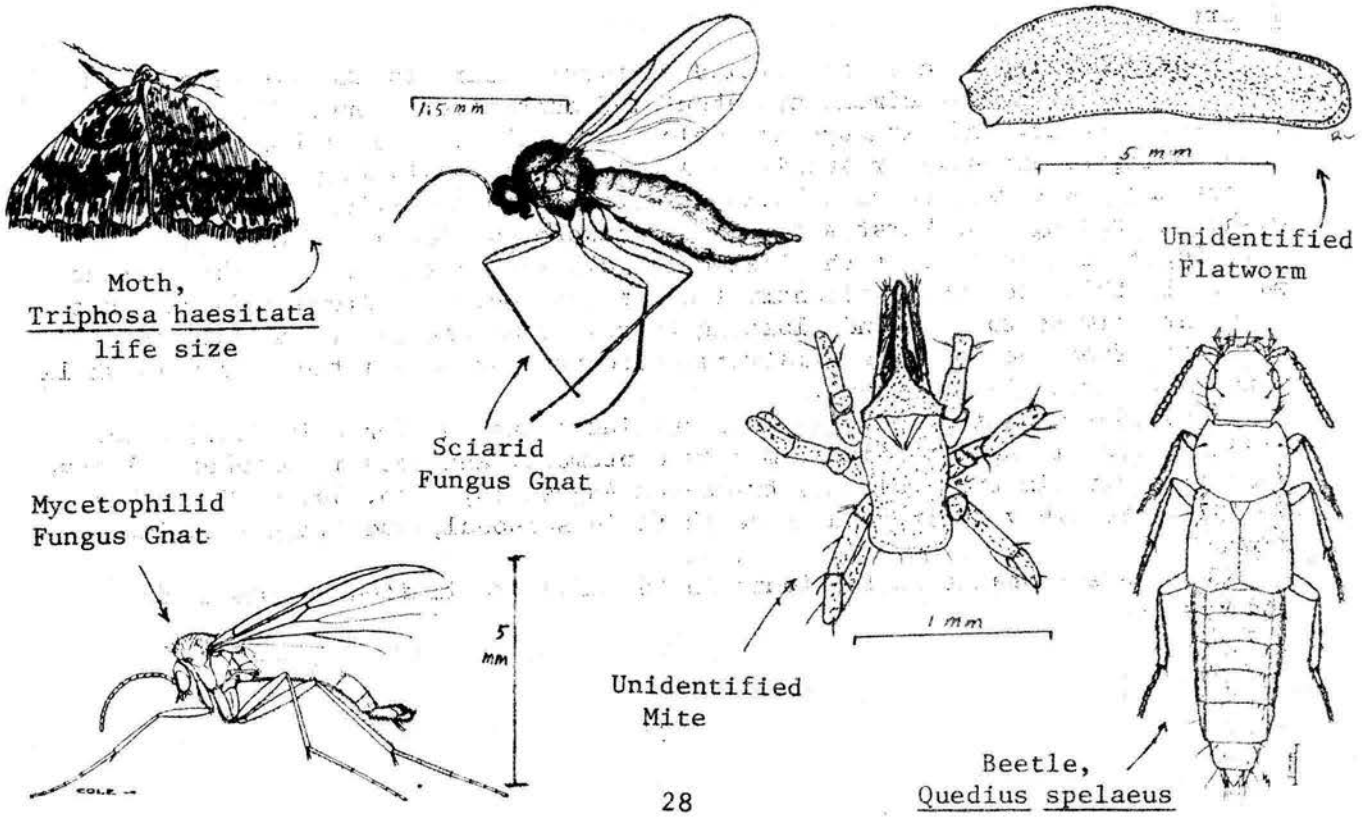
For more information on some of these animals, see my past "Biologist's Chamber" columns in the Cascade Caver:

Moths: January 1975, 14 (1): 10-11.

Pikas, Pack Rats, and Porcupines: October 1975, 14 (10): 117-118.

Cave Energy Sources: September 1975, 14 (9): 100-101.

Bones: April-May 1975, 14 (4-5): 47-48.



OTHER CAVES IN THE WINDY CREEK CAVE AREA

by Rod Crawford

Four additional small caves are known on the same mountain as Windy Creek Cave. All of these are in the same limestone formation and three are in the same outcrop. More will undoubtedly be discovered in the future.

Danner's Cave was discovered by geologist W.R. Danner in 1957. Danner, a specialist in the study of limestone, did not enter caves but always reported entrances to the Cascade Grotto. The cave was explored by the Cascade Grotto party which first scouted the area in the summer of 1969 [1]. The name "Danner's Cave" was applied in 1975 to distinguish it from the new caves nearby.

Danner's Cave starts 15 feet down in a sinkhole as a small, steeply sloping passage ending in fill in 10-20 feet and perhaps 10 feet lower. It directly overlies the northern end of the Cairn Room of Windy Creek Cave, about 80 feet above the cairn, and the two caves are probably connected hydrologically. Danner's Cave sucks air during the summer and probably contributes to Windy Creek's "chimney effect."

Unnamed Cave A is to the south of the others and at a somewhat lower elevation. It does not underlie the main karst area but constitutes a separate small karst area of its own, which was first noted by a Cascade Grotto party about 1970 [2]. The cave was discovered by Jan Roberts and Dave Walker on July 19, 1975, and explored by Walker [3]. Several people have independently rediscovered the cave in the ensuing years since the entrance waterfalls are audible from a elk trail frequently used as a route to the main karst area. The cave consists of two sinkholes on a brushy slope with waterfalls plunging into small pits. Walker reported about 50 ft. of wet passage at the bottom, ending in dirt fill. There is a window-like connection between the two sinks, and one has a short cave segment continuing on the other side.

Unnamed Cave B is perhaps 700-900 feet south of Windy Creek and Roberts Caves, and it is developed on the same joint controlled pattern. The passages are extremely tight and total about 50 to 60 feet (unmapped). This cave was located and explored by Kevin Allred and Walter Bosshart on September 15, 1979. A footprint found inside indicates a previous visit to the cave, possibly by Dave Walker, but this is undocumented [14].

Roberts Cave, the second longest in the area, is located some 50 feet south and 35 feet above Windy Creek Cave. It was discovered by Jan Roberts and Dave Walker on July 20, 1975, and explored at that time up to an impassable constriction [3]. The cave's name was bestowed by Dave Walker at the pizza parlor following the first exploration of Windy Creek Cave, August 10, 1975. The cave was seldom visited over the next few years, when attention was concentrated on the much larger cave nearby. But on August 25, 1979, Kevin Allred noticed a slight air current blowing from the constriction that had stopped earlier explorers. Digging easily in the soft dirt, he soon came to a small chamber--then more dirt. Undaunted, he kept digging, and soon emerged into a space high enough to stand up, leading into a long, moonmilk-lined passage. Roberts Cave was mapped that day by the Allreds and John Hart for a total of 218 feet (76 m), 100 feet of it virgin [14].

Most of Roberts Cave is rectilinear joint-controlled maze passage, similar to the entrance maze of Windy Creek Cave. It directly overlies the latter by 35 feet at the entrance and roughly 55 feet near the end of the Moonmilk Passage. The two caves formed in the same limestone outcrop, apparently on the

same joint system, but there is no connection. A connection may eventually be made through an unexplored tight fissure, but this seems unlikely.

Roberts Cave is a relatively dry cave. Its biota known to date includes only a few trogloxenic insects: Mycetophilid fungus gnats (same species as in Windy Creek Cave); crane flies, Limonia sp.; and overwintering moths, Triphosa haesitata.

On October 13, 1979, Kevin Allred and Eckart and Wolfie Schmidt found another cave entrance which appeared to have considerable potential; this has not yet been entered [17].

Numbered references in the above refer to the reference list at the end of the "Historical Sketch of Windy Creek Cave."

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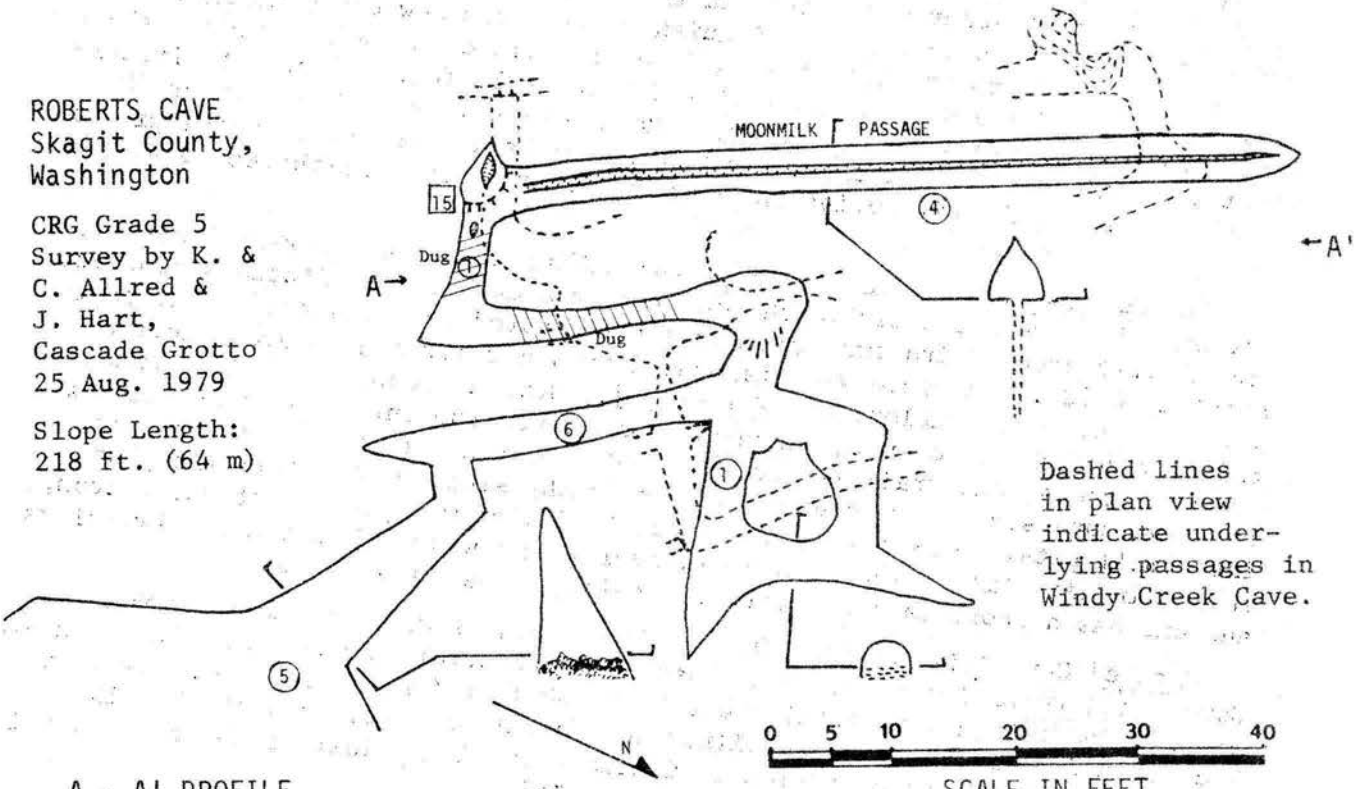
ROBERTS CAVE
Skagit County,
Washington

CRG Grade 5
Survey by K. &
C. Allred &
J. Hart,
Cascade Grotto
25 Aug. 1979

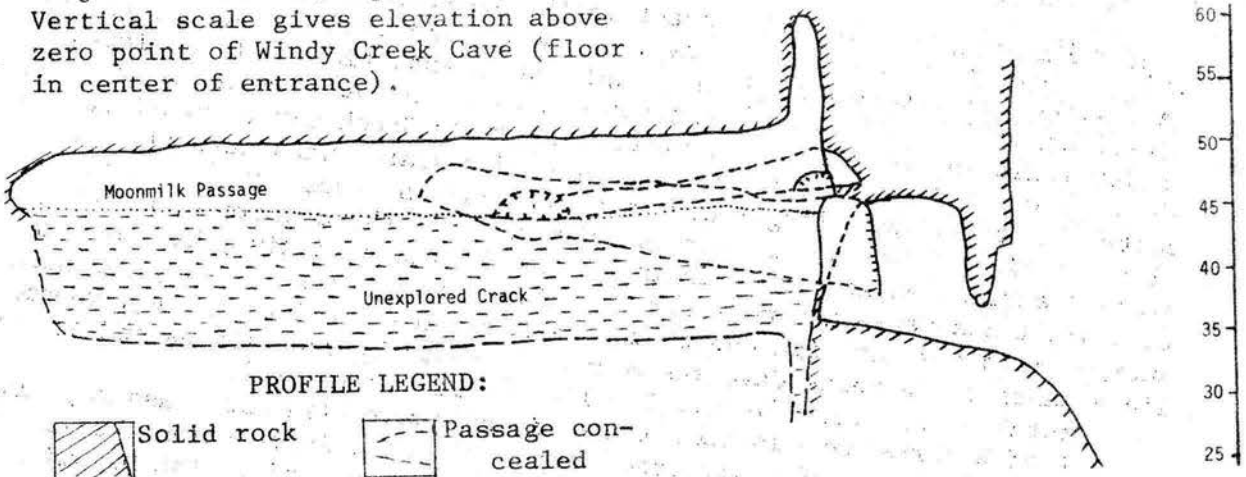
Slope Length:
218 ft. (64 m)



Dashed lines in plan view indicate underlying passages in Windy Creek Cave.

SCALE IN FEET

A - A' PROFILE
Projected view looking East.
Vertical scale gives elevation above zero point of Windy Creek Cave (floor in center of entrance).



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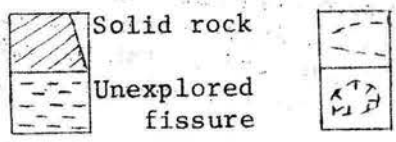

MESSAGE FROM THE CHAIRMAN: REFLECTIONS AND THOUGHTS

by Bob Brown

Last year I stated that our Grotto would be whatever the members make it. During the past year both old and new members have worked together to produce an active, responsible grotto. In order to maintain a healthy grotto, we must continue improving and be willing to make whatever changes are necessary. Let's take a few minutes and review some of the grotto's program elements.

Without money our Grotto could not function. Fundraising therefore is very important. Last year we spent more money than we brought in and were able to do this only because of a surplus left over from previous inactive years. The recent dues increase will help, but it is not the entire answer to our money needs. The potlucks and meeting donation jug help, but do not produce very much money. The sale of firewood at $100 per cord has been a real money maker but because of the lack of a flatbed truck we cannot expect this to solve our money needs. What, then, is the answer? All of the above methods, along with new ideas. I would like to see the grotto hold a garage sale this spring. All we need is a location and donations of sale items from the members. Also any member having a job which requires manpower should consider having the grotto do the work. We will be discussing fundraising at the April 15 meeting.

We all realize the importance of the Cascade Caver to the grotto. The last dues increase will provide the needed money, but the members must supply the content (articles, cartoons, etc.). I hope the members realize the number of man hours needed to edit, print, collate, and mail each issue of the Caver. If you want to improve the Caver, and ensure that it is mailed every month, you need to: pay your dues, provide material, and/or offer to help with the above work. There will be another trip report contest this year.

Last year produced numerous field trips. I believe our field trip flier program helped to get more members on more trips. We will continue this program with regular and associate members receiving these fliers. The high cost of gasoline this year will require better trip planning. We must carpool more often. Our trip coordinator is moving and Geary Sanders is the new coordinator. Between now and the April 15 grotto meeting, we will be developing this year's long term field trip schedule. Please give input. Last year the long term schedule worked fairly well; let's make it work better this year. Why not a few trips further away from the state--Montana or Utah?

Attendance at grotto meetings has steadily increased since last year. The NSS slide shows have been well received and will continue this year. If you have ideas on other programs, talk to Chuck Fair. Nobody has complained about meeting format, so I assume it's O.K. Any ideas on improving format are welcome. The coffeepot is now a permanent feature at meetings and you are encouraged to bring other snack type items. Remember, it's your meeting.

The grotto store now has many items for sale, as well as rental gear. We will soon purchase a large order of carbide lamps and parts. The money for this order ($300) came from last year's sales and the purchase of store certificates by members. Building a store is a slow process. Every item you purchase or rent, and every dollar's worth of store certificates you purchase, will help to improve the store. Also, any ideas that you have for improving the store need to be relayed to the storekeeper.

The cave register and information sign program started last year will expand this year. By the year's end we plan to have signs and registers in over 40 caves statewide. This program allows our grotto to do something for the caves we care so much about. It is a time consuming program and any interested

persons are encouraged to help.

We will have a more intensive cave hunting program this year. Aerial reconnaissance of northeastern Washington limestone areas will start soon. A cave hunting trip there is planned on the Memorial Day weekend (May 23-27). Western Washington members plan cave hunting trips to the Windy Creek, Black Mountain, and Monument 48 limestone areas. Cave hunting can be a lot of work, but it can also be rewarding. If interested speak up.

I hope discussing a few of the grotto's programs has stimulated both ideas and questions. We must ignore problems which have no solution and continue to make improvements when possible. The involvement of the members determines a grotto's health. Membership involvement is the reason for last year's success. If you want to be involved in a grotto program, have ideas or questions, speak up! REMEMBER, IT'S YOUR GROTTO!

Thanks to all the members who helped to make 1979 a successful year. I look forward to working with you again.

TRIP REPORT CONTEST

Again this year there will be a trip report contest, this time with a prize of $40.00 for the best report. Contest rules, briefly, are as follows:

1. A trip report is a narrative of a caving or cave scouting field trip. It must specify the date, people involved, and cave(s), if any, visited.
2. Editor reserves right to make minor changes before publication.
3. Secret caves inadmissible.
4. All reports printed from the Nov.-Dec. 1979 through Oct. 1980 issues will be eligible--editor and chairman will select three by three different authors.
5. At the December, 1980, meeting, the members will vote for one of these three; its writer will receive the prize.

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FIELD TRIP COORDINATOR

Geary Sanders is your new trip coordinator. His phone is 763-0361. Contact him first if you plan to, or want to, go caving.

THE CASCADE CAVER
207 HUB (FK-10) Box 98
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DON'T FORGET THE APRIL MEETING IS TUESDAY, APRIL 15th!