Cascade Caver

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Cascade Caver

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Membership in the Cascade Grotto is $15.00 per year. Subscription to the Cascade Caver is free to regular members. Membership for each additional family member is $2.00 per year. Subscription to the Cascade Caver is $15.00 per year. Subscription via email is $11.00 per year.

GROTTO ADDRESS

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MEETINGS

Regular grotto meetings are held monthly at 7:00pm on the third Friday of each month at the Mountlake Terrace Public Library, 23300 58th Ave. W. Please see the map on the back cover of this issue.

UPCOMING EVENTS

Please notify Mike Fraley at (360) 424-7297 (email: mfraley@valleyint.com) of any upcoming or last minute trips. Call him to check for any unpublished trips.

Aug 20	Grotto Meeting 7:00 p.m.
Aug 21	Windy Creek Cave area. Search for new caves in Washington Monument. Contact: Dave Hopf (360) 766-6978 ibis@cnw.com
Aug 27-29	General Cavers Gathering by PSG Peterson Prairie Group Campsite Cave Rescue Seminars on Sat. & Sun. Contact (for general info on cave meet): Scott Davis (253) 862-1035 scott.davis@weyerhaeuser.com Contact (for sign-up for a rescue class): John Punches punches@wizzards.net
Sept 3-6	Memorial Weekend Marble Valley Project (California Board) Contacts: Cynthia Ream (503) 284-3773 cynthiar@flexoprep.com or: Steve Knutson (541) 592-2100 sssknutson@aol.com or: Gary Petrie (503) 690-5465 gp@europa.com
Sept 11, 12	Cave Ridge - Snoqualmie Pass, WA Contact: Scott Davis (253) 862-1035 scott.davis@weyerhaeuser.com
Sept 17	Grotto Meeting 7:00 p.m.
Nov 7	Big Red Barn FALL Vertical FUN - PSG 24212 SW 384th St. Enumclaw, WA check maps.yahoo.com for directions Contact: Scott Davis (253) 862-1035 scott.davis@weyerhaeuser.com

COVER: Dave Hopf in the Arco Tunnel gate during the NSS convention in Filer, Idaho.

TRIP REPORTS

Crystal Cave, Montello Nevada

April 24, 1999

By: Stuart Monson

On a recent trip to Utah to attend my son Jeff's college graduation, we decided to get some caving in. I had two leads on where to go to find a suitable cave or caves to explore. The first lead was a friend, Mike Ahlstrom.

Mike was a member of a caving club in Utah in 1962. He related this experience that his caving group had. The group went to this cave located in the top of domed hill. The entrance is in the top of the hill of limestone. When you walk on the dome it sounds hollow under foot, because it is. The enthusiastic group tied a manila rope to a small tree, then each member in turn slid down the rope approximately 60 feet to the floor. They explored the cave to where it ended in break down. They tried to dig out the passage but were unsuccessful. After a long trip back to the entrance they discovered that no one could climb up the rope to get out. (Remember this was 1962 before rope walking systems were used.) After some grave concern and a panic attack or two, one of the cavers with some rock climbing experience, with great difficulty free climbed the 60 foot wall, some over hung, to freedom. Then he was able to pull up the smallest member of the group, then in turn the next and so on, until the entire lot were out. The first caver out was so exhausted that he got sick, loosing his previously eaten lunch to the September night.

Obviously this group had more enthusiasm than common sense. I have heard this story several times so I wanted to go see this cave for myself. Mike was reluctant to give me directions, fearing for my safe return. I explained that the equipment now a days was a lot better and that coming up a rope was not a problem. He gave me directions and made me promise to be safe. I promised.

After Jeff's graduation on Friday Jeff and I drove out to see if we could find the cave. We were not successful. We saw a lot of limestone on the West Side of the lake. The weather was great! So much for the first lead.

Jeff and I had talked to several Utah cavers starting with Dale G. who referred us to Holly M. who told us to call Ralph. We talked to Ralph for a long time, he wanted to take us out but was sick. He called Peter R. who called us and met us in Lehi to give us a map and directions to Crystal Cave in Nevada. Peter was a great help and a great guy.

Saturday morning our caving group had diminished to three, Jeff his wife Angela and me (Stuart). We headed out along the south side of the Great Salt Lake on I-80 past Salt Flats to Oasis, then right to the Montello area. It was snowing when we got to the entrance. The actual cave is located at the end of a hard rock mine shaft that is around 6 feet tall, 4 feet wide, and 400 feet long. When we reached the end of the mineshaft off to the left was a small hole that is the entrance to the cave. An iron ladder goes down about 6 feet. After about one minute in the cave Angela told us that she was claustrophobic and wanted to go out. She did. The cave was actually a lot warmer than the outside. Jeff and I explored the main passage to the end. Then explored all the side passages on the way back. Peter had told us about a green water lake that was in the cave. We had not found it yet. The walls, ceiling and floor are covered with popcorn with a lot of black crystals in different areas. At the end of one small corkscrew passage there is a lake in a dome shaped room. Three of the walls of the room go into the small round lake. When we talked loudly in the chamber the sound would vibrate and echo. "It was cool". The walls of the room had names and dates from the 1920's and 1930's. We were almost back to the entrance and still hadn't found the clear green lake. There are many side passages in this cave and we were running out of time and energy. We wondered if it was still snowing outside. Two more side passages, Jeff took the right and I took the left. I don't know what Jeff found because when I found the lake I started yelling for him to come see. The lake is T shaped, very narrow and deep, 10 to 30 feet, it's hard to tell because the water is so clear. We bridged our way over the water, Jeff went straight and I took the turn down to the bottom of the T. I didn't go to the end because we were out of time. We made our way out to find the sun shinning and the temperature a warm 65 degrees. Angela was down at the truck enjoying the sun. Crystal Cave was just a neat place. Very enjoyable.

SPECIAL FEATURE

Leonard Slack provided the following, edited from an article, "Inside the Mountains," in the 1960 *Mountaineer Annual*.

THE FIRST DISCOVERIES ON CAVE RIDGE

by William R. Halliday, M.D.

During the 1940's, cave exploration as a sport and speleology (the study of caves and their contents) began a period of mushrooming growth throughout America. Initiated in eastern United States, interest in cave exploration reached the northwest in 1950. During that year, several Mountaineers and other northwesterners, aroused to the lure of the underground,

organized the Cascade Grotto of the National Speleological Society. This group located, explored and carried out preliminary studies of almost every major cave then known in Washington and several in Oregon. Unfortunately the cavers enthusiasm exceeded the supply of caves known at that time and even though they succeeded in discovering additional caves, interest soon slackened.

Entered upon the scene a hero, as a classicist would say, in the person of a mountaineer, Tom Steinburn, fresh from his conquest of Mount McKinley. Learning from Bob Clark that there was a tiny cave in the saddle between Guye Peak and Mount Snoqualmie, Tom and his wife, Ann decided on an exploratory trip. Much to their amazement, sinkholes and cave entrances were scattered throughout an area ranging almost half a mile across. The more they searched, the more they found. None were really large, but at least three were more than they could safely tackle alone.

One of these newly found caves was a slanting crack, too narrow for Tom. Ann squeezed into it feet first for several yards, but could not turn around to see what was ahead--or rather behind. [Not until 1964 was this entrance forced by Don Dilley, Luurt Nieuwenhuis and others. It is now known as Cascade Cave.] Another opening led downward a few feet to a broad, low chamber, partly choked with breakdown. At its far end was a deep, broad pit, extending deeper into the mountain and clearly no place for a novice. The third was most impressive of all. A depression, almost hidden in heather, had a small hole at the bottom. It looked large enough for a person to wriggle through, but the beam of the flashlight indicated the hole opened straight down into the vault of a large, deep chamber. Rocks dropped into its maw floated downward until they shattered at the bottom far below.

The experiences of the first competent party to visit the Snoqualmie Pass caves gives a good idea of what can be anticipated of cave exploration in the northwest. Loaded with packs bulging with ladders, rope and camera equipment, Tom Steinburn, Bob Clark, Bob Spring, Joan Webster and the writer made the lone ascent on September 15, 1956, stopping first at Clark's Cave. With some difficulty, Bob Clark backed full length into the tiny cavern to pose for the party's photographers. These were historic photos for it was Bob's discovery of this tiny limestone cavern which led to the discovery of all the other caves in the immediate area. After pacifying the photographers, the party continued along the hanging valley on the south side of Mount Snoqualmie and scrambled to the entrance of Prospector's Cave. Bob Spring took one look at the inches-wide slit of the opening and gave up all hope of getting more than the nose of his camera inside. As titular leader, I tried to force the entrance and found it less tight than it appeared. Most of the party succeeded in following, and we set about exploring each of a complex of narrow passages and crawlways, mapping each passage in detail. The result was the recording of the largest limestone cavern known at the time in western Washington, totaling approximately 200 feet of passages. But the rock was rotten and the roof crumbly near the rear. It was not at all a pretty cave.

At the upper end of the valley, Tom directed us towards the south and over the rim. Below us lay a tiny valley in the form of a trough between glacier-polished limestone outcrops with a number of sinkholes arranged in a row. At the bottom of one of the sinkholes was a narrow opening which slanted downward into a sizable chamber. Red flowstone in an obscure chimney fostered the name "Red Cave". Fortunately, this particular cave opening was of sufficient breadth that Bob Spring could squeeze through and make up for lost time photographically. One of his photos later adorned the cover of the Seattle Times Pictorial.

At the south edge of this little amphitheater, pitted with sinkholes and ribbed with long limestone outcrops, still another opening appeared--this cave soon to become known as "Danger Cave". Sliding beneath a chockstone and down a steep muddy slope, we arrived in a broad, low chamber which seemed stable in spite of the presence of considerable breakdown. At the far end was a pit. Two 35-foot lengths of rope ladder, lashed together and tied to a convenient rock, reached bottom with many feet to spare. Tom assumed a satisfactory belay position as I tied in. Then, just as I was about to reach for the ladder, someone called "Wait a minute!" As we clustered around the pit, we could see freshly gouged scratches on one of the jumbled rocks at the top of the pit. It looked well wedged, but . . . we left. A year later Tom Steinburn returned to Danger Cave. Ascertaining that the rocks had stabilized, his explorations proved that the pit continued into the mountain and led to a stream passage, beyond which was a chamber of considerable size.

There was one more cavern to be visited. Not far away was Tom Steinburn's prize hole--opening into the top of a large chamber. We took turns being convinced, shining our flashlights into what seemed like an immense abyss, with the floor miles away. Rocks dropped, however, struck bottom in less than two seconds so we know it was not beyond our grasp. "Hellhole Cave," we dubbed it.

Tom dragged up a log. Two sections of rope ladder were tied together and lashed to the log. As the ladder was lowered, we hoped it would reach the bottom. It did,, with one rung to spare. Now to start the 68-foot descent on a flimsy, swinging ladder, entirely free of the walls of the cave. The narrowest part of the entrance was roughly triangular and about one foot wide on each side. Fortunately cavers are characteristically narrow of beam. I had to remove my pack and assume the position of minimum width--one arm at the side and the other arm

pointed forward. I slipped through without much difficulty. The room widened around me as I climbed down the swaying ladder. The bottom was an ugly mass of great, unstable blocks of breakdown. I untied the nylon rope, called "Off belay", and gingerly started making my way around the room while I waited for Bob Spring to follow.

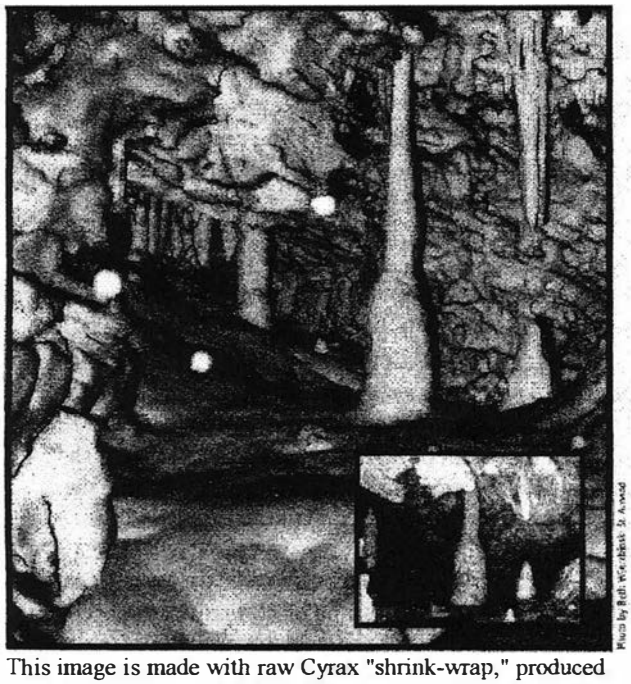
Time dragged on and on. Confused noises echoed from the top of the ladder. I guessed that Bob was having a tight squeeze. Then, finally, I could see the bulky body capped with a carbide light starting down the ladder. It was Tom, not Bob. Bob simply didn't fit. By the time Tom reached bottom it was so late that we had almost no time left for exploration. After emerging from the cave, we watched the sun cast pink hues on the eternal snows of distant Mount Rainier. Hurriedly we packed the gear and began the descent in dusk which soon gave way to nightfall. For cavers this is almost a normal situation and our headlamps served as well above ground as below.

IN THE NEWS

Out of the Dark Ages

New laser technology brings cave mapping into the 21st century.

by Beth Wienbinski St. Amand



This image is made with raw Cyrax "shrink-wrap," produced after the scans were finished. This image portrays the south end of the room (see inset photo). The color of the surface was determined by how much light was reflected back to show the formations' different colors.

Ninety years ago this month, the National Park Service (NPS) set aside the marble halls of the Oregon Caves as a national monument. Since then, thousands of men, women and children have climbed through its narrow passageways to investigate soaring rooms with names such as Paradise Lost and the Ghost Room.

To prepare the caves for the next hundred years' worth of visitors, though, the NPS must determine the best way for humans to both enjoy and preserve the caves. Today, a new laser mapping system offers NPS the chance to create three-dimensional cave maps, allowing them to monitor in-depth the caves' response to human activity.

The Cyrax, a state-of-the-art laser scanner and integrated 3-D modeling software (Cyra Technologies, Oakland, Calif.), can measure and model challenging structures and objects. The system uses an auto-scanning laser to capture and collect unique geometric features and formations of the cave walls, creating a 3-D virtual model of the cave itself with survey-grade accuracy. Jack W. LeRoy and Associates (Medford, Ore.) proposed a promotional test project to scan one room in the caves, the Joaquin Miller Chapel.

Cave Mapping: The Traditional Way

Traditionally, mapping caves involves hard work and an adventurous spirit. The location—inside rock or under ground—and the conditions—damp, uneven ground—make ground survey methods impossible. Steve Knutson, a physical science technician with NPS, performed the first complete survey of the Oregon Caves in the 1970s.

"With a tape and clinometer, you take the distance, bearing and inclination from station to station," Knutson said. "You make a line from traverse to traverse. In a mine, you have smooth floors. In a cave, you're climbing, crawling, wet, and you're trying to show what the cave looks like. A compass survey is better than turning angles with a transit—it's difficult in here. Each leg is independent of one another. In a transit survey, each leg is dependent on each other. It sounds crude, but it works pretty well."

Each line was marked with metal tags driven into the cave floor. Knutson explained that in cave mapping, the walls of the map are important, not the line. "We sent crews in to survey stations, who looked at each area and recorded all that is there to know about what's in the cave, and to try to under stand what's going on [as a result of human activity]." It's an ongoing project, as crews try to constantly add more features to the map.

Knutson's map, now in AutoCAD R14 (Autodesk, San Rafael, Calif.), consists of a two-dimensional plan map with layers (see Figure 1). Before the computerization, everything was done by hand, which could be problematic.

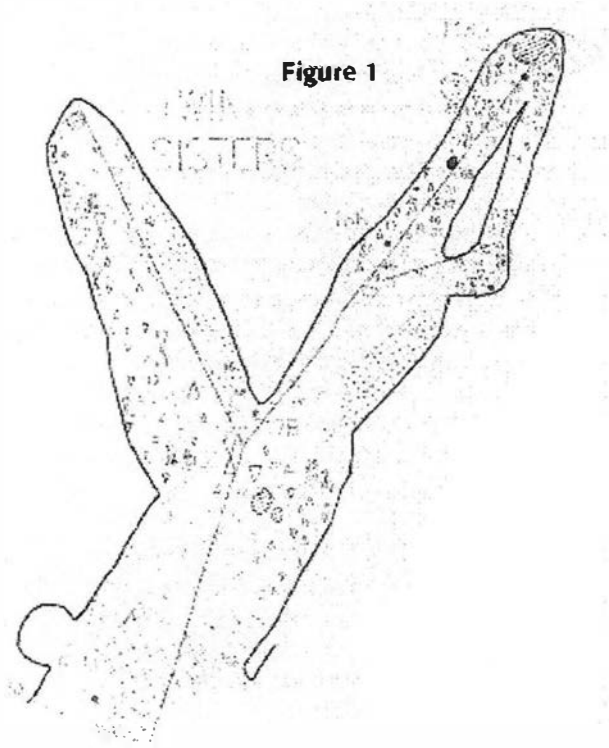


Figure 1

"As soon as you draw a cave map by hand, you can make a map as big as a page, then someone finds a new passage and it runs off the page," said Knutson. "You never do know with a cave."

With the AutoCAD-based map, Knutson can enter changes or additional information into the various data layers. This information helps cave managers keep an eye on formations, such as stalactites and stalagmites which are deposits of calcium carbonate hanging from the roof or side of a cave and formed on the floor, respectively. Human activity, rodent activity, wind patterns and vandalism are all factors they must monitor.

"The essence of cave management is to know what's in your cave," Knutson said. "For you to sit in your office and look at your cave; that would be great. One problem of managing is to be able to look at the cave as it was before photo monitoring was in place and to compare shades [of the formations]." Newly discovered formations are always white, which allows cave managers to determine the human contact with a cave. By having that information in a 3D database, though, it would only require someone in an office to call up the information.

But until this point, 3-D was only a dream. For a long time, although 3-D would have been great for the NPS, the computer processors weren't fast enough and the costs were prohibitive.

Mapping Caves, May 1999

Then this year, Jack W. LeRoy and Associates came across Cyrax. LeRoy brainstormed the applications of the Cyrax, and came up with cave mapping as only one of the uses.

"This was an obvious application," LeRoy said. "We went to the park service, showed them a video of what we have, and of course, then they're excited about it....The park service foresees that they could have in the future a video so that a person with disabilities who couldn't tour the caves could go to an interpretive center and actually experience the caves without having to enter them."

Jack W. LeRoy and Associates per formed the scanning May 3-5. LeRoy obtained the Cyrax unit from Pacific Survey Supply (Medford, Ore.), which owns one of 18 currently used worldwide. LeRoy and his associates trained staff members to perform the scanning services and modeling.

The Cyrax system consists of a large black box containing the laser scanner and a video camera, which captures the image to be scanned. CPG software collects and processes the points on a laptop computer to create a 3-D model that can be exported to CAD programs.

Before the data collection begins, the scanner is set up on a tripod. The scanner is not set up over a control point and does not have to be leveled. The Cyrax works in relation to point to point, not point to scanner. This dispenses with the need to locate over control points and level the scanner. Colored spheres (see photo, page 25) are used as registration targets to merge several adjoining scans together. To geographically reference the data, targets are set up over existing survey points identified by metal tags from Knutson's existing survey.

"The video image is taken first, then we can define certain areas that need to be scanned at higher densities, such as areas that have a lot of detail or targets," LeRoy said. "We can also take a video image and break it up into quadrants. The camera gives us the ability to see and target a specific area that the laser will scan. We also use the video image to determine proper overlap of multiple scans that must be registered together using the targets as control points. We are still trying to get used to the concept that all of the points captured by the scanner have their own x,y,z coordinates and that the cloud of points are floating in space. The individual points only relate to each other until they are registered to actual survey points on the scanned surface. We need to use a minimum of three survey points to establish accurate geometric data. The larger the scan file, the more survey points are needed to insure consistent accuracy."

To collect the data points, the green laser inside the Cyrax scans at an average of 800 points per second. In this project, the laser shoots an average resolution of 800 points vertically and 600 horizontally per second. This resolution is also used to cover small areas of complex structure and detail. While the scanner is working the operator makes a corresponding sketch

which act as the field book. They record the planimetric offset and the horizontal and vertical offset.

Each group of points is considered a "cloud of points," capturing detailed 3-D geometry of the surface. On the corresponding laptop, the scene unfolds as an exact (although green) model, as the scanner progresses. As the scanner proceeds on the cave, the walls of the Chapel are revealed in exact detail. After the scan is completed, the system software is used for converting sets of scanned, dimensioned points into final 3-D models and 2-D plans, elevations and section drawings. Visualization, query, analysis and documentation needs can also be met directly with the soft ware. For design needs, the final model can be imported directly into popular CAD packages, such as Knutson's.

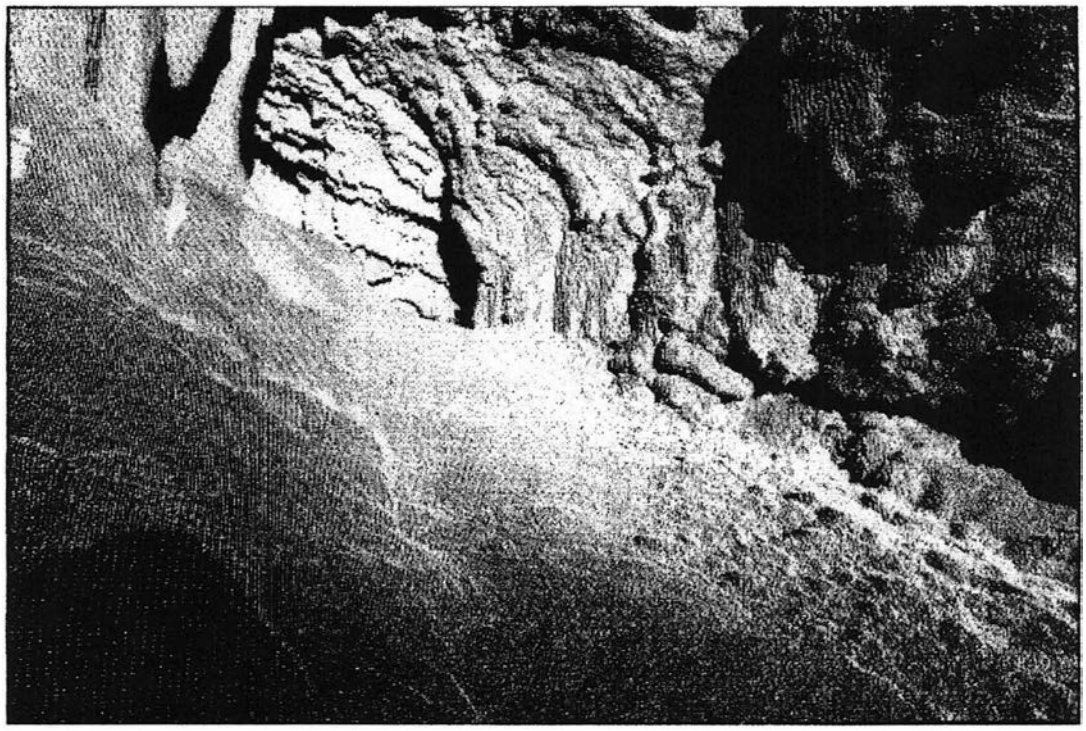
Final Results

For three days of work, LeRoy's crew captured more than 35 million points— work that would have been impossible with conventional measuring and modeling methods. To give Knutson and the NPS their awaited product, back in the office LeRoy and associate Carlos Velazquez registered all the scans together in one seamless file. Doing this allows the user to pick one point in the 3D map, and, like a video game, be able to rotate the view without changing the map. The user can check out the ceiling view, or another wall, all in the same file.

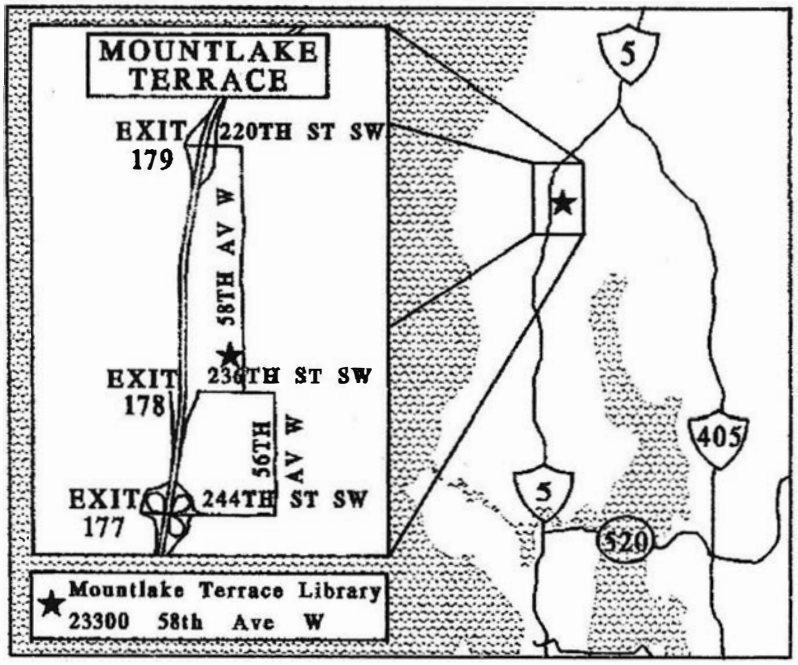
"We're giving them a 3-D real-time map of the room," LeRoy said. "If they want to identify existing survey points, these tags will be identified so that [Knutson] can tie it to his 2-D AutoCAD map. He can measure, label and get the full dimensions of the stalactites and stalagmites from the map, which is completely viewable in 3-D in AutoCAD. He can also manipulate the data however he wants."

And Knutson has big plans for the data. He summed up his goals for the Cyrax data this way: "How can we best utilize, enjoy the caves, view them, study them, preserve them, maintain them, monitor them? Tools like this are what we need: 3-D management. It will probably be a while to have it [for everything]; as soon as it's available every cave manager will want this kind of tool. In GIS and images on the surface, you can get all kinds of information. In caves you can't do that— you have to come in and get the information. In traditional cave mapping, you draw the walls; it's so intricate it's difficult. Something like this is such a great step over any hand-drawn map."

Reprinted from *Point of Beginning* (a surveyors' professional journal) with permission. Beth Wierzbinski St. Amand is POB's editor. The cover photo for the July issue of *Point of Beginning* shows the instrument set up in the cave and all the pictures can be viewed in the original color at http://pobonline.com.



The software automatically creates "point clouds" of the same area by placing a triangle polygon mesh over the point cloud, giving it a smooth surface.



The Cascade Grotto meets at 7:00pm on the third Friday of each month at the Mountlake Terrace Public Library, 23300 58th Ave. W.

To get to the Library from the Eastside, take Bothell Way to Ballinger Way. Head North on Ballinger and take a right on 19th Ave. N.E. (this turns into 56th Ave. W. at the county line). Turn left on 236th then right on 58th Ave. W. Go North 3 blocks.

We look forward to seeing you at one of our meetings.

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c/o Scott Fee
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