THE CASCADE CAVER

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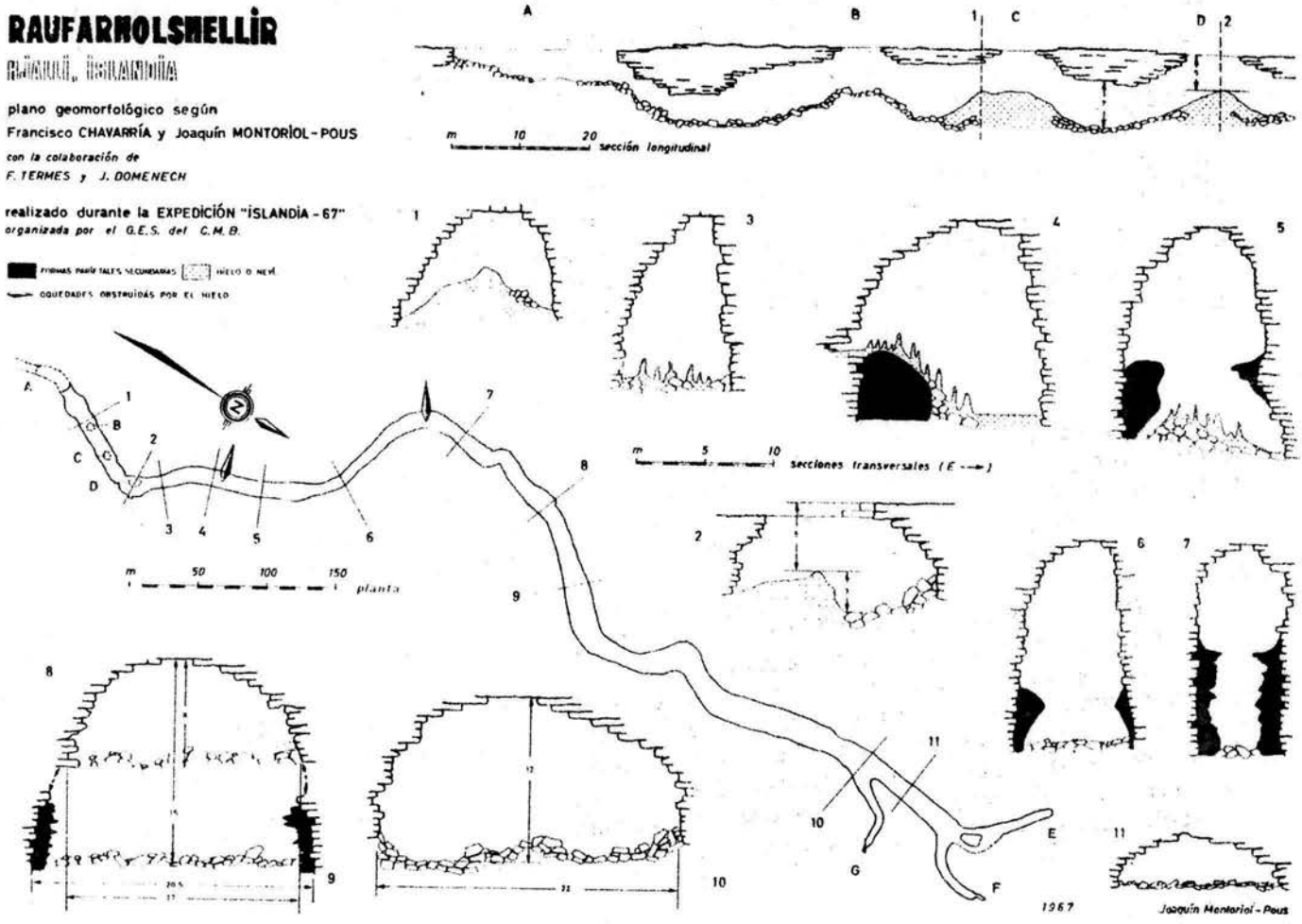
Please note: last issue mistakenly labelled No. 2-3, should have been 3-4. Published July 1979



THE CASCADE CAVER hopes to be published ten times per year by the Cascade Grotto of the National Speleological Society. Subscription rate is $4.00 for one year's issues... Full Grotto dues are $4.50, and family memberships (not including subscription) 50¢. All payments should be made to Grotto treasurer Craig Hansen, Rt. 3 Box 118, Cheney, WA 99004.

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

For information on any of the following events you may contact Trip Coordinator Chris Burdge, at 775-6724.

The present up to August 23. International lava tube and glacier cave field trips in Washington. Guides are needed; contact Bill Halliday, 324-7474. American, Spanish, and British cavers will participate.
August 13-17. Craig Hansen and Dave Jones will be at Crawford State Park, remapping Gardner Cave.
August 18-19. Official Grotto trip to Sumas Mountain and Black Mountain limestone areas, notrhwest Washington. Contact Wes Gannaway, (206) 384-4209.
August 21, Tuesday. Regular Grotto Meeting at the Hallidays', 1117 36th Ave. E., Seattle, 8:00 PM. Program: NSS slide show, "Gwonk Show"; also a presentation by Dr. Christopher Wood, British vulcanospeleologist.
August 24, Friday. Eastern Washington Unit Meeting at 8:00 PM, at Dave Jones' house, 106 N 3rd, Cheney. Program: Gwonk Show.
August 25-26. Windy Creek Cave, north Cascades. Contact Bob Brown, (206) 569-2724.
August 28, Tuesday. Northwestern Washington Unit Meeting at Wes Gannaway's house, 1604 Brockwood Drive, Ferndale, Wash. at 7:00. Program: "Gwonk Show".
Sept. 1-3 (some staying until Sept. 9). Nelson, B.C., including at least two trips to Cody Cave; cave hunting in NE Washington; and a real chance for Grotto members to see 17,000 foot Nakimu Cave. Staying at Phil Whitfield's house in Nelson. Contact Brown.

NEWS AND NOTES

Craig Hansen and Dave Jones recently probed Crack Cave (near Gardner Cave) again; Craig descended the narrow crack 30' to a point where he could look into a room and see passages leading off. Unfortunately, he couldn't quite squeeze into the room. More crack-widening is clearly indicated.

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Among business conducted at the Regional Meet was the following:

1. The regional treasury had $206.30 in the treasury and $40.64 in cash as of the beginning of the meeting.
2. Craig Hansen and Dave Jones, of this Grotto, were appointed to edit a semi-annual regional publication. The first issue will go out to all members of member grottos and clubs, so far as known.
3. The Gem State Grotto received this year's $50 Special Service Award for their new statewide cave rescue organization.

Watch for more Regional business in a future issue.

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Joseph Patrick Pierce (R), 5910 SE 41st St., Apt. 12, Portland OR 97202. (503) 771-7189.

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Our Cover: Map of Raufarholshellir by the Spanish vulcanospeleologist Joaquin Montoriol-Pous. This Icelandic lava tube figures in our feature article.

F E A T U R E

Lava Tubes: Their Morphogenesis and Role in Flow Formation

by Christopher Wood

CONCLUSION

As a lava tube cave is a drained segment of the channel once occupied by the internal feeder river of a pahoehoe lava flow, the morphologies of caves were recognised as evidence upon which a model of the morphology of the feeder river system could be based. Using this evidence, together with observations of the emplacement of pahoehoe lava flows, the ideal arterial system is one described as resembling a long, sinuous, partly braided river lying along the axis of the lava flow, terminating at a delta-like front. The cave forms were rarely so simple (examples investigated are Vidgelmir, Surtshellir, Raufarholshellir and Borgarhellir) and more often than not the lava river appears to have threaded its way through a complicated maze of open conduits within the axis of the lava flow (examples investigated are the Cueva del Viento, Cueva de San Marcos and Stephanshellir). The complexity of axial conduit networks was seen to originate from such processes as braiding in the main routeway, stream piracy, the development of lateral conduit networks to carry overflow during periods of high discharge, and the elongation of the tube system across former deltaic frontal regions. Lava rivers, it is argued, are comparable with other fluvial systems with regard to their dynamics and morphologies. They possess the capacity for self-adjustment. Such forms as open and closed channels (lava tubes), channel sinuosity, and channel braiding are the developments of such aggradational and degradational processes as bank-cutting, bed erosion, stream piracy, and delta formation. The lava tubes of the arterial system must be regarded as "adjusted" or equilibrium forms because of their efficiency in maintaining the temperature and velocity of lava flow over quite considerable distances (40 km +).

At the flow front, where the mobility of the lava passing out of the tube system is checked as a result of rapidly increasing energy losses, the stream divides and sub-divides into a system of smaller distributory tubes and channels, feeding lava to a broad delta-like front. As the front advances through contunued aggradation, it is envisaged that the feeder river elongates behind (as demonstrated by the Cueva de San Marcos). Comparison with the work by Bates (1956) on river deltas suggests that lava emerging from the end of a lava tube at the front of a pahoehoe lava flow may be likened to a jet flow. Thus, the development of pahoehoe lava flows may be predictable and amenable to future quantification through the application of jet theory.

The principal conclusions reached by this study are:

(1) The development of lava tubes, with their ability through self-adjustment to maintain the temperature and mobility of the lava river within, is the reason for the emplacement of long pahoehoe lava flows over regions of low gradients. As such, lava tubes must be considered important factors in the formation of the gentle slopes of basaltic shield volcanoes.

(2) The relationships between lava structures and passage forms in the caves investigated mainly support the observations of active tube-forming processes of channel closure and toe-budding. Lava tube networks are compound

and constructed of a variety of conduit types. Some previously favored theories on lava tube formation, particularly the "layered lava" theory of Ollier and Brown (1965) and supported with modifications by Hatheway (1971, 1971a and 1976), Hatheway and Herring (1970), Greeley (1971a), and Greeley and Hyde (1971), are rejected as being b ased upon erroneous interpretations of flow structure and cave morphology.

(3) Lava tube systems in both active and ancient lava flows are frequently much more complicated than has been formerly envisaged by geologists, and each may be composed of the following elements: a long, sinuous axial throughway which is the part usually occupied by the lava river; lateral tube complexes which carry flow periodically when surges from the vent cause the main route to overflow; higher tube complexes left vacant through the capture of their flow by an underlying, older routeway; a complex deltaic region of distributory tubes at the flow front.

(4) Ignoring secondary complexities, the ideal form of the arterial system in a pahoehoe lava flow consists of a long, sinuous, partly braided lava river housed mainly in lava tubes along the axis of the flow, terminating at a delta-like front in which the flow divides and sub-divides into smaller anastomosing distributary open channels and lava tubes.

(5) The main axial feeder tube transmits the flow without significant loss of temperature or mobility, enabling the continual advance of the front as the tube system elongates behind. Because of the efficiency with which the fluid lava is transported, the flow will continue to lengthen indefinitely as long as vent discharge is maintained. Thus, it is possible to explain the emplacement of enormously long pahoehoe lava flows, such as the flows erupted from the Undara Volcano, North Queensland (Atkinson, Griffin, and Stephenson, 1977).

(6) Low thermal conductivity of the enclosing basalt of a lava tube is <u>not</u> the main reason for the maintenance of high temperatures and mobility of the lava river. Rather, it is bacause lava rivers possess the ability through aggradational and degradational processes for self-adjustment. They are seen to modify their channel forms in such a direction that thermal and mechanical energy losses are minimised and the transmission of the flow is maintained. Such adjustments to the varying flow conditions in time and space are seen firstly in open channel construction and then in channel closure (tube formation) and through the development of sinuosity and braiding.

(7) Because the efficiency of flow is so well maintained throughout the length of the lava flow, fluid lava eventually emerges from the end of the axial tube as a jet flow. Suddenly increased energy losses cause aggradation and the splitting of the flow into distributaries, as in a delta. As the delta front advances, through continued aggradation, the axial tube elongates through the former deltaic regions. Thus, a new model of flow formation is introduced which is suitable for quantification and experimentation and will enable the prediction of the rate of frontal growth of the lava flow through the future application of jet theory.

(8) Some lava flows are not developed as single long flows, but are more complex. Parts of the 1614-24 lava flow, Mt. Etna, were probably built up as a result of aggradation from lava tubes originating from secondary boccas located throughout the length of the lava flow (though boccas and respective tubes do not appear to have been active simultaneously). In the Gullborg lava flow lava tubes and channels were developed radially about the vent, each feeding an independent flow unit and thus developing a compound lava flow.

(9) Lava tube caves are the drained and partly collapsed segments of lava tube networks. Their evolution consists of three stages. The first stage involves the construction of a conduit network beneath the congealed surface of the lava flow through which liquid lava is transported from the vent to feed the advancing flow front. The conduit network is complex and takes the form described in (3) above. In the second stage activity at the vent ceases, the conduit network drains and it is modified by the deposition of cooled lava to the walls. Such second stage modifications cause parts of the conduit network to become choked and therefore segmented and cause quite extensive modifications to the passage profile. The third genetic stage is characterised by breakdown and collapse of the walls and roof of the lava tube as a result of the destructive work of sub-aerial agents. Passage forms are further modified and the cave becomes further segmented. Thus, because the rapidly changing environmental situation in which cave genesis is induced is unique to each cave forming locality, these caves exhibit an infinite variety of sizes, forms and occurrences.

Future Research Based Upon the Results of This Study

The model developed in this study requires confirmation both in the laboratory and in the field. In the laboratory, experiments with fluid analogous with basaltic pahoehoe lava (liquid paraffin wax, liquid metals, etc.) under conditions of jet flow (hypopycnal flow of the plane jet type) would provide a basis for the quantitative interpretation of the development of pahoehoe lava flows. In the field during periods of effusive volcanic activity, much needs to be known about the distribution of temperature, viscosity, and velocity throughout the lengths and cross-sections of lava channels and lava tubes in order to confirm their efficiency as transportation systems and to better understand the dynamics of the lava river within. Further observations of tube-forming processes should also be concerned with the adjustability of the channel form by the lava river as a response to varying discharges and slopes. The dimensions, cross-sectional forms, channel patterns, and slopes of lava tubes can be determined from lava tube caves. As a result of such work it may be possible in the future to be able to predict the rate of advance of the lava flow, the mechanisms of flow formation, and the eventual form the flow will assume.

There is much regional work on the mapping and geological investigation of lava tube caves still to be done--in fact, such work has hardly begun. Many of the world's great classic lava tube caves remain unsurveyed: for example, surveys are required of the two great Kenyan systems of the Mt. Suswa Lava Cave (over 8 km) and Leviathan Cave (over 11.5 km)*. Geologically, very few lava tube caves have been properly examined, though vast systems are known from the Western U.S.A., the Canary Islands, Hawaii, Korea, and Kenya. To the writer's knowledge, even the now drained and segmented lava tubes of Mauna Ulu, Hawaii, have not as yet been entered to confirm the tube-forming processes observed during the eruption or to map the system, much of which must have remained unknown while the eruption was taking place. With further regional studies it will be possible to compare and contrast cave forms and their respective controlling factors quantitatively. As mentioned while

*Editor's note: as noted in the last instalment, these lengths are misleading. As far as we know, the longest Mt. Suswa cave is no more than 1/2 mile long (see Cascade Caver 13 (8) p. 2); Leviathan is apparently also segmented.

discussing the complexity of the Cueva del Viento (p. 8), there is as yet very little information upon which to base comparative study, yet it is only through such study that many of the outstanding questions of lava tube and pahoehoe flow formation will be answered. [Editor's note: the page 8 referred to evidently is in the body of the thesis, not reprinted here].

Acknowledgement

Much of the fieldwork for this study was undertaken jointly with Martin T. Mills and other members of the Shepton Mallet Caving Club.

List of Publications Resulting from This Study

Wood, C., 1971. The nature and origin of Raufarholshellir. Trans. Cave Res. Group of Great Britain, 13 (4) 245-256 (November).

Mills, M. T., and C. Wood, 1971a. A preliminary investigation of Surtshellir, west central Iceland. J. Shepton Mallet Caving Club, 5 (1) 15-24 (Spring).

---1971b. Original contributions to vulcanospeleology from Iceland. Proc. Internat. Symposium on Vulcanospeleology and its Extraterrestrial Applications, 29th Ann. Convention NSS, 16th August, 1972. Publ. by Western Speleological Survey, Seattle, 1976 (edited by W. R. Halliday).

---1972. A preliminary investigation of Vidgelmir lava cave, west central Iceland: a case for cave conservation. J. Shepton Mallet Caving Club, 5 (4) 3-17 (Autumn).

Wood, C. (Ed.). 1973. The actively forming volcanic structures observed during the Heimaey eruption. Report of the University of Leicester Expedition to Heimaey, Iceland, 20 pp. Unpublished manuscript.

Wood, C. 1973a. Cueva del Viento confirmed to be the longest lava tube cave in the world. J. Shepton Mallet Caving Club 5 (6) 3-7 (Autumn).

---1973b. A recently successful investigation of the Cueva del Viento, the world's longest lava tube cave. J. Shepton Mallet Caving Club 5 (6) 8-12.

---1973c. Lava caves in Europe (abstr.). Bull. Brit. Cave Research Assoc., (1), 22 (August).

---1974a. The genesis and classification of lava tube caves. Trans. British Cave Research Assoc. 1 (1) 16-28 (January).

---1974b. Cueva del Viento: the world's longest lava tube cave. Bull. Brit. Cave Research Assoc., (6), 27-30 (November).

---1975. Factors contributing to the genesis of caves in lava. Atti del Seminario sulle Grotte Laviche, Catania, 27-28 August, 1975. Published by Gruppo Grotte Catania. Abstr. in Cascade Caver, 17 (9-10): 48.

---1976a. Lava tube caves on Mt. Etna, Sicily. J. Shepton Mallet Caving Club, 6 (1) 10-16 (Spring).

---1976b. Lava caves and a conference (Seminario Sulle Grotte Laviche: a report). Bull. Brit. Cave Res. Assoc. (12) 22-26 (May). Reprinted in part in Cascade Caver 15 (8) 83-86.

---1976c. Caves in rocks of volcanic origins. Ch. 4 in (Eds.) Ford, T.D., and C.H.D. Cullingford, The Science of Speleology. Academic Press, New York etc. Abstr. in Cascade Caver 16 (3) 23.

---1977a. The origin and morphological diversity of lava tube caves. Proc. 7th Internat. Spel. Congress, Sheffield, England, 440-444; publ. by B.C.R.A.

---1977b. Topographic survey of part of the 1614-24 lava flow, Mt. Etna; report of an expedition to Mt. Etna, 1976. 22 pp. (unpublished manuscript).

---1977c. Morphogenetic study of the 1614-24 lava flow and its lava tubes. in (Eds.) A. T. Huntingdon, et al., United Kingdom Research on Mt. Etna, 1975-76.

Wood, C., and M. T. Mills, 1977. Geology of the lava tube caves around Icod de los Vinos, Tenerife. Trans. Brit. Cave Res. Assoc. 4 (4), 453-469. Abstr. in Cascade Caver 17 (9-10) 48-9; see also comment in 17 (1-2) 1, 3-7.

T R I P R E P O R T S

Trip to the Cape Disappointment Caves

by Wes Gannaway

On Saturday morning, on the 21st of April, at 5 A.M. (yes, there are some cavers that get up before 8 A.M.) I left the house with my son Jason, and went to Seattle to pick up Rod Crawford, our trip leader. We then made our way down to Ilwaco, where we waited at the rendezvous and collected our first spiders of the trip. When no one else showed up, we went on to Fort Canby State Park.

We grabbed a quick snack and checked out the area of our first cave of the day. Upon our return to the car to get our gear, we found that the other cavers had arrived. There was Alan Lundberg, his son Baron, and Chris Burdge.

We all got our gear on and went back to the cave. We explored and measured the cave, and then under the direction of our cave life expert, Rod, we studied the abundant life in this cave. We found red-legged frogs, a species of newt, a cricket that is peculiar to the caves in the area, and other assorted insects and spiders, which we helped Rod to collect.

We then proceeded to the next cave, which Baron had discovered the last time he and his father had been in the area. Some of us took the easy way from one end of the cave to the other. Jason and Baron made it through the sand-filled hole (I decided to save this one for later). Jason and Baron then explored the next cave (called Compost Cave for the obvious reasons) while the rest of us explored the area. We all then spent some time checking the bluffs near the campground, without more success. We found several small openings of the shelter variety, but nothing that looked promising as far as length or size.

We all piled into my faithful Nellie Belly and proceeded to the Cape Disappointment Lighthouse Trail. From there we went on foot to Dead Man's Hollow (we had to carry our gear past the Coast Guard Station without looking like we were going climbing or caving. This is hard to do when five people are going up the trail carrying lights and helmets and wearing coveralls, etc.). This is the location of Cape Disappointment Cave, the first cave found in Washington. This cave can only be entered on extremely low tides, and we had to send Baron back for the rope so that we could get around the side of the bluff to the cave entrance above the incoming tide (again, just how do you hide a rope on you while casually strolling past the Coast Guard station? We naturally assumed that our activity was not Federally sanctioned).

We explored this cave but we ran out of time due to the incoming tide. It was possible that we could have had one of the younger fellows force a small opening at the rear of the cave. Unfortunately, "time and the tides...". We did find some cave life, mostly in the form of crustaceans of marine origin.

After swinging back to dry ground, we then went back to camp and had dinner and rested. We spent most of the evening telling Chris, who is from Indiana, that he was actually visiting caves, and not just somebody's root cellar.

The next morning we all proceeded to Beard's Hollow to look for a cave that Rod had an old picture postcard of, called Mammoth Cave. Again, as in the Jackman Creek trip, someone's Old Rust had to be left behind and my Nellie-Belly samed the day. After wandering through the swamp, we finally found the beach area and started our search. We found another cave which we should ca'l

Garbage Cave. We found a couple of small shelter-type holes, one of which had quite a variety of spiders which were duly collected.

We never found Mammoth Cave and came to the conclusion that the postcard picture was a reversed scene of the Cape Disappointment Cave.

It was time to recover Old Rust (I understand that our Glorious Chairman has finally put his O. R. away for good) and start the long trek back home, so everyone said their good-byes and started for Seattle.

On the way back home, we helped Rod search for some spiders in sedge grasses along the coast. After collecting a few species we arrived at Seattle and Rod had us take him to the Burke Museum where he showed us the spider collection and some other areas of the work rooms and storage areas.

Windy Creek Cave

by **Carlene Allred**

On Wednesday evening, the 18th of July, Kevin, Lehi, and I decided to try to find Windy Creek Cave. We drove to the area that we thought would be a good approach and began searching for a road that would be a good place to park. On one of the many logging roads we found a lost dog that looked half starved, so we decided to return it to its owner later on our way back (it was tagged). We spent the night camped at the base of a beautiful waterfall in a clearcut. Before it got dark, Kevin took an eight mile hike along roads and ridgetops to scout out the country.

Friday morning we drove around some more until we found the road closest to the cave. From there we began the hike across the obstacle course countryside towards the cave. It was a terrible route. Devil's Club, giant horseflies, mushy bogs, giant logs, and

dripping trees tortured us. We found a fairly small cave along the way that seems to be a good prospect for pushing [Editor's note: would this be the one with the waterfall entrance?]. Finally, we reached Windy Creek Cave after ascending through a tortuous giant patch of Devils Club, stinging nettle, and other calamities. Since the baby was very tired and cross, we only took him into the first room and then we took him back out. I stayed with Lehi while Kevin took a short look at the front portion of the cave. Then Kevin stayed while I took a look. We had both made it to the Ex-Pool.

After photographing Columbines, we started back toward the car. Our route was better this time, except for the last part, which was worse. We finally found the clearcut and drove home.

On the way we returned the dog to its owner in Bow, who was very glad to see him. The dog was a Blue Tick bear hunting dog. The owner was so happy that he insisted on giving us a fifteen dollar reward. We went out to dinner.

We are very excited about cave hunting in this area and would like to take some more trips into there.

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REPORT OF THE CHAIRMAN OF THE MT. ST. HELENS CAVES CONSERVATION TASK FORCE

by William R. Halliday, M.D.
28 May 1979

On May 22, 1979 I had a little time free in Vancouver, Wash., and was able to meet briefly with some members of the staff of the Gifford Pinchot National Forest to obtain some unofficial information on progress toward various cave conservation goals in both the Green/Spirit and White/Panther Planning Areas.

The staff, of course, is not free to state what management plan will be recommended for either area as yet, although it was clear that certain decisions have been made. The Mt. St. Helens lava caves lava flow will be managed "as a single unit" in some way, not as recommended by this task force and other conservation groups. The Environmental Impact Study on the recommended plan on this area is expected by August. By coincidence, it appears that the USFS-Weyerhauser exchange of lands in the cave area also will be completed in mid-summer. In discussion of this it came to light that there was a lack of understanding of the problems of managing Lake Cave (which will be transferred to the USFS in this exchange) in view of the large number of persons using Lake Cave for wild caving. In the last two or three years, a well-worn trail has come to lead directly to its entrance, and protection of the blade stalactite area and the Red Passage were discussed at considerable length.

As a result of recent input from this task force and also from Mike Dyas, the planning team has been taking a much harder look at Dynamited Cave and it seems likely that it will receive special protection in some form, like Deadhorse Cave. Dry Creek Cave is not receiving such consideration although the roadbed of road 123 which runs over its lower end may receive reinforcement. Falls Creek Cave and its system were not mentioned, which may indicate a great tragedy in the making.

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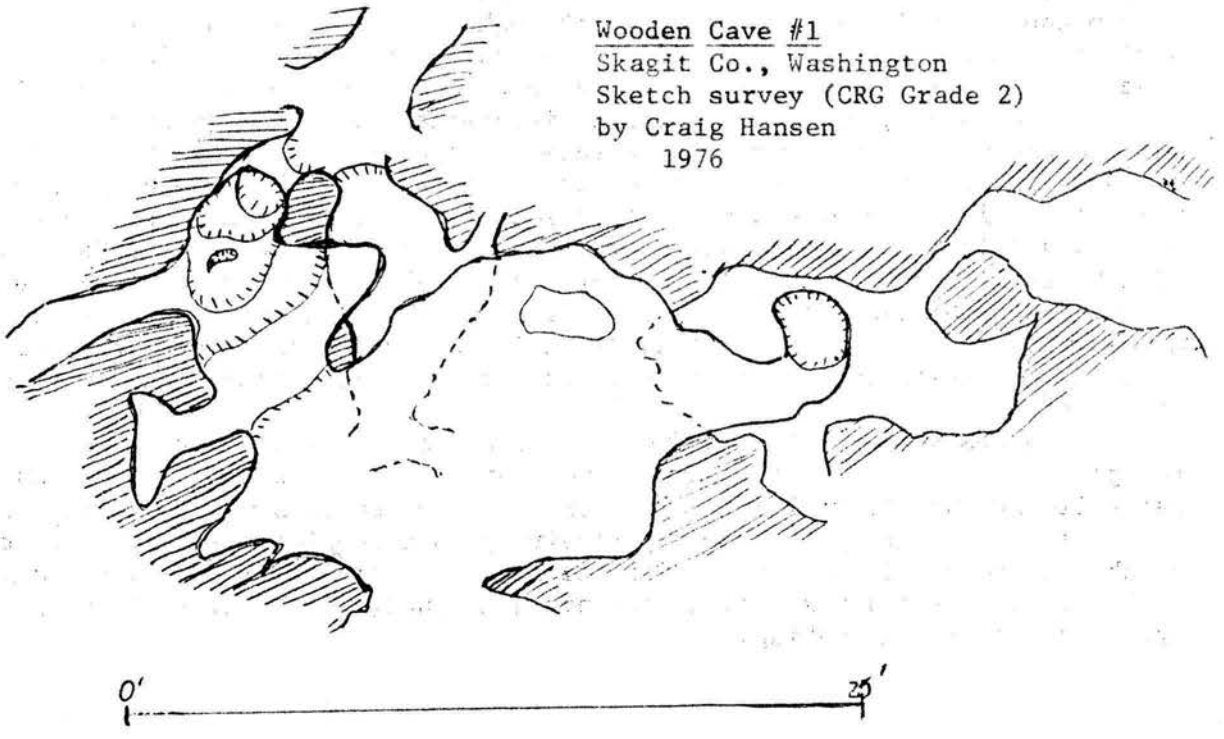
BIG LAKE WOODEN CAVES

by Craig Hansen

In a recent phone call with Rod Crawford, we talked about several rumors of caves in the Big Lake area in Skagit County. Rod mentioned caves on the east side of the lake. To the best of my knowledge (and this may be Rod's rumor), there is a large and old stump pile there, close to 100 feet high. During the last hundred years these stumps have sunk together and been overgrown with evergreen blackberry, cascara trees, pine trees, and almost anything else that grows. This gives the stump pile the overall look of just a regular wooded hill. On my first trip there three years ago with a friend, Tim Thomas, we were amazed at the number of holes that lead into the ground. We hurriedly got a flashlight and returned to the top of the hill. Upon entering the first hole we saw we were amazed, I should say impressed, at the size of the chamber. We also realized that there was nothing but wood. The whole hill was wood. I've heard of caves in limestone, dolomite, and marble, caves in lava, and talus caves in any rock imaginable, but a cave in wood? A cave in old rotten wood--the idea was novel, no more than unique, and I was delirious at the idea that I had been the first to find them.

The original chamber had several holes to the outside and was fairly well lit. Its dimensions were about nine feet high by 25 feet long, and about 12 feet wide. Off to one side was a pit that from all we could tell was close to 15 feet deep. It was small enough to chimney, so with me in the lead, Tim and I started down. Upon reaching the bottom of the pit, which was the confluence of two logs, we noticed passageways leading out in every direction. Since we were in the zone of darkness now, and with only one flashlight, we were reluctant to push on, but because of our infinite trust in our flashlight we continued on into several linked rooms all about 3 to 4 feet in height. We finally turned around when faced with a narrow crack leading down one way



Wooden Cave #1
Skagit Co., Washington
Sketch survey (CRG Grade 2)
by Craig Hansen
1976

and a tight crawlway the other. On the way up, we noticed that in this hill the caves were like trees (no pun intended), branching out in every direction. When finally in sight of light again, we gained a little courage and took one of the passageways that branched off to the side. It was an agonizing crawl for about 35 feet and we came out in what seemed like a large sinkhole in every respect except that it was wood. Upon exiting the cave via a side entrance, we had explored close to 150 feet of passageway and found two rooms large enough to stand up in.

In the various other trips we made to that wooden hill that summer, we found 27 holes in the ground, some going in only 30 or 40 feet, others to unknown distances and depths. For lack of names we called them cave #1 through cave #27, with cave 5 being the deepest, cave #7 the longest, and cave #1 being the most spectacular. These caves, although devoid of formations, offer even the most experienced caver a change of pace, the vertical caver a slight challenge, and the biological caver a quota of wooden cave dwelling insects and other animals.

These caves are found on a small wooden hill on the east side of Big Lake. If you find the hill, you can't help but stumble across some of the holes that penetrate it. Although I could give no definite directions to the hill, Tim Thomas, who lives south of Big Lake toward Arlington, is listed in the phone book and would be able to guide potential wooden cavers.

I know of several other rumors in the Big Lake area, and one talus cave on the south side of the lake, but further research will be needed before I can write up directions.

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The First Description of the Surtshellir in Iceland?

The following is extracted from a letter to Ole Borrich, written by Thorkil Arngrim in 1675, and published as: Observation 94, Actes de Copenhague, 1674-1676, in Collection Academique, Dijon and Paris, 1757, Tome 4, p. 316. Supplied by Dr. Trevor Shaw, translated by William R. Halliday.

"Also I am sending to you some stalactites which were found hanging in the vault of a cavern which I visited last year. Some are solid, some are hollow or tubular, they are all singularly scultées, some more than others. Moreover, the cavern itself merits observation; it is more than 240 paces long and 30 paces wide, and the height appears quite proportional to the width. The floor which is of rock is flat and smooth, the vault is proportioned artistically. The walls are encrusted with stone which is varicolored almost like the walls of our rooms. In the center of the ceiling, about 40 paces from the entrance of the cavern, is a skylight. In this area there are two other recesses in the walls, equally large and of the same structure, but without more than six feet of elevation. One of these alcoves has two entrances separated by a large column, very round and shaped like the top of a castle or tower. It seems that this lair, according to the history of this country, once upon a time was inhabited by a giant named Surt; subsequently it served as the retreat of 18 brigands, whom the local people finally trapped and executed for frightful crimes."

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THE JUNE MEETING: 20 people attended, and a flurry of business was conducted: An addition to the operating policy, authorizing the formation of local units, was approved, and the first two local units chartered. The "Bats Need Friends" program (handing out brochures at the movie "Nightwing") was made a Grotto project. $10 was allocated to the trip coordinator; $40 to the program committee for expenses in the next six months; and $40.07 to the membership committee for producing brochures and supplements. The program was "Mystery Hole, Tennessee."

Our hot dog pot luck, preceding the meeting, netted $30.07 profit.

SPECIAL BUSINESS MEETING, July 11th: Five voting members attended. Phil Whitfield was granted lifetime associate membership in return for his generous act of contributing the signs for our register program. $38.94 was allocated to the register program to cover recent costs. Chuck Coughlin resigned as Secretary-Treasurer, to be replaced as interim treasurer by Craig Hansen. Craig was also appointed fundraising committee chairman.

JULY BUSINESS MEETING, contd.:

The Cave Calendar project was organized as follows: the fund-raising committee chairman was empowered to produce a caving calender (using pictures from commercial caves only), its purpose to raise funds for the Grotto, provided:

1. Capital to be raised by sale of shares at $1 each.
2. Originally no more than 800 shares will be sold.
3. The first priority of the sale will be to pay back the shareholders.
4. Any remaining profit will be divided as follows:
   20% shareholders
   10% fundraising chairman
   70% Cascade Grotto.
5. More slides or black and white prints are needed for the calender and will be accepted up to the August Grotto Meeting.

THE CASCADE CAVER
207 HUB (FK-10) Box 98
University of Washington
Seattle, WA 98195

Take
Nothing
But
Pictures
Leave
No
Trace

DON'T FORGET THE AUGUST GROTTO MEETING, TUESDAY AUGUST 21st.