

undercurrent®

THE PRIVATE, EXCLUSIVE GUIDE FOR SERIOUS DIVERS

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Saba, Dutch West Indies

—A Caribbean Mountain Vacation



The island is Saba (SAY-BUH). It is an extinct volcano of five square miles. Carpeted in the lush green foliage of a tropical rain forest, it juts upward from the blue Caribbean with a peak elevation of 2900 feet. A cloud frequently rests at the highest point, giving it a mystical, mysterious look. As my small plane arrived from St. Martin, I wondered if perhaps I was not entering a lost world.

The journey here is itself an adventure. Windward Airlines flies from St. Martin three times daily, and must make its landing on a short 1300 foot runway with 200 foot vertical dropoffs at each end. Thankfully, their twin-engine Otter STOLS (short takeoff and landing) handle the breathtaking task quite nicely. It's a 10 mile trip from the airport on the tortuous road. More than 1000 people live in small, spic and span villages with lovely, white gingerbread houses, with red roofs. Along the way I saw apple trees, papaya, mango, lime, bananas, oranges, cashews, tangerines, grapefruits, avocados and coconut trees, as well as several varieties of wild orchids. Cohabiting with the islanders are goats and sheep, cattle and burros, pigs and chickens and several varieties of birds, especially hummingbirds. White tropic birds live in the high cliffs, while frigate birds roost near the airport. Indeed, this is quite an island.

There are a few small inns on Saba: The Captain's Quarters and Scout's Place in the village of Windwardside, and Cranston's in The Bottom. The Captain's Quarters, the only one featuring hot water, is considered Saba's best. Nestled in the leeward slope, it is a delightful collection of white clapboard and gingerbread village houses with red roofs and Dutch blue shutters. The Victorian main

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building was built in 1900 by a Saban sea captain. Ten large guest rooms, with modern private baths, are surrounded by gardens of hibiscus, poinsettia, and orange, lime and papaya trees. Each has a veranda or private balcony with sweeping views of the surrounding hillsides and the sea below. Accoutrements include a fresh-water swimming pool, a pleasant open-air bar, and an open-air dining room surrounded by lush, jungle-like foliage. Because it is situated almost 1500 feet above sea level the low humidity and refreshing mountain breezes dropped the February temperature from a noontime high of 78°F to an evening low of 68°F.

All is not tranquil, however. The main road runs directly in front of the hotel. Although just about all traffic ceases between 10pm and 6am, the other sixteen hours can be quite noisy. The village dogs and roosters begin their day at 5:30am. Hotel manager Steve Hassell is a descendent of original settlers. He is friendly yet laconic, and offered no welcome leaving us to fend for ourselves. But it was no big deal--I just asked any of the employees for whatever I needed. Nevertheless, a briefing about the island would have been a decent courtesy. And the service could be improved. (Friends left a message for me with Steve--he never passed it on.) But enough petty reprimand.

Diving is offered by a single shop, Saba Deep, run by two friendly Americans, Edward Arnold and Louis Bourque, and their congenial assistants Joan Curtis and a Saban named Irving (or Topo, depending on the day). Irving visited the hotel just after my arrival to brief me on the diving routine and the daily schedule, to determine what diving equipment I needed, and to confirm that I was certified. I felt like an appreciated customer.

Each morning the dive shop produced a van at the hotel at 9:30am for the 15 minute ride to the shop; there, the equipment was loaded into the van for the short trip to the dock. Divers could help but were not obligated to do so. The shop has two open boats: one an 18-footer with a 115 HP motor for 6 divers, and a 24-footer with two 70 HP motors for 10 divers. Most of the dive sites are 10 to 15 minutes from the dock.

Once at the dive site, each dive began with a comprehensive briefing. Both divemasters helped us don our tanks, checked the air on, and handed down camera equipment. The divemasters are very conscious of the fragile underwater environment. When they observed a careless diver destroying coral accidentally--or on purpose--they warned him to be more careful by using signals and writing on a slate. Although photographers wishing to snoop around on their own were welcome to do so, I found it advantageous to follow the divemaster, and had no problem keeping the leisurely pace set on each dive. Navy dive tables were strictly observed. Because the boat is often left unattended--that's bad form--the divemaster is the first back on board so he can help the other divers. As a diver reaches the boat, he removes and hands up his weight belt, fins and then his tank. A boarding ladder made it fairly easy to climb aboard.

The second dive, after a surface interval of 40 minutes or less, was in waters never deeper than 50 feet. Upon returning to the dock, the equipment is loaded into the van, then driven back to the dive shop for safe keeping overnight.

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The divers then are driven back to the hotel. This busy two tank routine takes a little more than four hours, and the rest of the day is left for relaxation. However, special arrangements can readily be made for earlier dives, and for late afternoon and night dives. Dive buddies change daily. Many people, unhappy with the mediocre diving at St. Martin, come over for a day or two of Saba diving.

But is Saba worth diving? One of my first dives was at Man O'War Shoals. As soon as I entered the water my first impulse was to raise back out and shout, "Damn, what a dive this is going to be!!" A large pinnacle rose from a sandy bottom at 80 feet to within 20 feet of the surface. It had a great abundance of fish --as it turned out, more than any Saba site I visited. All the tropical commoners were present and several five to six-foot barracuda patrolled the top of the pinnacle, keeping a critical eye on the divers. Sponges were everywhere--barrel sponges large enough to hold a diver, purple tube sponges jutting out from the walls, yellow tube sponges and orange elephant-ear sponges delightfully arranged among the vast stands of gorgonia, azure vase sponges, basket sponges and colorful wall sponges everywhere on the coral and rock walls. A shark may be sighted here occasionally, I was told, but I was not so fortunate. I did encounter two small hawksbill turtles as I rounded a corner encrusted with sea fan. The hard coral formations were extremely abundant and appeared never to have suffered any damage. Magnificent sea fans, both green and purple, were everywhere waving gently in the light current flowing around this miniature seamount. As I slowly circumnavigated the pinnacle, Edward swam up and thrust his slate in front of my face. "Do you hear the whales?" I stopped to listen. Indeed I could! I had been too engrossed in exploring to notice their songs.

SABA, NETHERLAND ANTILLES				
Diving for Beginners	★	★	★	★
Diving for Old Pros	★	★	★	★
Hotel Food	★	★	½	
Hotel	★	★	★	★
Boat Snorkeling	★	★	★	
Moneysworth	★	★	★	★
★ poor, ★★ fair, ★★★ average, ★★★★ good, ★★★★★ excellent				

It was a fairly rough ride into waves cresting at four to six feet to get to Core Gut, a small cove on the windward side of the island. Would all the pounding I was taking be worth it? We anchored in about 30 feet of water after Edward carefully maneuvered the boat so as to be able to drop the hook into the sand bottom and not in a stand of elkhorn coral. A simple backroll transported me into another underwater wonderland. Visibility was more than 100 feet, and a short swim through formations of elkhorn brought me to a beautiful wall similar, perhaps, to Little Cayman's Bloody Bay Wall. It reportedly bottoms out at 1300 feet. The sea floor on the way out was just as I had been seeing on other dives, absolutely covered with lush growth of coral, gorgonia, fans and colorful sponges of many varieties. Huge coral formations looked like giant ice cream cones. Most of the normal Caribbean tropical fish were here, but in far smaller numbers than I had seen at Man O'War Shoals. I leveled off at 80 feet where the wall, alive with color at this depth, was vertical with some undercuts and covered with large gorgonia, human-sized barrel sponges. Looking up I could see large waves breaking against the top of the wall. Cruising slowly along the wall, I found anemones everywhere, green moray eels, large orange crinoids, and sizeable growths of black coral. Large jacks, many with accompanying remoras, darted around me, and a large barracuda came in to check me out. Once again, I could hear the whales singing. I wished for a second shallow dive here, but the surge down to 40 feet was prohibitive.

Outer Limits, another seamount dive less than 15 minutes from the dock, is a

real blue-water dive. And the big fish are here. At 110 feet I could see large groupers and snappers poking around the coral a good 50 feet below me. Schools of snappers, grunts, jacks and what looked like mullet hovered above the seamount. Magnificent sponges, gorgonia, corals and fans literally covered the top and sides of this seamount, as well as thick black coral trees with base diameters of at least three inches. I have never seen larger. An orange crinoid had arms of a length I have seen only in the central Pacific. I circumnavigated the seamount at 110 feet at a leisurely pace. After 20 minutes, I eased up to hang for 5 minutes on the mooring line.

The Saba underwater world is characterized by very alive reefs and lack of garbage on the bottom--thanks to a tiny population and few tourists. In all the dives I made, I saw only one object not native to that environment--an old, coral-encrusted Heineken bottle. Now I would prefer more fish on the dives, but my strongest complaint goes to the stone crusher company located on what is normally the upwind side of the Fort Bay harbor. The blowing dust is more than a nuisance--it can be a pain in the eye while loading and unloading the dive boats. Many visiting sailors leave early because of this problem. I can't imagine why the government has not insisted that the stone crusher company relocate to any of several other unobtrusive sites.

Saba is no place, of course, for a Gorilla diver and forget any thoughts about beach diving. There is but one beach, a virtually inaccessible twenty-foot strip of sand. Otherwise it's sheer walls and Caribbean mountain living. There is snorkeling from the dive boat, fishing trips, sightseeing boat trips around the island, island sightseeing by car, and pool swimming. Many people enjoy strenuous hikes. A two-hour roundtrip climb up Mt. Scenery to 2900 feet on a well-marked path provides a beautiful view of the island, especially of Windwardside, and is the highest point in all the Netherland Antilles. From various parts of Saba one can see the islands of St. Martin, St. Barthelemy, St. Kitts, St. Christopher, Nevis, St. Eustatius and, occasionally, Monserrat.

Perhaps the big excursion each day was restaurant hopping, since the food at Captain's Quarters fell somewhat short of my standards. Breakfasts were the same every morning--"How do you want your eggs?" French toast was available a couple of times. Melons, oranges and apples were served occasionally. The small coffee pot always seemed to be empty or brewing. The service is satisfactory by Caribbean standards, but certainly could be improved. A light lunch--a small sandwich (sometimes with almost nothing between the slices of bread), a salad and iced tea--at Captain's Quarters is \$4.50 and a full lunch \$9.00. Dinner at \$16 might be lobster--usually dry and tough--Cornish game hen, broiled snapper, T-bone steak, lamb with green mint sauce, or filet mignon. All dinners included soup, (peanut, onion, goat), salad, good homemade bread, and dessert--cheesecake, apple crunch, chocolate cake, jello and a terrible lemon meringue pie. Don't sign up for meals in advance through an MAP. There are less expensive places to eat in Windwardside--a Chinese restaurant and Scout's Place to name two--and they should be visited. I recommend the Chinese place for lunch; Scout's Place also has good lunches, but a little too much food this time of day.

Captain's Quarters bar prices are not cheap, and if smoke bothers you, as it does me, you may be in trouble at the bar. Is there not a soul on the island who doesn't smoke?

Cruise ships such as the beautiful 320-foot Sea Cloud, the 280-foot Polynesian and the catamaran Eagle often visit Saba for the day. Many of the guests come to the Captain's Quarters for food, drink, swimming and sunning. Sometimes the hotel staff seemed to go overboard catering to the visitors, causing me--and other hotel guests--to feel somewhat unwelcome.

I have dived almost every Caribbean island. Saba diving is as pleasant as any. The coral, sponges, fans and gorgonia, together, are as plentiful, healthy and beautiful as any other Caribbean island. The abundance and the color rivals such Pacific areas as the Philippines and Palau. I only wish the fish life were more abundant. Evidently, Saba is a victim of over-fishing, like so many other Caribbean islands. But I am certain you will enjoy your dives at Saba, the unspoiled queen of the Caribbean. With its high-profile mountains and its low-profile life-style it is indeed a paradise.

Room rates are: Winter (in season) single \$50, double \$70 total, triple \$80, and quad \$95. In summer the rates drop to \$45, \$55, \$65, and \$80, respectively. For MAP, add \$22 per day per person. There is no discount here by signing up ahead of time for MAP. Breakfasts cost \$6 and dinners \$16, whether or not you have signed up for MAP. I found out later that they do have a divers' package deal for \$50 per day per person breakfast and dinner included; it requires a minimum of 6 people (three rooms) for a minimum of 5 days.

Divers Compass: A 15% service charge and a 5% room tax will be added to your bill; this can easily add another \$175 to a bill for two for a week's stay....Taxis at the Saba Airport Terminal run \$4.50 for the trip to Windwardside....Island tours by taxi are fun, interesting, and great for pictures--try Carl for \$5 per person.... The nearest hyperbaric chamber is about 150 miles away in the Virgin Islands....Address for Saba Deep: Saba Deep, c/o Captain's Quarters, Saba, Netherland Antilles. Telephone 04-2201/3347....Credit cards and personal checks are not accepted on Saba; only cash or Traveler's Checks....Saba Tourist Information Office, 25 West 39th Street, NYC 10018 (212/840-6655); in Canada 243 Ellerslie Avenue, Willowdale, Ontario, M2W 1Y5 (416/223-3501)....There are no car rentals on Saba....Dress is casual, but hotels do prefer long trousers for dinner....I saw not a mosquito, not a sand flea, not a no-see-um....Visibility in March ran 100 feet regularly and the water between 78° and 80°, wet suit top for most folks....The dive package is \$265Strobes can be charged in the room overnight....The island's shopping attractions are pulled thread linen pieces called "Spanish Work" or "Spanish Lace," and the rum-based native liquor, Saba Spice.

Why Divers Die, Part II

—The Fatal Oversight of a Well-Trained Diver

In the last issue we began a three part series about the causes of diver deaths in 1980 from a report issued by the National Underwater Accident Data Center, the University of Rhode Island. We will conclude the series in the next issue.

* * * * *

Charter Boat Deaths Increase

The number of fatalities from charter dive boats increased from eight in 1979 to fourteen in 1980. Six occurred in California, four in Florida, two in the Virgin Islands, and one each in Puerto Rico and the French West Indies.

One of the most unusual events in the history of record-keeping at the NUADC took place off Santa

Catalina Island in Southern California during November of 1980. Initially this event appeared to be a quadruple diving fatality accident. It was, in fact, two separate double fatalities occurring almost at the same instant, on the same day, from the same boat.

The sequence of events began with the discovery of one male victim unconscious at the surface following a 120-foot dive. During efforts to revive the victim, a head count was taken, and it was discovered that three other divers had not returned to the vessel. The missing divers included the brother of the first victim, who had been his buddy, and a second buddy team consisting of a man and a woman, both 28 years of age. During the ensuing search, the bodies of the man and woman buddy team were found at a depth of 140 feet with one body laying across the other. The

man had apparently shot a large fish, and the nylon spear line had become entangled in the diver and his gear. Both bodies were recovered. The search for the fourth victim had to be abandoned due to repetitive dive limitations and the lack of additional air. His body was recovered 24 hours later.

Double Fatalities

A double fatality involving two brothers occurred in the Virgin Islands. One of the two bodies has not been recovered. However, some of the missing diver's equipment which had been recovered had many shark tooth marks on it. The body which was recovered was unmarked. It is strongly suspected that the missing brother was a victim of a shark attack, and the second brother lost his life attempting to assist him.

A very popular dive site at a water-filled quarry in Ohio was the location of another double diving fatality incident. A 23-year-old female diver and a 25-year-old male diver, both quite experienced, apparently swam under an abandoned cement silo and were unable to find their way out. Both died, although one diver still had more than half a tank of air.

Two brothers, aged 19 and 23, lost their lives exploring a tunnel system in a northern Florida cave. The buddy pair had entered the cave system with only a half-full, 80-cubic-foot tank of air each.

For the second time in ten years we have recorded a single cave diving incident which cost the lives of four divers. All four victims were quite experienced, and two of the victims operated their own dive shop. The four entered a cave system at a depth of 125 feet. One of the victims was found 250 feet inside the cave. Three of the victims were entangled in their safety lines. All four were beyond a sign that warned divers to stop and not attempt further penetration. The single tank worn by each diver would have limited their time at a depth of 125 feet to less than fifteen minutes and might have led them into the need for decompression.

NUADC has stressed repeatedly the extra-hazardous nature of cave system diving. This is especially true if the diver has not received formal training in cave diving, which should include indoctrination in the special procedures and equipment needed for cave penetration by divers.

Diving Partner Behavior

Table 2 shows that the actual response of the buddy can seriously affect the outcome of an accident. In the instance of "Buddy Stayed With Victim," one must consider the double fatality event. In seven of these instances the buddy also died, for a total of sixteen of the twenty-six fatalities which occurred when the buddy stayed with the victim. In another 23 in-

cidents, the buddy lost the victim under water, while in eight such instances the buddy lost the victim on the surface.

From these numbers one can rightfully conclude that in many of the fatalities the buddy system either has not been in use or has failed. Two divers in the water do not make a buddy system. To work properly, the buddy system must function as a person-to-person working relationship with divers in close proximity, and each looking out for both himself and his buddy. This might best be expressed by the diver maxim, "Always dive close to your buddy."

Regulators

During 1980 there were two incidents in which poorly maintained regulators probably contributed to the accident

"The victim had mounted the first stage of the regulator upside down with the air hose on the left hand side of the valve, (which) significantly shortened the effective length of the hose."

In a third instance, the victim had mounted the first stage of the regulator upside down with the air hose on the left hand side of the valve. All American-made regulators are designed to be mounted so the hose comes over the right shoulder. This incorrect mounting required an awkward twist of the regulator hose for the diver to be able to place the mouthpiece of the second stage in position, and significantly shortened the effective length of the hose. The victim in the above case was diving alone and attempting to set salvage lines on a small sport fishing boat. When this diver failed to surface, a rescuer went down and found him with the lines entangled in the first stage of the regulator and the regulator out of the diver's mouth.

Weights, Belts and Buoyancy

A diver gathering shellfish was wearing more than 30 pounds of lead weight, and further complicated the situation by attaching a bag with 60 pounds of shellfish to his weight belt. As he began to run low on air, he was unable to leave the bottom because of the weight of his bag of shellfish. Using his knife, he attempted to cut it loose. The dull knife slipped and cut the man's eye. Apparently, he panicked and drowned.

A diver in the Pacific Northwest was carrying two belts totaling 40 pounds of lead. This diver's situation was further complicated by the failure of his CO₂ cartridge. Another incident found the victim diving alone with no buoyancy compensator plus 30 pounds of lead weight. His body was discovered at a 75-foot depth in a freshwater quarry.

A dive into a high altitude, freshwater inland lake

cost the life of another diver, who was said to have had seven years of experience. The dive was to have taken place in excess of 125 feet. The victim was apparently well-equipped, wearing a full quarter-inch nylon-two wet suit, booties, gloves, knife, depth gauge, watch, mask, snorkel, a buoyancy compensator with power inflator and a 22-pound weight belt. He was equipped with a submersible pressure gauge and a twin set of 3,000 psi steel tanks.

Just before entering the water, the victim asked the tender on board to pass his fins to him after he entered the water. He then attached a safety line to his weight belt and proceeded to enter the water using a standard back entry. The tender reported that upon hitting the water with his snorkel in his mouth, the diver proceeded to sink rapidly to the bottom. Upon feeling the safety line go slack and assuming the diver to be at the bottom, the tender then attempted to signal the victim by four tugs on the safety line. When he got no response, the tender proceeded to haul away on the line, but when the line reached the boat, only the weight belt had been retrieved.

The NUADC estimated that because of the negative buoyancy of the tanks (about 26 pounds) and his 40-pound weight belt, this diver was too heavy for a dive to a depth of 125 feet. It is possible that the diver was using the same amount of weight that he might have used for a shallow ocean dive and had not considered the negative buoyancy of his tanks.

The victim's body was located beyond 150 feet. He still had the snorkel in his mouth and his face mask was on. The quick-release loops for the tank buckles were improperly rigged and the tanks' waist strap was undone. The buoyancy compensator was not inflated and the low-pressure hose used for such infla-

tion was not attached to the buoyancy compensator. Because he sank very rapidly, he was unable to return to the surface by using the mechanical inflation device system. Since the victim entered the water without his fins, he lacked sufficient propulsion to keep himself at the surface.

Such a rapid descent can very well result in ruptured ear drums and disorientation on the part of the diver, leading him to leave the snorkel in his mouth without attempting to replace it with the regulator mouthpiece.

Another case involved a young man diving at night in a freshwater lake in the Midwest. The victim chose to counteract his buoyancy literally by tying window sash weights around his waist. The NUADC can assume only that this victim must have had little or no diving training or experience.

"At least three fatalities during 1980 may have been related to the unexpected release or detachment of the low-pressure filler hose from the personal flotation device."

The performance of personal flotation devices is critical. The importance of proper maintenance of these devices is second only to the proper upkeep of the diver's regulator and tank. Corroded CO₂ firing devices, leaky air valves, hoses dried out or stuck, over-inflation valves and the deterioration of the air bag itself have all contributed to divers deaths. At least three fatalities during 1980 may have been related to the unexpected release or detachment of the low-pressure filler hose from the personal flotation device. When this occurs, the diver's only alternative may be to use the oral inflation hose to introduce air into the device.

Table 2: Buddy Activity During Fatal Accident, Yearly, 1971-80

Activity	Number of Fatalities									
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Buddy stayed with victim	25	27	22	40	20	39	24	32	25	26
Buddy lost victim underwater	24	23	38	36	52	34	12	18	25	23
Attempted buddy breathing	15	14	7	11	14	15	14	8	6	10
Buddy left water before victim	9	4	4	3	6	11	4	2	6	2
Buddy lost victim on surface	12	15	14	11	12	7	6	9	11	8
No buddy	12	11	10	21	13	18	24	22	23	25
Unknown	15	23	30	22	14	23	18	24	34	15
Total	112	119	125	144	131	147	102	116	130	109

Undercurrent editors welcome comments, suggestions, resort/travel reports and manuscripts from readers of Undercurrent.

Editorial offices: P.O. Box 1658, Sausalito, CA 94965.

Preventing Theft Of Your Dive Boat

—Some Safety Tips From Gulf Coast Research Lab

Last month an old dive buddy called to complain that someone had broken into the locker aboard his Boston Whaler and helped themselves to his new Unisuit and his old but comfortable U.S. Divers Calypso IV. "But I've still got my boat," he said.

Last week he called again, this time nearly in tears. This time his boat was missing. He'd spent the night camping about 100 yards from where his boat rested on its trailer. In the morning, the boat and trailer were gone. Fortunately, about a week later the police found the boat with several other purloined craft in a small boat yard run by a theft ring. He's lucky. Most people aren't. So, we tracked down these suggestions offered by the Gulf Coast Research Lab in Ocean Springs, Mississippi, as good tips to prevent boat theft.

- Remove the key from the ignition when the boat is not in use.
- If the boat is moored in the water unattended, remove and store the battery in a locked building or in the trunk of your car.
- When parking a trailer boat, attach the trailer hitch lock. If parking for a long time, remove a wheel. Fasten the boat itself to a fixed object with a steel cable or chain and a heavy-duty lock.
- If using a marina, choose one with good lighting and a full-time security guard. Wire a theft alarm to the ignition, with a second, hidden switch in case a thief jumps the first one.
- At home, keep your boat in a locked garage or a fenced yard with a heavy padlock.
- Do not leave a FOR SALE sign on the boat; someone seeing a thief at work might assume that he/she bought the boat.
- Do not leave valuable documents, such as the boat registration and title papers, in an unattended boat.
- Record all serial and identification numbers and keep them at home. Hide a second set of numbers somewhere on the boat so you can prove ownership if thieves remove the original set.
- Take color photographs of the boat from different angles. These may be used to recover losses under a boat owner's insurance policy and to help police identify a stolen boat.

Regulator Mouthpieces

Why Your Jaw Aches & What To Do About It

We've gotten so conditioned to having our mouths ache during and after a dive that most of us don't even realize just how uncomfortable most mouthpieces really are.

Have you taken your mouthpiece out of your mouth while diving to relax your jaw? Have you held the mouthpiece with your hand to take the weight off your mouth? Have you tried to eat after you finished your dive only to find your jaw so tired or tender that you could hardly chew?

Why all this discomfort? Quite simply, scuba mouthpieces are rarely designed with the anatomy and physiology of the mouth in mind.

The Ideal

Mouthpieces have three distinct parts: the mouthpiece flange, the bite block and the nub. (See Figure 1) An *ideal* mouthpiece must meet six critical criteria. First, the vertical thickness of the bite block

(Dimension A) should be three mm. To illustrate, while you are reading this article, your upper teeth should not be touching your lower teeth (unless, of course, you are eating). They should be three to four mm apart. Your lower jaw is not at rest if your mouth is open wider than four mm or closed shut.

If you are biting on a mouthpiece bite block which is seven or eight mm thick, your jaw muscles are constantly under tension. This may eventually cause discomfort. Try putting an apple in your mouth and holding it there for an hour to see what we mean.

The second point in the design is the width of the bite block (Dimension B). The distance between the mouthpiece flange and the nub should be at least eight mm. The teeth will be able to fit within this width without interference from the side of the nub. If the teeth hit the side of the nub and cannot close down on the bite block, then the "A" dimension (see above) will be more than three mm, and the muscles will be under tension. If the bite block width is less

than eight mm, biting forces will be applied to the sides of the teeth instead of the biting surfaces, possibly causing soreness in and around the individual teeth. This will also cause a certain instability in the way the mouthpiece is held in the mouth, requiring more pressure to hold the mouthpiece in place.

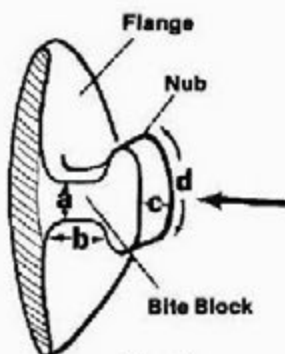


Figure 1

Third, the dimension of the nub (Dimension C) should be broad enough to rest behind more than one tooth. It must also be tall enough (Dimension D) to prevent the entire mouthpiece from slipping out of the mouth under strain. Dimension C should be thirteen mm; Dimension D should be six mm. If the nub is of sufficient size, it *locks* against the inside of the teeth, thus allowing the diver to hold the mouthpiece with minimal pressure. If either dimension is too small, more muscle pressure is required to hold the mouthpiece securely. If either is too large, it can both irritate the gum tissue on the inside of the mouth and possibly cause the diver to gag.

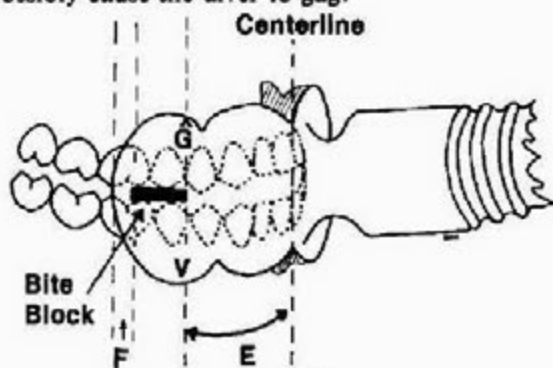


Figure 2

Fourth, the bite blocks on the mouthpiece flange (Dimension E in Figure 2) should be placed far enough to the rear so that the upper and lower jaw are parallel to each other and not tilted. A reasonable starting point is sixteen to twenty mm in from the "facial center line." If the block is too close to the facial center line—which is too often the case—the lower jaw moves slightly forward to hold the bite block in place. This forward sliding of the jaw will cause a strain on ligaments and muscles. Placed too far to the rear, however, the bite blocks may gag some individuals.

Fifth, the mouthpiece flange should extend no more than two mm to the rear past the bite block (Dimension F). The height (Dimension G) should be no more than six mm, so that it does not impinge on the soft tissue or gums surrounding the teeth. Furthermore, flange edges should be notched to stay clear of the six points (three on top, three on the bot-

tom) where the facial muscles attach to the jaw at the gums.

We have seen some flanges eleven mm in height, obviously too much. Taking a scissor to your existing mouthpiece can alleviate any pressure on your gums. You can also cut notched "U" shapes in the top and bottom of the mouthpiece flange to curve around these muscle attachments.

Silicone is the best material for manufacturing mouthpieces. It is much softer—and hence more gentle—to the mouth than black neoprene rubber. We would hope that mouthpieces could be manufactured with "flow" material within the bite block—material similar to that found in certain ski boots. In this way, the mouthpiece can be moved around slightly in the mouth and so insure proper fit. The teeth will fall evenly and firmly into the blocks generating equal pressure on the teeth and less discomfort in the jaw muscles.

The Real World

How do today's mouthpieces compare to our ideal? Below are brief reviews of the products of six major manufacturers. All, of course, have strengths and weaknesses.

The Farallon entry (Figure 3) has bite blocks intended to be softened in very hot water and then bit into to get the impressions of the teeth. The concept is excellent, but unfortunately the average diver does not know how much to bite. Most don't penetrate deeply enough, resulting in a large, "open mouth." More important, the odds are very slim that an individual will bite evenly into the softened blocks, because when biting into something hard the tendency is to bite harder on the dominant side of the jaw. Also, some have a tendency to move the lower jaw forward. The teeth will be locked into grooves in a "forward-and-open" position, which may drastically strain the jaw muscles. Substantial discomfort can result after diving.



Figure 3



Figure 4

The Poseidon mouthpiece (Figure 4) allows for the muscle attachments in the front of the mouth with intelligent "U"-shaped cuts in the mouthpiece flange. Also, the general curvature of the mouthpiece is the only one we've seen that approximates the curvature of the average mouth. But bite blocks are 5½ mm in thickness, rather than the recommended three to four mm. And they are only 5½ mm wide, rather than the necessary eight mm. You are actually forced to bite

down on nubs, and not on the bite block. Lastly, the Poseidon mouthpiece flange probably is unnecessarily thick and firm.

The AMF-Voit mouthpiece (Figure 5) also leaves something to be desired. The thickness of the bite-block is 10 mm, by far one of the worst. It is placed too far forward, causing the jaw to come forward and placing added strain on the muscles. At nine mm the bite-block's width is fine, but we cannot explain why holes have been placed in the bite blocks themselves.



Figure 5



Figure 6

Sherwood's mouthpiece (Figure 6) has a bite-block thickness of six mm—too thick. The entire nub-and-bite-block assembly probably is excessively long at 20 mm.

The best model to date is produced by Dacor (Figure 7). Made of silicone rubber, it can be easily formed to any mouth size. The bite-block thickness is an ideal four mm. The mouthpiece flange is thin and soft enough not to impinge on the gum tissues. All other measurements conform to the ideal. The only factor missing is our concept of "flow." Perhaps Dacor will take the lead and produce this without increasing significantly the cost of the mouthpiece.



Figure 7

The Dacor model has proven to be the most comfortable mouthpiece we have tried. We congratulate them, they must know a good dentist.

The authors of this article are Gary Goldstein, D.D.S., and William Katz, D.D.S. Goldstein, an associate professor at New York University's College of Dentistry, has been diving for more than a decade and Katz has been a diver for more than two decades. They wish to thank Atlantis II dive shop in New York City for providing the mouthpieces for study.

Million Dollar Fire At U.S. Divers

On March 29, a major fire broke out at the U.S. Divers' offices. It raged for four hours and involved thirteen fire trucks before it could be brought under control. Apparently the fire began in one of the office computers.

According to Mike Chapman, Director of Marketing for USD, "the fire caused about one million dollars in damage, but most of it was confined to the office areas and did not affect the production or engineering areas. However, if a fire wall had not been between the areas we could have lost the whole plant."

The sales and administration sections are now operating from a building next door to the damaged structure. The company lost only a few files and the services of their computer.

"Despite the fire," said Chapman, "we are still ahead of our April production goals. Right now things are a little crowded, but it could have been a lot worse."

Sex And The Single Dolphin

—A True Tale From The U.K.

Everyone has a favorite story about friendly dolphins. Even Jacques Cousteau writes about people shipwrecked at sea who get towed into shore by the humanoids. In the 1970s, a few British publications were atwitter with stories about a friendly dolphin off the Orkney Islands. Some of the stories were quite amazing, but the following by diver Joyce Huxley topped them all. This story appeared last year

in the British magazine, *Diver*.

• • • • •

With two good diving chums, Pete and Jim, we loaded up Pete's battered old VW Beetle, and headed from Edinburgh down to Cornwall for a short Easter break, planning to dive, surf, and generally have a good time.

We heard a whisper or two about an amazingly friendly dolphin in the area, but never imagined that we would have the good fortune to meet up with it. But at Penlee Point, close to the lifeboat station, we indeed met up with Donald The Dolphin.

His amazing story has been well-documented in many articles, so this is a personal account of a meeting between a very sexy male dolphin and a wet-suit-clad female diver.

During our first meeting below, Donald's approach was fast and fearless—he swam around us several times, then nuzzled *me* with his "beak," all the while giving cheerful little squeals. On the surface, Donald continued to circle us, diving and surfacing and calling to us.

I felt an instant rapport with this inquisitive mammal. I have frequently wondered since about the suggested telepathic link between dolphins and man—certainly I felt completely relaxed and happy with Donald, and knew straight away that he meant me no harm.

Talking with Pete and Jim after the event, they said they did not feel this at all, and were somewhat nervous about Donald's antics. This may well explain the dolphin's marked preference for my company—he paid little heed to the lads and concentrated his attention on me.

Did he single me out because I was unafraid? Or because I was female. Or because I was subconsciously more telepathically receptive than my companions?

Whatever the reason, I became his chosen playmate. As he approached, I stretched out and stroked his beak. This brought him to my side where he rested contentedly as I continued stroking. This seemed to make his smile all the broader, and he closed his eyes and rolled his head back in enjoyment, very much like a cat being stroked.

As his mouth opened, I ran my fingers along the outside of his teeth. He seemed to enjoy this, so I next ran my fingers along the inside of his teeth and over his tongue, to be thanked with happy gurgles. He seemed to shake off Jim who was trying to hold on to his dorsal fin. But when I tried, he let me hang on and moved over the water surface for a short distance before diving.

We continued playing for about an hour, Donald appearing as delighted with the experience as we were. But the dive had to come to a halt—we had little air left, and all Donald's joyrides were away from the shore. We snorkelled back slowly, accompanied by Donald, into shallow water. Then he turned and was gone as quickly as he had appeared.

What a tale to tell in the pub that evening! Many people were fascinated by our story and listened eagerly. Then we heard some third-hand tales about Donald's always preferring female divers, and even pinning them to the sea bed in amorous adventure. What nonsense, I thought!

Three days later we returned in the hope of meeting Donald again. This time, of course, there was an air of expectancy about us. One eye was always searching the gloom for some sign of Donald. My hopes were beginning to fade after nearly an hour submerged. We were again at only nine metres, but with small cylinders which had only enough air left for another 15 minutes or so.

But then Donald arrived, grinning and calling to us like a long lost brother . . . or lover!

On this occasion, his lack of interest in Jim and Pete was even more obvious, but that did not seem immediately significant. As before, Donald swam round and round in circles, and allowed me to be towed along.

He rolled and played, and I stroked the inside and outside of his beak, much to his delight. After some minutes of this, he suddenly dived deep. I thought he had gone. But as I trod water, he suddenly leapt out of the water, his belly just touching the left side of my body.

He flipped over my head, then down again, this time just touching the whole length of the right side of my body. This was followed by close circling, then the dive and leap were repeated again and again, each time Donald moving over my body before plunging into the water.

I was overawed by the controlled strength of the animal, but also began to feel a little apprehensive as his attentions became more and more persistent. And there was a new maleness about Donald which had not before been obvious.

I really did become quite nervous. I have yet to see the sex education manual that tells a girl how to cope with a sex-crazed dolphin.

Jim and Pete were of no help to me at all—they could do nothing for giggling. And to make matters worse, a crowd of about 50 tourists had gathered at the roadside and were watching the spectacle through binoculars and the telephoto lenses of their cameras. My apprehension grew as Donald's demands became more aggressive. Finally he had his moment of release and flooded the sea with sperm. Then he moved away, slowly, on his back.

I have heard it suggested since then that Donald used his sexual organ for a tactile response, but I remain unimpressed by this argument. It seemed to me that he knew a female when he met one, and used typical male tactics in his pursuit—fun and games and gentle flirtation on the first date, then "moving in for the kill" on the second.

* * * * *

Now, how about that! If you don't believe this, we can only say that from time to time stories have appeared in various publications about the amorous adventures of dolphins, which would support Ms. Huxley's experience. Furthermore, awhile back we reviewed a novel by Ted Mooney, *Easy Travel to*

Other Planets, in which a female biologist engages her acquarian friend in a waterlogged tryst. And, if you need further evidence, let us provide the response of Sir John Rawlins, of Hants, England, who wrote to *Divers* after he read that story:

"I hesitate to disillusion a lady, but I very much doubt if it was Joyce Huxley's feminine charms that induced dolphin Donald to put on his sexual performance. The Atlantic dolphin is a notorious lecher and possesses an insatiable curiosity. This first came to light thirty years ago at Marineland of the Pacific.

"Male and female dolphins mate in the spring. The males, however, engage in sexual activity all the year round, with any species of animal or fish available,

attempting as many as fifty intromissions in half an hour.

"Sexual play occurs every day. Homosexual matings occur many times between two males. Marineland dolphins attempted mating with everything that was animate—giant white sea bass, leopard sharks, green turtles, skates, bat rays and even moray eels. This proved fatal in the case of the fish and turtles. Even the Marineland divers who were attending the fish were not exempt from the dolphins' attentions.

"So don't tease the dolphins. You may start something you wouldn't want to finish."

For The Aging Diver

—Organization From Down Under

From an article by Carl Edmonds in the *South Pacific Underwater Medical Journal*, we have learned of the Subaquatic Geriatric Association (SAGA). SAGA recognizes that the requirements of older divers differ from the requirements of younger divers, and has therefore developed certain rules to apply to their members.

SAGA first acknowledges that bodies change as one ages, and therefore it is a bit foolish to presume that a 45-year-old person who is "fit as a fiddle" differs not a twig from the 20-year-old who is equally pronounced as "fit as a fiddle." Edmonds cites data that show that if the medical requirements (EKG, blood pressure, etc.) for professional divers were applied to amateurs, 20% of the sport divers between the ages of 20 and 30 would fail; of those divers over 40, 45% would fail the medical requirements.

With this in mind, SAGA believes that diving should change for the clientele at risk. Therefore, the criteria of membership in SAGA is that one must be over the age of 40, and older than the two members who are proposing him for membership. Although a brief mathematical calculation might suggest that such criteria would result in an ever diminishing number in the society, this is not the case. Edmonds, you see, notes that a mathematical oddity prevails here. As one passes forty, there is a continuing reduction in his own perception of his years.

According to Edmonds, SAGA was originally formed by Mike Ball, a dive instructor in Townsville, Queensland, Australia. Since its formation, a number of splinter groups have organized in other communities. They all have established the same basic rules for the membership.

- Depth and duration of each dive must be doubled for calculating the decompression requirement and for all apres-dive discussions. Any diving depth stated by the member is fixed, and no discussion or correspondence shall be tolerated.
- Members shall be helped on and off the boat with their diving gear, and no members shall draw attention to, or poke fun at, the condition of another member.
- SCUBA tanks must be carried to and from the site by nonmembers.
- Any member too exhausted at the end of the day to open up his own stubby (bottle of beer), may sip from half empty bottles of nonmembers.
- Apart from observing the sun's position relative to the yard arm, members shall be exonerated from all boating activities, and especially from those related to the retrieval of anchors.
- Any member who is also a physician is exonerated from undergoing annual diving medical examinations, but shall remain perfectly fit.
- Nonmembers must treat members with the greatest respect. They are to listen intently, as if they are hearing the SAGA's stories for the first time. They are to express admiration and respect for the member's continued youthfulness and courage and the degree of awe shown must directly relate to the age and improbability of the story. There must be no comment made about apparent discrepancies within the story, or between it and previous versions.
- Members shall be encouraged to partake of medicinal beverages, before and after any diving activity.
- Nonmembers must campaign for more genteel and comfortable diving facilities, and for roll-on/roll-off systems for all diving vessels. Soft bunks and hot showers are to be available on all diving vessels used by members, so that the aforesaid members can then indulge in reminiscences of the bad old days when the diving was presumably done under much more adverse circumstances.