

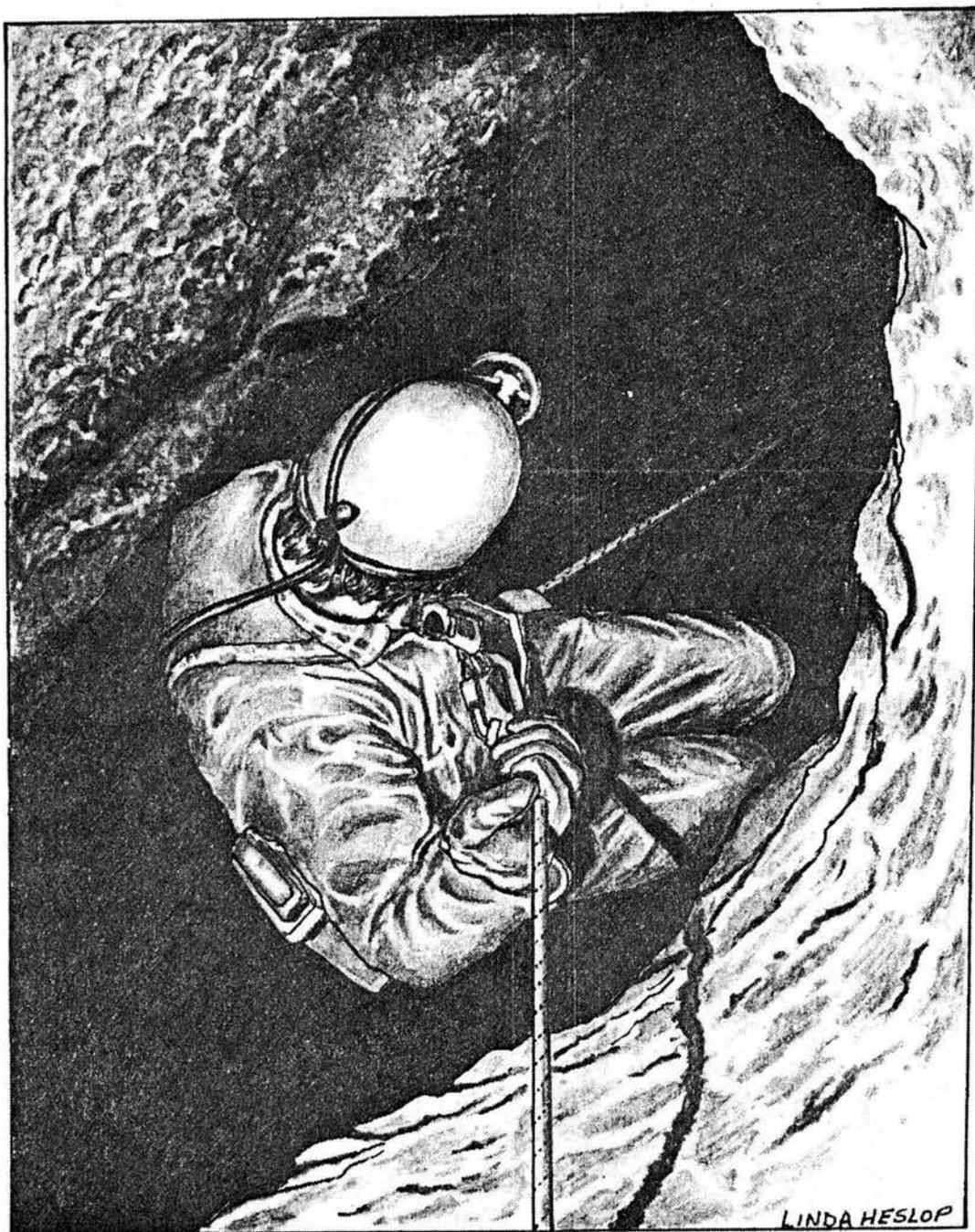
The Cascade Caver

Published by the Cascade Grotto of the N.S.S.

Mark Sherman and Ben Tompkins, Editors

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CASCADE CAVER

The CASCADE CAVER is published 10 times a year by the Cascade Grotto, a member of the National Speleological Society.

Meetings: 7:00 pm on the third Tuesday of each month at the University of Washington, room 6 in the basement of Johnson Hall.

Officers:

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Dues: Membership in the Cascade Grotto including subscription to the Cascade Caver is \$7.50 per year. Dues for additional family members is \$1.00. Subscription to the Cascade Caver only is \$7.50 per year. Send subscription or membership requests to grotto treasurer:

Al Lundberg at 19221 - 38th Place N.E., Seattle, WA 98155.

Overdues: Please note the date on your mailing label that indicates when your dues expire. The following folks appears in arrears:

Last Issue:	Jay Rohrer	5/86	Julius Rockwell	6/86
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Due soon:	Robert Martin	11/86	Art Tasker	11/86
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	Frank Hymes	1/87	Dan McFeeley	1/87

Mail: All other correspondence should be sent to:

The Cascade Grotto, P.O. Box 75663, Seattle, WA 98125-0663.

Cover: Linda Heslop: "This drawing was made from quite an old picture of Steve Logan on Jabawok Jump in Nakimu Cave, B.C. I don't even know if Steve is still caving any more but it was a great photograph."

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UPCOMING EVENTS

Oct 11-12	Trout Lake area caves, camp at Goose Lake. Contact Bob Brown at 569-2724.
Oct 21	Grotto meeting at the University of Washington. See also previous page.
Nov 8	NSS Board of Governors meeting, Troutdale OR.
Nov 8-11	Vancouver Island scouting trip. Contact Bob Brown at 569-2724.
Nov 18	Grotto meeting at the University of Washington.
Dec 16	Grotto meeting at the University of Washington.

NSS BOARD OF GOVERNERS MEETING

From the Willamette Valley Grotto comes the following invitation:

The Fall NSS Board of Governors meeting will be held on Saturday, November 8, 1986 in the Community Center at Troutdale Community Park, 1110 E. Columbia Street, in Troutdale, Oregon. The meeting will begin at 9:00 a.m.

Troutdale is located about 10 miles east of Portland, Oregon on Interstate 84. Take Exit 17 off of I-84 and go south for one block to Columbia Street. Go east on Columbia about one-half mile to the Troutdale Community Park. (See map).

Plan to attend this BOG meeting at the "End of the Oregon Trail" and the gateway to the Columbia Gorge. There will be cave trips on Sunday, November 9, and also on Monday November 10, to lava caves in the Mount St. Helens or Trout Lake areas in southern Washington.

For further information contact:

Willamete Valley Grotto,
505 Roosevelt Street,
Oregon City, OR 97045
(503) 655-6609

NWCA MEETING, AUGUST 1986

Dave Klinger

(The following is a merger of Dave's cover letter about the meeting and his official minutes)

The regional meeting was held on August 31, 1986, at Buttel Lake Campground on Vancouver Island, B.C., Canada.

The meeting was moved from Thanksgiving Cave to the campground as a result of the accident at the cave on August 29. Cavers present at the time began a rescue effort but the victim died of his injuries before he could be removed from the cave. VICEG put out the call for additional equipment and assistance and a well organized, professionally conducted recovery operation took place on August 30. They are to be congratulated for a difficult job well done.

The accident at Thanksgiving Cave points up the fact that all member clubs should review their cave rescue procedures and conduct training on an annual basis. For information and assistance it is suggested that you contact Rick Rigg, 169 - 25th Street, Idaho Falls, ID 83401. Rick is the Northwestern Region Coordinator for the National Cave Rescue Commission of the NSS. Rick's home phone is (208)-524-5688 and work phone is (208)-526-7816.

The first order of business was the election of officers. Elected were:

Chairman	Bob Brown
Vice Chairman	Ben Tompkins
Secretary	Dave Klinger
Treasurer	Phil Whitfield

A treasurer's report from Phil Whitfield was read and donations were voted to the Bighorn Project and to a memorial set up in response to the accident at Thanksgiving Cave.

The next NWCA Regional Meet is scheduled for Memorial Day Weekend, May 23, 24, and 25, 1987 at Trout Lake, Washington. It was noted that the Joint Regional Meet last year was a success but the turn out from members of the NWCA clubs was disappointing. The central location and the timing of this meet should insure that we have a good turn out.

The Bighorn Research Project had a great turn-out this year and accomplished a great deal of important work. The 1987 Bighorn session will be held from August 8 to August 16 which is the week after the NSS Convention. Contact Bob Brown for more details.

Member clubs are reminded that they must submit a complete and current roster of all officers and members and include the designation of the NWCA representative and an alternate to represent the club on the NWCA Executive Board. While this roster is not due until 15 February of each year, it would help me if the name, address, and phone number of your representative and alternate be sent to me as soon as possible. Your cooperation will be appreciated.

Dave Klinger, Secretary, NWCA
P.O. Box 537, Leavenworth, WA 98826

Newton Cave
The Definitive Survey
Jeff Forbes

History - During my flatland years, back home in Indiana, I was perusing the List of Long and Deep Caves for the U.S., which appeared in the now defunct publication Inside Earth. Newton Cave was there, listed as the 26th deepest cave in the States, with the highly suspicious depth figure of 500 feet. Probably an estimate, I thought, never dreaming of actually going there.

Discovered in the late 1950's and named for an early explorer, the cave had a nasty reputation as a difficult and wet vertical system. Sitting up there on scenic Cave Ridge, it was long known as the deepest solution cave in Washington. Upon moving to Seattle, I was surprised to learn that no published map was available. At least three prior attempts had been made to survey the thing, but for one reason or another, these had been unsuccessful. Trying to dig up information on the old surveys proved frustrating at first. It seemed that everyone involved in the previous efforts had either died, moved away, gotten religion, or some combination thereof.

The map in Caves of Washington was good, though it showed only a portion of the known cave, and depths were estimated rather than measured. Hearing rumors of a Xanadu Grotto survey trip in the late 1970's, I wrote to Mike Dyas, who had lived in the area at the time. He recounted an ill-fated dusk-to-dawn trip, which had failed to reach the bottom due to lack of rope. He believed, however, that their survey showed that Newton was probably not 500 feet deep as often quoted. Mike recommended a complete resurvey from the entrance down, and I was inclined to agree. Bob Brown later produced an old sketch map done by Dave Mischke, Rob Stitt, and V. Frese in 1966. This map showed nearly all of the known cave, but gave no depth or length statistics.

Lurking Magnetic Anomaly - Talk of a new survey at the monthly grotto meeting produced much interest, but some suggested that an accurate survey was impossible due to local

magnetic disturbances which would invalidate compass readings. As a geologist, I had some knowledge of this, and I was skeptical of these claims. Although the existence of a magnetic anomaly seemed quite reasonable given the geology, I felt that it was unlikely that this would seriously hamper our mapping. Magnetic disturbances can be classified as either local or regional in extent. One such anomaly was said to derive from magnetite-rich rocks in the vicinity of Chair Peak, some three miles west of Cave Ridge. I reasoned that for a source at this distance, all compass bearings should be affected in like manner, and that the relative bearings should still be useful.

If, on the other hand, we encountered small lenses of magnetic rocks in the cave, the range of the disturbance should be limited to distances comparable to the dimensions of the magnetic source body. According to physics, the intensity of the magnetic field should fall off rapidly away from the source. If local anomalies did exist, I felt that these would at least be revealed by forward and reverse compass bearings, which would fail to agree in this case. At any rate, the vertical component of the survey would be unaffected, and a resurvey seemed in order if for no other reason than to establish Newton's depth.

The Best Laid Plans - Given what I had seen of the cave, I was not at all sure it could be surveyed in one trip. Though short, there were a number of side passages, four rigged pitches, plus there was the water. Just going to the bottom of Newton and back could be challenging under anything but the driest of conditions. But mapping was another matter. The rope work had to be second nature or little would be accomplished. And a slowly moving survey crew might soon become chilled if not dressed properly. And so it was that I was overjoyed when veteran Canadian cavers Pat Shaw and Peter Norris agreed to come down from B.C. When in doubt, call in the pros from Vancouver.

On July 19, the three of us set 40 survey stations from the entrance to the bottom, finding the pits nearly dry. The final 19 meter deep Wet Pitch was still a steady drizzle, but with our waterproof suits

and by prussiking very fast, we were able to stay reasonably warm, if not dry. During the course of the trip, we were consistently able to get agreement of forward and backward compass bearings to within two degrees, and I breathed a sigh of relief.

The trip lasted well into the night, and when we surfaced, Snoqualmie Mt. was cast in the eerie silver light of the full moon. For me, such rare moments make wilderness caving the spice of life.

Two months elapsed before the nagging side passages prompted a return trip. Rob, Mike, and Ron Lewis of Tacoma enthusiastically volunteered to help, as did fellow geology graduate student John Garver.

Towards the end of the nine hour trip, we found a genuine magnetic anomaly in the area northwest of the first 3-meter climb leading down to the Cement Mixer. Our compass readings would not agree, and the cause was found to be a meter-size block of dark metamorphic schist, apparently loaded with magnetite. When the compass was put against the block, the needle pegged toward it, but when moved away by half a meter, the needle returned to normal. The rumored magnetic anomalies, though present, did not prove to be a problem.

Results of Definitive Survey - The survey showed Newton Cave to be 141 meters deep (462 feet) from entrance to the very bottom. I am confident that this figure is reasonably accurate given the use of forward and reverse shots and the fact that 3 survey loops in the upper part of the cave closed within less than one meter.

The prospects for extending the depth at the bottom are not good. The water leaves via a narrow gravel-choked canyon which shows no sign of opening up. This point may well be near the contact of the marble with the surrounding volcanic rocks. The depth of the cave could possibly be increased by about 3 meters if a connection could be made (i.e. dug) to the small pit on the surface known as Devil's Icebox which lies about 10 meters northeast of the entrance. This pit nearly overlies the passage above the Cement Mixer, and fresh air can be smelled in the cave at this point.

Depth notwithstanding, several areas of the cave could yield more passage to curious cavers. The passage marked with a question

mark just above the Dry Pitch was incompletely checked out, and may continue with little or no digging. Likewise for the dashed connecting passage above the Water Well. The breakdown area on the way to the Flute Room is fairly complex, and could contain a few hidden secrets. Lastly, a narrow descending canyon was dug open by Ron Lewis just northwest of the prominent red flowstone at the south end of the cave. This is said to end shortly, but may warrant another look. All other leads shown as question marks require substantial digging to proceed.

Rigging the Pitches - The entrance may be free-climbed, though some may prefer a hand line or rope. Aside from this, four ropes are needed to reach the bottom. A 15-meter rope will rig Bolt Pitch if tied off conservatively on the two stout bolts at the top. Provide your own 3/8" hangers and nuts. The Water Well is easily rigged with a 10-meter rope using a natural wall flute. The small diameter bolts above the Dry Pitch should not be trusted, as they are loose. Rig off natural projections using a 15-meter rope.

The Wet Pitch requires a 30-meter rope, as the rig point is well back from the lip. The old names "Dry 60" and "Wet 80" were not used on the map since the pits are only 25 and 60 feet deep, respectively.

Geology - The geology of Newton Cave is sufficiently complex that it is not easily summarized. The cave is developed in marble (metamorphosed limestone) of unknown age. The age of the marble is difficult to determine since metamorphism was sufficiently intense to destroy all fossils which would otherwise serve as useful time guides. Suffice it to say that the marble is much older (probably Paleozoic) than the 24 million year old granodiorite of the Snoqualmie Batholith. Snoqualmie Mt. is composed of this granodiorite, which was emplaced into the surrounding older rocks as an igneous (magma) intrusion which must have cooled and crystallized slowly at a depth of perhaps 10 km below the surface. Although the heat released from a cooling igneous intrusion can cause metamorphism of the surrounding rocks, such "contact metamorphism" is usually limited to a zone quite close to the intrusion.

Newton Cave King Co., Washington

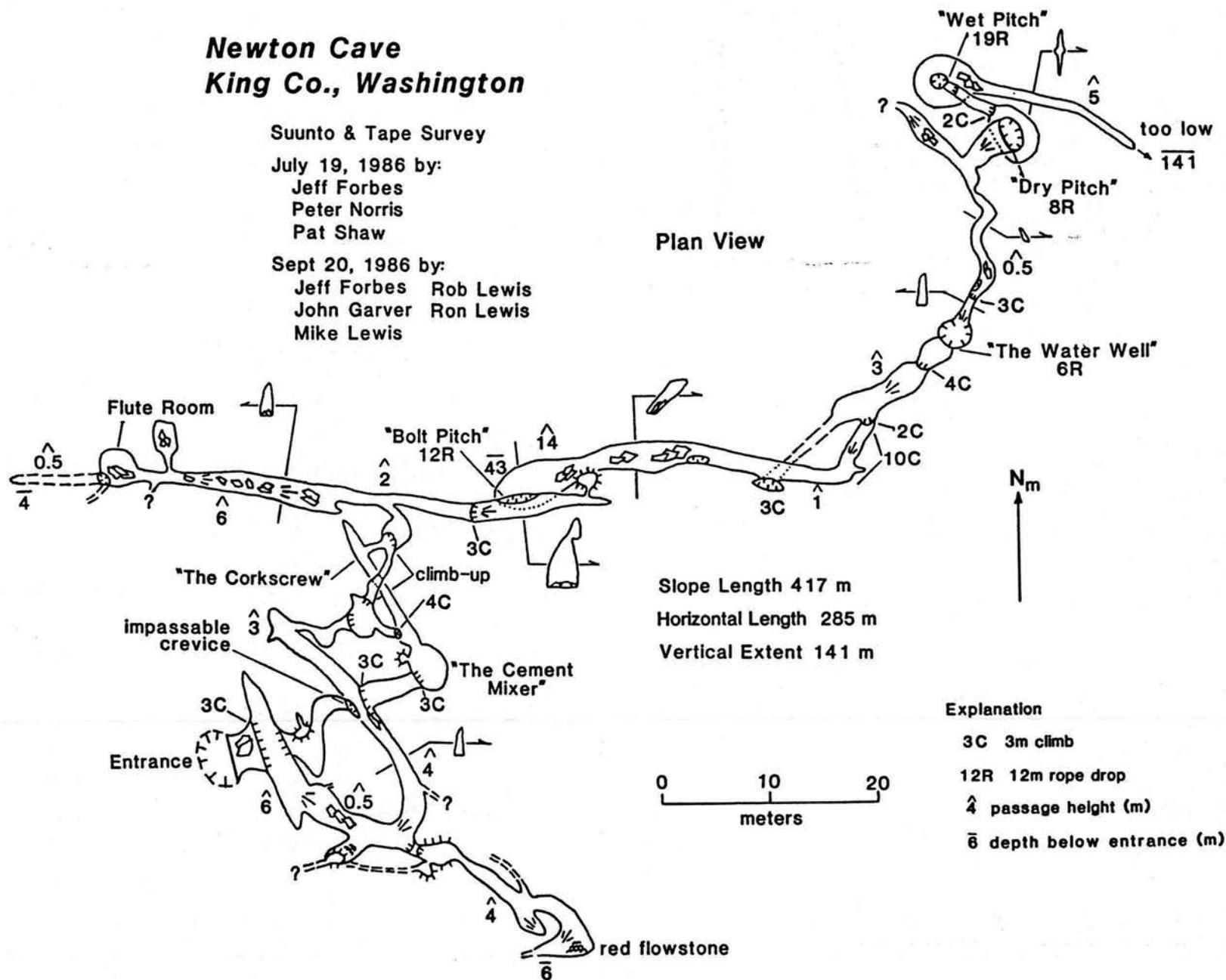
Suunto & Tape Survey

July 19, 1986 by:

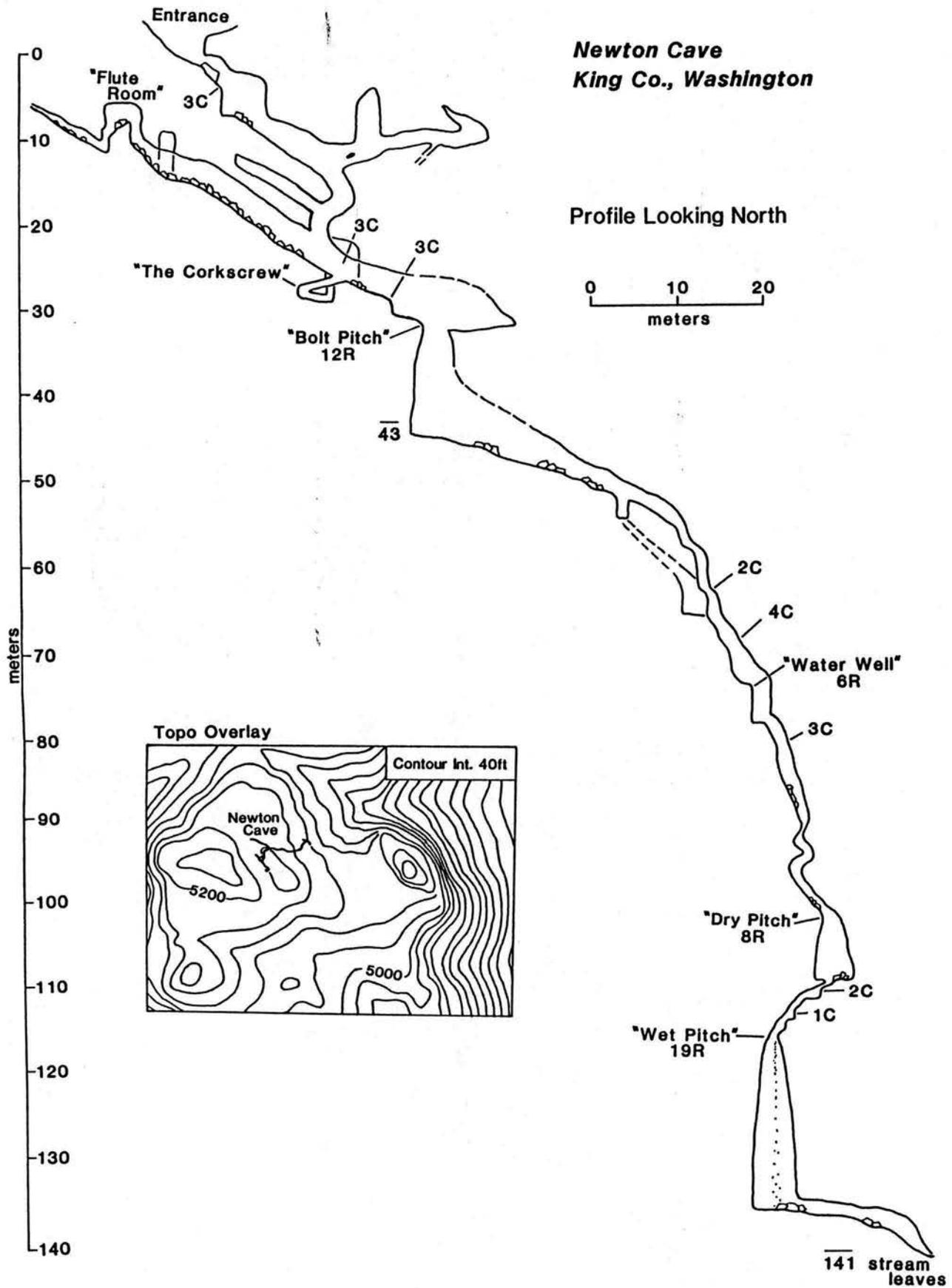
Jeff Forbes
Peter Norris
Pat Shaw

Sept 20, 1986 by:

Jeff Forbes Rob Lewis
John Garver Ron Lewis
Mike Lewis



**Newton Cave
King Co., Washington**



Since all of the rocks on Cave Ridge are highly metamorphosed, and since the granodiorite of Snoqualmie Mt. shows no sign of high pressure metamorphism, it is likely that the limestone was converted to marble by "regional metamorphism" long before intrusion of the batholith. This process occurs whenever sedimentary rocks are deeply buried (40+ km) by tectonic movements of the crust. Such metamorphism also tends to destroy bedding planes initially present in the limestone. The marble has been subjected to great pressure as can be seen by the large crystal size and sharp folds evident in the walls of Newton Cave, particularly near the Flute Room. This type of isoclinal folding may only occur if the rock behaves in a plastic manner under high pressure. Once pressure is released, by uplift and erosion, the marble would exhibit brittle fracture.

Long after deposition of the limestone, metamorphism to marble, emplacement of the Snoqualmie Batholith, and uplift of the Cascade Range beginning about 6 million years ago, Newton Cave was born of rain and snow melt working its way down through the cracked marble. Like the rock in which it is developed, the age of the cave itself is also difficult to determine, but it is almost certainly less than 100,000 years. The hanging valley between Cave Ridge and Snoqualmie Mt. was filled with ice during the last glaciation ending about 13,000 years ago. Looking north from Cave Ridge, the approximate upper limit of ice in this valley can be seen on the south flank of Snoqualmie Mountain. This appears as a line about halfway up the mountain, below which the rocks are smoothed off by the valley glacier and above which are rubbly due to the longer period of weathering. Based on this elevation, the top of Cave Ridge may have been covered by a thin veneer of ice, but was not heavily glaciated. The orientation of cave passages is highly controlled by geologic structure. The parallel set of northwest trending passages near the entrance tend to be fairly horizontal, and may represent strike-oriented passages developed along parallel faults in the marble. The passages trending northeast are much more vertical, dropping steeply in that direction. These include the slide down to the Cement Mixer and the section

just above the Water Well. These appear to be following the dip of faults, one of which was measured as 60 degrees to the northeast. Whether these faults bear any relationship to the relict bedding planes of the limestone parent rock is not clear, but this seems unlikely given the relatively high grade of metamorphism.

The dead straight east-west passage through the Flute Room and Bolt Pitch is almost certainly aligned with a nearly vertical fault. Large chunks of dark insoluble rock can be seen protruding from the walls and floor throughout the cave. The first of these is encountered at the entrance climb-down. These can be described as phyllite or schist, which is the metamorphosed version of shale. Being insoluble, these rocks weather more slowly than the surrounding marble, developing rinds of clay on their surfaces which makes them very slippery.

The Not-So-Deep Caves List - And so the glory days of Newton Cave are gone. With a depth of 141 meters, it will no longer qualify for the List of Deep Caves, the cut off being 150 meters. Crossing caves off the Deep Caves List is a thankless job, but someone has to do it.

Newton Cave Dye Trace

Jeff Forbes

Overheard at the bottom of Newton Cave, August 1985:

Dan McFeeley: "I wonder where that water goes?"

Jeff Forbes: "I've no idea. Let's do a dye trace."

It sounded reasonable at the time. But now the time had come and I was having some doubts. What if one pound of dye isn't enough? What if we can't find all of the springs? What if the cave stream simply goes into groundwater storage for thousands of years as Larry McTigue suggests, recharging some unknown aquifer? Wait a minute! Armchair dye tracers never prove a damn thing! Just get out there and give it your best shot, and if that's not good enough,

well, at least you've tried. And that's a damn site more than most of our spectator society will ever do. Besides, fate favors the brave. Guaranteed.

June 21, 1986 - Today is the day we dump the dye in the cave. Potent stuff, that fluorescein, one tenth part per billion being easily visible. Given a few tons of the stuff, we could turn all of Puget Sound...no, the entire north Pacific, a brilliant fluorescent venom green! Hold the world for ransom. Say Greenpeace did it. Frightening.

But where does that leave Newton Cave? First, we've got to put the charcoal traps in the surface streams. Thrashing through the central Cascade bush can be discouraging, and the reality of the situation is coming down hard. Do we really stand a snowball's chance of success?

After placing ten traps in the various streams around Cave Ridge, Larry McTigue, Roger Cole, and I finally reached Newton Cave late in the afternoon, only to find the entrance plugged with snow. Not about to let so minor an obstacle spoil weeks of planning, we had the thing dug open in ten minutes flat. A sizeable stream was flowing in from snow melt, perhaps one liter per second. Ideal dye tracing conditions. We dumped slightly under one pound of fluorescein, turning the whole place vivid green.

Roger and Larry headed for Seattle, while I set up camp on Cave Ridge. That night I slept the sleep of the just, dreaming of green rivers coursing through caverns measureless to man. The next afternoon I checked most of the traps, 24 hours after the dye release. All were negative.

I did not return for three weeks, at which time all but the most remote traps were checked. The charcoal in the north fork of

Commonwealth Creek contained a large amount of fluorescein. The exact spring from which the Newton Cave stream resurges was not ascertained, but it is somewhere along the southeast corner of Cave Ridge near its junction with Guye Peak. There are several swampy areas in this region that are likely candidates. At any rate, the water does not emerge to the west near Alpentel and the Snoqualmie River, as previously suspected.

SEPTEMBER GROTTO MEETING

The September grotto meeting was attended by 17 people and began with Jim Harp, Jerry Thompson, and Ben Tompkins discussing of the accident at Thanksgiving Cave in which Glen Peppard of British Columbia was killed. The grotto voted \$50 to send to VICEG for the memorial fund for Glen.

Ben then expressed some concern about what would transpire if we had a caving accident in the northwestern Washington area. Rod Crawford stated that the Sheriff's office is responsible for rescue operations and that they must be contacted in case of an accident. Jim and Jerry will be looking further into the rescue situation.

At the October meeting we will be accepting nominations for 1987 officers. Make sure you attend or you might get nominated.

Rob Stitt mentioned that the NSS BOG meeting will be held November 8 in Troutdale, OR. All are welcome to attend.

Rod Crawford gave a good talk and slide show on mammals found in caves and how to identify them. The program for October will be Bob Brown with the latest Bighorn Project slide show.