

undercurrent®

THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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The Seaquest, Philippines

Sharks, Stingrays and Lionfish

As the travel editor of this persnickity publication, I try to make as many on-sight visits and write as many firsthand reports as I can. But I can't make all the trips so I normally rely on two other associates for their reviews. This article, however, was written by a fourth person, our mysterious Far East correspondent, who has written for Undercurrent previously. He is a professional journalist whose name appears on the top of many articles in a major U.S. newspaper and in dozens of minor papers several times a week. Currently stationed in Hong Kong, he joined up with this See and Sea Philippines trip and paid only the land portion, while arranging his travel separately from See and Sea. The leader of the trip, See and Sea's President Carl Roessler, knows the writer from previous trips and knows he is a journalist, but was unaware that he was writing for Undercurrent. Needless to say, Carl, we won't be able to use him on your boats again.

C.C., travel editor

Our 102-foot live-aboard diving vessel, the Seaquest, was anchored on the edge of the south reef wall off Apo Island, which is west of the big island of Mindoro and just north of the Calamianian island group. We had cruised overnight, at a slow 4½ knots -- top speed for the lumbering Seaquest -- and were now poking out of our cabins and yawning to the first bright rays of a spectacular Philippine sunrise, heading for the coffee, mangoes, fried eggs and spam, and hot toast, all in anticipation of our first day of diving. The boat was quiet, the water relatively still.

"Look," someone said. Something had cracked the surface less than 60 feet from the boat, and that something was big! Within seconds, Carl Roessler, our guide, had slipped quietly into the water, in snorkeling gear with a camera. I was right behind.

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I caught a glimpse: it was a huge

manta ray with a wing span I guessed to be eight feet across! It surfaced several times before looping slowly down and over the wall. Not a bad way to begin this diving vacation, I thought.

A lot of people will tell you that the most important piece of equipment needed on one of Roessler's See and Sea Travel diving trips is either a fat wallet or a creative tax accountant. Others will argue, however, that inflation has made everything expensive, especially landlocked tours to exotic parts of the world. Is seeing India's Taj Mahal worth spending \$2100 plus airfare? Is swimming alongside a giant manta, discovering Spanish Dancer nudibranchs, photographing sharks up close, petting lionfish, and spending 10 days in an isolated watery corner of the Third World worth \$2100 plus airfare? If the answer is maybe, read on:

In the preparation bulletin Sea and Sea sends to participants prior to these trips, telling them what to wear, what to bring, where to meet, and so on, I learned that there were to be nine divers on this tour, plus Carl and his wife, Jessica, as escorts. But when I arrived at Manila to meet the trip, I found that four had cancelled. There would be only five divers, plus Carl and his wife. I was surprised -- and delighted -- the trip has not been aborted.

In flying in from the states, one day is lost crossing the international date line (of course it's regained on the flight home) so arrival is on the morning of the third day. Due to extraordinary jet lag, most of that day gives way to slumber, for which Roessler has chosen one of the best places in Asia for down time-- the Manila Hotel. It is not only the most luxurious hotel in the Philippines, it's one of the best in Asia -- highly regarded worldwide. It's the renovated and extended hotel in which General MacArthur lived during the Second World War. Right on Manila Bay, in downtown Manila, it has five restaurants, a huge swimming pool, two tennis courts, and enough great service to entice you to forget the diving trip and simply remain here.

That first night in Manila-- the third night of the trip -- everyone goes out for a meal at a great Filipino restaurant. Day four is a cruise tour of Corregidor, the island fortress in Manila Bay, an afternoon of shopping and sightseeing, and an evening of Philippine dances and food.

On day five, at 4 a.m., we met sleepily in the hotel lobby and headed for Manila airport for a morning jet to the town of San Jose, on the tip of southern Mindoro. There, after a last-minute loading of food, beer (San Miguel, naturally), fruits, and fuel, we boarded the Seaquest at dockside, while crewmen brought aboard all our gear. I have never had to carry anything on a See and Sea Tour. The service is always super. The Seaquest, by the way, had fifteen efficient Filipino crew members, though I never saw more than five at a time.

By midmorning the Seaquest was underway. It's sort of an old wooden tub--a converted fishing boat with two wide wraparound decks and cabins in the middle. On the top deck there's a large open area where we ate breakfast in the morning sun and dinner under electric lights and the stars. In midday the hot sun made it too warm for lunch. There's also a dining room on the top deck, and four small cabins, each with bunk beds for sleeping two and racks for clothes and equipment. None of the cabins is air-conditioned, so on nights when sleeping became impossible we flopped mattresses on the deck outside and snored away under the stars--interrupted occasionally

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by a nighttime shower. On the main deck, shaded by the top deck, there is a bar where we usually ate lunch; cabins on each side run back to the diving area where tanks and gear are stored. Here are freshwater showers and toilets. With only seven divers aboard, there was plenty of room. Roessler takes up to fifteen divers, still short of the craft's complement. European or Japanese tours bring up to twenty-five divers at a time. Because of our small number, we converted one cabin into a camera room for charging strobes, greasing O-rings and cursing flooded equipment--a necessity because four strobes were drowned!

The food was delicious and plentiful. For breakfast we were served standard western fare of eggs and fried ham, pancakes, pineapple juice, toast, coffee and tea plus fresh mangoes and pineapple; a variety of western, Filipino, and Chinese dishes were offered for lunch and dinner, including fresh salads, fried chicken, and lots of fresh fish (some of which the crew caught off the stern at night). There's lots of ice-cold beer and soft drinks, and mixed drinks, for an extra charge.

Of course the virtue of a live-aboard dive boat is that most of the time you are anchored directly over a dive site and, thus, can make as many dives per day and night as your energy permits. Some of the less energetic members of our group stopped at three dives for the first few days, but were up to five daily towards the end of the trip. Others averaged five to seven dives per day.

From the Sequest, we did not have to dive under the boat. Two crewmen operate two Zodiacs all day long carrying divers to any part of the reef they cared to explore. The Zodiacs waited overhead, then ferried us back to the Sequest for a quick change of film, a shot of cold water, and the next trip to the reef.

As isolated as the Philippines is I've often found diving difficult; compressors break, crews don't show up for work or, in one case, after spending two days to get to Manila for diving, fishermen had dynamited the reefs. We had but one problem, which was quickly solved. For a couple of days the other divers and I had headaches and after we compared notes we suspected the air was getting fouled. This could have ended in a disaster but we decided the problem was the compressor. The crew began filling bottles from the alternate compressor and repaired the main one. It worked out fine and everyone stayed healthy.

The diving? Superb, with visibility running from 80 to 150 or more feet. At South Apo Wall, where the manta frolicked, we spent our first day and a half. The wall begins at 50' and drops straight to 130', but there's plenty of big stuff in the shallows, including an occasional manta. On my first dive I dropped to 80 feet and swam along with the help of a slow current (with Zodiacs to pick us up, we never had to fight currents). In the distance, about 30 feet away, two grey sharks hovered. The wall was alive with small fish, gorgonia, fans and sponges. Two fat tunas cruised by. At the top of the wall, a couple of five-foot barracudas slipped in to satisfy their curiosity and darted away. In the coral cuts and around the bottom edges of coral heads, lionfish seemed to be everywhere. A couple of four-foot whitetip sharks glided by between the coral heads. And then, as I started running out of air, a big black stingray floated by towards the wall. That was my first dive!

In five dives that morning and afternoon, I saw at least one shark on each dive. Most of them took a quick swim into about 30 feet, then departed just as fast while we buried our cameras into huge clumps of anemones sprinkled with clownfish and tiny shrimp. In a single day, I have never seen such a diversity of creatures -- and nudibranches galore.

It was more of the same the next morning, but by midafternoon the one thing See and Sea can't control -- the weather -- forced us to move. Although it was sunny and calm where we were, one of the first typhoons of the season was bearing down

on Manila, north of us. So the captain decided to head south for shelter behind bigger volcanic rock islands.

The diving turned out to be unique, for when we flopped over the side the next morning we were in a sea of underwater boulders, crevasses and caves much different from the Apo wall. There was quite a surge, but as we poked in and out of holes we found a pair of sleeping nurse sharks and lots of hard-to-photograph but beautiful clown triggerfish. Because of the surge, we could sweep right up next to them and pop our strobes.

For sharks, Colobato Island, our next stop, was paradise. This island again was a rocky cliff that jugged straight down 40 feet, then giant boulders dotted the slope all the way down to 200 feet. As soon as we hit the water, we saw two white-tips and a blacktip below us. Halfway through the dive, two more whitetips appeared and we had five of them cruising among us and through the rocky ravines. Occasionally, one of them would get within 10 feet of us, but we usually didn't have our cameras ready. Moving around to the other side of the island that afternoon, however, we hit the jackpot. At 110 feet down the slope, two seven-foot ocean grays darted in and started cruising back and forth in front of Carl and me. Just above us at our flanks, two whitetips and a fat blacktip turned wide figure eights. For nearly ten minutes they darted in and out of camera range without showing any signs of menacing us but rather looking us over. Then the grays got bored and swam off and the white and blacktips escorted us up to shallow water.

At about 5 p.m. that afternoon, the Seaquest divemaster, Papoose Zayco and myself were cruising among the rocks on another side of the island -- visibility was easily 200 feet -- when a squadron of three whitetips glided by us and peeled off. Then a blacktip, then a huge big bellied shark without markings (looked like a bull but I didn't come close enough to see) came into view. As I photographed a beautiful yellow-spotted brown stingray under a rock, Papoose watched the sharks getting bolder and bolder. A slender five-foot gray surged out from under a rock passage between Papoose and me. After that we sat more or less back to back watching the sharks do their ballet around us before rising 60 feet to the waiting Zodiac.

The edge of the storm had long since passed and the crew had determined from radio weather reports and wireless Morse code that it was clear all around, so we headed back to Apo. During the four-hour cruise, a school of porpoises danced along the Seaquest bow briefly and we spotted sailfish thrashing out of the water on the horizon.

Just north of Apo Island is Apo Reef, a huge underwater atoll where the visibility wasn't much better than 60 feet if that, but there we anchored near the most productive (photographically) little wreck I have encountered. It rested, bow in a coral cliff and stern in sand, in only 35 feet of water. And it was crawling with critters. Two stunning lionfish sat right there in the sand before our cameras. They are usually tucked well up and under things, but this couple was right out in the open. Camouflaged on the bow wench deck was a three-foot rare crocodilefish (big brother of the scorpionfish in terms of decoration). Another one commuted between that deck and a sandy hole on the side of the wreck. The wreck was festooned with soft corals and hard mushroom coral. In six dives around it, I shot off 12 rolls of film with the two I carry.

We returned to Apo Island for our final days of diving and spent the tail end of a couple days cleaning out hundreds of crown of thorns from an infested patch of coral on the east side of the island in front of a tiny lighthouse manned by two Filipino militiamen.

Let's see -- oh yes, I left out the turtles. We saw several, but they were all very skittish and didn't stick around long. That applies to most of the fish we

saw here. They are not used to divers. They are not fed. So they do what comes naturally when confronted with big fat monsters with bubbles coming out of their heads -- vamoose. But if you are still, and you wait around, they get used to you, accept you, and you can photograph them. The reefs were full of anemones with clownfish, butterflies, jacks, lionfish, scorpionfish, damsels, unicorns, and giant clams.

Now I don't know whether its worth \$2100 and the plane fare to see the Taj Mahal, but I do know its worth that tab to see the Philippines underwater. And there's a good chance I'll do it again this year.

GETTING THERE: The 16-day trip, not including airfare, booze and tips, costs \$2100. From the West Coast the 1981 airfare will range between \$800 and \$1300. For that price there are 9-10 full days of diving. The rest of the time is spent getting there and back, resting, and engaging in a couple of days of sightseeing around Manila. See and Sea currently has two trips scheduled in the forthcoming spring diving season: March 14-29 and May 12-27. In addition, See and Sea now offers shorter stays in the Philippines for divers and families. For information write to See and Sea at 680 Beach St., San Francisco, CA 94109. You may call at 415/771-0077.

From Our Readers' Travel: Part II

From time to time we like to compile comments from our readers and publish them for the benefit of others. This is the second part of our series begun in last month's issue. If you have traveled to a foreign resort recently and would like to share your experiences with us, please complete a travel questionnaire from a previous issue (or simply send a letter) and mail it to me, C.C., the travel editor, at POB 1658, Sausalito, California 94965.

MOREA, TAHITI, CLUB MED: Most readers report the usual Club good partying, but not the best in diving. Hank Feldman (Granada, California) writes: "Typical club diving is unexciting, structured and convenient--everyday without a hassle. Three out of nine days: four 6-8 foot reef sharks, 250 lb. grouper and ten mantas; the other six days the diving was dull."

GUANAJA, HONDURAS BAY ISLANDS: B.D. McLaughlin (Los Angeles) writes: "Diving in the dry season is out of this world. The best I've seen in the Caribbean. The Bayman Bay Club is terrific, great people, wonderful layout. \$150/couple includes all meals, unlimited diving, and bar. Only complaint is they need a faster boat. Visibility drops sharply in rainy season in mid to late summer." John Moore of Jackson, Miss., though, had problems with SAHSA airlines. "It took us three days to get there and we had to take a shrimp boat to Roatan to get a flight home. I wouldn't recommend anyone flying SAHSA airlines to go anywhere, anytime, for any reason." It's not the first time we've heard these complaints of SAHSA.

CAYMAN BRAC: When we visited the Buccaneer Inn in July, 1977, we were disappointed with the inconsistency in dive sites; though we had a couple of terrific dives, we had a couple of horrible dives. Since then the Buccaneer seems to have improved its consistency and most people now tell us of the generally good diving, claiming it was what Cayman was once before the divers swarmed over the island. K. Feingold (Hebron, Ohio), said the diving was great, but there was no night life and "army-style overcooked food." B.D. McLaughlin said the Buccaneer too had "poor accommodations, food and service, but the dive operation is superior, helpful and friendly." And one reader, who did not sign his questionnaire, said, "One of the best--in some respects better than San Salvador; guides went out of their way to find new spots with good visibility, the greatest variety of fish and critters I've seen in the Caribbean. . . ." Frank Davies (Tampa) prefers the Brac Reef Hotel and says, "I have been diving here for five years and haven't had a bad dive yet. Still the

finest diving in the Caribbean."

MALLORCA, SPAIN: "I live here part of the year", writes Jacqueline Bardach Grech, of Providence, Rhode Island, "and it's the poorest diving place I've been."

WALINI, WEST NEW BRITAIN, PAPAU, NEW GUINEA: Larry Stewart of Seattle took a six-week trip through New Guinea, Fiji and the Solomons and found the best diving here. He stayed at the Walindi Plantation from which boat trips to the reefs took 5-45 minutes. "Excellent untouched reefs. The best natural setting I have ever seen. Big fish, small fish and nice walls. Hard to get to, but well worth the stop since it's the diving we all dream of."

ST. KITTS: According to Edwin Granite of Wilmington, Delaware, the diving is good and Dennis Berridge and Kenneth Samuel of St. Kitts Water Sports are "fantastic guides, very accommodating and helpful. They have two good boats."

ACAPULCO, MEXICO: We never get good reports. This time around Kevin Gallagher of NYC writes, "If the dive/hotel package wasn't so cheap I'd have cut the airhose of our infrequent dive guide. The best part of the trip was the good old stewardesses on Braniff going home. I could tell you some good stories!" Kevin, old buddy, we're all ears.

ST. MARTIN: We didn't think much of St. Martin in our June, 1976 review, and readers Frank and Sue Hines echo our complaints from their trip there last year. They encountered heavy seas and a strong current (which we too found), complicating the diving.

ISLE OF PINES, CUBA: The few divers who have written about their trips here complain of two-hour boat rides to the diving and very inconsistent quality of the dives, ranging from poor to sometimes quite good. John Taupier of Chicopee, Maine, said his trip wallowed in red tape (it took 13 hours to get processed and overcome scheduling errors to depart). Though the food was fine at the hotel, he said "the beds were older than the divers, the curtains did not open, the showers did not work, and the water supply might be shut off without warning."

COZUMEL: Diving is an all-day venture. Two-hour one-way trips to the reef often mean the boats return after sunset. Even so, most divers find touring the grottoes of Palancar reef and riding the lazy current worth the trip, though some first-time divers fret over the lack of guidance or attention from the often disinterested guides. Because photography is impossible on many of the drifts dives, Tim Rock of Omaha says he rents a car and dives from the southwest shore for his macro work. Readers seem to prefer Aqua Safari dive shop, but since all shops depend upon the boatman's union for reef transportation they lack control over trips. Tiny Wirs of Key Largo complained that Discover Cozumel Dive Shop promised 80 cu. ft., 3000 psi tanks, but provided only 71.2, 3000 psi tanks filled to 2400 psi, which gave him only 57 cu. ft. of air. His complaints, he writes, were ignored. The Barracuda seems to be our readers' choice for hotels; it's clean, on the beach, and only a short stroll to downtown's many inexpensive restaurants. From Creede, Colorado, Glen Hinshaw writes that "Carlos Sierra was a fantastic host at the Barracuda, bending over backwards to please." The Galapagos Inn usually gets good marks from our readers for its good price--and proximity to town. Others like La Ceiba, but some don't like having to take a taxi into town.

Jim and Cathy Church Underwater Photography Courses: In December we reported the Churches had canceled their fine photography courses because of the closing of Spanish Bay Reef on Grand Cayman. They have since relocated at Villa Olga on St. Thomas and are once again offering their full range of courses. For information write them at P.O. Box 80, Gilroy, Ca. 95020

The Sportsways Empire Strikes Back

Authors of Undercurrent "Are Best Ignored."

For some time we've claimed that the regulator manufacturers are trying to obfuscate the facts about the performance of regulators with a lot of jargon. A memorandum apparently sent to Sportsway's distributors illuminates our point.

In the October, 1980, issue, we reported that the Sportsways 950 Arctic Regulator *failed* the U.S. Navy regulator tests at every depth at which it was tested, from 33 feet to 198 feet, and at every workload at which it was tested, from light to extreme. In fact, the 950 finished dead last out of 39 regulators, according to U.S. Navy Experimental Diving Unit Report No. 2-80, which was approved for public release last year.

The Sportsways 1390 regulator, according to the Navy, also failed the overall test, but it did prove satisfactory with a light workload at 33 and 66 feet. It failed with a light workload at 99 feet or deeper, and with a moderate or greater workload failed at all depths beginning at 33 feet.

We synthesized and published that report in three parts. In response, Sportsways issued the following memorandum dated November 25, 1980, to "Whom it May Concern."

* * * *

Some controversy has been created as to the rated performance of Sportsways Regulators in the report published by the U.S. Navy. Other reports, *or shall we say "Interpretations,"* such as recently published in the November 1980 issue of *Skin Diver Magazine* and the Sept. and Oct. issues of *Undercurrent*, need some clarification. Sportsways wishes to set the record straight with the following facts:

- (1) Unless the reader is an engineer, and/or technically oriented and thoroughly knowledgeable as to regulator functions and the very sophisticated and sensitive testing equipment used by the Navy to perform the tests, the test report can be confusing.
- (2) The total text of the *Skin Diver Magazine* article is a *relatively* accurate interpretation, but the text of the article must be read in its entirety to properly relate to the chart of "work scores."
- (3) Information missing from the "interpretations" is that the model 1390 is an "unbalanced" type of regulator and it is not intended to perform as well as a balanced type at depths below 100 feet. The 1390 was one of the original Sportsways Regulators dating back some twenty (20) years which coincided with the "State of the Art" at that time. Thousands have been sold, with no problems. The 1390 was phased out of the Sportsways product line in 1979, because of the lack of demand for this type of regulator. *Comparisons of this*

regulator should only be made to similar regulators.

(4) The models WL-200 (introduced in 1972), W-600 (1975), WL-900 (1979) are all balanced piston first stage regulators. All have identical internal parts. Hence the similarity of performance. The WL-200 and WL-600 were both phased out during 1979 due to the introduction of the WL-900 as an upgraded model, swivel end cap etc.

(5) The WL-950 Arctic Regulator is identical to the W-900, insofar as its first stage parts and function. The only difference is that it is totally sealed and filled with silicone oil to create a "non-freeze" 1st stage for cold water diving conditions. The balancing effect is created by water pressure against the rubber diaphragm which also seals the oil chamber. This sealed condition, does in fact create a dampening effect which tends to decrease the 1st stage intermediate pressure. This pressure change causes a *slightly* increased breathing effort at depths beyond 150 feet, especially if excessive work and/or rapid breathing rates are involved. Normal nonworking dives have been made as deep as 200 feet with no noticeable problems.

... "It is also our opinion that [the publication] creates for the diver, and the overall Sport Diving industry, a grave disservice with the articles [it publishes] about equipment and various manufacturers with [their] distorted opinions."

(6) Sportsways's opinion is that the W-950 is a *safe and satisfactory* performing regulator for the *sport-diver*. It is also our opinion that educated and properly trained and certified *sportdivers* are not going to put themselves into a situation of the non recommended sport diving depth, workload and breathing rate as depicted by column 2 in the *Skin Diver Magazine* chart, or the *other similar* areas of tests as performed and shown in the Navy report.

(7) There have been *no complaints* from any diver who has purchased *any model* Sportsways regulator as to the breathing performance of the regulator, when it is properly adjusted and maintained to our specifications.

(8) Sportsways's comments and opinions, in regards to the UNDERCURRENTS [sic] article, is that it is *misleading, totally out of context, and should be ignored*. It is also our opinion that [the publication] creates for the diver, and the overall Sport Diving industry, a *grave disservice* with the articles [it publishes] about equipment and various manufacturers with [their] *distorted opinions*. In fact, I, as DEMA president, have a copy of a letter from [the alleged author] in which he specifically states that he is *not* an engineer.

Sportsways feels that to take any form of legal action against the UNDERCURRENTS [sic] publication *would only inflate their ego trip*, and authors of this type of publication are best ignored.

(9) Sportsways is, as always, continuing to research and develop revisions in their products for improved performance. We are an active member on the D.E.M.A. engineering committee to develop minimum performance standards for safe Sport Diving equipment.

(10) Sportsways invites inquiries from any diver or dealer who may want any further information about its regulators in respect to the U.S. Navy report.

* * * *

If a reader has followed our articles on regulators during the past year, he should be able to easily dissect the logic of the memo and resist the non sequiturs. It's obvious that the manufacturers—and in this case, Sportsways—still ignore the bottom line.

★ Regardless of Sportsways's rhetoric, neither the 950 nor the 1390 (no longer being manufactured), passed the U.S. Navy tests. Neither is approved for U.S. Navy purchase or use. In addition to the two Sportsways regulators, four regulators from other manufacturers failed. But 30 regulators did pass. Twenty-three were moderate performers, including the Sportsways WL-200 and W-600, which are no longer being manufactured, and the Sportsways 900, which is being manufactured. Seven regulators were judged "Superior," but none of these was manufactured by Sportsways.

The bottom line is that one Sportsways regulator, the 950, failed the test, and one regulator, the 900, passed, though it finished at the lower end of the approved category.

★ The notion that regulators of like design should be tested against each other has some validity in pure research, but it is of no consequence to sport divers who are interested in the best performing regulator regardless of internal design. Neither the U.S. Navy nor UCLA's Glen Egstrom conducted tests according to regulator design category.

★ Sportsways claims that they have had no complaints from any diver about any model of Sportsways regulator. That may be true. On the other hand, we have never heard any manufacturer, unless the government has engaged in a formal recall, admit that they have received a complaint about a regulator. Furthermore, we have contended in many articles that many serious accidents may be caused by divers pushing their regulators beyond their limitations. The limitations of the Sportsways 950, according to the tests, are much more severe than, for example, the limitations of the U.S. Divers Calypso VI. We often read about divers bailing out because they find that they can't get air. The Navy tests suggest that problems of sucking air are more likely to happen with the Sportsways 950 than in approved regulators. And that's why the Navy won't buy it.

★ Sportsways is correct. The author of the Undercurrent article is not an engineer. He graduated with a degree in mathematics. But Undercurrent only reported the tests. They were conducted by Navy Test Engineer James R. Middleton and approved by three of his superiors.

★ It is Sportsways's opinion that the W-950 is a "safe and satisfactory performing regulator for the sportdiver." It is *Undercurrent's* opinion that the sportdiver ought to buy the best regulator available. According to U.S. Navy, there at least 30 models which perform better—that is, more safely—than the W-950. Now, just who should one believe?

Mysterious Diving Deaths in Southern California

On November 8, about forty divers were aboard the dive boat *Charisma* to dive off the California coast, near Santa Catalina, about 26 miles from Los Angeles. As with nearly all Southern California dive boats, divers pay only to be ferried to dive sites; dives are not supervised or guided. On this day a number of divers planned a deep dive, below 100 feet, apparently down to 135 feet. At the completion of that dive four divers did not surface. Four bodies were recovered later that day.

Those deaths have been big news in Southern California. The dead divers were in two separate buddy teams. They claimed to be experienced. There were several other pairs below at the same time. Rumors quickly spread that bad air must be the cause, but apparently the divers had filled their tanks at two different air stations before boarding the boat. Nitrogen narcosis seems the next most likely cause, but again the chances of four divers suffering from the same syndrome to such a degree that they couldn't return to the surface indeed seems remote. The causes of deaths, then, are anybody's guess.

An inquest begins in mid-February. *Undercurrent* has spoken to many people connected with the tragedy, but each person will speak only off the record, preferring to reserve remarks for the formal hearing.

U.S. Navy BC Tests

Four Models Accepted, Nine Rejected

A series of six manned and two unmanned tests were conducted in the Gulf of Mexico and in a pool to evaluate several buoyancy compensators for authorized use by the U.S. Navy. According to the 1979 Navy report, the devices tested were:

- Dacor Seachute BC 1 (horsecollar)
- Dacor Seachute BC 4 (horsecollar)
- Scubapro Buoyancy Control Pack (backmounted)
- Scubapro Stabilizing Jacket (jacket)
- Scubapro Vest (horsecollar)
- Seapro Atpac (backmounted)
- Seatec TD 1002 (horsecollar)
- Seatec Sunfish 420 Nylon (horsecollar)
- Seatec Sunfish Tuff Tiger (horsecollar)
- Swimmaster GBC-1 (horsecollar)
- U.S. Diver's Sea Otter I (jacket)
- U.S. Diver's Vest (horsecollar)
- White Stag BC IV (horsecollar)

Test 1: BC Surface Floating Position

To meet Navy requirements, a BC must float an unconscious diver with his head completely out of the water so he may breathe. In this test two buoyant ascents were conducted with partially inflated BC's. In each test a different bottom position was assumed by the diver prior to ascent to determine the effect of the initial lift position on the diver's surface position. In the first test the diver assumed a prone position on the bottom, the normal position of an unconscious diver. In the second test he assumed a head down/vertical position.

Results indicated that a diver's position prior to ascent has no effect on his surface floating position, but the position is indeed affected by the type of BC worn by the diver, whether or not it is used according to manufacturer's specifications. *Most BC's tested floated the diver satisfactorily, his head out of the*

INFLATION/DEFLATION RATES AND BUOYANCY AT 60 FSW

AT 60 FSW	DACOR SEACHUTE BC1	DACOR SEACHUTE BC4	SCUBAPRO BUOYANCY CONTROL PACK	SCUBAPRO STABILIZING JACKET	SCUBAPRO VEST	SEAPRO ATPAC	SEATEC TD1002	SEATEC SUNFISH 420 NYLON	SEATEC SUNFISH TUFF TIGER	SWIMMASTER GBC-1	USD SEA OTTER I	USD VEST	WHITE STAG BC-IV
INFLATION RATE (seconds)	9	6*	14	14	11	13	11	13	15	12	17	15	12
DEFLATION RATE (seconds)	9	7*	10	11	9	16	6	5	8	7	12	9	4
BUOYANCY (pounds lift)	42	23*	41	40	40	45	31	42	42	40	50	46	32

*This refers only to bag filled by low-pressure inflator. Buoyancy doubled when separate CO₂-filled bladder was included.

water. Some did not. Those requiring qualification are as follows:

Dacor Seachute BC4: The unique design of this BC features two separate bladders—one for CO₂ cartridge inflation and one for oral and L.P. inflation. The low pressure-inflated bladder is beneath the CO₂ bladder and is intended strictly for buoyancy compensation. Consequently, the position in which the lower bladder floats a diver on the surface is not consistent from test to test and may float a diver face down when used by itself. However, the upper CO₂ bladder which encircles the diver's neck, always floats a diver face up on the surface but is intended strictly for emergency use.

Scubapro Buoyancy Control Pack: The Scubapro backmounted BC does not have a weight pocket built into the backpack. During testing, therefore, the diver always floated face down when using a conventional weight belt.

Scubapro Stabilizing Jacket: The Scubapro jacket-style buoyancy compensator always floated the diver face up. However, since a Navy Diver must be able to ditch his scuba gear on the surface *without* losing his flotation, any jacket style BC whose harness is integral with the BC is unsatisfactory.

... "A diver's position prior to ascent has no effect on his surface floating position, but the position is indeed affected by the type of BC worn by the diver."

In this light the Scubapro engineering department provided NEDU with a Stabilizing Jacket with the capability of ditching the scuba tank independently of the BC. This mechanism worked quite well. However, once the scuba tanks were disconnected from the Scubapro Stabilizing Jacket, the BC floated the diver face down. The weight of the tanks kept the diver's center of gravity and center of buoyancy in the right relationship to float a diver face up. Without the tank weight, this relationship no longer existed.

Seapro Atpac: The Seapro Atpac features a unique weight pocket in the BC's backpack. This shot-filled pocket replaces the conventional weight belt. The Seapro Atpac floated the diver in a face-up position whenever the lead or copper shot weight was in place. However, when the shot was emptied and replaced by a conventional weight belt, the diver floated face down.

U.S. Diver's Sea Otter I: This jacket has a large lift capacity due to enlarged bags located on the diver's back and chest. This large air bladder caused the divers to float face down during approximately 50 percent of the tests. The surface floating attitude was determined by whatever position the diver reached the surface (i.e., if he ascended in a face-down position, he remained in that position on the surface). The problem was eliminated when a diver large enough to comfortably wear the Sea Otter I used the vest. The smaller Sea Otter II is more appropriately sized for most divers.

Test 2: BC Inflation and Deflation Rates

This test determined how fast a diver could fill or vent his BC in an emergency. The power inflator, normally used for buoyancy control, supplements the CO₂ cartridge's lift capability in an emergency. Inflation/deflation rates are recorded in the table. The time range for inflation varied from 6 to 25 seconds; the time range for deflation (venting) varied from 4 to 16 seconds. Variations in fill and vent times were directly related to BC lifting capacity and the design of the inflator. Tests showed fill and vent times to be adequate for any foreseeable Navy requirements.

Test 3: BC Buoyancy at 60 fsw

This test determined BC lift capacity for using the BC as a tool or for bringing an unconscious diver to the surface. The lift (pounds of upward force) of each completely inflated BC at 60 fsw is recorded in the Table. The range varied from 31 to 50 lbs. All BC lift capabilities meet U.S. Navy requirements.

Test 4: BC Interface with Scuba Tank Harness

This test evaluated the compatibility of each of the BC's with scuba tank harnesses and the results revealed no problems when using any of the BC's with conventional scuba. The minor problems encountered were quickly solved as divers became accustomed to using the equipment.

Test 5: BC Air Consumption

A pony bottle was used to measure the air consumption of the power inflator at two depths, 100 feet for 25 minutes and 60 feet for 60 minutes. BC air consumption varied from .5 to 4.25 cubic feet, no more than 5.9% of a diver's air supply when using a single 71.2 cu. ft. tank. This consumption rate does not significantly reduce a diver's air supply and posed no threat. Consumption is low enough to permit a diver to connect the supply to a small 8.0 cu. ft. pony bottle, if desired. As divers grew accustomed to using the BC's and the power inflators, air consumption was reduced. Air consumption, then, is solely a function of a diver's experience with his equipment. It is not related to BC design.

Test 6: BC Air Supply Source Evaluation

The two sources of air supply were evaluated: air received directly from the first stage mounted on the tank and air from an independent pony bottle (15.5 cu. ft., 3000 psi) attached to the tank.

With the pony bottle, once the diver entered the water he became comfortable and found it easy to maneuver. Securing the pony bottle to the primary tank was somewhat inconvenient. In addition, connec-

ting an extra first-stage regulator to the pony bottle solely to supply low pressure air to the inflator is viable, but not expedient.

No problems were encountered with attaching the low-pressure inflator hose directly to the diver's primary first-stage regulator. This method provided a simple, quick, and uncluttered low-pressure air supply.

Test 7: BC Component or Design Failures

The purpose of these tests was to determine if a design or component failure could endanger the diver:

A. Low-pressure inflator sticking in an open position: In this test the power inflator was held open at 15 ft. As the BC inflated, the exhaust valve on the oral inflator hose was held open to determine whether the BC could be adequately deflated to prevent uncontrolled ascent. All BC oral inflator exhaust valves adequately vented the equipment. Divers were able to easily maintain their depth by holding open the exhaust valve under maximum inflow.

B. Overpressure relief valve flow capability: This test was conducted to determine whether the BC would rupture when fully inflated if the power inflator stuck in the open position. On all BC's tested, the overpressure relief valve prevented vest rupture by sufficiently venting the excessive air.

C. Diver personal evaluation: Divers were asked to evaluate the ease of operating the low-pressure inflator valve, the quick disconnect coupling, the exhaust valve on the oral inflator hose, and the BC harness adjustment fittings. With gloved and ungloved hands divers found the operation on all BC's relatively easy.

Test 8: BC Swim Characteristics

Divers' comments on overall comfort, mobility, ease of operating the inflator and the ease of attaining neutral buoyancy are as follows:

1. *Dacor Seachute BC1:* Overall impressions were positive. However, the "diamond type" harness was difficult to learn to use and the lack of a strap running from the neck through the crotch caused the vest to ride up under the diver's chin.

2. *Dacor Seachute BC4:* The unique upper/lower bladder design of this BC was liked by all divers. The location of the low-pressure inflated bladder under the diver's stomach provides precise and comfortable buoyancy control. The lack of a strap between the neck and crotch was not a problem due to the placement of the low-pressure air bladder. Difficulty in donning the "diamond style" harness persisted.

3. *Scubapro Buoyancy Control Pack:* This BC was compact and easy to don. Lack of straps and an unencumbered chest were well received. Comfort could be increased by adding a crotch strap to prevent the inflated backpack assembly from riding up on a diver. *However, the diver's loss of surface flotation upon ditching his scuba gear with this style BC is unacceptable for Navy use.*

able for Navy use.

4. *Scubapro Stabilizing Jacket:* This jacket style BC incorporating the diver's harness as part of the BC, was well received. No problems were encountered except that placement of the oral inflation hose higher on the jacket would facilitate venting the BC. No straps to adjust, and in-water comfort were strong points for small to medium divers. This jacket is available in a large size to accommodate large divers. *As with the Scubapro Buoyancy Control Pack, the loss of surface flotation upon ditching the scuba tanks is unacceptable for Navy use.*

5. *Scubapro Vest:* This BC was functional and easy to operate. However, the stiff rubber impregnated vest material caused neck chafing on some divers. The crotch strap, which runs only from the waist through the crotch, allowed the partially inflated BC to ride up on the diver. Placement of the oral inflation hose higher on the BC would aid in exhausting air.

6. *Seapro Atpac:* The Atpac was well received for the same basic reasons as the Scubapro backmounted unit. Divers liked the power inflator connection position which reduced the free length of hose to snag on objects underwater. The contour backpack provided a snug fit although the addition of a crotch strap would help to further secure the tank to the diver in the water. The backpack's weight pocket for shot is a convenient alternative to the conventional weight belt, but it is not suitable for Navy diving operations. The retractable bladder design on this BC made it one of the most compact units tested. *But once again, this style BC causes a loss of flotation when tanks are ditched on the surface and is therefore unsuitable for Navy use.*

7. *Seatec TD1002:* Divers found this BC to be compact, easy to don and adjust. The harness was comfortable and prevented the vest from riding up during the dive.

8. *Seatec Sunfish 420 Nylon:* Divers found this BC exceptionally comfortable. Doffing and donning were easy and all controls were functional.

9. *Seatec Sunfish Tuff Tiger:* This is basically the same BC as the Seatec 420 Nylon with the exception of a heavier outer-bag material. Diver's comments were essentially the same as for the 420 Nylon.

10. *Swimaster GBC-1:* The Swimaster BC was seen as functional, rugged and easy to operate. Divers generally liked this BC and no problems were encountered.

11. *U.S. Divers' Sea Otter I:* The inflation and exhaust controls were exceptionally well positioned and easy to operate. When swimming, this BC is comfortable on a large man but is too big for the small to medium-sized diver. The Sea Otter I is available in a smaller size (Sea Otter II) to accommodate medium to small divers.

12. *U.S. Divers' Vest:* This BC was very well received. The harness is comfortable, easy to adjust and holds the BC securely in position. As with the U.S.D. Sea Otter I, the L.P. inflator and exhaust valve loca-

tion on this BC were exceptionally well liked.

13. *White Stag BC—IV*: This BC was liked by all divers. The compact design and functional harness were mentioned as strong points. No problems were encountered with use.

Conclusions:

The buoyancy compensators tested were generally comfortable and well constructed. Problems encountered were due to BC configuration and style rather than quality control. Specific conclusions drawn from testing are as follows:

- ★ The conventional horsecollar style BC will always float a diver face up in an emergency situation.
- ★ Backmounted and jacket style BCs are functional and have application in specific diving situations. However, training and operational requirements preclude Navy use of these types of compensators.
- ★ All compensators tested have inflation and deflation rates adequate to meet Navy operational and safety requirements.
- ★ Every BC tested provided adequate buoyancy (lift) via the power inflator, to bring an unconscious diver to the surface.
- ★ BC interface problems with scuba harness are negligible.
- ★ BC air consumption is very low and does not threaten a diver by consuming inordinate amounts of his breathing air supply.
- ★ The BC's power inflator, supplied via a diver's first-stage regulator, is the simplest and most expedient method to use. However, a pony bottle power supply is suitable should the diver supervisor deem it necessary.
- ★ No power failure mode was observed which could make this type of equipment unsuitable for Navy use.

Based on the conclusions cited above, the horsecollar style BC's are preferred for Navy use.

Since the performance characteristics of all BCs tested were adequate and similar, final ANU recommendation is based on the following parameters.

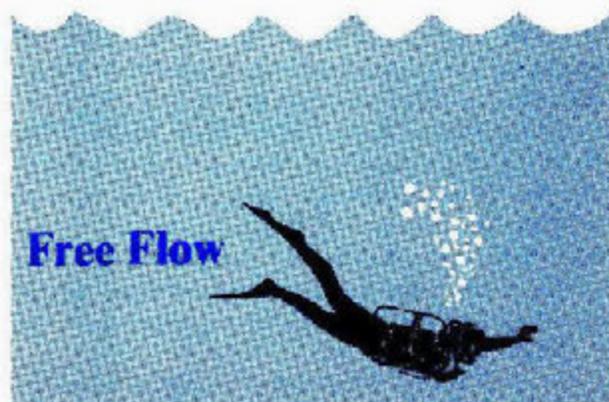
- a. *Harness design*. The conventional waist strap and neck-through-crotch strap was preferred by all divers. In addition, this type harness simplifies training and makes practical the use of a single BC for several different divers.
- b. *Overall Diver Comfort*. Two factors became important during testing: chafing and BC position on the body. BC material must be soft enough to prevent neck chafing on a working diver when no wet suit is used. It is also important that the BC when partially inflated does not ride up under the diver's chin.
- c. *Durability*. BC outer bag material must be durable enough to withstand the rigors of Navy operational use. Those preferred are the heaviest outer bag materials available which do not interfere with diver comfort and mobility.

Recommendations:

The Following BC's are recommended for Navy use in conjunction with any suitable commercially available low-pressure inflator.

Seatec Sunfish Tuff Tiger Models 10396-01 through 04
Swimaster Buoyancy Compensator Model GBC-1
U.S. Divers' Vest Model 7700-BC700
White Stag BC IV Model No. 53962

Next Issue: *Why the Navy BC tests has limited validity for sport divers.*



Between March, 1976 and August, 1980, 123 divers took refuge in NOAA's Florida recompression chamber for cures for a variety of diving accidents. Contributing causes to the accidents included inadequate training (33%), no watch or depth gauge (32%), improper use of the dive tables (26%), decompression diving (25%), defective or unobserved dive plan (24%), inadequate experience (15%) and inadequate equipment (9%). Thirty of the divers (24%) were not

certified and for what it's worth, 37 had been certified by PADI, 16 by NAUI, 6 by NASDS and 6 by the YMCA.

The lowly sea squirt, which to the diver's eye does little more than lie nearly motionless on the ocean's bottom, may be the source of a powerful new drug which can kill many viruses, including those that cause infectious diseases such as herpes, meningitis, influenza and even some types of the common cold. William O. McClure, a diving biochemist from the University of Southern California, has been studying the peculiar chemicals in invertebrate marine animal-sponges, sea squirts, sea cucumbers and sea anemones—and has discovered a variety of intriguing compounds, but the recent discoveries of didemnin compounds from the sea squirt seem to be the most promising. Upjohn Co. has already had encouraging test results. In one series of experiments the sea squirt compounds doubled the life span of mice with leukemia and prolonged the lives of other mice afflicted with lethal skin cancer called melanoma. McClure warned, however, that a long research program is required before the drugs ever reach the market.