Looking up through the limestone entrance crevasse of Piccaninnie Ponds Cave in Australia

photo by Jeff Bozanic
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Magazine Submissions — We welcome all news items, articles, letters to the Editor, photos, slides, cartoons, and other items of interest or importance to the cave-diving community from all members, subscribers, and other interested parties. They should be sent directly to the Editor (see address on left column). We can also use text processed in most IBM-compatible and some Macintosh formats. (Please contact the Editor directly for details and arrangements.)

Advertising — The NSS-CDS Board of Directors has recently approved the reinstitution of paid commercial advertising for Underwater Speleology. Please contact the Advertising Manager for rate information and arrangements (see address on left column).

The NSS and Cave Diving — Founded in 1941, the National Speleological Society joins together thousands of individuals dedicated to the safe study, exploration, and conservation of caves. The first cave-diving information ever published in the United States was in a 1947 NSS Bulletin. In 1948, NSS divers were responsible for the first cave dives in the United States using scuba. Prior to 1973, cave diving within the NSS was on a purely local level. That year saw the creation of the NSS Cave Diving Section to provide a vehicle for information exchange. Today, with over 500 members, the Cave Diving Section promotes safe cave diving through semi-annual workshops; caver- and cave-diving training programs; warning-sign installations; search, rescue, and recovery through the National Cave Rescue Commission; cave exploration and mapping; several texts and publications on cave diving; and the bimonthly magazine, Underwater Speleology.

NSS Membership — The National Speleological Society welcomes the interest of anyone who has a sincere concern about the safe study, exploration, and conservation of caves, wet or dry. You may join the NSS either by writing directly to its main office (National Speleological Society, Inc., Cave Avenue, Huntsville, AL 35810) or to the Cave Diving Section. Annual membership is $25.00 and includes subscription to the NSS’s bimonthly magazine, Underwater Speleology, as well as voting privileges and discounts on publications and conventions.

CD5 Membership — As a sub-organization or "section" of the NSS, the Cave Diving Section is subject to the bylaws and ethics of the NSS. Membership in the Cave Diving Section is open to anyone who is a member in good standing of the NSS. Annual membership is $5.00 per year and includes subscription to the CDS’s bimonthly magazine, Underwater Speleology, as well as voting privileges and discounts on publications and workshops.

Subscription — If you do not wish to join the NSS and CDS, but would like to keep current on cave-diving events, exploration, and technology, you are invited to subscribe to Underwater Speleology for $15.00 per year.
"LOOKING TO THE FUTURE"
NSS-CDS Winter Workshop Takes Shape

The NSS Cave Diving Section will be holding its Winter Workshop, entitled “Looking to the Future,” at the High School in Branford, Florida Dec. 29-30, 1990. Cave divers, open-water divers, and non-divers alike are cordially invited to attend and find out what the future holds in store for cave diving. Registration begins at 8 a.m. with coffee and doughnuts, and the Morning Program begins at 9 a.m.

Emphasis will be divided between advances in exploration and equipment techniques, and conservation and land-access concerns. Sump diver Jim Brown of Worcester, Pennsylvania, will be presenting “The Wakulla Project Mark II-R Second Generation Mixed-Gas Rebreather” designed and manufactured by Dr. Bill Stone, who led the Wakulla Springs Project in 1987.

Noted Cave Diver and Biologist Tom Morris of Gainesville, Florida will be speaking on the vital importance of “ Conservation and Landowner Relations,” and Park Ranger Joe McGrath will talk about “Cavern and Cave Diving at Peacock Springs State Park.”

A special presentation on the dramatic “Exploration of Scott Hollow” will be made by renowned dry-cave surveyor, photographer, sump diver and cave-equipment manufacturer Ron Simmons of Charlottesville, Virginia. (Ron is the Simmons of the famous “Simmons Roller” for rope walking.) With more than a month and a half remaining before the Workshop, we expect commitments from other current exploration projects to fall into place.

After you have enjoyed a delicious Bar-B-Que Lunch Buffet catered by the Suwannee River Cove Restaurant, included with the registration fee, afternoon Mini-Workshops will begin. Among the workshops that have been confirmed at this point are “The Use of Mixed Gas in Cave Diving,” by the man who literally “wrote the book” on cave diving—premier underwater cave explorer Sheek Exley, who has set the mixed-gas cave depth record for the western hemisphere. Cave Diving Instructor Kelly Brady will give a fascinating “Cartography Techniques Workshop,” and anesthesia instructor, gas expert, mathematician, and computer whiz John Crea will discuss “What’s New in Decompression.”

The Saturday Evening Film Festival is slated to feature Jamie Hempstead’s Multimedia Cave-Diving Slide Extravaganza (which utilizes an uncountable number of slide projectors!), Ron Simmons on the U.S. Deep Caving Team’s Sump Exploration of Huatla, new videos by master underwater cave photographer and explorer Wes Skiles, and other surprises in the works.

On Sunday there will be several activities of interest. NSS-CDS Training Coordinator Harry Averill will explain step by step the process and requirements for “Becoming an NSS-CDS Cavern Instructor.” Later in the evening there will be an NSS-CDS Instructor Meeting, to which everyone—instructors, divers, and other interested parties—is not only invited, but encouraged to come.

Also on Sunday, Cave Diving Instructor Dale Fox of Fairfax, Virginia will give a “Tank Inspection Course; NSS-CDS Chairman, Instructor, and ICDSA recipient (completion of 1000+ cave dives) Mark Leonard will give a course on “Nitrox Diving”; and there will be a Rescue/Recovery Workshop. (Additional fees will be charged for the materials associated with these three activities.)

Pre-registration is $12 for NSS-CDS Members and $14 for nonmembers. Registration will be $16 for everyone at the door.

For more information contact the Workshop Chairman Jim Gabriel: (home) 904-454-8571, (work) 904-454-3556.

JOINT BOARD MEETING
BETWEEN NSS-CDS AND NACD

The Boards of Directors of the NSS Cave Diving Section and the National Association for Cave Diving (NACD) met together officially for the first time in recorded history in an open meeting held October 27, 1990 at the Suwannee River Cove Restaurant in Branford, Florida.

In attendance were more than 40 members, instructors, media representatives, and other individuals and business people with a vital concern for cave-diving safety.

The primary focus of the meeting was the potential negative impact of an article published in the November issue of Skin Diver which advocated an approach to cavern diving considered dangerous by not only the NSS-CDS and NACD, but the major scuba training organizations, PADI, NAUI, and YMCA, which have developed cavern and/or cave training programs along the guidelines established by the NSS-CDS and NACD.

The meeting was jointly chaired by Frank Howard, Vice Chairman of the NSS-CDS, and Dayton Saltsman, President of the NACD, and was a model of cooperation and common purpose. Several excellent suggestions of joint NSS-CDS/NACD media packages, prepared articles, and general press information, as well as specific responses targeted to Skin Diver readers, were proposed.
DEATHS IN MEXICO AND FLORIDA

At press time preliminary reports of three drowning incidents had been received. One was a fairly open-and-shut case in mid October involving a solo open-water diver who became lost in a tiny, silty cave called Devil’s Den, near Williston, Florida. The body recovery was performed by Rescue/Recovery Team Members Kelly Brady, Steve Berman, Ed Paradisio, Mark Leonard and Lamar Hires, and required side mounts.

The second incident occurred Oct. 17 in Cenote Sac Actun near Tulum in the Yucatan in Mexico. According to information received, eight certified cave divers, divided into two teams of four, entered a main entrance, intending to make a roundtrip traverse, involving a 70' gap, to another entrance, the Grand Cenote. The traverse to Grand Cenote proceeded without incident and the return trip went well up to the point where the second team was to reel in the gap line.

The first team proceeded back to the entry point with the second team at the gap with reel in hand. When the second team failed to appear at a third entrance after a second planned traverse, the leader of the first team, Steve Gerrard, became concerned and began to search for them, retracing the traverse to and from Grant Cenote. He did not have enough air to search in the other direction, so returned to the third entrance to collect the rest of the first team.

For reasons which are not clear at this time, the second team had reattached the gap reel and gone in the opposite direction down the main line. They apparently wound up on a gap offshoot of the main line and it was apparently not until they reached a line marker some distance in on this jump-tunnel line that they realized that they were not where they had thought.

Retreat was complicated by sitting, anxiety due to being low on air, and the fact that one of the divers was carrying a video camera. The four divers apparently became split up into two teams at this point. The first two divers ended up sharing air and ran out of air at the entrance of the cave, but managed to make successful free ascents to the surface.

The third incident occurred only hours before press time. Nothing more is known other than that a certified cave diver familiar with the system died while solo diving in Olsen Sink Nov. 4. More complete reports and analyses will be published when more information is made available.

Message from the New Editor

Dear NSS-CDS members, UWS Subscribers and Contributors,

I have been appointed as Editor of Underwater Speleology effective as of this issue. I want to begin by thanking those of you who have taken the time and effort to write something of interest or importance to other members and subscribers, and to send it in for consideration for publication in Underwater Speleology. It is the wealth of selfless and sincere contributions by cave divers and non-divers alike that has made this publication what it is today.

Letters have gone out to all contributors to apprise them of my intentions regarding submissions which were forwarded to me by our past Editor, Harry Averill. Harry has agreed to accept the very important and challenging post of NSS-CDS Training Coordinator, a very demanding and time-consuming position for which he is uniquely qualified. Naturally, it is impossible for him to carry the double load of being both the Training Coordinator and UWS Editor.

However, despite the time pressures of his new office, Harry has graciously offered to continue to make his expertise and experience in the field of professional publishing available to UWS by serving in the capacity of Advertising Manager. So, if you have any professional advertising needs regarding UWS (aside from the sale/purchase of personal gear, buddy ads, etc., which will still be handled completely free of charge and should be sent directly to me, the Editor) you will want to contact Harry directly for rates, specifications, and publication and contractual arrangements. His address, phone, and fax information appear on the inside cover.

All articles, news items, photos, Letters to the Editor, cartoons, personal gear ads, etc. should be sent directly to me. We can process teed files from most IBM programs and some Macintosh, so feel free to give me a call if you have questions. (And please note my new address.) I look forward to hearing from you.

Sincerely,

H. V. Grey

CALL FOR NOMINATIONS

As per NSS-CDS Bylaws, Chairman Mark Leonard has issued an official call for nominations for the election of three Board Members to serve two-year terms beginning Jan. 1, 1991. Both nominators and nominees must be current, dues-paid members of both the NSS and the NSS-CDS.

You may nominate yourself, provided you meet these criteria. All relevant memberships will be verified before the nomination is accepted, and all non-self-nominating candidates will be given the opportunity to decline the nomination if they so desire.

We're a little late this year getting the announcement out, so send, or better still, call in nominations as quickly as possible directly to Secretary/Treasurer Lee Ann Hires: P.O. Box 3308, Lake City, FL 32056, (904) 755-5913. Candidates may submit written platform statements for inclusion with the ballot if they wish.
ADVENTURES IN WARNING SIGN INSTALLATION

by John Reekie (NSS #28002)

On June 9, 1990 some fellow divers and I set about to install an NSS-CDS warning sign at the O'Brian Mine in the Canadian province of Quebec. This dive site is known by the locals as the Back Mine and is about a 5½-hour drive for us each way.

This dive site was an open-pit feldspar mine that was actually hollowed out of a mountain. I am told that one day about 10 years ago the pumps failed and the mine was abandoned, leaving behind a huge underground lake with a few holes to the surface to allow light in. This site has become a popular spot for local instructors to do student checkouts.

I was introduced to this site one year ago while doing an equipment demonstration. The locals dive the top 100' of water, with visibility that ranges from 20' to 100'. After an almost disastrous first start I went back in with full cave gear. Following the underwater road to a depth of 100', I came to a drop-off and also a silt barrier that reduced visibility to zero. Sinking down slowly I came bursting out of this barrier at 130'.

I could not believe my eyes, for in front of me was this tunnel with air-clear water of the type found in Florida caves. I went about 300' along this tunnel when I came to a room that had Little Dismal proportions, with bright white walls that bounced my light right back at me. I thought that I had died and gone to heaven except for the fact that the 39' water brought me back to reality. What a great place to scooter dive, I thought; so I would come back later and install a permanent line. My permanent line starts in 60' and ends about 900' later at a depth of 171' in the back of this large room.

I decided to install a warning sign after some instructors told me that they instruct their students not to follow any lines that they may happen across. Without cave training, divers would not likely return once they had passed the silt barrier.

I had obtained an NSS-CDS sign from Mark Leonard this past winter and got the team members involved up here in making up a stand and base. Stan Drdla welded together a 2" x 2" aluminum H frame and provided aluminum fasteners. Fred Brown made a base out of 1½ ft³ of 3000psi concrete containing apoxy-coated rebar. This base was about 180 lbs. I obtained a pillow lift bag so we could transport the sign to the far reaches of the mine.

The dive plan was for me to tow the sign with my scooter back to the start.
of the large reel and it floated away without him knowing it. Just then my drysuit started to fill up with cold water and I was already looking at a first decompression stop of 50'.

Now this dive was becoming a great concern to me. Looking forward to 2½ hours of decompression with a suit full of 39° water was not the least appealing. We made a hasty exit, leaving behind everything. The thinsulate woolies I was using are the only reason that I was able to survive.

After surfacing I learned that my marker buoy had not reached the surface, and the exhaust valve on the lift bag was not in the right location. The other members had managed to install the sign on a ledge at 110' about 40' into the overhead. In doing so they lost the float bag and could not recover the marker buoy.

Well, the sign was in and now all we had to do was recover the equipment. The next day Terry and Kim went down to get the scooter but had to abort the mission after the scooter, seeming to have a mind of its own, broke the line and took off up the tunnel on its own. And as if that weren't enough, Kim lost a stage bottle on the return trip. We were all out of air, time, and drysuits that didn't leak for this week.

I could not wait to get back there, considering the investments that we had left inside. The next week I went back with a borrowed drysuit and a single tank. With Vince Bell's help we managed to recover the float bag and
Getting the oxygen cylinders ready.  
Photo by Vince Bell.

marker buoy. The next day Kim and I went in to get the scooter, finding the stage bottle laying on the floor in 50' of water. I took side-mounted 95's and went down for the scooter.

Kim was supposed to reel up all the slack line so I wouldn't have to worry about it. After arriving at 145' I waited in vain for Kim to show up with the reel, but he didn't show. Conditions had not improved from the previous week. After decompression I learned that Kim had been only a few feet away from me, but in the zero viz we could not see each other. Also, Kim had a pony bottle filled with argon to inflate his drysuit, but the bottle had somehow also got half-filled with water. So every time he hit the inflator button he would receive a blast of cold water. He had a very cold decompression.

The next day Kim, Terry and I went in for the scooter. Terry and Kim were again supposed to reel up the old broken line, but signals got confused so they ended back at the sign waiting for me. I found the scooter back in the tunnel in 150' of water. It was still attached to the old broken line. On reaching it I turned the prop to #1 and dipped the tow rope to me. I was not leaving without it. I had to cut the scooter out, making sure that I had the lines leading out in one hand. I started to moose my way out of the tunnel, but the line was becoming like spaghetti, and I had to stop and cut myself free about very 6' or so. When we finally reached the sign, Kim reached over and cut the last piece of line away from me.

After all that we decided to take a few weeks off before we returned to finish laying the new line and clean up the rest of the loose line. Hopefully, the viz will get back to normal and we will get our great dive site back.

• • •

Episode Two:  
Four Divers and a Drill...

On August 4, 1990, Terry German, Stan Drdla, Fred Brown and I drove for 4½ hours to install two NSS-CDS warning signs in the Ottawa River Cave System located in the provinces of Ontario and Quebec. This cave has many entrances and we decided to install the signs at the easiest access points after seeing open-water divers at these location. The sign locations are marked on the map by stars.

This cave has about 4km of known passage with many leads remaining unexplored. The diving activities at this site are limited to August and early fall because of high river levels that exist for most of the year. The visibility ranges from 0' to 7' at best. Depths range from 0' to 30'.

Terry predrilled the first sign, and I
towed it and the extra air tank for the drill out to the river entrance. Dropping the scooter, we took the sign back about 60' from the entrance where we mounted it on a large flat piece of breakdown. After drilling into the limestone, we hammered Rawls into the sign and rock.

The job was a lot harder to complete than I had anticipated. I had to put my feet against the ceiling in order to make any impact with the drill. All the air from four divers and the drill knocked a large piece of breakdown on top of Stan. After a few tense moments we managed to get the job done. That night Stan sharpened the drill bit and the next day Fred went back out to add more fasteners to the sign.

While Fred was busy with that task, Terry and I went about the task of installing the new gold line in the passage that I had found a couple of years previous. After laying just over 2000' of new line we came to the end of the exploration line, and, still having air reserves remaining, decided to push on. After only 200' we came to a resurgence, and tying off the line, we headed up.

I still had the line in my hand, not knowing what to expect, but Terry, in his excitement, forgot protocol and got off the line. We surfaced in the river beside an island that is in the next province. The current got very strong, washing Terry away to the next island, but I was able to make it back to the cave and lay line across the river bottom over to the island.

After surfacing I was able to flag down a small fishing boat—much to their dismay—and get them to retrieve Terry. At that point Stan showed up, offering us an apple that he had taken through the cave with him. Then he proceeded to get washed away in the current also. With Stan a mere dot in the distance, Terry and I decided to head back, since we could do nothing for Stan at this point.

When we got back to the entrance about 100 minutes later, Stan was there waiting for us; he, too, had gotten rescued by fishermen. After dragging ourselves back to Pool One, I took the second sign that we had mounted on a patio slab the night before, and placed it in the middle of the tunnel about 60' back. We had fastened a large boat clip into the slab and attached this to the line that runs through this part of the cave. And so ended another exciting weekend in this sewer we call the Ottawa River Cave System.

At the present time the passage that the gold line was laid in is the longest continuous underwater cave passage in Canada. It is also the first underwater cave to cross provincial boundaries.

[Our thanks to John and his team for their hard, cold work on behalf of safety.]

Next Issue: Find out more about this impressive cave in “Canada’s Longest Cave - Ottawa River Cave,” by David Sawatzky, M.D.]

COVER ART ON 17:4

Credit for the outstanding cavediving art on the cover of the last issue (Vol. 17, No. 4) was accidentally omitted. Members and subscribers who have been with us for several years probably recognized the distinctive style of sump diver and dry caver Joanna Florio-Jefferys of Torrington, Connecticut, whose artistry has netted the CDS two awards for newsletter covers in the last two annual NSS Graphic Arts Salon. We look forward to featuring more of Joanna’s artwork on future covers. 

RENEWALS

Membership renewals and ballots will be mailed shortly. Please respond promptly and note any mailing address changes. Instructors should receive important renewal information from Training and should respond without delay to keep current.
In 1979, Dr. John Zumrick (NSS #18788 Fellow) published an article ('Knotted Line, a New Cartographic Tool," LIWS Vol. 6, No. 1, Feb. 1979) describing the use of line-knotted every 10' for the surveying of underwater caves. Since that time I have discovered a number of enhancements to this measuring technique. Double knots (one tied on top of the other) are much bigger and easier to see and feel than single knots. I also started using small loops at 100' intervals. Later I added plastic arrows, marked with numbers indicating the distance out in feet, first at 200’ and 500’ intervals (Madison blue deep tunnel, 1982; Charles Spring, 1984), then at 100’ intervals (Devil's Eye, 1988 to present; Manatee, 1989; Charles, Lafayette Blue, 1990), and even at 50’ intervals.

The first advantage of labeling the line in such a manner is that it gives every point in the cave an address. By checking the numbers on the markers, divers can communicate precisely and unambiguously exactly where any point in the cave is. This is useful for describing where stage bottles are placed, locations of side tunnels or special features, or sections to be surveyed, resurveyed or detailed. The addressing system can be used to measure the differences in lengths of different routes. (Is one shorter? If so, by how much?)

The list of uses is still growing. With such a system in place, it is no longer necessary to speak in terms of rock formations or tunnel characteristics in order to pinpoint a location. If you know the line address of a point and your current position on the line, then you need not wonder how much further you have to go or if you might have inadvertently passed the point of interest.

Can it be that there are any cave divers who have never wondered what their penetration distance was? In his article, Dr. Zumrick said, "By counting knots, the diver can arrive at penetration distances. Subsequently, he can calculate his swimming efficiency and speed..." In my experience, counting knots requires quite a bit of attention, and it is rather difficult to combine this task with almost any other. It also slows me down.

Line labels provide a convenient means for measuring total penetration, and when you have a long swim out, it can be comforting to be able to quantitatively monitor your progress. Speed of swimming or scootering can be measured by noting the time and penetration when passing labeled markers. (For example, if you go from the "300'" arrow to the "2000'" arrow in 20 minutes, your average speed is slightly under 100' per minute. A slate mounted on the scooter is handy for taking such notes—but be careful to mount it so that the pencil is not drawn through the prop!)

Can it be that there is any cave diver who has ever surveyed and never lost track of the count? If the locations of such markers are included in survey notes, then, when the notes are plotted, one has another check on survey data: Do the runs between markers (plus wraps) add up to the inter-marker spacing? If they do not, or if any part of the survey is in question, the markers can be used as reference points so that only a short section of line need be resurveyed instead of doing the whole tunnel over. With markers every 50' it may be simpler, when surveying, to record addresses of bends in the line rather than distances between bends (lengths of wraps would also have to be noted).

One problem with setting up such a system was the effort required to carefully count knots between 100' points on established lines. It was easy to lose count, especially when deep or swimming slowly. Errors were not uncommon, and counts would have to be checked. Errors usually required separate dives for detection/suspicion, confirmation, correction, rechecking, etc. I found the deeper I tried to do this, the more difficult it was to count.

Having loops at 100' points on the line before it was laid out, helps but was less than optimal if the loops were not aligned on 100' boundaries. It was still necessary to count knots in order to avoid making 100' errors in marker placement. It is important, if you are going to mark a line in this a manner, to get the numbers right. If they are wrong, then when the error is detected and corrected, it is likely to cause confusion. One will then have to distinguish between data taken before the correction and after the correction, and correlate pre-correction and post-correction addresses.

For a while I resorted to laying my own pre-marked line along side the established permanent line in order to measure off 100' runs and then winding my own line back up. But if one is to go to this much trouble, why not replace the permanent line while you're at it?

Larry Green and I were discussing the problem of all this labor required for such a seemingly simple operation when Larry remarked that it would certainly be nice if we could put the arrows on the line before laying it. (WHAT A BRILLIANT IDEA!)

Does anyone remember Dorf markers? Dorf markers were arrows made by folding a wedge of duct tape over the line to form a tape arrow.* Since the advent of plastic arrows, in 1979, tape arrows have almost been forgotten, although a few may still be seen in some caves in Florida and the Bahamas (e.g., the Mount offshoot from main line in Madison Blue).

-- Lewis Holtzendorf--

* Lewis Holtzendorf is credited with the invention of the tape arrow which later became known as a "dorf marker." I never knew him, but according to Sheck Exley, Lewis was a prominent and well-liked cave diver, who was most active in cave diving in the early 70's, was once vice president of the NACD, was a founding member of the NSS/CDS, and was on the first 3000' penetration (Devil's Eye) and the first 4000' penetration (Manatee). Contrary to what you may have read or heard, Lewis Holtzendorf never changed his name to Henkel. Lewis Henkel was a different person (formerly Lewis Solenberger). As far as I can determine, neither of the Lewis's had anything to do with the development of plastic line arrows. Plastic line arrows first appeared following a suggestion I made to Forrest Wilson during a forum he lead concerning directional markers at the 1978 Christmas NSS/CDS Workshop.
Tape arrows can be made to roll up on and come off of a reel very nicely. Plastic arrows can also be wound up on the reel if they don't have to pass through a line guide and the winding radius is not small. One can also write on them (tape or plastic) with indelible pen. In such a manner, one can pre-label a line topside, taking all the time in the world to make sure the intervals are correct, before laying the line.

Now, when the pre-labeled line is laid, if the line has been properly prepared, all the arrows automatically come out in the right places at the right intervals—all on one dive!! There is no need to check, recheck, suspect, confirm, change, recheck, etc. Pre-labeling a line does require more preparatory time before the dive, but it saves a lot of dives in getting the marked line system in place and correct. I have found the tape arrows difficult to read from a distance, and have therefore made a habit of supplementing them with marked plastic arrows after the line is laid—sometimes on the way out on the same dive.

When I first began this sort of work there was only one known way out on the lines which I was marking. When I did it in Manatee and Devil's Eye I had two new situations. In Manatee I had more than one exit to choose from. In Devil's Eye I had multiple possible exit paths. In some places in Manatee, where the shortest route out required going upstream, it might be easier and faster to go to the downstream exit.

Exactly where this "halfway" point is will also vary with the current. Manatee also has one exit which the Park rangers prefer you not use (Sue Sink). In Devil's Eye, there are many places where the main or continuous lines do not follow the shortest routes out. They instead follow the main tunnels. The shortest routes out often require one or more jumps.

Which way should I point the arrows? Obviously, they should all point out, and as far as I know they all still do point out, but sometimes there is more than one way out. In such a case, which way should the arrow point? What I decided to do was keep the numbering system indicating the distance to the main entrance (Manatee Spring or Devil's Ear entrance in these cases), following the path indicated by the line the arrow is on, and point the arrows in what I felt would be the quickest, easiest, and simplest route out for a diver critical on air and not familiar with shortcuts which require jumps.

This system includes Sue Sink as a possible exit, but again, the Park prefers that you not enter or exit at that location. Hence, the numbers do not necessarily indicate the shortest distance out, or the distance out in the indicated direction, but rather the distance from some starting reference point if one follows the path indicated by the line the arrow is on. For example, in Manatee, the arrow marked "700" is at a penetration of 700' from the Spring. It is only about 200' upstream from Catfish Hotel sink, which in turn is about 400-500' from the Spring. "700" points downstream, toward Catfish. "1900" points upstream, toward Friedman Sink, which is about 1925' from the Spring. If the numbers had instead indicated the distance out, there would be a lot of points in Manatee with the same address of "200."

An example of the multiple-exit path dilemma is at the "bat" in Devil's Eye. At this point a tunnel called the "Roller Coaster" (RC) connects with the "Hill 400" (H400) or "Hillier Tunnel." A toy bat is (was?) also hung on the H400 line at that point. If one reaches this point by following the H400 line, the penetration is about 1420' and requires one jump off the Main Line. If one comes by the Roller Coaster line, the penetration is about 1120', and requires three jumps from the main line. From this point, exit by the RC route is certainly shorter (100 yards), and probably faster if swimming. Does this mean that the "1400" and "1300" arrows on the H400 line should be turned around to point toward this intersection so that they will point the shortest way out?

I decided not to because the RC exit was smaller and muddier and required more jumps than just following the H400 tunnel out. Though it was shorter, it certainly was not the simplest route. It may not even be faster on a scooter. If a diver was not familiar with the RC route, attempting to do it "by the arrows" might cause more trouble than it was worth, and might be fatal if he was out of light. It also would not make sense for arrows on the same line (H400) to point toward each other if there was not some connection between them tying that line to the indicated exit route.

I am generally not an advocate of changing line arrangements which have been any given way for many years. This causes confusion, too—even though sometimes the new way may make more sense. I have no idea what the lines and arrows in that area are like now. The prepared cave diver will, of course, always be prepared for anything.*

Another example of the multiple-exit dilemma is in one of the Lunaville springs. About 1000' or so in from the main entrance is a connection with a sink. Exit by this route is only about 100' from the main line. While this is by far the shortest route, it is not the best for most because 1) it has a restriction which is only about 15" in diameter (definitely a tanks-off restriction and still may not pass double 100's), and 2) the surface is often choked with debris (sticks and branches) such that one might have to dig oneself out. (You can drown just as effectively only 1' deep and within daylight as 60' deep in a cave!) It is probably better not to point arrows this way. Any who are able to come out by this route probably came in that way too and therefore would already know about it anyway.

Lafayette Blue presents an extreme example of the multiple-exit problem. While we point the arrows toward the nearest open water, many of these sinks are not desirable entrances or exits due to the climbing required. Unless one monitors the numbers written on the markers, it may become unclear which way is toward the desired exit. So far, all numbers descend toward the Spring, and the current, though slight, usually flows that way.

Disadvantages with using pre-labeled line are primarily related to the

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*The 100' arrows in Devil's Eye may not be on knot boundaries for several reasons: 1) Sometimes the line they are on contains splices which were not aligned on 10' knots or the line itself did not start on a 10'-knot boundary; 2) Some intervals were measured using a separate line which probably followed a different path and had a knot spacing which was not exactly the same as the permanent line; and 3) sometimes a jump was involved, in which case measuring line was always started from a numbered-arrow (100') boundary on the parent line, and this often did not align with knots on the branch line because of (1) and/or (2) above.
time required to prepare the line. Since the first arrow to go on the spool is the last one to come off, you need to know how much of that line the spool will hold before you load it. This can require a bit of loading and unloading when using an unfamiliar spool or line. It helps to have a spare spool of the same size and some sort of power winding apparatus.

The work is simplified if all sections of line spooled or laid start and end on 100' boundaries. This may seem like a lot to ask when there are still many cave divers who don’t even knot their line, but for the working diver all this effort is minuscule when compared to the effort and expense of several dives spent counting, checking counts, suspecting errors, confirming errors, modifying, recounting, rechecking, etc., or redoing someone else’s work.

Another possible problem might be associated with making sure arrows are put on pointing the right way. Duct tape arrows are virtually impossible to take off and turn around. If you prepare and lay line with all the arrows pointing the same way, and then discover another entrance, some of the arrows on the line you’ve just laid may now be pointing the wrong way.

Another hazard concerns loops in the tunnel. If you go around a large room or column or any circuit, then the arrows may end up pointing round the circuit, and again, some of the arrows would be pointing the wrong way. It is also possible for a single arrow within a wrap to end up pointing the wrong way. One way to avoid this problem is to pre-label the line with non-directional tape markers which may later be trimmed with scissors to point the best way out after the line is in place (and don’t make wraps with arrows in them).

A third problem concerns wraps. Wraps introduce errors into the measuring system and therefore are to be avoided in the measuring line. If measuring line is pre-labeled and left in place as permanent line then this means that the permanent line would have no wraps—or at least they should be very small. Wraps are good for limiting the amount of line which will go slack if the line breaks.

One way we could avoid introducing errors with wraps and still secure our line would be to tag the line every 51' or 102' and make 2' worth of wraps every 100'. This would make many labels not fall on 10' knots. Another way would be to make no wraps and then tie the line to wrap points with separate short lengths of line. Before we get too wrapped up in accuracy, though, it should be recognized that a line’s length can vary by as much as 10% due to shrinkage and tension.

Addendum: Since writing this article it has been brought to my attention that many regard survey lines and permanent lines as “different animals.” I must confess this came as somewhat of a surprise to me. In my experience, we (myself and my diving acquaintances) have always simply surveyed the permanent line, and laid new line only if the original line was unknotted, and then removed any unknotted line, effectively replacing it with new knotted permanent line. This makes the job one step easier for the next person willing to take data. Clearly, the best path for a survey line is as straight as possible with as few as possible bends. Often this may be down the middle of a zigzagging tunnel—not always the best place for a permanent line; however, after the survey has been done, the line can often be hooked on things (or weighted) to make it follow a more desirable permanent-line path.

About the Author: Roger Werner began cave diving in 1978. Since that time he has logged over 1000 hours of bottom time and decompression from cave dives exclusive of training dives. Most of his dives are working dives. His most concentrated efforts have been in Peacock, Madison Blue, and Devil’s Eye. When he is not diving, much of his spare time is spent making cave-diving equipment and trying out new ideas or writing. Roger has been a regular contributor of technical articles to Underwater Speleology (several of which have been featured in the NSS Student Cave Diver Workbook) and has given several lectures on cave-diving equipment and surveying techniques at both NSS-CDS and NACD workshops. For the past two years he has been coordinating the volunteer cave-diving team assisting the Florida Sinkhole Research Institute with flow and dye studies. The ideas and views expressed in this article are his own and not necessarily those of the NSS Cave Diving Section. The article is published in the spirit of sharing of ideas and is not to be construed as an endorsement by the NSS-CDS.
THE SAFETY LINE

by Wendy Short (NSS #30802). Safety Coordinator South

There are more cave divers now than there were ten, or even five years ago. Most of them can be found at the same dozen popular sites on the weekend, thus making these sites more congested than they used to be.

Most divers are out there for one of two reasons: recreation (fun) or training. CONSIDERATION has to be the operative word of the future so everyone can have the most enjoyable, safest dive possible.

Then why is it that some people deliberately trash an entire popular cave system on a weekend, not just once, but numerous times? You wonder, how can anyone’s technique be so bad as to silt a thousand feet (or more) of passage? Scooters are usually implicated in these incidents, giving scooters a bad image, when it is usually the operator who is to blame.

Inconsideration of others who may have travelled for hours, or days, to dive these systems is only the beginning. Compromising everyone else’s safety is the major infraction, and there is no excuse for that. Most cave divers are not prepared to deal with a siltout condition for hundreds or thousands of feet because the standard lights-out line drill used in training traverses only about 200’.

Limited or no visibility has not been a direct cause in most cave-diving accidents, yet it has been a contributing factor. A siltout alone is enough to deal with, but additional complications always seem to be present, such as negotiating tight restrictions. It is possible for divers using remote parts of the system to get totally silted out by others and then unexpectedly be in no visibility during their entire exit. This certainly does not make for an enjoyable or safe dive.

Each of us is responsible for the condition we leave the cave in, whether we use scooters or not. If you deliberately trash the tunnel, then YOU become responsible for others’ safety and enjoyment. So what do you do if you have to make that dive at the expense of visibility? If you must silt out a popular cave—chose an unpopular time to do it.

CAVE DIVING "DOWN UNDER"

by Jeffrey Bozanic (NSS #22532)

We finally sighted land. A few hours later I stepped off the U.S. Coast Guard icebreaker, Polar Star, upon which I had spent the last 12 days. I was glad to have solid land under my feet again, instead of the pitching boat deck which had been rolling up to 53° at a time for days! I was also glad to be stepping ashore in Adelaide, Australia, where I hoped to spend several days cave diving before continuing on to New Zealand, and eventually the United States.

The first thing I did was call Chris Brown, whom I had met when he was visiting Florida several years ago. He in turn started the process to get me the required permits so that I would be able to dive. Fortunately, I had started the application proceedings several years ago, and the appropriate individuals still had the materials I had sent them at that time. So within a few days, I was off to Mr. Gambier to “see the sights.”

The drive from Adelaide was about five hours, in a general south-southeast direction. Along the way, I, of course, stopped and took the obligatory photographs with me standing by one of the “Kangaroo — Next 15 Kilometers” road signs. On the drive down we saw a fox, a possum, and several hares and rabbits. But no kangaroos. The ‘roos are supposed to be all over the roads here, and quite troublesome (especially if you hit one), but we saw not one—not even a dead one. (We did see several on the drive back.) Yes, I really was in the land down under.

Arriving at Mt. Gambier at 1:00 a.m., we knocked on the door of Ian Lewis, the current CDAA National Testing Officer. I had met Ian in 1981 when he visited the U.S. Ian has a room behind his house in which he puts up visiting cave divers. We sat up and talked for several hours, in an atmosphere very reminiscent of the “Skiles Hotel” in Branford. Cave divers seem to be the same the world over!

Since Chris was teaching a class, my first few dives were with Sonia Tucun. Sonia had the pleasure of introducing me to several of their common training sites. During successive days I dove with Chris, Peter Home (past CDAA president), Peter Stace (coauthor of Cave Diving In Australia), Phil Prust, and Paul Arbon. The following are brief site descriptions of the eight sites I dove. Also included are the site categories, maximum depth I reached, and comments from my log:

1. Little Blue Lake (Sinkhole) — 120’. A typical bell-shaped sinkhole, with a very silty bottom. Visibility about 20’. Slightly overhanging walls had lots of algal growth. Bottom had a car wreck,
trees, and a flat silt bottom. The sinkhole has a 20' drop to the surface of the water, but also has a ramp cut down through the limestone to the edge of the water. The ramps are for sheep and cattle to get to the water to drink, and were cut there years ago by the local ranchers. The sinkhole is located in the midst of pasture land. The region about the holes is brown, sparsely vegetated, but obviously valued. Fences, many of them electric, divide the fields from each other and keep the livestock segregated.

Goulden's Hole (Cavern) — 70'. Another sinkhole, with restricted passages leading off the lower end in one section. Visibility still about 20' in the main area, but better in the passage off the bottom. Walls encrusted sporadically with sponges and other organisms. I found several syncarids, insect larvae of some type, and a multitude of copepods. In fact, the upper 20' was a copepod soup, teeming with the barely visible crustaceans darting about in their characteristic manner. During the walk back up saw a poisonous brown snake in the grass. Also has a ramp carved for livestock. Makes entry very easy.

The syncarid is neat, and very reminiscent of remipedia. It swims and walks with the same type of leg motions. I found several swimming, but it is quite obviously a primarily benthic, crawling organism. It is shaped the same way, with a long, skinny body with many segments, and equally many pairs of legs. It looks even more like a white millipede or centipede than does remipedia. They were originally collected by Peter Horne, and were the first syncarids found in South Australia. They were also much larger (to 40m) and deeper (to 40m) than any other known syncarids.

Engelbrecht's Cave East (Cave) — 30'. It was a bit of a walk down to the cave, which is located in a small park. Keys were required to enter, and before we came I had to get a permit and sign a waiver at the headquarters in town. I also had to show my temporary Category 4 CDAA cave-diving credentials to them, which I received this morning. It was a nice dive, with several air chambers, a few other passages, and easy swimming.

Engelbrecht's Cave West (Penetration) — 40'. The west side of the cave is accessed through another entrance. Saw more syncarids, but mostly just wandered about. The worst parts of the dive were the restrictions ... one above the water, the other below. On the dry restriction, I had to take my tanks off, slide into the water, and put them back on again.

The wet restriction was right at the beginning of the dive. I did not like it at all. It took me several minutes to figure out how to get through, squeezing about in zero-visibility water. I also tore holes in both of my drysuit cuffs, but the larger of the two holes was in the cuff I just replaced. I was completely soaked by the time I surfaced from the dive. Another night to spend fixing my cuffs — yuck!!

Ten-Eighty (Sinkhole) — 165'. Ten-Eighty was named after a brand of pesticide. Apparently, bags of the stuff used to be stacked near here. It is in the middle of a working sheep ranch, and is another typical sinkhole collapse. At the bottom of the cave are a bunch of fossil kangaroo bones of an extinct species.

Tank Cave (Penetration) — 50'. Tank Cave also has an interesting entry. First you shoo away the herd of horses from the water tank, where they are resting in the shade. Then you unlock a steel door, set flat with the ground. The hatch opens up, and you affix an extension to the ladder which descends down a hole 2' x 3'. About 10' down you get on your stomach and crawl through the mud (because the ceiling is just above your back) into the water. At the end of the small pool, you descend through a major restriction. All this is done wearing your double tanks!

It was OK for me, except for two things. One, I started down, and could not get underwater because of the air trapped in my drysuit feet. It must have been a funny sight, me thrashing around upside down, trying to get started in the restriction. It was a serious contingent effort to get positioned in the water in the limited space to dump air from my suit to be able to descend. The second problem was another major tearing of my drysuit cuff. Another sopping wet dive.

The system is a maze-like cave, with lots of intersecting passages. Chris and others (mainly with Phil Prust though) are in the midst of a big mapping project here. The cave is closed, but I was given special permission to dive so as to be able to give advice on how any permanent lines should be placed. They want eventually to open the cave to other divers, and want advice on how to make it as safe as possible.

Most of the cave passages were very silty, because several dive teams have already been in this weekend mapping. In fact, the major entry restriction was zero viz. I just turned my light off to
exit, as I figured it would be easier than trying to use it. It was.

Where the water was clear, though, the passages were sparkling. There are lots of seeming leads about, and I can see where they have been having lots of fun exploring the place. This is the largest, most complex cave in the Mt. Gambier area, and one of the most complex in Australia. To date approximately 5000m (5km) of passages have been mapped.

This is also probably the major problem the divers have here. There are not many sites to dive—only 23 which are open. So there is not much opportunity to get a wide range of experience here, unlike diving in Florida. And of the caves and sinkholes which are open, most are very short and contain little or no “penetration” passage. Of the ones I have seen, only Engelbrecht’s and Tank Caves have any to speak of.

The Shaft (Sinkhole) — 200’. From the surface, it is not much to look at. There is a hole three feet in diameter, in an otherwise barren field used for pasture. Dropping through the hole, it immediately opens to a larger room underground. 16’ below is the water surface. Off to the side, very conveniently situated, is a ledge suitable for gearing up on. To enter we clambered up and down a cable ladder, and then lowered the tanks in on a rope.

It was 130’ to the top of a silt mound. Passages traversed roughly north and south, but much deeper than the top of the mound. The deepest I got was 200’, which was just below the ceiling in one of the passages. The floor was about 60’ below me, and the passage screamed onward. It reminded me of Eagle’s Nest, but with the water level lower.

We waited for a couple of hours for the sun to move into the proper position. During the summer months, the sun is high enough to shine through the hole and into the water. This is about as late in the season as this occurs, and so I was very lucky to be here now. It was not in the water yet when we started the dive, but soon after it was out in force.

Blue laser beams, streaming through the water column from the surface to the depths 190’ below. It is a foot, maybe two, wide, and continually is weaving itself into a braided rope of light that never at any moment looks exactly the same as it did before. The bubbles from our cylinders break the surface, shattering its still calm into myriads of ripples. Through this cauldron’s surface arrives the mighty beam, which is then transformed.

Beginning as a solitary force, the ripples split it into many parts. The thickness of each section, the number of sections, the time each exists change as the ripples change, evolving into a macrame of light below the surface. The pure blue contrasts against the blackness, individual columns of light traversing their way to the bottom. The different, ever-changing strands of blue force weave, dance, pulsate, and provide a light show unlike any I have seen before. Because the hole to the surface is so small, the light maintains its coherency as a beam, rather than diffusing out through the water. This purity of form is maintained, and one’s eyes are continually drawn along its length, ending at last in the mysterious depths. It is one of the most spectacular light shows I have ever seen.

Picaninnie Ponds (Sinkhole) — 111’. The ponds looked like any swampy lake from the surface. It was bordered by thick boundaries of reeds and inhabited by a horde of flying insects, and had waters rimmed with algae. Duck below the surface, and the typical picture changes. The pond is filled with sparkling clean water, and the floor is a crevasse of limestone that drops to depths reaching 300’.

A separate section, the Cathedral, is an adjoining room with three individual entrances, each at a different depth. The ledges of the limestone are terraced, reminding me both in form and general appearance of Blue Springs, Volusia County, Florida, but are filled with bright green algae. These planters drip with strands of green, their crops overflowing the available space like Spanish moss cascading from the old oaks of central Florida. The greens contrast and complement the royal blues of the water beyond.

It was unfortunate, but this was my last dive in Australia. I look forward to the time when I may yet again visit, not just to see the caves again, but to visit with the people. Everyone there was very helpful, and lots of fun to be with. I really appreciated their good nature, the effort they made to make my travels pleasant and successful, and their excellent humor (in spite of the jokes about my “yank” accent!).

So, to those who helped me, I offer my most sincere thanks, but especially to Peter Horne, Chris Brown, Sonia Tucun, and Ian Lewis for chauffeuring me around and putting me up while there. C’day to them all!!
AUSTRALIAN CAVE DIVING RESTRICTIONS

by Jeffrey Bozanic (NSS #22532)

The Mt. Gambier region of South Australia is a karstic area, with geology similar to north Florida. It is one of the two primary parts of Australia in which cave-diving activities are centered, the other being the Nullarbor or Panniken Plains region.

Diving in Mt. Gambier, while similar to Florida, offers some significant differences. The caves there are primarily sinkholes, most of which have no flow in them at all. Because of the still groundwaters, once stirred up, mucks and silts occlude visibility for a long period of time. In addition, most of the sinkholes have only limited passages when compared to the major cave systems in Florida.

Despite that, there is much cave and sinkhole diving activity in Mt. Gambier. In fact, the Cave Divers Association of Australia (CDAA) has over 900 members, from a total Australian population of 16 million. If we had the same level of participation from the U.S., the NSS-CDS would have nearly 12,000 members!

One of the reasons that they have so many members in the CDAA is that the diving sites are very well controlled. All of the common sites require that permission to enter be obtained, and that a waiver be signed. Of course, to obtain permission to enter, one must be trained in sinkhole diving by the CDAA, and be a current CDAA member. This is true even on the sites which are privately owned.

The CDAA has gone to great lengths to educate landowners and managers as to the hazards of diving in these sites, and has assisted them in developing waivers and guidelines for their use. This has been done not to restrict access to the sites by qualified individuals, but rather to keep them open by minimizing the number of deaths that occur. As such, it is one model of landowner relations taken to an extreme. It is a model which has worked very well for them, as cave-diving deaths have decreased significantly since the controls were instituted and training is now required to enter the sinkholes.

Most of the sinkholes have locked gates preventing access by unauthorized individuals. In most cases, it is the landowners who have provided the capital required for these safety measures. To obtain a key, the diver must have a signed waiver on file, must be certified by the CDAA, and must be a current CDAA member.

Training under the old CDAA standards consisted for four levels. They were tiered as Categories 1 to 4, with Category 4 being the highest level of training. Each advancement required further training, a minimum number of dives at that level, and a minimum amount of time as a diver with that qualification before advancing to the next level. (Frankly, I believe that elements of this program could benefit our own training standards ... but then that is not the point of this article.)

However, in April 1989 the CDAA changed their standards significantly. The training standards for each of the levels were redefined in issue #34 of Guidelines, the CDAA newsletter. In this issue, they based the training on environmental criteria, to insure that individuals have the necessary skills to safely access different types of environments.

Their entry level is a Freshwater/Cavern Diver certification. This rating is the equivalent of the older Category 2 level, and requires that the divers go no deeper than 20m (66') in an open-water body. The freshwater training site may contain silt, thermoclines, tie-offs, and some obstructions. Cavern sites may have slight undercuttings, overhanging, near-vertical ascents possibility, and daylight always visible. Sea caves and flooded quarries are also considered appropriate. Five hours of training dives must be conducted in depths of 12-20m (40'-66'). This training most nearly approximates our Cavern Diving certification.

The main level qualifications include tracks called Cave Diver, Ice Diver, Research/Mapping Qualifications, and Sinkhole Diver. The two of primary interest to American divers are the Cave Diver and Sinkhole Diver certifications.

The Cave Diver candidate must have an instructor different from his Freshwater/Cavern Diver course. The course includes four (4) supervised dives in "caves." A cave is defined by their definition as an enclosed area, containing silt, darkness zones, and passages large enough for two divers to swim side by side. The maximum depth is 20m (66'), and the maximum penetration is 40m (131'). This course exceeds our Introduction to Cave Diving course, as it requires the use of double cylinders.

The Sinkhole Diver student must also have a different instructor from the one who taught the Freshwater/Cavern Diver course. The program includes four (4) dives to a maximum of 40m (131') depth. Maximum penetration is 40m in areas with large passages. We have no certification which is remotely equivalent.

Finally, they have two advanced-level ratings, Penetration Diver and Mine Diver. Penetration Diver courses must be conducted by a minimum of two instructors, and require that divers participating already have the Cave Diver certification and ten (10) cave dives. This qualification allows the diver to penetrate cave systems greater than 40m (to a limit defined by the use of twin 100cf. cylinders), but still at a maximum depth of 20m. If the divers wish to penetrate caves deeper than 20m, they must also hold the Sinkhole Diver rating. The Penetration Diver would be a sort of "restricted" Cave Diver in the NSS-CDS system.

Each course also entails a minimum of 20 hours of lecture material and related activities.

Each of the dive sites is classified according to training levels. If the diver who wishes to enter a particular site...
A new manual, Research Handbook for Cave Divers, has been recently published in Australia. Written by Peter Home, it is meant to provide an interim guide for cave-diving research techniques and to foster discussion and development of new techniques used for research in submerged caves.

The handbook contains nine chapters, covering the following topics: history of Australian research cave-diving activities, getting started in cave research, selecting and planning a research project, speleological research activities, mapping caves, environmental studies, biospeleology, geomorphology, and paleontology. It also includes a reference section suggesting further reading materials.

While much of the material in the book is drawn from work being conducted in Australia, the techniques involved have relevance to similar studies which might be conducted in other locations, including the United States. The text is aimed at the intelligent layman, and is quite readable and easy to understand (except for the occasional Aussie humor included). Even though written at an introductory level, it contains information of interest for professional scientists who are contemplating the use of cave-diving technology and techniques on projects, and researchers who are experienced in the collection of data from underwater caves as well.

The format of the text is 8 1/4" x 11 1/2", which is standard Australian-sized paper. Unfortunately, the photographs in the handbook generally did not reproduce very well, but this does not significantly affect the information content in an adverse manner.

Peter Home has been cave diving for many years, and is the past president of the Cave Divers Association of Australia. He has been conducting studies in sinkholes and caves of the Mt. Gambier region of Australia for almost a decade, and has written many reports describing that work. He is also a founding member of the South Australian Underwater Speleological Society, Inc., an organization formed to study and foster research in submerged caves.

The cost of the handbook is US $20.00, including postage to the United States. It may be ordered from: Peter Home, 12 Addison Road, HOVE, South Australia 5048, Australia.
Slide Show by John Burge
[Letter to NSS-CDS Training Chairman, Joe Proser]

October 2, 1990
My wife and I recently traveled to Bonaire for a week of relaxing diving. During our stay there we had the incredible opportunity to see the slide show, "Cave Diving in Bonaire," presented by John Burge on behalf of your organization. I would like to input some comments to your Board regarding that presentation.

As an SSI diving instructor, I am most interested in diving education and, most importantly, safety, and it pleases me to see the cave-diving community contributing to the education and safety of the open-water community. This was evident all throughout this presentation, and emphasized that safety is everyone's concern and that we open-water divers can learn much from the techniques and practices of cave divers. I commend you for your policies.

Many open-water divers view cave diving (if they have ever even heard of it) as either macho or insane, while others view it as "no big deal—anyone can do it." Your policy of conducting shows for open-water audiences that blend the beauty and fascination of the underground/underwater world with the vivid explanations of the special equipment and very special training required, fills a real need in the diving community.

I am an experienced diver myself, as is my wife, and we thought this excellent presentation, "Cave Diving on Bonaire," was the most thoroughly produced and best-explained diving lecture we had ever seen. I don't know if you have, yourself, seen this lecture, but I would encourage you and your Board to review this series for its excellence of production and delivery by Mr. Burge.

Again, let me commend the Board of your organization for reaching beyond the closed community of cave divers by extending your educational/ enlightenment and training programs into the open-water community. Your continued application of such policies will certainly contribute to the prevention of unnecessary diving deaths. Also, we would greatly appreciate your relaying our intense satisfaction to Mr. Burge for teaching us and his other many audiences more about the special and individual aspects of cave diving. He is an impressive credit not only to you and the organization, but to all of diving.

Sincerely,
Joseph P. Bark, M.D.
Lexington, Kentucky

Cave Access and Conservation
[Letter to the Editor]

January 15, 1990
I have followed with considerable interest the series of articles by Milledge Murphey on the current lack of available cave-diving sites in Florida, which have been published in both Underwater Speleology and the NACD Journal. This is certainly an important topic to all cave divers who dive in Florida and Milledge has done the cave-diving community a service by putting this issue on the table for discussion. In this letter I would like to provide a contrasting point of view and some comments on a couple of the topics that Milledge has raised in his articles.

In his most recent article on this subject, as well as in a previous article, Milledge contends that certified cave divers do "no damage" to cave-diving sites. It would certainly be nice if this were true, but personal observation at most of the popular north Florida cave systems over the past 16 years clearly indicates that it is not. As a group, certified cave divers probably do less "damage" to the cave entrance and the area surrounding it than other groups that use these sites.

However, certified cave divers as a group bear much of the responsibility for the silt angels, stage-tank trenches, scooter craters, broken projections, and crushed fossils that are, unfortunately, all too common in some of the more popular cave systems. Unscared underwater cave passage is getting harder and harder to find. Milledge himself acknowledges this fact in his most recent article when he comments on the "almost unbelievable changes made in the most popular caverns and caves by the continuing overuse and misuse of..."
The fact is that certified cave divers are pretty individualistic people and, as individuals, they vary in (among other things) their levels of experience, their mastery of buoyancy control and cave-penetration techniques, their awareness of the fragile nature of the caves they dive, and their commitment to cave conservation.

"Dry" cavers have an expression for caving so as to do as little damage to the cave as possible, "caving softly." Just as some cave divers dive more safely than others, some cave divers dive more "softly" than others. Possession of a C-card does not make an individual immune from poor technique, lack of judgment, poor awareness, or lack of concern for the cave itself.

I totally agree that the cave-diving organizations should take a more active role in the area of dive-site access. But, making broad pronouncements to landowners and public land managers that all certified cave divers will do "no damage" to cave-diving sites and should, therefore, be given "free run" of any site will do nothing but erode the hard-won credibility cave divers have begun to achieve in the last couple of years.

On a related subject, Milledge appears to indicate that he doesn't think much of most "guide" systems, viewing them as a tool of the "elite cave divers." It appears to me that if it were not for some of these "guide" systems and "projects" a number of important cave systems in Florida would be totally closed to cave divers. Why? Because of the landowners' desires for privacy, preservation of the site, and last but not least, avoidance of liability and the lawsuits usually associated with the deaths of scuba divers.

All of these are valid concerns for landowners. Guide systems serve the cave-diving community by allowing limited access to otherwise totally closed systems. They also serve landowners by insulating them from having to deal with, in some cases, literally hundreds of requests to gain access to their property by divers of all experience and skill levels who are unknown quantities to the property owner.

Some guide systems or "projects," are set up solely to provide controlled access for qualified individuals to an otherwise closed dive site, while others are set up to produce a product, i.e., maps, films, videos, scientific knowledge, etc. The rules of access for these systems are probably based on the type and degree of access acceptable to the landowner or land manager.

Most of the guides (for various systems) that I have met have been concerned about wider access to the sites for qualified cave divers if it doesn't conflict with the landowner's conditions for overall access to the site. If, however, a guide system with access to a site doesn't control diving at the site in accordance with the wishes of the landowner, it is quite reasonable to expect that shortly no cave divers will have access to the site. This would be a situation which would benefit no one in the cave-diving community.

It appears to me that the best way to make real progress in improving cave-diver access to dive sites in Florida is through a united, low-key approach that respects the rights and desires of the property owners. An approach that implies that all certified cave divers somehow have a "right" to dive all cave-diving sites and attempts to pit so-called "regular cave divers" against so-called "elite cave divers" will be unlikely to convince any property owners to allow cave divers increased access to dive sites they control.

Sincerely,
Bill Dunn (NSS #20429)
Conyers, Georgia

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**Diving in the Yucatan**

[Letter to NSS-CDS Secretary/Treasurer, Lee Ann Hires]

April 16, 1990

Well, it's time to reup for the NSS and the Section also. Jim said I could do both, so here is the money. Hope you and Lamar are fine and in good health. Everything here is fine and we are all working hard and in fine health.

I would at this time like to let you know that Jim Coke is the best representative for the agency that there is around. He has, in the past and now, shown a professional attitude toward fellow instructors and divers alike. He has represented the Section as a true conservative-minded diver and has gone out of his way to be a quality-minded instructor. Each and every one of his students gets the best course available, and he does not compromise himself for anyone. Safety is Jim's best side.

He has the professional attitude that is welcomed here in the Yucatan. He shares his discoveries freely and the word exclusive is not in his vocabulary. Finally, Jim is not out to make a big name for himself, but is out to make the NSS-CDS a big name in safe, quality, intelligent, fun cave and cavern instruction. If you could put this letter in the next CDS newsletter I wouldn't mind at all. Anyway, thanks for reading this and I hope that this coming year is a good one!!!!

Respectfully yours,
Stephen J. DeCarlo (NSS #27081)
Playa Del Carmen, Quintana Roo,
Mexico

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**The Hogarthian Method**

[Anonymous letter to the Editor]

June 4, 1990

I have recently become a certified cave diver, and have been receiving the NACD Journal and Underwater Speology for several years. I have been reading with interest the several letters dealing with the Hogarthian method of cave diving. It appears to me that most people are dismissing the idea without ever trying it, or trying to understand it. Observation, based on previous journal articles, would lead one to believe that those people who dive this Hogarthian way have done some pretty awesome dives and exploration. This method obviously did not hinder Bill Main and Bill Gavin in the Sullivan traverse and other dives that I remember reading about.

This leads me to the question that I have been pondering while reading these numerous articles and letters. It seems that the Hogarthian method of cave diving is used by those with an extremely high level of expertise. It has allowed divers to do exploration beyond the scope of typical diving. The
training organizations offer advanced training such as scooter diving and stage diving; does anyone offer a training course in the advanced technical aspects of Hogarthian diving? Furthermore, are there any instructors out there qualified to teach this specialty?

* * *

**Sump Dive Planning**

*Personal letter to H.V. Grey*

July 25, 1990

Well, the drought is over, for now, in Iowa. Cave and spring water levels are at or above normal. Viz has been poor in the sites I've been monitoring. The summer's about shot and I've yet to work on any of my sump projects.

I've been reading a lot of back issues of *UWS*, mostly looking for references to air allotment. I've reread all the debates on twin singles vs. "ideal" manifolds, all of John Schweyen's stuff, two or three times, and the various things on considerations of solo diving. I've been doing this in my ongoing attempt to form some rational basis for risk assessment.

Here are my conclusions and my invitation to you to pick apart any weaknesses or fallacies I may be dealing with.

**Solo Diving:** The Y-valved primary tank and the independent backup K-valved tank provide me with access to as many sources of air as I would have with a dual-outlet manifold and a buddy equally equipped, and the necessary redundancy in the event of a tank-neck O-ring or burst-disk failure.

I'm satisfied with this arrangement, and the Thirds Rule, on only my primary tank, for solo diving. Having two extra second stages and one redundant tank to manage is well worth the peace of mind they provide.

I would opt for two K-valved tanks (in a muddy or gritty situation in which the second-stage of my preferred system may be a major free-flow risk) over a single tank with a Y-valve. I consider a Y-valved single tank unacceptable for solo cave diving.

To my understanding, most all of the sump diving in the northeast is done with side-mounted twin singles with K-values. Am I being much too cautious using my three-regulator setup?

**UWS** Vol. 16, No. 1 (Jan./Feb., 1989) probably held more info on the topic than any single issue before or since. It provided many opinions and posed many questions, most of which, to me, seemed unresolved or to need clarification.

In Lamar Hires' "Putting the Basic Back into Basic Cave Diving," the first limitation of Basic states: \( \frac{2}{3} \) of a single tank or \( \frac{1}{2} \) of doubles. Is there something I'm forgetting from my Basic Cave training or is the \( \frac{1}{6} \) of doubles to limit penetration distances, as yoked doubles are, for all practical purposes, one tank of air? This was a rule which, broken, was one of the factors in Bill Cronin's drowning in Emerald Sink, also in that issue (though he was using twin singles).

In Roger Werner's "To Those Who Would Dive Alone," he said he dives to \( \frac{1}{2} \) in on each tank and then out on either tank or \( \frac{3}{4} \) in on and then out, assuming both tanks start with the same amount of air." (Is that in on \( \frac{1}{2} \) and out on the other half of the same tank or \( \frac{1}{2} \) of the second tank?) Either way, it would seem that in the event of a catastrophic air loss at maximum penetration/maximum air use, before turning the dive he would, with \( \frac{1}{2} \) in on each, then out, have only enough air to return (\( \frac{1}{3} \times 2 \) tanks = \( \frac{2}{3} \); \( \frac{1}{3} - \frac{1}{2} \) breath = \( -\frac{1}{3} \) remaining). With \( \frac{1}{2} \) in, then out, losing his backup bottle would leave only \( \frac{1}{4} \) of the used bottle.

I assume, as it wasn't stated as such, that it was planning close to this that John Schweyen and Roberta Swicegood (same issue, "Arch Spring Accident" by Dr. Bill Stone) were regularly using in the northeast. I have yet to discuss this with John; I will probably learn something when I do. He's not struck me as one to cut corners or miss anything so obvious. But that planning seems pretty close to the edge.

On my redundant backup tank I don't even use an SPG. I check it with the gauge from my primary air source before the dive. I've never used my backup air, but if I had to, how much air was in the tank would be irrelevant. Either there would be enough, or there wouldn't. Eliminating the SPG also eliminated several failure points and a line grabber. In the small things I've dabbled with here in Iowa, I believe there's only been one dive in which I've used over \( \frac{1}{2} \) of the air in a 3000psi 4 c.f. tank for the entire dive.

My report on A. J. Spring Cave in that issue looks rather insignificant next to the bulk of the other subject matter, but I never lose sight of the fact that I can end up just as dead as anyone else working anywhere else, if I overlook something or underestimate the skills/tools needed to work these short, shallow, small caves.

Am I being too cautious? Do you think twin singles with K's is a safe solo setup? Do you think it's safe to dive to \( \frac{2}{3} \)'s, or even \( \frac{1}{2} \)'s, on both tanks, or should one dive to the limits (\( \frac{2}{3} \)) on one tank and keep the other totally for reserve? Any other comments, insights, opinions I've overlooked?

Now, onto **Buddy Diving:** We'll base this on diving side-mounted twin singles, with K-values.

Is it realistic to assume that there would be little likelihood of ever losing more than one tank to a catastrophic air loss on a given dive (as had been stated in opinions expressed in *UWS*)? With the total loss of one tank, I still see some interesting facets.

A dive is turned when one diver reaches \( \frac{1}{2} \) on both his tanks. He's following in, leading out. His buddy, who is now following and has only slightly more air in his tanks, experiences a total
air loss with one of them. He now has only as much air to regain the surface as he used to the turn-around point. They're in zero viz. They spend 10 minutes negotiating a line trap. There is a minor restriction just over halfway back. This is their first dive into a virgin cave. They are smart divers. Their plan called for either diver who may have such an air loss to use his buddy's spare bottle where possible. Things were dicey, but no one suffered, because of the plan. Add a high silt-induced free flow or two and a line snag, and things could have been different.

As Ron Simmons said in his letter to you, the Editor, again in the same issue, "The diver has to draw a line somewhere between having enough reserve air to deal with even the most unlikely problems and having enough air to actually accomplish the task of the dive." Steve Knutson ("Getting the Edge," Point 5, Pity the Poor Novice) wrote that the novice "will be anxious when the experienced people are at ease ..." And your reply to Kamran Dadsetan's letter alluded to a veteran pilot doing "things that would never be appropriate for a student to do ..."

Does it seem safe to assume that familiarity does indeed breed contempt, or does experience a) sharpen one's awareness, or b) dull one's sense of how close to the edge he can safely operate?

Everything else considered, total air management seems to be the big point in risk assessment. Any opinion on the topic, your own or those gleaned from your larger circle of cave-diving friends, will be appreciated and considered fully. Also, your opinion of my grasp of the concepts involved will receive equal consideration. After all, if I was totally sane, rational (normal?) I probably wouldn't be motivated to do the things I do.

The issue that I cited so much from was a truly fine one (my sophomore dives and resulting reports notwithstanding). It seemed like too much of a coincidence that so much relevant material just happened to fill an issue in which solo diving, risk, and death were brought into such sharp focus. And too farfetched to imagine that it was anything but. Excellent planning and a backlog of pertinent material maybe?

Other than not diving, I've been filling my time with dig projects. My wife and I dug open an abandoned spring resurgence that still functioned as an overflow outlet. Most springs I've dealt with had a bedding plane and went horizontal in 2'-4'. This one went 8'-10' before hitting passage and water at the same time. Subsequent heavy rains have kept it too murky to scope out with a dive mask. Imagine that trip report, if things progress that far: "Digging for a Cave Dive."

We're also setting up to dig out a cave dome that valley entrenchment has intersected. The fill from the opening event and frost shattering is filling in the dome floor and hiding the horizontal bedding plane drainageway that is always associated with these domes. There is little doubt that we can eventually clear the talus from the pit. The big gamble is if the drainage passage will be big enough for a man. As this feature appears to be within the collection basin of the second biggest theoretical spring system in the state, the gamble seems worth it. It might involve a year or two's commitment in digging and hauling materials from the 54' deep hole, giving a few hours' effort each weekend we spend caving.

Stay in touch. Please feel free to share this letter with your friends. I do not have the vast reserve or experience and opinions to draw from in formulating decisions on dive planning and risk assessment. Thanks.

Stay challenged,
Mike Nelson (NSS #27176)
Fertile, Iowa

* * *

It Can Happen
[Letter to the Editor]
June 27, 1990

I would like to respond to the article, "Think It Can't Happen to Us? Think Again," which appeared in Underwater Speleology Vol. 17, No. 2. There were several points that were very well brought across.

Some time ago, a well-known, experienced cave explorer and instructor made a comment which really sunk in, as far as I am concerned. He stated that the best candidates for cave-diving training were those divers who were obsessed with cave diving and who wanted to do it all the time. Those divers who were going on an ego trip or just putting another C-card in their wallet were asking for trouble.

I have no idea how many certified Full Cave or Intro Cave divers there currently are, but there is one thing that I have discovered over the last 2½ years of my cave-diving career—many of these cave divers are not active cave divers.

I have watched cave divers who have not cave dived in months, and the results are very noticeable. Some of them carry more danglies than an octopus. Some of them have lost their techniques and buoyancy control and have no problems in quickly blowing out a large, clear cavern. Some of them have equipment that has no business being in the water and probably should have been discarded some time ago.

Some of them swim so far off the main line to explore something, without running a jump reel, that I have had to stay on the main line and shine my light in their direction to give them a reference back to the line. These cave divers soon lose their enjoyment, besides causing added stress.

Many of my fellow divers fail to understand my desire to go cave diving at least once a week. I am by no means highly experienced in cave diving, and will be the first to say so, but it is my desire to be as good as I possibly can. I take my cave diving very seriously. Unfortunately, many cave divers don't.

Cave-diving deaths among certified cave divers are inevitable. Like Bill Mcdonald and Roberta Swicegood, there will eventually be other highly experienced cave explorers who will perish, for whatever reasons. But it appears that the vast majority of these deaths will come from cave divers who are inexperienced and cave diving beyond their personal limitations.

Maybe some thought should be given to having cave instructors attempt to determine their students' motives and desires for cave diving through a pre-class questionnaire or by some other means. This may possibly weed out those divers who have no intention of taking cave diving seriously and responsibly.

Sincerely,
Frank R. Lavallee (NSS #27829)
Brandon, Florida
The National Speleological Society Cove Diving Section invites you to its 36th Cove Diving Workshop

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