

undercurrent®

THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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Coco View, Roatan, Honduras

-- No Action, Just Relaxin'

The dive shop owner from Pennsylvania, along with several other people I had had the pleasure of diving with at Coco View, sat sipping his after dinner beer, engaged in conversation about our sub-surface adventures. "Ever read Undercurrent," someone asked? One of my eyebrows raised, hopefully the only signal that I found the question both amusing and stressful.

"Sure," he said. "I like their equipment reviews, but I ignore the travel stories." He took a long pull on his beer. "If the guy doesn't get any 'action'--and you know what I mean--he gives the place a bad review. Take here for instance. My room is small, there is no cover over the drain in the shower and something could fall down there and be lost forever. My overhead light doesn't work. The food is okay, but there's not a lot of it. And the visibility isn't that great." He waved his hand in the air. "Still I like the place. I'm shooting macro and don't need to see for 200 feet. I have enough room to spread my camera gear out and don't need the overhead light to see. But that guy from Undercurrent would only list the bad things and never tell what really great things are here." And with that he said goodnight and went to bed.

Now that I'm back home, at my typewriter, I'd better see if I can meet his challenge -- even though I didn't get any "action," if you know what I mean.

And it's unlikely that anyone else would get any action in this slow-movin', slow talkin' retreat reachable only by a two-mile boat-ride through mangrove swamps--although once upon a time Coco View was indeed set up to be an action place, claimed co-owner Calvin Bodden. Calvin had motored me through the swamps, carried my bags from the boat, and though I had arrived too late for the scheduled lunch, he slapped together a couple of ham and cheese sandwiches,

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located a few deviled eggs, and provided a Port Royal Beer. While I ate he explained that this building, the first on the spit (Coco View has the ocean on one side and a lagoon on the other) had been conceived as a casino and whore house. No one ever got the chance to test their luck at the tables or in bed because the main man fell in love with the first filly he hired and they left the island for some other paradise. The next owner built a five-room house, started another, then expired. The heiress, his daughter, lived in Ireland; she never visited the property before selling to Bill and Evelyn Evans. They joined in partnership with Calvin and Stella Bodden and there you have it. I required a second beer, of course, to get through the story.

As one might expect for a place so isolated on the isle of Roatan, this is no resort at which to luxuriate. The rooms are small and basic; two single beds, a reading light, a bench for stacking stuff, some shelves for storage, and



MAIN BUILDING—COCO VIEW

a bathroom with a shower. There has been some effort to decorate -- in my room colorful fish had been painted on one wall and soft coral on another. Louvered windows, aided by an overhead fan, provided ventilation--and a view of the ocean (and the building next door). Thirty-eight people can be accommodated in the rooms of the two buildings. During my October stay occupancy was half.

Diving is conducted by James "Doc" Radawski, a marine archeologist who came to Roatan in 1970 to reclaim a pre-Columbian wreck. A promised five-year contract never materialized. Doc hung around anyhow.

Doc is thorough. Newcomers get a personal briefing from him and quite a good one it is. First the historical background of the island and its inhabitants, then charts of the reefs; next a chart of how diving is to be done (according to Doc, and then charts of several of the dives I could expect, including description and depths. Doc gave me a net goodie bag to put my gear in. "This way you go home with a dry dive bag," he said.

Doc is organized. He keeps about 100 filled tanks, mostly aluminum 80's, standing in racks. Since there's diving right off the beach, one can grab a tank any time. Fifteen minutes prior to the 9 A.M. and 2 A.M. boat departures a klaxon sounds, and sounds again at ten minutes and five minutes prior.

Doc is straightforward. He asked for my dive log, dwelled on it for a few minutes, then handed it back. "We don't have a maximum depth here. If your certification means anything, then you ought to be able to plan your own dive. We lead the dives, but you don't have to follow. It's your vacation. We do watch, though, and if someone needs help, we offer it. If they don't accept, we

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don't help. And just remember. If anything goes wrong it will take a minimum of 12 hours to get you off this island. Any questions?"

"Who's the 'we'," I asked. I was pretty certain Doc didn't lead the dives since his knarled feet were twisted up in clumps with what looked like arthritis. "I lead most of the dives. Either Calvin or Chris Higgins, the assistant manager, joins in."

During my week's stay here I made a dozen or so dives, a few of which I'll describe shortly, after I take a shot at generalizing. Overall, I'd say the reefs here are quite lovely, with plenty of hard and soft corals, gorgonia and sponges. There's a goodly number of common tropicals, but the sizeable fish are missing and that means the unexpected thrills can be missing too. Just as important, I'd like to report that the water was gin clear, but it wasn't during my stay and seldom is. Coco View diving is on the windward side of Roatan, which can keep things stirred up a bit. During my stay, algae and plankton and run-off from the rains limited visibility to a milky 80 feet or less, certainly of no consequence to my friend the macro photographer, but less than perfect for me.

For diving, Doc uses a 35 foot twin-engine converted Egg Harbor motor vessel, large enough to handle his divers well. My first dive departed right on time, taking but fifteen minutes to reach the site. After dropping over the side and sinking to the top of the reef I looked around. Indeed, the coral was alive and plentiful. The usual reef fish were present--harlequin bass, wrasses, stoplight and green parrot fish, a couple of small French angels, damsels, grunts peeking from between layers of coral, and just off the wall, small schools of grunt and blue chromis swam about. I dropped over the wall to 80 feet. Covered with plate and wire coral, interspersed with cluster of flower coral, it also featured isolated basket sponges and tube sponges. Hidden under the plant corals were squirrels and small groupers, a couple of lobster, coral crabs and arrow crabs. I continued to gaze off into the blue, hoping for visions of pelagics, but as I was to learn throught the trip, few were present.

A dive at the Chimney's proved a worthy experience indeed. I entered the first chimney at 80 feet, and swam upwards to the light at thirty feet. Then over to the second and down, this time emerging on the wall at about sixty feet. That afternoon our second dive was at Enduro I. Here we swam along the wall to view the entire reef structure, then back across the sand bottom directly to the resort, through the cut in the reef. Along the way, in addition to the usual reef fish, I saw a couple of spotted rays. Diving in front of the resort itself is interesting. It's about 200 feet to the wall, which is indeed healthy. Visibility started as low as thirty feet when I entered from the shore, but raised to 60 feet plus at the wall (which drops down to 90 feet). Snorkeling from the shore is easy and one can find a number of spots to view fish in 10-20 feet of water.

I had an excellent dive at "Two Tall, Two Short," named for the palm trees which serve as markers for the dive. Here the wall has canyons, overhangs, slopes and shear drops to over 100 feet. But the best dive of all is Mary's

COCO VIEW

Diving for Experienced	★ ★ ★ ½
Diving for Beginners	★ ★ ★ ★
Beach Snorkeling	★ ★ ★
Boat Snorkeling	★ ★ ★ ★
Meals	★ ★ ★
Resort Otherwise	★ ★ ★ ★
Moneysworth	★ ★ ★ ★ ½

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

Place, which starts at 40 feet and drops down and down. Eons ago the land separated and formed deep crevices, more than 10 feet across and as deep as 40 feet. Down in one crevice I found myself surrounded with coral while straight ahead, through the V, seemed to be the dark blue of infinity. Out of one crevice I swam into a second where plate corals had grown across the opening to form a tube-like structure. I could see the surface, but no way could I reach it straight up through the maze of coral. Each of these formations were nothing short of astonishing. For sheer beauty and uniqueness, this dive ranks among the Caribbean's very best.

With only two organized dives a day, one has time on his hands for other activities, of which there are few. The resort sits on but four acres of land dotted with palm trees. The one story main building contains the dining room, a small shop, a bar, the game room (with Trivial Pursuit!) and a veranda for lounging in the hammocks. With enough folks present one might be able to organize a game of volleyball, but that never happened while I was present. Frankly, I spent most of my time watching Zinger, a Golden retriever which someone had abandoned, who displayed rare fishing skills which he had to learn for himself while alone in the mangroves. Zinger would wade into the water, freeze with his eye on the bottom, just as an egret might, then when prey came close, strike with a strong and quick snout. I saw him land half a dozen fish that way.

When I wasn't watching Zinger, I was shooting the breeze with the other divers. On my first night, since I was alone, Evelyn Evans introduced me to all the guests and I joined what had already developed as quite a nice family atmosphere, an ambience which extended to each of the meals and afterwards. Breakfasts, by the way, were standard fare--pancakes, eggs, bacon, omelettes, potatoes, etc. Lunches always featured a soup, with salad, with perhaps fish salad sandwiches, ham and cheese, fried fish, or even pizza. Dinners would usually feature soup and a salad, perhaps tasty conch fritters, barbecued chicken, lobster, snapper, vegetables and always a homemade dessert. Of course, this is no hangout for gourmets, and the meals might be what one would expect if the sign outside said "home cookin'." I have no complaints--and no hearty compliments.

Overall, the proprietors do an excellent job with what they have. They keep the place clean, prepare good meals, and run an operation that provides easy diving with some variation. The owners and staff are fine people and treat their guests well. And they've added some nice touches: iced tea is always available; showers are located right outside the dive shop, along with plenty of water for rinsing equipment; clotheslines are handy for drying garments. No doubt they have a professional attitude and a personal interest in their customers. But they also recognize that, with the less than spectacular diving, they will have to discover ways to get divers to repeat. Calvin Bodden told me that Bill Evans is bringing down a motor sailer to offer live aboard diving so that they can visit some of the more spectacular sights such as Lighthouse Reef. They're giving some thought to adding a sea plane to their stable to transport divers to distant spots for the day.

That might get me to come back, but I would return just to dive Mary's Place, the superb site that it is. I had a fine time at Coco View and many divers looking for the simple life will be quite at home here. Yet, for me, I have other places I wish to see so I doubt that I'll get back in this lifetime.

Diver's compass: Cost per person for seven days, double occupancy, all diving and meals is \$449 or \$62/person; a single is \$509; the rates are year round Reservations may be made by calling 800/282-2392 (Florida 813/973-

0651) or writing 1713 Pasco Road, Wesley Chapel, FL 34249 the no see-ums were miserable, and my repellent (OFF) seemed to have little influence on the nasty buggers although experienced divers are free to dive as they wish, inexperienced divers will get companionship and guidance from one of the staff if requested.

Spinal Hits And Heart Attacks

-- *New Perils In Short, Deep Dives*

Most divers have heard tales that deep short dives carry serious risks, but recent studies by researchers at the University of Wisconsin have found that the risks may be far more severe than ever expected.

Charles Lehner, a physiologist on the research team from the University's Sea Grant program, reports that in experiments using sheep and goats they found 5 to 10 times more spinal cord hits in decompression sickness resulting from deep, half hour dives than from longer, shallower dives. "Our research shows that the incidence from short, deep dives may be thirty percent, forty percent, maybe fifty percent," Lehner said. "At this point we are unsure."

Furthermore, the researchers believe that some post dive deaths blamed on heart attacks may actually be the result of "chokes," a decompression sickness that clogs blood vessels to the lungs with frothy bubbles. The current estimates of one to three percent of decompression sickness victims suffering chokes is perhaps like "the tip of an iceberg," Lehner said.

Edward Lanphier, leader of the research team, advises divers to stay well within the decompression guidelines that govern depth and duration of dives. He further advises that divers wait a day between diving and flying home or driving over mountains.

Because of the significance of this study to sport divers, we have chosen to publish an edited version of the test and analysis report.



We have conducted an extensive study of decompression responses in sheep and pygmy goats. The purpose of this paper is to present unexpected findings that not only appear to have relevance for safety in ordinary diving but also increases the understanding of basic mechanisms of decompression sickness (DCS).

The original purpose of the study was to evaluate sheep and pygmy goats as surrogates for humans in decompression experiments. For comparison with data in the literature, we began by determining "thresholds" of depth/pressure for production of minimal but definite signs of DCS following direct

ascent from the 24 hour exposures. We used "altitude provocation" as a means of reducing the number of exposures required to determine thresholds while obtaining a maximum of information from each simulated dive.

Following the 24 hour series, we investigated a number of factors during observation at surface and/or altitude following 4 hour dives. Finally, we conducted a series of 30 min. exposures.

The unexpected frequency of DCS affecting the central nervous system (CNS) in the 30-min. series led us to analyze the data from all exposure durations for frequency of CNS manifestations. Other observations related to the influence of exposure duration have included a high incidence of "the chokes" under certain conditions and production of bone lesions.

The results indicate the need for greater caution in certain types of diving.

Methods of Testing

Mixed-breed domestic sheep and pygmy goats were exposed to compressed air in a hyperbaric chamber. The initial series involved 24 hour exposures followed by direct "ascent" to "surface" for 20 min. of observation. Animals that showed no sign of DCS were then taken to a pressure, simulating an altitude of 8,000 ft., for 15 min. of observation. Animals still showing no sign of DCS were taken to 16,000 ft.-4,700 m for another 15 min.

After intervals rarely less than 5 days, animals were exposed to somewhat higher pressure. The process was repeated until a pressure was reached that produced minimal DCS. Such a "threshold" was determined for surface and for both altitudes in every animal. Four-hour and 30 min. exposures were conducted similarly (but with some exceptions).

Altogether, over 750 animal-exposures were conducted with careful observation during and following decompression. If signs of DCS developed at altitude, the animal was returned to normal pressure, where the signs almost invariably disappeared. Animals with persistent or life-threatening DCS were recompressed according to US Navy air treatment tables.

TABLE I

Range of pressures producing some form of DCS upon return to surface in all animals exposed for different durations.

Durations:	24 h	4 h	30 min
Pressure (psi):	19-34	20-35	41-74

TABLE II

Average incidence of Central Nervous System episodes among DCS events following different durations of exposure (percent).

Duration:	24 h	4 h	30 min
Sheep:	6%	7%	64%
	N=11	N=14	N=3
Goats:	0%	6%	32%
	N=4	N=7	N=6

TABLE III

Summary: The influence of duration and depth of exposure on manifestations of DCS.

LONG	Chokes	SHALLOW
	Bone necrosis	
	Limb bends	
	CNS	
SHORT	Chokes	DEEP

Results

There was little differences in the range of pressures between 4 and 24 hour exposures, but the 30 min. exposures required considerably higher pressures to produce DCS of any type in all of the animals. (Table I)

Table II gives the average percent incidence of CNS events among all episodes of decompression sickness following exposures of the three different durations. For example, the incidence in sheep was only 6% at 24 hours and 7% at 4 hours but was 64% at 30 min. Every animal that experienced CNS signs also had limb bends at some time during exposures of a given duration.

Episodes of acute spinal cord DCS in the 30 min. series included the death of one goat despite prompt

recompression. In another goat, quadriplegia followed an intractable recurrence during treatment. (The paralyzed animal made a substantial recovery after 10 weeks of attentive nursing.

Discussion

Retrospective analysis of differences between studies conducted at different times has obvious pitfalls, but we have no doubt about the reality of the difference in incidence of CNS events between longer and shorter dives. The difference in the pressures involved was also considerable (Table I), but it seems likely that time is the most important variable in determining which tissue or organ is the most vulnerable under given circumstances. Given a certain duration of dive, we assume that pressure will usually determine whether or not the most vulnerable site will be affected and whether less vulnerable sites will be involved as well.

We had long accepted the correctness of values around 10% for the incidence of "Serious" or "Type II" cases among DCS incidents. When we heard mention of much higher proportions of central nervous system events, we initially assumed that some factor such as the difficulty of reaching a certain treatment chamber was causing bias. When our experience in the animals become definite, we accepted the newer figures and considered whether the higher incidence of CNS events might not be explained by the predominance of shorter dives (often mandated by air-supply duration) among scuba divers. In the very nature of the situation, deeper dives would generally be shorter dives, and short dives that produced any form of DCS would frequently be deep dives.

"Many scuba divers mistakenly believe that limb bends would be the only likely consequence of careless decompression."

Whether this particular explanation is valid or not, many scuba divers mistakenly believe that limb bends would be the only likely consequence of careless decompression. This misconception almost certainly influences behavior. In any event, education is badly needed concerning the seriousness of CNS episodes and their true incidence.

Dr. Arthur Dick kindly furnished information derived from the Diving Accident Network. In a 2-year study period, the incidence of CNS involvement was nearly 60% at depths less than 90 ft. (27 m) and 70% beyond 90 ft. Dr. Andrew Pilmanis confirmed that experience in the Santa Catalina treatment facility has been roughly similar. According to D.E. Clarke, a survey conduct around Los Angeles indicated that deeper dives usually produced

neurological involvement.

A report by P.Y. Bell and others indicates compatible findings in submarine escape studies with goats. When pre-saturation (corresponding to time and pressure in a submarine before escape) was increased, the maximum safe depth of escape was decreased; but the dominant form of DCS was shifted from Type II to Type I. The authors commented, "This change, we feel, is indicative of a change in the critical 'decompression limiting' tissues of the body from the faster tissues of the central nervous system and spinal cord to the slower tissues of the periphery."

Our own experience has included the observation that long exposure is important in the generation of chokes with otherwise minimal decompressions effects. G. Masurel (personal communication, 1983)

Science Fiction Scuba

With the attempt by scientists at Duke University and Aquanautics, Inc., to create an artificial gill, one can imagine all sorts of possibilities for potential underwater scenarios. But to science fiction buffs, the notion of an underwater gill is mere child's play compared to the futuristic activities spun by science fiction writers. We asked an expert on science fiction, writer A.B. Emrys of Chicago, to give us a run down of science fiction literature where we scuba buffs might escape into the unknown while lounging on a beach in Barbados or curled up in our own bed. Here is his report.

★ ★ ★ ★

From the mysterious Floatwood in James Schmitz's *The Demon Breed* to conversations with whales in Alan Dean Foster's *Cachalot*, science fiction writers continue to be as intrigued by underwater worlds as by the lure of space.

Earlier speculative novels plumbed the uncharted depths in the manner of Captain Nemo and the Nautilus, safely contained in vessels able to withstand pressure and keep adventurers safe from decompression dangers. This type of story was boosted by World War II submarine activity in books like Frank "Dune" Herbert's *Under Pressure*, in which submariners wear "vampire gauges" in their veins to monitor carbon dioxide diffusion.

The advent of scubagear changed the face of underwater science fiction permanently by literally releasing its characters to explore in new and increasingly imaginative ways.

Among the first SF writers to exploit scuba diving

responded to this information by describing chokes associated with very short, deep exposures of minipigs involved in submarine escape studies. We have seen apparent dysbaric osteonecrosis and bone-scan evidence of bone damage in our sheep, but only in association with 24 hour exposures.

Table III provides a highly qualitative view of exposure times and depths in relation to manifestations of DCS. D.A. Hills has called for the kind of analysis of probably sites and mechanisms that findings of this sort suggest. There is much to be done in this area with considerable promise of basic improvements in decompression. Meanwhile, educating scuba divers about the risks of central nervous system involvement in decompression sickness is extremely urgent.

-- Ten Books For The Beach

along with submersibles were Frederik Pohl and Jack Williamson with their Sub-Sea Academy series. Young Jim Eden, their hero, has an uncle who invented "Edenite," a filmy armor that forces water pressure back upon itself "instead of trying to hold it out by brute force." Edenite makes four-mile plunges possible and allows construction of Marinia, home of Jim's friend David Craken in *Undersea Quest* and Krakatoa Dome, the setting for *Undersea City*.

But when Jim and his pals don the sea-green fatigues of the Academy, they confront tests for diving ability and endurance. Cadets use an electrolung that generates oxygen by electrolysis of sea water as they study underwater combat, submarine operation, and compete for sub-sea posts.

One of science fiction's main attractions is its unlimited freedom. SF writers play "what if?" in water worlds by designing equipment to let the diver stay down for weeks, talk with dolphins by whistle or whales by translator disk, undertake elaborate studies including making scotch from sea water, and finally, invent exotic undersea *other* worlds.

Divers in science fiction are equipped for their particular adventures. For detective work on the destruction of floating towns in *Cachalot*, extramarine biologist Cora Xamantina's gear features a wet suit lined with thermosensitive gel retaining warmth to a hundred meters, a full-head mask with peripheral faceplate and a gill system with liquid rations and water spigot that allows her to remain underwater up to several weeks. Her favorite piece of equipment is the belt containing liquid metal alloy at its heaviest out of water and achieving negative buoyance at

Aquanautics Update

The development of scuba tanks which can withdraw oxygen directly from seawater has become a low priority, said Claude Gans, Chairman of Aquanautics Corporation at their December 8 stockholders meeting in San Francisco. Aquanautics, which broke into the national spotlight last year when it announced that its scientists had demonstrated the capability of extracting oxygen from seawater with its patented hemosponge, believes that the product, once developed, will be too costly for the limited sport diving and military market. Gans said the current compressed air tank most likely provides enough air at the right price for divers. "We're not sure there's a market for a breathing device which will provide two to seven hours of underwater time. For that duration it takes a real committed diver to overcome being cold, wet, hungry and tired."

The Navy had remained lukewarm to Aquanautics' research because they believed the size of the hemosponge required to extract oxygen was too unwieldy (See *Undercurrent*, March, 1984 for a more detailed explanation). Aquanautics responded by using heme (a synthetic substance with the properties of hemoglobin) in a fluid, thereby eliminating the sponge and reducing the size requirements for the unit. The Navy, Gans said, is once again interested and they soon expect to sign a major research contract.

Although Gans' announcement was disappointing to divers, he offered hopeful news for investors. Gans said the efforts to extract oxygen to power underwater combustion engines was on schedule. But perhaps more important commercially, Aquanautics has now demonstrated the ability to extract oxygen from air with their patented heme, which can lead to the development of portable machines able to produce a continuous supply of oxygen. According to Gans, this will open an enormous market, with little competition, among emphysema patients and others who require oxygen for survival. Gans expects the device to weigh less than ten pounds, be roughly the size of a brief case, and require only an occasional change of batteries to maintain operation.

Aquanautics currently owns two subsidiaries which produce wet suits and diving gear. Wemlor, in England, has had heavy financial losses and the firm is being closed since no buyers have been located. Imperial, in Bremerton, Washington, is now profitable and a buyer is being sought. When this is completed, Aquanautics will be out of the wholesale business and will have become a pure technology company. Said Gans, "Our research is behind us. Development is what's ahead."

After the meeting *Undercurrent* Editor Ben Davison reported that he was sufficiently encouraged by Gans' report to buy 1000 shares at 1¼. When reminded that he had made his first purchase of stock several months ago at 2 5/8, Davison remarked "well, I'll stand to lose less on this investment than on the first one, now, won't I."

Ben Davison, the logical chap that he is, still fails to understand why he remains a pauper.

ninety meters.

Diving into a sunken and radioactive Los Angeles in Jerry Earl Brown's *Under the City of Angels* presents different problems. Mad Jack Kelso, who roams the drowned freeways to scavenge houses where morays pop out of windows relies on the "Eumarine breathing apparatus" with its "dechlorinators and pollution filters" for "removing poison gases from the sea salt and radioactive or other toxic materials from the water." Kelso's other equipment includes handfins, a malfunctioning gill system replaced by a modified electrolung, and footfins that switch to caudal fin position when using jets to dodge the San Andreas Sea Patrol.

Divers in David Brin's *Startide Rising* wear masks with small sonar displays to compensate their underwater deafness while diving with their dolphin crew. Some plots involve alteration of the body itself for diving, as in Vonda McIntyre's *Superluminal*: "Orca was not about to wear a wet suit, or anything else, on a long-distance swim. For a diver, the idea was ridiculous." Her people manipulate DNA instead.

A prime underwater activity in science-oriented fiction is undersea research, and it combines with fabulous diving adventures like *Undersea City's* "geosonde" probing for seaquake prediction or at Cobb Seamount, a research station dropping 7,200 feet beneath the Pacific in *Red Tide* (Chapman and Tarzan). Here geological exploration, high pressure chemistry research and even open-heart surgery are carried out, along with Alex Demetre's secret program in oxygen-enriched fluid breathing.

When Cobb is cut off by land warfare, Alex seeks help from a colleague whose similar experiments succeeded on a volunteer from an undersea maximum security prison. The chase leads him to an underwater resort where tourists go on sea game safaris and play underwater croquet — "the presence of an occasional scorpionfish only made the game a bit dicy." Meanwhile his assistant, Marne, defies shut-down orders for Cobb's lowest levels and begins to metabolize hydrogen along with her rats, while Alex must decide whether to save a crew member's life by turning him into a water-breather.

Wet Suits & Rescue

Divers from the New Zealand Underwater Association recently jumped in the water to test whether the color of wetsuits had any effect on the visibility for search and rescue people. The exercise followed the disappearance of two wetsuit clad divers who were swept away while diving.

They conducted the tests in moderate seas, with occasional moderate to heavy rain, on an overcast day. They experimented both in daylight and at night. Their conclusion:

"The colour of individual wet suits was not crucial for effective visibility. In fact, it was unanimously agreed that *silver was by far the least visible*, especially in overcast and showery conditions. . . . Retroflective tape on wetsuit arms and hoods, Cyalume chemical light sticks, and red divers' flares were the most effective items for identification in the water. It was also strongly recommended that divers carry a whistle.

"At night it was observed that the retroflective tape was instantly recognized by torchlight -- 'like turning on a switch'! The Ministry of Transport believes that it would be a desirable step forward for safety if the reflective tape was incorporated into wet suit design. They added that manufacturers may also look into incorporating pockets for carrying whistles and flares. . . ."

Fathom. Blue Water. Henderson, Parkway. Are you listening?

Research is such a way of life to the crew of *Startide Rising* that they conduct studies while hiding out from inter-galactic fleets under the water planet Kilthrup. Commercial research helps keep the economy of Nandy-Cline afloat in *The Demon Breed* by extracting new substances from the towering Floatwood forests as they circle southward and back on the great Meral Current.

Science fiction writers also create full-scale water worlds, complete with flora and fauna, including intelligent aquatic races and seagoing animal partners -- especially whales and dolphins. On Cachalot, a full range of cetacea and porpoises have been ceded this oceanic world as reparation for earth's wrongs. Cachalot is a diver's paradise, where hexalate exoskeletons have built up coral-like reefs whose few beaches gleam like diamonds, where Cora and Sam make love in a glowing starfish grotto, and cephalopods find their yellow wet suits a turn-on: "[Cora] let herself drift, suspended in luminescence, as blue and red spheres jiggled and courted about her hands and head and legs."

The Demon Breed depicts an eco-system equally at home on land or undersea whether it's biologist Nile Etland and her otter partners, Spiff and Sweeting (who speak ungrammatical translanguage and are good at demolition work), the wriggler apple plant that turns a piranha in water, or the hideous, froggish Parahuans who drop their space ship into the lagoon. In this underwater *Guns of Navarone*, as in most speculative water worlds, the oceans themselves are always positive environments even though some of their inhabitants are definitely undesirable.

The metallic seas of *Startide Rising*, which won the 1983 Nebula Award for best novel, provide another detailed sea world, one that its dolphin-scientists are well-equipped to explore. Its plot utilizes conflicting species' perspectives: "Fins had been making wisecracks about human beings for thousands of years." Most scenes in the ten sections with titles like "Buoyancy" and "Currents" take place in or under water, whether holding a staff meeting in the space ship's pools, riding a sea sled, or diving for more data.

Conflicts between sea and shore are featured in several fictional scenarios. In *Superluminal Orca*, a web-fingered Diver, must decide whether to continue evolving with her people or take the training and surgery for starship pilot that will bar her from diving. On her earth sea and land dwellers avoid each other out of past clashes. At home in the deeps, she and her brother watch reruns of "The Man From Atlantis" -- "best watched slightly drunk" -- while fantasizing the hero telling off his military bosses and swimming to freedom: "that matched her people's history more closely."

Perhaps the ultimate interface of underwater and outer space occurs in Gordon Dickson's *The Space Swimmers*. In this two-book series, beginning with *Home From the Shore*, rebel sea people are hunted for sport by "landers." But when landers make con-

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tact with alien "swimmers" -- "gas in an envelope of magnetic forces" -- the People's magnetic sensitivities are needed to follow and communicate with the space travelers. One enjoyable drawing in the illustrated edition shows divers with scuba gear on inside space "envelopes" plunging into the dark void after the aliens. The way to outer space is once again through the water.



If you have placed a book order with the Diver's Bookstore in Milwaukee and haven't received your book, consider yourself out of luck. Undercurrent reader Martha Erickson (Monsey, NY) told us that she order a book over a year ago and although her check was cashed, the book did not arrive. After repeated attempts to contact the company, a letter was finally returned marked, by the Post Office, "no longer at this address." We looked into the problem and learned that Rowe Publishing Company (the parent of Diver's bookstore) declared Chapter 11 bankruptcy several months ago. Now, it seems, there are insufficient assets for anyone who ordered a book to expect their book or even a partial refund.

What do the British think about American dive products? Writing in *Diver Magazine*, Mike Todd had these observations of the 1984 Diving Equipment Manufacturers Convention. "The first impression gained was that there were a number of products exhibited on different stands which seemed to be identical. This intensive copying of products among manufacturers is a demonstration of the importance of following trends, and the economics of copying a product rather than developing a truly new product. . . . The United Kingdom observer would note that they pay a lot more for their equipment than is common here, but they demand far more in the way of appearance and fashion. . . . Looking good is important in any leisure activity, and this now includes diving."

When the San Francisco 49'ers take to the gridiron in sub-freezing weather the equipment manager makes sure they're wearing the appropriate scuba gear. . . . they've discovered that neoprene wet suit gloves can keep their hands warm while giving them

Seas and oceans, in fact, are the chief metaphor used by science fiction writers to describe the physicality of space as well as its fascination and promise. Terms like "wave," "tide", even space "ship", are commonly used in titles and text to express space adventure by its nearest analogy -- our curiosity and awe for earth's underwater territories.

enough flexibility to field a football.

Yes, we loved the Southern Cross Club on Little Cayman, but let us give you a new booking address: Mary Ann Evans, Merchants Travel, 11 S. Meridian St., Indianapolis, IN 46204 (317/267-7970).

The fulfillment of God's instructions to Moses regarding the coloring of ritual prayer shawls hit a snag about 500 years ago, when the secret of how to make the prescribed blue dye somehow faded away. Now, however, *Science News* reports that an Israel biochemist, by piecing together chemical, historical and archaeological evidence, claims he has rediscovered the ancient blue-purple dye -- an achievement that could lead to a revival of an ancient Jewish practice and the birth of a new industry. The source is the banded dye murex, a mollusk that secretes a mucus that produces the pure blue-purple color of antiquity. The murex is found along the coasts of Israel and Lebanon and sold by the kilo for food in Cretan markets, but before the dye can be commercially produced the mollusk will have to be raised in greater quantities than now available.

Why do silicone masks steam up? We thought we resolved that in the November/December issue, but reader J.D. Hinton of Mahwah, New Jersey, has his own explanation: "On March 17, 1973, Anatoli Garkov, staff chemist at the University of Minsk, delivered a paper before an elite group of scientists, in Moscow, on the unique effects of pheromones (smells) on silicone. Control group results, tabulated over fourteen years, confirmed an interesting anomaly. While silicone is practically impervious to the effects of sunlight, ozone, and a wide variety of pheromones, it is especially and particularly vulnerable to the pheromones of excretus bovinus. Since Dacor has found that the problem of persistent fogging of silicone masks seems to be confirmed to Texas, I believe we have solved the problem."

In the continuing search for ways to stamp out nose-um's, Linda Stough of the Diving Den (Kokomo, Indiana) claims that Avon Skin-So-Soft Bath Oil will prevent the bites. One of her customers, Roger Murphy, has been using it successfully for some time. Any other thoughts?