The Blue Grotto near Williston, Florida, has new underwater lighting installed. See article p. 16. Photo by Ed Paradiso.
REScue/RECOVERY TEAM MEMBERS -
Should immediately report any change of address or telephone to their Rescue/Recovery Team Area Coordinator(s).

AREA ONE: North Florida
Lenny Kozubowski
1000 Broadway Rd., #1106
Jacksonville, FL 32218
(904) 765-1900 / (904) 771-2070

AREA TWO: Northwest Florida
G. E. O'Brien
5428 Hamilton Bridge Rd
Monroe, FL 32571
(904) 994-6862 / (904) 994-4540

AREA THREE: Central Florida
Joe S. Hills
B162 Darts St
Brooksville, FL 34613
(904) 994-4583 / (904) 867-8102

AREA FOUR: South Florida & Caribbean
Joe Furrer
7400 N.W. 55th St.
Miami, FL 33166
(305) 566-6019 / (305) 566-3145

ARKANSAS & MISSOURI:
Clyd Kooker
P.O. Box 1421
Henderson, AR 72544
(501) 488-5314

KENY & FLORIDA:
L. V. Gray
P.O. Box 3308
Lake City, FL 32056
(904) 755-5913

National Caving Section of the NSS
575 N.W. 3rd St
Miami, FL 33136
(305) 965-0618

NSS-CDS PUBLICATIONS CHAIRMAN
H. V. Gray
T-Shirts: C&S Evans
Maps: Frank Howard
Maps
(904) 922-2032

V. GREY
Harkins
Morris
Henderson, Jr.
P.O. Box 950
Branford, Florida

ALL MEMBERS ARE COVERED.

NEWSLETTER SUBMISSIONS -
We welcome all current items, news, reviews, articles, papers, photographs, notes, news, letters, letters to the Editor should include the author's name and any photos to be published as a group, or if you have any questions about the submission, or if you are interested in any further details, please contact the Editor directly.

THE NSS AND CAVE DIVING -
Founded in 1951, the National Speleological Society joins together a dedicated group of individuals dedicated to the study, exploration, and conservation of caves. The NSS cave diving information is published in the NSS-1947 NSS Bulletin. Since 1949, NSS divers were recognized in the NSS-1949 NSS Bulletin. In 1951, cave diving within the NSS was a purely local level. Today, cave diving is regulated by the NSS National Cave Diving Section to provide a vehicle for information exchange. Today, with over 400 members, theNSSCave Diving Section promotes safe cave diving through semi-annual Workshops, career-cave diving training programs, underwater safety and orientation, and through the NSS National Cave Diving Section newsletter, underwater photography, and conservation efforts.

Start-off Rssion. Opinions expressed within are not necessarily the official policy of the NSS Cave Diving Section. All communications should be sent directly to the NSS-CDS.
REPORT ON THE WINTER WORKSHOP

The NSS Cave Diving Section held its 32nd semiannual safety and information-exchange workshop Dec. 31, 1988 - Jan. 1, 1989 at the Branford High School in Branford, Florida. The workshop was organized by Kathy McNally of Miami, Florida and was attended by 325 registrants.

Park Ranger Joe McGrath of the Florida Park Service spoke on the Future of Peacock Springs. John McNiff, Director of the National Underwater Accident Data Center, spoke on Underwater Cave Accidents in North Florida. Scheck Exley spoke on the World’s Deepest Cave, Main, in Mexico. Lt. Henry Nicholson, NSS-CDS Rescue/Recovery Team Coordinator, spoke on pressing issues in Safety in Cave Diving. James Coke gave a presentation on Caves in Belize. Biologist and NSS-CDS Conservation Coordinator Tom Morris gave a presentation with Dave Young on Conservation issues. Dr. Art Bachrach, a diving-medicine consultant, gave two lectures, one on Stress and Diving, and the other on Nitrox Diving. Wes Skiles gave a presentation on the Penniken Plains Expedition in Australia. Tom Young gave a presentation on the Exploration of Sacactum in Mexico. And a presentation was made of Parker Turner’s Sullivan Project video. A delicious barbeque lunch was catered by the Suwannee River Cave Restaurant of Branford, Florida, and door prizes were provided by Springs Systems Dive Center, Ginnie Springs, Dive Rite Manufacturing, Batcave, Underwater Connection, Manatee Dive Shop, Roger Werner, and Branford Flite Service. On Sunday there were repair clinics offered by Dive Rite Manufacturing and Sherwood, a Rescue/Recovery Course, a clean-up at Peacock Springs under the direction of the Park Service, and an Instructors Meeting.

ABE DAVIS AWARD RECIPIENTS

In recognition of having completed 100 safe cave dives, the ABE Davis Safe Cave Diving Award was bestowed at the Winter Workshop, December 31, 1988, by the ABE Davis Award Administrator, Mark Leonard, upon the following individuals:

Mark Black
Jeffrey E. Haupt
John W. Burge, Jr.
Norman P. Sheridan
Dianne T. Weatherford
Daniel E. Lins
Dan Danciger
Stephen L. Poll
Gayle Bratome

Ruby C. Haupt
John Reekie
Thomas M. Young
Wayne Weatherford
Daniel B. Buller
David Engelbrecht
Ron Simmons
James B. Womack
Toni Gilleland

OUTSTANDING SERVICE AWARD

In recognition of his many years of service to the cave-diving community and advancement of exploration, safety, and general excellence in cave diving, the NSS Cave Diving Section’s highest honor, the Outstanding Service Award, was bestowed upon Capt. John L. Zumrick, M.D. (NSS #18768) December 31, 1988 at the Winter Workshop.

Having served as a Medical Officer in the U.S. Navy’s Experimental Diving Unit in Panama City for more than twelve years, Dr. Zumrick became interested in cave diving in 1970 and has since done extensive exploration in underwater caves all over the eastern United States, Mexico, and the Caribbean. He has been involved in numerous large underwater cave mapping projects, including the U.S. Deep Caving Team’s massive dry-cave and sump-diving expedition to Sistema Haulua in the Yucatan in 1984. He has been a certified NSS-CDS Cave Diving Instructor since the beginning of the program and was active in the NACD prior to the creation of the NSS-CDS. Representative of just some of his many contributions: Dr. Zumrick has served as Chairman of the Section, as Editor of Underwater Speleology, as Workshop Chairman, as a frequent Workshop lecturer for both the NSS-CDS and NACD; was a contributing author to the NSS Cave Diving Manual, primary author of the NSS Cavern Diving Manual, and contributor of numerous articles and photographs for Underwater Speleology through the years; has served as an Instructor for NCRC’s annual rescue seminars and the CDS’s Rescue/Recovery seminars and sump-diving rescue seminar, and has participated in many actual recoveries. Despite heavy time commitment with his current Navy assignment in a training program in Anesthesia, Dr. Zumrick has agreed to contribute a chapter to the Sump Diving Handbook which is currently being developed. The Outstanding Service Award is richly deserved and is just a token expression of appreciation and gratitude on the part of Section members.

NACD’S “EXPLORATION ’88” A SUCCESS - by Christopher H. Muir

[ABOUT THE AUTHOR: Chris Muir is a Cavern Diving Instructor, and Public Relations Chairman for the National Association for Cave Diving.]

On November 5-6, 1988, the National Association for Cave Diving held its 20th annual seminar at Camp Kulaqua near High Springs, Florida. The seminar was attended by over 300 people, including open-water divers as well as cave divers. Presentations included such timely topics as the early explorations of Wakulla Springs, nitrox gas applications, updates about cave exploration in the Yucatan, Texas, and northern Mexico, the Diepolder systems, and the famous “Sullivan Connection,” which set a number of cave-diving world records.

Parker Turner, NACD’s Safety Officer, was presented with Sherwood’s Scuba Safety Award for his efforts to prevent the deaths of open-water divers in underwater caves, and a presentation of a map of the Little Dismal Cave System was made to the NACD, the cave-diving community, and the U.S. Forest Service in the memory of Bill McFaden for his contributions to cave diving and his outstanding efforts to survey Little Dismal. Further, the Bill McFaden Award was established for excellence in subaquatic cave cartography and its initial presentation was made to Doug and Gayle Kidd, Bill’s sister and brother-in-law.

The seminar not only updated current cave divers about the newest techniques and trends in cave diving, but presented the opportunity to educate open-water divers who attended about the dangers associated with underwater caves and how to minimize those risks with proper training through the NACD and the NSS-CDS.

LETTER CONCERNING WATCH BATTERIES

Dear Editor:

Recently I found that both of my diver watches needed a battery replacement. Since these watches do require special handling, I thought that the following may be of interest to other cavers. Charges shown represent battery, seals, and pressure testing.

Casio Repair Center
570 Mount Pleasant Ave.
Dover, NJ 07801
(201) 361-5400
Cost: $9.50 (allow 4-6 weeks)

Seiko Repair Center
c/o Americor Time
100 Century Blvd., Suite 3
Atlanta, GA 30345
(404) 458-6051
Cost: $19.50 (allow 3-4 weeks)

Sincerely, Joe Prosser, Miami, Florida
SHERWOOD SCUBA SAFETY AWARD

A Scuba Safety Award was presented Dec. 31, 1988 at the Winter Workshop to Lt. Henry Nicholson, National Cave Rescue Commission Cave Diving Officer and NSS-CDS Rescue/Recovery Coordinator, by Sherwood. The Award was given in recognition of outstanding service in promoting cave-diving safety and included a check for $500.

ELECTION RESULTS

Lee Ann Hires, Pete Butt, and Lamar Hires were elected by the membership to serve two-year terms as Directors of the Section. Jeff Bozanic offered to serve an additional year to put the roster of officers the same, with Jeff Bozanic as Chairman, John Burge as Vice-Chairman, and Lee Ann Hires as Secretary/Treasurer.

PUTTING THE BASIC BACK INTO BASIC CAVE DIVING

- by Lamar Hires (NSS #23991)

[ABOUT THE AUTHOR: Lamar Hires is our newest addition to the NSS Cave Diving Section Board of Directors. He has been a Cave Diving Instructor for five years and trained more than 200 cave-diving students; has made over 1000 cave dives; has participated in the exploration and survey projects of Little River, Bonnet, Cow, Madachaulk, and Wakulla; and is National Sales Manager for Dive Rite Manufacturing in Lake City, Florida.]

Sunday morning at 10:30 am as I was in the water at Little River Spring briefing my Basic Cave class before we went under, I heard the clanging of tanks coming down the hill. I looked up to see a diver bringing a stage bottle to the water. The face was familiar—it belonged to a former Basic Cave student of mine. I asked him, “What are you going to do with a stage bottle?” He replied, “I need it to get to the Florida Room.” “I felt like this person had used me. I had taught him BASIC CAVE only three months earlier and now he was stage diving.

Whether it be Cavern, Basic Cave or Full Cave, what do divers really want out of a class? Some people really want to learn about the overhead environment and heed the warnings about making only limited penetrations based on the level of training they seek. They understand that training is the first step to survival in the overhead environment, and that they can gain experience safely through cautious exploration that stays within the limitations of their training. However, it would seem that with some Basic Cave divers, the word Basic is not in their vocabularies when it comes to planning dives. For these divers there is only Cavern and Cave.

Basic Cave certification is a “learner’s permit” for limited penetrations. It allows no complex dive plans with circuits or traverses. Maybe in order to discourage Basic Cave divers from going on complex dives we need to change the rating of Basic Cave to “Advanced Cavern” or something similar, to reinforce the fact that there is more training to be completed before venturing beyond the prescribed limits of Basic Cave. Maybe with the change to Advanced Cavern instead of Basic Cave, fellow Cave Diver certified persons would not be so quick to take those Advanced Cavern divers on guided circuits that they could not repeat without the help of Cave Diver buddies. The concept of “Advanced Cavern” might jog the Cave Divers’ thinking a little.

Changing the name of the certification level will probably not change what is happening, but—where is the line of demarcation between the two levels of certification? What do we do to get people to finish training before they make more complex dives?

I am in the field every weekend watching cave-diving teams attempt dives they are not completely prepared for. The training manuals are excellent references, but cave diving is not a home study course. The interaction with instructors who have been trained to convey the proper procedures for laying out complex dive plans and dealing with complicated scenarios, and who can draw from their own past experiences in handling emergency situations, can make all the difference in the student diver’s ability to exercise good judgment under adverse conditions. These “Advanced Cavern” divers who have forgotten what “Basic” means, have marched themselves right back into the high-risk accident category by diving beyond their level of training. Accident Analysis Rule #1: Be trained and dive within the limitations of your training.

THE BASIC CAVE DIVER LIMITATIONS ARE:

- 1/3 of a single tank or 1/6 of a set of doubles
- NO complex dive plans (meaning no jumps off the main line, no traverses, no circuits, no stage diving, and no diver propulsion vehicles)
- NO dive to exceed a depth of 100 feet
- NO decompression dives

If you are only Basic Cave certified and in violation of any of these rules, you need to take the next step to continue your education and complete your training.

CHI DELTA SIGMA SOCIETY FOUNDED

- by Dr. Milledge Murphey (NSS #24433)

[ABOUT THE AUTHOR: Milledge Murphey, Ph.D. (Psychology) is a recipient of the International Safe Cave Diving Award (which recognizes completion of 1000 cave dives), a Cave Diving Instructor, and Training Chairman of the NACD, the National Association for Cave Diving.]

Following data analysis of the longitudinal cave-diving personality data developed by Dr. Robert Millott and myself, a number of fascinating opportunities presented themselves, not the least of which was the need for development of a nonproprietary cave-diving fraternal organization without agency/organization loyalties or limitations. It was thus that the Order of Hogarth Cave Diving Society, Chi Delta Sigma, was born.

The Society has no formal purposes other than fraternity and has no, I repeat, no diving or cave-diving agency or organization affiliation. Rather, it exists solely for the informal and fraternal benefit of its members. As with any fraternal organization, membership is not open and functions will in all probability be limited to members.

Suffice to say that membership includes an 11 x 14 certificate of membership and an emblem with the totem of the Society thereon. Potential members will be considered twice annually and an invitation to those nominees who are selected rendered. Benefits of the Society include those of association and the fraternal bond of a common dedication to cave diving.

GETTING THE EDGE....

- by Steve Knutson (NSS #5433 Fellow)

[EDITOR’S NOTE: This article appeared as the Introduction to the December 1988 (46:12) issue of NSS News, the annual report on American Caving Accidents, which Mr. Knutson edited, and is reproduced with the permission of the National Speleological Society.]

Those of you who are NSS members will have had the opportunity to read the report, which discusses both dry-caving and cave-diving accidents, in its entirety. However, I think that the observations Mr. Knutson has made regarding safety and
good judgment in all types of caving activity, are so valuable as
to justify reprinting the Introduction here so that anyone reading
this newsletter who is involved, or contemplating becoming
involved, with cave diving, may study and reflect upon its
implications.

Cave exploration is a hazardous activity. No one can argue
against this—there are obviously many potential dangers
waiting for you in a cave. But how dangerous is it? How likely
are we to be involved in an accident?

In cave exploration there are some 60 reported incidents per year in
North America. Let us for a moment assume that there are 3000
“active” cavers, taking, say, 20 cave trips per year involving 10
hours in the cave per trip. Thus there are only 60 incidents per
year per 60,000 caver-hours, or one incident per 1,000
caver-hours. If an “active” caver’s career (some “cavers” have
no career) is ten years, that equates to 2000 hours of caving.
We can readily see that, statistically speaking, only one caver
in five would have an accident in the course of his career.

However this sounds to you, whether you consider this to be
safe or dangerous, is irrelevant, in my opinion. Statistics can
usually be fudged to say whatever we want. The real question
here is who is to be that one caver in five? ... And why do some
cavers have more than one incident? Why does an accident
occur to one caver and not to another in the same party?

If we make the decision to go caving, we will find that some
accidents are truly an act of Nature or fate—they are not
predictable. This could include encountering bad air, a storm
not in the forecast, illness, some equipment failures, some
rockfall, failure of a tested helmet, etc. Yet other accidents
are the obvious consequences of decisions we have made: to
go in a water cave in bad weather, not to replace gear that
died soon, but one was

The question then becomes, what causes us to make poor
(risky) decisions? And most important, can we manipulate any
of these causes and affect our own fate?

1. Body Chemistry. Studies have shown that sensation
seekers tend to have higher levels of sex hormones, particularly
testosterone. They have also been shown to have lower levels
of mono amine oxidase, an enzyme regulating brain activity.
We probably shouldn’t manipulate body chemistry, but
recognizing a sensation seeker can at least allow one to avoid
that person. The knowledge that body chemistry is a factor may
also allow us to realize that our own urge to do something risky
may have no rational basis.

2. Perception of Risk. In a study done at the University
of California at San Francisco, teenagers tended to see the risk of
drug addiction and unplanned pregnancy as becoming less
likely with the repetition of the act over time. This is the same
as getting “heads” several times in a row when you flip a coin
and believing that the chances of getting “tails” are thus
decreasing. In risk taking, it is the same as believing that
successfully climbing without a delay once makes it safer the
next time. This is false.

3. Peer Pressure. To be accepted, to be part of a group
or a society is a strong urge and this alone will sometimes
dictate what we will do and how we will do it. Thus a person will
attempt something extremely risky rather than face social or
group rejection. We should try neither to exert nor to yield
to peer pressure in making decisions on safety, but it will be there
nonetheless. Keep it in mind.

4. The Leader-Follower Syndrome. Leadership is not
just something to be assigned or named. In any group, even ones
that profess to be without a leader, someone will lead; others
will then follow. The roles are not necessarily fixed, they can
be assumed or played by some as required. Even if one is fixed
in a role, knowing the liabilities of that role will enable him to
perhaps evaluate situations.

The leader has the great advantage that he is more aware.
He is more aware because he is going first, both choosing the
way and trying difficult moves first. Note that if one caver is
leading and another tries a difficulty first, then at that moment
their roles have reversed—remember that we are talking about
assumed roles, not assigned roles.

The leader’s big disadvantage is that if there is some hazard
hiding along the way, he will encounter it first. A loose rock,
badly rigged rope, crumby holds, etc.

The follower has the opposite advantages and disad-
vantages. In following others, he will be less aware of what is
going on. The pace will not be his and he is not required to find
the way or make choices—his mind is free to drift. He is not
likely to test holds and rigging like the leader would, or should.
Some hazard the leader notices, and avoids, may not be noticed
by the followers if the leader does not point it out.

Similarly, the follower will not have to try difficulties
first—ideally he can watch those ahead of him do something
tricky and learn.

Yet, if the leader (usually a person of greater ability) makes
a difficult move, he may know exactly what he is doing and be
quite safe whereas the follower may not have any idea whether
he is capable of this and will do it just because he is expected
to follow.

This is a complex concept but understanding it will be
beneficial when it comes to making safety decisions.

5. Pity the Poor Novice. In the late ’60’s I was involved
in a mountain rescue in Oregon. One Monday morning in March
we were called out to search for a party of six lost on Saturday
in a storm on Mt. Hood. We found them when the storm broke,
shortly after dawn. They had no food or dry clothes with them
when trapped and were in bad shape, immobile, with
dangerously lowered body temperatures. They all would have
died soon, but one was already dead, having died Sunday night.
He was the novice of the group.

The novice in caving is in a similar position. He will be
anxious when experienced people are at ease; he will not have
the right equipment, the proper clothes; he will expend more
energy making the myriad body movements necessary in
caving. He will be most likely to make a mistake. All other
things being equal, he will be the most likely to succumb to
hysteria, as in the mountain rescue situation I observed.

Keep this in mind when you take a novice caving and when
you yourself are the novice—when you do your first sump dive,
cave SCUBA dive, vertical caving, cave climbing, or alpine caving.

6. The Macho Mystique. Caving is a physical activity and
it is wonderful to revel in our exertions, in the overcoming of
obstacles, in success in a difficult environment... to survive,
conquer, and not to yield.

Yet as in any physical activity you will encounter people who
are not satisfied with reaching a goal or completing a job. They
want to show how good they are—especially in comparison to
someone else. Thus a companion may come under pressure
to show that he is not inferior, and do something not because
he thinks he can do it, but because he feels compelled to do it.
Amongst males we would say that his “manhood” is in question.

Every person has limitations and should only be expected
to perform within them. Beware of macho cavers, they may be
your undoing.

Perhaps it would help to hold in mind that a caver’s
evolution does not convey greatness on the caver—he just
happens to be there. What his exploration reveals is the
greatness of the cave.

7. The Solo Caver. The common concept is that solo
caving is exceedingly dangerous and foolhardy. Yet solo
caving is always been with us and there are very few
instances of solo cavers in trouble. Indeed, on the face of the
evidence, cave diving is much more foolhardy.
There are two types of solo cavers. One is the caver who operates independently from companions in the same cave or area. His companions are aware of his "solo" efforts and will send help if needed. The other is the true solo caver, who tells no one of his intentions and is thus entirely on his own, truly solo.

Is it really more dangerous than group caving? Except for the possibility of the loss of light, the same hazards are present as in party caving. But most important, just as the leader should be more aware than the follower, the solo caver should be more aware than the normal leader. He cannot allow himself the luxury of complacency that comes on us in group caving.

In a different vein, there are accidents that occur because you are in a group—rocks dislodged by a caver strike a companion, a leader makes a poor decision for a group, or one caver does a poor job of rigging a rope, as examples.

Thus, within the context of greater awareness, the solo caver is safer than the same caver in a group.

The problem comes when something does happen—the act of "Fate." So many incidents are solved by help from the companions. A number of factors affect our awareness, or are we as aware as our companions?

1) Are we a leader or a follower?
2) Do we exert or allow ourselves to be a leader or a follower?
3) Are we a novice?
4) Are we macho or allow ourselves to be affected by macho behavior?
5) Are we aware as possible?
6) Do we recognize and consider the awareness of a solo caver with the security of thoughtful companions, and with some luck in Fate, you'll go through your caving career safely.

DROWNING AT EMERALD SINK

Bill Cronin (NSS #26107), of Lake Worth, Florida, a certified Basic Cave Diver, drowned at Emerald Sink in Wakulla County on December 15, 1988. According to a preliminary report, Cronin (who was reported to have logged some 100-125 cave dives) and two other divers, also Basic Cave certified, entered the Sink, with the idea of Cronin leading the other two on a tour through the downstream (syphon) portion of the system, which features black walls and 50' visibilities. Cronin was using twin 80's side-mounted in the British fashion, and the other two divers were diving dual-manifolded double 80's. At a depth of approximately 150' and a penetration of approximately 800', Cronin signalled turn-around, and the team began to exit.

When they reached a line junction that they had passed on the way in, the divers followed the line that was marked with existing exit arrows (the team had not identified the line with line markers of their own). When they were almost out of the cave, Cronin flashed the other two divers and signaled that they were going the wrong way. Because he was the more experienced member of the team, and the "leader," the other two divers thought that they might be wrong and followed Cronin back into the cave. At the line junction he pointed in to a deep tunnel (which led to Clear Cut Sink, some 5000' away). The other two divers were becoming scared because they were low on air, but they were unable to convince Cronin that the line with the arrows was the correct way out. At this point the team split up, with the other two divers heading back out and Cronin going deeper into the cave. The other two divers made it out of the cave but did not have enough air to complete their decompression; fortunately they had oxygen available on the surface and had no reported bends symptoms.

The recovery operation was performed by the cooperative efforts of the entire Tallahassee cave-diving community. Cronin was found by trained recovery divers some 300' from the entrance floating in approximately 117' of water in a pecket area. His companions are aware of his intentions and is thus entirely on his own, truly solo. According to a preliminary report, Cronin (who was reported to have logged some 100-125 cave dives) and two other divers, also Basic Cave certified, entered the Sink, with the idea of Cronin leading the other two on a tour through the downstream (syphon) portion of the system, which features black walls and 50' visibilities. Cronin was using twin 80's side-mounted in the British fashion, and the other two divers were diving dual-manifolded double 80's. At a depth of approximately 150' and a penetration of approximately 800', Cronin signalled turn-around, and the team began to exit.

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narked (much more than would be normal) even at this depth.

4) Violated the Basic Cave restriction prohibiting decompression dives. The dive was planned to be well beyond the no-decompression limits. Also, decompression bottles were not left at the depth of the first anticipated stop, which meant that the intention was to decompress on emergency reserve air.

5) Failure to check gear and/or be familiar with its proper operation. Checking the ambient first-stage pressure bleeds on Sherwood regulators is a routine procedure. Checking the ambient first-stage pressure bleeds on Sherwood regulators is a routine procedure. The fact that they were not working indicated either pre-dive forgetfulness or carelessness, or ignorance of the proper functioning of the regulators. Although Cronin was found to have been using his operational primary light when he died, tests of his back-up lights showed that the batteries in all of them were low, and therefore poorly maintained and not well checked before the dive.

6) Violated equipment configurations stipulated for Basic Cave. Cronin was wearing two single 80's attached low on his hips in the British side-mount fashion, an advanced technique which requires additional hoses and complicated regulator exchanges and gauge monitoring. It is hypothesized that the additional stress and time factors associated with performing the necessary regulator switches may have decreased Cronin's ability to deal with the narcosis induced by poor regulator performance, and slowed down his final attempt to exit from the cave. It is speculated that his chances of surviving the dive might have been enhanced had he been diving a standard dual-valve rig. Side-mounts are an advanced form of dive technique that are properly way beyond the scope of anyone who only has Basic Cave certification.

7) Encouraged other divers to violate the dive parameters of their certification levels. Cronin was the "leader" on this dive, and though he knew the others were only Basic Cave certified (like himself), encouraged them to participate on a deep decompression syphon dive on doubles. It is reported that on other occasions Cronin had helped other Basic Cave certified divers rig themselves for side-mount diving and in other ways "instruct" them in advanced cave-diving techniques. As is also reported that several instructors, including his Basic Cave instructor, encouraged him repeatedly to complete the full training course before attempting to do dives that went beyond the parameters of Basic Cave Diver certification, but to no avail. It has also been suggested that this was very nearly a triple drowning.

SCUBA SAFETY PROGRAM

One of the special guest speakers at the Winter Workshop was John J. McAniff, Director of the National Underwater Accident Data Center, located althe University of Rhode Island. For those of you who were not able to attend: "This research program investigates and analyses underwater diving accidents, conducts equipment and uses studies and make recommendations for the improvement of underwater diving safety. The financial support comes from the Undersea Research Program of the National Oceanic & Atmospheric Administration, Dept. of Commerce, with matching funds from the Diving Equipment Manufacturers Association, the Professional Association of Diving Instructors and several other contributors."

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The project lacks sufficient funding to maintain a mailing list for notification of new reports. SCUBA SAFETY suggests that interested members of the diving community write them at yearly or half-yearly intervals noting what reports they own and requesting new ones. SCUBA SAFETY will send available material and bill. Since they are not primarily a publishing house, delays of up to six weeks can be expected when demand is heavy.
TO THOSE WHO WOULD DIVE ALONE
- by Roger Werner (NSS #22665)

[Editor's Note: The opinions expressed in this article are its authors and should not be inferred to represent the official policies of the NSS Cave Diving Section.]

Although a formal proscription against solo diving is not an official part of the NSS-CDS's Rules of Accident Analysis, we do not recommend or encourage solo diving. The dangers of solo diving that are presented and carefully analyzed in the following article are very real. Although recent dialogue within the cave-diving community and Underwater Speleology reveals that solo diving may have application in a few very specialized, highly specialized areas of underwater-cave exploration such as stunt diving, where the risks of having a buddy may be perceived to outweigh the advantages, it is not considered to be advantageous for the vast majority of cave-diving scenarios. A proscription against diving below 130' on air is a formal part of the NSS-CDS's safety rules as derived from Accident Analysis, and all divers are cautioned against attempting such dives.

ABOUT THE AUTHOR: Roger Werner has made more than 600 cave dives and has been involved in extensive underwater-cave exploration and survey in Florida, Mexico, and the Bahamas. He has lectured on equipment manufacture and surveying at both NSS-CDS and NACO Workshops, and has been a frequent contributor of highly technical articles on a variety of subjects for Underwater Speleology.

For a long time I have abstained from writing on the subject of solo diving because it is not officially condoned, and because I did not wish such an article to give the appearance of a micro-course in solo diving. However, in recent years I have witnessed increasingly more people engaged in cave diving alone, and have even read its glorification by more than one author, such that I can hold my peace no longer.

First let me say that, like any diving, diving alone in a cave still cannot be done without risk. I know of no organization which endorses solo cave diving. This article is not intended to promote any sort of diving. I write it out of concern for the manner in which I see so many people doing their solo cave diving.

Granted, there are many advantages to diving alone. You can do exactly what you want, when you want, and need not be concerned with the shortcomings of a buddy or his equipment. Some "buddies" may present so much of a hazard as to outweigh the probable benefit of their presence. HOWEVER, I have identified several risks in solo diving for which I have not been able to find solutions.

The purpose of this article is (1) to share with you these hazards, (2) spur discussion of possible solutions, if any, and (3) share with those who still chose to dive alone some practices which I have developed to help mitigate some of the risks.

UNSOLVED HAZARDS OF DIVING ALONE. Most of my unsolved hazards fall into the category of failures of the mind or body. It is easy to carry redundant equipment, but you have only one body and only one brain.

Confusion. Failures of the mind can be divided into confusion, bad judgment, and careless errors. For example, only a day or two before one of my first solo dives, I heard a story about a reputedly good, experienced cave diver, who had died while diving alone. The story attributed his death to his having failed to notice a gap in the permanent line. Upon his return he saw the gap and became confused. I vowed that I would not repeat his error. To protect myself against missed gaps, I ran my own line all the way from open water, everywhere I went. When I was only a short way into the dive, I thought I recognized where I was. I thought that by turning left, I would come out Olsen Sink in a short distance. In fact, I was not where I thought I was, and after a number of twists and turns in the tunnel (all of which already had permanent line in them), I became quite confused, comforted only by the continuous guideline back out which I still held in my hand. If I had not been running my own line, I probably would have turned the dive sooner, but I still wonder whether I would have turned soon enough. The moral of the story is: when you're alone (and get confused), you're on your own. If you have a buddy, then hopefully two brains will be at work to both avoid confusion and try to resolve it if it does occur (although this can also lead to disagreements).

Another confusing experience happened to me while diving a highly decorated cave. I was lead diver, and soon became quite confused due to the lack of well-defined walls in a large room (they were obscured by lots of stalagmites, stalactites, and columns) and spider-web-like line which crisscrossed back and forth, over, under, around, and all over the room. We started to keep track of how many right and left turns we had made. However, the divers behind me, since my light was way ahead of theirs, saw a much bigger picture. They recognized from the start that we were just swimming around a big room and did not become confused. It was nice to have them along. (Incidentally, this touches on one of the advantages of not being lead diver: Assuming his silt technique is not lousy, you see more with your light and his than you would with yours alone.)

Errors in Judgment. For an illustration of bad judgment and careless error, I have another confession: One day while just getting into the water at a favorite cave, after a bit of walking and climbing in 100's, I noticed a torrential leak in my "dry" suit. I had never leaked that bad before. Upon closer inspection, I saw that my zipper had failed. It was wide open on the right side, and my right shoulder was fully exposed, bare to the water. I was not happy. For what I did next, I can only plead temporary insanity brought on by the emotional distress of seeing that my drysuit had just "given up the ghost." I decided just to make a short dive. What started out to be a short dive, turned into a longer dive (it was in Florida, with 70°F water; it really didn't feel too cold). Not once during the dive did it occur to me that my zipper might fail until the last few feet of penetration to pull the line open and that the open flap might then tunnel in gallons of water, making the exit more difficult, and possibly giving my hypothermia problems. Fortunately, it didn't pull open any further, but when I returned to decompress, I realized that in my disgust and haste I had neglected to note my starting time. (It had been intended to be a short dive.) How long had I been down? How long should I decompress?

In my analysis of this dive I see several errors: going too far with a bad suit, forgetting to check my starting time, starting the dive in the wrong state of mind (and many would also include diving alone). Some might argue these errors as being "stupid," and if they had been made consciously and intentionally, I would be inclined to agree with them. But, they were not made consciously or intentionally. I did not deliberately fail to check my starting time, nor did I think of doing it and decide not to. It was simply a careless omission. Despite the best of intentions, all humans are at risk of making errors. All we can ever hope to do is to minimize them. Having two brains working rather than one reduces the risk that a careless error will go unnoticed an uncorrected.

Failures of the Body. The body can fail in many ways. If you have ever dived when you're out of practice, you may be familiar with cramped calf muscles. Fortunately for me, my cramps have usually worked themselves out over the course of a dive—but what if they hadn't, and what if for some reason I suddenly had to get somewhere in a hurry? What about an attack of indigestion during the dive? I have heard of people vomiting while diving. Vomiting can be very spasmodic. If perchance you took in a little water (or bile) and started to choke,
it might be nice to have a buddy around to make sure you kept a regulator in your mouth.*

Have you ever had a reverse sinus block (pressure inside a sinus cavity which does not vent automatically; therefore, you can't come up)? I have. It's no fun. Imagine what it would feel like if a tooth were to explode (or be pushed out by pressure from within the sinus cavity). The assistance of a buddy to help you maintain your regulator and guide you on the way out during such pain might come in handy.

Other more severe conditions, but hopefully less likely, might include heart attacks (especially for those in high-risk groups), appendicitis, etc., in which cases, even though the chances of survival might be slim, they would probably be considerably enhanced by a friendly tow from a buddy. It has been said that anybody can embolize at any time (for any reason). Depending on where the embolism occurs (and it need not be an air embolism), it may be beneficial to have the assistance of a buddy.

In such situations any assistance would be better than none. Even if the buddy cannot help in any material way, he may be able, through no actual action on his part, to provide the afflicted diver a psychological boost by simply being there and giving the troubled diver the impression that there's someone else there to do any necessary thinking, etc. This assumes that the buddy is qualified and the afflicted diver has confidence in him. If the buddy is incompetent, then the afflicted diver is still on his own, but it he doesn't realize that, that may make just enough difference to keep him from going berserk and allow him to concentrate clearly enough to get himself and his incompetent buddy out of the bad situation. (On the other hand, if the afflicted diver does not have faith in his buddy's competence, the situation could take a turn for the worse, or a faithful afflicted diver could unthinkingly turn the lead over to an incompetent buddy who might in turn lead them both to disaster. Moral: when you dive with incompetent buddies, you're really alone—or worse.

Though getting out alive may still depend heavily on certain performance by the afflicted diver (nobody's going to tow him out swimming at depths of over 200'), being relieved of mental tasks (such as keeping track of which way is out, etc.) may be just enough psychological relief to alleviate stress just enough to reduce air consumption just enough to make it out, or to have enough air to decompress, etc.

**Accidents.** What about accidents and/or injuries while getting into and out of the water? One of my sayings has long been “Once you know the procedures and have mastered cave-diving techniques, one of the most dangerous parts of cave diving is getting in and out of the water” (assuming you also have the necessary equipment). If you are getting in/out of the water alone and have an accident, who is going to help you, or how long will it be before help arrives? Problems might include: falling and being seriously injured, falling into deep water without your air turned on and/or without your fins on, or turning turtle on your back on top of your regulators with 100's (e.g., in the water at a rock).**

**Line Entanglements.** Perhaps one of the most serious hazards to the solo diver is the guideline. If you become entangled, it is entirely up to you to disentangle yourself, regardless of where or how the line is caught. If you have to cut the line to free yourself, despite the best of intentions, it is incredibly easy to let go of the wrong line. Let's hope you can see and have some time to deal with such a problem.

**Silt.** It is widely agreed that in particularly silly situations (e.g., ceiling is 18' or less from silt floor), one may be better off alone. In any silt-bearing cave one may be better off without a buddy who has poor silt technique. Consider a passage where it is necessary to plow through the silt to get through. Visibility will go down to 0-3’ during the plow, but will clear considerably within 10-30 minutes. Since one's technique is markedly degraded in zero visibility, a second buddy to go through such a section is much more likely to damage the cave and/or may snag the line. The solo diver, on the other hand, is the first one through going in and the first one through coming out. Nobody has to go behind anyone else. The chance of damaging the cave and/or snagging the line (or of a diver getting lost) through such a section is much less.

**Other Hazards.** Cave-ins, though rare, do happen. It is not uncommon for rocks to fall off the ceiling. If you had occasion to be pinned by such a rock, or cut off from the exit by a cave-in, it might be helpful to have a buddy to help dig you out.

**SOME RECOMMENDED PROCEDURES.** If you are still going to do it anyway, here are some tips which you may wish to consider including with your solo procedures. The medical and fitness communities can and do provide many suggestions on ways to reduce the risks of heart attacks and improve and maintain fitness. Don't smoke before diving, or better yet, don't smoke. Be fit. Don't eat or drink just before diving. If, during a dive, you feel the need to vomit, go to fresh air. Don't vomit (or be pushed out by pressure from within the water) through a regulator sounds no fun. However, vomiting through a regulator sounds like a great way to foul it. I can easily envision food particles getting caught in the exhaust valve and causing it to lock open. Then you'd be inhaling water anyway.

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* I have been told that, due to the spasmodic nature of vomiting, the correct way to vomit underwater is through your regulator. I'm not sure I agree, but then, I'm also no expert on this subject. Since vomiting is spasmodic, it is probably hard to control, and without your regulator you may take in water, and then who knows what will happen. However, vomiting through a regulator sounds like a great way to foul it. I can easily envision food particles getting caught in the exhaust valve and causing it to lock open. Then you'd be inhaling water anyway.

**Later I began to wonder why, if twin singles were safer for solo diving, didn't that also imply that they were simply safer (for buddy diving as well). The situation is severely complicated if only one buddy is doing twin singles, the other is using a manifold, and there are no other air supplies (e.g., stage bottles). See Underwater Speleology 14.3, May 1987.**
Spare mask around the leg include: (1) like a loose sock, it will occasionally slide down your leg and have to pulled back up, (2) the ideal strap adjustment for wearing the mask on your leg may be different from wearing it on your head, and (3) you may have to take a fin off to get the mask off your leg. A spare mask is a good idea for any dive. If you doubt thi, think about what it might be like to exit and decompress without one. Faces are great heat exchangers in water. Also, how would you read your tables and watch without a mask?

One handy new device, which backs up several pieces of equipment, as well as part of your brain, is the decompression computer. It backs up your watch, depth gauge, decompression tables (and knowledge of how to use them), presence of many other things you start by knowing how long you are down (bottom time), and how deep you went (max depth). Though the decompression computer backs up many pieces of equipment and does a lot of mental tasks for you, it does not relieve you of the responsibility of carrying this other equipment and also doing the mental work yourself. What if when you come back to decompress your decompression computer is no longer with you, or is flooded, or its battery has run down, or it runs down during decompression? Remember, the watch, tables, and depth gauge also back up the decompression computer. If your decompression meter is mounted within a console which is attached to a pressure gauge, it will be very hard to lose (straps can break), but it may take more abuse from passing rocks than if mounted on your arm. I never liked considering it a backup anyway, even if it could be on a scooter, but I have had to appreciate having air, time, depth, and max depth information all in one place, particularly on deep dives.

What would you do in a broken fin or fin-strap situation? It might also be a good idea to wear a helmet. You don't have to be on a scooter to hit your head real hard on a rock.

**Line Entanglements.** I have already addressed equipment tangles, the line-entanglement hazards which they present, and some things which can be done about them (See p. 2.). Such techniques, though, only reduce the risks. They do not eliminate them.

**DIVING DEEP ALONE?** Not recommended. When one dives deep on air, the mind can become incredibly flaky. Due to narcosis and high air-consumption rates, events (such as rolling over, silhouetted, any delay) which might only be little problems or inconveniences in shallower water, can cause big problems at depth. Just keeping track of the time, depth, air, line, and which way is out can be a full-time job. I have found the countdown timer provided with many digital watches to be very helpful in that (if set properly, and if it works, and if you hear it) it alerts you when it is time to turn back.

Simple tasks like reel manipulation or surveying can become quite challenging at depth. Whenever more than just line-following is involved, at least one diver should be responsible solely for keeping track of time, depth, his air, the line, and which way is out; i.e., he does not survey, take pictures, or shoot video, etc. A diver with no assistant, who falls and breaks his leg (or is sufficient at depth to bring you up or to stop your descent)...

**DEGREES OF ALONENESS.** No, diving alone is not like being pregnant. It is possible to be more alone on one dive than another. By "more alone" I mean help is further away. The diver who dives alone when no one else is at the dive site is more alone than one who has a surface tender (who can fetch more air for decompression). The solo diver who enters the cave alone is more alone than members of a group of divers who dive out of sight of one another. If there is ever a time when you cannot hold your breath until your buddy can respond to your signal and give you air, then during that time you are alone as far as major air failures go (e.g., broken manifold or low-pressure hose which drains your tanks before you can turn it off). I have found it almost impossible to hold my breath for more than a few seconds while swimming only moderately. (Don't pass out while trying to measure this!) In this respect, many divers who start and end their dives in groups are alone many times during their dives. This is especially true when on scooters or while negotiating restrictions, and most especially true for the rear diver.

As far as line entanglements are concerned, an abandoned diver need not worry about freeing himself as long as he has sufficient air and patience to wait for a "buddy"...
ARCH SPRING ACCIDENT
- by Dr. Bill Stone (NSS #12783 Fellow)

(This report was reviewed by and prepared with the help of the other five members of the recovery team: Jim Brown, Tom Morris, Rob Parker, John Schweyen, and Dr. John Zumrick. All were friends of Roberta Swicegood.)

ABOUT THE AUTHOR: Bill Stone, Ph.D. (Structural Engineering) is an NSS Fellow and accomplished dry caver and cave diver of long standing. Among his many climbing and caving achievements, he organized the U.S. Deep Caving Team’s massive exploration expeditions to Sistema Hauitla in the Yucatan and led the recent Wakulla Springs Project, and is the creator of a fully redundant closed-circuit exploration rebreather, which he hopes to make commercially available to cave divers in the next couple of years.

BACKGROUND. On June 18, 1986 two NSS-certified cave divers, John Schweyen and Roberta Swicegood, planned to conduct a series of survey dives in Arch Spring, near Altoona, Pennsylvania. Schweyen and NSS-diver Jim Brown had been working in this area for the past four years; Swicegood joined the effort in the spring of 1986. Their objective was to link Arch Spring with the sinking stream of Tytoona Cave, located approximately 4000' to the southwest. The upstream cave, Tytoona, contained four known sumps with lengths of 50', 30', 280', and 100', separated by air-filled sections of passage. The total length of the cave, as presently surveyed, is 3500' to the limit of exploration in the fourth sump where a boulder choke appears to block further progress.

Arch Spring is presently 2250' in length and contains a 250' initial sump (Sump I), which reaches a maximum depth of 35', followed by an 850' canal/airbell leading to Sump II. This final sump is 1000' in length and descends to a depth of 70' some 300' in. Near the end of the line the passage dips to 105' before rising 25' into a 50'-diameter terminal chamber approximately 200' away from Sump IV in Tytoona Cave. Several previous attempts by Schweyen failed to penetrate the breakdown at the end of this chamber, where the presumed connection to Tytoona lies.

The water temperature in both caves was approximately 51°F, and the visibility was at best 2-3'. Due to substantial till deposits, both on the floor and walls of the tunnel, and due to relatively slow flow, zero visibility conditions are likely to exist throughout the exit portion of a dive. The average passage dimensions in Arch Spring appear to be about 6-8' in width by 6-8' in height, although there are smaller sections and the possibility for line traps exists in several locations, particularly in Sump II where the rock is more fractured and friable than in Sump I.

The June 18 mission was to re-survey the most remote portion of Arch Spring in order to pinpoint the closest location to Tytoona. At approximately 1:00pm, Schweyen entered Sump II in Arch Spring and proceeded on a nominal dive to a penetration of 700' along the existing line (1/8" braided nylon). There he tied off a new #18 nylon line and reeled out 190' to a boulder in the center of the terminal chamber where two branch lines lead a short distance to different points in the breakdown. He clipped the reel to the line at this point and marked the locations on the line where significant azimuth deviations occurred. He then exited to find Swicegood waiting at the head of Sump II.

Because of the siltling conditions, consecutive solo dives were planned. Swicegood’s primary mission was to take azimuth and depth readings along the line just laid by Schweyen and to remove the #18 line; given sufficient gas reserves, she planned to check the final chamber for leads. She entered Sump II at 2:50pm while Schweyen continued out of the cave. At 6:15pm Schweyen became concerned when Swicegood failed to return to the parking area. Following a trip to town for backup-light batteries, he re-kitted at 8:15pm and dove Sump I to check the canal leading to Sump II in the hope that Swicegood had been delayed there due to mechanical problems. She was not in the air-filled tunnel. Schweyen then exited and drove to the Huntington state police barracks where he initiated an NCRC rescue call down.

At midnight, June 18, Bill Stone received a call in Maryland requesting assistance with the effort; Schweyen was contacted at the state police office and a discussion was held concerning the specific requirements for the rescue team. At that time Schweyen had managed to recharge his dive gear and was planning, with the assistance of local cavers, to dive to the final chamber in Tytoona cave, in the event that Swicegood had made the connection and had mechanical difficulties at that point.

Stone contacted John Zumrick, who was also residing in Maryland, and Rob Parker and Tom Morris in north Florida. Following discussions with Stone, Warren Hall, a past Eastern Regional Coordinator for the NCRC, made arrangements for Morris and Parker to be flown from Gainesville, Florida to Altoona, Pennsylvania, pending the outcome of Schweyen’s recon dive in Tytoona. At 5:00am, June 19, Schweyen called Stone to report that he had not found Swicegood and that the dive team should be mobilized. By 2:30pm June 19 the team reached Arch Spring. A substantial amount of surface support had been arranged by local NCRC Coordinator Jacques Grief, which included a mobile 20 cu.ft. minute, 5000psi compessor.

Parker and Morris entered Arch Spring late Sunday evening, June 19, and reached a penetration of approximately 690' in Sump II, just shy of the location where Schweyen had tied off the new #18 line. They had spent the majority of their time carefully sweeping the passage (with an average visibility of 1' or less) and were convinced that Swicegood was beyond that point. At this time there was still hope that she had managed to reach an airbell and that further penetration would reveal a line leading up to it.

The situation was resolved on Monday morning, June 20, when Schweyen located Swicegood only 10' beyond the point where the new line had been tied off. She was facing into the cave and appeared to be wedged in a low section on the south side of the passage just beyond a brief restriction. Parker and Morris reached the same location several hours later and ascertained that both pressure gauges were reading zero. Parker reported that he was unable to move Swicegood and that substantial work would be necessary to extricate her from the restriction and prepare for safe transport.

At this time, given the serious visibility and constricted conditions in Sump II, it was decided that a sixth diver, Jim Brown, should be brought in to form three transport teams. Brown, together with Schweyen, was most familiar with the cave and was subsequently flown from North Carolina, where he was vacationing, to Altoona. It took until Wednesday night, June 22, for the six divers to complete the operation.

For safety of the recovery personnel, it was decided that two-man teams would be used. One individual was responsible for transport of Swicegood, the second was to maintain positive contact on the line 6' ahead of the first. A 6' tether, with carabiners on both ends, was used to connect the two divers. In this manner, the diver doing the towing was free to deal with snags without worrying about losing the line. Only during the trip through Sump I, where the passage had several line traps, was it necessary to use three divers. There, a third diver was needed behind Swicegood so that control was available at both ends to maneuver through the constricted tunnel. Parker, Morris, and Stone completed this move without major difficulty in one dive. The majority of the recovery work was carried out with less than 1' of visibility.

An inspection of Swicegood’s equipment showed no
mechanical problems. She had been diving twin K-valves (as did all members of the recovery team with the exception of Zumrick, who used a standard dual-valve manifold) with new 95-cu.-ft. steel tanks. Swicegood had informed Schweyen prior to entering Sump II that she had 3000psi in one tank and 2700psi in the other, giving her substantially more than 190 cu.ft. of air (at moderate work levels this could be expected to last 60 minutes at 70', the average depth of Sump II). She also reported that her new USD regulator had a minor free-flow through the first sump, but she had fixed that. Both regulators functioned properly when attached to freshly charged tanks. Although further studies are being made on the equipment at the U.S. Navy Experimental Diving Unit, it would appear that neither an uncontrollable second-stage free-flow, nor the unseating of a main high-pressure O-ring, was responsible for the accident. This was initially suspect, as Schweyen reported Swicegood as saying that she had to initially abort the mission at the entrance due to an improperly seated O-ring. She subsequently replaced this and carried on with the dive. Notably, a small rip in the left cuff of her drysuit was observed during the post-recovery investigation, as was a full 4" tear on the right thigh. It was suspected that this latter rip might have occurred during the recovery, but it might equally well have occurred during her dive at the 70' restriction at the initial tie-off for the #18 survey line.

Several questions remained at this point. Swicegood's dive slate was ruled for survey, but it contained only one depth and azimuth reading, indicating that the survey had been aborted for some reason, since the plan was to survey in and later recover the reel. The compass was missing from her equipment pouch [it was subsequently found by Schweyen on July 2 close to the point where he had tied off the survey reel in the final chamber]. Furthermore, Parker had reported that the #18 line went nearly straight up from its anchor point just before the constriction where Swicegood was located, and was taut.

Just beyond that point he noticed a slack piece of #18 line hanging vertically to where it touched the floor and disappeared up the silt slope which extended beyond that point. The passage ascends from that point, eventually reaching a depth of 50' (75' away) before descending steeply to the 105' dip and the final chamber some 115' further. The fact that the #18 line ascended with tension, and returned slack further upstream, indicated that there was a snag, or possibly a tie-off, near the roof. Based on the angle of rise and the distance between the rising and descending lines, Parker estimated the roof height to be at least 20' in that location. On July 2, 1988 Schweyen returned to this location and determined it to actually be 10' high and that there apparently was a previously unknown horizontal passage coming in at that point. What role this new passage may have played in the accident is uncertain; but if she had been off-line it certainly would have constituted a complication.

During the recovery effort it was determined that Swicegood was not entangled in the line at the point where she was ultimately found. However, her depth gauge recorded a maximum depth during the dive of 105', indicating that she had, in fact, likely been to the final chamber before trouble arose.

Following the recovery, Schweyen made one final dive in Sump II to ascertain the situation beyond the location where Swicegood had been found. There he discovered several clues to the tragedy. The #18 line reel (PMWilison type) was found some 20' beyond where Swicegood had been found. The reel was jammed and the line had been cut approximately 1' from the spool. Just before finding this, Schweyen discovered a drop weight attached to the original line. This, he recognized, was originally near the top of the silt-mound rise; thus the original line, and its positioning drop weight, had been pulled approximately 10' down slope (towards the entrance).

The original line was, however, still intact. On the surface, the #18 survey line was laid out and inspected. The first 190'
were marked at the bend locations for subsequent accurate distance measurement on the surface, as had been planned. The presence of fresh particulate matter on the next 270' of line indicated that this line may have been laid, and then respool during Swicegood's dive. However, it might also have been from a previous dive and was therefore not considered as hard evidence that she had gone exploring.

**ANALYSIS.** Based on the above facts the following accident scenario appears likely:

a) Swicegood passed Schweyen at the start of Sump II (they exchanged notes and discussed the dive) and proceeded on a nominal dive to a penetration of 700' where the new #18 line began. She then began the survey but aborted it after only one survey shot. Since the compass was subsequently found in the final chamber it must be assumed that some other factor caused her to make the decision to abort. This likely was a tear in her drysuit as she passed the restriction ahead of the survey-line tie-off. Schweyen reported that this area was known to have jagged projections that could easily snag a drysuit. Schweyen and Swicegood had planned to dive in Tyoona Cave later that afternoon and the survey reel would be needed there. It is likely that Roberta made a decision at that point, despite the drysuit tear, to continue on to the final chamber and recover the reel before heading out.

b) Having reached the final chamber, she picked up Schweyen's reel and accidentally dropped the compass (which she normally carried around her wrist by means of a loose lanyard while surveying). She started out, reeling back the line in what likely was less than 1' of visibility.

c) At some point between the 35' level and the restriction at 70' (on the way out), she became entangled in the #18 survey line (which she was reeling in). This would not be likely if she had the line in front of her as was reeling up, but would have been possible if she had turned around for some reason so that the survey line was behind her or off to the side. She may have turned around for any of the following reasons: 1) Entanglement in the permanent line. This could explain why the drop weight was out of position as well as subsequent entanglement in the line she was reeling in. 2) Bucyancy-Inflator malfunction [Schweyen reports of experience with sporadic drysuit free-flows in very sily conditions; in one instance he was momentarily pinned against the ceiling of a low bedding-plane passage] or from momentary overinflation to compensate for gas loss associated with the drysuit tear(s). This would also explain the movement of the permanent-line drop weight if she had tried to reels it to control her ascent. 3) On the way out, she may have explored a small side passage just upstream of the restriction at 70'. This had been found a couple of weeks before but had not been fully explored.

d) In any case, the survey-line entanglement was apparently so difficult that she had to cut it.

e) The only reasonable explanation for her using all her air was that she lost both lines somehow. If she was off the permanent line when she cut the survey line, and if that line snapped away, she would have been lost. Given the low visibility, the deep slit on the floor, and the lack of good projections on the walls, her gap reel would have been useless without a drop weight.

f) She reportedly used nearly all her air in the process of looking for the line. Although she was found on top of the line heading into the cave, she may have come to rest there after losing consciousness. If she did find the line, she would not have gone more than 50' to 70' in the wrong direction before realizing that she was going up the slope (and into the cave) or before she hit the drop weight there, a major landmark for those who have been in the sump before. This distance is small compared to the 700' to the entrance of the sump.

g) The survey line going up towards the ceiling just beyond the restriction may have caught around a projection after she cut the line (under tension) or, more likely, may have caught if she had been near the ceiling there in the passage reported by Schweyen. If she had been up there exploring, the line could have caught on a lip.

**DISCUSSION.** This accident is noteworthy for several reasons. First, Roberta Swicegood was an NSS-trained cave diver with several hundred logged cave dives in the U.S., Puerto Rico, and the Bahamas. She specialized in sump diving and had made three previous dives to the final chamber in Arch Spring. She was experienced in, and comfortable with, cold-water and low-visibility environments. Secondly, depth was not a factor in the accident.

The accident was almost certainly caused by a line entanglement, or a succession of line entanglements in very low visibility. Hard evidence only exists for one entanglement (i.e., the cut survey line). Irrespective of losing the main line, the cause of the accident would appear to be entanglement in, and subsequent surgery of and ultimate loss of the survey line. Medical factors were ruled out by an autopsy conducted following the recovery. If we ask ourselves why Roberta did not come back from this dive, and we believe that she was lost, the answer is that she could not find the line with enough air to get out of the cave. The reason she could not find the line efficiently was that she could not use her gap reel (since she lacked a drop weight and there were no nearby tie-offs).

Given the coldness of the water, extremely-limited-to-zero visibility, and the fact that wetsuit gloves are necessary, it is debatable that a person under stress could effectively use a gap reel without immediate recourse to an easy line tie-off. An apparently necessary safety modification underscored by this accident is the requirement to carry a drop weight with a quick connect that can be handled even with wetsuit gloves. This can be used under any conditions which might exist in the form of floor sediments to permit the undertaking of a radial search with a minimum of lost time. Rehearsal of such drills would serve to reduce stress (and therefore reduce breathing rate) during a real lost-line emergency. It is recommended that such lost-line and drop-weight drills be incorporated into the NSS Cave Diving training program.

All of the dives at Arch Springs, prior to the recovery, were conducted on a solo basis. The reasons for this will not be debated here, save to say that it has generally been accepted practice, both in Europe, Britain, and the U.S., to dive solo when original exploration or mapping is involved in constrained low-visibility situations. Swicegood's equipment had been modified for solo diving and the line was experienced in regulator switching; and equipment malfunction was apparently not a factor in the accident. Given the near-zero-visibility conditions it is highly unlikely that a partner would have been of assistance.

The original line strung through the cave was an 1/8" nylon variety, about twice the thickness of standard Florida line. There were no markers (arrows, etc.) on the lines in either Sump I or Sump II to indicate the direction of the entrance prior to the arrival of the support diving team. While it is uncertain what role this lack of directional indicators played during the final few moments of Roberta's dive (if indeed she had found the main line prior to losing consciousness), the use of regularly spaced directional markers for sump diving is clearly indicated. This becomes an even more pressing requirement in sumps where there are no distinctive landmarks.

All of the divers involved with the exploration of Arch Spring were NSS-trained cave divers, and as such, learned their technique in Florida. While the use of 1/8" line represents a step towards addressing the different environment, it is questioned as to whether, in fact, a stouter line might have provided greater safety, given the conditions encountered in Arch Spring. It may be useful to draw a comparison with British sump-diving practices, where conditions are similar. There,
5/16"-diameter stranded polypropylene line is used for guide line. The line is tagged at regular intervals (3m, 5m, and 10m are common) with different colored bands—for example, plastic electrical tie-wraps tightened with at least one loop through the lay of the line to prevent slippage. One color always indicates the direction of the entrance, and these tags can be felt even with wet suit gloves.

One could achieve the same effect with a braided line through the use of a knot code: for example, two closely spaced knots followed by a single knot, with the single knot on the entrance side or vice versa. This latter procedure has the advantage of being effective even in zero visibility since the entrance direction can be felt, even if it cannot be seen. [Ed.: see John Schweyen’s article, “Directional Indicators for Low-Visibility Sump Diving: A Proposed Standard,” Underwater Speleology, Sept./Oct. 1988, Vol. 15, No. 5, p. 6.]

Arrows are inefficient for this job since they cannot be pre-spooled before the dive. Larger line has the advantage that entanglements are less likely, and easier to rectify than with small-diameter line. In low visibility environments there is a tendency to place more force on a line, since buoyancy control without a reference point is less precise. Here again, thicker line is superior. Finally, there is always risk involved when more than one guideline exists along a particular passage.

Although the above scenario and discussion are likely close to what happened, the exact cause of the accident will never be known. One thing is certain, however. The myth that NSS certified cave divers are “immune” from the risks inherent in this endeavor has been shattered. It would appear that a re-assessment of the applicability of certain elements of standards Florida cave-diving practice to other environments (specifically sump diving) is in order.

LETTERS TO THE EDITOR

December 31, 1988

Dear Editor,

I have a few comments on Joe Prosser’s analysis of the Swicegood accident [Ed.: referring to “Comment on the Death’s of Bill McFaden and Roberta Swicegood,” by Joe Prosser, Underwater Speleology, Sept./Oct. 1988, Vol. 15, No. 5, p. 3]:

Joe’s statement about multiple guidelines needs some clarification. In general, sumps are rigged with only one line. Multiple lines can lead to confusion, increase the risk of entanglement, and decrease efficiency. However, occasionally multiple lines are unavoidable; such is the case with sumps that are rigged with old line that appears unreliable or line that is broken or periodically lost under heavy sediment. If practical, the bad line is removed. Otherwise, it is repositioned off the side or just avoided. An estimated 3% of the sump dives in the northeast involve multiple lines. In the case of Arch Spring, the permanent line was unsuitable for accurate surveying, so another one was temporarily laid out for this purpose.

With regards to the Thirds Rule, the facts contradict any suggestion that Swicegood was negligent in budgeting her air supply. She was planning on a nominal penetration of 900’ in a sump with insignificant flow and an average depth of 60’, a dive that has been easily done before with double 80’s. She entered the second sump with her 35’s pumped high at 2700 and 3000psi, i.e., about 205cf of air. This gave her an additional 45cf of reserve air over the roughly 55cf that one would normally have in reserve with 80’s. Simply stated, she had almost 45cf of reserve for anything but her emergency. Obviously, she didn’t have enough air to deal with the problems she had and get out alive, but her air planning was not inconsistent with her training.

The cave-diving community should remember that fatal accidents do not necessarily imply a violation of accepted safety procedures. To think otherwise is tantamount to believing that this is a no-risk activity.

John Schweyen (NSS #24848), Hackensack, New Jersey

Tom Morris (NSS #24256), Gainesville, Florida

Jim Brown (NSS #25591), Newark, Delaware

Dear John, Tom, and Jim,

Thank you for your clarification of line policies and procedures for sump diving. Your letter, combined with Bill Stone’s thorough accident report, should give most readers a much clearer picture of sump-diving conditions and problems, and the possible causes that led to Roberta’s death. I concur with your conclusion and reminder to the cave-diving community, that fatal accidents do not necessarily imply a violation of accepted safety procedures.” In this case, most likely not. But in a few of the other deaths we have had recently involving divers with some degree of cave-diving training, there are indications that the divers did not exercise the best possible judgment in establishing their dive plans; that, against the advice of instructors and other more experienced divers, they attempted “too much too soon.”

I hope that readers will infer from your description of sump conditions and problems just how extremely advanced and technically sophisticated this activity actually is compared to the kind of diving one does during, say, a Basic Cave training exercise in a pristine north Florida cave. I think that if other divers had had the opportunity I had after the Winter Workshop, of watching you, John, practice tricky blind line-trap sump drills—for me, one of the observing “safety divers,” a kind of “cut-away simulation” of what of a zero-visibility sump dive might actually look like if you could somehow magically see it—they would have a much greater appreciation for the extreme demands of sump diving (or for that matter, any kind of constricted, low-visibility exploration) and a much keener and humbler awareness (as I hope I gained) of their own self cave-diving limitations.

—The Editor

November 15, 1988

Dear Editor:

After reading the comments of Joe Prosser on the death of Roberta Swicegood in Underwater Speleology, Vol. 15, No. 5, I feel that I must make a reply on several points.

First, he is giving a mistaken and incorrect description of sump-diving line technique. He states that sump divers “tend to lay their own line on each dive.” This is incorrect. The general practice is the same as in north Florida exploration. An exploration line is laid and left in place. This line is used on future dives into that particular sump. Given the nature of sumps, the line may not be in the best of shape on the next dive. In this case the line is repaired or replaced as needed, the same as in Florida underwater exploration. Divers only lay entirely new lines in a few cases. If the old line is of a very small diameter, it may be replaced for safety.

The small diameter lines used in Florida diving are not at all appropriate for sump diving. The limestone in sumps is much harder than that found in Florida and lines abrade much faster. Another instance when a new line would be laid is the installation of a heavy line through a sump where there will be a lot of traffic, as in the case of continued exploration on the other side of the sump. In the case of the dive Roberta was on, the new line was being used as a survey line. Roberta and John were using a survey technique where a separate line was used and stations marked on the new line. After the line was removed the distance between stations could be very accurately determined. This technique resulted in very good loop closure on their surveys.
My other problem with the comments is that he states that Roberta "failed to reserve adequate air for her escape." I knew Roberta well and dove with her quite a bit. She was not one to cut her air reserves for any reason. She always planned her air in a most conservative manner. To say that she caused her own death by not reserving enough air is an insult to Roberta. The real cause of death in cave-diving accidents will almost always be running out of air. The real cause of her death will probably never be known, but I am sure that it was not because of poor air planning. Knowing her diving abilities, the air she started into the dive with, and her knowledge of the dive site, I believe that she had plenty of air to cover any reasonable amount of problems.

Before each dive the diver must plan his air usage so that there will be reserve air for unexpected as well as expected problems. This is a very difficult task! 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. Cave diving, and especially sump diving, will never be a completely safe endeavor. There is always the risk that things can go so far wrong that you could not possibly save enough air to get out. From the evidence of Roberta's last dive this seems to be the case.

Several little things or perhaps one major problem, such as losing the line, added up to such an extent that she did not have enough air to deal with them and get out. It cannot be said that she did not reserve enough air. We will never know what happened for sure, but I am sure that Roberta reserved as much air as she considered was reasonable for this dive. It just happened that in this case it wasn't enough. She was an experienced sump diver and knew the risks that she was exposing herself to. Anyone that gets involved in cave diving, and especially sump diving, should sit down and think about how much risk he is willing to accept. Cave diving will never be completely free of risks and if someone cannot accept that fact, he should find another, safer endeavor. This is the same decision that a mountaineer or any other explorer makes, and an explorer must realize the dangers involved and decide how much risk is acceptable.

As more cave divers get into the specialty of sump diving there are going to be more fatalities among trained, experienced divers. In England, where sump diving has been practiced much longer than here in the States, it is assumed that there will be fatalities among trained divers. This is just a fact of life. This doesn't mean that we can't try to make cave and sump diving as safe as possible, but all of the risk will never be eliminated.

Sincerely, Ron Simmons (NSS #16894 Fellow), Charlottesville, Virginia

Dear Ron,

Thank you for your additional insightful comments on sump-diving line protocols and your first-hand knowledge of Roberta's conservative and safety-conscious attitude towards sump exploration. Again, you have pointed out the fact that "some degree of self-assumed risk is inherent in this kind of activity." I wonder what the reaction would have been if, rather than dying while sump diving, Roberta had been killed instead by a drunk driver on the way to the dive site... I suppose that there are some who would still have attempted to claim that it was her "fault": she got in the car, she drove onto the highway, she deliberately took the "unacceptable risk" of engaging in an activity in which some 50,000 people are killed each year in this country alone!

We come from an unfortunate (in my opinion) irrational (in my opinion) ethically relative tradition that brands suicide (and therefore, by propinquity, many forms of self-assumed risk-taking activity such as mountain climbing or hang gliding) as "immoral" or "sinful," and these centuries-old (but irrational-all-the-same) attitudes have been translated into civil law in many parts of the world. As a hidden, but related corollary of these attitudes, many people are also unable to grant others the "right" to assume exploration/adventure risks, and insist upon trying to foist "blame" for the the taking of the risk upon some other person or thing, which may take the form of a lawsuit or legal restriction upon the risk activity. Expressions of enlightened attitudes of self-responsibility such as yours may ultimately help change these fundamental philosophical attitudes. Thank you for your letter.

The Editor

October 20, 1988

Dear Editor:

Recent tragic drownings of experienced NSS-CDS cave divers have saddened the whole diving community. Until Joe Prosser's recent article was published in the Sept./Oct. issue of Underwater Speleology, almost every cave diver was anxious to learn why these highly experienced cave divers had perished. Well, Mr. Prosser's report shed light on the possible causes of the accidents, and to my surprise, he explained that these cave divers died because the Rules of Accident Analysis were violated.

As a novice cave diver, I have always used the more experienced cave divers as my role models and taken advantage of their experience while adhering to the Rules of Accident Analysis. Now I wonder if I should follow that practice any more. The fact of the matter is that our fellow divers died needlessly. Maybe the more experienced cave divers are beginning to think that they are invincible or maybe the ego factor is on the rise. Let us remind ourselves that cave diving is not a macho sport, and cave divers are not invincible, especially the more experienced ones. Perhaps the NSS-CDS should make it a policy for the cave divers to read the black and white facts, printed in Sheck Exley's Basic Cave Diving - A Blueprint for Survival at least once a month to constantly remind ourselves that "Anyone can die at anytime, in any cave."

Sincerely, Kamran Dadsetan, NSS-CDS-certified Basic Cave Diver, Pittsburgh, Pennsylvania.

Dear Mr. Dadsetan,

Thank you for your letter expressing your concern about the recent cave deaths and giving us all some insight into how you, as a Basic Cave-trained diver, are reacting. I hope that you will continue to "use the more experienced cave divers as your role models and take advantage of their experience while adhering to the Rules of Accident Analysis" insofar as the attitudes and behaviors you are modeling are taken completely in context of their experience.

A student pilot with 20 hours of flying time may choose his experienced instructor as his role model. But the student must always keep in mind the fact that his instructor is experienced, that he has 2000 (or maybe it's 20,000) hours, and that with this much greater experience it is entirely appropriate for him to do things that would never be appropriate for the student to do with his piddly little 20 hours. Even with 100 hours, a pilot is still a mere "babe in arms." The novice mountain climber may choose Sir Edmund Hillary as his role model, but this choice does not mean that the novice mountain climber will ever be ready for Everest.

You say that "maybe the more experienced cave divers are beginning to think that they are invincible..." and that "cave divers are not invincible, especially the more experienced ones." Experience is, of course, a relative term. Of the four divers with some level of cave-diving training who died in the last 8 months, none was "massively" experienced. According to the official Recovery report, Basic-Cave-certified Miss Eaves had only logged 10 cave dives, including instructional dives.

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According to his instructor, who had just asked him a few days before his death, full-Cave-certified Mr. McFadden had logged only some 80-90 cave dives. Basic-Cave-certified Mr. Cronin had logged only 100-125 dives. Of the four, full-Cave-certified Miss Swicegood was probably the most experienced, with "several hundred logged cave dives," according to the Recovery report. I am afraid that 10 dives, or even 100 dives, don't amount to much compared to the thousands of cave dives logged by people like Shock Exley, Wes Skiles, Mark Leonard, Joe Prosser, or Lamar Hires.

It sounds like you are probably planning to take a conservative, sensible approach by getting full Cave training before attempting to go beyond Basic Cave limitations, and building up your own experience slowly and gradually, always trying to exercise your very best judgment. For this I commend you, and as a European diver once wrote me, "wish you a good visibility."

—The Editor

LETTER FROM BILL CRONIN'S PARENTS
To All Bill's Friends,

I am sure you must realize that this is probably the most difficult note I'm having to write. Bill died cave diving, and that is very difficult to accept.

I would like you to know that Bill's father and I constantly worried about cave diving, but he kept assuring us he was cautious, and we believe he was. But, people make mistakes and this one made by Bill was fatal. We had also allayed our worry by telling ourselves we couldn't lose another son; we had already lost one 16 years ago in a drowning accident.

But, Bill lived his life the way he wanted and he was supremely content with it. It was a good and rich one, albeit very short. We know he died doing what he loved best. We couldn't have asked that he give it up, even if he would. He wouldn't compromise his style of living.

We thank you all for the beautiful flowers and the thought that you cared.

I won't say we wish no one would cave dive. We are content enough that our son, Jim, will no longer be cave diving. But consider your families and know no mistakes are allowed.

Thank you again for your caring and may you be safe.
Know that Bill loved the caves.

Sincerely, Helen and Dave Cronin, Lake Placid, Florida 33852

Printed card enclosed with the handwritten note:

What kind of man would live where there is no daring?
I don't believe in taking foolish chances, but nothing can be accomplished without taking any chances at all.
—Charles A. Lindbergh

MISSING ISSUES OF UWS
Keeper of the Back Issues of Underwater Speleology, Stan Hankins, reports that we are missing the following issues: Vol. 3, No. 1, 2, 3, and 4; Vol. 4, No. 1, 2, 3, and 4; Vol. 5, No. 1, 2, 3, and 4; Vol. 6, No. 1 through 6. If anyone has a copy of any of these issues and can make copies for us (you would be reimbursed for the copying fees) or allow us to borrow your copy so that we can make copies, please contact Stan Hankins directly: 9510 Ashley St., Tampa, Florida 33612, (813) 932-0326.

NEW RESCUE/RECOVERY TEAM AREA COORDINATOR
Cliff Rooker has been named Area Coordinator for Arkansas and Missouri. His contact info. is listed on p. 2.

BLUE GROTTO INSTALLS NEW UNDERWATER LIGHTING
Reprint - Photos by Ed Paradiso
In the late 1960's, Blue Grotto, near Williston, Florida, became the first cavern in the world to introduce a surface-supplied underwater lighting system. This consisted of six car headlights attached to an umbrella-shaped fixture which hung from the ceiling at a depth of 30'.

Realizing the need for an updated system, the new management of Blue Grotto hired Mark Leonard and Lamar Hires of Dive Rite Manufacturing in Lake City, Florida to design, construct and install a new lighting system.

New owner Ed Paradiso said he would like to create the nation's first underwater video and photography filming set with state-of-the-art lighting permanently available for use by sport divers. On May 26, 1986, Blue Grotto installed a lighting system that is sure to be a milestone for the sport-diving community.

Major considerations were put into the design to provide enough light to enhance the enjoyment of Blue Grotto's crystal clear water for the multiple training levels of divers who would be diving the site. For the novice divers who do not wish to enter an overhead environment, the entire upper section of the cavern can be viewed from a stage platform that is in open water at a depth of 35'.

For the night diver, the lighting system provides an even more spectacular experience. The four dazzling light beams spread across a 100' horizontal span giving off a "Star Wars" laser-beam effect.
The new lighting system can also add supplemental lighting for basic video taping or special effects in backlighting. Video applications are now limited only by the imaginations of the modern underwater film makers who visit and utilize this newly created arena. For the first time in history, video enthusiasts have an artificially lit, professional underwater set at their disposal in crystal clear water.

Divers who are considering purchasing an advanced underwater lighting system for personal use, can see firsthand the light output of these newly designed lighthoods, which are available in a portable version at Blue Grotto’s dive shop or your local Dive Rite distributor.

Blue Grotto offers complete camping, including RV’s, and dive-store services. It is conveniently located about 2 miles from Williston (between Gainesville and Ocala, Florida) and only minutes away from I-75.

For more information contact Blue Grotto, Rt. 2, Box 2790, Williston, FL 32696 or call (904) 528-5770.

HARASIB UNDERGROUND LAKE REVISITED - by Charles Maxwell

[ABOUT THE AUTHOR: Charles Maxwell is the Cave Diving Officer of the South African Speleological Association and has been involved in extensive caving and cave-diving expeditions throughout Africa over the last several decades.]


Far above, the taut 10mm SRT [single rope technique] rope continued up to a crack in the massive dolomite roof where the warm winter Namibian [Africa] sun shone from a cloudless sky onto the dry rocks. Below, the remainder of the rope snaked long and slack through an immense void at the bottom of which the diminutive ant-like figure of a fellow diver could just be made out in the gathering gloom of the late afternoon. From this vantage point I was afforded a most amazing spectacle of massive stalactites, many millions of years old, hanging from the roof of the cave. Huge walls towered around me and I became aware of the blue misty surface of the great lake that lay below me in the silent bowels of the cave.

WHAT AN ABSURD WAY OF GETTING TO A DIVE!!

It appears that Harasib Cave was first explored by Major Hubble in the early 1900’s. On finding a large depression in the side of a dolomite hill, he was lowered into the cave to a ledge, seated in a boatswain’s chair, from which vantage point a huge dark blue lake could be seen. On the discovery of Dragon’s Breath in 1986, Major Hubble wrote to a Windhoek newspaper, insisting that it had been he who had discovered the cave. It was later ascertained, however, that he was confusing Dragon’s Breath with Harasib, as a trip into the former, seated on a boatswain’s chair, would have been an impossible exercise.

In 1967, members of SASA [South African Speleological Association] explored the cave above water and produced the first survey of the lake surface. This survey revealed that the surface area of the lake was larger than any other known underground lake in Southern Africa, including the famous Sinoa Cave in Zimbabwe, a record held until the discovery of Dragon’s Breath Cave 20 years later. The vertical distance from ground level to water surface was found to be 100m. In 1974 I joined the first recorded diving expedition to Harasib, led by Dick Howell.

An incident that is fixed in my memory from that trip gives one a good indication of the amazing clarity of the water. One of the team members had decided to make some soup and stepped onto a rock to fill his billy-can with water, only to discover that the rock in question was about half a meter below the surface of the water. As a result he disappeared from sight with a splash, much to everyone’s amusement save his own!

The purpose of this return trip to Harasib in July 1988, with a team of cavo divers and film makers led by Gerald Favre from Switzerland, was to complete a documentary film of the water-filled caves of northern Namibia. During our previous trip we had concentrated on surveying and filming Dragon’s Breath Cave but, due to technical problems, some underwater shots had to be redone. Although this was a bit disappointing in some ways, we were pleased to see our good friends from Switzerland once more.

After a week of filming the First World War field cannons and artillery shells 50m below the surface of Otjikoto Lake and performing the first sonar survey of Guinas Lake, where a maximum depth of 120m was recorded (although it is possible that greater depths may be found beneath the overhangs), we moved on to Harasib. We decided to film Harasib Cave rather than the nearby Dragon’s Breath Cave as the access to the water was both logistically simpler and visually more impressive.

Firstly, we rigged the traditional western pitch where the old iron, fixed ladder can still be found, and then, to enable the filming of cavers descending into the cave, past the large formations, the northern pitch was rigged. The latter proved to be the most impressive way into the cave and is recommended for those of us who enjoy a good SRT pitch. An overhead pulley system was rigged from an ancient water pump on one side of the sinkhole to an equally ancient-looking tree on the other. Tension mounted as Gerald’s Betacam professional video camera and housing, valued at about R25 000, was gingerly lowered towards the lake, 100m below. 100m may not sound like a big deal, but when this measurement is applied to a sheer drop into a cave such as this, the visual impact is substantial. Eventually all the equipment was safely stored on a narrow and steeply sloping ledge about 20 meters above the lake. Could this be the very ledge used by the intrepid explorer of yesteryear on his first trip into the cave? Our 150m high-pressure hose, to be used for recharging our diving cylinders in situ, hung down from the compressor far above us.

In an upper level of the cave there lived a magnificent pair of owls. Every morning, without fail, these birds would visit while the others abound past their nest only to emerge at high speed and in full cry just as I was opposite them. Although this became a daily ritual, these birds always managed to startle me, much to everyone’s amusement.

The water level in Harasib varies considerably from periods of drought to periods of good rains. For example, in 1988 the water level was similar to that in 1967 during the first (non-diving) SASA trip to the cave, but in 1974 the level was at least 20m higher, due to a period of good rains in the area. The present low water level necessitated a further two short SRT pitches to be handled, wearing full diving equipment. The thought of a diver wearing a combination of helmet-mounted torches, wetsuit, weight belt, diving cylinders, decompression computer, and SRT harness and associated hardware, together with fins, mask, underwater floodlights, flashes and camera
strapped to his waist, seems most cumbersome but, in reality, this worked extremely well. The divers were definitely benefiting from the experience gained during SWEX77. The last pitch dumped the diver unceremoniously into the clear crystal water where his desccender could be left to cool. From the surface of the lake the stalactite-laced root could be seen far above. Some light filtered down to the lake, reflecting the beautiful cobalt-blue water.

Calcite formations decorated the walls right down to the water and magnificent underwater formations were found continuing to a depth of about 30m. The water temperature in Harasib was noticeably cooler than that of Dragon's Breath, presumably due to the better ventilation of the former. There was, however, no noticeable thermocline in either cave. Harasib was noticeably cooler than that of Dragon's Breath, which Dick and I swam in 1974, only one remained. How lonely he must be in this vast underground world. Although introduced to the lake by a local farmer only a few generations ago, loss of pigmentation was evident in the middle of this specimen's body. With a length of around 60cm and a large, heavily whiskered mouth, this denizen of the deep provided an eerie touch to an otherwise lifeless vista. Contrary to our expectations, no aquatic amphipod, similar to those living in Dragon's Breath, was found in Harasib, possibly due to the introduction of barbel into this cave.

Aesthetically, the most striking underwater features of Harasib were these magnificent submerged calcite formations. These formations really came alive when the powerful underwater movie lights were switched on and the divers, with their colorful diving suits, swam amongst them. After SASA's visit to Harasib in 1967, a layer of floating calcite and a low water level were described in the subsequent SASA Bulletin. In 1974, presumably due to the increased water volume and associated reduction in the concentration of dissolved calcium carbonate, this calcite layer had disappeared, only to reappear for the 1980s trip. As we swam beneath this calcite mantle it began to rain down on us; large pure white snowflakes in a void of colorless liquid, thereby adding an interesting aside to the film script.

My introduction to the world of underwater filming was, at first, somewhat confusing. Gerald had the difficult task of trying to teach us, in a short time, the intricacies of underwater filming. One point was made clear to us: always swim slowly, using slow and precise body movements. The time finally arrived when we were ready to film Harasib underwater. I was swimming in front of Gerald, who was filming with his bulky underwater camera, while two other divers illuminated the chamber with powerful underwater movie lights. After a few minutes of filming, Gerald surfaced and started shouting excitedly in French and divers began to swim around at full speed, totally contrary to our strict instructions, leaving me in a state of confusion. Only later did I discover that his camera had refused to switch off and, as a result, he only had three minutes left before his video tape ran out!

With the water level as it was, we had a better chance of finding the bottom of the fault or a secondary system. The deepest dive in 1974 had been to 70m, at which point the steeply shelving fault had been seen to continue, out of sight under the overhanging roof. Unfortunately, in spite of the large quantity of oxygen and helium at our disposal, due to the generosity of our sponsors, the limited time left to us after the filming was completed only allowed us one dive to 60m (that was equivalent to an 80m dive in 1974). At this depth the fault could be seen to carry on in a series of silt-laden ledges supporting the occasional animal bone, but with no sign of the fault bottoming out. The cave entrance, some 200m away, could be seen clearly in the eerie blue light of the water. Therefore, it can be safely assumed that, when the water was at the 1974 level, the water depth was in excess of 100m, thus making it the 15th deepest underwater cave in the world.6

We were preparing our diving equipment on the ledge above the lake one day when the most terrifying noise reverberated around the cave. It sounded like an erupting volcano followed by a loud splash and then, once the noise of the resulting echoes and re-echoes had subsided, a deathly hush descended over the cave. Expecting the worst, I called out, anticipating no reply. "No problem...just a few loose rocks," came the welcome reply. This did, however, remind us of the potential danger of working in such an unstable area.

After days of hard work, the filming was complete and it was time to make our reluctant departure. Before I began my last long ascent from the cave, I tossed a piece of bread into the lake as a parting gift to the solitary fish.

My next dive a few weeks later, quickly brought me back to the real world, being an underwater inspection of a hydroelectric outfall structure in the Orange River in cold, zero-visibility water! Roll on the next SWEX.

REFERENCES

A. J. SPRING CAVE, Allamakee County, Iowa - by Mike Nelson (NSS #27176)

[Editor's Note: The opinions concerning sump-diving techniques and dive planning expressed in this article are the author's and should not be inferred to represent the official policies or attitudes of the NSS Cave Diving Section.]


We looked at some sinkholes first, with Arlo Johnson, the landowner, as always, out of curiosity. We were also killing time, as his wife, Virginia, wanted to be there for the diving. There was a series of crevice-related sinks, of which one was enterable, but for no great depth or distance.

Arlo told us to go ahead with the diving, as we had not actually coordinated well and he wasn't certain of Virginia's time of returning from church. He then volunteered his services in hauling the gear to the site. We loaded up the basic stuff on the platform he had on the rear of his little tractor, and headed for the spring.

As I was getting ready, I handed the divelight and goggles around for the others to see what we had seen on our initial peek into A.J. Spring. Greg stuck his head in deepest, even deeper than Doug or I had back on 4-17-88, when first evaluating it. He came out of the water somewhat excited, raving about the big passage. Getting right down in the water, I took a better look myself, and sure enough there was more cave on a level look back than I had imagined, and less downward than I had imagined.

Very excited now, I finished putting on the dive gear. I used two mini-pony tanks that were rigged up just for peeking around the sump daylight area of the cave. Not even a full body into the resurgence (working with a base-fed line on my wrist), I spotted enough reflection to know there was a good airspace available. Scooting back out, I informed the rest of the team. The bigger part of the reflection was parallel with the cliff face, but there was a narrow piece angling off above large submerged

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passage. I dived in for a good look. About 12' in I came up in 

a joint-oriented passage in 2-1/2' of water and about 4' of air; it 

was just under arm's width. The dry part was about 12' long. 

Some of this was not visible from outside but some of the cave 

continued underwater, creating the illusion of really big cave. I 

tried to work my way back to look at where the reflection had 

narrowed. I could see that there was pushable air-filled 

passage, but the line had become stuck on something, and 

I couldn't determine how much. I ducked out again and we went 

about fetching the serious dive gear. 

This time in I tied off the jump line to a rock and let myself 
in. I quickly but carefully tied off inside the cave, leaving the line 
for future use. The cave, once away from the joint-aligned 

room, held a constant 8' width and 4' height. The narrow area 

of the reflection was just over head size above the water line 
and continued in another 15' or so. Here, just beyond the 

visibility of the entrance sump, was a breakdown room, still 

8' wide. Climbing over the breakdown for about 20', I found the 
cave going underground. Sticking my head in the second sump, 
I observed it pulling the classic enticement. The cave rounded 

a curve to the right, wide open, a constant 8' x 4'. I could see 

12'-15' yet.

I imagine that it is to my own benefit that caution overwhelms me when working solo like this, but this cave was not in the least bit intimidating. There was no real reason not to go get the bigger line reel and line markers and another light source or two and push this out a ways. So I really surprised myself when, 

upon returning to the outside world, I called the diving for the 

day.

Sure, it's great to have a partner when doing things like this, 

but mostly for someone to share the experience with and know 

there is immediate back up; that's reassuring. The sump diver, 

though, should not be dependent upon a partner to save his 

butt. Then there's the real concern of demonstrating to the 

landowner that we are going about things in a calm, calculated 

manner. I am not a thrill-seeking risk-taker. But after several 

days' contemplation, I realized that the reason I did not progress 

was the subconscious awareness of the intoxicating effect of 

virgin cave. It is one thing to deal with this in big dry cave, or 

for that matter, tight little passages. It is a totally different 

story underwater. It would be all too easy to get in all too deep. The 
cave-diving philosophy is to make repeated dives to become 

familiar with the submerged cave a little at a time; it's a good 

philosophy.

Another solo push dive is in the works for the immediate 

future. This cave that is big by comparison to its spring 

resurgence, will not let me sleep.

Trip Report - May 30, 1988, "First Light and a Surprise": 

Mike Nelson, Delores Nelson, Aaron Nelson, and Greg 

McCarty.

In the previous trip report, I forgot to mention one very 

important item: Landowner Relations. The folks that own 

A.J. Spring Cave have been extremely hospitable towards us. 

They've hauled our gear to the site with their tractor. They've 

been on hand at every step of the exploration so far. They've 

ever led us picnic lunches. They are evidently as interested as 

we about what lies beyond the spring's resurgence. They show 

the way to leaving us well fed, and totally, despite making it 

clear that the place was their little hideaway, and though they didn't want to be overrun, or well known. In this light, we are keeping 

the personnel to the bare requirements from here on out. There is 

precious little anyone else can do to help anyhow.

This dive allowed me to be a little more exacting on 

proportions than the first, as always. The resurgence sump was 

right about 10', the first airbell about 10-12', as per my previous 

estimate, and the low air-space area was somewhat shorter than it first seemed as was the breakdown room. The second sump seems roughly 50' in.

Greg McCarty followed me through to this part of the cave, making his first cave dive in over a decade. We reexamined the 

established line before going to the second sump to tie on 

again.

I intended to go in to the second sump slowly, looking for 

natural tie-offs to keep the line-out line of harm's way. The 
snake of the passage changed so radically, though, that I 
pushed on in to explore. As noted in the last report, the cave 

was about 8' wide and 4' tall in this sump, but once around the 

first meander it went tall. The width remained at least my arm's 

span, over 6'; the height varied from the holes in the floor and 

the ceiling, the relief between the highest and lowest spots 

being about 10'. If it were dry, the passage would be almost 

walking size. I must have been moving at a depth of about 4' 

as I don't recall having to pressurize at all. Niches in the ceiling 

that rose 2-1/2 to 3' had no air in them. The most unexpected 
sight was what appeared to be pot-holing in the floor, a feature 

associated with streambed passages. I did not think to look for 

evidence of speleothems.

I wound through several meanders and found no good 

natural tie-offs to keep the line-out line of harm's way. The 

nature of the passage changed so radically, though, that I 
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I wound through several meanders and found no good 

natural tie-offs points. As I came around a sharp left-hand turn, the 

passage straightened out as far as was visible 

the first light ever to shine in its hallway. I wanted to go with it so 

badly, but I recognized the feeling and knew I had to leave. One 

last look back and I turned to go, and snared my line on my 

backup-tank pressure gauge. Even though I messed with it for 

a short time, I did not manage to totally destroy the visibility. I 

still had 2-3' as I picked up my line by hand and worked my way 

back to Greg in the breakdown room.

We both went back out to inform the owners and crew of the 

unexpected good fortune we had encountered. Stringing out 

the line, I found that I had gone 65' in a dive that only lasted 

4 minutes. But what an intense 4 minutes they were. I had 

expected the passage to remain bedding-plane opening for a 

long ways. Coldwater Cave was low and wide; April Cave was 

very low and proportionately wide. But here, behind this 

little spring, was walking cave within 60' of the entrance! If it wasn't 

completely filled with water, that is. It is so much different of an 

entrance area that it probably isn't likely to act as those other 
two caves did. But if it enlarges in a manner similar to the two 

longest spring caves in the state, the potential is fantastic.

Another aspect that makes this cave a treat to work is that 

it's a clean cave. It was observed that on subsequent dives much 

less silt was dislodged from the ceiling of the resurgence 

sump. In the second sump the floor had mud right behind the 

breakdown, but once away from it, it was almost all bedrock. 

As I was progressing, I'd look back over my shoulder, and where 

I assumed there would be zero vis behind me, I could see 8-10'. 

Once I was through the meanders the visibility was limited only 

by the power of my light. I feel safe in saying I was viewing 

25-30' beyond the point of penetration. Even stopping to mess 

with the line didn't totally wipe out the visibility. I'm hoping that 

the percolation, the dislodging of loose materials from the 

ceiling, will make it less prone to dirty up the cave with each
Now that we have what appears to be going cave passage, we are gearing up for serious efforts. That next venture will be more slowly and carefully executed. Lines will be laid properly and permanently. We will be ready to do repetitive dives to methodically push this passage, hopefully to where it will "come up." As line is laid and it becomes necessary to move farther faster, we have the room to go to standard cave-diving gear, including fins and BC’s.


The successful part of this dive was easy enough to determine. The given criteria for a successful dive is that all the divers come back. The foul-ups were all mine, things that a bright diver would have figured out before hand, but I had to discover by making the mistakes.

Doug and I ducked into the air space and got back to the sump. We tied on the line and I took one drop weight to use in the event that I could not find natural points to tie to. The intent of this dive was to secure a permanent hand to use in pushing out the submerged portion of this cave. If I had to use weights, I would make a separate trip in and out for each one. Traveling much slower than on the first dive (5-22-88), I found a good “natural” at the first tight turn to the left. This is where I started “learning.”

I laid the reel and the weight on a ledge by the tie-off point, but failed to lock the spool. While attempting to tie to the wall, I knocked the reel off the shelf. No big deal, I thought, even though I was losing visibility, I had observed the depth of the floor and was sure I could pick it up to finish the knot. Unfortunately, there was a crevice where the reel went down. To keep things terse, I'll just say that it took numerous dives to finally retrieve the reel, by means of pulling out every last inch of line on it, before I could bring it up to within reach. Needless to say, nothing of importance was accomplished this day.

Back on the bright side, though, I did get to try out different gear in different combinations. I've gotten things pretty much streamlined and down to basics. I also probably doubled my actual time spent in the overhead environment and got much more comfortable in it. (Except for diving in Roubidoux Spring and the Wild Well, all my dives have been duck-unders that never kept me submerged for more than 2-4 minutes.)

I like A.J. Spring Cave and diving it is rewarding, even the snares. All in all, though, I had the most success on the first dive by just going for it. Only caution cut that dive short. I feel that the things I learned on that dive, and this will allow me to use my original tactics with a different combination of gear to make deeper explorations on the next dive.


Greg and I peeled off the 370” of small-diameter line that came on my dive reel and replaced it with 120’ of 1/8” nylon, all that it could hold. I had no qualms about working with the original line, but the new stuff was confidence inspiring. You can still feel it in your hand when you’re not moving.

I scooted into the airspace and tied on. I took adequate time to look around better this trip. The sump made a hard right turn at first and continued mildly to the right for 30’. This is where I wasted all the time and energy on the last dive playing games with the reel. The crevice I had dropped it into was a joint-aligned extension of the sharp left that the passage made here. At the height that I was working, it indented the right wall for several feet. 6-8’ lower, where I had dropped the reel, the passage continued on out of sight.

35’ further down the tunnel, to the point of previous penetration, was the next sharp left. This ran straight for 30’ and made yet another sharp left. I noted that there was a deposit of line-grained sand at the corner.

I intended to leave plenty of line on the spool of the reel, to be sure that it would rewind, but ended up unwinding it more than was prudent to get a look around the right-hand turn. This was roughly 110’ in. The cave ran straight for another 30’ and appeared to make another right.

The only air I saw was that which I had left on earlier trips. I should have made the effort to tie on the line and not just reel it out. I didn’t. With my light just floating free on its lanyard, pointing in no particular direction, I could still see to operate the reel and 2-3’ of the line. Either I’m getting better at not stirring up the silt or my hunch that the percolation that cleaned loose material from the cave ceiling would make for progressively cleaner conditions was correct. Hopefully, it was some combination of the two.

On the next dive I will either go back to the original line, or use a larger reel that Greg is constructing that will hold a more generous amount of the thicker line.

CAVE DIVING, A FAMILY AFFAIR?—or "Daddy, Which Spring are You Cave Diving at This Weekend?"

- by Harris Martin (NSS #26771)

As I am gliding through the subterranean rivers, my topside worries are left behind. I am absorbed with cave formations, silt, and air supply. Settle in for the long decompression, put on my gloves, harass my buddy, then perhaps the real world comes back to mind. Can I trust my children to be safe while swimming in the spring with the baby sitter? Will they get swept away by the Suwanee River? Will the local rednecks and cave divers have the courtesy to refrain from cussing in front of them? Will I get home early enough to get the kids back to my ex-wife at the appointed hour? What about that old failed relationship that might have gone better if she had only gotten into diving? Can’t go diving next Saturday, have to get the kids to their gymnastics lessons and a birthday party. That woman that I am going out with next Friday—do I have to explain accident analysis to her for a third time?

The sport- and cave-diving "industries" are geared primarily toward single men without children. More and more women are getting into open-water and cave diving, but most of them are wives or girlfriends of divers, and are either childless or have older children that don’t require baby-sitting. How often do you see a small group of women, out at the springs cave diving with the girls, with no men in tow? You do see men doing this with the boys all the time. Why is this? In large measure the heavy equipment, high costs, and macho social environment involved are responsible. Perhaps activities such as mountain climbing, white-water rafting, dry caving, etc. have similar sociological characteristics.

There is another obvious factor limiting the number of women involved in cave diving and other highly involved outdoor activities; they get pregnant and men don’t. Mothers usually have the primary responsibility for the care of young children, whether by choice or not. Sneaking off to the health spa or tennis courts or bridge game for an hour or two while the kids are in school or day care, is a lot easier for a young mother than going off to the springs, mountains, or caves for the day. Some ski resorts and health clubs, and most bowling alleys have child care. How many dive shops, marinas or springs have you seen lately that have child care facilities? How often do married men say, "Go on, honey, you go cave diving (or fishing, or kayaking, etc.) this Saturday; I’ll stay home with the kids, get Susie to her ballet lesson and Tommy to that birthday party?"

How many male cave divers do you know who dropped out of diving after they got involved with a woman who had no
interest in diving, or who had an ignorant fear of the dangers of
cave diving? How many open-water diving couples do you
know who quit diving after they had their first child? How many
women divers have you encountered, who got dragged into the
sport by diving boyfriends or husbands? How many times have
you dived with a guy who couldn't make the second dive
because he promised his wife that he would be home by six
o'clock?

The diving industry has barely begun to address the fact that
eventually, most heterosexual divers get married and have
children. This is one reason why so many divers are divorced.
I once met a cave diver who had a bumper sticker on his pickup
truck that said, "My wife told me that if I went diving one more
time, she would leave me. I sure will miss her." A sad
commentary, but very true to life for some divers.

When I was married, diving was my main relief valve for a
lousy marriage. My wife tried to take open-water lessons, but
she didn't want to go. Then, under duress, I promised my
wife that I wouldn't get cave certified until I finished graduation
school. In August of 1985 I took my stepson on a "camping and
diving trip." We didn't tell her that it was my Basic Cave class.
A week later she found out. While Hurricane Elena was stalled
off of Cedar Key, she gave me my walking papers. The divorce
was final two months later.

For a few months I did a lot of diving—caves, spearfishing,
riv. fossils, whatever. Then she took a weekend job. For two
years I had my kids every weekend. Saltwater diving was out
of the question. I couldn't leave my two-year-old and
two-year-old with my 12-year-old stepson at the dock for four
hours. The springs were sometimes feasible, but adequate
baby-sitting was a rare luxury. Sometimes friends helped my
stepson watch the kids at the springs, but when his mother and
me got involved in another legal battle, my stepson dropped out
of the picture entirely. Ex-stepparents

Once I took my stepson on a "camping and
diving trip." We didn't tell her that it was my Basic Cave class.
A week later she found out. While Hurricane Elena was stalled
off of Cedar Key, she gave me my walking papers. The divorce
was final two months later.

A month or two years back, my friend, Rick Wellsmith, and
I dove Madison Blue back past the Half Hitch, while my
cave-diver friends, Tim Ford and Tony Mellone, watched my
kids. My two-year-old son, Stan, came down with severe
diarrhea and the guys used up my entire diaper supply. After
decompression I had to bum extra diapers from the local
mothers hanging out at the springs, while Tim and Tony did their
diving shift. Needless to say, they didn't volunteer to baby-sit
for me again.

The wife of a dive-shop owner baby-sat my kids while
I went cave diving. Another time local Brandan friends of the
Skiles family baby-sat for me. My daughter, Rachel, did not like
these arrangements. She wanted to be at the spring where
my kids were, and she could watch her kids while I was diving.
Occasionally I got lucky and a cave-diving buddy had a girlfriend
along who would baby-sit, or a woman
cave-diver friend was sick and couldn't dive, allowing her to
watch my kids.

Only once did male cave divers volunteer to baby-sit for me.

Babysitting, women's liberation is
taken for granted. The Awards Committee has spent most of our
entertainment fund in an effort to aqurate the Tom Barton Safe
Cave Diving Award (PRICKS/CDS) to the U.S. Abe Davis Award
(NSS/CDS). This project was deemed necessary because most of the work in western Canada is sump diving,
and with the remote dive sites, even the most active cave divers
won't be eligible for the NSS-CDS award until sometime after
the year 2010.

Accordingly, the Committee attempted to aqurate the
appropriate number of northern dives to the 100 safe dives
required for the Abe Davis Award. They decided that
equivalency could be calculated by "weighting" dives using

1. 1.0 point (one dive) for venturing beyond daylight
underwater.
2. 0.1 point for every 1000 vertical feet above the road.
3. 0.1 point for every mile from the truck, and 0.2 if there isn't
a trail. Deduct 0.1 point if you use a helicopter.
4. 0.4 point for every mile from the truck if you do it on skis.
5. 0.1 point for every F˚ below 40˚ (water temp.).
6. 0.3 point for vis below 1˚, and 0.5 points for vis below 6˚.
7. 0.2 point for each bear sighting on the approach, 0.8 points for a charge, and 3.0 points if you get mauled.
8. 0.1 point if Morris brought his dog.

Although the Awards Committee has some good suggestions, the Section's biostatistician (Ralph LaTouque) discovered that a diver could receive an equivalency Award without even hitting up, simply by hiking the Jasper North Boundary trail for two weeks with his equipment, and others could claim Abe Davis equivalency after only 3 dives in the Flatheads. Obviously further work on this system is required.

In the meantime, the Tom Barton Safe Caving Award will continue to be presented using last year's criteria, namely:
1. You have been in ten sumps.
2. You are still alive.
3. You have bought the Committee members several beers.

DIVERS' CAMPGROUND IDEA IS ALL WET, RESIDENTS SAY”
[AP - Reprint - The Orlando Sentinel, Jan. 9, 1989.]
LURAVILLE—The question of whether cave divers should be welcomed as job-making tourists or shunned as rubbish-tossing rabble has surfaced during debate over the development of a campground catering to the thrill-seekers.

Few Suwannee County natives have embraced the thrill of scuba diving in the area's numerous springs and caves. In fact, many residents say they don't even use the springs as swimming holes on scorching summer days any more because of the outsiders who flock in to dive through the caves.

"I used to go to the springs all the time, but you can't go down there now with your family," said Sonny Sapp. "People are cussing and roughing it up, and there's trash everywhere. I'm not saying the divers do all of it, but if there's a bunch of them there, they kind of take it over."

Sapp lives in Luraville, site of the interconnected spring and sinkhole system known as Peacock Slough. It has long been such a mecca for cave divers that some Luraville folk feel that outsiders have wrongly laid claim to the springs.

A dispute about a campground that would cater to divers has heightened those emotions.

Leading the fight against the campground and the divers it hopes to attract has been the Luraville Baptist Church, just across the road from the campground.

"They've messed up the springs so much that you can't even enjoy yourself there now on weekends," church member Hank Dowling said.

Arwyn Carr, Jr., owner of Luraville's Spring System Dive Center and the man who wants to open the campground, defends divers.

Divers provide an economic boost to the area, and would add more money if they didn't have to stay in Lake City because of a lack of motels or campgrounds around Luraville, he said.

ATTN: ANONYMOUS FROM WAKULLA CO.
Dear "Anonymously Yours from Wakulla Co.:

Because of the nature of your anonymous letter, I am a little bit reluctant to print it—in spite of—or perhaps because of—its particular subject matter, without a little more proof of the bonafides of its authorship and intent. I can certainly understand why you don't particularly want to sign your name, even to me, but by the same token, you can probably understand that, for the same reasons, I feel a certain responsibility as Editor and am reluctant to print it without a little better assurance that it is not a hoax, or a "hypothetical," of some kind. I have upon occasion made independent investigation of the subject matter of articles, the veracity of whose authors I have reason to question; this, I feel, is my responsibility as Editor. I will be happy to print your letter as "Anonymous" just as soon as I am convinced of its authenticity.
—The Editor.

LETTERS TO THE EDITOR
January 2, 1989
Dear Editor,
I want to know why we are not having open membership meetings any more.
Sincerely, Paul Smith (NSS #14385), Gainesville, Florida

Dear Paul,

Good question. Personally I kind of miss the free-for-all shouting matches we used to have years ago in the auditorium after the workshops. (They reminded me of nothing so much as a Jacques Cousteau episode about bull sea elephants bellowing at each other on the beach...) No, all seriousness aside, the member meetings kind of got "phased out" as a matter of practicality, as the amount of material that had to be covered at board meetings grew from what could be covered in a five-minute huddle in the front of the auditorium to what was still incompletely covered in six-hour marathon typed-agenda meetings.

Workshop schedules have always been rushed, and the membership meetings didn't seem to attract very many people (witness the number of people who got up and walked out when the meetings began), so they were the first things to be eliminated from the workshop schedule. But I agree with you, and I would like to see some kind of general membership meeting reinstated, where members can openly state their opinions and ask nasty questions. Of course, Underwater Speleology—in the form of articles and "Letters to the Editor," such as yours—is open to all members and subscribers (and other interested individuals) as an excellent way to make their comments and criticisms known to other cave divers and elected board members. It's unfortunate that more people do not avail themselves of this method. A great number of people say that they're going to write in, and I am frequently told that I'm going to be positively inundated with angry letters on this subject or that—and almost invariably never receive a thing. Talk is cheap, and quickly forgotten. Who can even remember what's said at a membership meeting? Still, I rather like bull sea elephants...
—The Editor

January 4, 1989
Dear Editor:

I would like to voice my support for the safety concerns expressed by Lt. Henry Nicholson at our recent 1988 Winter Workshop. By the positive reaction of the audience following the comments, it appears obvious that these concerns are shared by many.

Sincerely, Jack Rensch (NSS #22172), Columbus, Ohio
### CAVERN AND CAVE MAPS

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