The Cascade Caver

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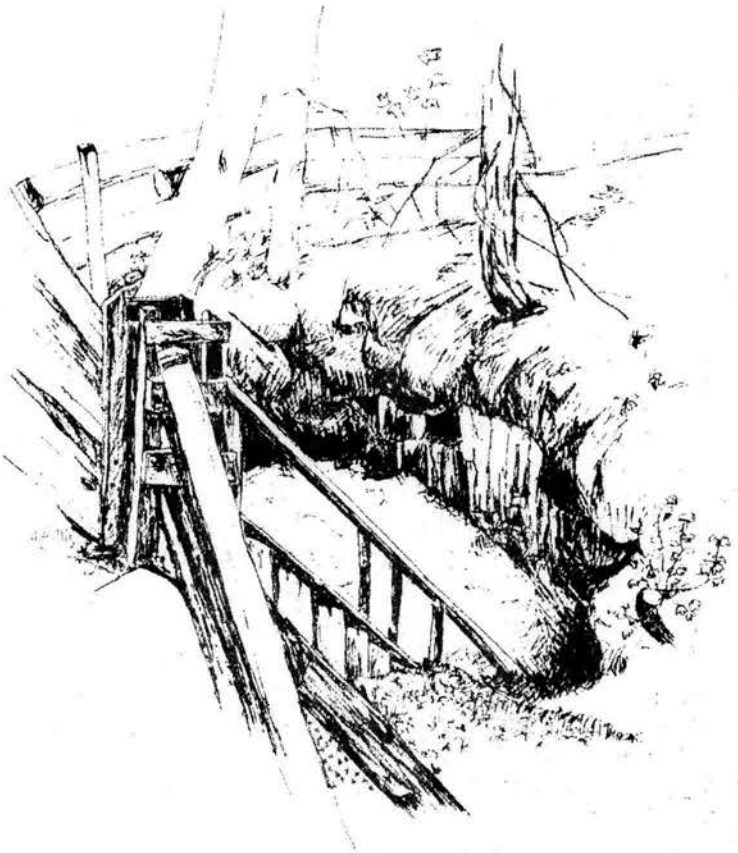


THE CASCADE CAVER intends to be published ten times per year by the Cascade Grotto of the National Speleological Society. Subscription rate is $4.00 for one year's issues. Full grotto dues are $4.50, and family memberships (not including subscription) 50¢. All payments should be made to Grotto treasurer Chuck Coughlin, 6433 S. 127th Place, Seattle WA 98178.

P A S T E V E N T S

June 30-July 4. NWRA Convention at Trout Lake, with 20-some odd Cascade Grotto people and a cast of 88 (not counting dogs).
July 7th, Saturday. Senger's Talus Cave with Bob Brown, Rod Crawford, and Wally Bosshart mapped some more passage.
July 14th, Saturday. Reception at the Hallidays' for Chris Wood and his party of British Vulcanospeleologists.
July 15th. First contingent of British Hawaii trip leaves Seattle; also a Concrete area trip with Brown and others.
July 17th, Tuesday. Regular Grotto meeting at the Hallidays, 1117 36th Ave. E, Seattle, 8:00 PM. Program, NSS slide show "Utah Caving".

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

For information on any of the following events you may contact our Trip Coordinator, Chris Burdge, at 775-6724.
July 21-22. Cave Ridge (Snoqualmie Pass) limestone caves if the weather's good. Contact Bob Brown, (206) 569-2724.
July 24th, Tuesday (and each subsequent fourth Tuesday). Northwestern Washington Unit meets at Wes Gannaway's house, 1604 Brockwood Drive, Ferndale, at 7:00. Program: "Utah Caving".
July 27th, Friday (and every subsequent fourth Friday): Eastern Washington Unit meeting at 8:00 PM, at Dave Jones' house, 106 N. 3rd, Cheney. Program: "Utah Caving".
July 28 (Saturday). Reception for second contingent of British vulcanospeleologists, at the Hallidays, 10:00 PM. Time limited to 1 hr. due to jet lag.
July 28-29. Official trip to Gordon River, Vancouver Island. Limestone caving; stay in the VICEG cabin that our auction helped build. Contact Brown.
July 29. Hawaii trip: second contingent departs.
August 5-12. NSS Convention in Massachusetts. Contact Bill Halliday, 324-7474, who is leaving on or after July 27th.
August 18-19. Official Grotto trip to Sumas Mountain and Black Mountain limestone areas, northwest Washington. Contact Wes Gannaway, (206) 384-4209.
August 18-23. International vulcanospeleological field trips in Washington: contact Halliday. American, British, and Spanish cavers will be present.
August 18 to September 3rd. Chitistone River (Alaska) limestone area expedition. For details write Jay Rockwell at 2944 Emory St., Anchorage, 99504.
August 21, Tuesday. Regular Grotto meeting in Seattle, same time and place. Program: NSS slide show, "Gwonk Show"; also a presentation by Dr. Christopher Wood, British vulcanospeleologist.
August 24, Friday. Eastern WAshington Unit meeting, same time and place as above. Program: "Gwonk Show".
August 28, Tuesday. Northwestern Washington Unit meeting, same time and place as above. Program: "Gwonk Show".
Sept. 1-3, Labor Day. Cody Cave, B.C. Meet at Whitfield's house in Nelson, B.C. Contact Brown.

OUR COVER: Drawing of the entrance of Trout Lake Ice Cave by Jeanne Hillis, from a greeting card in the Halliday collection.

F E A T U R E

Lava Tubes: Their Morphogenesis and Role in Flow Formation*

by Christopher Wood

This study considers the problems of lava tube formation and the role of lava tubes in the emplacement of large basaltic pahoehoe lava flows. It is based upon field investigations of 27 km of lava tube cave, consisting of twelve caves in five contrasting lava flows from Tenerife, Iceland, and Sicily (Mt. Etna) (Table I). A lava tube cave is defined as a drained segment of the internal artery system (lava tube system) of a pahoehoe lava flow. Descriptions of other lava tube caves in the speleological literature and reports of the observations of tube-forming processes operative during the 1969-74 Mauna Ulu eruption, Kilauea volcano, Hawaii, have also been called upon to support the arguments put forward.

The many previous studies throughout the world have shown that lava tube caves are quite common volcanic landforms and possess a wide diversity of sizes, forms, and occurrences. They have been investigated mainly by speleologists and local geologists, though later, more detailed investigations were stimulated because it was believed that partly collapsed lava tube caves were analogous with some lunar sinuous rilles. As a part of the same study programme, observations of lava tube formation were carried out during the 1969-74 Mauna Ulu eruption, Kilauea volcano, Hawaii, when it was realised by professional vulcanologists that the formation and functioning of lava tubes was essential to the continued advance of pahoehoe flow fronts and, perhaps, to the growth of Hawaiian type shield volcanoes.

Previously, varied hypotheses have never adequately explained the development of conduit systems in pahoehoe lava flows. The problem was that the complex cave morhpologies encountered in the field could not be reconciled either with the traditional model of lava tube formation, entailing the drainage of the fluid core of a partly congealed lava flow, or with the tube-forming processes of channel closure and toe-budding observed during periods of active vent effusion. The present writer has never held this view, and has shown in this study that the relationships between flow structures and passage forms in the caves investigated in general confirm the channel closure and toe-budding mechanisms. It also appears that the structures related to the caves investigated are similar to the structures related to all other lava tube caves and that some previously favored, though controversial, theories on tube genesis are based upon erroneous interpretations of the structural evidence. Lava tube caves are recognised as compound forms, each being constructed of a variety of conduit types. The various methods of conduit genesis in pahoehoe lava flows have been demonstrated and the morphogenesis of selected caves has been worked out from the spatial relationships between their constituent passage types.

The caves investigated occur in small groups. On Tenerife, three caves--the Cueva del Viento, Cueva de Felipe Reventon (this cave not investigated) and the Cueva de San Marcos--form part of a 15 km long cave complex situated in a basaltic lava flow on the norther slope of the island. The Cueva del Viento, with a length of 10 km [segmented into three caves--ed.] is one of

*This paper, comprising the extended abstract from Wood's unpublished Ph.D. thesis (University of Leicester, 1978) is here published for the first time anywhere.------editor.

TABLE I.
LIST OF LAVA TUBE CAVES INVESTIGATED

Name of Cave	Name of Lava Flow	Location
Cueva del Viento (Cueva de las Breveritas; Cueva de los Piquetes)	unnamed	Icod de los Vinos, north Tenerife.
Cueva de San Marcos	" "	" "
Raufarholshellir	Leitahraun	Southwest Iceland
Borgarhellir	Gullborgarhraun	Snaefellsnes, West Iceland
Vegghellir	" "	" "
Thrihellir	" "	" "
Ishellir	" "	" "
Vidgelmir	Hallmundarhraun	W. Central Iceland
Surtshellir-Stephanshellir	" "	" "
Grotta dei Lamponi	1614-1624 lava flow	Mt. Etna, Sicily
Grotta degli Inglesi	" "	" "
Grotta del Labirinto-Pozzo Superiore	" "	" "

the longest known lava tube cave systems in the world.* It consists of two parts, one part trending beneath the line of the other, though the two parts are connected as a result of lava stream piracy. Each part originated as a separate cave: they are housed either in separate lava flows or separate large flow units. The morphology of the Cueva del Viento was shown by the survey to be complex, but this complexity could be attributed to the abandonment of some passages and passage complexes as a result of various piracies of flow and to the development of "overflow conduits" on either side of the main route. The Cueva de San Marcos, situated downflow of the Cueva del Viento, was recognised to be of great geological interest because it had been truncated by the retreating sea cliff at Puerto de San Marcos and offered a unique opportunity of relating cave form and flow structure. The flow was composed of many small flow units or pahoehoe toes, some of which housed small cave passages along their axes. The structure of the flow around the cave was regarded as typical of structure near the front of a large pahoehoe lava flow and it was demonstrated how the morphology of the cave originated through a modification of the conduit network as the feeder tube elongated in sympathy with the continued advance of the front downslope.

Raufarholshellir, situated in the Leita lava, Iceland, and Vidgelmir and Surtshellir-Stephanshellir, situated in the Hallmundarhraun, Iceland, are enormous caves which originated from feeder conduits aligned along the axes of long lava flows confined by valley sides. The origin of Raufarholshellir is problematical, for its apparent source is small lava tubes above lava-falls in the three main tributaries at the head of the cave, though these

*It should be noted that Wood's concept of what constitutes a single lava tube cave differs sharply from the policy of this journal. For details, see the Cascade Caver, vol. 17 no. 1-2, p. 3.

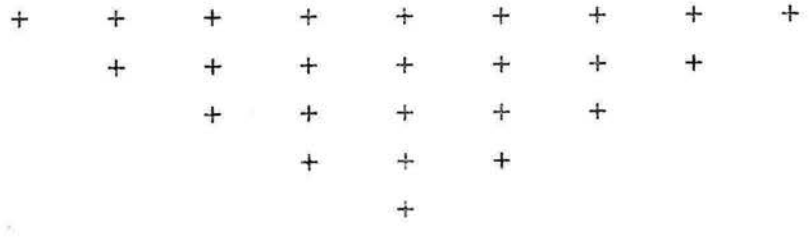
could not have contributed the volume of lava that was required to partly fill the main tube and it is believed that other, larger, sources never drained and today lie buried beneath the floor deposit. The Hallmundarhraun caves are vast, sinuous tunnels, though Stephanshellir is partly braided and this cave may have originated in an area subjected to periodic underground lava ponding. Vidgelmir is a particularly splendid cave, with spectacular displays of ice and lava formations, while Surtshellir is relatively featureless, though exhibiting an interesting passage intersection in its higher reaches. All of these large Icelandic caves appear to have originated from open lava channels and they have all drained quite extensively of the very fluid lava they were transporting. Consequently these caves have undergone little secondary modification. Drainage of all of the caves was demonstrably related to variable gradients in the pre-flow topography.

Lava tube caves and open lava channels located about the vent crater of the small Icelandic lava shield, Gullborg, were constructed as feeders for the large flow units making up this compound lava flow. One group of caves, known as Thrihellir, was developed around the breach in the crater rim as a result of the rapid aggradation of the escaping fluid lava and probably compares with the multiple layers of intersecting tubes noted in the vent area of Mauna Ulu. Borgarhellir, the largest cave of the Gullborg group, was particularly notable for its lava formations and its situation in a long flow unit trending to the notrhwest. Lava channels and tubes exhibited comparable wall structures and the relationship between passage form and lava structure was well exposed about an undrained tube in the wall of the entrance collapse of Borgarhellir, and about a remnant of the lava tube lining (the "gothic arch" structure) in Vegghellir. Surveyed relationships between the positions of the caves, the vent crater, the open lava channels, and the major flow units, enabled a reconstruction of the history of the lava flow.

The lava tube caves of the 1614-1624 lava flow, Mt. Etna, were investigated primarily in order to assess the role they played in the formation of the large terrace-like features of this lava flow. Three very different caves--Grotta del Labirintho-Pozzo Superiore, Grotta degli Inglesi, and Grotta dei Lamponi--occurred in varying positions relative to the terrace fronts and appeared to have originated from independent secondary boccas. Structures of the lava flow were rarely seen in the caves and morphogenetic interpretations were based upon the caves' morphologies. Spatial relationships between the caves provided details of their relative ages and the possible order of terrace formation. Caves were seen to have played some part in the growth of the terraces, which have been described as lakes held back by a rubble dam.

T O B E C O N C L U D E D

The conclusion and bibliography of this paper will appear in the next issue of the Cascade Caver. Watch for it!



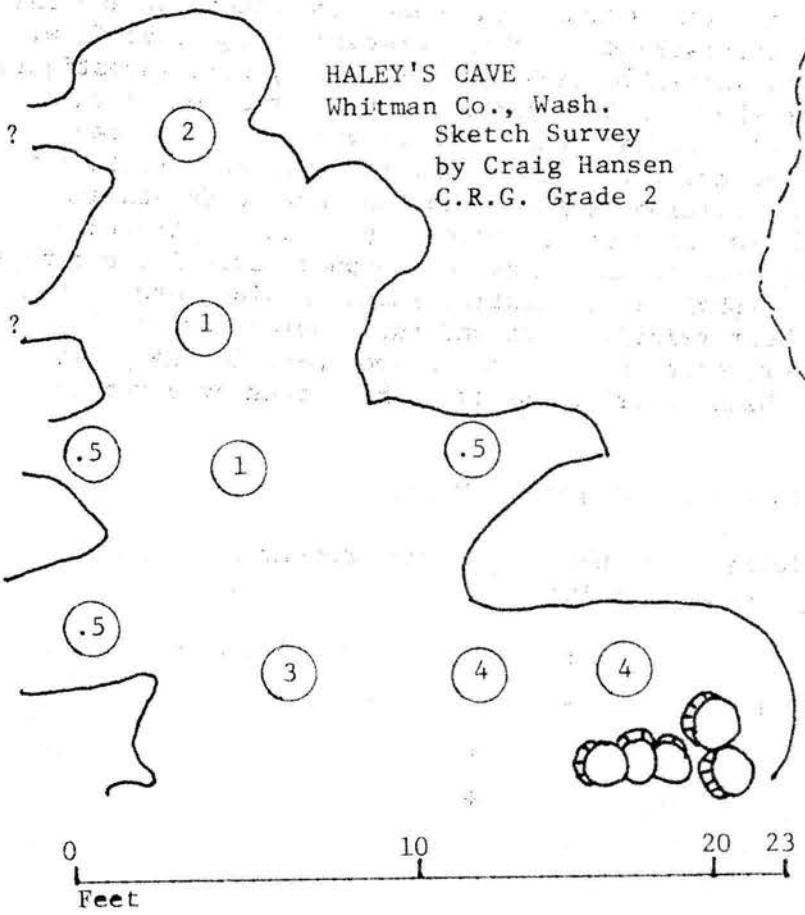
TRIP REPORTS

Eastern Washington in February and March

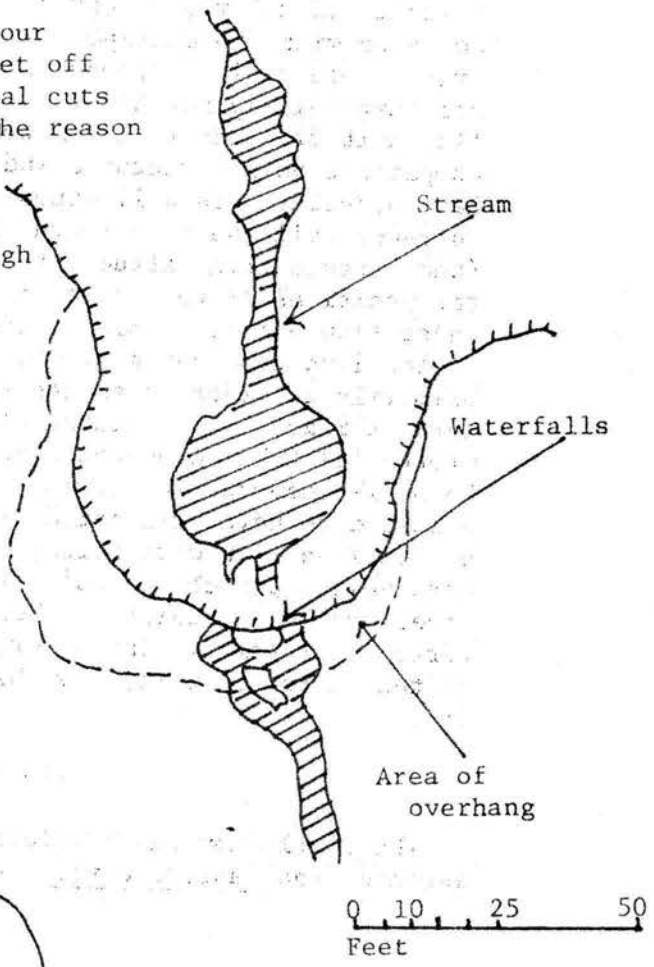
by Craig Hansen

In early February, David Jones and I were in a serious caving mood, so despite two feet of snow and zero degree weather, we prepared ourselves for checking out some local rumors. Our first trip brought us to Kepple Lake in Turnbull National Wildlife Refuge, near Cheney. We wandered around for two hours, but in spite of the specific directions given us, we could find no caves. So, to lighten our depression, Dave and I visited the lava caves mentioned in the previous report, and were surprised to find them almost completely iced in. We took some pictures, dug a little revealing a tree cast leading off to the side, and found a small rockshelter leading off to a small creek on one side. In going to these caves or the tree casts one must be careful of the landowner; they don't like to be bothered. Anyone interested please contact me, for I have previously talked to the landowner.

Don't go to Whitman County in the spring, our friends told us, but, undaunted, Dave and I set off March 5th to study the sedimentology of several cuts and check on some rumors while down there. The reason for the warning was soon found out: mud. The mud was so thick that my small Nova was soon laden with an even two inch coating of mud. Not to worry, though--it had been through



HALEY'S CAVE
Whitman Co., Wash.
Sketch Survey
by Craig Hansen
C.R.G. Grade 2



WATERFALL SHELTER
Whitman Co., Wash.
Sketch survey by
Craig Hansen
C.R.G. Grade 2

worse. So we continued and by the end of the day we had found three small rockshelters.

The first one located in section 5 Range 39 E Township 19 N, near Revere, Washington, is a rather large undercut produced by two small waterfalls. From a distance it looks like a large black hole close to 50 feet in diameter, but a closer look reveals it to be an undercut which recedes at the most a little more than 20 feet into the hillside. It was rally interesting in one effect, and that was that you could completely walk around and behind the waterfalls. We were going to practice rappeling since it was a nice 60 to 70 foot cliff with both free and cliff rappel, but due to finding no decent place to tie in, we gave up and proceeded down the gully ridden road for about 8 miles where we spotted our next rock shelter close to one mile off. Upon reaching it, we found it to be only a small rockshelter formed along a fault in the basalt. Slightly disappointed, we climbed to the top of a butte and spotted another hole about a mile off, so, a little bit more slowly, we started off. Arriving at the scene, we found a small rockshelter extending 50 feet into the cliffside. Haley's Cave, as we later decided to name it [after a recently deceased friend--ed.] was entered through a fairly large hole in highly vesicular basalt. After crawling through the entrance, which averaged 3 to 4 feet in height, we went further with the clearance getting less and less, due to the rising porcupine dung which in the end finally sealed off the cave. So we inched our way out of the cave and, once out, proceeded to pick out the many porcupine quills embedded in our skin. After this painful job, we proceeded toward Hole in the Rock Canyon; but after two miles of solid mud and barely escaping three gullies which reminded me of the Grand Canyon, we decided to quit while we were ahead.

Although we didn't go up to Pend Oreille County during February or March, we found several rumors. While researching the rumor near Rock Lake named Devils Well, we found a picture of another Devils Well in Pend Oreille County. The picture gives the dimensions with the statement that it plunges to unknown depth. It is a waterfall plunge pothole at the lip of the dry falls on Horseshoe Lake, in section 8, T 30 N, R 43 E. We checked it out on a geological map and found that it is located in granite, and the topographic map shows that it is 60 to 120 feet above the lake and has water in the bottom of it. It size alone makes it unique, and since it is close to the lake I wonder if any connection is possible.

Rattlesnake Cave

by Clifford S. Churchman, III

On Sunday, April 20th, I picked up Geary Sanders at his home about 6:00 A.M. We drove into the rising sun on I-90 with North Bend in mind. It's nice to be on the road when the populace is still asleep.

A magnificent view of big and little Mt. Si, as we drop into the Snoqualmie Valley; a cloudless day, and a new freeway. The road swings south around North Bend; we exit from the freeway and soon reach the head of a trail going southwest and uphill. Soon the trail switchbacks a hard right and continues up to a cleared old railroad bed. About 200 feet south the clearing ends and the trail goes uphill, and uphill and uphill, 1300 steep feet.

From the top of Rattlesnake Ledge is an excellent view of Rattlesnake Lake and the Cedar River Watershed. Chester Morse Reservoir can be seen to the

east, as well as the beautifully jagged rock and white snow of the high Cascades.

But the best feature on the top of Rattlesnake Ledge is the crack, 25 feet deep and about a meter wide. The south end is partially full of breakdown, and the north end has chockstones. Entrance is easy on the south end, the breakdown forming a natural staircase to a six foot jump to the floor.

From there you can go 10 feet under the rock to a dead end, or north to an opening in the face of the rock--an excellent view, but a dead end to all except birds.

Back where your jump landed you on the floor, there is a small hole going down. It's a tight squeeze, feet first and turning, with no floor until you're most of the way through. Then it's a nice room, three to four feet wide, 20 feet long, with about a six to seven foot ceiling. This we call the Smoke Room.

From this room is a passage northwest about seven feet. At the end are passages going both up and down. (Also, twisting around backwards is an untried passage to the floor of the main crack). Going down is a tight squeeze to a room in breakdown, six feet by 20 inches, and on to an entrance on the north face. This is a short crawlway through a roughly square hole, and has been termed Entrance #4. The caver can stand up on the steep slope surface, go four feet up, and into Entrance #3. Re-entry is a separate and tight passage back to a squeeze into the seven foot passage into the Smoke Room. Turning north is a crack to daylight.

In the floor of the Smoke Room is another hole. It permits passage down about another seven feet. Just north is the crack to daylight from above (possible #5 entrance?). To the southeast the rock permits two passages, reconnecting about 30 feet away. Then a sharp 90° turn east, another 20 feet of passage, and there's a place I call "Sanders' squeeze". I tried on three separate expeditions to negotiate that pinch, and failed until I saw Geary Sanders succeed.

Just past Sanders' Squeeze is the #2 or face entrance. It is four feet tall and 16 inches wide and opens onto a broad, sloped shelf on the east face of Rattlesnake Ledge.

On the same fracture, above the face entrance, is another skinny passage about 40 feet to a proven passable hole in the stairway of the main crack.

The rooms and passages suggest that this is a block creep cavern. Why the whole top of Rattlesnake Ledge doesn't fall into Rattlesnake Lake, I don't know.

Water modification is extremely minor, suggesting that this is a geologically recent formation. But then, I don't know the type nor characteristics of the rock, so my basis for setting an age is weak. Most of the cave is in twilight, with little true darkness.

Biota observed on this expedition included two or three rodents about 6 inches in body length with about 4 inches of tail. They were brown/white with rounded ears and apparently nest in the bottom of the cave [Sounds like Deer Mice--editor].

Absent on this trip were the many noths we've seen before; also missing were the Daddy longlegs (harvestmen) and one large slug.

Many people come up to the top from the campground, but few even enter the crack. Trash is throughout the cave, thrown from above by visitors, and carried lower by the rodents.

We have been to this cave may times. It's right out the back door of Seattle, and is open basically year around.

UNITED KINGDOM SPELEOLOGICAL EXPEDITION
TO KILAUEA AND MAUNA LOA VOLCANOES, HAWAII, 1979

A Prospectus

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by Dr. Christopher Wood

Exploration and photography of the inner planets of the solar system by NASA and the USSR has revealed vast areas of the planetary surfaces which in the past were subjected to basaltic volcanism. In the main, this volcanism took the form of outpourings of fluid, basic lava and it gave rise to expansive basaltic plains and low, broad shield volcanoes, each macro-form being apparently dissected by elongated, channel-like features known as sinuous rilles. Earth-bound representatives of basaltic plains and shield volcanoes are abundant, and open lava channels and partly collapsed lava tube systems (artery systems within large lava flows) are believed to represent terrestrial analogues of the sinuous rilles. Particularly exciting is the recent idea that channel-and tube-fed flow has been responsible for the construction of the large areas of the planetary surfaces represented by plains and shields.

This expedition is designed to test this hypothesis and is built upon the experience of other similar projects undertaken by this team in Iceland, Tenerife, and Sicily (Mt. Etna). Hawaii Island is constructed from five shield volcanoes, with Mauna Loa and Kilaues being perhaps the two most active volcanoes in the world. Mauna Loa is immense, rising to over 9 km above the floor of the Pacific Ocean (in fact, slightly taller than Mt. Everest--though shield volcanoes on other planets, such as the 27 km tall Olympus Mons on Mars, appear to be larger eminences than terrestrial shields), and a recent photo-geological study undertaken by a NASA team suggests than almost 82% of its surface flows were emplaced in association with lava channels and lava tubes (these two features being genetically related). Of even greater attraction to the expedition is the complex, braided lava tube system that was observed to develop down the flank of Kilauea Volcano during the 1969-74 Mauna Ulu eruption--until this year the drained segments of this tube system (known as lava tube caves) have been too hot to enter.

The expedition has two main objectives: (1) to locate, explore and map as completely as possible the drained segments of the Mauna Ulu (Kilauea) tube system, as a basis for morphometric analysis and interpretation of the dynamics on the emplacement of this type of lava flow; (2) to investigate generally the occurrences and forms of lava tube systems (as identified in lava tube caves) on the volcanoes Mauna Loa and Kilauea.

Such work is of both speleological and volcanological importance. Speleologically, lava tube caves are now recognised as landforms ranking in size, complexity and internal beauty with limestone caves. To date, the longest known lava tube cave is the 11.5 km Leviathan Cave, Kenya*, though this expedition has every hope of finding much longer and deeper systems than this on the flanks of Mauna Loa. Indeed, it is surprising that an area with so much speleological potential has never before been investigated. Volcanologically, if the dynamics of tube-fed flow are understood, then the construction of long lava flows, of basaltic plains and of Hawaii type shield volcanoes

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*This seems to be an error. The largest figure published for Leviathan to date is 11.122 km. What is more, information recently received strongly indicates that the cave is, after all, segmented into three caves.--editor.

may be interpreted. Such work may also form a basis for mathematical models of flow development with opportunities in the future for flow prediction.

The expedition therefore combines serious scientific enquiry with cave exploration and adventure in the world's most volcanically active region. An experienced team of 10 geologists and speleologists will investigate long and complex lava tube caves at altitudes ranging up to 4,200 m, entailing mountain and underground bivouacs. Cave networks will be accurately mapped in relation to the surrounding surface terrain, cave geology will be examined and the cave biota will be recorded. As the Mauna Loa and Kilauea volcanoes are located within the boundary of the Hawaiian Volcanoes National Park, it is hoped that there will be cave discoveries that will be of future public interest.

The expedition is led by Dr. Christopher Wood and fields a team made up of members of various caving clubs. The expedition departs from the U.K. on Saturday, 14th July and returns on Saturday, 25th August--there being 42 days in the field. Base-camp will be situated at the National Park campground at Namakani Paio, near Kilauea summit crater, where accommodation has been found in two camper cabins. Lightweight camping equipment will be used during excursions to remoter regions of the volcanoes. The expedition members will be transported to Hilo by one of the regular airlines and a four-wheel-drive vehicle will be hired on Hawaii Island to provide day-to-day transport.

The expedition has to date the support of the following organisations:
The Royal Society
The Royal Geographical Society
The Ghar Parau Foundation
British Cave Research Association
The Sports Council
Hawaiian Volcanoes National Park Office
United States Geological Survey Hawaiian Volcano Observatory.

SPECIAL NOTICE

The first contingent of the expedition will pass through Seattle on July 14th, and there will be a reception for the British cavers at Dr. Halliday's home from 10:00 to 11:00 PM. They will depart from Seattle for Hawaii on Sunday, July 15th.

The second contingent will arrive in Seattle on Saturday, July 28, with a reception probably at the same time and place.

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VULCANOSPELEOLOGICAL ABSTRACT

Decary, R., 1949. Les galeries basaltiques de l'Ile de la Reunion et de Madagascar. Societe Geol. de France, Compte Rendu Sommaire (bound with its Bulletin, series 5 No. 19). Abstr. by W. R. Halliday.

On the island of Reunion in the Indian Ocean, lava tube caves were recorded as early as 1772. Their speleogenesis was outlined in 1804, and "confirmed" by A. Lecroix in 1923 (the references were given and are being sought). Their names are derived from local topographic features: Delcy Hole, Saint Benoit Cavern, Mussard Cavern, Cape Blanc Cave, etc. Hermitage Hole, in the SW part of the island, is probably one of the oldest. It opens on a sea cliff about 100 feet above sea level and can be seen to run north as a

gallery 4-5 meters high. A stream of water runs from its mouth and, if it could be tapped, would be of great importance to the people of that part of the island. This cave had never been entered, as of that writing. The Grotto of Rosamond or Chapel Grotto on the flank of Piton Bory is of a different origin. It extends into a cinder cone, some 20 m wide, 4-5 m high and is about 40 m long. Decary attributes its origin to degassification.

Decary records the presence of lava tubes with stalactites, on the active volcano of Karthala, on Grand Comoro Island, and briefly mentions some in Madagascar, in the region of Andranofanjava, on the west flanks of the massif of Ambre. Among them are the cave of Andavakoera, adjoining Renard Crater; several about 2 km north of Bobakilandy; the cave of Andanakaomby; "etc.". They are mostly rectilinear, 3-5 m wide and 2-3 m high, and can be explored for several hundred meters.

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OVER THE GUANO

Another Terrible Caving Song

by Ordovician Ord

To the tune of "Over the Rainbow".
Based on an idea by Phil Whitfield.

Somewhere over the guano,
Deep inside,
There's a passage I heard of
Where untold beauties hide.

Somewhere over the guano,
Brown bats fly,
Bats fly over the guano,
Why, oh, why can't I?

Instead I have to wallow through
A deep morass of slimy goo
Beneath them...
While there they fly with spotless fur,--
If I had wings, you may be sure
That I'd unsheath them...

Somewhere over the guano
Vast caves lie,
Bats fly over the guano,
Why, then, oh why, can't I?

If leather-winged bats can fly
Beyond the guano--
Why oh why can't I?

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THE MARCH GENERAL MEETING was reported in the last issue under the erroneous title of "February Meeting".

SPECIAL BUSINESS MEETING, MARCH 31st:

The Cave Resources Committee was allocated $10 to house the Grotto Map Library. Sections were added to the Operating Policy dealing with: exchanges and Grotto library; Grotto store; equipment rental; and cave resources committe; and the section dealing with editor's responsibilities was amended (all these changes were incorporated in the version printed in the Summer Supplement).

APRIL MEETING

Proceedings of the March S.B.M. were ratified unanimously. The Grotto Rental Equipment was divided; Chuck Fair now has half and the other half is kept at the Hallidays'. The Treasury was reported to contain $70. It was announced that on April 8th Bill Halliday and Chuck Coughlin rappelled down Chuck's 150' rope to the Deception Pass mine which proved to be 150' long with some interesting hand-hewn timbers. The program (on Fern Cave, Alabama) was good, although unfortunately we couldn't use the taped narration, and was capped by Bill Halliday's slides of his Venezuelan trip.

MAY MEETING

Six voting members passed all our previously proposed constitutional amendments (see v. 17 no. 11-12). A potluck was arranged for the June meeting. Chris Burdge reported finding no sea caves between La Push and Ozette. Program was "Introduction to Northwestern Vulcanospeleology".

THE CASCADE CAVER
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University of Washington
Seattle, WA 98195

Take
Nothing
But
Footprints
Leave
No
Trace

THE AUGUST MEETING IS TUESDAY, AUGUST 21ST.