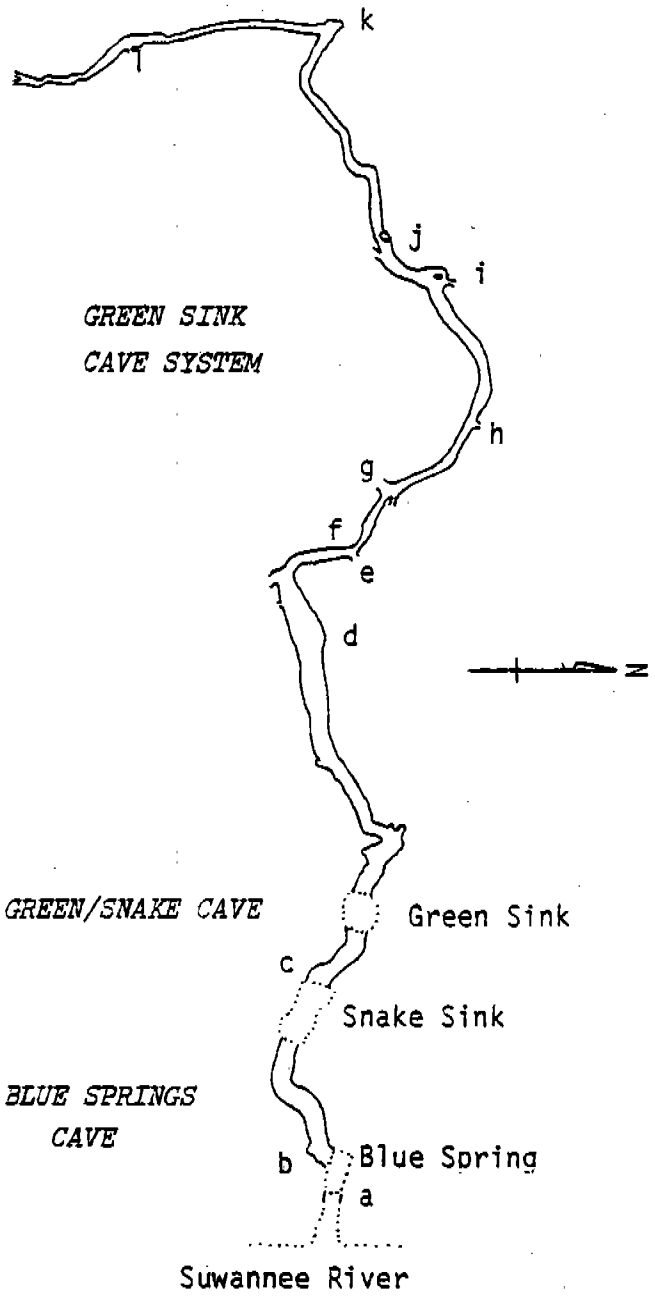

GREEN SINK CAVE SYSTEM
GREEN/SNAKE CAVE
BLUE SPRINGS CAVE

LAFAYETTE COUNTY, FL

Survey by N.S.S. Cave Diving Section

scale 0 200 400 ft.
0 50 100 m

SURVEYORS
D.W. Sweet
C.S. Stevens
B.S. Stevens
T. Allen
I.S. Exley

total surveyed lengths:
GREEN SINK CAVE SYSTEM - 2873 ft. (876 m)
BLUE SPRINGS CAVE - 259 ft. (78 m)
GREEN/SNAKE CAVE - 125 ft. (38 m)

cave completely underwater

legend: a= natural bridge, b= Skylight Sinks I & II, c= Egg Sink, d= Great Pyramid Room, e= Stevens Sink I, f= Stevens Sink II, g= Stevens Sink III, h= Sweet Sink, i= Amoeba Room, j= Kitty Sink, k= Trao Sink, l= the Nostrils I & II

underwater speleology

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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 1977). 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, Box 60, Williams, IN 47470.

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

Sep. 5-10: 3rd International Cave Diving Camp, Bristol, Great Britain. (This is just before the 7th International Speleological Congress - contact B.E.C. Travel Limited, 63 Dun Keld Road, Ecclesall, Sheffield S11 9HN England.)

Dec. 31-Jan. 1, 1978: 7th NSS Cave Diving Workshop, Branford, Florida. (Contact Sheck Exley, 1591 Lane Ave. So., 118C, Jacksonville, FL 32210.)

June 18-24, 1978: Cave Diving Session and Annual Section Meeting at NSS Convention, New Braunfels, Texas.

1979: 4th International Cave Diving Camp, Mexico. (Contact Eduardo Castro Ruiz, Cerro de Tezonco 117, Mexico, D.F.

COVER

Our cover this month is a map of Florida's red-hot discovery, Green Sink Cave System, and goes with the article on page 59, but the biggest news is in Martyn Farr's article on p.56 regarding the latest developments at Britain's famous Wookey Hole.

REGISTER FOR NEW YEAR'S WORKSHOP

Those desiring to register for the super fantastic 7th Cave Diving Workshop in Branford, Florida, on Sat. & Sun., Dec. 31 & Jan. 1, are urged to send their fees on in to Sheck Exley (see address opposite) to help defray expenses. The registration fees are as follows: section members - $2.00; section subscribers - $5.00; all others - $10.00 (includes 1 year's subscription to *Underwater Speleology*. All proceeds will be donated to our Section, so help support the section and cave diving investigation and safety with your presence!

NEW MEMBERS

Gary Cislaghi, 3401 Sandra Dr., Shreve Port, Louisiana 71119

William Mixon, 5035N South Drexel Blvd., Chicago, Illinois 60615

NEW SUBSCRIBERS

Larry F. Collins, 1724 N.W. 39th Ave., Gainesville, Florida 32605

Raymond F. Fogarty, 6603 Broadhale Drive, Louisville, Kentucky 40291

Tony Murland, 6311 St. John Ave., Kansas City, Missouri 64123

Jamie Stone, 1125 NW 36th Road, Gainesville, Florida 32601

COMMENTS ON FLORIDA'S LONGEST CAVES

by Chuck Heller (NSS 6618)

(see vol. 3, no. 6 of Underwater Speleology, *p. 63)*

Check with the FSS* as to the surveyed length of Briar Cave in Ocala. The main most passage is water-filled (water table) where one has to swim before reaching "dry" passage. Many underwater leads seem to be probable. This cave runs under a horse breeding farm in the Ocala Ridge, and the owners do not (as far as I know) currently let people in. *(editor: Paul W. Smith of FSS and the Florida Underground Karst Survey says that Briar is in fact in the 3000-foot range, with some additional passage unsurveyed, and is indeed closed.)*

I discovered this cave about 1963. I asked a local resident if he knew of any caves in the area that no one knew about. He promptly pointed to a woods in a field and told me a cave was closed up in 1938 because bats bothered the picnickers. We finally found a small crevice-like opening in a bunch of briar bushes. Evidently no one had been in it before. This cave has some of the prettiest and most abundant formations in Florida, and is well worth checking out due to the underwater possibilities.

Roosevelt Cave is a little-known cave, just south of Ocala off US 441. This has a large underwater potential. When the water table is extremely low, one can enter the cave and swim down the passages. Roosevelt Cave has not been surveyed, dived, nor extensively explored. In general, the cave has quite a few large passages. With water table normal (13 years ago) the cave was usually totally filled with water. To enter the cave, one slides down a sink (hard to get out of, especially with wet sneakers) to a small body-only sized hole. This is where the water level is in normal levels. Once through the hole there is a large room with passage in 2 directions. This room is about 50% dry and is the "beach" when water is low.

While swimming along (with our old form of "B.C." then - and inflatable US surplus "jungle bladder") we could view a lower, totally water-filled level in the cave with very large rooms. But silt quickly obscured visibility here. The above-water sections (at that time) were pretty much explored by me, except for small crawls. I think that this cave should be surveyed and re-explored, including an exploratory diving party. One would want to go through the small entrance hole dry.

The following is a synopsis of my explorations to Roosevelt Cave taken from my old caving records. The times given are total time spent in the cave.

4/13/63: 2 hours: Water started in big room. Swam down center main passage. Crawled down sand passage (dry) leading left off main passage.
4/14/63: 2 hours: We did not find end of passage. We went about 1000 ft. One carbide lamp doused out. Water covered with a calcium film.
5/4/63: 4 hours: Problem with 6V Burgess battery post. Problem - air bladder puncture and slow leak. Problem - nicad wet cells pooped out prematurely. Found common frog in big room. Found bat guano deep in.
9/7/63: 1.5 hours: Water about 1 foot higher than last spring.
9/14/63: FSS trip to see cave - same frog there.
1/12/64: FSS trip.
1/25/64: 1.5 hours: Water colder in first section than in rest of cave.

* Florida Speleological Society

EXPEDITION 1977

WOOKEY HOLE G.B.

by Martyn J. Farr,
The Cave Diving Group

(Editor's comment: On the way back from the NSS Convention this year we stopped at Crystal Cave, Tennessee, and ran into one of the area's top cavers. Naturally, we asked if there were any particularly interesting sumps in the area to be dived. Yes there was, he replied, but it had been checked out by Martyn Farr the previous year, who is the best there is, so we needn't bother.

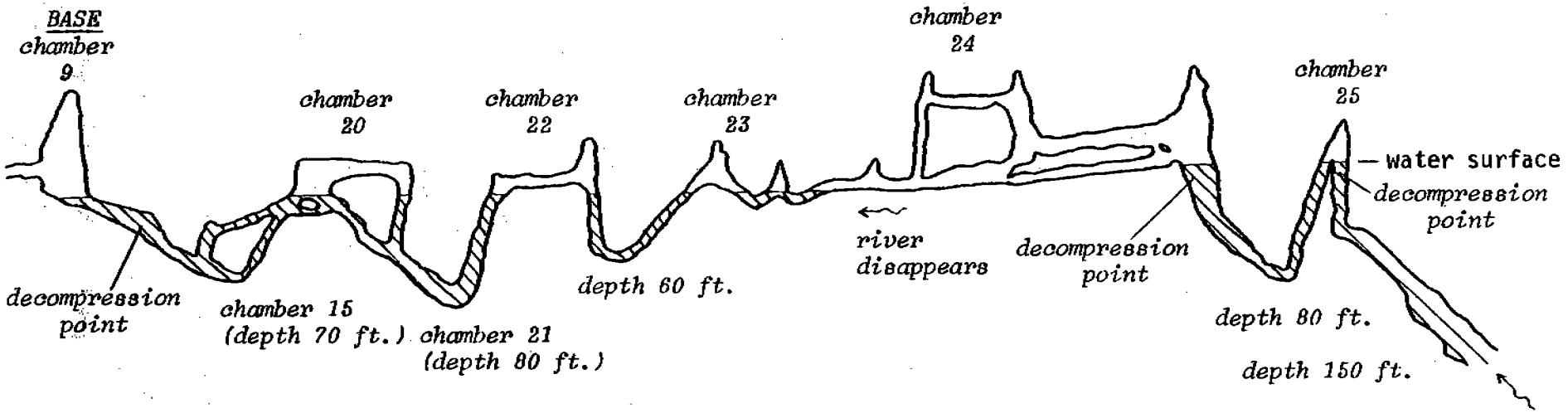
We won't, either. Martyn is one of the world's best cave divers, and has the dives to prove it (they will be the subject of a book by Martyn to be published soon). One of Martyn's pet projects of late is famous Wookey Hole, where the achievements of the Cave Diving Group have become legendary. We are indeed grateful to Martyn for the opportunity to present this article on the latest exploit by the Group at Wookey.)

Cave diving, as anyone with experience of the sport will admit, is undoutedly the most dangerous specialisation in either caving or diving. It combines all the hazards of both sports, and not surprisingly participants are few in number. There is generally very little to see when diving underground and the prime objective, in virtually every instance is to pass the submerged section. Exploration of submerged passages, in which visibility is soon reduced to a few feet, is not pleasant and the real satisfaction comes when one reaches air and a hitherto unknown cave. It is a pioneering sport in every sense and pushing divers are very conscious of being out on a limb. Light or equipment failure, entanglement in guidelines, or running out of air might not be too critical in open water; but underground in nil visibility the situation is extremely serious. We advocate diving alone, in this way one sorts out one's own problems; for there is little that any buddy can do when he can see nothing.

To those dedicated and highly determined individuals who enjoy the sport Wookey Hole provides the ultimate challenge. Situated at the southern edge of the Mendip Hills, it is not only a famous show cave, but it is also the finest cave diving site in the British Isles.

Here, as early as 1935, cavers adopted diving apparatus and attempted to discover what lay beyond the submerged sections. The objective, then as now, was to connect this resurgence with caves on the hills above. The better-known of these are Swildon's Hole and St. Cuthberts, near Priddy several miles away. These early explorations, in Standard Equipment, not surprisingly yielded very little. In the 1940's self-contained oxygen rebreathing sets were adopted and from base in Chamber 3 divers advanced several hundreds of feet, at shallow depth, discovering numerous above-water air chambers. However, it was to be compressed air techniques that were to yield the greatest rewards. By 1971 explorers had progressed to Chamber 22, a total of over 1200 feet of diving away from Base. The route to the last air chamber was split into three stages; from Chamber 3 to Chamber 9, 9 to 20 and 20 to 22.

Until 1976 divers were dissuaded from further attempts by an air of isolation. At this time an artificial tunnel was opened, by the management, as far as the 9th Chamber. Coinciding with renewed interest in the system



WOOKEY HOLE CAVE, GREAT BRITAIN

profile showing divers' extensions

horizontal scale 0 300 ft. / 0 100 m

vertical exaggeration 3:1

submerged passage

map furnished by MARTYN J. FARR, THE CAVE DIVING GROUP

and all the potential rewards, a substantial breakthrough was made in February. Within a few months divers had advanced beyond Chamber 25. Over half a mile of new dry cave had been explored and the terminal point extended to 2000 feet of diving away from Base in Chamber 9.

All sorts of problems now presented themselves and it was obvious that only a major "expedition" could serve to further the exploration. The problems broke down as follows. Length of diving - with over 2000 feet of submerged passage to be traversed to reach our terminal point there was a very heavy air consumption. Fortunately, in one way, the dive could be broken into five stages. This allowed one to transport fresh cylinders to advance diving bases, in preparation for further dives. However portering these items was difficult in itself.

Depth of diving - this was the greatest problem. Not only was there a greater consumption of air at depth, but the situation was exacerbated by the fact that buoancy was lost, and that one has to expend greater efforts to swim. A.B.L.J.s and the like have never caught on in British cave diving owing to the possible risk on entanglement in constricted passages. The answer therefore was to abandon the use of any lead. Once below 30 feet depth this was unnecessary. This disadvantage was that progress was difficult in shallow sections, for example in 23 (see sketch). Here the sumps are shallow, small and extremely muddy. (There is no flow through this section as the River Axe disappears in 24, to reappear deep in 21.) Being light in such a section is potentially hazardous, necessitating very cautious movement.

Combination of length and depth naturally led to the question of decompression. In the final dives of 1976 it was plain that we had exceeded the safety limits. No one had ever planned to decompress deep in a British cave and advice was sought from several quarters. Lengthy stops would entail a greatly-increased air consumption and in the cold water lengthy periods of immersion would be very wearing. The optimum answer appeared to be the use of oxygen for this stage. Stop times could then be halved and porterage appreciably reduced. Developing the concept further led to the use of mixtures; breathed as normal, on open circuit. A 50/50, oxygen/nitrogen mix was to be used to and from the final air chamber, 25; while a weaker 30/70 mix could be used for the final push. The former was safe to 100 feet, while in practise it would only be used to 75 feet. The latter was safe to 150 feet and it soon became clear that it was impractical to exceed this depth. The mix was obtained by decanting a specific proportion of oxygen into an empty cylinder and then topping up with ordinary compressed air. Another advantage of using the 30% oxygen mix was that the narcosis level at 150 feet would be equivalent to 130 feet using compressed air.

The preparations were immense. In the first place a great deal of new equipment was essential, e.g. bigger cylinders and better suits. The potential expense was offsetting, but fortunately counteracted by sponsorship. Wookey Hole Caves Ltd. provided us with a handsome figure in order to purchase two tailor-made dry suits; Rolex supplied the finest watch, while Reynolds Tubes donated a pair of cylinders. Other sponsors include Ultimate Equipment, Helly Hansen U.K. Ltd., Ladysmith Busywear, Typhoon, Damart and Aquasnap. To each we are extremely grate-

ful.

The constant volume Dry Suit served to maintain body temperature and offset negative buoyancy at the depths which were anticipated. The big worry was that of heat exhaustion in the dry sections of cave, between dives, while damage to the suit had to be avoided at all costs.

Amassing equipment and practise with techniques took time. Concurrent with this moves were being made to facilitate easy movement through the system. Climbs and a long strong flowing canal were roped, while rigged steel ladders were transported to 25, to scale a low wall. Continually delaying progress was the weather which prevented access to the further reaches for over four months.

Week after week one, two or three of us made arduous and often exciting, trips to the further reaches. Heavily overweighted with additional cylinders, boots (for the sections of ordinary caving) and sundry other items, there was no room for error. Equipped in such a manner there was no question of making a speedy retreat to the sanctuary of an airbell; dependance on bottle and valve was complete. At every instance concentration had to be mustered. To fall and break a leg was unthinkable, for rescue was virtually impossible. Again dropping one's mask or demand valve was just not on, for it could take 12 or more hours to bring a replacement.

In May the long awaited dry spell arrived. By this time a team had crystalized comprised entirely of members of the Cave Diving Group, and in particular, the Welsh Section. The stalwarts, David Morris, Brian Woodward, Paul Atkinson, Colin Edmunds and George Bee deserve every credit.

The push dive was scheduled for Saturday 11th June and we were fortunate to recruit additional diving support. Unfortunately the weather broke and the exploratory stage had to be deferred. Rather than disappoint the news media a "dress rehearsal" was activated and the final touches made to the earlier preparations. Seven divers took part.

The following weekend the water levels were back to normal, though visibility was less than 15 feet. Farr led in, at 11:40 AM, to make the best time before the sediments were disturbed. He was accompanied and ably assisted by Brian Woodward and Paul Atkinson to the head of 24; and on the final stage by Dave Morris. The latter remained on the surface while Farr conducted the final exploration alone. The diving reel, deposited the previous July, was picked up at 100 feet depth, and the descent continued. The passage was about 5 feet wide and 25 feet high, inclined at an angle of 45 degrees. The floor consisted of coarse rippled sand, until at 135 feet depth a vertical drop appeared ahead. At 10 foot descent led into an area of boulders where after a few feet the gauge registered 150 feet. The reel was dropped and a hasty exit made. A few extremely worrying moments were experienced, in visibility of 1 to 2 feet, as the diver struggled to regain height. Despite the advantages of the Dry Suit there was a tendency to overbreathe, almost uncontrollably. It came as a great relief to regain the fixed shotline, swap gags and decompress on the installed oxygen supply. After a total of eight hour and two more decompression stops four very weary divers emerged at base.

The main objective had been to pass the final sump. In this we failed, but a new British cave diving depth record had been achieved. More significant was the fact that decompression had been adopted for the first time, together with the use of open circuit mixtures. All in all, this must be seen as one of the most technical operations ever conducted in a British cave. Any attempts at advancement in Wookey Hole will have to await the days of rebreathing techniques.

None of this would have been possible without the support that was forthcoming. To our sponsors and all who helped in any way - many thanks.

* * * * *

THE GREEN SINK CAVE SYSTEM

by Sheck Exley (NSS 13146)

Introduction

Ask any Florida cave diver to rank in order of enjoyment his favorite underwater caves and you'll find Blue Springs Cave of Lafayette County near the bottom of the list. This less-than-esteemed position is well-deserved: the unusually large passage, dirty limestone walls, thick deposits of dark silt and relatively poor visibility (seldom better than 30 ft. or 9 m) gives one a rather disturbing feeling of hanging in endless space - and a very dark and unsanitary space at that!

Blue's image as a cave better forgotten is certainly enhanced by the many cave diving students I have tortured there through various water exercises during classes. And those students that later became cave diving instructors recalled their horror and brought their own classes there. "Lafayette Blue" may now be the most popular underwater training cave of all time!

...but dive there for pleasure? Never!!!

Early Dives

Blue Spring, Snake Sink and Green Sink were probably all first dived by members of the Florida Speleological Society or John Harper's (NSS 8352) bunch in the late fifties or early sixties.

My first dives at Blue Springs Cave came on 4/23/67. Accompanied by three other members of the youthful "Aquacks Diving Club" of Jacksonville, Joe Prosser, Bob Gatling and Tom Hawkins, we stopped there almost as an afterthought on the way from Telford Springs Cave to Troy Spring. I remember being surprised by the poor visibility - the worst I had seen in a Florida spring at the time - and the depth of the cave, almost 50 ft. (15 m) instead of the 30 ft. (9 m) we had heard. Our dives were short and we left

completely unaware of any connecting sinks. As a matter of fact, about the most scenic thing we found was the old Blue Springs Cafe, which even by that early date was already only a burned-out ruin.

When Tom Mount and I first met at Tom's old dive shop in Titusville in 1968, we compared notes on our favorite dives and Tom volunteered that Blue connected to two adjoining sinks, "Green Sink" and "Snake Sink." But even the lure of two new traverses was not sufficient to rekindle my interest, and I did not return to Blue until 1/24/71, when Chuck Stevens and I (now diving with the Dixie Cavern Kings Cave Diving Club) swam through to Snake Sink, then from the head of Snake through Green/Snake Cave to Green Sink and then beyond. "Beyond" was rather nice: the walls upstream from Green Sink were lighter, and there were patches of a white sandy floor that reflected our improved lights well and gave us the deception of better visibility. Best of all, the size of the cave increased from "unusually large" to "huge," with widths in excess of 50 ft. (15 m) and heights of over 20 ft. (6 m).

Discovery of Stevens Sinks

Accordingly, we returned on 2/5 to take a longer look at Green Sink Cave. After almost 600 ft. (183 m) we were surprised to see a very large, pyramid-shaped block larger than a car standing near the center of the passage. Continuing, the passage abruptly forked and we bore right into an ascending passage of reduced size. Suddenly we were astonished to see light streaming in a 10 ft. (3 m) diameter entrance and surfaced, shouting, in StevensSink. Resuming our progress upstream in the underwater cave, we quickly found two more entrances and named them "Stevens II" and "Stevens III".

However, continuing upstream we found an extremely shallow, unstable area that frankly scared us (there was no more than 10 ft. (3 m) of badly fractured Ocala Gp limestone over our heads). One sink - Doodlebug Sink - had already recently formed in that area, and we didn't want to become part of another so we turned back.

The Survey Begins

June was getting to be "mapping month" with the D.C.K.'s (we had mapped another Blue Springs Cave - in Madison Co. - the preceding year) and June 7 & 8, 1971 found our team busy at Lafayette Blue. We knew the old standard single base line method of cave surveying would give unsatisfactory results in such wide tunnels with poor visibility, so I devised the "dual base line" method in which we ran a base line along each wall. By tying the stations along each wall together with cross-passage measurements, we were able to obtain a remarkably accurate plan of Blue Springs Cave despite visibility limitations. Bob Friedman (NSS 13215) and I later included this map in our book *Mapping Underwater Caves*.

Some Hydrogeologic Clues

A lot of interesting things happen in the Luraville bend of the Suwannee River. For approximately 10 miles the Suwannee flows along the top of the Suwannee Limestone before crossing the contact back on to the Ocala Group. The river, en route to the west coast of Florida, actually flows east at

that point. The fact that the lower portion of the Suwannee Limestone and the upper portion of the Ocala Group can form very long (by Florida standards) cave systems in the area is well-demonstrated by the Peacock Springs Cave System (5.86 km surveyed) and Dorado Chasm (1.25 km surveyed) even when the usual harbinger of large underwater caves - large water flow - is absent. Blue Springs, whose flow probably exceeds 100 cfs, is the largest point of discharge in the area. Further, Blue is the only known spring of any significance whatsoever draining the west side of the Suwannee River from the Luraville bend all the way over 17 miles northward to the Ellaville area, despite a lack of any significant surface drainage over that distance.

It was plainly time to take another look at the Green Sink Cave System. A new measured line was installed from the Green Sink entrance to just beyond Stevens Sink III and the passage was surveyed. A tentative look at the upstream continuation showed that it was not as frightening as remembered.

The Longest Day

On 10/2/77 Dale Sweet and I entered the System at Stevens Sink I, then swam to Stevens III while practicing sharing air. At Stevens III Dale tied off a 150-ft. (46 m) piece of line and we proceeded into the fearsome shallow section. I was sort of expecting that by the time this line ran out we would be halted by breakdown in the vicinity of Doodlebug Sink, but Dale's line ran out with the shallow passage still going strong. I looped in my spool of 500 ft. (152 m) and cruised on down the passage, which was slowly becoming more interesting.

Suddenly there was daylight ahead, and we swam on up into what I was certain would be Doodlebug Sink. Surprise! The sink we surfaced in was not Doodlebug, but a new discovery, which I pronounced "Sweet Sink." Continuing, I laid another 370 ft. (112 m) and cursed into my exhaust when we ran out of line with plenty of air left in our double 72's... but what was that gleam in the distance?!?

Another new sink! Drifting onward, we surfaced in "Kitty Sink" (named in honor of Dale's better half). Even though we were going to survey back to Stevens III, I wanted to get a landmark (like a tall tree) to help locate Kitty Sink in the dense hardwood forest. Carefully climbing up the slippery bank, I immediately found a pretty good landmark - a heavily-traveled dirt road!

We didn't want to get caught short of line again, so after lunch we measured out spools of 200, 420 and 600 ft. against my fiberglass tape. Plunging back into Kitty Sink, we swam downstream 61 ft. (19 m) to tie back in to the end of the line we had put in that morning, then swam back across the sink and past an interesting offshoot into the large upstream continuation. Just as my 600 ft. (183 m) spool was about to empty, another sink entrance showed dimly to the right. Swimming upward into the murkey water, I was surprised to see a large wire mesh trap lying on the bottom at 20 ft. (6 m).

Swimming back down into deeper water, Dale tied off his 420 ft. (128 m) piece and we continued beyond "Trap Sink" into a passage that still refused to get smaller than 15-20 ft. (5-6 m) wide and 5- 10 ft. (2-3 m) high. Soon

two more narrow sink entrances ("the Nostrils") appeared, but by now this sort of discovery was getting so routine (our 4th and 5th new entrances of the day) that we didn't even bother to surface. When Dale's line ran out I put in the last 200 ft. (61 m), tied off on a pendant at a water depth of 52 ft. (16 m) and paused to squint disappointedly into an enticing 5 ft. (2 m) by 15 ft. (5 m) tunnel that continued beyond before turning to survey back to Kitty Sink.

When we added up "the score" back at our cars we found that we had explored and surveyed 1870 ft. (570 m) of virgin underwater passage, and discovered and connected in 5 new entrances from underground. These figures may represent records for those interested in that sort of thing.

The Future

The passage continuing beyond "the Nostrils" has enormous potential, and the upstream leads sown on the cover map also have promise, particularly the one just downstream of Stevens Sink I which heads off toward a sink-pocked area which includes picturesque Bullfrog Sink, a miniature version of Snake Sink. The Amoeba Room contains another very interesting, though smaller, outflowing lead. With the surveyed length of a single passage already 2873 ft. (876 m), an abundance of side leads and delightfully shallow depths, it is not unreasonable to predict that by the end of this year the Green Sink Cave System could replace the Devils Eye Cave System as Florida's third longest cave.

* * * * *

REVIEW: THE UNDERGROUND LEADER

reviewed by Sheck Exley (NSS 13146)

The Underground Leader, printed quarterly by the School of the Ozarks Troglophiles and the Ozark Highlands Grotto of the National Speleological Society, Michael Warshauer, editor, Box 78, Pt. Lookout, MO 65726. Approx. 36 pages per issue. $3.25 per year (4 issues).

The Underground Leader enjoys a reputation as one of the finest periodicals of its type in the country, and this reputation is well-deserved. The reviewer cannot profess to be aquainted with all of the grotto publications in the U.S., but among the ones he does read, this is his favorite. For layout and content *The Underground Leader* is hard to beat. Imaginative cover designs, fancy artwork, good-quality photos and maps, not to mention interesting articles on caving all over the country and even Mexico make it well worth the price.

Vol. 7, no. 2 should be of special interest to our readers since (1) it is the lengthiest issue ever, and (2) it is devoted almost entirely to cave diving. In addition to a six-page review by this writer of the history of cave diving in the United States, there is an excellent 19-page report on the recent earth-shaking discoveries through cave diving at Cave River Cave and Nesbitt's Spring in Arkansas. The report by Mike Warshauer and Don Monnot includes several photos and maps of the historic dives made by Don (NSS 16322) and Ed Arters (NSS 6247). Their dives resulted in the discovery of thousands of feet of new air-filled passage, with future dives planned to push further.