

Southern Cross Club, Little Cayman, BWI

--With Grand Cayman For Openers

If one hasn't been to Grand Cayman before, then one is missing the Big Apple of Caribbean diving. It's got all the conveniences, ranging from hotels used almost exclusively by divers, to private and personalized service, to sales of and service for just about any piece of gear imaginable -- and to a chap named Barefoot who sings dirty diver dittys at the Holiday Inn. Since I don't find myself turned on any longer by such urbanized diving, my ultimate destination would be tiny Little Cayman. But with a few extra days at my disposal, I decided to give the parent island a visit.

I first left my fate in the hands of Cayman's Fisheye Photographic Services, which had accepted by mail my check for lodging at the London House. They assured me I would be met at the airport at my 10pm arrival, but I wasn't. I hailed a cab, but the London House was dark. The cabbie was able to find accommodations for me at the well-appointed Plantana Condos. Fisheye, it seemed, tried to leave a message at the airport but I didn't get it.

Diving with Fisheye is fine: good uncrowded boats; well-maintained equipment; nice people. I was picked up at my condo beach right on time by a flat-top, welcomed, and given a helpful briefing before each dive. And, of course, Cayman diving is, without question, interesting and varied. I was particularly pleased to see that the numerous brilliant sponges, black coral "trees," healthy flora and fauna, and unusually tame fish were nearly as I have remembered them over the years... as well as the clear, warm water.

I had expected Fisheye's dive-masters to swim around making helpful photo suggestions, correcting strobe angles, posing and pointing out unusual subjects--photo-dive boats are their business. But, perhaps they only do those things if you sign up for their photo course, which I didn't. However, they did hover nearby, keeping a watchful (but not inhibiting) eye on the underwater scene. But I am not impressed with

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their management. There was the condo snafu; and once no one in the office had told the divemaster that my buddy and I were planning to dive. We waited on the beach, gear ready. Their boat sailed right past and out to sea.

I spent a few days at the Sunset House. I selected it because of its proximity to town (without being in the heart of the seven mile beach tourist haven) and to decent diving. I like the accommodations: large, pleasant air conditioned rooms, bountiful food and an eager staff. But the diving? . . . Much of Cayman diving is highly regimented and Sunset House is no exception. I find myself annoyed at such rules as: No one descends until all divers are in the water. . . Hang onto the safety line until we go down and then descend hand-over-hand down the anchor line. . . This will be a 100 foot dive for 20 minutes. If you only go down 80 feet, you still come up after 20 minutes. . . On the second, shallow dive you don't have to stick with the divemaster, but be sure not to get out of his sight. . . You must let your divemaster know when you are down to 1000 lb.; do not signal to him, show him your gauge. With as many as 30 divers for three divemasters on a boat, there have to be rules . . . but these were excessive in my book.

Sunset House has two superbly designed two year old 36' custom monohulls powered by 200hp diesels. Sixty tanks fit neatly under the seats and 30 divers can sit down. There is a head, and a large carpeted box over the engine for cameras. Stern exit and entry from a platform are easy.

One day I was fortunate enough to dive Tarpon Alley on the North Wall. Currents, choppy seas and poor viz don't often allow the 75 minute ride to the North Sound, and there is a reasonable \$5/person extra charge for the added fuel and time. It's worth it! As we descended in a 2½ knot current, (where hand-over-hand down the anchor rope makes sense) I hit quiet water at 40 feet. Several large southern stingrays allowed close approach before swimming away right past my lens. As I approached a high canyon in the wall, I was literally surrounded by huge, 30 to 50 pound tarpon. There must have been 100 of them! It was a very exciting dive with great visibility and unusual marine life.

I signed up for a night boat dive at Sunset House after the divemasters assured me that they'd take us to the Balboa--providing there weren't too many boats anchored there before us. When we arrived two craft were already anchored. We motored to the Oro Verde wreck, instead. A fairly new wreck with no growth on it and very few fish, it was a bust! I saw a few grunts, two blue tangs and a scattering of squirrel fish. With so many other night diving sites, a dive on this wreck should be passed by.

I had hoped to dive with the highly-reputed Peter Milburn. I telephoned him many times, leaving messages on his machine. No one called back. Someone at his number once assured me that Peter would call. He didn't. If you want to dive with Milburn, I suggest you write ahead of your arrival.

In a way, it was a relief to leave Grand Cayman. As good as the diving

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is, its urbanization has not been universally welcomed by the residents. More than one local reminisced about the good old days, when the culture and land was intact. A sign of urbanization is increasing crime; 10 years ago one never had to lock a door, on this trip some dive gear was stolen from my balcony.

On Little Cayman, one does still not have to lock doors. With only 18 full time residents of the island, it's no wonder. But what I might recognize as a heaven, no doubt others may see as hell. On Little Cayman there are only eight things to do: dive; wait to dive; fish, wait to fish; eat, wait for meals;

FIGHTING OFF FIRE CORAL

Mike Emmanuel taught me a great little trick on Little Cayman. I was scooting along at 30 feet when I saw him waving his hand, hard and fast, back and forth, about two inches from his thigh. For twenty seconds. Back on the boat I asked him what he was doing.

"Why that little trick washes away the tiny stinging nematocysts of fire coral," he said. "But don't grab the area or rub it first. If you do, you can't blow the stuff away."

Now, I'm a bit of a skeptic, but I tried it. Purposely, I bravely brushed against fire coral, then fanned the area. Sure enough, the initial sting disappeared quickly. Within fifteen minutes there was not a sting or a welt. A couple of other times, inadvertently, I brushed against fire coral and employed the same technique. It worked perfectly. To think of all the times I've scratched away at fire coral...

And to think of the poor lady diver I met a few years ago while on her first tropical dive. She picked up a bunch of "beautiful pieces of coral" and tucked them into her bikini bottoms to transport them back to the boat. If I had only known Mike's technique then...

C.C.

walk the beach; read, play pingpong, sleep, talk. If you're with a lover there's perhaps one more activity available. It's the perfect place for complete relaxation. . . or to drink away the boredom. It's your choice. Some people resolve the matter by getting the next flight back to Grand Cayman--but it doesn't depart daily.

Eleven miles long and one mile wide, Little Cayman is mostly flat, dense jungle with lovely beaches interspersed with ironshore coast. The prevailing breezes can sweep down both shores, often making the water choppy and sometimes downright rough. The two dive resorts--the Southern Cross Club and Pirates Point, are on the South shore, and the magnificent Bloody Bay wall is off the North shore. At certain times of the year it's difficult--or impossible--to boat around the southwest point to Bloody Bay and the equally fabulous Jackson's Bight. However, South shore diving is also virgin, beautiful and exciting, and more on the lee side. Southern Cross Club, once a members only fishing lodge, began offering diving to the public only a year ago. It offers a cluster of widely spaced cottages on a

beautiful palm-shaded beach, plus a simple main building housing dining room, kitchen, pingpong and sitting areas, and office. The Club guest rooms are simple and rather sparse, but large, comfortable and well-ventilated, with louvered windows and a ceiling fan above the two double beds. Strobes can be recharged without converters and adapters. Meals are served family style at a long table with a warm, friendly atmosphere. Each day's menu is posted on the blackboard. I found the food delicious but those who travel after me will have to report about it; you see, chef Julie will be gone by the time you read this. So I'll report on the bar, which employs the honor system; drink anything you want, day or night, keep track of it, and pay when you depart.

The Club can handle 20 guests, but limits divers to ten, certainly an overflow for their converted camper boat. Should there be too many divers, Terry Burke of Cayman Brac brings over "his" 28 foot monohull to handle the extras. He proved quite capable on my two dives with him. The dive operation is quite simple, and I suppose it's a miracle it even operates given the insolation of Little Cayman. Mike Emmanuel, the club manager, his wife and divemaster Donna, and Bill Vosteen, the club engineer and divemaster somehow kept everything running -and remained cheerful throughout. Some dives are so new that they've yet to be named (e.g., "that 70 foot cave with the big pink sponge.") Little Cayman is

best described as virgin Caribbean diving, perhaps even "complete" diving with plenty of excitement for the experienced diver.

One of my first dives was at Randy's Gazebo and the Chimney. Mike gave us a careful briefing so that we could fit into the chimney without getting stuck. This was an 80 foot wall dive where the dropoff juts out to form a pinnacle (shaped much like a gazebo), with a large, window-like hole through the center. Swimming along the wall I entered what looked like a dead-end cave--and suddenly I was face-to-face with two huge, midnight parrot fish. In their surprise they allowed me good close-up pictures before they skittered away. As I penetrated the cave further, I looked up to see a 30' chimney. I managed to squeeze through the small, oval opening slowly, without scraping tank or camera. Along the inner wall are cavelets full of interesting growth and brilliant, miniature sponges.

At Three Fathom Wall the wall begins at 3 fathoms (18 feet) and goes down to 6000-feet. I just wasn't prepared for the beauty and clarity as I rolled off the boat into the blue crystal. Almost before I righted myself, I was at the edge of the wall. Yellowtail snapper swarmed around me; characteristically shy black durgons approached very close; brilliant princess parrots darted about, and as I dropped down the wall, enormous tube sponges spread their fat fingers into the deep. A big hawksbill turtle swam right beneath me. There are not many dives like this in the Caribbean.

The Miniwall at Bloody Bay starts at 30' and drops down to 55'. As I busily checked my camera, I heard my buddy clang on her tank. I was about to land on a 7' nurse shark. The nurse was more startled than I and she swished under a nearby ledge just before my fins touched it, leaving us laughing in a cloud of sand. Jackson Reef is an incredible spot. The dropoff starts at about 40', but stretching shoreward from the top is a veritable fantasy of coral heads rising from pure, white sand, full of caves, tunnels, holes, and ledges. Schools of fish, brilliant living corals and clear, clear water surrounded me. I followed two gigantic rainbow parrotfish through the mazes and found myself just at the edge of the wall as a big lemon shark cruised by, totally oblivious of its fascinated observer.

Diving here is easy. The boat leaves from the beachfront dock around 9:30 am for two tanks. Sometimes lunch is served aboard, other times it is a beach picnic, and the other times we returned to the Club for lunch. Night dives might be negotiated, but none were offered during my stay. Snorkeling off the beach is poor (it's mainly turtle grass) except for viewing the three foot nurse sharks which live under the dock in three feet of water.

Diving at Pirate's Point, the other hotel on the island, isn't quite as easy. Because coral gardens prevent boats from coming directly to the hotel, their dive operation trucks people to the boat's mooring. Nonetheless, Pirate's Point is a good operation, especially now that they closed for a few months to improve the property. Now, dynamic young managers, Sarah and Dana Vied, emphasize diving. You might look up our August, 1982 review, to get the full skinny on Pirate's Point.

Frankly, you won't go wrong at either retreat. Although Little Cayman is not the Big Apple that Grand Cayman is, it's got the core of just about the

LITTLE CAYMAN	
Diving for Beginners	★ ★ ★ ★
Diving for Old Pros	★ ★ ★ ★ ½
Hotel Food	Cook is Departing
Hotel Accommodation	★ ★ ★ ★
Beach Snorkeling	★
Moneysworth	★ ★ ★ ★ ½
★poor, ★★fair, ★★★average, ★★★★good, ★★★★★excellent	

best diving around the Caribbean these days.

Divers Compass: Anything that you have any inklin' you'll need while on Little Cayman, take with you; this place is isolated. . . . Ron and Nancy Sefton, who made quite a name for themselves in the hotel and underwater photography business on Grand Cayman, are the business managers of the Southern Cross Club. . . . a total of four radio telephones provide the island's link with the outside world. . . . Little Cayman has the Caribbean's largest bird sanctuary. . . . didn't get hassled by mosquitoes, but needed repellent for the sand fleas. . . . Visibility in April dropped below 100 feet on one dive only. . . . Until December 15th it's \$535/person, double occupancy at the Southern Cross Club for six nights, three meals a day, and ten dives' in high season it's \$680; booking agent is Southern Cross Club, 1400 Louisiana Tower, Shreveport, LA 71101 (318/222-2144). . . . Pirate's Point charges \$176/day double occupancy; book through International Travel and Resorts, 25 W. 39th, NYC, 10018 (800/223-9815). . . . you can reach Fisheye at POB 1560, Grand Cayman (809/949-6085).

The Lowly Sea Urchin

--Death Comes In Many Forms

Black sea urchins are dying all over the Caribbean. This was first noticed in 1983 around Panama and reported by researchers from the Smithsonian Tropical Research Institute, located in Panama. Now, from Aruba to the Caymans, from the Virgin Islands to Bermuda, there is barely an unaffected reef in the Caribbean. For example, on a recent trip to Barbados, our travel editor found no signs of the once-prolific urchin.

The urchins appear to develop white spots near their spines and then the spines fall off, leaving them unprotected against fish predators. Why only the black urchin is affected is still a mystery, but there is some indication that the cause is a micro-parasite.

According to Dr. Peter Glynn, from the Rosenstiel School of Marine and Atmospheric Science, University of Miami, the high water temperatures caused by El Niño may account for the growth of the micro-parasite.

As Dr. Glynn told us, "This was first noticed near the coast of Venezuela and then spread clockwise through the Caribbean. While it appears that the large scale deaths of the black urchin now appear to be over, it is possible that it could spread to Brazil. We don't know if the fresh water coming from the Amazon will stop it or not."

One thing is sure; the coral reefs we all love will be in for a bad time. El Niño hit the reefs hard and with the deaths of the black urchins things may get worse. Graying urchins feed on the algae which forms on coral. Without the urchins the algae will build up on the reefs and inhibit their growth. Other long term effects are only beginning to be studied.

Dr. Glynn told us that, "there are isolated pockets of black urchins around, but it may take a decade or two before they really come back."

★ ★ ★ ★ ★

What nature can't do to the sea urchin, man will. Fish and game officials in Southern California have taken to "urchin bashing." One basher, John Grant, has pounded so many urchins he now claims he can destroy 60 per minute. But it's bashing with a purpose.

For billions of years nature had provided a fine balance of life in the kelp beds. In the last fifty years, man has destroyed that balance. Heavy fishing for lobster, abalone and sheephead, critters which compete with the urchin for food and habitat, has led to the death of the beds and the increase of urchins. Raw sewage pumped in from Los Angeles has depleted kelp beds and provided boosts to urchin nutrition. And where the urchins multiply they encroach upon the kelp. The result is no kelp, no fish, no crustaceans.

The problem has been magnified in the last couple of years due to El Niño. The warm currents caused wind speed to pick up, creating heavy surf which not only destroys kelp but redistributes large families of kelp haphazardly. El Niño appeared in the early 40's and again in the late 50's, but with the increase in sewage and the decrease in fish in the last 25 years this recent bout has been most difficult.

Fish and game officials are hoping to transplant healthy kelp to areas now overrun by urchins. Urchin bashing is the way they open up an area for transplant. But it's slow work. It can take a week or more to clear out a 30 foot area. Once cleared, an area is then transplanted with healthy kelp from other areas.

Other urchin killing techniques have been tried. Quick liming works well, but it kills abalone and

You Wouldn't Kill Zoo Animals, Would You?

You wouldn't think of harming a zoo animal, would you? The very idea is repugnant. But would you kill or collect at an established dive site -- dive sites that are visited almost every day by boatload after boatload of divers?

These sites are under tremendous stress. Anchors and the fins of countless divers constantly damage the fragile marine life. Add spearfishing and collecting, and the site becomes barren.

Some divers -- and even divemasters -- break the urchins at established sites. After all, it's a quick and easy way to attract the fish. To them, it's a big ocean with an infinite supply of urchins. But as they decimate the urchin population in a relatively small area, they reduce other marine life as well.

Stop and look at a long-spined urchin sometime. Look at how arrow crabs and dozens of baby fish hide among the urchin's spines. Remove the urchin and these creatures lose their hiding place. Some of the baby fish are cleaners -- cleaners that are necessary to keep the larger fish healthy.

Some dive guides take fish and lobster at their regular dive sites. Their view is short-sighted. Only one person can take the fish or lobster home, but dozens of divers and photographers can enjoy its beauty. We're not saying that it's wrong to take a fish or lobster -- just don't take them at established sites. This idea, of course, doesn't stop with fish and lobster, it applies to all forms of collecting.

Some divers are either insensitive or incredibly selfish. We've seen divers standing on the rear platform of their boat throw bread on the water. Then, they shot the fish that surfaced for a free handout. They stopped and quickly ducked into the boat cabin when we yelled at them. One of our friends told us of seeing an underwater photographer photograph a fragile coral and then smash it. Later, when asked about the incident, the answer was, "I didn't want anyone else to get a picture of it."

If you want good dive sites, you must help protect them. Try to influence other divers and don't be afraid to express your disapproval. If the resort divemaster breaks urchins or spears fish on the dive sites, complain to him and the management. If he is seven feet tall and weighs 250 pounds, at least write a letter to the resort after you get home. After all, you don't want them killing the animals in your underwater zoo, do you?

Jim and Cathy Church

other living things. A new dredging technique, however, has some merit. Urchins are broken loose with long rakes and swept into a vacuum with blades which pulverizes them. It works on a flat bottom, but in rocky areas pebbles clog the blades.

The restoration is a long and tedious process, but in some replanted areas abalone has returned where they've not been seen for thirty years. To hasten the process, fish and game officials are planting hatchery-bred abalone -- as many as 5000 can be planted a day.

Ken Wilson, project leader, is optimistic about the eventual success of the project, although the small budget limits the success to the Palos Verdes area. Nonetheless, the kelp is growing, the fish are coming back, and the abalone are taking hold. But there will never be anything like the big beds that once existed. Says Wilson, "Controls need to be maintained on all the critical factors -- kelp restoration, commercial urchin harvesting, sewage treatment, etc. Not until this

is done will our beds and abalone return in decent number."

★ ★ ★ ★

The urchin problem -- caused by man -- does not end in California. Last December more than 50 divers launched a full-scale attack on the biggest collection of sea urchins in Australia killing 25,000 in one day.

The divers believe that the urchins are destroying plant life in Botany Bay and threatening the livelihood of fishermen in the area.

The organic food sea grass that many fish and other marine creatures depend on is being destroyed by over one million sea urchins, attracted to the area by shells uncovered by erosion of the seabed at Silver Beach.

The sea urchins' natural predator, the Port Jackson shark, has disappeared from the bay, partly due to dredging of the seabed for ship channels.

The Multi-Level Dive Procedure Revisited

--A Response By The Developer of ORCA

In the January issue of *Undercurrent*, we carried an important article by Dennis Graver detailing

multi-level dive procedures. In this article Graver outlined the rationale for being able to conduct dives

at various ascending levels without being constricted by a rigid interpretation of the U.S. Navy Tables.

For example, Graver cited a hypothetical diver who begins at 100 feet for 15 minutes, then goes to 40 feet for 15 minutes, then to 25 feet for 10 minutes, surfacing *without* decompression as an H diver. If one were to follow the same dive and strictly adhere to the U.S. Navy tables, then 15 minutes worth of decompression would be required and the diver would surface as a K diver. In the article, Graver explained why this can be done.

Graver's procedure is a significant contribution to sport diving, but it is far from being accepted. In the article, Graver quotes Karl Huggins, a co-developer of the ORCA decompression meter. Huggins responded to Graver's article, which we are now publishing along with Graver's response to Huggins.

★ ★ ★

In Dennis Graver's Multi-Level Diving article, he stated that I have concluded in one of my publications that "the (MLD) technique is 96% accurate." This statement does not reflect my position on the results of the analysis.

ARE YOU A MULTI-LEVEL DIVER?

If you follow multi-level dive tables, Karl Huggins wants to hear from you. Send him your name and address and he'll send you a questionnaire that will aid him in his research—and your ultimate safety.

Karl Huggins
Associate Professor
Underwater Technology Laboratory
Space Research Building
Ann Arbor, Michigan 48109-2143

If you wish to receive, free-of-charge, copies of his papers and a new set of No-Decompression Tables, send the request to:

Michigan Sea Grant Program
Publications Office
2200 Bonisteel Blvd.
Ann Arbor, MI 48109

If you want a detailed paper on multi-level diving prepared by Dennis Graver, you may receive it at no cost by sending a stamped (37¢) self-addressed envelope to:

Dennis Graver
American Sailing Association
13922 Marquesas Way
Marina del Rey, CA 90292

The publication, "Mathematical Evaluation of Multi-Level Diving," shows that out of 101 Multi-Level Dives evaluated, 55 of them resulted in nitrogen pressures that exceed 96% of the maximum nitrogen pressure allowed in at least one of the six theoretical tissue groups in the U.S. Navy decom-

pression model. This is 96% of the nitrogen limits determined for Navy divers, *not* the general sport diving population. This, in my opinion, presents a potential danger for divers using this type of Table Based MLD Technique.

This problem occurs due to the major assumption used in the MLD technique: no matter how you get into a group designation (say Group E), you will have a certain level of excess nitrogen in your body. In other words you would have the same amount of excess nitrogen in your body from a 30 minute dive to 40 fsw (feet-of-seawater) as you would from a 10 minute dive to 120 fsw since both dives place you in Group E. The error in this assumption is that whereas the No-Decompression Limits are based on all six tissue groups, the group designations of the No-Decompression Tables are based solely upon one group (the 120 minute half-time tissue group). This type of group designation representation is quite reasonable for modeling nitrogen uptake and elimination during repetitive, single level, No-Decompression dives.

The No-Decompression Tables were designed to be used with single level dives. No attempt was made to incorporate any Multi-Level capability into their design. The No-Decompression Tables attempt to assure that on single level dives within the tables, all six tissue group pressures will fall within "safe" levels. However, when multiple level dives are performed using the tables the only tissue group considered in the technique is the 120 minute group. The other five tissue groups may be building up nitrogen pressures greater than their allowed limits, but there is no way for a diver to obtain this information from the tables. The Table Based MLD Techniques would work fine if the diver's body consisted totally of 120 minutes tissues. But this is not the case. For these reasons I question the safety of MLD Technique that have been based on the No-Decompression Tables.

If the Table Based MLD Technique is going to be used by a diver then the following recommendations based solely on mathematical calculations were made in the publication:

★ Cut back the limits on the No-Decompression Tables to:

40' - 150 min.	90' - 25 min.
50' - 70 min.	100' - 20 min.
60' - 50 min.	110' - 15 min.
70' - 40 min.	120' - 12 min.
80' - 30 min.	130' - 8 min.

★ Take a safety stop at 10 or 20 fsw for 5 - 15 minutes.

★ Attempt to keep back at least one group from the above limits (A).

★ The time at a level should include the ascent time to the next level.

These recommendations attempt to keep the nitrogen pressures in *all* tissue groups below 90% of their pressure limits.

I do believe that MLD can become a safe practice if all the tissue groups in a safe decompression model are taken into account. Simple tables that use all tissue groups to calculate group designations are possible, but allow for almost no Multi-Level capability. Conversely a set of tables that allow a moderate amount of MLD and consider all tissue groups would be difficult to generate and complex to use even for most advanced divers.

As Graver has concluded, computer technology may present the best answer for MLD. By using a microprocessor, all the tissue group pressures can be calculated and the diver can be informed in some manner of their status. This is what was implemented in the EDGE (ORCA's computer) by using a model more conservative than the U.S. Navy's which included a wider range of tissue half-time groups.

Graver also stated that there have not been many attempts to scientifically validate any of the MLD Techniques. The only studies I am aware of are the Navy's work at developing a Combat Swimmer Multi-Level Technique using the No-Decompression Tables, some initial tests done by Dr. William Fife at Texas A&M, and the testing done to validate the MLD Technique allowed by the EDGE.

The testing done for ORCA involved 12 subjects exposed to 10 MLD profiles designed to build the nitrogen in the tissue groups up to, but not over, their limits. The results of this study showed that none of the subjects developed any signs of decompression sickness and only one subject developed the mildest form of venous gas emboli (silent bubbles) following one of the profiles. These results were very encouraging. They indicate that MLD can be safely practiced if conducted under certain guidelines.

These studies have only scratched the surface. Further research needs to increase the subject sample size under controlled conditions, study results of Table Based MLD Techniques, and to determine the limits of MLD. With the results of future studies most of the possible misinformation and conflict with respect to MLD could be dispelled to the benefit and safety of all sport divers.

Graver's Response:

After reviewing Karl's paper, I can see where I misinterpreted his position. I also see that the basis for our differing conclusions regarding MLD is dissimilar. I believe Karl is being more conservative than the Navy tables while my position is that, except in noted areas near the no-decompression limits, the MLD procedure is as safe as the tables themselves.

It should not be alarming that the nitrogen limits exceed 96% of the maximum nitrogen pressure allowed in 55 of 101 MLD dives because the Navy allows 100%. Also, that's a primary reason for the recommended safety procedures for multi-level diving.

Dear Undercurrent:

Thanks to your infamous Mr. Davison, I feel that renewing my subscription would be harmful to my reputation, peace of mind and pocket books, both short and long term. I believe that NO scuba course should be taught through the mail—even multi level diving. . . .

As an instructor, if I recommend your publication to my students and they learn some scuba course by mail order and then injure themselves, I am afraid I could be held liable for your stupidity by recommending your publication. . . .

J. Frank Blagg
La Porte, Texas

Dear Frank:

You know we hadn't thought of that. Thanks to your thoughtful letter, I've written my local dive shop to insist they remove those PADI and NAUI instructional books that they sell to just any old jerk. You know, some people don't want to wait for the mail and walk into those shops to buy their lessons off the shelf. And I might be liable for not stopping them. Sure glad I figured that out.

Ben Davison

Not being a mathematician, it is difficult for me to calculate all the various tissue saturations for all depths, but these calculations have been done by associates who are engineers and computer programmers. Their printouts reinforce the position that MLD within normal diving times does not violate the tissue pressures found within the Navy tables.

In my estimation, the MLD procedure has been tested and proven valid. The difficulty is not that the procedure lacks verification, but that the results have not been scientifically documented. I quote Dr. Robert Workman of Taylor Diving and Salvage, who stated in a letter, ". . . you can use table 1-13 of the U.S. Navy Diving Manual to get equivalents of bottom time at depths of 40 to 190 feet. We have used this method for thousands of air dives to permit the divers to work at various depths on risers during the same dive."

The procedure is also included in commercial diving manuals. Further, it has been used successfully for thousands of dives in resort areas and elsewhere. While more research and study is certainly desirable, it is awfully hard to argue with the amount of successful usage which has taken place. MLD is a standard practice in commercial diving. The recreational community was unaware of it until I stumbled across it in 1975.

In light of the findings of Professor Hill, it may be that MLD is safer than spending all the time at one

depth and then ascending directly to the surface. Outgassing of fast tissues takes place at shallower depths during multi-level diving.

I recognize the value of being conservative when it comes to the tables, but I believe the tables can be used safely for MLD. The limits must not be pushed, safety decompression stops should be made, and all

other recommendations must be followed. Divers do dive at more than one level. Few can afford a computer to continually calculate multiple tissue ingassing.

One last point. I discourage teaching MLD techniques at levels below Divemaster. It causes confusion as an alternate procedure.

Why Divers Die, Part III

--Schnapps, Stupidity and Shallow Water Blackout

This is the conclusion of a three part series based on an analysis of 1980 diving deaths as conducted by John McAniff of the National Underwater Accident Data Center at the University of Rhode Island.

Proximate Starting Causes

The proximate starting causes of nonoccupational underwater diving fatalities are presented in Table 3 on page 11. Many have been discussed previously.

One fatality in 1980, caused by the diver being run over by a motorboat, occurred despite the fact the diver was operating within 30 feet of his diver's flag.

Two cases are listed under "Aspiration of Stomach Contents"; one involved the inhaling of vomitus, and the second case was an event involving "dry vomit" resulting in the dislodgement of some bronchial tissue which was then aspirated into the lungs.

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The presence of a ruptured ear drum is not uncommon in ordinary drowning cases. However, in the one case during 1980, there was sufficient evidence to determine that this caused the drowning.

Ten divers died in caves. One case occurred at a depth of 70 feet at some distance back into a cave. When the victim's air began to run low, he failed to activate his reserve and chose to buddy breathe with

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his partner. The two became disoriented, and only one was able to get out of the cave alive.

In another such fatality, the diver's regulator apparently had not been well-maintained. The buddy system was not properly used since this victim drifted away from his two companions. There were only two lights for three divers. In addition, this was a case of diving too deep too soon after certification. This was the victim's fifth logged dive.

Another cave-diving fatality took the life of a 21-year-old male who was reported to have been uncertified as a diver. He apparently slipped off the safety line and disappeared. He apparently became disoriented and traveled in the wrong direction, going deeper into the cave rather than back toward the cave opening. The body was recovered two days later more than 600 feet from the mouth of the cave.

One cave diver apparently took off his tank to gain access to a very small opening while using only his pony bottle. He became stuck and was unable to get back to his primary tank and regulator before running out of the air from his pony bottle.

Snorkel Or Free Diving

During 1980 the NUADC recorded a total of 20 skin-diving fatalities which included one female. The geographical distribution of these reports included nine from Florida, five from California, three in Hawaii, two in Massachusetts, and one in Minnesota. 16 of the 20 cases occurred in ocean, three in lakes and one in a Florida sink-hole.

Of the three fatalities 60 years of age and over, two were determined to have been the result of a cardiovascular event.

At least two of the 20 fatalities were attributed to "shallow-water blackout." This is a condition which has contributed to hyperventilation, described as rapid, deep inhalations and exhalations before a breath-hold dive. This reduces the carbon dioxide content of the lungs to the point at which it fails to trigger the automatic breathing reflex before the amount of oxygen in the brain has been depleted to a point of possible unconsciousness. The diver may then simply blackout and drown.

Another of the skin-diving fatalities was reported to have been complicated by a combination of alcohol and the central nervous system depressant known as methaqualone.

At least seven of the twenty cases occurred during very heavy or rough surf conditions and four of these resulted in the divers being thrown into the rocky shoreline, resulting in unconsciousness and drowning.

Undercurrent comments:

Nearly all diving deaths are preventable. Many begin with an improper decision at the surface. An inexperienced diver goes too deep, a macho diver braves high surf; a queasy diver decides to give it a go. Underwater, wrong decisions are made: a diver tries to suck the last ounce out of his tank before heading for the surface; the symptoms of narcosis are

(Continued on page 11)

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not recognized; a buddy is left in the lurch.

But the biggest killer is panic. Although the NUADC lists panic as a possible factor in less than 25% of the cases, it could be a contributor in at least that many more. We have carried several articles regarding the roots and responses of panic and will continue to carry them. Suffice it to say, that the bet-

ter trained, more experienced and more comfortable a diver is, the less likely he is to panic.

And that means that a diver who selects conditions for which he is trained and feels sufficiently experienced is a diver who is less likely to encounter a situation he can't handle.

Table 3. Proximate Starting Causes of Nonoccupational Underwater Diving Fatalities, Yearly, 1976-80

Estimated Cause	Number of Fatalities						Number of Fatalities				
	1976	1977	1978	1979	1980		1976	1977	1978	1979	1980
(A) Medical and Injury Causes						(C) Equipment-related Causes					
1. Possible exhaustion, embolism, or panic	24	25	24	33	28	1. Out of air at depth	7	12	17	6	8
2. Diagnosed air embolism	10	16	12	14	10	2. Overweighted at depth	1	1	1	0	4
3. Cardiovascular event	8	4	4	5	6	3. Weight belt entangled in vest straps	1	0	1	0	0
4. Nitrogen narcosis	1	0	0	2	3	4. Poor maintenance regulator	2	0	0	2	0
5. Hit by boat, extensive injuries	2	2	2	3	1	5. Equipment "tied" on victim	1	0	1	0	1
6. Aspiration of vomitus, etc.	1	2	1	2	2	6. Tank fell from backpack, victim strangled by neck strap	1	0	0	0	0
7. Possible intoxication	1	1	0	0	3	7. Accidental back-mounted buoyancy compensator inflation	1	0	0	0	0
8. Possible choking, wad of gum	1	0	0	0	0	8. On anchor line, struck on head by boat	0	1	0	0	0
9. Decompression sickness	1	0	1	1	0	9. Tangled in buddy's dropped weight belt	0	2	0	0	0
10. Cramps at depth/cold	0	1	0	0	0	10. Lost buddy line, black water	0	1	0	0	0
11. Ruptured eardrum	0	0	1	0	1	11. Burst safety disc, tank flooded	0	1	0	0	0
12. Ruptured stomach blood vessel	0	0	0	1	0	12. Air reserve pull rod under tank band	0	1	0	0	0
13. Gunshot	0	0	0	1	0	13. Carbon monoxide poisoning, bad air	0	0	1	1	1
Total Medical Causes	49	51	45	62	54	14. BC oral inflator broken	0	0	1	0	0
(B) Environmental Causes						15. Regulator freeze-up	0	0	0	1	0
1. Lost or out of air in cave	21	7	11	12	10	Total Equipment-related Causes	14	19	22	10	14
2. High waves or surf	3	4	3	7	1	Proximate cause not defined	39	13	23	29	13
3. Strong current	7	2	3	0	1	Total	147	102	116	130	109
4. Entangled in kelp or weeds	6	2	2	3	4						
5. Lost under ice	3	1	3	3	2						
6. Suspected shark attack	1	0	0	0	2						
7. Entangled in external lines/ropes, etc.	3	3	3	3	1						
8. Night dive, lost sight of shore lights or lost buddy	1	0	1	1	0						
9. Foot wedged in rocks	0	0	0	0	1						
Total Environmental Causes	45	19	26	29	28						

Lake Diving Precautions

--For The Turkey Ocean Diver

People who get certified in the ocean often look upon divers certified in lakes and quarries as "turkey divers" -- after all, ocean diving is for "real men." Then again, an ocean diver, unaccustomed to the craft whizzing around lakes, might be ill-equipped to handle the fast moving boats and propellers.

So who's the turkey? The last thing a boat operator expects to see in the middle of a lake is a human head bobbing out of the water. Unless a diver exercises extreme caution when lake diving, he can be easily vulnerable to injury from a passing boat.

Bill Stevens has worked as a diving instructor at

Culver Military Academy in Culver, Indiana. Although the first line of defense for divers is the divers down flag, he's found that most landlocked boat captains aren't knowledgeable about nautical flags and symbols -- and the last thing they expect to see is a diver's head pop above the surface. In working with his students, he developed a check list to ensure that they would not fall victim to a passing boat.

★ Display the red and white diver down flag. With the recent change to the blue and white alpha flag, it would be a good idea to fly both flags. Be sure to stay within the 100 foot limit that accompanies the flag.

★ Use compass readings to avoid any unnecessary surface swimming. If you are a bit rusty with a compass, practice on dry land.

★ Have a set bottom time. It's a good idea for the surface support boat to know when to expect you to surface.

★ Keep your hand on your deflator. If trouble is headed your way, you may have time to deflate and sink out of the way. Valuable time and perhaps a life can be saved if the deflator is in your hand and ready for action.

★ Listen. Anyone who dives in a lake where there are boats recognizes the whirring sound they make underwater. Closer boats are exceptionally loud and make a distinctive chopping sound.

★ Watch for quiet craft. Sailboats can be just as dangerous as motor driven craft. If you see a sailboat approaching, use extreme caution. Remember that long, protruding centerboard.

★ Stay close to your buddy. If buoyancy suddenly

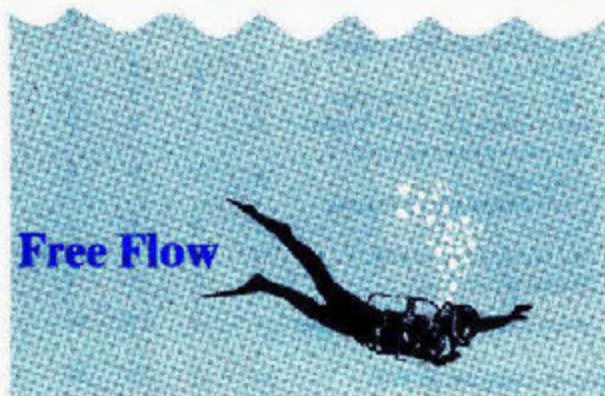
becomes a problem, you will be there to pull him down.

★ Keep a healthy ceiling over your head. Avoid diving close to the surface until you are ready to ascend.

★ Purge your regulator a few times before surfacing. The bubbles frothing at the surface may enable the driver of an approaching boat to spot you and steer clear.

★ Always follow proper ascent techniques: look up so you can see what is directly on top of you. This also serves as an ascent guide to following your bubbles to the surface. Reach up; if there is danger up there, your hand will hit it before your head. And circle; this gives you a 360-degree look at anything that might approach from any direction.

★ Educate area boaters on symbols such as the diver down flag. Ask the owners of marinas if they will permit you to display a sign or poster explaining the diver down flag and its meaning.



If you're in the market for clothes-optional scuba diving, how about August 5th to 11th at Glovers Reef in Belize? Or September 15th to the 22nd at Baskin-in-the-Sun, Kaliko Beach Resort, Haiti, for \$499. Those are just two trips where you can go dip your snorkel with other like-minded folk. For more information contact Naturist Travel at 414/725-0125. Ask for Rich. If you want to get an occasional issue of the *Buff Diver's Bulletin*, send \$5 to Watersports Scuba Group (POB 6812, Stockton, CA 95206) to get you the current issue and other details.

Do you have a few poetic lines you would care to spin about the rapture of diving? W.A. and Vera Shoen, long time *Undercurrent* subscribers, are publishing *The Scuba Diving Experience* and would like to review your work. You may send as many as five poems (no more than 40 lines please) to Ocean Poets, Suite 740, 507 3rd Ave., Seattle, Washington 98104. The deadline is September 15.

Seen those *Choose Your Own Adventure* books for kids? Where they read the beginning of the story, then have to make decisions about what they want to

do then turn to any number of variable endings accordingly? Kids love 'em, and now there's one called *Treasure Diver* (by Julius Goodman) with 19 possible endings. Unlike most books that deal with scuba, this is relatively accurate and begins with good definitions of the equipment. *Treasure Diver* is recommended for children ten and older and will give a kid a real introduction to diving, the need for safety, and the adventure — and they'll love the multiple choices. It's a Bantam Book available this summer for \$1.95. And you may find it fun, too.

From time to time we've written about the development of a steel mesh shark suit that seems impenetrable by sharks. A number of magazines have published photographs of tests and one even showed Australian Valeria Clark being bitten on the arm. The suit worked perfectly. The suit is now being marketed by Neptunics, Inc., of San Diego, which claims that it will offer "absolute protection" against bites from sharks up to 12 feet long. An outer layer of steel mesh is designed to prevent teeth from penetrating while an understructure of rigid plastic plates "drastically reduces the animal's enthusiasm for a second bite." The price is \$5,000.

Are there alligators in the sewers of New York? Many people claim so, but most people scoff, saying that nothing could live down there. But is that true? Commercial Diver Tom Mathes is hired to clean out the sewers of Jacksonville, Florida, certainly a dangerous task since the openings are a thousand feet apart. It's a bit like ice diving, Mathes says, and there's a lot of life down there, including catfish and eels that run 2½ feet long.