

## The Cayman Aggressor

### --Is A Live-Aboard The Way To Dive Grand Cayman?

Since Christmas Day I've been on the move--the Florida Keys, Antigua, London, and I wanted to get home. But with a change of planes due in Miami on February 11, I couldn't resist a quick side trip to Grand Cayman, only for a day, but just to check in with the local gossip. I wouldn't even dive. What I learned that day I'll report in a couple of issues, although one encounter must be reported now.

I decided to drive out to the Tortuga Club, perhaps the last of the truly peaceful Caymanian resorts, for a sunset rum. I nodded politely to a gentleman who ordered a couple of beers and then the barkeep, the very amiable Jose, said, "You know who that is, mon? He one of de owners of de Cayman Aggressor but you won't meet a nicer man, no sir." Well, I'll be damned, I thought, what luck. The Aggressor would be featured in our March issue and, since the story was done in November (and not by me), why not introduce myself to pick up a few facts. And that I did. As it turns out, G. Burns Ruddy is typically Caymanian -- friendly and likable. And, I learned a few things which indeed alter the course of our review. Nonetheless, I've let the review run just as it was written, and I'll conclude with an update from Burns.

-- C.C., Travel Editor

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My old friends were headed for Seven Mile Beach and they thought I was crazy. "Pass up a week in a nice condominium with a swimming pool, and all those wonderful restaurants, plus barefoot at the Holiday Inn," they said, "just to rock about on a boat 24 hours a day?" "Ah, yes," I replied. "But it might be nice to get over to Little Cayman and re-visit Bloody Bay Wall. And, all that schlepping of dive gear and camera rigs twice a day to the dock has lost its appeal. It's much more diving for much less effort."

I would avoid a rather routine Cayman vacation to try the Cayman

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Aggressor, successor to the Cayman Diver, which had plied Cayman waters for a dozen or so years before tiring out. I'd generally been well-pleased with live-aboards but would the new boat live up to expectations? Was I smart to try it on one of the early voyages, before all the shake-downs had occurred? The answer, bottom line, is yes. But with a little nitpicking and some caveats. Read on.

Coming through the crush at the airport exit, I spotted a cheerful young fellow in natty nautical garb, bearing a sign that identified him as Aggressor crew, Jim, the boat's divemaster. On the quick trip to the harbor, where the Aggressor awaited her week's complement of 14 divers, Jim told me her history, amplifying my pre-trip briefing from See & Sea Travel. Like nearly all live-aboards, the Aggressor is a reincarnation. In its prior life, actually a very heavy working past, it was part of a fleet servicing Gulf of Mexico off-shore oil rigs. As such, she was built to handle heavy seas and long distances with infrequent maintenance. The Aggressor bears few reminders of its heavy working history: The money obviously lavished on her refitting as a dive boat was very well spent.

The sturdily built, gleaming white, all aluminum craft is 90 feet long, with a 23 foot beam. She is diesel-powered and boasts a 15-knot top speed. She has excellent stability even with our spell of nasty weather, which made for some bumpy trips to the North Wall. On the main deck are the wheelhouse, a large, salon with a compact, open kitchen and the spacious gearing-up area. Below main deck are the crew quarters, divers' cabins, showers and heads, and the engine room. Above the main deck is a 40-foot carpeted sun deck with ample chaises, a small bar and a large, built-in barbecue. It all hangs together quite neatly.

Leading the vessel's spare crew is jovial Wayne Hasson, new to live-aboard management, but with plenty of stripes for knowing Cayman waters and who was former manager of Casa Bertmar. Ann Davis, a southerner like Hasson, manages the commissary, the facilities for photographers and a host of other details. Completing the crew was divemaster Jim, ingenuous and outgoing, and Jerry--a Caymanian, one of those super-competent boat types without whom no live-aboard could set out to sea. The crew contained no cook; the culinary tasks were shared.

The moment I cast an eye at the gear-up area, I knew I was in the right place. Two wide aisles were flanked with rows of spacious dive lockers, each with a lid which serves for sitting while gearing-up. There was sufficient elbow room that I never needed to worry about getting a concussion from my neighbor's tank. Conveniently behind each locker area were racks for two tanks, which were speedily refilled from the two 15cfm compressors and replaced after each dive.

Sturdy ladders led down from the gearing area to a wide platform, where we could don our tanks if we chose not to wear them down the ladders. From the wide platform it was an easy step-in or roll-off entry. At each end of the platform ladders reach down into the sea, making it easy to exit. The Aggressor has a suspendable bar below the keel, usually deployed during our deeper wall dives for those who wished a little hanging at ten. But perhaps the most appreciated apres-dive amenity was the fresh water shower on the platform, with a (usually

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filled) locker of fluffy blue towels nearby.

It had been several years since I had been to Grand Cayman; would the diving still be as good as I remembered it? In the main, yes. Grand Cayman features some awesome diving. But it's by no means virgin diving. The sea life is a little too accustomed to divers, and some sites, particularly, the oft-dived west side reefs, show signs of coral damage and perhaps even some unhealth. But nowhere in the Caribbean, with the possible exception of Cozumel, can be found more dramatic reef conformations, whether it be on the island's nearly vertical deep walls, broken by sand chutes, undercuts and tunnels, or the exciting shallows with their coral heads amassed into strange shapes, producing an almost endless variety of labyrinths, archways, chambers, little canyons and gorges, crevices and chimneys. On most of Cayman's popular reefs can be found huge expanses of quite healthy hard corals and some nice softer corals and undulating sea fans, with an occasional stand of lush gorgonia. Cayman's waters abound with spectacular sponges, and virtually all the common tropicals can be found in abundance. Yet I continued to search in vain for those fabled sites where the big fish and pelagics are rumored to dwell. I saw precious few larger fish--only one midnight parrot and two large triggers, tarpon, no large jacks, no sharks save for one shy nurse. Barracudas do cruise past on most dives, but no diver should set his or her heart on lots of huge ocean action.

On this trip I seemed to find not as much of the invertebrate life as I had

## No Comment

A resort operator from Little Cayman was fined a total of \$3,800 and sentenced to one day imprisonment, on charges of possession of .5 grams of ganja, a "roach clip" and two power head firearms and ammunition, when he appeared in Magistrate's Court yesterday.

Dana Stark Vied, age 29, pleaded guilty to all three offenses which occurred on February 7.

Crown Counsel Ms. Lorna Dilbert told the Court that on February 7, Sergeant McLaughlin had carried out a search, around 8:20 am at the Pirates Point Resort on Little Cayman.

She said during the search a part of a stick of vegetable matter resembling ganja was discovered along with a utensil used for consumption of the drug.

Ms. Dilbert said 24 rounds of .44 magnum ammunition and two power heads, (bang sticks) used to kill sharks were also found on the defendant's premises.

She said when the defendant was questioned about the fire-arms he said he was not aware that a license was needed.

He was arrested and cautioned, but made no reply.

Defense attorney Mr. David Ritch, said Vied and his wife had leased the Pirate's Point Resort and had worked hard at promoting the dive industry there.

He said the resort offered a very unique dive called "the shark dive" in which a speared fish is staked out and divers interested in shark photography then had an opportunity to film them at close hand.

It is for this purpose, Mr. Ritch said, that the "bang sticks" and ammunition were kept at the Lodge and taken on the dives.

Referring to the possession of ganja and utensil charge, Mr. Ritch said the drug was only for the defendant's personal use.

Photos of a shark dive and the "bang sticks" in use were also shown to the Court along with a number of recommendations from various people.

Magistrate Kipling Douglas told Vied that there were three very serious charges against him but he had taken into consideration all that Mr. Ritch had said and was treating the other charges as a first offense.

Vied was fined \$2,000 or 6 months and one day imprisonment for possession of ganja.

For possession of the utensil used in drug consumption he was fined \$1,000 or 3 months and one day imprisonment and for possession of the ammunition and fire-arms, he was fined \$800 or 3 months.

*-The Daily Caymanian Compass*

February 12, 1985

remembered. Where were the shells? Gone now, except for conches, which are still abundant, especially on the east side of the island. Weren't there more of both spotted eagles and ordinary rays? Why did I see only one each of arrow crabs and cleaner shrimp all week? Where were the lobster condos you could count on finding, lining the walls of a small canyon? Hadn't there been more huge green morays, instead of the still-abundant little spotted ones? Were there not more tidy little plots of garden eels? Perhaps it was indeed my memory, editing only selected takes from the long-ago mental tapings. Or, perhaps it's time for this aging diver to invest at last in a good prescription mask.

Does the Aggressor get to the best diving? Yes, Hasson pretty well knows the sites, and is willing to push the boat to get to them. Yet there's a peculiarity of Cayman weather; when it's good it's very, very good, with flat waters, little surge and only rare current. But when it's bad, it's horrid, and those renowned North Wall sites are tantalizingly near but unreachable--at least, if you want any safety and comfort once you get there. The Aggressor, being a good deal sturdier than the average Cayman flattop day dive boat, can get most anywhere, but it may just not be safe to put divers into the surge and the waves found at the site. In sum, Hasson got us to the more common reefs with ease and speed.

Our diving was almost equally divided between the more notable North Wall sites, the lesser-dived South Wall and a sprinkling of the occasionally boring and ordinary West Side sites, the only option on several days of weird weather. We did get to a few nearly-virgin eastside reefs, as well as some north and south wall sites so far east they are usually out-of-range of all but the most aggressive land-based operators.

Blessings on Hasson for not taking us to the wreck of the Balboa, now much the worse for 50 years of sea-wear. Instead, we took a dive on the Oro Verde, a sizeable wreck, deliberately sunk in 1980 to attract divers, and--hopefully--various kinds of sea life. There's not been time for coral to beautify its stark hull, but there are hoards of fish which swarm about every descending diver, hoping for a handout. The fish on the Verde are also used to camera lenses. One gray angle in particular knows all the poses and professional turns: "You want a semi-profile just above that wheelhouse railing? Hohkay." Upon ascending, I was greatly amused to find that I had surfaced not near the Aggressor but close to a boat from Fish Eye Photo--and whom did I find aboard? My old buddies, who had had visions of my being off to Little Cayman or some other exotic spot, rather than at a common site like the Verde, which often has dive boats clustered about like a Super Bowl parking lot. I waved, they waved back.

### Cayman Aggressor, BWI

Diving for Beginners	★ ★
Diving for Old Pros	★ ★ ★ ★
Boat Food	★ ★ ★
Accommodations	★ ★ ★
Snorkeling	★ ★
Moneysworth	★ ★ ★ ★

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

More exciting was the next day's array of dive sites, this time on the North Wall. First stop: Tarpon Alley, but the tarpon must have been out on a coffee-break. So we moved the boat a little, and, on the second try, had success. The tarpon were here. Not the hundred or so said to dwell in this highly-publicized area, but a nice respectable dozen. I was enthralled by these elegant, graceful, silvery 30-pounders, sinuously moving between the giant coral heads, and up the canyons into the chimneys, for stunning, sun-backed profiles.

### \$1.2 Million Award In Diving Death

A District Court jury recently awarded \$1,129,236 to the family of a Michigan man who drowned while visiting St. Thomas in 1980.

Russell Goddard drowned while on a diving trip off Buck Island. According to court information, a suit was filed against V.I. Diving School and Supplies in Long Bay by Goddard's wife, Sylvia.

Court records cite Mrs. Goddard's charge that the "unfit and dangerous" condition of a buoyancy compensator vest rented from V.I. Diving School resulted in Goddard's death. He was wearing the vest when he drowned.

The inflator hose on the vest broke because of improper installation of a power inflation device on the hose, and because the hose itself was weakened due to the alleged failure to properly inspect and maintain it, court records say.

One of my favorite places remains Aquarium Reef, which always has a showcase assortment of nearly tame, and often playful, sea life. One of my companions on that dive caught a puffer, who had to have been one of the more blase, sophisticated members of his species. We toyed with the little guy for several minutes, tickling him, petting him, and passing him hand to hand before he inflated himself. Thusly satisfied, we went off in search of more, and found some lovely tame angels, as well as non-skittish butterflies and hogfish.

Perhaps because it was new to me, I most enjoyed diving on the south side. To my mind, the walls are just as pretty as on the north-edge--although they start deeper (about 70 to 80 feet), making them less accessible for repeated dives. And I think the south side offers even more exciting shallows, with all the drama in coral formations you could ever want. I could wander about endlessly in pristine little

caves and canyons, from which I could always find a safe way to the surface, once I had satisfied my curiosity about what might be lurking in that crevice just beyond. The east side sites we visited were mildly interesting, though the anchorage picked for one overnight proved a disappointment. Collier Bay, which was home to a host of conchs (of which we harvested a few at dusk while free diving), was found to be rather barren on the later night dive.

All this diving was accomplished in perfect freedom, the very thing that appeals to experienced divers. It was what I had come for, bearing unpleasant memories of regimented, cattleboat dives with certain Cayman operators: "Follow the leader, no one's to descend 'til we're all in the water, and be back at the boat in 15 minutes with 500psi," is the usual drill.

Yet the other side of the coin is a pretty iffy safety situation for those with only a few hours in their logs, or ones not in optimum condition. Therefore, one of my nits to pick with the Aggressor was the management's slight nonchalance about safety. They did check C-cards, and asked that divers record, by noting on a large board, their entry and exit times, max depths and repetitive groups. Yet there was little in the way of dive spot briefings, warnings of known hazards, projections of depths and current directions, or suggestions on planning the dives. And if someone had wanted to do solo numbers and flaunt the tables, they just might not have been discouraged. In short, this is no place for a novice, unless he or she is accompanied by a highly experienced travelling partner. While the Aggressor's little runabout could presumably go after a troubled diver in a real emergency, it might not at any given moment be quickly deployable.

For safety reasons, some crew member could have been in the stern when people were diving. That's the kind of service that one might expect from a well-run pricey live-aboard. When crew were in evidence, they were quick to help with tank-donning or to hand down camera rigs. But when they were gone, they were very, very gone--and several times, no amount of hollering from the ladder would raise someone to take up photo gear from me at the end of a dive. Perhaps these systems will fine-tune themselves as the Aggressor's crew gains more experience

Dear *Undercurrent*:

I recently purchased a pair of Force Fins for an upcoming trip to Antigua. While snorkeling, the fin strap came undone and I discovered that it had been screwed into the rubber with a small, Phillips head screw. Even had I been carrying a Phillips head screwdriver I would have been out of luck, since the screw had disappeared. I tracked down a substitute at the hotel, but then lost another screw from the other fin a couple of days later. What a bummer.

Lyndon Cortwright  
San Rafael, CA

Dear Lyndon:

Yes, that would be a bummer. Scott Dailey of BG Watersports, which distributes the fin, says this is the first case he's ever heard of and will replace the failing fin if you return it to the point of purchase or directly to BG Watersports (530 6th St., Hermosa Beach, CA 90254, 213/374-4074). Dailey says that the screws are "pressed" into the fin so that they can't come unscrewed, but the proof is in the ocean and you, unfortunately, had to prove them wrong. Hopefully, this is an isolated case, but it suggests that Force Fin users better keep their eye on the screw and perhaps even pack a couple of alternates with them just in case the product is a little less reliable than the manufacturer would have us believe. If this should happen to you, please let us hear about it. Losing a fin underwater could be quite dangerous.

Ben Davison

and stops expecting the divemaster to act also as assistant cook, bottlewasher and bartender.

But enough carping. What will the underwater photographer make of the facilities? For openers, there's nice, safe deck space to lay out cameras pre-dive and to work on them post-dive. There's a swell, fresh water dip tank, close to the boarding ladder. (I resolve before my next trip to practice more tactful language to inform the turkeys that it's bad form to wash wetsuits after every dive in the camera dip tank.) There's reliable current and plenty of outlets, which don't require converters, for recharging strobes and lights.

Then there's the on-board Ektachrome developing, nicely handled by Ann Davis. At \$8 per roll, plus a few more dollars for mounts, if wanted, I had a welcome luxury to test for glitches and check out several new gizmos. And I could examine my developed rolls on a light table, a nice pull-out shelf which tucks into one of the tables in the salon. Ann also maintains a tidy store of replacement gear and camera parts--nice if an O-ring goes, or you want to experiment with a new extension tube. The boat also has a slide projector, and its TV is equipped with a cassette player and a petite library of underwater tapes.

Divers, like armies, travel on their stomachs. A lot of calories have to go down to sustain us through three or four dives per day. I had no complaints with the Aggressor's culinary quantity, but don't expect Cordon Bleu. It was rather "down-home" style, an odd mixture of Creole and Caymanian. Breakfasts were usually juice plus scrambled eggs, sometimes with bacon, grits or biscuits. Lunches tended to be casual, rather ordinary sandwiches, sometimes served with soup--or macaroni and cheese, Jamaican-style meat patties, or cheeseburgers, each of which came by us once. Dinners were more diverse. One night there was linguine with creamy seafood sauce, followed by coconut ice cream. Another night there was Louisiana shrimp boil with rice'n beans, plus--strangely--yams. A third night, Captain Wayne held sway over the top-deck barbecue, producing some credible ribsteaks, partnered again with rice'n beans and coleslaw. Snacking cake from a mix completed the meal. The nicest dinner was turned out by Jerry, who transformed the conchs we had pulled up from the Collier Bay into a delic-

table Island-style stew, tender and long-simmered, mellowed with spices and coconut. Desserts were largely fresh fruit, the quality of which declined, expectedly, after the fourth day. Wine was offered with dinner only once or twice.

Not too much was available in terms of between-dive snacks, though a coffee pot was generally operational at the end of the buffet bar. Simple hors d'oeuvres such as nachos sometimes appeared at cocktail hour and, each day 'round sundown time, the upper deck bar starred a special drink, such as Pina Coladas or Tequila Sunrises. The Aggressor's crew is obviously trying, but the boat will never be premier class until a professional, full-time cook is counted amongst the crew.

All the Aggressor's sleep spaces are below deck, reached by a flight of steep steps. Aside from a quadruple cabin, occupied by crew on my trip, there are seven guest cabins. Four feature a double-sized bunk, nice for couples, with a single bunk overhead. Two have three single bunks and one cabin—truly minute--has two more single bunks. The Aggressor is billed as being suitable for groups of 20, but, to my mind, that would be a definite strain. All of the cabins, even the triples, have darn little move-about space, and they have not much in the way of storage space. The cabins were tidied up daily, and sheets were changed once during the week; there were always ample towels. The air conditioning worked just fine. When I came down to retire the first evening, I found a surprise: What's this on my pillow? A chocolate mint! Shades of the Century Plaza. The below-deck, no-porthole nature of the living space may be bothersome to a few, those of a claustrophobic bent. My cabinmate was thoroughly dissembled, still carrying some traumatic memories of a boat accident a few years back, in the Pacific. I did, however, have trouble sleeping. Directly below the cabins must be the bilge or water or fuel storage tanks. Whatever, the liquid sloshed back and forth all night, making me wish I'd brought a few sleeping pills. Divers topping six feet might find the bunks too tight. Only a few steps from any of the cabins is one of the two head-and-shower compartments, nicer than any boat's I've travelled on, and the showers had plenty of dependably hot water.

So: Are live-aboards the real way-to-go for every diver? Certainly not. The big plus is that they offer plenty of diving. I came home with a log of 18 dives over the 5 1/2 days. And that was 50 percent more than my friends who'd so-journed on Seven Mile Beach. Actually, most of my on-board companions logged 20 to 22 dives, but I was a bit lazy about taking all the dusk and night dives I might have.

But the big question remains whether a live-aboard really makes sense and is needed for Cayman waters. Again, not for everyone. All the good sites are quite reachable from the land-based operations. The Aggressor's publicity makes much of her power, her ability to make the five-hour, 30-mile run to the splendid reefs of Little Cayman. Yet we never got there, which was the only real disappointment of my trip. And I'll wager that most other vacationers on the Aggressor, at least in the poorer weather season from late fall through early spring, will not get there either. Chances would be better in the summer, but, even then, sometimes boats from Cayman Brac, only 10 miles from Little Cayman, cannot make the passage over what is truly deep sea. If your main reason for booking the Aggressor is the promise of Little Cayman, best go in the summer.

There's the other, perhaps small, caveat if you're considering a first-go on a live-aboard. On any boat where you've booked singly or as a twosome, without being joined up with a dive shop or a dive club group, you take your chances with companions. Fortune will probably give you at least a few new good friends. But, unlike a land-based spot, where there are plenty of escape possibilities,

there's no place to run to if the luck of the draw has linked you up with a macho-man, a princess, a chronic complainer, a rank novice or a couple whose bliss card is about to expire. They are your family for the week.

Diver's Compass: Price for a six-day trip, including all meals and diving: \$950...Brochure suggests tip to crew of \$60-\$100 per diver, but our group figured \$40 per guest was what was warranted by the level of service...Liquor and beer prices seemed fair enough, but some may rankle at a buck a throw for a soft drink...Winter and early spring water temperatures can be as low as 78-80', making a shorty or lightweight tropical suit a comfort...Don't forget your C-card and proof of citizenship...They'll reconfirm your return air flights, which is essential...Book through See and Sea Travel Service, Inc., 680 Beach Street, Suite 340, San Francisco, CA 94109; (415) 771-0077 or (800) DIV-XPRT.

\* \* \* \*

That's the story, written after a November cruise. I decided to discuss a few of the boat problems with Burns, and he assured me that there had been corrections. Food preparation is no longer shared; a chef is on board who, Burns says, had "Swiss" training. The sloshing water which kept our writer awake was due to a sewage holding tank not being emptied. The switch was nearly unreachable; it has been moved so that the tank may be readily pumped out each day. As for visits to Little Cayman, even Burns can't control the weather but he is planning a second boat, most likely called the Aggressor II, to be ready this summer. He would hope to have the boats begin their run on either Cayman Brac or Grand Cayman and conclude the journey at the other island, thereby ensuring a chance to get to the better diving. By having a port on both islands, there is always a safe haven in bad weather. So, with assurances that one can get some diving in on Cayman Brac or Little Cayman, the advantage over a sojourn at Seven Mile Beach is clear. For the serious diver, the best of Cayman means diving three islands, something no other Grand Cayman operator can provide.

## Ascent Rate And The Buoyancy Compensator

### -- When Is A Bag Too Big?

Our investigation of ascent rate problems has led us to conclude that the increased size of buoyancy compensators and the greater buoyancy of wet suits seriously complicates the ability of the diver to control his ascent correctly under emergency. In fact, data we have derived from pool tests indicate that the speed of ascent, under certain situations, can be many (two to four) times greater than the recommended 60 feet/minute ascent rate, especially through the final four feet of water.

Generations of scuba divers have been taught that the 60 feet per minute rate of ascent is the maximum safe ascent rate. When asked how fast they ascend, the majority of divers indicate that they follow the "small" bubbles, which rise at 60' per minute. Many divers, however, are apparently unaware that the "small" bubbles referred to are the very smallest that can be seen and are little more than foam. As these miniscule bubbles expand and accelerate they are going faster than 60 feet per minute. *Therefore it is pru-*

*dent to continue changing the bubbles which you monitor, in order to avoid a rapid ascent.*

The problem of assessing ascent rate is further complicated by changes in buoyancy of the diver. The diver of the 1980's wears a neoprene wetsuit that is generally thicker and more flexible than those previously used. The thicker material contains more bubbles which are susceptible to Boyle's Law. Less experienced divers weight themselves to be neutral at eye level on the surface, as has been traditional, only to find that they become quite negative only a few feet below the surface due to the compression of the wetsuit material. Passage through the first few feet of water is typically made easier by overweighting and using a buoyancy compensation device to provide both surface flotation and control during descent. While this is undoubtedly an acceptable solution, it has resulted in a lack of education relative to the "trade offs" which have been made.

Table I demonstrates the changes in compres-

sion/expansion of gases underwater. The exponential nature of these changes means that greater volume changes occur as the diver approaches the surface.

**TABLE I**  
Volume Changes With Pressure

Depth	Air in Cu. Ft.	Buoyancy (lbs.)	Expansion/Potential (%)
0	1	64.0	0
1	.974	62.3	2.6
2	.943	60.4	5.7
4	.892	57.1	10.8
10	.767	49.1	23.3
20	.623	39.9	37.7
30	.524	33.5	47.6
40	.452	28.9	54.8
50	.398	25.5	60.2
60	.355	22.7	64.5
70	.321	20.5	67.9
80	.292	18.7	70.8
90	.268	17.2	73.2
100	.248	15.9	75.2

Table II illustrates this point and is the result of a study conducted in a fresh water pool 10 feet deep at UCLA. The subjects were dressed in full gear, including: 1/4" wetsuits, mask, fins, snorkel, tank, regulator, back pack, weightbelt and buoyancy compensator. Each subject assumed a horizontal position on the bottom of the pool and held on to a box of lead while the buoyancy compensation device was fully inflated. This, in effect, simulated a condition where a diver with a partially filled BC at a great depth is involved in an uncontrolled ascent, unable to exhaust the air from the buoyancy device. Due to expanding air, the device becomes fully inflated by the time he reaches ten feet.

The subjects, who had been instructed to relax and exhale during their ascent, released their grip on the lead box when they were ready. A video tape and timing record was made of the ascent and trajectory.

The ascent rates from 9 feet 4 inches are averages and reveal values which exceed the recommended 60 feet per minute rate. In fact, all but one device produced an ascent rate of 120 ft/min or faster. Since the divers are accelerating however, it was felt that an investigation of the rate through the last 4 feet of water would be important. Dr. Jefferson Davis has, for many years, pointed out the potential dangers of the changes which can occur in this depth range and the selection of the 4 feet rather than the historical 6 feet was used as a realistic danger range when breathing compressed air.

It becomes clear that these ascent rates are significantly faster than the 9 feet 4 inches ascent rate averages. The one exception is the smaller of the front-mounted vests, which slowed down as the result of a "flare" pattern which developed in the shallower water. It appears that the reduced lift force resulted in a slower rate of rise, permitting the body to arc during the ascent. The larger devices were accelerating and lifting the diver in a much more vertical pattern, resulting in faster ascents during the last 4 feet. Rates as much as four times greater than the recommended 60 ft/min. It should also be noted that buoyancy alone is not the only active variable. The location of the device and drag considerations also play an important role in producing the resultant measured speed.

The human head weighs approximately 17 lbs. and, according to Archimedes, if we displace 17 lbs. of water while using an inflated air chamber this will provide sufficient flotation to keep the entire head

**TABLE II**  
Ascent Rates for Various Buoyancy Devices

Device	Vol(L)	Lift(lbs)	Avg. Ascent	Avg. Ascent
			Rate At 9 ft.4 in. Depth	Rate At 4 ft. Depth
20 x 17" Flat Nylon HC*	5.1	11.2	68 ft/min	43.3 ft/min
23 x 18" Flat Nylon HC	12.7	27.9	122	147.8
23 x 19" Nylon w/bag HC	15.5	34.1	132	185.8
24 x 19" Nylon w/bag HC	17.2	34.8	138	187.8
24 x 18" Nylon w/bag HC	17.5	38.5	143	205.7
25 x 20" Nylon w/bag HC	17.3	38.1	149	208.7
19 x 16" Nylon w/bag HC	21.6	47.5	156	213.3
Jacket type (Lg.)	21	46.2	149	225.9
26 x 10" Back Mount w/bag	24.9	54.8	168	245.3
Over the Shoulder	21.2	46.6	150	254.7

\*HC denotes "Horse Collar" type. L denotes litre volumns.

FPM denotes the ascent rate in feet per minute. All data has been arrayed according to the ascent rate average from 4 feet.

out of water. Note that it is the weight of water displaced. Those portions of the device which are above the waterline only serve to restrict motion and will not contribute to flotation.

It should be obvious that the dangerous ascent rates are a potential problem if one uses large buoyancy compensation devices. The recognition of the nature of the problem requires that the diver who chooses to use these larger B.C.'s must be adequately trained in order to prevent large expansion differentials from oc-

curing, especially on ascent near the surface.

It has been my experience that a properly weighted diver has little need for more than 20-25 lbs. of buoyancy for conditions where retaining the weight belt is reasonable. Obviously, if the weight belt is then ditched, the diver will become that much more positive.

*The author of this article, Dr. Glen Egstrom, heads the UCLA Diving Safety Research Project, Department of Kinesiology at UCLA.*

## The Art Of Breathing: Part I

### -- In Emergencies It Becomes A Science

Different ways of breathing under water can either cause or alleviate problems.

If your mask leaks or is knocked off, you could inhale water. Your basic training in scuba should have included plenty of practice in breathing without a mask while under water, providing confidence in the ability to breathe comfortably without a mask and through your mouth. Then, if the mask leaks or is lost, you'll habitually inhale only by mouth and continually exhale a few bubbles of air from your nose to keep the water from entering.

Long, slow breaths are the most efficient for diving. Whenever you are not inhaling you should be exhaling, breathing all the time. Holding a breath is appropriate only when necessary for the task at hand -- photographing a fish, for instance. During such breath-holds, avoid a lung over-pressure accident by making sure that you are not moving upward, and that there are no high waves overhead. Such waves can cause sudden variations in water pressure just as if you are bouncing up and down under water. Also, avoid filling your lungs to capacity. The alveoli (microscopically small air sacs in the lungs) can over-expand if they are full.

#### BUOYANCY

While diving, you can fine-control your buoyancy by adjusting the volume of air in your lungs. Relatively full lungs (but, for safety, not filled to capacity) will help you to rise. A low-lung volume will help you to descend. By varying your breathing pattern (*but* still breathing in and out continuously) you can change your buoyancy by four to five pounds without adding or subtracting weights on air.

On the surface, a large lung volume will help you to float. Here, you *can* fill your lungs to capacity without danger. Inhale quickly and fully after each exhalation and make your exhalations short to avoid losing the buoyancy you have gained.

#### SKIP BREATHING

Some divers pride themselves on their ability to conserve air, and do so by inserting long pauses between inhalations and exhalations, in effect skipping a breath. Holding the breath this way allows dangerous buildups of carbon dioxide that can cause headaches, drowsiness, and confusion. CO<sub>2</sub> can intensify other problems including decompression sickness and nitrogen narcosis. Eventual loss of consciousness could occur.

#### COUGHING

A coughing diver on the surface may not only be unable to catch a breath, he may also be struggling to stay afloat because he is losing buoyancy each time he coughs out air and gets none back. Get to him quickly. If he is not panicky, make yourself buoyant, then give him support or inflate his buoyancy compensator.

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*"There is a tendency for a rescuer to hold his breath as the victim drags him up."*

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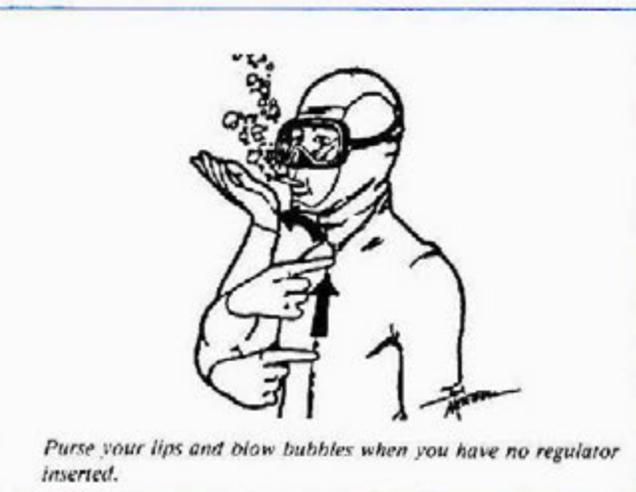
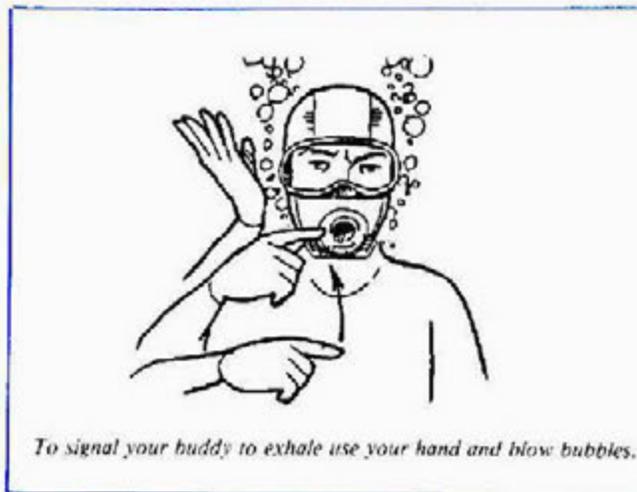
A coughing diver under water is likely to dash madly for the surface, holding his breath. You may be able to stop him by grabbing a leg as he goes by. However, tests have shown that there is a tendency for a rescuer to hold his breath as the victim drags him up. Don't let the circumstances make *you* forget to vent air.

If, in your grab, a fin comes off in your hand, its loss may slow him somewhat. Follow him at a slower pace to make sure he hasn't suffered a lung over-pressure accident.

In stopping a panicky diver, don't hold *your* breath. If you do stop him, don't punch him in the

chest to make him exhale. You can't force a panicky diver to exhale that way. The pressure of such a blow could cause the lung rupture you are trying to

prevent. Signal him to exhale using the language of the deaf.

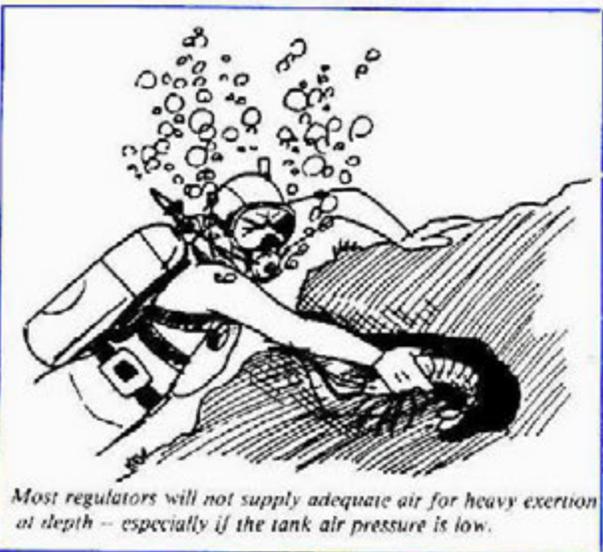


If you have a coughing spell at the surface, try submerging your face. You'll gain buoyancy. Your seventeen pound head weighs almost nothing under water. With your mouth aimed down, gravity will help expel the water. Stay near the surface so you can lift your head as soon as the coughing spell is over.

During a dive, water in your regulator could start you coughing. Swallowing may help. But if it doesn't, cough into your regulator. Don't remove it. The experienced diver will sense the presence of water and inhale slowly and cautiously with the tip of the tongue at the roof of the mouth, thus excluding water droplets from reaching the air passages that could cause coughing or a laryngeal spasm.

### EXERTION BREATHING

On land, you can do strenuous exercise and get enough oxygen by heavy breathing. Under water this can be very dangerous. Your regulator may not supply the required large volumes of air fast enough.



Rapid breathing won't help. If you are able to suck air fast enough through a regulator to double the flow, four times the resistance will be created, and you'll use eight times as much oxygen in the attempt. The resulting air hunger will make you breathe faster -- a vicious cycle. Most regulators will not supply enough air for even moderately heavy work at 130 feet when the tank is below 300 psi. Some won't give adequate air to support a working diver at only 66 feet. If you are caught in an exertion-breathing cycle, stop working, ascend, and breathe gently. Avoid these problems by taking it easy under water, staying shallow, and surfacing before the tank pressure gets low.

*"Offering an octopus second stage may make matters worse. The first stage serving both mouth-pieces will be dangerously over-breathed unless you alternate breaths."*

If your buddy starts working and breathing hard, stop him and signal him up. He may want to buddy breathe. That won't help. If your tank pressure is the same and your regulators have similar breathing characteristics he'll be no better off. Offering an octopus second stage may make matters worse. The first stage serving both mouth-pieces will be dangerously over-breathed unless you alternate breaths. An air-hungry diver isn't likely to be able to coordinate his breathing with yours, and you'll both end up without enough air.

A pony bottle or BC breathing would help solve this problem, but prevention is best. Avoid exertion under water, especially at depth with low air pressure.

A diver breathing hard on the surface is probably fighting to stay afloat. He may be using his arms so

vigorously that he can't stop long enough to even reach down for, much less unfasten and drop a weight belt or inflate a BC. So, commanding him to do so may not work.

Asking him to give it to you to hold may present an even more difficult problem. He will not only have to undo his belt, but also hold it out for you while he sinks from inability to use that arm for support. If he is encumbered with goodies, however, he may be glad to give them to you to free his hands. Don't keep what he gives you and drown. Even if it is an expensive camera, drop it if you are not buoyant enough nor can't get buoyant enough to hold it.

### PANTING

Rapid shallow breathing is sometimes called the "hyperpnea syndrome." Inhalations do not get air as far as the alveoli where oxygen is exchanged for carbon dioxide. Air is simply moved back and forth in

the airway "dead spaces." Fresh air doesn't mix with the stale air deep in the alveoli. So carbon dioxide accumulates and oxygen is depleted. Faster panting simply makes matters worse.

On the surface, the small volumes of air inhaled make a diver less buoyant so he works harder to stay afloat. This exertion increases air hunger and starts another vicious cycle.

The answer is to stop strenuous activity. To do that you'll have to make yourself buoyant. Inflate your BC, drop weights, or turn onto your back and put your heavy head in the water where it will weigh almost nothing.

Under water, panting is even more dangerous. If a diver can't be signaled to slow down and breathe deeply, he must be brought back to the surface. Buddy breathing, octopus breathing, or even an auxiliary air supply isn't likely to help.

*Continued next issue...*

*Albert L. Pierce,*



Can dolphins learn to understand "humanlike sentences?" Scientists at the Kewalo Basin Marine Mammal Laboratory in Honolulu believe their experiments clearly illustrate the ability of dolphins to understand the basic structure. Two dolphins there have learned that a whistle or gesture stands for an object, action or modifier, and understand the grammatical rules that allow these "words" to be combined in many ways to form sentences. They respond correctly to sentences with novel word combinations and comprehend references to objects they cannot see. For example, Phoenix, a female bottlenosed dolphin, is given a series of distinctive whistles representing individual words -- SURFACE HOOP FETCH BOTTOM BASKET. Without missing a beat, Phoenix swims to a hoop on the surface, and pushes it toward the tank bottom with her beak. She passes another hoop attached to the floor of the tank and a basket floating on the surface and then touches her mobile hoop to a basket on the tank bottom. The animals are able to handle a number of other questions, as well. BALL TANK (is there a ball in the tank?) gets a "yes" or "no" answer from a dolphin by pressing one paddle or another. Almost invariably

they provide the correct answer. The results of the experiments so far suggest that natural communication between animals may be far more complex than thought. And although dolphins seem to understand the researchers, the researchers are yet to understand the dolphins.

The next time you put gas into your car, think about Bonaire. The Exxon corporation plans to close its refinery on Aruba by March 31. Royal Dutch Petroleum has indicated they may shut down their money-losing plant on Curacao. If that happens, government income would be cut by half. And Antillean leaders claim that the resultant unemployment could turn the trio of islands into a political time bomb.

Three divers almost bought the farm after their small boat capsized as they were preparing for a wreck dive in the Gulf of Mexico, off Panama City, Florida. They clung to their overturned craft for more than ninety hours before being rescued after the Coast Guard picked up the divers' 23 foot boat on its radar. A fourth member of the diving group died shortly after rescue. The survival of the three can be attributed to strong constitutions, the wetsuits that they were wearing in the 65° water, and to their meager sustenance during the 90 hours -- one can of sardines and five beers.

### Coco View

We erred in our January review. The correct number for reservations is 800/282-8932; in Florida dial 813/973-0651.