October 2011

NSS News

CALENDAR

USA

October 3–7, 2011—National Cave and Karst Management Symposium, Zermatt Resort, Midway, Utah. Web site: www.nckms.org/2011/ For more information contact Cami_McKinney@nps.gov or Andy_Armstrong@nps.gov

October 3–7, 2011—Carlsbad Caverns NP Annual Lint camp. For more info contact Pat Jablonsky @ patjabo@hotmail.com or 806 E. 4th Street, Delta, Co 81416 or 970-874-8979

October 6-9, 2011 – 34th Annual TAG Fall Cave-In hosted by the Dogwood City Grotto, Lookout Mountain, Georgia at Little River. NSS members and guests only. Sorry, no dogs or ATV's. Pre-registration begins June 1st. Vendors contact Pam Dopp at 770-301-9360 or pdopp@woa.com. Online registration, printable forms and directions available at www.tagfallcavein.org

October 14-16, 2011—34th Annual Texas Caver's Reunion at Flat Creek Ranch in Johnson City, TX. More info at www.oztotl.com/tcr or call 210-338-0TCR.

October 14-16, 2011—BATL grotto will be hosting the fall MVOR @ N. R.O. campground on the beautiful Niangua River near Lebanon,MO.More info @ MVOR.org and at Batlgrotto.org

May 25-28, 2012—Memorial Day Weekend: 41st Kentucky Speleofest hosted by The Louisville Grotto at the Lone Star Preserve, Bonnieville, KY. We will have a food vendor, cave vendor, camping, warm showers, howdy party with DJ, banquet, band, kayaking, hiking, bonfire, cave social and all caving will be based on the newest information from the Ky Fish and Wildlife. Lots of childrens activities. More info: louisville.caves.org

June 25–29, 2012—NSS Convention in the Greenbrier Valley of West Virginia

July 19-22, 2012—Greater Cincinnati Grotto is hosting Karst-O-Rama at the Great Saltpetre Cave Preserver in Mt.Vernon, KY Website: http://karstorama.com/

August 5-9, 2013. NSS Convention in Shippensburg, PA.

Send items for the calendar to davebunnell@comcast.net at least 6 weeks before desired month of publication (i.e., by March 15 for the May issue).

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NSS News
October 2011
Volume 69 Number 10

FEATURE ARTICLES

Andy Zellner

Brian Gindling and Mike Green packed for a long trip to a Peruvian pit

Mike Green

Jason and Andy Zellner standing next to the entrance of Wishing Well Cave in Peru

DEPARTMENTS

ABOUT THE COVER

This month's covers feature photos from the Peruvian deep pits expedition:

Front cover:

Brian Gindling rappels into the 74m Green Chasm in Peru, South America. Photo by Mike Green

Back cover:

Right: Mike Green on rappel at El Hodago. Photo by Andy Zellner.
Left: The large entrance to Flower Pot Cave. Photo by Mike Green.
Bottom: Double Rainbow seen from the project area. Photo by Mike Green.

Perusing South America

Mike Gringo, ***mikegreen027@gmail.com***

"*We shall not cease from exploration and the end of all our exploring will be to arrive where we started and know the place for the first time.*"

-T.S. Elliot

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My eyes were coldly fixated on the wet grass in front of me. Each step from my saturated boots brought an annoyingly loud <squish> as water seeped from deep within the leather confines of my Ozark Trails. <squish><squish> Somewhere close to my front door over 3200 km away sat a pair of hiking boots that I had opted not to bring in order to save weight. This would be a mistake that I would learn to lament.

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A cold, alpine breeze brushed over my weathered hiking pack before continuing its aimless and lonely journey on the barren, treeless landscape. I stopped my modest pace long enough to capture an ever elusive breath that evades the lungs of those unprepared for the extreme elevation above 3050 m. While gasping for air, I looked up just in time to see the ridge disappear beneath a pervasive cloak of fog. Within minutes the day vanished as a purgatory of whiteness transformed the mountainside into a ghostly apparition. Countless cattle trails littered the steep Peruvian grasslands, but none seemed to lead anywhere in particular. I resumed my arduous ascent to base camp, and in turn, continued my labored breathing. Buddha once said that, "life is suffering." Surely he said this while collecting pits at 4250 m (14,000') above sea level. Yes, life was hard for a few weeks, but fruitful all the same for members of the 2010 Peruvian Expedition.

Our team first assembled on June 27th, 2010 at Jorge Chavez International airport in Lima, Peru and collaborated on the expedition details while awaiting our domestic flight. Leading these talks were Peruvian caving vets Jeb Blakeley (ID) and Andy Zellner (GA) who, together, had visited our target region in South America over a dozen times and for months had mulled over the complex logistics required of such an expedition. Also attending were John Swartz (TN) and David Cole (VA), each of whom were participating for a fourth year. First time participants included Brian Gindling (ID), Carl Heitmeyer (NJ), Tony Theriault (GA), and Cody Planteen (CO). This was to be my second trip to the remote mountainside in northeastern Peru and one that I anxiously anticipated since my first expedition in 2005. In total, there were nine of us, a number that was not surpassed on any of the previous

Mike Green

The end of the road at 3050 m into the Peruvian Andes

expeditions. The team was a healthy mix of newcomers and the experienced, type As and type Bs, tall and short; however, one thing that we all had in common was our high energy and an ever-present lust for the unknown.

Little was to change between the 2010 agenda and those years that had preceded: drop as many vertical pits as possible and continue to survey and catalog the entire karst landscape. One would believe that after almost fifteen years of exploration it would become increasingly difficult to locate virgin caves, but the reality is that a vast majority of pits remain undescended. It almost feels as though the caves are propagating faster than their depths can be searched, but with such a large team we were confident that we could make a considerable impact.

BACKGROUND

"Only those who will risk going too far can possibly find out how far one can go."

T.S. Elliot

The Andes Mountains are the world's longest continental mountain range at a length of almost 4000 km and contain most of the western hemisphere's tallest mountains. Hidden within this rugged landscape is an area that is dominated by limestone and littered with deep pits that are completely untouched by modern man. The prominence of this limestone, coupled with the extreme elevations of the Andes, creates a depth potential in excess of 1000 m. For the last twenty years, Peru has had a magnetic draw on subterranean explorers and at the current rate of survey should continue to have a pull

One of the many alpine lakes in the project area

Mike Green

Mike Green

Local mule skinners work for several hours to secure countless bags on the only means of transportation into the high Andes.

Mike Green

The mule train approaches the top of the 3050 m ridge marking the entry into Cyclone Valley.

on the hearts and imaginations of cavers for at least another twenty years.

North American interest in this remote, Peruvian landscape began in 1996 when Steve Knutson (OR) and Jeb Blakeley (ID) organized a reconnaissance mission that set the stage for future expeditions into the alpine karst fields of the Western Andes. Early ventures were anything but ordinary as the team constantly battled the harsh alpine weather; however, the rewards were as great as the elements they fought against. After verifying the existence of thousands of caves, Knutson and Blakeley continued leading expeditions for thirteen years. In those years that followed, 17 of the 23 deepest limestone pits in South America were found in this particular area but many more were left unexplored. At 4250 m, there exists the possibility for deep caves that would compete on a global scale.

The history of caving in this region is best described by Steve Knutson in the February 2004 *NSS News*:

"The Andes Mountains of South America dominate the west side of the continent and run the length of it, with elevations of over 22,000 feet. Strangely enough, this forbidding landscape of tall, sometimes glacier-shrouded peaks, and 8,000 foot deep canyons—the ancient home of some very advanced but mysterious cultures, of whom the well-known Inca are but minor late-comers. Ruins left by these ancients are still being found in remote areas.

In 1985, '86, and '87 a Colorado caver named James Miller had some interesting rambles in the Andes of northern Peru. He was a mining geologist and was working at a site on the edge of the Amazon Basin. When work left him with free time, he naturally headed for the alpine country, to look for caves. He was usually alone but occasionally found non-caver companions. His load often included a 300-ft rope, vertical gear, helmet and lights. He made use of such and dropped pits even at over 15,000 foot elevation, at least to the extent of his rope. Solo caving at 14-15,000 feet!

I heard of this and got interested. Back in the 70s I had become intrigued with Peru, both for the ancient cultural aspects, and for the potential for great cave depth. But I was nervous about the machinations of Maoist anarchists, like the Shining Path and the Tupac Amaru. I settled for Mexico and Central America instead.

If I were going to finally go, it would be much better if I had someone to go with so I talked it up to Jeb Blakely, from Idaho Falls, Idaho, and his wife, Bitsy, who had been companions on Central American efforts. They thought it was a great idea. Jeb has been a Co-Leader of the expeditions, ever since. We were going—but exactly where to?

I corresponded with Mark Stock. Some years before, he and Marion Smith had gone to check out a large sink that appeared on a topo map in the Huanuco area but had not found much.

I got out the geologic map of northern Peru that I had got in the 70s and the air navigation topographic map on which I had for my early fantasies plotted the extensive limestone bands. These bands run across high altiplano and deep valleys. There was big depth potential everywhere.

Yet there were negative aspects as well. The Andes had been created by rapid mountain uplift, so there may have been little of stable water tables for phreatic development. Indeed, some research showed that previous expeditions had not found anything extraordinary. The longest cave in Peru was only 2.8 km, and the deepest only 407 m.

To help decide the question, I tracked Miller down, and asked him if he wanted to go. He was back in school, now had a wife and child, and was in no position to do so. I asked if he were to go, what would he want to see—what was the area or cave that had seemed most promising? He replied that he had heard of a tragadero (the Peruvian word for a sumidero, a stream or river submergence) at around 12,000 ft elevation, that sounded good, and that he never had a chance to check out.

We figured that we needed one trip just to find out about the relevant aspects, travel, weather, local attitudes and so on, and so we settled on April and May of 1996, April to be spent in Peru and May in Ecuador.

As our departure time grew near, we agreed to include Matt Oliphant and Nancy Pistole, from California, who would be traveling in Peru at about that time.

As it turned out, April and May are still in the wet season in the Peruvian Andes, and the weather was always bad. Traveling by road we found was very different from that in Mexico or Central America. There are huge roadless areas. Except for the Pan American

Mike Green

Our humble abode at 3050 m

Highway, which stays on the coastal plain from Lima north to the Ecuadorian border, and one or two highways heading into the mountains, main roads are not paved. No road runs for any distance north and south along the axis of the Andes—they all run mostly west to east, from the coast into the mountains to a particular town and then usually end. Few vehicles traverse what roads exist. If you take transport part way to your destination, you may find yourself stranded for a time. We spent two days in one town, and no vehicles passed through in that time.

At roads end we were told that the tragadero, still over a day away on foot or horse, was not enterable. Damn, all that trouble for nothing? Well, they said, there are some 'Infiernillos' up on the mountain, above town. But they are just holes in the ground…of little interest…just a local hazard for grazing animals.

Well, we were there so what the heck. The plateau in question was at over 14,000 ft, and the town at 10,000 so we arranged for horses and mules to pack our gear up there, and a day or two later, were off.

The horse packer was dubious. Tourists never came to this area. What were these strange-looking folks up to? They hadn't wanted to buy the Chachapoyan mummies that townsfolk offered them. Now they wanted to look at holes in the ground?

So at the breakover at the top he stopped, got off his horse and called us over to a gaping pit just off the trail. Picking up a big rock, he gave it a toss, and then turned with a stern look, to judge our reaction. The rock fell 2 or 3 seconds, hit something, then another interval, hit again, and repeated this until the sounds faded into the depths. Wow! Our looks and exclamations told him enough—these *pendejos locos* actually like these deep holes!

We stayed up there for several rainy, snowy days and saw enough—there were several of such pits around—this needed more manpower, more rope, and better weather. We vowed to return in 97!

We have been returning ever since, and there seems to be no end of deep pits…

Of course, we always hoped for continuing cave, and there are signs that such may be imminent. We will see…" (Knutson, *NSS News* February 2005)

In his article Steven Knutson also provides insight to the geological and geographical cave development in Northern Peru:

"The Andes are lowest near the border with Ecuador, and broadest south of Lima and on into Bolivia. The structure seems similar to mountains such as the Klamath and Sierras of the American west, with the volcanism of the Cascades occasionally thrown in.

Structure is aligned north-south. In places there are huge volcanoes, but the volcanism is mainly in Ecuador and Colombia, and then on south of Lima and through Bolivia and Chile/Argentina, but not in northern Peru.

It seems never to be a single mountain ridge. Canyons between ridges are sometimes stupendous, over 8,000 feet in depth. There are several major limestone bands along the axis of the mountains and these cross these canyons in places and provide great depth potential for caves. Indeed, some of the highest limestone in the world is present, and I have seen it up to 18,600 feet.

The downside for cave development is that the uplift, the orogeny, of this range is said to have been rapid. One published opinion said there was a stable period during the uplift but there may have been little chance for ordinary phreatic development. On the positive side there are many sites of great vertical relief, to allow vadose solution and there could be thermal water development. Also, in such a big area there are bound to be situations of special geology, where water is trapped or concentrated along the structure, and extensive or significant caves are the result.

Examples of this found just recently are the cave above Soloco, near Chachapoyas, which is now the longest in Peru at some 4 km, and the Pumacocha cave, in the Cordillera Yauyos, which is the deepest, at 638 m. The former is in limestone sitting on an underlying sandstone base, thus trapping the drainage, and the latter is in a narrow band of limestone, catching a surface stream coming off granitic rock, creating a vadose cave. The former was done by French cavers (Jean Loup) and the latter by British (Nick Hawkes).

The thermal water development seems to be a viable idea, as I have seen large travertine deposits at elevations of over 13,000 ft., as well as at lower elevations.

After scouting a number of areas in northern Peru, I must say that in many places development seems to be at an early stage and as predicted for rapid uplift. Drainholes for lakes and existing tragaderos are often small and pinch out after just a short distance. Big expanses of limestone tend to have few good pits, and large closed basins have small drains." (Knutson, *NSS News* February 2005)


Jason Record

One of the most prominent features in the valley, South America Pit

2010 Arrival

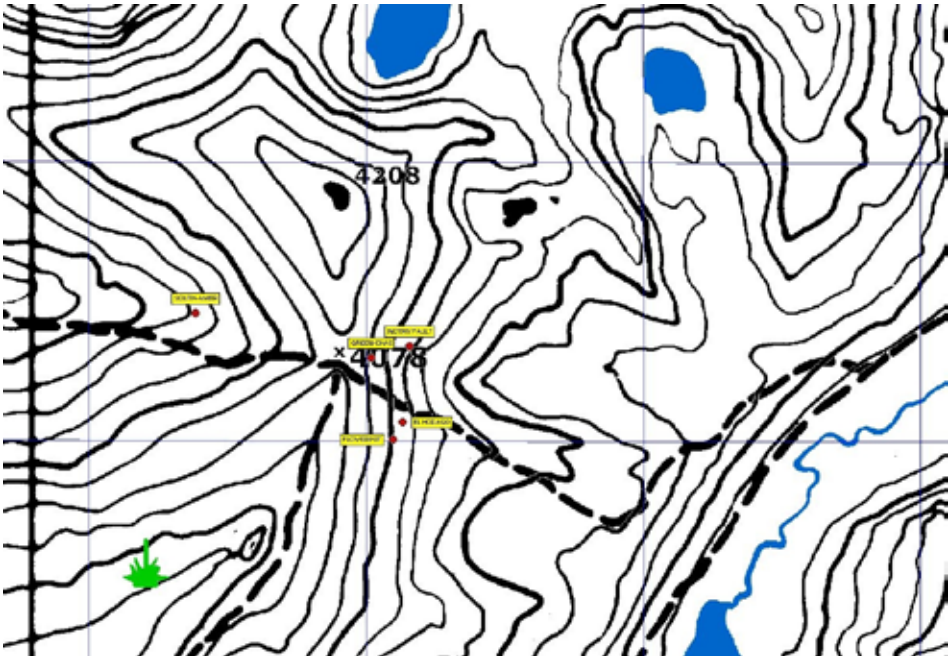
Following a flurry of introductions in Lima, the 2010 Peruvian expedition officially began with a domestic flight to one of the more remote areas in the country. We would have ample time to become better acquainted during the week of travel that followed. The project site requires that almost half of our four week journey be spent flying between cities, riding in an uncomfortable bus, and enduring a multi-kilometer trek above 3050 m. The days passed very slowly during this time as we anxiously anticipated our arrival, but our team finally reached the "end of the road" on June 29th. The road's end consisted of a small village nestled at 3000 m in the Andes Mountains. This town of only a few thousand inhabitants would be the launching point for our trek into the mountains.

As customary for all expeditions into this particular area, our group met with the local government to obtain official permission to conduct our exploration. This gave us time to gather up boxes of food and provisions to sustain nine people for two weeks.

Once our team finally departed from quasi-civilization on the morning of July 2nd, we began the long march with mules and equipment to the ancient Incan pass that looms ominously over the small village below. Upon cresting the 3050 m pass, we were officially in Valle del Ciclón, home to countless infiernillos, many of which hold places on the South American deep pit list. It should be noted that the term "Valle del Ciclón" is in fact a gringo name and is not authentic as it were but rather was chosen to conceal and protect the area that we are working. The karst in Valle del Ciclón is categorized primarily by blind pits with the occasional air-blasting termination. The first expedition to this area in 1995 found practically every pit to be a roaring maw of water. Needless to say, there was not very much exploration in the way of caving on that particular trip. All the water in the area drains somewhere further down the Valle del Ciclón before it continues into the Amazon basin. To this day, the resurgence is a bit of a mystery.

After approximately 4 km of indiscriminately passing hundreds of pits, we arrived at a relatively flat area that is situated at the base of a steep section of mountainside. This was to be our refuge from the harsh alpine environment for the following two weeks. What first drew expeditions to this location was access to a small pond that sustains the needs of no more than ten people. Heavy filtration and purification is an absolute necessity, but even then, the quality of the water quickly diminishes after the first few days. This is the only water source for kilometers, and given the elevation, it is a bit of a novelty for a land dominated by thousands of insurgences. This is both a blessing and a curse as every ungulate knows of this alpine oasis and refuses to share with a bunch of gringos. For these locals, the drinking supply doubles as both a watering hole and bathtub. The pond's limited size constantly dictated its importance as even a small herd of cows could completely drain its reserves within minutes and force our team to abandon our efforts on the mountain.

After weeks of travel, the team finally arrived at our 3050 m home for the following few weeks and the 2010 Peru expedition was well underway. The group wasted no time establishing base camp with all of its alpine amenities, and by the next morning, everyone was busy trekking across the mountainside in search of the unknown.



Caves of the Fault

Caves of the Fault

"They say, best men are molded out of faults."

-William Shakespeare

One area of interest since early expeditions to this region is a fault that runs through the ridge and continues for several kilometers into the adjacent valley. The fault has shown great potential time and time again as numerous high volume pits have been found in this geological feature.

South America Pit

South America Pit is the largest of the fault caves and is easily recognized by its shape which closely resembles that of the South American continent right down to the islands of Tierra del Fuego. The 20 m-wide entrance dwarfs the surrounding pits making it one of the most prominent features in the valley. What separates South America Pit from the other fault caves is that it sits directly in the middle of the slowly descending valley floor, therefore making it a likely entrance to the missing drainage system.

The cave was located in 1994 by Steve Knutson on a solo reconnaissance hike from an area that served previous expeditions as a base camp dubbed Gringobamba. Steve had decided to push the edge of the known limestone in an effort to find a new area for future exploration.

"On a Gringobamba expedition, I had the notion that we were exhausting the pits near there and needed a campsite further out. So I took off one day to find one. As I recall, I circled up and over the ridge into the valley and headed down to see if there were indeed pits there. I was looking at one near the bottom and a herder happened by. To prod him I said something like, 'wow, this is a really good pit.' And he pointed to South America Pit which I could see just a short [distance] away and said no that's bigger/deeper. I continued to it and then up the valley passing more pits and was pretty much sold." [An email correspondence with Steve Knutson].

Steve did not have time on that particular expedition to explore South America Pit but did manage to make very accurate and encouraging notes. It was not until 2004 when Bonnie Crystal, Matt Covington, and David Cole first dropped the entrance which measured 61 m. The bottom of the drop was found to be a sloping talus that leads to the top of a 14 m pit. Due to a lack of resources, further exploration did not continue until 2005 when Heather Levy, Jason Record, Andy Zellner, and I returned to conduct an official survey. The second drop was rigged and rappelled to find a tall meandering canyon that moved a considerable amount of air. Several climbdowns and filters led us to a termination with yet another too tight crack that howled with hints of a large system. The cave was pushed to a depth of 130 m.

Green Chasm

During the 2005 expedition, I decided to take full advantage of the unusually clear and cloudless morning by walking a series of ancient Chachapoyas trails that intersected the primary fault on the west side of the ridge. I left camp immediately after breakfast armed with little more than the clothes on my back and a GPS. While hiking, I stumbled upon several large vertical entrances located just a few hundred meters below the saddle.

Cody Planteen

Mike Green beginning the 74 m plunge to the bottom of Green Chasm

The cave entrance, although obvious on a bright and sunny day, was undoubtedly shrouded during previous expeditions by a blanket of clouds that ordinarily dominates the Andes. The quarry-like walls around the pit took some time to negotiate as they all funnel directly into the abyss but I found my way to a ledge where I safely began throwing rocks into the void. The bottom of the drop sounded to be about 60 m away but what really caught my attention was the incessant echo that lent credence to the existence of a large chamber below. My imagination was immediately captured, and my thoughts constantly wandered back to the pit for the rest of the day. That night, it was not hard to convince Heather Levy that we needed to return the following day with the means of descending the new find.

Mike Green

Andy Zellner begins setting bolts for El Hodago

The caves located directly in the fault had proven to have a lot of potential for large, deep pits so I hoped that this cave would not be any different. Upon throwing rocks into the abyss, I knew that it would require a substantial amount of rope so Heather and I returned to the drop with a 100 m rope. After rigging and rappelling a 10 m drop I was finally able to paint a more complete picture of what we had been observing from the surface. The pair of entrances as a whole is approximately 10m wide in total and is divided by a land bridge that pars off one third of the sink. The smaller of the two entrances slopes steeply to a precipice while the larger section is completely vertical after the lip. Grasses, moss, and vines envelop the entrance from all sides, causing the entire pit to glow like a jade stone in the bright, alpine sunlight. This flora covers the walls all the way to a steep talus slope at the bottom before vanishing into darkness. The shear diameter of the room below the entrance shattered any hope of estimating the depth without scale.

Heather and I were forced to anchor the rope rather far away due to the lack of rigging options, which is fairly typical in an area devoid of trees. Not really thinking too much about conserving our 100 m rope, I began my freefall descent into the massive chamber. The walls shrank back into the dark recesses of the cavern as I descended further and further from daylight. After a few minutes, the floor did not appear any closer from my perspective and I realized that the pit was much deeper than previously estimated. It was not long before I was at the end of the rope that danced freely in space without any promise of reaching a ledge, much less the ground. I cursed the lack of materials and returned to the surface where we rerigged the rope for more length. I returned to the darkness with expectations of touching bottom but this proved to be a hopeless plea because once again, the rope neglected to reach the floor. Without another rope, I changed over for the long climb out. We began our trek back to camp as the sun set on the mountainside but vowed to return the next day to complete our exploration.

Most of my night was spent tossing and turning with the image of a short rope etched into my lucid dreams. Waking frequently, I anxiously awaited sunrise. Morning came fairly early for both Heather and me. She seemed just as eager as I to see the bottom of the Chasm. We ate breakfast quickly and were out on the ridge before eight but this time armed with twice as much rope. We inevitably had to tie two ropes together but were more than willing to trade another day of changeover practice for passing a knot. We rappelled and measured the deceivingly large chamber and found that it was a 74 m-deep shaft. I vividly remember the moss-encrusted talus, algae-covered speleothems, and vine-dominated ledges that created the feeling of standing in a botanical garden. We decided to call it the Green Chasm for this reason.

Green Chasm was located in 2005 but was never fully mapped or photographed during that time so Brian, Cody, and I returned on the 2010 expedition to resume the incomplete survey. We explored and surveyed numerous leads but all attempts proved to be futile. Green Chasm is little more than yet another impressive but blind pit.

El Hodago

South America Pit and Green Chasm are not the only large entrance pits located directly in the fault's path. The 2010 expedition yielded the breathtaking El Hodago that easily outshines many of the surrounding pits due to the entrance's enormous size. Boasting a 10 m-wide entrance, El Hodago drops 49 m into a chamber that quickly bells in excess of 30 m. The bottom is rubble-filled landscape reclaimed by the same alpine flora that dominates the surface. The cave continues for 15 vertical meters before ending at a breakdown choke. Like many of the large pits of the fault, it is a monolith that ends without any chance of continuation.

Mike Green

El Hodago


Cody Planteen

Brian Gindling drives in the first bolt at the top of a 56 m pit named Not My Fault.

Not My Fault

Not My Fault has a far more modest entrance than that of its neighbor El Hodago but is no less deep. Not My Fault begins as a 5 m shelter and slopes steeply to the lip of a 56 m free-drop. The shaft retains a 6 m diameter to the base where it breaks off into several smaller pits. The deepest of these pits is 21 m and ends at the top of a talus slope leading to a blind 6 m drop. The total vertical extent is 83 m.

Flower Pot

Nearby Flower Pot is a shelter cave much like Not My Fault, except that its entrance volume is many times larger and houses a natural bouquet of flowers, vines, and of course the local version of stinging nettle known as Mala Mujer. Flower Pot and Not My Fault were located early during the expedition but not dropped, so Brian, Cody, and I returned to survey the depths of both pits. We knew that the abyss was deep after launching several stone queries so we were wise to carry several ropes each. Cody was the first to rappel and unfortunately, at least in this case, the first to climb out as well. I say "unfortunately" because he was short-roped an unknown distance from the ground and forced to climb out without the pleasure of touching bottom. I proceeded to where Cody left off with another 60 m rope in tow. After tying the two ropes together, I was able to touch bottom, where I viewed one of the most beautiful pits in Valle del Ciclón. As with Not My Fault, Flower Pot's ceiling is illuminated by the intense alpine sunlight that accentuates the vibrant hues of the moss-covered limestone giving the appearance of a glowing Chinese painting suspended in the subterranean darkness. Breaking out of my trance I called to the surface for Brian and Cody to join me. We immediately began our survey and found that the entrance drop measures 80 m, which to this date is the deepest known pit located in the fault. The cave continues briefly as an 18.5 m pit followed shortly thereafter by another 14 m pit until it inevitably pinched into an air-blasting crack that was much too narrow to permit human occupancy. From the surface, Flower Pot is a 113 m deep cave, and like most other caves in this area, has less than 50 m of horizontal passage.

Other Caves in the Area

Mossbeard

(as told by Brian Gindling)

Mossbeard was found on the first full day of ridgewalking on the mountain. A 5 m-wide pit lined with long tendrils of moss drops 60 m to a flat sandy floor. Two parallel 50 m domepits connect near the bottom of the shaft, which is coated with green moss from the noonday sun that shines straight down the pit to highlight a moss covered skull of the now extinct Marsh Deer. A short climbup leads to a 10 m popcorn-lined pit which enters a long, narrow canyon with a few 2 m columns and small helictites. A tight crack in the floor drops another 11 m into a similar canyon where there are two leads. One way leads to a blind 18 m pit and the other to a breakdown-choked climbdown.


Brian Gindling

Mike sets a bolt for the 60 m entrance drop to Mossbeard.

Wishing Well

During the 2005 expedition, Jason Record and Andy Zellner located an interesting cave that was later named Wishing Well. From the entrance, the pair knew that they had found something significant. Jason recalls his personal account on its initial exploration:

"Andy and I set out the morning of the 21st [of July] in search of a cave indicated the previous year by Matt Covington to be a '13 second rock rattle'; we would never make it


Cody Planteen

Mike Green at the bottom of the first drop in Flower Pot


Cody Planteen

Mike Green at the entrance of Flower Pot

David Cole

Cody prepares to rappel the 100 m + entrance drop to Forth of July Cave

to that cave. After traveling about 1.5 km, including hiking up the 300 m hill above base camp and descending the west face of the ridge about 150 m, Andy and I saw a small vertical shelter type entrance in the bluff to our left. 'I found a rock,' said I to Mr. Zellner, who had a strange look on his face. It turned out he had already tossed one in and was still listening to it fall as I was talking to him. We tossed another. 'About 100 m,' I said. 'At least,' replied Andy. 'Well do you want to tie another rope to the end of this 100 m rope?' he inquired. 'Andy, if I get my wish we will need to' was my response... I got my wish…"

"Andy began setting the bolts for the entrance drop as I ran around looking at other holes in the same area. Nothing looked too significant, so I suited up and prepared for descent. Andy saw the look on my face, and when I asked if I could go down first he quickly agreed…"

"Before long I was at the knot, and it was at least 20 m off the floor. I passed it, and before giving Andy the signal, I quickly scouted the bottom. A small crawl with air... and then... another pit!! 'Only about 15 m deep,' I thought. I yelled for Andy to bring the bolt kit and a knife, so that we could get this other pit rigged. He understood, and came down with the proper tools. Assessing the crawl, Andy began placing a bolt at the beginning of it as I calculated the extra rope we had. Before long, I was on rappel. Down I went, and soon I could see another crack in the floor at the bottom of the pit. 'Andy!' I yelled, 'another hundred footer!...'"

Andy and Jason had in fact verified the way deeper into the cave, but a blessing in the form of another pit temporarily halted further exploration.

"'We should return tomorrow with Mike [Green] and Heather [Levy] to survey this thing,' Andy commented. Agreeing, I threw a couple of rocks to see if I could get them to go further... nothing. Satisfied, I changed over and we exited the cave.

The next morning the four of us, well, to be specific: Andy Zellner, Heather Levy, Michael Green and myself, headed up the hill with 60 m more rope to bottom the cave and get it surveyed. Upon our arrival I grabbed the extra rope and headed for the lead. Andy and I discussed further rigging possibilities to free up extra rope 'just in case,' and decided to rearrange things slightly. Having done this, I sent the rope down the previously short rigged pit, and was soon on the ground at the bottom of the pit. Now for some survey details: The first pit proved to be a whopping 111 m, followed by an 11 m, and now a third pit of 26 m. I peered around the corner at the bottom and noticed a small crack in the floor, the same way every other cave so far had ended. As I raised my eyes to view the rest of the room, I saw a massive void extending up and down. I grabbed a rock and eagerly tossed it over the lip. A couple of seconds went by, and I heard a crash, but before I could calculate what I thought to be the depth, another resounding crash echoed back around 5 seconds after the first. Enthusiastically I exclaimed, 'We're going to need more rope!'... We couldn't believe our ears. The first thing that came to my mind was how we would get more rope without further postponing the trip. Mike would certainly command admiration from all of us by volunteering to tackle that particular task…"

Cody Planteen

Forth of July Cave - David Cole shows how to hump rope at 4250 m

"Andy and Heather then surveyed their way out, while Mike battled the elements to get more supplies. A couple of hours passed with no word from anyone, so I decided to go ahead and drop the next pit. It would turn out to be 28 m deep. When I reached the bottom, I found myself in the largest room so far, at least the most horizontally extensive, and walked across it to where I knew the next drop was. I grabbed a rock, approached the ledge, held out my hand, and released…"

"It was a clean 4.5 second freefall all the way down. I set two more bolts for this pit and waited... and waited. Finally I heard voices. Apparently, Mike the Great had brought back 200 m of 11mil PMI all the way up from base camp. I climbed the 28 m pit to meet Andy, and he snaked down the 200 m of rope to me…"

"I was soon joined by Mike and informed that Heather was on her way down to help complete the survey. Soon enough I was at the bottom of what would turn out to be the cave's final pit at 69 m deep. Again, this was a clean, classic drop. Some quick lead checks were done, and companions were called down. We exited the cave at 3:00 a.m. to find the outside temperature well below freezing. Inspired by fatigue and the elements, we embarked on our journey back to base camp for a total trip time of 14 hours." (Record, *TAGnet* 2005)

Jason's and Andy's find made its mark on the South American deep cave list with a total vertical extent totaling 261 m (pits: 111 m, 11 m, 26 m, 28 m, and 69 m). The discovery of Wishing Well opened up the imaginations of all those who attended the 2005 expedition, showing that there was no shortage of deep virgin caves.

Forth of July Canyon

(as told by Cody Planteen)

On July 3, 2010, David Cole and I found a lead (later named Fourth of July Canyon) that sounded promising. The lead was a long and narrow canyon which sounded deep based on dropping rocks. A single rock would set off a cascade of other rocks falling deeper, making it likely there was a ledge or slope down the pit.

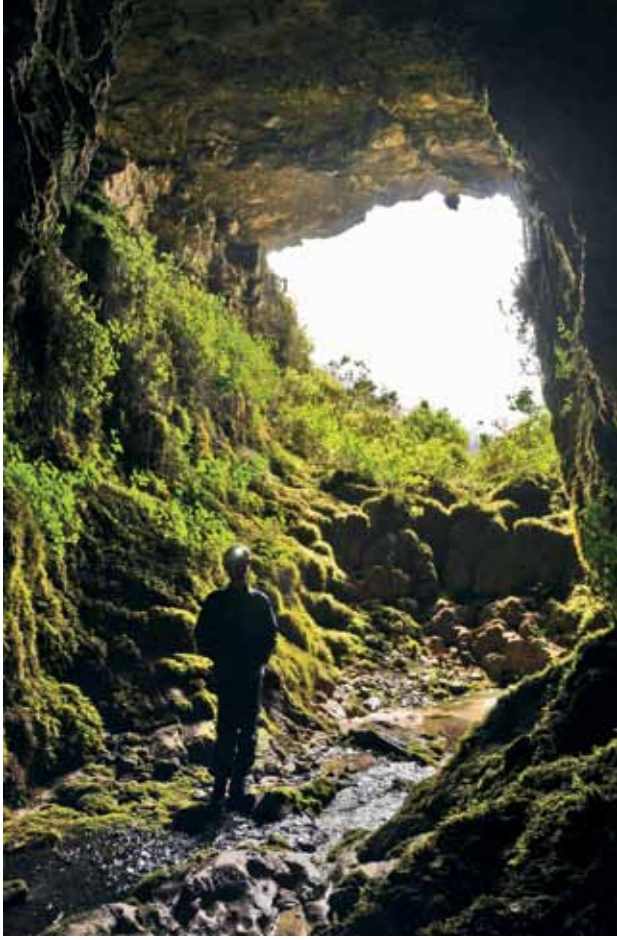
On July 4, David and I returned and set two bolts in the rock face adjacent to the pit as there was no natural rigging available. A 105 m rope was lowered into the pit. I entered the pit, which was a narrow canyon passage for the first 30 m. There were two tight spots on the rappel which required some negotiation. The cave then opened up onto a large ledge where the remainder of the rope was stuck.

From the ledge, only a small amount of diffused daylight was visible was due to the tight nature of the canyon passage. I spent roughly 20 minutes untangling the rope,

Mike Green

Photos of the Nacimiento del Rio Ciclón entrance as seen from base camp. Rectangle shows area detailed below. Rectangle in below photo includes the entrance.

Mike Green



Brian at the entrance to Nacimiento del Rio Ciclón

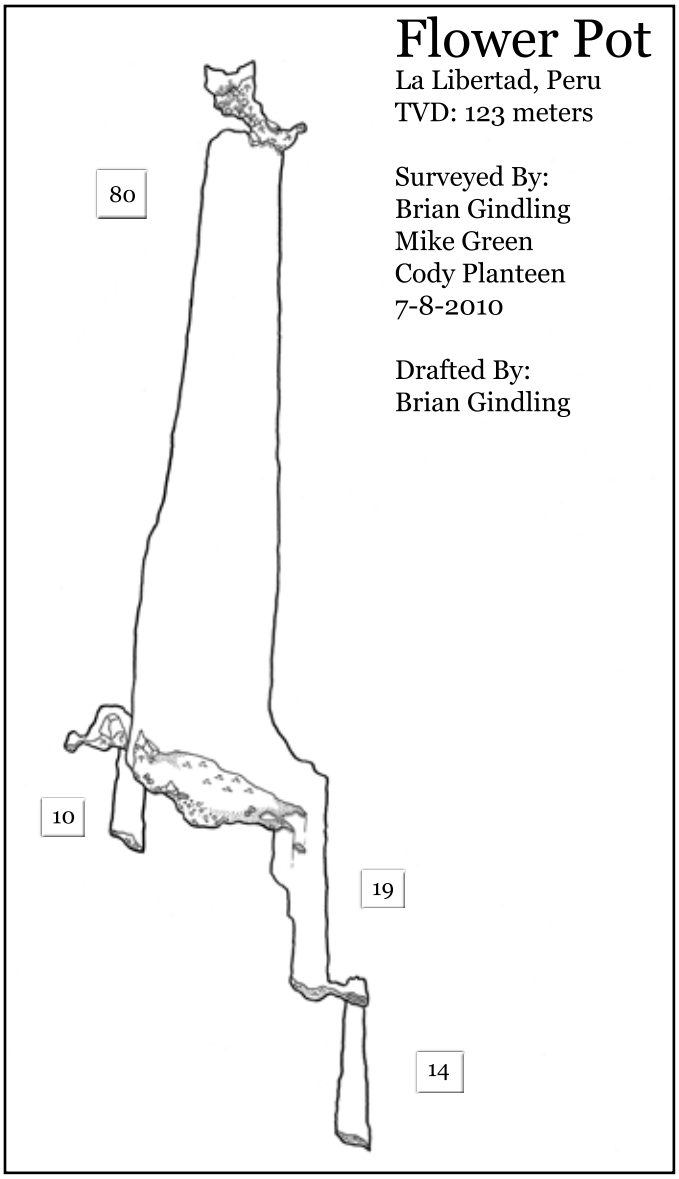
Brian notes the water line in Nacimiento del Rio Ciclón

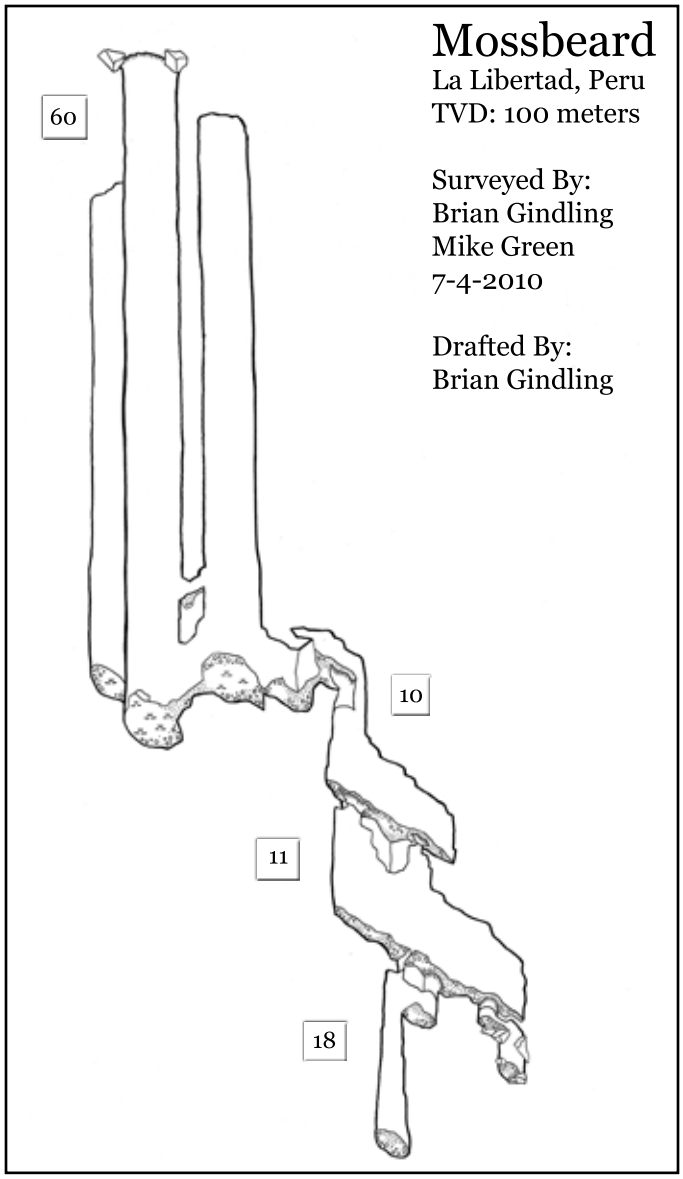
Mike Green

Andy at the bottom of El Hodago's 49 m entrance

Mike Green

El Hodago





gardening rocks off the ledge, and setting a rope pad. I then rappelled down the next pit. The rappel was somewhat terrifying. I remember thinking, "What will I find at the bottom? Am I crazy for exploring caves in the middle of the Andes so far from home?" The pit was 66 m in depth and free after the lip.

Getting off rope, the passage continued in a canyon. After a tight spot in the canyon, there was a small room approximately 3 m in diameter. The room had a small pool of water, walls covered in sandy popcorn formations, and a tight hole in the floor which appeared to lead to another pit.

The cave continued on to wider canyon passage which led to a larger room about 10 m long with a high ceiling. In this room was another pit with a much wider entrance than the first. I estimated the next pit's depth to be 60 m deep based on timing the sound of dropping rocks. Having no extra rope with me, I returned to the surface to tell David what he had found.

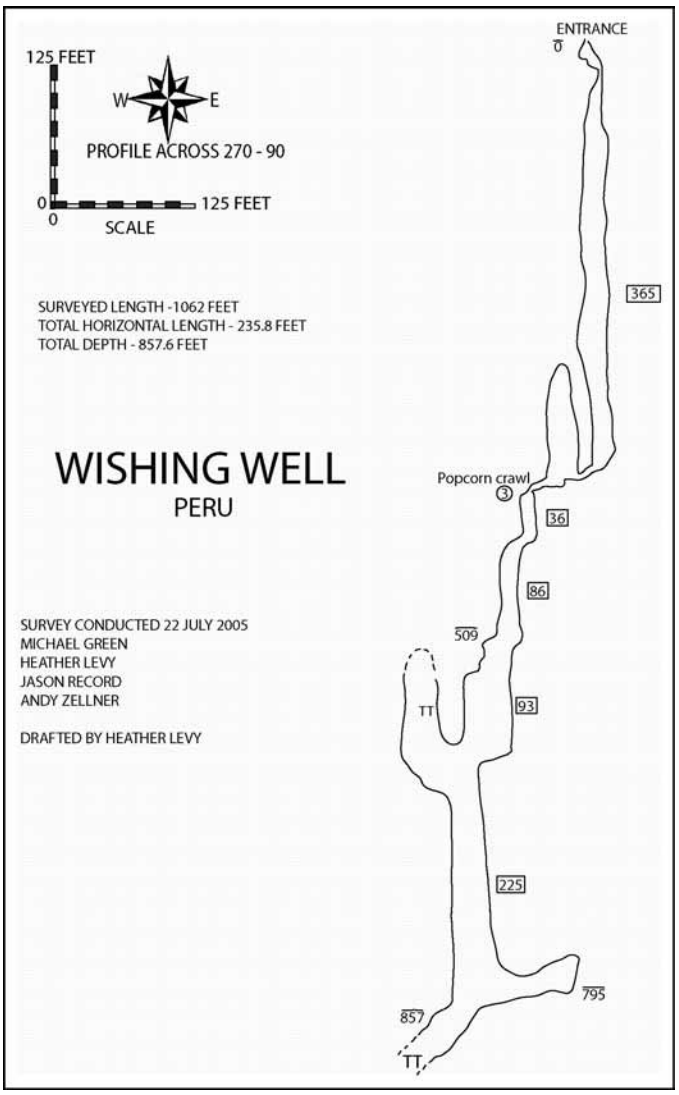
On July 5, David and I returned to Fourth of July Canyon. The lengths of rope in camp were not ideal for what was needed to explore the next pit. The choices were a 60 m rope or a 180 m rope. I chose to bring the 60m rope, figuring I had over-estimated the pit's depth.

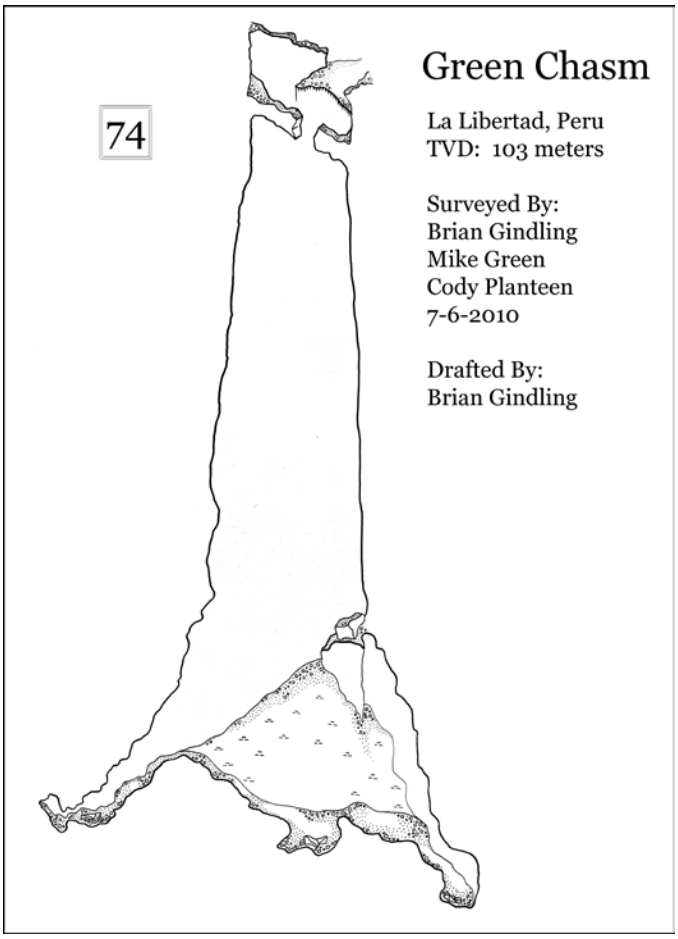
David rappelled down the entrance pit first and set a bolt for rebelay at the ledge. We then continued down the 66 m pit. Natural rigging was used with the 60 m rope for the next in-cave drop. I went down the pit first, which had more sandy popcorn covering the walls. As I rappelled, I saw the rope was approximately 12 m above the bottom. I then executed my first in-cave changeover and climbed back up the rope as I had been short-roped.

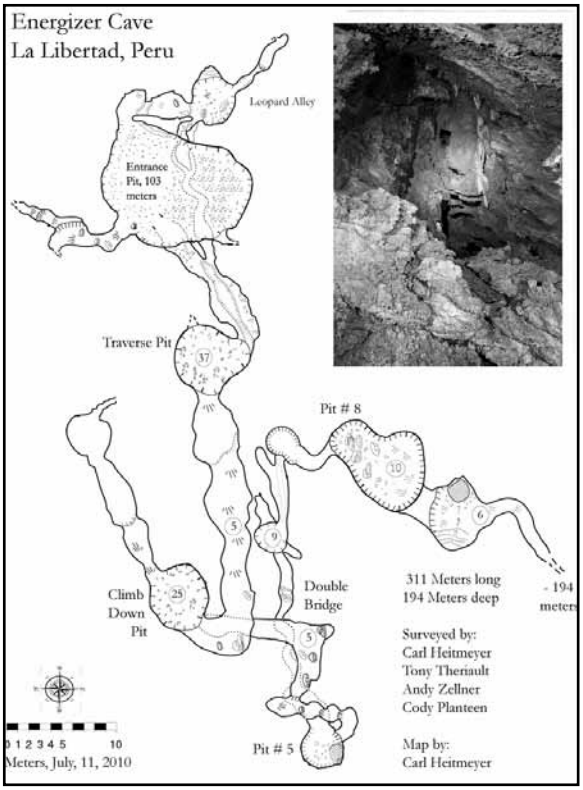
On July 6, the longer 180 m rope was brought into the cave and rigged to the in-cave pit. David rappelled down this time and was able to reach the bottom. He set a rebelay bolt near the bottom and swung while on-rope to explore some side canyon passage which did not go. The pit depth was recorded at 76 m.

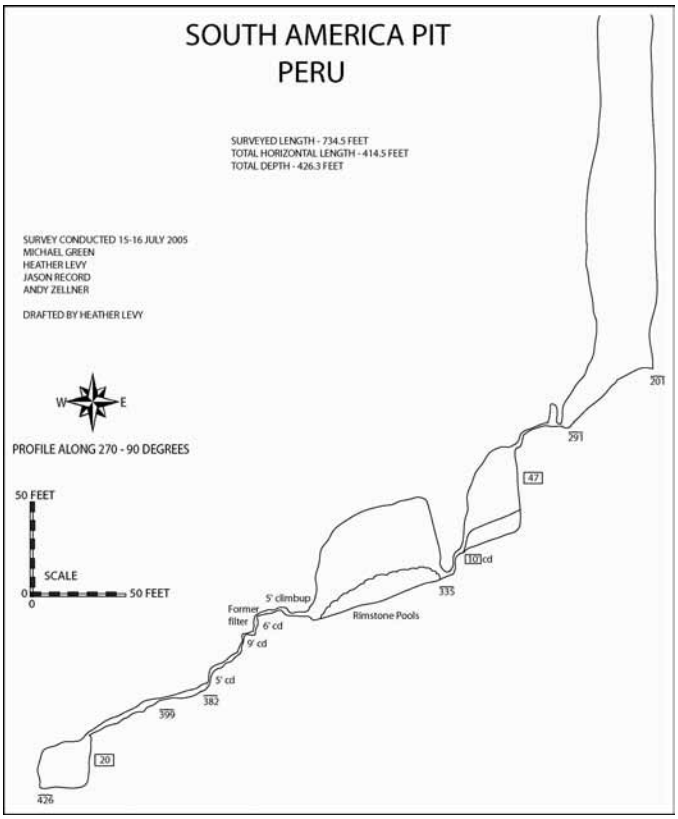
While David was at the bottom of the 76 m pit, I went to the other small tight lead and dropped some rocks. David was unable to hear the rocks dropped, indicating that the two pits lead to different parts of the cave. About half an hour was spent hammering on the smaller pit entrance in an attempt to widen it but it was still too tight to enter. I may have been able to squeeze but getting back up would have been quite the challenge and a rescue situation in remote Peru could easily result in a fatality.

In the end, the Fourth of July Canyon had three pits explored with depths of 30 m, 66 m, and 76 m, giving a total depth of 172 m and a lead left behind for exploration in the future.


125 FEET
W
E
PROFILE ACROSS 270 - 90
0
0
125 FEET
SCALE
SURVEYED LENGTH -1062 FEET
TOTAL HORIZONTAL LENGTH - 235.8 FEET
TOTAL DEPTH - 857.6 FEET
WISHING WELL
PERU
SURVEY CONDUCTED 22 JULY 2005
MICHAEL GREEN
HEATHER LEVY
JASON RECORD
ANDY ZELLNER
DRAFTED BY HEATHER LEVY
ENTRANCE
0
365
Popcorn crawl
3
36
86
509
TT
93
225
795
857
TT


74
Green Chasm
La Libertad, Peru
TVD: 103 meters
Surveyed By:
Brian Gindling
Mike Green
Cody Planteen
7-6-2010
Drafted By:
Brian Gindling


Energizer Cave
La Libertad, Peru
Leopard Alley
Entrance
Pit, 103
meters
Traverse Pit
37
Pit # 8
10
6
5
9
Climb
Down
Pit
25
Double
Bridge
5
0
Pit # 5
311 Meters long
194 Meters deep
- 194
meters
Surveyed by:
Carl Heitmeyer
Tony Theriault
Andy Zellner
Cody Planteen
Map by:
Carl Heitmeyer
0 1 2 3 4 5 10
Meters, July, 11, 2010


SOUTH AMERICA PIT
PERU
SURVEYED LENGTH - 734.5 FEET
TOTAL HORIZONTAL LENGTH - 414.5 FEET
TOTAL DEPTH - 426.3 FEET
SURVEY CONDUCTED 15-16 JULY 2005
MICHAEL GREEN
HEATHER LEVY
JASON RECORD
ANDY ZELLNER
DRAFTED BY HEATHER LEVY
W
E
PROFILE ALONG 270 - 90 DEGREES
50 FEET
SCALE
0
50 FEET
201
291
47
10' cd
335
5' climbup
Former
filter
6' cd
9' cd
Rimstone Pools
5' cd
382
399
20
426

Tony Theriault

Carl crawls under one of several constrictions in Energizer Cave.

Energizer

"It keeps going, and going, and going…"

- The Energizer Bunny

One of our team's greatest finds during the 2010 expedition was a discovery made by Tony Theriault on a solo recon. Halfway through the expedition, Tony located a deep 100 m+ entrance that overshadowed anything he had seen earlier during the day, but without vertical equipment, he was forced to satisfy his curiosity by simply throwing rocks and snapping a few photos. With the sun quickly setting, Tony realized that it was probably a good time to return to base camp, a challenge not yet realized. In all reality, the cave was not too very far from our nylon city but this did little to abate the commute as it was 350 m lower in elevation. Tony described this experience in his journal:

"I had to slide most of the way down on my backside which may not make the most ideal route back to camp. I clawed my way back by grabbing clumps of wet grass for anchors and old horse and cow tracks as footholds. The temperature dropped fast as the sun disappeared below the mountains but the effort of getting back to camp, a hot meal, and sharing the day's findings was more than enough to stay warm." (Journal of Tony Theriault 07-06-10)

After climbing the steep mountainside, Tony arrived at camp with tales of a large entrance with a five second freefall. The team's interest was immediately roused and it was not difficult to recruit support to plunder the depths of what would later be known as Energizer Cave.

The following day, Tony and Carl returned to Energizer, and with the aid of a 200 m rope, claimed the honor of being the first two explorers to have ever touched bottom. The pit measured an unanticipated 103 m but what was most surprising was that unlike most of the surrounding caves, Energizer was not just a blind pit but continued with a 10 m drop. The duo followed this passage to the top of a 35 m pitch. Carl bottomed this pit to unfortunately discover that it was blind; however, during his climb to the top, Carl noticed something that seemed inviting. On the opposite wall was a void that was some 10 m from the ceiling. Being too close to the top to pendulum, Carl describes the dangerous traverse by saying, "if I had peeled, I would have fallen halfway down the pit." Within a few nail-biting minutes, Carl had reached safety. This drop was later dubbed the Traverse Pit for obvious reasons. After regaining a little composure, Carl soloed further into the cave and confirmed their hopes of continuation. The tired pair decided that this would make a good point to stop for the evening.

The following nights were filled with dreams of deep caves and booming borehole for both Carl and Tony so it was not long after their first exploratory trip before they were ready to resume the effort in Energizer.

Tony Theriault

Carl finishes his sketch of Energizer Cave.

Tony Theriault

Carl checking leads in Energizer Cave.

The pair returned to the newly discovered cave within a few days and made short work of the first two pits. Within an hour of entry, Carl had renegotiated Traverse Pit; however, this time he rigged a fixed handline to avoid any unfortunate mishaps. Carl and Tony continued their survey down two more drops before reaching a constriction and needed to be hammered. Hours passed before the passage was wide enough to permit travel and the two ended their trip at the top of yet another nuisance drop. Close inspection of the data revealed that this area of the cave had in fact broken a depth greater than that of the 35 m Traverse Pit validating their beliefs that the new route was in fact leading them deeper into the mountain.

Subsequent trips into Energizer were made with Andy and Cody to push the cave to a total depth of 194 m. The exploration ended at a typical blowing crack with a trickle of water leading down a tight canyon before undoubtedly resurging at a valley spring a few hundred meters away. On the last trip made into Energizer, Carl made it to the surface with just enough time to watch the sun set behind a spectacular alpine mountainside littered with hopes and dreams not yet realized. On this particularly clear night, the stars kept the team company as each of the exhausted cavers defied the laws of gravity by returning to the surface. When interviewed for this article, Carl followed his description of this surreal experience with, "it was so cold that I had frost on me by the time we last left Energizer behind."

Nacimiento del Rio Ciclón

"*Commit first, then figure it out.*"

-Napoleon

"It was one of those classic moments. Unable to find a single loose rock and a beckoning void at your feet, so a grass clump will have to do. Having just stumbled upon a 6 -7 second free drop, I'm reminded that I'm not even supposed to be looking for pits today.

Mike Green

Brian and Mike stand in the entrance to Nacimiento del Rio Ciclón.

My goal is a conspicuous black hole 3.5 km as the condor flies from base camp at the end of a wall of cliffs plunging into the mountain's foot. Almost every day our esteemed leader Jeb Blakely would remind us that no one had ever been on the other side of the valley, and with our youthful enthusiasm it would be but a quick jaunt 400 m down the mountain, then swim across the wide lake or wade through the wetlands, and then climb back up the 400 m to the opposite side. So that is what I did (except I had no interest in swimming across an alpine lake, and at 4000 m ASL you would be most foolhardy to do so). Off the cliffs I went, and began making a beeline for my target, working my way down and around the valley. I had been following a conveniently inclined bench all morning and now, as it seemed to be ending, I came to the deepest of a long series of pits with three entrances and much potential. Peering down I could see a few sunlit ledges, but with no rope and no gear I was just wasting time. Taking a GPS point, I vowed to return.

In the back of my mind I knew this was coming. It always seems to around here. Before me was nothing but a 60 m long, near-vertical slope that bristled with bedewed, chin-high clump grass, which rivaled the slickness of the fog laden cow pies. With backtracking out of the question I continued down as far as I could on my feet and, when gravity began to overcome traction, pushed my pack over the brink and followed as well as I could on my posterior. Now don't get me wrong, I searched hours for the best way up and down the cliff wall, and in the end just had to accept the shortest descent in what I've come to know as a controlled fall. My day pack careened down the hillside and came to rest near a lone Peruvian stone barn surrounded by cows. I arrived soon thereafter. Little did I know how intently these cows were observing my proceedings, though later I would come to know. I now found myself in a small cliff surrounded bowl with a magnificent view out and above the large waterfall seen from camp, which fed the twin lakes below and drained into the waters of the Amazon. Springs seeped from numerous ledges at the limestone-sandstone contact and the ground became a true swamp, bisected by a meandering stream issuing from the base of a 60 m tall vomitous mass of boulders deposited by the cliffs above. Leaning back you could almost see the 5000 m peak of the mountain, which was undoubtedly the source of many of the rocks surrounding me. Deep spongy moss and spear-like succulents hid hip-deep, treacherous trenches and fetid pools with chest-high grasses crowded amongst 2 m-high, extraordinarily potent Mala Mujer stinging nettles, sporting large orange, poppy-like flowers. At the top of this pile beckoned my destination, and after a long afternoon of fiery curses and burning skin from trudging through this damnable maze, I arrived directly below the entrance. But as I was catching my breath, the sound of flowing water could be faintly heard above. Soon after scaling a wall of nettles and silt, the lost stream was before me, sinuously threading its way amongst sandbanks as it exited from the borehole piercing the mountain and immediately sank again beneath the nettle maze. As this was a scouting trip, and having not much more than a helmet and a light, I followed only a hundred meters of nice stream passage before turning around, yet I knew from what I had seen that I would soon return. With daydreams of massive systems and underground rivers, the hike back was just as steep as ever, and I arrived back at camp as the darkness and fog began to settle in." (Brian Gindling)

Brian admires one of several large chambers in Naciemiento del Rio Ciclón.

Mike Green

Towards the end of the expedition, Brian and I discussed visiting the promising resurgence he had found on his solo reconnaissance a few days prior. He told stories of large borehole that feed the headwaters of the Rio Ciclón, which is a tributary of the Amazon River. This crystal- clear stream flows from the heart of the tallest peak in the surrounding countryside. Furthermore, the passage was blasting air like a blacksmith's bellows. The only downside was that the cave was located on the opposite side of the valley from where base camp was situated. This would entail dropping at least a thousand meters to the valley floor, hiking several kilometers along the Rio Ciclón, and then ascending a completely different ridge. In all reality, this cave could easily be seen from camp, but the obviously long trek required to visit the cave would force one to turn his attention and efforts to closer goals. There was no doubt that a pilgrimage would necessitate camping somewhere along the way but it would have an incredibly high chance of yielding something very unusual for the area since the landscape is more or less devoid of any horizontal caves. With little contemplation of the details, we committed the last two days of our expedition to the expenditure.

Brian and I set out early on the morning of the 11th and quickly began our dreaded decline to the valley floor. It was not long before we were passing our hiking packs and

Mike Green

Brian explores the dry trunk passages in Nacimiento del Rio Ciclón

free climbing near vertical cliffs much as the explorers of Energizer Cave had just a few days prior. At one point, Brian's top-heavy pack managed to escape his attention long enough for it to begin rolling a hundred or so vertical meters before stopping just shy of a pit. Eventually we made it down to the valley floor where we walked passed ancient Chachapoyan dwellings before continuing our journey to the source of the Rio Ciclón.

The traverse through the next hanging valley was certainly a relief from the treacherous drop we had endured earlier. We stopped for a few minutes to refresh ourselves in several spring-fed waterfalls that were a much invited change from the cattle bath at base camp; however, our luck quickly changed as we entered the bogs and marshes approximately one kilometer from the now noticeable cave entrance. It was here that the inviting limestone portal began to show itself in all its grandeur. The cave is situated high on a semispherical wall of the valley much like that of an outside auditorium and exuded an aura of mysteriousness. The beauty of the cave recessed into the dark corners of our minds as passage through the bogs became increasingly difficult. We sloshed up to our thighs in grass-cloaked potholes and climbed a waist-high jungle of South American stinging nettles. We arrived exhausted at the picturesque resurgence only after negotiating the swamps for almost two hours.

The diameter of the entrance was over 10 m and bored into the darkness without a hint of constriction. The water was clear and fast moving as it banked around the sides of the massive trunk which was draped in a layer of moss several feet in thickness that undoubtedly grew undisturbed for many years. Ferns as long as 2 m hung from the ceiling and rocked gently in the breeze that poured from the heart of the mountain.

Immediately I could feel a large gale wind blowing from deep inside the cave with whispered promises of large, extensive passage beyond. Out of the thousands of caves found in this area, none were remotely similar in nature. It was almost as though we were in a completely different karst area than that of Northeastern Peru. Brian and I wasted no time at all emptying our packs and suiting for exploration. The passage pulled on our spirits and our imaginations much like a planet pulls on its moon. It was not long before we were running tape down large sections of stream passage that showed no interest in ending. One thing that continuously drew our commentary was that of the massive airflow that passed our bodies. Surely there must exist something extensive to move this volume of air through a passage the size of this…

"Mike Green and I returned near the end of our trip for an overnight excursion, loaded with all the gear needed for a line plot survey and photo shoot. Knowing that we wouldn't get anywhere near done, we wanted to get enough information to understand the cave's rough direction and enough eye candy to entice a return in the following years. After attempting numerous alternate routes to the entrance we were once again funneled down and forced to ascend the nettle maze with overloaded packs, reaching the vegetation-lined entrance with the afternoon sun. After donning our gear we were soon on our way upstream in a 4 m x 7 m streamway with dryer upper-level connecting passages. The walls displayed a distinct flood line above our heads and we were relieved to be here in the dry season. After a few photos, we negotiated a deep sandy slope bringing us ten meters above the water. After fifty meters of scrambling, we were deposited back down to the water's edge and to the first significant side passage. The main passage continued to a confluence of two streams, both blowing significant air. The left way shortly came to an exposed climb-up, which opened onto the foot of a steep talus slope at the bottom of a tall dome/pit with water cascading down from far above. My light could penetrate but 50 m or so before being engulfed by a cyclone of mist, concealing the roof from view. This was the first instance I had yet found of a horizontal exit for the innumerable pits on the mountainside and my imagination was soon working on scenes of deep, wet, multi-drop routes burrowing towards me from the sunlit stone benches above. Back at the confluence, the right way squeezed through two large flowstone deposits protruding from the walls above a deep pool, soon returning to comfortable stream passage again. Here was yet another gathering of waters with one way becoming a narrow, upward trending tube, which we left for a later trip so we could focus our precious time on following the main passage. Mike stayed at the confluence to work on photos while I continued solo another hundred meters, hoping to come to another prominent feature to mark a good return point. The passage was 5 m x 5 m with the stream still flowing strongly, yet now with very steep and eroded sides and treacherous silt-covered boulders that had fallen from the ceiling above, forcing me to traverse between, above, and below them. I stopped just after the last obstacle. The cave beckoned me ahead, but I reluctantly turned back for I knew that Mike would appreciate my help with photos and we still had to survey our way out. The air was strong at my turnaround point and the walls showed no inclination of changing

Mike Green

Mike and Brian set up an overnight camp in Nacimiento del Rio Ciclón.

Tony Theriault

Tony contemplates the meaning of life in Vista Pit.

from their hallway-like dimensions. After finishing 235 meters of survey and taking some good photo documentation we spent a pleasant night in the cave on a sandy gravel bar beside the stream. Once again the fog and rain returned by morning to make our last hike to base camp a memorable one." (as told by Brian Gindling)

Conclusion

"The journey is the reward."
- Chinese Proverb

The team began to slowly disperse in Lima the night of July 18th after we ate our final meal. One by one we boarded our respective means of travel and went our separate ways into the early morning. All left Peru that day with a sense of victory.

DEEP LIMESTONE PITS OF SOUTH AMERICA

Name (Cave name, if different)	Depth	Country	Reference
1 SP1 (Pumacocha)	282	Peru	N Hawkes (I Mckenzie List)
2 Dos Ojos	**255**	**Peru**	**J Blakely / J Swartz / A Zellner**
3 Deep Surprise	**190**	**Peru**	**J Blakeley**
4 Pre-Inca	**186**	**Peru**	**R Sundquist/ C Ream**
5 Clatter	**145**	**Peru**	**J Blakeley/A Zellner**
6 Humdinger	**137**	**Peru**	**R Sundquist/C Ream**
7 Steve's	**137**	**Peru**	**J Blakeley / C Ream**
8 Inf Grande del Plano	**131**	**Peru**	**R Sundquist**
9 Ojo de Conejo	**131**	**Peru**	**J Blakely / J Swartz / A Zellner**
10 Andes Surprise	**128**	**Peru**	**D Cole**
11 Anniversary	**126**	**Peru**	**J Blakeley / D Cole**
12 Hidden	**125**	**Peru**	**D Cole**
13 SP3 (Pumacocha)	125	Peru	N Hawkes (I Mckenzie List)
14 Devoid	**125**	**Peru**	**D Cole / J Swartz / A Zellner**
15 Velozia	120	Brazil	I Mckenzie List
16 Overlooked	**117**	**Peru**	**D Cole / J Blakeley**
17 Entrance Pit (Windy Rift)	**116**	**Peru**	**D Cole / M Convington**
18 Gruta De Bocaina	116	Brazil	I Mckenzie List
19 Skull	**115**	**Peru**	**D Cole**
20 Friendship Well	**115**	**Peru**	**J Swartz**
21 Flower Pot	**113**	**Peru**	**B Gindling / M Green / C Planteen**
22 Ammonite Shaft (Pumacocha)	113	Peru	N Hawkes (I Mckenzie List)
23 Wishing Well	**111**	**Peru**	**J Record / M Green / A Zellner**
24 Echo	**103**	**Peru**	**D Cole**
25 Inf del Condor	**103**	**Peru**	**J Smith / J Swartz**
26 Energizer	**103**	**Peru**	**T Theriault / C Heitmeyer**

*caves found in project area of Peru are denoted in bold

DEEPEST CAVES IN SOUTH AMERICA

Name (Cave name, if different)	Meters	Country	Notes
1 Sima Pumacocha	638	Peru	
2 Gruta do Centenario	484	Brazil	quartzite, deepest non-limestone cave in the world
3 Millpu de Kaukiran	407	Peru	aka Sima de Millpu, Sima de Racas Marca, Grutas de Guagapo or Gruta que Llora
4 Gruta da Bocaina	404	Brazil	
5 Sima Auyan-tepui Noroeste	370	Venezuela	
6 Sima Aonda	350	Venezuela	
7 Tragadero San Andres	334	Peru	
8 Windy Rift	**305**	**Peru**	
9 Dos Ojos	**290**	**Peru**	
10 Wishing Well	**260**	**Peru**	

*caves found in project area of Peru are denoted in bold

We had succeeded in achieving what we had originally sought out to accomplish and with that came a renewed spirit for exploration. We answered many questions about the karst hydrology of the Valle del Ciclón with the discovery of Energizer Cave and Nacimiento del Rio Ciclón. Energizer showed that some of the caves can be completely independent of other systems by draining to the valley floor before resurging. Nacimiento del Rio Ciclón opened up the imaginations of those who learned of its existence by proving that the opposite side of the valley not only had the potential for caves, but was littered with them; however, with every answer comes a new set of questions: Where is the missing main drainage for all the large volume caves of the fault? What is the source of the mysterious airflow inside of Nacimiento del Rio Ciclón? Fifteen years of dedicated exploration and survey has yet to reveal the truth to these unknowns. Maybe another fifteen years of expeditions can begin to grasp the larger picture that was undoubtedly under our feet the entire time.

We were blessed with many positive factors that lead to great successes in our Valle del Ciclón exploits. Almost forty new caves were explored and surveyed. Still, even after a two week excursion with nine people, the mountain proved that it still has many secrets not yet realized. It is difficult to say for sure what could potentially lie waiting in one of the thousands of undescended pits in one of the most remote karst fields in the world.

Tony Theriault

The 2010 Peruvian Expedition Team : (from left to right) David Cole, Andy Zellner, John Swartz, Cody Planteen, Jeb Blakeley, Mike Green, Brian Gindling, Tony Theriault, and Carl Heitmeyer

An Archaeological Expedition to Atumpampa Cave in Northern Peru

Roc Pursley and Louisa Hooven

High in the Andes of northern Peru are a number of caves that were used by a culture known as the Chachapoya. This culture is thought to have existed as early as 900 A.D. and thrived until they were conquered by the Inca in 1470 A.D. Research seems to indicate the Chachapoyans were not so much a centralized society but some 22 clans that made up a confederation. The most impressive site attributed to this culture is called Kuelap.

When people refer to Kuelap as the Machu Picchu of the north they are doing it a disservice. It is twice the size and 1000 years older than the more famous site. Perched on the top of a mountain, this site measures 1909 by 364 feet and contains the foundations of some 350 circular structures built with mortared stone. They are arranged on four levels and the whole site is surrounded by a perimeter wall that reaches 60 feet in height. There was more cut stone used in Kuelap than was used constructing the great pyramid of Giza. While all of Machu Picchu is well manicured for the mobs of tourists that visit it, parts of Kuelap retain the look of recently discovered ruins. Trees grow among the tumbled stone walls. Vines, orchids, and bromeliads festoon the vegetation. The stunning views of the steep hills surrounding Kuelap reveal a surprising patchwork of nearly vertical agricultural plots.

The Chachapoya people were revered as healers and known for their impressive stone mausoleums, called *chullpas*. These would be built on ledges in the middle of extremely tall, vertical cliffs. But there was an additional facet of Chachapoyan culture that, until recently, had not been known. Building on the previous explorations of Steve Knutson and associates (see *NSS News* February 2006) an expedition was organized to more formally study the Chachapoyan use of caves, particularly as places for interring their dead.

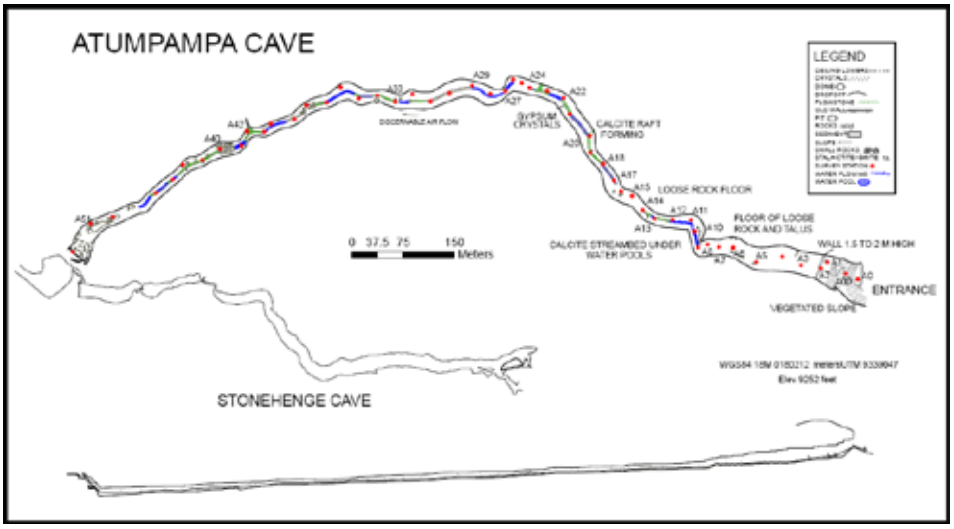
At work in Atumpampa

Academic confirmation of this fact would be groundbreaking since all previously studied sarcophagi and *chullpas* had been discovered in cliffs, not underground. The expedition was directed by Peruvian archaeologist Dr. Sonia Guillén, director of the Museo Leymebamba and Centro Mallqui. Dr. Guillén had been informed by Knutson of the presence of large numbers of human bones in the caves he had been recently exploring. Thus, in July of 2007 a joint American and Peruvian team of cavers and archaeologists set out, on horseback, to Atumpampa cave. The group included NSS members Steve Knutson, Dr. P. Willey, Dr. Louisa Hooven, Scott Linn, and Roc Pursley. Rosío Díaz Ruiz, Flor Cachay and Rocio Paz Sotero made up the Peruvian contingent. Anthropology students Karen Smith Gardner and Andres Krumpl completed the team.

Atumpampa Camp

ATUMPAMPA

Most of the caves in this part of Peru are called *tragaderos*. This refers to a cave with a vertical entrance, often with a water source flowing into it. While they may become very deep it is not uncommon for them to have little or no horizontal passage. If one is lucky and can access the stream level, they can run some distance and will sometimes connect with other nearby *tragaderos*. Cueva Atumpampa, as well as many of the others we investigated, is different. Atumpampa is a mile-long cave with minimal vertical extent. For most of its length, the single 40-foot-wide passage slopes, often steeply, from the side walls downward to the center. There is evidence of ancient pathways that run along the walls. In several places calcite-rich pools fill the usually narrow, central area. The average ceiling height is 25 feet. The twilight zone of the cave floor is littered with rocks from the constantly spalling ceiling. This long wide passage ends suddenly with a massive breakdown pile. There is one small crawlway



leading into the breakdown but it also ends. Mapping Atumpampa, and a nearby cave dubbed Stonehenge, revealed that these two caves are just a bit shy of connecting to each other. There are few remarkable formations except for the calcite rafts which almost cover one of the pools. In several pools bones have lain in the water so long they have become encrusted with calcite. Beyond that, the primary "decorations" in this cave are the bones.

The cave, depending on one's point of view, is somewhere between the set of a horror movie and an osteologist's dreamscape. It is not an understatement to say that in places one had to watch each step for fear of trampling on human remains. Since the bones had been scattered by the actions of both time and looters, no archaeological excavation was performed. It was decided, by the archaeologists, that the main focus of work in Atumpampa would be a surface collection to inventory the human remains and calculate the minimum number of individuals that the assemblage represented. Unfortunately, the 15 days we were at the cave would not be enough time to complete this task.

An amazing part of this expedition was the cooperation between the Peruvian archeologists, the American archeologists, and the cavers. Karen Smith Gardner and Louisa Hooven spoke some Spanish, but the Peruvian and American archeologists rapidly taught each other the key words required for effective communication. Since this included the names of all the bones in the human body, it was a large vocabulary. Yet this exchange happened almost effortlessly and was frequently a source of humor in the group.

Over 5400 human bones were inventoried, 4747 of which were judged to be from adults and the remainder from persons under the age of 18. In addition to human bones another 2700 animal bones were simply counted. A variety of healed fractures were noted, including three particularly gruesome broken tibias that made one's leg hurt just to look at them. These nasty breaks are a great testament to the ruggedness of the Chachapoyans who lived with these fractures, the abilities of their healers, and the community that must have existed to support these individuals while convalescing. In addition to the fractures, a number of other bone-related infections and degenerative diseases were observed. Besides the disarticulated bones there were also parts of six mummified individuals located in the cave. The presence of both mummies and disarticulated skeletons supports the theory that the Chachapoyans employed a variety of burial styles; or it might suggest that the cave burials occurred over a long period of time.

In addition to all the people parts, there were also a few artifacts discovered in the cave. These included pottery fragments from the Chachapoyan, Cajamarcan and Incan cultures. Several intact textiles and examples of braided fiber rope and cordage were also identified. The rope is particularly interesting since it may hint at how the Chachapoyans were able to access and build their mid-cliff mausoleums. There were also a few bone tools and fragments of decorated gourd containers. Wooden poles, some of which were still lashed together with ancient cordage, were inferred to be from platforms used to display the mummies. Early Spanish chroniclers wrote about how the indigenous Andean people would regularly visit and consult with their departed ancestors. This was especially true of the mummified individuals, who would be brought out, paraded about, and treated as guests of honor during certain feasts.

When we first arrived, Atumpampa seemed remote. Dense cloud forest covered the hills, with flower-studded grasslands in the highland valleys between. Cows and horses drifted across the pasturelands, at times driven by local herders, and we came to know that we were in the middle of a sparse community of ranchers. Although there was no time to find and explore them, locals told us there were also ruins in the area. It was easy to imagine the Chachapoyans living here. The bones of llama and alpaca found in Atumpampa offered some clues about the diet of the inhabitants. A substantial stream nearby rushed into yet another cave, which we ourselves treated and used for drinking water. There was no shortage of water here, either from the heavens, or beneath curious areas of vegetation that looked like dry land until stepped on, revealing a sticky muddy spring underneath. We were thankful for the wide welcoming mouth of Atumpampa, a dry shelf under an overhang draped with vines. This was our kitchen, dining room, and shelter from the frequent drizzle. During the day, hummingbirds visited the vines, and in the

Bones in Atumpapmpa


Bones in Atumpapmpa

evening, bats darted from the cave opening.

While work at Atumpampa was the archaeologists' primary focus, there were other caves in the area that needed to be explored and mapped. But before setting out to explore, Knutson and Linn set mapping stations; these stations were also used as datum points for the archaeologists. Knutson and Linn were able to find and investigate three other caves in the immediate area: Stonehenge, Stonehenge II, and 3 Skulls. These caves were small, but also found to contain human remains and ceramics. They were later briefly examined by Rosío and Rocio and added to the list of things that they did not have time to study. It was a rather long list. There are about 500 known archeological sites in the Peruvian state of Amazonas and not a lot of funding for archaeological projects. (At one point it was asked if there was a map with all of these sites on it. Currently the best map has only 80 percent of them.)

Curibamba is another nearby cave containing cultural and human remains. It also had been visited earlier by Knutson. This cave was a 3 hour hike distant and with so much found in and near Atumpampa it was only visited and photographed. However it impressed the Peruvian archaeologists because of the quantity of remains in it.

A NEW DISCOVERY

Following a tip from a local, yet another cave was visited. Muyucsha is a short through cave about an hour hike from Atumpampa. It is hidden in one of the many thickets of dense fern and vine-filled jungle which are dotted about this rolling highland pasture. The eastern entrance had a low wall across it, similar but smaller than the one at the entrance of Atumpampa. In addition, there were several stacked stone terraced areas along the sides of this cave. The silty floor showed signs of water flowing through and pooling in places. This cave contained two important finds.

The first was an almost intact Chachapoyan ceramic vessel. Finding intact pottery is somewhat rare. Looting archaeological sites for the antiquities market is a HUGE problem in Peru and results in the permanent loss of much information. We found it interesting that this vessel was placed in a side passage under some soda straws that would have dripped into it while they were growing. While there were active formations in this side passage, the straws directly above the pot were now inactive. Very near was a large column that was broken off and missing. It had been about 6 inches in diameter and 10 feet tall. An 8 inch long stalactite was actively growing down from the upper stump. Both of these features have been found in Central American sites where cave water was collected and formations were removed for use in aboveground shrines and elite burials. It will be interesting to see if future research suggests that the Chachapoyans collected cave water for similar reasons.

Muyucsha contained the most significant find of the expedition. Near the unwalled entrance was an intact Chachapoyan platform burial. This is specifically important because it had the only sarcophagus still containing its mummy ever found. The very first! A crack in the side of the mud and fiber exterior provided a glimpse of the textile wrapped mummy interred within. The platform was built on a natural ledge about 12 feet off the floor of the cave. The ledge had been made larger by adding a wooden pole in front. Flat rocks spanning the gap from the front of the ledge to the pole were then put in place. The rocks supporting this addition were literally an inch away from slipping off the pole they were perched on.

For the archaeologists to safely photo-document and sketch this site they needed to have a work platform built. A local rancher, Manuel, was hired to assist Pursley with this side-project. Poles were cut from the jungle then lashed together and braced against the cave walls and ceiling. We ended up with a 10-foot-long, 3-foot wide work space that was slightly higher than the level of the platform. Linn and Knutson mapped this cave as well, allowing the archaeologists to focus on their work. Besides the intact sarcophagus there were two more that were broken but still seemed to contain partial mummies. They were surrounded by mounds of human bones. There were at least 30 skulls in the mounds. With financial assistance from the NSS, a subsequent expedition was mounted to recover the sarcophagus for study and conservation.

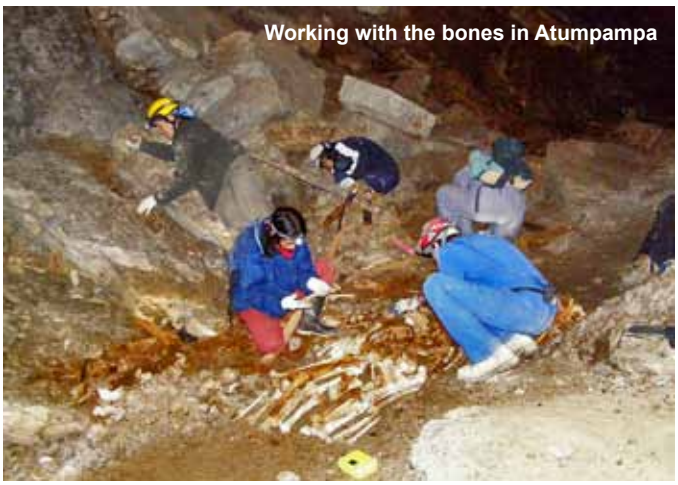
Just two days before we were to leave, Manuel informed us of another cave in the area. This unnamed cave also contained human remains, three styles of ceramics, and a couple of large ground stone bowls. One bowl was intact, another first, but too heavy to retrieve at this time. The archaeologists were impressed with the contents of this cave but did not have time to do more than visit, photograph and add it to the list.

HISTORY CHANNEL

Another interesting facet of this expedition was the filming of some of our work by a team from the History Channel. Dr. Guillén had contacted them while she was putting the project together. Hunter Ellis and his crew from "Digging for the Truth" arrived at camp late one rainy night. While we had taken horses on the steep and muddy trip up from San Carlos, they had elected to walk. Although they were soaking wet and exhausted after their six-hour slog, they got up bright and early and filmed nonstop the next day. If you happen to catch a rerun of the "Mummies of the Clouds" episode you will be able to watch interviews with Karen Smith Gardner and get a video taste of what Cueva Atumpampa is like. This episode is also available via the History Channel Web site. After interviewing Dr. Guillén at her museum in Leymebamba, the film crew also visited some of the mid-cliff tombs. This program gives one a chance to see the outrageous rapelling potentials that exist in Peru.

THE LOCAL COMMUNITY

The local muleteers came to retrieve the history channel and their gear. With them came the mayor, and several teachers


Working with the bones in Atumpampa

from the local community of San Carlos. We were scheduled to come back to San Carlos the next day, and they invited our team to come to dinner. We were treated to a feast of chicken, cui (guinea pig), potatoes, rice, and a wine made from sugar cane juice. After our dinner, we met in city hall to brainstorm about ideas for tourism in San Carlos. Improving the trail to Atumpampa is a priority for the community, and they are interested in conserving the cave as a resource so that others may enjoy it, and to revere those interred in the cave, likely their forebears.

TWO MORE CAVES

Following the work at Atumpampa three of us visited a town called Lamud to see the caves that are nearby. The first two were commercial, which means simply that they were gated—no lighting or paths provided. Our guide had a key to the first which contains many very nice formations. Human remains poked out in the stream channel of this muddy-floored cave. Our guide had the wrong key to the second and we could not get in but a farmer said there was yet another cave nearby. This was a smaller version of Atumpampa; steeply sloping floors with old trails on the sides, stream in the middle after breakdown in the twilight zone, human and animal bones. Twelve left femora were identified. Linn found lots of pottery shards and an interesting bone implement. Hooven came across a fossilized shell with a hole drilled in it. These were all left where they were found. This cave would have required chest-deep immersion in the stream channel to continue so we don't know how it ends … yet. We informed Rocio of our finds. This cave also went on the list as one more item to add to the unfinished map of unexcavated sites.

IN CONCLUSION

The expedition was remarkably successful in many ways. It was the first attempt to study Chachapoyan cave usage and confirmed that they used caves for mortuary purposes. It indicated that not just the twilight zone but also the dark zone were actively used. Additional unknown archaeological cave sites were identified. Several very significant artifacts were recovered and are now on display in the local museums. But perhaps most importantly it was a fine example of the contributions we cavers can make to the field of archaeology. The discoveries we make while underground can be significant. If we treat artifacts with the same "take nothing but pictures" attitude that we apply to speleothems and cave critters, then we can truly aid in expanding the knowledge of human prehistory. Unfortunately the work cannot happen fast enough.

LETTERS

CLARIFICATION OF TERMINOLOGY ABOUT PHOTO SLAVES

Dave Bunnell has started an excellent series of articles on the Digital Underground. In the August issue, he talked about the Flashwave-3 Radio Slaves. Despite my being the distributor of Firefly Slaves (2 & 3) for cave photography, I do have and occasionally use a Quantum 4i Radio Slave I picked up on eBay. In fact, during a post Colorado Convention photo workshop I taught at Carlsbad Cavern, I would have given anything to have more radio slaves. Flashes set off by cameras over 1000 feet away in The Big Room would false trigger the Firefly Slaves I was using to the point of ruining all intentions of my getting a flash-lit photograph! Darned inconsiderate of those tourists…

In the article, Dave refers to Firefly and Wein Slaves as being "optical slaves." This is partially true in that it triggers from a portion of the electromagnetic spectrum associated with light (as opposed to much longer radio frequency wavelength), but neither the Wein nor the Firefly use visible light as their trigger. In the general nomenclature of types of slaves for remote triggering, an "optical slave" is usually one that responds to visible light. The Wein and Firefly slaves respond to the infrared (IR) portion of the spectrum, just outside the realm of what we can see with our eyes as visible light. As such, they are referred to as infrared slave units, not optical slaves.

Usually the cheaper the price for a slave, the more likely it is that it responds to visible light, not infrared, and is therefor called an "optical slave." Anyone who has bought a less expensive slave for cave photography quickly finds out that the slave must be pointed back towards the on-camera flash to trigger at all and the distance must be very close to the slave for it to "see" the flash from the camera and thus trigger the remote flash. Part of the reason for optical slaves failing so easily at longer distances is that the intensity of visible light falls off dramatically the farther you are away from the source. It follows the rule of the inverse of the distance squared: I(ntensity) = 1/D(istance)^2 This means if you double the distance, you get only 1/4 of the amount of light. Triple the distance (X 3), you get only 1/9 the amount of light and so on.

The key to the high sensitivity of the infrared type slaves is the type of sensor and the circuit in which it is used, especially the use of a high pass filter. This is the reason why the Firefly, based on David Gibson's design, and to a lesser extent the Wein, are more sensitive than lower cost optical slaves. In addition, their sensitivity is based on small but sudden changes in the IR light level, namely the flash from your on-camera flash.

The are some disadvantages to radio slaves in comparison to infra-red type slaves:

1. they do not work very far around corners because radio waves do not reflect much off cave walls (unlike infrared), so they are a line of sight device really.
2. you need a transmitter and receiver.
3. they must be switched off after use as the batteries drain quickly. The Firefly runs at such a low standby current (<10uA) that it is on all the time with a battery life of years and can be sealed up and forgotten about.

Infrared slaves are, in one sense, the perfect trigger for cave photography. If used on the surface or in a house where there is already considerable IR light (either from sunlight or fluorescent bulbs), their sensitivity diminishes considerably. With so much IR light, it is hard for the slave to pick up the small changes caused by the on-camera flash going off. Take it underground where there is virtually no IR light (usually only that from your headlamp) and their sensitivity increases dramatically. Any flash from a camera strobe, even a very weak one, will cause an IR-based slave to trigger. That's why my slaves were being triggered so easily by flashes from nearly 1000 feet away in Carlsbad Cavern! In reality, they were doing the job they were designed to do, albeit not to my liking.

As Dave described in his article, you are not at the mercy of other peoples' flashes on your photo trip if you are using a dedicated radio slave. There are certainly many reasons to use them and I advocate using them in appropriate settings. As such, my intention here is only to clarify how Firefly and Wein slaves operate.

Peter Jones
Shot in the Dark Cave Photography

[*Ed. Peter is quite right to distinguish optical and infrared slaves as two different types. However I take exception to his statement above that radio slaves are a line-of-sight device. As a test I successfully triggered a flash 600 feet away with a brick building in-between transmitter and receiver. Whether radio waves reflect from cave walls as well as infrared waves may be a moot point, as a flash placed around several corners of a passage may not show up in one's photo anyway. In any event I've yet to see one of my radio slaves fail to trigger underground because it was around a corner, behind a rock, or not line-of-sight with the transmitter.*]

The 800-foot long Big Room in Cass Cave is one of the largest passages in West Virginia, with ceiling heights reaching over 160 feet. Suicide Falls, a 140-foot high waterfall, lies at one end of the room, but access is via a nearby 160-foot drop from a high ledge. Photo by Brian Masney.

The Resurvey of Cass Cave: A West Virginia Classic

text by Greg Springer; photos by Brian Masney

Introduction

The founders of the National Speleological Society (NSS) spent many productive years exploring caves in eastern West Virginia. The area is close to the greater D.C. region where the organization was founded and—most importantly— there was an abundance of what were then unexplored caves and challenging pits. In fact, two vertical caves— Hellhole and Schoolhouse—center prominently in histories of the NSS because they not only helped shape the organization, but also set cavers on the road to single rope techniques (SRT).

Less well known is the role of Cass Cave in shaping the NSS and SRT even though its exploration in the early and mid-1950s was substantially harder and more challenging than those of Hellhole or Schoolhouse. Yet, Cass' original exploration and explorers are little known. And, in spite of being one of the first large West Virginia caves to be explored, Cass gained a black reputation because of multiple caver fatalities on Suicide Falls, a 140-foot interior drop, while the bulk of its passages became little visited and even less well known. Fortunately, a resurvey has at last been completed and an opportunity created to tell its side of the story. Those are the focus of this and subsequent articles.

But! I strongly encourage any and all readers to stop reading and download Huntley Ingall's account of Cass' original exploration (http://goo.gl/WRxV4) from Ohio University's server. The 1959 article appeared in the *NSS Bulletin*, now the *Journal of Cave and Karst Studies*, and is a fun, but humbling read. As I write, cavers have technological advantages far exceeding those available in the early 1950s, and reading Huntley's article makes you appreciate just how easy we have it today and just how tough those early NSS cavers were. The story will get the mud pumping in your veins and make your next cave trip seem like a cakewalk.

A Cass Primer

Ask any Virginia Region caver what she knows about Cass Cave and you will probably hear two things: it has a big pit and a really big room. In fact, despite its blackened name, Cass was fairly well visited after SRT techniques began to mature in the 1970s. Pit bouncers entered through a climbable, 40-foot deep open-air pit, assuming its waterfall was low. Please note the past tense; the owners allowed us to finish our resurvey, but have closed Cass to all caving while their family decides what to do with it and the surrounding property.

A pleasant, 30-foot tall stream canyon begins at the pit and ends 800 feet later at a seven-foot high waterfall into a small room. The water quickly crosses the room and enters a 1.5-foot high cobble crawlway. Joy. The crawlway occasionally sumps shut, so wet weather trips (always ill-advised) ended right then and there. In drier weather, 150 feet of crawling gives way to a tall canyon ending quickly at a very large, black void: the Big Room.

The inky window is the lip of Suicide Falls, where two people have died trying to rappel through the waterfall. A sign near its lip directs people to the Belay Loft, a short upper level accessed 20 feet upstream of the waterfall. The Loft contains a floorless fissure with many bolts on its north wall for a 160-foot drop into the Big Room. For many years, the pit was erroneously described as 180-feet deep, which added to its appeal, but the last twenty feet were stolen sometime between the mid-1950s and our resurvey. The drop is free of the waterfall, but spray can envelop much of the lower 120 feet and the landing is sometimes a hurricane of swirling, gusting spray and mist.

The Belay Loft landing is atop a steep breakdown slope. The base of Suicide Falls is downhill where the stream immediately sumps. Uphill lies the main body of the Big Room. How big? It is best described as a 65 to 90-foot high borehole, 75+ feet wide, and 800 feet long. The floor is breakdown and comparatively flat, but the room ends in a 155 feet high dome containing impressive splattermites (bizarre stalagmites). This leads to a 30-foot wide trunk, The Grotto, and an impressive formation area ending at the breezy, one-foot high Cat Crawl and its lovely pools of cold water and cheese grater-like rimstone floor. For obvious reasons, the vast majority of trips ended at the beginning of the Cat Crawl.

The passages "above" and "below" the Cat Crawl are very different from one another. The entrance canyon, Big Room, and The Grotto are all large, pleasant, and easily seen during an afternoon trip. Passages below the Cat Crawl form what I refer to as the Lower Cave, and they include over two miles of mud-coated crawlways, stoopways, and trunks. These include the cave stream, last seen at Suicide Falls, which occupies the cold, breezy "Lower Stream Passage," as named by the cave's original explorers. Unlike the entrance canyon, the Lower Stream Passage contains an abundance of oozing mud, which is also present in low-lying upper levels.

Wrapping up this primer, most Cass Cave trips consisted of some easy caving, a short crawl, a nice drop, and a big room followed by a nice formation area. Not a bad place to spend an afternoon! But there is much, much more to Cass Cave. In all, our resurvey netted 5.25 miles (8.44 kilometers) and what follows is an abbreviated description of our adventures therein. The story can be broken into three well-defined phases: survey of the Upper Cave between 1990 and 1992; survey of the Lower Cave between 1992 and 2001; and the final push in 2010.

Phase One: The Upper Cave

Our survey began almost on a whim during the 1990 Thanksgiving weekend. We had completed the survey of nearby Piddling Pit the day prior. Piddling taped out at 2.38 miles and I enjoyed leading the project and penciling the map. It would be another month before the map was inked, but I was eager to survey another large cave and gullible enough for someone to sucker me into Cass.

I had recently begun caving with Mark Botkin, who spent his childhood summers in the vicinity of Cass Cave and its namesake village, and Mark really wanted to survey the cave. At the time, I knew very little about the cave and none of its history. Of course, all that would change and I eventually sketched four of the cave's five plus miles, but our first day went incredibly well. Outside, it was a nice Fall day, and inside we found the cave deceptively dry and welcoming. Much to our surprise, a mess of infeeders and paleo-passages yielded 1,200 feet, all within 5 minutes of the entrance pit. This was going to be a bigger cave than expected, as the old survey only totaled a little over two miles and we had barely escaped daylight.

Mark and I were accompanied by a variety of people, and trips were initially frequent and very productive. We never left with less than 1,000 feet in the book and spent most of those early trips in the Left Hand Passage, which is atop a 30-feet high climb just upstream of the Belay Loft. The passage is fairly unremarkable, but consistently walking height with painfully tight or low upper levels in two locations.

We christened the shortest upper level as the Pants Shucker Crawl. We completed the loop by surveying from each end and connecting the legs by throwing the tape through a very narrow body-length pinch. For no sensible reason, I decided I had to pass the pinch. Of course, I became stuck and had my pants torn off, along with some flesh, but I made it through. Such is the

Cass Cave was a popular destination for early adopters of single-rope techniques and its location was well known inside and outside of the caving community from the late 1950s onward. Many visitors were ill-prepared and lacked proper equipment, caving experience, or knowledge of a dry alternative to Suicide Falls (Belay Loft). These signs were installed after several rescues and two separate body recoveries. The deaths occurred when groups attempted to rappel Suicide Falls and a team member became stuck on the drop and died of hypothermia.

advantage of being young, thin as a bean-pole, and stupid.

The Left Hand Passage did give us several pleasant surprises, besides yielding over 3,000 feet of easy cave. The first is a five-feet wide igneous intrusion, later dated as 27 million years old. The basalt dike greatly pre-dates the cave and is one of less than five found inside a limestone cave east of the Mississippi River. The passage makes a 90º turn at the dike, so it has played a role in the cave's development. Mark found the dike exciting, but he was most impressed by a mastodon tooth we found a short distance upstream. Shed by a juvenile, the four-inch long tooth has retained a rich assortment of colors on its little-used cusps and enamel. Completing the Left Hand Passage left us with trivial work to do around Suicide Falls and within the Belay Loft. We had surveyed over a mile by the time we were done and had reached the Big Room with our enthusiasm intact.

Sensibly, we did not survey the Suicide Falls drop, only taping the Belay Loft drop. Expecting 180 feet, we were surprised when the drop proved 20-feet shallower, something confirmed during the Final Push. A perimeter survey was done for the Big Room, a pleasant and pretty job that drew help from an assortment of folks, including Aaron Bird and Troy Teets (see list of surveyors elsewhere). They became our SRT gurus and essential members of the team. Prior to this time, Steve Parks, the Unstoppable Force, had also joined us and he soon brought on board Dave Berman, who has perhaps the best combination of positive spirits and toughness I've ever seen. In the end, the project would have later died without their enthusiasm.

We turned up a few unexpected items in the Big Room, including a 27 feet deep pit leading to a complex lower level within massive breakdown and a crawlway hidden behind a boulder at the base of the Belay Loft drop. Both end in breezy chokes near the Lower Stream Passage, which is separated from the Big Room by a sump beneath Suicide Falls and inaccessible, except through the Cat Crawl. Not coincidently, we soon completed the 800-feet long Grotto leading to the Cat Crawl to almost, but not quite, wrap up the "Upper Cave".

The remaining leads were all in the walls of the Big Room. The most tantalizing was a 40-feet high void high on the south wall a few hundred feet away from Suicide Falls. We had heard previous attempts to reach the lead had failed because the underlying wall includes over fifteen feet of shale, so Aaron Bird bolted up the walls of the Big Dome where the shales are often covered in flowstone and two gaping holes are also visible.

My most vivid memory of Aaron's first climb is watching thick, solid streams of water shoot out of newly drilled holes; a column of water frequently separates the flowstone and walls. Despite the unnerving spout holes, Aaron gained a ledge roughly 50 feet above the dome floor from which he explored a very steep bedrock and breakdown slope rising another 50 vertical feet to several fissures ascending into the unknown. After turning back, he left a fixed rope at the ledge for a later return.

His second climb began back at floor level and gave access to another ascending breakdown slope about 70 feet off the floor. The alcove extends much higher, but he saw no leads and so ended a very long day. Two points of interest, the successive long climbs were possible because—amidst so much open space—Aaron was free to use a gasoline-fired Ryobi hammer drill. And, because the fixed rope hung unused for over five years, Aaron's 1992 (roughly) climb effectively finished the Upper Cave.

Phase Two: The Lower Cave (1992-2001)

We surveyed the Cat Crawl in 1992 or so and, much to our regret, Mark Botkin bowed out immediately afterward. The Lower Cave spooked him, being completely unlike everything preceding it. Passages are much more complex, muddy, and dark. The main drags are a paleo-trunk divided into two sections by collapse and the Lower Stream Passage. The later is cold, wet, and windy. Walking passage is the norm in the stream passage, but the upper levels include every imaginable combination of walking, stooping, and crawling passages. Intersections and collapses cause frequent changes in passage cross-sections. In all, we surveyed over two miles beyond the Cat Crawl with much of the work accomplished during two-man trips drawn from Dave Berman, Steve Parks, and yours truly. Aaron Bird and Troy Teets were instrumental early on, but long-distance moves soon left them unavailable.

I wish the Lower Cave had yielded thrilling passages or stories, but unfortunately there are only a few points worth mentioning. The first is Gloop Canyon. Traditionally, the Lower Stream Passage was entered near the downstream end of the cave where the stream sumps, which is several thousand feet from the Cat Crawl. From the sump, the stream can be followed 3,000 feet upstream to sump teasingly close to the sump below Suicide Falls. However, there is no connection, so trips to the "Upstream Sump" required a very roundabout approach. Fortunately, we discovered a 150-feet long shortcut hidden under a ledge in a mind-numbingly cool pool only 10 minutes from the Cat Crawl. Gloop Canyon is quite muddy, but leads to the middle reaches of the Lower Stream Passage and cuts nearly a mile off a trip to those areas. As a result, Gloop was instrumental in the survey of the Lower Stream Passage.

Our other "major" find is the Right Hand Passage (see map), which was probably virgin. This 800-foot long beasty is easily the worst passage in the cave: tiny, muddy, breezy, and a dead end. Aaron, Steve, and I surveyed the passage and we hate it. With a passion.

Surprisingly, the most important find

relevant to the Lower Cave is on the opposite side of the Cat Crawl. This is Cass Annex, an abandoned infeeder first accessed from atop Aaron's bolt climb in the Big Dome. Dave and Steve climbed Aaron's rope in 1997, and followed the aforementioned fissures to the top of a free-climbable, 20-feet deep pit. At first, they thought a dead-end had been reached, but then one of them saw a passage through an inches-high gap between mud fill and the ceiling. The crawl was soon gained by simply pushing over a mud mound. They then had a real surprise: footprints! As was soon realized, they had connected to Cass Annex, a cave we had failed to find from the outside. I won't spoil the details, but the whole story is in the Cass monograph and definitely worth reading.

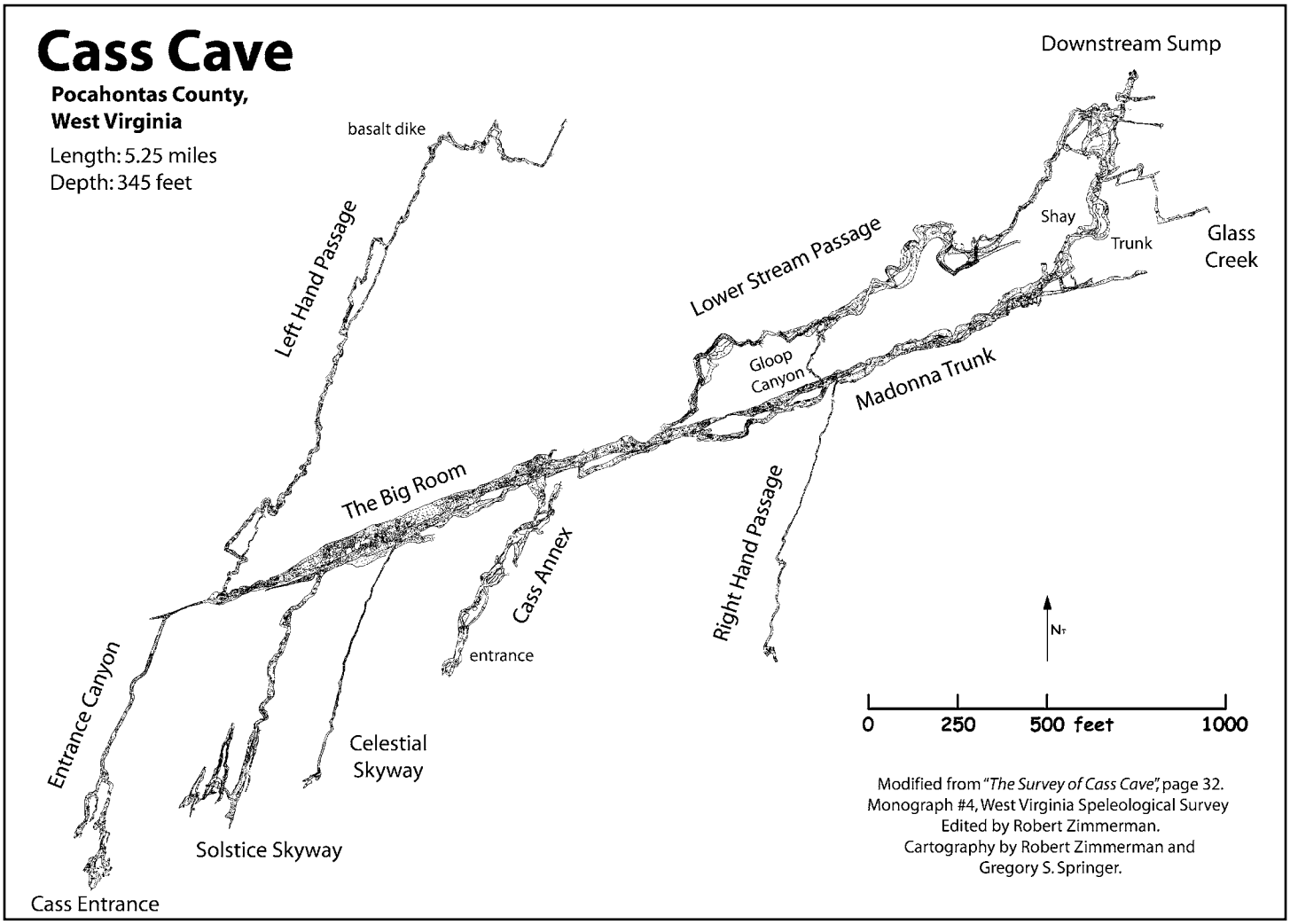
The Annex was important because it gave us an all-weather entrance. Hence, we stopped using the Belay Loft and ran all future trips through the Annex. The tradeoff was mud: 600 feet of mud crawling with occasional convolutions and general awkwardness. The crawl is followed by multiple down-climbs in a dome through truly massive breakdown until one reaches the top of Aaron's bolt climb. But the Annex shaved time off the trip to the Lower Cave and flooding would never be a problem. Also on the positive side, Aaron Bird and Mark Botkin were able to help survey the Annex, so the old team was briefly restored.

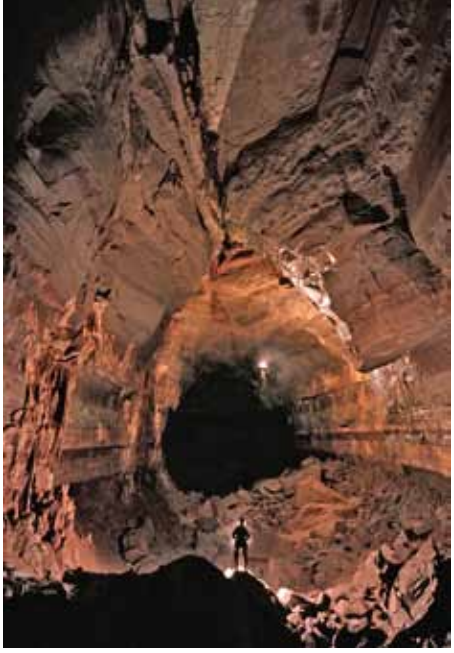
Phase Three: Final Push via Germany Valley (2010)

The Lower Cave was effectively completed in 2000 when Dave Berman and I reached the Upstream Sump with only a few side leads left to pursue. The cave was then over 4.4 miles long and nearly finished, so I began to ink the map in Adobe Illustrator. The drafting went slowly at first and then nearly ceased altogether when I became a tenure-track professor in 2002. Sporadic work led to nothing substantial and eventually I despaired of ever finishing the map—mental and practical inertia stood in the way. This ill state of affairs persisted until 2009 when Bob Zimmerman agreed to take over the map, a process mediated by George Phillips, and Bob decided to simultaneously work on a monograph about the survey and cave.

Greatly relieved, I turned everything I had over to Bob and almost immediately he made amazing progress. Inspired, I wrote a detailed cave description and then wrote an illustrated a geology article for the monograph. *The Survey of Cass Cave* was published in 2011. However, the cave survey was not done when Bob took over. So, he recruited cavers working to the northeast

A four-foot tall splattermite in the Big Dome at the eastern end of the Big Room





A caver suspended in the middle of the Big Room is leaving the Celestial Skyway, a 950-foot long canyon discovered by Aaron Moses when he bolted upward nearly 100-feet in a single day. A nearby bolt climb led to a large virgin canyon now named Solstice Skyway. The Skyways were both reached during the Final Push in 2010.

in Germany Valley. This proved a boon for the survey with multiple trips taken in 2010. A detailed profile was surveyed; two bolts climbs were made in the Big Room, and many photos taken for the monograph. Amidst this, I led three trips to the Lower Cave and Vonny Droms, Mark Minton, and Dave Riggs took another two trips to beyond the Cat Crawl. We were able to kill off the remaining leads and many hundreds of feet in the Lower Cave.

The first bolt climb was into the gaping, 40-feet high void mentioned previously. John Harman, Pete Johnson, and Aaron Moses successfully passed the nasty shale and reached a large paleotrunk, the Solstice Skyway. The passage added a new wing to the cave (see map) and used to carry the entrance stream. Next, Aaron Moses did an incredible overhung bolt climb—nearly 100 feet high—a little closer to the Big Dome. This yielded a 900-foot long canyon, the Celestial Skyway. My hope is that the bolt climbs will be detailed in a future *NSS News* article.

After adding all the new work, Cass taped out at 5.25 miles. Not bad! Surprisingly, despite its reputation as a vertical cave, Cass proved only 345 feet deep. Much more information is available in *The Survey of Cass Cave*, including Bob's excellent map, a monograph published by the West Virginia Speleological Survey (http://wvass.org). This article is not included in the monograph and is pretty much my own personal account. I apologize for all the names I had to leave out and thank Bob for picking up the ball after I dropped it.

The Big Dome viewed from a high ledge leading to the Cass Annex entrance

Above and below: The Grotto, a formation area midway between the Big Dome and Cat Crawl

NSS Award Nominations

Once again, it is time to nominate that deserving member of your grotto, section, or region for an NSS award to be presented at the 2011 Convention. Please submit nominations to the appropriate award sub chair by November 15, 2010. Need to find all the award information in one spot, check out the NSS Web Page at this URL: http://www.caves.org/committee/award/ . You can submit your nominations in writing or via e-mail, for the following awards:

William J. Stephenson Outstanding Service Award

One Outstanding Service Award is given each year to a member of the NSS for outstanding service to speleology and the NSS. Life Membership is conferred upon receipt of this award. This and the Honorary Membership (below) constitute the Society's highest awards. Send nominations to Bill Mixon, 14045 N Green Hills Loop, Austin, TX 78739-8619 e-mail bmixon@alumni.uchicago.edu.

Honorary Membership

One Honorary Membership is given each year to one person, not necessarily an NSS member, for outstanding contributions to the field of speleology. The award confers life membership to the Society. Send nominations to Bill Mixon, 14045 N Green Hills Loop, Austin, TX 78739-8619 e-mail bmixon@alumni.uchicago.edu.

Lew Bicking Award*

The Lew Bicking Award recognizes dedication to the thorough exploration and mapping of a cave or a group of caves. The award may be given to an individual, or to a pair of cavers who, through specific joint actions, qualify equally for the award based on the exploration they have done together. Candidates must have been NSS members for at least the past two years. A cash award accompanies this recognition. Send nominations to Pat Kambesis, 1906 College Heights Blvd., Dept. of Geography & Geology, Western Kentucky University, Bowling Green, KY 42101, e-mail pnkambesis@gmail.com.

Science Award*

The Science Award is given each year to recognize one or a pair of NSS members who, through specific joint actions, qualify equally for the award based on outstanding dedication to the scientific study of caves. Candidates must have been NSS members for at least the past two years. Send nominations to Dr. Kathy Lavoie, 101 Broad St SUNY, Plattsburgh, NY 12901 e-mail lavoiekh@plattsburgh.edu.

Spelean Arts & Letters Award*

One Spelean Arts and Letters Award is given annually to recognize one or a pair of NSS members who, through specific joint actions qualify equally for the award, over time has advanced spelean arts and letters by significant artistic expression, management, or criticism. Candidates must have been NSS members for at least the past two years. Send nominations to Linda Starr, 509 Aliso NE, Albuquerque, NM 87108, e-mail lstarr@hubwest.com.

Victor A. Schmidt Conservation Award*

The Victor A. Schmidt Conservation Award is given annually to an individual or a pair of NSS members who, through specific joint actions qualify equally for the award through his, her, or their actions and has demonstrated an outstanding dedication to the cause of cave conservation. Candidates must have been NSS members for at least the past two years. Send nominations to Bob Vandeventer, 525 Lawndale Dr., Greenwood, IN 46142, e-mail vandeventerbob@netzero.com.

Fellow Of The Society

Recipients are members who, over a number of years, have exemplified by their actions their dedication to the goals of the Society or to the Society itself. Recipients must have been members in good standing of the Society for at least two years immediately prior to their names being submitted as candidates. Send nominations to Mike Hood, 4668 Airway Rd, Riverside, OH 45431, e-mail mkhood@woh.rr.com.

Certificate Of Merit

Certificates may be given to individuals, jointly to no more than three individuals, or to organizations. (NSS Membership is not required.) A maximum of three Certificates of Merit may be awarded each year for specific, recent accomplishments in cave exploration, study, conservation, or for accomplishments which further other goals of the NSS. Send nominations to Gary Moss, 7713 Shreve Road, Falls Church, Virginia 22043-3315, e-mail kd4itj@amsat.org.

Peter M. Hauer Spelean History Award

This award includes a cash award to be given to an individual or group of individuals engaged in an outstanding spelean history research project. Send nominations to Carolyn Cronk, 870 Yarnell Dr, Larkspur, CO 80118, e-mail carolyncronk@arasian.com.

James G. Mitchell Award

This award includes a cash award for the best scientific paper presented at the Convention by a member (or members) of the Society age 25 or younger. For consideration contact Mike Backe, 98 Forest Drive, Boise, ID 83716, e-mail caver.backe@gmail.com.

*The Awards Committee shall give preference to candidates who have not received the Outstanding Service Award or Honorary Membership.

Comments and suggestions on the nomination process and operation of the Awards Committee are always welcome. Please write Scott Fee, Awards Committee Chairman, 2324 Carraway St, Birmingham, AL 35235, e-mail scottfee@bellsouth.net.

Cave Conservancy Announcement

The Cave Conservancy Foundation has awarded its 2011-12 Karst Studies College Scholarships. The awards are:

Undergraduate Scholarship ($5,000) to Lory Henderson, The Department of Biology, University of New Mexico for "Hidden treasure lies beneath the Earth's surface: Do nutrient availability and human impact correlate to antibiotic production in cave bacteria?"

M.S. Scholarship ($5,000) to Cameron T. Craig, Department of Biological Sciences, University of Alabama for "Investigating Limiting Factors in Surface vs. Subterranean Systems: A Threshold Elemental Ratio Approach"

Ph.D. Scholarship ($15,000) to Katrina Koski, Department of Earth and Environmental Science, New Mexico Tech for "Hyporheic Zone Exchange in Phreatic Karst Conduits and Contaminant Implications"

The Foundation encourages scholarship applications. Interested parties should watch the *NSS News* or our website: www.caveconservancyfoundation.org/ for announcements.

Hawai'i Speleological Survey Newsletter
Spring 2011-No. 29
Hawai'i Speleoglogical Survey

A detailed abstract on **Whitney's Cave** in Hawai'i is included in this issue, along with photos, maps, and survey results. Exploration and survey of this cave has yielded astonishing insights into the processes that act to enlarge the tunnels of underground lava conduits.

William Halliday supplies the description and map of **Shield Cave** in Hawai'i. A small, symmetrical dome or cupola is present above a depression. It is believed that the depression is a small vent; possibly the only vent forming the shield, and that the main room is a roofed drain back chamber. No other cave of this magnitude formed by such a process is known. William concludes that this cave has exceptional, possibly unique geological values.

Doug Medville describes a survey trip to **Upper Mouflon Cave** in Mauna Loa Forest Reserve in Hawai'i, and includes map and photos. The survey team was hoping to connect this cave to **Once a Puka Twice a Cave**, only a few hundred feet further up the flow. However, the passage beyond climbed over breakdown dropped off and ended in a lava seal. This cave has 725 feet of survey shown on the map.

Another article by Doug Medville includes a map of **Lower Glazed Chimney Cave** in Mauna Loa Forest Reserve in Hawai'i. After reviewing the area on a Google Earth image, a short hike was rewarded with a 10 foot deep and 20 foot wide puka with passages going both up and down the flow. A total of 1,662 feet have been surveyed. There appears to be another entrance about a half mile below the road that will be explored on a later trip.

Ric Elhard gives a report on the survey of **Anomaly Cave** in Hawai'i, along with photos and map. Ric describes seeing a most unusual vulcanospeleothem which appears to be formed by one of the various drippings from above to create a hallow stalagmite that is connected to the floor, rising nearly a meter. The map lists a length of 1,212 feet and a depth of 72 feet.

Nevin Davis provides details on three more Anahulu Caves in Hawai'i, along with maps and photos. **Shallow Cave** has a surveyed length of 842 feet. A notable feature of this cave is its maximum depth of 15 feet. Another feature is its lack of goat skeletons which abound in the nearby **Old Goat Cave**. Nevin describes **Old Goat Cave** as having passages of ample size with widths up to 40 feet and probably averaging 15 feet wide with ceiling heights to 17 feet. Total length of the survey in this cave is 1,311 feet. He also includes details on **Giant Centipede Cave**. This cave has been visited by the native Hawaiians as evidenced by some torch fragments and charcoal as shown on the map. The total passage surveyed is 3,128 feet and the vertical extent is 65 feet.

Grove Farm Caves in Hawai'i is highlighted in this issue. This cave may be the richest fossil site in the entire Pacific Island region, loaded with bird and fish bones and ancient Polynesian artifacts. Photos and a map are also included.

Also in this issue are photos and map of **Pig Fence Cave** in Hawai'i along with survey description supplied by Doug Medville. **Pig Fence Cave** is in the middle of the 3,000-5,000 year old Henahena lava flow in which to date, has 7.65 miles of surveyed passage in 18 caves with much, much more remaining to be done. The map shows 1,332 feet of survey.

Espeleorevista Puerto Rico
enero-junio 2011-No. 4
Federacion Espeleologica de Puerto Rico

Patricia Kambesis documents the caves of Isla de Mona in Puerto Rico, along with photos and map. The caves of Isla de Mona hold significant cultural, historical, and archeological materials. Isla de Mona is situated in a tectonically active region and has undergone tectonic uplift. A small number of sea caves have been documented on the island, they are mostly formed in the Mona Dolomite, but it is possible that they may in actuality be breached flank margin caves.

Thomas Miller provides photos, map and description of **Cueva Almeida** in Puerto Rico. Thomas indicates there may be ancient petroglyphs in this cave, and perhaps buried treasures. The map shows a length of 134 meters and vertical of 17 meters.

Thomas Miller continues his report of **Sistema Bocaza del Infiernillo**, which is one of Puerto Rico's largest cave networks. He also includes maps and photos.

The Alaskan Caver
July 2011-Vol. 31, No. 3
Glacier Grotto

David Ochel gives a report on **Blowing in the Wind Cave**, located in Tongass National Forest, Prince of Wales Island, Alaska. Photos, plan view, and a projected profile are also included. In July 2010, this expedition was organized with the objective to continue a survey that had started in 1992. As a result of efforts on this trip, some unexplored passage was pieced into the survey puzzle.

Minnesota Speleology Monthly
August 2011-Vol. 43, Issue 8
Minnesota Speleological Survey

David Gerboth provides June 2011 highlights of the latest digging activities at **South Portal Cave** in Wisconsin.

According to a message from John Ackerman, over one thousand feet of newly discovered cave has been surveyed in **Holy Grail Cave** in Minnesota, making the cave close to four miles long. Work on the map continues.

Sub-Urban Troglo-News
July 26, 2011
Sub-Urban Chicago Grotto

Provided in this issue is a detailed report on the monitoring of the caves on the Jacks Fork River in Missouri, along with photos. It was reported that photos of a rough green snake in one of the caves was determined not to have been previously known to be a trogloxene.

Cave Crawler's Gazette
August 2011-Vol. 53, No. 8
Central Arizona Grotto

Photos, map, and a survey report are included in this issue of **Dum Ditty Cave**, located in Arizona. The survey group split up into two teams. One survey team spent their time connecting all the joints in the entrance room. About 260 feet of survey was shot by one team, and the other team ended up with about 265 feet of surveyed passage.

VCA Newsletter
August 2011-Vol. 20, No. 4
Vermont Cavers Association

David De Simone and Marjorie Gale include the geology of **Dorset Springs** in Vermont. The setting is of very high flow emanating from the base of a steep slope littered with angular boulders and cobbles. There is a reservoir which masks the actual spring flow. The spring is within the Bascom

limestone but is located far below the major Taconic thrust fault.

Southwestern Cavers
July/August 2011-Vol. 49, No. 4
Southwestern Region

The **Soapberry Complex** in New Mexico was surveyed on a trip in June 2011. Since Ken Harrington got past a sump debris obstruction on a previous trip, this complex was on his list of things to do. Ken observed two of what he believes are Rio Grande leopard frogs. This was the fifth time he has observed this species of frog in a cave and all of them have been in complete darkness. The total surveyed on this trip was 185.9 feet, bringing the total surveyed passage of the complex of five caves to 917.5 feet.

Also included in this issue is an executive summary of the **Fort Stanton Cave** Study Project in New Mexico in June 2011. A total of 1609.5 hours of volunteer time was recorded. All remaining tools and wood were removed from the cave. Data loggers in several locations were downloaded and redeployed. Bat nettings and counts were conducted. Soil samples were collected in order to look for the presence of the *Geomyces destructans* fungus. The water level behind the weir at Government Spring was checked. A resistivity line was conducted

with electrode spacing near the junction of Devil's Canyon and Cave Canyon Roads.

Sag Rag
May/June 2011-Vol. 30, No. 3
Shasta Area Grotto

Bighorn Broeckel includes photos, description, and map of **Dark Star Cave**, located in California. This cave has a length of 98 feet and a depth of 33 feet. During the same trip, **Hole-of-the-Bear Cave** was surveyed to a length of 104 feet and a depth of 16 feet. **Hole-in-the-Drain Cave** was also surveyed on this trip, which has a length of 37 feet and a depth of 12 feet.

The Subterranean Voice
July 2011-Vol. XIV, No. 7
The St. Joseph Valley Grotto

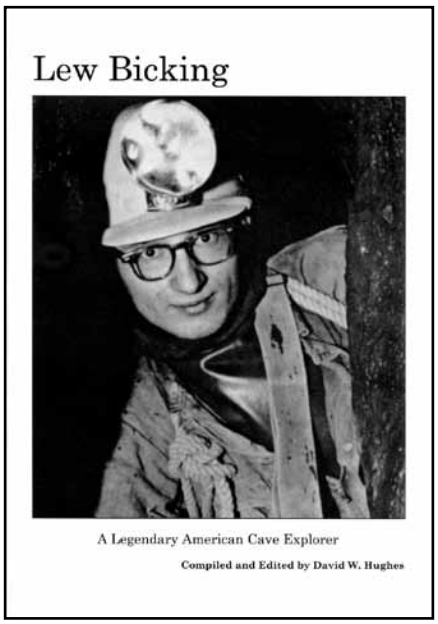
The survey of **Living Waters Cave** was continued in July 2011. Just over 200 feet of low passage was added bringing the cave to just over 240 feet so far. Digging tools will be necessary to continue.

The Subterranean Voice
August 2011-Vol. XIV, No. 8
The St. Joseph Valley Grotto

Several members surveyed 222 feet of the Crazy Maze section of Upper Sumpways in **Lost River Cave** in Indiana. Because the cave is so complex there, they ended up re-surveying some passages, but were still able to delete 4 leads without adding any.

About 110 feet was surveyed while connecting **Elrod Cave** to the **Lost River System** in Indiana. Another 8.2 feet was added as the last lead in the Found River area of the cave was finished.

A draft map of **Hackney Cave** in Indiana is also included in this issue. The last survey trip to this cave was in 2002 and the survey needs to be completed. Total horizontal cave is listed at 1,911 feet with a vertical extent of 27 feet.



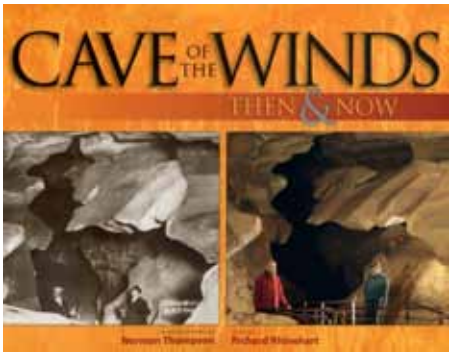
LEW BICKING: A LEGENDARY AMERICAN CAVE EXPLORER

Edited by David W. Hughes. National Speleological Society; 2011. ISBN: 978-1-879961-40-1. 7 by 10 inches, 324 pages plus plates, hardbound. $36; discounts for NSS members.

"Solo" Lew Bicking was an enthusiatic and hard-charging caver from his novice days in 1961 until his early death in a motorcycle accident in 1966. He gave his name to the NSS's annual Lew Bicking Award for the exploration and mapping of a cave or group of caves. (Originally, documentation—publishing—was also a requirement, before the secrecy types got to it.) Bicking was best known for exploration in the East, especially the Friars Hole Cave System in West Virginia, but he went west a few times, including for the 1964 NSS convention in Texas and the 1966 convention in California, after both of which he did some post-convention caving in Mexico.

David Hughes's recent book on Vertical Bill Cuddington (NSS, 2008) was written to be read. This book is a compilation that can only be browsed. It contains what appears to be everything ever written about Bicking's caving, by Lew or anybody else, mainly trip reports from the heyday of the *Baltimore Grotto News*. Included are a number of obituaries and items concerning the collection of the Lew Bicking Fund and the creation of the award. There is a section of twenty-nine black-and-white photos on pages not assigned numbers (shame!). Many of the articles are well written and interesting, but there *are* an awful lot of them. Finding the ones most informative and entertaining to you will be a matter of supernatural persistence, or luck. My favorite summing up was written by Squire Lewis on encountering Bicking in Mexico after the 1966 convention: "Lew's only traveling and survival equipment consists of a small Kelty pack whose sole contents are the largest Spanish dictionary every printed—about a 20-pounder—and a box of Mexican crackers. . . . His only clothes are those he wears, and he obviously has some warped goal of not taking them off—ever—for washing or any other purpose. . . . He has gotten all the long way from Baltimore to California to [Mexico City] with nothing but his great dictionary and his crackers. We have never seen him spend any money—not any—he may well not have any. Yet he calmly proceeds intact through all the chaos of the byways and accomplishes his goals. He is the true stuff from which cavers are made."

Bill Mixon



CAVE OF THE WINDS THEN AND NOW

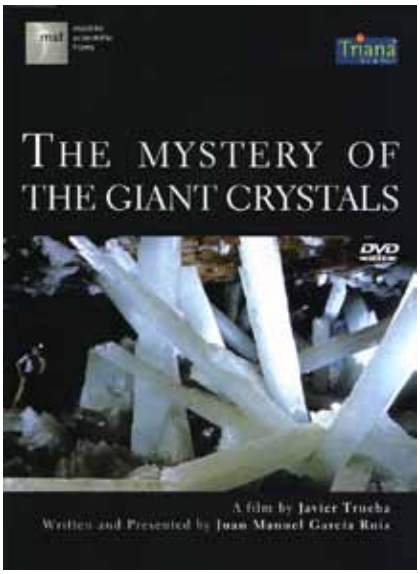
Photography by Norman Thompson, text by Richard Rhinehart. Westcliffe Publishers, Boulder, Colorado; 2011. ISBN 978-1-56579-650-8. 11 (wide) by 8.5 inches, 112 pages, softbound. $17.95.

This is a very clever book. The Cave of the Winds in Williams Canyon at Manitou Springs, Colorado, has a long history as a show cave, starting in March 1881, and this book was published on the occasion of its hundred-thirtieth anniversary. It contains about a hundred pairs of photographs, one in each pair old, from roughly 1880 to 1930, and one recently taken to match as closely as possible the old scene. The old photographs are in black-and-white, except a few hand-colored postcards. The modern photos are of course in color. In addition to illustrating the development of the cave and its surface facilities, many are views of the canyon and sights within it, such as the Narrows and the Temple of Isis, a cave remnant penetrating a small ridge. I was struck by how much more vegetated the vicinity of the cave looks in the modern photographs. Evidently the canyon had only begun to recover even fifty years after a fire tore through it in 1847. Many of the photos, old and new, are stereographs, providing another possible use for the stereo viewer that was distributed with the guidebook for the 2011 NSS convention in Glenwood Springs.

The text consists of a brief historical introduction and long captions for the photographs. There is a good bit of redundancy, but this is not bad in a book meant for browsing.

Bill Mixon

SPELEMEDIA



THE MYSTERY OF THE GIANT CRYSTALS

(2010). Madrid Scientific Films. Running time: 50 minutes. Written and presented by Juan Manuel García Ruiz. Directed by Javier Trueba. Distributed by Hampton Research. Aliso Viejo, CA (Catalog #HR5-208). Region Code 0. ISAN 0000-0002-94F8-0000-W-0000-0000-F. Available in both DVD and Blu-Ray formats ($18.00).

By now, most members of the caving community are aware of the spectacular gypsum (selenite) crystals recently discovered in Mexico's Naica Mine and have likely seen one of the short video or slideshow presentations available on the internet. These giant crystals are as interesting to people today as they were in millennia past. Prior to the creation of glass, the clarity and ease of splitting high-quality selenite crystals made them a commodity of considerable value in the ancient world.

In this absorbing documentary, Professor Juan Manuel García Ruiz of the Laboratory for Crystallographic Studies, University of Granada considers these unique natural wonders from both an historical and modern perspective. In pondering *The Mystery of the Giant Crystals*, his attention is focused primarily on why, when, and how they formed. Pursuing his fascination with giant crystals, he takes viewers on an extraordinary journey to visit four separate locales (in Spain, Chile, and Mexico) containing rich deposits of the largest—some more than 33 feet long, 3 feet wide, and weighing as much as 25 tons—and most beautiful selenite crystals known. As García Ruiz explores the world of giant crystals, he explains the nature of crystal structure, the environmental conditions in which such giant crystals flourish, and the various factors responsible for their creation and continued growth. His presentation is in clear, easily understood language that is quite suitable for a general viewing audience.

The crystal cathedral of Naica Mine in northern Mexico has been referred to as the Sistine Chapel of crystallography…a name that is well deserved. Despite its relatively harsh environment (with temperatures of 122^0 F. and humidity approaching 100%), which limits the amount of time one can safely spend on site, stunning cinematography captures the breathtaking beauty of this singular geological treasure. Complementing images of Naica's underground splendor, laboratory analysis of mineral samples and realistic animations of past geological processes help to provide a geologic context for understanding the origin and growth of these crystals. This educational documentary will be of considerable interest to members of the caving community and is a highly recommended addition to the video collection of anyone intrigued by unique underground environments.

This DVD is accessible in three languages (English, French, and Spanish) with an option of five subtitle selections (English, French, Spanish, German, and Japanese). It was formatted for region 0, which is meant to be compatible with DVD players anywhere in the world. However, not all DVD players in the United States can play DVDs formatted for region 0. It is a good idea to check the specs on your DVD player prior to purchasing this video, so as to ensure compatibility with your system. Alternatively, the DVD can be viewed on a computer. Free VLC software can be downloaded from videolan.org to enable viewing.

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