

Diving The Grenadines

Living Out The Fantasy Of All Of Us

Consider a typical dive vacation. In the morning the divemaster announces you will have your first dive at the Pinnacles, 30 minutes and 80 feet, and your second at Jasper's Reef, 40 minutes at 40 feet. And you tag right along. Or, if you're boarding on a dive boat, the skipper will announce that during the night he has traveled thirty knots, you are now in Gallway Bay, to the north is the wall, where you will find a black coral tree shaped like a cross at 60 feet, and an encrusted cannon at 85 feet, which you are not to fiddle with. He's been here before.

I've always had the fantasy to be my own captain on a dive boat, stopping when and where I damn well please to search for the mysterious blue bearded finger fish or to probe for gold from the wreck of the Somoza de Castro. And I've also wanted to sail bare bottom through the verdant Grenadines, the lush Windward Islands in the Southern Caribbean, so rather than die an unfulfilled man, my buddy and I chartered the 45' wooden ketch (12' beam) Am Stram Gram, owned and captained by Marcel Pellitier. Now, before you tell yourself you would never take this trip, hear me out. Most important, the price for four people, seven nights, is \$1,800, which is \$65/night/person. Add \$3/day for tanks and weights, and your diving, comfortable accommodations in two roomy cabins, and a repast superior to any dive resort is paid for. Only your bar tab is extra. Since the captain runs the ship, you need not be a sailor. And you need not fear being stuck at sea for a week, for much of the time is spent exploring deserted islands, calling on sleepy ports, or doing whatever the passengers decide, including lounging on the ample deck space or suspending oneself from the hammocks strung from the masts. Dive when you have the calling, visit port when you lose your sea legs, sip rum when your mouth parches. It's your show. You call the shots.

INSIDE UNDERCURRENT

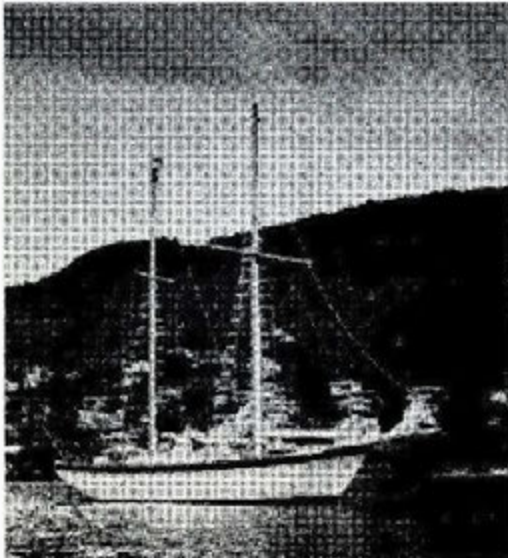
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Hundreds of craft charter for Grenadine trips (see insert) and each journey will differ. Some specialize in scuba, others in sailing, others in partying. Marcel is a free diver, not a scuba diver. There is no compressor on board, but there is air along the way. He has been sailing his boat in the Grenadines for ten years with his companion Gladys, the only other crew member. He is 55, a sculptor, she is 34, a painter. This trip is their fantasy as much as mine.

Before I report on my journey, I must say that the diving, on Caribbean standards, was about as good as anywhere. The exceptions (remember that I selected the stops, with no prior knowledge) were no sheer walls and no big fish, including even reef sharks. In October, a month after Hurricane David, the water was in the mid-80s with visibility as high as 100 feet (the hurricane still had things stirred up a bit) and ran down to 60 feet, except once where it dropped to 20 feet. Much of our diving was done at 60 feet, where the fish and the colors are. Extensive hard and soft coral growth reflected the lack of marauding humans. Among enormous green and purple sea fans and plentiful sponges, were every common species of tropical, including the more interesting--filefish, rock beauties, queen angels, puffers and cowfish, green and spotted morays. Often the snorkeling was so good we did not don our tanks. Because we were discovering our own spots as we went, the diving probably seemed even better than it was. When asked, Marcel helped. If not asked, he obligingly loaded us into his Zodiac for a run to our destination. Our major complaint would be that we would hope for better visibility, although we recognize the toll of the hurricane, and that there would have been bigger fish (the largest were 30-40 pound groupers, big by resort standards, but not by the standards of virgin diving) and a few reef sharks for added thrills. Other than that, the diving was splendid, and, indeed, I would return again:

Friday: Board in St. Lucia, depart at 2 p.m. from Marigot Bay, where Rex Harrison dropped anchor as Dr. Doolittle. Motor/sail southward, past conical Pitons rising from the sea to the clouds. Stunning. Destination: Bequia.

Saturday: Arrive 5 a.m. After bacon omelette take the Zodiac into Port Elizabeth for a sunrise stroll on quaint streets. Chat with wooden boatbuilders on Admiralty Island, swap stories with working sailors, reputed to be the best in the Grenadines. Meet a grizzled American who twice sailed solo around the world in his 18' Plumbelly. Drop into Whaleboner bar, pull up a whale vertebra bar stool and belly up to the jawbone bar for a potable. Chat with locals who live up to Bequia's "Happy Island" reputation. Pick up tanks from Marcel's friend who says the only commercial compressor in the Grenadines, on Palm Island, is on the fritz. Nearly panic, but Marcel says native fishermen on two islands have compressors, so we set sail, passing uninhabited Petit Nevis, where whalers butcher their catch. Said to smell like the "left wing of the day of judgment" during whaling season.



Arrive at Mustique to dive liner Antilles, in 30' of water since 1971. Surge so powerful I am thrown against rocks and hull. Supposedly vintage wines inside, but nearly impossible to enter. One diver who did became entangled in webs of electrical cords barely survived. Outside, wine bottles fused

Undercurrent (ISSN: 0192-0871) is published monthly by Atcom, Inc., Atcom Building, 2315 Broadway, New York, NY 10024, (212) 873-3760. Second-class postage paid at New York, New York. This guide is available to the diving public by mail subscription only. To maintain

its independence, *Undercurrent* carries no advertising.

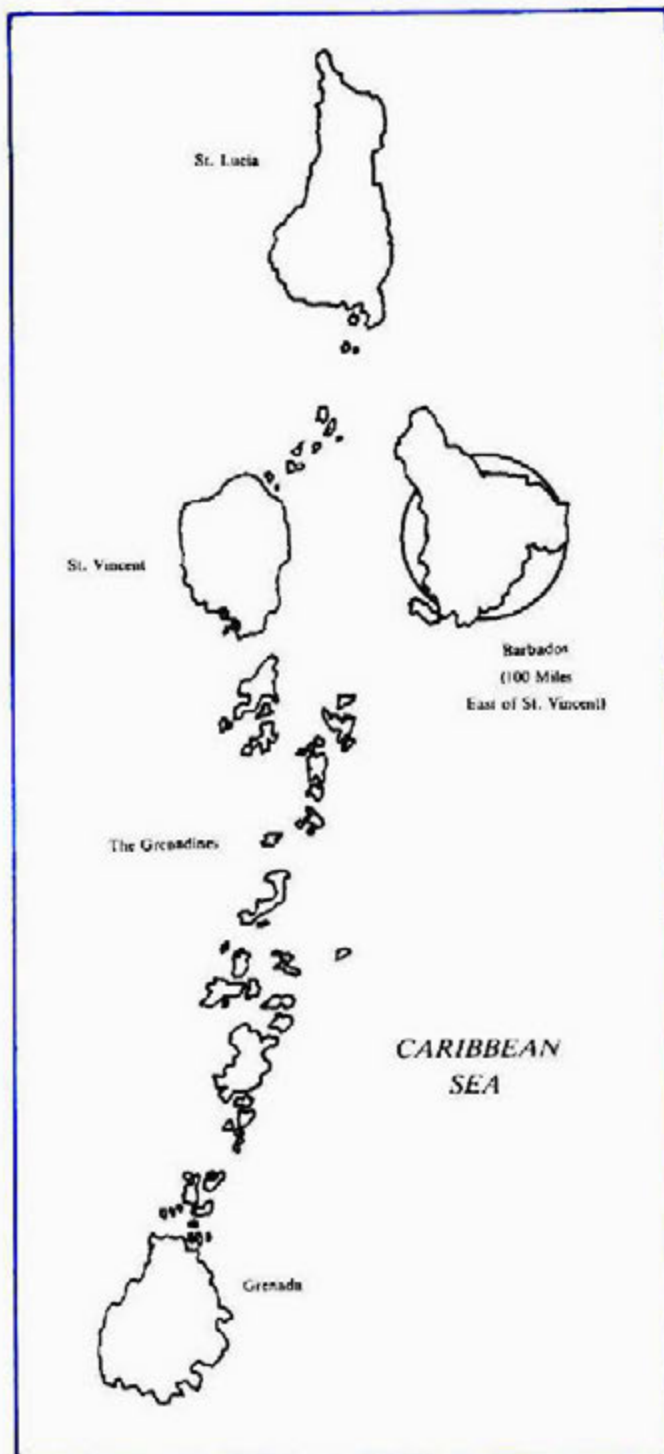
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by heat lie in the rubble; 30 yards away rests a Japanese salvage tug, it too a victim. Sparse coral along port side, but many tropicals, sea fans and gorgonia, and a six foot bull shark resting in a bow depression. A tough, fascinating dive. Then, on to Mustique, where we drop anchor for the night. Frigate birds circle overhead and callypso from a pick-up local band drifts from a single hut on the deserted white beach.

Sunday: Misty images of French plantations evoked as we sail past grand and graceful restored colonial islands. Visit Cotton House, once an estate, now a remarkable hotel of textured stone, graceful arches and eleven doll house cottages amidst manicured lawns and pools with floating pink and blue lillies. On to Canouan Island, where we take the Zodiac to dive a little 40' wall. Abundant gorgonia, fans and sponges, tangs, hogfish, trumpets and enormous feathers. Collect conch for dinner, mindful of conserving air until we find the fishermen. Back aboard, we lift anchor for Tobago Cays (pronounced "Keys") and find our fishermen, at work at sunset spreading fish and turtle meat to dry, working on boats and tending lobster pens, from which Marcel buys two lobsters. The aroma of the fishermen's creole lobster sends us scurrying back to the Am Stram Gram for our feast.

Monday: Begin the day with 60' dive, then snorkel. Surface temperature: 90°. Exceptional scenery: colorful coral, impressive staghorn and elk-horn (but very fragile) and variety of tropicals as varied as anywhere in the Caribbean. This becomes our favorite anchorage, so decide to stay until Tuesday. Locate flying gurnards on several dives. About 15" long, with a colorful, spotted pectoral spread of 20" used to forage in the sand. Numerous anemones, green and spotted morays, and tube worms so large they would not fit into my 1:3 framer. Spend rest of the day in the water, eating, sunning, and beach combing.

Tuesday: At our first dive site, Marcel says he too will dive, but on the other side of the reef to spear dinner. I ask that he stay in the Zodiac and follow our bubbles since occasional currents have carried us beyond our limits. He agrees, then we snorkel while he spears grouper. After lunch we depart for Union Island, only a half hour sail, to pick up supplies at grocery in the small town of Clifton. Stop for an afternoon cocktail in Les Bouganvillea Hotel and watch the captured sharks, rays and turtles swimming in one hotel pool, while in a smaller pool lobster await



the cook's pot. I would not exchange the hotel dinner for whatever surprises await me aboard the Am Stram Gram, for Gladys, like the French proverb, can produce a gourmet meal from an onion and a pot of water. Consistently, she creates ambrosial meals from a handful of fresh vegetables. Lunch, salads perfectly seasoned, vegetables beautifully arranged, with fresh dressings--even fresh mayonnaise--prepared daily; French cheeses and hard rolls. Dinners? Voila. An unusual spicy soup; perhaps mushroom crepes, steamed vegetables, chicken or lobster in sauces whose secrets she would not disclose, fish kebabs (fish speared by Marcel) and once, an omelette prepared with the roe of short-spined urchins we had gathered. Delectable. Always special deserts: once, fresh coconut cake in a flaming rum sauce, another day cheese sourdough rolls with fresh fruit. Preceded by a \$5 bottle of dry red wine and a round of backgammon, dinner is an experience worth the entire trip. But, one caveat: Once I learn the species of fish commonly used in the Grenadines for dinner --it might include queen triggers and even queen angels--I decide not to ask what kind of tasty fish is gracing my table.

Wednesday: Two hour sail to Mopion ("bedbug" in French), a 100-yard wide spit with a grass hut and three palm trees, two planted by Marcel. Make dive down a short vertical wall to view enormous fans and hundreds of fish. Lunch, then a brief sail to Puanise ("crab louse") for a similarly beautiful dive, this time visited by inquisitive barracuda and a school of large jacks dashing between us. I find an enormous hermit crab, outgrowing even conch shell; take plenty of macro shots of banded coral shrimp and arrow crabs. Sail to Petit St. Vincent, drop anchor and motor ashore for rollicking Jump Up, a Wednesday night tradition where visiting boaters, tourists and locals boogie to the penetrating music of steel bands and flute bands. Great sport.

Thursday: Fill tanks at encampment of lobster divers and set sail for Mayreau, arriving in two hours for our first dive on the west side of the island. Just below surface, hundreds of light blue needle fish part as I descend. Schools of tropicals swirl about coral encrusted rock canyons. Nearby lays 80-year-old wreck of British gunboat, Purana, where ammunition and bottles are reportedly found, but I have no luck. Sail to Saltwhistle Bay, lined with palms and sea grapes; lunch and loll, then take Zodiac to Catholic Island, hoping for a good dive, but the charts deceive us. High-light is hundreds of enormous starfish loading up on hundreds of conch, so we follow their lead and take back our share for dinner, returning afterward to Tobago Keys, anchor for the night.

Friday: Journey aboard Zodiac to the reef walls of Jamesby and Barabel Islands,

Tips On Yacht Chartering

We chartered the Am Stram Gram from Richard Bertram Yachts, PO Box 3367, Bahia Mar, Fort Lauderdale, Florida, 33316. Another firm which charters yachts is Caribbean Sailing Yachts, Box 490, Tenafly, N.J. 07670. We have spoken with a number of people who have used both services, and Bertram seems to be the preferred. Certainly, our experience was excellent. If you charter a yacht in the Grenadines, keep these tips in mind:

Be clear and specific about your diving needs. Specify the number of tanks you would like to dive each day. Request that the tanks, packs and weights be onboard before you depart. Request a dinghy of suitable size for the number of divers.

Inform the captain that you will need some fresh water daily in a container to soak camera and diving gear.

If your boat is without a compressor, ask the skipper to determine--before you leave--if Palm Island's compressor is working and to ascertain the location of the fishermen with compressors.

Select a yacht with a captain who is a free diver or a scuba diver.

Insist on having someone in a motorized dinghy follow the bubbles at all times. Currents can pop up, carrying a diver far from the mother craft.

Because there is little storage room, pack as lightly as possible, but bring everything you need for repairs, extra mask and fin straps and an extra regulator. Take plenty of film because land photography is excellent and much of the film for sale in the islands is out of date.

The sun is strong and while sailing you may have difficulty staying in the shade without going below. Take sun screen and suntan oil.

Take a copy of the U.S. Navy dive tables. You are always on your own. The nearest recompression chamber is on Martinique.

hoping to find big fish, perhaps reef sharks. No luck. Off Jamesby, scenery much the same as elsewhere. At Barabel we enter water through 4'-6' swells; my buddy and I separate in visibility less than 20'; we surface and descend again, holding hands. Three knot current catches us and surge swings us in ten foot arc; after eleven minute dive we surface, surprised to find ourselves 500 yards from entry and 90° off planned direction. Nearly exhaust myself blowing emergency whistle, but at last attract Marcel's attention and the Zodiac is soon at our side.

Saturday, Sunday and home: Last days of ten day trip spent doing more of same, being as hedonistic as possible. Can terminate anywhere, but have selected Union Island, where we charter a plane from Air Caribe for flight to St. Lucia. En route we make low pass over the smoking crater of Mt. Soufriere, which erupted only a few months before, sending residents of St. Vincent scurrying to sea in boats.

Divers Compass: To reserve the Am Stram Gram write Richard Bertram Yachts, POB 3367, Bahia Mar, Fort Lauderdale, FL 33316 (305) 467-8405 or Marcel Pellitier Am Stram Gram, BP 702, Fort de France, Martinique...Many sail boats, including this one, use a small Zodiac; suiting up can require muscle and patience...English is spoken throughout the islands...uniform aboard the boat is swimming suits and t-shirt, when desirable, but nudity is not uncommon on many of the passing crafts; on shore, shorts and shirts are required in all establishments...when fresh water is limited the ocean becomes your bathtub...U.S. money is generally accepted, but stores may not give the same exchange rates as banks...Eastern Airlines has a direct flight from Miami to St. Lucia...the peak hurricane season is mid-August to mid-September, but they are possible a month or so on either side of that period....

Critical Review of Worldwide Diving: Part II

Reports From Our Readers

In the October issue of Undercurrent we began a three-part series on popular vacation dive sites, basing our comments on the reviews from readers we have received during the past several months. In this issue we continue with those reviews:

TURKS AND CAICOS ISLANDS: Air service has been a real problem to these islands, but Air Florida is now in the picture, and we would expect business to begin booming--and the reefs to begin to get crowded. We reviewed the diving out of Prospect of Whitby Hotel (North Caicos) in our July, 1979 issue and our reviewer returned in September to see how they dealt with the high marks we gave them. "Everything," he wrote, "is just as I found it a few months ago. Although the Undercurrent article brought a lot of business, the staff seems just as personable and accommodating and the diving remains every bit as good as I reported. It's still the best place to head in this part of the Caribbean--and among the best anywhere in the Caribbean." We should note that reservations are required well in advance at the hotel, since it is a favorite spot of many European nondivers.

As to our other favorite spot in these islands, Phil Pruss' operation on Grand Turk, we're pleased to learn from our readers, it is back on track. For a time we received reports that divers were not getting the personal attention and trips to the good reefs we wrote about in April, 1978, but Pruss took a moderate bend hit awhile after the review appeared, and he just may not have been up to his previous high standards. Nevertheless, during the last six months reports from our readers have once again been solid. Suzanne Bachrach (Gaithersburg, MD) writes of her June, 1979 trip: "As good as Cayman or Bonaire; mantas on nearly every dive; the courtesy of Phil Pruss,

which impressed all divers there, made up for the rustic hotel accommodations and un-dependable air service; lovely place. I went there after reading your review. Thanks." And thank you, Suzanne.

HAWAII: On Kona, Tom Shockley and Lisa Chouquette still get top marks for their personalized service (Dive Makai), and last we heard from our readers, Mike McIlvenna at the Kona Village was providing luxury service at this luxury spa. Kona diving is unique; colorful fish against a background of lava tubes makes it interesting, but the water is a bit colder than Caribbean diving.

On Maui, we complained about the lousy diving offered by Blue Water Divers, and subsequently learned that they went out of business in March (see Undercurrent, Nov./Dec., 1978). We also learned that a lady, claiming she suffered "severe and permanent" injuries, including lung and brain damage, is suing the defunct firm for \$1.2 million. The suit claims that she took a dive billed as "safe and simple" and was not provided adequate supervision. One of the defendants has said that there are "no grounds whatsoever" for the suit and that the plaintiff "made a gross mistake by breathing in sea water" during the dive. The suit also claims that the firm "solicited inexperienced persons" to participate in scuba diving.

ST. LUCIA: Full review October, 1977. Readers now say that guide Junior Alcee is not willing to go much out of his way to find unique diving, prices are too high for what he offers, and Berwyn Braden, an attorney from Lake Geneva, Switzerland, writes that Alcee's attitude is "at best indifferent, more nearly arrogant."

PANAMA: We raved about Moody's Pidertupo Village in March and we've since learned of another little hotel on the Caribbean side. Robert Trabers of Los Angeles visited the Isla Grande Resort and the five divers in his party had it all to themselves. His stay was pleasant, the food and accommodations good and the American management worked hard to please. The diving is from the beach and in his words "interesting... modest...limited."

PUERTO RICO: While in San Juan in August, W.A. Carlson (Washington, D.C.) took a 25-mile journey in an ancient van, then a one hour sailboat ride to get to Icacos Island. The trip was a tour by the Caribbean School of Aquatics operating out of La Concha Hotel. Carlson rated the diving on the low, low end of the scale and said it was just not worth the hassle.

ANTIGUA: Long Bay Hotel is now advertising itself as a divers' hotel, but we have only received one comment from a diver who's been there. Carl Peterson (Del Mar, CA), who visited there a little over a year ago, writes: "A beautiful resort with diving, but not a diver's resort...good for nondiving spouse...easy and good snorkeling...I was the only diver there, but dove every day with owner (whose attitude was great) and never felt shortchanged...Not a hot diving spot, but I found the diving enjoyable and the place great for resting and relaxing."

BRITISH VIRGINS: D.C. Fernan visited Anegada Reef, one of the premier dive spots in the Caribbean, in September, and writes: "Anegada Reef has been virtually wiped out by the recent storms. The canal at 30-80' was destroyed by 30-40 foot seas as the hurricane came through." They dived there and elsewhere with Chip Kilbride (who has taken over for Bert and Jaki) and say that the rules are unrealistic for experienced divers, but suitable for the inexperienced and moderately skilled divers who frequent Little Dix Bay Hotel (which is served by this operation).

ROATAN: Anthony's Key is "the" resort on this verdant isle, but reviews from readers are remarkable in their inconsistency. Most people complain of lousy air service and voracious sand fleas, but many like the varied activity and relative luxury: L.L. Craft of Salem, OR, says you can't beat the price, considering the free extras:

tennis, sailing, horses, etc. On the other hand, Marjorie Bank was disturbed by what she says is a dying reef (others lament the great changes in the quality of diving in the past several years), found the guides indifferent and cannot recommend it for serious divers. Dana Mardaga (Austin, TX) spent a week last January at the Reef House Resort and reports virgin diving on the south shore and the freedom to do whatever they wished with their dive plan; the food was "great" and Reef House owner Bill Kepler "very accommodating."

BELIZE: Lighthouse Reef has the best diving in these parts, but it's accessible only by boat. Whitewater River Expeditions (POB 1249, Turlock, CA 95830) runs regular luxury camping trips here which receive high marks from our readers. The Isla Mia, sponsored by See and Sea Travel (680 Beach St., S.F., CA 94109) also gets good notices. Lloyd Craft, Salem, Oregon, writes: "This is unlimited diving at its best. The crew of the boat are super. Excellent food, good service. A terrific spot to dive with many large fish. I went last December and will return this December." Land based Belize diving from the hotels is not as good as from live-aboard boats, but it can have its moments and beats a number of Caribbean destinations. Bernard Gold of Jackson Heights, NY, found Ambergris Lodge too noisy to sleep because locals raised hell in the hotel bar, and didn't care much for the cuisine, although the dive guide was a nice guy; Gold preferred Ramon's Aqua Lodge, "a pretty place, on a pretty beach with good food," and Ramon is considered Belize's best guide by most people who write Undercurrent. Chas. Steele of Petasky, MI, reports \$10/day accommodations, \$3 meals and \$7 boat dives to the Belize barrier reef at the Hotel Marvin. Although Glover's Reef has all the makings of romantic tropical isolation, travelers still complain of surly management, bad food and reefs which show the effect of last year's hurricane and unmanaged spearing for the dinner table. Richard Jaross (Brooklyn, NY) visited there last winter and writes: "Definitely do not go; this was my worst of 20 Caribbean dive trips."

BAHAMAS: Last April we reviewed Small Hope Bay and later received a number of comments from readers indicating that although the management claims unlimited diving, it is difficult, if not impossible, to get a third tank. J.M. Cofer, Kernersville NC, writes of his August trip: "Lodge and dive sites are excellent, the food great, the atmosphere terrific, but the diving far too restrictive and experienced divers should go elsewhere." Phil Hampton (Huntsville, AL) complained about the continued shorting of bottom time (the afternoon dive at 40 feet for 35 minutes) and says: "A dive resort is for diving and cheating divers out of bottom time is intolerable. When seeking a third tank, the guides first said it would cost extra (although he had paid ahead for three tanks), then said it was not safe, and then said the divers would become ill. Manager Alex finally straightened it out for us, but after three days of diving at the identical site in 12 feet of water, we gave up and settled for 2 tanks per day."

Regarding our Bimini review, only one comment has been received, and that just before we went to press. Dr. Robert Rill (Enola, PA) wrote: "The rooms are deplorable, the dive guides unsafe with novices; go elsewhere."

In December, 1975, we reviewed the Current Club, we liked it and readers like it, too. Shallow reef diving is decent, but the highlight is riding the current cut at up to 7 knots with the tidal changes. There's nothing quite like it. Dr. Donald Mahler, Newton, MA, reports on comfortable rooms, nice beach and excellent food, but cautioned that after he paid \$19/dive, he learned that nonguests were charged only \$15; he wrote and got a refund. Carl Mintz (Wash., DC) liked the Current Club better than Walker's Key. He found the diving slightly better at Walker's, but much more expensive and much less friendly. While some divers complain of bad management of the diving facilities, Mintz complained that "Walker's is owned by Robert Abplanalp (Nixon's friend), and his daughter, who runs the front desk, was not very helpful and made several errors on our bill." Sounds like the '72 campaign.

Just about everyone who writes about Stella Maris (Long Island) cites the pleasures

of the accommodations, food and staff, but some of the divers find the patch reef diving kind of a bore after a few days. Jim Kostreva of Chicago, IL, reports, however, that there are a few thrills at "shark reef" where the guides spear fish to attract small sharks, and the divers would lay back and watch the miniature feeding frenzy develop right before their very eyes. For a full review, see Undercurrent, November/December, 1977.

There are many other Bahamas spots about which we get a few random comments. This is what readers currently say: Exuma Islands Charter Adventure Cruises: Dale S. Kreiner (Akron, OH) writes: "Used to be a good operation, but in August, under new captain, I had my worst trip ever; the skipper was lazy, did not know the dive sites, and the food was poor."...Chub Cay Club: Anne Spitzer, Gainesville, FL, says: "I was the only diver brave enough to go out when Hurricane David was still stirring things up. Chub gets gold stars for fulfilling promises when most divemasters would have faded into the sunset. Fantastic eagle rays day-after-day, huge turtles abundant. The wall is fairly interesting, but the blue hole is a bust."...Cape Eleuthera Resort: Gordon Schele, Littleton, CO, writes: "Good wall diving, but with 30 people in the water and the divemasters spearing fish I good a bit concerned. They allow collecting at dive sites, which should be prohibited."...The Impossible Dream: We have always gotten mixed reviews about this boat which charters into the Bahamas, and most recently Stewart Williams, North Platte, NE, tells of his August trip: "This boat is nowhere. The captain didn't know where the reefs were; it was always hit and miss. We were promised a wall dive every day, but only found the wall twice, and each time it began at 140 feet--not much bottom time there. The crew treated us like we didn't know our head from a hole in the ground. The food was barely tolerable and the boat was a mess--the heads were never cleaned. This is the most unprofessional boat I've been on, and I've been on good ones, including the Cayman Diver and the Dragon Lady."

Good And Bad Regulators

Tests The Advertisers Ignore

When you buy your next regulator—or when you bought your last one—were you influenced about Dacor's product because the advertising told about "a small lever" that "makes the Pacer the easiest and smoothest breathing regulator on the market today"?

Were you persuaded by Scubamaster claims that the demand lever is "tipped with an anti-friction Teflon button" so that the "lever slides easily across the diaphragm disk for smooth regulator operation"?

"Our safety underwater depends upon three significant variables in regulator performance, and since the advertisers won't tell you about them, we will."

Or did the claims of the Arctic 950, that the regulator has an "anti-friction device on second stage demand lever, plus a floating piston orifice," provide the information required to clinch the sale?

To most sport divers—and especially to beginners buying their first regulator—this kind of information by itself is useless, although advertisers would have us think that our lives depend upon a little dab of Teflon or a long lasting silicone seat. Our safety underwater depends upon three significant variables in regulator performance, and since the advertisers won't tell you about them, we will.

Depth: The deeper a diver descends, the greater the ambient pressure; the greater the ambient pressure, the more difficult it is for a regulator to deliver air. A high performance regulator will deliver air easily at virtually any depth reached by sport divers, but a low performance regulator may become noticeably harder to breathe from below 50-60 feet.

Tank Pressure: The lower the tank pressure the more difficult it is for a regulator to deliver air on demand. On the surface a diver can breathe the last ounce of air out of his tank with any regulator. Once he descends, getting air from a tank with only 100 or 200 psi remaining becomes more difficult the deeper he goes. A low performance regulator, under some circumstances, may have difficulty delivering air at 130 feet, 100 feet or, in the case of some very poor regulators, even 60 or 80 feet.

Divers' Work Level: Divers engage in varying degrees of "work" underwater. The manifestations of the intensity of work include faster heart beat, increased inhalation and exhalation, and other physiological variables normally associated with work. A diver may be routinely working—welding or lifting bars of gold—or unexpectedly working—trying to remove the rocks from the mouth of a cave or freeing himself from kelp entanglement. A diver in

UNDERWATER ACCIDENT REPORT

Forward report to:

NATIONAL UNDERWATER ACCIDENT DATA CENTER

P.O. Box 68 — Kingston, R. I. 02881

VICTIM INFORMATION	Name of Victim: Last First Middle	Victim's Sex Age Hgt. Wgt.
	Address:	Marital Status: M S D W UNK
	City County State	Occupation Employer
LOCATION OF ACCIDENT	Location of Accident (use landmarks, distance from prominent terrain features. Attach Chart or Map if available) City County State	CIRCLE LOCATION (By Code Number) 1. Ocean, Bay, Sea 2. Minor Lake, Pond, Slough 3. Quarry, Pit, Open Mine 3A. Cave 4. River 5. Major Lake, Pond 6. Swimming Pool 7. Great Lakes
	Date and Time of Accident Day Mo. Yr. Use 24-Hr. Clock	Autopsy Performed: (Yes or No)
TIME AND PLACE OF ACCIDENT	Date and Time of Death	Cause of Death:
	Date and Time of Recovery	Medical Examiner Name
	Death Occurred in Water? (Yes or No) Address Phone

CODE FOR NON-FATAL INCIDENT
Circle one only (A, B, C, or D) which best describes seriousness of incident. Important: Report all "incidents", however minor. Describe in detail on page 4. Include equipment factors.

- A. Incapacitating injury rendering person unable to perform normal activities as walking or diving or to leave scene without assistance.
B. Nonincapacitating evident injury as loss of blood, abrasions, lump on head, etc.

- C. Possible injury indicated by complaining of pain, blackout, limping, nausea, etc.
D. Incident with no apparent injury, (near miss, etc.)

DESCRIPTION OF DIVES AND ACTIVITIES	Description of all dives within previous 12 hours including accident dive.	At time of incident, Activities engaged in.	At time of incident, Buddy record:
	Depth Time Down Surface Interval	Recreational Under instruction Instructing Cave diving Spear fishing Photography Night diving	Diving alone Diving with buddy Buddy distance Diving with more than one Distance to next nearest diver
	Type of Diving: (Explain if Necessary) Scuba Skin Other Unknown	Occupational or Commercial (see back page)	Vessels Involved (Yes or No)
	Others in accident (Yes or No)	U.S. Coast Guard aid sought (Yes or No)	(Give Details in "Description of Accident", Name, Captain, Address, Phone, etc.)
	Separate report filed (Yes or No)		

WITNESSES	Name	Address	Phone	Function/Role

	* Reported by:	Other Contacts:		
	Name	Name		
	Address	Address		
	City Phone	City Phone		

* If you want to contribute case information and remain "anonymous" please call collect to the Director, John J. McAniff (401) 792-2965. Only Mr. McAniff will accept these calls.

ENVIRONMENTAL
CONDITIONS

Sea: Calm Moderate Rough

Weather: Clear .. Cloudy .. Fog .. Snow .. Rain ..

Current: Slight .. Moderate .. Strong .. Direction

Thunderstorm .. Tornado, Hurricane .. Other ..

Wave Height: ... Water Depth: ... Type Bottom: ...

Wind Force Direction

Water Temperature: (°F)

Air Temperature: (°F)

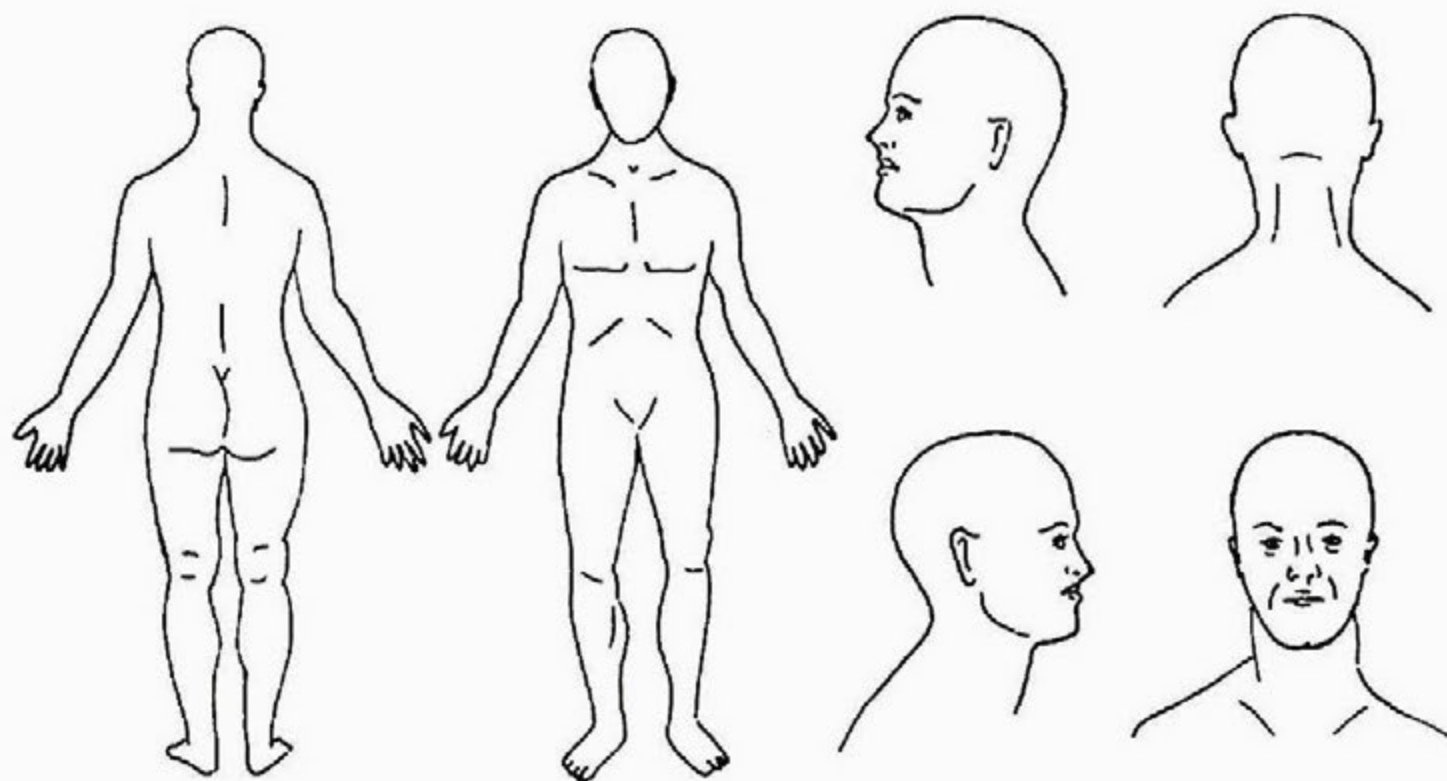
VISIBLE
INJURIES

Illustrate all visible injuries (cuts, abrasions, fractures, etc.)

.....

.....

.....

VISIBLE INJURIES (Illustrate and describe all visible injuries)EXPERIENCE
DATA

Swimming Experience: Years

Courses and Agency

Skindiving Experience: Years

(1) Certification Date

Scuba Experience: Years

(2) -DO-

(3) -DO-

HUMAN
FACTORS

Hours of sleep in past 24 hours

Time of last meal What and how much?

Time of last alcoholic drink What and how much?

Any known physical ailments, disability or impairment?

.....

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Payment must accompany order

EQUIPMENT DATA

NOTE: *Equipment Brand, Type and Serial Number data need be included only if malfunction or failure was contributory to the incident.*

Equipment Data Date and Time of Inspection	Brand, Type	Present Before Diving (Yes or No)	Present at Time of Recovery (Yes or No)	Condition	Equipment	Brand, Type, Serial No.	Present Before Diving (Yes or No)	Present at Time of Recovery (Yes or No)	Condition
Diving Suit					Knife (Posit.)				
Hood					Ab Iron				
Boots or Socks					Flashlight				
Gloves or Mitts					Depth Gauge				
Mask					Spear Gun				
Snorkel					Compass				
Fins					Regulator				
Weight Belt (lbs.)					Tank				
Buckle					Reserve				
Flotation Device					Watch				
Other Equipment									

For "Occupational" or "Commercial" cases give equipment details on back page.

Flotation Device: Used
(Yes or No)

Tested after event?
(Yes or No)

Regulator Tested?
(Yes or No)

Results

Tank: Air Left MFG. Date

(PSIG)

Last Hydro-Test Date

Last Visual Inspection Date

Internal Condition: Clean

Slight Corrosion

Extensive Corrosion

By:
NAME ADDRESS PHONE

Special Comments on Equipment

Equipment Inspected by:
NAME ADDRESS PHONE

Equipment: Released to/or Held by:
NAME ADDRESS PHONE

panic, also is working harder, and a panicked diver or any diver, swimming against a current, may be pulling on his regulator harder than any diver lifting bullion. The better the regulator, the more likely it will deliver under hard working conditions.

Depth, Tank Pressure, Work Level: Consider the combination: 100 feet, 500 psi, heavy work load of a panicked diver. A good regulator delivers air, a poor regulator may not. The diver thinks he's out of air, undertakes an emergency ascent, and doesn't make it. Alter any variable and the quality of the regulator becomes even more important.

Getting Accurate Information

In the last decade, we know of only one article appearing in any general circulation publication which provided the facts about regulator operation by manufacturer, and that article appeared in *Undercurrent* in April, 1979. We published a synopsis of a government funded study by UCLA's Dr. Glen Egstrom in which 39 regulators were comparatively tested. We subsequently learned from several sources that many manufacturers were unhappy with the publication of that study, and some were even critical of Egstrom for releasing it, although as a government-funded study it is in the public domain and can be printed by anyone. The only American publication so far willing is *Undercurrent*.

Summary Of The Egstrom Study

The 39 regulators studied by Egstrom were tested at moderate workload at depths to 197 feet, and at two tank pressures, 1200 psi and 300 psi. Some of the newer regulators on the market (the Dacor Pacer, the Technisub Inject 40 L, the Scubamaster 1687, the Arctic 950, and the Scubapro Air I) became available after the study's cutoff date and could not be tested. Of the 39 tested, two rose to the head of the pack: The Tekna 2100 and the Scubapro Pilot. Since the Pilot is no longer being produced, the Tekna seems, for the time being, the best performer in the Egstrom study.

Deciding which of the 37 remaining regulators are the better regulators requires careful assessment of the data and, essentially, a judgment call about sport diver needs. For example, the White Stag Deep 3 (5110) and the Scubapro Mark V show similar performance characteristics in each of the tests up to 131 feet with 1200 psi. When, at that depth, the tank pressure is reduced to 300 psi, White Stag's performance is rated as "marginal" while Scubapro is "unacceptable." When the next test is conducted—191 feet with 1200 psi—the Scubapro outperforms the White Stag.

Many sport divers go to 131 feet, but few journey to 191 feet, so in that case we find the White Stag performance preferable to the Mark V, so we would tend to rate that regulator slightly ahead of the Mark V, and just a notch behind the Tekna, all other variables being

equal.

In assessing the results of Egstrom's test, we would then judge a number of other regulators suitable to most sport divers. They would include: Dacor 400, Healthways 1675, Scubapro Mark I, Mark V and Mark VI, Sherwood SRB 4100K, U.S. Divers Conshelf 12-1081-00, U.S. Divers 1083-00, and Calypso 4, 1084-00, Voit MR-12 and Voit V 124. Of this grouping, our preferences would be the Scubapro Mark VI, the Sherwood SRB 4100K, U.S. Divers Conshelf 12-1081-00, and the Voit MR-12.

Six Basic Laws Of Regulator Performance

Writing in a 1973 publication of the British Sub Aqua Club, J.G. Van der Walt and R.J. Nyman listed six basic laws of regulator performance.

Don't believe a word of them.

1. All regulators of the same make and model breathe the same.
2. All regulators are set to optimum performance by the manufacturers, and this does not change throughout the entire production run of that model.
3. The performance of a regulator never changes until the day it finally ceases to function at all.
4. Notwithstanding the above, if you borrow or rent a regulator of the same make and model of your own, yours will always be the superior performer.
5. The newer and later regulators all breathe better.
6. All rumors concerning reliability or performance of a particular regulator are to be discounted utterly until it happens to you.

We should also note that there were a few surprises. The Poseidon Cyklon 300 has a substantial reputation among sport divers, but the Egstrom test discovered, in our opinion, a serious flaw in the performance of that regulator. At 66 feet, and at every greater depth tested, the Poseidon performance at 300 psi tank pressure was unsatisfactory. Only one other regulator of the 39 tested, the Dacor 100, had the same poor result in this test.

The poorest regulator performance seems to be attributable to two White Stag models, the 51141 and the 51440, both of which showed marginal performance at 66 feet with 1200 psi, a very common situation for any sport diver. The 51141 even proved marginal at 33 feet, with only 300 psi. To us, the results of this test clearly suggest that these two regulators are unsafe for anyone but the most conservative of sport divers.

And one nice surprise, to which Egstrom alerted *Undercurrent*, was the relative strong performance in deep water with low supply pressure of the Sportways 200, a moderately priced regulator.

Criticism And Other Studies

Manufacturers critical of the study attempted to criticize the test design, claiming that they could not produce the same results in their laboratory. That may be true. Seldom are identical results produced when different testing equipment is used. But Egstrom's study is clearly the best effort so far, and it seems unlikely that if someone else were to study the range of 39 regulators (and the U.S. Navy is doing just that) the relative position of the regulators to each other would change significantly. That is to say, that we would expect the Tekna and the Pilot to still be at the top, the Poseidon to show its weakness at low supply pressure, and the two White Stags to be near the bottom of the list.

The United States Navy also tests regulators, and *Undercurrent*, from time to time, has published their test results. In comparing those results in the past, the rankings seem similar to Egstrom's: The Scubapro Pilot proved about the best, the Sherwood 4100 K looked solid, but Sherwood's 3100 much less so. Though the Poseidon received Navy approval, the Navy noted that it "performed poorly both at high work rate and at low supply pressures."

"Only five or six regulators currently on the market will meet these new Navy standards."

U.S. Navy standards for regulator performance were established several years ago. Few regulators could meet those standards, so many companies had to redesign their products if they were to sell to the Navy. Today, the state-of-the-art has advanced considerably and the U.S. Navy standards, to some degree, do not even meet sport divers needs. For example, many of the regulators Egstrom found unsatisfactory at a low supply pressure at 131 feet do meet Navy standards. The Navy, mindful of the more demanding needs of their divers at 130 feet and recognizing that manufacturers have the capacity to produce better regulators, have established new performance standards and are completing tests of some forty regulators. Once the study is complete, *Undercurrent* will publish the results. We have learned,

Regulator Performance Chart

The Egstrom regulator performance chart appeared in the April, 1979, issue of *Undercurrent*. It ought to be a part of every divers' library. If you were not a subscriber at that time, you may order that issue by sending a \$2.50 check to Ai-com, 2315 Broadway, New York, NY 10024.

however, that only five or six regulators currently on the market will meet these new Navy standards, and another three or four meet neither the new nor the old standards, although they are still sold over-the-counter to unsuspecting sport divers.

One other test, conducted recently, suggests the validity of Egstrom's ranking, although in this test few of the same 39 regulators were compared. An Italian commercial diving firm, Sub Sea Oil Services, has been conducting a series of tests on internationally available regulators. Mike Todd, of the British magazine *Diver* put sixteen regulators, provided by the manufacturers, to the test on the SSOS equipment. These are his rankings:

The Best Of The High Performers:

- Spinnaker Pro
- Scubapro Pilot
- Spirotechnique 50/10
- Spinnaker B

Other High Performers:

- U.S. Divers Calypso IV
- Spartan J2

The Good Performers:

- Poseidon Cyklon 300
- Spartan X2
- Typhoon Mark 2
- Typhoon Mark 3

The Moderate Performers:

- Submarine Products Aquarius 200
- U.S. Divers Deepstar
- Siebe Gorman Neptune
- Scubapro Mark V
- Nemrod Snark 2 Silver
- Spirotechnique 20/20

One of Todd's conclusions was that the servo-assisted regulators had inherent breathing advantages over conventional models. The only servo-assisted regulator tested by Egstrom was the Tekna.

The Information Gap

In addition to performance under use, other characteristics have a role in the selection of a regulator. The most important, perhaps, is the stamina of a regulator. Few sport divers want a regulator they must have serviced after every few dives, and since few sport divers treat their regulator with the care it should receive, the device must be sturdy. The Scubapro Pilot, one of the best regulators ever made, was removed from the market because it was too sensitive to sport diver use and sport divers were continually complaining that they could not keep the regulator working properly. Scubapro complained that the divers didn't exer-

White Stag Recall

White Stag regulator, model #51144 Deep V has been recalled by the manufacturer. The high pressure Teflon seat in the first stage may be forced out of position inadvertently, causing the second stage to freeflow. For the location of your nearest White Stag dealer, who will repair the regulator at no cost, call (800) 421-1525 or (213) 538-9540.

cise the care required, but the divers eventually won. Scubapro stopped making the Pilot, replacing it with a less sensitive model.

Although the number of high and low pressure ports, the comfort of the mouthpiece, the swivel action of the first stage, and several other regulator features are important to the purchaser, the advertisements would have us believe that these are the only important features.

Why don't we know more about the performance characteristics of a regulator before we buy one? Why isn't there an instruction card accompanying your regulator which explains that you should never trust your regulator at 100 feet with only 300 psi remaining? Why is there no warning that you are taking your life in your hands when you take your regulator down to 150 feet?

Why are the manufacturers holding out?

The story continues in the next issue.

Self-Regulation Of The Diving Industry?

The Broken Promises Of 1975

In the summer of 1975, it seemed that the entire dive industry was in chaos. The Los Angeles County Board of Supervisors—the elected governing body of LA county—had investigated causes of mounting diving deaths and had informally concluded that the county government must begin regulating diving. There were serious questions about inadequate training, about faulty equipment and about the poor supervision and management of local diving charter boats. The county officials, seeing no effort at self-regulation by the industry, decided to act themselves. Industry officials, alarmed at the comprehensive local proposals, feared that the state government would follow, regulating diving throughout California and perhaps a national movement might even develop. Indeed, there was quite a stir.

"So, for the first time in diving history, the competitors sat down at conference tables, held their bickering and molded an industry-wide strategy to cope with the spectre of regulation."

Executives from every diving company and training agency scurried from meeting to meeting to come up with self-regulation proposals that would be accepted by LA county and forestall government regulation. If they could develop a sensible approach to the problems, indicating the concern and responsiveness of the industry, they presumed LA County would back off. So, for the first time in diving history, the competitors sat down at conference tables, held their bickering and molded an industry-wide strategy to cope with the spectre of regulation.

For the most part, the industry won. Although the Board of Supervisors passed an ordinance, they accepted industry pleas to permit self-regulation, and the

law had no significant effect on training agencies or manufacturers. The industry publicly decried the effort toward regulation, but privately whistled in relief.

Undercurrent reported on the legislation and industry response in our November, 1975 issue. Here's what we said:

"At long last the certifying organizations have had to sit down together at the bargaining table to solve a major mutual problem. For too long they've been engaged in unnecessary competition but with the impending threat of government regulation, they acted fast. In a noteworthy effort, they formed the National Scuba Training Council to develop general standards for instructor and diver training and then to monitor that training. Students in the future, whether in Las Vegas, Los Angeles, or Lasalle, will be assured a complete training program. Furthermore, if any of the certification organizations do not solve internal problems of inadequate training, the Council is committed to act. But, make no mistake. Without the strong stimulus of the LA act, the organizations would still be miles apart. Their progress in working together in the last year has been remarkable.

"Rather than face the issues, the Big Four backed away, dissolving the National Scuba Training Council before the members ever got a chance to tackle the problems of industry wide training."

"Moreover, the equipment manufacturers were put on notice that if they did not develop some important industry-wide standards, then the government would act for them. They reacted quickly. DEMA, the Diving Equipment Manufacturers Association, committed themselves nationally to accept the standards posed by the original ordinance and to monitor their own industry. DEMA even took a step beyond the law and

proposed additional national reforms. DEMA knows that the government means business. An *Undercurrent* interview, with a key LA county executive, confirmed that should the industry fail in its program of self-regulation, then that quality control law will be right back on the books. No one believes the manufacturers will go back on their agreement and so far they have demonstrated their good faith. It is obvious, however, that the manufacturer's positive action came about only because of government action."

That was 1975. Has the industry kept its word? Quite candidly, the answer is no. We called a number of representatives of the training agencies and here's what they told us.

The National Scuba Training Council

In rapid response to the LA ordinance, NAUI, PADI, NASDS and the YMCA formed the National Scuba Training Council to carry out the verbal commitments made behind closed doors to county officials. Soon after their first meeting, at least two new and small certifying organizations, SSI (Scuba Systems International) and NASI (The National Association of Scuba Instructors) requested membership. The bylaws of the Training Council did not preclude the addition of new members, but the Big Four did not take lightly to new certification organizations moving in on their turf. By admitting them to the Training Council, their legitimacy as certifying organizations would be established. When Brawley was excluded, he apparently threatened to sue, claiming his exclusion was a restraint of trade. Rather than face the issues, the Big Four backed away, dissolving the National Scuba Training Council before the members ever got a chance to tackle the problems of industry wide training. Interestingly, no one seemed to notice.

The story has a twist. When the Training Council moved for formal dissolution, they discovered that they had, in fact, never existed legally. No one had completed the papers required to organize the Council as a nonprofit organization. When Ed Brawley, who runs the National Association of Scuba Instructors in Monterey, California, learned this, he took out a legal 90-day option on the name and briefly promoted it at the 1979 DEMA trade show. Brawley did not pursue ownership, so Dennis Graver, PADI Training Director, took legal possession of the name, but his reasons are uncertain. He recently told *Undercurrent* that: "I have no intention of reactivating the Council."

Other Efforts

Although the formal interagency effort, spawned by the LA threat of legislation, to improve and perhaps standardize training went bust, the agencies still make some effort to reach agreement. They don't get very far.

Agency representatives met in January in New

Orleans and again in February in Los Angeles to discuss training standards. The fact that they meet on the topic seems to indicate that the agencies acknowledge the need for improvement. According to several participants we spoke with, the meetings end up focusing on agency procedures, not on the skills taught or the qualifications of the certified diver. The members seem to get stuck on matters important to agency operation, not on matters necessarily important to people about to become certified.

For example, one of the areas of conflict centers on the definition of an assistant instructor. Each agency treats the assistant differently. Neither NAUI or PADI permit assistant instructors to take students into open water without an instructor present; the YMCA allows assistant instructors to evaluate students in open water and report back to an instructor; NASDS claims not to have assistant instructors, using instead provisional instructors who can teach but cannot certify. One reason for the variance between organizations is that assistants in each organization have undergone different levels of instructor training—some agencies require more rigorous training than others. Another reason is that agency philosophies differ.

Price Hikes

Price increases for rubber and petrochemical products will shortly lead to increases in scubagear prices from most manufacturers. Some manufacturers will raise their prices January 1, while many others will jump their prices shortly thereafter. If you expect to buy new gear next year, you will save money by acting now.

On the other hand, Environmental Systems announced recently a price reduction of an astonishing \$50 for their Warm Air Breathing Apparatus. The WABA is a canister strapped to the scuba tank and filled with hot water prior to a dive. The hose from the tank enters the canister where the air is heated before it goes to the diver. The 80° air reduces a great deal of internal heat loss, permitting deeper dives in cold water. The WABA was selling for \$189; its price now is \$139.

An outsider may wonder why it is important to standardize assistant instructor roles, but one agency representative told *Undercurrent* that "the group needs a point of departure. If we can't agree on what an assistant instructor or instructor is, then we have no point of departure." But, it seems unlikely that the agencies will reach agreement. PADI's Dennis Graver told *Undercurrent* that he sees "no way to write a standard without each organization changing the way it does business." But, John Gaffney, NASDS, recently wrote to his shops saying that the other organizations

would have to improve their programs to meet the high standards already established by NASDS.

The role of an assistant instructor may matter to each agency, but the bottom line for the student is how well he can dive when he completes the course. It doesn't matter to us, and it doesn't matter to trainees, whether people in the water with them are called provisional instructors, junior instructors, or assistant instructors. What does matter is that the trainee in Las Vegas, just as the trainee in Los Angeles or Lasalle, knows that once he is certified he is equipped with the know-how to be a safe diver.

There is no doubt that diving instruction has improved over the years, but every day divers throughout the

county are handed their PADI, YMCA, NASDS, NAUI, or SSI card when, in the eye of any independent evaluator, they are not sufficiently competent to be sent off with another unskilled buddy for an unsupervised dive. That 1/3 of the deaths in scuba are attributed to divers undertaking one of their first few open water dives seem to attest to that.

One day, again, some government jurisdiction will respond to a surge of diving accidents and move to regulate diving training. The certification agencies will plead, as they did in 1975, for the right to regulate themselves.

Will anyone listen?

Next month: Equipment Standards.

CO Poisoning And Accident Reporting

Unsolved Case Raises Serious Questions

Most divers never contemplate the possibility of carbon monoxide poisoning. Have you ever checked a dive shop's compressor to verify that its intake is clear of exhaust or fumes, that it's well-maintained without the possibility of oil leaking into it, that it pumps air pure as Rocky Mountain air? Probably not. We sport divers trust our local dive shops to provide clean air, and presume that the likelihood of getting contaminated air ended years ago with the advancement of compressor technology and professional know-how.

That's not quite the case, unfortunately. Life is not without error, and even the most conscientious dive shop could find its air quality inadvertently deteriorate for a number of reasons. The deterioration is normally minor and quickly corrected, but unfortunately that was not the case for a diver in Puget Sound who, in September, died of carbon monoxide poisoning. *Undercurrent* does not normally report on a single fatality, but the events surrounding and stemming from this accident suggest lessons for each of us.

The Accident And Subsequent Events

Mark Marquess, 31, left his home in Eugene, Oregon, for a commercial dive in Newport, Oregon, then returned home, apparently filling his tank somewhere along the 100-mile journey between the two towns. He and his buddies subsequently drove to the Bellingham, Washington area where they were among twenty-one divers on a Zumbrota Boat Charter to dive Lummi Island. In fifty feet of water, he and his buddy agreed to split up to swim around a large rock, but his buddy circled the rock and could not find Marquess. On the surface he was spotted, feet up. He could not be revived with CPR. After an investigation, the death was attributed to a heart attack, but the cause of the heart attack seemed to be

the 3,500 parts per million of carbon monoxide in his air; 20 ppm is the U.S. Navy pure air standard.

Ten weeks later no one has determined where Marquess got his air. Authorities have ruled out homicide, but acknowledge that the "chain of evidence" has been broken because his well-intentioned buddies broke a major rule of dive accident management: they took Marquess' gear back to Oregon where it was stored for four days before it could be inspected.

The gear was finally tested at the University of Washington, where the carbon monoxide was discovered. Marquess owned his own compressor, but, according to Chief Deputy Doug Gill of Whatcom County Sheriff's Department (Bellingham), the air in his tank also contained trace elements of the glue used in making wet suits, which seemed to rule out the possibility that Marquess, himself, filled the tank and points to a dive shop as the source of the air. Marquess' father-in-law, Donald Hollingshead, owner of Eugene Skin Divers Supply, said that a subsequent investigation of Marquess' compressor indicated that it had not

Symptoms Of CO Poisoning

First Stage: no prominent symptoms, but decreased judgment and psychomotor performance.

Second Stage: mild frontal headache.

Third Stage: more severe headache, throbbing temples, nausea.

Fourth Stage: severe headache, dizziness, dimness of vision, vomiting, increased pulse and respiration.

Fifth Stage: coma, convulsions, weak pulse, respiratory failure, death.

NOTE: Carbon Monoxide is colorless, odorless and tasteless.

Cobras, Crocodiles And Polar Bears

Sweet Dreams To Our Readers

It may have been the full moon, but for some reason a rash of scary little stories came into our office all at once and after three nights of restless sleep filled with visions of monsters, we decided to share our misery with our beloved readers.

The first tale comes from Len Charlton, Assistant Editor of the British *Subaqua Scene*, who recently visited Thailand in search of new dive sites and has this to relate about his first dive there.

My son and I hired a boat and boatman to take us to a good dive site. When we arrived I asked the boatman to put the ladder in the water for our entry, but he refused. I insisted and pushed the ladder into the water. He shook his head again and pulled it up. Then he went to the anchor and started to pull it up. By this time I was getting slightly angry. He spoke no "Engerish," he said, but I tried to find out what was the matter. I could see no reason for us not to dive in this beautiful, calm sea. Finally, he pointed to several lots of driftwood floating about 100 meters away. He took a piece of wood from the boatdeck and threw it at the driftwood. Suddenly all hell broke loose. The driftwood became a mass of writhing cobras. There had been a few big storms, I was to learn later, and the snakes drifted down the rivers into the sea, where they would float in clusters to the nearest islands. I saw six lots of big and small snakes. Imagine coming up after a dive among them. I apologized to the boatman and rather quickly helped him pull up the anchor.

And then we read of an Australian skindiver diving a few hundred yards offshore in the Arafura Sea last August. His wife saw him suddenly surface, screaming and struggling in the jaws of a 13-foot salt water crocodile. Seconds later both the diver and the crocodile disappeared underwater. Several hours later a search party found his body on shore, where the crocodile had apparently dragged it prior to dining. There were few marks on the body since crocodiles normally kill their prey by drowning, rather than with their teeth.

Now if this is not enough, consider polar bears. We have heard that polar bears can't open their mouth and bite underwater, which may be an old husband's tale, but they can indeed take a healthy swat with a paw and knock a diver senseless, waiting then for him to bob to the surface. Italian filmmaker Paolo Curto was recently filming a documentary entitled *Dear Monsters of the Sea* and reports that the defense used by the camera crew against polar bears was to dive with several extra pounds of weight and an inflated BC. "If a diver became a target for an angry bear, he would pull his dump valve and dip down to below 16 ft., where no polar bear can follow because they cannot compensate." During the filming only one bear showed any aggressive tendencies and Curto, who for awhile couldn't find his dump valve, only received a light scrape from the bear's enormous paw. On the other hand, most bears ignored the cameramen and the biggest problem was to get them off the ice floes and into the water for filming. In one case the frustrated cameraman dragged a seal carcass away from a feeding bear, to which the bear responded by rolling over and falling asleep.

And our last tale comes from our own fearless correspondent who visited North Caicos a second time in October to check on the veracity of the review which appeared in *Undercurrent* in July, 1979. He had taken several dives on this trip, seeing no sharks, until on one dive he happened to look up and see a six-footer speeding directly toward him. He raised his arm and shouted so loud his regulator popped from his mouth, and then grabbed his octopus regulator to press the purge button to blow bubbles. The shark scraped his wet suit, but kept right on going and didn't return. Our correspondent reported: "I've seen hundreds of sharks in my twenty years of sport diving, and this is only my second incident. I was busy poking around the bottom and did nothing to provoke this fellow, but he came anyway. I suspect the bubbles from my regulator or the shout kept him from coming back a second time, but then he may not have seen me since I immediately found myself engulfed in a brown cloud."

Humans, like squid and octopus, seem to have their own techniques of self-defense.

been used for sometime.

The Whatcom County Sheriff's Department sent a detective to Oregon for four days and, according to Chief Gill, they were able to narrow the source of air to seven shops, but no shop recalled, of course, selling air

to Marquess. With homicide ruled out, Chief Gill told *Undercurrent* that limited funds prevented them from taking the case any further. Continued investigation "would be of benefit only to litigants in a civil suit," he said, "and there is only a limited amount of money."

Carbon Monoxide And The Compressor

More Than Auto Exhaust

The most common statement made by untrained personnel operating compressors to fill scuba tanks is "my compressor cannot produce carbon monoxide because it's electric."

Gasoline powered compressors indeed increase the likelihood of CO (carbon monoxide) contamination, but switching to electric eliminates only 10% of the battle. To win the full battle, and keep the air within acceptable purity limits, the compressor operator must have a complete grasp of compressor mechanics. All compressors that use oil to lubricate the pistons can generate CO as a result of a malfunction, misuse, or poor condition. CO can occur suddenly or intermittently, without a visible change in the compressor's operation.

Two conditions lead to the formation of CO in a compressor: oil in the compression cylinder and temperatures high enough to cause oil to burn in the cylinder.

Oil lubricated compressors always have oil present on the cylinder walls. Cylinder temperature often rises to a point that causes the oil to ignite, thus releasing hydrocarbons and CO. This is often caused by the compression ratio being too high, which can be caused by any of the following:

1. Restriction of the compressor intake caused by a clogged or dirty inlet filter, a kinked inlet hose, undersized or extended inlet piping or other restrictions of the air intake. The compressor is required to pump air from lower than ambient pressure, so the final compressor stage must make up the difference with a higher compression ratio.

2. Interstage leaks, leaks from interstage piping, vibration loosened fittings or head gaskets, or excessive piston blow-by will result in reduced pressure to following stages and a proportionately higher compression ratio.

3. Compressor valve leakage or failure and poor operation of the first stage valves can result in reduced pressure to following stages and higher compression ratio in the final stage.

4. General overheating or operation of the compressor beyond design limits can directly or indirectly be the cause of CO production. High ambient temperature with marginal cooling in area can result in excessive cylinder temperature. An inoperative cooling fan, loss of cooling water, blocked cooling air passages, or inadequate cooling between the stages can also result in oil ignition.

This article is a condensed version of an original piece by Dick Rutowski, National Oceanic and Atmospheric Administration Dive Office which appeared originally in the February, 1979, issue of *The NOAA Diver*, newsletter of the NOAA Diving Program.

Gill did say, however, that a full investigation might uncover the source, or certainly narrow the choice to fewer possibilities. Of course, by now all dive shops are on notice about the death and any compressor problems surreptitiously uncovered have most likely been rectified. Nevertheless, private investigators have apparently been hired by the deceased diver's family to pursue the case.

Lessons For Sport Divers

Divers present after any fatality should see that the victim's equipment is turned over to authorities, and

not taken from the accident by well-meaning friends. Too often the equipment or the air is not analyzed, and the cause of the death remains listed as "heart attack" or "embolism" when other factors are contributory.

One organization in the country studies all scuba deaths: The National Underwater Accident Data Center, University of Rhode Island, Kingston, RI 02881. Their goal is to improve diver education and safety. We have included their questionnaire, and ask that any diver present during a serious accident do his best to complete the questionnaire and return it to the Accident Data Center.

Contact Lenses And Diving

The Soft Lens Option

Hard contact lenses can be worn when diving, but many divers experience eye discomfort and impaired vision. Without considering other options, they have prescription lenses glued into their mask or, in some cases, dive half-blind. There are other solutions.

According to tests recently conducted by two Navy medical researchers, divers wearing hard contact lenses during a decompression dive to 150 feet developed sore eyes, had decreased sharpness of vision, and saw halos and radiating spokes when viewing lights.

However, when the subjects wore soft contact lenses or hard lenses with a tiny hole drilled in them (fenestrated lenses), the problems did not occur.

Captain M.E. Bradley and Commander D.R. Simon discovered that the eye problems stemmed from small nitrogen bubbles which developed in the precorneal tear film. The bubbles expanded during ascent, remained trapped, and disturbed the tear film covering the cornea. Deprived of oxygen, but retaining carbon dioxide, the tissue was sufficiently damaged to produce the unpleasant symptoms.

When hard contacts with a tiny 0.4 mm hole were used, a tiny amount of tear could pass, permitting nutrients to bathe the cornea sufficiently to prevent tissue damage.

Soft contacts contain a large amount of water and cover the entire cornea. The permeability and flexibility of the soft lens allowed the exchange of the trapped gasses and nutrients, so bubbles did not form during decompression and no discomfort and damage resulted.

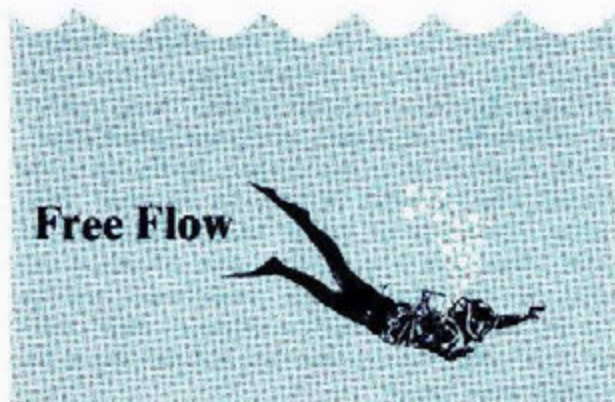
Although a facemask with fitted lenses may still remain a good choice for some people, soft contact lenses or fenestrated contact lenses can normally be used without the discomfort and tissue damage accompanying the use of hard contact lenses. As to the fear of losing contacts underwater, they can indeed be lost if a diver's eyes are not protected by a mask. But when there is an accident—if the mask gets knocked away or water comes rushing in—eyes close reflexively. If a diver must open his eyes under these circumstances to

Mask Defoggers

On a recent dive trip, one of our staff members reported that a novice diver registered shock when she saw him spit into his mask prior to a dive. When he explained his purpose, to keep the mask from fogging, she informed him that she had just been certified and had never heard of such thing. Her instructor, it seems, simply peddled her a \$2.98 bottle of juice that would be lucky to last her a week. She did not take kindly to our staffer's suggestion that what she had purchased was only bottled cow spit.

Nevertheless, there is an inexpensive alternative for people who don't want to spit in their mask and for those who object to the price of defoggers. A few years ago the Naval Coastal Systems Laboratory in Panama City, Florida tested a number of items, both in the laboratory and during diving operations, and determined that *Lemon Fresh Joy* was a highly effective anti-fog compound. Just pour some in a small plastic container, slip it in your dive bag, and you've got a defogger at about 10% of the price of the commercial stuff.

save himself, then the price of lost contacts, when the issue at hand is self-rescue, is nothing to fret about.



Texas Governor Bill Clements was recently declared the winner of the "Barefoot and Pregnant" award, a monthly distinction awarded by a Texas chapter of NOW, the National Organization of Women. Clements was attending an August 30 conference at Texas A&M University, where he heard a presentation by Dr. Feenan Jennings, head of the school's Sea Grant program, during which Jennings reported on University research which indicated pregnant women should exercise great care scuba diving since recently developed evidence indicated that the fetus may be susceptible to bends. After hearing

Jennings, Governor Clements responded that women are "always looking for birth control. We might say 'go deepwater diving and exercise birth control.'" The NOW group presented the award "in recognition of his callous attitude toward childbearing, his ignorance of the tremendous contribution of self that Texas women dedicate to this state and society, and his unconscionable disregard for the health and safety of women and children."

According to the *Miami Herald*, Fitzhugh Rollins walked into Miami's Calypso Dive Center and paid \$1.56 to fill his tank last June. Later that afternoon, he hired a boat and driver to take him out on "a test dive." On the way to the site he sat quietly, reading a science fiction book. After he entered the water, he surfaced and asked the boatman to hand him a bag he had brought aboard, and again slipped below the surface. He did not return. The following morning he was found dead, floating in red gym shorts and scuba gear. Police said he had shot himself in the right temple with a .22 caliber automatic pistol while underwater.