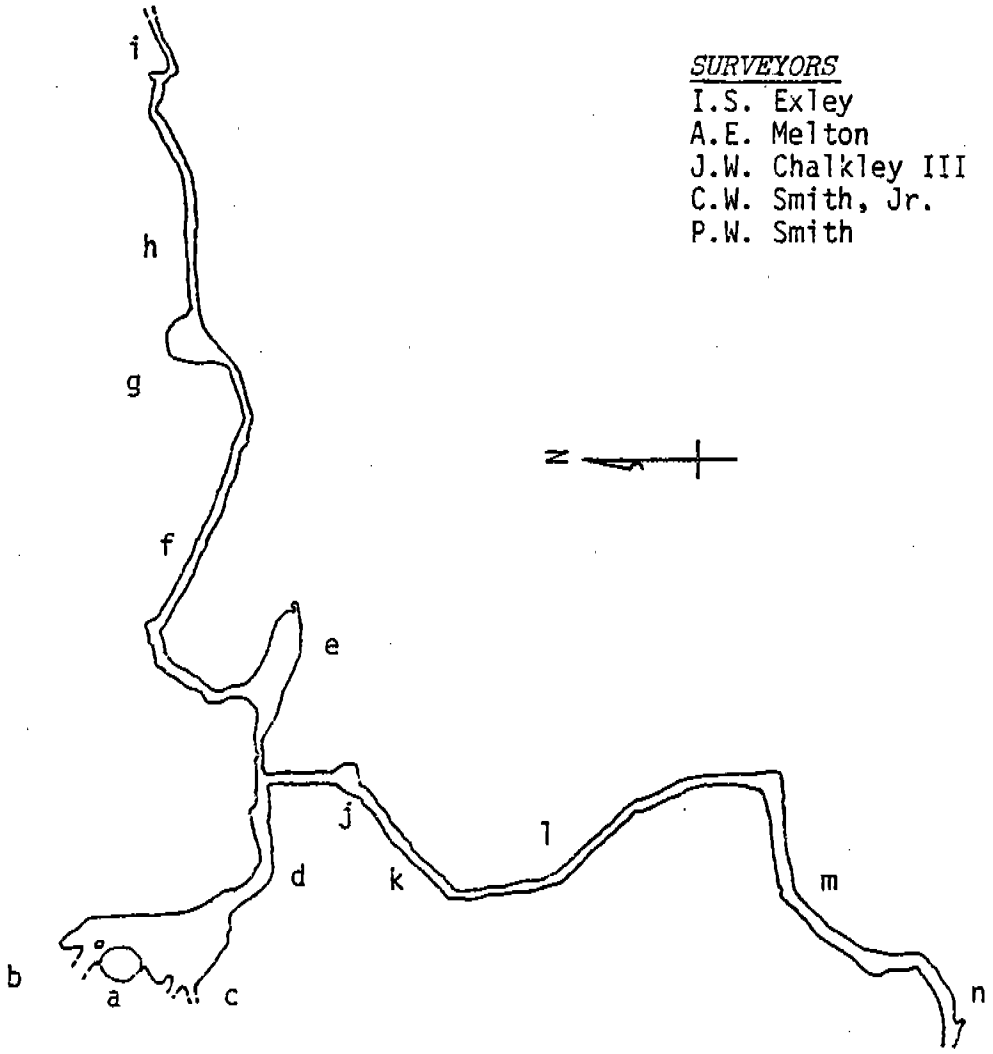
a= entrance; b= mill creek ponor; c= crayfish heaven room; d= focus passage; e= dana's room; f= roller coaster; g= lewis' room; h= rocky road; i= court's canyon; j= syphon tunnel; k= restriction; l= spiral staircase; m= valdosta viaduct; n= devil's backbone



SURVEYORS
I.S. Exley
A.E. Melton
J.W. Chalkley III
C.W. Smith, Jr.
P.W. Smith

ALACHUA SINK CAVE

ALACHUA COUNTY, FL

Survey by N.S.S. Cave Diving Section

0 100 200 ft.
SCALE

UNDERWATER SPELEOLOGY

OFFICIAL NEWSLETTER OF THE CAVE DIVING SECTION OF THE NATIONAL SPELEOLOGICAL SOCIETY © 1976 by the Cave Diving Section vol. 3, no. 6

UNDERWATER SPELEOLOGY

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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

Aug., 1977: Cave Diving Session and Annual Section Meeting at NSS Convention, Alpena, Michigan
June, 1978: Cave Diving Session and Annual Section Meeting at NSS Convention, Austin, Texas
1979: 4th International Cave Diving Camp, Mexico. (Contact Eduardo Castro Ruiz, Cerro de Tezonco 117, Mexico, D.F.)

FLORIDA FLOODS

In case you are planning a cave diving trip to "the sunshine state" soon, don't waste your time. The Suwannee and her tributaries are in flood. Only Manatee on the Suwannee (closed to diving during high water anyway) and Devils Eye and Jenny on the Sante Fe have not reversed. To make matters worse, it recently *snowed* in Miami for the first time in recorded history!

COVER

The cover map is of Florida's 11th longest cave, Alachua Sink. The completely water-filled cave, which reaches vertical water depths of 200 feet, has 2120 feet of "true horizontal" passage surveyed as of 12/31/76. For a list of the state's ten longer entries, five of which are underwater caves, see p. 63. In Florida at least, "underwater speleology" is really starting to come of age!

MANATEE ENTRANCES CLOSED

Cpt. Barrett, superintendant of Manatee Springs State Park, Florida, has informed us that the Sue's Spring (sink # 2) and Friedman Sink (sink # 3) entrances have been closed to all persons indefinitely. While we hope that the problems of access can be worked out for those having a serious speleological interest in the cave, for the time being we urge all members to ask everyone to respect Cpt. Barrett's wishes and restrict their dives to the Manatee Springs and Catfish Hotel entrances.

3RD INTERNATIONAL CD CAMP CANCELLED

The latest circular on the forthcoming 7th International Congress of Speleology indicates that the cave diving camp has been cancelled. This undoubtedly comes as a disappointment to Americans, who were looking forward to an international cave diving event in an English - speaking country.

NACD ELECTIONS

At the December NACD BOD meeting in Gainesville, Fla., two of our members, David Fisk(NSS 17149) and Paul DeLoach(NSS 16517), were elected as president and vice-president of that organization for the coming year. Lewis Sollenberger (NSS 17572) and Sheck Exley (NSS 13146) are directors of NACD, as are Dave and Paul for the duration of their terms.

EL CHEAPO UNDERWATER LIGHT

by

Tom Cook (NSS 15548)

For those who are unable to operate an erector set or whose Lincoln log buildings always fall down, behold this piece of El Cheapo diving equipment is for you. It should only take a couple of hours to make. It's all PVC pipe and some odds and ends. The D.I.S.C.O. parts have to be a certain kind, with a flat surface on the collar instead of a sloping surface (see diagram, p. 59). They have a screw top on them. Cut a piece of Plexiglass and glue it to the inside on the screw cap and make sure that it is a waterproof glue job. Clamp the pieces together to ensure a good bond. Do this to both D.I.S.C.O. caps. File or sand the threaded part of the D.I.S.C.O. until the cap plus a O ring cut from an inner tube forms a good seal. Sand the collar beneath the threads and apply contact cement to one side of the rubber O ring. Put the ring over the threads and secure it on the collar (this is the seal for the screw cap). Do this to both D.I.S.C.O.s. Then use PVC cement to glue the D.I.S.C.O.s to the pipe.

Install your switch and waterproof boot and battery spring. Run the other wire up through the spring and connect it to the flashlight reflector that you are using so it makes an electrical connection to the side of the bulb. I used a metal reflector unit and clamped the wire to its stem with a mini hose clamp. Put your batteries in it and it should work. Check your wiring circuit before you install it in the light, as this saves a lot of screwing and unscrewing.

You can hook all manner of snap hooks or spring clasps to the light so you can attach it to yourself. Glue Plexiglass pieces to the PVC with Plexiglass cement. The solvent kind works, but the acrylic epoxy glue is better. The most expensive thing was the underwater switch boot which is $1.25 from Hydro Tech Co., Box 14444, Long Beach CA 90814. The switch is a regular toggle switch from Radio Shack.

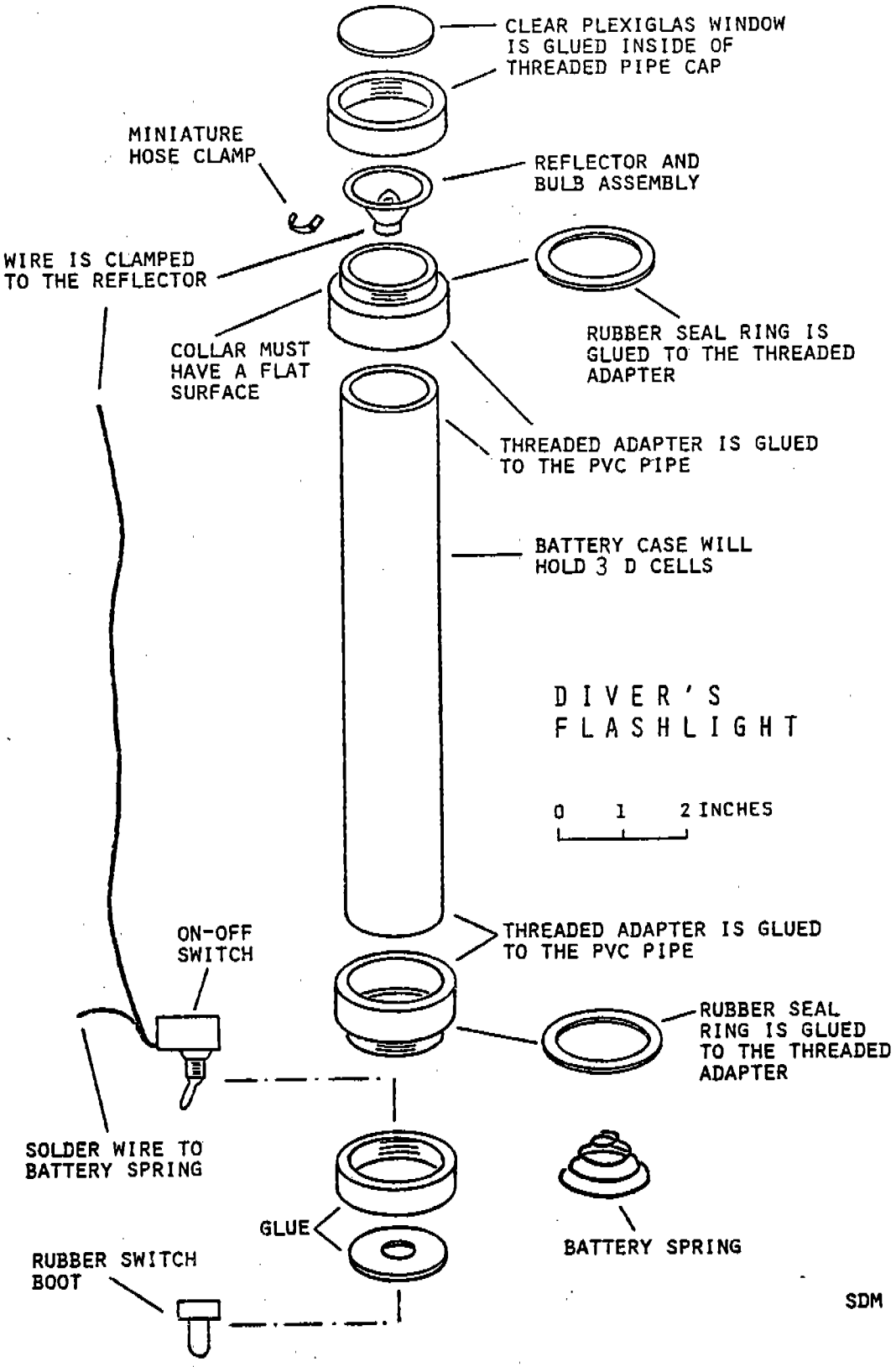
A word about the switch boot: it only screws on the switch about an eighth of an inch, so that's all that should be out beyond the Plexiglass plate. Smear a little silicon grease around it and screw on the switch boot. Also, make sure the light is waterproof before you put the switch in.

* * * * *

WORLD'S DEEPEST UNDERWATER CAVES???

Aug. 1976 *National Geographic* (vol. 150, no. 2) chronicles a 12,000 - foot (3658 m) dive by the U.S. Navy's submersible Alvin in the Cayman Trough, a deep rift in the Caribbean separating the American Plate from the Caribbean Plate. The 1976 expedition encountered and photographed enticing open fissures (p. 241) and hot water vents (p. 239) caused by volcanism in the area. The article, by R.D. Ballard and E. Kristof, can be found on pp. 228 - 249.

Next year the scientists may find even deeper caves when they return to explore the Trough's 15,500 - foot deep central rift with the Trieste II.


CLEAR PLEXIGLAS WINDOW IS GLUED INSIDE OF THREADED PIPE CAP
MINIATURE HOSE CLAMP
REFLECTOR AND BULB ASSEMBLY
WIRE IS CLAMPED TO THE REFLECTOR
COLLAR MUST HAVE A FLAT SURFACE
RUBBER SEAL RING IS GLUED TO THE THREADED ADAPTER
THREADED ADAPTER IS GLUED TO THE PVC PIPE
BATTERY CASE WILL HOLD 3 D CELLS
DIVER'S FLASHLIGHT
0 1 2 INCHES
ON-OFF SWITCH
THREADED ADAPTER IS GLUED TO THE PVC PIPE
RUBBER SEAL RING IS GLUED TO THE THREADED ADAPTER
SOLDER WIRE TO BATTERY SPRING
GLUE
BATTERY SPRING
RUBBER SWITCH BOOT
SDM

BURNSVILLE COVE

by Sheck Exley
NSS 13146

ITEM: "...Butler Cave - Sinking Creek System has 14.3 miles surveyed...Breathing Cave has 4.5 miles surveyed...Better Forgotten Cave has 0.78 mile surveyed..." - Nevin W. Davis, *NSS News*, vol. 29, no. 7 (July 1971),p.86.

ITEM: "Aqua Cave...a half mile..." - Dr. William R. Halliday, *Depths of the Earth* (1966), p. 362.

ITEM: "All of the water draining Breathing, Boundless, Butler and Better Forgotten Caves...resurges at Aqua Cave..." - Nevin W. Davis, *NSS News*, vol. 29, no. 7 (July 1971), p. 83.

ITEM: "...there is room between the head of Butler Cave and Aqua Cave for twenty times as much cave as is now known. Or one hundred times..." - Dr. William R. Halliday, *Depths of the Earth* (1966), p. 367.

Now, for a little simple arithmetic:

14.3 mi. + 4.5 mi. + .78 mi. + .5 mi. = 20.8 mi. X 100 = **2080 mi.!!**

Fanciful nonsense? Probably. But even if Dr. Halliday's revised estimate (*American Caves and Caving*, p.9) in 1974 of ten times as much additional cave in the area is used, it will still exceed the current figures for the world's longest cave, Flint Ridge - Mammoth in Kentucky, by a considerable margin... and that's something for every cave explorer to dream about!

And cave diving may be the key to unlocking the door to the "missing" 90% of cave passage.

Early Diving In Burnsville Cove, Virginia

(For excellent accounts of the fascinating history of exploration by "dry" cavers in the area, see the list of references at the end of this article.)

When Beven Hewitt strapped on his scuba rig in 1956 and splashed into Refrigerator Spring at the head of Mill Run, the historic section of Breathing was the only cave known in the area, despite the fact that Dr. William Davies had predicted the existence of a very large cave system there. After descending 6 feet and traversing only 35 feet underwater, Hewitt surfaced in a large air-filled streamway that was soon named Lockridge's Aqua Cave. With half a mile of passage explorable before the stream sumped again at "French Lake," Hewitt's historic dive was probably the most productive sump push in the Eastern U.S. until Forrest Wilson's discovery in Organ Cave twenty years later (see *Underwater Speleology*, vol. 3, no. 5). A swimway was soon dynamited into Aqua so that non-divers could enter.

By the publication of *Caves of Virginia* in 1964, Hank Hoover had pushed past a couple of near-sumps to dive the terminal sump beyond French Lake. Yoking up double tanks beyond a messy mud crawl, Hoover penetrated 300 feet to a depth of 80 feet in a fair-sized, sand-floored passage that unfortunately gave no hint of ascending to an air surface.

Meanwhile, Ike Nicholson and other dedicated cavers had discovered and explored much of the great Butler Cave (this group of hard-charging cavers would later organize into the Butler Cave Conservation Society and purchase the cave). On the downstream side, over two miles from Aqua Cave, their progress was halted by "Last Hope Siphon." Hoover and later section member Rick Rigg (NSS 7236F) pushed the sump as much as 300 feet without surfacing.

August 30-31, 1975

Enter the expert cave divers from Florida and instant success, right? WRONG! By the time Court Smith (NSS 15394), Lewis Holtzendorff (NSS 14831) and myself had returned from this trip we had rightly concluded that we had a lot to learn about cave diving outside Florida.

Our involvement began when a cave diving friend, Tom Tompkins of Virginia Beach, put us together with Ike Nicholson. Our first dive (by Court and Lewis) was at Aqua, and what a fiasco it was! Diving with doubles and heavy nicad quartz lights, they could get no farther than I could swimming without tanks!

The next day I did Last Hope in Butler with only slightly more success, installing all 500 feet of my line with depths going as deep as 8 feet on the ceiling but still no air surface. The biggest of many problems were my overheating (I wore a dry suit in and out from the 2-mile trek to Last Hope because a zipper jammed) and my clumbsiness (I wore only wet suit booties instead of caving boots).

October 24, 1975

By now, to the relief of the BCCS, the "Florida experts" had learned enough to wear boots, save the dry suits for the dive only and stuff the equipment into moderately-sized packs. Since we had no idea how long it would take for Last Hope Siphon to "pop up," we elected to yoke up doubles at the sump and take lots of line. Visibility was down to about 4 feet from the previous 20 we had enjoyed. As luck would have it, after only an additional 100 feet I popped up into virgin vadose, and tossing off my tanks, scampered down 950 feet of low muddy stoopway (the "Good News Passage") before being stopped by a second sump (the "Bad News Sump"). The worst news of all was that, having dived with doubles, there was no chance of my dragging the heavy gear on to the second sump.

July 3, 1976

On the way home from the NSS Convention we stopped by Butler full of confidence that Last Hope and Bad News were shortly to divulge their secrets. However, once more we were to be foiled, this time by an improperly-equipped diver that tried to do too much. Dragging a single 72 and other heavy and cumbersome diving, photographic and survey gear proved to

be too much for a dry-suit-clad diver, who "pooped out" halfway from Last Hope to Bad News and could manage only a few fuzzy photos on the retreat.

Prospects for the Future

The unanimous feeling at this point is that the key to opening up the huge missing link of cave separating Butler from Aqua Cave lies in diving beyond Last Hope Siphon and Bad News Siphon in Butler Cave. However, there are numerous problems in diving that area. First of all, the logistics involved are considerable. From the entrance of Butler Cave, the support team must climb, crawl and scramble through more than two miles of wild cave that drops at least 590 feet in elevation before reaching Last Hope. Six strong, experienced cavers per diver is not an excessively large support team. Unfortunately, the larger the support team, the longer the trip takes (we're running about 8-9 hours now), and the colder the support team gets (everyone gets wet wading through Sinking Creek about halfway to Last Hope).

The dive itself is a far cry from a typical Florida spring dive. At least two points in Last Hope constitute minor restrictions where divers can comfortably pass only in single file. Further, the floor, walls and ceiling are lined with fluffy red clay silt that is inevitably disturbed, ruining visibility on exit even though the first man will have the benefit of 4-20 foot visibility going in. The lack of tie-offs in the deep clay floor makes it very hard to keep the permanent guideline from drifting into the sides of the sump, where vertical clearance may be too low to permit passage (meaning one must pull the line back and forth to find the best way on). Finally, the cold temperature - 50°F- reduces manual dexterity. Fortunately, the duration of total immersion is short - only about 10-12 minutes each way), so serious exposure problems are unlikely even without dry suits.

Despite the underwater hassels of having two divers in such a mess, two persons are nevertheless needed to transport gear to the Bad News Siphon. A smaller-volume tank (perhaps a 38 ft.^{3}) should be used for this purpose, and dry suits should be eliminated. To keep the support team from chilling during the long wait, one team could bring the gear in and leave, then another team enter and remove the gear after the dive.

In summary, Burnsville Cove undoubtedly offers cave diving one of its most promising opportunities to contribute to speleology.

The writer would like to express appreciation to the members of the support teams for the latest dives, including Nevin W. Davis, Ron Miller, John Wilson, Jack Igoe, Fred Wefer, Lee Gilman, Champe Burney, Frank Marks, Joe Brady, Evan Shuster, Keith Wheeland, Judy Davis and others.

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* * * * *

FLORIDA'S LONGEST CAVES, 12/31/76

		total passage surveyed		
	*	*meters*	*feet*	*miles*
1. Warren's Cave, Alachua Co.[1]	*v*	5551	18200	3.45
2. Peacock Springs Cave System, Suwannee Co.[2]	*p*	5501	18037	3.42
3. Devil's Eye Cave System, Gilchrist Co.[3]	*p*	1870	6130	1.16
4. Hornsby Spring Cave System, Alachua Co.[4]	*p*	1302	4268	.81
5. Ellis Cave, Jackson Co.[1]	*v*	1190	3900	.74
6. Hollow Ridge Cave, Jackson Co.[5]	*v*	1005	3296	.62
7. Blue Springs Cave System, Madison Co.[6]	*p*	946	3100	.59
8. Florida Caverns, Jackson Co.[5]	*v*	885	2900	.55
9. Little River Spring Cave, Suwannee Co.[7]	*p*	824	2700	.51
10. Bat Cave, Alachua Co.[1]	*v*	718	2348	.44

* *vadose (air-filled) or phreatic (water-filled) according to present water levels... no inference as to origin is intended*

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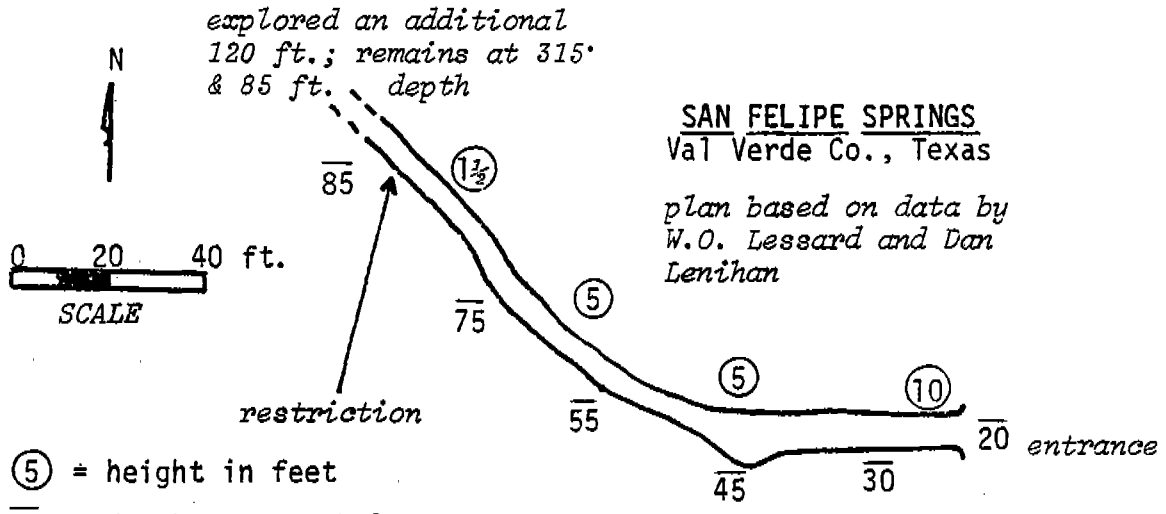
2 Survey by S. Exley, C. Smith, L. Holtzendorff, K. Hillier, R. Johnson & J. Zumrick, 1975-76
3 Survey by K. Hillier, E. Hall, E. Kalakauskis & S. Card, 1975
4 Survey by S. Exley, C. Smith, L. Holtzendorff, D. Fisk, D. Turner, K. Hillier, T. Chalkley, B. Goodman, K. Sullivan, G. Melton & M. Melton, 1974 & 1976.
5 Boyer, Paul (SEKS)- "Florida Caverns," *NSS News*, vol. 23, no. 10(Oct. 1975), p. 155.
6 Survey by S. Exley, C. Stevens, R. Rodgers, J. Townes, B. Stevens, T. Allen, & K. Hillier, 1970-71 & 1975(note: additional survey notes have been lost)
7 Survey by W. Hurst, M. Chestnutt & J. Chupka, 1974-75

SAN FELIPE SPRINGS, TEXAS

Earlier this year one of our members, Dan Lenihan, led a diving reconnaissance of the springs noted by Carl Fowler in Del Rio, Texas (see "Goodenough Springs, Texas" in vol. 3, no. 2 of *Underwater Speleology*, p. 22). At the invitation of the Del Rio Utilities Commission, Dan's team explored 120 feet to a depth of 84 feet in the "West Spring" of the four-spring group, ranked third largest in the state with a mean annual discharge of 82 cfs in 1971 (since the inundation of Goodenough Springs).



Diving into the 75° F, crystal-clear water that serves as the Del Rio municipal supply, Dan found a six-foot-wide x 10-foot-high horizontal entrance at a depth of 20 feet. Continuing westward into the conduit, the divers found the spring to gently slope to greater depth while the height decreased to 5 feet and the width remained constant. The width increased momentarily when the passage bent northward. The divers were halted by a diggable debris-clogged restriction that would not permit them to continue farther without removing their tanks, a virtual impossibility in the high velocity current. A report by CPT William O. Lessard indicates that the height at the restriction is only 18 inches, but that beyond it increases to 3 feet and continues at least another 140 feet until he, too, was stopped - by diminishing air supply (single tank?).

Gunnar Brune in *Major and Historical Springs of Texas* describes the springs as being formed in the Georgetown Limestone of the Edwards (Balcones Fault Zone) aquifer, and mentions that the recharge area is believed to cover about 6500 square miles. Brune also mentions that the springs were named for the king of Spain during a mass held there in 1657.

* * * * *

NOW, THAT'S GETTING AWAY FROM IT ALL!

Overheard at 1976 Cave Diving Session: Jim Storey (NSS 5309) describing setting up camp beyond a 250-ft. sump in Tennessee's Martin Springs Cave.

Comment by Dick Bishop (NSS 1365): "Wow! You really like your privacy, don't you?"

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