Vol. 15 #8

THE CASCADE CAVER

Official Publication of the
CASCADE GROTTO N. S. S.

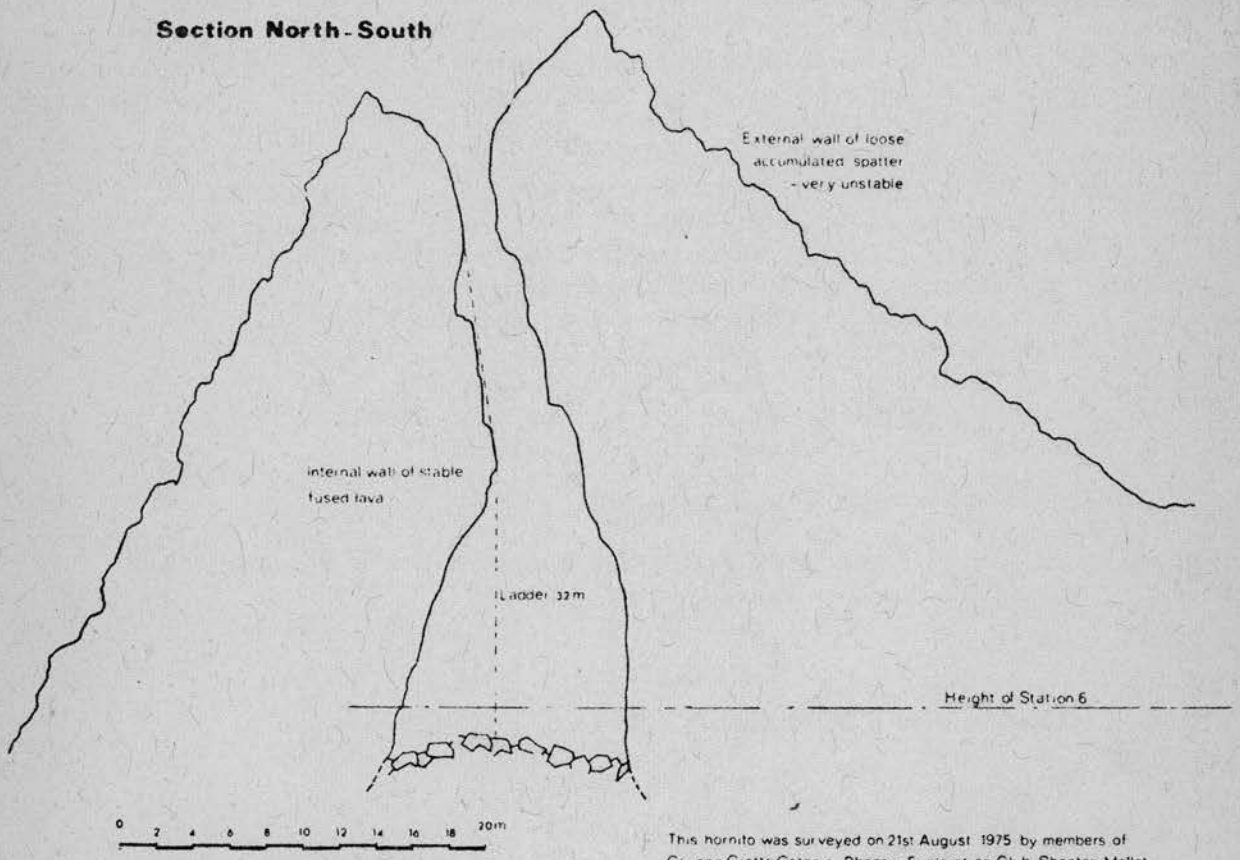
INTERNATIONAL JOURNAL OF VULCANOSPELEOLOGY

Volume 15 No. 8 Editor: Rod Crawford August 1976

POZZO DEL M. DUE PIZZI INF. 2 (N.W.).

LOCATION: Lat. 37°47'08" Long. 14°59'58" Alt. 2515m.
MOUNT ETNA NORTH, SICILY.

Section North-South

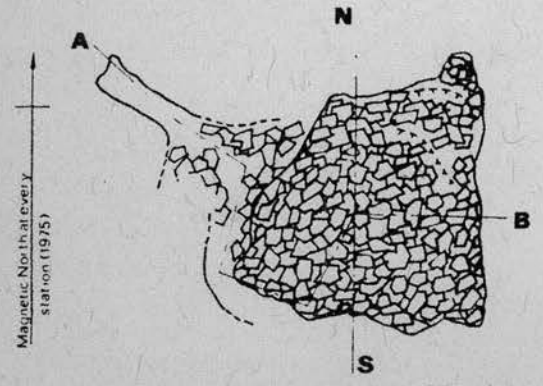


Scale: Plan & Sections.

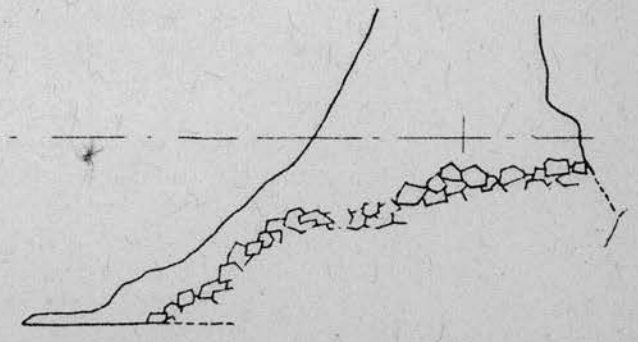
Survey originally drawn to the scale 1/200

This hornito was surveyed on 21st August 1975 by members of Gruppo Grotte Catania Phoenix Exploration Club Shepton Mallet Caving Club Hornito below St 6 surveyed with a Suunto compass (KB-14/360R) and clinometer (PM-5/360PC) and a 30m Fibron tape Hornito above mainly sketched

This survey drawn by C Wood on 7th January 1976



Plan of hornito below Station 6



Extended Section A-B

THE CASCADE CAVER is published ten times a year by the Cascade Grotto of the National Speleological Society. Subscription rate is $4.00 per year. Full grotto dues of $6.00 includes a subscription to the quarterly Northwest Caving. All payments should be made to the grotto treasurer, Chuck Coughlin, 6433 S. 128th Pl., Seattle Washington 98178.

COMING EVENTS

Almost every weekend. Paradise Glacier Cave. Call Charlie Anderson at work, 622-3848.
August 1, Sunday. Postponed to August 8 and perhaps later. Boulder Glacier, Mt. Baker. Call Bill Halliday, EA4-7474.
August 14-15. Trout Lake cave area for further exploration and mapping in the new system. Call Ed Crawford, 522-1203, or Rod Crawford, 543-4486 eves.
Camp Muir trip preparatory to Summit Steam Caves trip. Call Halliday.
August 14, Saturday. 1-day trip to Windy Creek Cave. Call Chuck Coughlin, 772-1170.
August 16, Monday. Regular meeting at the Hallidays', 1117 36th Ave. E, 8:00 P.M. Program: Charlie Anderson's gorgeous slides of SW U.S. caves.
August 21-22-23. Mount Rainier Summit Firn Caves. Call Halliday.
August 22. Black Mountain Karst, Whatcom Co. Postponed from Aug. 7th due to rain. Call Jan Roberts, 778-8503, or Greg Cady, 784-6608.
August 28-29. Official trip to Cave Ridge limestone caves scheduled for this weekend. If anyone is interested, call Coughlin.
September 1. DEADLINE for the September Cascade Caver.
September 20, Monday. Regular meeting, same time and place.
October. Alabama caving. Call Russ Turner, 284-1125.

NEW ADDRESSES

Barb MacLeod (temp.)	Kenai Lake YCC, Star Route Mile 23, Seward, Alaska	
Dave Jones	403 NE 124th Ave, Vancouver WA 98664	695-2671
Russ Turner	416 W Fulton St, Seattle 98119	284-1125

NEW MEMBER

Dave Ridley	8204 W 42nd, Tacoma WA 98466	564-2073

NEWS AND NOTES

The wooden ladder in the upper entrance of Gremlin Cave, mentioned in the last issue, was found on July 21 to be completely demolished. Vertical gear of some sort (such as a cable ladder) is now needed to use this entrance.

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Anyone glancing at the back cover of the last issue will see that our official trip list is about due for a revision. If you have any ideas, bring them to the August meeting (which is NEXT MONDAY, remember!).

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Ryan's Cave #2 is not, as reported previously, a synonym of Wildcat Cave. It is a synonym of Jennings Cave.

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Congratulations to the grotto on getting in a remarkable amount of material for this month's issue. Let's hope we can do as well next month.

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Editorial: Rain, rain, go away.

Cover: a hornito or vent cave in Sicily (illustration for abstract on p. 83).

VERTICAL CAVING TECHNIQUES: WHAT YOU NEED TO KNOW

by Russ Turner

Rope work is one of the most stimulating aspects of caving and for many cavers (the yo-yo) is sufficient reward in itself for going underground. Although the Northwest is certainly deficient in vertical caving, several of the more interesting caves require knowledge of vertical techniques. Many cavers delude themselves into thinking that vertical caving is perfectly safe. It isn't! Vertical caving is an extremely dangerous pursuit and anyone who thinks otherwise is a fool. Every time you drop a pit, you are risking your neck. Whether or not the risk can be minimized to an acceptable level depends upon the adequacy of your equipment, training, and experience. In too many cases these conditions are not met. Although most caving accidents (drowning, getting lost, etc.) involve the novice caver, an appalling number of the vertical accidents involve experienced cavers. Most vertical accidents result from ignorance (and are therefore avoidable) or from gross stupidity. The following is a list of the types of vertical accidents which have led to serious injury and/or death:

1) Falling while approaching the edge of a pit unbelayed, or falling after derigging upon completion of an ascent.

2) Falling as a result of using improper vertical techniques.

3) Falling as a result of equipment failure.

4) Injury due to exposure while on a rope or ladder.

5) Injury due to being hit by falling debris.

While climbing or descending, a caver is normally physically attached to a standing rope, but many stand near open pits without any safety. As a result, one of the most common causes of serious vertical accidents involves falling into an open pit. The danger of this form of accident could be largely eliminated by simply using a prussik or jumar safety from a harness to the standing rope whenever you are in the vicinity of a pit. This is particularly important after derigging upon completion of an ascent because there is a greater chance of losing your balance when tired and overheated.

There are an infinite variety of ways to kill yourself using improper vertical techniques. One common way is to depend upon an improperly tied knot, another is to have a carabiner in a critical position pop open. A host of others involve improper use of rappel and ascent equipment. Because of the great diversity of vertical techniques, it is impractical for me to discuss each method in detail. Instead, I will briefly discuss what you need to know in order to perform ropework safely.

First, and most important: the place to learn vertical techniques is on the surface, not underground. The surface is also the place to test new techniques and equipment. Before you drop your first pit you should have accomplished the following:

1) You should have your own harnesses and slings which fit and are comfortable enough to allow you to remain on a rope for several hours in event of an emergency. Using equipment that does not fit properly can greatly reduce your endurance.

2) You should be intimately knowledgeable of how your vertical system works and of its limitations.

Harnesses and slings. Make sure that the material you use is strong enough for the intended purpose. For my seat and chest harness I use 2" wide seat belt material (5000 lb. test) sewn with nylon thread (cloth thread is not as strong and deteriorates quickly). For sling material I use either 1/4" Goldline (1400 lb. test) or 1" x 3/32" nylon webbing (2000 lb. test). It is important to carefully inspect your harnesses and slings after every use and discard them as soon as abrasion is obvious. If you are going to use buckles on your harness, be very careful. Good buckles are hard to come by. The ones commonly found attached to seatbelt material sold locally are unacceptable.

Since it is always possible that there are undetected flaws in your equipment, I recommend redundancy. When rapelling, I wear both a chest and seat harness connected together. I use a prussik safety attached from my chest harness to the main rope and I connect my rappel equipment to my seat harness. When I ascend, I also wear both harnesses. My upper Jumar is attached to my chest harness and my lower Jumar has a safety sling which runs to my seat harness. As a result, any single sling or harness could fail without resulting in physical danger to me (I might, however, have a coronary).

Not all vertical accidents involve falling. Injury due to exposure can result from a caver's inability to reach the surface without aid. Although usually not serious, it can be extremely inconvenient and a lot of work to pull a caver out of a pit. It is important to learn how to make such a rescue quickly and efficiently without outside aid, since under certain conditions lengthy exposure can be deadly. Pits in which the descent involves going through water are particularly dangerous, since it is unlikely that someone hung up in the water would be able to survive long enough for outside help to arrive. Extreme care must also be taken when doing pits that contain vertical squeezes. If stuck in a vertical squeeze in which there is no air movement the concentration of CO_2 due to respiration can increase to lethal levels. Because of the increased possibility of encountering problems in returning to the surface, and the increased difficulty of rescue, it is advisable to avoid wet or tight pits until you have had considerable vertical experience.

Many pits contain loose ledges or other debris which can be dislodged either by a caver on the rope or by someone at the top of the pit. Under normal conditions cavers at the bottom can avoid danger by staying out from under the rope. A person on the rope, however, is highly vulnerable, so it is critical to avoid moving around at the top in order to minimize the probability of dislodging something. When you are ascending a rope, remove any loose objects from your pockets (i.e., spare carbide containers). Carry them in a pack which can be secured to your person. Loose objects in the pocket have a nasty tendency to work themselves out while you are climbing and go crashing to the bottom. This is particularly dangerous since it is unlikely that you will know that it has happened and, therefore, you cannot warn those below.

3) Although great speed in prussiking is unnecessary, you should have the stamina and experience obtained from surface practice to be able to ascend from a pit in a reasonable length of time (it should take you no longer than ten minutes to ascend one hundred feet).

4) No matter what system you are going to use for ascending, you should be proficient at using prussik knots, since they provide the simplest and

most dependable method of climbing a rope. Furthermore, you should always carry spare prussik slings with you since there are many situations where your primary ascent system might fail.

5) You should learn how to use a prussik safety for descending (and use one).

6) You should be able to come to a complete stop while descending and be able to switch to your ascending system. This of course necessitates having it with you.

7) You should be able to stop in the process of ascending and be able to return to the bottom of the pit.

8) You should be practiced at getting over severe overhangs.

9) You should be able to do all of the above in complete darkness. Many of the above techniques are quite difficult and require considerable practice to master.

Equipment failure can best be avoided by proper choice of materials and its proper maintenance.

Standing ropes. Since very few cavers utilize a belay for the standing rope, its breakage would be disastrous. It is therefore imperative to use a high tensile strength rope proven adequate for caving. For endurance, a minimum of 7/16" diameter is in order. Goldline, Bluewater II, and Samson are the most commonly used caving ropes. In terms of resistance to abrasion, handling properties, and cost, I have found Bluewater II to be superior. Goldline, however, has the advantage that it can be utilized as a belay rope in addition to a standing rope.

It is critical that you pad a rope if it goes over a sharp ledge. The tensile strength of a rope is meaningless if it is rigged in such a fashion that it is subject to abrasion. I generally use heavy canvas packs for padding since they can be easily positioned with slings (sharp ledges can occur anywhere in a pit). Since in most pits it is impractical to pad everywhere the rope touches the wall, it is important to carefully inspect the rope for abrasion after every use. When excessive mud has accumulated, the rope should be washed with cold water. A mild soap may be used.

Rigging is an art form the object of which is to position the rope to maximize ease of access to the pit while at the same time attempting to minimize damage to the rope. Knots which bear weight should be avoided in the rigging process since they result in damage to the inner fibers of the rope. It is always advisable to use a secondary rig point in addition to the primary rig. NEVER! trust a bolt unless you know its history... Finally, if someone else does the rigging, inspect it carefully.

The purpose of this article is to point out the dangers that you are continuously exposed to when you get into vertical caving. I have outlined what you need to know in general, and in future articles I will discuss specific vertical techniques in detail. I consider it critical that you are prepared physically, technically, and mentally for vertical work. I hope you will consider my suggestions carefully. Unfortunately, I have observed very few "experienced" vertical cavers who are capable of executing the minimum standards that I have discussed. There are many who probably feel that I am overly cautious. Well, I go under the assumption that neither my reason nor my equipment are infallible when exposed to the rigors of the cave environment, and I want the maximum insurance. I learned proper vertical caving by trial and error and somehow managed to live through the experience. You may not be so lucky.

TRIP REPORT SECTION

Robber Baron's Cave, San Antonio, TX
May 31, 1976
by Stan Pugh

Having heard of this "famous" Texas cave from the Richardsons, I was looking forward to the "infamous" entrance squeeze.

The cave's location seems unique to us in the Northwest as it is only 150 feet from a very busy street in the suburbs of San Antonio. The 100 ft. diameter sink hole has about 20 foot high walls; however, much of the bottom has been filled with all kinds of junk...alias Rubbish Cave near Concrete.

Upon stepping between metal roofing, stones, and smaller rubbish, one finds himself at the bottom of the 5 foot diameter by seven feet deep smaller sink hole in the bottom of the bigger hole. At the bottom of this at 90 degrees is a nearly horizontal passage varying in size originally from 8 - 18 inches high by 18" to 36" wide. I got as far as 12 feet into the passage when it became too shallow for further entry. Heavy rains had washed clay, bricks, and rocks into the passage, nearly plugging it. Steve (a neophyte) and I worked for over one hour pushing the debris into the cave past the narrow point. We finally made it, but had to leave one member at the entrance because of his size. Once through the 16 foot entrance tunnel, the cave is primarily narrow (3-6 feet) walking passage. The ceiling is as high as 18 feet and as low as 2 feet. The entire cave is solid clay, nearly devoid of speleothems. Compared to our caves, this cave is extremely complex. There are side passages everywhere, as the first visit was spent finding short "dead ends". We left the cave after 40 minutes since we had to keep the exit time we had made with our "big" friend.

On our next trip we found the lead "that went". After spending nearly an hour and a half checking out innumerable leads we went further than I felt we should with two "neophyte cavers", so we returned to the entrance. The cave's complexity makes Deadhorse look puny. I later learned from the Alamo Grotto secretary that the cave has over a mile of passage. His invitation to go with them on a Saturday tripwith a 160 foot drop and three miles of walking passage had to be turned down as I was leaving for home...not to mention my acrophobia.

Without a doubt, every town should have a Robber Baron's in it!!

Windy Creek Revisited
by Chuck Coughlin

Trip 1 - July 3

Russ Turner, Pakawon Duvall, Ed Crawford, Bill Halliday, myself, and packs crammed into the Rig and drove up Bear Creek Road in the Concrete area headed for Windy Creek Cave. We got as far along the road as the 2500 foot level where we were stopped by a washout. This meant there was approximately 3 miles of road to hike along to reach the pass at the south end of the valley separating Dock Butte and Washington Monument. At the washout we met two carloads of people from Xanadu Grotto, so made the hike with them. Since I was the only member of the party who had been to the cave previously, my advice was repeatedly sought for route finding (which was a mistake!). After about 3 hours we came to the end of our road. A spectacular view of the Monument at that point proved we were on the wrong road, but allowed us to locate our position on the map. I had missed a turn off, and we had gone about 1 1/2 miles too far. Recovery to the west rim of the valley took

several more hours and the remaining strength of several of our party. In order to keep our people together we were forced to turn back, but were able to scout the proper route on our return for next time.

Trip 2 - July 9

Russ Turner, Dave Mischke, and I left Seattle early enough to be at the Bear Creek Road washout by 6:30 AM. Now that we knew the correct road we were able to reach the saddle in 1 1/2 hours hiking in a steady drizzle. From here it took another 3 1/2 hours to find the cave. Thinking the entrance higher on Washington Monument than it actually is, we wasted time and energy on a difficult climb and long steep traverse. To find it more easily next trip we took sightings from the entrance of prominent landmarks. These tend to place the entrance on Forest Service property, and farther north than I previously suspected. [Ed.'s note: Danner's limestone book gives the exact location of the karst area and the relation of the cave to this is known]. In 5 hours in the cave, Russ and I managed to map the Flatworm Passage and another hundred feet of the stream passage. This brings our survey of the main passage to 678 feet. Total surveyed passage to date is 830'. The Flatworm Passage loop surveyed to closure within 2 feet out of a total loop distance of 180'.

After the mapping session I checked out some leads in the muddy crawlway section off the Breakdown Room. One inviting virgin crawl that Bill Capron had discovered on a previous trip led to a section of what seemed to be promising passage, but dead ended after about 40'. Three other leads in that area remain. As they are tight crawls and I was alone at this point, I didn't feel it was prudent to push them.

The trip back to the car took 3 1/2 hours. It was 8 PM.

Trout Lake, 25-26 July
by Rod Crawford

There had been much talk about a trip to the Mt. Adams lava tube area, via the Randle road, this weekend at the July meeting. In order to briefly join the festivities, Les Nelson and I started out from Seattle with ouigee Joyce Thompson at 1:30 on Saturday. At 6:30 we arrived at the norther edge of the lava flows.

First order of business was to check out another of my likely-looking new sinkholes. Attentive readers will recall that the last of these proved to be a small pond. This one was not quite a pond--just a wet spot with low bushes and a little standing water. However, some of those things really are sinks, so there is still some hope.

Having an hour and a half's daylight left, we stopped to confirm the location of Flashcube Cave, discovered on the last trip. Having failed to locate it, Les and I walked back through the woods toward the car and found another cave. This one was a small circular sink with an 11 foot vertical drop. A yellow ribbon hanging by the only penetrable lead--perhaps left by loggers--indicated that we were not the first to visit the cave. Neither of us was really equipped to crawl but I just couldn't resist the temptation of passage unexplored by cavers. So, I proceeded to crawl over some mud and one awkward breakdown block into a slanting stoopway.. Suddenly a horrendous noise proceeded from the passage ahead of me--a high-pitched, strident "eenk!". After some trepidation I remembered that this is just what a Pika sounds like. Since there were pika scats all around, I felt confident in my con-

clusion and proceeded. Soon I could stand up. The pika retreated down the passage ahead of me, squeaking angrily. I followed, noting several side leads. Finally, I came to a spot that looked as if it was passable primarily to the pika. On returning, I tried two of the wrong side leads, looking just like the one to the entrance, before I found the right one. I later decided to name the cave Squeaking Pika Cave.

Two additional sinks appeared before us before we finally reached the car. The second appeared penetrable, but it was getting dark, so Clearcut Cave (named by Les) remains unexplored.

We soon arrived at the Deadhorse Cave campsite, but strangely there was nobody there. Les hungered for the company of other cavers, so we proceeded to the Trout Lake Community Park, where we found the Pughs and Nieuwenhuis', and camped with them. None of the others ever turned up.

Sunday morning Les and Joyce deposited me at the area of Saturday's discoveries, then went to join Luurt and Stan in a visit to Tooth Cave. Meanwhile, I completed a surface survey connecting Clearcut, Squeaking Pika, Flashcube, and a small unnamed cave, along with one blind sink which appears--from its position and squeaks--to be the pika's rear entrance. At least 5 more blind sinks in the area remain to be connected, and additional caves probably exist. This system appears to be parallel to the nearby Smoky Creek System, and to consist in itself of three parallel tube systems (!). It is much downtube from the Potluck System, surveyed the previous weekend by the Nielands and Bill Halliday.

Les and Joyce joined me at 2:30 and, after relaxing from the heat of the day in a small 44' tube segment, we brushwhacked over to Flashcube Cave for exploration and mapping. First we surveyed into an upper passage that I had thought ended in a lava seal. Having crawled with the tape to the supposed end, I found that it was no such thing--just a pillar. Fifty feet further the crawlway divided, and by then it was almost time to leave. I explored one branch and found at least three more leads before rejoining the original passage at a point I hadn't noticed coming in. And this leaves the more promising lower passage as yet unpushed.

The trip home included a record (?) time of 1 1/2 hours from the cave area to Randle.

The map of the new system will appear in the Caver after it is (hopefully) completed later this summer.

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Caves of Zanzibar -- a Further Note
by Bill Halliday

In followup of my previous note on caves of Zanzibar in the Cascade Caver, I recently obtained a copy of the 2nd edition of G.H. Shelswell-White's A Guide to Zanzibar (Zanzibar, 1934, Government Printer, 74 pp.). This rare paperback guidebook gives information on several karstic locations which I have not seen mentioned in later works. 5 miles south of Zanzibar city is a natural "cave-well" which then supplied extensive baths adjoining Chukwani palace. Mangapwani Cave is mentioned on page 60; the text has been extensively plagiarized in later guides. Nine miles south of the city, a cave halfway up Haitajwa Hill "often contains rags, potsherds, and other offerings to the spirits [and] is worth a visit." About 7 1/2 miles SE of the city, the River Mwera, "the largest in the Island", disappears underground, at a point "a five minute walk" south of the road, at Kibonde Mzungu. Caves near Chwaka and Kufile are also mentioned in the same words used in later guides.

Wood, Christopher, 1976. LAVA CAVES AND A CONFERENCE (Seminario Sulle Grotte Laviche, Catania, August 1975 : A Report). British Cave Research Association, Bulletin 12, May, pp. 22-26.

"Mount Etna is in a state of almost continuous activity, as even the most casual observer lower down the slope can see from the constant plume of white smoke hanging over the summit. Sicilians look to Mount Etna for its beauty and grandeur, and its offer of such recreational pursuits as walking, camping and skiing. Cavers in Sicily are no exception, for being without extensive areas of limestone, they turn to their volcano in pursuit of their sport locally, and have here been very successful in the discovery of over 150 caves. Principals in the exploration of these caves are members of the Gruppo Grotte Catania. As a section of the Club Alpino Italiano, whose centenary year fell in 1975, Catanian cavers sought to celebrate the anniversary of the parent club at the end of last August with two weeks of caving on Mount Etna, culminating in a conference ('Seminario sulle Grotte Laviche') on lava tube caves both internationally and at home.

"...This is not to say that lava tubes do not occur in aa, for many small lava tube caves were seen during our short stay in this type of lava. One particular aa flow was erupted in 1923 from a fissure at 1880 m, lying just above our camp. This particular flow is famous for its deep lava channels, which on close examination yielded lava tube caves of varying shapes and sizes in their walls, illustrating well the genetic relationship between open and closed lava channels. The lava tube caves in the 1614-24 lava flow were much bigger, and the longest was visited by us first because of its close proximity to the forest track which skirts the mountain from Villagio Turistico Mareneve (incidentally, providing one with magnificent vistas to the north). Grotta dei Lamponi lies at 1728 m in that part of the 1614-24 lava flow known as the Lava del Passo dei Dammusi, and although reputed to be Etna's longest cave, it had never been surveyed in its entirety.

"...Principal interest was in the enormous lava flow of pahoehoe basalt erupted between the years 1614-24. This particular flow was the only major pahoehoe lava flow on Mount Etna, most others being of the aa basalt variety.

"...Grotta dei Lamponi was of especial interest to us because the very end of the cave lay 55 m below the surface of the flow.

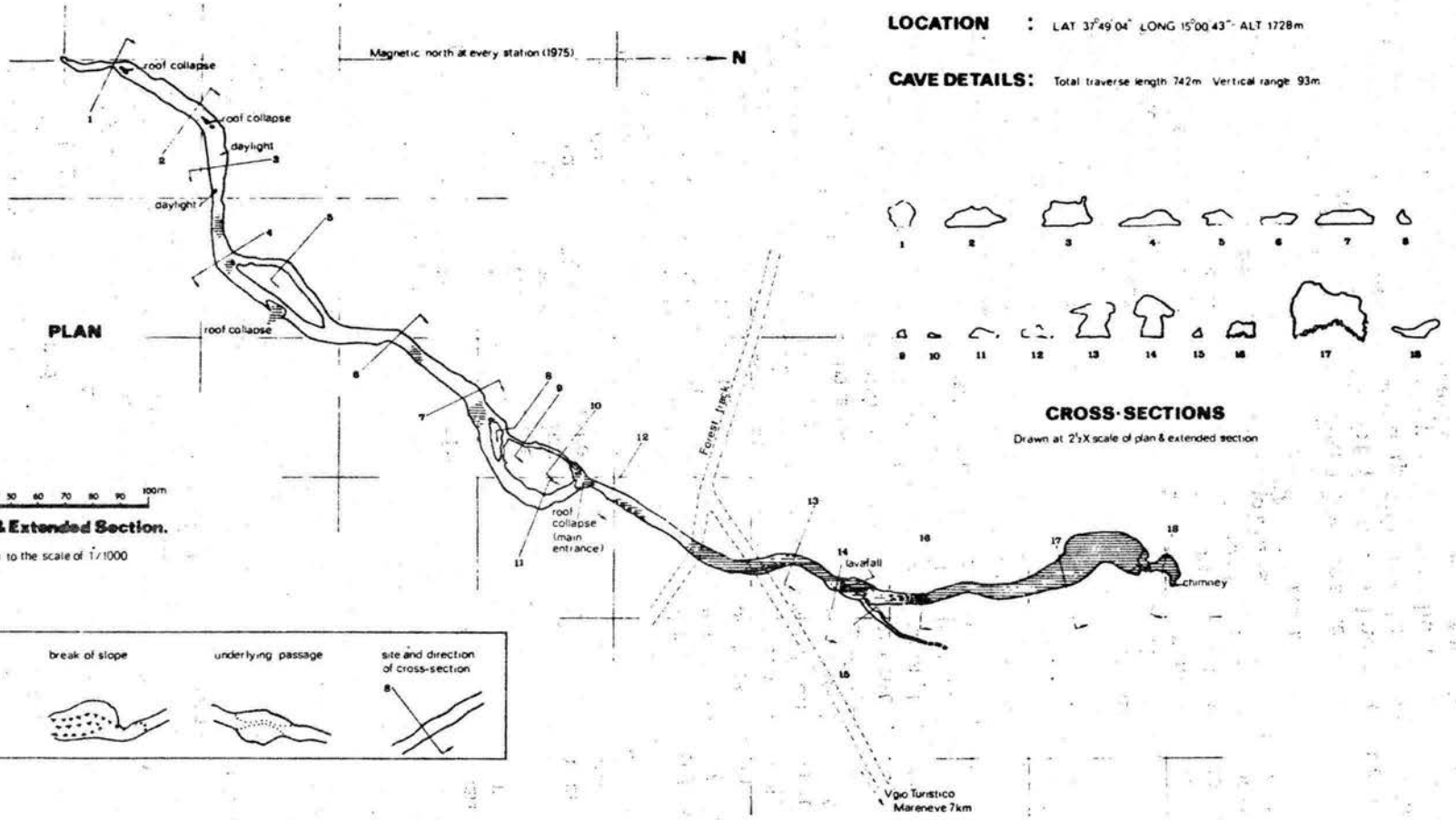
"Another cave visited lay at a height of 2030 m in the 1614-24 lava, 4 km WSW of Grotta Dei Lamponi, and because of the ice partly filling it, was known as Grotta del Gelo. It had an imposing entrance and a magnificent layering of the clear ice at the bottom of the cave. Still higher in the same flow at 2200 m was possibly the best preserved and most classically formed lava tube cave we visited on Mount Etna, Grotta Aci. Over 400 m in length, it had a tiny entrance roof collapse through which a 10 m ladder was slung. It was practically all uncollapsed tube, of perfect form, showing varying floor features with changes of gradient.

"Another highlight of the week was the descent of a hornito. In fact it was intended to descend both the hornitos known as Due Pizzi, located at a height of 2515 m, but because of problems in belaying the ladder, and because a sketch survey was made of the northwest hornito [reproduced on cover--ed.] we were underground until early afternoon, and the attraction of a new lava tongue trundling past us not 250 m away took any ideas of exploring the second hornito from our minds.

GROTTA DEI LAMPONI, MOUNT ETNA NORTH, SICILY.

LOCATION : LAT 37°49'04" LONG 15°00'43" ALT 1728m

CAVE DETAILS: Total traverse length 742m Vertical range 93m



PLAN

CROSS-SECTIONS

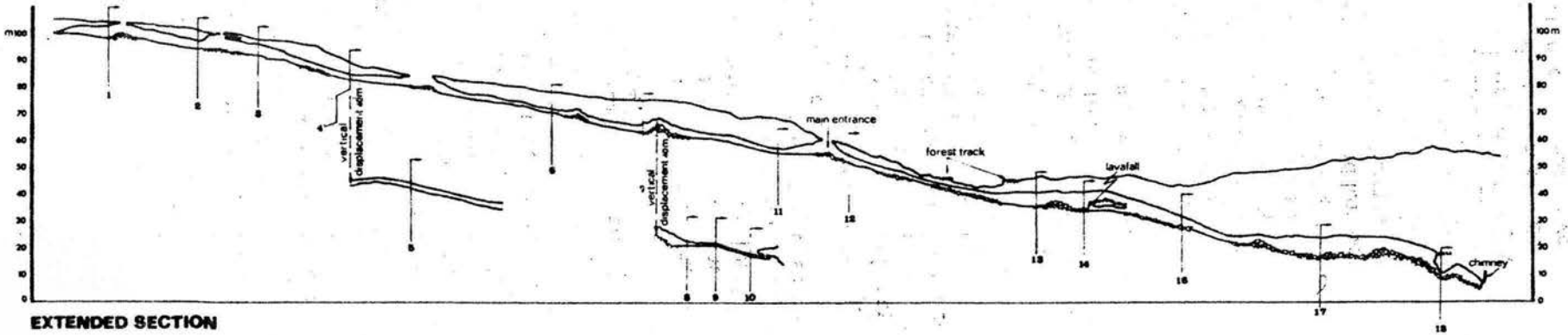
Drawn at 2½X scale of plan & extended section

0 10 20 30 40 50 60 70 80 90 100m

SCALE: Plan & Extended Section.

Survey originally drawn to the scale of 1/1000

KEY



EXTENDED SECTION

This cave was surveyed on 22nd / 23rd August 1975 by members of Gruppo Grotte Catania Shepton Mallet Caving Club Phoenix Exploration Club using a Suunto compass and clinometer (types KB-14/360R & PM-5/360PC) and a 30m Fibron tape Magnetic survey techniques were employed throughout This survey drawn C Wood 28th December 1975

The hornitos on Mount Etna were the largest I had ever seen, towering above the surface of the flow by over 30 m. On eventual descent we found the ladder pitch to be 32 m, though the full depth of the central shaft was 50 m. At the bottom was a large chamber floored with boulders through which one could climb to find the remnants of a tube 10 m lower.

"Returning off the volcano, the 'Seminario sulle Grotte Laviche' was held in the Dept. of Biology at the University in Catania. It was extremely well planned and executed, and when the papers are published later this year they will represent the most up-to-date review on speleogenesis in lavas. The morning of the first day (27 August) was a greeting to participants and it was an opportunity to see films of Mount Etna.

"This was followed by a paper written by Prof. Alfred Rittmann (Inter. Inst. Vulcanology, Catania) on 'La formazione delle grotte laviche', in which he discussed the physical characteristics of flowing basalt, and the role of viscosity in tube formation, and firmly put the conference in a scientific frame of mind. My own paper followed on 'Factors contributing to the genesis of caves in lava', in which it was explained which variable factors contributed to cave genesis, which could be taken up for measurement in the field, and the need of comparative study.

"Dr. L. Villari (Inter. Inst. Vulcanology, Catania) on behalf of Dr. D. W. Peterson and Dr. R. A. Swanson, of the Hawaii Volcano Observatory, read a paper which sought to add more information to, and explain in more detail, the paper written by these authors for Studies in Speleology ('observed formation of lava tubes during the 1970-71 eruption of Kilauea Volcano, Hawaii'). As one would expect, excellently produced and highly pertinent photographs were shown of tubes in formation, and views on lava tube genesis were discussed in the light of recent work by other authors. This represented a most constructive discussion. Then came the paper I have particularly been waiting for, that of Prof. Cliff Ollier, from Australia, on 'Lava caves, lava channels and layered lavas'. Prof. Ollier, with M. C. Brown, published in 1965 a paper which was the first major scientific interpretation of lava tube caves ('Lava caves of Victoria'). The theory they put forward in that paper linked tube formation with internal shearing of thick lava flows. It had been accepted by many authors as explaining many of the features of lava tube caves, but due to certain criticisms which could be made of the theory, I was particulary interested to hear if any new evidence would be presented. Interestingly, Prof. Ollier did believe his theory still relevent in the light of new work on lava tube caves, and explained in what context. Because of the short discussion that followed, a note by Prof. J. Montoriol Pous (Univ. of Barcelona) and J. de Mier (Club Montanes Barcellones) was not read, though these authors were unable to send a full paper. This was a pity, for they have been leaders in the exploration of many of the world's longest lava tube caves, and it would have been interesting to hear their views. I did not really catch the gist of the paper read by Giorgio Pasquini (Univ. of Genoa), because my interpreter (kindly supplied by Gruppo Grotte Catania) leaned over to whisper after a few minutes "He's mad!' (though I'm sure in the nicest possible way), and refused to say more. It certainly led to animated discussion, none of which I understood. When things calmed down, a short paper by Dr. Ronald Greeley (University of Santa Clara, California) was read, entitled 'Lava tubes on other planets', showing us the evidence that lava tubes may exist on the lunar surface, connected perhaps with sinuous rilles which may be partly collapsed tubes.

"A short paper followed by A. Lucrezi (Gruppo Speleologica Aquilano) which was a bibliographical history of lava tube caving, and the conference that morning finished with Fabio Brunelli and Blasco Scammacca (Groppo Grotte

Catania) discussing the variety of caves on Etna, with many good photographs.

"After the usual late start, the afternoon session started with Prof. D. Caruso (University of Catania) discussiong 'La problematica biologica delle cavita nelle lave'. This was followed by a paper on archeological remains found in lava caves on Mount Etna by A. Larosa and E. Piccone (Centro Sicil. di Iniziativa Archeol., Siracusa), and Prof. S. Cucuzza Silvestri, Director of the International Institute of Vulcanology in Catania, gathered together the points raised in the conference, illustrated these with his own observations, and opened a general discussion. Topics ranged from ice in caves, airflow, hydrology, pseudokarst and lahars. The conference was closed in true caving style at the local Yachting Club restaurant, after a very successful two weeks of activities."

-----Abstracted by W. R. Halliday.

* * * * *

Verhoogen, J., 1948. Les éruptions 1938-1940 du volcan Nyamuragira. Institut des Parcs Nationaux du Congo Belge. Exploration du Parc National Albert. Missions J. Verhoogen (1938 et 1940). Fasc. 1, 1-186, 27 pl. [U. W. Library 570.9675/In7eav/no. 1].

Nyamuragira (Nyamlagira) Volcano in the Eastern Congo erupted continuously from about January 1938 through June 1940 from a vent on the west side. The resulting flow of pahoehoe lava extends all the way SW to Lake Kivu, a distance of about 15 miles. Verhoogen observed and studied this flow closely with all the best equipment of the time.

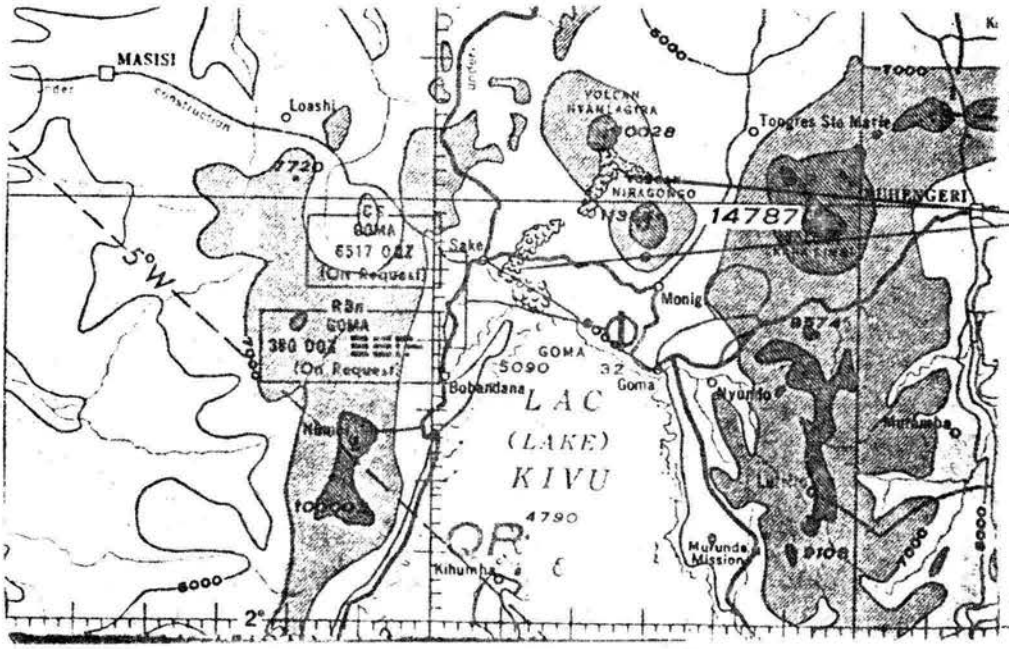
There are a number of references to lava tube formation, The following, p. 57, recounts observations of May 12, 1938.

"The torrent of lava is mintained almost entirely underground. Thirty metres downstream from the source, an opening in the arch of the tunnel permits one to see the lava flowing, and whence the discharge appears smaller. It exists equally in openings in the arch upstream of the old bridge, and downstream of it.

"The mechanism of formation of the tunnel appears to consist in a series of repeated overflowings. At each overflowing, the lava which is left on the edges of the torrent narrows the bed more and more, up to the point at which the opposing banks come to touch. The vault of the tunnel does not comprise a "crust" under which the lava continues to run; it is formed of the stacking of outflows which themselves are spread out to the right and left of the axis of the torrent. The lava in the river returns to the same level, whereas the vault of the tunnel, which is several metres above the river, marks the maximum level attained in the course of the floods. At each flood, the outflows flow laterally and are still easily seen, the orientation of the ropy surfaces indicating clearly that the exposure of these outflows forms perpendicularly to the direction of flow of the lava river."

"Translation" by the editor. Some phrases are translated rather conjecturally, and should not be taken for granted. This extract seems to support the Harter and Harter "semitrench" theory. Several spectacular photographs supplement the author's account. A map showing the location of the lava flow appears on the next page. Perhaps our African colleagues will be interested.

Abstracted by the editor.



VICINITY OF LAKE KIVU, EASTERN CONGO

Showing the location of the 1938-1940 lava flow.

From: World Aeronautical Chart,

Scale 1:1,000,000.

* * * * * * * * * * * * * *

Sun never shines on favorite place

By BOB BECK
Columbian Staff Writer

The favorite place of Charlie and Jo Larson is a world where the sun never shines.

It's a world of stalactites and stalagmites, of bats and giant crickets, of fish born with no eyes.

Charlie and Jo Larson, longtime Vancouver residents, are speleologists, nationally known authorities on caves. The Larsons, of 13402 NE Clarke Rd., have just returned from Morgantown, W. Va., where Larson was elected president of the 4,500-member National Speleological Society at the organization's annual convention.

"Exploring caves is not a thing you can learn to like," Larson admitted, in explaining his own love affair with the world beneath the surface of the earth. "You just naturally love it, or you hate it."

The Larsons' interest in speleology dates back to 1964, a year when fishing was their main form of recreation. Someone gave them a book, "The Caves of Washington." They decided to look at a cave near Trout Lake — and that was it. "We never went fishing again," Larson laughed.

Larson is a former industrial engineer who gave up that career to become a professional photographer. His photographs of caves grace many national publications and books, and he and Mrs. Larson are coauthors of a book, "Caves of Oregon."

Mr. and Mrs. Larson admit the Northwest isn't all that great, from a cave standpoint. All the caves in Southwest Washington are lava tubes. There are some limestone caves, which have the most unusual formations, in northern Washington and southern Oregon, they said.

"Missouri is the real cave state," Larson said. "There are more than 3,000 caves there."

Locally, he said, the most popular cave is the Ape Cave, just south of Mt. St. Helens in Skamania County. This is considered the second longest lava tube in the United States. It was believed the longest until the recent discovery of a longer tube in Utah.

The local chapter of the national society is the Oregon Grotto. Larson said members of this Grotto spend their weekends at the entrance to the Ape Cave, helping guide tourists and answering questions on the lava tube and caves in general.

"We get some odd questions," Larson said. 'One person wanted to know how much of the cave was underground. Another asked how thick the walls of the cave are."

Larson said he and his fellow speleologists are hesitant to publicize the location of the caves they explore, because there is so much vandalism and destruction when hordes of people pour through a cave. "It's a very fragile environment," he explained. "Features that took nature thousands of years to create can be destroyed in a few seconds."

All the caves of the area have not yet been discovered, Larson said, although new ones are getting hard to find. The Larsons themselves discovered one cave. They named it the Prince Albert, because an old tobacco can was found near the entrance. "We try not to give names to caves that will identify where they are located," Larson said.

Although the story of Floyd Collins, a speleologist who was trapped in a cave in the 1920s and who died a lingering death there, gained national publicity, cave exploring is not all that dangerous, Larson insisted.

Those with the desire to crawl through caves should never go alone, he said. A group of three is ideal, as one can go for help and another stay with a trapped or injured person.

"During the past five years, we know of only two experienced cavers who have been killed," Larson said.

From:
Vancouver
Columbian,
8 July 1976
p. 2.

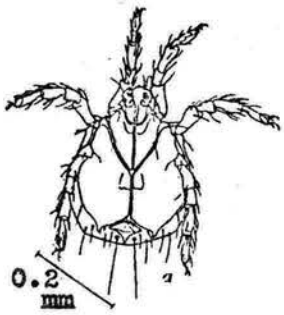
THE BIOLOGIST'S CHAMBER: PHREATOBITES
by Rod Crawford

The name "phreatobite" was first proposed in 1946 by the Hungarian C. Motaş. It refers to the aquatic animals that inhabit the phreatic or ground water zone, the strata below the water table in which ground water moves, and are found nowhere else. The term is designedly similar to the term "troglobite", referring to animals found only in caves. To a considerable extent, the two groups overlap.

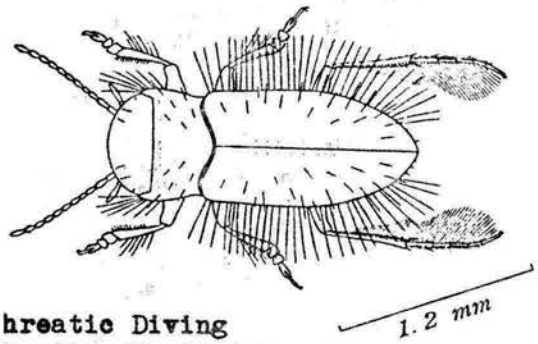
The habitat of the phreatobites is called the "interstitial medium". It consists of the tiny water-filled spaces in phreatic sand and gravel beds, and of the crevices in fractured or jointed bedrock in the phreatic zone. Naturally, it is suitable only for aquatic animals. The water characteristically is slow moving and has a low content of oxygen and organic matter. But life is able to adapt to exceedingly inhospitable conditions, and a surprisingly great variety of phreatobites are known from most parts of the world. Ground water is everywhere and it is probable that the total extent of the phreatic habitat is comparable to that of the earth's surface (barring the oceans). But few people are aware that, in addition to the living and interacting "ecosystem" around them, there is a whole separate one far beneath their feet.

The conditions of the phreatic environment share many characteristics with those of caves. The most obvious is of course the total darkness. The second is absolute protection against influences of air, weather, and climate. The temperature is constant near the annual average for the surface above. There are instances in Europe of at least part of the phreatic fauna surviving the glaciation of an area, due to the protection afforded by their environment.

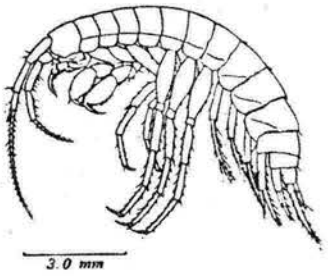
VARIOUS PHREATOBITES



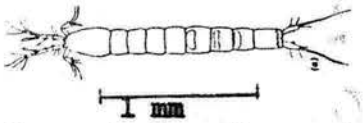
Phreatic water mite



hreatic Diving Beetle, Morimotoa phreatica (Japan)

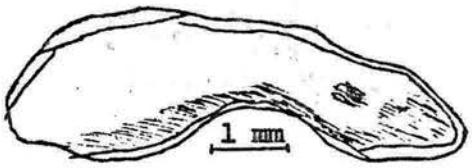


Amphipod



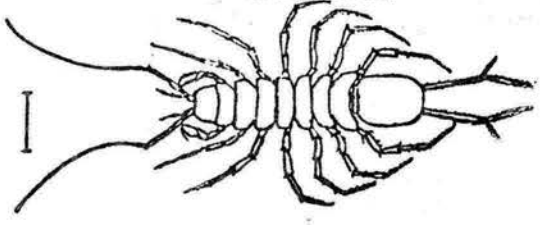
Copepod, Parastenocaris

CRUSTACEANS



Phreatic (?) flatworm, Kenkia rhynchida (Malheur Cave, Or.)

Isopod, Asellus



Phreatobites have adaptations to these conditions (blindness, depigmentation, slow metabolism) similar to those of troglobites. The basis of phreatic life is, of course, organic matter (mostly dissolved) which has made its way down from the surface. Some other nutriment comes from places where the phreatic zone merges with surface waters, or with the sea.

These places are also among the sites where new species can begin to colonize the phreatic waters. Colonizing species are generally pre-adapted by life in the interstitial medium of the sand and gravel on river bottoms and the continental shelf. Indeed, many modern-day freshwater phreatobites are descended from marine interstitial species left behind from times when the sea covered areas that are now land. Another source of colonizing species is the tiny streams found several centimeters below the surface in areas where a layer of silt or clay is overlain by a small amount of humus or turf.

Sampling the phreatic fauna presents great problems for the biologist, and in many areas this fauna is almost unknown. The only opportunity for such sampling occurs at points where the phreatic zone is accessible from the surface--in caves, springs, and wells. The geographic distribution of phreatic species, and which accessible habitats they inhabit, depend on many factors which are not well studied for particular species. Among them are the size and habits of the animals, the geologic structure of the area, and the patterns of flow of the ground water. Some species are wide-ranging, others very restricted. Many, but by no means all, occur in suitable caves in their native region. When they do, they are troglobites as well as phreatobites. Troglobitic salamanders, larger fish, and a few others seem to exist only in caves and have not invaded the interstitial medium to any extent.

More work has been done on the phreatobites of Europe than of all the rest of the world. A smaller amount has been done in Japan. Despite a few recent studies, the phreatic fauna of the United States remains largely unknown except in cave areas. The use of plankton nets in wells has been especially productive in Japan, and perhaps the technique would serve here as well. I plan to acquire such a net and test it in sampling of cave streams.

The phreatic fauna contains a few examples of such unusual beasts as tubeworms and leeches, but most species belong to the following groups: protozoa (one-celled animals), flatworms (see figure), oligochaetes (group to which earthworms belong), insects (a few water beetles etc. in Europe, Africa, Japan), water mites, and crustaceans. The last two groups are by far the most numerous, with known species in the many hundreds.

In the Northwest, three possibly phreatic flatworms are known. The first, Kenkia rhynchida (see fig.) of Malheur Cave, Oregon, is definitely a troglobite but none have been recovered from wells. On the other hand, no collecting in wells has been done in that area. Two others, in Deadhorse Cave and Windy Creek Cave, Washington, are of uncertain status. No phreatic mites are recorded from the Northwest, but I feel sure they must exist. They are just too small to be noticed, and must be collected with a plankton net or by sorting subterranean sand, etc. Two of the three major groups of phreatic crustaceans--the amphipods and isopods (see figures)--occur in the Northwest. One or two of the amphipods were found in wells, the rest in caves. The amphipod Stygobromus elliotti occurs in lava tubes on both sides of the Cascades, and so presumably occupies all the ground water in between. The total distribution of S. hubbsi of Malheur Cave is unknown but is probably rather extensive. All our phreatic isopods belong to the genus Asellus. They are common in the Deadhorse Cave stream. Phreatic copepods should occur here but are not yet known, probably because of their small size.

Elsewhere, a few species of small cave minnows are able to move freely in phreatic waters. One that Ellen Benedict found in Malheur Cave lake might be an example, but conclusive information is lacking.

EASTERN WASHINGTON CAVE RUMORS

The following selections are extracted from previously unpublished reports by Tom Miller, written in 1970 and 1972. By the way, where is Tom nowadays, anyway?

In a note dated August 1970, Tom says: "Have been hearing persistent reports of a lava tube in the Spokane vicinity. Now a friend says he knows someone who can lead us to it. This someone claims a large pit is in front of the entrance. Another spelunker says he also knows of a lava tube around Spokane."

The following is dated October 1970: "I've heard a couple of new rumors concerning the Omak region.

"One, about 3 1/2 miles SW of Albright Cave, is supposed to be a large sink about 30 feet in diameter and 30 feet deep, on the left side of the Omak to Conconully road at the base of Happy Hill (sec. 21, T35N R25E).

"Two, a service attendant at a (the?) Texaco in Omak claims there are deep pits in the Toroda Creek area, near Curlew. His family apparently lost a dog in one when he was a boy. That was all the information we could get out of him--he wasn't too communicative. [This one was later debunked].

"Our trip to Albright Cave was interesting, but it's too bad about the vandalism in it. Vandals should be forced to go through Misery Crawl as punishment.

"On our way back to the car we stumbled on a sink comparable to the Albright Cave sink at the base of the hill, NW sec. 19. We figured it was probably one of those that Bill [Halliday] mentioned in his book. It looks promising.

"We spent that night at the foot of Whitestone Mtn., a couple miles NW of Tonasket. A hundred yards away was the Lucky Knock Mine where a large limestone outcrop begins which stretches for about two miles SW on the southern slope of Cayuse Mtn. (secs. 25, 26, T38N R26E).

"In SW sec. 19, T38N, R27E, we found a small fissure about 50 yards from the mine on an outcrop. Its entrance was about 20 feet above the road. It is about forty feet long, with a second entrance about midway through. There was at least an extra ten feet too small to crawl in. The floor was covered with rat droppings and smelled like it. It's not a cave in the true sense--there's a faint glow of light at the end.

"Near a lime kiln at the base of Cayuse Mtn. is a large fissure that extends for about forty feet through a small hill. On top of the mountain, in a large hollow that apparently holds a seasonal lake, is an area where there are many shelters, and even a small natural bridge (10' x 10'), none of which lead anywhere.

"Just below the sheer cliffs on the southwest slopes of Cayuse Mtn. are several shelters. One is a fissure that leads in about 30 feet. One other is very small, but contains in the back a horizontal bench that looks like it is made of pebbles cemented together, perhaps similar to deposits made in a pool some time in the past. Otherwise we found nothing, although we searched the mountain thoroughly.

"On the south slopes of Dunn Mountain (sec. 11, T35N, R25E) is supposed to be a hole (not a mine) approx. 12 feet in diameter. We were unable to follow the road leading to it because the farmer who owned the property refused us permission. The only other way would be to continue following the road leading by Albright Cave further north and then hike about a mile down over the valley rim. [This one was later checked out. See Caver 14(9):98].

"I've also located Osborn on a topo map (the town near Grand Coulee that supposedly has a cave on the old McNeil homestead). It's on an old topo

map of the area about 15 miles west of Grand Coulee Dam."

The following is dated March 1972: "Last summer, I took a solo trip through Okanogan and Ferry counties looking for caves. I heard some rumor of what sounded like shelters on a mountain just south of Old Toroda but didn't have time to investigate. I later drove to Buckhorn Mtn., east of Chesaw (Okanogan Co.) but found no trace of rumored caves. There are some old mines, but the townsfolk didn't know of any caves either.

"From there, I drove to Dunn Mountain..." The rest of this story, including the discovery of N.S. Cave, was reported in the Caver 14 (9): 98.

* + * + * + * + *

THE JULY MEETING was fairly well attended. Coughlin and Turner displayed the new additions to the Windy Creek Cave map. Bill Halliday reported that on the previous weekend he and the Nielands explored the Potluck Cave System (new) at Mt. Adams, parallel to and NE from Slime Cave, consisting of Hoarfrost Cave (lower) and Braided Cave (upper). Much trip planning occurred. A proposal from the NSS, on establishing a nationwide closed cave list, was discussed and the grotto voted to oppose it on grounds of impracticality. Luurt Nieuwenhuis, an old member recently returned, showed some beautiful slides of flowing lava tubes in Hawaii. Some other slides followed.

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TWENTY-FIVE YEARS AGO IN THE CASCADE CAVE REPORT

[The following appeared on page 3 of Cascade Cave Report #1. The twelve caves listed appear to represent those actually visited by the Grotto as of May 21, 1951.]

"CASCADE GROTTO
NATIONAL SPELEOLOGICAL SOCIETY
CAVE REPORT

"Duke's or Mt. Issaquah Cave, King Co., Wash. This andesite boulder cave is difficult of access but pleasant, and provides a definite cave feeling in its 111' length.

Icy Wind Cave, Snohomish Co., Wash. Two trips and some research have indicated that this former cave of undetermined type is now buried beneath a logging road.

Grotto (Lost) Cave, King Co, Wash. Two digging expeditions have failed to uncover this reported cave in Stevens Pass.

Mt. Adams Ice Cave, Skamania Co., Wash. This Portland-Seattle field trip in Oct., 1950 mapped its 650' length and studied ice deposits. It is a lava tube with several breaks in the ceiling.

Boulder Cave, Yakima Co., Wash. This is a lava tube [sic!] about 600' long with a stream flowing its length.

St. Helens Cave, Skamania Co., Wash. The Vancouver group made two attempts to reach this cave, but neck deep snow has discouraged them to date.

Skeleton Cave, Arnold Ice Cave, Wind Cave, East (i.e. South) Ice Cave. [Lava tubes in the Bend area of Oregon. Accounts not transcribed.].

Mt. Olive Cave, Okanogan Co., Wash. This small 14' by 14' dolomite cave on Mt. Olive contains a stalactite.

Allbright Cave, Okanogan Co., Wash. This is the second largest limestone cave known to us in Washington, measuring 300', which is encouraging."

CASCADE GROTTO STORE
Bill Capron, Keeper. Phone 525-2260
Price List April 1976

Cave Packs	$1.50
Carbide	*
Helmets	*
Chin Straps	.85
Premier carbide lamps	8.50
Lamp brackets	*
Lamp felts	2/15¢
Lamp tips	.20
Lamp flints	3/25¢
Lamp Gaskets	.10
MSA Nickel-iron headlamps	*
Gibbs ascenders (spring)	8.50
Gibbs (quick release)	10.50
Bonaiti D carabiners	2.75
Bonaiti Locking D	3.75
Cascade Grotto Patches	1.50
Cascade Grotto Decals	.25
NSS Decals	.20
Plastic Bags	3/10¢

*Contact keeper for information.

Quantities are limited in some cases. If you want any caving-related equipment not listed here, please ask for it. The store is here to serve you, so take advantage of it.--B.C.

THE OFFICIAL TRIP LIST is not included here because it is badly out of date and in need of revision. Perhaps the needed revision will be completed by the time of the next issue.

* * * * *

THE 1976 NORTHWEST REGIONAL CONVENTION

At Nakimu Caves, B.C. has been in preparation for two years. Nakimu is an extremely long, complex, pretty limestone cave which has in effect been closed to the public for years, and is assuredly worth a visit.

The cave is located in Glacier National Park, B.C., between Revelstoke and Golden. Cavers will meet on September 4th at Mtn. Creek Campground, 20 miles east of the cave. Highway distance is less than to oft-visited Papoose Cave, Idaho.

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THE CASCADE CAVER
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Seattle, Washington 98195

Take Nothing but Pictures
Leave Nothing but Footprints

REMEMBER, the MEETING is NEXT MONDAY (the 16th)! BE THERE!