

# undercurrent®

THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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## Glover's Reef Village, Belize C.A.

### *An Outpost Of Civilization*

To survive a ten-day sojourn at Glover's Reef, one need not necessarily be a hearty soul. Oh, there is no plumbing, no running water, nor enough electricity to do anything other than keep a couple of refrigerators running now and then. And the only way to get there is a seven-hour sail from Belize City, sixty water miles away. But there are nine tidy little cabins (sometimes fewer if the owners find the annual hurricane damage too much to repair) with twin beds, meals of fresh fruit and fresh fish, plenty of sun, damn good diving--and not much else. It's not physical stamina that's required of visitors, it's psychological stamina--the ability to let go and lay back. If you can't handle the vacant hours when you're not diving or not eating, then you're bound to go stark raving mad somewhere in paradise and surely here at Glover's Reef Village. The village is an outpost of civilization. The reef itself, located 14 miles beyond the second-largest barrier reef in the world (it stretches the full length of Belize northward up the coast of Mexico's Yucatan), is one of the major navigational hazards of the western Caribbean. A number of wrecks are scattered around the fringes of this 15-mile-long, 6-mile-wide limestone plateau, and only recently has the Belizean government bestirred itself enough to install a small solitary light on the southwestern tip. The Village is located on three small islands, one housing the residence of the proprietors, Gil and Marsha Lomont. The second, a lush coconut-palmed plot about a half mile long, has the nine guests' cottages, though new cottages are being built on an adjacent isle. An open air dining hall accessible by a sandbag causeway, is built on the third island. Guests are accepted from February through July. Every other Sunday morning, the Lomonts collect their charges from the hotels of Belize City, then set sail in their 50-foot craft, Christmas Bird. Normally it's a 7-hour sail to Glover's but during my journey rough water slowed us to nine hours. Guests remain until Tuesday next (which means eight full days of diving) when Christmas returns to Belize City. The Lomonts use the four days between groups to purchase and load supplies and take care of paperwork.

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Though you cannot expect to live with all the comforts of home at such an isolated retreat, Glover's is not tantamount to camping out. The clean,

one-room cabins (most are mounted on stilts) have two single beds; linen was changed once during my stay. Air conditioning is provided by trade winds; in the heat of a midsummer day the temperature was, for example, more comfortable than Florida weather and nights were perfect for sleeping. A brackish water shower and a bucket toilet (emptied daily and never obnoxious) are located beneath the cabins. Shower water temperature varied from cold when the tank had just been filled to almost-warm after a day in the blazing sun. Fresh trapped rainwater was available for drinking and washing small items. On the roof of the dining hall a windmill is perched to power two refrigerators, devoted in large part to housing chilled Belizean beer (Bellikin), indeed a necessity to wash the day's salt from my gullet.

Before I visited Glover's, I wondered what kind of man would make his life so far from civilization. Once I met Gil Lomont, I knew. He reminded me of an old tale about laconic Calvin Coolidge. An acquaintance approached Coolidge and said, "Mr. President, I bet a friend that I could get you to say more than two words." Coolidge glared back. "You lose," he replied. Getting Gil Lomont to say more than two words was just about as tough. Though he seldom spoke unless spoken to (and then with only the most sparse response) there's still a friendly air about him and his appearance nicely fitted my pre-trip perception. He's in marvelous physical shape, without a pinch of fat. His skin's as leathery as an old saddle, his body never covered with anything other than his bikini trunks. His wife Marsha no way fitted my image. A fair-complexioned lady, she kept herself well-covered and out of the sun, tending busily to resort management. Their two charming daughters, 15 and 8, were present, leading an idyllic childhood yet fully capable of dealing with the rigors of remote island life. Becky, the older of the two, could sail a narrow dugout without a center board as if she were a master skipper. And while we divers searched for a few average-sized bugs for supper, with a moment's notice she returned with a lobster so monstrous we dined on fingers of meat from the antennae.

So with all this isolation, one must expect fine diving. Indeed, my expectations were more than met. Fish are abundant. I observed virtually every Caribbean species. Coral and sponges were numerous and large: on one side of the reef I found black coral at 60 feet. Invertebrates were not so well represented; I saw more crabs walking around the island than in the water, but lobster and conch could be had. And the visibility? Well, it ranged from a high of 150 feet in some areas to 50 feet in a few others. Guests who had been here before complained that visibility was not as good as usual.

Twice a day, after breakfast and after lunch, Gil took us through the cut on the Christmas Bird to the outside reef for a single tank dive. If there were only a few divers, one of the staff took us in a smaller sailboat. No one from the resort accompanied divers below, which permitted us to select our own depth and time profile. That's fine for experienced divers, but no doubt novices would be uncomfortable particularly when they realize how far they are from any emergency services. Both boats were adequately rigged for diving and easy to enter from the water. Trips were usually very short; often we dived on the east side within a coconut-throw of our beach cabin. Here depths ranged from 50-80 feet, sloping suddenly down into the abyss. At the start of the drop, coral was scattered but became more prolific in the canyons and cuts as we went deeper. I saw innumerable crinoids and large colorful sponges, often with brittle stars asleep inside. Fish life included large queen and gray angels, hogfish, blue chromis, dignified spade fish and perhaps a barracuda or two. On

one dive here, just as I reached the bottom, a strong current created by the incoming tide welled up over the reef, I had to put my head down and chug to get to the drop off. But the view in 150-foot visibility was well worth it. My only problem was wanting to go deeper. And deeper. And deeper.

On days when it was too rough on this side, Gil would take us across the lagoon to the glassy calm west side, where diving is possible in just about any weather. We would make a single trip, diving two tanks. I liked diving better here. Though the visibility might drop as low as 50 feet, I found much greater variety in fish life and coral including red and black corals at fifty feet. On a few perambulations, I found a mother lode for fish photographers: spotted morays, trumpetfish, longjaw squirrels, coneys, blue chromis, harlequin bass, red and Nassau and tiger groupers, rock hinds, fairy basslets, sand tilefish, bar jack, white and blue striped grunt, spotted drums, cherubfish, rock beauties, queen and gray and french angels, spotfin and foureye butterflies, blue and brown chromis, dusky and yellowtail damsels, beau gregories, blueheads, hogfish, clown and blackear wrasse, blue and rainbow and midnight parrots, blue tangs, durgeon and queen triggers, orange spotted filefish, sharpnose puffers, balloonfish. Did I miss any species?

**GLOVER'S REEF VILLAGE, BELIZE, C.A.**

Diving for beginners	★	★		
Diving for old pros	★	★	★	★ ½
Beach snorkeling	★	★	★	
Hotel Meals	★	★		
Hotel Otherwise	★	★	★	★
Moneysworth	★	★	★	★

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

The lagoon itself contains some 700 coral patches; the depth averages 10-15 feet, the visibility 50 feet or so. There were fewer fish, but lots of sponges, large coral stands, plenty of anemone and arrow crabs, coral shrimp, and on one dive I spotted two very large and elegant queen triggers. Pleasant night dives were held in the lagoon, but I would have preferred at least one at a drop-off to avoid blundering through sea grass and elkhorn coral. No spearing or collecting is permitted within a mile from the Village.

The available dive gear consisted of about 45 aluminum 80's and sufficient number of lead weights. That's all. Period. One must bring everything else, including a belt on which to string the weights and a backpack to take the 80's. About half the tanks were past their hydro date, a common occurrence at remote resorts where transportation to a testing facility would cost more than a new tank. A big Armstrong-Siddley diesel compressor pumps about 16 cu. ft./minute, so we never waited more than a minute or two to get a tank for the second dive. Several smaller compressors were scattered about the island, but none worked, so pray for the Armstrong-Siddley. Tanks were filled to 2500 psi, which turns an 80 cu. ft. into a 67 cu. ft. tank, again not unusual for such a remote resort because it saves wear and tear on the compressor.

A half-mile walk to the end of the island and a forty-yard walk through shallow water brings one near a reef especially fine for snorkeling. If you're energetic enough to tote a tank down here (they're available anytime), the diving would be superb. For me, the hike was not worth it. If you don't use your spare time snorkeling, then about the only other thing to do is sit in the sun (few did, because it took so little time to burn or tan), comb the beach (it's rugged--all limestone rock), nap, or wait for the next meal. And after three or four days, waiting for the next meal became as tedious as the food itself, and indeed, that's tedious. Not that it wasn't fresh, wholesome, and nutritious. There was always fresh fish and plenty of fresh fruit--mangoes, pineapples, oranges, bananas, coconuts, grapefruit. But there was no imagination in the

preparation, which is especially important when faced with routine supplies and inadequate refrigeration. Unless a guest walked into the kitchen to cook, the fish or lobster came grilled or baked, without changes in spices and without sauces. The potatoes were potatoes, the cakes and puddings were just cakes and puddings. Lunch was fruit, marinated fish, salami and cheese, avocados, onions, tomatoes, key limes. Breakfasts were eggs, pancakes, fruit. Every meal was accompanied with a good homemade bread and margarine. Two or three days on this fare were fine, but by the fifth or sixth day, the routine became very boring--and I believe unnecessary.

One way the Lomonts get many of their needs met is by bartering with people for services. Bring a skill they need and get a reduction in the vacation cost. You might get a moderate reduction for helping with cleaning and kitchen work, reef surveying, offering construction skills, or tutoring the children. During my stay, people bartering included two young women helping with general chores, a fellow (and nondiver) who fished from a boat every day (with native guides) and provided fish for all the staff and guests, and a physician who had provided health care. If you could repair the broken compressors, I suspect you'd get a healthy reduction. And--Marsha and Gil, hear this--if you could teach new tricks with fresh fish and fresh fruit and herbs and spices and sauces which can be applied in the difficult conditions here, you might also be awarded a substantial rate reduction. At least I would hope so. Now I don't know that the Lamonts want me to advertise their barter effort, nor do I know for what skills they're willing to barter but if you have something to offer, I suggest you drop them a line explaining yourself.

Finally, come prepared. Bring everything you need for gear repair; I filled up a 10-lb, multicompartmented tackle box with things I thought I'd need; many other guests didn't even have so much as a spare o-ring. An underwater light is handy for seeing colors at depth or walking the island at night, but don't bring rechargeables--remember, there's no electricity. And, what else? T-shirt and pants for snorkeling to save your backside from the sun....sunscreen....lots and lots of strong bug repellent....long pants and sleeved shirts for cool evenings....booties or sneakers for wading in the shallows; stinging hydroids and sea urchins are plentiful....snacks to occupy your belly and perhaps a bottle of your favorite spirit....antihistamines to reduce the reaction to bug bites. And, need I tell you to dive conservatively. With a 7-hour boat trip to Belize Airport as only the first stop for a bent diver, this is no place to screw around.

Getting There: Belize City is served by TACA, TAN-SANSA, and Air Florida airlines. Suffer through whatever inconveniences you must to fly with Air Florida; the others are undependable at best. The tab for the ten-day excursion from Belize City to Glover's and back is \$825/person. You'll require two nights lodging in Belize City, perhaps the toughest town in the Caribbean (don't carry or wear anything valuable when you walk the streets, and at nights use taxis). The Fort George, about the quality of a decent Holiday Inn is \$94.50/night/double. The Tropicana is \$10/night/double, where I stayed the first night and found it much too gamey for my taste, but the hotel offers luggage storage service, so you don't have to tote your gear around if you take a tour. There's no air conditioning. A number of mid-priced hotels, including the Bellevue (\$70/double) and the Bliss (\$30/double) are reasonable bets. Best bar: Fort George. Best nightclub: the Bellevue.

Reservations: From February to July, write Lomont Enterprises, Box 563, Belize City, Belize, C.A. At other times write airmail to Lomont Enterprises, Box 977, Verdi, Nevada, 89439 (702/345-0483). You may call in Belize to relay messages; the combined country city code number is (501) 2548 or 4332.

## Reports From Our Readers' Travels—Part III

**BONAIRE:** We're not always perfect, and in our review of Bonaire (September, 1981) we were less than perfect. One of our reviewers visited Bonaire in November and, although our perception of the diving was right on the money, he suggested that a few factual corrections are in order. Here is his brief report:

Klein Bonaire is about half-a-mile west of Bonaire, and though it, itself, does not shelter Bonaire, the diving remains good year-round because nearly all of the sites are on Bonaire's leeward side... Cap'n Don has three hardtops, Bruce Bowker has one small open runabout, a 23-foot Proline powered by a 145-hp outboard (not fitted with a sun canopy) and Peter Hughes has four flattops plus a 30-foot off-shore Pirogue cruiser, powered by twin 115 HP motors....At Dive Bonaire I dived from the 34-foot flattop with a full complement of 24 divers, had plenty of room for my camera equipment and once underwater had no problem separating myself from other divers (though most divers aboard seemed to prefer to see other divers below to heighten their own sense of security.)...Dive Bonaire also offers night boat dives....The Flamingo has two restaurants and I found the meals much better than "reasonably satisfactory": the fresh fish and filets for dinner were excellent, and breakfast indeed had fresh eggs, unlike most other establishments....

Our initial reviewer had a bit of difficulty with one staff person, Dee Scarr, but a flock of readers rose to Dee's defense. "I thought Dee Scarr was just great--courteous, helpful, a good leader, interesting and interested." (George Klingehofer, Sun Valley, Idaho)...."Ms. Scarr went out of her way to answer divers' questions and try to fix their malfunctioning equipment. In my case, her patience helped to give me confidence I lacked as a new diver." (Sue Ackerman, Cincinnati)...."We've known Dee for several years and she has patience and encouragement for those who need extra help--we know from personal experience. She may be overworked and sometimes tired--but never rude. If you need a course in rudeness, try staying at any resort holding a medical seminar. Physicians, as a group, are egocentric and boorish." (Ken and Sue Scribner, Portsmouth, VA)....And our follow-up reviewer said, "I have never found Dee anything but friendly, cooperative and helpful. She is a divemaster, instructor and Mother of the Touch-the-Sea program, which introduces divers to tactile sensation underwater, including hand feeding moray eels. Dee gave a couple of underwater slide shows during my stay, and always had time to discuss the marine life of Bonaire and diving with visiting divers."

We inadvertently left out the reservations information for the Flamingo Beach. Reservations may be made by writing the Flamingo Beach at P.O. Box 686, Ithaca, NY 14850, or by calling 800/847-7198. (In NY dial 800/252-6323).

And for the rest of Bonaire? "Bruce Bowker is a super guy, very energetic and runs inexpensive and not very crowded tours." (Carl Bronnel, Holmdel, NJ).... "I was very pleased with the Aqua Habitat; I found Cap'n Don to be helpful, charming and very interesting, with a nice sense of humor." (Eugene Hise, Knoxville).

**COZUMEL:** It's been nearly four years since anyone of our staff has visited Cozumel, but our readers report that the fish life, once decimated by spear-fishermen, seems more abundant. Dives along Palancar Reef (40-120 feet or so), especially drift dives, prove interesting to both novices and old hands as well. Most guides pay little attention to divers, making Cozumel a not-too-wise choice for the newly certified. And 3-4 hour round-trips to Palancar are a drawback.

Regardless of the hotel at which one stays, most divers go aboard boats arranged by one of two dive shops: Discover Cozumel and Aqua Safari. Both are located near the pier from which dive boats depart. Special trips can be arranged to Columbia or Maracaibo Reef, which according to Doug Hilton (Teterboro, NJ) is "high voltage and for experienced only. Strong currents, occasional sharks." Aqua Safari seems the best shop, with comments consistently positive; e.g., Brez Lester (Cotulla, TX) says, "Dick Thompkins and the crew at Aqua Safari are fine people to deal with." Three other readers wrote that they have dived with several operations and Aqua Safari is "the best." Though we have received positive comments about Discover Cozumel we also received complaints. J. Jordan (Edgewater, NJ) said the four in his group arrived at the shop one morning for a prepaid trip and found the shop closed with no explanation. Shop owner Ernesto Kensler decided to take the day off. They got a refund, but lost a full day's diving. Ellen Scott (Manchester, MO) complained of faulty depth gauges, regulators and rental gear which cut diving short. Our preference is clearly Aqua Safari, even with rates higher than Discover Cozumel's. Robert McCaulley, M.D. (Anaheim, CA) reports discovering a free lance divemaster named Alvero, (nicknamed "Blondie") who is well-known at the shops and hotels. "He runs a small boat capable of taking eight divers, custom tailors the dive to meet the needs of the group, is extremely safety-conscious and painstaking in describing the dive plan. We had the good fortune of seeing Santa Rosa Reef, the most beautiful reef I've ever seen." Jack Alyn (Houston) praises the Villa Blanca Hotel and diving the Hotel's Damsel Fish Divers. "Their boat accommodates six divers, leaves at 8:30 a.m. and after two tanks, is back at the hotel by noon. We've come to Cozumel ten times and we're very high on this dive operation."...Three hotels are the most popular: The Barracuda, the Galapago Inn and La Cieba. Our readers enjoy La Cieba, finding the accommodations pleasant and the food generally good. The Barracuda, too, seems to hold its own; it doesn't serve meals, but it's only a short stroll to many restaurants. We're surprised with the number of readers describing deteriorating service at the Galapago. Guillermo Colocho, M.D. (Albuquerque) says, "The Galapago Inn has lost its touch. They tried to handle too many divers without the organization to do it." Jeff Hayes (Mill Valley, CA) says, "Galapago has become too big. They keep adding rooms, but not facilities. Very noisy on the road, the staff very rude at times, particularly diving personnel." One diver who didn't include his name said, "I have stayed at this hotel five times. It's gone from a clean neat, efficiently run hotel to the pits." Julian Marshall (NYC) was disappointed in the quantity and quality of the meals. And though his first stay at the Galapago was enjoyable, he says after his second trip, "I will not return."

## **U.S. Navy Approves BAUER Compressor**

### *Weighing In At 65 lbs., It's A True Portable*

The U.S. Navy Experimental Diving Unit has recently completed tests of the BAUER Varius G-3 portable compressor and recommends that it be approved for Navy purchase. The G-3, a three-stage, three-cylinder, gas-powered high pressure compressor, is 26 inches long, 12 inches wide, and 14 inches high. It weighs 65 lbs.

The compressor is designed to deliver 2.2 actual cubic feet of air per minute at 3200 psi. The Navy determined that the average time required to fill a standard 80 cu. ft. aluminum cylinder was 39 minutes. A single 72 was not tested, but it took 71 minutes to fill a twin 72.

Depending upon the ambient pressure, the discharge

temperature of the compressed air ranged from 120°F to 139°F, not great enough to become a major factor in the resultant bottle pressure.

Air samples were taken at the start and the end of various test periods, every 12.5 hours of running time, and after the performance of scheduled maintenance. No appreciable contamination was noticed and the samples met U.S. Navy standards for compressed breathing air. It should be noted that the air quality began to deteriorate after 12.5 hours of running time, but returned to normal after the recommended 25-hour servicing and filter change. Even when the air deteriorated, it still remained within acceptable standards.

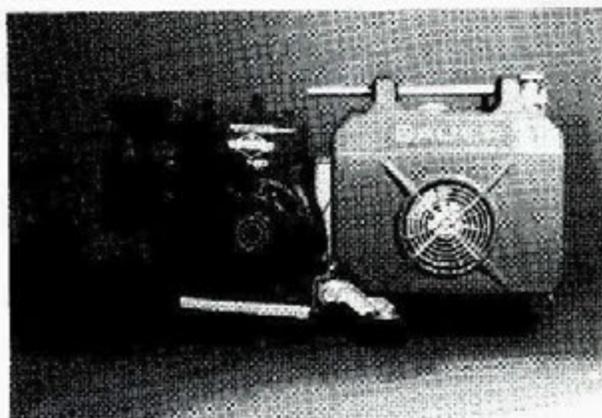
Fuel consumption was calculated twice. Two quarts of unleaded gasoline provided 3 hours and 30 minutes of running time in the first test and 3 hours and 19 minutes in the second, enough to fill about five, 80 cu. ft. tanks.

In conclusion, the Navy stated: "The BAUER Varius G-3 compressor is suitable for use by the Navy. . .it delivers acceptable breathing air at a charge rate and volume, which meets the manufacturer's specifications. . .the charging time is considered to be satisfactory. . .fuel consumption is satisfactory and very economical. . .the unit is sturdy, reliable, readily maintained, and one-man portable."

*Undercurrent Comments:* Over the years, the U.S. Navy has had difficulty finding portable compressors to meet its standards. In fact the Navy last approved a portable compressor in 1959: the Cornelius Scuba Air Compressor (gasoline, 3.5cfm). The Cornelius Company was purchased by Briggs and Stratton in the 1960s and the approved Scuba Air Compressor was discontinued. The BAUER people, according to spokesman Chuck McCoy, didn't think about submitting their compressor for Navy approval. They had designed the compressor for sport divers and had no idea that the Navy might have use for the device. When the Navy contacted them, they were delighted to supply a model for testing.

The portability and the gasoline power make the G-3 an excellent aid for divers travelling into remote areas. In addition to the gasoline-powered model, an option of three different electric motors (each producing different volume outputs) is available.

The BAUER Varius G-3 retails for \$1,695. Information on the compressor and the name of the nearest dealer (there are 350 distributors) can be obtained by writing Chuck McCoy, BAUER Breathing Air, Inc., 1328 Azalea Garden Road, Norfolk, VA 23502, (804) 853-4593. The G-3 has a 6-month guarantee on parts and labor.



THE BAUER VARIUS G-3 PORTABLE COMPRESSOR HAS BEEN APPROVED IN U.S. NAVY TESTS

## Psychophysiological Factors in Diving

### *Stress, Panic And Sudden Death*

The concept of "imbalance" is central to understanding all human stress and stress in divers. Through internal or external stimulation, stress factors throw the body out of balance, and the individual then strives to restore that balance.

To paraphrase one researcher: The human organism, unlike other creatures in the animal kingdom, deliberately seeks stress or imbalance for the apparent pleasure of later restoring equilibrium and getting a thrill from the pleasure of imbalancing. So, we have roller coasters, skiing and diving. Sex, as a stimulation/restoration cycle, is more universal in animals (including man), but the equivalent of man's intensity while skiing would be difficult to find in other animals.

Stress, being individual in nature, is largely learned and, in part, determined, by culture. Humans tend to seek the stressful imbalance (thrill seeking), with the belief that it is within their power—or someone else's—to correct the imbalance and restore equilibrium. Roller coasters or ski slopes or dive trips, they normally assume, have been engineered or evaluated by knowledgeable and responsible individuals. Though some people take greater risks than others, they do not normally seek stress they perceive as being beyond control.

The stress of diving is unique. In addition to the physical exercise (which is, in itself, stressful), cold temperatures, pressure of the hyperbaric environment, impact of diving equipment, and potential for marine hazards multiply individual stress. And control of or recovery from stress are rendered more difficult by the very nature of the underwater environment. The actual number of fatal accidents among sport divers, about 150 per year in the United States, is relatively high when compared to other sports. Perhaps it is fortunate that the attrition rate in sport diving is also relatively high. After training, many divers neither pursue a career in diving nor make a long-term commitment to sport diving. Many of these individuals apparently withdraw if they find that the thrill (or financial rewards) of diving does not compensate for the possible discomfort and danger.

#### **The Motivation To Dive**

What motivates the sport diver to enter the potentially hostile (and certainly foreign) environment, wearing the necessary, however unusual gear?

One motivation is probably that of *adventure*, which includes not only the search for pleasure through the beauty and challenge of the underwater environment,

but also the gaining of the rewards of accomplishment in successfully controlling one's behavior in such a potentially hostile environment.

For the sport diver, there is also major *social* motivation. Few sport enthusiasts are as club-oriented as are sport divers. The pleasure of sharing the diving experience through conversation is a major reward for sport divers. For many, identification with a group is a paramount consideration. To be sure, in sports such as skiing a proliferation of jacket patches often identifies a skier's experiences on various slopes around the world, but the numerous patches that many sport divers attach to their jackets led one observer, Reg Vallantine (head of the London Underwater Centre) to state that American divers, in particular, seem to be suffering from the disease of "emblemism." This wearing of emblems acts as a motivator for many a diver and is a positive feature of the camaraderie of sport divers.

### **Panic and Sudden Danger**

Diver panic, researchers assume, accounts for most of the sport diving deaths in the United States. As noted earlier, individuals entering a self-determined stress environment for pleasure assume that the situation is under control. Apprehension—a feeling of uncertainty about one's ability to cope with the situation in which one finds oneself—is a moderate response. Panic is more severe. It results when individuals perceive a loss of control of their performance.

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*"Apprehensive divers are likely to be more concerned with checking equipment than observing the underwater environment."*

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Apprehensive divers usually orient themselves toward the surface to relate themselves to the boat or shore. As apprehension increases, their breathing rate increases. Swimming movements become irregular and the diver may bring his knees forward and kick with short jerky movements from the knees rather than the thighs, making for a less smooth passage through the water. Apprehensive divers are likely to be more concerned with checking equipment than observing the underwater environment. All of these behaviors suggest a loss or lack of comfort and control. But the apprehensive diver, if he is well-trained, still has time to gather information, plan, and cope with the potential threat.

Panic is a loss of control with a concomitant loss of the behavior that would help cope with the potentially hazardous situation. In the panic stage, the likelihood of coping is severely diminished—if not extinguished.

In the majority of fatalities reported, diver's weight belts were still fastened, mouthpieces had been "spit out," buoyancy vests were uninflated, and air remained in the tanks. All of these conditions point to a lack of coping with the perceived danger situation.

That panic is a major cause of diving accidents is supported in part by accident statistics and cases. The majority of accidents occur in relatively shallow water. In one study of diver deaths in Los Angeles, for example, 15 of the 18 individuals who died were on the surface when panic occurred. Dealing with panic and the concomitant biomedical problems (e.g., air embolism) deserve more emphasis than they generally receive in sport-diving training. If most accidents occur in relatively shallow water, after relatively short periods

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*"In one study of diver deaths in Los Angeles, for example, 15 of the 18 individuals who died were on the surface when panic occurred."*

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of exposure, training emphasis on decompression diving seems unwarranted especially since the "rules" suggest that sport divers should not engage in decompression dives.

When observed on the surface, divers in panic situations have been frequently described as clawing the air with their hands, striving to get their bodies out of the water, and holding their heads high, with mouthpieces out, trying to get air—types of behavior that do not cope with the threat. The diver who is struggling on the surface quickly becomes fatigued, in part because his head is being held high, which increases his body workload. This severe work effort increases fatigue and further contributes to his panic.

To illustrate panic—and the effort to become rational again—let me cite this passage from *Go to the Widowmaker*, a novel by James Jones, in which he depicts a diver caught in a narrow cave.

"But when he was in far enough that he could no longer bend his knees to flutter his feet, the panicky breathlessness, the sensation of being unable to breathe to get enough air, which panic brings. . . hit him debilitatively. Stopping, he forced himself to breathe deeply but it didn't help. Suddenly his instinct was to throw off everything and run for the surface blindly, even though covered by coral rocks, get to anywhere there was air. Instead, he reached out with his hands and pulled himself further in, trying to get his movements slow and liquid, unviolent, though by now he didn't care whether the coral cut him or not."

### **Machismo and Panic**

Finally, one diving motivation that has not been discussed directly is the motivation of conquering the environment in a powerful manner. And every diver knows that one of the more serious marine hazards is the diver who claims that he dives deeper, longer, and with less air than his cohorts, thus placing everyone including himself at a risk. According to one researcher, "severe panic occurs in our machismo culture more commonly among men than women, especially in settings in which the man feels the ambience to be one of strong social disapproval of any display of

# UNDERCURRENT BACK ISSUES AVAILABLE

Quantity Desired	Date	Topics
_____	Jan 79—	The Red Sea; Sharm-el Shiekh; Frozen Regulators; The Sequest BC
_____	Feb 79—	The Red Sea, Part II; Dacor dive computer; Photography Courses
_____	Mar 79—	San Blas Islands, Panama; Ocean Survival; Tax Deductible Dive Vacations
_____	Apr 79—	Andros, Bahamas; Navy Decompression Studies; Scuba Regulators
_____	May 79—	San Salvador, Bahamas; Aluminum Versus Steel Tanks; Cyalume Lightstick
_____	Jun 79—	Sea of Cortez, Mexico; Mask Maintenance; Sport Diver Deaths
_____	Jul 79—	North Caicos; Timing Your Dives; Sport Diver Deaths*
_____	Aug 79—	The Great Barrier Reef, Australia; Teaching Your Child To Free Dive
_____	Sep 79—	Bimini, Bahamas; Navy Tests Of Submersible Gauges; Diver Nutrition
_____	Nov/Dec 79—	The Grenadines; Co Poisoning; Regulator Performance*
_____	Jan 80—	The Clubs Mediterranean; Treasure Hunting; Inflatable dive boats
_____	Feb 80—	Crystal River, Florida; \$13 snorkels; The dive business
_____	Mar 80—	Turks and Caicos; Regulator Limitations; DEMA convention
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weakness. . .the need to exaggerate bravery, strength, aggressiveness, and other culturally defined attributes of manliness and to deny, minimize or at least not acknowledge fear, coupled with the shame for failure to live up to such standards, constitute the classic psychological preconditions for this response."

### Physiological Events

Agitated breathing—usually rapid and irregular—is observed in many different stress situations. In diving, it indicates the possibility of impending panic. Most of the research on changes in breathing and hyperventilation has involved individuals at the surface breathing air unencumbered by diving gear. When normal breathing resistance is compounded with snorkels, regulators, restriction of breathing by straps and suits, and pressure, the problem becomes more serious. One Australian researcher has suggested that when a diver is breathing with minimal resistance on the surface the maximum ventilation that can be maintained for longer than a few minutes is about 40% of the maximum breathing capacity. For a diver wearing equipment that restricts his breathing capacity, the maximum ventilation for the same period might be 25% of his maximum breathing capacity.

Many patients have said that their awareness of rapid, forceful heartbeat has caused them to hyperventilate. Thus, there is clearly a relationship between psychological factors of anxiety and physiological changes resulting from and causing hyperventilation. Such changes can be magnified many times by the increased stress of the underwater environment. Moreover, by the very nature of the environment, the consequences of physiological changes underwater can be more profound and devastating than those at the surface.

In recent years, there have been accounts of experienced divers in California waters (usually males whose ages ranged from the mid-thirties to the mid-fifties) who had been perceived by their diving buddies as "calm", but who sank below the surface and perished within a matter of moments. A diver's state that is perceived by his diving associates as normal and nonstressed may well be a precursor of sudden death in some circumstances.

The speed with which some divers appear to "get in trouble" and sink suggests that panic can be a psychological and physiological precursor of such sudden death. One researcher stated that "when a person collapses but quickly recovers, it is fainting. When he dies within the next few minutes it is sudden or instantaneous death."

The stress response leading to death in divers causes certain initial physiological changes: increased heart rate, blood pressure, total systemic resistance and cardiac output.

In the second phase of the circulatory changes, an abrupt reversal occurs—a fall in the heart rate, systemic and pulmonary vascular resistance, cardiac

output and index, ventricular work, and atrial pressure which set the stage for sudden death.

### Understanding Oneself: Will Stress Lead To Panic?

It is evident, then, that significant psychological stress may lead to physiological events with severe consequences that can lead to sudden death. To understand one's predisposition to diving stress and panic, one needs to look at his own physical condition and his stress history. One's capacity to perform underwater is important, just as is his ability to work cooperatively with other individuals in a potentially stressful environment. And, we've assumed here that labile hypertension is associated with panic and subsequent sudden death.

Claustrophobia is often named as a potential hazard in diving, but in all probability the self selection of divers after initial exposure to masks and other equipment will take care of this concern.

Sport diving, then, is a pleasurable and potentially hazardous, stress-inducing activity. To be a safe diver, one should clearly understand his predilection towards stress and subsequent panic, especially in light of the finding on sudden death in divers.

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*The author of this article, Arthur J. Bachrach, Ph.D., is Director of the Environment Stress Program Center, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md. A version of this article was originally published by the Undersea Medical Society. Undercurrent takes full responsibility for all editorial changes.*

### Mail Order Watch Repair

A number of readers have written, complaining of problems with dive watch repair shops in their home town. Many shops aren't able to pressure test, some don't guarantee the seal, others can't repair many older models, and few seem very pleased at all when faced with the repair of diving watches.

We suggest, then, trying the House of Clocks in Los Angeles, to which you send your prized timepiece by mail or UPS, and they'll respond with a written estimate within 48 hours. Once they receive the go-ahead, they will repair your watch in about 10 days, assuming they can get the parts. Of course they'll repair just about any watch regardless of age (the exceptions are non-jeweled watches and Timex), but they pressure test all dive watches to 600 feet, then guarantee their work and the seal for six months. They've been successful repairing a number of old dive watches (Zodiac, for example) for which parts are difficult to find.

House of Clocks, Repair Department, 404 W. 7th St., Los Angeles, CA 90014, (213) 626-7893.

# A New Seasickness Preventative

## —It's Bad News For Divers

*Mal de mer*, or seasickness, is the bane of many a diver. Indeed, the bilious chyme that flows from the deepest depths of the stomach when the water gets rough has caused more than one would-be diver to seek a more terrestrial pastime. For others, seasickness pills have become an essential part of their dive gear. It is no surprise, then, that a number of divers have expressed interest in a new and well-publicized motion sickness preparation—Transderm-V—recently marketed by the Ciba-Geigy pharmaceutical company.

Unlike other commonly used motion sickness medications, Transderm-V is not a pill. Instead, it uses the skin as a portal of drug entry. The active ingredient in Transderm-V, scopolamine, is impregnated in several layers of inert material that is molded into a patch and placed on the hairless skin behind the ear. Scopolamine is slowly released from the patch and passes through the skin directly into the circulation at a rate that is believed to produce optimal therapeutic effects.

Scopolamine has been known to prevent motion sickness for a long time. However, it has not been found to be particularly more effective than other standard medications, and it has been associated with a number of bothersome side-effects. Several of these effects are of particular concern to divers.

Scopolamine is well known to both excite and depress the central nervous system. Some persons who take it will get drowsy or forgetful, while others will become anxious, restless, confused or even hallucinatory. At the same dose different people will have completely opposite effects. Of concern to divers is the risk that nitrogen narcosis (even in very mild degrees), or dive-related anxiety, may accelerate these unwanted side effects and increase the chance of an underwater accident.

Scopolamine is also known to affect the heart rhythm—usually slowing its rate. It is not known how this might affect an exercising diver whose heart is also subject to the pharmacological effects of increased pressure. The main concern is that the combined ef-

fects of exercise, increased pressure and scopolamine could lead to the development of a dangerous heart rhythm—possibly life-threatening. (Disturbances of the heart rhythm are believed to be the main cause of sudden death in divers.)

A third possible dangerous effect of scopolamine in divers is that it decreases sweat gland activity and, consequently, the ability to get rid of excess body heat. Although this should not be a problem for divers when in the water, it could present a major problem for divers wearing a wet suit on land for any prolonged period of time. Body heat can build up rapidly when wearing a wet suit, especially on a hot day or in a poorly conditioned diver, and it is not hard to imagine a diver developing a problem with heat stress in this situation.

A last area of concern for divers is that scopolamine decreases the secretion of mucus from the mouth, throat and lungs. In fact, the manufacturers of Transderm-V report that two-thirds of people using it report bothersome dryness of the mouth. It is possible that this decreased production of mucus combined with mouth breathing through a scuba regulator and the mild dehydration that always accompanies diving could cause the mucus in the airways to get dried out enough that it plugged up small bronchi leading to a risk of pulmonary barotrauma and air embolism.

Tests of Transderm-V on "surface sailors" have shown it to be effective in preventing seasickness, but no tests have been published on the safety or efficacy of it in divers. And even though no major diving accidents due to the use of scopolamine have yet been reported its use is felt to represent a significant potential hazard. Until controlled tests prove its safety in the hyperbaric environment, divers are cautioned against the use of Transderm-V and other scopolamine preparations.

*Author Kenneth W. Kizer, M.D., M.P.H., is President of the North Pacific Chapter of the Undersea Medical Society, Inc., and practices aquatic and hyperbaric medicine in Novato, California.*

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