undercurrent®
THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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St. George's Lodge, Belize

Total Isolation And Super Diving

A popular T-shirt sold in Belize proclaims on the front "Where the hell is Belize?" The T-shirt answers itself. On the back is printed "Who the hell cares?" With the possible exception of a few divers from Texas and Louisiana, it seems that most American divers don't really care and very few even show up. If you're one of those, I'm about to suggest that you may very well be missing something.

As I reported in the last issue about my experience at Ambergris Caye (pronounced "key"), if divers can't get to the outside of the barrier reef--and some days they can't--then Ambergris Caye offers little for experienced divers. But outside the reef--ooh la la! And my current discovery, St. George's Lodge on St. George's Caye, is a destination where a journey to the reef is quite a bit easier. Here, my fellow divers, I engaged in some of the best land-based diving I've had in the Caribbean. The reefs were lush and full of life, the critters abundant and unique. Since St. George's is too tiny to spend much money advertising itself, it has yet to be discovered, although rumor has it that Sport Diver may soon cover it. For the time being, count yourself among the first to know.

INSIDE UNDERCURRENT

An eight-mile boat ride from Belize City, St. George's Lodge, at first impression, seems a bit odd. Perched on stilts ten feet above the sand so that high hurricane waves don't wash it away, the single white frame building houses the bar, dining room and 14 bedrooms. The entire operation is the proverbial one-man show. Fred Good, a large burly fellow with a greying beard, formerly a partner in the Southern California dive boat Truth, arrived on this spit eight years ago. He dammed, dredged, drained and filled the land to build his resort. He designed the lodge and supervised its construction. He is the owner, manager, repairman, dive guide, bartender, and genial host. So far as I could tell, the only services he doesn't perform are changing sheets and scrubbing backs.

After my week at Ambergris Caye, I was indeed anxious for good diving. Fred quickly assured me to not to worry. The exterior of the reef, about a mile from

the Lodge, is reached after motoring through a natural two-mile wide break in the reef. If the winds get rough and the cut can't be crossed, Fred substitutes day trips to the lee of the atoll of Turneffe, about 18 miles from the Caye, where the water will be calmer and the diving, I was to learn, superb. In good weather--and all I had during my late May stay was good weather--there are enough dive spots 10-20 minutes from the dock to keep any sport diver occupied for a month of Sundays. The ocean along the barrier reef is alive with just about all the underwater critters I would ever hope to see at any Caribbean dive spot. On one dive along the reef, for example, I dropped to the anchor and watched a large green moray having his dental hygiene work being performed by a tiny cleaning wrasse, while a parrotfish awaited its turn. Along the wall I saw a school of hogfish, two sophisticated queen triggers, hundreds of giant blue chromis, and an array of enormous black snappers. Hidden in the prolific plate coral on the wall were scores of lobster and a few spotted morays. Along the reef were plenty of soft coral and sea fans, all intact and unbattered. Hard coral formations were impressive: giant walls of plate coral, many large brain corals, outcroppings of flower coral, and acres of lettuce coral provided the backdrop to the meanderings of the marine life. On my return to the boat, on this dive, I stopped to watch a lazy loggerhead turtle mosey by.

St. George's Lodge

Of the nearly one dozen spots I visited along the reef, each was complete with complex coral and a broad array of fish. On another dive, I discovered a large nurse shark asleep under a coral ledge, wedged so tightly I was sure she would never extricate herself. Later, a dozen midnight parrotfish followed me for several minutes as I poked around various coral formations. On another dive, after requesting that Fred take me to a spot where I could exercise my skills of fish photography, in 35 feet of water I snapped a pair of delicate jackknife fish, a number of queen and grey angels (large angels were common on every dive), coneys, an indigo hamlet, a harlequin bass, and would you believe, two free-swimming jawfish. Of course, the area was also filled with varieties of hard and soft coral, and a surplus of parrots, damsels, wrasses, butterflies, grunts and basslets provided additional company. Whenever special requests were made of Fred, they were always met. Curiously, on four of the seven days at the lodge my buddy and I were the only divers (and only residents!). One might expect to get a short shrift under such solitude (two divers do not a profit make!), but Fred responded as if we had leased the entire villa for ourselves. His congeniality and willingness to provide the best of diving never wavered. And though some people might abhor being the only guests, I found it the perfect respite from urban living. With plenty of books and a good buddy, I needed nothing else, though I know some people would be bored silly before the first day's sunset.

For all his congeniality, Fred Good is still in charge. Like most divemasters, he has the one "right way" of doing things. He makes no request for C-Cards, preferring instead to spend a few minutes snorkeling with new arrivals being sure that each is properly weighted for neutral buoyancy. It's important because his rule--and you definitely conform to his rules at St. George's--is for each diver to don fins, weight belt and mask in the boat, then enter the water where he assists each in putting on the tank. I was initially indignant at the idea--why try something

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new when the old way has always served me well?--but after a couple of dives it proved quite acceptable. Fred also eschews any kind of buoyancy control device, except when conch diving, and encourages his guests to do likewise by gently poking fun at those who arrive with stiff new $200 vests--as did I. He does not carry a depth gauge, but his depth projections were within five feet of what my gauge read. At the end of the dive, divers remove their tanks, weight belts and fins in the water, hand them to Fred, then climb onto a small platform at the rear of the boat, which for small groups is an 18 footer with a 50-hp Johnson, or for larger groups a 25' twin engine skiff. Because of the lack of fresh water on the island (rainwater is caught), no facilities are provided for washing gear.

Now, with such good diving close at hand, and a divemaster who seems to know what he's doing, just what keeps divers away? The food and shelter perhaps? Not on your life. Sitting on stilts, the lodge is indeed an odd structure, but the building has a large central room, containing the bar, the dining room and lounge, with several tiny bedrooms--ours was barely two feet wider and three feet longer than our king-sized bed--extending on both sides of the main room. I was surprised to find that each bedroom was finished in beautiful Santa Maria wood, as carefully handcrafted as a stateroom on an elegant yacht. Even the bathroom and the walls, the shower, and the wash basin counter are finished in this dramatic wood, the deep color punctuated by blue and white curtains tied with white cord. The rooms are not air-conditioned, but plenty of ocean breeze can pour through the louvered windows on the wall facing the ocean. In each room a request is posted to turn out the lights upon departure. Since windmills generate 12-v current for the lights, there is insufficient power to operate electric razors or hair dryers, unless you have a converter to upgrade 12-volt to 110-volt current. Arrangements can be made to charge strobes partially, but again a converter ($49 at Radio Shack) would be more suitable.

As you might expect, there is absolutely nothing to do at St. George's. Fred hopes to build a swimming pool and provide small sailboats, but unless one is diving or swimming (there is not a thing to see snorkeling), the next best place is sitting at the huge rosewood bar or lounging on the handmade, aesthetic and uncomfortable furniture in the lounge. A spiral staircase leads upstairs to the sundeck, quickly renamed as a romantic moondeck in the evening.

Although everything other than seafood arrives at St. George's by boat from the mainland, the meals were excellent. Breakfasts featured omelets, stunning banana pancakes, ham or spicy sausage, juice and fresh papaya, pineapple or mangoes. Lunch, a bit too heavy for me, was frequently a fish entree (once meatloaf), fried bananas, two vegetables and fruit. A typical dinner began with seafood soup and homemade breads, followed by a salad, and a main course featuring, say, lobster, conch, or the surprisingly tasty porkfish, with mashed potatoes, and two vegetables, at least one of which would be prepared in a cream sauce. It is quite an accomplishment to serve fresh fruit and vegetables nightly, and Fred's attention to the kitchen deserves credit. Of course, he is not alone in this venture. His Jamaican cook, Rose, gets fine marks for her meals.

Now, this would be sufficient report for a solid week in isolation, simply sitting, diving, and stuffing myself, but I've not yet told you of the diving highlight of this trip, a journey to dive the famed Blue Hole at Lighthouse Reef. For $50/diver, Fred offers this 40-mile trip when six or more divers request it, but because he wished to explore a shorter route, he took this journey with just me and my buddy. Departing at 6 a.m., winding past coral heads just beneath the surface, we crossed the coral shoals surrounding the hole at 10 a.m., then anchored at the rim of the deep azure Blue Hole. I quickly dropped into the mysterious waters, descending eventually down to 180 feet. Aside from a distant reef shark, I spotted no life, only stalactites suspended from the side in the eerie stillness. The dive, indeed, was a religious experience, not to be missed. Afterwards we

lunched on the boat, took a second tank outside Lighthouse Reef, then stopped for a third tank at Turneffe, where the reef was every bit as interesting as the reef at St. George's, the main difference being that here I spotted a couple of small sharks. We returned to Turneffe for another day's outing, and climbed the lighthouse and met its keeper, Thomas, who lives alone on the reef.

Actually, if one wishes a few side tours, Fred can arrange them to break up the stay. On a boatride through the mangrove swamps, we saw a large osprey clutching a fish in its talons, spotted a manatee, and observed scores of ducks and birds. From our dive boat each day, I saw porpoises in the water, but they were never around when I was diving. Fred can also arrange a trip to Mayan ruins and to an inland blue hole, 60 miles northwest of Belize, claimed to be connected to the ocean Blue Hole.

So, to sum up, St. George's is indeed the spot to get away from it all, for good diving and reclining, and absolutely nothing else. It is without the charm, say, of Moody's Pidertupo Village, a somewhat comparable hostel, but its diving is somewhat better. In fact, the diving scenery here, in my meager estimate, surpasses Cayman and even Bonaire. Although one must be a bit concerned about the possibility that the proprietor of a one-man operation must leave, now and then, for business reasons, Fred explained that he brings in a replacement from a nearby resort to ensure that the diving continues uninterrupted. Bay Travel, the booking agent, verified that this was the arrangement. Assuming we have heard the truth, we can recommend heartily a journey to St. George's.

Diver's Compass: Current rates are $69/day/person, double occupancy, which includes two tanks, one in the morning, and one in the afternoon; no other diving is offered . . . of course, you must bring everything you need and be prepared to repair your own gear should anything go wrong . . . although gentle breezes kept mosquitoes away, I recommend bringing repellent . . . Bay Travel handles the reservations to St. George's; 2435 E. Coast Highway, Corona Del Mar, CA, 92625 (714/675-4320) . . . summers are the rainy season . . . visibility during my stay dropped as low as 50 feet, but for the most part ran from 80 to 100 feet . . . things pick up a bit at St. George's if British soldiers come over for a short stay.

U.S. Navy Tests Of 36 Regulators

Seven Are Superior, Six Fail

In June 1979 the Navy Experimental Diving Unit (NEDU) performed unmanned tests on 36 open circuit scuba regulators currently manufactured in the United States. Breathing resistance, respiratory work and first-stage performance were evaluated. Results of these tests produced new NEDU scuba regulator performance requirements to replace the current standards. Of the 36 regulators tested, 7 regulators met the upgraded performance standards, 22 regulators met the old standards, and 6 regulators failed to meet either the old or new standards. The lengthy report has been edited by our staff, with the essential information presented here.

"The state-of-the-art in scuba regulator design has improved significantly in the last four years. The vast majority of regulators currently produced meet or exceed existing NEDU performance requirements."

Introduction

The state-of-the-art in scuba regulator design has improved significantly in the last four years. The vast majority of regulators currently produced meet or exceed existing NEDU performance requirements. Consequently, the evaluation of all available regulators during one test sequence was undertaken to develop an upgraded NEDU performance requirement.

A single regulator of each model style was purchased through commercial distributors. Each unit was calibrated to factory specifications to ensure that each regulator was tested under the same conditions. Performance, then, is indicative of the actual design and quality control limitations of the unit, uninfluenced by

improper set-up procedures.

The NEDU performance requirement which resulted from these tests was based solely upon identifying a group of regulators whose performance, at maximum normal operating depths and moderately severe work rates, was *significantly* superior to the other units evaluated. The data was analyzed and a specific group of seven regulators demonstrated superior performance at and beyond 132 fsw (feet of sea water) and 62.5 RMV (a moderately heavy work rate). Maximum respiratory work level for these regulators at 132 fsw and 62.5 RMV was 0.14 kg.m/l. This value (0.14 kg.m/l) was established as the performance criterion since it represents the point at which the difference between state-of-the-art and more conventional regulator performance becomes significant.

In the past, *breathing resistance* rather than *breathing work* (the effort through the entire cycle of inhalation and exhalation) has been used as the primary criterion for regulator evaluation. Although the data is meaningful, peak respiratory pressures on inhalation and exhalation do not provide as complete a definition of total performance as does the so-called work of breathing measurement, which we selected as the primary criterion for comparison.

All tests were conducted using established NEDU Unmanned Test Procedures. The regulators were tested at five rates to simulate light through extreme diver work rates at each depth, therefore defining a complete performance profile on each regulator under all possible operating conditions.

Due to the enormous volume of data involved, a detailed analysis of the results of each test is not feasible. However, we will provide a general discussion of the three areas evaluated, breathing resistance, breathing work and first-stage performance, and list the regulators alphabetically, in three categories of performance.

Breathing Resistance Tests

Regulator breathing resistance is a measure of the exhalation and inhalation effort required by a diver. The cracking pressure, which is the effort required to initially start flow upon inhalation, at times may represent the peak inhalation pressure but is normally ignored because it represents very little breathing work.

"Exhalation effort, however, is simply a function of the size of the exhaust flow passages and the stiffness of the rubber exhaust mushroom valve..."

Maximum breathing resistance normally occurs in scuba regulators at the point of peak flow or, in other words, halfway through the inhalation or the exhalation cycle. The breathing resistances represent the maximum pressures measured, except for cracking pressure, during one complete breath at a specified depth and work rate. During our tests, air supply pressure to the first stage was 1000 psi at all depths except at zero, 99 and 198 fsw; inhalation resistances were also measured at 500 and 300 psi. Breathing resistance was measured at five different rates of breathing and at depths from 0 to 300 feet.

At a moderate work rate (40 RMV) none of the regulators tested showed a significant decrease in performance by reducing first-stage supply pressure to 500 psi at depths down to 99 fsw. Deeper, at higher workload and 300 psi supply pressure, some degree of performance loss is expected; the extent is strictly a function of first-stage design. It is important to understand that inhalation effort is affected by the design of both the first- and second-stage pressure reducing valves. Exhalation effort, however, is simply a function of the size of the exhaust flow passages and the stiffness of the rubber exhaust mushroom valve; that is, the softer the mushroom valve and the larger the flow passages, the less the exhalation effort.

Breathing Work

Breathing work is defined as "the external respiratory work required by a diver to operate his breathing apparatus."

"...how "hard" or "easy" a regulator breathes is a direct function of whether or not the diver has to maintain the peak inhalation and exhalation pressures for the entire breathing cycle."

The previous NEDU performance requirement for regulators was based on peak inhalation and peak exhalation pressures as the standards for evaluation. Because peak breathing effort normally occurs at the peak inhalation and exhalation flow rates in conventional, nonassisted regulators, breathing resistance and breathing work are approximately proportional. So, breathing resistance is a valid measure of comparing the performance of this group of regulators.

Few scuba regulators produced today, however, are purely nonassisted. Most have venturi, vortex or pilot-assisted boosters to assist second-stage inhalation performance. The result is that while peak inhalation pressures from assisted and nonassisted regulators may be similar, the breathing work from the assisted regulator drops significantly because this peak inhalation pressure occurs for a much shorter period of time.

Work of breathing is much greater for the nonassisted regulator than for assisted units. Consequently while peak pressures on two different regulators may be identical, the actual respiratory work required from the diver can be significantly different. In addition, how "hard" or "easy" a regulator breathes is a direct function of whether or not the diver has to maintain the peak inhalation and ex-

halation pressures for the entire breathing cycle.

For this reason, breathing work rather than breathing resistance is the more valid approach for setting performance standards.

First-Stage Performance

The performance of a regulator's first stage is critical to the inhalation effort required by the diver. The first stage must supply air at a sufficiently high pressure to the second stage in order for the regulator to function properly. The results of these tests have revealed that as inhalation effort increases with depth and work rate, it is often due to the failure of the first stage to supply sufficient air to the second stage. This is especially curious, since most design work in recent years has been directed towards lowering breathing resistance by improving second-stage rather than first-stage design.

"...as inhalation effort increases with depth and work rate, it is often due to the failure of the first stage to supply sufficient air to the second stage."

The spring/valve mechanism of most second-stage regulators is designed to function with minimum inhalation effort when supplied with 125 to 150 psi from the first stage. This intermediate pressure out of the first stage is normally set under static or no-flow conditions by the manufacturer. Upon inhalation this pressure drops as the air flows from the first to the second stage. As a diver descends and increases his work rate, the increased flow from the first stage to the second stage causes the pressure drop from the static setting to increase dramatically. Consequently, the second stage may no longer receive air at a pressure and volume sufficiently high to meet the diver's inhalation demands, so the diver must increase his inhalation effort. This phenomenon increases when the supply pressure to the first stage is below 500 psi, further reducing regulator efficiency.

Conclusions And Recommendations

The overall performance of the regulators tested was outstanding. All but six of the regulators met the old performance requirements, a significant improvement over regulator performance of only four years ago. While only seven regulators met the upgraded 1980 NEDU requirements, regulators which meet the past requirements are considered safe and effective.

The regulator results are divided into three groups:

Group A. Regulators which met or exceeded the upgraded NEDU performance standards.

Group B. Regulators which met or exceeded the past NEDU performance requirements.

Group C. Regulators which did *not* meet the past NEDU performance requirements.

Group A.: Regulators meeting or exceeding upgraded NEDU performance standards.

1. Poseidon Cyclon 300
2. Scubamaster Model 7687
3. Scubapro Air I/Mk V (4-Port Swivel)
4. Scubapro Air I/Mk V (5-Port Swivel)
5. Tekna T-2100B
6. U.S. Divers Calypso VI
7. U.S. Divers Conshelf XIV

Next month: The rest of the pack. And the six which failed.

Poseidon Cyclon 300; performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	◕	o	o
Heavy	●	●	◕	o	o	o
Extreme	●	◕	o	o	o	o

Scubamaster model 7687; performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	●	o	o
Heavy	●	o	o	o	o	o
Extreme	o	o	o	o	o	o

Scubapro Air I/Mk V (4-port swivel); performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	◕	o	o
Heavy	●	●	o	o	o	o
Extreme	●	o	o	o	o	o

Scubapro Air I/Mk V (5-port swivel); performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	●	●	o
Heavy	●	●	●	●	o	o
Extreme	●	●	◒	o	o	o

Tekna T 2100B; performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	●	o	o
Heavy	●	●	●	o	o	o
Extreme	●	●	o	o	o	o

U.S. Divers Calypso VI; performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	●	o	o
Heavy	●	o	o	o	o	o
Extreme	o	o	o	o	o	o

U.S. Divers Conshelf XIV; performance at 1000 psi

Work rate	Depth in feet of sea water					
	33	66	99	132	165	198
Light	●	●	●	●	●	●
Moderate	●	●	●	●	●	●
Moderately Heavy	●	●	●	◒	o	o
Heavy	●	◒	o	o	o	o
Extreme	●	o	o	o	o	o

These charts represent the results of regulator tests from light to extreme workloads, defined by the Navy as ranging from 22.5 RMV (respiratory minute volume in liters per minute) to 90 RMV. The supply pressure is 1000 psi and the depths range from 33 feet of sea water to 198 fsw. A solid circle (●) indicates the regulator's performance was acceptable. A semicircle (◒) indicates the regulator's performance was marginal. An empty circle (o) indicates the regulator's performance was unacceptable.

Undercurrent Comments: In our April, 1979 issue, we published the results of UCLA's Dr. Glen Egstrom, who tested 39 regulators. For the most part the Navy results seem consistent with Egstrom's, but precise comparisons are difficult because workloads, depths, and supply pressures used by the Navy and Egstrom differ slightly. We will cite whatever differences seem significant.

We have included the performance charts of the Navy's top performing regulators at the five workloads, at several depths, at 1000 psi supply pressure. The Navy study seems to indicate that the top performers, in alphabetical order, are the Scubapro Air I/Mark V (5-port swivel), the Scubapro Air I/Mark V (4-port swivel) and the Tekna 2100B.

The Tekna 2100B second-stage housing is made from tough molded plastic. The 2100, which was the top performer on the Egstrom test, did not perform quite as well comparatively on this test, finishing in the second category. Why, we wondered, did the 2100B outperform the 2100? We asked the question of Ralph Shamlian, Tekna president.

Shamlian claimed that once his Tekna 2100 regulator led the pack in the Egstrom tests, many other manufacturers, knowing that the Navy would soon be performing its tests, moved quickly to produce new, high-performance regulators. To maintain their competitive edge, Tekna, according to Shamlian, studied means to increase the performance of its regulator, upgrading the 2100 and using those new specs to produce the 2100B, the model housed in plastic. At this point, Shamlian says, "we screwed up. We did not tell the Navy about the changes we had made." The Navy purchased their regulators off the shelf, from dive shops, and, according to Shamlian, bought the first Tekna model which was still in the inventory of some shops. Shamlian says the 2100 and the 2100B are the same regulators, although the housing is made of different material, and in Tekna's tests the performance is nearly identical. Regardless of where the 2100 rates, *Undercurrent* believes that a diver is wise to save a few bucks and buy the less expensive 2100B.

One virtue of the Egstrom study was its consistent testing of regulators at low supply pressure, 300 psi. The Navy performed tests as low as 500 psi, but did not provide the emphasis we believe essential for sport divers. Let us quote from our report on the Egstrom

study about the problems of low supply pressure.

"...of the seven top-rated regulators, the Poseidon Cyclon 300 demonstrated the greatest weaknesses at low supply pressures."

"When tank pressure drops, the flow through the tank valve opening or the inlet port to the first stage will be reduced dramatically. If the diver's demand for air then exceeds the flow capability, he requires a large increase in inhalation effort, a situation which commonly exists when a diver's tank pressure reaches 300 psi and he tries to draw more air from the regulator. The harder the diver sucks on the regulator, the greater the resistance to flow becomes. If the demand for flow increases as a result of rising panic or stress, the diver, in his attempt to get more air than the valve can deliver, erroneously [may] believe the air supply has run out. On the other hand, if the diver can maintain a low peak flow breathing profile, it should be possible to breathe with relative comfort and make a safe ascent."

Hurricane Allen

Just as we're going to press, Hurricane Allen is dying out on the U.S. mainland. We made a cursory telephone survey of Caribbean islands and though we were unable to get through to all, we learned that Negril, Jamaica, a reasonable diving destination, is relatively unaffected by the hurricane, that Grand Cayman reefs seem intact, and that though there was some soft coral damage by the 18-foot waves at Cancun, the hard coral, on first check, remains reasonably intact. We'll try to provide more information in the next issue.

With this in mind, we must point out that of the seven top-rated regulators, the Poseidon Cyclon 300 demonstrated the greatest weaknesses at low supply pressures. In fact, many of the so-called group B regulators performed better at low supply pressures. The Egstrom study pointed out the low supply weaknesses of the Poseidon (at 66 feet and 300 psi the Poseidon performance was rated "unacceptable") and we wish to emphasize that. A Navy diver, because of his skills, his support, and the rigid diving rules he must follow, is unlikely to be affected by the low supply pressure weaknesses of the Poseidon. Sport divers are different critters.

"Regulators support life. Settling for second best, it would seem to us, is nothing short of foolish."

Perhaps the important difference in the results is that the Navy has divided its regulators into three categories. Seven are top performers. From this category Navy divers will make their purchases. We believe that the top performer category is also the category from which serious scuba divers should make their purchases. Should a regulator fail under any circumstances, a diver faces deadly problems. It would be negligent for us to recommend that a diver purchase any regulator which cannot perform under the most extreme circumstances. It would be negligent to recommend that a diver purchase any regulator other than those among the very best manufactured. Regulators support life. Settling for second best, it would seem to us, is nothing short of foolish. We recommend that a sport diver confine his purchase to the top six regulators (Poseidon excluded) in the Navy study. That way you know you're getting the best your money can buy. Your life is worth it.

Diving To Reduce Taxes

Tests For Calling Your Hobby A Business

How we envy the traveling diver who has found a way to "write off" his trip to Maui, his new Tekna regulator, or his Oceanic strobe. For some people the key to making money in the dive business is to produce income; for others it is to develop substantial and legal income tax deductions. Indeed, the tax game can be played, whether you dive for golf balls, clean boat hulls, lead tours to Australia, write articles for *Skin Diver*, or collect sea urchin roe for export.

If you use diving to produce income to help offset diving expenses, then you have a tax liability. With an income-producing *hobby*, you can only use your diving-related expenses to offset or reduce the income from your hobby. However, if you can qualify your diving as a "business," your expenses may be used not only to offset your diving income, but also to *offset* your income from *other* sources. You are using dollars that would otherwise go to taxes to help pay your diving expenses.

Some divers insist that the only way a venture can qualify as a business is to show a profit in at least two out of five years. Show that profit, they believe, and the IRS will automatically accept the losses.

Hopefully, these people are more skilled as divers than as tax advisors. Profits are not the only criterion used to establish a legitimate diving business for tax purposes. Behind the business must also be a profit motive. In the past many diving-related ventures were able to make an end run past the ever vigilant IRS and their "profit motive" criterion, but the IRS recently

Ciguatera Poisoning Strikes Florida

"You'd Just Rather Be Dead."

In the Caribbean people now and then get sick from eating barracuda. The malady is ciguatera (sé-gwah-tá-rah) poisoning, recognizable by vomiting, diarrhea, tingling and itching skin, and muscle pain. Barracuda contract the disease by eating other fish which have ingested one-celled algae called dinoflagellates which live in coral reef communities.

Recently, the *Journal of the American Medical Association* has revealed that at least 1500 residents and visitors in Southern Florida contract ciguatera poisoning each year, many cases of which go unreported because people either don't know why they're sick or believe it's "simple food poisoning."

Barracuda, not a major food fish in Florida, is not the culprit. Groupers and snapper are the major carriers, and sea bass, parrotfish, surgeonfish, amberjack, mackerel and dolphin have also been found with the ciguatera toxin. In one sample of 129 cases, 60% resulted from eating grouper. Since grouper is a popular food fish, the statistics may not necessarily mean that groupers are more contaminated than other fish; the bigger a fish, however, the more likely it is to contain the toxin.

Most of the cases come from fish sold in markets or prepared in restaurants which can be expected since most fish consumed are purchased rather than caught by individual rod and reel or spearfishers. There is no way to determine which fish are infected, since the toxin is odorless, colorless and tasteless.

But it is powerful. One woman who ate broiled grouper at a Miami restaurant last October said, "The fish was really good, but I came down with stomach pains within an hour. Then I started throwing up. I had diarrhea. I became numb all over, my hands started burning, my legs ached like you can't believe." The pain in her legs, which was accompanied by a painful, itching rash, lasted five months.

So far there is no cure and no preventative, other than not eating the fish. In Hawaii, however, an experimental testing program using radioactive molecules has been initiated after an outbreak of ciguatera on Oahu. From these tests, 10% of the amberjack tested have been rejected. There have been no new reports of ciguatera poisoning.

No deaths from ciguatera poisoning have been reported in the United States, but the Associated Press quoted one victim as saying that the pain was so excruciating "you'd just rather be dead, I'm telling you."

won a tax court victory which could signal a renewed attack on all hobby-businesses—including yours.

A wealthy California breeder of Arabian horses, for example, became the target of the IRS. The taxpayer in this case bought, bred, raised and sold horses. For seven years she had suffered losses totalling more than $129,000; the court said her venture had never shown a profit.

"...if you can qualify your diving as a "business," your expenses may be used not only to offset your diving income, but also to offset your income from other sources."

Normally this lack of profit would be unimportant; after all, to be classified as a business, the tax courts say, an activity must be conducted *for the purpose* of making a profit. The expectation of a profit need not be "reasonable"—only "genuine." These factors may be considered by the court.

★ *The manner in which the taxpayer carries on the activity.* If the taxpayer maintains complete records of the venture and alters his management strategy to realize a profit, a strong case for a profit motive exists.

★ *Expertise of the taxpayer or his advisors.* Paying for expert advice usually indicates a profit motive.

★ *Time and effort devoted to an activity, either individually or by employees.*

★ *Expectation that assets may appreciate in value.* The use of diving income to maintain a boat which, for example, is an integral part of the business and likely to increase in value might help satisfy the profit motive requirements.

★ *Success in other business.* Previous business successes may suggest that the present loss activity is being conducted for ultimate profit.

★ *History of income or losses.* Although initial losses are normal in business, subsequent losses must be attributable to reversals indicative that the business is pursuing a profit. Bad weather, extensive research or equipment testing costs, for example, might serve as an explanation for later losses.

★ *A series of profitable years.* However, where the profit is relatively small in relation to the investment, that profit is not necessarily determinative.

★ *Financial status of taxpayer.* Although a well-heeled person may use a diving hobby/business mainly for a tax loss, he may still get favorable treatment. In ruling that one questioned operation was a business, the tax court said: "A business will not be turned into a hobby merely because the owner finds it pleasurable; suffering has never been made a prerequisite to deductibility."

The above are mere guidelines. The California horse breeder discovered that when the tax court ruled: "The petitioner has learned a good deal about breeding horses, and she has devoted energy and time to the activity." Nevertheless, the court said, "when we strip

away all the talk, dig out the hard facts, and apply cold logic, we are convinced that the petitioner did not truly expect to make a profit from her horse-breeding venture, and that such activity was not potentially profitable and could not recoup the losses which have meanwhile been sustained in the intervening years." The court ruled that this particular taxpayer's venture was an "activity...not engaged in for profit" and, therefore, she was not entitled to deduct her losses.

But does that mean that every hobby/business faces similar problems as a result of this decision? No. Since every situation is unique, an adverse decision by one court might be overturned in a higher court. But for anyone, the best advice is to conform to the rather ambiguous guidelines, recognizing that each situation will involve conflicting factors and differ from previous cases.

Furthermore, to achieve some predictability for recreational businesses, Congress has added a new section to the tax law. This section presumes that an activity is engaged in for profit if certain requirements are met, and permits any taxpayer to postpone determining whether such presumption applies until he has engaged in that activity for at least five taxable years.

Should a diver show a profit for two of the five years, it will be the IRS who would be required to prove that the activity is a hobby. If, on the other hand, the taxpayer fails to show a profit in that five-year period, this failure may not be conclusive; the taxpayer may still point to other factors to show that this loss activity constitutes a business.

Thus, continued losses make each situation a judgment call by the IRS. If questioned about continuing losses, the dive business operator would naturally point to all the factors he feels indicate the presence of a "profit motive." If the IRS disagrees, the courts may be asked to referee.

Of course a taxpayer who operates his contract-diving, travel, salvage or teaching activity on a cash basis can always create a profit in two years by bunching his expenditures into one year and his receipts into another year. Although this practice probably cannot stand great abuse, a profit can often be shown.

Despite the success of the IRS's latest attack on hobby/businesses, small diving businesses still thrive. Along with unique tax shelter possibilities, they may, in fact offer an opportunity to afford the equipment you have always wanted, and eventually produce income not fully taxed. But remember, if the IRS takes an interest, they will tax both your profit and your enjoyment, unless you have played by the rules.

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Thar's still gold in them thar reefs. In mid-July Mel Fisher, the male Mae West of the underwater gold diggers, recovered about $12 million in sunken treasure from the sunken Spanish galleon, the *Margarita*. Since February, in the wreck located 40 miles from Key West, Fisher's salvors have surfaced with 10,000 coins, a one-carat emerald ring, half a 10-pound gold disc, 34 gold bars, two marble cannon balls, a steer-by-the-stars astrolab (a navigational instrument), and 13 silver bars. The divers, who started working on the wreck last February, estimate the total value of their salvage, to date, as $20,000,000.

And while Mel Fisher was scavaging for gold in the Florida Keys, Brian Williams, a Miami policeman, was struggling for his life. Williams, separated from his buddy while diving, got lost in the dark, and turned up 15 hours later, 45 miles from his dive site. Williams, who had been spearfishing in only a bikini and tee shirt, floated along in his BC. Apparently his only trauma came from having to release a couple of hog-snappers dangling on his spear which became the target of a barracuda. Rescued by a fisherman, Williams was reported as being in fine shape when he was dragged from the water. He refused a police escort or a ride home, and, according to one observer, after all that time in the water "his skin wasn't even wrinkled."

For those of you who dream of joining research crews, underwater, for days on end, let us simply state the menu aboard the NERTICA, a privately built underwater research habitat which for nine days served as home for research divers. Lunches were fruit, tea and biscuits, and dinners weren't much different, although twice meat and red wine were provided. The main meal was breakfast: a mixture of crushed corn, chopped nuts, sunflower seeds, marrow seeds, dough, yogurt, fresh olive oil, eggs, milk, orange juice, raisins, linseeds, wheatbran, grape sugar, and ground up multiple vitamins. *Bon Appetit!*

Correspondence located strategically in the major diving areas of the world as well as on all coasts and major inland waters of the continental United States. The editors welcome comments, suggestions and manuscripts from the readers of Undercurrent. Editorial offices: PO Box 1658, Sausalito, CA 94965.