19(6)

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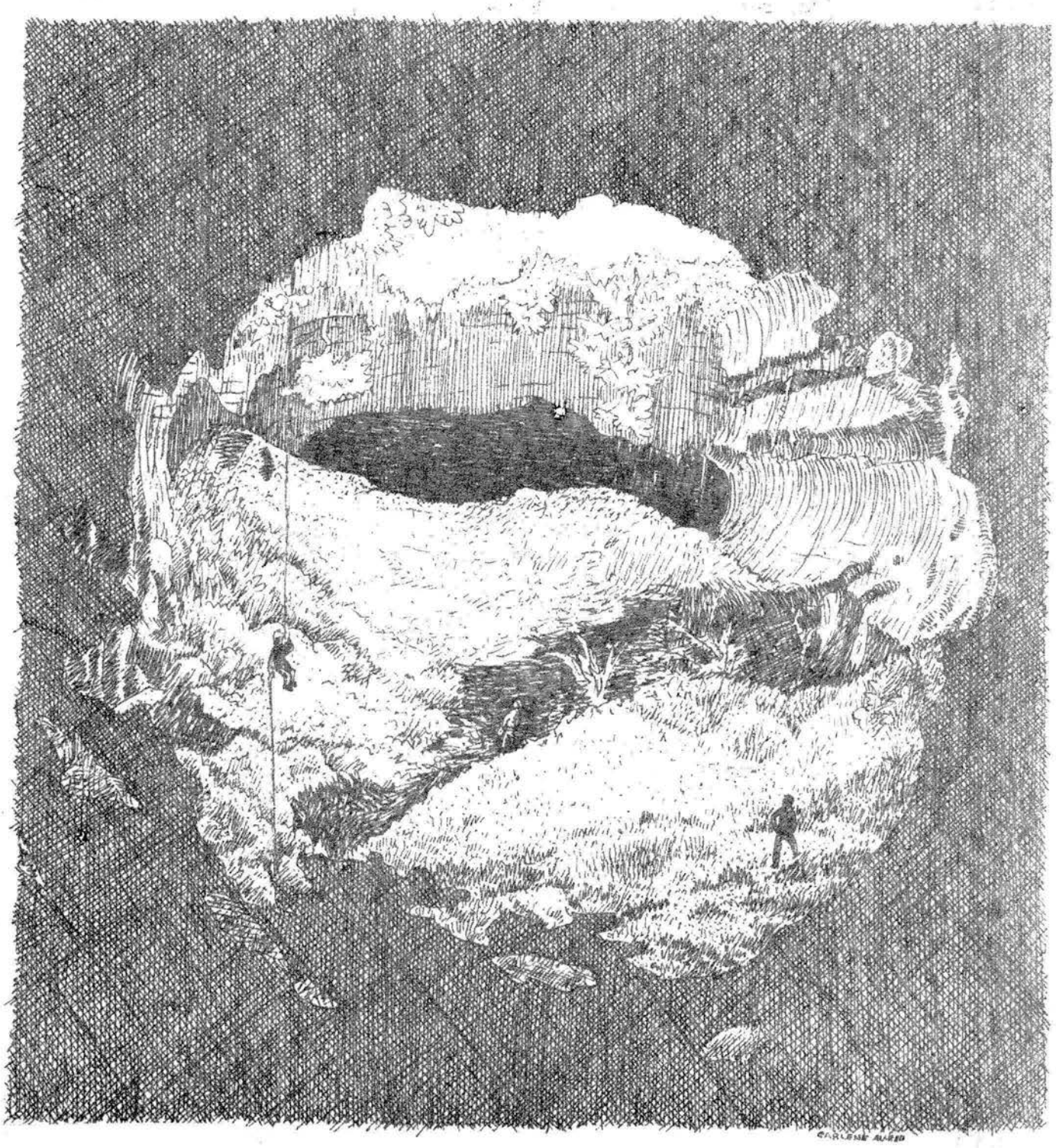

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THE CASCADE CAVER is published ten times per year by the Cascade Grotto of the National Speleological Society. Subscription rate is $6.00 for one year's issues. Full Grotto dues are $7.50, and family memberships (not including subscription) $1.50. Due to upcoming election of new treasurer, please make payments for the time being to the address shown on the back cover.

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

Field Trip Coordinator: Geary Sanders, 763-0361

If you plan a field trip, PLEASE contact the trip coordinator first--otherwise other members won't have an opportunity to go along and share the fuel costs!

Nov. 18, Tuesday. Regular monthly meeting. Nominations for officers. 8:00 PM at the Halliday residence, 1117 36th Ave. E., Seattle.

Nov. 29, Saturday. VICEG Annual General Meeting, gala tenth anniversary party. 4 PM followed by potluck at the Boormans', 2064 Allenby St., Victoria, BC.

December 1. First due date for titles of papers and presentations for NWRA Symposium on Cave Science and Technology (Seattle, February).

December 5-24. New Mexico expedition, Elbe contingent. Space for riders probably available, probable cost $100-200. Contact Bob Brown in Elbe, (206) 569-2724.

December 13-Jan. 4. New Mexico expedition, main contingent. Contact Brown as above, or Phil Whitfield (Nelson, BC) (604) 352-9936.

December 16, Tuesday. Regular Grotto meeting, time and place as above.

December 26, Friday. Hawaii geology field course leaves from Spokane airport; for details see page 81.

January sometime. McLoughlin Canyon Cave, eastern Washington. Contact Brown (above), Sanders (above), or Rod Crawford 543-9853 late evenings or afternoons.

January or February. Scouting trip to Colville area, eastern Washington. Details in a future issue.

February 2. Registration fee due for International Congress of Speleology, Bowling Green, Kentucky.

February 14-16 (Presidents' Day Weekend). NWRA Symposium on Cave Science and Technology, University of Washington, Seattle. For details see p. 81.

March (weekend of 1st or 7th). Caving in Nevada. Contact Brown.

April 14-17. Far West Cave Management Symposium, Portland, Oregon. See p. 81.

July 18-24, 1981. NSS Convention and International Congress of Speleology, Bowling Green, Kentucky. At least 3 Grotto members are planning to go!

→ → → → THERE WILL BE NO NEW YEARS' PARTY AT THE HALLIDAYS' THIS YEAR.

→ → → → There will be trips to Vancouver Island close to once a month for the next few months. Inquire at meetings or talk to Bob Brown.

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NEW AND RETURNING MEMBERS

Larry Hardie, Rt. 2 Box 70, Cheney WA 99004; R 5-81

John and Joanne King, N 6327 Stevens, Spokane WA 99208, (509) 327-6087. RF9-81

CHANGES OF ADDRESS

Craig Skinner, 2396-1 Patterson St., Eugene OR 97405

Charlie Anderson's new phone number is 821-2367.

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The Eastern Washington Unit of the Cascade Grotto meets the first-Monday-after-the-third-Tuesday of every month--this Nov. 24 and Dec. 22; in the Kennedy Library of Eastern Washington University, Cheney, 8 PM.

THIS MONTH'S COVER: Main entrance of Man Jang Gul, Cheju-do, South Korea, drawn from a pre-1970 photograph by Carlene Allred.

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MAN JANG GUL

A Lava Tube Cave System of International Importance

by Rod Crawford

Man Jang Gul is located near the northeast corner of Cheju-do, a large (70 km long) volcanic island off the coast of South Korea. The latitude is about 33° N., and the climate is warm temperate. The flora and fauna resemble those of Okinawa and southern Japan. The cave's name literally means "Hundred Thousand Foot Cave", or figuratively "very long cave".

Regional Geology

Most of the island is covered by large flows of basalt, andesite, trachy-andesite, and trachyite, with smaller areas of sedimentary formations. There are numerous cinder cones (Ogawa, 1978). I have been unable to find any reference to the age of this vulcanism. Apparently the island is not active now, but an eruption was recorded in the tenth century (Kawasaki, 1926).

Man Jang Gul is located in the Hanlasen Basalt, which covers large areas of the island. Three of the four longest caves on Cheju-do are in the Hanlasen Basalt. Baem Gul (Snake Cave), some 380 m downslope from Man Jang's lower end, is apparently also part of the same system.

Problem of the Cave's Length

Different lengths have been given for Man Jang Gul in different publications. Ueno (1966) gives 6 km; Lee (1974) gives 6.8 km; and Ogawa (1978) gives approximately 10 km. Unfortunately, all of these are totals of three separate caves, divided from each other by segmenting collapse.

At the risk of belaboring a point, let me state again this journal's policy concerning segmentation of lava tubes: a collapse involving the full width of the cave roof, which cannot be bypassed via intact passage (thus necessitating a traverse in full daylight), divides a lava tube into two individual caves. Two such collapses exist in Man Jang Gul. One, the lower entrance, delimits a 613 m long lower cave. The main entrance, shown on the cover of this issue, does not segment the main passage because it penetrates only an upper level (as is the case, for example, with the entrance of Washington's Ape Cave); see detail map at bottom right. However, it does separate an unmapped but apparently extensive upper level passage from the rest of the system.

I calculate from the accompanying Korean Speleological Society map that the length of the longest mapped cave in the Man Jang system is 4632 m, placing it high among the world's longest lava tube caves. Subtracting 4632 + 613 from Ogawa's total of 10 km leaves about 4750 m. If all this is in the unmapped upper level, this would rank even higher in length; however, available sources are not specific enough to enable one to conclude this for sure.

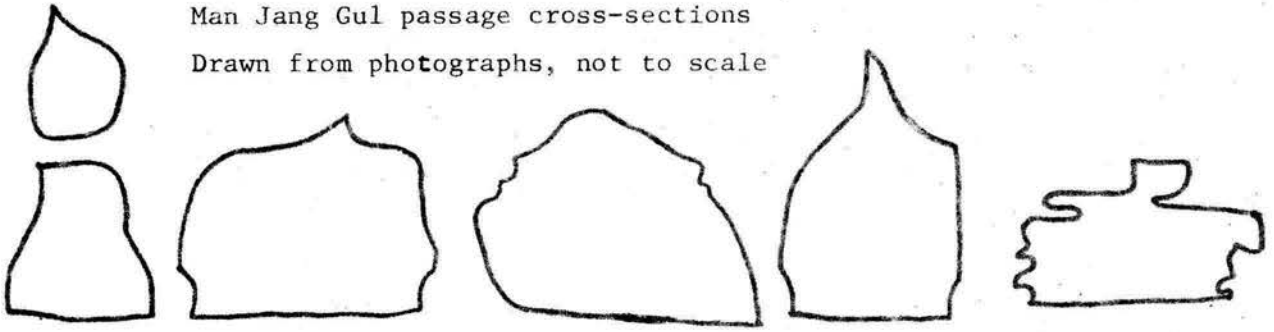
If the upper and lower levels were otherwise connected, for instance through one of the chimneys shown on the map, the combined

Main Entrance
(detail)

lengths would make a much more impressive figure. However, without more detailed information, the greatest confirmed length of a cave in the Man Jang system must stand at 4632 m (superseding the figure of 4550 m given by me in 1979 and based on faulty measurements). This is just one example of the crying need for better published information on the structure of all very long caves. All too often, scientific reports discuss a system of many caves as if it were a single cave, and compilers of length statistics are left to grope in darkness.

Structure and Geology of the Man Jang System

As noted above, two major collapses segment the system into three caves, one of 4632 m, one of 613 m, and one of unknown length. A fourth and lowest cave, Baem Gul, apparently separated from the others by a lava seal, is listed by Ogawa at about 400 m.



Man Jang Gul passage cross-sections

Drawn from photographs, not to scale

The main entrance, shown on the cover of this issue, must be one of the most impressive cave entrances anywhere, an enormous sheer-sided misty sinkhole grown green with ferns and hanging vines. The huge passages average some 10-20 m high. Some passage cross-sections are shown above.

The cave contains numerous lava speleothems, ropy floors, short upper levels, a natural bridge, and a unique pillar (shown diagrammatically at right) which is apparently composed of lava that drained out of an upper level chamber. There are flow ledges, wall grooves, and cornices at various levels on the walls.

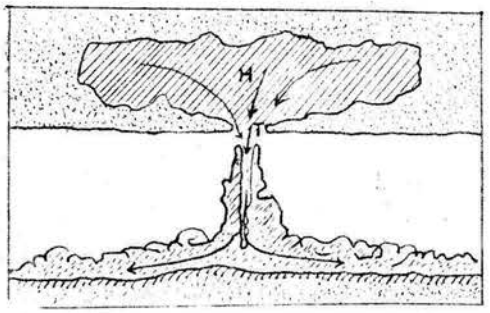


Diagram of Pillar

Microclimate

The temperature, humidity, and water pH data given in the table at the head of the next page (from the Korean Speleological Society 1970 book) were taken on November 28-29, 1968. Most unfortunately, the text that accompanied this table gives no indication at all as to where in the caves the 13 stations were located, nor are they indicated on the map. However, the data still give some indication of the general climate of the cave.

Botany

The entrance flora of the Cheju-do lava tubes has been given very careful study, in sharp distinction to U.S. lava tubes where the fauna has been studied to some extent but the flora hardly looked at.

Man Jang Gul Microclimate Data

Station	Air Temp., °C	Water Temp., °C	Humidity, %	pH	Remarks
Surface	13.0	----	---	---	Nov. 28, 1515
1	12.0	11.4	87	---	Near entrance
2	12.2	11.0	84	7.3	
3	13.0	13.0	95	7.4	
4	14.0	13.5	95	7.4	
Surface	9.8	----	---	---	Nov. 28, 1650
5	12.2	11.0	89	7.6	
6	6.8	9.0	88	6.8	
Surface	10.0	----	---	---	Nov. 29, 0930
7	9.4	----	77	---	Near entrance
8	9.0	9.0	94	7.6	
9	10.6	10.0	89	7.4	
10	11.8	----	94	---	
11	12.4	12.0	100	7.2	
12	10.0	----	100	---	
13	9.4	----	88	---	

The species list of entrance flora at Man Jang Gul is particularly notable for a complete absence of mosses, so common in North American lava tube entrances. The ecological niche of our mosses appears to have been taken by various one-celled plants: blue-green algae, green algae, and diatoms.

There are seven species of blue-green algae--the most primitive of green plants--listed. Three, belonging to the genus Gleocapsa, are denizens of damp rocks. The others, in the genera Nostoc and Chroococcus, may have been taken from pools. One species of advanced alga, Trentpohlia aurea, forms a red-brown layer on rocks. Two species of diatoms are present, probably in pools.

By far the most typical plants of the Man Jang entrances are ferns, of which fully 20 species are present, as listed below:

Schizaeaceae (family):
Lygodium japonicum
Hymenophyllaceae:
Gonocormus minutus
Vandenboschia radicans
Pteridaceae:
Lindsaea japonica
Pteris cretica
Coniogramme japonica
Aspidiaceae:
Polystichum lepidocaulon
Polystichum makinoi
Cyrtomium falcatum
Cyrtomium caryotideum

Aspidiaceae (continued):
Dryopteris atrata
Dryopteris lacerta
Dryopteris varia
Dryopteris erythrosora
Cyclosorus acuminatus
Athyrium dimorphophyllum
Diplazium wichurae
Aspleniaceae:
Asplenium normale
Polypodiaceae:
Lepisorus thunbergianus
Neocheiropteris ensata

Fourteen species of vascular plants are listed, as follows (some names have been updated to reflect changes in botanical nomenclature since 1970).

Cyclobalanopsis acuta. Asian oak, a cultivated tree.
Castanopsis cuspidata. A large evergreen tree.
Ficus erecta. False fig.
Ficus nipponica, Ficus pumila. Climbing figs.
Stauntonia hexaphylla. An evergreen vine.
Rubus hongnoensis. A berry, related to blackberry.
Orixa japonica. Aromatic shrub of the orange family.
Camellia japonica. Mountain cammelia.
Eleognus glabra, Trachelospermium asiaticum. Climbing shrubs.
Hedera tobleri, Textoria morbifera. Woody vines.
Ardisa japonica. Creeping undershrub.

Truly these cave entrances are miniature jungles in their own right!

Zoology

Two species of bat, Miniopterus shreibersi (Kuhl) and Rhinolophus ferrum-equinum (Schreiber) are reportedly abundant in Man Jang, and have deposited large quantities of guano. R. ferrum-equinum, the Greater Horseshoe Bat, weighs up to 28 grams and varies in color from reddish brown to deep black. The ears are large and pointed, the nose up-tilted, the body rotund, giving the resting bat a somewhat comical appearance. Horseshoe Bats feed on insects within 6 m of the ground or on the ground; young are born from April to July. M. schreibersi, one of the "Long-Fingered Bats", is smaller and more ordinary-looking. They feed on beetles and other small insects, usually 10 to 20 m above the ground.

The only other fauna noted as common to abundant are parasites of the bats. Brachytarsina kanoi, one of the bizarre wingless Streblid flies, parasitizes the Horseshoe Bats; a tick, Boophilus sp., may occur on both.

Also listed as occurring in Man Jang Gul are a trogloxenic centipede, Thereuonema hilgendorfi, and five species of spider: Meta menardi, which builds large orb webs in entrances and occurs in Europe and eastern U.S. caves; Cicurina japonica, Porrhomma sp., and Nesticus quelpartensis, which build small webs in dark, damp places; and "Doenetzi sp.", a name which I have been unable to trace; it may be a misspelling.

Mapping and Commercialization

The map which appears on the following pages was made by the Korean Speleological Society prior to 1970, when it was published in their volume, "Korean Caves, 1: Lava Tube Caves of Cheju-do." Instruments used were tape and cave theodolite. The latter is an instrument for determining direction in magnetic lava tubes unsuitable for compass use. It consists of a tripod-mounted, graduated card, with a pointer and clinometer mounted above. At each survey station the horizontal angles to the next and the previous stations are recorded, in order to calculate the included angle; thus the cave's direction is determined independently of magnetic north (Wood, 1977).

A 1974 postcard set shows that between 1970 and 1974, the cave was commercialized, with a metal staircase in the main entrance having about 60 steps, and stone stairways and signs in the interior. It is apparently located in a national park, and should be fairly easy to visit.

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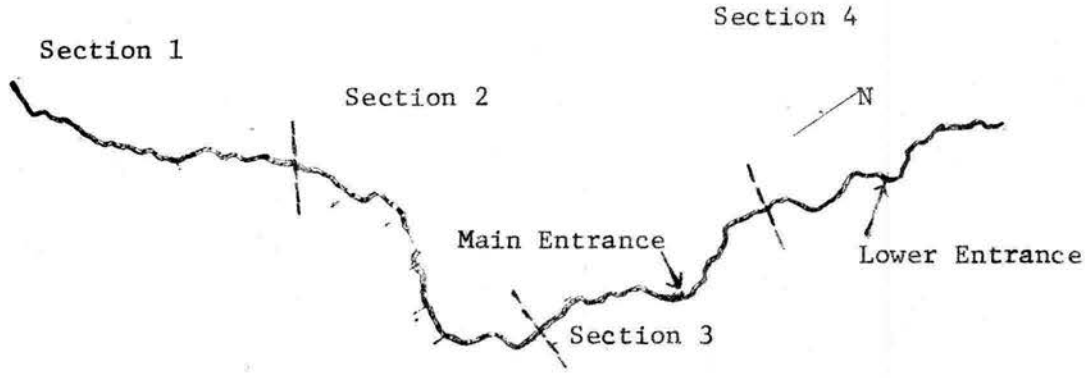
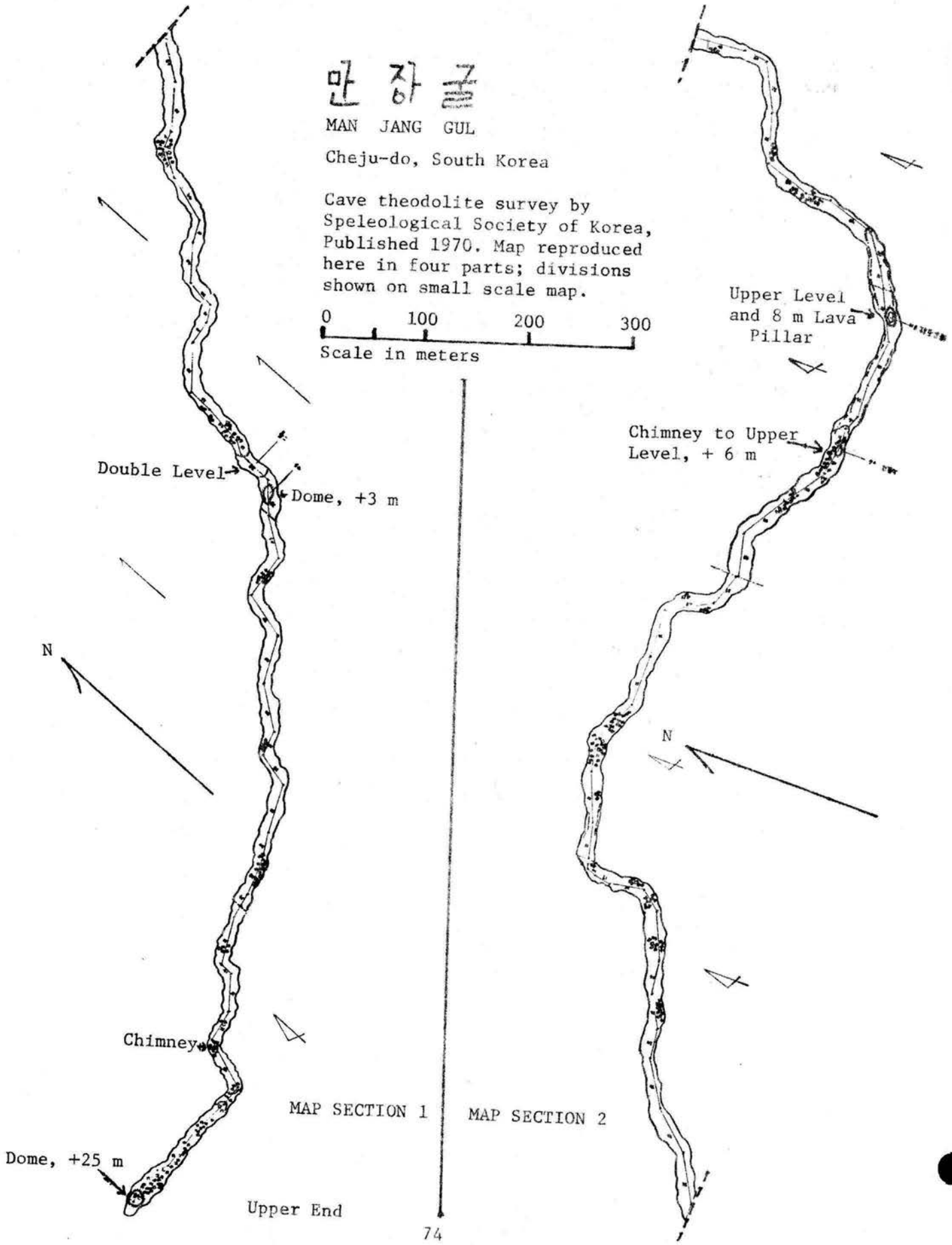
MAN JANG GUL
Greatly Reduced Index Map

Showing Sections of Large Map

Scale approximately 1:30,000

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MAN JANG GUL
Cheju-do, South Korea
Cave theodolite survey by Speleological Society of Korea, Published 1970. Map reproduced here in four parts; divisions shown on small scale map.
0 100 200 300
Scale in meters
Upper Level and 8 m Lava Pillar
Chimney to Upper Level, + 6 m
Double Level
Dome, +3 m
N
N
Chimney
Dome, +25 m
Upper End
MAP SECTION 1
MAP SECTION 2

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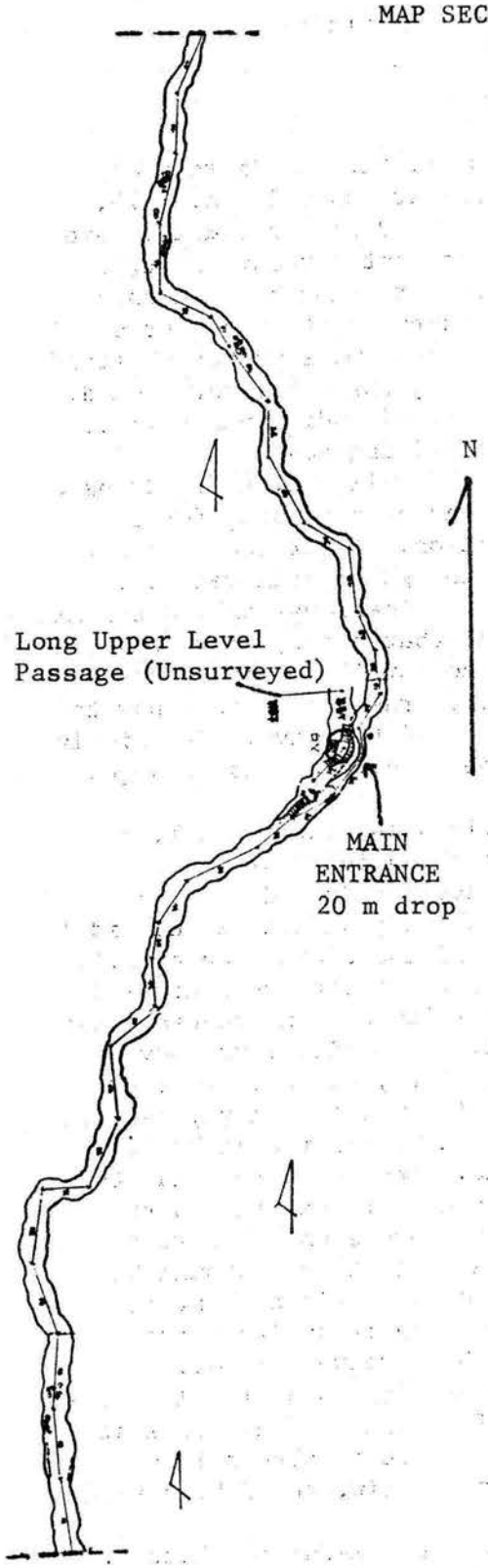
MAP SECTION 3



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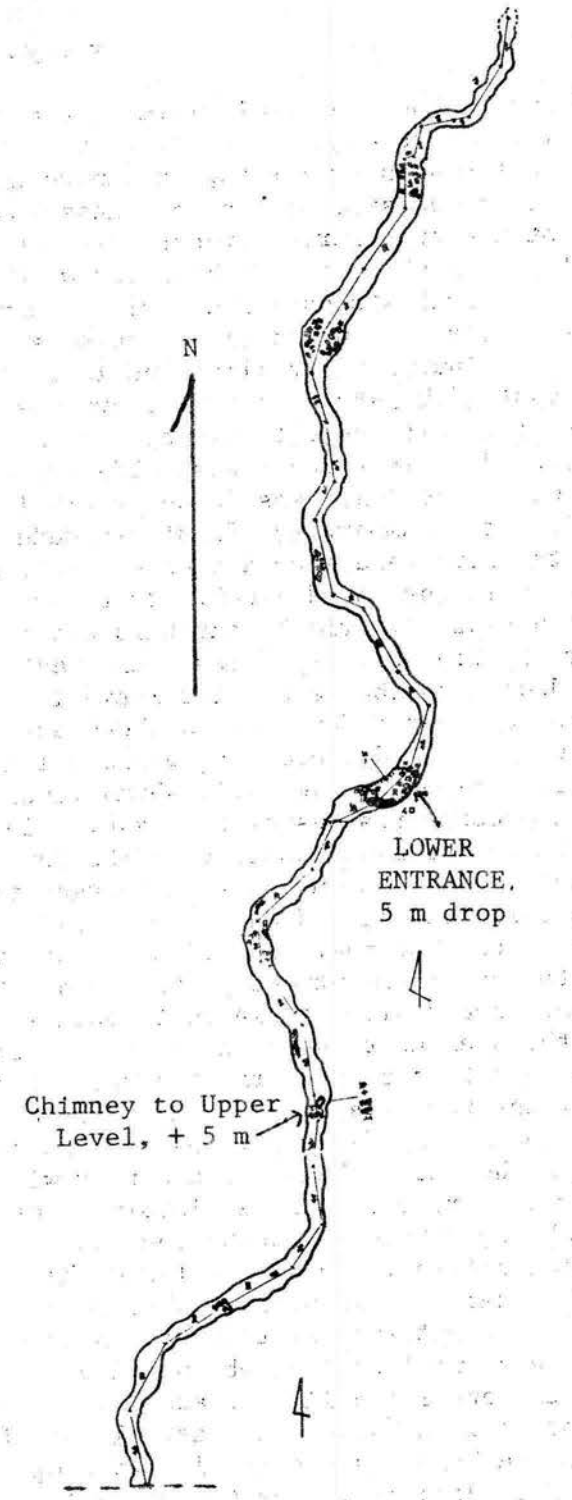
MAP SECTION 4



FIELD TRIP REPORTS

Clyde Senger Talus Caves, Chuckanut Mountains
December 1, 1979

by Clyde M. Senger

It was to be the final field trip of my fall course, Natural History of Mammals. We were going to the nearby talus caves on Saturday, 1 Dec. 1979, to look for bats, woodrats, and anything else that looked like a mammal. Since there were few students in the class and this trip was not a requirement, I did not expect a large turnout. It was a disappointment, though, when only Phyllis Kronenberg and Jack Laufer were waiting on campus at the appointed hour. Several students had earlier complained about the small number of field trips we were having in the class. As you could guess, they were not around. After 40 minutes of stalling and last minute gathering of additional helmets and lights (the students didn't bring any), we left Bellingham.

At first, it was not raining, but as we neared the trailhead, a few drops splattered against the windshield. Even though it had been raining for the last week, the trail was in surprisingly good condition. After the long dry spell of the summer, the first big mudhole was dry enough to even walk on. Both the first and second creeks were completely dry. There was only a trickle of water in the third creek. By the time we reached that point, there was a light but steady drizzle and this had changed to a cold rain at the caves. After fighting our way through the last tangle of wet brush, we were happy to slip down into the dark but relatively dry large room of the cave. We quickly warmed some water for tea and chocolate and had some lunch. We also changed into what extra dry clothing we had along.

While the others were finishing lunch and mentally preparing themselves for the deeper reaches of the cave, I decided to take a quick look in the Fred Thomas Room. I quickly climbed up the rock ledge and ducked into the anteroom. I looked up where I thought the packrat chimney should be and didn't see a thing but breakdown. I wondered for a minute if there had been a shift in the rock, but there seemed to be no evidence of it. No matter--I crawled over to the other entrance, the backbreaker. It is a low opening several feet off the ground with no places to push with the feet. You stick your body into the opening to about the level of the stomach, lift your feet off the floor, and then try to drag the rest of the body on in over the sharp, jagged lip of the rock that is the floor of the entrance. Maybe experience helps; there seem to be fewer scrapes and bruises each time. The north room had the usual moths but no bats. A short crawl over talus and there was the south room with more moths and a sleeping (torpid) bat. My, how soon one forgets. A quick look where I thought the inner end of the packrat chimney should be revealed nothing. Then I realized that the south room is divided along the floor of talus by an upright slab and the elusive opening is on its north side. I am not sure if this way is better than the backbreaker or not. There is a small opening which allows easy and safe exit to chest level. However, the opening bells out and there are no lower footholds. Thus the last foot or so is a "somewhat controlled" slide (fall). There is also a large pile of packrat nest material, droppings and dirt on the lip, and debris tend to dribble down as you exit. Oh, well.

Just as I started out for the "main party", there was a metallic clatter. One of the lights I had been able to find was an old delta battery operated lantern with a cracked bottom. I had found what was supposed to be a new

battery, but it didn't seem to be working any too well. Phyllis had the lantern when the bottom came off and it and the battery decided to go caving on their own. After a little searching, we located the errant parts and managed to retrieve them. The battery had some deep dents on the edges but appeared otherwise OK. When we tried it, there seemed to be only about 1/2 the light we had had before, and that hadn't been much. When the usual repair techniques such as shaking and banging didn't improve the situation, we started for the back room with what we had. Later, I realized that the seal of the case on the battery had ruptured and that allowed a pool of clear thick fluid to leak onto the floormat of the car on the way home. Soon we located more moths and several lump-nosed bats, which seemed to impress the students. However, there were some less than favorable comments about the woodrat droppings underfoot and particularly those just out of sight but not out of touch on one handhold. I don't know what all the complaints were about. After all, first hand contact is an important part of the learning process.

By the time we had finished looking around the back room area, I was convinced that our female contingent was not very experienced and enthusiastic about the typical maneuvering involved in a talus cave trip. Thus it was best to avoid the back exits and return to the main room. I fully expected to take the overland trail to the lower entrances for more caving. We sort of threw things into our packs and headed for the entrance. Getting out has been a problem ever since someone removed the knotted log. Now the rocks were wet and cold and Jack and Phyllis were inexperienced. Jack finally made it, but Phyllis was having a real problem. Finally Jack and I each grabbed one of her hands and we more or less lifted her out. She was really nice about it, though. You know how it is when one is dragged up and over the sharp lip of a rock--or do you? We found ourselves in a heavy mixed rain and snow. We started out, but when I looked back from the top of the big rock, Phyllis called that she had left her walking stick in the cave. Naturally, the guide offered to recover such missing items. Really, that was simpler than extracting Phyllis from the cave a second time.

As the party headed down the boulder field on the other side of the big rock, another problem appeared. There was a drop of about two feet from a small perch to the sloping surface of the next rock. In dry weather there is no problem, but with the wet snow, I looked at things with a different attitude. After a long pause, I stepped over to another rock and started down its 8 to 10 foot steeply sloping face. Another long pause, and then a return to the top for consideration of other alternatives. Unfortunately, nothing else seemed better. A couple of more hesitant attempts at each and we finally jumped--safely. A few more rocks and we were at another similar situation. We were getting wet very fast, had no more dry clothing, and had a long walk out. One more look at the jumps ahead and the guide decided to call it a day. Of course, that decision was about one jump late, as the easiest way out was back the way we had come. The guide refused to admit a goof, and continued on down in a different direction. It really hurt to go by another entrance without at least a look. However, it was a long crawl after getting into a five foot pit, and we were all wet and tired.

Now the going was easy across a flat rock, then into the brush and the trail beyond. The snow disappeared as we descended, but that made little difference in the rain. About an hour later we were back at the car and headed home--wet, tired, and a little "down". The students were polite and commented about how wonderful it had been, but seemed to be more interested in the warm contents of a thermos and the car heater which warmed very slowly.

Back home, dried and rested, I decided I really had to get back to make another count of the bats in the other parts of the cave so it would be more comparable with past data. Well, here it is almost two months later and there always seems to be something else to do or the weather is too bad. Well, maybe this coming weekend--or next weekend. Maybe in March.

The Mystery of "Underground Passage"

by Kevin Allred

We became interested in the "Underground Passage" last fall when on a trip to see the Rain Forest out on the Olympic Peninsula. Wally Bosshart, Rod Crawford, Kevin Allred, Carlene Allred, and Lehi Allred (at 9 months old) were on this f rst trip. On the long drive out there, Rod noticed a place on the map which said "Underground Passage". Ah! What an opportunity to see the rain forest and Rod's discovery on the map at the same time. Unfortunately, we abandoned our search for the "underground passage" still not knowing just what it might be. We felt the best possibility was that the stream which went to dashed lines for 2 or 3 miles on the map was so overgrown with the rain forest that it was completely covered with organic material.

Saturday, March 22nd, 1980, found all of us jammed in the junky Datsun, minus Wally who had other commitments. Carlene and I left with visions of an emerald stream flowing through a 2 1/2 mile long root covered cavern. I suspect Rod dreamed of gigantic harvestman critters and cave crickets clinging to the ceiling, not to mention the Neaphaenops beetles!

The approach we chose is a trail northeast of Quina t Lake which nears Irely Lake and the "Underground Passage" after about 1 1/2 miles from the road. It rained in fine little droplets most of the time, and Lehi didn't appreciate that on the bush whacking we did when the trail disappeared for a short distance. After a mile and a half Carlene took refuge from the rain with crying Lehi under a 4 foot diameter log while Rod and I went cross country to ou disappearing stream.

When we found it, it looked like it would be better termed a river, and after Rod went back to Carlene and Lehi to hike back out, I followed the river downstream. The torrent gradually disappeared until it was a small brooklet to my surprise. Apparently the greater volume of water was captured somehow by gravel and rocks. I got to the outlet of Irely Lake and followed that stream for half a mile or so; it also began getting small. It was fabulous to go through the rain forest terrain. Most everything had globs of moss hanging from it, and ferns were abundant. The ground was like a springy green sponge much of the time, and it was truly beautiful to wander free and alone there.

At the shore of the lake, the sun appeared creating a vivid rainbow which spanned the water. I noticed that the inside band was a pretty purple, the next a blue, then a yellow, and finally red. As soon as I looked away and then glanced back, the blue band turned to green, probably from a light change. I have never heard of the like, and enjoyed the scene thoroughly, noting waterfowl on the crystal lake.

After catching up with the others, we finished the trip without problems. The mystery of "Underground Passage" is at least partially solved.

[Editorial note: for anyone interested, the "underground passage" is marked on Elk Creek in the southwest quarter of the Mt. Christie 15' quadrangle (USGS). It seems unlikely that much besides water and interstitial animals will ever pass through the "passage".]

Maple Falls, Whatcom Co., Washington
8 March 1980

by Clyde M. Senger

While Robert Todd and I were talking recently, he mentioned he was from Maple Falls. I immediately asked if he knew of any caves near there. He mentioned a couple of mines and a sort of cave visited by the local children. He also mentioned that they had run into interesting things at the limestone quarry where he worked. That did it. Stanley Senger, Roger Pressentin, and I drove up to the area on 8 March 1980. We stopped to recheck directions and were referred to Todd's son who had visited the "cave"recently.

The first "cave" is about halfway up the cliff on the east side of Maple Creek, near the north end of "town". Some of the rock appeared to be limestone since it had evidence of solutional erosion and responded to acid. Other material did not respond and did not look like limestone. We walked right up to two holes. One, about 10 feet into the cliff, looked man made. The origin of the other is questionable. The entrance looked like it might have been enlarged, but inside it looked more natural. About 10 feet in there was a small trickle of water down a crack that led back but was too small to enter. To the right one could duck under a rock and enter a room that sloped up and back another 10 feet or so. The rock looked very decomposed and some was eroded. Natural or not, it wasn't that significant to me. There were a lot of large, dark bodied harvestmen at the back, some of which brushed off onto my coat. I noticed a distinctly unpleasant smell, which didn't seem to go away when I emerged from the cave, so I checked. Sure enough, a couple of harvestmen were still there.

Stan checked the cliff and located another short, apparently man made, shaft closer to town. Meanwhile, Roger and I looked around on top. It was gently sloping in general, but there were several very small sinks and cracks in the immediate area, and some small valleys further back. Roger ran into some rough, broken country but did not seriously investigate. We all walked the base of the cliff more or less to the north end and found nothing more. Since the locals knew about the one cave and the area is so close to town, I suspect there are no other large openings in the area. However, the country I covered had only a few game trails and no sign of recent human travel. Thus, there might be something.

Next, we headed for the quarry. Supposedly there were several pits three feet in diameter and 50 ± feet deep, a shot hole that took 110 feet of cord instead of the usual 45 feet, and two horizontal test drillings where they hit voids. I understood the voids to be at least 20 feet across. One coated the drill with mud, whereas the other didn't. Our informer seemed to imply that nothing was open at the moment, maybe because he didn't want us in the area. When we arrived at the quarry we headed for the bottom of the pit and the working face. No doubt about it, we could see exposed erosional faces, eroded cracks, and remnants of small vertical pits.

Stanley worked along the base of a large, unbroken, smooth face and soon found some possibilities. Roger and I joined him and we assessed the situation. It was not good. The opening was a squeeze under a large, loose rock with many other loose rocks above it. Roger stood back while Stanley gave it a try and I checked out another opening 10 feet further down. They both went. I could look up steeply for 20 feet or so and the passage was from two to four feet in diameter. I could make out a pipestem speleothem in the distance. Stan's passage joined mine about halfway up, and had both stalagmites and stal-

actites. I backed out and let Stan carry out the exploration. We wanted as much help as possible outside in case of a problem. Besides, I had the car keys in my pocket. Soon, Stan emerged and reported that there was a continuation but it was very muddy and a bit small. The cave walls were coated with a fine black deposit with deeper layers of dark brownish material on the floor. There did not seem to be recent erosion by dripping or running water. We still had a lot of quarry to cover, so we continued our search rather than push that prospect.

Stan went south while Roger and I went north. There were several slumped places on disturbed level places which probably were just due to settling in the fill. There was a fair creek on the north running out of a deep canyon, but we went up the quarry road. On top, at about 250 feet, it tends to level out. Several small creeks ran across the area and were now channeled into a water supply system. It seems likely they might have run directly into the quarry area at one time. We could see additional exposed faces of limestone and roads probably to test drillings. We didn't check them, since running surface water didn't suggest openings. Near the edge of the quarry on top, we found a crack 10 to 15 feet long and several feet deep, partly filled with stumps and snow. It undoubtedly had been deeper at one time, but didn't look promising now.

We were beginning to get a little worried about Stan, so we walked on down a road to the south and finally found him resting. Why couldn't he answer our calls? He reported a find, but had to show us as we missed it even with his directions. There, right next to the face but up a slope of debris, was the vertical pit, probably the one we had been told about. We were about 200 feet up at that point. It was about 20 feet down to a mass of recent rubble and a plastic Prestone bottle. The sides were quite rough in contrast to the very smooth sides reported by our informant. Otherwise the description matched. Dropped rocks seemed to roll off under us, but not away from us. We might have been able to descend safely, but it did not seem wise without a rope. We found some crystals in debris nearby, and some dark orange-red stains suggesting iron bacteria in mud in some cracks.

We drove back to see Robert Todd, to indicate our survival and say thanks. Now he indicated that the test holes which I understood were no longer visible were, in fact, the two scars on the otherwise smooth surface very close to the lower cave and between it and the pit. We could have pushed a lot harder if we had known that at the time. Oh well, that is an excuse for another trip. There was also a report that one man some years ago had tried to convince people that he had entered a hole well up the cliff before there was a quarry and come out beside a stump on the nearly flat valley floor below. If I hadn't been there, I wouldn't have believed it. At the moment, I think it is a possibility. Certainly the vertical pit we found has a lot of debris in it, and others may have been filled. Still, I think there is likely to be over 150 feet of vertical cave still there, and who knows what connected elsewhere. Further, there is a lot of nearby area we didn't even look at. All in all, we were pleased with the day.

Oh yes---Stan suggests the present entrances in the quarry be called "Temporary 1" and "Temporary 2" for rather obvious reasons. We understood that they were not selling as much rock now as in the past. We do not want to wish anyone poor luck, but . . . .

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ANNOUNCEMENTS

Geology of Hawaii Field Trip: E. W. U.
December 26-January 5, 1980-81

A field course (4 credits) from Eastern Washington University studying volcanic geology on the Island of Hawaii, mainly in Hawaii Volcanoes National Park.

Instructors: Felix Mutschler and Eugene Kiver, Department of Geology, Eastern Washington University, Cheney, WA 99004 (telephone 509-359-2286).

Cost: Approximately $500 for round trip transportation from Seattle and camping fees. Tuition is extra. Fee was due Nov. 1, but perhaps arrangements could be made for paying late or financing your own transportation.

Registration: All participants must preregister for course GLG 297 at E.W.U. for Fall or Winter Quarter; enrollment limited to 16.

For more detailed information, contact Kiver.

1981 NWRA Symposium on Cave Science and Technology
University of Washington, Feb. 14-16, 1981

Once more the Cascade Grotto will host this event at the Burke Museum, U. of W., and help is solicited from all members. We still need someone to coordinate accommodations and airport shuttle, as well as plenty of people to open their homes to out-of-town guests.

Speakers are still needed, so if any of our gentle readers would like to give a talk about something, here's your chance.

Preregistration will cost $9 per person or $12 for a family, including the proceedings volume which we estimate will cost up to $5 to produce and mail. Registration at the door will be $6 higher. We will send out registration materials about January 1st. Of course, it is expected that all Cascade Grotto members who aren't bedridden or stranded in Texas will loyally attend. Honestly, it will be well worth your trouble!

Scientific coordinator: Rod Crawford, Burke Museum (DB-10), Univ. of Wash., Seattle, WA 98195

Technical Coordinator: Bob Brown, P.O. Box 2, Elbe WA 98330.

Far West Cave Management Symposium - 1981
Portland, Oregon, April 14-17, 1981

This symposium will include formal papers and panel discussions on topics relating to cave management, resources, interpretation, and safety.

Registration will be $20.00 per person before March 1, 1981, or $25.00 after, including a copy of the symposium proceedings.

If you would like to present a paper, register, or just help out, send your name, address, and other relevant information to:

Far West Cave Management Symposium
505 Roosevelt St.
Oregon City, OR 97045

Last Chance to Buy "Depths of the Earth"

Bill Halliday announces that the 1976 revised edition of Depths of the Earth [incidentally yr editor's favorite nontechnical caving book] has officially gone out of print; he has bought up all remaining copies and offers same singly for $14.95; $12.95 in lots of 5-10; $9.95 10 or more; and will inscribe them.

VULCANOSPELEOLOGICAL BOOK REVIEW

by William R. Halliday, M.D.

Acts of the 1975 Catania Speleological Week and Seminar on Lava Caves (Atti: Settimana Speleologica Catanese e Seminario Sulle Grotte Laviche), edited by Giuseppi M. Licitra. No date (1978?), Gruppo Grotte Catania del Club Alpino Italiana (C. A. I, Sez. dell'Etna). 261 pp. plus index. Paperbound, 51 figures and plates, one fold-out map.

This handsome paper-bound volume represents the proceedings of what might be called the second international symposium on vulcanospeleology and its extraterrestrial applications. Some of the participants in the first such symposium at the 1972 N.S.S. Convention also submitted papers at the Catania meeting in 1975; that of Ron Greeley, for example, appears in these proceedings and not those of the 1972 meeting. As in the case of the 1972 symposium, the papers presented by the international authorities were almost entirely in absentia; England's Chris Wood was the only non-Italian vulcanospeleologist to attend in person.

Whereas the 1972 symposium was primarily descriptive, the 1975 seminar was primarily theoretical and speleogenetic. Most of the work is in Italian, some papers and abstracts are in English and some in Spanish; the reading is less difficult than I expected. A particularly valuable feature is the inclusion of the text of discussions among the participants.

Among the papers included are reports on the geology, biology, history, and prehistory of lava caves of Etna, speleogenetic theory in general with special reference to Ollier's layered lava concepts, convergence of karstic and pseudokarstic morphology, pseudokarstic piracy, and evidence of extraterrestrial lava tube caves. Peterson and Swanson's report on 1970-71 observations of the formation of lava tubes at Kilauea is included in an Italian translation. Despite the language problem faced by the average American vulcanospeleologist, this volume needs to be studied by all concerned with this growing field.

Address of the C. A. I. Sez. dell'Etna is: Via Amore, 4, 95128 Catania, Italia (Italy). Price not stated. Probably the volume will soon be available from Anne Oldham Books in Wales.

[Editor's note: Most of the relevant papers in this volume have already been abstracted in these pages. Abstracts of the remainder appear below.]

VULCANOSPELEOLOGICAL ABSTRACTS

by the Editor

Rittmann, Alfred, 1977 [pre-print]. La formazione delle grotte vulcaniche. Atti del Seminario sulle Grotte Laviche (as above): pp. 87-100.

This paper on vulcanospeleogenesis ascends to rarefied heights of mathematical physics. Some figures are intriguing, but due to ignorance of the Italian language I am unable to judge whether any of it makes sense.

Author's abstract in part: "Due to its very high viscosity, lava moves by laminar flow only, in cylindrical concentric laminae. Their viscosity increases from the core toward the exterior of the flow. For some time the inner laminae continue to be moved by the hydrostatic pressure, even though the eruption has ceased at the vent. This causes the upper part of the flow to be emptied, thus forming lava tunnels." To say the least, this seems at variance with the "Lava River" theory as demonstrated in recent Hawaiian observations.

Cavallero, F., and G. M. Licitra, 1977. Grotta di Serracozzo I. Atti della Settimana Speleologica Catanese: Catania, 24-30 August 1975. Pp. 245-248.

Authors' abstract: "From May 1971, from two fissure vents located at 1840 m and 1800 m above sea level in Serracozzo Rill, an aa lava flow poured downhill eastbound in Mt. Etna's flank. It reached 600 m above sea level in Cava Grande Rill, near S. Alfio.

"The outpouring of lava ceased on June 12th, leaving two caves: Serracozzo I Lava Cave and Serracozzo II Lava Cave. They were visited for the first time in 1972.

"The Serracozzo I Lava Cave has a total length of about 350 m and a vertical range of about 60 m. Its entrance is located in a collapse hole through a wall of the fissure vent. The lava tube is extended on two different levels.

"A description of the cave and of its morphological features is given and hypotheses on their genesis are proposed." Editor's comment: ignorance of the Italian language prevents me from determining what evidence the authors give in support of this being a true aa flow. I reproduce their map below:

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Lucrezi, Alfonso, 1977 [pre-print]. Le prime esplorazioni di grotte laviche. Atti del Seminario Sulle Grotte Laviche, Catania: pp. 197-200.

A brief note on some of the earliest published references to volcanic caves.

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Brunelli, Fabio, and Blasco Scammacca, 1977. Le grotte dell'Etna: stato attuale delle conoscenze. Atti del Seminario... pp. 201-204.

Authors' abstract in part: "A description is given of the criteria used for the acquirement of data, the search, the identification and the location of the caves [lava tubes of Mt. Etna] and lastly the exploration, survey, and study of them."

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Cucuzza-Silvestri, Salvatore, 1977. Le grotte vulcaniche dell'Etna e il loro studio. Atti del Seminario sulle Grotte Laviche...pp. 215-229.

A history of the study of lava tube caves in Sicily, going back to 1591.

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CASCADE GROTTO STORE PRICE LIST

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P A R T S , contd.

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1-1/2 inch felt	10¢
1-1/2 inch foam O ring	10¢
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1-1/2 inch Premier felt holder	50¢
Snap holders with hardware	25¢
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Justrite reamer	25¢
NSS Decal	60¢
Premier wing nut	55¢
Justrite hex nut (small)	10¢
Justrite hex nut (large)	30¢
Justrite cap nut	20¢
Premier cap nut	45¢
1/2 inch striker spring	15¢

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COMPLETE RENTAL SETS (hard hat with chin strap and L-1 bracket; 6 v electric Justrite headlamp with batteries; cave pack) $2.00 per weekend; $6.00 per month.

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THE CASCADE CAVER
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Be sure not to miss the December meeting, Tuesday Dec. 16th