

SUBAQUA

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JOURNAL

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Fifth Anniversary

EQUIPMENT

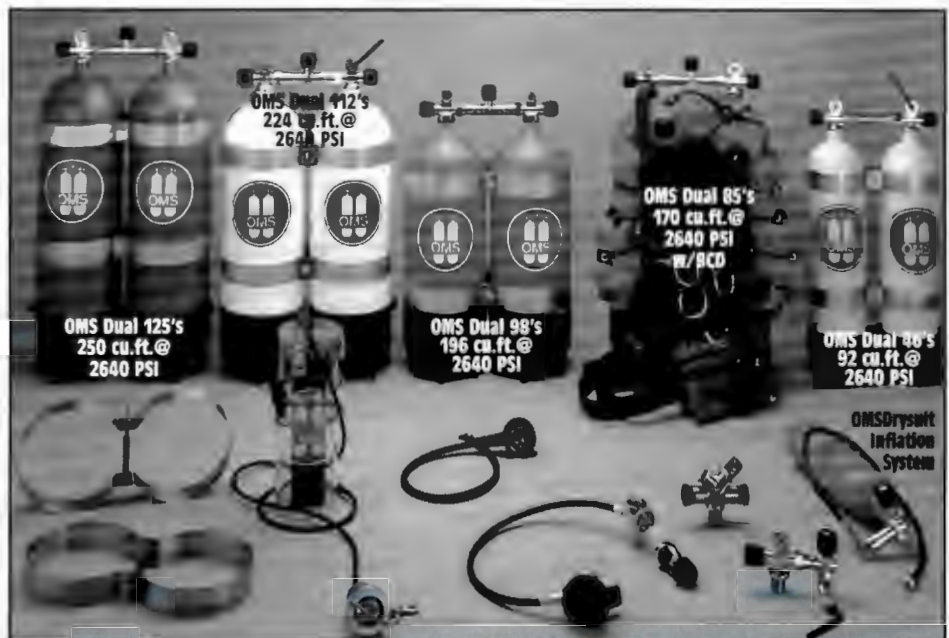
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EQUIPMENT

“A host of modern inventors have contributed a bewildering maze of patented gadgets...”

William Beebe, Half Mile Down, 1934

Beebe's fascinating book, written over sixty years ago, was one of the first attempts to explain the mysteries of dive technology to the public. We wonder what the pioneer of the bathysphere would have said had he walked with us through the exhibit halls of DEMA and tek.95. Would he have been bewildered by rebreathers, a host of dive computers, and the trends in dive fashion? We guess he'd probably take the approach of interviewee Richard Pyle, and ask "How can I use these things to get closer to fish?" (After all, Beebe was the Scientific Director for the NY Zoo).

You hold in your hands our 5th Anniversary Issue. The years went by in a blink. SUB AQUA continues to get accolades - on our exclusive interviews, extensive coverage of the wreck scene, and on the quality of our articles. Enjoy this issue — we give you ways to use the equipment you already have, and top thinking about the equipment you'll be buying in the near future. We hope you're getting in some diving, whether in warm locations, refresher and advanced classes, or locally. Spring is just around the corner - time for evaluating and maintaining your rigs and planning your expeditions. It's a good time to leaf through your back issues of SUB AQUA for innovative ideas and great destinations.

I wonder what some reader in sixty years will think when she thumbs thru these pages.

Joel D. Silverstein, Editor

THE HANG LINE

ABYSS to Develop HBO Software

Abyss developer Chris Parrett pulled out all the stops at DEMA this year. Not only is Abyss the fastest growing dive planning software, Abysmal Diving keeps on putting safety first. As other software vendors try to recalculate formulas and build in safety margins for their software, Abyss keeps moving ahead. Abysmal Diving and ERDO-City Island Chamber



Chris Parrett, John Crea and Dr. Bill Hamilton.

announced that they will begin working on a hyperbaric version of Abyss. This special software will allow recompression treatment facilities to analyze a diver's profiles as well as help physicians and technicians manage a patient's treatment. Like the dive planning version of Abyss, the hyperbaric version will track a patient from admission through post treatment progress. In addition the data compiled on the program will be exportable into standardize formats for statistic collection and reporting. ■

FREQUENT DIVER PROGRAM

Dacor Corporation has unveiled its Frequent Diver Program. Wouldn't it be nice if new divers could take all their new gear and go diving in some exotic place right now? Well DACOR thinks they have the answer with their *Frequent Diver Program*. For each dollar of Dacor product purchased, the consumer is credited one point (at suggested retail value). Earn 1,600 points and he/she is awarded a certificate for *free airfare for 2* to a choice from over 1,000 destinations. There are some restrictions and blackout dates, and the purchases must include a regulator, BCD and instrument. See your Dacor dealer for details. ■

CITY ISLAND CHAMBER RELEASES BENDS REPORT

The northeast's busiest hyperbaric facility for divers, **City Island Chamber**, has released its "1994 Bends Report." The report, developed by E.R.D.O., the Extended Range Diving Organization, presents complete demographic information about 29 divers treated for decompression illness since June 1994.

Since reopening last summer, **City Island Chamber - North American Hyperbaric Center** has performed 128 recompression treatments, on 29 divers, including those requiring mixed gases. Among the significant data presented in the Bends Report is that 0% of the cases were technical/mixed gas divers. Over 82% of all cases were diving within recreational limits (130 fsw) and 55% were shallower than 100 fsw. 52% involved flying after diving.

"The Bends Report is a prevention tool," commented Associate Medical Director Edward Golembe, MD. "A quick look at the profiles, and activities of these divers is like a blueprint for planning safety."

City Island Chamber is a 24 hour - 7 day a week diver treatment facility. It is operated by a not-for-profit organization, and is funded by private donations and insurance reimbursements. Copies of **The Bends Report** are available at no charge from City Island Chamber. Contact: 718-885-3188 ■

DAN OXYGEN TRAINING AT CITY ISLAND CHAMBER

The Dan Oxygen Provider Course is now available every month at City Island Chamber. This comprehensive program is designed to educate the general diving public in recognizing possible dive related injuries; providing emergency oxygen first aid while activating the local emergency medical services, and arranging for evacuation to the nearest appropriate medical facility.

The course will not only cover symptom recognition and evacuation but teaches how to use, assemble and deploy the DAN Oxygen Unit, with skill and confidence. This program is a must for dive leaders.

While you are at CIC you will get a complete tour of this unique diver treatment facility. The Saturday course dates are:

April 8, May 6, June 10, July 8, Aug 5

Contact: 718-885-3188 ■

EQUIPMENT

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ON THE COVER - Circa 1965, high pressure US Divers steel tanks, Voit Schwimmaster balanced diaphragm regulator, US Divers Aquamatic snorkel regulator and a low volume snorkel mask - all to make your diving safer and more enjoyable. Historical equipment courtesy of Noel Voroba, Orbit Marine Sports, Bridgeport, Ct., modern equipment courtesy Dacor Corporation, and Ocean Edge. First edition Half Mile Down by William Beebe, 1934. Shot with a Hasselblad 500C, 150 mm Sonar lens at F16 on Kodak Plus-X film by Joel Silverstein.

HAPPENINGS

APRIL

Annual Boston Scuba Symposium sponsored by PDIC and the Underwater Club of Boston will be held on April 29.

Contact: 508-897-0877

Wrecks '95 - The Third Annual **New England Wreck Diving Symposium**, will take place at 9:00 am, Saturday, April 29th in Framingham, MA. This is the only event in New England specifically for wreck divers. Highlights include slide and video presentations by noted divers Brian Skerry, Bradley Sheard, John Chatterton, and Eric Takajian [all SUB AQUA contributors].

Wrecks '95 also features: Door Prizes, including course discounts, charters and gear. Great displays of wreck diving equipment and artifacts *plus* a meet the speakers reception following the show. The event is sponsored by Metrowest Dive Club. Tickets are \$12 for members \$15 for non-members. **Contact:** John Lydon 508-820-3408. ■

MAY

OCEAN EXPO - The 9th Annual **Ocean Expo Dive and Travel** show will be held on May 20 and 21st at the Radisson Convention Center, Miami FL. This year's show will include exhibits, educational and entertainment mini theaters, plus a technical diving seminar series - XPOTECH.

Contact: Ocean Expo 305-891-6095 ■

JUNE

UHMS - The Undersea & Hyperbaric Medical Society will hold its annual conference at the Breakers Hotel in West Palm Beach FL. This annual event brings together the elite of the hyperbaric world for seminars and case discussions. This year's main topic directed by Dr. David Elliot, is entitled "Are Asthmatics Fit to Dive?" June 21-25. **Contact:** Jane Dunn, UHMS 301-942-2980 ■



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May is Responsible Diver Month

For many divers, springtime is when we break out of hibernation, dust off our dive gear and blow bubbles for the first time of the year. It's a perfect time to get back into diving shape - to reacquaint ourselves with the underwater world. This is why a concerned group of diving leaders got together and designated the month of May as Responsible Diver Month.

"It's really just a simple reminder about safety," said Steven Barsky, secretary for the Scuba Diving Resource Group (SDRG). "The folks at SDRG believe that responsible divers are safer divers and May is a great month to promote that message." Barsky said.

In addition to the SDRG, Responsible Diver Month is sponsored by Luxfer USA, you know, the tank people, and professional dive centers across the country. Free Responsible Diver tank stickers and brochures are available to you at your favorite dive shop, or call 303-444-3353 to order them free of charge.

This May, Responsible Diver Month, remember to focus on being safer divers. Remember to have your gear inspected by a professional and always refresh your skill, *before* taking the plunge.

Code of the Responsible Diver

As a responsible diver, I understand and assume all risks I may encounter while diving. My responsible diving duties include:

Diving within the limits of my ability and training.

Evaluating conditions before every dive.

Being familiar with and checking my equipment before and during every dive.

Knowing my partner's ability as well as my own.

Accepting the responsibility for my own safety on every dive.

Respecting my equipment and having it inspected regularly.

SHIPWRECK DIVING GEAR *You* NEED

By Daniel Berg

Shipwreck diving, just like cave diving or any other advanced diving, requires some specialized skills, education and equipment. The equipment used in wreck diving will vary from location to location. On shallow scattered wrecks, a single tank of air may be sufficient, but on intact or deeper off-shore shipwrecks, double tanks, or the addition of a pony bottle may be necessary. Diving in the warm clear waters of the Caribbean may only require a 3 mil wet suit, but North Atlantic divers often choose to wear dry suits year round. Take this into consideration as we discuss the equipment needs for wreck diving. The selection of wreck diving equipment is also a highly individual matter. Just remember, we want to streamline ourselves as much as possible in order to reduce drag, permit easier swimming with less fatigue, and eliminate the possibility of becoming snagged.

THE BASICS – A wreck diver's equipment consists of the necessary thermal protection for the environment, safety equipment needed for depth, and whatever gear is needed to safely dive his plan. For example, if a diver is planning a dive to 50 feet to penetrate into the wreck's interior to take photographs, he will need the proper supply of air which would be accomplished by carrying a single tank and pony bottle. For penetration he will need a tether line reel, a main light, back up lights, dive knives and most importantly the knowledge and mental attitude to function in an overhead environment. Lastly, he will need his camera gear. All of the equipment must be located so it is easily accessible and will not be dangling, possibly causing the diver to get snagged. Dangling equipment is also more likely to get damaged, and it is certainly not easily located when needed. There are few hard and fast rules regarding the location of items such as back up lights and line reels, but all divers should carefully plan where each piece of gear is to be placed. For example, a back up light is useless unless it can be easily and quickly located even in the worst conditions. Next time you're on a charter boat, take a look around at how each diver's gear is set up. If you see anything interesting, ask how it works or why it's rigged in that manner. Let's start by examining some basic dive equipment and some modifications that are used in this exciting sport of wreck diving.

THERMAL PROTECTION – It doesn't matter what area or type of wreck you're diving, some sort of thermal protection will surely need to be worn. As we all learned in our certification class, water conducts heat away from our bodies 25 times faster than air. Depending on the temperature and depth of the water you're diving in, exposure suits will vary drastically in design, thickness and thermal protection. In the Caribbean, divers may choose to wear a lycra suit or a 1/8 inch short wetsuit. Northeast divers prefer 1/4 inch wet suits with hood, boots, and gloves or dry suits. Dry suits also come in many designs and materials. Basically you get what you pay for, so get the warmest properly fitting suit that also fits your budget. It is very important to be warm and comfortable while diving to better enjoy yourself. Note that most shipwrecks look more like huge junk yards scattered across the ocean floor. This wreckage is anything but delicate on exposure suits, especially in the knee area. Knee pads will greatly extend the life of a dry, or wet suit. Pull up style knee pads offer the added benefit of inhibiting some air from entering the feet of dry suits. This reduced buoyancy in the foot area allows for easier swimming and a more comfortable dive.



O'Neill 7/5/3 Neoprene drysuit

REGULATORS – Although there is no one brand of regulator that is recommended for wreck diving, divers who are planning to explore wrecks should make sure that their regulator hoses are streamlined. Route all hoses as close to your body as possible. Depending on the regulator model, this can be easy or may require the use of wire ties or Velcro straps. The



Mares - Abyss Regulator

idea is to reduce the chance of a snag. Divers should also be able to distinguish between second stages. This is extremely important, especially when using double tanks, an octopus or a pony bottle. If the second stages were not marked, a diver could easily suck his pony dry while thinking he was using his main tank. There are many methods of identification. One way is to use a different style or color for the second stage or use color coded hose protectors. This can be carried one step further by color coding the corresponding pressure gauge with the same color.

The placement of a pony bottle, octopus or the use of a double tank system with twin regulators is often wasted because divers don't take the time to mount the second stage in a convenient and easily reached, secure location. Having the mouthpiece float behind you or drag in the mud is worse than not having one at all. Not only does such equipment get clogged, but it's also not easily located when needed. Your alternate air sources have to be located around your chest area. If you were to draw an imaginary triangle from your waist up to your shoulders, your extra second stages should be mounted within it. Each must have a quick disconnect release. This means that you should never store your octopus in a buoyancy compensator pocket because it takes too long to get it out when it's needed. There are a number of quick releases on the market, all available at your local dive shop. Attached to your buoyancy compensator, these clips will hold the second stage firmly in place, yet when it's needed, the diver only has to pull firmly. Another method is to secure the regulator's second stage to a loop of surgical tubing worn loosely around your neck. There is no searching around for your alternate air source; it's always directly under your chin.



DUI - Weight and Trim System - available in three styles - Standard, Tech and Slim-line.

WEIGHT SYSTEMS – The equipment used in wreck penetration is different from any other type of diving. Take weight belts, for example. We have always been taught that a weight belt is an expendable piece of equipment and should be able to be dropped quickly in an emergency situation. Wreck divers who explore the exterior of ships also need to be able to easily drop their weight belts, but when doing wreck penetration a diver never wants to drop his weights. The reason is simple: A diver's weights compensate for the positive buoyancy of his wet or dry suit. If a wreck diver's quick release buckle were to get snagged and released while inside a wreck, he could find himself plastered to the wreck's ceiling. The answer is to install two

buckles to your weight belt. Only use the first while outside the wreck, and the before beginning any penetration, clamp the second buckle shut. This will give you the added security needed inside while allowing for emergency outside or on the surface.

DIVE KNIVES – It is essential for all wreck divers to wear at least one dive knife, and is also highly recommended to have a back up knife. Almost any manufacturer's knives will do, but bear in mind that you get what you pay for. The first choice is what blade alloy to buy. Stainless steel varies greatly in its strength, durability and rust inhibiting factors. As a main knife, I prefer to wear a medium size blade, solidly constructed with a portion of the blade serrated. This serration allows easier cutting of heavy rope. Other options available in dive knives include ground in line cutters and a solid metal butt on the back end of the handle to use as a tap hammer. I also wear a small sharp back up knife attached to the side of my gauge console. A back up knife serves the same function in the case when a main knife is lost or cannot be easily reached.

TETHER LINE – A tether line reel can be used not only for penetration but as an emergency up line, for search and recovery, underwater mapping, or in the case of limited visibility, it can serve as a guide to and from the dive boat's anchor. Some divers choose to tie knots in the line every ten feet. By counting the knots as the line is let out, the diver can tell how far he is from the anchor or how deep into the

wreck he has ventured. Tether line reels can be home made, converted from construction reels or store bought. Since dive reels were originally designed for cave diving, it's important to use a reel that was specifically designed to withstand the rigors and abrasive environment of salt water wreck diving.

Wreck reels are available with anodized aluminum or stainless steel construction and contain all of the desired design features such as sufficient line capacity, lock down screw, and winding knob. A reel should always have an adequate supply of line for the depth of water you're diving in. If you're diving in 50 feet of water, your reel should contain no less than 100 feet of line. This is because of the presence of any current if the reel is used as an emergency up line.

Most tether line reels normally use a number 36 white braided nylon line. This line may be sufficient for cave diving but it is too thin when used in the abrasive environment of wreck diving. Wreck reels should contain a 1/8 diamond braided nylon. Nylon is preferred because it is strong, abrasion resistant, highly visible and sinks. If a floating line were used, it would have the tendency to get tangled in the diver's feet as it was un-reeled, and it would not stay where it was laid out. Tether line reels should never be clipped off and allowed to play out unattended. The reel should be held with one finger firmly on the spool so that the spool turns only when there is tension on the line. When reeling in the line, reel just fast enough to maintain a constant tension on the line. When winding in the line, make sure the line feeds evenly across the spool face to prevent jamming. Remember, just having a reel is not a substitute for proper training in navigation or wreck penetration.



Dan is using the Aqua Explorers RAB wreck reel.

GOODIE BAG – Goodie bags, Bug bags, Game Bags, Tool bags, or Catch bags as they are commonly called are simply a mesh bag that divers use to carry lobsters, tools and artifacts. Wreck divers should keep their bag wrapped up and closed upon itself when starting their dive. After you have caught a lobster or found an artifact, you can throw the bag over the back of your legs. This keeps the bag from dragging. One other note on bug bags, buy a bag that has nylon material on the top and mesh on the bottom. This allows you to insert the lobster without the legs getting caught in the mesh.

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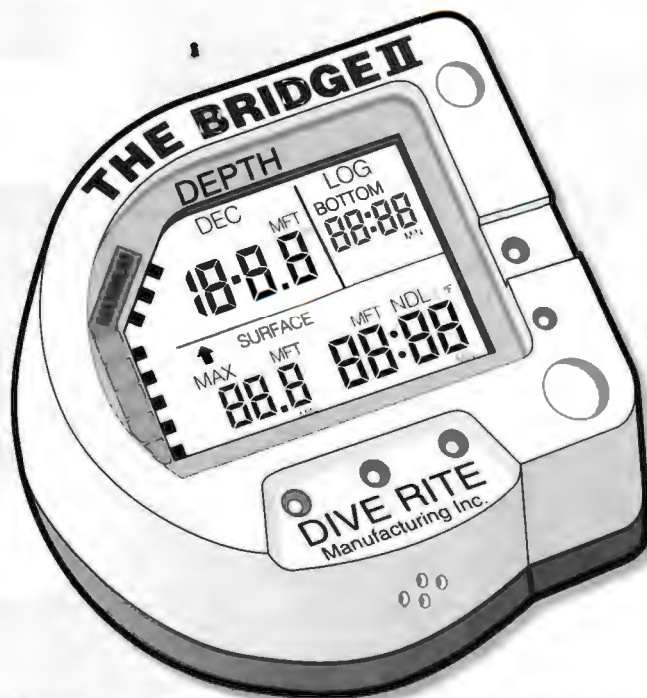
Dive Rite, Mfg. - Neutralite MR 11 - burn times from 75 to 420 minutes. The lamp can be hand held or mounted on a helmet.

LIGHTS - As a wreck diver, you will need two different types of lights. Your main or primary light should be a powerful, dependable wide beam light capable of illuminating the wreck's interior darkness. This primary light should have a burn time longer than the planned duration of the dive. For any wreck penetration diving, a second wide-beam backup light is also strongly advised. The second type of light is a smaller spot light used to look deep into holes. Remember that the location of these lights is critical. Each should be located in a secure place that doesn't cause a possible snag yet allows easy access.

HEAD AND HELMET LIGHTS - Wreck divers as well as night divers and cave divers have found that having a light or lights mounted on their head allows the diver to have free hands while being able to see. There are all types of helmet lights on the market, or divers can use a little ingenuity and modify almost any light to be head mounted. This setup allows the diver to have a main or back up light in a location which is out of the way, and points in the direction he is looking. These lights come in very handy when engaged in working or during a penetration when hands are needed to manage a reel. One down-side to head mounted lights is that while diving in a dry suit, they increase the amount of head movement which can increase the amount of leakage through the neck seal. This problem is usually only temporary until the diver familiarizes himself with movements that don't cause leakage.

When choosing a light to be mounted, make sure it is easy to switch on. Then decide, based on the type of diving you do, whether you prefer a large main light or a smaller backup light. Cave diving lights are also excellent for head mounting. These units, with remote battery packs mounted on a harness or tanks, are extremely powerful and long lasting.

Continued on page 12 →



Dive Rite Presents the Top Ten Reasons to Move Up to the New BRIDGE™ II Dive Computer

- 10 It's cool. (Hell, its green and yellow color scheme even matches the "Nitrox" decal on your doubles.)
- 9 It's field programmable for nitrox mixtures ranging from 21% to 50% oxygen using a "digital" adjustment tool (your finger).
- 8 The available hose mount does a wicked 360-degree spin.
- 7 If set to air, it remains set to air, dive after dive.
- 6 The new BRIDGE™ II is more rugged and reliable than ever—and much simpler and easier to use.
- 5 You can upload logbook and profile data to BRIDGE™ Windows™ software, using the optional personal computer interface.
- 4 You can also use BRIDGE™ Windows™ to do "what if?" projections of dives, varying factors such as profile and gas mixture.
- 3 The BRIDGE™ II impresses members of the opposite sex.
- 2 It goes diving instantly—no need to activate it first.
- 1 Your spouse or mother most likely won't want you to have one.



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The tekConference

By Barb Perry Lander

The movers, shakers, doers, and wannabes of the technical diving world assembled in San Francisco for what has become *the* annual tech-fest. The exchange of gossip, ideas, equipment, information, and myth-making that took place staggered my imagination. The tek Conference track system of five programs running simultaneously meant making hard choices about which to attend.

REBREATHERS remained a hot topic with an entire track being devoted to the technology. Four different vendors, BMD, Cis-Lunar, Prism, and Oceanic were exhibited, with only one unit, the SCR-4 by BMD currently offered for sale. BMD had no announced purchasers for its system, currently priced at \$15,000. Perhaps buyers were put off by the numerous cable ties hidden beneath the housing or maybe they are still waiting for *all* the candidates to present their platforms.

BMD, Cis-Lunar, and Prism strutted their stuff in demos in the Hilton's rooftop pool. Those willing to part with \$100 could sample what it's like to *do it on the quiet*. Cis-Lunar, although successfully using their units for Dr. Stone's deep cave expeditions, is still seeking financial backing to turn out a consumer unit. Prism is looking for a manufacturer to bring their units into production. The Fieno Grand Blue introduced in 1994 was nowhere to be seen; rumor has it that Nissan is getting it packaged for distribution in late 1995. The hangline is abuzz, will 1995 see a second entry on the rebreather market?

Oceanic is accepting deposits for their \$2500 training course scheduled for September to coincide with delivery of their stealthy-looking \$7500 Phibian. Slated to be available in two models - one for recreational depths and one for technical depths, Oceanic may be hoping that *everyone* will use rebreathers. Their sales people told us that the Oceanic system of training and delivery will put Phibian centers around the world where a card-carrying Phibian trained diver can have access to the equipment. We feel that this method of distribution may limit the Phibian from some exotic expeditions.

On other fronts, it is becoming more difficult to hide from **COMPUTER TECHNOLOGY**. Microchip giant Intel had a booth at the show promoting a prototype dive tracking device, and an "Information Superhighway" vendor pitched wiring you into the Internet. Abysmal Diving debuted the working version of Abyss Dive Planning Software. This dive planning software is probably the most completely thought out program on the market. [See Jan/Feb issue of Sub Aqua for full review.] The coup of developer Chris Parrett was the involvement of Dr.

Bill Hamilton and the inclusion of DCAP in future versions of Abyss. Windows and 4 Meg of RAM are minimum requirements to operate the software.

Orca, Dive Rite Mfg., Uwetech, and Cochran Undersea Technology all continue to forge ahead with nitrox computers. The Orca, programmable through EPROM changes, remains non-programmable to end users. The Aladin Nitrox by Uwetech and Nemesis Nitrox II by Cochran use remote sensing for tank pressure. In addition, the Cochran unit has the ability for dual gas (read, air/oxygen, nitrox/oxygen, air/nitrox) computations. Dive Rite Mfg. has issued the second version of the Bridge — the Bridge II. The unit's programming capabilities have been streamlined, where now the unit will default to air when it starts up. New software on the Windows platform allows for comprehensive pre and post dive analysis.



Cochran Nemesis Nitrox II

Several vendors offered **TRAVEL** options for deep, mixed gas diving either for an already trained group, or for instructors with classes or individuals seeking training in exotic locations. Mad Dog Expeditions, a NYC-based travel consortium, offers a full schedule of worldwide diving with varying degrees of technical difficulty. Trimix diving vacations that include equipment and gases are available in the Red Sea and Ireland to name just a few. What a change from having to arrange for gas, boosters, doubles and stage bottles — if you could find a charter operator in some far-off land that was willing to take you deep.

Also in the travel category is a rebreather trip being promoted by famed underwater photographer Amos Nachoum. He will be leading a trip to photograph hammerhead sharks in Costa Rica. It's a cost-intensive trip, \$1700 for the



K. Weydig

rebreather training required and \$5,700 for the Costa Rica portion of the trip. No one ever said tek diving was cheap.

Divers on the forefront of **UNDERWATER EXPLORATION** reviewed last year's projects. Included were discussions of Huatla, Zacatun, *El Cazador*, *Lusitania*, *Alabama*, *Monitor*, and the *Goulandris*. **LEGAL** issues received a great deal of attention as divers are finding their projects more restricted by a variety of agencies and individuals on both preservation and safety issues.

SAFETY remains a hotly discussed issue in the tech world. Different tracks covered safety issues ranging from accident prevention, to treatment possibilities and everything in between. Some felt they should be able to look to diving's pioneers to provide leadership in safety, though I feel that may not be prudent. Although diving pioneers like Cousteau and Gagnan were instrumental in the development of the early dive equipment, their safety records leave much to be desired. Commercial dive pioneers like André Galerne and later Lad Handleman realized early on that open-circuit scuba was unsafe for long or deep working projects. Explorers may just be the last people to emulate for safety. Daniel Boone knew he had a very good chance of losing his scalp. It was a combination of good luck and unusual skill that allowed him to die of old age. Many underwater explorers do not die of old age. The survivors acknowledge and accept increased risk.

The tek Conference succeeded in promoting the exchange of ideas and education. Starting out as an offshoot of aquaCORPS magazine two years ago, the tek Conference has grown very quickly from its humble beginnings. Of course this reflects increased financial interest in the marketplace. Is that a good thing? I feel that the really high tech, glossy exhibits may just be making extended range diving out of reach by promoting too much glitzy hardware too soon. Should discussions of in-water recompression, and open-circuit scuba trimix working dives that move towards the edge of commercial diving be encouraged? I'm nervous about opening this Pandora's box.

Does the tek Conference encourage exploration and new technology, or glorify irresponsible risk taking to hobbyists not yet ready for the challenge? Only the future will tell. ■

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Continued from page 9

BUOYANCY DEVICES – Once you have decided on what kind and how many tanks you will need for your diving you will need to pick out a mounting system for them. The choices



Dacor Seachute Pro - Stabilizing Jacket BCD.

today are virtually endless, yet they break down to just a few main categories.

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Some of the newer back mounted "wing" type units are well designed with many D-rings and choices of soft, plastic or stainless steel back plates, making them *customizable*. Plus, many are available with integrated weight systems. Most important to picking a BCD for wreck diving is lift capacity — a Caribbean type BCD will not have enough lift to keep you neutrally buoyant with a set of double steel tanks. Then



OMS - Double Bladder BC and Backplate Harness

again, a 160 pound diver just won't need a double-wing system with 100 pounds of lift while using a single tank. Some good common sense is needed here.

A little common sense, education and planning in regards to equipment goes a long way. Don't wait until you're ready to jump off a charter boat to decide how or where to clip on that new back up light. ■

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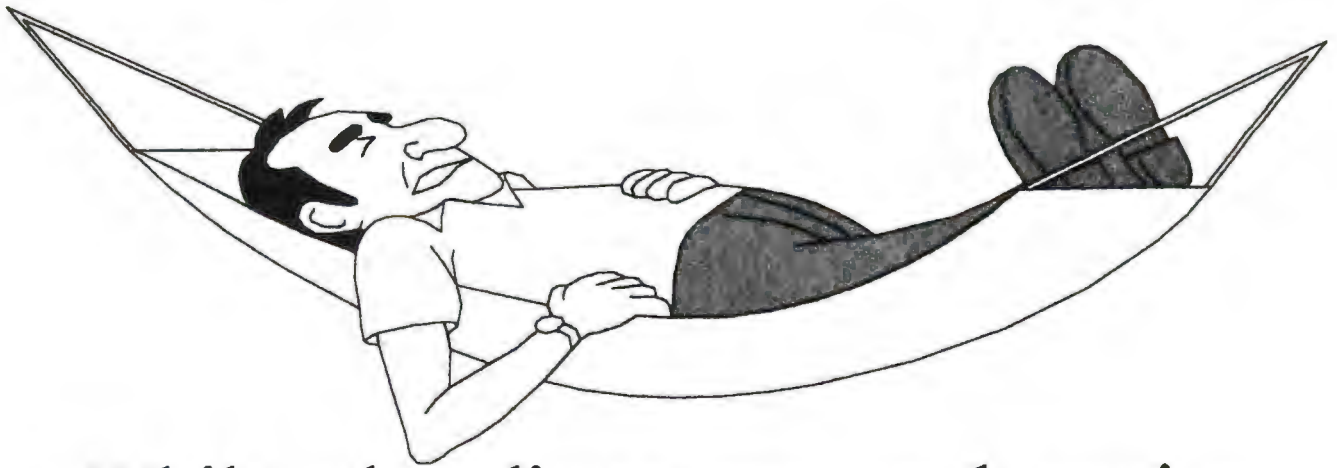
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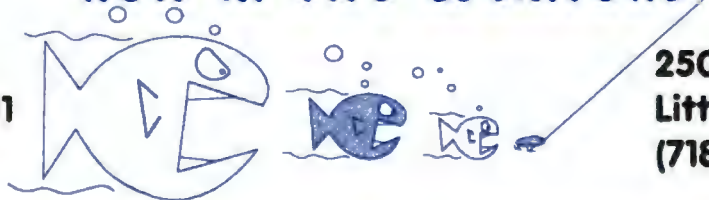


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GREAT SCOTTISH WRECK DIVES THE WALLACHIA

By Ken Farrow

The North Atlantic is a vast place and inevitably the most readily dived areas are shallower inshore areas. The western coastline includes the heavily indented Scottish Coastline which with its islands and sea lochs accounts for two thirds of the United Kingdom coastline.

Like the eastern coastline of the States and Canada there are numerous wrecks, many known, many more unfound and many at serious depths. There are however many other similarities with diving the eastern side of the North Atlantic. Dry suits are normal, for these are not warm waters. As a result it can be off-putting for those from even as close as southern England where wet-suited divers can be seen without gloves. My earliest memory of diving the *Wallachia* is from a repeat dive in a wet suit - and being absolutely shivering cold on hitting the wreck. This is for serious divers, not for warm water coral reef holiday divers. As a result the diving is relatively exclusive.

Inevitably there are great numbers of wrecks from the Great War of 1914-1918 and the Second World War of 1939 - 1945/46. In both wars German submarines and surface raiders took heavy tolls on shipping with mines, torpedos, guns and explosive charges.

There are however many wrecks from civilian mishaps, storms and disasters. The most busy shipping lanes were the sites of the most abundant wrecks. Glasgow is the largest Scottish City, the third largest British City and is based on the Clyde River which opens out into a vast waterway including many islands like Bute, Arran, Cumbrae and the massive rock of Ailsa Craig. Along the banks of the Clyde River there used to be an abundance of shipyards which provided vessels for the British Fleet in Victorian times when Britain was the world power.

Those wrecks now provide substantial man made but unintentional reefs. The *Wallachia* is just one such vessel which sank due to a collision but now sits upright and largely intact on the bottom to provide a haven for sea life, a splendid dive for the touring diver and artifacts for the more serious wreck diver.

Many of the Clyde River wrecks are in the 30 to 40 meter zone (98 to 131 feet) and as such the *Wallachia* is typical at around 30 meters to the upper decking.

Though no longer as important a ship building area, the Clyde River is still a very busy waterway and one can encounter everything from ore carriers, container vessels, tankers, nuclear submarines (now just British) and ferries down to yachts, gin palaces, wind surfers

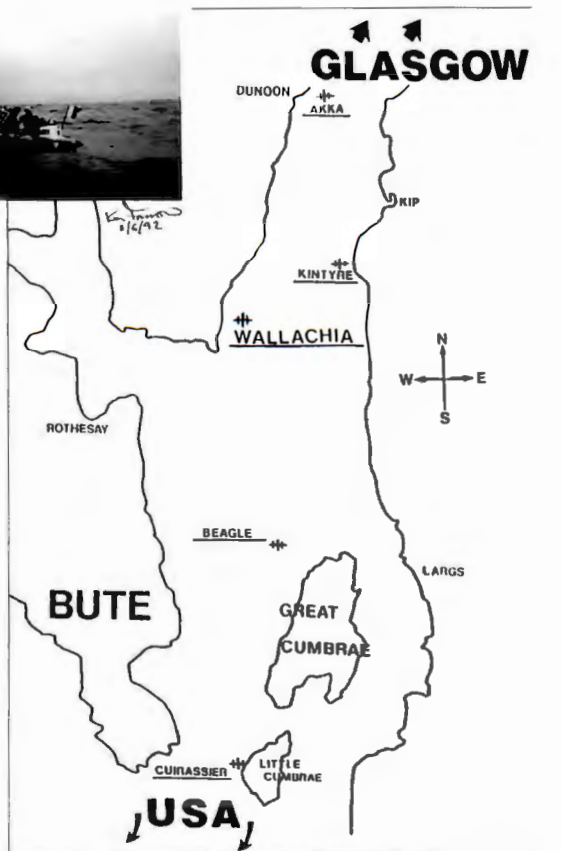
and canoes. Good boat cover is therefore needed for divers. Here the blue and white flag alpha is used as the internationally recognized diving flag signifying "I have a diver down, keep well clear at low speed." Sadly many vessels, particularly yachts seem oblivious to its meaning. Fortunately the greater majority of the hundreds and hundreds of yachts, seem to serve as weekend retreats at their marina moorings rather than venturing out to sea.

The *Wallachia* sank in 1895 following a collision with the Steamer *Flos* which became embedded into the side of the *Wallachia* just back from the bow. However, whilst the two vessels were held together, the *Wallachia*'s boats were launched and all the passengers and crew escaped. However as soon as the *Flos* ran astern, water flooded into the *Wallachia* and she exploded, presumably as the sea reached the boiler, then quickly sank. The masts were removed that same year but otherwise she appears to have lain quietly until rediscovered in 1977. Since then she has been dived regularly but the site, depth, darkness and visibility pose restrictions and there are still relatively few divers who venture inside the less accessible spaces.

The *Wallachia* originally carried large numbers of substantial earthenware jars each containing a gallon or more of stannous (tin) chloride. In the early 1980's they were the most accessible of the cargo being in boxes on the deck. However though they were accessible they were not necessarily easy to extract. Deposits of silt and the marine life had effectively concreted them in place. The jars each had a couple of lugs and it looked as if they merely needed a sufficiently vigorous or strenuous pull. Unfortunately that was not the case and by 1990 only a few remained - the ones where the lugs broke off or the top was smashed.

The forward hold extends under the fore-castle from a single hatch. Coming astern from the bow, which still clearly exhibits the gash from the collision, there is another larger hold with open hatches. Amidships the superstructure is partially open since the paneling has disintegrated so that some parts of the accommodation are open and accessible. The funnel too is missing, presumably lost in the explosion which must have accounted for some of the other damage. Astern there are three further holds all without hatches the more forward two having double hatchways.

Besides the earthenware jars the manifest



included various items apparently including mercury which has yet to be found. Readily accessible in the open holds are lots and lots of glass bottles. These are in two sizes and all appear to be dark brown glass and are tightly stoppered with corks. On those corks is burnt the name McEwans.

The contents if poured comes out dark and foaming with a good creamy head and if shaken they can exit in a foaming gush. Some have a delightful smell of well fermented beer which is dry after all this time. Others have the sort of stench that will clear a room in no time. It is however real literally live beer and one enthusiast used the living ninety odd year old yeast to start his home brewed beer with this vintage material.

The bottles are in two sizes which would lead one to imagine them as being half pint and pint sizes but that is not the case since the small bottles provide a very generous half pint.

If left, the corks tend to dry out and shrink. If static, that can lead to a slow leak of the contents. However if being carefully wrapped in your clothes bag, to avoid breakage whilst traveling home, the gentle agitation whilst traveling can excite the contents and the cork can be expelled to give your clothes a beer shampoo. The solution is to seal over the top of the cork and bottle with something like candle wax.

The last hold at the stern is only accessible down through a small square hatchway with a ladder. Here there are more bottles which tend to be clear glass. Their contents are golden, aromatic, reminiscent of peat and are of interest to Her Majesty's Customs and Excise as being



for export; the excise duty on this malt whisky has yet to be paid. However entering here is a serious business for trained, experienced, well equipped divers, not as a mere whim. The silt can readily be stirred up to absolutely zero visibility even in the open holds. The Clyde River is also dark even in the open. Inside the wreck I leave to your imagination.

Generally the Clyde River tends to have poor visibility in the upper meters due to freshwater and less attractive materials. Below that it tends to be clearer, but the light having been filtered out, it is generally dark. The archetypal Clyde River wreck diver has several torches [flashlights]. Besides the commercially made ones there are many custom ones based on car batteries and headlights. Others have battery packs in pony like containers strapped to their cylinders and the light source on a flexible lead.

The *Wallachia* lies to the east of Toward Point, where her bow points north, meaning that to pick up on an echo sounder or to grapple in it is best to run EW or WE. A 1077 ton ship, 259 foot long by 36 foot wide, she provides a substantial wreck to explore.

Within the same few miles on the Clyde River are other deep wrecks in the 30, 40 and 50 meter range (98, 131 and 164 feet) they include the *Cuirassier*, *Kintyre*, and *Beagle*.

Diving the *Wallachia* is from either day charter vessels or by small boats. Small boats are best launched from Largs or Largs marina both of which have excellent slip ways. The larger charter boats operate from either of the two large marinas at Kip to the north or Largs to the south both of which have air and dive shops. Offhand the *Rachael Claire* out of Largs is one of the better vessels despite an attempt to convert her into a dive site by ramming one of the channel marker buoys.

Live aboard dive vessels such as the *Salutay* out of Belfast can also be found on the Clyde River, though they generally tend to be used for more remote Scottish diving - but that would lead us on to many more stories. ■

Ken Farrow, lives in Scotland and is an avid wreck diver.

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A WONDERER UNDER SEA

“**B**efore many years, along the temperate and tropical seaboards of the world, conversations will be heard which to many people today would seem fantastic or at least prophetic of a century hence. Hosts and hostesses will be summoning their house parties to row with them offshore, to put on helmets, dive and inspect at leisure the new coral plantings and beds which a seascape gardener has lately arranged. And later in the year his purple and lavender sea anemones will take first and second prizes in the local sea-flower show. Mothers will be begged by their boys to let them go again and play pirates in the hold of the old wreck just inside the reef and three fathoms down. Submerged artists will wax wroth with an over clouded sky because the half-finished painting of the canyon, four and twenty feet below the surface, must have full sunlight to show its miraculous coloring.”

William Beebe, Half Mile Down

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RICHARD PYLE Ph.D.

an exclusive interview by Joel Silverstein

(Phish Doctor)

Pretty fishies blithely continue their amorous dance as a bubble-less, rebreathing diver stealthily hovers in their boudoir. World-class ichthyologist Richard Pyle enthralled us with tales of his tech diving exploits in pursuit of rare specimens. A diver since his teens, Pyle explores the leading edge of equipment, techniques, and personal risks to further his passionate obsession - fish.

When was the first time you went diving? My earliest memories have been of fish. When I was about five years old I would go fishing with my friends where I lived in Washington D. C. When I was seven, my family moved back to Hawaii and that's when I took up snorkeling. I was about ten or eleven when I first tried scuba. The high school I went to offered scuba as a PE course, *that's* when I really started scuba diving seriously. I think, 1979.

What actually got you hooked? Scuba diving had always been a tool to gain access to fish. I started out as a marine aquarist — I've still sort of been at heart and I've always wanted to collect some of these things for my home aquarium. Scuba was just a way to get me closer to the fish and in a sense always has been. In the recent years, with technical diving and the thought processes involved with figuring how to solve problems of getting a diver safely to a particular place and back — that's when my interest in diving per se has increased to almost match my interest in fishes. Whereas scuba used to be a means to an ends of fishes, now it's almost equal. I enjoy the actual process of diving and figuring out how to do these technically difficult dives.

When did you realize that you had to go deeper? I'd progressively go deeper until the magic 130 foot barrier. But it wasn't really so much a barrier because there was plenty for me to see in shallow water. I decided I wanted to see fish. Certain rarer species of fish are only in deeper water. There is a ledge system that runs around Oahu, the island I live on, which is about 160 feet at the top 210 feet at the bottom. I've spent hundreds of hours paired scuba diving along those ledges, but there isn't much a lot deeper in Hawaii. The deeper diving came when I started going to other places in the Pacific that had drop-offs that kept on going.

... and the deeper you go the rarer the fish? New species are the rarest of all because nobody's ever seen them at all before. One of the things about reef fishes is that none of them are truly rare — there are no rare and endangered fish, at least, not reef fishes. But what rare fish are in the ocean are fishes which are difficult for people to get to. In almost all cases, every species is common somewhere. You just have to figure out where it is. So some of these rare species have been collected, but only one or two specimens, it's almost like cracking a mystery, figuring out where this population is — why is this fish so difficult for people to encounter? In a lot of cases it's because they simply live deeper than where most ichthyologists or collectors or divers have been able to get to. Submarines of course have always gone deeper into the thousands of feet deep, but seldom do the submarines spend any time in the 300 to 400 ft. range. So that 300 - 400 ft. range, which I call the *twilight zone*, has really hardly received any attention at all and from our original explorations on, it's pretty obvious that area is just full of undiscovered stuff.

Are you alone in your profession or are other ichthyologists venturing deep? Well, I'm certainly not the first to be aware of this *twilight zone* concept. Walter Stark, one of the designers of the *Electrichung*, wrote an article in National Geographic in 1972 talking about how they designed this thing so that they could go down and start exploring the organisms that lived in the 400 foot area. On the very last photo it shows a picture of this strange looking fish, the caption read "Just one of the many mysteries awaiting in this twilight zone." Another researcher, Pat Colen, in Truk Lagoon, started doing trimixed dives decades ago but back then there weren't any tables available, and technical diving concepts weren't developed, so he never got very far with it.

Do you collect the fish or only photograph them? I don't have a camera housing that will go deep enough, so on the really deep dives I collect them. I use hand nets and generally try to bring them up alive. I almost always try to bring them up alive and put them in my aquarium.

Do fish need to decompress? Fish do not have to decompress for the same reasons we do and the basic premise is they're breathing water, not air so they're never exposed to compressed air in their breathing system. They never get high partial pressures of nitrogen or whatever is dissolved in their circulatory systems. However, most fishes have a swim bladder. It's an organ inside of their body — it's filled with gas and it allows them to control their buoyancy. This inflates like a balloon, just like a BC would. If you just brought them straight to the surface, it would expand and crush their other organs. So in order to bring the fish up from these depths alive I have to stick a hypodermic needle into the swim bladder and vent all the gas out as I bring them up. Once I do that, they're fine on the surface. They don't need the pressure.

When did you start using mixed gas? I started pushing below 300 feet on air back in the early to mid-1980's, just real short hit-and-run dives, starting off with very simple equipment. The most complex I got was a set of twin 80's with a manifold. Basically we were just doing these hit-and-run dives to 300 feet. In the late 80's, I visited Chip Boyle in the Cook Islands. That's when we did our first real hard core deep air expedition, and we decompressed on oxygen in shallow water. We did a total of fourteen I think, dives below 330 feet in a ten-day period. So it was some pretty hard-core deep air diving. In most cases we did one very early morning dive and a very late afternoon dive. It became clear to us during that expedition that there were a lot of things in this depth

zone that were undiscovered, and that air was not the way to do it. It was very obvious to us that if we continued doing it [air] we were playing Russian roulette.

Did the fish look different at 300 feet? I honestly can't tell you because I don't remember much from those dives. We found ourselves on the decompression line coming out of a haze looking in our buckets and seeing fish. I have vague recollections, like a dream, of actually being on the dive, but at 360 feet the narcosis is very intense; we had tunnel vision. My brain was working in serial. I had to consciously take turns thinking about breathing, then thinking about swimming. And that was one of the points that made me realize that this air diving was crazy, for me anyway.

Are these deep dives sanctioned by the museum you work for? No university or museum in the world would endorse this kind of diving. So this is all funded out of my own pocket — or it was back then and pretty much is now, although that's beginning to change. I actually never tried to get funding. One of the things I learned early on is that if you pay all the bills yourself, you get to make the rules yourself. For me that's very important — I don't want to follow anybody else's rules when I do these kind of dives, I want to be only following my own rules and the easiest way to do that is to pay my own bills.

How did you go about the gas diving? Right after that trip it was obvious to us that we needed to do something different, and helium was the obvious solution. We knew commercial divers were using helium to get to these depths. We knew it was non-narcotic. We ran up all of our physiology. We understood all of that. What we didn't know was the decompression schedules — that was our main barrier. We figured out tri-mix and all the elements are pretty simple. It was only later that we realized that other people were using the same concept of using air and helium. One day, a friend gave me a copy of an Explorers' Club Journal. There was an article by Bill Stone about one of the projects he was involved with, and I was so intrigued by his organized tri-mix diving. I wrote him a letter right away and he wrote back a nice long letter and referenced his book the Waukula Springs Project. That became my main reference on how to do this. Bill and I communicated over the next year rather intensely. As a cave diver he had a very strong redundancy mentality, and we as reef divers only have to come straight up and aren't concerned with the redundancy as he is. So he would tell me I would need all these back-up things and I'd say no, no we don't really need it because all we have to do is come up. He educated me through correspondence about the attitudes and the discipline involved with doing multiple gas mixture diving. That's where I got to the point of realizing how important things like redundant back-up regulators were. In the old days, we were just doing this with single regulators, our attitude was, well, they've



never failed us before, so we'll take our chances. That's the attitude that Bill weaned me off of.

When you do these deep dives are they long projects? Most of the deep mixed gas diving I've done has been in the Cook Islands with Chip Boyle. It usually involves shipping 12 bottles of helium and 12 bottles of oxygen to Raratonga months in advance, setting up a field station down there, going through drills and routines and working out protocols and all of that. It's not just simply a dive vacation. The expeditions are generally two weeks long.

When you've found your fishes, what do you do with them? In most cases I bring back as many as I can alive, photograph them in the aquarium and keep some in my home aquarium. Eventually, they end up in jars of alcohol at the Bishop Museum where I work. Our museum has a collection of probably 130,000 specimens of fishes.

They end up in jars and then I'll do all the necessary observations and study that fish taxonomists do to characterize them. Look at all their fins, fin rays, their spines or scales, all that, make all accounts and measurements and write up scientific descriptions of them and describe them and assign names to them. The names are fairly arbitrary in a lot of cases. Angel fishes are my specialty — we've gotten two new species of Angel fish during our Raratonga dives. One of them's a beautiful red and white striped fish — absolutely gorgeous. Chip Boyle was actually the first one to discover that one. So I named that one *Boyleae* — it's in the genus called *Centropygi-Boyleae*. And the other new one is one we only saw in about 330 feet or deeper. We've seen them as deep as 400 — it's all yellow with a big brownish/black spot on the side. We caught the first one of those on our deep air diving. And so that one now has the official scientific name, *Centropyginarcosis*.

Fish names are Latin and we try to use the Latin word that describes the most distinctive

characteristic of that fish. In the case of *Centropyginarcosis*, it was the deepest dwelling of all the species in this group. I figured narcosis was an apt description of its habitat.

What kind of training programs did you put your team through to adapt to the deep water diving? Well, the team consists of me. I'm generally a solo diver. I have a number of friends who have similar interests who I've known for a long time — long before the trimix days, who are involved in a lot of deep air diving — we're sort of self-taught deep air divers. We never took any courses. We never got formally trained for any of this stuff — we just would sort of learn it as we went along, using our own personal limits as guidelines for how far to push ourselves on a given day. There are at least half a dozen people with whom I've done a lot of deep air diving and who I would trust blindly under water.

Are you using any kind of support system? Well, me and Randy Kosaki started out going out on the 200 foot ledges — we started off anchoring the boat and just going down together as any buddy team would. We realized there's a lot of problems with that, especially with unpredictable currents. So we got in the habit of staggering our dives where one of us would be down with a floatline and the other would be in the boat following the floatline. We found that with one person in the boat, one person in the water, we have tremendously greater safety margins for things like unpredictable currents and bail-out options and everything, so we always like to dive with somebody in the boat. We've worked that system out to where we think it's the safest we can do. We find that, especially on deep dives, having more than one person in the water tends to be a greater liability than it is an asset. For the 300 foot air dives, we generally have two people in the water and one person in the boat.

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Richard with the Cis-Lunar rebreather.

We don't like a lot of complicated people around. We don't think the safety would go up any with more people or a bigger boat. In fact, in a lot of the places I dive, I'd much prefer a smaller boat because it's more maneuverable, it's quicker to get around, it's more manageable by different people. Big boats are great for having all kinds of extra equipment aboard, but we don't really want all that extra equipment or need all that extra equipment — a 17 or a 19 foot Boston Whaler is what I consider one of the ideal boats to do these kinds of dives. You can't decompress under a huge boat in a strong wind because the boat's blowing so fast that it's sort of an induced current on the diver — we like to do drift decompressions.

Have you found the Cis-Lunar rebreather advantageous to getting closer to the fishes? Absolutely incredibly so. With certain species of fishes there isn't a whole lot of difference. On our first few dives we noticed this, some fishes kept the same distance as with scuba. Obviously, those are fishes that are more intimidated by our bulk and our size. Other things like sea turtles, eagle rays, sharks and a whole variety of certain snappers, and particularly the kinds of fish that spear fishermen go after. We can get right up to them, like we've never been able to get up to before. I've got full frame photographs now of fish that in the past I've only been able to see their tails swimming rapidly away.

So the fish behavior is more natural? I had no idea that there is so much fish sex going on

out on the reefs. I've seen so many species of fishes spawn on these rebreather dives and courting with each other, and caring about natural behaviors. I always assumed fish were behaving naturally in the water when I was scuba diving around them because they didn't seem intimidated, I mean they seem frightened by me, but I now realize they were keeping an eye on me even though they didn't show it because with the rebreather it seems like I'm not there. I'm not a part of the reef, I'm just an observer to what normally goes on the reef. I've had fish come over to me and spawn right over my head. Certain sturgeon fish like to spawn over prominences or big rocks presumably because there's gyres and eddies in the current that help mix their eggs. I've been sitting out in the sand and I've seen the pair of fish come swimming out straight over to me right over my head, a foot above my head, and spawn right over my head. They're *that* oblivious to my presence, and it has made a huge difference.

What made you go to that system? All along, Cis Lunar is the only rebreather design that I've even been remotely interested in. And that's not knocking the other rebreathers. Each has their purpose, but I guess I inherited too much of Bill Stone's "cover your ass" philosophy — make sure that you can get back to the surface alive and in one piece. And in reading the various snippets about the Cis Lunar rebreather, even before I knew who Bill was, I realized that this was a rig designed with a philosophy that is now comparable to my own. I figure a rig

designed to go way back in a cave *has* to be reliable enough to get someone out. It's the margin for error I want on my open reef dives.

How long have you been using it? I've had it about a month now. I've put 50 hours on it so far. We put about 20 hours on the rig in less than 30 feet of water just to get familiar with the operation of it. We were familiar and comfortable with it after five hours, but we decided to put 20 hours on it anyway, just to be sure we were seeing all the parameters and all the things that could go wrong. Then we put in another 10 or 15 hours in the 60-130 foot range, just getting familiar with bailout options and gas switches. I've since done a few 230 foot dives with it, all without a hitch. All the hours that I've been on the rig are virtually problemless. Over the month of February I'll probably put in another 20 hours at the 200 to 250 foot level. Then by the end of February we're going to shoot for 300 and 400 foot ledges.

Tell us about the dive accident you had. Oh, the bends situation in Palau. That was 1986, I was 19 years old and immortal and nothing could hurt me. It was basically a suicide profile. It was the first time I'd ever dived with a decompression meter — it was one of those old needle and bell things, I guess they're called "Bend-O-Matics" nowadays. Anyway, I went down to about 250 feet and my intuition told me I should get out of there. But the little needle wasn't in the red yet, so I figured I was all right and I saw an interesting fish and tried to catch it and finally caught it. I kept looking at my pressure gauge, and at the decompression meter, kept saying, wow, you know I'm OK. Then I finally decided it's time to go — I guess that was probably after about 15 minutes. On the way up at about 180 feet it was getting awfully difficult to breathe and I was looking at my pressure gauge which still said 750 PSI, and I was confused. And all of a sudden the needle just dropped down to zero. Then I had to skyrocket from 180 all the way up to the surface.

I came up to the surface, got pain in the shoulder, I went back in the water using the old omitted decompression procedures, and the pain went away. Everything would have been fine except later in the afternoon I did another 240 foot dive — same problem with the needle on the pressure gauge. For some reason I'd forgotten about that problem. Again, I was 19 and immortal and extremely stupid, and ran out of air at about 150 feet, skyrocketed to the surface, no more tanks in the boat, and within seconds my body started going numb and bad things happened. I again went back in the water for about 7 minutes at 10 feet on air, which is all the air I had left. That bought me about 20 minutes of asymptomatic time. Enough asymptomatic time to get back to the dive shop in Palau — alert the people that there was a problem. They gave me more tanks, I got back under water — it never got better and it never got worse during the time I was under water. I waited underwater while they got the chamber ready, and at about midnight, the chamber was



Up close with no bubbles, Richard studies the feeding habits of an eel.

finally ready. I spent one night in the chamber. My legs weren't functioning very well but I was able to walk to and climb into the chamber. After the treatment, I was completely paralyzed. I got worse while in the chamber, through no fault of the chamber operator.

I was exhausted — it was 3:00 or 4:00 in the morning, I had been under water for so many hours, and then in the chamber. I woke up the next morning still completely paralyzed from about collarbone down, and they put in another chamber down there in Palau and it didn't do any good. They flew me to Guam where I spent two more days getting treatments. That did some good. It took my numb level from my collarbone down to about my sternum. Then they flew me to Hawaii. I did 28 or 30 treatments in the Hawaii chamber starting off with some 220 foot spikes then back to standard hyperbaric oxygen therapy once a day for eight hours.

When I was done with the chamber treatments I could sort of hobble on my own. Then over the course of the next year I regained most of my ability to walk again, and the improvements continued for about — well, it's continued to this day. I couldn't run for two years, still can't quite dance yet, but it's getting better all the time. So the feeling's coming back very gradually and the balance is coming back very gradually. I'd say I'm at about 95% right now. Ten years later I am still getting better, the improvements are slower though.

Where do you see your exploration five years from now? Don't have a clue. I'm taking it one step at a time, I'm not planning anything long in the future. I just got married, and we're about to have our first baby so that's going to be a big paradigm shift for my life. I imagine that one-atmosphere diving suits are going to play a large role. I was up visiting Phil Nuyton at his plant in Canada and he's got some exciting ideas that will certainly supplement and complement rebreathers. The hard suits will give me the ability to spend more time at depth for much

longer periods of time to scope out areas. Another area that I see a lot of promise in is the resurgence of underwater habitats. Basically saturation diving. I can see spending a couple of weeks in a saturation pod at say 150 or 200 feet and doing excursion dives to 300 or 400 feet on rebreathers. That's where I see the next century.

All the diving technology and tools are for you to find fishes? Pretty much, yeah. If I said I didn't enjoy it, the act of the diving itself and the technical diving, I'd be lying. The fishes have always been and always will be the underlying motivation of why I do this. I might get into cave or wreck diving, only to the extent that there are interesting fishes that live in these areas. But it's always been the fish that have brought me into the ocean.

What do you say to divers that are trying to go deeper and staying down longer? The single biggest and most important word for doing this kind of diving is discipline. I see a lot of people who would like to do this who don't yet have the discipline and don't have the patience to attain the discipline that's required. I just hope that people understand that without that discipline your probability of dying is a lot greater. The discipline is to honestly assess your own limitations without being obscured by ego or pride. Staying within those limitations, or at least cautiously exceeding those limitations in an intelligent way. Bill Stone told me "Cover your ass." Make sure you have several ways of getting out of any situation you get into. Another point — don't use equipment just because it's cool. Decide on the components you need. Learn what you need to do, understand the best way to do it, figure it out for your own particular needs. Concentrate on keeping yourself alive and the people you dive with alive, not trying to be trendy, or not trying to get your picture in magazines or anything like that. You have a reason to do it, whatever that reason may be and you have a reason to stay alive. That's the most important thing. ■

Hot Products for '95

DIVE TRAKKER



Desert Star Systems has introduced Dive Trakker Sport — a simple yet effective sonar based navigation system for recreational divers. Desert Star Systems is well known in professional dive circles for its DiveTrakker DT1 product line, the world's most advanced diver tracking and underwater survey system.

DiveTrakker Sport is a two component system. A small transmitter serves as a beacon emitting sonar signals in all directions as soon as it is immersed in water. This transmitter is used to mark the dive boat or any underwater site for easy return.

The diver carries a compact sonar receiver incorporating a directional sonar transducer and a n LED strip-signal-strength meter. The direction of the transmitter can be found at any time by pointing the receiver until the strongest signal is detected. A scale above the strip estimates the transmitter distance. A high gain / low gain knob prevents receiver overload and allows the system to work at short ranges. Powered by six AA alkaline batteries, the units will last about 100 hours. **Contact:** Desert Star Systems, 408-728-3100 ■

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Contact: Hasselblad Inc. 800-338-6477 ■



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150'	38'	9	35	55	65	70	80	90	100	110	120	135		
110'	35'	12.5	30	45	55	60	65	70	75	80	90	100		
90'	40'	12	25	40	45	50	55	60	65	70	75	80		
70'	50'	22	18	28	35	38	41	44	47	50	55	60		
50'	60'	28	12	18	20	24	27	29	31	34	37	40		
35'	70'	27	10	13	16	18	20	21	23	25	27	30		
25'	80'	24	8	10	12	13	14	15	16	17	18	20		
20'	90'	22	7	8	9	10	11	12	13	14	15	16		
15'	100'	20												
12'	110'	17												
10'	120'	16												
8'	130'	14												

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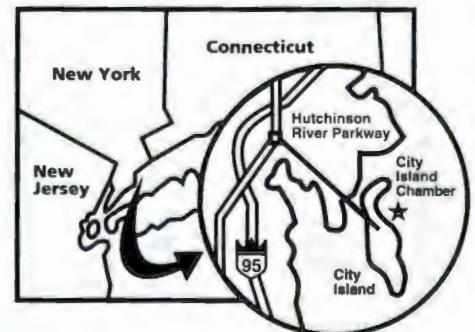
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BOAT DIVING ETIQUETTE

Tips TO MAKE YOUR TRIP MORE ENJOYABLE

By Captain Eric Takakjian

Unlike beach or cave diving, space on a wreck diving charter boat is always at a premium. Regardless of the size of the boat, larger boats carry more divers, so even that fifty or sixty footer can get real crowded real fast! Bearing this in mind divers should pack their gear accordingly. Equipment should be packed in boat friendly containers, such as gear bags, fish totes or action packers. Clothing should be in small duffel-type bags. Avoid using such containers as trash cans, plastic bags or suitcases. Utilizing a proper stowage container for your personal belongings will go a long way towards protecting them from damage or loss, while keeping things well organized.

Bring only what you will need for the trip; try and avoid carrying that extra wetsuit or weight belt. Some large items such as coolers and large tool/save-a-diver kits can be shared amongst buddy teams and small groups. Divers diving with double tanks should bring them already in bands and not as a pile of loose single tanks. This will facilitate loading and stowing the sets of doubles. Lashing gear, such as short lengths of line or tie-down straps are ideal for securing large hard items in place.

Arrive at the boat early enough to get all of your gear aboard and stowed properly before the boat is scheduled to depart. This may be thirty minutes to a couple of hours depending on the trip. It is a good idea to check with the captain at the time of booking the trip, as to what the specific loading times are. If you arrive at night or in the wee hours of the morning, be

considerate of others sleeping on board! Once your gear is stowed, you should try and work out of your space or bunk for the duration of the trip. Stow your gear after you use it, so that it is not in the way of other divers.

As far as what to bring in the way of clothes, staying dry is the key to being warm and comfortable. Practicality takes precedence over fashion! A change of sneakers or a pair of knee high boots are ideal for keeping feet dry. Sweat-shirts, a rain slicker, and a hat are advisable, even during the summer months. Hard soled shoes should be avoided; they are slippery and hazardous to wear on boats. For overnight trips a sleeping bag and a pillow are a must.

On most boats a member of the crew will give a safety briefing prior to departure. These briefs are designed to help insure your safety and enhance your enjoyment, so it is a good idea to pay attention to them. There is usually a good reason for any specific procedures. Each boat is different, so procedures may vary from boat to boat.

Some boats have designated dry areas. Wet gear should be kept out of these areas; no one wants a soggy sandwich or change of clothes. These areas are also utilized by divers changing film or batteries in their cameras, and no one wants a wet camera!

When the time comes to get wet, be sure you and your buddy are ready at approximately the same time. Any last minute adjustments should be made prior to reaching the staging area or



platform. If you need assistance with something, ask a crew member for help, that's what they are there for. Large items such as cameras, stage bottles or scooters can be handed over to you, after you enter the water.

If your dive plan involves recovering artifacts, don't automatically assume someone is going to go retrieve any lift bags you may send to the surface! If you're planning to send up a bag, advise the crew of it, so it will be expected and not mistaken for a diver on an up line. If possible ask someone to retrieve it for you. It is generally recommended practice to send bags up on a line that is secured to the wreck, and then retrieve the line on a subsequent dive.

When exiting the water, large items and artifacts can be handed up to crew members or clipped off on lines left hanging over the side for that purpose. Once back aboard the boat, stow your gear as soon as possible. Loose gear sliding around on deck is a hazard to persons onboard the boat and the gear itself. If you have recovered an artifact, have a place to put it. Spare fish totes and five gallon pails are ideal for this purpose. Coolers work well for fragile items such as china and glassware. If your artifacts have made a mess of the deck, you should clean it up. The crew will not appreciate a big pile of smegma left on the deck!

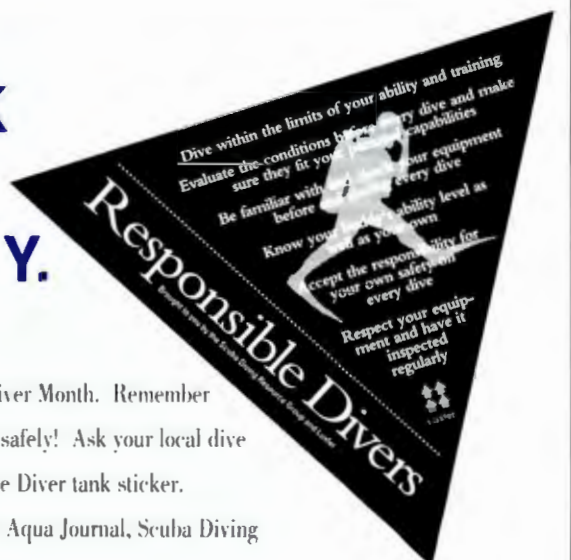
No discussion of boat diving procedures would be complete without mention of the "THE HEAD" and getting seasick. You don't have to be a rocket scientist to be able to flush a marine toilet, although it may seem that way if you didn't listen to that part of the pre-dive briefing. If you are not sure, ask a crew member. Nothing is worse than a plugged up head! Most marine toilets can not digest foreign objects such as cigarette butts, paper towels or sanitary napkins etc. If you are feeling seasick, be considerate of your fellow passengers and don't puke in the head! The best place to be if you are feeling sick is out in the fresh air. Eating saltines and drinking Coke® will help to settle an upset stomach. Motion sickness medication should be taken prior to departing on the trip. If you must throw up, over the down wind side is most ideal, for everyone concerned. Being seasick is nothing to be embarrassed about, it happens to almost everyone at some time or another. A good night's rest the night before and a stomach full of non-greasy breakfast will go a long way toward prevention of seasickness.

By following a few simple guidelines your boat diving adventure can be made easier and more enjoyable. ■

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STREAMLINING

By Captain Roger Huffman

Streamlining. The mere suggestion that some diver has a streamlined rig would make a tuna die laughing. Where he has evolved a high aspect ratio tail for max rpms we wear fins designed for chugging along. Where he has evolved grooves in his skin to tuck his fins into for drag reduction, we dangle gear on clips. Thinking about this, I began to get curious. I wanted to see just how far diving had evolved in the streamlining department so I drove up to Virginia Beach to see the Past Life Dive Regression lady. This time she told me to save my money and just face the facts that on the evolutionary dive scale man is still several rungs below a loggerhead turtle. In fact Mike Nelson wearing a pair of shorts and a single 72 may have been man's peak to date in hydrodynamic streamlining.

So how can a diver streamline his rig, or should he even try? Well, if we don't try, we don't evolve and personally I became very tired of being laughed at by every passing loggerhead. That's when I decided to sit and study my dive rig and everyone else who came on the boat. Talk about enlightening!

With a little study I began to see evolution in the making. The divers from the northeast had addressed the problem of streamlining to avoid entanglement on and even inside wrecks. Some of the solutions to the problems had been hard one to learn. The term "suicide clip" carries a terrible connotation. But out of the suicide clip [a swing gate clip that always seems to attach itself to something without your knowledge] evolved the equipment line, a single line tied to the first stage then routed over the shoulder and ending with a clip and a ring. The line is long enough that you can hold it out in front of you and see the clip and ring, which becomes the attachment point for everything the diver carries. No more groping around in places you can't see trying to release or clip on a piece of equipment.

The cave divers have obviously had a big influence. These guys are really into routing. They set up their first stages so that all their hoses lead down. Then they strap them in place with wire ties so they don't plop, dangle, and drag. They use back mounted BC's and only carry gear required for the dive.

All this cuts down on the diver's profile and serves to reduce drag. That's smart rigging for any type of diving. Then there are the little things that you notice that someone just figures out and you feel are worth trying. For instance, one diver had rolled up his lift bag and slipped it into two surgical tubing bands he had installed at the bottom of his backplate. Later my editor tells me that Capt. Billy Deans showed them that trick years ago . . . oh well I tried it and liked it. It's out of the way, drag free, and easily accessible. Other things just don't need to change. In the beginning divers used a strap

around their neck to keep their backup regulator close to their mouth where they wanted it if they needed it. Then that regulator began to migrate around and all sorts of gadgets showed up to try and keep it in place. Now, it seems to have come full circle and I see divers hanging all their second stages around their necks again.

Last year I had another lesson on streamlining pounded into my head. We were anchored up on a shallow wreck on the shoals where the current was two notches above ripping. The only reason we even attempted the dive was that we had a crew of highly seasoned divers and if the current had moved this far inshore we were likely to run into it wherever we went. The divers wore wetsuits or drysuits, doubles, all of their individual rigs were well thought out with streamlining in mind. Well, some of them made the dive and some of them didn't make it to the bottom in thirty feet of water.

Then while we were sitting on deck licking our wounds a visiting boat from Virginia pulled



up with a group of highly inexperienced divers in skins and single tanks. Without ponies or up line reels they jumped into the waiting arms of the current monster wearing grins of innocence while we waited for them to start popping behind the boat. They all made the dive and came up grinning while we pulled the hook and slunk out of there with our lesson learned. One rig does not fit all occasions. A pair of 120's will see you through a deep dive but do you really need them on a shallow dive? A single with a "Y" valve, a lift bag tucked behind you, a small BC, and a few items in a small bag clipped to an equipment line would have made for a much more enjoyable dive on that occasion. ■

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CAVE DIVING EQUIPMENT: ORIGINS AND APPLICATIONS

by Shannon Sikes

CAVE diving equipment continues to evolve, as the recent trade shows in San Francisco demonstrate. Yet the origins of much of the gear we've come to depend upon are not well-documented. The first backplate, for example, was made out of a discarded Stop Sign. Greg Flannigan found on the side of the road in the early 1980's. At the time, cave divers were using "two-inch webbing through the bands of the tanks, which meant having a harness on every set of 104's or every set of doubles you owned," according to Lamar Hires of Dive Rite Manufacturing. "Back then we were diving jacket BC's for the most part. Greg was wanting to dive with a back mount. He wanted something different so he could sandwich the wings to the tanks. So that's when he came up with a metal backplate with a low profile. And he made it out of an old Stop Sign. "Luckily," Lamar adds, jokingly, "he didn't patent it."

Much of the gear that both wreck and cave divers now consider standard was born out of necessity and made in this fashion. Openwater gear was used, but obviously had to be altered to meet the needs and demands of the unique cave environment and of the divers diving it. As cavers will tell you, what is now standard "tech diving" gear came from the cave diving community. Stop Sign back plates, reels out of bent and formed aluminum, lights out of PVC tubes, and of course lots of duct tape, have evolved into the clean and sophisticated rigs most of us use today.

The terminology used to describe this early gear-- "stab jackets and choker rings"-- speaks volumes about functionality and comfort. Short for stabilizing jacket, the "stab jacket" was a traditional open water BC with full flotation all around the front, over the shoulders and through the back. Lamar comments, "That was a step up from horse collars. The stab jackets provided 40-45 pounds of lift. But as with any piece of open water equipment we didn't have D-rings on it, so it was really cumbersome in terms of hooking up equipment. Streamlining," Lamar pauses, choosing his words carefully, "sucked. Big time."

Choker rings came about because of stage diving. "We didn't have a harness with a good mounting platform, so we used choker rings. We would take a piece of line and run it around the valve on each of the tanks manifolded together and then bring it around to the front so it sat right there on your chest. Then you hook-

ed it off to a brass ring. The brass ring was where you clipped off the neck of your stage bottle; you clipped off the bottom of the tank on a D-ring on the bottom of your harness. So all your bottles were laid out there right flat in front of you. Today we have the stages off to the side; back then they were just underneath. The biggest fear, though, came from when you undid the harness to get out of your tanks and realized you didn't undo the choker ring."

This, of course, provides a whole new meaning for the term -- redneck. Stage configurations obviously had to evolve quite a bit from the choker ring, and did because of explorer Woody Jasper. "Woody was one of the first ones to stage in the manner that we do now," Lamar comments. "As we started looking at his rig, we realized that his bottles were worn almost on the sides instead of directly in front. He was utilizing D-rings on his harness and actually side-mounting the stages to give him some access to the frontal area so he wasn't all cluttered. Woody was basically side-mounting back in the early 80's." Harnesses, or "mounting platforms," evolved because "conventional BC's weren't stable and didn't offer hook-ups in the right places, so the harness on the backplate gave us a good, stable platform. We could position D-rings where they were needed and not have to sew them on stab jackets and have them rip off, or not have access to them because the BC's were in the way. That's when wings came into play. A couple of companies were making them, and we started using them for back-mounted doubles, but we were always having to add an extra grommet in them because they were set up for plastic backpacks instead of a backplate. But now, all the companies have grommet positioning 11 inches apart to accommodate the traditional backplate rig." "All this combined," Lamar notes, "gives us the streamlined configurations we have today."

As cave diving became more and more popular, not everyone was into making their own gear. "The first actual mass production of back plates," Lamar relates, "was at Branford Dive Center in Branford, Florida, with Gene Broome. Before Ginnie Springs had a program going, before Steamboat Inn, there was [and is] Branford Dive Center. A lot of the equipment was hand-made by people and taken to Gene to trade and barter for air. One of the first reels made and sold on a production basis was the 'Wilson Reel,' as it was called: an enclosed primary reel that held about 800' offline. Forrest Wilson was making those. He made them and started distributing them through PMI [Pigeon



Dive Rite Mfg. Transpac

Mountain Industries]. But that was it. No safety reels; no jump reels. It was either this huge reel or nothing. Wes Skiles and I used to build lights at Bradford, and I used to make reels from parts from the chemical plant I worked at in Jacksonville. I used to go in and use the machine shop at night. We used to make a little bit of money, but mainly we bartered it out for air."

Along with all the modifications in existing equipment came a change in the type of equipment being produced. "Yesterday there wasn't all that much equipment out there that suited the purposes of cave diving. Lights weren't made to run with reels, for example. Lights were designed so that if you had a light in your hand you didn't do anything else on the dive except hold that light. So in the past there was a lot of duct tape, zip-ties, hose clamps -- everything we could use to modify a rig. We were always having to modify every piece of equipment. Today's manufacturers are becoming more in tune with technical diving and there isn't this need for every wreck or cave diver to have two rolls of duct tape and a thousand zip-ties because the equipment is becoming more streamlined from the start. We don't have to look like a hardware store anymore." Once there was mass production of this kind of gear, interchangeability was no longer a problem. "Before, everything was a custom piece of work. A person couldn't call in and say 'I need a new this or that.' You would have to send it in to ensure that the new part would fit the light or the reel. Wreck divers and cave divers aren't these small little groups anymore."

Although much of the gear for wreck divers and cave divers is now the same, the use of that

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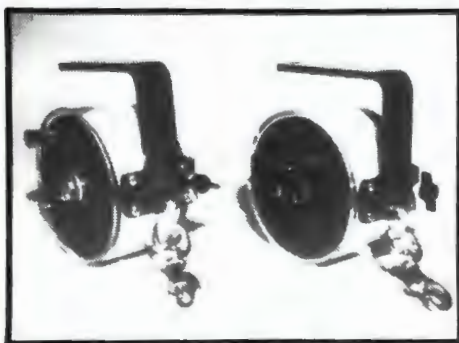
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gear in the two environments is often different. "Wreckers are more brutal on their gear than cavers," Lamar observes. "The big difference between many wreck divers and cave divers is that cavers learn finesse; wreck divers don't. The difference is in the approach. A wreck diver's response to being stuck may be to pull harder instead of asking, 'Why am I stuck?' If a hose gets snagged, you don't just put curly-wrap around it and leave it dangling; you tuck it in and clip it off. All this massive protection of gear that I see among wreck divers should suggest something other than just more protection. That's related to something else I see going on among both wreck and cave divers: many people immediately want to modify gear because of a problem they had, rather than analyzing the problem itself. For example, someone scratches up their gauges and immediately goes out to buy gauge guards. What are you doing that you need them? Is it something you are doing? Is it where your gauges are stowed? Maybe if you clipped off that console, it wouldn't get scratched up so bad. If it's operator error, then you should address that problem. That's where a lot of divers need to sit back and really analyze what's going on."

Ultimately, when people have problems with equipment, they shouldn't immediately start assuming the equipment is faulty. Most equipment problems can be avoided by proper maintenance and familiarity. Whether you use your gear wrecking or caving or just watching fish, knowing how to use it and how to maintain it is the key to using it well. ■

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Book Review

Beating the Bends -

The Diver's Guide to Avoiding Decompression Sickness

by Alex Brylske

BEATING The Bends



We applaud this concise yet thorough book, and advise every diver to read it and review it each season. In enough detail to please physiologists and hyperbaric specialists, yet written by Brylske in his usual diver-friendly style (he was one of the principal designers of the PADI materials), *Beating the Bends* is solid work.

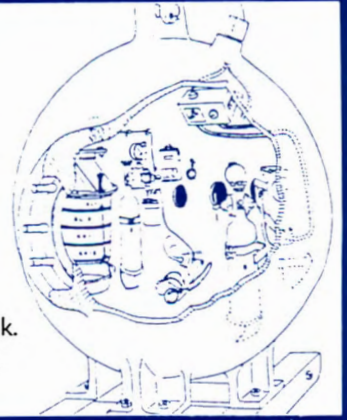
There's a wealth of information in this volume, from theory to practice. Nicely organized material on the basics of decompression illness serve as a primer for those new to the subject. Safety, prevention, physiology, procedures, and dive computer use among other topics, make this the most comprehensive work of its kind targeted at the general diver. This book will go a long way towards taking the bends "out of the closet" and properly into the consciousness of all divers.

Beating the Bends is clean, well illustrated, and handy enough to slip into your shoulder bag as you jet off to your next adventure. Go on, read it on the plane, you've already seen that movie.

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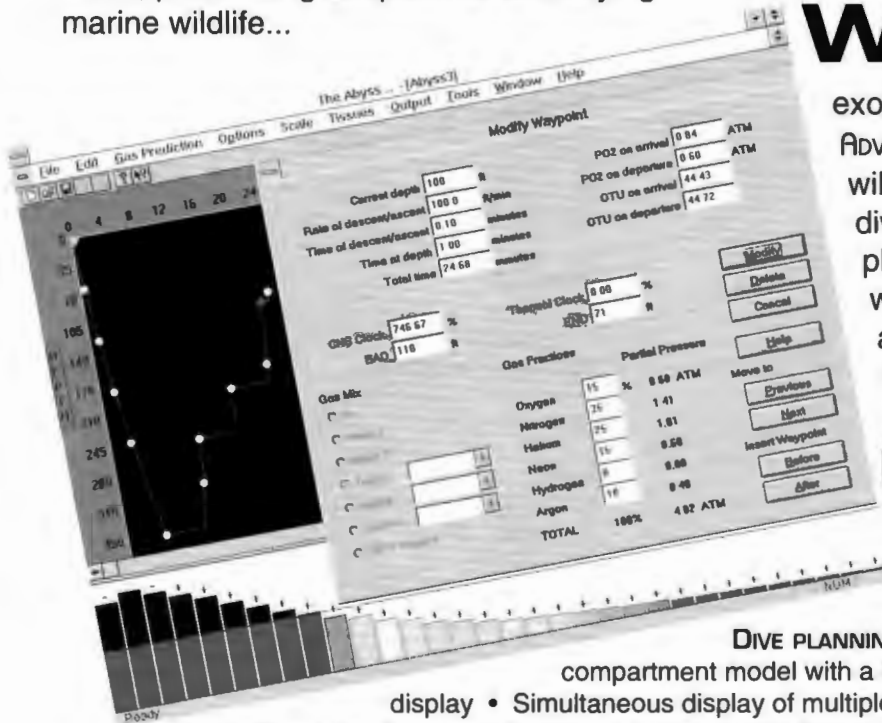
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May

- 6 USS San Diego
- 7 Lizzie D 7:00am
- 7 Lizzie D 12:30pm
- 13 RC Mohawk
- 20 Oregon
- 21 Lizzie D 7:00am
- 21 Valerie / Pipe 12:30 pm
- 27 Lillian
- 28 Iberia 7:00 am
- 28 Fran S /Iberia 12:30 pm
- 29 Yankee / Tarantula

June

- 3 Asfalto / Bald Eagle
- 4 Iberia 7:00 am
- 4 Lizzie D 12:30 pm
- 7 Bug Hunt
- 9 Ayuroca
- 10 USS San Diego
- 11 Pipe Barge 7:00 am
- 11 Valerie / Pipe 12:30 pm
- 14 Linda / Kenosha
- 17 Stolt D'Agali
- 18 Lizzie D 7:00 am
- 18 Fran S /Iberia 12:30 pm
- 21 RP Ressor
- 23 Virginia / Reggie
- 24 Coal Barge 7:00 am
- 24 Lizzie D 12:30 pm
- 25 Pinta / Bald Eagle
- 26 Andrea Doria

Jeanne II

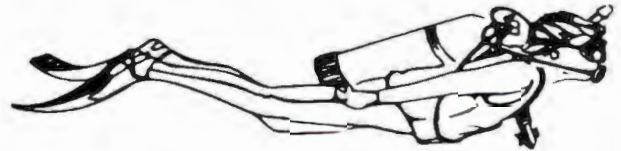
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April

- 1 USN Algol / Pinta
- 2 RC Mohawk / Ambrose
- 8 Mystery / Warrior
- 9 Bald Eagle / Turner
- 15 Lizzie D
- 22 British Corvette
- 23 Asfalto
- 29 Arundo / Bald Eagle
- 30 New Mystery Wreck

May

- 6 Lizzie D
- 7 Pinta / Macedonia
- 13 Stolt / Algol
- 14 Asfalto
- 20 Liberty Ship
- 21 Lizzie D
- 27 RC Mohawk / Mystery



- 28 British Corvette
- 29 Immaculata / Cindy

June

- 3 Gypsy / Asfalto
- 4 Lizzie D
- 10 Pinta / Bald Eagle
- 11 New Mystery Wreck
- 17 Valerie / Pipe Barge
- 18 Liberty Ship
- 19 Immaculata / Mystery
- 24 Arundo / Pinta
- 25 Steam Ship

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April

- 15 Turner
- 22 Iberia
- 23 Asfalto
- 29 Sandy Hook
- 30 Bald Eagle

May

- 14 Mother's Day Dive
- 17 Night Dive
- 20 Stolt D'Agali overnight
- 26 3 day Memorial Day
Wreck Weekend

June

- 3 Varanger overnight
- 8 Night Schooner
- 10 Lillian overnight
- 14 Night Dive
- 17 USS San Diego overnight
- 21 Night Dive
- 24 Texas Tower overnight
- 25 Jacobs Return
- 28 Night Dive

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April

- 23 USS San Diego
- 30 USS San Diego

May

- 6 USS San Diego
- 7 USS San Diego
- 10 USS San Diego
- 13 USS San Diego
- 14 Oregon
- 17 USS San Diego
- 19 Linda
- 20 USS San Diego
- 24 USS San Diego
- 27 USS San Diego
- 28 USS San Diego
- 31 USS San Diego

June

- 2 Frank Buck - new
- 3 USS San Diego
- 4 USS San Diego
- 7 USS San Diego
- 9 Virginia 170'
- 10 USS San Diego
- 11 USS San Diego
- 14 USS San Diego
- 17 USS San Diego
- 18 USS San Diego
- 21 USS San Diego
- 23 Coimbra 180'
- 24 USS San Diego
- 25 USS San Diego
- 28 USS San Diego
- 29 Andrea Doria

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Margie II

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