

Anse Chastenet, St. Lucia, W.I.

-- Great Beauty, And A Touch Of Boredom

I must apologize. This issue is later leaving the dock than a Mexican dive boat. Just before the December 1 deadline, my writer on assignment called. He had reached his destination, but he had not dived. Somewhere in paradise he had fallen desperately ill. There could be no story. I had to pull myself together and tackle the task, but I would be unable to leave until well past the deadline.

My destination would be the Anse Chastenet, that St. Lucian retreat which has received quite a bit of print coverage since its conversion from a quiet lovers' retreat to a 37 unit hotel/time share resort emphasizing diving. It was not my first visit. I dived the beachfront in 1977 when the nearest compressor was 15 miles away. In our October, 1977 issue I wrote:

"The virgin reef I saw in St. Lucia thrilled me. . . My excitement was shared by other touring divers who could only shake their heads in wonderment and say to their guide, 'Are you aware of what you have here?'. . . Fish life was varied and abundant. . . Just as fascinating was the reef itself. . . It was as virgin as anywhere. . . If I return in ten years I suspect that the reef I have known but a day will be unrecognizable. Even the most cautious diver will have damaged the reef, unintentionally, to be sure. . . Someday, someone will surely turn the 18 room Anse Chastenet into a diver's hotel, probably after reading this article. The unspoiled reef will become accessible to all of us, so make your trip as soon as it opens."

Is the reef as beautiful now?
Were my predictions too pessimistic?
What about the hotel? The stories and advertising are quite alluring. Is it for real?

I arrived in mid-December at the Hewanorra Airport, 18 winding and picturesque miles, an hour's drive from the hotel. Although my prepaid hotel voucher said a taxi would be there to greet me, none was standing by. I was not amused

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by the prospect of a \$30 cab ride, but I had no option. Since my six-night stay was to include one, not two airport transfers (the ad I read said round trip transfers, but in the high season they're not part of the deal), I requested a free return when I arrived at the hotel. Rachael Pietruszka, wife of manager Peter, at first resisted my request, saying they had sent a driver and since my stay would extend into high season they couldn't provide the transfer. I gently protested and she acknowledged there must have been a screw up (I learned later the cab driver had gone to the wrong airport) and then agreed to my request. Her resistance is barely worth noting. I mention it only because I found a certain reticence on the part of most hotel and dive shop staff to volunteer much information or assistance. I had to ask for it. Once I did, everyone was quite helpful. I got by just fine, but the way this hotel tries to position itself in the market, I expect more.

Perhaps the most favorite topic among the guests is the climb from the beach to the reception and dining areas and then on to the rooms, for me a total of 415 uphill steps. My introduction came quickly. One staff person came to carry my five bags up the hill. I had no idea where I was going so to expedite things I carried two he couldn't handle. Damn near killed myself. I should have asked for help. Then I carried my dive bag down to the dive shop. Later I read an article that said someone would do that for me. At the time I didn't think to ask.

My spacious deluxe room, with two comfortable couches, was incredible. One side was to a sea view, unscreened, unshuttered and unable to be closed off to the lush foliage and open air. Tiny birds flew in and out at will. The queen sized bed was surrounded with a conical mosquito net providing ample bug protection. The shower had no ceiling at all, permitting me on more than one occasion to shower simultaneously in hot water and a tropical rainstorm. But I had to step with care. Tiny toads hopped the eight foot wall to wallow in the water. My partner mooshed one in her bare feet. To me, the wildlife made the room most charming (found an unusual bug which was the spittin' image of a leaf!) I had deluxe quarters; the standard rooms in octagonal shaped buildings too have marvelous views and seemed quite comfortable.

I schlepped downhill to the dive operation, where I met Karen Brown, who with her husband Wayne, has been managing the hotel-owned business for a couple of years. They have an impressive beachside plant. Two big compressors to keep their aluminum 3000's filled. A couple of dozen lockers big enough to store a dive-bag and camera gear. A big fresh water wash tank. A good stock of rental gear, including wet suits at \$5/day (Fathom has a plant on the island, ensuring stock and repairs). A sizeable tri-hulled, flat topped dive boat, comfortable for 12 to 16 divers (but the ladder has hard and painful edges, particularly if you climb up fully weighted down; no one suggests you take your weights and tank off before you climb; you have to figure it out yourself). And a couple of smaller boats for back-up. I signed a release form, flashed my C-card, as requested, and took over a locker. Karen then took me on the first dive, which they require to be from the beach. She asked for no formal demonstration of skills.

So, here I was. Back on the reef I visited eight years ago. Yes, it proved

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to be as beautiful as I remembered it. Karen led the dive, pointing out a basket star here, a scorpion fish there, and not far from shore a couple of sea horses lashed to the coral. Great touches! But the highlight of St. Lucia diving is the alive, colorful and unique reef. It's base is healthy hard corals, including sheet coral, star coral and magnificent heads of brain coral. Soft corals and sponges provide blazing reds and yellows and blues and greens and oranges throughout the dive. This is what a coral reef should look like. After consulting my log book, the only change I noted was that years ago large patches of the reef were carpeted with the colonial anemone. It is still present, but apparently not as abundant. With the iridescent sponges, feeding hard corals, red and yellow boring sponges and plenty of tropical fish, I barely missed them.

This is aquarium diving, which means aquarium fish, nearly all of which are aquarium-sized. After moving through a school of sergeant majors, which swarm to be fed immediately upon the entry of divers, (because Karen often brings bread) we moved onto the reef, never dropping deeper than 50 feet. The fish are quite typical. Yellow tail snapper appear nearly everywhere. Damsel fish protect their algae farms. Trumpet fish balance on their noses. Every hundred feet or so a school of brown chromis seems to appear. A few parrotfish nibbled on the reefs, which hide small puffers, banded coral shrimp, juvenile angels, plenty of redeyes, cowfish and -- well, I could list most of the commoners but I'll save my breath. There was barely a fish over a foot long, but there were surely thousands of others. We slipped back into a cave, which becomes barren immediately, and at the end stood to breathe from a fresh air pocket. Then back out to the virgin reef. This rates among the best, most beautiful, easy beach dives in the Caribbean. I can't imagine better.

After the dive I signed my name on the blackboard for the next day's boat dives: one tank at 9 AM, a second at 2 PM. The first dive would be the Piton Wall. A spectacular site, the Pitons, twin peaks, rise from the ocean to nearly half a mile in the sky. I speculated years ago that this might be the ultimate Caribbean dive. I would now find out. A single tank had been put aboard for each diver, and after toting my gear 60 feet and hopping aboard that flattop, which comes to the beach like a landing craft, we traveled 15 minutes to the Piton Wall, gearing up on the way like warriors preparing for battle. The dive master, Charles Richards, a St. Lucian with his PADI instructor certification, told us the dive would be at 60 feet for 60 minutes, disappointing for a wall dive but I went along with the program.

I dropped to 30 feet, noting the bottom was not as splendid as off the beach, but as I approached the wall the beauty returned. Here were many large basket sponges, tube sponges and soft corals. At 60 feet deep water gorgonia sprung from the wall, along with wire coral. Again, schools of brown chromis appeared everywhere. A swarm of blue surgeon dropped down upon me, seemingly unaware of this human in their presence. A single mackerel swam past. Below, a large puffer emerged from its hole. I gently lifted a yellow crinoid from inside a hard sponge; in another sponge I found a basket star so tightly wound it was barely identifiable. I crossed to barren areas, more than sixty feet across, where no doubt a slide had come down the mountain and wiped out the size of the reef. Yes, a fine dive, but sizable critters were obviously absent.

But one sizeable critter roamed the shore. An African elephant lives freely on the coconut plantation between the peaks, a wild pet of the owner. Our boat pulled to the beach and the beast marched right up and consumed a box of bananas Wayne had placed aboard. It was great fun.

The afternoon dive at Fairyland, a shortways around the point from the A.C., proved a beautiful shallow dive. The site was well named. A large crab had wedged

itself into a hard sponge. A single barracuda came in for a peek. I tweaked the tail of a scorpion fish. Two french angels passed. Under a coral head a spotted drum weaved back and forth, flashing its lengthy dorsal. My buddy ran out of air, so I continued alone at 30 feet, away from the group, in utter peace. I came upon a school of a hundred or so Southern Sennet, a member of the barracuda family, but no longer than 18 inches. These fish remain perfectly parallel forming an imposing squadron.

On this dive, as all dives, we were instructed to move along the reef. The boat moves ahead and when the dive is concluded a signal from the water brings the craft in short order. Mild currents came and went throughout each dive. I generally found myself rolling with the current, but on occasion I would struggle for a couple of minutes to move forward. Charles was my leader each trip. Maximum depth assigned was always 60 or 70 feet, but divers were free to leave the group.

After a couple of days of this diving I began to get restless. And I noted that other divers skipped either one morning or one afternoon trip. There was a certain sameness to each dive (in fact, many sites were repeated) and I wished for something more. At the base of the Pitons I had hoped for excitement. I didn't get it at sixty feet below. Some people get it above.

They come to climb the Pitons and guides are available through the hotel. Apparently one need not be a seasoned climber, but to my eye only a fool or a mountain goat would ascend these miniature Matterhorns. I decided on other options to break up the day. I took a boat ride to Castries, the capital, to visit the bustling Farmer's Market, have a drink at Rain (a fine restaurant surely out of a Somerset Maugham story), and get into the hubbub of this busy little city. (The hotel charges \$15 for the boat trip, but on my trip used one leg to fill up their craft with a load of pipe, letting us tourists pay the freight for their work boat.)

One morning I toured the dormant volcano (a separate charge if not on a package) and sat in a mineral bath for a few minutes. Another afternoon my partner and I walked the tough mile to the quaint town of Soufriere.

Divers I spoke with didn't use all the dives in their prepaid package. The problem lies in having but a single tank in the morning and a single tank in the afternoon. If you want to do any touring at all, you can only get one tank a day in. That's too few for a hotel that claims to be a "dive resort."

I might note that one need not prepay dive packages. Since there is no refund for missed dives, one may wait until he is at the hotel to work out a deal that seems suitable.

The same goes for the MAP, which is \$28 for full breakfast and dinner. I eat a light breakfast and found that the full course meals provided too much food (a plus for most vacationers). I saved a few bucks by paying as I went, and it gave me the option to eat at local restaurants. The A.C. offered a superb weekly creole buffet, featuring local vegetables such as christophene, dasheen and breadfruit, along with several tasty meat and fish dishes. Sit down dinners were less spectacular; one night the fish was excellent, the duck miserable. Soup, salads

ANSE CHASTENET, ST. LUCIA, W.I.

Star Chart:

Diving for Experienced Divers	★ ★ ★ ★
Diving for Macrophotographers	★ ★ ★ ★ ★
Diving for Beginners	★ ★ ★ ★ ★
Beach and Boat snorkeling	★ ★ ★ ★
Hotel	★ ★ ★ ★ ½
Hotel Food	★ ★ ★ ½
Moneysworth	★ ★ ★ ★

★ poor, ★★ fair, ★★★ average, ★★★★ good, ★★★★★ excellent

"I Think You Do Divers A Misservice"

Dear *Undercurrent*:

I read "Travel Reports from our Readers -- the decline of pleasure" very carefully. It frankly illustrates better than a thousand advertisements the value of a dive travel specialist such as See and Sea Travel.

We stand between the diver and the destination operator to assure the diver a quality trip. We can advise the diver about alternatives he or she may not have considered. And we stand behind the dive programs we offer.

I often think you do divers a disservice by encouraging them to book directly with a destination rather than consult a specialist. In areas such as Australia and Micronesia, we have saved divers from horror stories with our knowledge. In a way, See and Sea is a zero cost "insurance policy" to guarantee a first class, reliable dive vacation."

*Carl Roessler
See and Sea Travel*

Dear Carl:

Over the years, letters and reports from our readers have indicated that See and Sea has an excellent record in serving its clientele. In fact, most major tour operators do and I have no doubt that a diver has a much better chance of having a trip without hitches if he joins a reputable tour operator -- especially when journeying to far away and remote destinations.

At the same time, the tour operator is a middle man who must charge a fee for his service. He earns it if the tour runs properly. But not everyone wants to join an organized tour and many others can't afford the middle man. So, they "pay their money and take their chances." If things go right, and they usually do, they save hundreds of dollars over the more expensive tours. When things go wrong, they complain to us.

Undercurrent doesn't encourage divers to

book directly with destinations, as you believe. It's our job to provide alternative sources of information so divers can make their own choices as whether to join up with a tour operator or to go it alone. However, if providing a phone number of a dive destination or a charter boat directly (instead of the tour operators number) is "encouragement," than I suppose we are guilty.

Now, let me toss one your way. First, I am aware of many situations where something has gone wrong on a trip and See and Sea has provided refunds and otherwise compensated divers. Your agency has an excellent record, according to readers who write us. But, let's talk about your phrase "zero-cost insurance policy." First, one way or the other the diver who joins a See and Sea tour pays some percentage of your markup. That's legitimate, but it's not zero cost. Second, let us take the case of the diving physician from Mill Valley, California who had advanced you something like \$4000 for a trip several months ago, then injured himself several weeks before the departure date and was unable to attend. See and Sea would not refund the money, explaining that he needed travel insurance to be able to claim a refund. (His position was that the travel insurance form was not included in the package that your agency sent to him, but your staff claimed it was.) No matter what agency one deals with, one can find himself out of pocket for a princely sum unless he has travel insurance.

Now I must add that you agreed to let him apply that sum to another trip whenever he desired. That's more than many others might offer. But that doesn't seem like "zero cost insurance" to me. Certainly some agencies might not be as generous as See and Sea, but an old proverb is still called to mind: "there's no such thing as a free lunch," even at See and Sea Travel.

*With due respect,
Ben Davison*

and vegetables quite suitable. Desserts were uniformly poor. In town, the Hummingbird rates very well and the setting is sexy. Fish creole and fish curry were delicious. Local vegetables were professionally prepared. And lobster-sized fresh water crayfish, a three tail dinner for \$18, was an experience. The downside is that it's a \$13 cab ride for two. But you must eat here once (you can get one night off on the MAP if you ask) and you ought to try other restaurants such as the Still or the breathtaking Dasheen or local places such as La Creole or

Charlo's (dinners for two less than \$20, with beer). Call ahead to be sure they're open. Decent lunches are served at the A.C. beachside, but the help here (and at breakfast) acted distant and removed. No big deal, but ask for what you want. When I was direct, I always got satisfactory service.

Overall, I must give the A.C. high marks, especially for its unique and romantic setting, surely one of the Caribbean's classic spots. But it deserves an unusually critical eye because of the way it positions itself in the market through advertising and editorials. For the diving world, the hotel proper is a very good hotel. But there are many better Caribbean hotels for nondivers and we divers need some luxury spots. The criticisms I offer are not meant to chase divers away, for those whose needs are matched with what the A.C. has to offer will indeed have a memorable stay. But I do wish to suggest improvements.

Of course, the A.C. can't improve upon that long upward hike from the beach to the hotel and the rooms (at best someday golf carts will be added), although some new units are being constructed on the beach. The hillside configuration has sociological impact which management can do something about. Each day people load their beach bags in the morning and don't return to the rooms until day's end, just as if they lived in Brooklyn and went to Coney Island. They then stay in their rooms until dinner time. I enjoy a diver's hotel where divers get together to talk about their day; here, I found, that most divers kept a friendly distance from one another and I think it's all due to the hotel layout. Hotel and dive shop management can do something to open the social contacts between their guests. Introducing people at the dive shop to integrate the newcomers or holding a manager's cocktail party once or twice a week to integrate divers and nondivers are a couple of possibilities.

Now, who should go to this beautiful and romantic hotel, set on a wonderful beach, with a great reef at its doorstep and a beautiful sameness to each dive? It must be the diving connoisseur, one who appreciates undersea life to such a degree that he can make very similar dives day in and day out and not tire. Visibility is not great (40-70 feet on these dives, which is not atypical), but for the macrophotographer there is such a wealth of subjects, he could easily work the reef out front for a week (and Wayne Brown can develop your Ektachrome in his darkroom to let you know just how well you're doing). There are plenty of unusual critters here. Snorkeling on the right side of the hotel beach, my partner spotted an unusual flying gurnard; I picked up a gold spotted snake eel and let it slip through my fingers a few times; sea horses reside in front; turtles show up in the summer; a first rate night dive (offered twice a week) right off the beach provided marching crabs and lobsters, parrotfish in cocoons, touchable trumpets, plenty of basket stars, a couple of squid and the very living reef. Yet, unless one has a good eye, one might not see many of these. Karen and Wayne can find them for you, but they only led beach dives during my stay. From the boat, Charles wasn't much of a help. When asked what to look for on one dive he replied: "Coral and fish." He did find a yellow frogfish on that dive, but few divers in the group saw it. When it comes to unique creatures, even the experienced diver needs the trained eye of Wayne or Karen to point out the possibilities.

Who else should go? It's a great place for inexperienced divers. I can think of no better place. Honeymooners, middle aged couples and people who want easy diving, a lot of beach time and interesting side tours will love the A.C. Singles will suffer, unless part of a touring group. Snorkelers will be pleased. Thrill seekers will be disappointed.

Yes, it's a grand place, but don't get caught, like I did, expecting the service of, say the Four Seasons. This is the Caribbean. Ask for help to tote your bag. When ice is not placed in the room (they missed three out of six nights),

ask for it. Bring your own alarm to wake up (upon departure the wake up man was 45 minutes late). If you want to alter your meal plan or get credit to eat elsewhere, ask for it. If a tour falls through because of lack of attendance negotiate for other arrangements. If you want to go without a guide off the beach, ask for it. If you want to go deeper than the divemaster says, ask for it (or slip away from the group, but watch those tables since it's expensive to be sent to a chamber in Barbados). If you want to rent a camera, ask for it. If you want to see unique fish, ask. And, don't worry about the reef spoiling. Wayne and Karen protect it well. If you can't make it this year, it will be there next year and for years to come.

Divers Compass: Package rates, with the 10% service charge and 8% tax, are: winter, per week \$553/person, double occupancy; with breakfast and dinner, \$751/person; with the ten dive package and meals, \$905/person; at Christmas its \$100 more, in the summer \$150 less. . . For reservations: Go Diving (800/328-5285); in Canada, CAIRS (416/960-0170; collect calls accepted); or call the Anse Chastenet directly (809/454-7534 or 35). . . the hotel has a 4-5% surcharge if you pay by credit card, so bring travelers checks. . . readers have reported some illness while in St. Lucia; my partner got sick, but it could have been for reasons unrelated to the hotel; bring Lomotil or Pepto Bismol just in case. . . in December water temperature ran 78°F. . . Tennis courts were popular before the sun rose too high in the sky.

The Diver Of The Future: Part II

-- Equipment For The Year 2000

This is the second of a two part article by Ralph Osterhout, the President of Tekna Manufacturing Company. The first part appeared in the previous issue:

★ ★ ★ ★ ★

Gauges

The micro-electronic revolution is about to descend on the sport diving industry. Tiny digital dive timers, powered by 4-bit mono-chip micro-computers are paving the way for sophisticated highly integrated 8-bit micro-computer driven instruments that reliably manage the inputs from multiple sensors such as high and low pressure transducers and thermistors. The result will be digitally displayed information that is instantly recognizable by its pictograph shapes. For example:

Tank pressure will be read out in actual psi. It will also be displayed in the form of a scuba tank with the level dropping as one consumes air. Remaining air time will be computed for breathing rate and pressure drop and digitally displayed in a window next to an hour glass.

Breaths per minute will be displayed next to a pictograph of lungs that "fill and empty" with each breath.

Decompression status will be read out in the form of remaining no decom time, not only in minutes but also in the manner of a human form that "fills up" with nitrogen as one approaches their no decompression time limit.

Ultimately, well-designed displays should allow the diver to glance at the tank and see that it is not empty, and glance at the body and see that it is not full. The balance of the information is more technical support data for decision making beyond "Am I OK?" As an example: The no decom time and remaining air time numbers tell the diver he should perhaps ascend to shallower depths in order to increase his bottom time and lower his air consumption.

Clearly, useful decompression computers will have to be based on the multi-level dive concept where decompression status is based on actual time at actual depth. This will safely allow the diver more no-decompression time in multi-level dives, but provide no advantage in staged dives, based on, say, the U.S. Navy tables. However, if a diver gets into decompression, he will be penalized as though he were stage diving. Clearly, the efficiency comes in staying within the computer's no-decom limits, which will use tissue saturation ratios more conservative than the old U.S. Navy's. In fact, the U.S. Navy is in the process of recalculating the air tables, decreasing the allowable saturation levels, especially in the slower half-time tissues.

"These new generation computers will store the 'last 100 dives' allowing them to be recalled and reconstructed on an IBM PC interface unit."

These new generation computers will store the "last 100 dives" allowing them to be recalled and reconstructed on an IBM PC interface unit. At any world-wide decompression site one would simply plug a tiny connector into an access port of the instrument for a readout.

Lights

Lightweight, corrosion-proof and virtually indestructible structural resins have totally displaced metal for external housings. Small, molded lights, once sold as emergency or "back up" lights for divers, now perform as primary dive lights, due to higher capacity batteries, more efficient bulbs and improved reflector designs.

Injecting a dense gas, such as argon, into a bulb envelope draws heat away from the filament, allowing the lamp to radiate at a higher, whiter color temperature. Still greater efficiency is achieved with krypton. The ultimate choice is the rarest and most expensive of the inert gases, xenon, which typically produces three times as much brightness as vacuum lamps.

Lithium batteries will be more common, offering greater capacity, long shelf life and efficient operation in extreme temperatures. Ultimately, rechargeable lithium cells will provide energy densities of up to 350 watts per pound, capable of producing three times the brightness of alkaline or nicad systems, and with run times of five hours between charges.

Finally, we may witness lights incorporating tiny integrated circuits coupled to an externally visible LCD pictographic display. This "senior circuit" constantly monitors and displays the lights relative charge allowing the user to conveniently determine when to recharge the batteries before he ever runs out of light.

The Future Diver

Now, with these small paint drops of coming technology on your brush, let's race our minds forward to that world of dream and possibility we might call "what could happen," and paint a landscape that might be like this:

Before beginning your dive flight, you check your equipment and your partner's. Placing your magnetic encoding module against your instrument console, you enter your three digit code, so as to be able to "communicate" with each other undersea. Just before you jump from the boat, you each set

your Automatic Depth Control Monitor (ADCM) to 45 feet. As you slip beneath the waves, you sink comfortably, automatically at 75 ft. per minute until smoothly stopping with flawless buoyancy trim in virtual suspension at 45 feet. Beneath the boat a silent transponder sends an encoded signal for your navigational fix on return. You press a button on the side of your mask and the snorkel disappears into itself.

As you turn to your partner and call out his name, your vox-activated transceiver delivers your voice clearly and crisply through the water through a pulse-coded modulation scheme, immune to background noise. As you look towards your desired direction of travel, you softly say "display" and the display of your Digital Total Dive Computer appears in "infinity" out through your mask as the digitised information from the computer has been fed through an optical character generator and down a fiber optic link which projects the "image" through a selfoc lens at the transfective mirror and onto the surface of your cornea. Wherever you look, the image follows -- for 15 seconds.

Pressing the button on the aft of your tiny diver vehicle, your retractable cruise seat deploys to comfortably position you for your five mile "flight" over the reefs. As you bank over reefs and sandy bottoms, you are periodically "updated" from tiny transponders buried undersea as to your locale and the immediate things of interest by soft, synthesized voice which disappears as you fly on.

Stopping at hemispherical way stations anchored at 35 feet, you duck your head up into the "pocket" of fresh air driven constantly into it by its floating surface action pump. Reaching up, you unsnap your contoured flat food cannister and press its pressure compensating valve to allow access to its rewards before continuing your journey. With your distilled water injection regulator, you never feel thirsty as it automatically replenishes your body with the fluid lost through osmotic pressure.

"Noticing a deep reef, you head down to ink blue water. As ambient light drops, your 'Auto-sensing' Xenon mask light turns on, 'correcting' the flora and fauna colors."

Noticing a deep reef, you head down to ink blue water. As ambient light drops, your "Auto-sensing" Xenon mask light turns on, "correcting" the flora and fauna colors. Sensing it's time to return, you say "display partner" and your Heads Up Display (HUD) reveals he too needs to return according to your No Decompression Time Status. Slowly you spin in a circle, until your HUD indicates the exact heading home and your Estimated Time of Arrival (ETA).

As you surface at the boat, 28 minutes later, you are comforted by the thought that the highlights of your journey were captured by your two cubic inch mask mounted, low light, charge injected camera, which stored the images in its magnetic bubble memory for playback later. On board, you press a tiny printer module against the Total Dive Computer, for a graphic reconstruction of your "Dive Profile" in 90 seconds.

Impossible you say? Or worse -- unneeded!

Depth Gauge Inaccuracy

-- It Should Mean Big Business For Dive Stores

It is conceivable that the biggest contributor to decompression sickness among sport divers are inaccurate depth gauges.

To get a clear grasp of the problem, let us quickly review three studies on depth gauges, which we published in 1982.

Temple University Study: Tested the gauges of six manufacturers. Some gauges were ten years old. Most gauges were ± 3 feet in accuracy and most of those that had larger errors erred on the "safe side," that it showed the depth to be deeper than the true depth. Only one gauge in 30 tested had a major error on the dangerous side.

British Sub Aqua Club Study: Tested 610 gauges, of which 109 were less than one year old. The rest were older. The results: 8% gave readouts deeper than 6.6 feet of the actual depth, and 32% gave the depth by 6.6 feet on the shallow side -- "dangerously shallow" according to Mike Todd Chairman of the BSAC. Todd also wrote: "the greatest worry has got to be that 23% of the new gauges were reading dangerously shallow."

U.S. Navy: Tested new gauges. The accuracy of a vast majority was ± 5 feet from 0 to 50 feet, and ± 10 feet from 50 to 130 feet. Accuracy of identical depth gauges from same manufacturer could vary substantially from unit to unit; individual gauges generally kept the same profile on each test. Accuracy of an individual gauge varied between ascent and descent, meaning that gauges need to be tested in both directions. The fact that a depth gauge reads zero on the surface and is correct at a known depth does not mean that its calibration is intact at other depths. Tests in water 32°F, 70°F, and 90°F indicate that temperature can have a significant effect on accuracy and can cause great variance. Dropping a gauge as little as three feet can also significantly affect the calibration.

Obviously, these kinds of errors in depth gauges can lead to serious problems for a diver. An error of five feet or more easily can push a diver into another

Remember, we are but adventuresome pilots when undersea who must use wisdom, caution and harnessed technology to allow us our safe sojourns in this breathtaking innerspace. If we left suspicion, and the comfort of the known -- the "old ways" of diving govern our possibilities, we won't be able to reach for the "sky" and venture on to that world of reefs, caves, valleys and cliffs that lie just beyond our present grasp -- but in our reach with the equipment of tomorrow.

repetitive dive group. If he is making two or three dives with a faulty gauge, he could find himself in real trouble. What is frightening about these studies is that any gauge, new or old, well-treated or mistreated, may be substantially in error on the shallow side. Unless a diver has had his gauge tested, no matter how careful he is he may inadvertently be undertaking dive profiles which can produce the bends.

"What is frightening about these studies is that any gauge, new or old, well-treated or mistreated may be substantially in error on the shallow side."

The problem is magnified because it's not always so easy for a diver to get his gauge calibrated. We called a dozen shops and found four which test gauges in the shop. The others send gauges out for testing, but it can take up to a month to get the gauge back. In-house checks run \$6 to \$7, while some shops charge as much as \$20 if they send it out. No wonder many divers forego a gauge check.

Dive shops don't test gauges for several reasons. Until recently, depth gauge accuracy hasn't been much of a concern to anyone, including instructors, shop personnel and divers themselves. People tend to use all kinds of folk lore about gauge accuracy when they dive and most people presume it's their gauge that's accurate -- the other guy's got the bad one. Divemasters seem to always act that way.

Second, with a relatively low concern about gauge accuracy and therefore not a strong market, tests aren't particularly profitable. A good chamber pot for testing can run \$1000 or more (although Global Manufacturing offers one for less than \$500); it takes someone to run the test, which is a cost to the shop. Without any sort of national push, similar to the push used to insist upon tank inspections, and national marketing material (e.g., VIP stickers), a shop is left to go it alone.

Third, and perhaps most important, there is a continuing trend for dive shops to move away from doing any shop work, preferring now to ship regulators and other equipment to specialists for overhaul and repair. It's much less of a headache for the shop, and they make just as much money by marking up the repair (although some don't). It's no wonder that regulator overhauls keep getting more and more expensive.

Still, there is a move toward bringing gauge testing into the shops.

An interesting effort is underway by an Australian company, Advanced Diving Technology, to market a full promotional system, including a pressure pot, to U.S. dive shops. Their system is being successfully marketed in Australia, and currently the Royal Australian Navy School of Underwater Medicine is using it to test the depth gauges of all bent divers.

Their approach is first to convey to divers that depth gauges can indeed be inaccurate. They provide materials for dive shop display, which contains some of their own research about depth gauges. In fact, they have found that gauges develop a "memory" when used regularly to the same depth; if one takes a deeper than normal dive, the gauge with a "memory" could perform inaccurately.

If more divers become aware of the problem of depth gauge inaccuracy than have, they believe shops

can do a profitable business. They will provide stickers for divers, advertising material, and even postcards to mail to divers four months after the initial test to suggest a six months checkup. The heart of their program is a pressure chamber, which has both a capillary tube gauge and a bourdon tube gauge. With this system, they hope to penetrate 20% of the dive shops in 1985. It's an idea whose time has come. And dive stores can get into it for under \$500, pot included. The U.S. distributor is Charles Royer at West Coast Divers (1693) Sherman Way, Van Nuys, CA 91406; 818/708-8136).

That still won't be enough for some divers, however, who will rely on mail order. We have found one excellent source: National Scuba Repair, 16442 Gotahard Ave., Huntington Beach, CA 92647. Wrap your gauge carefully before you send it off. Within a couple of weeks you'll receive a profile of your gauge showing the depths your gauge recorded both in ascent and descent. You need not send money. The gauge is returned C.O.D. (\$7 plus charges).

One caveat: if after the test the post office drops the box housing your gauge, or someone gives it a hearty heave into a truck, what it reads when you get it may not be the same as it read when tested. There should be no problems, but remember that gauges are sensitive to shock.

The Stress Of Scuba Diving: Part I

-- *Recognizing The Critical Signs*

Some divers are their own worst enemies underwater. Loss of control -- i.e., panic -- is the major contributing factor to most accidents. Novice and experienced divers alike must constantly train themselves to prevent this loss of control or panic to avoid accidents.

Diving is stressful. Stressors may be physical or psychological and the response to stress may include many physiological and psychological reactions to restore the diver to maintain or restore a balanced state. This response is often referred to as the "fight or flight" reaction because the diver responds by either attacking or retreating from the stressor.

Stress is perfectly normal. However, if the stress becomes extreme and continues unchecked, it may lead to panic, an emotional and volatile human reaction which occurs in the presence of a real or imagined danger. A panicky diver becomes illogical and loses mental control.

Stress and Underwater Performance

Different individuals respond to identical stressors in different ways. Some become rapidly stressed.

Others show increased alertness and apparently improved performance. Still others appear to be "immune" to the stress-producing qualities of the environmental conditions.

Human performance underwater is influenced by varying levels of psychological stress. Stress prior to a dive can make the diver more aware of the problems and procedures of the dive, while overwhelming stress during a dive can disable the diver. A diver in the panic state becomes all action and movement but is not capable of thinking clearly. Panicked divers are almost impossible to assist and incapable of helping themselves.

Moderate amounts of stress may actually enhance performance (See chart I). Optimum performance for complex tasks usually occurs when stress is neither extremely high nor extremely low. For some, high states of arousal enhance performance, but in others the same level of stress can be detrimental.

Causes of Stress

The physical stressors include cold water, limited

visibility, strong currents and rough waves. The physical state of the diver may also present stressors, including fatigue, cramps, rapid respiration, performing too many tasks at one time and racing against the clock. Lack of physical fitness and poor swimming ability are major contributors to these forms of stress. Cumbersome equipment causes confinement or restriction of movement, overweight, fatigue and discomfort and any one may increase stress. When several physical stressors occur simultaneously, the diver may feel threatened, resulting in dangerously high levels of psychological stress.

Peer pressure may keep stress levels relatively high. Winning the admiration and respect of others is a goal most people attempt to achieve. This self-imposed peer pressure can be significant, and when colleagues make statements like "If I can do it, so can you," additional pressure is created.

Failure or any possibility of failure in the face of peers is an ego threat. A damaging blow to one's pride may be inflicted if a diver fails at a task or refuses to attempt or complete a task. The combination of peer pressure and ego threat increases stress levels among scuba divers. Research findings at the University of Maryland have shown that peer pressure, ego threat, concern about receiving a good grade and concern about receiving the certification card are the most significant stressors for college students in dive courses.

The possibility of underwater danger is also a cause of stress, although it takes a back seat to peer pressure. Subconsciously, some divers fear drowning because they are entirely immersed in the water for an extended period of time. They realize that if equipment problems do arise they do not possess the ability to breathe in the water without a mechanical device.

Symptoms of Stress

Excessive stress, which can lead to loss of control underwater, usually begins well before the diver enters the water. By being able to detect these telltale signs of extreme apprehension, divers may be able to help themselves avoid panic.

Psychological stress is accompanied by several physiological responses, including increased heart rate, respiration, muscle tension and perspiration. These increased energy expenditures lead to additional stress problems of hypoxia, hyperventilation, fatigue and exhaustion, which in turn pave the road to panic. Changes of voice and shaking hands also indicate heightened stress levels.

Since a stressed diver breathes more often and exhales more forcefully while underwater, the frequency and intensity of the exhaled air bubbles can alert other divers to a problem.

NUADC Keeps Afloat

The National Underwater Accident Data Center has stayed afloat, at least for one more year, thanks to the hard work of NUADC Director John McAniff -- and to a great volume of letters generated by *Undercurrent* readers in response to our call for help.

In our July issue, we reported that both NOAA and the Coast Guard had discontinued funding NUADC, which meant that there would no longer be a central body to collect and analyze data on diver deaths. We have no doubt that information published by NUADC has made a major contribution to diver safety. Its termination would leave a serious gap in information collected and disseminated about the causes of fatal accidents. We called upon our readers to write both NOAA and the Coast Guard.

NOAA has since reconsidered its position and has agreed to provide matching funds up to \$31,884, one half of NUADC's budget. If McAniff can raise a like amount, he gets NOAA's grant. To date, he has raised more than \$20,000 of his \$31,884 goal.

Help came after McAniff made an initial proposal to DEMA, the Diving Equipment Manufacturers Association. While DEMA was considering his proposal, McAniff contacted NOAA and obtained an offer of matching funds offer from them. DEMA granted \$10,000 to NUADC and DEMA Executive Director Bob Grey sent a letter to all DEMA members and to the training agencies asking for assistance. To match DEMA, PADI responded with a generous pledge of \$10,000; so far NUADC has received \$5000 of that pledge. A few individuals have also contributed.

As for the role of *Undercurrent* readers, McAniff said NOAA and the Coast Guard got a great deal of mail protesting the NUADC budget cuts. "As far as I know," he said, "*Undercurrent* was the only diving publication to write about the problem and to publish a list of who to contact. So all that pressure must have come from you readers. It must have done some good because NOAA came through."

The project is not yet secure. Nearly \$12,000 is still needed for funding through June, 1986. For the years after, whether NOAA will continue with the matching grant -- and whether DEMA, PADI and others will continue contributing -- remains a big question.

You may send your contribution to: NUADC, Scuba Safety Project, University of Rhode Island, P.O. Box 58, Kingston, R.I. 02801.

When divers are overly stressed underwater, they will often open their eyes extremely wide and stare at a person or object. Because underwater communication requires good eye contact, this sign of stress is really recognizable.

The physiological symptoms of panic are similar to those of excessive stress: involuntary hyperventilation, wide-eyes, dilated pupils, excessive muscle tension and increased heart rate and respiration. These responses lead to breathing difficulties, fatigue, exhaustion and muscle cramps, which add to the existing panic state and can easily cause drowning.

Behavioral Responses: Before the Dive

Most behavioral patterns before a dive are forms of procrastination, a defense mechanism used by the diver to delay entering an uncertain or threatening situation. Subconsciously, these nervous divers are seeking help. Examples of stressed behavior include:

Introversion: The diver who withdraws from the rest of the group and remains continually quiet throughout the day might be dwelling on the possible negative aspects of the dive.

Tardiness: Some divers will be late. A diver who misses the car pool for a ride to the dive site, who is late picking up equipment, or who is the last one to suit up might be procrastinating because of fear.

Mental Errors: Divers who are excessively nervous will often make simple mistakes such as placing the regulator on the tank backward or putting fins on upside down.

Forgetfulness: Sure, it is easy to overlook something, but when divers forget several items (bathing suit, mask, wet suit, money), this may indicate another subconscious defense mechanism of the nervous diver.

Extreme Cockiness: Many divers are embarrassed when they experience excessive apprehension prior to the dive. To mask the fear, they will often brag about how easy the dive will be or make a big joke about the entire experience.

Irritability: Some divers display a loss of patience and a quick temper. Any slight change in plans or a delay propels these divers into a mild tantrum. This sudden irritability is quite possibly a manifestation of built up stress, which they cannot mentally accommodate and must, therefore, impose on others.

During the Dive

Once in the water, a stressed diver may display other behavioral patterns.

Inefficient Swimming: Rather than moving through the water smoothly and slowly to conserve air and energy, a highly stressed diver will swim erratically. Arms and legs will move wildly as the diver becomes overly dependent on the muscles and fins to make progress. Swimming inefficiently leads to excessive fatigue which often leads to panic. While on the surface the highly stressed diver may tread extremely high out of the water. If an anchor line or trail line is being used, the panicky diver can often be found clinging to it.

Equipment Rejection: Divers who are highly stressed tend to lose faith in their equipment. While on the surface, the diver may quickly and abruptly remove the mask or regulator. Underwater, the diver may continually readjust one piece of equipment; like the weight belt, or frequently fuss with just about every item of equipment being used.

Fixation: Some highly stressed divers will narrow their focus and not be attentive to what is going on around them. They may concentrate or stare at one person or object. Also, a diver who appears listless or apathetic underwater may be a victim of excessive stress.

Human Errors: When making procedural mistakes and errors in judgment while underwater, the diver may become overly stressed and unable to function properly. A key contributing factor to panic is a mistake made by the diver while attempting to correct a small problem. Typically, after divers become overly stressed, they make mistakes which ultimately lead to a total loss of control. For example, the mistake a diver might make in dealing with the problem of too much lead is either not removing lead from the weight belt or not using the B.C. vest. Failure to compensate for the excessive lead might eventually lead to fatigue, cramps and ultimately panic.

Perhaps the most critical factor in the progression of panic after stress increases is whether or not a problem arises. If a problem does occur, it is usually accompanied by an additional increase in stress. Problems include being overweighted, losing one's buddy, or running out of air, among others. If a problem does develop, it might be confronted by the diver regardless of how insignificant it appears to be.

*The second part of this article, dealing with stress in yourself or your partner, will appear in the next issue. This article is excerpted from the book *Sport Scuba diving in Depth*, by Tom Griffiths, Director of Aquatics at Indiana State University. The publisher is Princeton Book Company (PO Box 109, Princeton, NJ). The book, which retails for \$14.50, is available in many dive shops or can be ordered through your local book store or directly from the publisher.*