

# undercurrent®

THE PRIVATE EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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## Palau Pacific Resort, Palau, Micronesia

### --Channels, Chimneys And Chandeliers

I can't imagine any place in the world with more varied, unique and exciting diving than Palau, a majestic republic in the Pacific of nearly 200 jungle-covered islands with 14,000 residents. Just what can compare to a week which includes diving in a blue hole, diving into a cave that emerges into a fresh-air cavern, being surrounded by a hundred barracuda, photographing giant clams, snorkeling in a lake thick with jellyfish, or being caught in swarms of brilliant tropicals? So exciting is the diving that I'm going to take a pause in the series of readers comments to provide this full review.

Of course, Palau without the diving isn't too shabby. Most of its brilliant green islands are uninhabited. Some little ones look like giant, tropical house plants, with "pots" of silver-grey undercut rock beneath the lush jungle growth. Others curve like sea serpents, with colored parrots flying around their mountainous spines.

I stayed at the Palau Pacific, a gem of a resort. No expense has been spared in developing the decor, atmosphere and comfort. One hundred modern rooms, tropically furnished, spread like wings through 64 acres of jungle gardens and manicured paths. The beach is a clean curve of white sand etched around an aquamarine lagoon. This is a complete resort-hotel, designed for escapists who like luxury: there is a fresh water swimming pool; two tennis courts (and a resident pro); a library, gift shop, open-air cocktail lounge, terrace coffee shop and an elegant dining room; and a good movie every evening. I took frequent walks along the hiking and jogging trails fragrant with tropical blossoms. Deep-sea fishing, water-skiing, windsurfing and canoeing are offered and the hotel dive shop is but a few yards from the rooms.

So inviting was the turquoise and transparent water, my first task upon arrival was to saunter down to the dive shop so I wouldn't miss a single dive. Shallum Etpison and his family, successful local business people, own Neco Marine and Neco Tours. Shallum runs the dive operation at the hotel (and also has a

#### INSIDE UNDERCURRENT

Regulator Survey: Part II.....p.3

When Are You Too Old To Dive?  
--The Effects Of Aging On Diving.....p.5

Back Problems In Divers .....p.6

Why Divers Die: Part I  
--An Analysis Of 1983-1984 Fatalities....p.8

A First Peek At The DEMA Show  
--And A Last Poke At The Products...p.11

shop at the town harbor) with the very able assistance of Mandy Thyssen, a young woman from the Netherlands. It's a first-class operation, with 120 new aluminum 80s and 20 smaller 50s and any other equipment you might need. With one of their nine fast boats, each of which comfortably accommodates eight divers, they pick up divers at the hotel pier each morning and stay out most of the day; 70% of the touring divers on the island are Japanese.

Each morning shop personnel loaded the boat with tanks and weights and I'd pull my gear from the dive shop. Diving promptness is not always a principle in paradise, but we always left within 15 minutes of the scheduled 9 a.m. departure, whizzing through blue lagoons and brilliant, crystal-clear channels fringed with overhanging foliage to the open sea. The trips ranged from 15 to 50 minutes. Local Dennis Morros, my underwater guide and boatman for 12 days of diving, had a superb knowledge of the sea, weather and diving.

My first diving day was a bit choppy, so, Dennis explained, we would have to dive inside the reef. In Belize that would be a bore, but here that meant a dive on the Iro Marua, a Japanese W.W.II freighter. As I dropped down to the deck, 50 feet below, the lateral visibility was not as good as I expected, about 80 feet (even that would make a New York wreck diver overextend his stay). The ship was covered with wondrous growth and the superstructure created terrific frames of divers and silhouettes and I was able to penetrate the wreck and poke around. We divers were so enthusiastic about the wreck that Dennis took us to another Japanese freighter that, he claimed, few people knew about: the Sata. At the top of the mast, 20 feet from the surface, I was greeted by a gaggle of clown fish in their mast-top anemone and soft corals grew off the mast and the entire ship... Indeed, it was more interesting than the previous one, with clearer water, more colorful and profuse growth and many more places to enter the ship and swim through the chambers.

The next day the sea was mirror-perfect, so we headed for drift dives at the more distant Blue Hotels and the Blue Corner Drop-off, where visibility was a lateral 150 feet. As soon as I entered the water, I faced my first approach-decision (remember psychology 101?): whether to photograph the several sharks cruising below, photograph the technicolor wall, with its teeming life, or just watch the show! More than a 100 barracuda approached and surrounded me before gliding away! I saw five white-tips and grey sharks within the first 20 minutes. This is no place for a tentative diver especially since the dives were not always guided. The current tried to pull me away from the wall, out to sea. It was often difficult to adjust for it and at the end of these dives, I and the other divers had to leave the security of the wall to ascend over blue depths, drifting farther and farther off the reef. Dennis always brought the boat to pick us up quickly. It was not always easy boarding the boat, since it was without a ladder. Even after nearly daily complaints by one diver, the shop failed to replace it during my stay. It's obviously a well-heeled operation, so such a simple matter should have been taken care of, even with a makeshift ladder, so the less-than-burly divers would not have to be dragged up over the gunwales at the end of each dive. I trust that by now they've solved this problem.

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The late-November weather remained perfect for four days, but the next four were overcast, with frequent rain squalls. In the longer boat rides, at 35 mph, being pelted with rain after two or three dives, was not pleasant. But the diving was worth it. Take along a sweatshirt and a waterproof windbreaker, unless you go January to June. October and November can also be perfect, but chancier. For my last few days the skies cleared and we had some sun once again. But get this: my underwater thermometer never registered lower than 86oF and hit 89oF. With 2 or 3 dives a day and a snorkel or two, I had nary a shiver, though my buddy felt more comfortable in a thin wet suit.

With 200 islands and unlimited sites, there is no end to beautiful diving. At Ngemilis Drop-off, a whole chain of magnificent spots along the walls are lush and alive. At Turtle Cove, I dropped through a large chimney, stopping to photograph lion fish clinging to the walls, before exiting through the window into schools of small, brilliant tropicals, including bunches of graceful Moorish idols. A white-tip shark swam toward me, then quickly turned away, making a large U-turn to return for a second look-see. In Lighthouse Channel, a sunken Japanese fishing vessel has been underwater for more than 40 years. A veritable garden of soft corals, sea fans and phosphorescing hard corals, it was swarming with amazing numbers of Moorish Idols, butterfly fish and schools of blue, gold and magenta beauties.

One dive I'll never forget: Chandelier Cave, no place for the claustrophobic. After anchoring in a blue lagoon, I could easily see the tunnel entrance 15 feet below. Six of us headed into the darkness with our lights. The tunnel is about 35 feet high, and perhaps 60 yards long, with two openings in the ceiling where one can ascend into room-sized caves. Swimming in that blackness, even with a light, I couldn't tell if I was ascending, descending or neutrally trimmed. At the tunnel's end, we six surfaced in a large cavern literally dripping with stalactites. As my light hit the ceiling and walls, sparkling veins and crystals of salt and other minerals flashed like jewels.

Once inside, Dennis had us, much to my surprise, take off our gear, float our tanks, put our other gear on a ledge, and climb out of the water. We followed him on our hands and knees through a small archway, first crawling through slime and then bridging spaces with long, unsteady steps. We reached a cavern more beautiful than the first, with ceilings and walls full of glistening mineral-stars and fringed with twinkling fiber-like strands. Returning to our gear, we submerged into the pool of the main cavern to photograph the submarine stalactites and stalagmites before swimming out. Indeed, a dive so unforgettable, it alone would be worth the return trip.

#### Regulator Survey, Part II

The second part of the *Undercurrent* reader survey on regulators, which was begun in the January issue, will appear in the next issue.

At Lighthouse Channel we hoped to spy dugong, a.k.a., manatees. Dennis told us, "Keep the wall on your right and go with the current. About halfway through the dive, the current will probably reverse, so turn around and swim back to the boat." And that's exactly the way it happened. It was a swift drift, but I was able to hold my position long enough to photograph the vivid wall, including flaming scarlet and royal blue starfish, several gorgeous species of nudibranch and lion fish. But we saw not a single manatee. (Nor did we see one of Palau's other unique critters, the salt water crocodile. They eat people -- the last one 10 years ago. Divers need have no fear, so I'm told, since they live in the mangroves and reportedly come out only at night.)

Perhaps one of the world's most unusual snorkeling dives is in Jellyfish

Lake, once featured in National Geographic (February 1982). After climbing 15 minutes to the interior of a neighboring jungle island, we reached a small salt water lake, full of jellyfish whose ancestors have been trapped here centuries ago. They have lost their ability to sting -- one theory says it's because there are no predators -- so we jumped in with them. How bizarre! Since the jellyfish are thick near the surface, no tanks are needed. En route, we saw fruit bats flying overhead and large, purple land crabs scurrying beneath our feet.

My one night dive was at Coral Garden, lovely, shallow, clear and calm with lots of fish. I saw scores of unique collectible (though shelling is not permitted) but I was disappointed in the few close-up subjects. My, how we photographers render our judgments based on what our camera is set up for! A good night choice might be the hotel lagoon, where there is much color among the vivid clam mantles, myriad oysters and tropical fish. I even spied a lone sea snake here.

Each day, for our two hour surface interval, we had lunch on a peaceful beach with good snorkeling. At Neco Marine's own island, I snorkeled in eight feet of water around a colony of the giant tridachna clams, whose mantles are exquisite and vibrant, like tapestries from a Sultan's kingdom. On the island are several thatched shelters with tables, benches and hammocks. The \$7.50 lunch comes in two varieties: the sandwich-based American, or the fish-and-rice-based Japanese. For \$2.50 the boatman will pick up a native box lunch, consisting of fish or chicken, a vegetable and rice or taro. Or, there's a beach barbecue for \$10 and the boatman brings along or spears the fare.

Speaking of food, the hotel cuisine maintains a balance for Western and Oriental palates. The food isn't cheap (an average \$12/person in the coffee shop and \$20 in the dining room), nor is it 5-star. But it is imaginative and well-prepared: e.g., fresh snapper baked in rock salt, teriyaki chicken, skewered seafood baked in coconut milk and superb sashimi. I had a massive meal at Osel Plaza, a Japanese restaurant in a small white frame abode. Expect no menu. After drink orders are taken, courses begin to appear. They seemed nearly a dozen, starting with sashimi, then baked clams in the shell, a crispy sweet and sour fish with peppers, a whole red snapper beautifully presented, turtle meat stew (where's Greenpeace!), a steamed, dark leafy vegetable, lobster, its meat sliced and its body stuffed with lobster salad, and on and on, all for \$20 per person! After this two hour feast, I fell asleep in the taxi back to the resort. I also had two superb and hefty meals at the Carp Restaurant, basically Japanese food, at \$12 per person.

If you want a day away from diving, there are land tours. For the adventurous climber, Ulong Island has caves in the high cliffs where you can find wall drawings from ancient Palauan tribes. The tour of Peleliu Island can be sobering, with its W.W.II relics; most of the defending Japanese were killed, as well as nearly 2,000 U.S. troops. Neco Tours, the sister organization of Neco Marine, can arrange any land excursions. Neco Marine had our dive package so their hostess "Baby," who is in charge of Neco Tours, met me at the airport, reconfirmed tickets, kindly made small purchases for me in town so I didn't have to take time off from diving, reserved tables at local restaurants, arranged taxis and was a font of information. She did a splendid job, very good-naturedly.

With all the beauty of Palau, there are still problems in paradise -- and alcohol and drugs are often the catalyst. Tourists are advised not to wander around town late at night. Palauans themselves complain about some tourists, claiming that the Japanese are spoiling the islands by littering and by killing and eating anything and everything edible, including the magnificent tridachna

clams, despite efforts to preserve them. The giant clam is disappearing quickly. I asked several dive guides why they didn't tell Japanese divers that the clams were "off limits." They rolled their eyes and said they had tried signs, pleas, words and notices in the hotel rooms. Nothing worked. I'm not sure I understand why. Nothing is to be taken alive or dead, shells included, and those rules seemed enforced. I'd simply not let the butchers back on the boats. Somewhere, somehow, someone will have to enforce good sense if Palau's unique diving is to remain just that.

### Star Chart:

|                               |                 |
|-------------------------------|-----------------|
| Diving for Experienced Divers | ★ ★ ★ ★ ★       |
| Diving for Beginners          | not recommended |
| Hotel                         | ★ ★ ★ ★ ★       |
| Hotel Food                    | ★ ★ ★ ★         |
| Beach Snorkeling              | ★ ★ ★ ★         |
| Money's Worth                 | ★ ★ ★ ★ ★       |

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

Divers Compass: If you go a la carte, the Palau Pacific runs up to \$120 a room and diving is \$70/day; any travel agent can book you. . . Tropical Adventures (800/247-3483) has an 11-day trip for \$2133, air and diving included; Asia Divers (7529 N. 23rd Street, Phoenix, AZ 85020, 602/944-2166 -- the answering machine answers "Assembly Technologies") has a personalized 9-night trip for \$2300; also try See and Sea (800/DIV-XPRT) and LA MER (800/348-3669). . . electrical power is the same as the U.S.. . . local currency is U.S. dollars; Neco Marine and Tours do not accept credit cards, but the Palau Pacific does. . . there are practically no biting bugs. . . if you're prone to a bruised bum, take along a small inflatable cushion for the bumpy boat rides. . .

## When Are You Too Old To Dive?

### --The Effects Of Aging On Diving

Scuba diving equipment first became widely available during the 1950s. Those who began diving then, during their teens or early 20s, are now in the middle 40s to 50s. With their maturity has evolved an interest in the effects of aging on divers.

All divers should be aware of the normal changes which occur due to aging if they are to enjoy diving throughout life. Yes, lifelong diving is possible as Marlon Perkins, curator of the San Diego Zoo and TV personality, so vividly displayed for us all. A diver until just prior to his death, Perkins gradually moderated his bottom time and depth, until in his late 70s he never exceeded 40 minutes at 40 feet. Lou Fead, prolific diving author, has cited similar examples in his writing.

Indeed, diving can be a lifelong avocation, as long as one carries a realistic and positive attitude about oneself, one's capabilities and the waters below.

Given normal aging -- and the absence of diabetes, heart disease, emphysema, hypertension, cataracts, or other diseases which may occur with age -- everyone will experience gradual psychophysiological changes which will alter diving capabilities. As these changes occur, prudent divers will make corresponding changes in depth, bottom time and multiple exposure dives in order to avoid decompression sickness or other dive-related injuries.

**\*\*At 80 years of age, one has 50% of the breathing capacity that one had at 30. Obviously, as breathing capacity is reduced with age, one must consider diving at shallower depths -- perhaps at 70, one should consider Marlon Perkins' 40 feet for 40 minutes maximum rule. In this connection, strict use of the Spencer/Huggins no-bubble decompression tables (See *Undercurrent*, May 1986) will prevent problems related to depth and time underwater.**

**\*\*The metabolic rate slows 10% or more between age 30 and 80. This may lead to increased body fat percentage and consequently a greater potential for decompression sickness.**

**\*\*Muscular strength is greatest at age 27 and declines only about 16% by age 57. As we age, we become slightly slower and weaker; however, this fact has little impact on the enjoyment of recreational diving.**

**\*\*Healing time from injury slows dramatically with age. A wound which took 31 days to heal at 20 years of age takes 55 days to heal in a 40-year-old person and 100 days in a person of 60. As we become older, we must allow more time after injury before exposing our bodies to the rigors of the deep.**

**\*\*Changes in vision with age include yellowing of the cornea and the inability to focus the eye on close objects due to a flattening of the eye curvature. Be-**

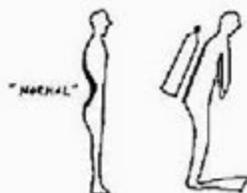
### Back Problems In Divers

The large number of back problems in veteran divers have probably developed due to a postural mistake when putting their tanks on their backs.

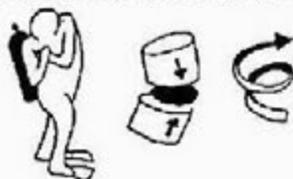
Between each pair of vertebrae is an elastic disk which acts as a shock absorber. When a diver bends forward the vertebrae incline forward and push the disk backwards; when a diver bends backwards the reverse is true.



Normally, the lumbar spinal column is naturally curved. A diver with his tank on his back loses this curve creating hypertension of the disk between the 5th lumbar vertebra and the first sacral vertebra.



The diver, as he puts his tank on his back, makes movements which subject the intervertebral disks of the lumbar spine to a compression and a shearing strain. The mechanism is akin to that of the rotation of the knee which causes the torn cartilage found in football and rugby players.



I must therefore warn, then, of the potential danger to the integrity of the lumbar spinal column by putting tanks on one's back by lifting them from the ground and twisting to settle them in position. To prevent unnecessary back injury we should adopt the habit either of helping each other or putting our tanks on ourselves while floating on the surface.



*The author of this piece is Dr. R. Sancho; it first appeared in French in the World Underwater Federation Bulletin and later in the Journal of the South Pacific Underwater Medicine Society, with whose permission we reprint it. Undercurrent takes all responsibility for editorial changes.*

tween ages 40-50, many persons experience "farsightedness" and may need small lenses inserted in their masks in order to read instruments or see small critters up close while underwater. Cornea color changes will affect color perception and light gathering power. A person of 50 needs twice as much light as a person of 20 in order to see equally well. A person of 80 needs three times the light to see with equal clarity objects that the 20-year-old sees. Objects will appear to have less color and all underwater areas will appear darker. Using a quality high-power diving light and appropriate lenses in masks can help mitigate these changes.

\*\**Skeletal changes* may include thinning of the soft connective and padding tissues, plus the onset of a generalized stiffening and drying of the body. Further, arthritic changes in the joints (particularly knees, back, shoulders, hips and feet) may reduce one's ability to carry tanks and weights, causing joint pain on long walks to a dive site. These normal changes may cause an active diver to curtail his or her diving schedule or even to cease diving. Answers to these problems exist, however, in that a person may take Motrin for the mild pains and aches associated with an aging frame and may select lighter 63, 50, or 40 cubic foot cylinders to reduce the above equipment carrying weight. One may also dive with charter boats which provide extensive personal support service. Underwater, one may use a diver propulsion vehicle to reduce hip, knee, and back pain due to kicking.

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*"Physical changes begin at about age 30 (and continue throughout life), reducing the scope of divers' underwater activities."*

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Numerous other changes of age impact diving and divers, including decrements in neurological, reflex speed, agility, hearing, touch, taste, smell, balance, cardiac, skin, hair, muscle and other areas. Physical changes begin at about age 30 (and continue throughout life), reducing the scope of divers' underwater activities.

During a University of Florida research project, I surveyed several older divers who provided me comments which any diver concerned about aging should keep in mind. To these comments, I added data from research on aging and on decompression sickness. The result is this list of conservative rules that the aging diver should keep in mind to continue diving safely.

\*Be in good physical condition through a reasonable program of diet and exercise. Remember, there are no diving tables for people over forty; they were developed for younger men and the ultimate effect of diving on the ag-

ing body simply isn't known. The better shape you're in, the safer your diving will be.

\*Keep your weight down to reduce the stress on your heart.

\*Do not smoke. Your lungs need all the capacity they can get for diving activities.

\*If taking prescription medication before or after diving, obtain the approval of a physician trained in underwater medicine. Many drugs have different effects under pressure and one should know about these effects before diving.

\*Do not dive when tired or exhausted mentally or physically. Do not exercise or exert yourself before a dive. Rest prior to and after deep or long dives. Fatigue is a catalyst for decompression sickness and in the aging diver it may have an enhanced effect.

\*Pause on the bottom of physically demanding dives before ascending.

\*Avoid exertion during a dive -- especially shoulders. The shoulder and the neck areas are especially susceptible to bubble formulation.

\*Ascend *and descend* slowly. The circulatory system in people over forty functions more slowly and one needs to guarantee plenty of time to get accustomed to the changes in pressure on the way down and to outgas on the way up.

\*Avoid deep dives and don't make "bounce" dives.

\*Divers over 40 should take an extra five minute stop at 10 feet and divers over 55 should stop for 10 minutes. Age-related changes in the circulatory system suggest such caution.

\*Ascent and descent rates of 25 feet per minute are better than the standard 60/75 fpm rates to ensure sufficient outgassing.

\*Use the "next deeper and next longer" table on repetitive dives to guard against age-related changes in the body that tables don't account for.

\*Use surface-to-surface, not bottom time, in all dive calculations to reduce the time underwater.

\*Do not exercise or exert yourself after a dive. Exercise may stimulate the release of bubbles into the blood system.

\*Drink plenty of water before and after diving to avoid dehydration. A dehydrated diver may be more susceptible to the bends.

\*Do not take a hot bath or shower after diving. This may increase your susceptibility to the bends by assisting in bubble expansion.

\*Don't drink tea, coffee or colas before and after dives. There may be some connection between the caffeine stimulation of these beverages and decompression sickness.

\*Avoid milk or milk products before diving. They tend to produce increased mucous secretion and can therefore contribute to sinus blockage.

\*Avoid restrictive wet or dry suits and similarly restrictive clothing before and after a dive. Circulation should be unimpaired.

\*Take one aspirin or Motrin before and after diving. This may reduce the risk of bends by increasing the capacity of the platelets to carry oxygen. But take only one. A second may increase one's threshold of pain and cause minor bends symptoms to go unnoticed.

\*Don't dive right after flying and carefully follow the rules regarding flying after diving.

\*Avoid large, high-fat meals before and after diving. Extra fat in the blood stream may reduce the oxygen carrying capacity.

\*If *any bends symptoms* appear, call DAN (919/684-8111) and go to the nearest hyperbaric chamber immediately.

Human performance capacities will diminish with age and so will subaquatic efficiency. The younger diver can only imagine these effects until deep, long, cold dives are no longer possible in comfort and safety and the harsh reality of aging presents itself: a beautiful, warm, clear, shallow reef becomes the only dive possible. Now, that's not a terribly negative future possibility, is it?

### The Industry And The Aging Diver

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*"The diving industry does not have modified standards for older persons, nor do diving equipment manufacturers cater to older customers in their product advertising."*

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Our culture is typified as youth-oriented; however, diving is a weightless activity which can be safely enjoyed by all ages. But the diving industry does not have modified standards for older persons, nor do diving equipment manufacturers cater to older customers in their product advertising. Perhaps when the industry realizes that older divers typically have more time *and money* to pursue the sport, we will see the emergence of products and services tailored for older diving participants.

Mask lenses, D.P.V.'s, smaller cylinders, dry suits, and other available equipment may enable us all to extend our diving.

### Psychological Changes

Of equal, and perhaps even greater, importance are the psychological changes which often accompany physical aging. Clearly, emotional states in-

cluding boredom, loneliness and the patterns of habit and routine take on new importance as one ages. An individual who is habituated to dive with a club or a group or to regular diving with a spouse or a friend is likely to continue diving into old age. The habit of regular diving may well be the most important psychological factor which contributes to continued diving with age. Thus, don't stop diving for too long if you plan to stay active in the sport.

Because mental functioning can increase with age, an aging diver may be mentally sharper than when younger. Similarly, memory in an active older person may improve across the life span. These higher functions, coupled with prudence in diving site selection, may make diving an even more enjoyable avocation for older persons than was possible in youth.

## Why Divers Die: Part I

### --An Analysis Of 1983-1984 Fatalities

The task of the National Underwater Data Accident Center (NUADC) at the University of Rhode Island is the acquisition, investigation and statistical analysis of all United States underwater diving fatalities. This includes all U.S. citizens wherever they may be diving worldwide.

The NUADC has been supported since 1969 by several federal agencies. The National Oceanographic and Atmospheric Administration (NOAA) has administered the grant since 1972 with additional funding by the U.S. Coast Guard and, for a time, from the National Institute for Occupational Safety and Health (NIOSH). Due to extensive federal budget cuts, the U.S. Coast Guard discontinued its funding of the NUADC in early 1985. NOAA could not fund the entire program, so it became necessary to search out new funding. After extensive efforts, a commitment was obtained from both DEMA (the Diving Equipment Manufacturers Association) and PADI, who with NOAA matching 50/50, are now the source of funds for NUADC, with smaller donations from others.

Since the inception of *Undercurrent* eleven years ago, we have published edited data from the NUADC report. It's our belief that by informing the diving community about the causes of deaths of fellow divers, we'll be providing critical information about how to dive more safely. *Undercurrent* takes all responsibility for editorial changes.

Here is the report:

#### Sources Of Data

The figures and tables in this report are derived from the study of more than 2400 fatalities since 1970. This report will concentrate on 1983 and 1984

Finally, emotional resources -- one's drives, motives, attitudes and interests -- can be bolstered in late life by participating in adventurous activities like scuba diving. One who remains active will probably discover renewed vigor and interest in life (certainly more than a person whose major activity is television viewing). The key appears to be to maintain a physically active life-style and a positive attitude regarding the enjoyment of diving.

Yes, there, in fact, is no age limit for scuba diving.

*The author of this article, Milledge Murphey, Ph.D., holds his degree in psychology. He is certified to teach diving through a number of agencies, including the National Association for Cave Diving, for which he is the National Training Director. Dr. Murphey is on the faculty of the College of Health and Human Performance at the University of Florida. He has been diving since 1954.*

underwater diving fatalities, and will include a preliminary assessment of 1985 deaths. We receive information from professional press clipping services, unsolicited press clippings, the US Coast Guard, the Consumer Product Safety Commission, health departments, training agencies and search and rescue teams. *Information about any diving fatality should be sent to the NUADC, University of Rhode Island, P.O. Box 68, Kingston, R.I. 02881.*

#### Totals Of Underwater Diving Fatalities

Since the beginning of this statistical analysis in 1970, the fewest sport diver deaths were recorded in 1982: 74. However, the number of fatalities jumped to 110 in 1983 but dropped even lower in 1984 to only 70.

NUADC investigated 148 underwater diving fatalities in 1983: 110 sport diver or nonoccupational fatalities, 12 were occupational fatalities and 26 were skin diving fatalities.

In 1984, underwater diving fatalities dropped to 83. Of these, 70 were nonoccupational diving deaths, 11 were occupational, and only 2 were skin divers. (We find it impossible to get a good report on skin diving deaths simply because many do not get into the press or are recorded as simple drownings or swimming deaths. We don't consider our data here to be statistically valid.)

Based on information obtained from all of the national training agencies, approximately 5.48 million divers have been certified since 1960. Allowing for drop-outs, cross certifications, etc. the NUADC estimates the active diver population (someone who dives more than three times per year) in the United States at the end of 1983 at 2.6 to 2.8 million active

**Table 1: Summary of All Underwater Diving Fatalities, 1970-84**

| Year:  | 1970 |    | 1971 |    | 1972 |    | 1973 |    | 1974 |    | 1975 |    | 1976 |   |      |    |
|--|------|----|------|----|------|----|------|----|------|----|------|----|------|---|------|----|
| Sex: M = Male, F = Female                          | M    | F  | M    | F  | M    | F  | M    | F  | M    | F  | M    | F  | M    | F |      |    |
| Category   |      |    |      |    |      |    |      |    |      |    |      |    |      |   |      |    |
| Nonoccupation underwater fatalities                | 99   | 11 | 104  | 8  | 107  | 12 | 118  | 7  | 129  | 15 | 123  | 8  | 137  | 1 |      |    |
| Occupational, scuba diving                         | 3    | 0  | 2    | 0  | 2    | 0  | 0    | 0  | 6    | 0  | 4    | 0  | 6    | 0 |      |    |
| Occupational, surface-supplied<br>air or mixed gas | 6    | 0  | 2    | 0  | 2    | 0  | 4    | 0  | 8    | 0  | 8    | 0  | 7    | 0 |      |    |
| On-duty military                                   | 0    | 0  | 0    | 0  | 0    | 0  | 0    | 0  | 2    | 0  | 1    | 1  | 1    | 0 |      |    |
| Skindiving   | 18   | 1  | 17   | 0  | 15   | 1  | 22   | 0  | 25   | 2  | 16   | 1  | 11   | 0 |      |    |
| Total  | 138  |    | 133  |    | 139  |    | 151  |    | 187  |    | 161  |    | 175  |   |      |    |
| Year:  | 1977 |    | 1978 |    | 1979 |    | 1980 |    | 1981 |    | 1982 |    | 1983 |   | 1984 |    |
| Sex: M = Male, F = Female                          | M    | F  | M    | F  | M    | F  | M    | F  | M    | F  | M    | F  | M    | F | M    | F  |
| Category   |      |    |      |    |      |    |      |    |      |    |      |    |      |   |      |    |
| Nonoccupation underwater fatalities                | 98   | 4  | 95   | 21 | 112  | 18 | 98   | 11 | 88   | 13 | 63   | 11 | 104  | 6 | 59   | 11 |
| Occupational, scuba diving                         | 14   | 0  | 5    | 0  | 1    | 0  | 14   | 0  | 6    | 0  | 9    | 0  | 8    | 0 | 3    | 1  |
| Occupational, surface-supplied<br>air or mixed gas | 7    | 0  | 6    | 0  | 7    | 0  | 6    | 0  | 3    | 0  | 4    | 0  | 4    | 0 | 2    | 0  |
| On-duty military                                   | 2    | 0  | 1    | 0  | 0    | 0  | 0    | 0  | 0    | 0  | 5    | 0  | 0    | 0 | 1    | 0  |
| Skindiving   | 18   | 1  | 13   | 3  | 12   | 0  | 19   | 1  | 19   | 1  | 9    | 1  | 25   | 1 | 2    | 0  |
| Total  | 144  |    | 144  |    | 150  |    | 149  |    | 137  |    | 102  |    | 148  |   | 79   |    |

divers, and at the end of 1984 at 2.7 to 3 million divers.

We find that 1983 had a fatality rate per 100,000 between 3.78 and 4.07. In 1984, the fatality rate would be the best ever recorded by the NUADC at 2.33 to 2.59 fatalities per 100,000 active divers. These figures support the position that diving is becoming safer, especially when compared to the peak year of fatalities in 1976, in which year the NUADC reported a rate of 8.62 per 100,000. (See Table 1).

We have made an exceptional effort to verify this fluctuation, contacting all of the agencies who have been involved with fatalities to ascertain if the figures presented here are accurate. In Florida, a fluctuation from 14 deaths in 1982 to 33 in 1983 and down again to 11 in 1984 can be partially accounted for by the number of cave diving deaths. In 1982, only 3 cave deaths were reported. In 1983, this number jumped to 16 and dropped again in 1984 to only 4 cave diving deaths. Hawaii, which recorded 5 deaths in 1982, had 12 fatalities in 1983 and 8 fatalities in 1984.

California had its worse year in 1973 with 36 fatalities. In recent years, California diving has proven much safer with only 14 deaths in 1982, 10 deaths in 1983 and 15 deaths in 1984. The state of Washington, which had as many as 17 deaths in 1979, recorded 9 deaths in 1982, 3 deaths each in 1983 and 1984.

During 1983 and 1984, deaths of Americans were recorded in four new areas of the world: The Fiji Islands, Grand Cayman, New Caledonia and Western Saudi Arabia.

### Environmental Aspects Of Sport Diving Fatalities

During 1983, 74 scuba fatalities occurred in an ocean, bay or sea. That represents 67% of the 110 fatalities. In 1984, 55 fatalities occurred in oceans, bays or seas, 78% of the total.

Six fatalities occurred in rivers during 1983. In 1984 two fatalities occurred in swimming pools -- the first in ten years.

A total of 16 cave diving fatalities occurred during 1983, up from the all-time low of three in 1982. Twelve of the 16 cave fatalities in 1983 occurred in Florida, with three incidents alone accounting for 7 fatalities.

The fluctuation in cave diving deaths in Florida and elsewhere may be due to the varied intensity of spring rains. Heavy spring rainfall may cause rivers to overflow, resulting in a reverse flow of the springs and muddy conditions, making it practically impossible to dive. Since there is no diving during these periods of poor visibility, there are likely to be fewer fatalities.

*“Between 1970 and 1986, the NUADC recorded a total of 219 cave diving fatalities.”*

Between 1970 and 1986, the NUADC recorded a total of 219 cave diving fatalities. Virtually all of these, involved persons who lacked any cave diving training and did not have the proper equipment and lights for such ventures. The National Speleological

Society has told us that they haven't a single fatality involving a properly trained and equipped cave diver.

Most diving fatalities occur in waters that are quite shallow (See Table 2). However, if a diver dives deeper than 50 feet, many insurance companies insist on increasing the cost of insurance by two to three times. However, our statistics have repeatedly shown that such increases for scuba divers are unfair. In fact, we find no basis for the fifty-foot limit set by some companies. Such a limitation seems to imply that most diving deaths are occurring in deeper than 50 feet of water, but our records indicate just the opposite. In most previous years, well over half the cases have occurred in less than 50 feet of water. However, in 1983 and 1984, roughly 30% of the deaths occurred in less than 25 feet of water. In 1983, 50% occurred in less than 80 feet of water and in 1984 50% occurred in less than 55 feet of water.

**The NUADC advice to scuba divers seeking life insurance is that they shop around to find the companies that are not using depth to determine the policy price.**

[Undercurrent comments: The NUADC report is correct, but there seems to be a trend toward fatalities in deeper water. In the eleven years between 1970 and 1980, at no time did more than half the deaths occur in water deeper than 48 feet; in the four years since 1981, 50% of the cases were in depths greater than 50 feet, which reflects the trend toward deeper diving.]

Weather or tough environmental conditions were cited in several deaths. Six 1983 cases involved strong currents, while one fatality occurred under ice in 1983 and two in 1984. In 1983 and 1984, we recorded ten cases with a wave height of more than two feet or where heavier or more dangerous surf may have played a part.

During 1983, the NUADC recorded 53 fatalities occurring while diving from a shore. Fourteen persons died while diving from a chartered diving vessel during 1983, while 18 deaths were recorded from private vessels. In 1984, a total of 35 fatalities were noted as having occurred while diving from shore, 7 were recorded from a chartered diving boat, and 11 fatalities occurred while diving from a private vessel.

## Training Deaths

In the sixteen years of this study, there have been an average of 10.5 deaths per year in formal training. In 1983, six fatalities occurred during formal training and four occurred the following year. Formal scuba diving training appears to be getting safer with each successive year. In 1984, more than 300,000 individuals were reported to have been formally trained.

Following are a few of examples of training fatalities.

A formal training dive in a New Mexico cavern resulted in the death of a 42-year-old male who, upon ascent, struck his head on a ledge about 20 feet from the surface and then fell back to the bottom of the cavern in about 70 feet of water.

A 26-year-old died while undergoing ascent training in an Arkansas' lake. The victim came up, bobbed at the surface and submerged again. Although the coroner's office ruled this as a drowning, the NUADC, on the basis of other reports, believes that this was a probable air embolism.

There were two deaths during formal ascent training. In a private lake in Arkansas, a 24-year-old male was practicing emergency swimming ascents from a depth of 27 feet. Upon reaching the surface, this victim collapsed and despite extensive resuscitative efforts, he could not be revived. The probable cause of death was an air embolism.

A 29-year-old female practicing emergency swimming ascent in a lake in Travis County, Texas, suffered ruptured lungs and a cerebral air embolism. The exercise had been conducted from a depth of 40 feet.

A lake near Pompano Beach, Florida was the site of a drowning of a 21-year-old female who apparently became tangled in vegetation twenty feet below the surface. Her body was recovered two days later. A suit brought against several parties was apparently settled out of court a year later for \$1.8 million.

A 33-year-old male tourist from California lost his life during a scuba training program off the island of Maui in Hawaii. This victim apparently became caught in the current, which took him away from his

**Table 2**  
**Depth of Fatal Accident Dive or Depth at Which Body was Recovered, Sport Diving Fatalities.**

| Percentage of<br>Total Cases | Depth at or Above Which Percentage Occurred (Feet) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|------------------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
|                              | 1970   | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |  |
| 25                           | 17   | 18   | 15   | 15   | 18   | 23   | 17   | 17   | 16   | 17   | 15   | 16   | 10   | 30   | 28   |  |
| 50                           | 30   | 40   | 48   | 40   | 43   | 40   | 30   | 26   | 29   | 30   | 30   | 50   | 60   | 80   | 55   |  |
| 75                           | 60   | 75   | 90   | 70   | 78   | 78   | 65   | 58   | 54   | 80   | 61   | 99   | 77   | 100  | 86   |  |
| 90                           | 130  | 140  | 250  | 120  | 125  | 120  | 100  | 110  | 101  | 125  | 120  | 126  | 240  | 121  | 110  |  |

**Table 3**  
**Experience of Sport Diving Fatality Victims**

| Experience       | Percent of Cases |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                  | 1970             | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
| First dive ever  |                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| with scuba       | 11               | 16   | 8    | 4    | 11   | 8    | 10   | 10   | 9    | 6    | 11   | 4    | 12   | 6    | 1    |
| First dive in    |                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| open water       | 6                | 7    | 4    | 5    | 6    | 6    | 5    | 1    | 1    | 10   | 4    | 3    | 5    | 3    | 1    |
| Early open-water | 31               | 24   | 21   | 34   | 37   | 25   | 30   | 26   | 34   | 21   | 37   | 23   | 20   | 12   | 5    |
| Some experience  | 33               | 19   | 37   | 16   | 24   | 20   | 34   | 40   | 45   | 39   | 33   | 32   | 23   | 14   | 10   |
| Considerable     |                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| experience       | 13               | 23   | 14   | 21   | 16   | 28   | 16   | 19   | 7    | 18   | 12   | 26   | 17   | 17   | 6    |
| Very experienced | 6                | 11   | 16   | 10   | 6    | 13   | 5    | 4    | 4    | 6    | 3    | 12   | 23   | 10   | 5    |

boat. He became exhausted and drowned in twenty feet of water.

A 29-year-old male suffered a probable air embolism during his first open water dive for certification in a lake in the state of Washington. This victim practiced buddy breathing in ten to twelve feet of water and then swam with the instructor and two other students to a depth of 42 feet. Fifteen minutes were spent at this depth and then all involved gave an OK sign to start for the surface. Upon surfacing, the victim yelled for help, replaced his mouthpiece and sank. He was then reported to have surfaced a second time and yelled for help before sinking. The victim was recovered from a depth of twelve feet and taken approximately 50 feet to the beach where resuscitation efforts were started, but the victim could not be revived.

Three people in training died of heart attacks. In one case, a West German tourist died while undergoing scuba instruction in the Florida ocean. The victim had completed a dive and was on the surface snorkeling back to shore when he became panicky and had to be helped. Upon reaching the shore he was unconscious and never recovered despite extreme CPR efforts. This victim was reported to have died from

asphyxiation due to drowning and no autopsy was performed.

A popular radio personality collapsed and died on the side of the swimming pool in which he had been taking scuba lessons in St. Louis. He died of a heart attack, probably brought on by strenuous exercise. A 52-year-old male died of a heart attack during his final certification dive in a Utah lake.

**The NUADC must once again emphasize the need for very careful screening of the physical condition of any individual entering into scuba diving training who is older than 35.**

One fatality occurred in an Alaskan lake while the victim was being instructed by a close friend. The 22-year-old male victim was said to be in five or six feet of water when he suddenly began to scream for help and then submerged. The would-be instructor attempted to help, but a struggle ensued and the friend was pulled underwater. He gave up his efforts to recover the victim and several other people made attempts to locate the body. He was eventually pulled from the bottom of the lake, which had a depth of 15 to 20 feet, and rushed to a hospital, but pronounced dead on arrival.

*(Continued Next Issue.)*

## **A First Peek At The DEMA Show**

### **--And A Last Poke At The Products**

Having just returned on Superbowl Sunday from the enormous Diving Equipment Manufacturers Show in Las Vegas, I want to report on how some of the upstarts in this industry have decided to market their diving products.

Stick a six-foot nubile blond into a passionate pink wet suit, let her bare ample cleavage, have her strap on her client's product -- a plum-colored buoyancy compensator, a baby blue tank or a striped weight belt -- and she's guaranteed to get giddy retailers to

climb all over themselves to place their orders. If the model herself has appeared in print advertisements, let her autograph posters of herself as if she's a full-blown starlet. For that's exactly what was going on in more booths than one at the 1987 DEMA show.

Less than a decade ago, some of the more stellar women -- and a few men too -- in the diving business were protesting the use of sexy women as models for diving gear. It was a time when American machoism was on the downslide, sex in advertising was growing

passé and women were demanding a role as people, not objects.

A pendulum always swings back -- and back it has swung from the 1970s. Potential divers are now sold on the unstated promises of tight bodies, flawless skin and perennial youth. When these people speak of looking for a Nautilus, they are not talking about taking a dive to 100 feet in the South Pacific.

But the upshot of all this is not that sexism (or even *sexyism*) is back in advertising. It never really left and nobody seems to care much -- including those stellar women (and a few good men) in our industry who have chosen to ignore the male need for titillation, and have transcended it all with an interest in good products and safe diving.

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*"The primary marketing strategy of the entire diving industry is to position diving products as apparel -- not as diving gear."*

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What's more important is to recognize that the primary marketing strategy of the entire diving industry is to position diving products as *apparel* -- not as diving gear. With so few significant differences in buoyancy compensators, wet suits, knives and weight belts, it's boutique fashion that's being sold. And the DEMA Show was, indeed, one big fashion show.

Every last piece of dive gear is now available in a range of pastels and high tech hues. When the newly certified diver walks out of a shop, he can be attired in a rainbow of shocking colors, right down to a magenta cover for his ORCA Edge or a pink sheath for his knife.

Of course, if anyone dressed in street clothes with colors like these, he'd immediately be labeled a loonie and avoided at all cost -- about the same way most people react to a Shriner in an Egyptian shirt, billowy pants and a fez. If you tried to check into Bonaire's Habitat in such colorful regalia, you wouldn't get past the front desk. So how is it that once you go to your room and come out looking like Joseph in his Coat of Many Colors, you're considered to be in high fashion? Captain Don -- do you let people dressed like this dive with you?

Whom do we blame for all this brightness? The manufacturers would be an easy mark, trying to cover up their lack of innovation and differentiation with a splashy surface on ordinary stuff. And women would be an obvious target, since they prefer even on land to wear ice cream colors, rather than the basic blacks and greys that we men know are truly sensible.

Regardless of these culprits, I'm going to blame, instead, Nikon Inc., a company that has developed an easy-to-use underwater camera which is now a must for anyone taking his first trip to clear water. Instead of focusing on hard-to-frame black durgeons or fairy bassets, we can put someone in front of the lens all decked out like a Christmas tree worm and

call ourselves photographers. With all that color, anyone can take an underwater snapshot to show the folks back home.

Perhaps there is one authentic diving advantage I'm overlooking. About once a year, a diver in Northern California waters gets hit by a great white shark. One expert or another is always quoted as saying that the shark "mistook" the poor diver for a seal. Well, there's no mistaking the diver of the eighties, now, is there?

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*"Accessories were once goody bags and emergency whistles, but now they're lime-green regulator covers and lemon-orange fin totes."*

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At the DEMA show, PADI set up a model dive shop -- i.e., diving boutique -- making no bones about the fashionable way to display gear and accessories (accessories were once goody bags and emergency whistles, but now they're lime-green regulator covers and lemon-orange fin totes). All this accompanying paraphernalia was displayed on designer wire cages, with nary a whiff of compressor oil in the air.

Now, I suppose all this fashion and design works pretty well to attract Yuppies to diving. They are, after all, the guts of the potential market. But for people who have never been in the real ocean, they don't have a notion about what happens to their garments after they scrape their arms against a sponge-covered wall, or drag their bellies on the bottom of a narrow tunnel. Within a dozen dives, the indelible dyes of the deep will have forever marked their designer gear with nature's own colors -- usually sludge black and slime green. And after a single trip through the Miami airport, that flaming dive bag will look like it was dragged across the floor of a Chevron station.

Caveat emptor.

Frankly, I distrust anyone who gets on a dive boat looking like he just walked down the runway at a Paris fashion show. His fancy new suit or skins usually smell like chlorine from his last pool dive. I like the smell of real rubber, wet suit goop and army canvas. And I'd rather trust the bloke who has mud in his creases and sponge juice on his knees. He's someone who has done a little diving and someone who's welcome to come along with me.

As I said earlier, a pendulum always swings back. But it has got to reach its farthest point before it can start its return -- and that point isn't even in sight. In fact, wait until the next generation of designers catches hold. It will not be long before the diver alongside you will have a polo player emblazoned on his regulator and crocodiles on his booties.

Ben Davison  
Editor