

undercurrent®

THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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Bimini, Bahamas

Going below with the 60-mile man

Bimini. That Bahamas hideaway where Congressman Adam Clayton Powell whiled away his official hours at the World's End Saloon. That romantic isle where Ernest Hemingway held forth in his shark-grappling days. That mysterious island where some imaginative archeologists claim remnants of Atlantis may be viewed in fifteen feet of water. Bimini. Sixty miles east of Miami and famous--indeed world-famous--for its big-game fishing. But what about the diving? I would see for myself.

The only dive operation on the island is Bimini Underseas Adventures, run by Neal Watson, a legend of machismo in the diving world. Watson holds the record for long distance swimming underwater (66.5 miles!) and for depth on scuba gear (437 feet). He is also called upon to catch sharks by hand for movie and TV crews which, I presume, nets him a tidy profit. I felt some trepidation about diving with this macho man, but aside from a dive boat or two out of Florida, Neal Watson has a monopoly on the Bimini dive business.

I initiated my trip with a telephone call to Watson's Fort Lauderdale booking agent, where a surly fellow named Chuck begrudgingly booked me for a four-day, three-night, eleven-tank dive trip. I called for more specific departure information a few days later, but was informed, this time by a pleasant lady named Jackie, that I had been booked erroneously for a weekend which had long been sold out to fishermen participating in a major tournament. I would have to select another date. Had this been solely a pleasure trip, I would have canceled. But since I am in servitude to the dear readers of Undercurrent, I set my pride aside and picked another date.

In late August I arrived at Bimini at 9 a.m. aboard a Chalk International seaplane which had departed Ft. Lauderdale only 30 minutes before. Quickly I passed

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through customs and an ancient porter loaded all my luggage aboard his wobbly cart and wheeled it a couple of hundred yards down the one-lane highway to Brown's Marina. Here I was to have my first meeting with Neal Watson, whose well-tuned physique added credence to his mainland image. But his soft words quickly betrayed that image. I found him a sensitive and sincere fellow, not out to prove his piscatorial prowess, but out to provide a quality diving experience for his customers. Immediately I felt comfortable about diving with him.

After his briefing, I loaded my gear aboard the 28-foot open outboard T-craft, with its meager Bimini top to shield us from the hot sun. Watson then showed us to our rooms in the adjacent Brown's Hotel. Had I come to my room first, I might have requested passage on the return flight home. My 10x16 foot room, with twin beds, a rickety dresser and an antiquated window air-conditioner, decorated only with a single obscure print of some religious episode, would be described to the excess if I were to label it "spartan." Nevertheless, the towels and the sheets were clean and I could not share the complaints of other guests whose toilets did not flush or whose sleep was disturbed by live-in hermit crabs shuttling about. A few return guests said we were fortunate simply to have uninterrupted electricity and fresh water for our showers, and I must admit amazement when my room stayed perfectly dry through a rain squall driven by 50 mph winds.

On arrival day, Watson offers one morning and two afternoon dives, and reverses the schedule when no divers are arriving. I reported to the dive shop for tanks and weights. No one asked for a C-card, no one asked about experience. "Neal just looks at you and can size up what kind of diver you are," said one of the old-timers. Watson delayed our departure when he found he had to replace a starter motor, but quickly installed a substitute which he purloined from a nearby boat, one of many stranded at Bimini during an end-of-the-month gasoline shortage. Watson manages to survive the fuel shortages by taking extra slow trips to the reefs (still, most took no more than 15 minutes) and by paying outlaw rates of \$2.50/gallon to other skippers with surplus fuel in the tanks.

At the first dive site, the Kinks, Watson detailed the attractions and the depth, cautioned us about the current, and wished us well. From the surface we could barely make out the bottom sixty feet away. The horizontal visibility averaged about 30 feet, the water was warm, and there was no current. I was surprised at the abundance of fish, so thick they looked like bees swarming. A variety of butterflies, very large gray and french angels, black durgon, schools of margate and grunt, ocean and queen triggerfish, squirrels, Nassau grouper--you name it. Just as impressive were the variety and quantity of sponges and coral. There were familiar tube sponges and giant black, orange and yellow hassocks with myriad webbing and openings as intricate as any chambered nautilus. There were soft feathered sea fingers, flowery fungus, and grooved brain coral, and waving sea fans of iridescent violet providing a colorful and animated touch.

Watson programed each day's dives so decompression penalties would not hinder his divers. I found each dive interesting, some fascinating, and each had substantial differences from others. At Moray Alley we were greeted at the anchor by a large friendly green moray who conned me out of most of my supply of fish feed which I had purchased at Bob's Bait Bucket. In 70 feet of clear water I wandered between giant hummocks of plaited coral, watching schools of silvery pompano and barracuda. In 20 feet of water at Rockwell Reef, I grabbed the tail of a five foot nurse shark who shook me around like a rag doll. At Sunshine Reef I found a conch garden and a number of rays.

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On two dives at Turtle Rocks, a group of coral lumps about a mile off the coast of South Bimini, I swam in a veritable aquarium, hand feeding cranky queen triggers and a beautiful golden tail moray. During my eleven dives I found hundreds of porgies, wrasses, brown and blue chromis, tangs, damsels, southern stingrays, midnight blue parrotfish, fairy basslets, hamlets and hawkfish, gobies and glassy sweepers, sharp-nosed puffers and jawfish. I watched aggressive coney change from dark brown to a startling half/white/half brown, their excited phase, and even had fed sand tile fish, which most photographers have difficulty attracting from their sand burrow for photos. Visibility ranged from a low of 30 ft. to 60 ft. and even up to 90 or 100 ft.

Drift dives in the Gulf Stream, where the gently sloping continental shelf turns into a vertical cliff at 150 feet, are a special feature. On our first trip the other divers and I dangled from a weighted rope down to 140 feet as we and the boat moved effortlessly with the stream. The next day we ventured from the rope to cruise by black coral trees, giant spiny lobster and 50 pound groupers. Watson, who accompanies divers on the drift while Jackson follows the bubbles in the boat, said that further down the wall a wide variety of shark can be spotted, but we saw none. For us the current was only a knot or two; it does reach 4-5 knots.

We were fortunate to dive with Watson most of the time because his assistant, Jackson, was out of town. On the two dives Jackson led I felt rushed--he wanted to limit our diving time--and if he were to lead every dive that way I would indeed be annoyed. My Friday dives were delightful, accompanied only by five other divers, but on the weekend a group of newly-certified divers from Miami and a number of other tourists meant as many as 23 divers filling the boat and the seas. Watson, however, did a good job managing the crowds and I found the boat less crowded than one might imagine.

As part of the package deal, my meals were to be eaten at Brown's, where the standards of the kitchen clearly surpassed the standards of the accommodations. Big American breakfasts--eggs, meat and potatoes--and common American lunches--cheeseburgers--gave way in the evening to a grand conch chowder, steamed lobster, broiled grouper, or panfried dolphin fish. One evening we passed by our package dinner to sample the superb baked-in-foil specialty fish and the cracked conch at the Red Lion Pub; other traveling divers recommended the local dishes at Priscilla's, a tiny, tiny eatery. After dinner one could catch the band at The Compleat Angler, or continue with the lethal goombay smashes at any bar, or, for that matter, a night dive, which Watson offers for four or more divers at \$15 each. Unfortunately, the divers must have lights of their own and I could not round up other equipped divers on any of the nights. My most enjoyable evening resulted from dinner with Neal Watson, listening to his reminiscences of the long, lonely and even terrible hours

David and Fredrick: Do the Reefs Remain?

On September 13, the day before we went to press, we checked on diving in hurricane country. Bret Gilliam (V.I. Divers) said the hurricane apparently did little damage to the reefs, but 34" of rain in 72 hours has created such a runoff problem that they have canceled their package tours until mid-October or later. On St. John a representative of The Dive Shop reported that some elkhorn coral got broken up and visibility is substantially reduced, but tours are being run as scheduled. Peter Philp (Virgin Islands Diving Schools) reported lower visibility but intact reefs on St. Thomas, which is the same message reported from Bimini by an aide to Neal Watson. Ernie Krumbein (Divers World, Key Largo) reports the reefs at Penecamp received no more damage than they might get during a typical weekend from the anchors dropped by private boats; guided tours are just about ready to resume. Krumbein also spoke with people at Barbados, south of the storms, who reported no significant damage.

Traveling divers are advised to check out the diving status of destinations in the Caribbean prior to heading there for diving, especially in the northern section of the Antilles where some reports indicate the possibility of substantial reef damage, perhaps from covers of sand on reefs in shallow water. If possible, the information received from tour operators should be checked against reports from divers who have no commercial interest in the resorts or the tours.

he spent training for his deep dives, or hearing his Bimini lore, especially tales of the strange and symmetrical rocks which can be visited by divers (good for about "five minutes" of diving, says Watson, but not worth wasting a half-day's diving) which some people argue are artifacts from past civilizations--even Atlantis.

Now, how do I sum this up? I must begin with the economics. Watson's package deal includes three dives a day, including the day of arrival and the day of departure (the plane flies low, very low), room, three meals and--now hear this--round trip air fare from Fort Lauderdale. The prices range from \$75/day for two days to \$64/day for four days, to \$59/day for eight days. That, I think, is the lowest package price for diving outside the U.S.A. that one will find anywhere. One may select 2 other hotels with the package, the new Bimini Inn or The Compleat Angler where Poppa Hemingway stayed. Both have better rooms--The Compleat Angler is where the nighttime action is--but are a 5-minute walk from the marina (you may leave your gear in the compressor room) and one must still take meals at Brown's. If you wish to pay Miami hotel prices and stay in the better, however, plastic, Bimini Big Game Fishing Club you can still dive with Watson for \$30.00/day for 3 tanks. That, friends, is the 1979 bargain.

So, for a diver who must carefully watch his budget, Bimini must be given a solid position on the list of economical dive vacations. But that does not mean it should be avoided by those who can afford to go elsewhere. It rates among the best of the Bahamas and probably offers a wider range of diving experiences than other Bahamas dive operations. It must be given special attention by people who have only a few days to dive--those in Miami on business for example, traveling, or divers visiting relatives--you get the most for your money here because Watson puts you in the water on the day of arrival and the day of departure. But exercise caution. If one spends a restful night in Miami or Fort Lauderdale, prior to the early morning flight to Bimini, then immediately hitting the water should be no problem. But if one has traversed the coast on a midnight flyer, diving the next day makes no sense at all. In fact, because of these kinds of decisions divers have to make and because one may not always find the guide joining him underwater, it might be best for people who travel to Bimini to have a little dive experience under their belt.

Divers Compass: For reservations and information, write Neal Watson's Bimini Undersea Adventures, POB 4960, Fort Lauderdale, FL 33338, or call (305) 763-2188.... For an additional \$5, divers may rent all the gear they need, including masks, fins, snorkels and even regulators.... There are no dive equipment sales and emergency repairs; be prepared to handle all your diving equipment needs yourself...and bring anything else you need, especially film, since it is difficult to get.... For non-divers, there's not much to do beyond taking a couple hour tours of the island, going fishing, or laying in the sun...the beach for browns is 100 yards away on the other side of the island. There is no swimming pool...the reefs of Bimini are not easy to find; many divers boating themselves over from Miami find only a sand bottom and go home complaining.

Why Divers Die: Part III

Sharks, bubblegum and backpacks

Following is the third part of the report by the University of Rhode Island National Underwater Accident Data Center (NAUDC) on the cause of sport diver deaths in the United States. Parts I and II appeared in the June and July issues of *Undercurrent*.

Each year it is impossible to determine the cause of a

number of scuba deaths: there are no witnesses, the victim is never found, the equipment is not checked or there is no autopsy. In 1976, the last year of our study, 26% of the causes could not be determined. Of those that could, 45% were attributed to medical or injury problems, 42% to environmental causes, and 13% to

equipment-related causes.

The starting point of an accident is sometime difficult to ascertain and requires subjective judgment. In cases diagnosed as embolism, for example, NUADC has always regarded the embolism as the starting cause. However, other factors such as "low on air," "lost mouthpiece" or "attempted buddy breathing" may also have been mentioned. Proper action by the diver in such circumstances would probably have resulted in avoiding the fatal accident.

Although most of the significant cases have been discussed previously, a few unique cases still warrant discussion. We believe by discussing these cases, divers will appreciate the diverse causes of fatal accidents and dive more cautiously.

In one case, the autopsy found a large chunk of bubble gum at the rear of the throat, and although it could not be firmly established as the cause of death, it appeared to be the major factor.

In Hawaii, a decompression sickness (there is some indication embolism may be the cause) occurred after three dives to 125 feet within three hours. The bottom time is uncertain, but surface intervals were roughly one-half hour each. There was no evidence of any effort to decompress, but the diver was wearing a decompression meter. The diver had 25 years of experience and was said to be collecting tropical fish.

For the first time in many years, a shark attack seemed to be the cause of a scuba death. Three other cases were discovered in which sharks had taken their toll on the body, but the victim had been missing for 1-3 days and it was presumed that the sharks had mutilated the divers after death.

To demonstrate the difficulty in determining the cause of death, one case involved a victim who was last seen trying to swim to the surface with two large bags of mussels; a second similar case involved a diver who was wearing two weight belts totaling 32 lbs. but was not wearing a wet suit. In the first case, the cause was determined as being "over-weighted." The second case is more difficult because the diver had apparently been warned before the dive that he should not put his vest on over the weight belts, but did so, and was found with both belts entangled in the crotch strap of his vest.

One of the more unusual cases involved a victim

whose tank slipped loose from his backpack, dropped out of the harness, pulled his mouthpiece away, and strangled the victim with the regulator neck strap.

A witness described one case in which the back-mounted BC inflated accidentally. The victim ascended quickly, only to bang into an overhanging rock ledge where he became lodged and drowned.

In one case involving equipment, an over-inflated dry suit shot a diver to the surface and the diver embolized. Although no faults were discovered with the suit, the victim apparently had little experience using it.

Freediving

Fourteen freedivers were killed in 1976, many of whom may have been affected by shallow water blackout, a serious problem facing freedivers. It is caused by the metabolic uptake of the oxygen in the lung when the diver is underwater and underpressure; with a rapid rise to the surface the partial pressure decreases within the lung. The decrease in oxygen partial pressure creates a potential for anoxia and unconsciousness and the decrease in carbon dioxide partial pressure eliminates the natural warning system that the body needs new air; unconsciousness can occur almost instantaneously. Accomplished free divers are more likely to experience underwater blackout, because novices will seldom push themselves to the blackout point by extra breath holding or hyperventilation.

The causes of death that could be pinpointed included a victim found entangled in kelp five feet below the surface. In another case, a 55-year-old man was engulfed by huge breakers as he attempted to reach the shore and in a third case the victim became fatigued in fighting a rip tide. In a fourth case, a strong current pinned a victim against the piling of a bridge in the Florida Keys and she drowned. In a fifth case, the victim became entangled in anchor lines under a dock and in another case, the victim was diving without a diver's flag and was runover by an outboard motor boat when he surfaced.

Next Issue: An analysis of the cause of accidents that lead to deaths and how industry neglect must be considered a contributing factor.

U.S. Navy Tests of Submersible Gauges

Quality control may be a problem

During January of 1979, the United States Navy Experimental Diving Unit in Panama City, Florida tested fourteen commercially available submersible pressure gauges to determine their accuracy and water-tight integrity. All fourteen gauges tested incorporated a Bourdon tube mechanism that is a spiral wound or "C" tube design. Each gauge is sold attached to one

end of a high-pressure hose—the other end is attached by the diver to the high-pressure port on the first stage of his regulator—and is encased in a chrome-covered housing of brass, stainless steel or plastic.

The Accuracy Test

All fourteen submersible pressure gauges were con-

ected to a single test gauge manifold. A Roylyn precision direct drive gauge with a ¼% accuracy was used to measure and compare the gauges.

Beginning with 3500 psi, differences in pressure reading between the commercial submersible gauges and the precision gauge were recorded for each 100 psi increment in pressure reduction. Data was recorded while gauge pressure was continually decreasing, which simulated normal diving conditions.

Table 1 represents data plotted during the accuracy test. The gauges were numbered according to their position on the test manifold. Positive numbers indicate psi readings higher than the precision gauge; negative numbers indicate readings below. Blank spaces indicate no variation from the precision gauge.

Rank	Gauge	Average Variation (in psig)
1	Poseidon, Model No. 7324 (0-5000 psig)	25
2	Sportsways, Model No. 1409 (0-4000 psig)	30
3	Healthways, Model No. 1629 (0-3500 psig)	40
4	Farallon, Model No. 04-1008 (0-4000 psig)	47
5	Dacor, Model TAG (0-3500 psig)	48
6	White Stag Deep, Model No. 51159 (0-4000 psig)	49
7	Sportsways, Model No. 1407 (end view/ 0-3500 psig)	50
8	AMF Swimaster, Model No. DS-111 (0-4000 psig)	50
9	Sportsways, Model No. 1406 (0-5000 psig)	66
10	Sportsways, Model No. 1408 (0-5000 psig)	99
11	U.S. Divers, Model No. 7036-00 (0-3500 psig)	109
12	Scubapro, Model No. 28-132-000 (0-3500 psig)	124
13	Selpac, Model No. SPG-5000 (0-5000 psig)	134
14	U.S. Cavalero, Model No. p/n 355-000 (0-3500 psig)	166

In Table 2, the pressure gauges are ranked from the least to the greatest average variation in accuracy. Note that the most accurate gauge tested (Poseidon Model No. 7324), and the next most accurate (Selpac Model No. SPG 05000) are identical gauges made by the same manufacturer, but marketed by two different companies. The average variation in accuracy ranges from 25 psi for the Poseidon to 134 psi for the Selpac. *This is a good indication of the lack of quality assurance in commercially available gauges—regardless of brand.*

The Pressure Shift Tests

When 0 psi was reached after the accuracy tests, the

pressure was again increased to 3500 psi and then maintained for thirty minutes. Any shift in the pressure gauge readings were recorded. Accuracy readings were repeated when the pressure was reduced to 1000 psi and then to 500 psi.

At 3500 psi all gauge readings were constant for 30 minutes. At 1000 and 500 psi there were some shifts but none were considered to differ significantly from the previous accuracy tests.

Watertight Integrity Test

The fourteen gauges were placed in a water-filled test box inside a hyperbaric chamber and connected to a high pressure gas supply. The gauges were pressurized to 500 psi at 200 feet of pressure for one hour and were observed for water leaks or escaping air. They were then brought to the surface and inspected. The same procedure was repeated at 3500 psi supply pressure at 200 feet.

All submersible pressure gauges maintained watertight integrity at 200 feet and 500 psi and at 3500 psi. No gas escape was observed, nor did water enter any of the gauge housings.

Undercurrent Comments: The study indicates that no gauge is entirely accurate and that the variations within the scale of any specific gauge are not predictable. Furthermore, as the Navy itself suggests, quality control in gauge production seems less than adequate.

Every gauge tested was somewhat inaccurate, but most were inaccurate at the upper reaches of the gauge where accuracy is less significant to diver safety. Yet, eight of the fourteen gauges were somewhat inaccurate at the lower end of the scale—500 psi or less—and one, the Scubapro, might be considered dangerously inaccurate because, for example, it gave a reading of 300 psi when only 200 psi of supply pressure remained. Four gauges registered no air when 100 psi in fact remained, which could conceivably contribute to panic in a diver who believes his gauge and fails to gasp for air.

We cannot recommend the purchase of one gauge over the others, but there are criteria which lead us to preferring certain models over others. First, we would feel most comfortable in selecting a gauge whose overall error was not greater than 50 psi. That would leave eight gauges.

Second, we would select a gauge which demonstrated no error in the danger zone—500 psi or less.

Four gauges remain: Poseidon 7324, Sportsways 1409, Healthways 1629, and AMF Swimaster DF-11. Note, however, that the leading gauge—the Poseidon 7324—is marketed under two other names which were tested in this survey and neither of those two made the first cut.

It would seem, then, that the best overall conclusion is to recognize the great disparity in submersible pressure gauge accuracy and to caution each diver to assume that his gauge is at least 100 psi in error when he has less than 500 psi supply pressure in his tank. That being the case, the diver should remember two things:

Table 2 Accuracy Test Results

PRESSURE PSIG	ACCURACY ± PSIG													
	1 HEALTHWAYS	2 SPORTSWAYS	3 WHITE STAG	4 POSEIDON	5 FARALLON	6 SPORTSWAYS	7 SCUBAFRO	8 US CAVALERO	9 SPORTSWAYS	10 SELPAC	11 DACOR	12 US DIVERS	13 SPORTSWAYS	14 AMF SWIMASTER
3500				-25	-25	-125	+100	+200		+200	-25	-125		-100
3400	+50	+50		-25	-25	-200	+100	+200	+50	+200	-50	-125	+25	-100
3300	+50	+50		-25		-175	+125	+225	+100	+200		-200	+25	-75
3200	+50	+50	+25	-25		-75	+125	+225	+150	+175		-200	+25	-75
3100	+50	+50	+25	-25		-75	+125	+225	+150	+200		-200	+25	-50
3000	+25	+50				-150	+125	+200	+100	+175		-200		-50
2900	+50	+50	+50	-25	+25	-150	+125	+200	+50	+175		-175	+25	-25
2800	+50	+50	+50		+25	-150	+125	+200	+50	+175		-175	+25	-50
2700	+50	+50	+50	-25	+25	-150	+150	+200	+50	+200		-150	+50	-25
2600	+50	+50	+50	-25	+25	-125	+150	+200	+50	+175		-150	+25	-25
2500	+25	+50	+50		+50	-125	+125	+175	+50	+150		-150		-25
2400	+50	+50	+50		+50	-125	+125	+175	+50	+175		-125	+50	-25
2300	+50		+50	-25	+50	-100	+125	+175	+50	+175		-125	+25	
2200	+50		+50		+50	-100	+150	+175	+100	+175	+50	-100	+50	
2100	+50	+50	+75		+50	-100	+150	+175	+50	+150	+50	-100	+25	
2000			+50		+50	-100	+150	+150	+50	+150		-100	+25	
1900	+25		+75		+50	-100	+150	+150	+50	+150		-100		-25
1800	+25	+50	+50		+75	-100	+150	+150	+50	+100		-100	+25	
1700	+25		+50	-25	+75	-100	+150	+150	+50	+100	+25	-75		
1600	+25		+75		+75	-100	+125	+150	+50	+75	+50	-100		
1500			+50		+75	-75	+125	+125		+100	+25	-50		
1400	+25		+50		+75	-75	+150	+150	+50	+100		-75		
1300	+25		+50		+50	-50	+150	+150	+50	+100		-50		
1200			+50		+50	-50	+125	+125	+50	+75		-50		
1100			+50		+50	-50	+125	+125		+75		-50		
1000			+50		+50	-50	+100	+100		+50		-50		
900			+50		+50	-50	+100	+100		+50		-25		
800			+50		+25	-50	+125	+125		+50		-25		
700			+25		+25	-50	+125	+125		+50				
600			+25		+25	-50	+100							
500			+25		+25		+100							
400			+25				+100							
300							+100							
200							+100							
100		-50	-100		-100	-100	+50				-50			
0											-100	+25		

First, if you follow the rule to get back to the boat or back to the shore with 300 psi left, make that now 400 psi.

Second, if you bleed your tank down no farther than 100 psi to prevent water from forming during storage, make that now 200 psi. You may have been bleeding your tank dry.

Finally, recognize that the tests here were conducted on new gauges. A submersible gauge that has been knocked around awhile may be far less accurate. One way to test gauges is to hook up several to the same tank and compare the readings, both at the high end and the low end of pressure. The gauges with the highest reading at the low end—500 psi—are the ones to watch out for. Better yet, take your submersible gauge into your dive shop each time you have your regulator overhauled. Be sure to specify a check of your submersible, since some shops don't make a routine check when they overhaul your regulator. Some might not be able to handle the test with much greater accuracy than your own tests among buddies, but a comparison at least with new gauges will give you a clearer picture of the accuracy of your own gauge.

A Nutritional Challenge to Diver Safety;

will your morning breakfast mean an afternoon blackout?

If one is to examine the statistics on diver fatalities, he may be at a loss to explain why a diver in seemingly good health becomes a fatality. Divers drown, divers embolize, divers die for a variety of reasons. But the cause of the accident which led to the death is seldom known, particularly when the equipment checks out and air is remaining in the tank.

Of course panic is one common possibility. A diver

who panics will exercise bad judgment and perhaps not survive. We all know that a diver should be well-trained to handle emergency situations and he should be in good physical condition so that his body may respond to emergencies.

To most people, good physical conditioning means good muscular tone and no obesity, but I also believe that it should mean a proper diet. I am not just speak-

"A diver who has ingested the "wrong" foods a few hours prior to a dive—and in this case the "wrong" foods are fatty and oily foods—may very well be a candidate for underwater blackout or even a heart attack."

ing of a proper day-after-day diet. For scuba divers, I am speaking especially about eating the right foods immediately prior to a dive. A diver who has ingested the "wrong" foods a few hours prior to a dive—and in this case the "wrong" foods are fatty and oily foods—may very well be a candidate for underwater blackout or even a heart attack.

Foods high in oils and fats—whether vegetable or animal fat, saturated or polyunsaturated oil, hot or cold pressed oil—produce particles called "chylomicrons" (ki-lo-mi-krons) in the bloodstream about 3-6 hours after being consumed. These chylomicrons cause the red blood cells to aggregate or stick together, thereby reducing their ability to transport oxygen to muscles and brain tissues. Some tests have shown that the oxygen-carrying capacity of blood cells has been reduced by as much as one-third at peak chylomicron concentration. Should that happen to a hard-working diver, the effect might be as minor as increased muscle fatigue, show up as more serious leg cramps when the muscles are deprived of oxygen, or perhaps even lead to an underwater blackout if the brain receives less oxygen than it needs. Angina pectoris or a heart attack could also result in more serious cases.

"...it might serve divers well to take a few tips from long distance runners and serious joggers, for example, who recognize the effect of certain foods on their endurance and performance."

The most popular argument today for a low fat diet can be found in nutritionist Nathan Pritikin's recent book, *The Pritikin Program for Diet and Exercise*. Pritikin points out that in a number of the so-called less civilized nations, diets are much lower in fat and protein and the population has much lower incidence of heart attack, hardening of the arteries, hypertension and diabetes. The Pritikin diet has been called "the longevity diet," but I believe, along with many colleagues, that in addition to older folks, healthy athletes and healthy scuba divers can receive substantial benefit by following its principles. The diet is simple: avoid foods containing fats, oils and sugars; rely on fresh fruits and vegetables and complex carbohydrates.

This is no fad diet. It is followed by half the world's population and by hundreds of thousands of nutritionally-conscious people in the United States and Canada. It is not a weight loss diet, although people tend to eat fewer calories and many, subsequently, lose body fat. It is not a money saving diet, although much of the food can be grown at home or purchased and

prepared inexpensively.

But, scuba divers are among the world's healthiest—and wealthiest—people. Why should they eat like half the world's populations, like people of many underprivileged countries? Simply to increase their diving safety.

Few divers consider nutrition as part of their pre-dive planning and certainly instructional manuals fail to give it serious treatment. Yet nutrition is being given increased attention in other sports and it might serve divers well to take a few tips from long distance runners and serious joggers, for example, who recognize the effect of certain foods on their endurance and performance. Runners improve their capacity by stoking up on complex carbohydrates prior to a run rather than ingesting simple sugar or protein. Because their tissues need the maximum supply of oxygen, they also reduce their fat intake. I believe that scuba divers, too, can increase their performance, endurance and safety by following these nutritional ideas.

If you are eating 3-6 hours prior to a dive, eat a low fat meal. They are easy to prepare or, if you are dining out, easy to purchase. If you're on vacation, just ask the kitchen to feed you like the natives and load up on rice and beans, tacos and tortillas, broiled fish, broiled skinless chicken, veal, or cube steak. Skip the butter or added fat. Eat all the fresh fruit and vegetables you want, but avoid those fatty avocados.

Although there is plenty of evidence that this diet followed regularly can improve one's overall health, my point here is not to alter your regular eating patterns but to have you carefully select your foods prior to diving. A diver who has loaded up on fatty foods—butter, salad dressing, fatty steaks, chicken skin, pork chops, ice cream, pie, cake, eggs, sugar, cheese, nuts, and so on—may have deprived his tissues of the oxygen level they may need to give him the ability to bail out of a difficult situation.

I do acknowledge that controversy exists between some medical people and nutritionists about how efficiently the body processes fats; some people may doubt that a low fat diet has a significant effect on the oxygen-carrying capacity of the blood. Nevertheless, I am satisfied with the available evidence and offer one simple response to those who are dubious.

These dietary suggestions will meet an active individual's nutritional requirements. Clearly, a low fat diet can have no deleterious effect on a diver 3-6 hours before a dive. There will be no nutritional deficiencies, no side-effects, no impairment of one's ability. On the other hand, I find plenty of evidence suggesting that the diet will improve performance and endurance and therefore can be lifesaving. For this reason, I follow it every time I'm about to go diving.

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