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A Message To The Membership
by William K. Fehring (NSS 19079)

The Executive Committee will be meeting early in October to discuss two issues of considerable importance to the future of the Section, namely: the nomination of officers for next year and a proposed new Constitution and By-laws. With regard to the former, a formal request for nominations will go out in mid-October. However, the Executive Committee has taditionally proposed a slate of officers first, to which nominations from the membership are added. I would urge those of you who are interested in serving, or who would like to recommend someone, to contact any member of the present committee.

With regard to the Constitution, it has become apparent that the Section has outgrown its current organizational structure. While it is very simple, it gives frightfully little guidance as to who is supposed to be doing what, when and where things happen, who can change this or that, who can authorize things, etc. As chairman I have become painfully aware of this. In addition, our current organization leaves us with an entire new cast of characters each year, so there is little continuity from year to year. I would like to improve this situation for future leaders of the Section. I have asked Wayne Marshall and Sheck Exley to help me draft a new constitution. It will undoubtedly be longer and somewhat more comprehensive than the existing document and might at first glance offend the "keep it simple" crowd. However, the thrust of our effort is to make the operation of the Section more simple, even if the constitution seems more complex.

Our proposal will be forwarded to the Executive Committee around September 1. If approved, it will be put on this fall's bal-

See MESSAGE page 34.

Composite Diving Gear
A Critical Appraisal

by Bill Stone (NSS 12783)F

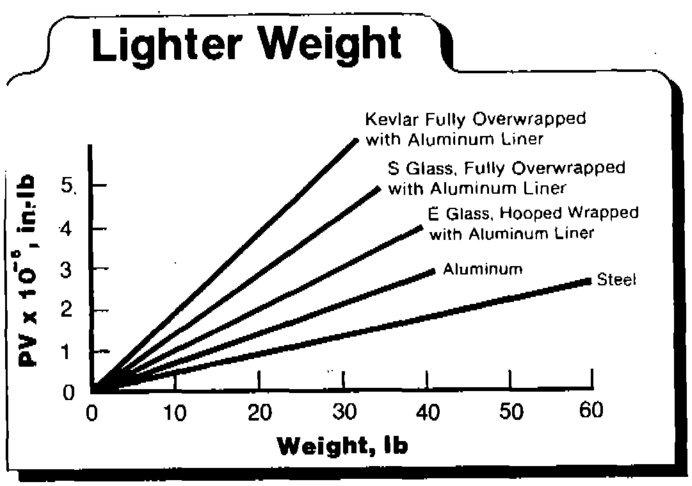
The idea of using lightweight composite tanks for sump diving is not a new one. As early as 1977 rumors were circulating through the cave diving community of veritably weightless Kevlar™ tanks that would soon be on the market. By and by it became apparent that such equipment was not likely to be seen in the local dive shop for a long time. This is primarily because the lightest type of composite cylinders have not yet received approval for underwater use from the Department of Transportation, which grants permits for the sale and manufacture of all compressed gas containers in the United States. To receive a DOT exemption, experimental evidence must be presented to demonstrate the safe performance of a pressure vessel in a given environment. To date insufficient evidence has been presented to the DOT. At least one company, Acurex Aerotherm, has initiated studies to determine the underwater performance characteristics of composite cylinders. This independent action on the part of Acurex, along with some very fortunate timing on our part, led to the use of composite cylinders on the San Agustin dive. Having now used these tanks for more than a year it may be useful to discuss some of their advantages and faults.

All composite tanks consist of basically two parts: a metal liner and an external wrapping under tension, of either Kevlar, E-glass, or S-glass fibers dipped in epoxy resin. In recent years it has been discovered that all of these fibers have a tendency to slowly breakdown with age under high stress, a phenomenon known as stress rupture. Laboratory tests of composite tanks filled to a high percentage of their new ultimate burst pressure have been known to explode when left standing for several months. For this reason the service pressure on composite tanks has been conservatively pegged at no more than 30% of their new burst pressure. Furthermore, stress rupture eventually causes a gradual breakdown of the fibers even when the tanks are operating at service pressure. Because of this all composite cylinders presently have a rated lifetime of 15 years. The upshot of the above is that large overfills, a now widely accepted practice among Florida cave divers to increase their penetration radius without increasing their equipment volume, are not to be recommended with composite tanks. In addition to the choice of materials to be used in making the tanks there are two construction processes which may be specified: hoop wrapping and full overwrapping.

The cover photo shows several of the composite cylinders both hoop wrapped and fully overwraped. The cylinders described by Dr. Stone are located in the lower left hand portion of the photograph. Photograph courtesy of the Acurex Corporation.

In the hoop wrapped version a metal liner, usually aluminum in the case of cylindrical tanks, is forged in such a manner that its top and bottom are sufficiently strong to withstand the internal pressure on the basis of the strength of the liner alone. The weight savings in these tanks is achieved by reducing the thickness of the metal sidewalls. Lateral bursting is prevented by wrapping the cylinder with filiment fibers which have a much greater strength to weight ratio than the metal. As an example S-glass fibers typically exhibit tensile strengths in excess of six times that of aluminum, and yet are 28% less dense. Since the fibers are wrapped only around the flat sidewalls of the liner, and not over either end, the minimum thickness of the metal sidewalls is determined so as to keep the tank from pulling apart longitudinally. The weight savings afforded by this method of construction can be as much as 38% less than the weight of a similar capacity steel tank.

The tanks we used were of the fully overwrapped variety, a term the composite industry uses to denote cylinders which are first wrapped in the longitudinal direction from the valve post to the base of the cylinder then later hoop-wrapped around the cylindrical sidewalls of the tank. This particular method of construction permits a large reduction in the weight of the cylinder since the top and bottom of the liner need not withstand the internal pressure on their own merit. Additionally, the liner sidewalls may now be thinned below that required to prevent longitudinal bursting, since there is extra support in that direction provided by the longitudinal filiment wrapping. This mode of construction can yield weight savings of up to 65% of the weight of an equivalent steel tank. As an example the tanks we used held approximately 90 cubic feet of air at the recommended service pressure and weighed 19 pound when empty. The typical 90 cubic foot steel tank weighs approximately 55 pounds empty.



The DOT has approved certain types of hoop wrapped cylinders for underwater use, and at one time Luxfer, one of the largest aluminum tank manufacturers, put these into production for scuba. But after developing a prototype cylinder for intended retailer, U.S. Divers, assesed that the market did not justify putting them into production. There were several reasons for this. At first the tanks were too buoyant, and would require excessive amounts of lead ballast. So Luxfer increased the weight of the liner so that the tanks would be neutrally buoyant when half full. In doing so the weight savings over the standard 71.2 cubic foot sport diving tank, which it was intended to replace, was reduced to only 24%. This, in addition to its uncompetitive price and the difficulty of obtaining 4000 psig fills, its rated service pressure, convinced U.S. Divers that the market was not yet ready for the hoop-wrapped scuba tank. Luxfer went back to selling aluminum tanks.

The fully overwrapped tanks have a similar problem with buoyancy but this can be minimized by selecting a low profile, high pressure cylinder. The primary problem with the fully overwrapped cylinders is that the metal liner cannot be inspected for external corrosion since it is completely covered by the composite fibers. After stressing to service pressure it is not uncommon for very fine cracks to form in the brittle epoxy between filaments. While this in no way detracts from the strength of the windings, in theory it might possibly provide a penetration path for corrosive agents, saltwater for example, to attack the liner. Although they are fairly well protected by the epoxy resin there is also some concern that the composite fibers themselves might degrade in corrosive environments. Pending prolonged exposure test results to prove or disprove the integrity of these tanks for general underwater use, the DOT will not issue the exemption numbers which every filling station is required to check before filling a pressure vessel. Although Acurex Aerotherm is conducting such tests company spokesmen have indicated that they presently have no near term intentions of applying for an underwater exemption for their fully overwrapped cylinders.

The tanks used on the San Agustin dive were made available on the conditions that they be used in fresh water only and that they be returned on a regular basis for ultimate testing to determine if any dangerous degradation in strength had occurred with time. The tanks were stamped, "Experimental - For Test Use Only", instead of with the usual DOT exemption numbers. Bearing this label, all but a very few dive shops in the U.S. will let you get past the door with such a tank, even if it is five times as strong as the highest pressure their compressor can produce (the burst ratings on the tanks we used was 17,000 psi; the average Scuba Shop fills to 3000 psi).

Higher Strength

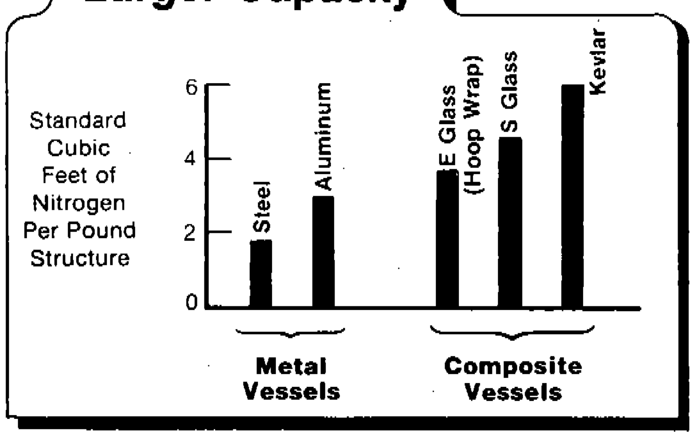
	Modulus (10^6 psi)	Ultimate Strength (10^3 psi)
Aluminum	10	48
Steel	30	105
E Glass	11	225
S Glass	12	330
Kevlar	19	300

Even if you do find a cooperative dive shop, chances are that you will not be able to fill the tanks to the pressures needed to make them efficient. To achieve a 90 cubic foot capacity the tanks used on the San Agustin dive had to be pressurized to 4500 psi. During our final state-side organization in Austin we found that only one place in Texas had the capacity to pump 4500 psi, the Houston Fire Department which uses a similar fully overwrapped tank for rescue breathing. To get them to fill the tanks Acurex had to phone NASA who in turn phoned the Fire Station with the compressor and convinced the chief to do the fills. That kind of cooperation cannot be expected for the weekend sump dive, and we have since been unable to fill the tanks to more than 3500 psi.

It appears that the serious sump diver wishing to use composite tanks will have little recourse but to purchase his own 5000 psi compressor, and the cost of that may well cause him to consider going back to metal cylinders. For that matter the composite cylinders themselves are no bargain: they cost on the order of twice that of a comparable metal cylinder.

Despite these disadvantages the fully overwrapped composite tank offers a stunning increase in diving capability for a given amount of weight. When filled to 4500 psi the tanks we used had an additional weight of 5 pounds of air, so that each tank weighed 24 pounds full. The weight of the tank carriers was approximately 7 pounds, which gave a total load per team member of 31 pounds: a stout cave pack when doing delicate traverse work, but not unmanageable. On the way out the tanks were completely emptied, resulting in a pack weight of 25 pounds. If we had used equivalent single Pressed Steel 104 cubic foot tanks the filled weight of each tank would be 61 pounds and because these tanks are at least 50% larger in volume, the tank carriers would have weighed on the order of 11 pounds, for a total pack weight of 73 pounds. If the 104's were overfilled, as they often are for Florida diving, the pack would weigh on the order of 80 pounds: a serious load to be carrying in addition to your normal array of technical gear for a deep caving trip.

Larger Capacity



The composite tanks we used measured 21 inches long by 7 and 1/4 inches in diameter and were approximately 5 pound positive buoyant when 1/3 full, the lowest you would want to breath them down on a normal cave dive. So, additional lead had to be taken down to keep the diver neutrally buoyant. Although this added up to 21 pounds of lead for the four tank set used on the 285m dive in the San Agustin sump, the individual leads weighed only 3 pounds and were easily carried on our battery belts and distributed among the team. For multiple assaults, in which fresh tanks are successively brought in from the surface, the lead weights become a negligible consideration, since they need be carried in and out only once. It is this feature, if

Available Pressure Vessels

Manufactured in Compliance with DOT Exemptions

Composite Wrap	Acurex Part No.	Min. Water Volume (in³)	Service Pressure (psig)	Nitrogen Capacity (scf)	OD (in.)	Length (in.)	Average Weight (lb)
Kevlar Full Wrap	6233	484	4,500	75	5.9	27.9	12.4
S Glass Full Wrap	6235	40	3,000	4.5	2.8	10.6	1.3
	6410	45	3.000	5.0	3.6	7.8	1.4
	6683	550	4,500	85	7.2	22.0	18.9
	6289	550	4.500	85	5.9	31.2	18.5
	6764	514	2,216	44	6.8	20.3	10.0
E Glass Hoop Wrap	OWM-D	172	3.600	22	4.5	16.5	6.5
	OWN-22	240	4,000	34	5.4	16.8	10.5
	OWM-E	283	3,600	37	4.5	25.6	9.6
	OWN-33	360	4,000	51	7.1	15.6	17.1
	OWN-60	660	4.000	93	7.5	23.6	27.4
	OWN-88	960	4,000	136	7.5	32.9	37.4
	OWN-122	1,320	4.000	187	8.3	36.8	50.0
	OWN-150	1,800	3,600	234	8.2	49.9	58.3
	OWC-50	2.040	3.200	241	8.8	46.2	58.6

marketed properly, that would make the tanks attractive to serious sport divers. By designing a detachable precisely weighted backpack, the cylinders would only need to be clipped in and out as they are used. No specially modified liner would be needed, and the greater the number of tanks involved per diver, the greater the overall savings in weight.

Far from a disadvantage, however, the positive buoyancy of the composite tanks makes possible a long awaited advancement in the art of stage diving, the technique developed by Florida cave divers for extremely long penetrations. In the past, stage diving involved carrying an extra front mounted, single metal cylinder, equipped with a regulator and pressure guage, when back mounted tanks alone were insufficient to reach the limit of penetration and allow time for exploration. This was simple enough at first: you breathed the stage bottle in from the entrance until its pressure guage read 1/3 down, then unclipped it, attached it to the dive line,. and continued on with the back mounted cylinders. If the dive still continued (we are now talking of penetrations greater than 500m) there are two options available. First do a set up dive wherein a full single stage bottle is carried in while breathing off the back mounted set to where you think it would be 1/3 down if you had breathed it from the entrance, and you drop it there for the next dive and exit. On the second dive you breathe a second front mounted single bottle from the entrance to where the pre-set tank is waiting. A switch is made and you continue on just as if you were doing a single stage dive from that point. Alternatively, if you are a strong swimmer, and have a large buoyancy pack, you could struggle in with two front mounted tanks and successively ditch them along the way as they reached their 1/3 points. Both of the above manuevers are known as double stage dives.

As the number of stages increase, the logistics and time spent preparing for, doing, and cleaning up after the dive can become staggering. Due to the excessive weights involved, as well as increased drag, nothing larger in capacity than an 80 cubic foot stage bottle, and rarely more than two at a time, have been the accepted tolerable limit of diving capability by Florida divers doing stage dives. Because of this, a lengthy and tiring string of set-up dives becomes necessary on a major push. Additionally, the large number of shuffling operations, donning and ditching bottles, finding regulators, and monitoring a maze of pressure gages, increases the complexity of the dive, and hence the opportunity for error, particularly when the switching must be performed at depth.

By using dual manifold double composite tanks as stage bottles in conjunction with back mounted Pressed Steel 104's, which are highly negative buoyant, all of the above problems can be reduced or, in some cases, eliminated altogether. Because the composite/steel system can be precision adjusted for neutral buoyancy the number of composite stage bottles that can be carried on any given dive is limited only by the projected cross sectional area, the total surface area, and the volume of gear the diver can strap on. The former two items deal with fluid dynamic drag. In simple terms the diver's thrust must overcome the resistance to motion through the water. This is of considerable importance when one is diving against a strong current. Herein again the composite tanks shine: because of their high pressure design, more gas can be packed into a smaller tank. A typical 100 cubic foot capacity composite tank occupies the same volume as a standard steel or aluminum 50 cubic foot tank. Lastly, using dual manifold double composite tanks for staging means that the number of switching operations is cut in half. The dive is simplified. The safety is also improved, since each double set is equipped with a redundant regulator.

Does it really work? On November 27, 1981 John Zumrick and I put the theory to a test on a 914m penetration dive in north Florida using Acurex stage bottles linked with Sherwood Selpac dual valve manifolds. Everything went like clockwork with the distance limited only because of the low pressures available for charging the tanks (3100 psi). Pending the general availability of high pressure filling stations, as well as some necessary improvements in high pressure regulator systems the composite tank will become the tool of choice for all sump dives as well as for long distance spring dives.

NOMINATIONS SOUGHT FOR
NATIONAL SPELEOLOGICAL SOCIETY
CAVE DIVING SECTION
OUTSTANDING SERVICE AWARD

The NSS Cave Diving Section Outstanding Service Award which was presented in the last issue of Underwater Speleology will be voted on by the membership at this years election. If approved by the membership, the first Outstanding Service Awards will be presented at the winter workshop. To aid the Executive Committee in selecting the recipients, we are now soliciting nominations for the award from the membership.

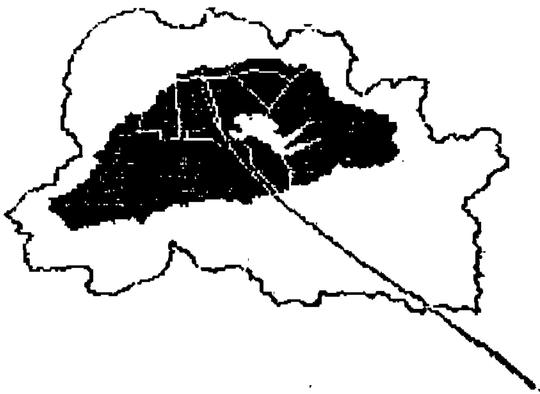
If you know of someone who you feel meets the qualifications described in the award and whom you would like to nominate for the award, send a letter of nomination to the Section Chairman, William Fehring, 3508 Hollow Oak Place, Brandon, Florida 33511. In this letter include a description of the significant contributions you feel qualifies the nominee to receive the award. Remember, unless one is nominated then he or she cannot receive the award. The Executive Committee must depend on you, the membership, to insure that all those deserving of the award are recognized for their contributions to the Section.

The Casio Watersport Watch

by Tom Cook (NSS 15548)

I read about the Casio Watersport watch in Skin Diver magazine and decided that an inexpensive underwater watch such as this was what I needed. The Casio Watersport uses a liquid crystal display that is always on and shows up as black numerals against a grey background. The watch displays both date and

See Watch page 35.



Continuing Possibilities The Round Sink System

by Steve Straatsma

As cave diving advances, and more and more of the well known sping and sink cave systems in the State of Florida yield to progressively longer, more technical dives, it only stands to reason that the more experienced, adventurous divers have forsaken the well-known, easily accessible cave sites and began exploring areas previously untouched. Often these sites are extremely remote, requiring four-wheel drive vehicles; shallow-draft boats for long, obstructed spring runs; and even aircraft for aerial reconisance of potential sinkhole locations. Considering the time and effort needed to discover these hidden sites, it would seem astonishing that a mayor cave system with a least six entrances would exist right under a major housing development, yet be so little known as to have only a handful of divers ever venture into its large, white limestone conduits. This system is in Pasco County, Florida, and the following article 'is a brief history of its exploration to date.

In early 1978, Will Walters (NSS 18801), who was heavily involved in the exploration of caves in the Tampa Bay area, discovered a series of small nondiscript sinks in the Beacon Woods Housing development in Pasco County. For the next year, Will, Jay Friend , Bob Gomez (NSS 19081), Paul Heinreth (NSS 21481), Bill Fehring (NSS 19079) and a few others made exploratory dives in the various sinks. The first surface entrance, located right next to the housing development clubhouse and pool, was named Nexus Sink. After a few exploratory dives in which several hundred feet of survey line was laid in both an upstream and down stream cave system, the divers then discovered and entered Round Sink. Its discovery was due to research done by Will and Jay, during which they'd uncovered a section in a report done by the USGS on spring and sink reconaissance in West Central Florida (W.S. Wetterhall, 1965, Investigations No. 39). This study reported that a large amount of flourescein dye had been placed in Round Sink and was observed outflowing in the Gulf of Mexico, approximately three miles distant to the West. According to geologist's calculations, the time it took the dye to flow from Round Sink to the Gulf, at a rate of 0.5 cfs, indicated a conduit cross-section of approximaterly ten feet. This was to prove startlingly accurate as the exploration and survey confirmed.

As the divers pushed ahead from Round Sink, they also began to realize how complex the system was becoming, with numerous large, yawning leads opening at the very edge of their limited visibility. In addition, the rather unique discovery of a large, fairly intact fossilized mammal skelton, imbedded in a shelf of limestone along one wall, added to the system's interest. What type of fossil it is has yet to be determined. As explorations sontinued, the divers became very conscious of the possibility of connecting Round Sink to Nexus Sink; yet it had not been accomplished as exploration subsided in late 1978. All told, at that time, five surface entrances had been discovered: Round, Nexus, Briar, Golfball, and Smokehouse Pond sinks. Round and Nexus had not yet been connected, but Briar, Golfball and Smokehouse had short 300-400 foot traverses connecting them at a depth of 50-60 feet. From Smokehouse, an additional 500 feet was explored by Sheck Exley (NSS 13146), leading west towards the Gulf of Mexico where the dye had emerged earlier.

In October 1980, Vaughn Maxwell (NSS 19950) and the author entered the Round Sink entrance for their first dive as a team in this cave system. Visibility was its usual tannic 5-15 feet, but we continued on for approximately 600-700 feet, passing the fossilized skelton discovered previously. Finding ourselves aclimating mentally to the low visibility , and determining it to be a tolerable situation as long as care was taken not to lose sight of the safety line, we decided to exit, vowing to return soon to photograph the fossil bones, and to continue our exploration of the system. Diving in such circumstances would soon prove to be intriguing because the low visibility hindered us from locating side leads, which are large and numerous, but allowed us, by becoming familiar with the caves characteristics such as depth, type of bedding plane, tunnel size, etc., to continue exploration.

On the next dive, we single staged in 900 feet. After photographing the fossilized bones at 450 feet, we made a two foot jump at the end of the line Jay Friend had layed four years earler onto another line he had laid right past the Round Sink line while trying to connect Round and Nexus sinks. This error can be attributed primarily to low visibility, sometimes you just can't see far enough to pick out lines to different tunnels in tannic water. We continued on and popped into clear. blue water as the cave ascended from its average of 130 feet to 90 feet, and suddenly found ourselves beneath the chimney at Nexus Sink. Another connection in the cave system was made, this one 1,200 feet at a maximum depth of 140 feet.

We now concentrated on the down stream tunnel of Nexus Sink. On a dive on November 2nd, we penetrated 700 feet, adding 200 feet to the end of the line laid in 1976. We were now in unexplored cave, and the possibilities of a large, long cave system grew with every turn we took. Although the low visibility limiting us to the obvious, large main tunnel, ocassionally we would see large, yawning leads to one side or another, but still the main tunnel continued. On November 5th, we single staged, laying another 780 feet of knotted line. The water was getting clearer with visibility now 10-20 feet. On a subsequent dive on November 8th, we hit crystal clear, sparkling water, as we ascended from 120 to 90 feet. It seems the clear, warm 70 degree water floats on top of the cooler, tannic 68 degree water. We continued on, staging in 1,400 feet to a large natural bridge spanning a pit in the floor. Tying off, we exited.

The next dive, on November 12th, involved double staging. We managed to lay 400 feet more line. The tunnel dropped down a pit into tannic water and continued North-Northwest at 140 feet. On exiting, we noticed a large, flowing tunnel, which we hoped might be a short cut to this remote section of the cave.

Turning our thoughts to a possible connection with Briar Sink, which was linearly approximately 3,000 feet from our maximum penetration in the Nexus tunnel, we next dove there on March 3, 1981. The three foot diameter vertical chimney led down to two tunnels at 60 feet, one leading to Golfball Sink 400 feet to the west, the other to the east and unexplored. We penetrated 500 feet to a vertical chimney which appeared plugged with debris. Thinking it might be a surface entrance, but hesitating to try it as we were diving at night and lacked the advantage of surface light if we tried to exit, we instead continued on 200 feet into a large, tannic tunnel, tied off, and exited.

On April 26th, while Bill Fehring and the author explored leads in Nexus, Vaughn Maxwell and Will Walters popped up in a large chimney to bright daylight, naming this new sink Stratomax sink after its original discoverers that night a month earlier. They then laid 330 feet more line past the 200 feet previously laid out of Stratomax. The property owner was extremely interested in our exploration, and urged us to return anytime to further extend our survey.

Taking advantage of his hospitality, Will and myself returned on April 29th and extended our penetration to 900 feet from Stratomax. The cave was trending south-southwest and showed signs of deepening, adding fuel to our hopes of connecting to Nexus. On May 5th, Will, Vaughn, Bill, and myself extended our line to 1,200 feet and the cave was still going. Our next dive. on May 20th, found us laying 600 feet more line as the cave dropped to 130 -140 feet. It had the same configuration as the Nexus Tunnel and was going in the right direction. This section of cave was extremely picturesque and visibility was about 40 feet. It seemed only another 600 - 800 feet and we would connect the two systems, achieving a potential traverse over 3,500 feet at a maximum depth of 140 feet.

However, the summer rains chose this time to commence their daily downpour, and the visibility was wiped out. The connection still awaits, hopefully for next winter or spring dry season.

The last dive we did was on June 3rd, when Will and the author laid 600 feet of line in a large lead out of Nexus, which Sheck Exley and Mary Ellen Eckhoff (NSS 19704) had discovered on a scooter dive on April 26th. The lead connected with the Round-Nexus tunnel at exactly the spot we'd seen the large, outflowing tunnel earlier. This discovery shortened the maximum penetration from Nexus by about 200 feet, but its greater depth negated the advantage of its shorter distance.

In addition to the main tunnels already explored, numerous side leads have been explored, adding many feet of passage to the systems total length. At present, there is over 9,000 feet of line laid in this system, assuming that Nexus-Stratomax can be connected. Many leads are unexplored, including the potential Round Sink, Bear Sink possibilities, a mind boggling 6,000 feet at 140 feet plus if the connection can be found.

Impossible, you say? Only if cave diving fails to grow as it has. With scooters and 7,000 foot penetrations already possible, the Round-Stratomax system could become the largest yet, especially if the tunnel leading to the Gulf of Mexico spring discovered by dye testing by Wetterhall in 1965 can be added to the sytem.

MESSAGE:

lot for approval by the entire membership. I urge those of you with special recommendations on this matter to convey them to the Executive Committee. I urge all of you to review the proposal when it appears on the ballot, ~~and to~~ vote. It will take the approval of a majority of our entire membership, about 100 votes, to improve the present situation. I hope we can count on your participation in the decision.

World's Longest Cave

by Sheck Exley (NSS13146)F

While Florida members of the NSS Cave Diving Section were crying in their beer one night about their beloved Peacock Springs being surpassed by Lucayan Caverns as the world's longest underwater cave, it was discovered that Peacock Springs was still the world's longest underwater cave in one catagory: fresh water caves. Our friends in the Bermuda Cave Divers Association, most of whose membership are NSS cave diving instructors, have also nominated their Green Bay Cave as the world's longest cave exclusively in salt water. These two caves lay claim to the world's longest in those catagoies because, of course, Lucayan is partly fresh water and partrly salt water.

It is also possible to come up with many more world's longest underwater caves in different catagories, for example: world's longest underwater cave with only one passable entrance, Blue Springs Cave, Jackson County, Fl. (5577m); with exactly two passable entrances, Devils Eye Cave System, Gilchrist County, Fl, (3638m); with exactly three passable entrances, Hornsby Springs Cave System, Alachua County, Fl. (4125m); with exactly four passable entrances, who knows. Also included could be world's longest underwater cave before 1975, Devils Eye Cave System; world's longest underwater cave crossing under a surface river, again Devils Eye; world's longest underwater cave crossing beneath two rivers, Suwanacoochee Cave System, Madison-Hamilton-Suwannee Counties, Florida (1672m); World's longest underwater cave containing depths in excess of 60 meters, Emerald Sink Cave System, Wakulla County, Fl 4205m).

Get the idea? With a little imagination you can probably figure out some way to dream up a category in which your favorite cave is the world's longest. And if that fails, you can always try the geographic category. For example, longest underwater cave in Mississippi. Using this approach it is possible to insure that any cave can be a longest. Thus, longest underwater cave closest to Little Dismal Cave is Littler Dismal Cave at all of five meters. Isn't cave diving fun.

Locked Decompression Tank Stolen

by Roger Werner (NSS 22665)

The following arrangement was apparently inadequate to deter thieves from taking over $1000 worth of decompression equipment from Blue Spring, on the Withlacoochee River in Madison County, Florida, on or about Thursday or Friday, 1-2 July, 1982.

Each tank was equipped with a two-inch bronze or galvanized steel ring around the neck. A bicycle cable was run through the rings on the 80's and through the yoke of the regulator (Scubapro Mark V) on one of the 80's. The other regulator was secured using only an allen screw in place of the regular yoke screw. The steel 71.2 was locked to the log between the entrances to the cave, using a similar lock. The log was approximately 27 feet deep and 10-20 feet laterally back under the ledge. The log is about 10 inches in diameter with both ends secured in sand or rocks. It is believed the thieves would have had to have their own Scuba equipment just to get to the tanks (to free dive 27 ft down and 10 to 20 feet back and turn on air is not a particularly amazing feat, but there is also a rather strong current to deal with, and the tanks were not plainly visible, if visible at all, from the surface). There was no evidence of hacking, sawing, beating, or chisling on the log, nor were any pieces of lock, chain, or rings recovered.

The missing equiment includes:

Two aluminum 80's, grey with serial numbers USD P129632 and P197637. One has an original hydrostatic test date of 10/76 and was rehydroed on 11 or 12/81. Both were well scarred from much cave diving.

One US Divers twin tank harness and bands, holding the 80's together. The lower band had sections of two inch weight belt webbing sewn around it.

One Sherwood "Y" valve on one of the 80.'s.

One galvanized steel 71.2 with a US Divers K valve. The only visible serial number was 71-1279 VOT. The tank was stage rigged, brand new clean on the inside (recently checked) and full of pure oxygen.

One floating aluminum 71.2. This tank is no longer made, but is noticeably longer than regular aluminum 71.2's and 80's, silver-toned, looking as if having been turned in a lathe, and floats even when full. The tank was equipped with a two pound weight which made it just slightly negative. This tank was not locked. Serial number: Z5930 USD. Hydro date: 1/72, 10/80.

One Scubapro Mark V regulator (second stage serial number 4500081, with the name of the previous owner, Jimmy Sanders, engraved on the face plate of the second stage, and initials J.S. engraved on the back plate of the first stage.

One US Divers Aquarius regulator.

Four feet of case-hardened 9/32 inch cromium plated chain, four feet bicycle cable, several padlocks.

Any person having seen any of this equipment or having any information reguarding its removal from the spring should contact the Madison County Sheriffs Department (904-973 4151) or Roger Werner (306-894-4606). I am currently in the market for two clean galvanized 71.2's.

WATCH:

time in normal and twenty four hour modes and has several alarm functions including a stop watch, timed alarm, and time of day alarm. The manufacturer tests the watch to 100 meters.

During ocean diving to 90 feet the watch worked perfectly. I experienced no leaks. The readout was easy to read underwater. I used the same watch during a game of underwater hockey. It leaked a little, but this didn't seem to harm the watch any as it is still keeping excellent time and has been used on 90 foot ocean dives since.

Considering the price, I found the watch to be an inexpensive answer in keeping time for one who only needs a dive watch occasionally and, therefore, does not want to take out a bank loan to buy one.

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