

Underwater *Speleology*

May/June Volume 22 Number 3



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CDS Membership—As a sub-organization or "section" of the NSS, the Cave Diving Section is subject to the bylaws and ethics of the NSS. Membership in the Cave Diving Section is open to anyone in good standing with the NSS. Annual membership is \$10 and includes a bimonthly subscription to this publication, *Underwater Speleology*, as well as voting privileges, publications and seminar discounts. Please send membership requests to Bruce Ryan at the NSS-CDS Main Office. Make checks payable to the NSS-CDS.

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Classifieds Policy—Free Classifieds for personal dive gear are available to members in good standing with the NSS-CDS.

Submissions

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

Submission Deadlines

May/June.....	April 20
July/Aug.....	June 20
Sept/Oct.....	August 20
Nov/Dec.....	October 20
Jan/Feb, 1996.....	December 20
Mar/Apr.....	February 20
May/June.....	April 20
July/Aug.....	June 20
Sept/Oct.....	August 20
Nov/Dec.....	October 20

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Events

Cave Diving Photo Contest

The CDS Board of Directors authorized the creation of an annual cave diving and underwater photography contest. There will be separate awards for amateurs and professionals. Professional photographers are defined as those who have had any photos published for pay.

Up to five entries per person can be delivered at the registration desk the morning of the workshop, and judging will take place during the day. All slides submitted will be shown that night, and the awards presented to the winners at the Workshop. If you cannot attend the Workshop but wish to send your slides for consideration, please mail no later than May 22 to CDS Photo Contest, PO Box 950, Branford FL 32008, Attention: Wayne Marshall. Please include a SASE if you wish to have your work returned to you.

Participants are encouraged to submit a duplicate slide for judging, in order to protect the original. You are also encouraged to donate the use of the image to the CDS for use in our publications. If a photo is subsequently used in any publication, credit will be given to the photographer. So, brush off your slides, and get ready to win! ♦

NSS & CDC Need Your Help

The January 1995 issue of *NSS News* contains a survey for the National Center for Disease Control (CDC). The CDC has little information on cave-related subjects and needs your input to establish their information base. The CDC would like to hear from all cavers, including wet ones! The survey is pretty basic, although quite a bit of information can be drawn from it.

The survey should only take about ten minutes of your time. It is designed to pull out from the center of the January issue, and folds up like a letter. Then you simply stick a stamp on it and mail. You don't have to hassle with envelopes or addresses. They are sent to the *News* address, and we bundle them up and forward them on to the Center each week.

With the number of cavers increasing, it is conceivable that a group will someday need to call the CDC, requiring information for their particular problem. Without the database, the CDC may not have the correct information to help out. While this may not seem significant to many, when it is your problem they are dealing with, it's significant. Please help out and send in your survey! ♦

Cathedral Opens

Cathedral is now open for diving. The following regulations have been approved by the Board of Directors concerning diving at Cathedral:

1. Divers must be members of the NSS-CDS and have their membership card.
2. Divers must be Abe Davis level or equivalent experience.
3. Divers must dive with someone who has been there before. No fees can be charged by those guiding.
4. Divers must have been to 150' depth in a cave before, with logbook proof provided.
5. Divers must have done at least 45 minutes of decompression on a prior dive.
6. Those wishing to dive Cathedral must contact Dell Motes (904-364-1590) before diving for conditions and approval. Conditions at Cathedral are extremely variable, with few diveable days each year.
7. Cathedral cannot be used as a training site.
8. A waiver is required each time Cathedral is dived, even if one has been completed the day before.
9. 20-foot visibility is the minimum requirement for diving Cathedral. ♦

Inside the Aquifer: Research Through Exploration

On May 13, 1995, at Wakulla Springs State Park from 1-4:00 P.M., a commendation will be presented to cave divers under the auspices of the National Speleological Society-Cave Diving Section and the National Association for Cave Diving. This commendation by the State of Florida will honor cave divers for the services they have performed by providing the State with information on the Floridan Aquifer system. The collection of data, production of maps, presentation of information, and documentation of cave geology and hydrology has been instrumental in assisting the State in protecting our valuable submerged natural resources.

In conjunction with the commendation will be presentations of research projects (15-30 minutes in length) that have been or are currently being conducted within the cave environment. The researchers will present information and data on the biology of caves, groundwater tracers, cave hydrology, and evolution of cave crustaceans, in addition to other topics. Posters of cave maps, photos and other research will be presented for viewing.

There are many fun activities available in the area. Canoes can be rented or brought to the Wakulla River. The riverboats at Wakulla Springs can take you to view the wildlife. The Wakulla Springs Lodge has excellent dining and

lodging facilities. St. Mark's Historic Trail offers biking and skating rentals (or you may bring your own). Unfortunately, because of the abundance of rain (more than 89 inches in 1994), the dive sites have not been clear in over a year and are unlikely to be clear by that weekend.

If you are interested in attending, please leave a message for Carliane Johnson at 904-539-9946. Include the number of people attending and the mailing address, and she will mail an agenda as soon as one is available. She can also send brochures associated with the above-mentioned activities. If you have a research topic you would like to present, please call her as soon as possible to make arrangements. ♦

Calendar

May

13

Inside the Aquifer: Research Through Exploration. 1-4 P.M., Wakulla Springs State Park. For more information see article on page four of this issue. Please contact Carliane Johnson at (904) 539-9946.

May

26-29

The 1995 CDS Spring Workshop, Branford, Florida. For more information see article on page six of this issue. Please contact Gene Broome, Workshop Chairman, at: NSS-CDS Workshop, PO Box 950, Branford FL 32008. Phone and/or Fax him at (904) 935-1141.

July

17-21

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

November

11-12

NACD Workshop to be held in Gainesville, Florida. Contact John Miller at (904) 629-1436.

Events Continue . . .

Bylaws and Constitution Review

In February 1994, the BoD assigned a committee to review the Section's existing Constitution and Bylaws. These documents have remained basically intact since the inception of the Section. As the Section continues to grow, the governing documents of the Section must be periodically reviewed to ensure they meet the needs of our organization. These documents currently have many inconsistencies between the Constitution and Bylaws. They also contain some provisions that are no longer applicable, and lack the means for addressing situations that may arise in a changing organization.

The committee, chaired by Watson Boxley and consisting of Kelly Brady, John Staub, and Rick Wolfe, spent the first half of 1994 in review of the existing documents. Revisions were

made with the goals of A) maintaining the original intent and purpose; B) correcting inconsistencies both within and between these documents; C) providing flexibility for a changing and growing organization. The revised documents were presented to the BoD in May of 1994 prior to presenting them to the membership for approval. The BoD, during the March 18, 1995 meeting, voted to accept the revisions for presentation to the membership for approval.

The revised documents will be published in an upcoming *UWS* for your review. Please give these your careful consideration. Changes to the original documents require a majority vote by two-thirds of the membership. **Your Participation Is Critical!** You will be receiving a ballot as part of the 1995 election process. We would

encourage you to vote in the affirmative to accept the revisions. As the Section continues to grow as a non-profit organization in the 1990's and beyond, it is imperative that our administering documents support and foster this growth.❖

*Submitted by Rick Wolfe &
Watson Boxley*

Members Manual Address Changes

Did the recent Members Manual contain all the correct information for you and your address? If not, please contact Bruce Ryan with those corrections. Instructors please contact Lamar Hires if incorrect information was listed for you. Their addresses can be found on page three of this issue.❖

Workshop '95 Venturing Thru the 90's

May 26-29, 1995

To say this workshop will be exciting is definitely an understatement! The response of professionals to become part of it in presenting lectures, mini-workshops, guided dives, and video presentations has been overwhelming. A large number of CDS members have volunteered to get involved and to assist in many ways. Our Workshop T-shirt was designed by Mike Bruic and is being printed at the screen printer right now; all who have seen the artwork have been excited about it. Be sure to get one!

Pre-registrations have been steadily coming in. We mailed out the official flier Monday, April 17 to all Section members to make sure that everyone can benefit from the pre-registration price by May 1. Also, we sent an unprecedented number to dive stores for distribution to many various markets. We want this to be the biggest and best ever. With this program of events, it surely does provide that potential. The flavor of this workshop is aimed at

all of our members, not to a specialty aspect of our pursuits. We have some wonderful information and presentations that the newest member or even the openwater diver can relate to. Remember, this is your workshop: support it and get involved in its success!

At this Workshop, the CDS will also inaugurate the first ever cave diving and underwater photography Photo Contest. All slides submitted will be viewed Saturday evening along with the other video presentations. For more information about the contest, please see page four of this issue.

We're extremely proud of those firms that are joining us in bringing you this event. Abysmal Diving, Inc., Beuchat USA, Cochran Consulting, and Dive Rite Mfg. are show sponsors, while Orlando Dive Center will sponsor the Friday evening social at the Suwannee River Cove Restaurant. Please be sure to let these firms know how much we appreciate their support. The best way to do that is to support them!

Friday Evening—May 26

Social at Suwannee River Cove Restaurant. Snacks and beverages will be available. Please join us for some fun.

Saturday—May 27

The speakers include: Bret Gilliam, Dr. Robert Millott, Dennis Williams, Hal Watts, Rob Palmer, Mike Cochran, Ed Betts, Jim Bowden, Jill Yager, and Terrence Tysall. Evening videos are brought to you by: George Irvine on the Sally Ward Project and the progress of the Leon County Sinks; Rob Palmer on

the Bahamas Explorations; Bill Rennaker on Convict Springs; Lamar Hires on Puerto Rico; and Wes Skiles with his latest and greatest! You don't want to miss this event. What a jam-packed day of events!

Sunday—May 28

Classes/Guided Dives/ Mini-Workshops:

Introduction to Closed Circuit Technology, Nitrox Certifications, Recovery Certification, CPR & First Aid Certification, Side Mount Class, Sump Diving Class, DPV Techniques (Obstacle Course), DAN Field Data Coordinator, U/W Surveying Techniques, Map Design Class.

Guided Dives to:

Hart Springs, Bonnet Springs, Thunder Hole, Peacock Springs, and Azure.

You must be pre-registered for the workshop by May 1 to participate in the guided dives. All locations *require* Abe Davis Certification. Air for all guided dives will be provided *free of charge* at the Branford Dive Center. Guides and divers will meet Sunday morning at the School at 8:00 A.M. for briefing, paperwork completion, and scheduling.

You can see that this is an action-packed weekend for you to enjoy. Please come on out and have some fun with us. We have more things available, but they will be surprises at the show. Hope to see you there! ♦

*Submitted by Gene Broome,
Workshop '95 Chairman*

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Apprentice Cave:

Is it a c-card?

by
**Lamar
Hires**

The Apprentice Cave Diver permit was started in the late 80's to offset the change from Basic Cave to Intro to Cave certification. The old Basic Cave Diver certification did not have any limits of training on the card, and twin cylinders were often used in

intent of the program. The program was designed to allow divers to venture out of the safety of the cavern zone. This is why the Basic Cave Diver certification was replaced with Intro to Cave. The limits of training are stated on the back of all certification



the course with the air rule of 1/6's used for penetrations. After some experience, many of these divers went to 1/3's on their doubles and were reluctant to complete training. At the time, Full Cave was looked on as the class for serious cave divers wanting to stage or do long penetrations. This was not the

cards. The state parks and private parks started enforcing the limits of training at cave sites after this.

The Apprentice Cave Diver permit is nothing more than a statement that a diver is in training to complete the Full Cave Diver program. There were many underlying reasons for the permit:

- 1) To give a diver time to absorb all the information conveyed in class without time pressure to complete or perform to make the grade over a short period of time, typically four days.
- 2) To give a safety break in multiple days of decompression diving.
- 3) To allow time to practice skills and techniques introduced in the Full Cave program.
- 4) To get comfortable with doubles and task loading of additional equipment.

The permit expires after twelve months, at which time the diver should complete training.

The Apprentice Diver should keep all dives straightforward and stay on the main line with no stage bottles or DPV's. Remember, it is not a certification, just a break in the Full Cave program.

I know those of you who think this article is aimed at you think you don't need to spend any more time with an instructor. I will have to agree that some may have better swimming techniques and penetration skills than some instructors, but the instructors are not there to show off their ability. They are there to evaluate your skills. So, if you think you have done everything your buddy has, but he has his Full Cave card, I beg to differ. The diver completing the program has demonstrated his or her skills in zero visibility and air sharing situations and task loading situations that any diver tries to avoid. Completing this evaluation is a feeling of accomplishment and earns you the Full Cave Diver certification. ♦

WKPP:

by
**Casey
McKinlay**

For the past ten years, WKPP has worked bits and pieces of Leon Sinks with the objective of proving that the caves of the Woodville Karst Plain are interactive. Now it will be possible for the group to simultaneously explore several key sites due to long-term permits extended by the Park Service, U.S. Forest Service, Department of Environmental Protection, Wakulla County, and several private/corporate landowners. These ongoing permits will cover the entire expected scope of Leon Sinks.

While George Irvine coordinated the national effort, Carliane Johnson, Steve Irving, and Gregg Knecht wrapped up the individual sites and laid the groundwork for the large-scale access. Background work, technology, and a proven track record in landowner relations were the work of Bill Gavin, Bill Main, Lamar English, Parker Turner, and many other group members. Bill Gavin and George Irvine were responsible for standards, procedures, and dive plan development, while training and assimilation of the expanded team were the domain of Jarrod Jablonski and Irvine. Equipment design and production were handled by Irvine, Gavin, and Arnold Jackson.

Once the system clears, WKPP will begin exploration with Big Dismal, trying to connect this to Cheryl Sink, and to explore the upstream conduit and sources at this end of the cave. The focus will then turn to Turner Sink, Wakulla Springs, and other new

sites between the two for which WKPP now has access. Meanwhile, the exploration team will be trying to tie Indian Springs into the system through one of the apparent interfaces between the spring and the conduit. As each section is completed, attempts will be made to expand Leon Sinks both east and west to determine the entire scope of influence.

Indian to Leon?

Recent dives by Steve Irving, Casey McKinlay, Barry Miller, and George Irvine have produced much more cave in Indian with possible interfaces to the Leon Sinks trunk system and Sally Ward Spring. On December 11, Steve and George found a way around the Wakulla Room, exposing a new larger room, dubbed the "Power Room," as it should lead to "power cave." The room is approximately four times the size of the Wakulla Room, with floor-to-ceiling clearance in the 100-foot plus range and width in the 200-foot range. Going back in a week later with a double team, Barry Miller and Casey McKinlay went right while Steve and George went left for a complete survey of the large room. Due to tannic in the trunk system, leads off the room are unpushable at this time.

On December 18, George, Steve, and Casey went back to push a tunnel first explored by George and Steve on the advice of Sheck Exley, which shows promise of an interface about 6000 feet out. This area of the cave has multiple branches of

large, wide tunnel, which is difficult to explore with much speed given the current limited visibility situation. Again, this area is currently unpushable, but still promising. These dives brought up an interesting technique used by WKPP for situations involving multiple restrictions, changes in flow, or unknown distances as far as scooter planning goes. Before each dive, each scooter is burn-tested using an array of resistors set up to mimic the current draw of the motors used (developed by Bill Gavin). This serves both to check the scooter and allows for a good charge for both the nicad and lead acid versions. After the dive, each scooter is then put on the array to see how much remaining time is left. This procedure allows the diver to estimate additional distance relative to remaining burn time, thus making a more informed decision of whether to switch to a larger pack or to a double scooter scenario. We follow the same procedure for lights.

Breakthrough!

On December 30, a major breakthrough was made at Indian. George Irvine, Casey McKinlay, Barry Miller, and Bill Mee set off on a survey dive, with the plan being for Mee and Miller to continue the survey from the 4200-foot station to the Wakulla Room, while McKinlay and Irvine went to gas and surveyed from the end of the line out. The main reason for this was both to find the real length of the cave

Leon Sinks Cave

and to properly position the side tunnels on the survey. The end of the line in the upstream tunnel at Indian has an interesting history going back to when Exley first discovered the Wakulla Room and left his reel—actually a 2-lb spool with a piece of rebar run through it—on the pillar, expecting to return someday to finish the exploration. Years later, in November of 1991, Bill Gavin and Parker Turner returned to explore further, adding line but not finding going cave in the back of the room. They would call the dive early, unaware of the blocked entrance restriction which would cost Turner his life and perhaps Gavin's as well had they found going tunnel and emptied a reel. Years later, the limestone pillar would be dubbed the "Nitrogen Mushroom" and to this date, Exley's reel is still lying on the top ledge of the pillar.

Irvine set up at the Mushroom to begin the survey while McKinlay looked around for anything unusual. Casey recalls: "Spotting a ledge some 20 feet above, I pulled out my WetNotes and wrote: 'looks good. Give me the reel.' I handed the WetNotes to George and George's response was to hand me Exley's spool of line and laugh, considering the visibility and the apparent absence of any going tunnel. I shook my head and insisted that George surrender the Gavin reel on his side immediately. He complied and watched as I tied in, aimed the scooter toward the ceiling and hit the trigger. I headed straight up, over the

ledge, and out of sight. Within seconds, George was in hot pursuit, survey book in hand." The tunnel was wide and swept clean at a depth of 240'. Almost immediately the floor fell away, revealing another pit with a duck-under at 290'.

There was no time to let off the trigger as the team headed on through and into going tunnel heading west-north-west. We tied off at 285' and decided to return in a week's time to push further. As it would turn out, that tunnel ended, but there were two more leads off the pit, and the best was yet to come.

The next set of dives would require a bit more planning, so we called in the troops for extended distance setups. Mark Sumner and Derek Hagler from Lloyd Bailey's Scuba and Rick Sanke and Brent Scarabin from Coral Reef Scuba in Tallahassee assisted with the decompression and nitrox setups. Bill Main, Todd Kincaid, and Tyler Moon placed nitrox stages at 3000 feet while Bill Mee, Barry Miller, and

Steve Irving placed trimix stages at 4900 feet. It's important to note that many of the setup divers and exploration divers are interchangeable on any given day should the need arise, and that everyone shares in the overall

"I shook my head and insisted that George surrender the Gavin reel immediately. He complied and watched as I tied in, aimed the scooter toward the ceiling and hit the trigger. I headed straight up, over the ledge, and out of sight."

success of any given mission. This interchangeability, along with WKPP's equipment configuration, keeps the team flexible and allows the majority of the dives to be very productive.

On January 21, 1995, the plan was to push the two remaining leads off the pit using two two-man teams. Jablonski and Irvine pushed the shallow syphon lead

WKPP continues . . .

812 feet at an average depth of 260'. The tunnel continues and will be pushed at a later date. Irving and McKinlay dropped into the pit and again found going tunnel, adding 500 feet at an average depth of 295'. The tunnel ended in a large, wide room with three to four leads, but again the visibility prevented the team from making an accurate assessment of exactly what was pushable and what wasn't. The following day the team returned and completed the deep survey, deciding to wait a few weeks until visibility improved to push on.

On March 5, 1995, the plan was to check out the most promising lead off the far room and to assess the possibilities of pushing the remaining leads in the future. Bottles were placed at the usual 3000-foot and 4900-foot stage drops, and the team was on its way. Irvine and McKinlay dropped their third stage bottle at 6500 feet and tied in with the reel. The tunnel took a sharp left and the flow noticeably increased. The floor was rocky and swept clean of any silt. The tunnel became low and wide, so they elected to leave the scooters and swim in the rest of the line. The tunnel stayed small at a constant depth of 310'. The team tied off and returned to the scooters, hoping to eliminate as many false leads as possible on the exit.

Future Plans

More dives are planned for April in this area of the cave as WKPP turns its focus to Sally Ward Spring in mid-March. Hopefully, WKPP will be able to establish a connection between these systems before year's end.

WKPP is gradually expanding and adding capable individuals willing to contribute to the team. WKPP is a research and exploration team comprised of NSS members using NACD standards as a base, and is by no means a recreational dive group running guided dives. WKPP uses its own standards and procedures with regards to team training, and has been at the forefront in develop-

upstream tunnel. WKPP divers Irvine, Jablonski, and McKinlay added and surveyed an additional 1080 feet of cave after pushing through a fourth restriction in the third downstream room. The cave was much smaller compared to the three previous rooms, with depths averaging 290 feet and the tunnel heading south-southwest. Meanwhile, Irvine, Miller, and utility man Steve "Bulldog"



© Bill Mee

**Indian Springs:
January,
1995**

ing some of the most advanced equipment used in long-range deep exploration diving. While WKPP may initially be thought of as an exclusive circle, the project has always been open to professionally submitted research proposals.

Sally Ward Update

A series of reconnaissance dives, requested by Wakulla County and the Department of Environmental Protection, produced both going cave in the downstream section and an accurate survey of the

Berman assessed the possibilities in the upstream tunnel for future side-mount exploration. The team concluded that the upstream has definite potential and completed an accurate survey on the final dive of the day. Many thanks to support divers Rick Sanke, Brent Scarabin, and Derek Hagler as well as Park Director Sandy Cook and Park Biologist Scott Savery. A new map will be forthcoming. Stay tuned! ♦

Hogarthian:

What's the Fuss?

by
**Jarrold
Jablonski**

Over the years there have been many arguments about gear configuration and many assertions of one style's benefit over another. Of course, in these cases one must merely evaluate all the pros and cons of a given style, attempt an impartial test, and render a decision. Obviously, one would follow that logical course in any important decision, and certainly in any case in which the decision could potentially impact one's longevity. However, I have noticed that this is not the case and that many people, and more disturbing yet, some cave instructors, are not even versed in the essentials of the sport's most basic styles. Some people are even unwilling to give a fair evaluation to all available options. Some of you are perhaps already turning a deaf ear. You have, of course, completely evaluated all your available options prior to arriving at your decision, right?

Different Styles

The vast majority of equipment styles are most easily discussed in relation to one's placement of the long hose. Many different styles of equipment configuration exist, and proponents of each variation differ in their specific solutions to the many details of equipment placement. The following two styles are the most popular divisions of hose placement. While many differences may exist within each group, the separation of the two primary groups largely pertains to one's

belief as to whether the regulator donated to an out-of-air diver should come from one's mouth or from one's retaining device.

The Bungie Style

The most common style places one's long hose in some type of surgical tubing or restrictive band. This band may be placed on the side of the tanks, near the manifold, on the backplate or nearly anywhere that suits one's fancy.

Proponents of this style vary in their dedication to the refinement of their equipment placement, with many divers generally lacking a focus on reduction and cleanliness. However, a few divers practicing this style do begin to approach the minimalist concept so obvious in the Hogarthian style.

The Hogarthian Style

William Hogarth Main is perhaps one of the most ingratiating personalities one could ever meet who, in many cases, has been cast in an unjust light. He is and has always been dedicated to the refinement of cave diving techniques, and seems to have been born with a great spirit of "kaizen," which is Japanese for "constant improvement." After nearly 25 years of cave diving, Bill Main still shows up at dive sights with gear modifications, constantly trying to reduce this or improve that. This attention to detail and constant desire to improve is one of the things that sets Bill Main apart as a person and as a diver. In that spirit, let us review some details of this style.

Breathing The Long Hose

This is by far the most controversial topic, so if you're still with me beyond the title, you may be curious enough to at least hear me out and consider your options. The following are some of the most commonly proposed excuses for breathing the short hose:

- 1) *The last thing I want to do in an out-of-air situation is give up my primary regulator.*

Is this really a rational fear? How many of you are *really* afraid to take your regulator out of your mouth for five seconds? If so, why? What happens when an out-of-air diver takes a liking to that regulator in your mouth? Will you be ready to handle that situation? By donating the long hose regulator in an emergency, one guarantees that the person most in need of a clean, fully functioning regulator is going to get it. If you pass any other regulator to an out-of-air diver, it is quite possible that the regulator received may contain contaminants that will be impossible for the stressed diver to manage. The advantage of donating your primary is that you are always ready for this very real possibility. Do you think everyone is going to casually give the "out-of-air/let's buddy breathe" signal? By the way, does anyone remember the out-of-air signal in zero visibility?

[There is no official touch-contact signal for this circumstance, according to CDS standards. However, Cave Diving Communications states, "If it becomes necessary to share air under conditions of zero visibility, the diver in need of air may have no choice but to take a regulator."-Ed] continues next page . . .

Nesbitt Spring Project

by
Jerry
Fant

On August 6-12, a team of sump divers will embark on a series of penetrations over 5000 feet in Nesbitt Spring. The sump of concern is the third in a series, located one mile from the entrance of Nesbitt Spring. The dives will consist of one to four hours each with total in-cave times being around 12 to 15 hours per day.

Nesbitt Spring Cave is located in North Central Arkansas. The entrance was once the site of a thriving sawmill owned by the Nesbitt family. The mill was torn down over 100 years ago, and today the only remnant is part of the limestone block dam in the entrance. To date there are 6050 feet of surveyed passages, with 2500 feet being submerged. The system begins as a dry cave with a large flowing stream; within 600 feet of the entrance, Sump I is encountered. Sump I is 237 feet long, with a maximum depth of 11

feet. Beyond Sump I, over 1500 feet of dry cave exists before Sump II is reached. Sump II is 157 feet long and maximum depth is again 11 feet. Sump II is slightly restricted midway through with breakdown. On the far side of Sump II are two 50-foot long crawls; these crawls restrict the size of equipment that must be carried through. Beyond the crawls, the system opens back up to its average size of 20 feet high by 30 feet wide. This passage extends for 1500 feet of wall-to-wall streamway, until Sump III is reached. Sump III is the object of the upcoming project and is 2000 feet long with a maximum depth of 100 feet. At the point of maximum penetration the cave continues, increasing in size and depth, down a 60° slope into the unknown.

Nesbitt Spring Cave saw the first diving activity in 1978 when Sheck Exley, Dave Monnett, and Paul

Smith made the first dives past Sump I. They passed Sumps I and II, and Sheck dove Sump III solo to reach a depth of 45 feet.

In March 1992, Jeff Disler and Jerry Fant made their first dives, passing Sump II. April 1992 saw the beginning of dives in Sump III. On the initial dives, a maximum depth of 75 feet was reached. Since April, 2000 feet of penetration have been achieved with a maximum depth of 100 feet and continuing. These dives were accomplished with a five-man support team, with 12 hours total in-cave time for a 54 minute dive in Sump III.

Due to increasing complexity and cold water (54°), work in Sump III was curtailed to push dry leads in the system. The dry leads have been extinguished and it is time to open exploration back in Sump III. Over 40 dives to date have achieved a surveyed distance of 6050 feet. ♦

Hogarthian continues . . .

2) *I don't want to breathe my long hose. I want to have the best performance regulator in my mouth and the long hose decreases this performance.*

I seriously doubt that your long hose is going to affect your performance in a noticeable fashion but, if it were, then I think it is poor judgement to stick the stressed, out-of-air diver with the lower performance regulator so you can have a more relaxed dive. Your best performance regulator must be on your long hose. The advantage in donating from your mouth is that you will be guaranteed to provide a fully functioning regulator in optimal condition to precisely the person who needs it most. You are also much more likely to be aware of your other second stage, as it is more intimately tied to your longevity. The

one thing to be clear on is that if the regulator you try to provide to an out-of-air diver is in *any* way substandard, you *will* be giving up the regulator in your mouth.

3) *I just don't want to deal with that hose around my neck.*

Any skill worth learning usually takes refinement. The long hose may at times seem uncomfortable to some people but, regardless of your storage location, you have to deal with that hose. When you tuck that long hose into some surgical tubing, you feel that it is forgotten, and indeed for some it is. What happens when it pulls free or is not set just right? You call your buddy to arrange it for you. Is it logical to configure your equipment in any way that forces your dependence on a dive buddy? If you do out-of-air drills prior to diving, you would

be amazed at how much quicker and more efficient two divers are who do not need help putting their hoses back in place.

4) *You can't stage dive and breathe the long hose.*

I would never have imagined that people felt this to be true, yet exposure to cave instructors whose abilities I otherwise respect has proven me wrong. Stage diving Hogarthian style is in no way more difficult than for any other style. In fact, the majority of cave exploration currently being conducted is by divers breathing the long hose, despite the fact that they are a minority in the cave community.

Remember, anyone can follow the masses. It takes character and conviction to invest the energy necessary to test all your options and render an evaluation. ♦

High Level of Nitrate in Springs

by
**Bruce
Ritchie**
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**The
Gainesville
Sun**

A federal study has found that springs near dairies along the Suwannee River have nitrate concentrations from 10 to 30 times higher than normal for groundwater in the region.

Nitrate is associated with diseases, increased stomach cancer and birth defects in humans. Nitrate in water bodies can favor algae growth at the expense of other aquatic life, including fish. Nitrate can come from several sources, but major sources are considered to be animal wastes and fertilizer on farm operations.

Blue, Convict and Telford springs, located near dairies in Lafayette and Suwannee counties, showed higher nitrate levels than groundwater in the region, according to the U.S. Geological Survey study. Wells at four dairy farms also showed high nitrate concentrations, according to the study.

"You can't have operations like dairy farms in an area like North Central Florida and not expect to see some effect on the groundwater system as far as degradation of water quality," said John Vecchioli, an agency official.

But a spokesman for a dairy trade association said a combination of land uses, including dairies, poultry farms and septic tanks, could be causing the higher nitrate levels in the springs. "There's more than

meets the eye on these things," said Art Darling of Dairy Farmers of Florida in Orlando. "To just say dairy farms are a bad actor is not telling the whole story."

The study report also comes amid efforts by government agencies to reduce ground- and surface-water pollution from farming operations. There also is opposition from some area residents to a proposed 750-cow dairy within a mile of the Suwannee River in northeastern Dixie County. More than 2,000 signatures have been collected on opposing petitions.

A 1992 study found high nitrate levels on nine dairy farms in North Florida. The more recent study, which covers 1990-1993, confirmed high nitrate levels on four dairy farms and suggested impact from area dairies on the springs.

Normal nitrate levels in area groundwater were 0.22 milligrams per liter in Lafayette County and 0.23 milligrams per liter in Suwannee County. The average nitrate concentrations in Convict Spring were 6.6 milligrams per liter. Blue Spring was 2.0 milligrams per liter and Telford Spring was 2.2 milligrams per liter. Samples were collected from wells and springs from 1990 to 1993. The report was released last week.

Darling said Convict and Telford springs are at least five miles from dairies, suggesting the

impact on spring water is questionable. But maps in the report show dairies within about two miles of each of the three springs.

The state Department of Environmental Protection (DEP) is developing a new dairy rule that includes more closely examining the proposed location of new dairies, Kirk Webster of the Suwannee River Water Management District said. New dairies in the Suwannee region also are required now by DEP to have an industrial waste permit, which requires treatment of waste on site.

The U.S. Natural Resource Conservation Service is developing guidelines, known as "best management practices," for dairies and poultry farms in dealing with animal wastes to protect water quality.

There is insufficient historical data to determine whether nitrate in the groundwater is increasing, said Vecchioli of the U.S. Geological Survey.

The study raises questions of whether best management practices can reduce the nitrate contamination and how many dairy farms should be allowed on the porous soils of North Central Florida, Vecchioli said. "I think it would be accepted by most that dairy farms will cause some degradation in water quality," Vecchioli said. "The question is how much degradation are you willing to accept?" ♦

The Cave Diving Section would like to thank Abysmal Diving, Inc., Beuchat USA, Cochran Consulting, Dive Rite Mfg., and the Orlando Dive Center, sponsors of this year's Workshop, for their generous assistance.

Inefficient Breathing:

by
**Woody
Jasper**

a

Wolf

in Sheep's Clothing

Breathing efficiency is critical to the safety and enjoyment of our diving career. Our personal air consumption rate influences our dive plans and eventually our selection of dive buddies. Our respiratory system has limitations that become more significant under diving conditions.

Let's go diving. Air is no longer plentiful or free, nor does it have low viscosity. Air is more dense, and requires more work just to breathe. Additionally, several significant psychological factors are imposed.

Time stress is such an integral part of diving that we almost take it for granted. When you began diving, your respiration rate was probably so poor that you were under time stress on the bottom of the pool. As our dive plans became more ambitious, our time stress to accomplish our plans focused on available air. When we became technical divers, our time pressure shifted to the decompression clock. It never goes away; it just gets worse as our dive plans become more complicated. It is insidious and unrelenting to the extent that we notice it most during its occasional absence. Take a new diver on a casual shallow reef dive and notice the absence of time pressure.

Another stressor is pre-dive apprehension. This can be a significant factor when executing a Big Dive. Always be aware that the physical and mental challenges presented by a difficult undertaking are magnified for the least experienced member of the team. If you are that least experienced team member, you have an obligation. You must slow the scope or pace of

the dive to a level you can maintain. Everyone has bad dives during which they do not feel well and perform poorly. The regulator for your third stage bottle is the old junker you bought at a garage sale and is breathing wet and hard while you are working at depth. These problems will occur, and you must respond. Remember, anyone can call a dive any time for any reason.

Objective-oriented dives are dangerous. Read some mountaineering books. They spend years and megabucks setting up a Himalayan expedition. When conditions deteriorate, and their time and reputation are on the line, they are prone to throw caution to the wind and attack the mountain. Consequently, the fatality rate for peaks higher than 8000 meters is about 10%.

Task loading: the more we can do, the more we take on. Cold? Throw on some more rubber. Low visibility? Hell, we're tech/wreck/cave/deep divers: it doesn't make a damn bit of difference to us.

"So," you ask, "do you have a point here or have you begun to babble incoherently?" The point is that we are dying in record numbers, and we don't know why. I suspect that our inefficient human bodies, placed under the physiological stress of diving (particularly deeper) and then pounded with the psychological stress of a long or deep dive, is prone to "pass out."

As mental stress increases, respiration patterns degrade. We begin rapid shallow breathing automatically unless we consciously avoid it. An article on controlling anger stated: "It is very helpful to remember to continue to breathe."

You're five to ten atmospheres deep, you're working, you're tired, your lungs and chest are fatigued, the regulator feels in need of a tune-up and then a problem occurs. You fight it rather than finesse it because your brain's problem-solving ability is low, your breathing goes to shit, CO₂ builds rapidly, you feel desperate for a breath; what else could go wrong?

The worst possible physiological response is the "what else." It's a big shot of adrenalin. One of the fastest and most powerful chemicals imaginable roars through your body like a runaway freight train, and you just pass out. Heliox, trimix, air or whatever gas you have does not cause or prevent this problem. Believing you are going to die is a self-fulfilling concept.

Fear, stress, anger: these emotions commonly cause people to pass out under normal non-diving situations. When it occurs underwater, it becomes another unexplained fatality. Several cases of passing out underwater have been documented. In some of these incidents, the victims have regained consciousness and survived. Oxygen convulsions are real and have clearly caused fatalities. However, to believe that O₂ is obviously the cause just because the diver was deep is an unjustified assumption.

When you are under stress, stop and deal with it. Sit on that desire to speed up and escape. If your buddy is under stress, help him regain control by holding his arm or hand gently, but with firm confidence. Emotions are conta-

How We Breathe

We learn in our initial open water training how a regulator or snorkel increases not only breathing resistance but also how we breathe. The volume of air we exchange with each breath is called the tidal volume and is composed of two parts. The first part comes from the airways, pharynx, mouth and regulator. This gas did not participate in gas exchange in the lung and is unchanged. This portion of the tidal volume is the "dead space."

The second portion of the tidal volume has participated in gas exchange and consequently is depleted of oxygen and is high in carbon dioxide. At the end of exhalation, this final portion occupies the dead space area and is the first gas inhaled into the alveolar with the next breath. Thus, each tidal volume is a mixture of the dead space volume and freshly inspired gas. The amount of fresh gas inspired is the tidal volume minus the deadspace. The larger the tidal volume, the greater the amount of fresh gas inspired with each breath. By increasing the tidal volume, we mix more fresh gas with the remaining dead space gas. Conversely, decreasing the tidal

volume or increasing the dead space depresses the ratio of fresh gas to recycled gas. We have a seriously inefficient system.

We get by with this level of inefficiency because air is plentiful, free, and easy to respire above water due to its low viscosity. At least we get by with it during low to moderate work loads. As the work level increases, several limiting factors occur. At the surface, our "cul-de-sac" lung arrangement is adequate to keep up with our cardiovascular system. During heavy exertion, the rate of blood movement, the capacity of our red blood cells and the efficiency of gas exchange to our tissues are the other major limiting factors.

One last physiological point: We can work for brief periods at a rate exceeding what these systems can support. Our muscles can produce energy through a secondary system called anaerobic metabolism that does not require oxygen and produces lactic acid. However, as anaerobic metabolism continues, lactic acid builds up, causing muscle pain and the "oxygen debt" that must be repaid. This oxygen debt causes us to breathe hard even after our activity level is slowed. ♦

gious, good ones as well as bad ones. The strength and confidence that you can give your buddy through your touch are potential life savers.

Despite potentially surprising or upsetting or angering anyone, I am coming out of the closet . . . No, not that, but to confess to skip-breathing. Breath-holding on scuba

is practiced by almost everyone that I know. The advantages include a more efficient breathing pattern, extended bottom time on the available gas supply and better buoyancy control. Skip-breathing increases the amount of fresh gas inspired with each breath. This is due to a tendency to take big deep breaths when skip-breathing. Respiration rate is controlled, and it is obvious when you are overworking. Gas goes significantly longer, wasting much less available oxygen. Buoyancy is only affected during the brief period of exhale/inhale. This is very important in low and silty areas. Lower respiration rates reduce work for the chest muscles that further reduces oxygen demand.

Learning to skip-breathe is just a matter of adjusting your CO₂ tolerance to reduce respiration, then figuring out how much is required to prevent CO₂ headaches. What did you think: that you were going to blow yourself up? I skip-breathe almost 100% of the time except during decompression, and I have skipped through several of those. Occasionally, take two or three deep-cleansing breaths if you feel short of breath.

The other suggestion is not to become so overworked that you can't deal with problems. You owe it to yourself and your team to admit: "I'm about to die at this pace if I don't slow down." Be aware of these conditions in yourself and watch for these conditions in your buddies. Nothing is sufficiently urgent to justify literally killing yourself from being in too much of a hurry. ♦

Why

by
**Wayne
Marshall**

Periodically, questions come up from new members of the Cave Diving Section regarding the relationship between the National Speleological Society and the Cave Diving Section. In a nutshell, the key word there is *Section*. The three best known and/or the largest United States caving organizations are the NSS, the Cave Research Foundation (CRF) and the American Cave Conservation Association (ACCA). Of these three, the NSS is the largest. The very names of the other two indicate where their priorities lie: in research on the one hand, and conservation on the other. The NSS is the only caving organization with specific programs for and emphasis on recreation, exploration, research, conservation, vertical caving, cave diving, and countless other special-interest areas. In fact, both of the other two organizations would rather sheepishly admit that the vast majority of their members were NSS members before joining the other organization, and remain NSS members still.

"Ancient History"

The ancient history of cave diving (about 30-40 years ago) records that there was a rift between certain members of the NACD over some exploration diving practices of the day. What the differences were and who the personalities were is probably not important, except in the memories of a few old timers who refuse to bury the proverbial hatchet. All that matters is that a group of people were forced out

of the NACD and went looking for a home. They found that home within the National Speleological Society, which welcomed them with enthusiasm. So, in 1973, another Section was formed within the NSS. The NSS had already established certain sections for the various special interest groups within the world of caving. These sections today include such diverse groups as the Spelean History Section, the Biology Section, the Cave Conservation and Management Section, the Cave Photography Section, the Cave Rescue Section, the Communications and Electronics Section, the Digging Section, the Geology and Geography Section, the Paleontology Section, the Survey and Cartography Section, the Underground Lighting Section, the Vertical Section, and the Cave Diving Section. Several have been omitted in the above list, but the Cave Diving Section is the second largest of these, second only to the Vertical Section.

Sections are but one of the types of Internal Organizations, as they are called, within the NSS. There are some 300 of these organizations—including many grottos, as the local chapters of the NSS are called. In fact, the CDS was not the first nor the second but the *third* NSS caving organization to be chartered in Florida. The Florida Speleological Society (FSS) has existed in Gainesville for over 40 years, and the Flint River Grotto (formerly known as the Florida State Caving Club) in Tallahassee were

grottos of the NSS prior to the creation of the CDS. Nowadays, there are a total of five grottos in Florida along with the CDS. The other grottos are the Central Florida Cavers in Orlando, the Dead Cavers Society in Orlando, and the Tampa Bay Area Grotto in Tampa-St. Petersburg.

CDS is Unique

The Cave Diving Section has a unique situation among these various internal organizations, including the other Sections, as it has evolved into a national training and certification agency and has been able to generate funding from external sources such as certification fees and publications sales. This has enabled the CDS to grow to its present size of over 800 members, and to continue to offer educational programs and training of the high caliber that has made the organization famous worldwide among divers. What is also somewhat of a challenge is that the CDS is the point of entry for many cave divers into the diverse and wonderful world of caving. Certainly, the majority of the Florida members have come into the organization from traditional scuba diving sources rather than from traditional caving sources. This avenue to caving is also unique among all the various 300 or so internal organizations of the NSS. By belonging to the Section, you also belong to a larger group of some 12,000 cavers nationwide with countless other interests, all bound together by their common interest in caves and caving.

NSS?

(Why not just CDS?)

This also means that you pay dues to the national organization as well as dues to the special interest section of the NSS to which you belong. That is true for all other Sections as well. Quite simply, the Section needs some funding to be able to operate and to continue its good work in many areas. It also means that if you do not pay your dues to the NSS, you cannot be a current member of the CDS. This policy has been loosely enforced in recent years, but you can expect that to change in the immediate future.

So, Why NSS?

The question then becomes: "What is there in the organizational structure of the NSS that I, as an individual, can take advantage of or benefit from?" The treasures of opportunity within the NSS are many and diverse. You should really study the NSS Members Manual, which will be mailed to all NSS members of record as of April 1. It is published alternately by state and alphabetically. The NSS Members Manual is usually received in mid-May every year. The Manual has a section in it listing the many committees of the NSS and the various internal organizations. The Society is somewhat loosely organized so that all committees come under the jurisdiction of one of the four NSS officers. As an example, the Internal Organizations Committee is found within the Department of the Administrative Vice President of the NSS. The

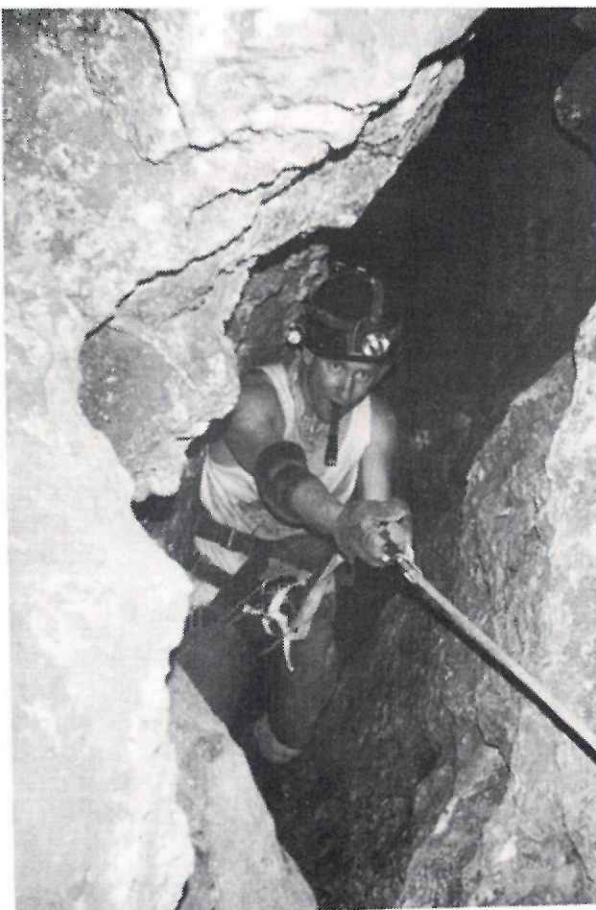
Conservation Committee is found in the Department of the Executive Vice President, and so on. There are some 25 pages devoted just to listing the various subsets of the NSS. Another ten pages are used to list the various Internal Organizations and contact phone numbers. There are simply too many subsets to list, but a few are noteworthy enough to deserve some discussion.

Publications—The NSS is the largest publisher of caving-related materials in the world, and aggressively seeks to publish anything related to caves and caving. The *NSS News* and the *NSS Bulletin* are the official publications of the Society. Various smaller special interest publications, such as *Underwater Speleology* and *Nylon Highway*, have grown to the point of having a significant number of international subscribers.

Conservation—Once again, the NSS is the foremost organization in this area. Task forces are organized in specific areas where caves are in danger of destruction. The Conservation

Committee works to educate the public on the importance of such concepts as underground wilderness, bat conservation, stopping cave vandalism, and providing leadership to lawmakers regarding cave-related legislation.

Cave Rescue—The National Cave Rescue Commission (NCRC), established by the NSS, is a nationwide network of cavers trained to face the unique problems caused by an accident underground. A national rescue call-out capability exists. The valuable work done through the leadership of the Cave Diving



Jeff Carson ascends the drop in Warren's Cave in Gainesville, Florida.

NSS continues . . .

Section's Rescue and Recovery Team Coordinator Henry Nicholson over many years has always been a part of the larger NCRC umbrella organization.

NSS Office and Bookstore—The national headquarters of the NSS is located in Huntsville, AL and also houses the NSS Library and the NSS Bookstore. Coincidentally, the office is located adjacent to a cave preserve containing Shelta Cave, which was the first cave property donated to the NSS by the Nature Conservancy. NSS-owned properties located in Florida include the 8.8 acres of land known as Alachua Sink, and the approximately seven acres of land that contains the entrance to Warren's Cave, also in Alachua County. Warren's Cave is the longest dry cave in Florida, exceeding 4.5 miles in length.

The NSS Bookstore offers a substantial discount on many products to NSS members. Publications from all over the world and symbolic devices such as belt buckles, pins, and other NSS related items are also available from this store.

Along with the above-mentioned facilities, the NSS Library is housed in Huntsville. Once again, this is the largest facility of its kind in the world. Researchers from all over the world have used this facility.

NSS Convention and Regional Events—There are approximately 10-15 regional events around the country, sponsored and hosted by various NSS organizations. These are very popular, with the largest having an attendance of well over 1,500 people. These activities provide an opportunity for cavers to get together in a social setting, and also provide a means for newcomers or visitors to an area to get to know local cavers who can

guide them to caving locations or provide local contacts for other activities throughout the year.

The NSS Convention is held in a different location around the country every year. Recent sites have included: Cobleskill, NY; Salem, IN; Pendleton, OR; and Bracketville, TX. The 1995 Convention will be held in Blacksburg, VA, July 17-21. The 1996 Convention will be held in August in Colorado, and the 1997 Convention will be in August in Missouri.

"Convention" provides an opportunity for cavers from all over the world to get together for a week of fellowship, technical sessions and presentations. Some excellent caving is always available as well.

The Cave Diving Section

One challenge that cave divers often have to overcome is that we are viewed with skepticism and wariness by regular cavers. This is largely due to the fact that cave divers have been content for way too long not to be a part of the mainstream of caving. A former chairman of the CDS once said to this author that "The problem is that the NSS leaders do not come to the CDS whenever they have a cave diving need." Folks, that is a severely distorted perspective.

The real problem is that we as cave divers have not taken the steps necessary to motivate the expedition planners and leaders to recognize our potential contributions to their goals and objectives for their expedition. For several years, I have cast the single largest block of votes in the Congress of Grottos meeting at the NSS Convention on behalf of the CDS, even though to do so for the last three years was a direct conflict of interest for me as an NSS Officer. "Why?" you may ask. The conflict was created because we, as officers,

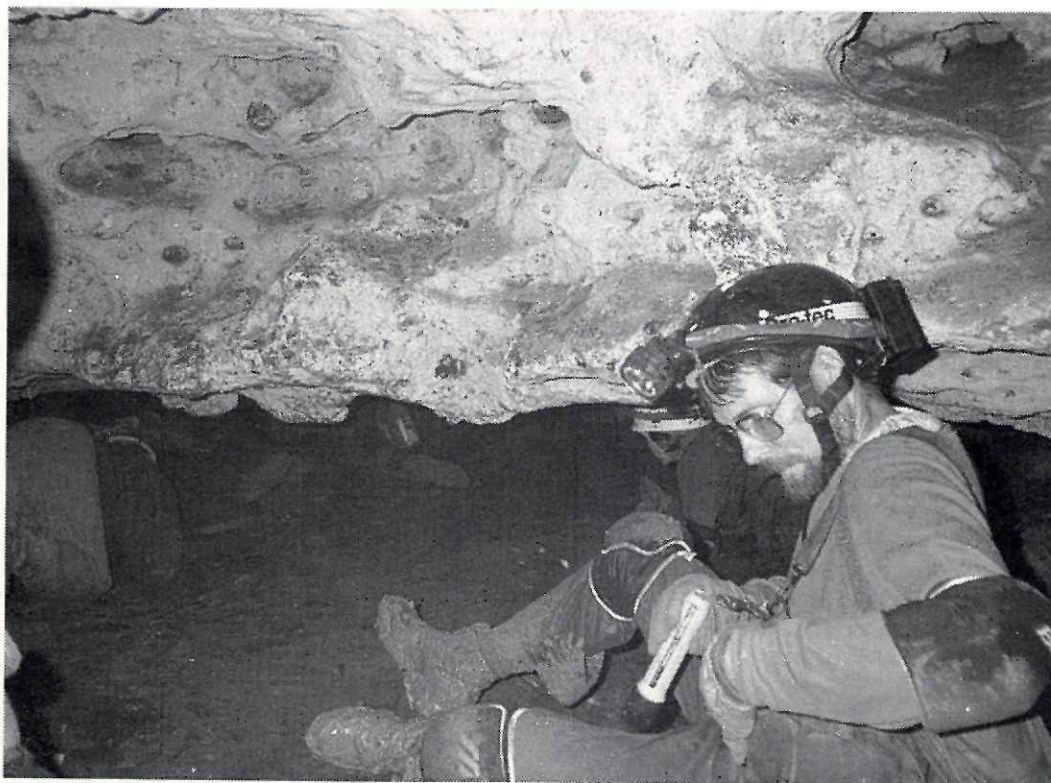
are supposed to remain impartial, and because there was not another single cave diver in attendance at the NSS National Convention. Unfortunately, that is the level of non-participation and non-leadership that the CDS has maintained for many years. Hopefully, that posture is changing!

Back to the question of cave diver participation in international and domestic expeditions. Most expedition teams are created in a word-of-mouth manner. Anyone can apply to be a member of the expedition, but only a few can make it as a walk-on candidate without prior credentials. Most expedition leaders recruit from their personal pool of contacts. That is the reality of the way things work. If the CDS membership continues to shy away from the NSS mainstream, the NSS leaders will continue to be wary of unproven expedition participants. If we truly want those few plum positions that come along, then we must prove ourselves worthy.

A brief example may be in order. I am a co-leader of an NSS-approved expedition to China. The initial group is planned to require 11 cavers and three or four cave divers. The only people considered for the cave diving team had to have vertical competency. There are a few people who have those skills in the CDS. I believe that I am either close friends or at least on a first name basis with virtually all of them. Therefore, if anyone else came along as a potential team member, I would have checked their credentials with other known qualified cave divers. If any one of my friends would vouch for or speak against the individual as a potential team member, that individual's participation on the trip might truly weigh completely on the opinion of one person. If, however, there

was a large group of people who were competent vertical cavers and competent cave divers, the negative opinion of any one individual would not carry near as much weight because a larger number of positive opinions might be found to counterbalance the negative.

On a final and somewhat personal note, I have often said that while I cannot go cave diving with my family and most of my friends, I can go caving with them. We can talk and socialize and explore all at the same time. Caving is a much more social activity than cave diving. I am speaking not of the period after caving, but the actual activity itself. You can actually talk with one another as you are doing it! What a concept! It has been my good fortune to have cave dived and caved on several international trips, and with a number of international visitors to our country. I can truly say that I now have caving friends all over the world. I regularly get caving e-mail from as far away as Australia, China and the Ukraine! I have found the fraternity of cavers to be very tolerant, accepting and welcoming of me as a relative newcomer to their side of the sport. I have encountered my fair share of good-natured kidding about being a cave diver, of course, but it came from people



Roger Werner in Briar's Cave, Florida.

who already understood and shared my fascination with the underground world.

It saddens me to think that we, as cave divers, would choose to continue to segregate ourselves from the mainstream of caving in America. It also disturbs me to think that some cave divers would actually think that they have learned all there is to know about caves and the caving experience in general. The end of learning is the beginning of stagnation. There are countless opportunities that are lost simply because we are not in the loop of expedition planning. Those relationships are developed and evolve over time. No one is clamoring to give their expedition plums to us without our members proving on an individual basis that they are deserving! As an example, the most recent issue of the *NSS News* had a short article seeking cave divers to assist with the exploration of a well-known cave in Arkansas.

That notice was not given to *Underwater Speleology* at all. The recent newsletter of the Karst Waters Institute had an excellent article on the development of the Woodville Karst Plain Project, which was published there first instead of in *UWS*. Folks, we need to step up to the plate and take a few swings at meeting our brothers and sisters in the underground. We need to quit talking about joint ventures between dry cavers and cave divers and get started making it happen! This year's NSS Convention in Blacksburg, VA, in mid-July, is an excellent opportunity to expand your horizons about caving! There will be a cave diving workshop or technical session (perhaps sump diving would be an appropriate topic!) if we want to have one. All we have to do is ask for it, and I am absolutely certain that the convention planners will be happy to schedule it! ♦

Please see important NSS information on pages 4 and 26 of this issue.

Out of Russia: A Memorial

by
**William
Oldacre**

Vladimir Kisseljov shook my hand, nodding impassively. Initially, I wondered if this tall, good-looking Russian was actually friendly. He seldom smiled. Moving briskly through his color slides, he matter-of-factly narrated some of the most stunning caving expeditions I've ever seen: a friendly deal with a military helicopter pilot, two weeks isolated in a mountainous "no man's land," bright yellow suits insulating them from water so cold it might freeze if it stopped moving, and spectacular rappels followed by miles of rugged passageway. All this to do a difficult cave dive at the end. "Geez, Vladimir, how many tanks did you portage in there?" Richly accented, but in good English, he answered our questions. Vladimir and his friend Ilia were clearly world-class cavers routinely challenging Earth's subterranean equivalents of Mount Everest.

Probably 95% of us have never faced such enormous obstacles, and that must have been obvious to him. But I never detected a hint of arrogance.

As we came to know each other, we argued caving techniques, equipment, and politics. A startled expression would often herald his responses as he studied my English until the meaning suddenly came to him. Despite his serious demeanor, Vladimir proved to be a friendly and

generous human being whose devotion to caving spanned twenty years. That warm bond that unites cavers everywhere, though unspoken, required no language to express itself. We became fast friends.

His immense contribution to caving has won him respect from around the globe. A seemingly tireless expedition caver, he discovered, explored, and flawlessly mapped hundreds of important caves inside Russia and elsewhere. Equipment and human resources were pressed to their limits as he pioneered new techniques and opened up uncharted areas for everyone. He spent years compiling a massive database on large caves of the USSR, cave accidents, and bibliographies. He prepared hundreds more English-language abstracts of Soviet articles for publication in Western bibliographies. He did all this, in addition to prodigious authorship of his own monographs on caving technique, mapping, regional analyses, cave descriptions, and literature reviews. Somewhere, Vladimir still found the time to participate in numerous international congresses, symposiums, and boards, in which he often assumed a contributing role. His works, letters, and travels introduced him to thousands around the world.

Recognition for all of this remained unimportant to him, overshadowed by his true love of caving and an honest humility. His only ambition was to do even more. Tragically, he died in the attempt.

Vladimir Kisseljov lost his life on March 8, 1995 in a cave diving accident at ZhV-52 in the Archangel region of Russia. He was 41. His friends risked their lives to recover him under extremely difficult conditions. Vladimir's loss has left a great ache in all who knew him. Even more, I ache for his best friends because I know the closeness that mutual survival can forge among cavers. Most of all, I grieve for his wife Tatiana and his children. I wish I could paraphrase Vlad—"Don't worry, the future will still be okay,"—though in today's Russia, I know it might not be.

This tragedy has exacted a price which international caving can scarcely afford. We have all lost someone important to us—even those who never knew him. He wasn't just a good caver and friend.

Vladimir Kisseljov was family.❖

(Some background information was drawn from correspondence with Alexander Klimchouk, Victor Komarov, and Ilina Manevitch.)

Expressions of sympathy:

Vlad's family:

Tatjana Kisseljova, Krasnobogatyrskaia 21-79, Moscow 107564 Russia. Fax (095) 361-1415 (Moscow; English okay, translation available).

Vlad's parents: phone (095) 964-2105 (Moscow; no English).

Vlad's friends:

Ilia Alexandrov: phone (095) 127-12-24 (Moscow; English okay).

Oleg Kazharsky: kaz@ogura7.kuee.kyoto-u.ac.jp (Kyoto, Japan; English okay).

Andrew Byuzukin, Tanya Nemtchenko: andrew@microb.oil.msk.su (English okay).

The Speleo-Club "Barrier" (Moscow) is preparing a history of Vladimir Kisseljov's life. Those who wish to contribute articles (3-5 pages, June 1995 deadline) please contact: Grigori Sigalov and Konstantin Dubrovsky, phone (095) 576-3463, fax: (095) 408-5144, e-mail: sigalov@barrier.mipt.su.

The Ukrainian Speleological Association (Ukr.S.A.) has created a fund to accept organizational and private donations in Vladimir Kisseljov's memory. Monies will be applied to future projects of the Ukr.S.A., which will bear his name. If you wish to contribute, please contact: Doug Soroka, Ukr.S.A. Treasurer (West), 1008 Schwenk Mill Road, Perkasio, PA 18944, Phone: (516) 477-0263, email: dsoroka@arserrc.gov.

A memorial videotape of Vladimir Kisseljov is being prepared. If you wish a copy, want to contribute material, or have questions, please contact: Alexander Klimchouk, P.O. Box 224/8, Kiev 30, 252030, Ukraine. Email: klim@klim.carrier.kiev.ua.

The large **Vladimir Kisseljov Archive** is being preserved intact. To access or contribute materials to this archive please write to: Tatjana Kisseljova, Krasnobogatyrskaia 21-79, Moscow 107564, Russia.❖

Mexico Deaths

Two certified Full Cave Divers perished during April in the Maya Blue cave system in Mexico's Yucatan Peninsula. Both were part of a larger group of divers visiting from the United States. The two were diving as a buddy team at the time the accident occurred.

Each of the victims had been certified to the Full Cave level for several years and were considered to be quite experienced divers by friends. One diver had over five years experience and well over 100 dives; the other had three years of experience and had done quite a bit of diving both in Florida and in the Bahamas.

Preliminary investigation and analysis suggest that the two made several navigational errors. Having made a wrong turn at a T intersection, the two apparently ignored the directional information imparted by line arrows and made at least one visual gap. Ironically, the victims found another main line leading to the exit; however, it appears that after following this line until it ended near the cave entrance, they inexplicably turned back into the system, rather than use a safety reel to search for daylight. Shortly thereafter, they ran out of air and died. ♦

Submitted by Harry Averill

Accident Report from Russia

On March 4, 1995, a cave diving expedition was flown by helicopter to the town of Pinega in the region of Archangel, Russia.

The expedition's goal was to investigate caves with underground rivers on the plateau Belomorsko-Kulojskoje, and particularly ZhV-52 in which earlier work had been done. On a previous dive at this site, Vladimir Kissel'jov passed 190 meters in the sump. At 1:45 P.M. on March 8, Kissel'jov began a solo dive in ZhV-52 carrying three tanks (7 liters each, 160 atmospheres), a spool with safety wire, and two lights fixed to his helmet. Although a safety wire was laid in the sump last year, it was decided to lay a new one because the condition of the old wire was not known (very strong floods may occur in the springtime).

Two of his three tanks had gauges for air reserve control. According to the plan, Kissel'jov was to leave the gauge-less tank 100 meters from the entrance and swim on with the other two tanks attached to his sides because a restriction was anticipated 190 meters into the cave.

He planned to lay the safety wire as far as possible, retrieve the third tank on his return, and exit to the surface. After that, they were to take the regulators off his tanks and put them on the three other full tanks (they had six tanks, but only three regulators). Roman Prokhorov was to make the second dive to extend the main passage or to investigate its

branches (depending on the conditions). The duration of Kissel'jov's dive, according to the air reserve, had to be one hour.

Three hours passed and Kissel'jov did not appear at the surface. Because the second diver did not have enough equipment for diving, the team attempted the only possible rescue under the circumstances: the inspection of the nearby dry caves in case Kissel'jov managed to surface in one of them. These searches gave no positive results. Two heartsick members went into the town of Pinega to call a helicopter with the necessary rescue equipment.

Rescuers from Archangel arrived aboard helicopter on the morning of March 9. At approximately 2:00 P.M. Roman Prokhorov, equipped with two special "Podvodnik-2" assemblies, entered the system and began searching for Kissel'jov.

At 80 meters from the entrance, he found one of Kissel'jov's fins with a broken strap. Two tanks were found at 100 meters. One of them was the one Kissel'jov had planned to leave there on the way in. The air hose of the second tank was tangled in the safety wire laid by Kissel'jov. Both tanks were empty.

Prokhorov followed the unspooled safety wire to its end where, at 220 meters, the unattached spool was found with the remaining wire. He continued to the 250-meter point, where he rigged the safety wire to a hole in the wall, cut off the excess, and swam back.

On his return he collected the equipment and, approximately 60 meters from the entrance, found Kissel'jov's body near the ceiling with the third tank (the height of the passage was 3-4 meters). This tank was empty, too. According to the medical examination, death came as a result of classic drowning.

The following accident sequence is presumed. Kissel'jov hooked the safety wire near the spare tank on his way in. Because it was not attached at the other end, a loop around the tank's air hose occurred on the way out. While attempting to untangle it, all of his air in the two tanks was consumed. It is likely that the wire's untangling was complicated by extremely heavy silt conditions and by weak batteries which, because of the extended stay, had seriously discharged. He finally abandoned the wire and attempted to swim to the exit with the air remaining in the third tank. He must have been swimming hard when the strap on one of his fins broke, crucially slowing him down and forcing him to work much harder. Ultimately, too many things had gone wrong and he did not have enough air to make his escape. ♦

Written by Victor Komarov from a firsthand account by Roman Prokhorov. Translated from Russian by Elina Manevitch; edited for publication by William Oldacre.

**Submitted
by
William
Oldacre**

60 Points of Light

by
Jeff
Carson

Question: How did you buy your last primary light?

Answer: DiveRite . . . because my dive buddy likes them, American Underwater Lighting . . . because Arnold taught me full cave, or some other thought-filled reason. As for me, I bought my first primary dive light from an advertisement in the *Orlando Sentinel*. Pretty typical! Recently I started to do a little research on dive lights and, specifically, lamps (Reader's note: you screw in a light bulb; you plug in a lamp). The following is intended to provide the basic information necessary to make an informed buying decision regarding primary cave lights. I have also included a section called "Mr. Poindexter's Garden," which provides the "overdrive" calculations for lamp draw, light output, lamp life and an estimate of battery burn time.

The three most popular light heads in use for the cave diver are the Test Tube head, the MR 16, and the MR 11. According to my research, the largest variety of lamps (you screw in a light bulb; you plug in a lamp) belong to the MR 16 family. Below, I have included a brief discussion of a few lamp parameters to ensure that we are on the same track.

Overdrive: The term "overdrive" is used to describe a lighting system in which the battery voltage exceeds the lamp voltage (i.e., a 21-volt 80 watt lamp powered by a 24-volt battery pack). Overdriving a lamp

provides a very bright blue/white light. A typical example of "overdriving" a lamp is the MR 16 DDS lamp, which is a 21-volt 80 watt lamp. If powered by a 24-volt battery pack, the output increases from 80 to 98 watts, the light color increases, the lamp life decreases from 1,000 to 201 hours and the lamp draw increases from 3.8 to 4.1 amps.

ANSI Code: The far left column in the following data tables is the ANSI (American National Standards Institute) code. This is the letter designation you need to know in order to buy exactly the lamp you need for any application. Notice that there are several choices in the same voltage/wattage categories. The primary difference here is beam angle.

Volts: This column in the data tables provides the voltage at which the lamp is designed. If the lamp is used at any other voltage, the wattage, light color, average life and lamp draw (current) in amps will change.

Watts: This column shows the rated power consumption in watts at the design lamp voltage. Wattage is a simple indication of how bright the light is.

Light Color: This column provides the light color in degrees Kelvin. An example of light color is the yellow light color provided by a primary light after a long dive. If the light is not turned off, the light color will turn orange and then red as the battery voltage is reduced below

the design voltage of the lamp. The higher the degrees Kelvin, the hotter the filament and the brighter the blue/white light color.

Average Life: This column is the average life in hours that a lamp will function at the rated voltage. Note that in the Test Tube data table, the BRL/BCD (ANSI code) has an average life of only 50 hours, while the lamp directly below, at the same voltage and wattage, has an average life of 2,000 hours. Big difference!

Beam Angle: This column provides an idea of light dispersion. Typically three categories are used including spot, narrow flood and flood. "Spot" generally includes beam angles from seven to 15°. "Narrow spot" includes beam angles from 16 to 30° and "Flood" generally includes beam angles greater than 30°. Most of the major lamp manufacturers provide some indication of beam angle. However, the specification books used for my research were not consistent and many of the lamps do not give any beam angle information due to the design application.

Test Tube head users don't have this problem. For cave diving applications, a spot or very narrow flood provides a focused beam angle to allow for signaling a dive buddy.

Lamp Draw: This column provides the lamp draw in amps. This is also referred to as "current." This information is used to calculate battery burn time and other neat stuff.

continues page 24 . . .

MR 16 Lamps

ANSI Code	Volts	Watts	Light Color Kelvin	Avg. Life Hours	Beam Angle Degrees	Lamp Draw Amps
EKZ	10.8	30	3,100	200	*	2.8
EPT	10.8	42	2,900	10,000	*	3.9
ESX	12	20	3,150	3,000	12	1.7
BAB	12	20	2,950	3,000	36	1.7
EPN	12	35	3,300	50	*	2.9
EYR	12	42	3,000	4,000	12	3.5
EYP	12	42	3,000	4,000	36	3.5
EYS	12	42	3,000	4,000	20	3.5
EXZ	12	50	3,000	4,000	24	4.2
EXT	12	50	3,000	4,000	13	4.2
ENL	12	50	3,050	3,000	30	4.2
EXN	12	50	3,000	4,000	40	4.2
FPC	12	65	3,050	4,000	24	5.4
FPA	12	65	3,050	4,000	13	5.4
FPB	12	65	3,050	4,000	38	5.4
EYC	12	75	3,050	4,000	38	6.3
EYF	12	75	3,050	3,050	14	6.3
EYJ	12	75	3,080	4,000	25	6.3
EMC	12	100	3,100	200	*	8.3
EXV	12	100	3,350	50	27	8.3
DDM	19	80	3,350	50	*	4.2
EKG	19	80	3,400	25	*	4.2
EJY	19	80	3,350	50	*	4.2
DDK	19	80	3,300	40	*	4.2
ENW/ENC	19	80	3,200	200	*	4.2
DDM-5	20	80	3,350	50	*	4.0
DDL	20	150	3,150	500	*	7.5
DDS	21	80	3,125	1,000	*	3.8
EDL/EJN	21	150	3,350	40	*	7.1
EKE	21	150	3,250	200	*	7.1
EJV	21	150	3,350	40	*	7.1
EJM	21	150	3,350	40	*	7.1
EJA	21	150	3,350	40	*	7.1
EKX	24	200	3,400	25	*	8.3
ESC	24	200	3,400	25	*	8.3
EWf	24	200	3,350	50	*	8.3
EJL	24	200	3,400	50	*	8.3
ELC/E	24	250	3,400	50	*	10.4
ELC	24	250	3,400	50	*	10.4

Test Tube Lamps

ANSI Code	Volts	Watts	Light Color Kelvin	Avg. Life Hours	Lamp Draw Amps
JCI2V30WH20	12	30	*	2,000	2.5
JCI2V35WH20	12	35	2,900	1,000	2.9
BRL/BCD	12	50	3,400	50	4.2
JCI2V50WH20	12	50	3,000	2,000	4.2
JCI2V75WH20	12	75	3,000	2,000	6.3
JCI2V100WH20	12	100	2,900	2,000	8.3
FCS	24	150	3,400	50	6.3
FDV	24	150	3,300	100	6.3
EHJ	24	250	3,400	50	10.4
ECV/FGX	24	250	3,200	300	10.4
FNT	24	275	3,400	75	11.5
JC24V300W	24	300	3,400	50	12.5

MR 16

I have included a data table of all the MR 16 lamps available (that I know of!) in 12 and 24 volt, as well as some of the lamps that are rated at slightly below 12 and 24 volts (please see page 23).

Wow! Thirty-nine choices: what a country! Notice that in the 12 volt family there are four 50 watt lamps. Three of these lamps have the same light color and the same average life. However, the beam angle varies significantly.

Through experimentation, I have found that beam angles greater than 20° are not adequately focused to allow the diver to safely signal a buddy. An asterick (*) in all tables indicates that the information was unavailable.

MR 11 Lamps

ANSI Code	Volts	Watts	Light Color Kelvin	Avg. Life Hours	Beam Angle Degrees	Lamp Draw Amps
FTB	12	20	2,900	2,000	10	1.7
FTC	12	20	2,900	2,000	17	1.7
FTD	12	20	2,900	2,000	30	1.7
FTE	12	35	2,950	2,000	10	2.9
FTF	12	35	2,950	2,000	20	2.9
FTH	12	35	2,950	2,000	30	2.9
50MRII/ 10/SP	12	50	*	3,000	10	4.2
50MRII/ 20/MFL	12	50	*	3,000	20	4.2
50MRII/ 30/FL	12	50	*	3,000	30	4.2

Points of Light continues . . .

MR 11

The MR 11 style light head is smaller than the MR 16 head and provides nine choices according to my research. However, the lamp selection is somewhat limited when compared to the plethora of lamp selections listed on page 23, and no 24-volt selections are available. I have included a data table for an informed MR 11 lamp selection (see bottom chart, page 24).

Test Tube Heads

Test Tube head users have a healthy variety to choose from with 12 lamps. A major advantage to the Test Tube head is

variation of beam angle. The BRL/BCD is the hottest of the 12-volt lamps, and provides a very bright blue/white light. However, the very hot Kelvin temperature causes a very short 50-hour average life. I have included a data table for the informed selection of Test Tube lamps (see top chart, page 24).

Typically, the 24-volt test tube and MR 16 lamps listed on page 23 are used for video lighting. As can be seen from the Lamp Draw column, the 24-volt lamps have a large amperage draw, requiring relatively large battery packs.

Mr. Poindexter's Garden

In the box below, I have presented some of the overdrive calculations as well as the calculations for burn time estimates. All of the examples below utilize a 24-volt 12 amp hour battery pack and a DDS 21-volt 80 watt lamp.

Conclusion

There are at least 60 different lamps to choose from out there. There are also several choices in many of the same voltage/wattage families. An intelligent buying decision goes well beyond "I want a brighter light."

Question: How will you buy your *next* primary light? ♦

Lamp Draw

The calculation for lamp draw in amps without overdrive is:

$$\begin{aligned}\text{WATTS} / \text{VOLTS} &= \text{AMPS} \\ 80 \text{ WATTS} / 21 \text{ VOLTS} &= 3.8 \text{ AMPS}\end{aligned}$$

The calculation for overdrive lamp draw is a little more complicated. Read through the example and a basic algebra background should get you through. Remember to do the stuff in the parentheses first.

$$\begin{aligned}\text{LAMP DRAW} \times ((\text{BATTERY VOLTAGE} / \text{LAMP} \\ \text{VOLTAGE}) \text{ TO THE } .55 \text{ POWER}) &= \\ \text{NEW LAMP DRAW} \\ 3.8 \text{ AMPS} \times ((24 \text{ VOLTS} / 21 \text{ VOLTS})^{.55}) &= \\ 4.1 \text{ AMPS}\end{aligned}$$

Notice that the amperage of the lamp is greater when it is overdriven. This increased lamp draw will shorten battery burn time.

Lamp Life

Overdriving the lamp reduces the average life of the lamp. From the MR 16 data table, the average life of the DDS lamp is 1,000 hours. The new life calculation is:

$$\begin{aligned}\text{LAMP LIFE} \times ((\text{LAMP VOLTAGE} / \text{BATTERY} \\ \text{VOLTAGE}) \text{ TO THE } 12 \text{ POWER}) &= \\ \text{NEW LAMP LIFE} \\ 1,000 \text{ HOURS} \times ((21 \text{ VOLTS} / 24 \text{ VOLTS})^{12}) &= \\ 201 \text{ HOURS}\end{aligned}$$

Light Output

The overdrive wattage is a simple indication of the amount of light a lamp will provide. The light output (overdrive wattage) calculation is:

$$\begin{aligned}\text{OVERDRIVE CURRENT in AMPS} \times \text{BATTERY} \\ \text{VOLTAGE} &= \text{NEW LIGHT OUTPUT} \\ 4.1 \text{ AMPS} \times 24 \text{ VOLTS} &= 98.4 \text{ WATTS}\end{aligned}$$

The above calculation indicates that the 80 watt lamp now produces 98.4 watts of light.

Battery Burn Time

In order to estimate burn time for the above example, the first step is to calculate the watt hour capacity of the battery pack. The formula is:

$$\begin{aligned}\text{AMP HOURS} \times \text{VOLTS} &= \text{WATT HOURS} \\ 12 \text{ AMP HOURS} \times 24 \text{ VOLTS} &= 288 \text{ WATT HOURS}\end{aligned}$$

The next step is to use the overdrive wattage calculated above in the following formula:

$$\begin{aligned}\text{WATT HOURS} / \text{OVERDRIVE WATTAGE} &= \\ \text{BURN TIME ESTIMATE} \\ 288 \text{ WATT HOURS} / 98.4 \text{ WATTS} &= 2.9 \text{ HOURS}\end{aligned}$$

It is important to note that the above is just an estimate. This estimate will be affected by several factors including quality, length and diameter of wiring harnesses, age and condition of the battery, and other factors.

A similar result can be achieved by dividing the amp hour rating of the battery pack by the lamp draw on the system. The formula is included below.

$$\begin{aligned}\text{AMP HOUR}_{\text{batt}} / \text{LAMP DRAW} &= \text{BURN TIME} \\ 12 \text{ AMP HOURS} / 4.1 \text{ AMPS} &= 2.9 \text{ HOURS} \quad \spadesuit\end{aligned}$$

Western Kentucky University, through its Center for Cave and Karst Studies in cooperation with Mammoth Cave National Park, offers a series of one week summer courses/workshops focusing on caves and karst landscapes. Some courses are available on a basic level, requiring only an interest in the subject matter, while others are taught on an advanced level, and prior subject knowledge is assumed. Visiting professors have been chosen who are internationally recognized as authorities in their field and as excellent teachers.

These intense field courses combine formal lectures with field observations and techniques. Some courses involve long and rigorous trips into rarely visited portions of Mammoth Cave while others are more surface-oriented and less physically demanding. All students must be in excellent physical condition, and should be prepared for strenuous activity each day.

Courses offered in 1995 include Karst Geology, June 12-17 with Dr. Arthur N. Palmer; Exploration of Mammoth Cave, June 12-17 with Dr. Stanley D. Sides; Speleology, June 19-24 with Mr. Roger Brucker; Karst Hydrology, June 19-24 with Dr. William B. White and Dr. Nicholas Crawford; Cave Photography, June 19-24 with Mr. Charles A. Swedlund and Mr. Richard Zopf. Also being offered is "Exploration of the Karstic Resources of Southeastern New Mexico" by Mr. Ronald C. Kerbo on Nov. 25-Dec 2.

More information on the Karst Hydrology course is provided below; for more information on the other courses listed, please contact Dr. Nick Crawford or Dr. Chris Groves, Center for Cave and Karst Studies, Department of Geography and Geology, Western Kentucky University, 1 Big Red Way, Bowling Green, Kentucky 42101-3576, phone 502-745-4555.

Karst Hydrology June 19-24

The hydrology of karst terrains is treated from the point of view of integrated drainage basins. Discussion will address karst landscapes, the hydrogeology of karst aquifers, caves and their importance as records of paleohydrology, karst water chemistry and its use in the analysis of flow systems, water balance and the physical hydrology of karst, evaluation of karst water resources, and the identification of environmental problems in karst. The course will deal with groundwater monitoring techniques, groundwater tracers, and the movement of contaminants through karst aquifers. Field exercises will include qualitative and quantitative dye trace tests, geophysical techniques (such as microgravity) for locating cave streams from the surface, color downhole video, and cave radio techniques for locating monitoring wells in karst aquifers. A primary objective of the course will be to provide state-of-the-art information and hands-on experience for dealing with groundwater problems of karst regions.

Instructors:

Dr. William B. White

Dr. White is professor of geochemistry at the Pennsylvania State University. He holds a B.S. degree in chemistry from Juniata College (PA) and a Ph.D. in geochemistry from Penn State (1962). He has supervised ten M.S. and Ph.D. theses in karst-related subjects and has written some 150 papers on karst hydrology and geomorphology. He is the author of *Geomorphology and Hydrology of Karst Terrains*, and co-editor of *Karst Hydrology: Concepts from the Mammoth Cave Area*. Much of his karst hydrologic work has been in the Mammoth Cave Area.

Dr. Nicholas Crawford

Dr. Crawford is a professor in the Department of Geography and Geology and Director of the Center for Cave and Karst Studies at Western Kentucky University. He has written over 160 articles and technical reports dealing primarily with groundwater contamination of carbonate aquifers. The recipient of 25 grants for hydrologic research on environmental problems of karst regions, he was awarded Western's highest award for Outstanding Achievement in Research in 1985. As a consultant specializing in carbonate aquifers for the past twenty years, Dr. Crawford has performed over 800 dye traces and has worked on numerous groundwater contamination problems for private firms and for federal, state and local government agencies. ♦

Rebreather Seminar

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The Prism semi-closed circuit rebreather system will be at Martha's Quarry (a quarry 15 miles east of Nashville) on July 8-10, 1995.

Your day will start with a 2-3 hour presentation on rebreather fundamentals. Then you will experience the rebreather in the water. Each diver can expect to get 20-30 minutes in the water, one-on-one with an instructor.

Workshops will be conducted over three days, and are limited to 20 divers per day. You must be a certified diver to participate in the in-water experience. For more information, please contact Bottom Time Divers, 4415 Cedar Hills Road, Memphis, TN 38135, (901) 382-9751. ♦

VOTE!

All of you should have received your NSS 1995 Ballot for the election of the next NSS Board of Governors. There are currently five positions to be filled. Please take a moment to read the platform statements of the candidates and place your vote. As Wayne Marshall mentioned in his article this issue (see page 16), the Cave Diving Section is the second largest Section within the NSS. By exercising your right to vote, you can influence the NSS in the direction you want! ♦

Cave Diving Communications



by

Joe Prosser and H. V. Grey



Cave Diving Section of the National Speleological Society, Inc.

For more information on ordering, or to receive the new, updated CDS Bookshop Order Form, please contact Bruce Ryan at the NSS-CDS Main Office, PO Box 950, Branford FL 32008

Cave Diving Communications by Joe Prosser and H.V. Grey

Comprehensive, illustrated text covering all forms of communications in underwater caves: light signals, hand signals, touch contact and slates, with a special chapter on the use of lines and reels. Published by the NSS-CDS, 1990. 68 pages; 5 1/2" x 8 1/2"; Softcover.

Item Number 40900
Nonmember \$8.00
Member \$7.00

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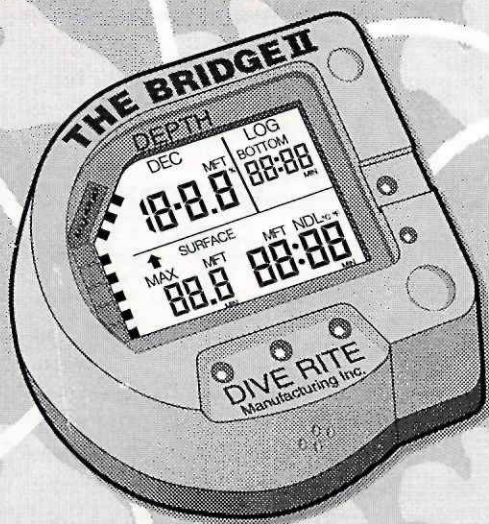
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DECO MADNESS

HELIOLIC'S ANONYMOUS

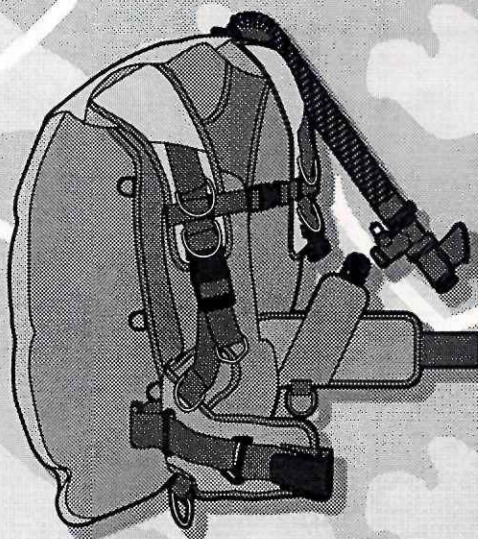


HELLO, MY NAME IS STEVE AND I HAVE A FOUR
STAGE BOTTLE A DAY HABIT.



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