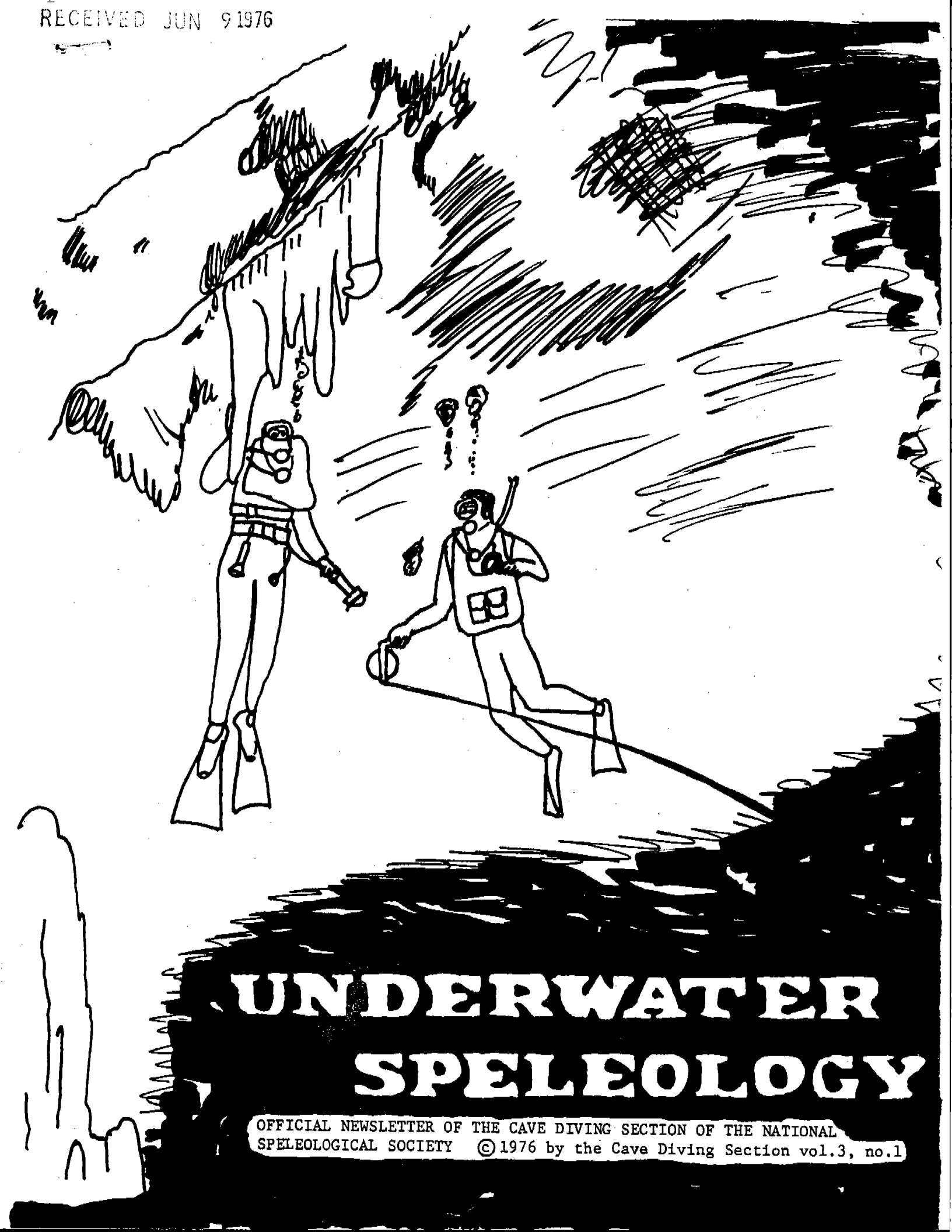

UNDERWATER SPELEOLOGY

OFFICIAL NEWSLETTER OF THE CAVE DIVING SECTION OF THE NATIONAL SPELEOLOGICAL SOCIETY vol.3, no.1

UNDERWATER SPELEOLOGY

published bi-monthly
beginning in February
by
The Cave Diving Section of
The National Speleological Society

Membership in the NSS Cave Diving Section is open to any NSS member in good standing that is interested in cave diving and has paid the dues ($3.00 for 1976). Persons not wishing to join may subscribe for $5.00 per year. Checks should be made payable to "NSS Cave Diving Section" and sent to Steve Maegerlein, Rt. 14, Box 17, Bloomington, IN 47401.

Deadline is the second Friday of the preceeding month. Send articles and correspondence to the Editor, Sheck Exley, 1591 S. Lane Ave., Apt. 118C, Jacksonville, FL 32210.

Opinions expressed herein are not necessarily those of the NSS Cave Diving Section.

CALENDAR

June 24- July 2, 1976: NSS Convention, Morgantown, WV. (Cave Diving Session is June 29- contact Tom Cook, c/o Hallin, Alton Bay, NH 03810)
Sept. 4- 5, 1976: 9th Annual NACD Cave Diving Technology Transfer, Atlanta, GA. (Contact NACD, 2900 NW 29th Ave., Gainesville, FL 32601)
Sept., 1977: 3rd International Cave Diving Camp, Great Britain.
1979: 4th International Cave Diving Camp, Mexico.

ADDRESS CHANGE

Tony Oldham, RHYCHYDWR, CRYMMYCH, DYRED SA41 3RB, United Kingdom

COVER

The cover drawing was inspired by a magnificent series of color slides taken by famous professional underwater photographer Eric Frehsee in Ben's Cathedral Cave, Grand Bahama Island. Yup, those are real stalactites underwater! See "The Blue Holes of Grand Bahama," p. 4.

NEW MEMBER

Mark R. Chesnutt, 117 Bradley Drive, , Montgomery, Alabama 36109

Rallin L. Peck, Box 9560 D-1, Ft. Gordon, Georgia 30905

NACD SEMINAR DATE CHANGE

As per the notice in the "Calendar" the NACD 9th Annual Cave Diving Technology Transfer has been moved to Labor Day Weekend, Sept. 4-5. The former date was in June.

ANNUAL MEETING OF CAVE DIVING SECTION

The annual meeting of the NSS Cave Diving Section shall be held on June 29, 1976, in Morgantown, WV during the NSS Convention. Several topics are now being considered for the agenda, including election of officers, three proposed amendments to the constitution (see vol. 1, no. 1 of Underwater Speleology, p.4), and membership requirements. Please send additional items for inclusion to the chairman, Sheck Exley.

A Cave Diving Session is also planned, including practicing procedures in a swimming pool. Several papers and presentations are also tentatively planned, including "The Transportation System," "Cave Diving in the Northeast," "The Exploration and Mapping of Peacock Slough Caverns," and "Cave Diving Emergency Procedures." Discussions on "Cave Diving Techniques" are also planned. Please send suggestions and your topic for a paper to Tom Cook, c/o Hallin, Alton Bay NH 03810.

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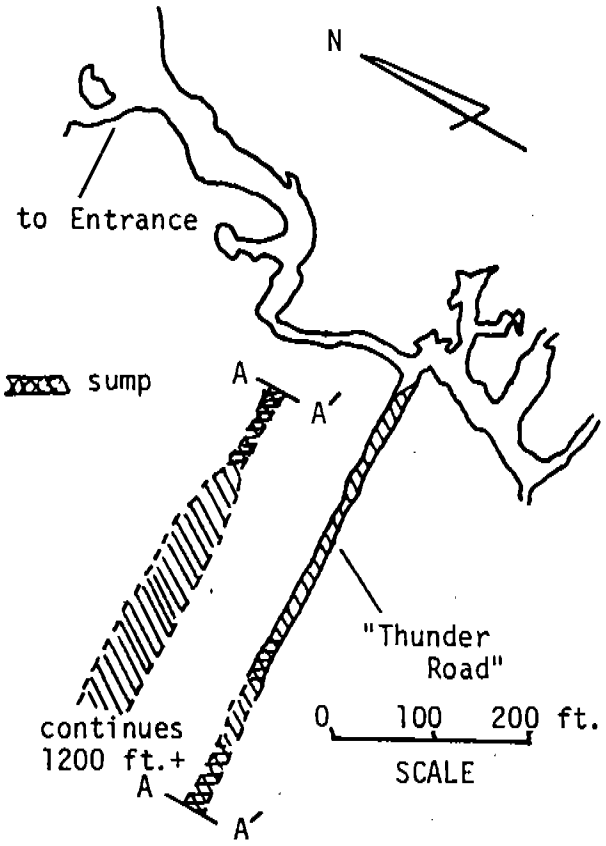
NEW OFFICERS

Due to an insufficient number of nominees, no election was held to select new officers for the Section as had been planned. Therefore, until the election during the Cave Diving Session on June 29 the officers of the Section shall be as follows:

Chairman: Sheck Exley(see address above)
Vice Chairman: Tom Cook(see address above)
Secretary-Treasurer: Steve Maegerlein(see address above)
Editor, Underwater Speleology: Sheck Exley
Representative to UIS Cave Diving Commission: vacant



SPRING CAVE, COLORADO
(plan sketch based on map by the Colorado School of Mines Grotto and the description in D.C. Speleograph)

SPRING CAVE, COLORADO

Vol. 32, no. 1 of the D.C. Speleograph (Jan. 1976) mentions a major cave diving discovery that was recently made in Colorado's third longest cave. A party including Norm Pace carried scuba gear through almost a mile of passage, then dived through a 250-foot-long sump to a large passage 50 feet in diameter which continued for 1500 feet. The divers turned back because they "lacked adequate lighting and boots."

Lloyd Parris mentions in Caves of Colorado that on November 25, 1963, four scuba divers dived through a sump at the south end of a dramatic streamway in Spring Cave known as "Thunder Road." They discovered less than 150 feet of vadose passage before being halted by a second syphon. On returning the divers were pulled back out with a rope because the inflowing current was too strong to swim against. It is believed that this is the same area dived by Pace's group.

Apparently the potential for discovery in this cave is quite high, for the article in the D.C. Speleograph mentions that the stream in the cave drains an estimated 30 to 40 square miles.

References:

Dyas, Mike D., 1976, " Rocky Mountain Low?" *D. C. Speleograph*, vol. 32, no.1, p. 4.

Parris, Lloyd E., 1973, *Caves of Colorado*, Pruett Publishing Co., Boulder, CO., 1973, pp. 221-225.

* * * * *

WOOKEY HOLE, GREAT BRITAIN

Geoff Yeadon and Oliver Statham of the Cave Diving Group of Great Britain made a major discovery in Wookey Hole, perhaps Britain's most famous cave diving site, on February 23, 1976. The new route to Wookey 23 and Wookey 24 was found by Colin Edmunds on February 21, after an unsuccessful earlier attempt by John Parker. The total length of new passage found was 2000 feet.

The exciting account of this landmark exploration is in the latest issue (new series no. 39, April 1976) of the *Cave Diving Group Newsletter*. Copies may be obtained from the Hon. Editor, Dr. Oliver C. Lloyd, Withey House, Withey Close West, Bristol BS9 3SX.

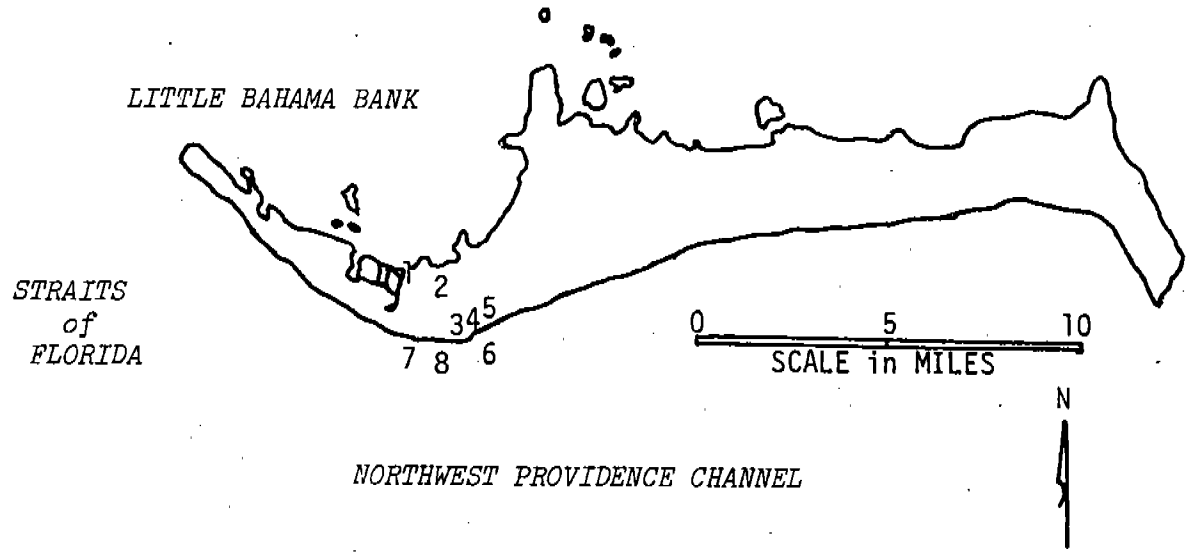
the BLUE HOLES of GRAND BAHAMA

by Sheck Exley

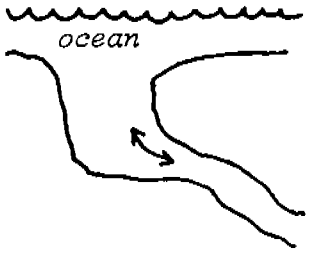
Whenever the cave diver thinks of the Bahamas, he invariably thinks of the famous "Blue Holes" - strange cavernous openings in the ocean bottom, so-named for their deep blue color, in marked contrast to the lighter azure hues of their shallower coral- and sand-covered surroundings. On a clear day the casual observer can spot literally dozens of them from the air over some of the islands, such as Andros.

Blue Hole explorers generally classify their underwater caves into two types - (1) marine and (2) inland. The marine Blue Holes are usually subject to violently fluctuating currents which shift according to local tides. The typical Blue Hole "boils" vigorously on a falling tide, whereas on the rising tide the current reverses, becoming a very hazardous inflow. As one might expect, the current changes do not match the tides precisely, there being a noticeable "lag" in changes which probably varies from one cave to the next due to length and volume of passages, etc. Generally the "slack" periods with little or no flow are best for diving, with the period just after high tide preferred since it is followed by a period of outflow.

The inland Blue Holes are generally collapse sinks and are seldom subject to the hazardous currents of their marine cousins. The inland Blue Holes of Andros, Grand Bahama and the other large islands frequently have a layer of very clear fresh water floating on top of the salt water. The depth of the fresh water increases with distance from the coast, as deep as over 100 feet on Andros. Frequently the top of the underlying salt water contains large amounts of hydrogen sulphide, which may be dangerous to divers if ingested or exposed to over long periods.

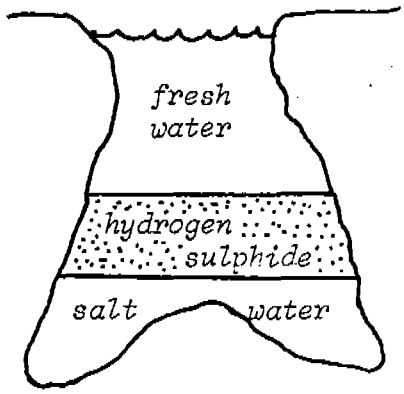


GRAND BAHAMA ISLAND, showing approximate locations of Blue Holes: *1= Hawksbill Blue Hole, 2= unnamed sink near airport, 3= unnamed sink near East Sunrise Highway, 4= Bens Cathedral Cave, 5= Janes Cave, 6= Rocky Point Blue Hole, 7= est. location of Deadmans Reef Blue Hole, 8= est. location of Zoo Hole*



PROFILE OF TYPICAL MARINE BLUE HOLE

My first impressions of the Blue Holes were gleaned from a showing of the Cousteau TV special on the subject at a cave diving seminar in May, 1971. I must confess that I was not overly impressed: despite the commendable effort of the French - some of the best underwater photographers in the world - the cave was simply too large to properly illuminate, making the walls appear indistinct and a neutral gray in color. Even the best shots were frequently obscured by clouds of silt riled up by careless flipper strokes. Not until I visited Archie Forfar's place on Andros later that year and had a chance to see Dr. George Benjamin's (NSS 2066L) magnificent photographs did I come to appreciate the mystery and strange beauty of these wonderful undersea caves. Dr. Benjamin's shots, some of which have been published in *National Geographic Magazine* (see references at end of article), depicted huge, snowy-walled grottoes festooned with encrusted stalactites thousands of years old, and awesome, forbidding chasms that seemed to drop forever into a bottomless blue void. Right then and there I resolved to take advantage of the earliest opportunity to personally visit the Blue Holes.



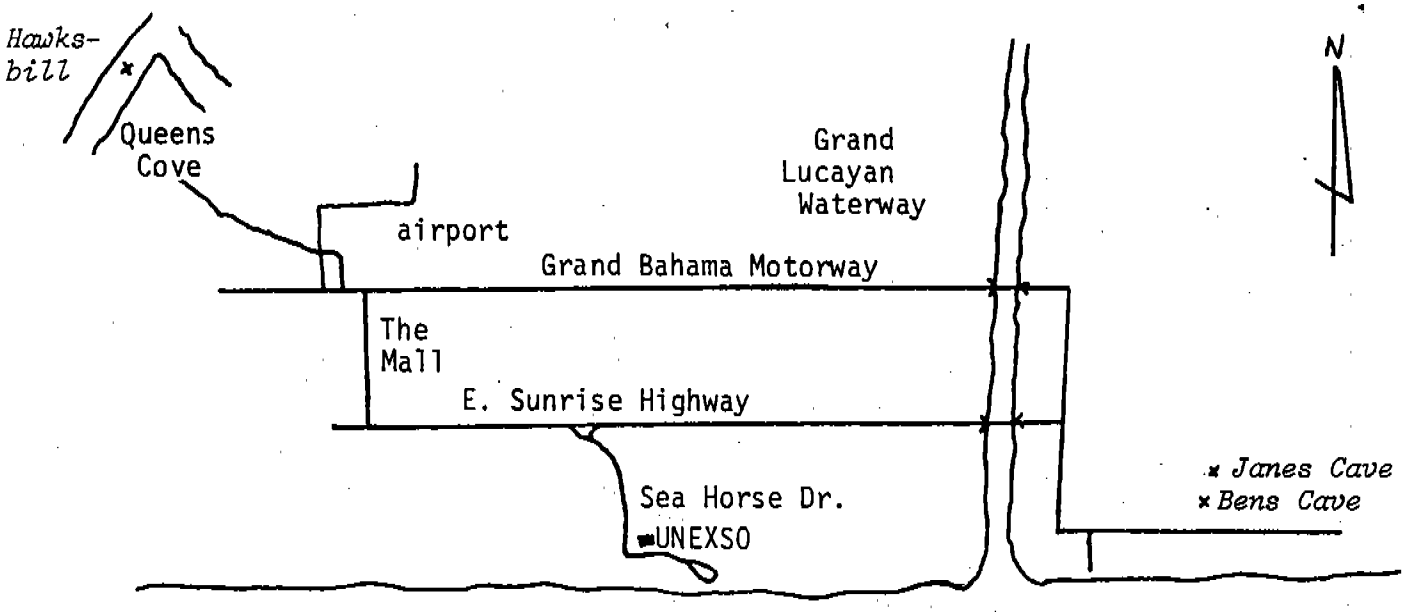
PROFILE OF TYPICAL INLAND BLUE HOLE

However, the earliest opportunity did not present itself until the spring of 1973, when several friends and myself were hired as aquanauts for a "Hydrolab" mission. The arrangements were made by Tom Mount, then diving officer for the University of Miami, who in addition to being a good friend was also one of my favorite diving partners. Inevitably the idea was to sandwich in as much Blue Hole diving as possible, especially since the other aquanauts were also cave divers.

The headquarters for our saturation project turned out to be Freeport, Grand Bahama Island, which just happened to be an ideal area for an initiation into Blue Hole diving. One of the largest of the 3000-plus Bahama Islands, Grand Bahama is also one of the closest-only 50 miles from the southeast coast of Florida by Eastern, Mackey International, or any of several other airlines. Its largest town, Freeport, has complete facilities - hotels, restaurants, car rentals, even two dive shops with compressed air and other supplies (UNEXSO and Freeport Gases Ltd.). Unexso also has a recompression chamber. Best of all, there are several inland and marine Blue Holes in the immediate vicinity, most of them accessible by car!

Arriving early, Tom, expert photographer Rick Frehsee, Dale Malloy and myself immediately hopped into a borrowed VW van and headed for a marine Blue Hole, located in the north central section of the island in an estuary called Hawksbill Creek. The directions we were given were somewhat sketchy, so we wasted some time looking in the wrong creek. Finally locating Hawksbill Blue Hole, we snorkeled out and were greeted by a powerful rush of refreshingly cool, crystal clear salt water from the submerged cave entrance into the bottom of the creek. However, we had not brought any scuba gear with us, so had to ride all the way back to Freeport before diving.

Finally returning to Hawksbill well after dark, we rushed back out to take another look, only to find that we had made an error in calculating the tides and



LOCATION SKETCH OF FREEPORT AREA SHOWING BENS CAVE, JANES CAVE & HAWKSBILL BLUE HOLE

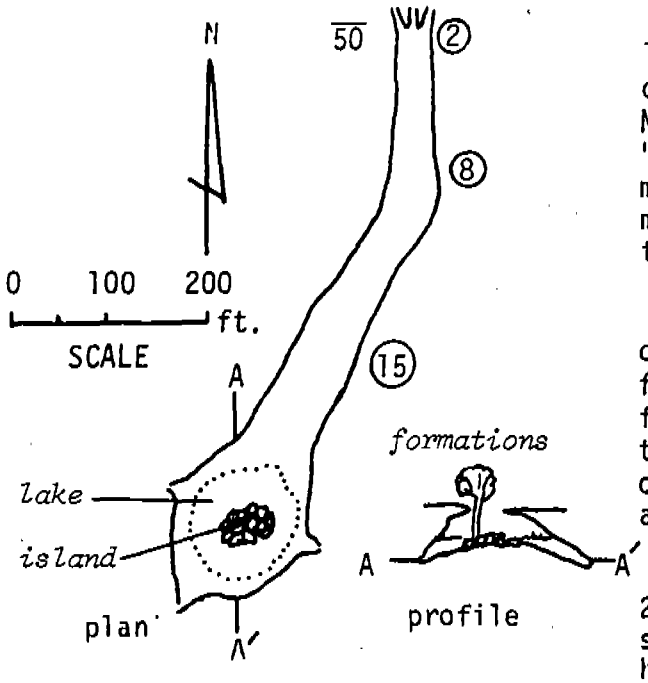
the Blue Hole was now inflowing! Even while we watched, a pronounced whirlpool was starting to form above the cave. Despite our obvious disappointment, we wisely decided to wait until a more opportune time for diving.

The next day we were admiring some award-winning photography by Hydrolab's Dick Clarke at UNEXSO when we ran across a startling shot of a diver next to a huge stalagmite in crystal clear water. Now, all of us had seen the Cousteau and Benjamin shots of dripstone in Blue Holes at Andros Island, but they were well-encrusted with marine deposits and bore little resemblance to the stalactites we see in vadose passage. However, Dick's picture showed snowy-white, crystalline stalactites that could have easily been transplanted from Luray Caverns!

Needless to say, in a matter of minutes we were on our way to Ben's Cave, later re-named by Rick to a more appropriate Ben's Cathedral Cave (the "Bens" was after Ben Rose, veteran guide at UNEXSO and reputedly the first to explore the cave). Unlike Hawksbill Blue Hole, this cave was a typical inland Blue Hole, with the exception that a room approximately 125 feet in diameter was partly above water. Access to the cave was through a collapsed section in the center of the ceiling about 20 feet in diameter. A dry "island" of rocks reached to within about 20 feet of the roof at this point.

With some difficulty we lowered ourselves and four sets of cave diving gear including doubles down to the island, a task made somewhat easier by the presence of a tree growing up out of the cave at this point. After a few surface shots we hurriedly suited up and plunged into the crystal clear 72 degree F fresh water. As soon as we submerged we gasped in awe as the ghostly forms of immense stalagmites, well-lighted by light filtering in from the entrance, appeared near the mouth of a huge underwater tunnel approximately 100 feet wide and 20 feet high. With Tom leading, we gradually progressed through 300 feet of well-decorated underwater cave averaging about 40 feet in depth and 50 feet wide. Below a pronounced interface at 30 feet was less clear salt water. Oddly, the character of the cave and the stalagmites changed dramatically in the salt water, from the crystalline, bone-white formations above to the dark, encrusted forms we had seen in the Andros pictures. We spent the rest of the day helping Rick photographically document the incredible beauty of the place. One of the shots was later selected as the cover of NACD's text, *Safe Cave Diving*.

Unfortunately, our saturation dive then intervened, and the next week was spent



BEN'S CATHEDRAL CAVE, GRAND BAHAMA IS.

living at a depth of 45 feet, collecting data for various NOAA and University of Miami projects. After the dive, a day of "R and R" and back Rick, Sari Gaines and myself went to Ben's Cathedral Cave for more photography. Finally, Rick and I returned to Hawksbill for one more try.

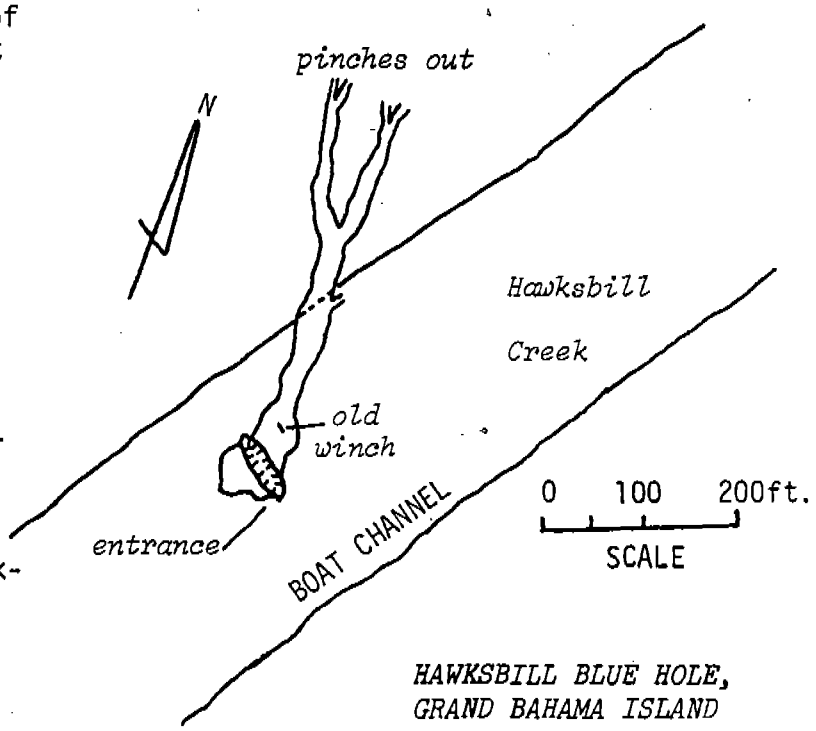
This time we hit it just right, and descending to the base of a 75 ft. x 10 ft. vertical entrance crevice 40 feet deep, found two large cave openings, one on either side of the crevice. The south side obviously pinched out, so we directed our attention to the north side.

Carefully deploying the line into the 20-ft.-diameter tunnel, we had our first surprise when we suddenly found a large, heavy winch emplaced on the bottom with a good supply of very old rope. It was well-encrusted and reminded us of a reported double drowning in the cave a couple of years earlier. If this guideline was an accurate gauge of their cave diving ability, it is obvious that the victims had no business being in the cave in the first place.

Continuing on, we soon hit a fork beyond which two smaller tunnels continued at a floor depth of 55 feet. Unfortunately, both leads pinched out pretty quickly. About the most interesting thing we found was a couple of odd-looking lobsters about 400 feet back from the entrance.

In August Lewis Holtzendorff (NSS 14831), Court Smith (NSS 15394), Dana Turner (NSS 15167) and I returned for another look at Ben's Cathedral Cave. This time the lake surface was clouded with green algae, but below ten feet the visibility remained excellent. Continuing beyond the end of our previous exploration we found that the ceiling of the cave soon dipped down into the salt water layer, and bent slightly to the left. Another 100 feet and the cave apparently went dendritic, branching off into several small, silty leads about 50 feet deep. Most of the leads appeared to be inflowing!

After tying off our permanent line we returned and surfaced. Hiking in the general direction of the cave passage below, we soon ran into another clump of trees and Jane's Cave, a major collapse area about 75 feet in diameter with several interesting-looking water-filled crevices at the bottom. Unfortunately, we had no time to investigate the obvious question, do the caves connect?



HAWKSBILL BLUE HOLE, GRAND BAHAMA ISLAND

Another question involves nearby Rocky Point Blue Hole, a marine Blue Hole only a couple of miles from Ben's Cathedral Cave and just off the beach. What is the relationship - if any - between the caves? Lewis, Court and Dana found a small, shallow dendritic system comparable to Hawksbill Blue Hole when they explored the Rocky Point Blue Hole. Are Ben's and Jane's reservoirs for the tidal recharge of Rocky Point Blue Hole? This would help explain the inflow found at the end of exploration in Ben's Cathedral Cave. And if they are hydrologically connected, can divers traverse the distance? Even a connection between Ben's and Jane's would be a first: despite the fact that more than a hundred Blue Holes in the Bahamas have been explored by Dr. Benjamin and others, and at least two have been connected by dye testing, to this writer's knowledge none have been physically connected by divers.

And how many more inland Blue Holes, similarly festooned with the stalagmitic relics of an age when sea level was lower, are there on Grand Bahama? There must be dozens. For example, there is a report of a large unexplored sink in the same low piney ridge as Ben's some two miles further west toward Freeport and immediately east of the East Sunrise Highway just south of the "movie colony." The sink apparently has sheer walls all around which extend as high as thirty feet above the water surface. Water depths straight down are reputed to be in excess of 80 feet. Also, near the airport is supposed to be another water-filled sink that is unfortunately used as a dump.

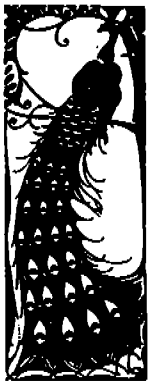
Zoo Hole and Deadman's Reef Blue Hole, both subjects of articles in *Skin Diver Magazine,* are hard-to-find, rather deep marine Blue Holes near Freeport Harbor a half mile off shore. Zoo Hole, so named for its profusion of marine life, drops to depths of 180 feet very quickly. The Deadman's Reef Blue Hole, more than 120 feet deep, is reputedly 1/2 mile off shore in 40 feet of water at the end of Deadman's Reef, which runs perpendicular to the south shore of Grand Bahama Island about one mile west of Government Harbor. Neither spot was visited in 1973, but both sound extremely interesting. Boats are necessary to visit both caves, as well as guides. Both the Victoria Skin Diving Club and UNEXSO in Freeport are the best bets to look for guides.

In summary, I think it is wise to remind the reader that the area covered by this report actually comprises only approximately 10% of the total land surface of Grand Bahama Island. It is highly probable that a careful reconnaissance of the remaining, less-developed sections of the island by air, boat, hiking, etc. would probably turn up many caves as spectacular or more so than those described in this report.

NOTE: In order to protect the formations of Ben's Cathedral Cave, no precise location has been given. The writer will be happy to give more information to members of the NSS Cave Diving Section or others of serious speleological intent.

For Additional Reading:

1. Benjamin, George J. - "Diving Into the Blue Holes of the Bahamas," *National Geographic,* vol. 138, no. 3(Sept. 1970), pp. 346-363.
2. Cousteau, Jacques-Yves - "The Blue Holes," *Three Adventures,* New York, Doubleday & Co., Inc., 1973, pp. 153-257.
3. Exley, Sheck - "The Environment of Cave Diving," *Safe Cave Diving* (Mount, Tom, ed.) Miami, NACD, 1973, pp. 6-7.
4. Mount, Tom - *Cave Diving Manual,* Miami, NACD, 1972, pp. 4-6, 8-9.
5. McKenney, Jack - "The Bahama Bluehole of Deadman's Reef," *Skin Diver Magazine,* vol. 18, no. 11 (Nov. 1969), pp. 36-39.



peacock progress. . .

the latest on the project to survey the so-called "world's longest underwater cave"

by Sheck Exley

Sometime in early 1974 I excitedly wrote Rick Rigg (NSS 7236) of a "4-mile-long cave" in Florida. Now, in many sections of the country - Kentucky and West Virginia, for example - 4-mile caves are a dime a dozen. However, in Florida such a cave would be the champ - the longest surveyed cave of record being the "6 km" - long Warren's Cave near Gainesville (2nd longest - Hollow Ridge Cave - is barely worthy of note at only 3296 feet).[1] Moreover, if the cave was completely *underwater*, it would be, as Rick responded, "mind-boggling."

These rumors got started in 1965, when Howard Lilly, George Krasle and Dick Olsen connected Peacock Springs # 1 to Pot Hole Cave, a distance of "450" feet. Shortly thereafter Howard Bradbeer and Rick Wright connected the Peacock System to Olsen Sink Cave, then to Cisteen Sink Cave, in 1969. Later John Harper (NSS 8352), Randy Hylton (NSS 13111) and Frank Martz continued by joining the rapidly-expanding Peacock System to Orange Grove Sink Cave, at which time(1970) the much-heralded "Peacock to Orange Grove" traverse was established, an *estimated* distance of 6000 feet.

But it was that word "estimated" that really bugged us. Soon we were installing only pre-measured permanent guidelines in the cave passages, so that at least we had a rough idea of how long they were, even if we did not know where they went. About this time Dave Fisk (NSS 17149), Dana Turner (NSS 15167) and myself succeeded in connecting Waterhole III Cave into the Peacock System, on July 7, 1973. This time, thanks to our measured line, we *knew* that it was about 2400 feet from the Peacock # 1 entrance to the Waterhole III entrance.

Seems like every year that I spoke about surveying underwater caves at a cave diving seminar somewhere, I invariably spoke at length of my dream - to organize a project to map the Peacock System. Finally, late last July, Lewis Holtzendorff (NSS 14831), Court Smith (NSS 15394), Ken Hillier, Bob Johnson, John Zumrick, Dave and myself finally put some effort where my mouth was and set about surveying the cave that we dreamed might be the longest in Florida.

By that time a rather crude map of the 4000-foot Madison Blue Springs Cave had been produced, and Ken's tape and compass map of the completely phreatic Devils Eye System, with more than 7000 feet surveyed, had supplanted Hollow Ridge as Florida's second longest cave. Predictably, we found that the passages explored in those caves "shrunk" noticeably in length when surveyed, proving I suppose that cave divers can exaggerate about as well as anyone.

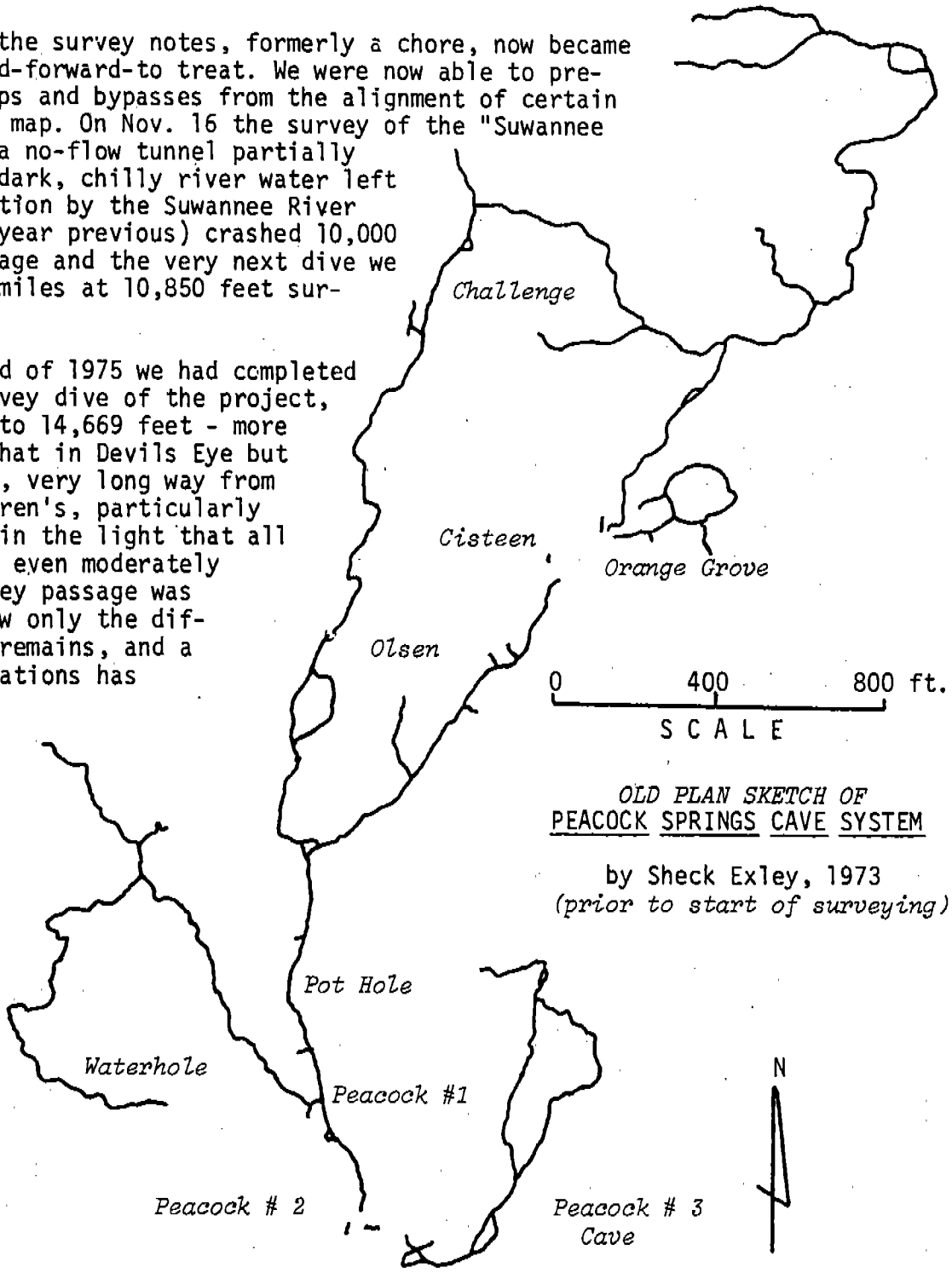
Our experiences at Peacock were no exception. Dragging a fiberglass tape and compass down the trunk connecting the Peacock # 1 entrance to Orange Grove Sink, we discovered to our dismay that the famous 6000-foot distance was now a "mere" 4693 feet. Worse, other well-known passages explored in the days before we started using premeasured line also shrunk. Now, rather than wondering whether we would hit 4 miles as predicted to Rick, we were seriously worried whether or not we would hit 2 miles total passage, much less replace Warren's Cave at the head of Florida's long cave list.

[1] Boyer, Paul- "Florida Caverns," *NSS News*, vol.33, no.10(Oct.1975), p. 155.

The initial work progressed rapidly... By the sixth dive (Oct.18) we passed the one-mile mark. Five more dives (still Oct.) and we had bumped Devils Eye out of second place on the long list with 7218 feet completed. As each goal was reached, our enthusiasm was rekindled and plans were immediately made for more surveying. Our motivation was further heightened by discoveries of new passages, routes and connections. Court and Lewis found a new route almost directly connecting the Olsen and Cisteen entrances, for example. A landmark came on Nov. 18, when I explored down a particularly narrow and silty passage into the largest room in the entire cave (named the "Crypt" after the skeletal remains of a large painted turtle we found there).

Plotting the survey notes, formerly a chore, now became a much-looked-forward-to treat. We were now able to predict new loops and bypasses from the alignment of certain leads on the map. On Nov. 16 the survey of the "Suwannee Reservoir" (a no-flow tunnel partially filled with dark, chilly river water left by an inundation by the Suwannee River more than a year previous) crashed 10,000 feet of passage and the very next dive we were over 2 miles at 10,850 feet surveyed.

By the end of 1975 we had completed the 31st survey dive of the project, and were up to 14,669 feet - more than twice that in Devils Eye but still a long, very long way from catching Warren's, particularly when viewed in the light that all the easy and even moderately hard-to-survey passage was complete. Now only the difficult work remains, and a lull in operations has ensued.

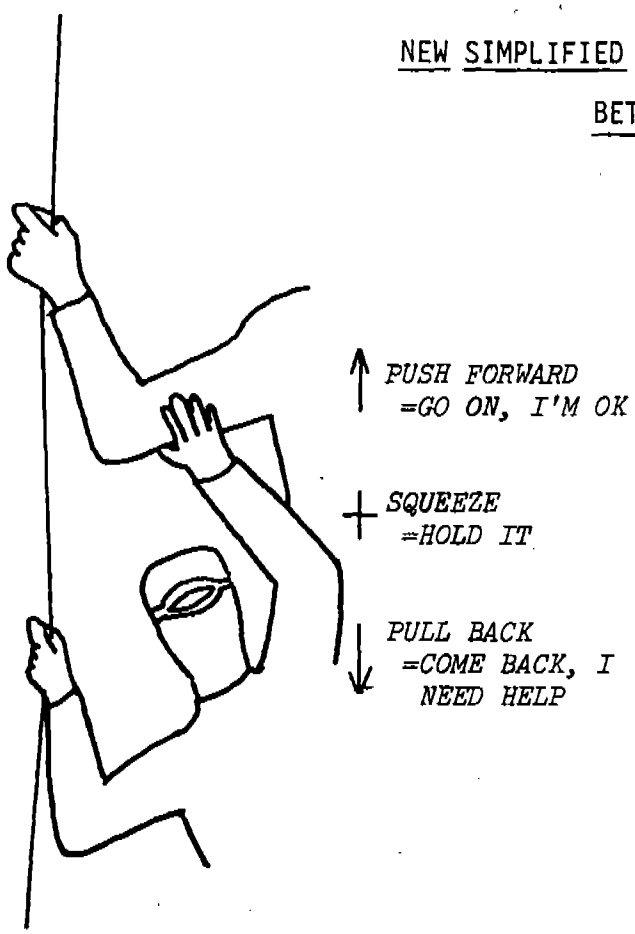


OLD PLAN SKETCH OF
PEACOCK SPRINGS CAVE SYSTEM

by Sheck Exley, 1973
(prior to start of surveying)

NEW SIMPLIFIED METHOD FOR NO-VISIBILITY COMMUNICATION BETWEEN CAVE DIVING PARTNERS

by Sheck Exley, based on a system suggested by Don Rimbach[1]



The communication system depicted at the left was recently explained to me by Don Rimbach, a cave diver and caver from St. Louis, MO. Don and his partners developed the system out of a need for improved signalling between team members in a narrow, silty cave they were exploring as part of an effort to stop the Meramec Dam Project.

In the tubular restriction the divers were working in, they found that things worked best if the lead diver stopped periodically, until the following diver could be felt and one of the three signals given. They used the lead divers leg instead of his arm, but in our experiments we have found that the arm works better in most cases other than tubular restrictions.

Tom Piskula, chairman of the UIS International Cave Diving Commission, has suggested the use of "underwater beepers" in similar situations, using a code similar to Morse Code. Bill Schane, current vice president of NACD, has suggested "finger spelling" as one alternative. However, so far no really satisfactory method of communication has been found for pairs of divers working in poor visibility.

[1]Don Rimbach, director of Ozark Spring Studies, is one of the top cavers and cave divers in the Midwest. Several of his cave maps are included in Vineyard's *Springs of Missouri*. He is now deeply involved in the fight to save the Meramec River.

* * * * *

WEEKIWACHEE SPRINGS, FLORIDA

Recently the world-famous underwater mermaid show at Florida's Weekiwachee Springs was closed temporarily. For the first time since discharge measurements began being taken monthly (1931), the spring was observed to become turbid, visibility dropping from the normal 150-ft.-plus to only about 40 feet. This development was of paramount concern not only to the management of the attraction, but also to the City of St. Petersburg, which reportedly owns the spring with an eye toward some future day when salt water intrusion in Pinellas and Pasco Counties may make it necessary to pipe water from the huge spring to St. Petersburg via a large conduit similar to Los Angeles, CA.

After several days the water cleared back up, but the spring is being investigated to determine what may have caused the unprecedented clouding of the water.