

Underwater Speleology

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Lamar Hires and Peter Thompson in Ryusendo Cave, Japan

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By David Rhea**



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UWS welcomes your submission. *UWS* assumes that anyone submitting photos and/or graphics has obtained proper permission from the cartographer/photographer for reproduction of such material in *UWS*. We prefer prints to slides, but can accept both. All submissions are subject to standard magazine editorial practices. Unfortunately, we cannot publish everything we receive. If you have an idea for an article but are unsure if it is suitable for *UWS*, please feel free to contact the editor.

Submission Deadlines

May/June.....	April 20
July/Aug.....	June 20
Sept/Oct.....	August 20
Nov/Dec.....	October 20
Jan/Feb.....	December 20

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Spring Workshop 1995— Venturing Thru the 90's

By Gene Broome, Workshop Chairman

May 26–29, 1995

Plans are rapidly coming together for the Cave Diving Section's Spring Workshop to be held Memorial Day Weekend in Branford, Florida. The itinerary is certainly becoming quite complete with all that is being offered this year.

Our Sponsors (to date) include:

- **Beuchat USA**
- **Cochran Underseas Technology**
- **Dive Rite Manufacturing**

There will be a number of fine speakers, to say the least. Those presently planning to present topics of interest to our diversified community are:

Rob Palmer, noted author & lecturer, speaking on "The Blue Holes Foundation"

Jim Bowden, noted explorer & lecturer, speaking on "The Zacaton Project—Exploration Techniques"

Terrence Tysall, instructor & lecturer, speaking on "Cave Diving Tech"

Mike Cochran, Cochran Underseas President, speaking on "The History & Future of Dive Instrument Science"

Bret Gilliam, Chairman of the Board of NAUI & author

Hal Watts, Forty Fathom Grotto

Tom Mount, author & lecturer

Ed Betts, author & lecturer

Bill Turbeville, attorney & lecturer

The list has not stopped there. These are, so far, the ones that have accepted the positions for speaking.

If there are others you would like to hear from or if you have the ability to arrange other speakers, please feel



free to contact me so we might include them in our program. Remember, this Workshop is for *you*: we certainly want and need your input to make it the event you deserve.

Also, we have been busy arranging for mini-workshops and clinics that will be most beneficial to the audience. We will have clinics/classes in: Side Mounting, Nitrox Certifications, Recovery Certification, Underwater Surveying Techniques, Map Design, and various equipment repair programs. These

are coming together quite nicely and we will make the offering as complete as is possible. Friday evening will kick off the activities with a social and get-together complete with snacks. Then Saturday will be the day of presentations by our speakers complete with lunch and followed by a video presentation that night. Rob Palmer will be presenting videos, as will Bill Rennaker on his latest work at Convict Springs. Sunday and Monday will include the mini-workshops and guided dives.

So, as you can see, this weekend will be packed full of activities that will surely suit your interests. There's much more planned that space will not permit at this time, but be assured that this year's Workshop is *definitely the place to be!*

Please contact me if you want to assist in this effort or if you have some suggestions. You should go ahead and pre-register for the weekend's events. Please see the enclosed registration flier for more details on being part of this extravaganza! ❖

**See You at
"Workshop '95—
Venturing Through
the 90's"**

Events

tek.95—San Francisco

“tek.95—a new acronym? Well, the first part is easy: “1995” (i.e. next year it will be tek.96—in New Orleans), but what’s tek?”

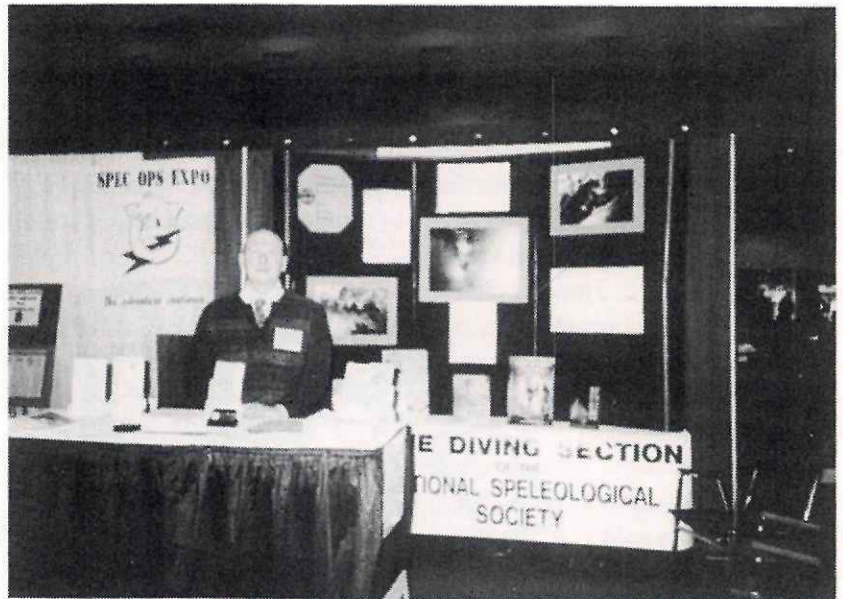
Well, a niche has opened up in the past few years and cave diving is on the leading edge. The new niche is called “Technical Diving” (i.e. “tek”) and many new people are getting turned on as gear configurations, safety techniques, consistent access to reputable materials, and education programs are developed and utilized. The tek Conference makes the sharing of this information possible on an international scale.

The community has grown. More non-technical divers are becoming interested in learning about what makes us tick as we continue with the ever-changing improvements to our gear and our techniques.

At this year’s tek Conference in San Francisco last month, many new divers, many very experienced divers, and all of us inbetween gathered to check out where the future of technical diving is headed and how cave divers are involved. The Section’s training curriculum and readily available materials are on the leading edge of technical diving worldwide.

Two years ago Michael Menduno, publisher and founder of *Aquacorps*, organized the first tek Conference and invited the CDS to exhibit. Over 300 people attended that first show in Orlando. Last year in New Orleans over 600 people attended. This year at tek.95 over 1,200 people walked by the Section’s booth. Many of our members from California and around the world came by and hung around talking tek with new and old friends!

I had the opportunity to put many faces with names and voices. This year Lisa Fletcher and Shannon Sikes volunteered tons of their time to help make the Section exhibit one to be proud of. This was Lisa’s third year,



Bruce Ryan at the Cave Diving Section’s booth at tek.95

and she still loves it. Our outreach program was so successful that we had to go out three times to make extra copies of informational materials. Best of all, 15 new members joined.

As technical diving continues to evolve, cave divers will be present and leading the way. As the Section’s goals, outreach programs, exploration foundation, and other projects evolve, we will continue to contribute to the forum offered at the tek Conference. ❖

*Submitted by Bruce Ryan,
Administrative Manager*

Accident Follow-Up

In the 1994 September/October *UWS* (Vol.21, No.5), an accident analysis was given on a fatality in West Virginia. The variable in this fatality was the regulator on the last bottle of bottom mix. The diver could not breathe from this bottle, which started the sequence of events leading to his death. The regulator was a combination of a Poseidon Odin second stage and a Sherwood Magnum first stage. These two parts were not designed to operate together, let alone at extreme depths

(below 200'). The regulator was also in need of servicing, as was evident by the salt water corrosion on the filters. The regulator was taken to 250' by Steve Berman of Ginnie Springs; he said the regulator would not deliver. He commented that breathing this reg was “like trying to suck mud through a straw.” ❖

*Submitted by Lamar Hires,
Training Chairman*

My Heartfelt Thanks!

I want to express my true appreciation for all the kindness and concern shown to me during my time of recovery from the tank incident in early January. I continue to improve daily, and it won’t be long before I will be able to rejoin you in the caves. The masses who have called (over 800!) or sent cards and flowers have certainly touched my family and me in a way you will never know! To say that it has been humbling is to say the very least. Jerri and I thank you, one and all! ❖

*Gene Broome
CDS Board member*

Calendar

March

18

Board of Directors meeting at Ginnie Springs, High Springs FL on Saturday, March 18 at 6:30PM.

July

17-21

NSS Convention, Blacksburg, Virginia. Contact Carol Tideman, 7600 Pindell School Road, Fulton MD 20759, (410) 792-0742.

May

26-29

The 1995 CDS Spring Workshop, Branford, Florida. Gene Broome, Workshop Chairman, is actively seeking volunteers and suggestions. Please contact him at: NSS-CDS Workshop, PO Box 950, Branford FL 32008. Phone and/or Fax him at (904) 935-1141.

November

10-12

NACD Workshop. Location to be announced. Contact John Miller (904) 629-1436.

Events Continue...

Ginnie Social Review

The event began early Saturday morning under the new Devil's Eye Pavilion at Ginnie Springs. Bruce Ryan and Lisa Fletcher brought the CDS portable shop with t-shirts, hats and books for sale. The most popular item of the day was Sheck Exley's new book, *Caverns Measureless to Man*. The day turned out to be gorgeous, and over 110 cave divers came and went. We spent the day cave diving, talking about cave diving, and dodging busloads of openwater dive lemmings. The party started around lunchtime, when a bunch of us got hungry and started cooking the weenies we got for the bonfire. The eating continued steadily until a little after 7PM, when the keg was tapped

and the food ran out. Thanks to all of those who donated food and beverages to the party! You may be interested to know that the party didn't cost the CDS a cent due to the generosity of several members. Also thanks to the Ginnie Springs for donating the use of the Devil's Eye Pavilion and the grill. The party was great. Many of the CDS Board members were there, along with about 50 or 60 other divers. Everyone enjoyed the opportunity to talk about the day's diving and to meet with other divers. Get-togethers like this one are a great chance for new divers to meet and talk to those who have more experience (and better stories!). When the wood for the bonfire ran out about 2AM, the party ended and the last few hardcore partiers adjourned to their

campsites. We had a great time and are now planning the next get-together. If you have any ideas or want to suggest a date or location for the next social event, please call Annette Korn at (904)728-6536. ❖

New Survey Coordinators

Mike Poucher and Tony Pate have volunteered for the position of Survey Coordinators. Mike is the Chairman of the Florida Cave Survey, affiliated with the Florida Speleological Society. Mike is also involved with the re-survey of Peacock Springs. *Underwater Speleology* looks forward to receiving information from the new coordinators for publication in *UWS*. ❖

Events continue on page 21

Off the Mainline:

By Lamar Hires

September 13, 1994

I recently had the pleasure of going to Japan to cave dive. Yes, cave dive, in limestone solution caves. We went to a small karst region in the province of Iwate 500 miles from Tokyo [see figure 1]. While none of the karst regions identified in Figure 1 are very large, the Iwate region is considered to be the most extensive and interesting. Of course this was also a business trip with a very hectic schedule.

I arrived in Tokyo on a Wednesday afternoon (August 10) and settled down to a few beers and some sushi. I was up early the next morning in anticipation of the day's events. After a morning business meeting, my friends Peter Thompson, Hide Nagata and I went to the customs broker to get the Dolphin 95's donated by Dolphin for the expedition and to pick up the compressor. After visiting customs, we were able to secure the cylinders without the usual ten day wait for high pressure containers. Getting the compressor, however, was not quite so easy. The compressor that had been reserved for us was no longer available at a reasonable price, so we spent the rest of the day negotiating for another. We finally secured one and also a fill whip for the oxygen bottles we had waiting for us in another city closer to the caves.

We rendezvoused with our part of the team at Nagata's dive store, Aqua Clair. I was a little concerned about how ten people, diving and caving gear, twelve cylinders (eight steel 95's) and a compressor were going to fit in a Mitsubishi van. It was very crowded, but we managed

to do it. Luckily, we only had to ride this way for about four hours until we picked up another vehicle to split the load. We left Tokyo about 9PM on Thursday evening and finally arrived in Iwaizumi around 11AM the next morning.

Iwaizumi is a small town located within the Iwate region. To the west of it are the Kitakami Highlands and to the east is the Sanriku Coast.

Ryusendo Cave (pronounced Ru-sen-doe; in Japanese the suffixes "do" and "kutsu" both mean "cave") is one of the three biggest caves in Japan and has been chosen as a natural monument in the country. The length of the cave is at present known to be over 2,500 meters [see figure 2]. We visited city hall to ask permission to dive Ryusendo Cave. Landowner relations are very important in Japan. Whenever we asked permission to dive or cave, the request was accompanied with a gift. It is Japanese custom to present a gift—usually food specialities, such as rice cakes or cookies—when asking for something, and everyone is very friendly and courteous.

We spent the afternoon filling cylinders and preparing equipment for our dive into Ryusendo that evening. The cave is a popular

tourist cave, and we had to wait for the cave to close for the evening. This was going to be a cold dive for me. The water temperature was 47°F. Apollo Sports, a leading Japanese diving company, provided us with custom drysuits and fins for the expedition (if you have seen me at the springs since my trip, you have *definitely* seen the suit). The



Figure 1

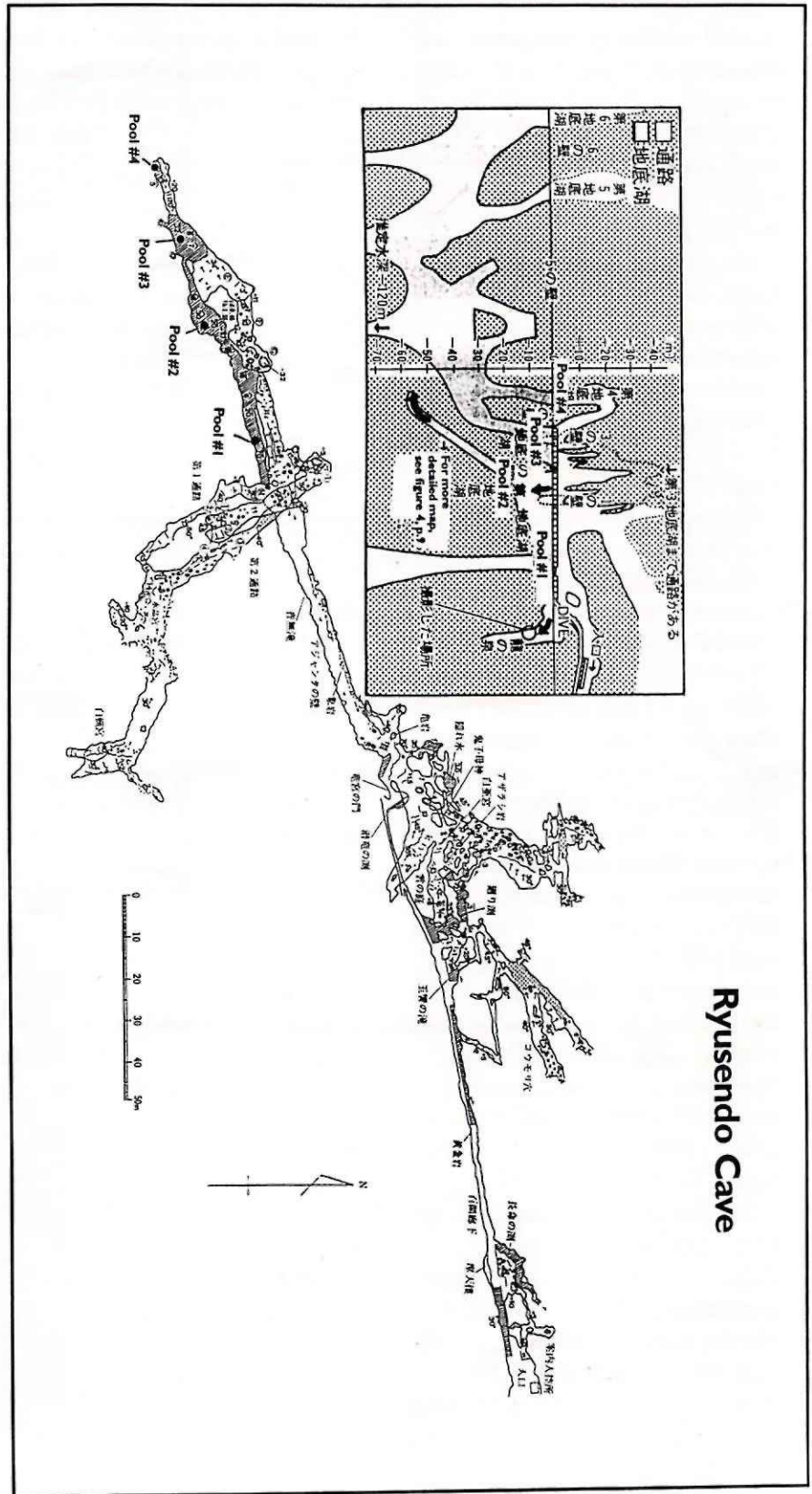
cave has four water pools with depths over 160' in Pools 3 and 4 with exploration to be done [see profile view in figure 2]. The last cave dive was done in 1968 by three Japanese commercial divers; one diver drowned and since then cave diving, for all practical purposes, has stopped in Japan. This was quite an event to be allowed to dive here.

Ryusendo Project, Japan—

On the first dive we—Peter Thompson, Nagata and myself—were restricted to the first pool so our anti-silting techniques could be evaluated by the cave manager. The water is so clear and pure that it is bottled for drinking water. The first pool had a maximum depth of 50' with tunnel going upstream and downstream. All the pools were connected by a surface stream, so the cave managers assumed a diver could swim from one pool to the next through submerged cave passage. This, however, was not the case; the downstream went approximately 100 feet before connecting back to the surface stream. The passage was 15 feet in diameter with minimal silt because most of the water leaving the cave went through this passage. The upstream narrowed to fissures too small for us to travel. The only way to the next pool was by the surface stream. We were able to prove ourselves to the cave managers and were told we could come back and dive the next pool. We returned to our base camp in a small mountain village near Iwazumi named Akka about 20 minutes away from Ryusendo Cave. Our base camp was a small, three-room house on the Akka River, which runs through the center of town. It was a beautiful setting with the town nestled between the mountains.

By noon on Saturday the rest of the cavers arrived. We now had nineteen people at our base camp. That afternoon we went to Iwaikutsu Cave. After a short walk through the cave, we arrived at the sump. I was overdressed for this sump and

Plan and Profile maps of Ryusendo Cave (Figure 2)



Ryusendo Cave

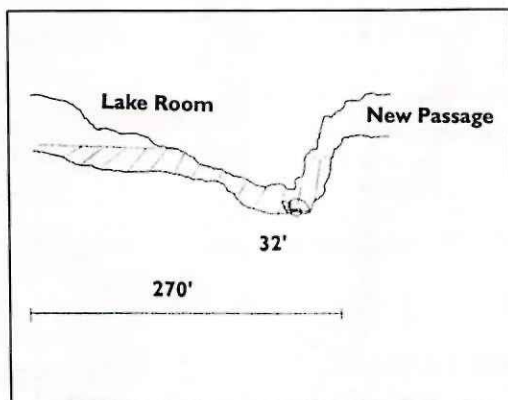
Japan Continues...

needed smaller cylinders and a no-mount setup. It was a small body tube with sharp rock grabbing everything. The depth was only eight feet, but it had enough flow to clear itself rather quickly. After we returned from Iwaikutsu, I gave the group the Cavern Course lecture with Peter interpreting.

On Saturday evening we returned to Ryusendo to dive the second pool to be informed we could only dive the first pool again. So we did, shooting video to show the managers and to help get past the landowner barrier preventing us from getting into the other pools. On Sunday morning we took the video to the mayor and got his permission to dive Pool #3, the deeper pool with known depths of over 100'. Although we received permission from the mayor, I later learned that this was a bad move on our part. That afternoon I did openwater drills and emergency procedure drills with the support group in the river behind our base camp. The water was 50°F.

Sunday evening we returned to Ryusendo all pumped up to dive Pool #3. To our surprise we were stopped and told we could not dive. The Japanese govern and do business through consensus. This means you don't go to the top to get what you want; you go through channels.

Instead of going straight to the mayor, we should have first asked the cave managers for permission to dive Pool #3. We screwed up. In order to save face in this matter, the cave managers told us we could not dive Pool #3 that day, but agreed to a compromise: we would have to come



Shigawatari Cave, Lake Room to Sump
(Figure 3)

back the following evening to dive.

Monday we went to Shigawatari Cave. This was the longest cave in Japan for many years at 2882 meters of surveyed passage until Akka-do passed it in total passage surveyed (presently 7650 meters as surveyed by the Japan Caving Association).

The cavers had been stopped at Shigawatari by a sump 2000 feet back in the cave: a lake room with a pool 160 feet long and 20 feet wide. After Akka-do passed it in length, the cavers asked a local diver to dive the sump. The cavers knew it continued on to an entrance on top of the mountain about a mile away. The diver told the cavers he would need 30 dive

cylinders to push the sump. It took the cavers two days to transport the cylinders to the dive site. The diver went in to the end of the Lake Room and returned, saying that the cave went more than 40 meters deep; he couldn't do it.

The Lake Room was 160' long and the surface of a fissure. Peter and I went to the end of the fissure on a single side-mounted 95. When we realized it was going to do something and the percolation was destroying visibility, we went back to the water's edge and I took both cylinders and went back in. At the end of the Lake Room, I started down the fissure (3' wide to the bottom). I was at a depth of 25' looking into a room. I proceeded through the room (25' wide), which had very little silt. The room dropped at this point to a depth of 32', and I came upon a sheer wall. I then surfaced upstream of the sump; I could hear a waterfall and see



Lowering Bottles at Ryusendo
from Tourist Trail Bridge

going passage. I didn't get out of the water because of the steep wall and the dive I still had to do that evening. The actual sump from the far end of the lake room to the other

side was only 110' wide and 32' deep [see figure 3]. We packed up all the gear and started the long 2000' walk out of the cave.

Monday evening we went back to Ryusendo for one more attempt. No problems getting in this time. We went back to the #3 pool and could find no easy access to the water. The managers said #2 connected to #3, so we opted to get in #2 for easier access. The basin dropped to 70' with no downstream passage. The upstream side had two entrances; I went into the one in the direction of Pool #3 only to find that the tunnel turned into a narrow fissure. I could see the surface lights from #3, but decided not to push the jagged fissure.

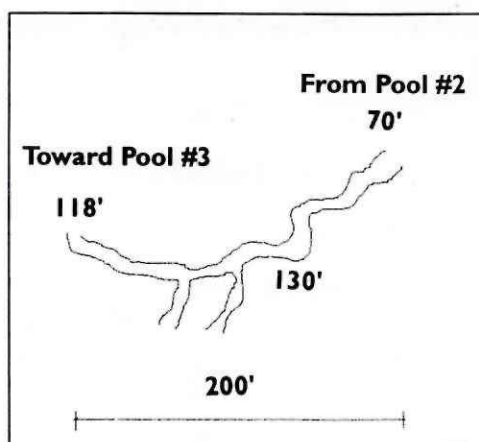
Back in the basin, Peter had found another upstream tunnel. I tied off at 70' and entered a body tube about four feet in diameter. It sloped to 100', and I was looking at a tube going straight down about three feet in diameter. I turned around and dropped into it feet first. The percolation was getting bad as visibility dropped from crystal clear bottling water to ten-foot visibility. The tube leveled out at 130', and I continued on. I passed two more tubes dropping straight down to at least 160'. The tunnel started to climb again, and I hoped I was going to

enter Pool #3. At a depth of 118' and a penetration of about 250', this tunnel pinched out [see figure 4]. I turned and decided to check out the deeper tubes, assuming these would still be clear.

Visibility was now three feet, with all the percolation and soft limestone. I didn't want to surface to face the managers of the cave, whose biggest concern was the water clarity after the dive. When I started into the first deep tunnel, my Poseidon regulator started to free-flow. The decision was made. I



Lamar Hires and Peter Thompson in Ryusendo



Profile View, Pools #2 and #3 of Ryusendo Cave

headed out, dealing with the free-flow until I reached the ledge at 100', where I changed regulators and shut down the cylinder with the free-flow. Peter was waiting for me at the ledge. We exited together back into the basin where Nagata, our safety diver,

was waiting. The managers didn't have much to say about the visibility; they were, however, very interested in what I had found, so I sketched out the passage and depths [figure 4]. The visibility was back to normal in four hours.

We have been invited back next year to continue the exploration of Pools #3 and #4 and Shigawatari Cave. The cave diving in Japan, characterized by clear water sumps and cold water temperatures, is similar to the cave diving in northern Georgia, Tennessee and Alabama. I would recommend dry caving experience before considering cave diving in Japan.

We would like to thank the Japan Cavers Club, the Spelunkers of Chuo University, and the Diving Club of Daito Bunk University for their efforts on this exploration trip. We would also like to thank Apollo Sports, Dive Rite, and Dolphin for their sponsorship of this trip to Japan. ❖

The Sulphur Springs Exploration Project

By Jeff Petersen and Frank Richardson

Winding under the streets of residential Tampa lies an extensive cave system that ultimately surfaces at Sulphur Springs on the Hillsborough River. For liability reasons, The City of Tampa (who owns the spring) has not allowed access to the cave system. A grate was in place for many years to keep would-be explorers out of the system; it has since been removed.

The spring discharges an average of 44 cubic feet per second (cfs) into a concrete retention pool 50 feet in diameter. A set of weirs on the south side of the pool controls the discharge of the spring from the retention pool to a 500-foot run that feeds the Hillsborough River. During periods of drought, an adjacent pump house is activated to pipe the water about two miles away to a city drinking reservoir. The pool was open to the public for swimming until the summer of 1986. That summer, the spring was closed due to high counts of fecal coliforms and has remained closed ever since.

The main contributor to the pollution is a series of sinkholes extending three miles north of the spring.

Stormwater and street runoff are directed into these sinks via large drainage pipes.

An environmental study contracted by the City in the late 1980's provided tantalizing information about what the system might be like. Dye tests at various sinkholes north of Sulphur Springs indicated that one sinkhole about 5,000 feet north of the spring was hydraulically connected. Another sinkhole (once known as Trinity Sink/Spring and currently referred to as Poinsettia Sink), approximately 10,000 feet north of the spring, connected directly into the system and two others (Curiosity Sink and Blue Sink 5), which are approximately 15,000 feet from the spring, directly connected to Sulphur Springs. Calculations based on travel times from these dye tests predicted a tunnel that would be on average ten feet by ten feet.

During the mid 1980's, a few local cave divers were granted access to enter the spring, but found the flow to be too great and the opening too small. In the late

this initial dive, the city decided it was too risky to allow diving, and again halted access to the site.

In March of 1994, Jeff Petersen and Frank Richardson negotiated an agreement with the city to allow exploration of the spring to help with an ongoing effort to find a solution to the pollution entering the system. The initial project members consisted of Jeff Petersen, Frank Richardson, Dave Miner, and Curt Bowen. Jeff and Frank planned a reconnaissance dive in the spring to assess the conditions. The information provided by the City stated that the flow was extremely high, and the restriction was very small. Our contact person with the City of Tampa expressed some skepticism about whether the team would be able to get through the entrance.

With this information, Frank and Jeff decided to use single tanks with Y valves clipped to a harness like stage bottles. At the beginning of the project, the

At the beginning of the project, the opening was only 15 inches high and 36 inches wide—with 44cfs blasting out of this small aperture.

opening was only 15 inches high and 36 inches wide—with 44cfs blasting out of this small aperture. Entry was more difficult because the floor of the restriction was

1980's one cave diver was able to get through the entrance restriction with a sidemount setup. After

comprised of small rocks and the ceiling was a smooth shelf of limestone; there was essentially

Man Wants To Go

no place to hold on to in order to pull yourself in against the flow. After several attempts, Frank was able to fight his way into the opening. After a few more attempts, Jeff was also able to squeeze through the restriction. Jeff then installed a thick rope to aid in pulling their way in on subsequent dives. Having determined that penetration was possible and that the tunnel diameter increased considerably after the first three feet, Frank and Jeff stopped for the day. It was decided that on all exploration dives the new line would be surveyed on the way out so that a revised map could be generated after each dive.

Returning with sidemount gear on the next dive, Frank and Jeff pulled themselves in with the previously installed rope. The cave averaged 10 feet by 10 feet as predicted; although the flow was weaker than at the entrance, there was still a significant flow in the larger areas. The floor, ceiling, and walls were covered in a fluffy brown detritus. In some places these deposits were over six inches thick. Every move—every exhalation—sent this detritus

blowing everywhere like a blizzard. This quickly reduced the 10 foot visibility to zero. Samples taken of this papier-mâché—like matter later revealed that it was



Where No Man Wants to Go!

actually pulverized plant matter, broken down to the cellular level. Interestingly, nothing living was found in the samples examined by the city.

The first exploration/survey dive yielded 300 feet of virgin cave with a large crevice room that was about 70 feet long. The pit dropped from 30 feet to 90 feet with a width that started at 20 feet across and pinched down to four feet at the bottom, where the main tunnel continued northward. This was named the Malebogia (a term from Dante's *Inferno* meaning

“the evil ditch”). During this dive, the team discovered how soft the limestone was in certain strata; an attempted tie-off to a boulder about one foot in diameter completely crumbled the boulder

when the line was pulled tight. The softest limestone appeared to be the Tampa formation, which ran through the system in the 30 to 40 foot depth range.

Jeff did not like having to dive with side mounts, so he excavated the entrance for over an hour on two successive dives. After the second dive it became possible to scrape in with backmounted doubles. Two dives later, Frank and Jeff had extended the

passage to almost 1,000 feet from the entrance. Surveying was performed in almost zero visibility on all pushes.

Next, Dave Miner joined Frank on a single stage dive and extended the penetration to 1,600 feet. In the process, the team fought their way through an area affectionately termed “CO₂ Hill”—a section of tunnel that pinched down in size (due to ceiling breakdown) while ascending from 90 feet of depth to only 30 feet. Although the general trend of the cave depth remained

Sulphur Springs

constant in the 90 foot range, the team members continued to use air to allow the most flexibility for exploration in the event that deeper sections were discovered. Scooters were initially ruled out because of the poor visibility.

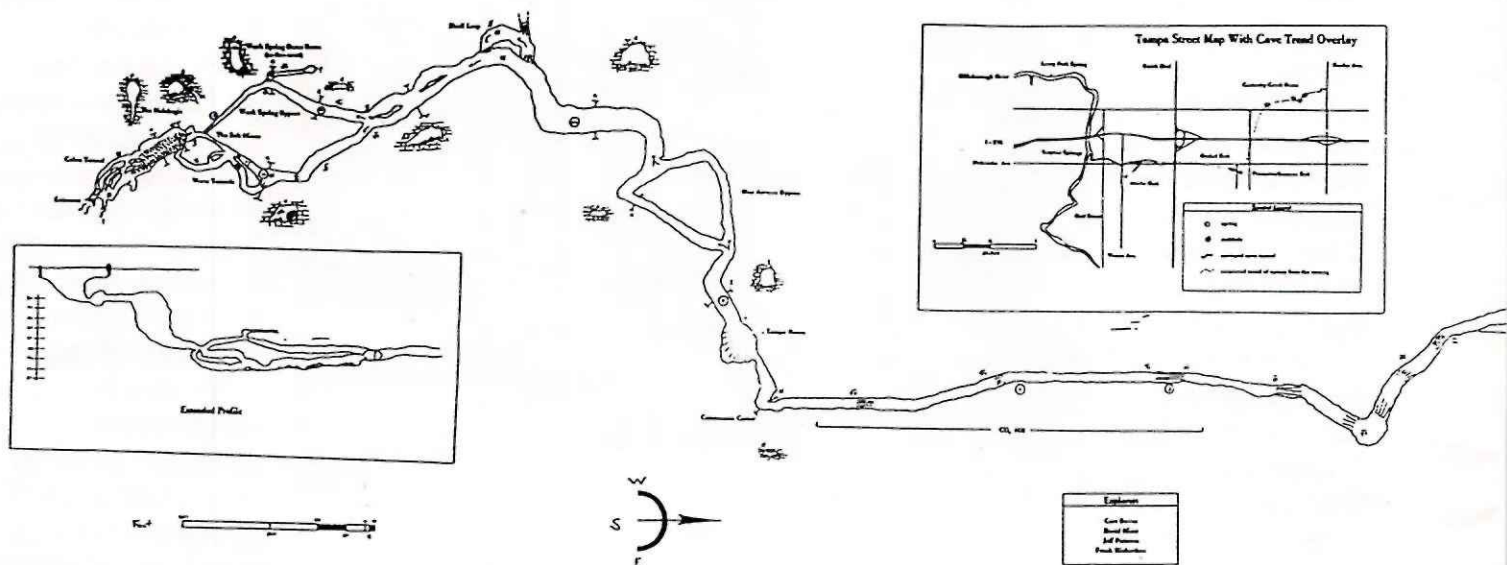
Curt Bowen and Frank performed the first double stage dive in early May. The cave got deeper

fitting. The post serving the inflator hose was quickly shut down at a cost of 700 psi of air. With a third of his air left and no buoyancy capabilities, Frank called the dive—his desire to explore had gone for the day.

Returning the next week, Frank and Curt did another double stage dive, this time laying line into a

After the second double stage dive, the total penetration was over 2,600 feet.

The dives to get to the end were now getting quite demanding, with dive times reaching 100 minutes. Although not long by most standards, the amount of exertion and concentration required by the conditions at Sul-



(115 feet) and much larger (10 to 20 feet high and 20 to 30 feet wide). Six hundred feet of line was added but not surveyed. This deeper section became known as the Highway because its smooth crescent ceiling and flat sand bottom made for the best scootering in the system. At maximum penetration, Frank's inflator hose blew out at the

large room, dubbed the Terminal Room. The tunnel also ascended again to 30 feet of depth. This section, between the Highway and the Terminal Room, was termed the Badland because it was characterized by a low, small, craggy tunnel. The team exited with Frank surveying on the way out, managing to survey the section from the previous dive as well.

phur Springs proved to be extremely draining. Several factors were compounding to limit efficient penetrations deeper into the cave. These factors include the strong flow throughout the system, restriction areas with even higher flow, softness of the limestone precluding pull-and-glide swimming, low visibility, and carrying 2-3 stage bottles.

Continues...

Discussions were made to start doing set-up dives so divers could swap out stages and not have to carry more than one (or two) bottles. Unfortunately, personal schedules for each project member made the set-up dive impractical at that time.

Curt and Frank performed a triple stage dive to try to extend

Frank chose his Zepp because of the neutral characteristics for the expected low visibility exit. Dave chose to use the Oceanic Mako scooter because it was as neutral as the Zepp and as small and nimble as the Tekna. These scooters were used on a set-up dive, during which they rode about 1,200 feet to drop off stage

dropped down to find a small outflowing tunnel at 110 feet of depth. The passage was about five feet by five feet and did not appear to be the main tunnel. The flow was still strong, but not as strong as would be expected if this tunnel were to be the primary source. This tunnel was unusual because the floor was covered

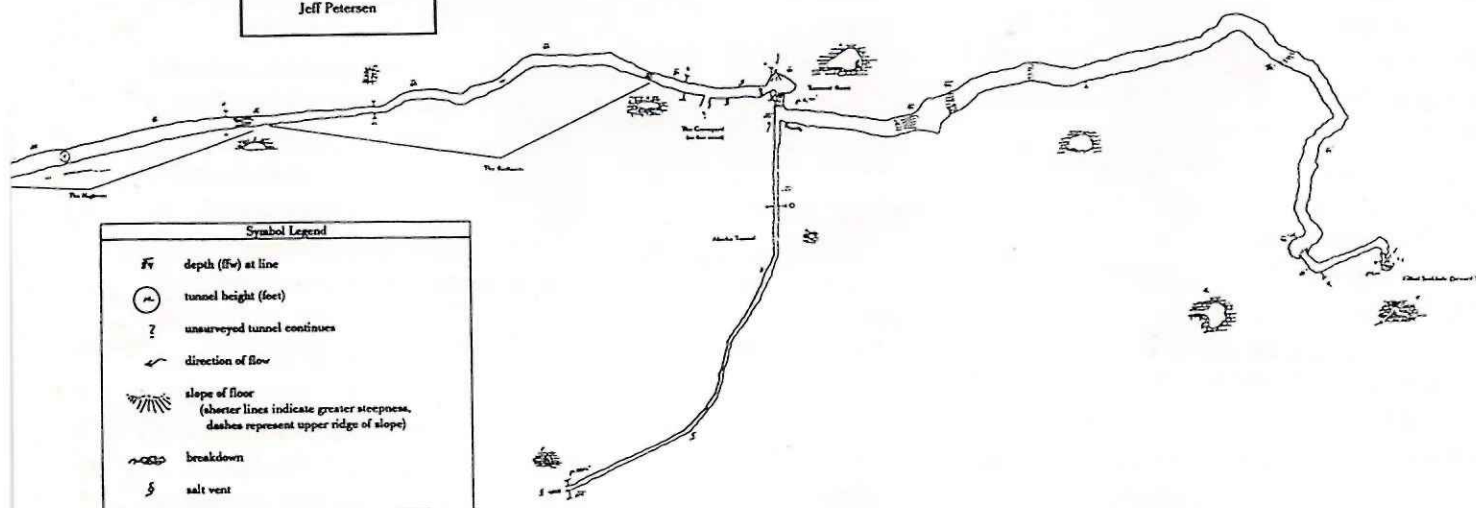
Sulphur Springs

Closed Site - City of Tampa Property

No access granted for recreational purposes

Cartography

Jeff Petersen



the line. The team laid about 100 feet of line but could not find a distinct inflow leading out of the room. Visibility on the dive was only about seven feet.

Over the next few weeks, visibility improved to about 20 feet. Frank and Dave decided to try out scooters in the systems. Frank used his "baby" AquaZepp and Dave used a Tekna DV-3X.

bottles for the divers to swap out on the next dive. Visibility on the exit was better than expected, ranging from five to ten feet.

The next evening, Frank and Dave scootered to the end of the line. Frank was having trouble finding the continuation of the northward tunnel that had brought the team into the large room. Spotting some clear water, Frank

with a hair-like bed of growth. Additionally, a brackish water vent was discovered. This tunnel took a southward course. After reaching a restriction, the team called the dive and surveyed back to the scooters.

During a series of solo dives, Jeff discovered several smaller tunnels in the first 800 feet of the system that branched off and back

Sulphur Springs

into the main tunnel. Additionally, Jeff discovered several fist-sized vents at various places on the cave floor that were issuing brackish water. Surrounding each vent was a white hair-like growth; on subsequent dives it was noted that the perimeter of the growth appeared to be expanding as the volume of discharge increased. This was the only sign of life that had been seen in the system since the beginning of the project, except for the suspected side tunnel at the end of the line. The rate of

expansion on these growths lent credit to the theory that these vents may have opened recently (within the last few months). With the help of Tom Morris, a cave diver and biologist, these growths were identified as sulphur bacteria (chemoautotrophs) that convert hydrogen sulfide in the water into sulphur, deriving energy in the conversion process.

Jeff and Dave made short reconnaissance dives at sinkholes to the north. At each sinkhole, flow was detected but the entrances proved to be small and relatively unstable. These sinkholes will be revisited to see if downstream pushes can be implemented.

In July, support divers were added to the team to help set up tanks in the system for the bigger pushes. The summer rains increased the flow, and visibility



Poinsettia Sink

dropped at times to five feet. With total surveyed passage in excess of 4,000 feet, the team is looking forward to the dry winter to continue exploration with better visibility and reduced flow to connect the northern sinkholes.

In January, the team was preparing to do the dye tracing from the sinkholes to determine which tunnels were directly connected when Frank and Dave found another tunnel while placing one of the dye traps at the junction of the Alaska Tunnel and the Terminal Room. This tunnel had been missed because this area had been notorious for vicious haloclines and turbidity from the mixture of

the brackish water in the Alaska Tunnel and the fresh water coming from the new tunnel. Since they found a new tunnel, the dye tracing was postponed so that the push teams could see if there were any additional splits in the new tunnel. Frank and Dave did a double stage scooter dive to see how much line they could add in the new tunnel. Policy had now become that scooter divers would retain one stage bottle in the event of a catastrophic air failure in their doubles. This was considered a strong possibility due to the higher speeds the teams were

scooting at and the extremely low visibility (1–5 feet). Stage bottles would not be used on the way out to maintain a maximum reserve in the event of catastrophic failure in their doubles. On this dive, Frank and Dave added about 800ft of line (they ran out of line before they ran out of air).

The next weekend, Dave and Jeff planned to see how much more line could be added. A set-up team placed stages at 1,200 feet. Jeff and Dave swapped stages at 1,200 and raced to the back. Even though the new line had only been swum once (i.e. there was still considerable ceiling/wall detritus to destroy

Continues...

visibility), they decided to scooter to almost the end of the line. After dropping off the scooters, only about 200 feet of line was added when Jeff and Dave encountered an extremely tight high-flow restriction reminiscent of the main entrance. The amount of flow indicated that this was probably still the main tunnel (unfortunately). Dave was running the reel and squeezed into the restriction with his stage bottle still on. Once on the other side of the restriction, it became apparent that what we had encountered was actually a filled sinkhole/solution tube. It looked as if the pressure from upstream tunnel was strong enough to reopen a small tunnel into the sinkhole, flush out a portion of the plug and reopen the restriction we had just come through to allow the flow to resume its original course downstream from the sinkhole.

Unfortunately, at this point we were 3,600 feet from the entrance and confronted with impassable restrictions that required excavation work inside the sinkhole with a potentially unstable plug of rock above us. We are currently assessing the feasibility of doing this excavation. Additionally, the team

is planning to use dredging equipment to remove the mud and debris that has choked the spring and syphon tunnels at Poinsettia Sink (currently both openings are about 1'x1'); if successful, this will allow downstream pushes and a chance to see if the system morphology is different upstream from Poinsettia Sink (which represents the most upstream open sinkhole in the system).

The total penetration from the entrance is currently 3,600 feet at the filled sinkhole. At 2,700 feet into the system, the tunnel splits



Entrance at Sulphur Springs

with one tunnel bearing southeasterly; this tunnel appears to connect to Alaska Sink, 4,500 feet north of Sulphur Springs. Maximum penetration in the Alaska Tunnel (from the entrance) is 3,300 feet. Total surveyed passage

is approximately 5,000 feet. Most of the tunnels are characterized by a clay/sand bottom with considerable breakdown typically covered with a thick carpet of detritus (except in areas of high flow). Walls and ceiling are craggy with numerous cracks and flanges of limestone jutting out into the tunnel, creating a "swiss cheese" effect in many places.

Currently, Curt and Jeff are drafting maps of the system. Curt has invested over 100 hours into generating three-dimensional representations of the system with the use of CAD computer

software. Jeff is working on traditional maps with illustrations of various perspectives in the system. Bob McGuire has helped out by shooting video of the system. The team is also planning fluorescein dye traces (introduced at the sinkholes 10,000 feet north of the spring) with dye traps in each major tunnel to confirm which ones will head to the

sinkholes. One of the goals of the project is to physically connect these sinks to the spring and to go in at the sink and come out at the spring—which will be about two miles underwater. ❖

Exley's Razor:

By R.D. Milhollin

Sheck Exley was one of the most outstanding explorers of his time. Within the field of cave diving, he was virtually peerless. He was concerned from the early days of the practice with identifying factors involved in cave diver deaths. Exley was one of the first to use an analytical approach to assess the causes of cave diver failure. His actions helped define many of the commonly held limits in this field today. His business was limits. And he died diving in a cave.

Ockham's Razor: a principle formulated by William of Ockham, stating that terms, concepts, assumptions, etc. must not be multiplied beyond necessity. It is a limiting and simplifying guideline for inquiry and explanation, advocating parsimony over complexity. The admonishment to science has guided inquiry for over 600 years.

Exley's Razor: a proposal for discussion involving the nature of limits. One never truly knows one's limits until they are encountered. Once a limit is reached and exceeded, return is not always possible. This razor is dangerously sharp. It divides those seeking the knowable end from those who have found the ultimate destination.

The problem posed by this proposition holds great importance for the pursuit of cave diving. Some of the basic admonitions given to the student entering this pursuit deal with limits, specifically those of depth, horizontal penetration, gas supply, and reserve gas. The implications of breaking these limits are often assumed to be understood. They are probably better appreciated during the first few penetrations into an overhead environment than later, after a few dozen dives have been successfully completed. The idea of limits in cave diving can be approached in many ways and may assume the following forms: hori-

zontal penetration, vertical depth achieved, hours submerged, distance traveled, speed of travel, gas supply and consumption, gas component depth/time considerations (i.e., PO₂ depth), fatigue, physical and emotional stress, task complexity, and equipment considerations. Limits are imposed on students during training, and are impressed on novices by the cave diving community. There are limits imposed by landowners, by physics, and by the legal system. There are limits that are self-imposed, such as those related to practical, financial, or physical comfort. Some limits may be dictated by body size or health and fitness considerations. The limits to be addressed here are primarily those involving experience, mental and emotional states, family considerations, personal safety, and internal feelings of security. By analogy, limits may be envisioned as the ability for a particular material to recover its shape after being deformed by applied stress, a measure of tensile ability. Past some point the material will either break (fail) or will not be able to return to its original shape. Every cave dive involves stress in one or more of its forms, and the diver must strive to avoid reaching and exceeding the type of limit he might not be able to return from.

The least well known aspect of cave diving is the psychological. There are now and have been divers who will do things on a dare. For these people the ego may be fragile: once the ego is threatened, it can lead them into areas they know to be unsafe. The ego threat, if not controlled, can cause divers to exceed their own known limits of comfort. The fact that another diver completed a particular dive can be reason enough for the threatened ego of a weak individual to justify taking risks that might otherwise be

avoided. A cave diver wishing to keep this potential threat under control might consider including "motivation" as part of the formal pre-dive planning process. This could help by providing an opportunity for the diver to assess the reason he or she wants to attempt a particular profile, and a chance to modify that profile if sufficient justification is lacking. By consciously considering the reason for choosing to attempt a particular dive, the diver is making the first step toward defining and enforcing the personal limits that will enable him or her to be comfortable while undertaking this demanding pursuit.

It may be possible for properly trained (to standards) but ill-informed novices to get a false impression of how more experienced cave divers became that way. They see individuals going through training from beginning students to "full cave" certified in a surprisingly short amount of time, and assume this must be the best route to take. The instant gratification expected by the children of the instant culture of the 1950's onward comes into play. Mix a newly certified diver, lots of money (equipment), and the right amount of encouragement (from the instructor or through the social environment), and you have the potential for a cave diving statistic. Just add water! The fact that some lucky individuals actually survive while taking poorly calculated risks can boost confidence in underdeveloped skills and abilities, blinding them to the reality of their limited developed potential. There are novices who can see no difference between themselves and a diver who has been actively and patiently honing skills for 20 years or longer, building up a vast reservoir of reflexes and insights that will be there when needed.

On Defining Limits

The dividing line between the successful and the not-so-lucky will not be seen on the ideal dive, but instead, on the dive that had a problem. The experienced diver will know how to react when things begin going badly, and will be better prepared to recover presence of mind in time to make the crucial decisions that will save his life. This observation should be borne in mind by all cave divers, who must inevitably assess their own capabilities and set their own personal limits. These limits must be set based upon the worst possible circumstance imaginable, not upon what is likely to be expected. Only by allowing the unthinkable to enter into consideration can the serious cave diver expect to survive the unlikely.

There should be a division drawn between the recreational cave diver and the cave diving "explorer," for lack of a better term. It is recognized that exploration assumes a wide spectrum of activity, and the term is applied in this instance to denote the

highly experienced diver who has been expanding his or her capabilities to significant levels over a considerable period of time and has made a conscious decision regarding the importance of cave diving in his or her life. The true explorer must carefully and continually assess the limits of his pursuit, allow them to change depending on any number of factors, and keep them always in mind.

To how many cave divers does this apply? How many are truly willing to take the chance and walk the razor's edge? Probably not a lot

if it really gets down to serious thought about consequences. Perhaps that is what is needed: serious thought among cave divers. This process should probably begin at the earliest level of instruction, when the effects of inappropriate decisions or poor technique are explained. An appropriate observation is that when things begin to go bad in one area, there seem to be an escalating number of things that go wrong or appear to go wrong in other areas. If this process is not stemmed in time, the result will ultimately be diver failure. Of course in cave diving, this most always indicates death. There is little possibility of escaping with injury. It is no accident that the open water training sequence features rescue practice while cave diving has a course in body recovery.

defeats any serious attempt at screening for personality types not suited to the pursuit, but invites much greater damage to the cave environment than is absolutely necessary for training and learning. There is a cost associated with the commercialization of cave diving that may not be readily apparent except to those willing to look past personal objectives to see the greater whole. The traditional cave courses were not openly advertised and students were not sold this form of diving as a product. Both of the major training organizations have discouraged the "promotion of cave diving," but have shied away from defining what "promotion" is specifically. New cave divers were once expected to systematically work their way from simple dives to

more complex dives, slowly, over time.

The idea of "progressive penetration" was espoused by those who had learned that way, and had accumulated impressive numbers of successful dives follow-

There should be a division drawn between the recreational cave diver and the cave diving "explorer," for lack of a better term.

The commercialization of cave and other forms of "technical diving" makes this discussion even more difficult than would otherwise be the case. The proliferation of "professional" instructors carries with it the implicit fact that they must earn a living and are hence prone to advertise their services to the general public, and may be less apt to deny a student with marginal skills or a poor attitude access to a course. The rent needs to be paid. Encouraging students to participate in cave diving courses not only

ing this dictum. Of course, in the early days of cave diving, the idea of a serious dive was something much different than what is commonly imagined today. Some of the early pioneers racked up thousands of cave dives over relatively short periods of time, for these were quite short penetrations by today's standards. There have always been those who tested the limits, as can be attested to by the exploits of Wally Jenkins and his Wakulla Springs team, among many others. Given the same circumstances, it is unlikely

Exley's Razor Continues...

that many of today's experienced cave divers would be able to (or want to) accomplish the same feats that were undertaken in the 1950's and 1960's.

Given the nature of cave diving limits, recreational cave divers should stay well away from where they feel their own limits might be to avoid the possibility of exceeding them. But how is one to know where those limits

lie? As mentioned previously, students and novices have the benefit of ready-made limits handed down by more advanced and capable practitioners

who have successfully gone through the learning process themselves. It should also be pointed out that the basic rules of accident analysis were derived from the observations of circumstances surrounding those who were not as successful. As the novice progresses, and experiences gained through time spent in the pursuit begin to add to his or her confidence and abilities, the task of redefining limits is encountered. How this is done is largely a personal matter, but it is likely that an honest appraisal of one's physical abilities and overall preparedness would allow most to define reasonable limits. Adherence to these standards, once drawn, is again a matter of personal integrity, and when to enlarge the scope of what one allows oneself to do is strictly subjective, for limits must be expanded as the diver grows. The immediate importance of achieving a

goal can lead to extending beyond where one feels comfortable or safe; this is what needs to be avoided.

Do limits need to be reviewed? Should the community address the subject of specifically recommended limits for novices versus "explorers"? One suggestion might be to have novices complete personal inventories during cave diving training detailing all they may have

We must realize that the best of recommendations are easily disregarded by the irresponsible, and that unfortunately the training of recovery divers will still be needed in the foreseeable future.

to lose if they were to die as a result of exceeding their limits. Spouse, children, other family, career, material possessions, the opportunity to make other dives, etc. would invariably crop up during this process and could help the introspective student realize the importance of adhering to known safe standards. Students and novices gaining experience should ask themselves honestly how they rate in terms of cave diving wisdom¹ and set their personal limits accordingly. The community might consider an attempt to further define limits for recreational versus exploration dives in terms of decompression times, number of cylinders, or any other arbitrary recommendations, but the ultimate responsibility for personal safety and comfort lies with the diver. Explorers have to set limits just as novices do, but they have more knowledge, time and experience under their belts, are generally capable of more efficient swimming, and have mastered more

advanced techniques. These are personal decisions with profound consequences. The nature of this type of decision is what should be provided through signs similar to the type used to warn untrained individuals of the general dangers of cave diving. The recommendations of any outside group, whether governmental, training agency, diving community, or more experi-

enced friends, will ultimately be just that: recommendations. We must realize that the best of recommendations are easily disregarded by the irresponsible, and that unfortunately the training of

recovery divers will still be needed in the foreseeable future.

Sheck Exley exemplified the ideal cave diver to many people. His experiences are well documented through his years of service to the NSS-CDS and to *Underwater Speleology*. His discoveries and successful ventures earned him the admiration of a diverse set of communities, from adventure seekers to scientific investigators. It is not ironic that his death can be looked upon as a source of information to be used to inform other cave divers, for this process is exactly the contribution that he made to the understanding of cave diving deaths. Exley's findings are not written in stone. They are subject to update. There is a blank space remaining under the fifth rule of accident analysis. ❖

References:

1. Milhollin, R.D. Cave Diving Wisdom. *The NACD Journal*, Vol.25, no.3 (Oct.1993)

Making the Connection

By Wayne Gamble, Computer Applications Coordinator

You walk into your house and press the playback button on your telephone answering machine. As you listen to the messages, you turn on your PC. While it is booting up, you head to the refrigerator for a cold one. Returning to the computer, you instruct it to dial up your e-mail service to download today's messages.

Sound familiar? For an increasing number of us, this is a ritual we perform daily. Electronic Mail (e-mail), once available to only a few corporate users, is now available to anyone with access to a telephone, a modem, and the most basic of computers. To an increasing number of divers, it is becoming one of the most popular and economical forms of communications.

A few years ago I needed to contact a diving equipment manufacturer in Germany. Imagine how I felt calling Germany at 4:30AM (remember the time difference) and getting an answering machine that made announcements in German, French, Italian, and something else (Klingon?), before rewarding me with the news that they were on holiday! Needless to say, I was thrilled to pay international rates to learn this. Several other attempts to call were also unsuccessful. What to do? A

cave diver living in Germany, whom I had met at one of the Fall Workshops, was a frequent visitor to the CompuServe Scuba Forum. I thought, "Perhaps he could make the calls for me?" After a few e-mails to him (at about \$0.25 each) and an electronic funds transfer to the company, my equipment was waiting at the Atlanta Airport (Thanks, Andy).

In addition to sending text, many services allow you to attach files to your messages. Programs, spreadsheets, even custom decompression tables ride the electronic highway every day. If you look at the NSS-CDS Board of Directors list at the

front of this issue, you will see an e-mail address next to the names. While one of the most popular among cave divers, CompuServe is only one of many commercial e-mail providers. Most are fairly simple to use, as long as you are trying to reach another subscriber on the same service. The fun begins when you try to mail to someone who uses another carrier. Sending from AT&T Mail to CompuServe, GENIE to Internet, X400 to MHS, etc. can be challenging at times for even the experienced user, if you can even find out the address of the person you wish to contact.

The next NSS-CDS Members

Manual will contain the e-mail addresses of members who wished them listed. In the future, *current members only* should send their addresses to Bruce Ryan, via "Snail" mail at the NSS-CDS PO Box, or via CompuServe at 71573,1073. You're not on CompuServe? No problem. Just check the cross reference chart [left] for your service and how to mail to/from CIS.

I have a more complete mailing guide showing to/from addressing for most of the major services, and will be happy to provide a copy to any member requesting one. I can be reached via CompuServe at 70461,1377. Please include your NSS number with your request. ❖

From CompuServe	
To Internet:	Internet:user@domain
To America Online:	Internet:username@aol.com
To Delphi:	Internet:userlogon@delphi.com
To Prodigy:	Internet:username@prodigy.com
To GENie:	Internet:userlogon@genie.gels.com
To CompuServe	
From America Online:	numericID@cis (use a period in place of comma in numericID. example: 70461.1377@cis)
From Delphi:	internet"numericID@compuserve.com"
From Prodigy:	You will need Prodigy's Mail Manager software. Go online, click JUMP and type Internet. numericID@compuserve.com (use a period in place of comma in numericID)
From Internet:	numericID@compuserve.com (use a period in place of comma in numericID)

The Reluctant

By Robert Laird

Ok. So, I'm a newbie. Don't listen to me. I've only had my full cave certification for two months, and have only been on three post-certification cave dives. I have a lot to learn, that's for sure. But the lessons I've learned so far have been good ones.

I have a perspective that maybe you've forgotten about. Maybe you've been down too long? Maybe you take too many chances? Well, maybe not. For me, my third dive introduced me to the wily ways of overconfidence, but not in the way you are probably thinking. No, this isn't a "near-tragic ending" story. This is about the thinking that goes into cave diving. Indeed, it is overwhelmingly clear that cave diving has more to do with

thinking than it does equipment, training or technique (pretty profound for a newbie, eh?). While corresponding with a fellow cave diver, Bob, he told me about another cave diver he knew, named Ike. It was clear from the way Bob talked that he not only liked Ike, but he felt Ike was a very good cave diver. Since I had not met Ike before, I filed that information away and nearly forgot about it.

Recently, I had reason to contact Ike over the phone. We talked at length about a particularly treacherous dive, one that he was about to make. The dive was to be deep with low-visibility, and there would be a lot of uncertainty about the location of particular landmarks. Obviously, it would be

quite advanced; the divers would probably be at least slightly "narked," and the stress levels would be higher than average. From the sound of his voice, it didn't take me long to arrive at the conclusion that Ike was reluctant to make this dive. It was in his voice and it was unmistakable. Or so I thought.

A day or so later, I happened to mention to Bob that I thought Ike seemed to be a bit reluctant. Bob was quite surprised at this deduction—especially since he knew I hadn't met Ike face-to-face. Bob assured me that I was "off-track" with that description, and recounted a tale which demonstrated, beyond a shadow of a doubt, that the opposite was quite the truth.

I suppose that someone could have as easily described me as reluctant when, in reality, I'm strictly being careful.

So I re-thought the whole conversation with Ike, and thought about the tone of voice and of the stories that Bob had told. I now think what I was picking up from him was "concern" over the seriousness of the dive. In my short career, I've been dealing mostly with cave divers who cover up that "concern" in their voices. So to hear it at all was a new experience. What is even more interesting is that I shared those concerns with him; I listened to each description and detail, and was

mentally nodding my head in agreement. I suppose that someone could have as easily described me as reluctant when, in reality, I'm strictly being careful.

For my third dive, there were five of us standing around talking about the dive plan. Two teams, three and two. We planned to go up the main line until thirds; no jumps. I was a bit astonished when the other four divers, all experienced, started agreeing that they were not going to run a line to connect the permanent guideline: "Yeah, I've been in there 20 or 30 times"; "Yep, it'd slow us down too much to run a line"; "That's okay with me. I've done it before"; "I don't have a problem with that, either." And

then they turned to look at me. Gulp.

Was this some sneaky initiation rite? Were they testing me? Or, worse, were they really serious? My mind was racing with doubt; not doubt about my training, but doubt about these guys. Could they *possibly* be serious? I'd been in the cavern zone of this particular cave before, and felt the

cavern zone was do-able without a line, *if* it were a bright sunny day. But the permanent guideline was way back from the cavern zone. And it was 11 o'clock at night. Nope, I thought to myself. There is *no way*.

They were waiting for me to say something: "I would not feel good about that. We need to run a line." It was easier than I thought! It came right out, and I didn't even sound embarrassed, and didn't stumble over a single word.

Cave Diver

And then, all my doubts disappeared. I looked at each of them, and no one was laughing or joking or pointing their macho finger at me. They simply looked around at each other and said, "Sure; OK. Let's go!" And that was it! What I thought was going to be an antagonistic moment had, in the blink of an eye, changed to sublime respect. Here, before me, was a group of *good* cave divers.

It was an interesting moment for me, being quite new to in-the-field, real-life cave diving. Interesting not only because I was witness to how casual many cave divers are about

some of the "inviolable" rules, but also interesting because my one vote won out over four others.

Now, I fully realize that the other divers knew the geography, and that any significant silting was very unlikely, so in this case violating an inviolable rule wasn't such a big deal. But, who knows? Maybe I'll get to that point one day, although somehow I kind of hope not. But I also felt *really good* about diving with the group when my one objection overruled all the other votes. I think that helped me enormously because I wasn't the least bit nervous. In fact, I had a blast and went farther in than ever before!

The point I'm trying to make is that I can see where someone in the group could have construed my vote to mean that I was a "reluctant cave diver." In a way they would've been right, in the same way I was right about Ike: reluctant, maybe; safe and concerned, most definitely.

I told Bob that I was retracting my description of Ike as a reluctant cave diver. Of course, Bob thought I did that because my estimation of Ike had been corrected. Well, it had been. But, I decided that I would keep the title of "Reluctant Cave Diver" for myself, and wear it as a badge of honor. ❖

Events Continue...

Indian Springs Workshop

The second joint NSS-CDS and NACD Instructor Workshop was held at Indian Springs February 18&19. The purpose of these types of workshops is to get instructors together for open discussions, to share ideas, to put faces with names and to give the instructors more information to convey to new students. At this workshop, the first group of Cavern Instructors upgraded to Intro to Cave Instructors. This rating has been reinstated and the name changed from Basic Cave Instructor. The new rating allows qualified instructors to teach both the Cavern and Intro to Cave programs. The new NSS-CDS Intro to Cave Instructors are: John Metcalf, Denny Willis, Al Pertner, Tyler Moon, and Kevin Questel.

Two heavily discussed topics at the workshop were Conservation and DPV's. On Conservation, Tom Morris led a discussion on cave usage and the damage in caves from increasing numbers of divers. It was agreed to limit the caves and areas of caves in

which zero visibility emergency procedure drills will be performed. Morris will also write a cave conservation brochure to be sent to every newly certified diver and also placed at popular sites for distribution. These actions should increase new diver awareness. We are still working on getting the message out to cave divers who have been trained in the past. Conservation seems to be a topic for wide discussion, but little action takes place. The instructors are going to take an active role in getting the word out.

DPV usage is increasing, and instructors fear some cave divers are not aware of all the ramifications of an emergency while on a DPV. Most of the cave wear today is from DPV's. This is obvious from major signs of traffic in cave areas accessible in the past only by multiple stage dives but within reach of any cave diver with a DPV today. The instructors will take an aggressive role in educating cave divers about techniques and usage of DPV's. ❖

*Submitted by Lamar Hires,
Training Chairman*

Remember Your Manners!

We had a problem recently at the Ginnie Springs Social, during which an exiting team waited at "The Lips" for not one but *three* teams to enter. Please remember that the exiting team *always* has the right of way over other teams in any system. ❖

Rescue-Recovery Seminar

The National Underwater Rescue Recovery Institute (NURRI) will be offering several seminars this summer. Underwater Search, Rescue and Recovery Diving, and Top-Tender Seminars will be held at Circleville Twin Quarries, Circleville, Ohio. The seminar is designed for Law Enforcement, EMT, Fire and Rescue Dive Personnel. Seminars are open to any openwater diver or persons desiring to be top-tenders. Topics include Sonar Use, Hypothermia, Rescues, Rigging and Lifting, and Search Techniques. Contact John Sanders, NURRI, 426 Ruth Avenue, Circleville OH 43113, (614) 474-7105. Seminar dates: May 26-28, June 23-25, July 28-30, August 25-27, September 22-24. ❖

Concerning DV-3X DPV's

by David W. Rhea

Saturday morning, August 16, 1994, I started what was assumed to be an average Saturday morning in the dive store business. At around 10:30AM, one of my employees retrieved me from the rental room where I was working. He informed me that a long-time friend and devoted consumer was out on the sales floor waiting to see me. I will refer to this person as Customer A from this point forward. He was here to exchange his DV-3X scooter for a similar one owned by another customer, Customer B. Customer B had brought in his DV-3X earlier in the week for this exchange. Customer B's scooter needed to have a blade replaced in order to make a fair exchange. After a few minutes of general discussion, I retrieved customer B's scooter from across the room and moved it up next to the front counter. I sat it upright on the floor just to my right side. As I proceeded to remove the new blade from its package, Customer A and my wife stood over the soon-to-be-repaired Customer B's scooter. It was at this time that Customer A took his right foot and gently depressed the right trigger mechanism to test that the machine did indeed function. The next thing I knew there was a deafening explosion. I turned toward the direction of the sound and instinctively yelled for my wife, who had disappeared down the hall. Upon realizing she was not injured, I turned my attention to Customer A. He was traveling across

the sales floor facing away from me, holding his head. I hollered for him, asking if he was all right, assuming he was holding his head because of the violent sound. Customer A turned toward me with a face full of blood and a gash running from just under his chin to just below his eye. We immediately grabbed some towels for his face and I rushed him to the hospital. I would like to say that I handled this in a cool, calm and collected manner, but indeed the only one calm was Customer A. Customer A gave me directions to the hospital while holding his face

in mind that none of the parties involved in this story knew of any individuals who had personally experienced this, and thus were not positive of the potential dangers.

I feel confident that many of you reading this article own or have owned one of these vehicles. This has been written not as a "horror story," but as a testimonial to the fact that these vehicles have the potential to do catastrophic damage. It was not until I was personally involved that I came to realize what devastating results they could produce. Since this happened, I have

been directed to communicate with others who have been exposed to similar explosions. Some of these explosions were far less destructive; some were far more severe. This article stands as a written

This has been written not as a "horror story," but as a testimonial to the fact that these vehicles have the potential to do catastrophic damage.

statement that these vehicles have a very dangerous potential to build up hydrogen gas. Even when charged, discharged and handled within the manufacturer's specifications, these scooters can still be of great risk.

together. I spent the next nine hours at the hospital, illustrating what had happened to the various yet extremely understanding family members who came to his need. Customer A spent over three hours in surgery, having his multiple-fractured jaw wired together and bone splinters carefully extracted from his lips and gums.

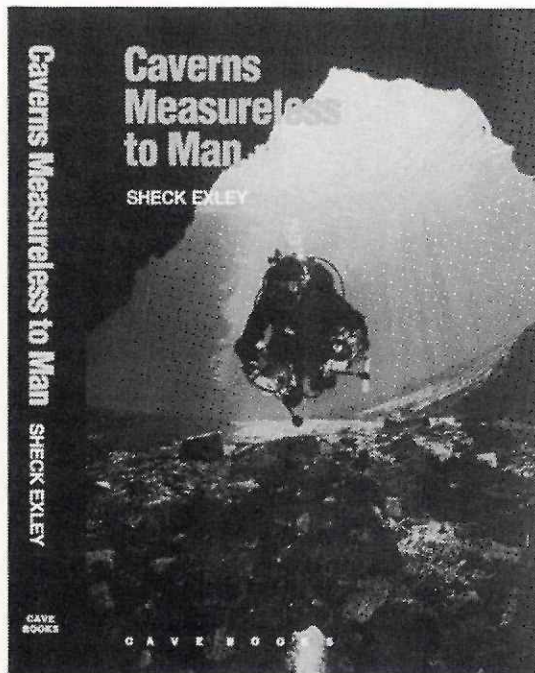
Customer A is doing well now and seems to be recovering just fine but, needless to say, he never wants anything to do with a DV-3X scooter again. Through all of this, we all felt that we were very fortunate that there was no-one killed or permanently disabled by this accident.

It took eight very uncomfortable weeks and approximately thirty pounds of weight loss before Customer A could again eat and drink normally. Through all this, he has never so much as once tried to put blame on anyone. Customer A was well-informed that these machines had the potential to do this, as was everyone who purchased these scooters from us. One must keep

in the future, if anyone asks you if you have ever heard of one of these vehicles blowing up, certainly tell them yes. The reason why these vehicles are no longer in production has become a reality. ❖

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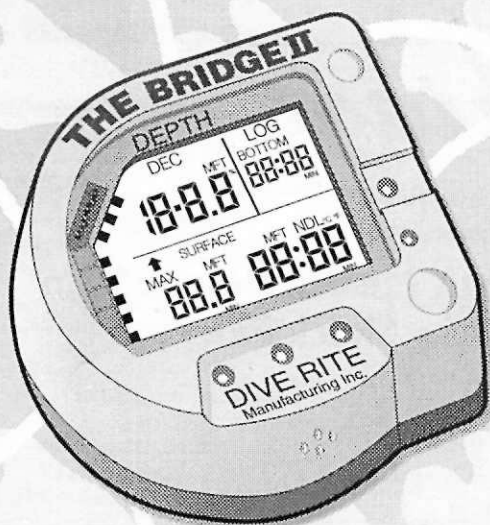
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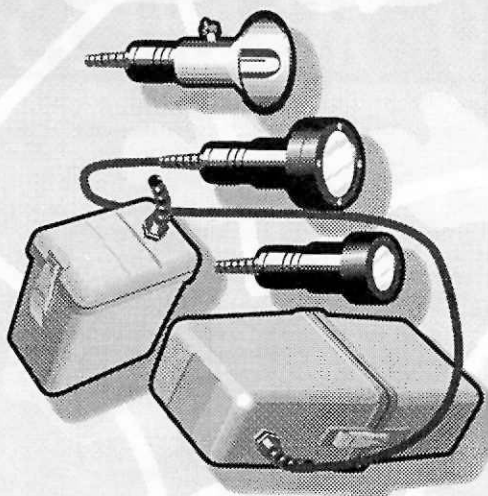
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