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Section membership, which includes a subscription to Underwater Speleology is open to all members in good standing of the National Speleological Society at $5.00 per year. Subscriptions to non-members is $7.00 per year. When making application for membership or requesting subscription information contact:

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Make checks payable to the NSS Cave Diving Section in care of the Treasurer. Opinions expressed in Underwater Speleology are not necessarily those of the section or the NSS.

COVER: Diver nears the bottom of the entrance shaft in DiePolder Sink Number 3. See the story of Sandy Hills Ranch, Cave Diver's Nirvana, in this issue. Photograph by S'eve Straatsma.

REMEMBER: 5th Annual TAG Fall Cave-In, October 15-17 at Sequoyah Caverns, Valley Head, Alabama. There promises to be a lot of cave divers there too as present plans call for having the fall Executive Committee meeting during this event.

COMING: The next edition of Underwater Speleology will include articles on the use of diver propulsion vehicles in cave diving and on the reopening of DiePolders Sinks to diving.

INSTRUCTOR INSTITUTE: An NSS-CDS Institute to qualify participants as Cavern, Basic Cave, and Cave Diving Instructors will be held in Branford, Florida, November 25-28. For information contact Forrest Wilson, 2832 Concord Dr., Decatur, Georgia 30033.

NOMINATIONS SOUGHT

Shortly, each current member of the NSS Cave Diving Section will be sent a copy of the proposed new Section constitution and a ballot to vote on its acceptance and also for the new executive committee for 1983.

The current executive committee is now seeking your nominations for chairman, vice-chairman, secretary, treasurer, training director, and newletter editor. If you would like to nominate someone for these important positions, contact Bill Fehring, 122 Hollow Oak Place, Brandon, Florida 33511. Be sure and contact your nominee first to see if he or she will be willing to serve. If you would like to serve in any of these capacities, please feel free to nominate yourself.

EVERY DANGLE IS A POTENTIAL TANGLE AND CAVE DESTROYER

Roger Werner

Have you ever heard a diver boast about how much redundant equipment he carries? "When we dive we carry pony bottles, two reels each and fifteen lights between us!" Sound safe? Maybe, maybe not. With additional equipment frequently come additional entanglement hazards. The purpose of this article is not to suggest that redundant equipment is dangerous, certainly only one of everything is worse, but rather to point out that additional equipment can add hazards as well as increase safety. In particular, the problems of danglies (hanging equipment) and their solutions are addressed. Besides disseminating my own thoughts on the subject, I hope to spur an exchange of ideas.

Every time a new piece of equipment is added or an equipment configuration is changed, one should be concerned with danglies. Not only will they drag in the silt, but they will reach out and grab the line and catch in cracks.

Perhaps you only dive in large tunnels where there is no entanglement hazard. It is still amazing how much damage dangling equipment will do to the cave. When a dangly drags in the silt, the reduction in visibility is localized and only temporary. Hopefully, all cave divers can live with that. However, the damage to the floor of the cave may be permanent. To myself, one of the most enjoyable experiences in cave diving has been the penetration of a virgin or near-virgin passage with an undisturbed silt floor, like newly fallen snow, before anybody has walked through it. It is incredible how much damage a diver with danglies and otherwise good technique can do to such a passage by swimming through it only once. In a light fluffy silt floor, the damage may be 80 to 90 percent repaired in one to two years. In a mud floor like that in the Orange Grove tunnel or in Devil's Eye, where there is a crust on the mud the damage will probably be permanent. The same applies for knocking rocks and snow off the ceiling onto the untouched silt floor.

This article is aimed not only at new cave divers, but at many experienced cavers who apparently have not paid much attention to their danglies. Cave diving has grown so rapidly in the last ten years, that if we don't become more aware of the permenent damage done by danglies, perhaps in ten more years all tunnels will look like the first few hundred feet of Orange Grove.

Lights: Many lights can be well secured to a tank with a rubber band cut from an old tire inner tube of appropriate size as shown in figure 1. For the light of appropriate size and shape perhaps three or four could be secured in one place on the tanks in this manner without inducing a significant entanglement hazard or significant extra drag. One should beware that these rubber bands can

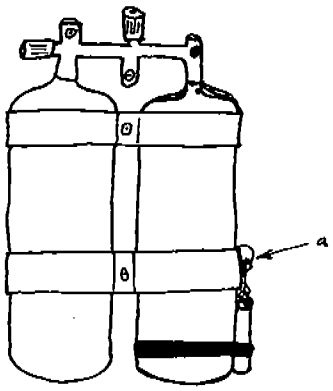

Figure 1. Light secured to tanks with rubber band. [a]Light is also clipped to a ring mounted on the tanks.

come off and may break occasionally. Under no circumstnaces should one's life depend on the rubber band, or any other single piece of equipment for that matter. A break, though inconvenient, should be tolerable.

When cutting rubber bands, one should be careful to cut the bands with smooth edges and of uniform width (figure 2). It is very easy to get a ragged edge, shown in figure 2b, if one is not very careful with the tin snips. If these "hanging nails" are not trimmed, they will grow and the band will eventually break at one of them. Wedges should be cut from the tube between each band, as shown in figure 3. Figure 2c shows a rubber band of uneven width. Most of the stretching will be at the narrowest area, and the band will probably break there. I have found it necessary to cut a wedge for each band cut from the tubes to get good bands. One can follow tube molding marks to make certain one is truly cutting radially. Rubber band strength can be changed by varying band width. Band lifetime will be a function of the quality of the tube from which it was cut, it's uniformity, and the smoothness of the edges.

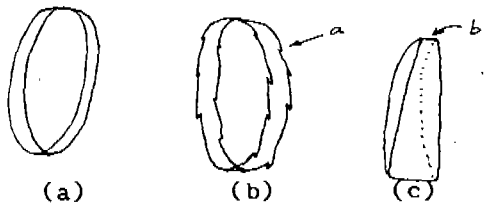

Figure 2. Right (a) and wrong (b,c) ways to cut rubber bands. a hang nail due to sloppy cutting. b narrow area -- a wedge should be cut out of this band to reduce it to uniform width all around.

Rubber bands have disadvantages. The area underneath the band will remain wet for long periods. Though fresh water does not result in significant corrosion, salt water may pose a problem. Bands occasionally slip off or break. Finally, they dont look professional. This, however, is counterbalanced somewhat by having equipment secured properly, certainly more professional than letting them dangle.

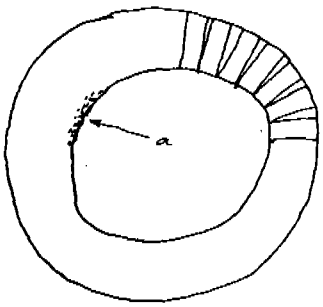

Figure 3. a Cut wedges between bands. a avoid areas where the tube is already rotting.

Surgical rubber tubing can also used to secure lights. Figure 4 shows a light secured to a shoulder strap using rubber tubing.

Some lights can be made to dangle with less radius by securing a clip to them using a hose clamp rather than using the lamp's provided lanyard-hole, as shown in figure 5.

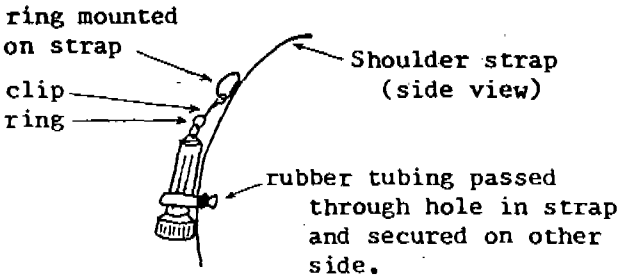

Figure 4. Light secured to strap using rubber tubing.

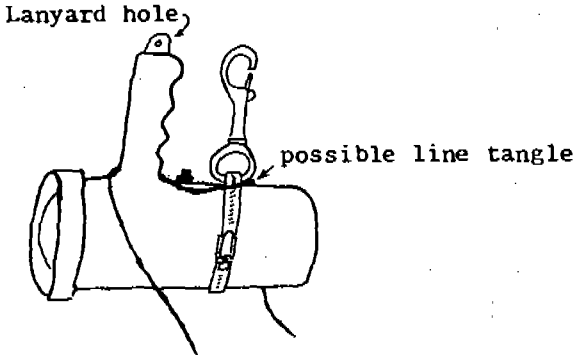

Figure 5. Light made to dangle with less radius by attaching clip with hose clamp.

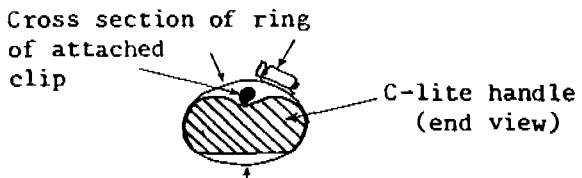

Figure 6. Where to push on an unshaped hose clamp to make it loose.

Even though a clamp may be very tight, unless it is actually bent into the proper shape, the band may become loose and slip when pressed at certain points (figure 6). The hose clamp solution, though not a good anti-tangle solution, will hold the light closer, helping to keep it out of the silt. Unfortunately, there seem to be very few, if any, lights available which are suitable for replacing a primary light, and which can be carried without a dangle or entanglement hazard.

When using hose clamps, any excess band should be cut off, for it can grab and hold a line very tenaciously (figure 7). A little bit, about 1/4 inch, may be necessary to get the screw started in the clamp, but any excess should be cut off and all corners and edges filed smooth. The remaining line traps under the ends of the screws and any necessary excess material can all be covered by a rubber band. One word of warning may be in order for hose clamps: A tight hose clamp, over time, may slightly warp or permanently change the shape of clamped plastic materials. Also, when buying a hose clamp, it may be wise to check how the screw mechanism is attached to the band. This is done in a variety of ways. I once had a spot weld break when tightening a new hose clamp for the first time.

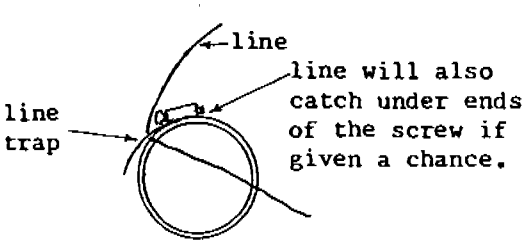

Figure 7. Hose clamp line traps.

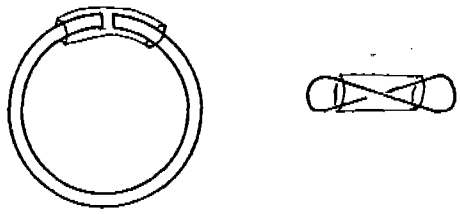

Figure 8. Protection of ring and S-link line trap areas with heat shrink.

Items such as key rings, S-links or other rings with existing or possible openings big enough for a line to pass through should get some attention. Although I have not tested it, I suspect heat shrink may be suitable for covering and protecting the hazardous areas (figure 8). I have never known a simple ring to catch a line, but I have seen it occur with S-links. Note that the very shape of an S-link actually funnels a rubbing line into the line trap.

Finally, when choosing a light, besides considering it's shape and how you are going to secure it, don't forget the quality of the light. Some lights may be very small and easy to stow without additional drag or dangle, but how well do they perform their primary function, as underwater lights?

Pony Bottles: Pony bottles can be carried as stage bottles, strapped to the tanks using rubber bands - be sure to use enough rubber band to allow at least one to break -, or hose clamps. Figures nine and ten show various configurations. My experience with a pony bottle has been that it was generally more trouble than it was worth. I carried it as shown in figure 9a. Not only was this symmetrical for balance, but it kept my valves and regulators from ever hitting the ceiling. The pony bottle itself, though, or the rubber bands that secured it were always catching on ceiling projections especially when I was trying to go gracefully under low areas and stay off the floor. It also provided a very significant drag. With the configuration shown, I never got a line caught between the tanks. I suspect the rubber band played a major role in keeping the line away from the tangent areas.

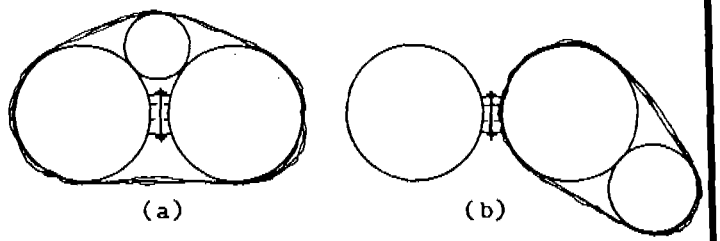

Figure 9. Two methods of attaching a pony bottle with rubber bands.

A possible problem with nonsymmetrical mountings (figures 9b and 10b), besides imbalance, is that they may limit you to one-way passage through certain restrictions. Consider the problem of the diver using the rig shown in figure 10b, who has gone through the restriction pictured in figure 11, turned around, and now wants to come out. He will either have to back out, or his buddy will have to take off whatever it is he has strapped to his side. This would be difficult at best if hose clamps had been used. Of course, you say, "who would ever be crazy enough to go through such a restriction in the first place?" Well, people do. The point here is that if the rig is nonsymmetrical, it may be more difficult to pass a restriction one way than the other.[1] Rigs don't have to be unsymmetrical for a restriction to be more difficult in one direction either.

Instead of pony bottles, many cave divers carry their primary dive light canister in a nonsymetrical configuration mounted on one side. Could you take yours off if you had too? Would your buddy know how too if you couldn't.

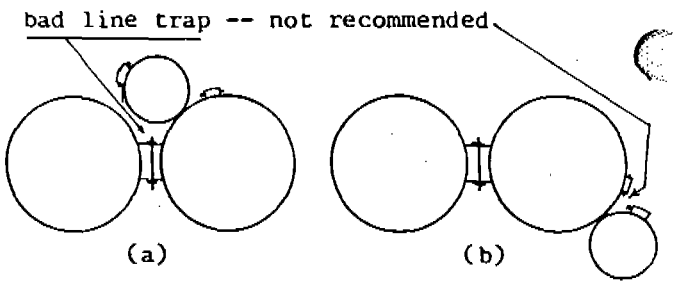

Figure 10. Pony bottle secured with hose clamps.

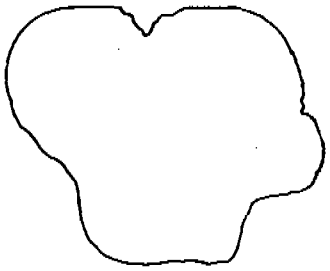

Figure 11. One-way restriction for nonsymmetrical rig.

Stage Bottles: It takes a lot of practice to get to be able to handle a stage bottle comfortably and gracefully. It increases entanglement hazards greatly over diving without one. Not only does it hang down, where the line is likely to be, and get in ones way, but with its own rugulator and pressure guage there is more equipment to drag in the silt, or reach out and grab the line, or catch in cracks. If one has already allowed for the total loss of any one air supply at any point in the dive, the addition of more independent air supplies in the form of stage or pony bottles probably does not add significantly to overall safety. Have there ever been any catasrophic losses of more than one air supply on the same dive? For dives where stage bottles are required there are good ways to secure all danglies. Short, six to eight inch long high pressure hoses are available for use on stage bottles.[2] Figure 12

1. See also Sheck Exley's Basic Cave Diving - a Blueprint for Survival, NSS, 1979, pp. 34-35. Sheck recommends studying the restriction carefully before going through and "since a divers profile is very much like a wedge (the point of which is his head), it may be a good idea to go through the restriction feet first so that if you do get stuck, getting out is easier." Attached equipment can provide a barb or ratchet effect when it slips into pockets just inside part of the restriction, preventing progress in either direction.

2. I spoke with Wes Skiles by phone on February 26, 1982. He said the short high pressure hoses are for sale at the Branford Dive Center, Branford, Florida.

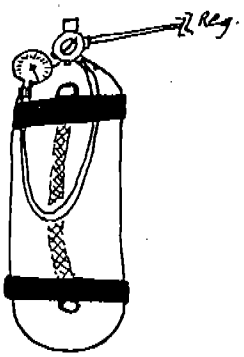

Fig. 12. Pressure gauge secured under rubber band on stage bottle.

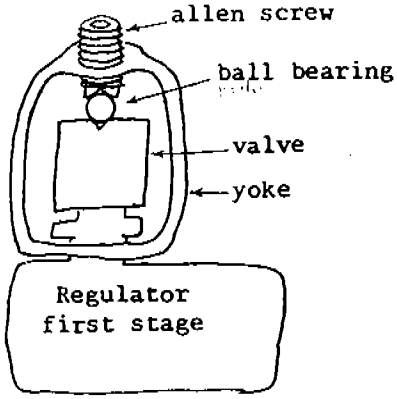

Figure 13. Ball bearing used to center allen screw on valve.

shows a high pressure hose secured under a rubber band, with the pressure guage pointing up right beside the valve where it can be easily read. Any other hoses can be secured to the tank using rubber bands. Covering the ose clamps with rubber bands also allows you o mount the hose clamp screw towards you, protecting the screw from the line and the rocks on the floor, and also protecting your dive suit from damage by the screw.

Presuming one would carry the stage bottle with the orifice and first stage up, the yoke screw of the regulator is likely to take a beating on a rocky floor. On one dive in Peacock I came across a 20th century artifact, the end part of a yoke screw. I have wondered ever since how that person got his regulator off. Yoke screws can be replaced with allen screws. Allen screws will not stick out and break off, and they have no wing or knob to tangle in the line. Since the allen screw has a concave cone in the end, instead of ending in a point like the typical yoke screw, a ball bearing is handy for centering the cone of the allen screw with the cone of the tank valve (figure 13).

These ball bearings are easy to loose when attaching or removing the regulator. There re also safety trade offs when using allen screws. First, you need a special tool to take the regulator off. Although remote, there is the possibility that you might wish to remove the regulator underwater to breathe directly from the tank. Second, don't torque the regulator too tight. This is very easy to do with the long end of the allen wrench. Remember, you're turning steel against brass and it will be the yoke threads which get worn not those of the screw.

Reels: There are many possible uses for a spare reel. The safety of carrying one may be diminished by its design or how it is carried. It is inappropriate to carry along during a dive many primary reels used mainly for getting in and out of the cave due to their drag and dangle. When being used, the problem caused by these reels is much lower because they are receiving the diver's full attention. However, for a spare reel one should consider how it is to be carried and the hazards of any sharp edges, corners, hooks and line trap areas. A reel free of such problems is to be the subject of a future article.

Pressure Guages and Instrument Consoles: Pressure guages and those accursed instrument consoles are among the worst offenders for dragging in silt. If you just ignore them and let them hang freely, you can count on them to mess up the floor. One way to secure the pressure guage and instrument console if you must use one is to tie it to your wrist. Some pressure guage hoses come with a rubber strap which is apparently there just for this

purpose. This is somewhat of a hassel, but it does hold the thing up and keeps the diver constantly aware of where it is. If the hose is able to slide through the tie, though, the guage can really get in the way while one is trying to work with line or operate a reel. I pass mine between the left front bladder of my stabilizer jacket and my chest. I am able to hold the pressure guage there for short periods of time, but it usually slips down and must be pushed back for every low area and duck-under. Ideas anyone?

Dry Suit Hoses: How do you keep them from hanging down and dragging in the silt? I have recently tried velcroing it to my suit, much the same way filler hoses are secured to BC's. This has proven to be only a temporary solution, but it is far better than nothing. Another simple solution to the hose problem might be a rubber band or loop of rubber tubing around the chest, under which one could tuck the hose when not in use.

Spare Knives: The purpose of having a knife in a cave is to be able to cut line.[3] If you are ever so unfortunate as to get into an unsolvable line entanglement, possession of a knife could save your life. I once though that carrying a second knife was overdoing it a bit, until I lost my single knife while diving Wekiva springs. The Wenoka forearm knife apparently just slipped out of its holder. I have lost at least two other knives since then. Home made knives and some commercial knives are small enough so that they can be carried in a pocket or on an arm without inducing any additional hazard or drag. I don't advocate a giant knife strapped to the leg for a backup, but small hazard-free knives are easy and cheap to make and stow.

Getting back to the original question: Are pony bottles, two reels each and fifteen lights safer then the standard dual valve manifold, one reel per team, and three lights per diver? This all depends on how they are secured, the guality of the equipment, the dive involved, the techniques of the divers and their familiarity with the equipment the are using. The numbers alone certainly do not make it always safer.

If one only dives large tunnels where there is no entanglement hazard, one may not be concerned with danglies, but they will still mess up streamlining, thereby causing one to exert more energy and use more air.

Authors note: Rubber bands got the most detailed treatment in this article simply because it is with them that I am most familiar; not to suggest that they are any better than any other securing techniques, though they have worked guite well for me. They do have some disadvantages, though. The area underneath the band will remain wet for long periods of time. Though there has been no noticeable corrosion with fresh water, salt water may pose a problem. Second, they don't look very professional. Finally, they occasionally come off or break.

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3. This should be a last resort solution to the entanglement problem and should only be done by the assisting diver. Remember to splice the line together. Somebody else's life might depend on it, especially if you have silted out the passage in the process.

The 20th Cave Diving Workshop sponsored by the NSS Cave Diving Section will be held on saturday, January 1, 1983 in Branford, Florida. The workshop is being organized by Paul and Shannon Heinerth. For the benefit of those who may be vacationing in Florida at that time and who need to travel home sunday, the entire workshop will be held on saturday. Presentations will be held all day long, thereby allowing approximately the same content as a full weekend workshop. The annual section meeting and a social gathering will be held in the evening. At the meeting the election results will be announced. If you have a presentation you would like to make or some suggestions for the workshop contact either Shannon or Paul at 6494 U.S. 19, North Hudson, Florida 32817. Your input will be appreciated. If you have some suggestions or a proposal for consideration at the annual meeting contact Bill Fehrin at 3508 Hollow Oak Place, Brandon, Florida 33511.

SANDY CREEK RANCH - A CAVE DIVERS NIRVANA

By
Steve Straatsma

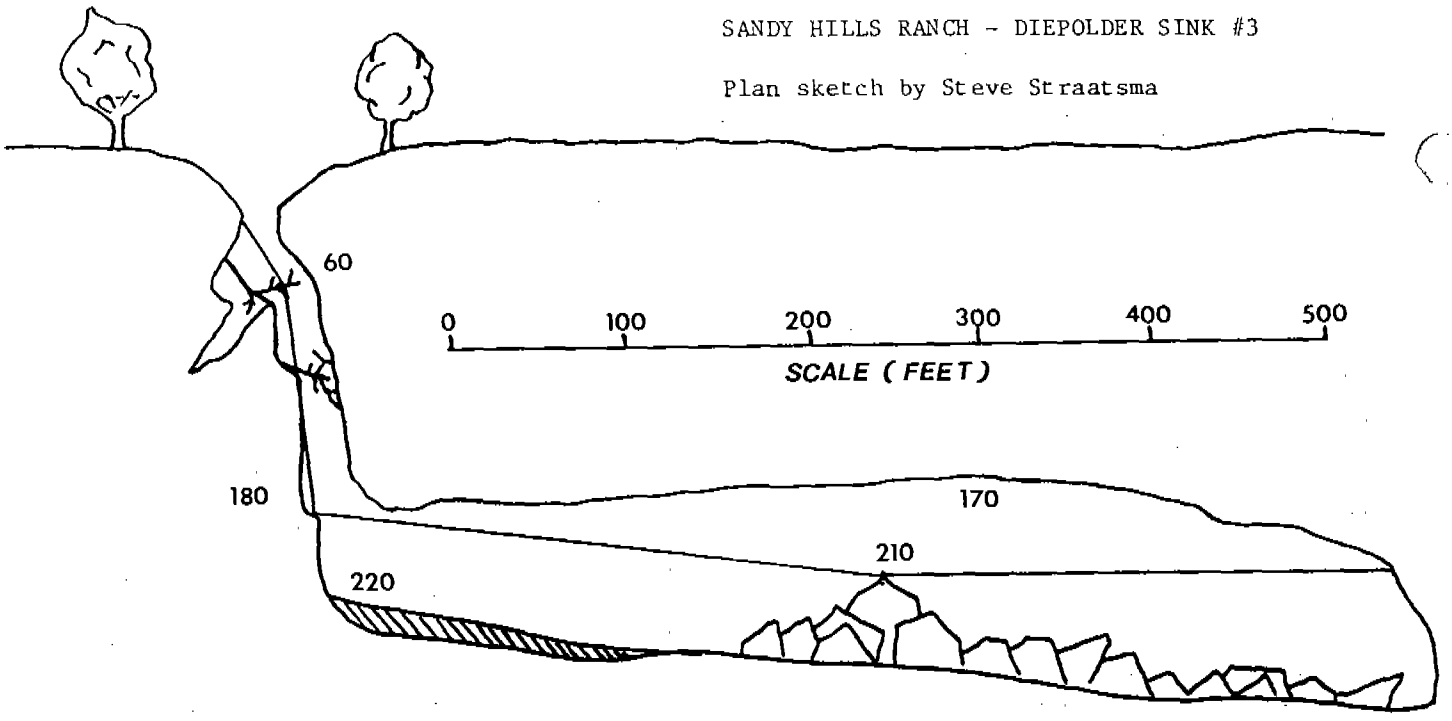
Situated approximately two miles east of Weeki Watchi Springs in Hernando County, Florida are twelve hundred acres of beautiful wooded sand hills, owned and operated by two west Florida councils of the Boy Scouts of America. Besides being some of the prettiest property you'd ever want to behold, an added pair of attractions nestle, hidden on the south-east quadrant of the property. Two inconspicuous pools of green, usually murky water lying in shallow, sandy depressions belay their winter clarity, characteristic of many Florida sinks. DiePolder's Sinks number Two and Three, named after the former owners of the property, Mr. and Mrs. Larry DiePolder, and numbered in order of their discovery back in 1975, offer truly astounding cave diving.

In May of 1975, Will Walters and Bill Cass both of Tampa, Florida, were actively seeking out potential cave diving sites in the areas north of Tampa along the west coast of Florida. Curious as to the possibilities of diveable sinks on the DiePolder property, they approached the owners for permission to dive and explore the area. After agreeing upon a release form waiving owner liability to visitors on the property, exploration began.

The first sink, DiePolder Number One, proved to be a disappointment, pocketing out at fifty feet in a small, silty chimney chamber with no further leads apparent. The second sink, Number Two, was explored, but its twenty to thirty foot visibility hindered exploration, as did the vertical fracture configuration of the basin past thirty feet, which narrowed to a scant two feet across at a depth of one hundred feet. Feeling justifiably claustrophobic under these conditions, they put Number Two on the back burner, temporarily at least, and decided to explore the possibilities of sink Number Three.

A circular, pea soup basin lying in a shallow depression about fifty feet across, Number Three didn't appear very promising. It was, however, to be the stuff of cave diver's fantasies. Entering the murky, five foot visibility water, Will and Bill slowly drifted down, bouncing off tree branches as they descended in the limited visibility. Suddenly, at about eighty feet, they fell through the soup into cobalt blue, crystal clear water. Visibility easily exceeded one hundred feet. After a quick exploratory search, they began to realize the astounding dimensions of their discovery. From the surface pool the basin dropped vertically to sixty feet where a hole measuring ten by fifteen feet across opened vertically like a huge window to the aquifer as Bill later described it. The chimney grew in size, getting wider as it dropped past a log jammed in it at one hundred feet. The white limestone walls of the chimney continued to fall away as they descended, spreading to fifty feet by thirty feet at a depth on one hundred sixty feet. Suddenly, at a depth of one hundred eighty feet, the right wall disappeared into a black, featureless void. It was the opening of a room of incredible size. The floor below was two hundred twenty feet deep, and the opening was easily eighty feet across by forty feet high. The divers low on air, ascended for decompression, their minds boggled at their incredible discovery.

During the next few weeks, Will, Bill, and Ed Brodessor, with assistance from north Florida cave divers, Sheck Exley and Ken Hillier, explored the huge room. It proved to be almost six hundred feet long, with a ceiling depth of one hundred seventy feet, and a huge boulder strewn floor depth of two hundred forty feet plus. At the midpoint of the room was a huge breakdown rock twenty by thirty feet across, dubbed Mt. Everest by the exploring teams. At the apex of the lines, layed along the south wall and across the



Sketch shows guideline running across from chlorox bottle at 180 feet to Mt. Everest to the rear of room where it meets another line running along south wall.

center of the room to the back, one hundred feet across in places, the floor sloped deeper still to a maiximum depth of two hundred ninety five feet where it pocketed out with no apparent continuing leads. Subsequently, exploration has yet to locate any other tunnels despite the fact that the room appears to be a huge downstream tunnel, syphoning surface debris after periods of rain.

During the winter this may be one of the most spectacular dives in the state, as the experienced deep cave diver can trim out at two hundred feet below the chimney and see a blue glowing window far above as sunlight penetrates the clear surface water.

But that's not all. Upon further exploration of previously dove sink Number Two, Will and Ed discovered, after negotiating an the extremely tight, siltly vertical fracture crack to a depth of one hundred seventy feet, a room with two tunnels going both up and downstream. Upon subsequent exploration they found the upstream tunnel to average two hundred twenty feet deep, its fifty by thirty foot dimensions revealed by the crackling blue clarity of the water. The tunnel terminates in a large, wide dome room at approximately five hundred feet of linear penetration.

Continuing their activities in Number Two, the divers began to explore the larger, deeper downstream tunnel, where visibility w[a]s often poor due to surface silt being syphon[ed] into it. This section of the cave is actually another tall, wide room with ceiling depths of up to one hundred sixty feet, the floor dropping gradually over a four hundred foot penetration to two hundred sixty feet. At this point, a low, horizontal restriction continues another two hundred feet. A major point of interest before the restriction is a craggy diagonal pit, dropping to three hundred feet before continuing, slopping horizontally to a reported depth of three hundred sixty feet, where Dale Sweet set a then cave diving depth record using mixed gas in early 1980.

DIEPOLDERS, THE REOPENING.

Part two of this article on DiePolders written by Bill Fehring will appear in the next issue. In it Bill describes the closing and subsequent reopening of the DiePolder sinks to diving. It highlights the fact th[at] a well structured management plan is nece[s]sary to persuade some landowners to permit diving on their property.

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