



THE CASCADE CAVER

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

Vol. 15 #6



PROPERTY OF
WINDY CITY GROTTO
LIBRARY June 1976

Volume 15 No. 6

Editor: Rod Crawford

Pupfish Win When Court Rules On Water Rights

WASHINGTON (AP) — The Supreme Court decided the Devil's Hole pupfish case today. The pupfish won.

In an unanimous opinion written by Chief Justice Warren E. Burger, the court ruled that the government has the right to control pumping which it says is threatening the rare species of wildlife with extinction.

The decision was a defeat for Western states which intervened in the case to protect their right to control use of underground water.

The Devil's Hole pupfish is a species less than an inch long which is believed to have lived for at least 30,000 years in a 200-foot deep limestone pool in Death Valley in Nevada. It survives nowhere else in the world. The pupfish population in the pool ranges from 200 to 800 at different times of the year.

The fish depend for their food supply on blue-green algae which grow on a sloping ledge measuring eight by 18 feet on one side of the pool. The dimensions of the pool are 10 by 65 feet.

In 1968, Francis and Marilyn Cappaert, owners of a 12,000 acre cattle ranch adjacent to Death Valley National Monument started pumping irrigation water from deep wells. The pumping drew down the water level in the pool so that by 1972, about 60 per cent of the sloping ledge was exposed.

In August, 1971, the government filed suit against the Cappaerts, claiming the right to control pumping of the water under a proclamation by the late President Harry S. Truman in 1952 which set aside Devil's Hole as part of Death Valley National Monument.

The high court agreed with the government's contention that in withdrawing land from general public use for such a purpose it also has the power to set aside the ground water.

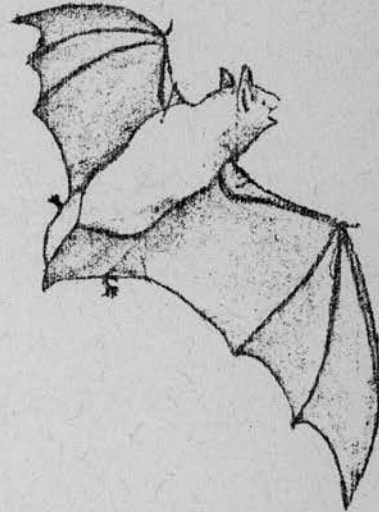
The high court decision upheld an order by U.S. District Judge Roger D. Foley of Las Vegas, Nev., ordering the Cappaerts to limit their pumping so that the water would not drop more than three feet below a copper washer placed on the wall of the pool in 1962 to mark the water level. If the water dropped more than three feet, Foley found, the survival of the pupfish would be endangered.

The Cappaerts and the state of Nevada appealed to the Supreme Court from a ruling of the U.S. Circuit Court in San Francisco upholding Foley's action. Briefs in support of the ranch owners were filed by California, Colorado, North Dakota, Washington, Arizona, Hawaii, Idaho, Kansas, Montana, Nebraska, New Mexico, Oklahoma, South Dakota, Utah and Wyoming.

Officials of these states said the decision threatened the rights of states in arid areas of the west to control vital water supplies. They noted that Devil's Hole is part of a 4,500 square mile ground water system.

The Devil's Hole pupfish is one of nearly two dozen original species of pupfish, of which at least five from the Death Valley area thought to be extinct. The fish are named for a puppy-like manner of leaping and darting about. In prehistoric America they thrived in a lake more than 600 feet deep which covered what is now Death Valley. Their scientific name is *Cyprinodon Diaboli*.

From: Daily Olympian, 7 June 1976



In this issue—

the inside story on

LEVIATHAN

THE CASCADE CAVER is published ten times a year by the Cascade Grotto of the National Speleological Society. Subscription rate is \$4.00 per year. Full grotto dues of \$6.00 includes a subscription to the quarterly Northwest Caving. All payments should be made to the grotto treasurer, Chuck Coughlin, 6433 S. 127th Pl., Seattle Washington 98178.

COMING EVENTS

June 19-20. Presumably someone is going caving. Call around and find out.

Our Official Trip to Vancouver Island is scheduled for this weekend but may be postponed to next weekend, June 26-27. Contact Bob Brown in Elbe, 569-2724, for information.

June 21, Monday. Regular monthly meeting at the Hallidays', 1117 36th Ave. E, Seattle, 8:00 P.M.

July 1. Deadline for July issue of Cascade Caver.

July 3-5, Independence Day Weekend. Windy Creek Cave, North Cascades. Probably a snow trip (see below). Contact Chuck Coughlin, 772-1170.

I presume there are other trips planned for July, but no one has told me about them.

July 19, Monday. Regular meeting, same time, same place.

CHANGE OF ADDRESS

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NEWS AND NOTES

Those who are receiving complimentary copies of this issue, remember: If you want the next, you will have to join or subscribe (i.e., pay the treasurer some dough). * * * * * *

Thought for the day from your treasurer: Did you ever try to convince a bank officer that your name was Cascade Grotto? (Please make checks payable to Chas. Coughlin). * * * * * * *

On the 13th, Bob Brown, Bill Capron, et al. checked the Bear Creek Road for access to the Windy Creek Cave area. Unfortunately, there was 3' of snow at 3000'. Probably there will be snow camping at the big Independence Day trip. Also, none of Bob's keys would fit the gate. We presume more will be known about this by the meeting. * * * * * *

Yr editor humbly apologizes for the May issue's being attached to the June issue instead of being printed and distributed in May like it should have been. At the same time, he must strongly complain about not having received one single trip report for either the May or the June issue. Come on, people-- I know you're going places. You'll have to start writing about them too, if you want the Caver maintained at even its present quality. I can't write them all every month. * * * * * *

Speleopolitics department: On March 5, 1976, the Executive Committee of the Oregon Grotto voted to expel Steve Knutson from that Grotto "for failure to properly credit the Oregon Grotto in its support of the Oregon Caves project." * * * * * *

Ryan's Cave #1 is a synonym for Madison's Fence Cave. Ryan's Cave #2 is a synonym for Wildcat Cave. * * * * * *

Special Feature

A NEW RECORD LAVA TUBE:

KENYA'S LEVIATHAN MAY NOW BE THE WORLD'S LONGEST

Leviathan Cave, in the Chyulhu Hills of Kenya, was discovered last year by the Cave Exploration Group of East Africa. A brief notice on it appeared in the November-December Cascade Caver. Since then, there have been stirring goings-on in that part of the world. The January CEG Newsletter contains an account by Jim Simons of explorations on the December 12-14 weekend down-tube from Compass Collapse, the furthest point reached at last report:

"A repeat survey through the forest enabled us to re-locate Compass Collapse, and for the next seven hours we remained underground on constant exploration...The tube section downstream of Compass Collapse has now been DOUBLED in length to roughly 2.4 km, most of the tube being of large dimensions...Few sections of the tunnel, however, are easily walkable, the floor being largely composed of great breakdown blocks, wet, and covered with guano and mud slime. At the first 0.5 km there is an upper level which can be seen to extend back upflow for 100 m or so to a collapse hole. A climb into this level may be feasible though most likely a maypole will be required. Just halfway along, the tube becomes only a few metres in diameter, being practically circular; it was here that Bob and John stopped last time. At a sharp bend in the passage in the new ground beyond we met with a veritable hurricane of draught, and this augered well, but not long after we reached what at first appeared to be a solid lava seal and decided to have lunch. Bats, of which there were many hundred present, were swirling around just in front of us, and it took only a little while to realize that they were disappearing through a hole in the rock. This turned out to be a short, low crawl and we were back into a sizeable passage with both an upper and a lower level. The lower level was comparatively flat going and finally came to an 'end' at a boulder ruckle through which daylight could be seen; we had reached yet another collapse hole. Only a large rock prevented us from squeezing up into what must be another upper section. At our level, a dig was feasible along the true right wall and even though we were within a eighth of breaking through, exhaustion took its toll and we ran out of steam. Very little work remains to complete this crawl and effect an entry to the remainder of the cave."

Beginning soon after the discovery last year, the CEG has been drumming up support from local businesses for a full scale expedition to the cave. The response was entirely satisfactory. Materials support was received from such firms as Union Carbide, Kenya Cannery, Kodak, and Kenya Guano, among others. The ten-day expedition took place from April 10-20, 1976. Participating were: Jim Simons, geologist and leader; Bob Davis; John Youngs; Chris and Allison Hillman, zoologists; Graham Cole; and Peter Roe. Operating the base camp and supply lines were James Kitheko, Mutuku Mutinda, Mulatia Ngovia, and Bernard Michael. The following account of the expedition by Jim Simons appeared in almost its present form in the Kenya Daily Nation, May 20, 1976, pp. 11-15.

PETER was clinging to tiny hand holds near the top of a 40-foot precipice. John watched from the bottom of the shaft which opened up from the tunnel, two kilometres from the main entrance. Bob was nearby, hacking away at lava rock with a shovel, trying to break through the plug that was blocking the main tunnel.

Minutes later, Peter broke through the top of the shaft and was looking up at the stars. Bob and John soon followed. The climbing and digging had been hard work, so they took time off to stretch their legs in the cool night air. But as they strolled away from the hole they came face to face with a full-grown leopard. Their re-entry of the cave was brisk!

They and four others were exploring the underground wonders of the Chyulu Hills, in what was to prove to be the greatest lava cave in the world. Near the base of the ash-cones high in the hills above the Kibwezi Forest, the entrances to this great cave were first noted by the Cave Exploration Group's founder and chairman, Jim Simons, through his study of aerial photographs. These fortuitous roof collapses are generally filled with large trees and the depressions show up as regularly oriented clumps in otherwise lightly bushed country.

He led a first CEG reconnaissance of the area in September last year when two of the entrances were located after a 4-km. hike, and about 1 km of the cave was explored. It was immediately realised that the cave was going to require several visits. Little was it then expected that the tunnel would go on and forever on, and that it would be a further four extended three-day trips, bivouacing at the cave, before even the main tunnel line had been traversed from end to blocked "end". By this time CEG was well aware that Leviathan was one of the world's great lava caves, if not the greatest.

The cave occurred in a pahoehoe lava flow extruded from the base of the ash-cones eastward toward Umani Springs and Kibwezi. This massive extrusion spread out at first over the steep ash slopes below the volcanoes and then onto the lower plains.

As is the case with most of the great tunnels of the hills, the cave was formed in the centre of the flow where movement was most rapid, the lava eroding a channel down into the loose underlying pyroclastic deposits, rather like the eroding action of a surface river. Beneath a rapidly cooling crust, the lava continued to flow to feed the advancing snout. As the cutting down process continued--and it is well demonstrated in the cave by almost vertical lava "falls" marking nickpoints of headward erosion--and as the eruption gradually subsided, so the molten lava in the channel dropped to a lower level. Again, a cooling crust was able to form above the molten river and so divided the subterranean course into two and even three distinct passage levels, one above the other. Finally, the eruption ceased altogether and the lava in the lowest level slowly slid to a halt, leaving behind the now empty tubes to solidify and thus form the cave much as we know it today.

But old age has now begun to take its toll. Great blocks of lava have fallen from the roof, making some passage sections treacherous to traverse. Curved slabs from the walls, often less than a metre thick, have fallen inwards to reveal their onion-skin-like nature and behind them the earlier ash deposits. In the upper levels, where the surface crust was thinnest, come the collapses through which it is possible to gain entry to the vulcanologists' paradise. Bats then colonised the open cave. Insect life entered the realm of eternal darkness and other mammals and man found the cave a useful refuge. Rainwater seeped through the porous lava, leaching out soluble silica to redeposit it in the form of secondary stalactites and stalagmites, adding to those of lava which had formed as the tunnels gradually cooled.

On each earlier exploratory trip underground, new sections of the cave were added to the sum of length. The Group gradually began to appreciate the cave's natural hazards, as regards the possibility of a major underground accident and the difficulties that would be faced in the event of a rescue.

Once the ash-choke in the 2 km upflow section of the cave had been reached on the second visit, upon which Bob was later to waste so much effort, attention was directed downtube of the main entrance. A party would proceed underground, digging out any collapse choke which barred progress, until daylight was reached once again at an upper passage level. It was not too difficult to locate the first few such entrances overland, but lower down the cave ran underneath the thick, confusing and game-infested Kibwezi Forest and it was necessary to move fast and make underground compass surveys and repeat them on the surface until the new entrance was located. Every downflow sortie naturally increased the walking distance from road-head and additional limitations on how much could be achieved during each three-day trip were imposed by the fact that it was not possible for each team member to carry all food, water, camping and caving gear for more than that short period. As it was the packs approached 20 to 25 kg! A full-scale expedition seemed the only answer.

Initial plans were laid as early as December last, and a date in mid-April set for the start of a 10-day assault. From a collapse half-way along the tunnel, teams would work up and down flow, surveying the cave and exploring any new passages encountered. A last reconnaissance trip had already shown that many upper levels awaited examination, and their entry would depend to a great extent upon the team's ingenuity and prowess as climbers. Looming greatly in their thoughts, however, was how to finance and obtain all the extra equipment required to make the expedition a success. So much of gear, clothes, and boots had already been practically ruined by the sharp lava floors and crawls.

A magnificent response to appeals for sponsorship from local firms solved the financial problem, and plans suddenly became a reality. After the months of planning and assembling equipment, the great day--April 10--arrived, and in heavily laden vehicles the group left Nairobi with mounting excitement and a united resolve to complete the mission come what may. They were aware that the long rains were imminent and to some extent were relying upon them to augment water resources, but they received a bit more than they bargained for.

By early afternoon Bse Camp had been established near a pleasant grove of trees at the start to the walking route. Great activity then ensued as water, food and equipment were sorted into porter loads for the days ahead. Barbecued steaks and beer around the camp fire and an early night. The team was up in the cold, pre-dawn twilight, breakfasting and repacking personal rucksacks--not too many clothes, as they would virtually live in coveralls throughout the trip. A slight change of plan had been agreed. Bob, with his party of John and Peter, would split from the main group and head directly uptube from the main entrance and bivouac for the next three nights, rejoining the others at Advance Bse Camp on the evening of the fourth day. Their task was to attempt a by-pass of the terminal choke, explore unentered upper levels and survey back down the cave as far as possible. They were the first to set off. The rest of the team, led by Jim, were to proceed as arranged to Forest Collapse and set up an Advance Base Camp of lightweight mountain tents. They would then make daily sorties downtube from this collapse, returning there for each night pending the arrival of the first party, after which plans would be re-vamped as the situation dictated.

Bob's party had the unenviable task of traversing and surveying the steepest section of the cave where it had been formed in the ash-slopes of the volcanoes. Later, he described their experiences: "Previous trips to the uptube end of the cave had shown that simply reaching this point was a difficult enough task--even without having to carry in heavy loads over sharp,

slippery and loose lava boulder piles. Our protective boots and coveralls were a boon! The first real problem appeared at the verticals, a series of solidified lava falls where unsafe handholds had to be broken off and thrown down. It was here, while scaling a six-metre wall, that Peter met with his first white scorpion--right on his next handhold! [Ed. note: probably an Amblypygid, or "whipspider", is referred to rather than a true scorpion.] Excitedly, the others threw him a tin so it could be captured (Chris would be pleased!) but it was a difficult and dangerous task in the circumstances, and rather fortunately, perhaps, he found a dead one instead. Later, while surveying here, we experienced a couple of nasty falls. The first occurred after Peter had been exploring a high-level side-passage above a remarkable series of lava stalagmites. Having made the most difficult part of his descent down crumbling black rock, with John photographing the action, he fell 10 feet onto his back and was lucky to escape with only cuts and bruises. In the other events, John scraped his forearm and I knocked and skinned my knees which later made walking in the cave somewhat difficult.

"We were dreading moving our equipment through the second boulder ruckle, though previously we had found a high-level bypass but had thought a ladder necessary to regain the main passage. This time, however, John crawled through below while the others scrambled over the top, lowered kit-bags down to him, and then pioneered a descent route round an awkward corner. Shortly after, top camp was made in a low and narrow passage with water dripping from many stalactites. This was to be "home" for two nights while the top end was explored and surveyed. Though climbing out of the topmost of the cave entrances was exciting, some of the most intriguing cave was to be explored later, lower down in Leviathan around 'Oxbow', 'Gruyere', and 'Serac' chambers, where side-passages still await final exploration. With the rains seeping through, this section had become treacherous and after one particularly long day when we had surveyed through the tight 'Fifty-metre Crawl', the prospect of a further two hours slog through the cave seemed too much. We decided to exit from the upper collapse and compass-march overland in the dark. Easier said than done, of course, for heavy rains had made our usual escape up a tree in Bivvy Collapse virtually impossible, and a free-climbing route up vertical lava proved a tense alternative with only one headlamp between three of us. Finally, on the surface at last, we wound our way downhill with almost complete faith in our instruments. That march through bush, inhabited by rhino and buffalo, was, quite frankly, scary. To keep up our spirits--though more likely to frighten off the big game--we sung non-stop until at last the tall trees that marked our objective showed up in the lights. It was the entrance to Advanced Base Camp. We had made it back 'home'."

While Bob and his team slogged the four hours up to their first underground bivvy-site, Jim's party and porters marched downflow to Forest Collapse, marking the last easy entrance of the cave before it went under the forest. The first 400 meters of the cave, including an upper passage level, took Jim's party the remainder of the day to survey as the tunnel echoed with question and answer--compass?, 13 degrees. Alison would shout back Inclination? Station plus 19, roof plus 53 degrees, Chris would cry out while Jim recorded the information as he sketched the plan, profile, and cross-sections. Graham would then measure to the walls on either side of the station and, once recorded, would march ahead with the tape, setting up the stave at the next convenient point and singing out the distance. And so it went on, hour after hour, day after day, with ten hours being a usual period of almost continuous work, with some days being as long as thirteen hour stretches for both teams.

Beyond the next collapse entrance, known as Compass after the method by which it had been found by Bob and John in the forest on an earlier trip, was one of the cave's longest unbroken sections--more than 2 km long but with many upper level passages which remained to be explored. It also achieved its most impressive dimensions, having a great canyon-like cross-section up to 15 metres high! Though less steep than where Bob and party were exploring, its great masses of wet and slippery, guano and mud-coated boulder piles, often filling the passage halfway to the ceiling and with chasms in between, were no less treacherous.

On the second day of downstream survey a point was reached where there was a major upper level, looking back along which daylight could be seen entering from yet another collapse. An airy traverse along a ledge six metres up along one wall, followed by an acrobatic move, permitted Graham to reach the level and briefly explore. Two days later, he, Chris and Alison would explore and survey an additional 400 metres of this new series, giving it the name "K.M." after an earlier visitor to the collapse who had carved his initials on a tree. The third day produced another surprise when, having reached a point considered about half-way between Compass and Reconnaissance Collapses, Graham again decided to investigate what had at first been dismissed as only a short natural lava bridge. Once again there was a system of complex side passages adding a further 300 metres to the ever-increasing cave.. Elsewhere, other upper levels existed, but most were too high up and impossible to enter without resorting to rock pitons as an aid to climbing, and lack of time prevented their exploration. Further such side-systems awaited the Group!

It was an excited bunch of tired, dirty, and unshaven cavers that regrouped at Advance Base Camp II on the evening of the fourth day--each trying to out-do the other in comparing their tunnel sections. Bob and party had been duly surprised to find Advanced Base Camp set up in a smaller cave system, near to and running parallel to Leviathan. This cave had been partly explored by him and John on an earlier trip and the move to it had been prompted by the extremely heavy thunderstorms which had flooded the original surface camp during the first night, soaking all occupants and bedding. What an awful night! It would take some days before equipment had dried out. At this time, Bob's group had surveyed most of the section upstream of main collapse, but still had to complete "Mud-Hall Passage" and down to Forest Collapse. This was to prove a very difficult section to survey, with its crawls, plunges, great chambers, and small ox-bow systems. It was decided that Jim's party, having covered most of the distance toward Recce Collapse, would move on down to bivouac at that entrance on the 15th, for three nights and continue their survey both up and downtube from that point.

Accordingly, they parted and, with the assistance of James, Mutaku, and Bernard, back-packed their water and supplies down through the forest, finding the string guide-line had been broken in several places by passing animals since the last visit and that the blaze marks were becoming difficult to follow. Silver-foil and new blazing was made to assist the porters in re-locating the party on the 18th. Pottery Collapse, the last known entrance over the cave, lay deep within the Kibweze Forest where the only sounds are of the Sykes Monkey's swishing through the trees and the night-calls of hyenas, bush-babies, and tree-hyrax. The entrance proved reasonably comfortable for the first night, after which it was necessary to continually move bed-rolls to avoid the increasing water drips following the daily down-pour. First task here was to march downtube in the magnificent 2 km long tunnel, through which it would be possible to drive a bus, to a long, low, oozy guano-floored crawl which marked the very "end" of Leviathan. There

were hopes that a dig at this point would lead to a major continuation of the cave, for many kilometres of lava lay ahead, but the seal proved too difficult for Chris and Graham to dig and they had to abandon the attempt after a few hours. In the mean-time, Alison and Jim busied themselves with photographing a veritable forest of small secondary stalactites and the many incredible lava formations.

Alison was in raptures over the hundreds of small, furry, orange-coloured bats which roosted here so far from the entrance. This was one of three insectivorous species which Chris and Alison captured for study at the National Museum. A much greater colony, of thousands of Rousettus Fruit Bats, was found in an upper level off the main entrance collapse.

Though the cave had "ended" rather disappointingly, it was a blessing in disguise since a great deal of survey remained to be completed and the teams would be hard pressed to complete the known cave and its upper levels without complicating the issue by having to add yet more lengthy passage. And so the laborious task continued, broken here and there by climbing into upper level passages and noting intriguing lava features--the "gloops", as they were nicknamed, for example. These were formerly hot blisters on the passage walls which, on bursting into the tunnel, left behind a smooth, deep cavity out of which the lava from the burst had trickled. Similar burst blisters had been noted elsewhere but in the roof of the cave, only here the bursting had left ragged protuberances of lava which had solidified around the hole.

In two days Pottery Passage had been completed. This passage was named after discovering the remains of a number of earthenware pots at the entrance, presumably left by poachers. Once again, attention was turned upflow. But first it was necessary to dig through the boulders at Pottery Collapse to provide a continuous underground link between it and Reconnaissance Collapse, 280 metres to the west. This was accomplished in a matter of only an hour and, by the end of the day, the traverse had been completed. And now, all that was left was to continue further upstream from Recce and connect with the earlier downtube leg. The final day's surveying for Jim's party, their third away from Advanced Base, was to be one of the longest and most tiring. By this time, members of both teams had been feeling the strain of too many laborious hours underground, the difficulties of keeping dry, of sleeping on the rocky floors, and more important of keeping some semblance of cleanliness. Most of the team had caught colds, Chris and John being worst affected. Jim had septic boils on one knee as the result of deeply embedded thorns acquired during the forest march, and poor Alison was swollen around the eyes due to bites from an as yet unidentified flying insect--perhaps a sand-fly.

They continued their survey from Recce through a tight boulder crawl, and after a further 120 metres climbed into a fine, almost circular upper level which led back downtube to the collapse where boulders blocked the exit. Then back into the lower level again, passing through the 0.5 metre high crawl of "Bat Alley", to where a break in the floor revealed an even lower level, but only 1 metre high. It was on the edges of this natural break that some of the most interesting lava formations occurred. These were lava protuberances up to 18 cms. long, extending outwards from the lava bench, forming an array of branched growths exactly like ferns in character. Such strange forms had never before been recorded in the lava caves of Kenya.

A stop for a mid-morning brew of tea saw Chris on hands and knees in the slush capturing small white jumping insects known as springtails, cockroach nymphs, and a variety of tiny flies which were attracted to torch-beams.

Finally, by late afternoon, a white stave gleamed on top of boulders in the distance and it was with relief that the team realized that their arduous days of survey would soon be over. The link between the two surveyed sections

was completed and a few hours later the new complex of upper passages, discovered some days earlier and named the "Blue Stal. Series" after some stalactite columns of incredible blue-grey colour, was added. A total of over 6 km of passage had been surveyed by Jim's party alone. It was with eagerness that they awaited the next morning when they would re-join Bob's group at ABC to add the up and downstream sections together. Had the world record of 10 km been surpassed? By 2 p.m. on the ninth day of the expedition, the full team had assembled. Bob, John, and Peter had only just finished their part of the survey. The smoky air of the underground quarters was filled with expectancy--then the news. A total surveyed passage length of just over 11 km!

As if to show that Leviathan still has many secrets, that same afternoon Jim and Graham returned downtube from Forest Collapse to retrieve a ladder left at a pitch into "KM Series", and a little before it noticed yet another high level. By the unusual yet splendidly dramatic method of lassoing a wedged rock, they were able to hoist a ladder and climb onto a natural bridge, then negotiate a 3 metre climb over very loose rock onto a wide ledge which in itself proved to be a short ox-bow with a window overlooking the main tunnel. Another 4 metre climb up a strange vertical lava fall and the entered a small high-level tube situated right in the roof with an inspiring view down the 15 metre high cave. What is more, this high level could be seen to continue in the opposite wall of the main tunnel, but it will need a caver with very strong nerves to make the extremely exposed traverse necessary to reach it.

Easter Monday saw the final departure, the Chyulus looking even more beautiful than before with a flush of new green grass. A very happy, but tired team began the adjustment to civilisation, hot baths and sleeping on soft beds in strange rectangular rooms.

A recent letter from Jim Simons to Dr. Halliday has the following to add to the story: "...Several new upper level braided systems, running parallel to the main tube, were explored and a total of 11 km. of passage surveyed! A real giant of a lava tube. Of this, the main passage accounts for 8 km with a vertical range of 470 metres! [This far surpasses the previous record of 265 metres]. The 8 km is unfortunately broken by two collapse holes into sections 3.5, 2.5 and 2.0 km long. The remaining 3 km are composed of separate upper levels, small ox-bow systems and the new high-level braided passages. The surveying revealed numerous other roof-holes leading into more upper levels which time and equipment did not permit examination. These are to be surveyed in due course. In addition, another cave system close by, with another 1 km. of passage estimated, has yet to be properly explored and a link with Leviathan is expected. So it looks as if we have 11 km and continuing! A miserable choke formed the downstream 'end' of the cave though we feel sure the cave must continue as many kilometres of lava still lie ahead. The upstream ash-choke was found to occur directly beneath the source volcano and upper levels enabled us to regain the surface near here through a small collapse. A complete end to end traverse of the cave in one trip is now feasible, though has yet to be attempted. We are currently working on the survey (1:1000) which will probably be some 8 metres long!

"The Expedition has caused quite a lot of publicity internationally--perhaps you might have seen something in the U.S. press--if so copies please... The Los Angeles Times also want to run an account with a sketch of the cave. We are also thinking that National Geographic might like an account.

"Four species of bats were captured, bat parasites, some scorpions [i.e., Amblypygids] and many insects by our zoologists. One small cockroach is causing considerable interest as it appears to be a cavernicole, most probably entirely new to science."

TRIP REPORT SECTION

Moses Coulee, May 23
by Rod Crawford

On Sunday the 23rd I took my arachnology class on a field trip in Moses Coulee, Douglas County. While there, I decided to check on a couple of speleological matters.

The first was Chief Moses Council Cave, shown on the USGS topo. map, which I and the Coughlins had failed to find last year. This time we reached it by hiking across an alfalfa field. What a disappointment--a mere 15' rock-shelter. I had hoped for at least a 50' one. The alfalfa farmer told us that WSU archaeologists excavated in front of the shelter, but found only one peacepipe.

After getting in some good spider collecting, I and two students (Rick McClure and Bill Chambers) went up Douglas Canyon looking for Goldy's Cave, a hundred foot tree cast that former member Wes Cope reported in 1971. We found a tree cast, but it went straight up about 12' and then stopped.

I later talked to Wes on the phone and he said that the real Goldy's Cave was just a short distance back down the canyon from the one we saw. He also mentioned that the Talus Ice Cave he reported in the same area, just opposite the Goldy Ranch near Palisades, is really not a cavity at all but simply an ice deposit exposed at the bottom of cold-trapping talus.

Trout Lake, May 29-31
by Rod Crawford

Cascade Grotto participants: Ed Crawford and family, Rod Crawford, Bob Brown, Annie Ruggles, and non-members Marlene Schneider, Steve Jackl and family, and Curt Black (!).

Oregon Grotto participants: The Nielands, Dave Jones, Mary White, JR, Roger Silver, et al.

And a cast of thousands (of caves)--or would you believe hundreds?

Yr editor rode down to Trout Lake on Saturday with the Crawfords to find the Deadhorse camping-spot rather wet. Yes, wet--in Eastern Washington yet. Jones, Silver, and White of the Oregon Grotto had arrived there Friday night, but had not yet been caving (they spent the day in the Trout Lake tavern). Later on, Nielands arrived, fresh from mapping a new cave. This cave, discovered by Jim Wolff the previous weekend, is in the clearcut above Deadhorse, a mere 200 feet away from Rabbit Hole Cave discovered by me last year. The inconspicuous entrance is concealed beneath a bush. The cave was named Quill Cave. This same night the Jackls camped at Peterson Prairie.

Sunday morning Roger left for home while I and the Crawfords prepared to do some caving. First stop was a small cave right beside the road. The '72 convention guide calls it a "small pit, believed blind". However, Dave Jones and others explored 5-700' of passage in it last year. Since it has not been named, I hereby christen it "Dave's Cave". The convention guide also reports some "small caves in roadcut" 0.2 miles further along the road. This is an error--they are immediately opposite Dave's Cave.

We went on to the Slime Cave area to check out a possible new sinkhole. It turned out to be a small pond. Continuing, we visited Ice Rink Cave (where one of my boots unfortunately sprung a leak), Ice Cave, and New Cave. At Ice Cave we met the Jackls, who were planning to do Dynamited. I have not heard whether they actually did it or not. At New Cave we met the Jones and

White contingent, who were about to check the register. All this time it had been intermittently sprinkling rain and snow.

After a sojourn at camp, Ed and I and his eldest son Jim drove on up the road and looked into Asher's Cave. We then beat the brush uptube for a small cave discovered in 1973 by Robert Senger, and amazingly found it. It was just as insignificant as originally reported. While taking a detour back to the car, Jim discovered Flashcube Cave, named for its one human artifact. We explored 2-300' of Asher's-like passage and stopped at a still virgin mud crawl for lack of coveralls.

The weather cleared up Sunday night, just in time for the arrival of the Brown and Black contingent. By Monday morning, however, it was snowing. Ruggles and Black did Deadhorse and later they, Bob, and Marlene visited Ice Cave. Meanwhile, all the Crawfords headed for home. On the way we looked at a small niche in the White Salmon River canyon said to have a short lava tube segment intersected above it. We saw the niche, but not the tube.

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This advertisement appeared in the Daily Nation along with this month's feature article.

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RECENT LITERATURE:

Holsinger, J. R., 1975. Descriptions of Virginia caves. Virginia division of mineral resources Bulletin 85, 450 pp., 7 pl. Available for \$8.00 check or money order from: Virginia Division of Mineral Resources, Box 3667, Charlottesville, Virginia 22903.

USGS Geologic Quadrangle GQ-112. Geology of Carlsbad Caverns West quadrangle, New Mexico-Texas, by P. T. Hayes and R. L. Koogler. 1958, reprinted 1975. Structure-contour intervals 100, 200, and 400 feet. Scale 1:62,500 (a 15' quadrangle). Sheet 24 by 31 inches. \$1.00.

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REMEMBER--ONLY YOU CAN POPULATE THE GROTTO MEETING!

IT IS THIS MONDAY, THE 21ST. BE THERE (UNLESS YOU'RE CAVING).

THE BIOLOGIST'S CHAMBER: COLLECTING, PRESERVING, AND CONSERVING CAVE LIFE
by Rod Crawford

In a recent Speleograph article, (12 (2): 52-53), Ellen Benedict has expressed the opinion that "Cave populations occur in small numbers...and may not be able to withstand a heavy kill off...Generally there is no good reason for removing an animal from a cave...Perhaps the best policy to adopt is to never collect anything in a cave until you have investigated its status." My feeling is that this stand is unnecessarily restrictive.

It is easy to conclude that if someone collects all specimens of a given cave species they can find, that species is likely to become extinct. Actually, most evidence indicates this to be highly unlikely. The smaller cave animals (including all true troglobites known in the Northwest) are not restricted to the caves themselves, but occupy an extensive underground habitat that consists mostly of tiny, impassible holes and crevices. Only a very small part of their habitat is in caves accessible to human biologists. This is demonstrated by their occurrence almost unchanged in widely dispersed caves, and also in such man-made intrusions into their domain as mines and wells. The harvestman Speleonychia sengeri, for instance, inhabits caves all over the Trout Lake cave area. Its underground habitat probably includes an extensive three-dimensional network of contraction fissures and so forth over an area of thirty-five to forty square miles. The part of this habitat actually inside caves is insignificant in comparison. Even in the unlikely event that a cave were completely cleared of the species, it would soon be re-invaded from the surrounding rock.

Another problem lies in the supposition that if a cave species is well known, no more need be collected. For instance, the Trout Lake cave milliped Troglotyla skamania was well described a few years ago by Dr. N. Causey. Someone knowing this might be tempted to avoid collecting white millipeds in Trout Lake caves. They would thus fail to discover that there is not just one, but at least four (probably more) white milliped species in these caves, almost impossible to tell apart in the field. We can only detect situations like this by collecting large numbers of specimens. There are other reasons, too. For instance, it is often desirable to study individual and geographic variation in a given species. Also, there are some other creatures (e.g., the aquatic isopod crustaceans) among which males are extremely rare but nonetheless required for identification. One must collect large numbers of these isopods in order to ensure that at least one is a male. Failure to find one is frequent, even so.

Of course, the above does not apply to vertebrate animals such as bats, salamanders, etc. These animals are actually, not just theoretically, well known, and much more limited in their ability to repopulate a cave. Also, I do not advocate needless destruction of cave life. In general, cave life should only be collected when all of the following conditions are met: 1) it is collected and preserved in good enough condition to be scientifically useful; 2) the fullest possible collection data is permanently associated with each specimen; and 3) the specimens will be studied by a specialist and/or permanently stored in an accredited museum. These conditions are not difficult to fulfill, and there is no reason why any interested person complying with them should feel any compunction in collecting invertebrate cave fauna.

Conservation of cave life concerns, not the saving of particular specimens, but the preservation of their environment. In particular, it is better to kill a thousand specimens than to leave one carbide dump. Spent carbide (Calcium hydroxide) is a very persistent substance and can make part or most of a cave uninhabitable for many years. Burning or the use of aerosol cans are also to be avoided. Even such small pollution-sources as carbide lamps

could create a problem if present in large numbers. And in my opinion, the use of fluorescein dye to trace water-courses should be avoided except as a last resort, despite its supposed non-toxicity. Lava tube slime, stream debris, and other organic deposits in caves should remain fairly undisturbed, since they provide food and habitat for a host of organisms. Also, rocks and other objects that are turned over in search of specimens should be replaced as they were found to preserve microclimatic conditions that otherwise take some time to re-create. One last point is that mammals, particularly bats, are sensitive to disturbance, so that the best way to conserve bat populations is to keep visitation of bat-inhabited caves and passages minimal.

In collecting, look for specimens on the walls and ceiling; on and in slime and other organic deposits; in and on water; under breakdown, sticks, etc. Where there is an ice floor many specimens will show up against the white ice.

Collecting and preserving cave organisms in good condition requires various techniques depending on the type of organism. In general, it is a mistake to keep a specimen alive any longer than necessary. Most cave creatures are very sensitive to heat and desiccation and do not survive well in captivity. A specimen that dies unpreserved will often deteriorate immediately and be useless for study. I have found the following equipment most helpful in general collecting: 1) A soft watercolor paint brush (with spare; 2) one or more wide-mouthed screw-cap vials of 70% alcohol (ethyl or isopropyl--drugstore rubbing alcohol will do); 3) a selection of pill bottles or film cans for large specimens; and 4) for aquatic organisms: a small strainer or seive 5-1/2" long with 2" wide bowl, and a small vial of Bouin's fluid (see below).

The following techniques apply to particular groups of organisms.

Aquatic organisms are best picked up with a wet (with water) paintbrush, then transferred directly to the preservative. Flatworms are usually found floating on the surface of cave streams and pools. They and other aquatic worms are preserved in Bouin's Fluid, a mixture of: saturated solution of picric acid in water, 75 parts; formalin, 25 parts; glacial acetic acid, 5 parts. These worms unfortunately do not preserve well in alcohol. Picric acid is a skin poison and should be washed off thoroughly if spilled on the skin. Aquatic insects and crustaceans are collected with brush or strainer and preserved in alcohol. Wash the preservative off the brush before picking up another specimen.

Spiders, harvestmen ("daddy-longlegs"), most insects, etc. should be preserved in alcohol. Small specimens can be picked up with a brush moistened in alcohol--larger ones simply pushed into the alcohol vial. The only exceptions are flies and moths, which should be collected into dry vials and kept dry. They can later be killed with an entomological killing tube. Dry specimens should not be allowed to rattle around or jostle one another. Alcohol will evaporate from most vials in a matter of weeks, and should be watched carefully to prevent drying of alcoholic specimens.

To make them scientifically useful, each container of specimens must have a label inside containing all of the following data: Name of cave. Its location if not well known. Date of collection. Name of collector. Type of habitat from which specimens were collected. The label should be in pencil as ink is soluble in alcohol. A specimen without data would better not have been collected in the first place.

The last requirement, that the specimens be studied by a specialist or deposited in a museum, is easy enough if, like me, you are a specialist who works in a museum. If not, I would be glad to take Pacific Northwest cave specimens off your hands. Pack them as if they were more fragile than eggs--they are. My address is: Burke Museum (DB-10), University of Washington, Seattle, Washington 98195. Contact me if you have any questions.

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*Contact storekeeper for information.

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

CASCADE GROTTO OFFICIAL AND TRADITIONAL TRIPS--1976

All cavers are invited to join these trips--especially those who don't go caving very often!
April 17-19, Easter Weekend. Papoose Cave, Idaho. Contact Curt Black, (206) 832-6352.

April 24-25. Official trip to McLoughlin Canyon Caves, Eastern Washington. Contact Chuck Coughlin, 772-1170 (Seattle).

May 29-31, Memorial Day Weekend. Deadhorse Cave area, Trout Lake, Washington. Contact Rod Crawford, 543-4486 eves. (Seattle)

June 19-20. Official trip to Vancouver Island limestone caves, B.C. Contact Bob Brown in Elbe, (206) 569-2724.

July 3-5, Independence Day Weekend. Windy Creek Cave, North Cascades. Contact Chuck Coughlin, 772-1170.

August 28-29. Official trip to Cave Ridge (Snoqualmie Pass) limestone caves. Contact Coughlin.

September 4-6, Labor Day Weekend. NWRA Convention at Nakimu Caves, B.C., Canada. Contact Bob Brown.

October 23-25, Veterans Day Weekend. Official cave-hunting trip to Colville area, E. Washington. Contact Dave Walker, 232-1698 in Seattle.

Speleobiological trip to Trout Lake lava tubes. Contact Clyde Senger in Bellingham, (206) 734-1360.

November 25 or 26-28, Thanksgiving Weekend. Speleobiological trip to Mt. St. Helens lava tubes. Contact Clyde Senger.

Hells Canyon limestone caves, Eastern Oregon. Contact Dave Walker, 232-1698, or Bill Capron, 525-2260, in Seattle.

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