

Pulau Putri; Bali, Indonesia; West Palm Beach, FL

—Double Doubts About Divemasters

From a glance at the map, it would seem that Indonesia would be the perfect destination for a diver. After all, 3,000 islands and atolls located smack dab on the equator can only mean paradise—or so it would seem. Undercurrent has received occasional comments from people diving at perhaps the most "famous" of Indonesian diving resorts—Pulau Putri. So when we received word from a correspondent that he had returned from a sojourn there, we looked forward to his story—perhaps with greater anticipation than it deserved.

Not everyone can—or wants to—run off to Indonesia. Most of us, however, can figure out a way to get to the Florida Keys. Advertised as the "best" diving in Florida is Pennecamp Park, a marine reserve reached by the typical half-hour boat trip over the shoals from Key Largo. Most diving is done in 30-40 feet of water, where beautiful reefs, protected from the goody bags carried during hundreds of thousands of dives made here each year, sport plentiful supplies of hard and soft coral and plenty of fascinating tropical fish life. After a few splashes at Pennecamp, many experienced divers become anxious for more excitement. That can be found about three hours north, at West Palm Beach, where the Norine Rouse Scuba Club offers high adventure for divers who have logged a few dives.

* * * * *

Pulau Putri, a collection of atolls in the Java Sea, lies 65 miles north of Jakarta (which is on the island of Java). Many islands are uninhabited, others are owned by private individuals. The resort Pulau Putri Seribu, is accessible from Jakarta by small plane or hydrofoil. It serves as the major resort for the capital region of Indonesia—former Queen Juliana of the Netherlands had departed the day before I arrived.

In Jakarta, I went to the booking office to sign up for the cheapest bungalow (i.e., "pondok"). Scuba packages were advertised, but I was told I must make my own arrangements when there. My hydrofoil trip, followed by a 4-minute speedboat trip, was enjoyable, and the resort beautiful: it occupies the entire mile-in-circumference island, which is almost entirely surrounded by coral flats with depths no greater than two feet. The more expensive lodging had air conditioning, but

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mine was the clean economy model, complete with overhead fan, outside coldwater shower, and double bed. I got what I paid for (\$28-\$55, depending upon the season +20% tax and service charge).

At the dockside dive shop, a staffer told me in spare English that the dive-master would not be present until the afternoon, so I passed my time snorkeling. It was a painful trek over the coral flats to reach the water (hard sole booties are a must!), but once I got to swimming depth the scene was interesting: rainbow wrasses, parrotfish and butterflies and mudibranch were abundant. Blennies popped in and out of their holes on the bottom. Bright electric blue coloring was ubiquitous; blue starfish, blue-tipped coral, and the bright blue of giant (usually less than one-foot) tridacna clams. Even a pair of leopard rays had blue markings! Hard corals were diverse, from brain to lettuce to elkhorn, but I saw few soft corals or sponges. The water was clear and calm and about 80° F.

After lunch I appered with my gear, eager to go. Again--no divemaster! I struggled unsuccessfully to get a satisfactory explanation, and then grabbed a tank (\$6/3000psi) for a solo dive off the dock. Yuk! Sand. Dead coral. No Sea life.

The following day? No divemaster! Morning or night. No explanation! My anger did nothing to rustle him up. The next day he arrived, explaining he was only an instructor, not a guide, then ordered up a boatman to take me and another American in the hotel to the reef. (Why could only he tell me that...?)

My guide and his assistant (neither spoke English) took us 20 minutes by prau (a local sailboat with a one-foot freeboard!) to a nearby island. The first dive was modestly interesting, but the next dive had better visibility--60 feet or so and less current. We drifted along the reef at 20 to 40 feet, observing small reef fishes and varied coral. Large white anemones, some several feet across, were homes to at least one orange and white clownfish and I saw a foot long Tridacna clam, with a bright red and orange mantle, instead of the usual bright blue. Indeed a pretty dive. A third dive in the afternoon was quite similar.

Pulau Putri is a pleasant resort, nicely situated, generally comfortable. Meals were either European (wienerschnitzel) or Indonesian (spicy chicken or one meat dish cooked in pure chili peppers), ranging from \$8-12. But, it's no dive resort. The newly appointed Australian manager told me they're opening a dive camp on a nearby island, but just what that will be like remains to be seen. In the meantime I'll leave Pulau Putri to Queen Juliana.

So, I flew back to Jakarta wondering what the deep, clear, inviting waters I could see from my window might have in store for a man with a motor on his boat. But, it was too late. Next call, Bali. I knew nothing of the diving, but I knew of her culture, her art, her Hindu customs, her mystery, for Bali is indeed a mecca for adventurous tourists. Yet, my purpose is not to write of the wonders of Bali--and indeed they are abundant--but to report on the diving. I shall let you locate other sources to report on how inexpensive Bali can be (i.e., how dirt cheap it can be). I selected the plush Hyatt, where guests are pampered and unfortunately "protected" from contact with the locals by fenced grounds. Service is excellent, restaurants expensive, the grounds lush, and the beach gorgeous with a wide coral reef and the 9000-foot sacred volcano, Mt. Agung, looming majestically. To learn about the diving, I was directed to the watersports staff, who reported "there may be diving tomorrow." Not again! In the morning it was the

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same answer, but as I was just preparing my tantrum a youth beckoned me to follow him, off the grounds, to a cluster of shacks just across the Hyatt boundary line. It was the Bali Dive Sports, run by five enterprising young men who had worked as guides at other hotels and now were beginning their own operation. My guide, Sudhana, and his assistant paddled me and another diver by outrigger several hundred yards from the beach where we suited up and rolled in. The visibility was 50 feet, the water about 75°, and the bottom, at 45 feet, was sandy with coral heads. Sudhana led the way, holding a line connected to a small silvery float, which trailed behind us on the surface so his boatman could keep us in sight.

At first there didn't seem to be much to see, but as I put my awareness on my unawareness I realized that before me were extraordinary specimens of every species, not abundant, but chosen by the hand of a master. Three Moorish idols, seemingly 18" drifted ahead of me. Butterflies, rainbow wrasses and parrots were superb. A beautiful blue-spotted ray ambled by. I stopped to photograph a lovely lavender gorgonian, perched on top of a blue coral head; as I aimed a 3-foot grouper brushed me, heading to a hole to hide. A magnificent queen angel fish swam by, then a two-foot-long yellow trumpet fish. And the next day it was more of the same: sauntering squid, a vivid green and purple nudibranch, groupers with a loud color scheme: black and yellow stripes and polka dots.

Bali Sports people work hard. My guide showed me interesting sights, without being intensive. But they are a shoestring operation, without much equipment or boats of their own. I still don't know how they managed to get my tank filled.

Let me add: when traveling to these remote areas, anti-malarial pills and gamma globulin for hepatitis are strongly recommended. And, don't drink the water.

* * * * *

I have covered a lot of territory in my years of diving the seven seas, and I must admit that some of the most exciting diving I've found is right off the coast of West Palm Beach, Florida, where year-round currents and big fish can give even the most experienced of divers a real run for their money. Norine Rouse has been in the dive business for years here, and is a mainstay in the national diving industry with her strong advocacy for underwater conservation. So dedicated is she that on her lawn is an unusual objet d'art, a sculpture of spears and spearguns, broken and bent, a testimony to her views on protecting the reefs.

Our writers have dived with Norine before (Undercurrent, Nov/Dec. 1976) and I too had hoped to dive with her, but during my Christmas stay she was recovering from a spinal hit that rendered her unable to walk for a time. After a dive to 70 feet for 40 minutes--well within the tables--she spent six days in and out of a chamber and a hospital, then a few more days in the hospital before being allowed to return home. A veteran of more than 5000 dives, she is unable to account for the hit. Does a long diving career make one more prone to the bends? Or more immune? To what degree do physical fitness, fatigue, being a little overweight, and age contribute to hits when one remains within the tables? How important is it to hang at ten feet for three minutes following the first dive and for five minutes following the second and subsequent no decompression dives? The answers to these questions are unclear, but it is clear that the invincible Norine Rouse is on the mend. By mid-March she was back making a dive a day--and looking forward to doing two a day soon.

The Norine Rouse Scuba Club is located at 4708 North Dixie Highway in West Palm Beach, Florida. She has a complete, self-sufficient dive center on the banks of the intra-coastal waterway very near an inlet to the ocean. It's an attractive and well-equipped shop with a fresh-water swimming pool, a 16-foot-deep training

tank with two large windows near the bottom, plenty of rental equipment (all one needs to dive here is a C-Card and money), two dive boats, a pier, and a large parking lot. The boats are comfortable and well designed for diving, with good tank racks, sufficient seating, room for photography equipment, sun-protection and a water level platform on the transom. One boat is 34 feet long (it will carry up to 22 passengers), the other is about 28 feet. She normally runs three dives per day: 9:00 a.m., 11:00 a.m. and 2:00 p.m. The cost of the first boat dive of the day is \$18, including tank, backpack, and weights, and the second dive \$15. One may choose between aluminum tanks, filled to 2800-3000 psi, and steel tanks, filled to 2100-2300 psi.

There are also hot showers and a steam room, which sounds very inviting following a dive, but should be avoided. Some experts believe hot showers, steam baths or even the intake of hot fluids make one more prone to developing decompression sickness following diving.

I made five dives here during the windy and somewhat chilly holidays. Each experience was quite similar to the other. On one typical dive on which I'll report, signing up and drawing equipment was quite efficient, even though 15 paying people were to be on board, and we would be joined by a Captain and mate and three divemasters. I toted my gear 30 yards to the boat mooring where we were instructed to suit up, tanks and all, for the trip to the dive site. You see the seas were so rough this day--4-5 foot rollers--that the journey to the site was itself an adventure on the high seas. Some no doubt would have lost their lunches had they been required to suit up once at the site. We received a complete briefing of the dive procedures (but few details about the site) then were told it would be a drift dive at 70 to 80 feet along the bottom. With a current of one knot we were to keep the lead divemaster in sight at all times. He would have a reel of line attached to the large orange float for the boat to follow. No one should have more than 40 minutes of bottom time. We entered the water at safe intervals, rendezvousing at 25 feet. When the lead divemaster was satisfied that we were all present, he headed for the bottom. The other two divemasters brought up the rear.

I thought we would enjoy a normal drift dive, just moving along at the speed of the current with plenty of time to observe the sights. But, alas, it was not the case at all! The leader kicked at about the same rate he would without a current, moving at just under the speed of light! The bottom was flat and unexciting with a few small coral growths (too small to be called "heads") many small black coral growths, some large orange sponges, and many small white sponges. But it was the abundance of marine life which made the dive exciting. I saw great schools of blue and yellow pork fish, their heads marked with two black stripes. Literally hundreds flowed in long lines, with at least 8-10 abreast. Two puffer fish swam in our path and I caught the larger one easily. I slowed to show her to the other divers and quickly found my buddy and I alone, and with the other divers almost out of sight. Luckily, I did not bring my Nikonos. To follow this divemaster only a movie camera would be suitable.

We found a lost, unmarked, fish trap full of tropical fish, including a queen angel. The divemaster did slow long enough to open the trap and free the fish. (Florida, by the way, has an extremely large number of lost fish traps which account for the deaths of thousands of fish and lobsters; fishermen continue to resist traps constructed of a biodegradable material.) Shortly after resuming our high speed safari, we found a large depression with attractive coral growths and a few gorgonia. We actually stopped! And it was a lucky stop for a giant hawksbill turtle rested there. She (or he) allowed us to touch her and inspect her closely, posing nicely for the one diver with a camera. Obviously, she was accustomed to being around divers.

We had been instructed to terminate the dive at 500 psi and to inform the lead divemaster that we were ascending. I burned up 300 psi just trying to catch him. The sea was rough, but not so rough as to prevent swimming on the surface. The Captain must have thought otherwise, because he attempted to bring the stern of the boat right to us and in doing so picked up a rather high speed in reverse. I was able to get out of the way, but my buddy was rammed into a V-shape by a blow to the mid-section from the transom platform. Luckily, the screws were not turning. Boarding the boat was easy as it is a well-designed dive boat, and we were back at the dock by 11:00 a.m.

This could have been a superb dive had we been allowed to just drift with the current. There was a lot of marine life. I flew by gray, queen and blue angels, beautiful large living cowries, puffers, stingrays, scrawled filefish, extremely large squirrel fish, spotted and green moray eels, surgeon fish, blue tangs, trumpet fish, a coronet fish, harlequin bass, trunkfish, snappers, barracuda, brown chromis, horse conchs, rock beauties, several scorpion fish, hinds, Spanish hogfish, and French grunts. But I had no time to stop and say hello.

After a leisurely lunch at a nearby restaurant, we were back on the boat for a 2:00 p.m. departure. We would enter the water as "C" divers, with a maximum of 27 minutes at 80 feet as prescribed by the divemaster. (I had hoped for a shallower dive to have more bottom time by diving shallower). Between dives I mentioned to the divemaster that I thought we had traveled too fast, but he was not on the second dive and once again the lead divemaster took us on an underwater speed swim. This dive was essentially the same as the first one except we ran across an old barge, and found a large nurse shark in a depression ringed with rocks and coral.

Each of us was responsible for controlling our bottom time, which is what I, an experienced diver, prefer. But, God, if you had only seen the lunkheads aboard this craft. At least ten of the fifteen divers could not read the dive tables. Most failed to keep track of their bottom time or ascent time. "How deep did we go?" and "how long were we down there?" were the two most common questions asked, because a majority of the divers were without a depth gauge, a watch, or both. Whoever permitted these turkeys to get out of training needs a boot in the butt, and I'm not too pleased with Rouse's operation for letting them in the water without essential gear.

For an experienced diver, diving with Norine's operation can be a real gas. Since I have no accounts of her kicking like crazy across the bottom, I can only assume that these divemasters were showing their stuff without having to be under her watchful eye while she recuperated. There's so much to see along the way that having to play catchup with the divemaster when a leisurely ride with the current will do just fine is nothing short of nonsense.

Winter weather in Florida can be cool, so a wet suit top is a must for people who get chilly. Visibility during my trip was as low as 50 feet, as high as 80, with water temperature about 76° at depth. Spring and summer, of course, are quite nice. For reservations, call (305) 844-2466.

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SUPER SQUID LIES IN STATE

—More Than A Legend

The giant squid in legends grabs sailors and clutches hapless ships; in real life it seldom comes to the surface of the sea. But visitors to the Smithsonian Institution's Museum of Natural History can now view a 450-pound specimen, preserved in 125 gallons of alcohol.

The particular giant squid on display was washed ashore on Plum Island, just off the coast of Massachusetts, in February 1980. It was the first giant squid to be found stranded on a U.S. beach in 20 years. Tossed about by waves, the squid's two long feeding tentacles and most of the arm tips were broken off, and much of its maroon-colored skin was rubbed away. But otherwise the specimen, still 12 feet long with 10-inch diameter eyes intact, is in "very good shape," says F.E. Roper, a Smithsonian zoologist.

Scientists surmise that this squid was only half-grown at the time of its death, at 30 feet long. The largest squid are 60 feet long from the tip of their tentacles to the tip of their tails.

Roper estimates that there are millions of giant squid in the oceans. Because they are seldom caught in fishing nets, only about a hundred specimens or parts of them are available to scientists. Most of these specimens were washed ashore, dying or dead. Others were picked up as they floated on the ocean surface or removed from the stomachs of stranded sperm whales.

"Our objective, (in displaying the specimen), is to try to show people that giant squid are real," Roper says. Although the myths of monstrous animals are exaggerated, these animals truly are giants, he says. Adults are 60 times the length and 1,000 times the weight of the commonplace squid, which are served Italian-style as calamari and Japanese-style as sushi. Roper reports from bitter experience that the taste of giant squid is chiefly that of ammonia. Subsequent to that disappointment, he discovered that the buoyancy of the heavy animal is due to the high concentration of ammonium ions in its muscles.

When the Smithsonian's giant squid specimen goes off display, Roper plans to dissect the digestive, circulatory and reproductive systems, leaving the outer form intact, so it may continue to fill the previous gap in the Smithsonian's cephalopod collection.

Julie Ann Miller
Science News



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Exhale All The Way During Emergency Ascent?

Recent Research Says No, No, No!

When a diver finds himself out of air at depth and decides to free ascend, he must remember two basic rules: ascend no faster than 60 feet per minute and don't hold your breath.

"Don't hold your breath" has many interpretations, most frequently "exhale all the way up." Since air expands as one rises, it is possible to exhale all the way up, and that technique has often been practiced by having a diver hum as he ascends to ensure that he is exhaling.

According to research by the staff of the Tobermory Hyperbaric Unit in Ontario, Canada, that exhaling response may create more serious problems than it solves. The following article, which appeared recently in *Pressure*, the newsletter of the Underwater Medical Society, explains what's wrong with exhaling all the way up. *Undercurrent* takes all responsibility for editorial changes in the original article.

For some time now, the Tobermory Hyperbaric Unit, Ontario, Canada, has been advocating the replacement of continuous exhalation on emergency ascent by attempting to continue normal breathing patterns at all times.

Our recommendations, as a best response to an out-of-air situation requiring emergency ascent, are:

1. Do not remove the regulator from the mouth unless you have another to replace it . . . or entanglement necessitates it (a very rare occurrence).

2. During an emergency ascent, continue to attempt to breathe in and out whether or not you have air and whether or not you have a regulator.

3. Make certain that you are positively buoyant to a sufficient degree to ensure that you will arrive on the surface.

The rationale for these recommendations arises from experience over the last 7 years in Tobermory, during which 37 cases of serious lung barotrauma resulted in 13 deaths. There have also been 30-40 near-miss incidents during this same period.

These cases have occurred against a background of 4,000 to 7,000 diver visits per year and 16,000 to 31,000 dives annually, a high proportion of these by novice divers on check-out dives. Each case was thoroughly investigated by interview teams consisting of police, park's staff and Hyperbaric Facility staff. Examination and testing of equipment and air supplies were carried out. Meticulous clinical examination of the victim was made and if the outcome was fatal, an autopsy was performed. All data were correlated with the narrative account, and the most accurate scenario was reconstructed.

It has long been recognized that overpressure in the

lungs leads to tearing of the lung structure and the probability of cerebral gas embolism. This can be prevented if the pulmonary spaces have an unrestricted passage to the outside of the body, so that expanding gas may escape.

From the outside inwardly, the first potential site of obstruction is the mouth. The nose, covered by a mask and perhaps closed off at the nasopharynx, is not the problem. Keeping a regulator in the mouth effectively prevents obstruction. In a vertical position the exhalation ports are located 18 cms. above the mid-chest, and provide a safety valve which offers no significant resistance to the exit of air.

"Many divers have been taught to regulate the amount of air they exhale by making a noise -- humming, for example. The difficulty is in knowing how much air needs to be exhaled. An incorrect assessment can lead to a quick death without warning."

Two means of blocking the airway exist in the throat. First, the action of the epiglottis, a valve mechanism which protects the trachea from food and other foreign bodies, responds to direction from the respiratory control center of the brain by opening during inhalation and exhalation. Thus, compliance with recommendation #2 -- i.e., keep inhaling and exhaling -- will help keep the airway open.

The vocal cords present the second obstruction. Many divers have been taught to regulate the amount of air they exhale by making a noise -- humming, for example. The difficulty is in knowing how much air needs to be exhaled. An incorrect assessment can lead to a quick death without warning, which occurred in the case of one 31-year-old diver in 1980, who hummed all the way up.

Humming very hard can rid the lungs of 1 - 1.5 liters/second. The unobstructed airway of the average diver can handle 10 liters or more per second. Breathing is an automatic process, and there is very little feedback to the brain about lung volume, especially when wearing a tight diving suit and harness, etc. By following recommendation #2 --breathing in and out --this hazard is avoided by simply ensuring that the glottis remains wide open and unobstructed.

The last potential area of difficulty in the respiratory passage is encountered in the small airways deep inside the lung tissue. In 1964, physiologists discovered that below certain critical lung volumes, small airways actually collapsed, cutting off segments of lung tissue. A diver, underwater, out of air and close to or below the

lung volume at which small airway closure commences, who begins to exhale, will further reduce his lung volume, causing closure of additional airways. If he continues to exhale without interruption as he descends, the gas trapped in the alveoli may expand to the point of tearing some alveoli and produce cerebral air embolism. Embolism thus produced is not likely to be massive, but one tiny bubble in the right place may cause a diver to lose consciousness, lose his mouthpiece, take on water, become negatively buoyant and return to the bottom.

An attempt at breathing in, whether or not it is successful in obtaining air, reverses the pressure gradients acting in the lung to produce closure, and actively assists in reopening collapsed airways. Thus, recommendation #2 effectively minimizes this potential hazard.

There are two additional advantages to this approach. On attempting to breath in, the diver may be pleasantly surprised to get air either from tank expansion or because his regulator malfunction was depth-related. If he does not have the regulator in his mouth,

or if he never attempts to breathe in, the diver will get no air. Second, since this routine requires nothing different from what divers do during "normal ascents," -- i.e., breathing -- each ascent is practice for an emergency ascent and there is no complex drill to remember. Indeed, most people find this response an easy one to accept, as it coincides well with a habit and activity in which all of us have engaged since birth.

If you run out of air when diving in depths over 50 feet, your ability to make the surface without assistance from an expanding buoyancy compensator, blown cartridge, or dropping of the weight belt, is in serious doubt. This is due to a combination of the oxygen requirement of the swim up and the shallow water black-out effect. Without buoyancy assistance, you may never reach the surface. As your arterial oxygen falls below critical levels, you forget where you are, lose your mouthpiece, take on water, become negative and go back to the bottom.

Therefore, with universal adoption of this simple three-step response to an out-of-air situation, lives will no doubt be saved.

Wanted By The FBI

Michael Ray Pickett, A Jackleg Scuba Instructor

No matter how honest and upright one might be, there is something damn scary about being told that the FBI wants to talk with you. You can imagine what went through my mind when our answering service reported that an FBI agent had called and left a message for me to return his call. Thoughts of old parking tickets leaped to mind, only to be rejected. Although my unpaid tickets might float the federal deficit for a day, they are not federal offenses. Perhaps it was that bottle of Mt. Gay rum I had stashed in my dive bag when I returned from St. Thomas -- the one the customs officer spotted. After that he searched everything. Perhaps I'm now a wanted smuggler. Or is it that off-shore trust I set up, where my millions gather interest away from the eyes of the IRS.

All flights of fancy, true enough. But just what the hell did the FBI want with me, Ben Davison?

I returned the call, having to push the buttons three times after my sweaty finger tip slipped from the right numbers. "We'd like you to help us find someone," the agent said. I took my first breath in a minute. "We'll be happy to," I said, "but why us?"

Our meeting provided the answer. The FBI is seeking quite a dangerous fellow who has worked as a scuba instructor and the FBI has reason to believe that he may very well be back in the sport again. They want our readers to lend a hand in locating this chap.



If he had been an instructor, I speculated, then he had to have been certified by one of the agencies. With the blessings of the agent, I called around but no agency had him listed -- at least not under the name "Michael Ray Pickett." He had apparently operated as a jack-leg instructor for a shop in the Southeastern U.S. With that avenue of investigation closed, we agreed to print the following:

Michael Ray Pickett, also known as: Michael Bigett, Richard E. Elks and Michael R. Pickett is being sought by the FBI for interstate transportation of stolen property and the sale of stolen goods. He is wanted in connection with the March 20, 1979, armed robbery of a jewelry store in Metairie, Louisiana. He is also a suspect in an armed bank robbery in North Carolina.

Pickett was born September 28, 1953, in Kinston, North Carolina. He is described as six-foot-one-inch tall, 195 lbs., blond hair, brown eyes, and has worn an earring in one ear. He has used the Social Security number 246-88-2170. In addition to his employment as a scuba diving Instructor, he is a

flying enthusiast and has reportedly been a vegetarian.

The Federal warrant charging Pickett with interstate transportation of stolen property and the sale of stolen goods was issued on August 16, 1979, in San Francisco, California.

Anyone with information regarding Pickett is requested to take no action other than to contact the nearest FBI Office, the number of which can be found on the first page of most telephone directories.

The FBI emphasizes that Pickett should be considered to be armed and dangerous, and no attempt should be made to do more than notify the nearest FBI Office.

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Drunk Diving

NOAA Divers Narked For Five Days

At depths greater than 100 feet, the majority of compressed air divers show impairment of thought, judgment, reasoning, memory, and ability to perform mental or motor skills....The diver may have feelings of elation and well-being, (euphoria), and a sense of detachment from the environment accompanied by a dangerous overconfidence, an uncontrollable desire to laugh, and a tingling and vague numbness of the lips, gums, and legs. There may be an inability to make correct and rapid decisions or to concentrate effectively on a task. Errors may be made in recording or compiling data or computations. Novices, especially, may develop terror rather than euphoria. Narcosis is a significant danger to divers because it not only in-

creases the risk of accident but diminishes the ability to cope with an emergency.

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These words, which appear in the diving manual of the National Oceanographic and Atmospheric Administration (NOAA), clearly explain the danger of nitrogen narcosis. To further an understanding of the effects of nitrogen under pressure, NOAA recently conducted studies with ten divers who were confined to two pressure chambers for five days of tests and four days of decompression

Perhaps the most substantial finding was that narked divers were often clearly unaware of the effect. Many sport divers believe that when they begin to feel

Narcotic Effects Of Compressed Air Diving

(30-100 ft)	Mild impairment of performance on unpracticed tasks. Mild euphoria.
(100 ft)	Reasoning and immediate memory affected more than motor coordination and choice reactions. Delayed response to visual and auditory stimuli.
(100-165 ft)	Laughter and loquacity may be overcome by self-control. Idea fixation and overconfidence. Calculation errors.
(165 ft)	Sleepiness, hallucinations, impaired judgment.
(165-230 ft)	Convivial group atmosphere. May be terror reaction in some. Talkative. Dizziness reported occasionally. Uncontrolled laughter approaching hysteria in some.
(230 ft)	Severe impairment of intellectual performance. Manual dexterity less affected.
(230-300 ft)	Gross delay in response to stimuli. Diminished concentration. Mental confusion. Increased auditory sensitivity, i.e., sounds seem louder.
(300 ft)	Stupefaction. Severe impairment of practical activity and judgment. Mental abnormalities and memory defects. Deterioration in handwriting, euphoria, hyperexcitability. Almost total loss of intellectual and perceptive faculties.
(300 ft)	Hallucinations (similar to those caused by hallucinogenic drugs rather than alcohol).

stoned at 80, 100, or 120 feet, they can recognize the effects and adapt. But the NOAA study seems to prove the contrary. When the divers' judgment and abilities with simple tasks became clearly impaired, they were often unaware.

Narcosis really begins to manifest itself at 130 feet, and the effects increase rapidly as the diver descends. Beyond 150 feet it was impossible for the divers to perform normally simple tasks such as welding.

Marc Kaiser, one of the NOAA divers, compared the effects of nitrogen narcosis to the proverbial three-martini lunch. "You may believe you are functioning normally," he said, "but you're not. You're acting as if you're intoxicated, and it takes a considerable amount of concentration to perform even the most

simple intellectual or mechanical tasks."

Dr. David Youngblood, a principal investigator, said that the divers showed two phases of improvement. "The first occurred after a few hours under pressure. This we believe to be an adjustment to the state of narcosis and not a true reduction in narcosis. After several days, however, a large percentage of the divers showed a significant improvement in their test scores -- an improvement believed to be a true physiological adaptation to high nitrogen pressure."

But this was not true for everyone. Some divers showed no improvement and remained in a state of significant narcosis throughout the study. Others continued to feel the narcotic effect, but could control it. Toward the end of the study, they showed significant skill improvement.

The Skin Diver's Bible

We can never quite figure out how there can be so many amateurish divers out dipping their snorkels, but we begin to understand when we come across books like this.

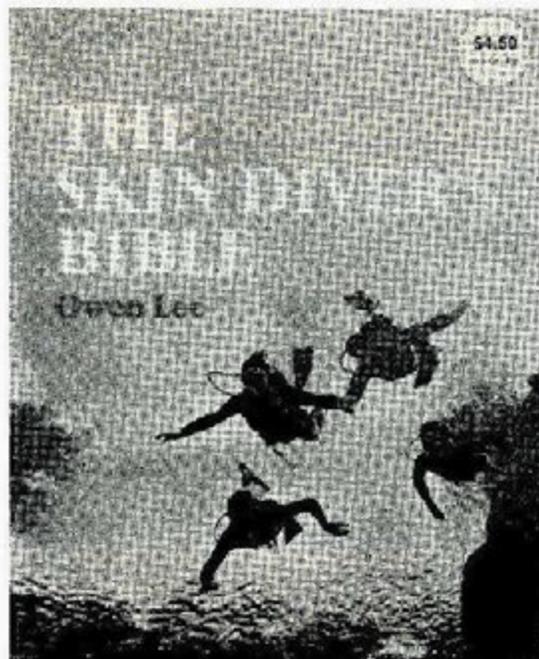
We purchased the *Skin Diver's Bible*, (author Owen Lee; publisher Doubleday), in the Miami Airport. It was copyrighted in 1968; 15 years later it's so out-of-date it's dangerous. For example:

"[Submersible pressure gauges] always seem to be dangling in the way, and because they are permanently attached to the tank, they are subject to many hard knocks. If you have a good constant reserve J valve on your tank, the dial gauge is really not necessary, as the J valve itself is a kind of gauge. In addition to this, the visible pressure gauges are rather expensive, about \$24 each. By far the best pressure gauge is the detachable one..."(p. 28). Or how about this one on regulators:

"Fortunately, the difference in performance is not as great as the price range. Except for the cheapest models that employ a tilt valve, all of them work well regardless of depth, and all of them provide the same fail-safe safety features that assure a constant supply of air. Should there ever be a mechanical failure, the regulator will never shut off the air supply abruptly." (But under certain workloads and depths, the Navy studies show you just can't get air -- that's not a mechanical "failure" but mechanical inadequacy.) And then there's this:

"Even if this were the best book ever written on the subject, it would take more self discipline than you are likely to possess to learn from it all you need to know about diving. Ask a professional instructor to help you 'apply' your new knowledge. The YMCA in your com-

Certainly Not The New Testament



munity is the best place to look, for all YMCA instructors are highly qualified in teaching techniques as well as in diving procedures."

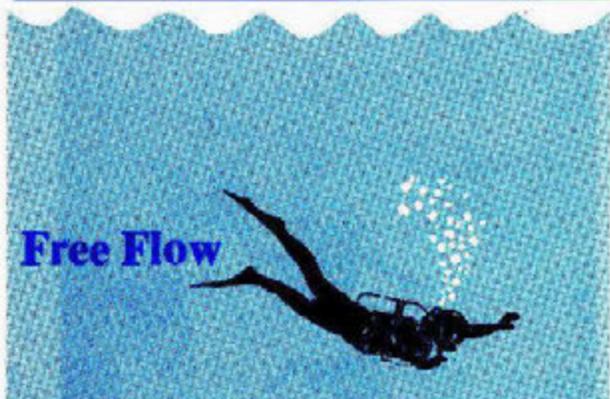
That alone ought to be enough to get NAUI hot after Doubleday to get them to yank this book from the shelves. (Don't the training agencies police this stuff?) If NAUI needs further stimulus, try page 55 where the author writes that an instructor "should be certified by the National Association of Underwater Instructors (NAUI) [sic] or the YMCA."

Each year a number of divers are injured or killed who are not certified or have not taken courses. They decide to teach themselves, usually with the aid of a buddy who is also uncertified. With books like this around, it's no wonder there aren't more fatalities.

Robert Smart, a NOAA Commander, said "I stayed just as happy as a bug in a rug for five straight days." When the tests were over and Smart was allowed to see some of the graded results of the tests, he discovered that he was one of the most marked people in the group. "I had no idea that my efficiency had been impaired that much," he said.

"There were strange, equivocal fantasies in which he had become a primitive, club-wielding caveman!"

Smart learned that narcosis began to take effect in a very subtle manner. That became evident from writings in the diary he kept. Interspersed with his philosophical reasoning concerning the development of the human nervous system and its adaptation to environmental conditions, there were strange, equivocal fantasies in which he had become a primitive, club-wielding caveman! "The effect I felt," he later said, "was definitely moving me back in time."



In the pre-dawn hours of January 17, on the fog-shrouded waters of San Francisco Bay, a Columbian freighter lay peacefully moored. She had entered the harbor the day before, after being routinely searched by U.S. Customs officials. Finding nothing amiss, they permitted her to tie-up. Just a few hours later, after an anonymous telephone tip, Customs put the ship under surveillance. At 2 a.m., a government lookout spotted seven men jumping from a truck and heading across a nearby marshy field to the Bay. Soon, two wet-suited men emerged from the icy water, toting waterproof bundles. F.B.I. and Customs agents quickly converged on the ship and the shore party. When the full party was over, 400 pounds of cocaine had been rounded up. The wholesale value was estimated at \$12 million; the eventual street value, after routine dilution, was estimated to be as high as \$750 million.

Other San Francisco divers who enjoy mind-altering substances seek more legal means. Remember a few years back when cases of Canadian

The youngest diver in the group, 22-year-old Steve Urlick, said during his five days "everything amused me. It was only when we began our ascent that I realized that I had been marked out."

Regardless of the effort to carefully control the experiment and to provide plenty of time for decompression, the U.S. Navy tables once again proved not to be foolproof. Nearly three days after Mark Kaiser came out of the chamber, he had shooting pains in his knees, shoulders and hips. "It felt like someone was sticking a knife in me." As quickly as possible he was taken to a chamber and put on Table 6, a bends treatment schedule. Today, thankfully, he suffers no ill effects.

The effects of nitrogen narcosis on ten experienced NOAA divers indicate that hidden dangers lie in deep diving. Individual people experience nitrogen narcosis at different depths and in different degrees, but, to a man, these divers all presumed narcosis was having no effect when the test clearly demonstrated that their judgment and abilities were seriously impaired.

That's a lesson we must all remember the next time we're tempted by that deep, deep dive.

A version of this article, by Jack Stringer, appeared originally in the *NOAA* magazine.

Club whisky were being hidden in remote places -- including somewhere on the Great Barrier Reef -- during a major advertising campaign?

Well, Seagrams, not to be outdone, inadvertently hid 20,000 gallons of blended whisky in 32 feet of zero-visibility water in San Francisco Bay this past December. It seems that a tank car carrying the booty to a bottling plant slipped from a barge and disappeared during a major storm. It took nearly five days for divers to find the tanker, but when they did they claimed the seals were intact and the whisky undiluted. Nevertheless, should your shot be a bit briny next time, remember who told you why.

There's a whale of a story out of San Diego! Warren Mooers and seven of his buddies were sailing off San La Jolla, when a migrating 35-foot gray whale surfaced with a lobster trap and heavy lines wrapped around his tail. A free diver happened to be paddling by on his kayak, so Mooers called his attention to the encumbered whale. The diver maneuvered close, knife in hand, and the whale suddenly "leaped out right on its back," Mooers reported.

"Now the whale is pirouetting and the skin diver is hanging on and sawing, most of the time underwater, like the whale knew he was trying to help and took particular care not to swipe him with its tail while he was sawing away. Anyway," Mooers told the press, "he cut the whale free and it immediately made a 90-degree turn into the open ocean." The diver identified himself as Jim Baross, 34, of San Diego. Mooers called him alongside and presented him with a cold magnum of champagne.