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## Grand Cayman, Swan Island, Roatan

*An annual trip aboard the Caymen Diver.*

What do you do when you find yourself in mid-August with no plans, no reservations, and the entire month of September off work for that much-deserved, last-minute vacation? Naturally I had to go diving. But where?

I figured an entire month in one spot would tax the enthusiasm of even the most dedicated of divers. So I tried to build a trip that would let me move around with the least amount of top time and the most diving. The Caribbean seemed like the best bet.

But I have a problem. Like most other serious divers, I have become more than a bit annoyed by an affliction that seems to be spreading among dive resort operators and divemasters. I don't know what to call it, but I know the symptoms: a hungover divemaster who dreads another diving day, who can't wait to finish, who flirts with women he calls chicks, who anchors at the nearest divesite, who thinks unlimited diving means one tank a day, who insists on follow-the-leader dives below 50 feet, and who gears every regimented dive to the lowest common denominator -- that panicky, newly certified, out-of-shape kid who can't read his tables and who puts his backpack on upside-down.

It only takes one or two of these symptoms to make me write off a resort forever. If that's vengeful, so be it. After all, I have time and money for only one or two dive trips per year. I pray for good weather and visibility. (Unlike skiers, divers can't consult TV, newspapers and toll-free numbers to get the latest conditions before they make decisions.) And then I take the plunge.

I can see how a full-time divemaster can catch a case of those another-day-another-dive blahs. But for the kind of money his resort bosses charge, you'd think they would insist in their divemasters at least pretending to be enthusiastic, and at least trying to arrange a dive trip so that the needs of both the fledgling divers and the experienced divers are considered. Any divemaster worth his BC can sort the wheat from the chaff in a minute or two. Any resort operator who doesn't insist on it is ruining his business. After all, word gets around about those overbooked elbow-to-elbow dive boats and hand-holding dives.

Well, anyway, back to our story. A few minutes of research revealed that the

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much-touted Cayman Diver, Paul Humann's 83-foot live-on dive boat was making its once-a-year "special cruise" from Grand Cayman to the Virginal Swan Islands and on to Roatan from September 10 through 21. The price tag -- \$900, booze not included -- floored me. These days, that would take me to Europe and back twice. But after getting up and dusting myself off, I decided I was worth it. And the Cayman Diver's exclusive agent, See & Sea Travel, convinced me with words like "exciting" and "unlimited" and "best" that the diving was also worth it. So I made a quick phone call, found out there was space, and made the Cayman Diver the centerpiece of my September diving odyssey. And off I went. Since September is the lull between summer and winter seasons, I had no trouble with other reservations.

Normally, the Cayman Diver offers \$600 one-week trips around Grand Cayman with an occasional side trip, weather permitting, to Little Cayman. Mine was a special once-a-year trip that ended up on Roatan, which offers perfect drydock facilities for annual repairs because the huge Honduras shrimp fleet is based there. By bringing aboard divers for the trip to drydock, Paul Humann cleverly makes a few bucks out of his required trip for repair.

On Saturday afternoon, September 10, I was among 10 divers who boarded. First, let me summarize the trip that followed:

It was the most diving, the most convenient diving, and the most varied diving I had ever done. Humann and his four-man crew were the most attentive, most responsive, most polite, and most efficient hands I have come across. I took a minimum of two and a maximum of five dives each day. Divers plopped over the side pretty much whenever they wanted to, kept their own tables, and planned their own dives.

Convenience is the key. No hauling gear on and off a day boat. No sand, sand fleas, or mosquitos. Instead of starting out after breakfast at 9:30 or 10 a.m., we could wake up, strap on our gear and make a pre-breakfast dive at daybreak. If I spotted something worth another roll of film, it took only 15 minutes for a tank refill, and back down I went. It was possible to go on a daybreak dive, one or two mid-morning dives, an afternoon dive and a night dive and still spread them out enough to stay well within no-decompression limits by moderating the depths.

Another plus I hadn't thought of: regular dive boats make a lot of noise en route to dive sites. After an all-night anchor on the Cayman Diver, the bottom life would be used to the presence of the boat and the hum of the generator. There was no churning of propellers and engine roars scaring away fish like skittish rays. So more than once we sank below to find spotted eagle rays casually gliding by, right under the boat.

My purpose here is not to review the quality of diving at Grand Cayman because beginning with the next issue we will devote several pages to a complete review off the north and west walls, mainly at well known sites, some of which were routinely visited by shore operations. Being water-based gave us access to some sections of the reef which are not regularly visited by diving tourists, who are typically land-based. Visibility ran about 80-100 feet, something less than those gin-clear claims, but the weather was occasionally rough.

The cruise to Swan Island, about halfway to Roatan, took 23 hours. We left at about 5 p.m., and anchored the next day at about 4 p.m., in time for an afternoon and a night dive. What a difference isolation makes. There were no dropoffs, but

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in 40 or 50 feet of water we saw more and bigger fish in three days of diving than on the entire rest of the trip. The sleeping nurse sharks were near and inside caves no deeper than 30 feet and only a hundred feet or so from shore. And no trash or sand tracks of man, anywhere. Forests of coral varieties provided spectacular underwater scenery. And for the marine life: well, on a single-tank dive in 40 feet of water I saw two sleeping nurse sharks, a couple of pesky 4-foot barracuda, the biggest jewfish I have ever seen (and accompanying sharksuckers), three black groupers, a couple of midnight parrotfish, swarms of typical tropicals, and a stingray nearly 5 feet across which refused to move for our cameras even when my buddy and I put our hands on its back!

Swan Island is actually two islands, each a little over a mile long, inhabited by a few U.S. weather personnel. The islands are flat and offer vessels no shelter from the wind. We dived at three different sites, each unexplored and fascinating. Because this is an annual trip, it would seem more appropriate for the Cayman Diver to spend more time at the virgin Swans than around Cayman. A couple of days here really did not satisfy any of the divers aboard, and although the weather can prohibit any diving here, if the weather is clear Captain Paul should head for the Swans and leave Cayman to the laymen.

Paul Humann is the boat's owner and Captain. He's an affable ex-attorney from Wichita, Kansas. He handled all the cooking, served family style. Except for one meal of conch tempura, the food came out of the freezer -- even the seafood. Breakfasts: pancakes, french toast or eggs with bacon and biscuits. Typical lunches: fruit salad and cottage cheese, chili, cheese noodles -- nothing much filling or memorable. Dinners: turtle curry, beef stroganoff, boiled shrimp, breaded salmon, with a frozen vegetable, a fresh salad, and, to be a bit more positive, outstanding desserts. An occasional cockroach would join us in the galley for a snack.

Now a trip like this, with just about all the diving I wanted, was not without its petty annoyances. Although some raved, I found the food only so-so; visibility was less than expected throughout (not the boat's fault of course); the beer and booze were overpriced; the seas and anchorages were sometimes rough; constant engine-room noise pervaded the only shaded part of the deck; one of the two toilets was broken throughout the trip; and we didn't do as much exploring as we had hoped.

Dudley Bodden, the boat's native engine man, had the habit, at first unnerving, of fishing off the stern while we were diving. Once, upon returning from a dive, we found a small shark's head lying in the sand below the boat. Just a little chumming, we were told. But we noticed that nobody went on a dive that evening.

The Cayman Diver, 83 feet long, is an old but well-refurbished coast-guard vessel, with two diesel engines. Privacy is limited. Sleeping quarters consist of three two-person cabins with bunk beds and one six-person area. There is one shower and enough fresh water for a Navy shower each day. The sleeping area is nicely air-conditioned at night. In the daytime, generated electricity is diverted to the air compressor for filling tanks.

Because the generator runs constantly, and because the hatch to the engine room is always open, the gearing-up deck is always noisy. We learned to live with the din, though this was also the only portion of the deck shaded from the sometimes brutal sun. The forward and top decks were great for lounging in the morning and evening, but too exposed for afternoon leisure. So it was noisy shade or quiet sun or the bunks below.

The galley seats 12 for meals, but we found that even with 10 it was elbow-to-elbow. That discouraged long, leisurely dining, especially in bouncy seas.

Roatan: The run from Swan to Roatan took another 23 hours. We left after

lunch and arrived the next day at Coxin's Hole immigration just before lunch. But by the time we cleared customs, got our papers in order and steamed around to the northwest side of the island, it was nearly 4 p.m. -- still enough time for an afternoon and a night dive. The next day was one of those five-tank diving orgies, including three tanks just before dark and into the night. We dived many of the sites frequented by the boats from Anthony's Key resort. The wall was beautiful -- but not with the large sponges of Cayman -- and the colorful nudibranchs and sluggish stonefish made fine targets for my lens. The quality of diving here was comparable to, however different from, Cayman.

After disembarking from the Cayman Diver, I stayed several days at Anthony's Key. With the possible exception of the Virgin Island's Caneel Bay, it is the most natural blending of rustic cabins and buildings into nature I have seen. But it is not primitive. It is luxurious. Brand-new tennis courts; outstanding food in unlimited quantities, including lots of fresh fish; sailboats; horses -- all included at a price of \$50 per day for single and \$40 per person per day for double occupancy. No plastic, no varnish, no phones.

But I thought the diving set-up could be better. It was back to the one-dive-in-the-morning, one-dive-in-the-afternoon routine. The dive boats were not roomy flat tops, but conventional sport-fishing launches. For a Canadian group there at the time, it was elbow-to-elbow. We were on a larger boat, with fewer divers, but the boat was still congested. And none of the boats offered shade.

Even though a check-out dive was mandatory, the divemasters set strict rules, like "we are going to 80 feet for 20 minutes." Period. Only after the big group left, and after negotiations, did we arrange to make a two-tank morning dive, and convince our divemaster that we were capable of planning the morning ourselves.

The divemasters were very nice, very likable fellows -- just too rigid for me. One day, one of them confessed they are seeing more and more turkeys coming out of stateside certification courses, and therefore they feel they have to be overly cautious. At the same time, the increasing volume of divers means they cannot devote as much attention to confirming the competence of each diver closehand. And lots of super-macho types turn out to be accidents waiting to happen. That was the saddest insight of my trip.

It was, in all, a fantastic trip. I will return to Grand Cayman, and to Roatan. And I will sign on again aboard the Cayman Diver. My mission -- to do a lot of diving -- was an overall success. I shot 60 rolls of film. I got my shark close-ups, my perfect nudibranch, my frogfish portrait, my scorpionfish mugshots, and my barracuda gnashing his teeth.

So what am I doing sitting behind this desk pretending to be back at work? Well, most of the time I am thinking about my next dive trip.

Organizing your trip: The Cayman Diver makes this trip every year in September. You can get more information by writing See & Sea Travel, 680 South Beach Street, San Francisco, CA 94109. Because the Cayman Diver takes only 12 divers, it is wise to begin planning now if you are interested.

(H.T., 10/77)

#### T-SHIRT CONTEST

We've seen some great T-shirts on the bodies of some great divers. Dive clubs around the world use creative art and crazy slogans to wear themselves, and we'd like the best to adorn the pages of *Undercurrent*. So we announce Contest #2.

For dive clubs, first place for the most creative, clever and attractive shirt (i.e., the one we like best) is \$30 for the club treasury and a one-year subscription

or renewal to *Undercurrent*.

Runner up: \$20 and a one-year sub.

Last place. For the most tasteless T-shirt (there are plenty of those) from a dive club, \$10 and a one-year sub.

The winners will have their T-shirts modeled by *Undercurrent* staffers in a future issue of *Undercurrent*. The shirt should arrive by April 1; if you want your

shirt back, send a large, stamped envelope. Also, for commercial operations—shops, charters, resorts, manufacturers: if you have a fine shirt send it along and we'll show the best. There's no cash prize but the advertising is free.

Send the entries to *Undercurrent*, P.O. Box 1658, Sausalito, CA 94965.

# Rest & Relax . . . To Save Your Life

*In scuba diving, fatigue is a killer.*

"Exercise is good for us, but too much exercise can kill us." These are words to live by in scuba diving, where safety and enjoyment depend on being able to rest and relax in the water.

Accident reports and stories of close calls and bad experiences in diving show that fatigue is implicated in a large number of diving problems, including some fatalities. Surface drownings are the direct result of a person's inability to rest, and small problems often become serious when a diver is tired. Many divers do not recognize fatigue itself as a threat and they fail to take action to prevent it or deal with it effectively.

What about you? Do you get tired when you dive? Do you think of diving as strenuous physical activity? Have you ever wished you could make another dive but were just too tired to do it? Do you respond to fatigue by blaming your physical condition?

The truth is that divers using modern equipment and skilled in "rest and relax" methods of diving do *not* need to work hard when they dive. They do not need to be in great physical shape to enjoy diving. They get more time in the water without getting tired, and they are safer divers than even top athletes who think they can depend on strength and stamina to solve diving problems.

Fatigue poses a distinct threat to diving safety and enjoyment. On land, if you work yourself to the point of exhaustion or unconsciousness, you can simply collapse, rest and recover. In water, exhaustion puts you in danger of drowning.

Once out of breath, returning to a normal breathing pattern is more difficult in water than on land. Because a diver is restricted by equipment and having to breathe in water, a denser medium than air, special techniques are often required for rest and recovery.

Fatigue affects our general ability to perform. Skills which we can perform easily under normal circumstances become difficult when we're tired. A simple task like inflating a buoyancy compensator can be impossible for a person who arrives at the surface exhausted. And fatigue stimulates fear, which further affects our ability to perform effectively.

Finally, feeling tired isn't pleasant. Consequently, anything we can do to reduce the amount of unnecessary fatigue while diving will increase our enjoyment.

*Training is needed to learn to avoid fatigue because, without training, our natural responses to many diving situations will be completely wrong.*

For example, as air-breathing animals, we have a natural instinct to try to hold our head out of the water to breathe. On the surface without flotation, this automatic survival instinct works against us.

If a person becomes uncomfortable, nervous or tired on the surface, his natural urge will be to lift his head to breathe. A diver can exhaust himself on the surface struggling to hold his head up, just doing what comes naturally.

A diver who is aware of this instinct and trained to rest and relax in the water will seek safety by inflating his buoyancy system immediately upon arrival at the surface, then use his snorkel to rest face down in the water—no struggle, no fatigue, no danger. If he is still out of breath, he will remove his tank to make it easier to recover normal breathing. If that doesn't work, he will drop his weights.

All of these are *learned responses*, not something a person will do automatically without training.

Another powerful survival instinct is the urge to escape from where we feel threatened to where we think we will be safe. The more threatened we feel, the harder we work to escape the real or imagined danger.

Since land is our natural environment, a diver who is tired and uncomfortable in the water will feel a strong urge to get back to the beach or boat. If he becomes more tired and uncomfortable as he swims, and eventually frightened, the urge will increase and he will work harder to reach what he believes is safety. When the escape instinct has control of a person's actions, he will struggle toward "safety" until he collapses.

A diver trained to avoid fatigue will behave in a completely different way. If he feels tired or uncomfortable in the water, he will resist the urge to head for land and concentrate on resting, relaxing and making himself comfortable before starting to kick anywhere. When he does start to move, he will pace himself and rest as needed to make the entire trip without getting tired.

Again, the correct behavior is *learned*. It is not what one would do naturally, without training.

Underwater, if a person begins to feel tired and out of breath, the natural instinct is to go to the surface.

Since a diver can usually rest more comfortably underwater than on the surface, a diver trained to deal effectively with fatigue will choose to stay underwater, rest and recover before going to the surface. Again, a *learned response*, not what one would do without training.

*How does your training score on development of skills to avoid diving fatigue? Use these questions to evaluate it.*

1. Was the training philosophy to do things always the easiest and most comfortable way?
2. Was "rest and relax" consistently given precedence over strength and stamina as a solution to diving problems?
3. Do you associate avoiding fatigue with safety in diving?

*The following questions refer to open-water training.*

4. Did you practice resting on the surface in each open-water session, face down, breathing through the snorkel, until you were relaxed and comfortable?
5. Did you always have your buoyancy system inflated when you entered the water, and did you always inflate it immediately upon arrival at the surface after a dive?
6. If you were using a front-style buoyancy system, did you practice taking your tank off and holding it beneath you in the water to help you rest and catch your breath on the surface?
7. Using a front-style buoyancy system, did you practice making a surface swim with the tank on your back and with the tank held beneath you in the water?
8. If you were using any of the buoyancy systems that are combined with the backpack, did you practice handling it on the surface—taking it off, resting, putting it on and travelling with it—so that you could do it without getting tired?
9. Did you practice taking off your tank and putting it on again on the surface, until you could do it easily?
10. During surface swims, did you monitor your own condition and go as slowly as needed to avoid getting out of breath, and stop and rest whenever necessary?
11. Did you learn to use an underwater compass?
12. Did you actually use a compass to get from one place to another underwater, without assistance from the instructor?
13. Did you practice making an effortless ascent by using your buoyancy system to float you to the surface, releasing air as needed to keep the ascent rate no faster than 1 foot per second?
14. Did you practice this type of ascent in more than 25 feet of water?
15. Did you practice making effortless sharing-air ascents, using buoyancy systems to float you and your

buddy to the surface at one foot per second while sharing air?

16. Did you practice this type of ascent in more than 25 feet of water?
17. Did you practice equalizing buoyancy to control descents to deeper than 25 feet?
18. Did you practice equalizing buoyancy underwater so that you could hover at any chosen depth, neither sinking nor floating?
19. Did you practice removing your weights in the water?

20. Do you feel that you learned the following techniques for comfort on the surface? a) Inflate buoyancy system; b) Remove tank; c) Rest face down using snorkel; d) Drop weights.

21. If you answered "yes" to all of the above questions, do you now use all the skills you learned to avoid fatigue every time you dive?

If you answered "yes" to everything and you think of diving as easy, relaxing recreation, your fatigue-control skills are excellent.

If you had a lot of "no" answers and you think of diving as heavy exercise, you are working harder than you need to and the risk of drowning while diving is higher for you than it should be.

If you have not been well trained to rest, relax and recover in the water, reading this article won't help you at all. Neither will knowing that you should rest, not talking about resting, nor thinking about it. The only thing that will improve your fatigue-control ability is open-water practice of the skills that make it possible to dive without getting tired.

The safest and most effective way to improve is to enroll in an open-water course with an instructor who believes in and teaches resting techniques.

When you can answer "yes" to all the questions, here is a collection of other tips that may help make your dives easier and safer.

- When getting ready to dive, pace yourself with your buddy so that you are both ready to get into the water at the same time. Stop and rest whenever needed. If you get overheated pulling on your wetsuit, cool off and rest by floating in the water for a while before getting into your heavy equipment.

- Use your compass and pressure gauge on every dive to plan the dive to avoid surface swims.

- Whenever there is a current, be especially careful to plan the dive so that you don't arrive on the surface out of air, downstream from your destination.

# Undercurrent Travel Data Bank

## Response Requested

Have you taken a dive trip to some famous dive resort recently and found it didn't meet your expectations? Have you discovered a new dive resort or location that other divers might be interested in reading about? If you have taken any tropical trip in the last six months, we'd like to hear about it. Your reports will be used to update our world-wide review of diving and appear in future issues of Undercurrent. Won't you take a moment and evaluate your last trip for us?

Location being evaluated \_\_\_\_\_

Date of your trip \_\_\_\_\_ Hotel \_\_\_\_\_ Dive shop \_\_\_\_\_

Would you return? \_\_\_\_\_ Did you get your money's worth? \_\_\_\_\_

criteria:	evaluation: check the item closest to your impression:			
fish size	<input type="checkbox"/> large ones plentiful	<input type="checkbox"/> a few big ones	<input type="checkbox"/> too small to eat	<input type="checkbox"/>
tropical fish	<input type="checkbox"/> abundant	<input type="checkbox"/> not bad	<input type="checkbox"/> sparse	<input type="checkbox"/>
kinds of tropicals	<input type="checkbox"/> impressive variety	<input type="checkbox"/> fairly interesting	<input type="checkbox"/> common ones only	<input type="checkbox"/>
coral	<input type="checkbox"/> plenty and colorful	<input checked="" type="checkbox"/> o.k.	<input type="checkbox"/> kind of a bore	<input type="checkbox"/>
sponges, gorgonia . . .	<input type="checkbox"/> very nice	<input type="checkbox"/> pretty average	<input type="checkbox"/> not much	<input type="checkbox"/>
caves, ledges . . .	<input type="checkbox"/> good variety	<input type="checkbox"/> some of interest	<input type="checkbox"/> none worth diving	<input type="checkbox"/>
wrecks	<input checked="" type="checkbox"/> exciting	<input type="checkbox"/> worth a tank or two	<input type="checkbox"/> none	<input type="checkbox"/>
sharks	<input type="checkbox"/> a couple for fun	<input type="checkbox"/> none	<input type="checkbox"/> too many	<input type="checkbox"/>
spearghishing	<input type="checkbox"/> all you want	<input type="checkbox"/> a few possibilities	<input type="checkbox"/> none or prohibited	<input type="checkbox"/>
shelling	<input type="checkbox"/> excellent	<input type="checkbox"/> o.k.	<input type="checkbox"/> none or prohibited	<input type="checkbox"/>
snorkeling	<input type="checkbox"/> some of the best	<input type="checkbox"/> not bad	<input type="checkbox"/> nothing to see	<input type="checkbox"/>
photography	<input type="checkbox"/> top possibilities	<input type="checkbox"/> average	<input type="checkbox"/> nearly a bust	<input type="checkbox"/>
water temperature	<input checked="" type="checkbox"/> no wet suit needed	<input type="checkbox"/> wet suit top needed	<input type="checkbox"/> full suit useful	<input type="checkbox"/>
visibility	<input checked="" type="checkbox"/> 90 ft. or more	<input type="checkbox"/> 50-90 ft.	<input type="checkbox"/> less than 50 ft.	<input type="checkbox"/>
rated for advanced	<input type="checkbox"/> terrific	<input type="checkbox"/> o.k.	<input type="checkbox"/> go elsewhere	<input type="checkbox"/>
rated for beginners	<input type="checkbox"/> terrific	<input checked="" type="checkbox"/> o.k.	<input type="checkbox"/> go elsewhere	<input type="checkbox"/>
guides for good divers	<input type="checkbox"/> top rated	<input checked="" type="checkbox"/> acceptable	<input type="checkbox"/> lousy	<input type="checkbox"/>
guides for new divers	<input checked="" type="checkbox"/> top-rated	<input type="checkbox"/> acceptable	<input type="checkbox"/> lousy	<input type="checkbox"/>
diving frequency	<input checked="" type="checkbox"/> 3 or more tanks/day	<input type="checkbox"/> 2 tanks per day	<input type="checkbox"/> one per day	<input type="checkbox"/>
night diving	<input type="checkbox"/> frequent	<input type="checkbox"/> 1-2 times/week	<input type="checkbox"/> none	<input type="checkbox"/>
boat diving	<input type="checkbox"/> two tanks under \$20	<input type="checkbox"/> \$20-\$30 for two	<input type="checkbox"/> over \$30 for two	<input type="checkbox"/>
beach diving	<input type="checkbox"/> as good as the boats	<input type="checkbox"/> fair possibilities	<input type="checkbox"/> no way	<input type="checkbox"/>
dive shop manager	<input type="checkbox"/> a great person	<input checked="" type="checkbox"/> just does the job	<input type="checkbox"/> a real bastard	<input type="checkbox"/>
air quality	<input type="checkbox"/> no problems	<input checked="" type="checkbox"/> I wondered	<input type="checkbox"/> I worried	<input type="checkbox"/>
air fills (check two)	<input checked="" type="checkbox"/> 3000 psi	<input type="checkbox"/> 2250 psi	<input type="checkbox"/> short-changed often	<input type="checkbox"/>
new equipment	<input type="checkbox"/> full range available	<input type="checkbox"/> limited range	<input type="checkbox"/> come fully prepared	<input type="checkbox"/>
rental gear	<input type="checkbox"/> everything you need	<input type="checkbox"/> tanks, w/ belts . . .	<input type="checkbox"/> bring everything	<input type="checkbox"/>
repair capability	<input type="checkbox"/> can handle anything	<input type="checkbox"/> some repair capacity	<input type="checkbox"/> pray nothing breaks	<input type="checkbox"/>
hotel food	<input type="checkbox"/> gourmet	<input type="checkbox"/> surely acceptable	<input type="checkbox"/> ugh	<input type="checkbox"/>
nearby restaurants	<input type="checkbox"/> must try	<input type="checkbox"/> adequate	<input type="checkbox"/> better off fasting	<input type="checkbox"/>
luxury accommodations	<input type="checkbox"/> indeed luxury	<input checked="" type="checkbox"/> o.k.	<input type="checkbox"/> far below par	<input type="checkbox"/>
moderate accommodations	<input type="checkbox"/> surprisingly good	<input checked="" type="checkbox"/> o.k.	<input type="checkbox"/> terrible	<input type="checkbox"/>
car needed	<input type="checkbox"/> of no use	<input type="checkbox"/> only for touring	<input type="checkbox"/> a daily must	<input type="checkbox"/>
nightlife	<input checked="" type="checkbox"/> swinging	<input type="checkbox"/> enough	<input type="checkbox"/> dead	<input type="checkbox"/>
action for singles	<input checked="" type="checkbox"/> a paradise	<input type="checkbox"/> if you're a mover	<input type="checkbox"/> bring your own	<input type="checkbox"/>
other divers around	<input type="checkbox"/> all over the place	<input type="checkbox"/> a few	<input type="checkbox"/> hard to find a buddy	<input type="checkbox"/>
locals	<input type="checkbox"/> helpful, friendly	<input type="checkbox"/> no complaints	<input type="checkbox"/> hostile	<input type="checkbox"/>
weather	<input type="checkbox"/> great everyday	<input type="checkbox"/> o.k.	<input type="checkbox"/> many bad days	<input type="checkbox"/>
package deal	<input type="checkbox"/> the best way to go	<input type="checkbox"/> seemed o.k.	<input type="checkbox"/> better off without it	<input type="checkbox"/>

Comments:

Location being evaluated \_\_\_\_\_

Date of your trip \_\_\_\_\_ Hotel \_\_\_\_\_ Dive shop \_\_\_\_\_

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rated for beginners	<input type="checkbox"/> terrific	<input type="checkbox"/> o.k.	<input type="checkbox"/> go elsewhere	
guides for good divers	<input type="checkbox"/> top-rated	<input type="checkbox"/> acceptable	<input type="checkbox"/> lousy	
guides for new divers	<input type="checkbox"/> top-rated	<input type="checkbox"/> acceptable	<input type="checkbox"/> lousy	
diving frequency	<input type="checkbox"/> 3 or more tanks/day	<input type="checkbox"/> 2 tanks per day	<input type="checkbox"/> one per day	
night diving	<input type="checkbox"/> frequent	<input type="checkbox"/> 1-2 times/week	<input type="checkbox"/> none	
boat diving	<input type="checkbox"/> two tanks under \$20	<input type="checkbox"/> \$20-\$30 for two	<input type="checkbox"/> over \$30 for two	
beach diving	<input type="checkbox"/> as good as the boats	<input type="checkbox"/> fair possibilities	<input type="checkbox"/> no way	
dive shop manager	<input type="checkbox"/> a great person	<input type="checkbox"/> just does the job	<input type="checkbox"/> a real bastard	
air quality	<input type="checkbox"/> no problems	<input type="checkbox"/> I wondered	<input type="checkbox"/> I worried	
air fills (check two)	<input type="checkbox"/> 3000 psi	<input type="checkbox"/> 2250 psi	<input type="checkbox"/> short-changed often	
new equipment	<input type="checkbox"/> full range available	<input type="checkbox"/> limited range	<input type="checkbox"/> come fully prepared	
rental gear	<input type="checkbox"/> everything you need	<input type="checkbox"/> tanks, wt. belts . . .	<input type="checkbox"/> bring everything	
repair capability	<input type="checkbox"/> can handle anything	<input type="checkbox"/> some repair capacity	<input type="checkbox"/> pray nothing breaks	
hotel food	<input type="checkbox"/> gourmet	<input type="checkbox"/> surely acceptable	<input type="checkbox"/> ugh	
nearby restaurants	<input type="checkbox"/> must try	<input type="checkbox"/> adequate	<input type="checkbox"/> better off fasting	
luxury accommodations	<input type="checkbox"/> indeed luxury	<input type="checkbox"/> o.k.	<input type="checkbox"/> far below par	
moderate accommodations	<input type="checkbox"/> surprisingly good	<input type="checkbox"/> o.k.	<input type="checkbox"/> terrible	
car needed	<input type="checkbox"/> of no use	<input type="checkbox"/> only for touring	<input type="checkbox"/> a daily must	
nightlife	<input type="checkbox"/> swinging	<input type="checkbox"/> enough	<input type="checkbox"/> dead	
action for singles	<input type="checkbox"/> a paradise	<input type="checkbox"/> if you're a mover	<input type="checkbox"/> bring your own	
other divers around	<input type="checkbox"/> all over the place	<input type="checkbox"/> a few	<input type="checkbox"/> hard to find a buddy	
locals	<input type="checkbox"/> helpful, friendly	<input type="checkbox"/> no complaints	<input type="checkbox"/> hostile	
weather	<input type="checkbox"/> great everyday	<input type="checkbox"/> o.k.	<input type="checkbox"/> many bad days	
package deal	<input type="checkbox"/> the best way to go	<input type="checkbox"/> seemed o.k.	<input type="checkbox"/> better off without it	

Please compare this trip to other resorts you've been to, and add any additional comments:

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• When moving against a current on the bottom, use your hands to hold on to and push and glide along the bottom. You will find it much less tiring than trying to move along only by kicking. If the bottom is sand, a knife stuck in the sand provides better leverage than fingertips to help you move along. Surf, surge and currents require more energy than calm water. Select your dives based on your experience of what you can handle without getting tired.

• If you do find yourself going the wrong way in a current, keep in mind that avoiding fatigue is more important to your safety than making it to your destination. It is much safer to make yourself comfortable on the surface and wait to be rescued than to exhaust yourself in a fruitless struggle to kick upstream.

• Whenever you make a long surface swim, take your tank off your back and hold it beneath you, or push it ahead of you, or ride on it like a surfmat, depending on the buoyancy system you are using. Choose whichever method makes it easiest to breathe and move along. Stop and rest whenever needed.



#### Using your tank as a resting float; a life-saving technique for a fatigued diver

• If you feel out of breath underwater, lie on the bottom face-down, concentrate on breathing normally both in and out, and consciously relax your body until things are back to normal. If you are in deep water and the out-of-breath feeling is not relieved shortly, move slowly to shallow water, 15-20 feet, and rest again.

*Anything that makes your breathing rate increase is a sign of trouble. At the first sign of exertion, stop, rest and recover your normal breathing rate.*

Some of you may be wondering where physical fitness comes into this picture. Can't we deal with fatigue by just staying in good enough shape so that we can just dive any way we want and not get tired? The answer is no.

Sure, it's good to keep in shape. And certainly the better shape you're in, the more you will be able to do without getting tired. But any diver can jeopardize his life by working himself to exhaustion in the water, regardless of his physical condition. Skill, not strength and stamina, is what makes the difference between safe and unsafe.

Whatever your physical capability, the better you become at controlling fatigue, resting and relaxing, the more diving you will be able to do safely and enjoyably.

The author, Jean Gregor, is a pioneer in diving instruction. In the early 1960s she worked with Ed Brawley (now head of the Professional Divers Instructional College in Monterey, California) to develop techniques for training both novices and instructors. Since then, she has been active in instruction and dive-shop management, and she now owns a shop in Northern California. With Richard Gallagher she is co-founder and co-director of NAUTIC INTERNATIONAL, a new certification agency headquartered in San Rafael, California.

*Undercurrent Comments:* Gregor wrote from the perspective of a training professional, asking the diver to evaluate the training he received. Divers ought to use the questions not only to evaluate their training, but also to evaluate their present skills. If you tire easily or you don't feel comfortable employing the techniques Gregor presents, you ought to consider additional training. If you're like most divers, however, you'll consider additional training but do nothing about it. So, consider these suggestions.

• Why not practice in a pool with your best buddy? You may be able to use your dive ship's pool if you select a time during which the pool is not otherwise used.

• Invite a good instructor from your local dive shop to accompany you on your next dive. Ask him to monitor your diving skills and help you improve. You can pick up his expenses for the day—gas, lunch, beer—or offer him a fee which you split among the 2-4 people who go along for the session.

• When you dive, be aware of your own resting skills; monitor your breathing rate, your work rate, your rate of tiring. Learn to slow yourself down. By attending to your own processes and decreasing the energy you waste, you may keep yourself out of unnecessary trouble and increase your bottom time.

# The Scubapro Decompression Meter

## -- Technical Analysis, Political Response.

In the April 1976 issue of *Undercurrent*, we featured a major story on the serious shortcomings in the operation of the Scubapro Decompression Meter (the SOS DCM, manufactured in Italy). We also argued that Scubapro had withheld essential information from the diving public about the meter's limitations and, in fact, made claims about the meter's performance which were false. Since then Scubapro has revised its instructional booklet. We commented on that booklet in the June 1977 *Undercurrent*, and asked for a response from Scubapro President Dick Bonin. We have received that response and have also made a further analysis of the instructional booklet. We present that analysis here.

### The SOS Instructional Manual

The earliest booklet on the DCP that we have seen was written by SOS, probably in the early 1960s. It claimed: "For a single dive or multiple dives, where the first decompressing level is no greater than 50 feet, the Automatic D.C.P. is infallible." Though this was evidently a manufacturer's exaggeration, it was then maintained that "realistically . . . the range of the Automatic D.C.P. will extend far beyond the usual scuba diver's depth time possibilities." The implication was clearly that as long as the needle pointed somewhere within the dial's markings, the DCP was providing an adequate indication of the diver's decompression status, no matter what his depth or bottom time.

The lack of any reasonable limitation on the DCP was apparent in Scubapro's instruction booklets as late as 1973: "You will note that the DCP is calibrated for decompression depths up to 50 feet. The 50 foot decompression range is adequate far beyond the normal time/depth possibilities of the scuba diver." And this was justified by reason that: "The DCP functions by mechanically duplicating the physiological phenomenon taking place in the body of the diver." Since the physiological phenomenon is still not well understood, nor even generally agreed upon by decompression scientists, this claim was without foundation and, in fact, ridiculous.

Later in 1973, Scubapro issued a new booklet which was, to our knowledge, the first acknowledgement of any reasonable limitation on the use of the DCP. A sentence was simply included in the text: "For maximum safety, on dives in excess of 150 feet, divers should decompress for a minimum of five minutes at ten feet even though the meter may not indicate that decompression is necessary." Apparently this restriction was based on the research<sup>1</sup> of a pair of physiologist-engineers who, since their first testing and evaluation of the DCP for the Scripps Institution of Oceanography, had been in quiet communication with Scubapro's engineering department.

The rule to take "5 at 10 when deeper than 150" was akin to Farallon's decomputer instruction to take "5 at 10 if in the red." Such inflexible procedures have always seemed to us contrary to the purpose of a decompression meter, i.e., providing a continuous monitoring of a variable-depth dive so as to minimize decompression requirements. Might sport divers be able to avoid the cost of a meter by always taking 5 at 10? In fact, many researchers now claim that a deeper safety stop, say at 15 or 20 feet, would be more effective, even if it were for a shorter time, than one at 10 feet.<sup>2</sup>

In addition, the second 1973 booklet had a graph illustrating "Recommended No-Decompression Limits" with a curve approximating the USN limits. But it was not made clear how this curve was to be used in conjunction with the DCP. As we reported in the April 1976 issue of *Undercurrent*, for a 150-foot dive the DCP would still give three times the bottom time allowed by the current USN limit, i.e., 15 minutes vs. 5 minutes.

Today, in the 1977 booklet revision, some operating limitations of the DCP are clearly stated. The 5-at-10 rule is now to be applied on all dives deeper than 100 feet, instead of 150, and the DCP's use is restricted to depths shallower than 130 feet. The reason for these limitations is, however, not made clear. This is unfortunate since such limitations would seem to concern a diver in just exactly the situations in which he might want to use a metered schedule. Certainly it is not well established that deep, single bounce dives on the meter are hazardous.<sup>3</sup> In fact, the DCP appears to give single-dive no-decompression limits which are about midway between those listed in the U.S. Navy Manual and those which were empirically determined by the Italian researcher, Albano. These latter limits were established in 1962 from measured exposures which are often considered to be the most comprehensive set of experimental no-decompression dives studied to date. This experiment involved over 1,000 submersions at an exercise level as carefully controlled as is pertinent to a scuba diver cruising at depth, and the submersions were actually performed in the ocean by free-swimming divers.

### Repetitive Dive Problems

The only incident we could find reported in the medical literature of decompression involving a schedule metered by the DCP occurred after a repetitive dive.<sup>4</sup> Further, all cases of decompression sickness on which one expert has consulted regarding the involvement of a DCP have occurred only on repetitive dives. Yet it is in the problem area of repetitive dives that Scubapro's new booklet has a conspicuous lack of information or any description of limitations or restrictions.

The extensive repetitive-dive test of the DCP reported by the Royal Australian Navy (RAN) showed that the total decompression time given by the meter consistently fell short of the total given in both the USN and RAN tables, while "much more serious" was the fact that 1st, 2nd, and 3rd stops recommended in the tables for a repetitive dive were often skipped by the DCP.<sup>5</sup> Even though in these tests the total decompression time given by the DCP on deep single dives was comparable with that in both tables, it was clearly indicated that: "With the combined dives the results showed that all the meters gave inadequate decompression compared to both R.A.N. and U.S.N. tables." This was the major conclusion of the Royal Australian Navy study which mainly involved dive schedules that require staged decompression.

No-decompression repetitive diving should be of more concern to the sport diver, so we review here some pertinent test results that have been reported in the literature, and present these with the USN requirements and new Royal Naval Physiological Laboratory/British Sub-Aqua Club recommendations. After an initial dive of 55 minutes to 60 feet, a longer surface interval time allows more no-decompression time on a second dive to 60 feet:

Surface Interval After 60/55 Dive (minutes)	2nd Dive No-Decompression Limit (minutes)		
	DCP	USN	RNPL/BSAC
29	18	5	2
45	27	8	2
75	35	16	2
120	40	24	29
165	47	36	29
239	49	43	43

Note that, as now required by Scubapro in the 1977 booklet, total bottom times reported above are less than two hours and the repetitive dive was conducted within six hours of the start of the initial dive. Yet the DCP here provides no-decompression bottom times on a shallow, repetitive dive that are well in excess of those allowed by tables.

*Consideration of this repetitive-dive problem by Scubapro should certainly be expected by diving consumers, if not outrightly demanded by safety-conscious diving instructors and organizations.*

Repetitive-dive analysis is a complex subject, avoided by many researchers in the field. Full appreciation of the pitfalls and hazards of such an analysis requires detailed knowledge of the physio-mathematical aspects of decompression. U.C.L.A.'s Dr. Glen Egstrom consulted with Scubapro in the preparation of the manual, but the consultation may have been more a cautionary effort than a substantively fruitful one. It does not appear to have resulted yet in a good approach to the repetitive-dive problem. And since so many, if not most, divers who

use the DCP use it often as a repetitive no-decompression indicator, this matter should not be left unresolved. How hazardous is the DCP on repetitive dives?

#### Other Omissions:

Consider leaving the DCP in the hot sun during a surface interval. It has been suggested (remember Charles' Law?) that heat will increase the pressure in the internal chamber and so drive gas out into the bag at a faster-than-normal rate. Upon re-entering the cooler water, the lowered initial pressure will provide even longer repetitive bottom times than those listed above. However, the Royal Australian Navy study reported that meters took an average of only 4 hours and 30 minutes to return to zero from the lower end of the 10-foot stop mark, with little difference in a 20 degree C or a 30 degree C environment. Certainly further consideration of temperature effects are needed, as well as of the much shorter equilibration time reported—25 percent faster than Scubapro's claim of six hours.

An omission from the 1977 booklet which was contained in all previous versions is the procedure for checking the calibration of a DCP, e.g., with the "30/30 System." A dive to 30 meters for 28 minutes, followed by a 2-minute ascent should, it had previously been stated, put the needle in the 0-30 minute area. Why such a description of the calibration procedure has now been omitted is entirely unclear to us, and does appear to leave the diver with less information than he was given in earlier versions of the booklet.

The 1977 booklet does give a better description of the meter's theory of operation. A critical engineer might prefer the term "permeability" as more appropriate than "porosity" when discussing Darcy's law, or point out that the gas flow is also dependent upon the internal-chamber volume and gas viscosity. A 5-minute, rather than a 10-minute, half-time governs the USN tables at depths greater than 110 feet, and differing half-times of the DCP have been reported by investigators, with some showing a less marked decrease with depth.

#### Footnotes

1. "The Decompression Meters—Another Look," by Red Howard and Kurt Schmitt, presented at NAUI's IQs, and published in PADI's *Undersea Journal*, Vol. 8, No. 3, 1975, p. 9.
2. For example, "Gas Phase Separation During Decompression in Man: Ultrasound Monitoring," by Tom Neuman, Dave Hall and Paul Lingweaver, in *Undersea Biomedical Research*, Vol. 3, No. 2, 1976, p. 121.
3. "The Single Pneumatic Resistor Decompression Meter and Albano's Theory of Decompression," by Red Howard, in *Marine Technology Society Journal*, Vol. 11, No. 4, Sept. 1977, p. 5.

4. "Theory and Evaluation of the Single Pneumatic Resistor Decompression Computer," by Red Howard, Hugh Bradner and Kurt Schmitt, in *Medical and Biological Engineering*, Vol. 14, No. 5, Sept. 1976, p. 570.

5. *Evaluation of the Automatic Decompression Meter* by Dave Quick, Project 2/74 of the Royal Australian Navy School of Underwater Medicine, 1974.

\* \* \* \*

In the June 1977 issue of *Undercurrent*, we ran a commentary on the revision of Scubapro's instructional booklet for the SOS meter. The aim of the piece can be summarized by this quote from that article:

"Indeed, Scubapro has improved the facts on the meter in the latest version of the manual. Yet, by omission, the manual is still misleading. It is still incomplete. It is still deceptive."

Scubapro President Dick Bonin responded with this letter, a copy of which he sent to Gibson, Dunn and Crutcher, a prestigious Los Angeles law firm.

Scubapro is deeply concerned with the safety and well-being of divers, and constantly strives to re-evaluate and improve its product. Your suggestion concerning a dissemination of information regarding the Decompression Meter will be considered and evaluated by the company. You may be assured that the company will take all steps which may be appropriate with respect to this product, including communication through Skin Diver Magazine and instructional organizations.

With the foregoing in mind, the company strongly objects to your article concerning the Scubapro Decompression Meter. Statements such as 'Scubapro fiddles while divers bend,' 'the manual is misleading . . . incomplete,' and 'the dance of deception' are unfair, misleading, and damaging to the company. In addition, the implications of your article, that Scubapro is callous toward divers and is intentionally misleading the public, are wholly untrue and without any foundation.

Bonin's letter is a political response not unlike that which citizens get from politicians who don't care to address the facts of the article. That meter has been on the market, with no significant changes, since the early 1960s. Since the early 1970s, Scubapro has been prodded by experts, questioned by users, and criticized by *Undercurrent*. We consider their response, i.e., their lack of response, to be inappropriate, to be unprofessional, and to be unsafe.

The operation manual provided for meter users is inadequate and, if divers rely solely on that manual when using the meter, there is a greater than necessary chance they can get themselves into trouble. For all its rhetoric, Scubapro has failed, in our

estimation, to live up to ethical business and safety standards.

In the April 1976 and June 1977 issues, we detailed very specific examples of where the discrepancies of the meter are not adequately described in the instruction pamphlet. The above article is a further delineation of those problems. Scubapro has never once responded to the facts of the discrepancies, but rather responds by calling *Undercurrent* "unfair." We presume we're unfair because we have reported facts that Scubapro had previously been able to keep to themselves. Scubapro believes we're unfair to them, but we prefer to think we're fair to the unwary users of the meter.

We also outlined an advertising campaign we thought essential to get the word out to the diving community. Bonin responded by "considering" and "evaluating" our suggestions. Since that letter from Bonin, Scubapro has remained silent.

Scubapro has a leading reputation among divers as a "quality" manufacturer, and *Undercurrent* has touted several Scubapro products, including the Pilot Regulator and the Stabilizing Vest. Yet the Scubapro hierarchy clings to the myths of their meter and the inadequacy of their manual in the face of facts they refuse to refute—because they cannot. Instead, they "consider" our suggestions and call our statements "untrue." So, Mr. Bonin, just how are they untrue? When you are able to refute our facts, we will correct ourselves and apologize in bold-face type.

Yet the diving community itself must share guilt with Scubapro. Why the silence from NAUI, PADI, NASDS, and YMCA? Why do other publications simply avoid discussing the meter? Why do books on training continue to print malarkey from Scubapro's claims without undertaking their own tests? Why do instructors continue to teach about it and dive shops continue to sell it, without demanding from the company either changes in the meter or changes in the information it provides about the meter? The Scubapro SOS decompression meter thrives in a community of false concern, in a community more interested in a good dive than in rocking the boat, in a community of bedfellows too closely knit to criticize itself.

*Undercurrent* has no ax to grind, no commission to lose, no friends to offend. We simply represent the individual sport diver, his safety, pleasure and well-being. Some days, however, it gets awfully lonely when we realize we have the only typewriter willing to pound out a simple truth about a piece of diving equipment.

So, have a good night's sleep my friends, and don't let the moans from the recompression chamber wake you.

Correspondents located strategically in the major diving areas of the world as well as on all coasts and major inland waters of the continental United States.

The editors welcome comments, suggestions and manuscripts from the readers of *Undercurrent*.

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