ADVANCED DIVER MAGAZINE

ISSUE 16 / 2004

- Isla del Coco
- Inspiration CCR
- Sixgill Shark
- Diamond Rock Cave
- Cruisers for Breakfast
- B-29A Superfortress
- David Evans Photography
- Cenote Kanun
- Wreck - Trek / BC
- Bianca C Wreck
- Ziggy Livnat Photography
- Mystery Schooner
- Dissecting a Hammerhead
- SS Cumberland
- Exuma Cave Expedition

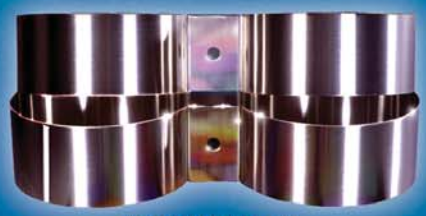
$7.50 U.S. Issue 16
41>
0 74470 56000 5

ADVANCED OPENWATER TO TECHNICAL EXPLORER

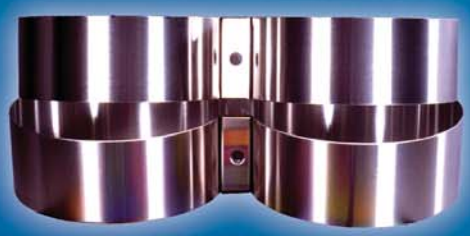
the art of DIR diving

HALCYON
DIR Dive Systems

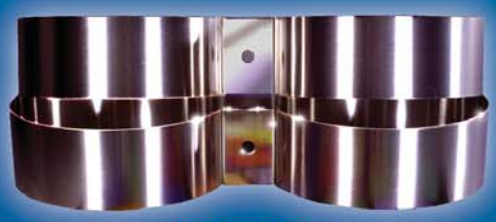
HMI & HID Lighting for video, still photography, and motion picture production · HID & Halogen Primary Lighting
RB80 Rebreather · Explorer Double Cylinder & Pioneer Single Cylinder Multifunction Compensators
Semi-Closed & Closed Circuit Lift Bags · Diver's Life Rafts & Surface Markers · Reels & Spools
Scout Back-up Lights · Dry Suit Accessories · Manifolds, Valves & Hose Kits
www.halcyon.net · info@halcyon.net · 1.800.HALCYON



5.50"/140mm



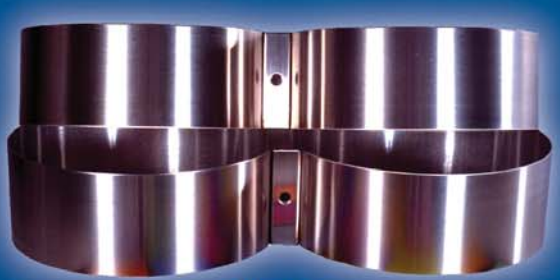
6.90"/175mm



7.00"/178mm

7.25"/184mm

8.00"/203mm



8.00"/203mm
Extra Duty

HIGHLAND

Cylinder Bands

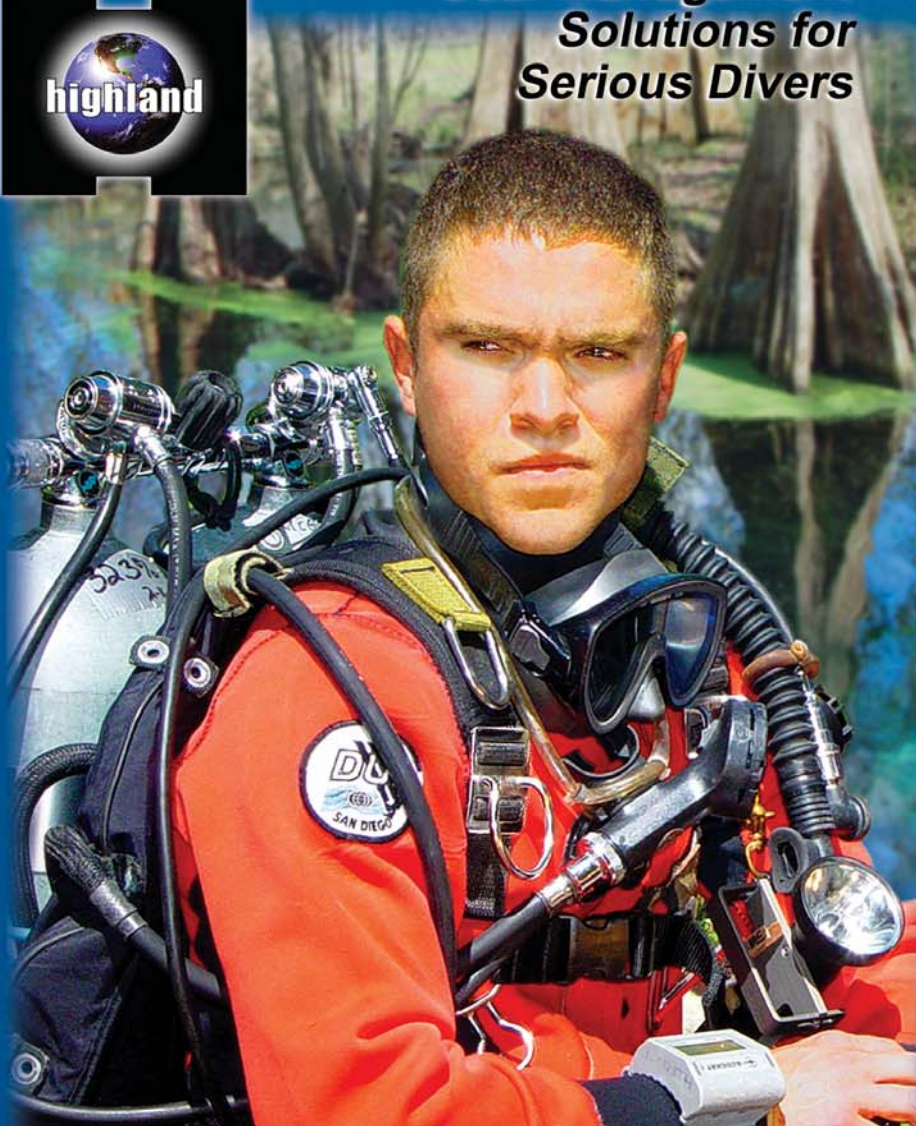
designed to fit . . .
built to last . . .

Double tank bands
for all popular tank
and manifold combinations

highland-millwork.com

highland

Gear Management Solutions for Serious Divers



PUBLISHER'S NOTES

My daddy says he is excited about the progress *Advanced Diver Magazine* has made in 2003 and is gearing up for another great year.

He has many new and exciting expeditions planned for 2004 that ADM's readers can join, including Mexico's Yucatan, Bahama's Caysal Banks, Lake Superior's Isle Royal, Belize Blue Holes, and the Pacific North West, just to name a few.

Many new divers from all over the world are also working with my daddy to help provide you, the reader, with the latest in exploration discoveries, new dive equipment, adventure travel, and outstanding photography.

Dad says over 20,000 divers worldwide and growing now read ADM. He told me he wanted the best dive magazine in the world. Expanding and becoming larger while still keeping the highest quality magazine is his goal for 2004.

Dad would like to welcome ADM's new editor, Dave Miner to the staff. Dave is an experienced technical diver and a professional writer.

The list of staff writers and photographers continue to grow as ADM expands its army of professional divers around the globe. If you have something to offer, please don't hesitate to contact my daddy or mommy at AdvDvrMag@aol.com.

Even though I am too young to dive, I will be here practicing with my new baby Armadillo side mount harness, so I'm ready when the time comes.

"Life is short, drop your diaper and DIVE!"

Savannah Lynn Bowen
Master Diaper

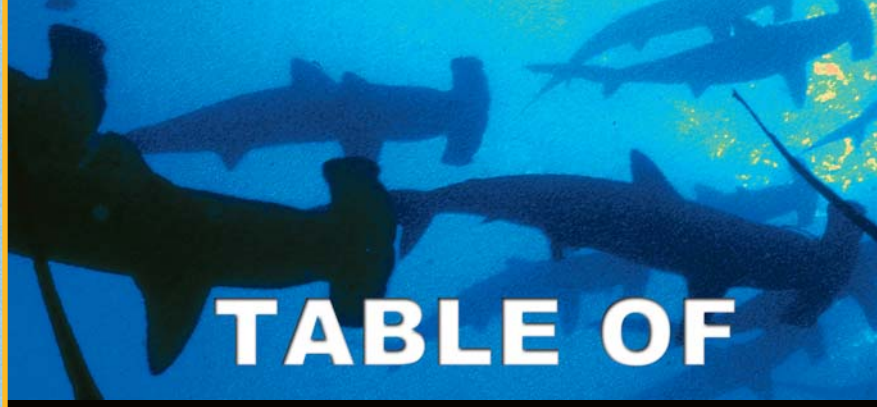


TABLE OF

Cover: Archeologist Luis Martinez examines animal remains located in the "Well of Time." *See page 41*

Large areas of cracked mud discovered at depths from 35 to 60 feet indicate the extreme drought conditions the Maya faced. Scientist speculate that these extreme changes in annual rain fall may have contributed to the demise of the ancient Maya culture.

Photo by Wes Skiles

CONTENTS

Exploration by Air

Capt. Glenn Larson's restored, mint condition 1939, Cessna-165 with Airmaster wipline 2350 amphibious floats.
www.GoldenAgeOfAviation.com

Photo: James Kelderman

see ADM On-Line for the editorial

ADM

Advanced Diver Magazine, Inc. © 2004
All Rights Reserved

Publisher Curt Bowen
Co-Publisher Linda Bowen

Deco-Modeling Dr. Bruce Wienke
Editor / Writer Dave Miner
Editor Heidi Raass Spencer
Master Diaper Savannah Lynn Bowen
Web Master Jakub Rehacek

Staff Writers / Photographers / Videographers

Jeff Barris, Jon Bojar, Scott Carnahan, Kevin Denlay, Rusty Farst, Aldo Ferrucci, Jill Heinerth, Brett Hemphill, Cass Lawson, Dr. Thomas Iliffe, Jitka Hyniova, Tom Isgar, T.R. O'Leary, Gaby Nenadal, John Rawlings, Jim Rozzi, Wes Skiles, Tamara Thomsen

Contributors (alphabetical listing)
Samir Alhafith • Joan Allen • Alan Barefoot
Ron & Chris Benson • Tom Berninger
Jack & Karen Bowen • John "Sparky" Campbell
Rich & Doris Chupak • David Evans • Jeff Friday
Chuck Gullick • Chuck Joseph • James Kelderman
Collin Kliewer • Emory Kristof • Capt. Glenn Larson
Gregg Mikolasek • Charles Northrup • Bob Olson
Eric Osking • Bruce Partridge • Jeff Peterson
Rob Polich • Eric Reintsema • Jay Roberts
Derik Smith • Cliff Stevens • Steve Straatsma
Jere Thorne • Mitch Thorne • Joel Tower
Charley Tulip • Joris Van der Ham

Subscription Rates
$25.00 (4 issues) • $45.00 (8 issues) • $65.00 (12 issues)
Canada and Mexico add $25/yr
Other foreign add $35.00/yr S&H.
Visa • Mastercard • American Express • Discover

Contact Information:

Write P.O. Box 21222, Bradenton, FL 34204-1222
Phone 941-751-2360
Fax 941-792-1787
E-Mail Office: AdvDvrMag@aol.com
C. Bowen: EANx@aol.com

ADM On-Line:
www.AdvancedDiverMagazine.com

ISLA DEL COCO

By Jim Rozzi
& Curt Bowen

White Tips
Black Tips
Silver Tips
Mantas
Whale Sharks
Marble Rays
& Hammerheads

Up Close and Personal

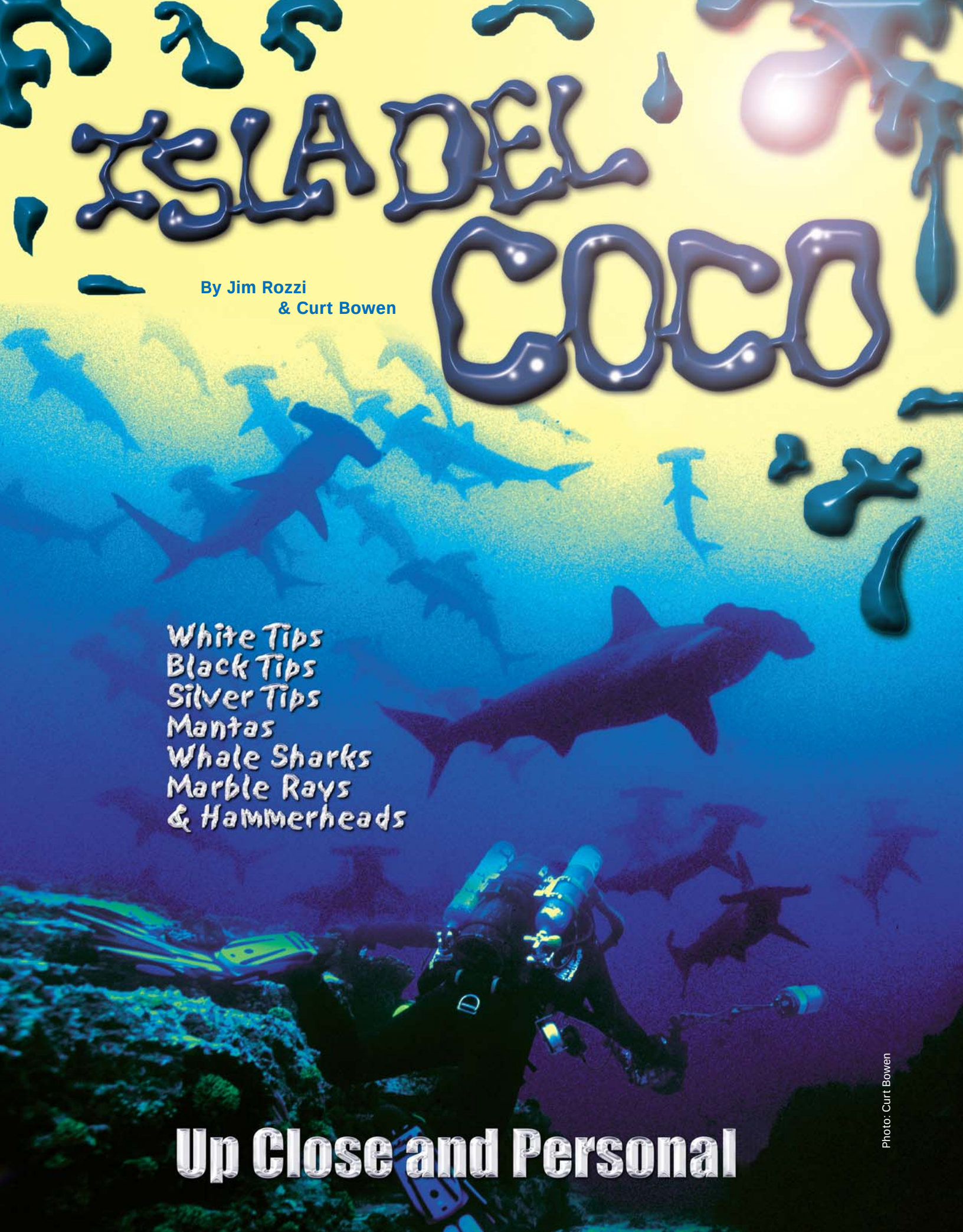


Photo: Curt Bowen

Imagine yourself in total darkness, on a reef, hundreds of miles from any major land. Your eyes are glaring into the endless blackness as your seemingly insignificant light beam frantically scans around, only catching the refraction of hundreds of pairs of silver eyes. Then, all of a sudden, you notice that you're completely surrounded by hundreds and hundreds of White Tip sharks that are scanning the reef in search of prey. Many times they come close enough to rub against your body.

Now, imagine clinching to the top of a lonely seamount that sharply rises from the seafloor hundreds of feet below. A swift ocean current is attempting to rip you from the rock as you stare into the cobalt blue darkness. Faintly, off in the dark gloom, your eyes make out a dark shadow approaching. Suddenly, a single ten-foot Hammerhead shark approaches. It's close enough for you to see your reflection in one of its deep black eyes. As the wondrous creature passes, you turn your attention back into the deep blue darkness. Off in the distance you see another dark shadow, then another, and another. Suddenly, the whole ocean around you comes alive as hundreds of large schooling hammerheads engulf the seamount. In awe, you find yourself flattened tight against the cold rock in a futile attempt to camouflage yourself in hopes that none of these sharks consider you as a potential meal. As quickly as they appeared, the large school fades and disappears back into the deep blue abyss, leaving you unscathed and alone with only the memory of this breathtaking experience.

This is Cocos Island!

Classified as one of the worlds best underwater locations, Cocos Island, located 331 miles into the Pacific Ocean, off the western coast of Costa Rica, provides experienced divers with an unforgettable, once-in-a-lifetime experience.

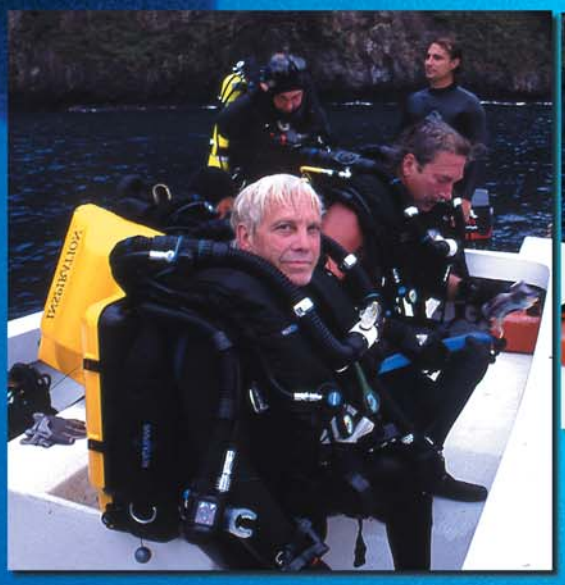
Cocos Island is located five degrees north of the equator and is the most northern island in the Galapagos chain. Established as a world preserve in 1997, the whole island and its surrounding waters are protected from any commercial fishing or harvesting.

Our adventure started with the Cocos Aggressor, the Okeanos, a 110-foot custom dive vessel, who holds one of the few permits that enable divers to experience this truly amazing destination. The boat ride from the west coast of Costa Rica to Cocos takes around 36 hours. Once the Okeanos arrives, it's possible to hide away in several protected areas and out of any rough sea conditions. The amount of sea life surrounding the island and its underwater pinnacles is truly amazing. Every dive provides sightings of schools of fish in the thousands, dozens of Marble rays, and hundreds of white tip sharks.

Ron Benson, owner and operator of Going Under Dive Center in Maple Grove, Minnesota, invited ADM staff writer Jim Rozzi and myself for a journalistic view of Cocos on a special rebreather only charter. Eighteen certified rebreather divers from the U.S. and Canada joined the charter with several different types of rebreathers, including the Megladon, Inspiration, Kiss, Drager, and the RB80.

The reduced amount of bubbles, elimination of noise, longer bottom times, and increased depth durations enabled the divers to interact much closer with the marine life without being conceived as something foreign. Standard gas fills on the Okeanos went from 80 cubic feet per diver, per dive, to a 10 cubic foot top-off of oxygen and air diluent once a day. In total, the whole group of 18 divers used less than two oxygen bank cylinders for the duration of the trip.

Photo: Jay Roberts



Poised motionless on top of a lonely sea-mount, a small group of bubble free rebreather divers stare off into the dark abyss. They have traveled far to experience one of the oceans true wonders.

Emerging from out of the gloom, hundreds of Hammerhead sharks cruise over the divers heads and disappear back into the darkness.

Photo: Curt Bowen
Nikon N90 - Aquatica Housing
Provia F100 F2.8/60
Natural Sunlight / Depth 115 fsw

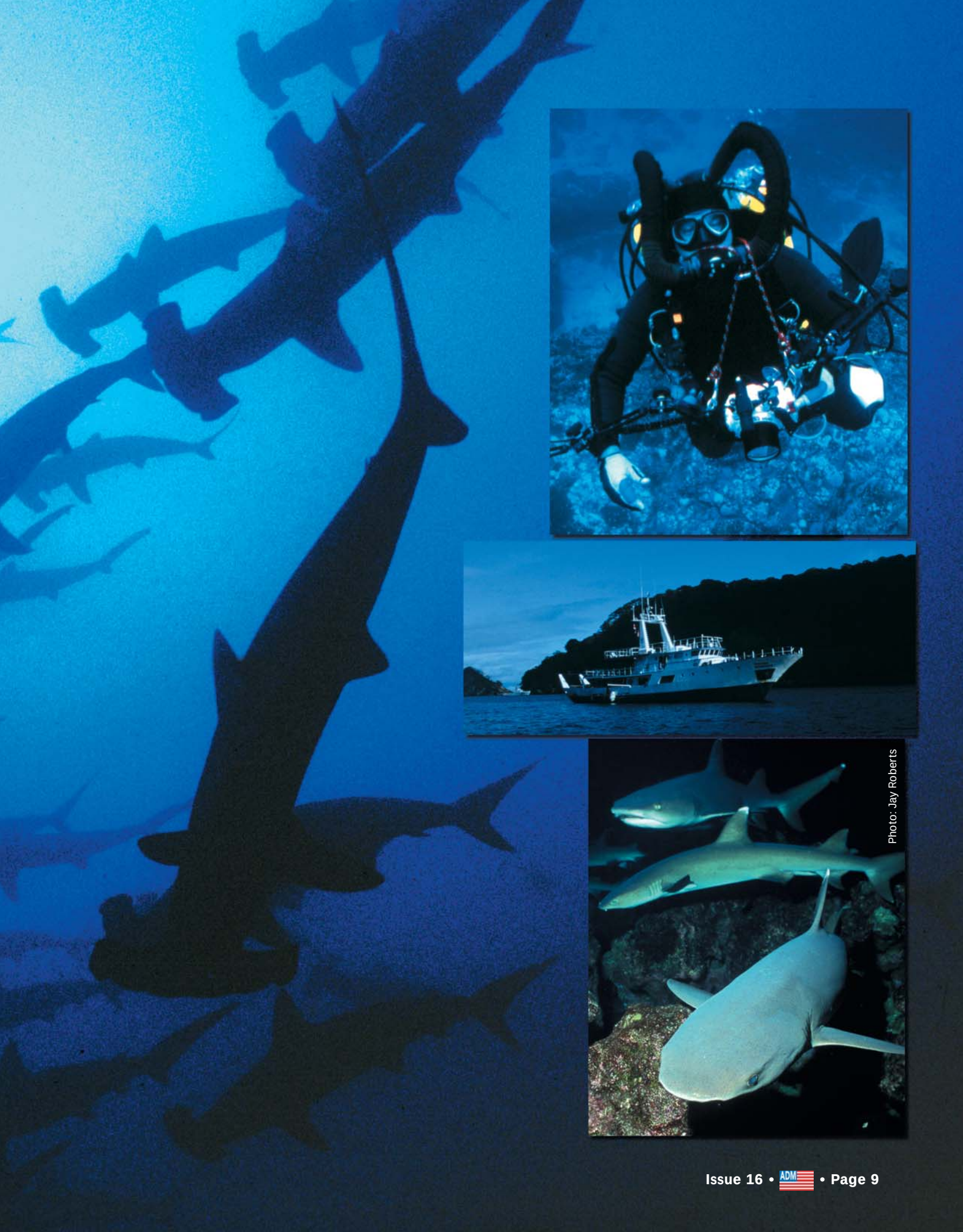


Photo: Jay Roberts

Photo: Jim Rozzi

While the Okeanos stayed anchored in the protective cove, the rebreather divers were shuttled to the dives sites on smaller vessels called Pangas. Once on the site, a time duration of around 60 to 100 minutes was set for the divers to return to the surface. Unlike a standard aluminum 80 cubic foot cylinder, many of the closed circuit rebreathers had three to five hour dive duration on less than 20 cubic feet of oxygen and diluent.

Diving is somewhat different in Cocos compared to a normal reef excursion. Being famous for it's large pelagic inhabitants, the focus of most dives was to interact with as many of these creatures as possible. Many times you found yourself perched on the edge of a wall like a lonely crab staring off into the vast blue void waiting patiently for any dark shadows to appear in the distance. Thousands of Horse Eyed Jacks, cigar minnows, and an enumerable amount of reef fish passed within inches, seemingly unaware of your existence.

This is the closest to being a real fish you'll ever achieve. The only noise you would hear was the occasional piston sound of your injector automatically maintaining the oxygen set point of 1.4 PO2 in the breathing loop. It was so quiet, that you started noticing that the ocean is really an extremely noisy place. Muffled sounds of waves breaking against the rocks, a pinging noise as the sand shifted along the ocean floor, grunts from a multitude of reef fish, whistles and song from distant marine mammals, along with a maraud of indescribable sounds echoed throughout the seas.

The wildlife is so extreme in Cocos that almost anything can appear in front of you from the deep blue abyss. When it does appear, it swims close enough for a one-on-one personal experience, and then disappears back into the darkness, leaving you with a visual experience of a lifetime.

The Okeanos Aggressor

Built by Codecessa shipyard in Viareggio, Italy, the 110-foot, 24-foot beam, all-steel vessel has a range of 1,500 nautical miles. It departs biweekly from the port town of Puntarrenas, Costa Rica.

Equipped with the most modern electronics, the Aggressor Okeanos has nine guest staterooms, each with double and single berths. All cabins are fully carpeted, air conditioned, and have a private bath and in-room vanity. The main salon is furnished for comfort and relaxation. Stocked with a large variety of DVD's, videos, books, and magazines help make the long crossing entertaining. The Okeanos has multiple sun decks and a wet bar for those divers who wish to relax and take in some rays.

The large dive deck provides each diver with his or her own personal location to set-up and store equipment. Cylinders are conveniently filled with either air or Nitrox between dives by the staff gas blenders. The dive deck also contains special protected tables and rinse tanks for video and photography equipment.

Going Under Dive Center
Specializing in rebreather adventure dive travel
10024 Co.Rd. #81 Maple Grove, MN 55369
www.goingunder.net

For more information on the Aggressor Fleet
www.aggressor.com.

INSPIRATION CCR

By Curt Bowen & Ron Benson

The Inspiration is a closed circuit system which means that the breathing gas is continuously recycled in a closed loop. This is in contrast to conventional open circuit diving in which the bulk of the exhaled breath is wasted by venting it out into the surrounding water.

With the Inspiration Closed Circuit, exhaled air is directed into the right hand counterlung then over the shoulder into the bottom of the scrubber unit. It then passes through a Sofnolime filter which absorbs the carbon dioxide before entering a mixing chamber where 3 individual oxygen sensors measure the oxygen pressure in the breathing gas (ppO2)

A voting logic system is used by the electronic controller which automatically instructs the solenoid to inject oxygen into the mix to replenish the oxygen the diver has metabolised and maintain the ppO2 at the chosen Setpoint. The replenished breathing mix passes into the inhalation counterlung to repeat the cycle.

The Inspiration has two default setpoints for the partial pressure of oxygen in the breathing mix - 0.7 bar and 1.3 bar. The controller will automatically maintain the ppO2 at the Setpoint chosen (ie.0.7 bar for the start and finish and 1.3 bar for the rest of the dive) ie. at a constant ppO2. This means that the Inspiration delivers a constant, optimum or 'best' oxygen-rich breathing mix at all phases of the dive.

There are two 3 liter cylinders, one filled with pure oxygen, the other with a diluent gas.

Diluent is manually injected by the diver to maintain volume as the counterlung collapses with increasing depth.

With the Inspiration the diver has the option of Air, Trimix or Heliox as a diluent. The depth limit is governed by the diluent gas used. If air is used the depth limit is the same as for open circuit air, which is 130ft.

The Inspiration mouthpiece is designed so that it can be closed by rotation of the body section and sealed water-tight before removing from the mouth when in the water. If the mouthpiece is removed without closing it first, water may enter the loop. The Inspiration is very tolerant of small amounts of water-entry as there are a series of water traps and barriers throughout the loop but allowing in excessive quantities should be avoided in the first instance by correct practice.

Oxygen Controller
The controller consists of three oxygen cells **(A)**, two control units with their own displays **(E&D)**, separate batteries **(B)** and one solenoid valve **(C)** for oxygen addition. Two control units act as a master control and a slave control. The master unit controls the oxygen solenoid whilst the slave acts as a secondary display, but ready to take over if the master controller fails. Whichever control unit is switched on first becomes the master control unit.

Chest Mounted Counterlungs Left **(I)**, Right **(N)**
Two sizes of counterlungs are available: medium and large. Both have sufficient volume for breathing.

Over-Pressure Exhaust Valve **(M)**
A two position valve with an additional manual override. The fully closed position is used for detecting leaks in the system during the positive pressure predive test. The open position is used for standard diving conditions and provides a over pressurized dump upon ascent.

Mouthpiece Valve **(K)**
Easy to close and open mouthpiece operates with a simple clockwise - counterclockwise movement.

Diluent (J) and Oxygen (L) Inflators
Diluent and oxygen manual inflators allow the diver to manually add either diluent or oxygen. The manual diluent inflator **(J)** allows the diver to purge the loop of high po_2, convert to semiclosed, or semiclosed-emergency bailout. The manual oxygen inflator **(L)** allows the diver to manually control oxygen addition for increased decompression po_2 or convert to semiclosed mode.

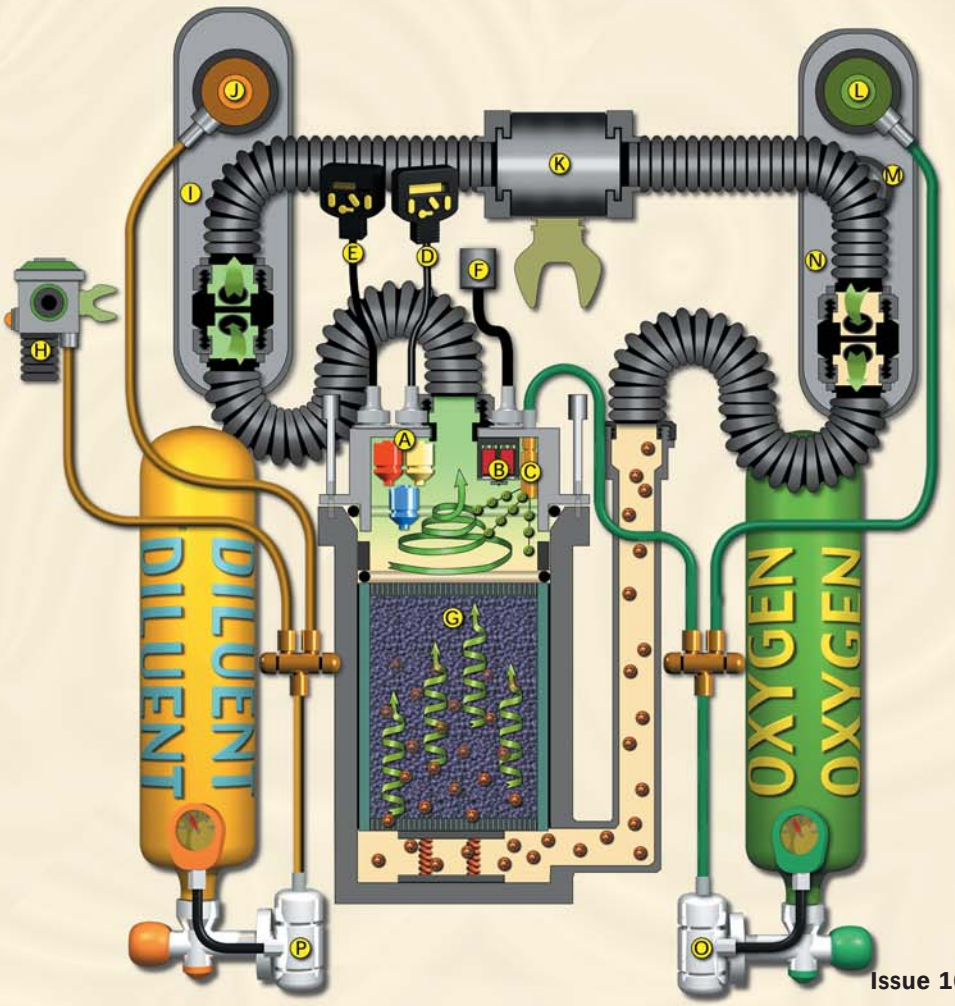
Audible Warning Device (F)
Warns the diver in the case of low oxygen ppo_2, high oxygen ppo_2 and low battery.

CO2 Scrubber Canister (G)
Axial flow, 2.45 liter CO_2 absorption cannister, 3 hour duration cannister.

Oxygen Cylinder (O)
Steel, 3 liter / 232 bar (24.5 cu ft / 3,500 psi)

Diluent Cylinder (P)
Steel, 3 liter / 232 bar (24.5 cu ft / 3,500 psi)

BCD Inflator and Open Circuit Bailout Regulator (H)
BCD power inflator for buoyance control and emergency open circuit second stage regulator.



All 3 oxygen sensor readings are displayed simultaneously in real time on both Master and Slave controller display units which allows you to see sensor movements and easily monitor their health. Sensor validation is also carried out by the controller software and an audible warning sounds if an individual sensor strays abnormally. Both high and low ppO2 levels activate the audible alarm - that is, at a high point of 1.6 bar and a low of 0.4 bar. These levels allow reasonable time to take appropriate action - such as, manually inject either oxygen or diluent or to bail-out to open-circuit. Both have their own power supply. In the event of the Master shutting down, the Slave instantly and automatically (within 0.06seconds) becomes the Master and controls the ppO2 in the loop.

Normally the Slave is simply a secondary display using the same three oxygen sensors as the Master. However, it uses its own calibration factors and is completely independent of the Master and so can be used to validate the Master. Both displays can be used as a simple ppO2 monitor, allowing you to control the oxygen pressure manually by operating the oxygen or diluent valves as required.

During a dive very little diluent gas should be used. Typically only about 30 or 40 bar from the 3 liter cylinder. The diluent cylinder provides gas for counterlung volume during the descent, for lung volume adjustments throughout the dive, for BC inflation and for dry-suit inflation. As gas consumption is so small a large proportion of the 3 liter cylinders remain for open circuit bail-out.

The Inspiration is the first CE Approved Closed Circuit Rebreather.

In the spring of 1997 the Inspiration underwent extreme and rigorous independent testing by the British Navy's Defence Research Agency (DRA) at Alverstoke and a further series of manned and unmanned equipment tests by the Societe Generale de Surveillance (SGS) UK Ltd - International Certification Services.

Tests included among other things, breathing performance, oxygen Setpoint control, CO2 scrubber duration, tensile strengths, flow rates, performances at different temperatures and open-water trials.

The Inspiration actually set new standards for the industry in terms of both the accuracy of the Oxygen Controller and the duration of the CO2 Scrubber. DRA had never before seen an oxygen controller that could maintain the partial pressure of O2 at the mouthpiece so close to the constant ppO2 Setpoint...within +/- 0.02 Bar.

Similarly, the Inspiration CO2 Scrubber was the most efficient system that they had come across to date. Tested in cold water (4 degrees C), they simulated a breathing rate of 40 RMV and CO2 production rate of 1.6 liters per minute - which is about twice the rate most people produce - and even in these conditions, the Scrubber achieved a duration of 3 hours.

The first impression when you see the Inspiration in the flesh is that "this is a quality piece of kit". It is made using mass-production techniques and this consistency of production not only looks good, it gives us divers greater reliability as well as benefits when it comes to spares and servicing. The production quality assurance conforms to ISO 9001 and is assessed regularly by Lloyds.

The Inspiration is manufactured in the United Kingdom by Ambient Pressure Diving Ltd,. For details of your nearest Inspiration instructor contact Silent Diving Systems at www.silentdiving.com

Dark Phantom of the Pacific Northwest
SIXGILL SHARK

By ADM Staff Writer &
Photographer John Rawlings

A close encounter

The day started off with four friends getting together for a summer's day of diving in Washington's Hood Canal. We rendezvoused at the boat launch at Triton Cove, happily setting out for what was expected to be an ordinary day of diving. It was decided to go to a location that we call Flagpole Point due to the fact that a lone flagpole stands on shore marking its location. This site is a popular wall dive known for having an abundance and variety of marine creatures. The decision we made to dive there placed us directly on course for an amazing encounter that we will remember for the rest of our lives!

Upon arrival at Flagpole Point, we rolled over the side of the boat and descended together. The visibility was extremely poor (less than 8 to10 feet), so I had left my camera on the boat. Despite that, the dive immediately proved to be a naturalist's dream as we plummeted down the seemingly endless wall. We encountered hordes of Squat Lobsters poking their tiny heads and claws from virtually every hole, several Spiny Lithode crabs (a rare treat), Pacific Lyre crabs scuttling around the rocky ledges, and a couple of Scaled crabs, the first of that species I had personally ever seen. Clouds of Rock Fish hovered just out of reach and, naturally curious, seemed to follow us as we made our way across the face of the wall.

At approximately 120 FSW we encountered a large Giant Pacific Octopus completely out in the open that looked oddly different than it should have. As we slowly approached it, we were stunned to find that all eight of its legs had been bitten off approximately 1 to 2 feet from its body. It was quite literally moving around on eight stumps. I have seen a Ling Cod bite off a leg from an octopus before, but this was a far larger octopus (the head approached three feet across) and all eight legs were missing. I couldn't imagine what would have done this as we swam across the wall.

Within minutes, we encountered a second octopus, every bit as large as the first. To our surprise, it was also missing two of its legs. I hovered briefly over the octopus, eye to eye, vainly seeking an answer to what had happened. Our bottom time had now extended to the point that we were into our planned decompression, so we turned and began our ascent through the murk, our lights the only reliable means of maintaining contact with each other.

Almost immediately, we encountered a third octopus, this one moving rapidly towards us as if fleeing something. Puzzled, we turned our lights toward the approaching creature and were absolutely astounded to see that this one too was missing three of its legs.

Photo: John Rawlings
Nikonos V
Provia 400F
F5.6 - 1/30 sec
SB105 strobe

We were all pretty creeped out at this point as the octopus passed directly through the center of our team, ignoring us as if we weren't even there. While the rest of us continued to watch the rapidly moving octopus, my buddy, Shawn, turned his light into the gloom from the direction the octopus had come, only to find a 7 to 8 foot Sixgill Shark approaching us. The flashing of Shawn's light caught our attention, and we turned just in time to find the shark amongst us as it swam leisurely right through the middle of our group with its pale, luminescent green eyes. Fascinated, I reached out and gently placed my hand on its side just behind its gills, feeling the surprising smoothness of its skin.

All thoughts of the octopus forgotten, we remained with the shark for approximately 3 to 4 minutes, completely absorbing the experience. When I first saw the shark, we were at 97 FSW and both our plan and my computer were telling me that I had deco stops in the immediate future. When the shark turned and began to descend, we all knew that no matter how much we wanted to follow, physiology demanded that we begin our ascent.

Giddy as small boys with a secret, we were virtually dying to surface to talk about what we had just experienced, but the tiny bubbles coursing through our systems kept us on task. Ultimately bursting through the surface and into the sunshine, each of us erupted with whoops and hollers as we celebrated the magical experience we had just shared.

Since that extraordinary day, I have sought to dive with and photograph these amazing sharks at every available opportunity and have made it a point to learn as much as I could about Sixgill Sharks. I've poured over the available literature and have spoken with marine biologists in the Pacific Northwest knowledgeable of these remarkable creatures.

A survivor from the ancient world

The Bluntnose Sixgill Shark, *Hexanchus griseus*, is a member of the *Hexanchidae* family and a species of shark that has remained virtually unchanged for over 100 million years. Some naturalists have even humorously referred to it as "Jurassic Shark." To dive with such an animal is to dive with a relic of a bygone age, your mind racing with thoughts of dinosaurs, ancient sea-reptiles, and other species now known only from their fossils. Of all of the sharks dwelling in our oceans today, none resemble their ancient ancestors more than do the members of the *Hexanchidae* family.

Bluntnose Sixgills are among the most readily identifiable shark species. They have a long, slender body with a single dorsal fin located far to the back of the body, almost to the base of the tail, (see the photos and illustrations). As their name implies, they have six pairs of gill slits, as well as a short, blunt snout. Their eyes are almost mystical; being extremely large and teardrop shaped, and appear to be almost luminescent and green like those of a cat. Their eyes are extremely light sensitive, with a non-contracting iris and only rods

Above Illustration: The top and bottom teeth of the Sixgill shark

with no cones. Camera flashes often send them turning toward the depths for relief. The lateral line is readily visible and has an interesting bump or dip in it just above the lower caudal or tail lobe. The lower caudal lobe itself is relatively short, while the upper caudal lobe, or tail, is quite long–tapering back at a slight upward angle from the body.

The Bluntnose Sixgill is one of the few species of shark that regularly grows beyond 12 feet in length. Many sources site their maximum length as 26 feet, although it is now believed that this is the result of a typographical error made while early records were being studied. It is generally accepted that the maximum length attained by this species is between 15 and 16 feet with an average size of 8 to 12 feet.

A worldwide presence

The Bluntnose Sixgill Shark has a confirmed presence off every continent with the exception of Antarctica. Only the Great White Shark approaches the Sixgill in the overall size of its distribution. In the western hemisphere, it has been found from Chile to the Gulf of Alaska on the west coast and from Argentina to Southeastern Canada on the east coast. It is common along the coast of Europe, off southern Iceland, in the Mediterranean, both northern and southern Africa, and off the coasts of Asia, Australia, and New Zealand.

Bluntnose Sixgill Sharks have been verified and filmed in deep submersible expeditions to a depth of 8,200 FSW. With most specimens taken or observed in deeper waters, it has been assumed until recent times that the Sixgill shark was a denizen of the abyss, only irregularly and unpredictably approaching the surface. It has been demonstrated in the waters of the Pacific Northwest, however, that this is not true and that shallow water annual migrations can be reasonably predicted and observed.

Sixgills can be found over rocky reefs as well as muddy bottoms, both of which abound in the Pacific Northwest. In Washington's Puget Sound, the link with the muddy bottom has historically been so profound that fishermen have nicknamed it the "Mud-Shark".

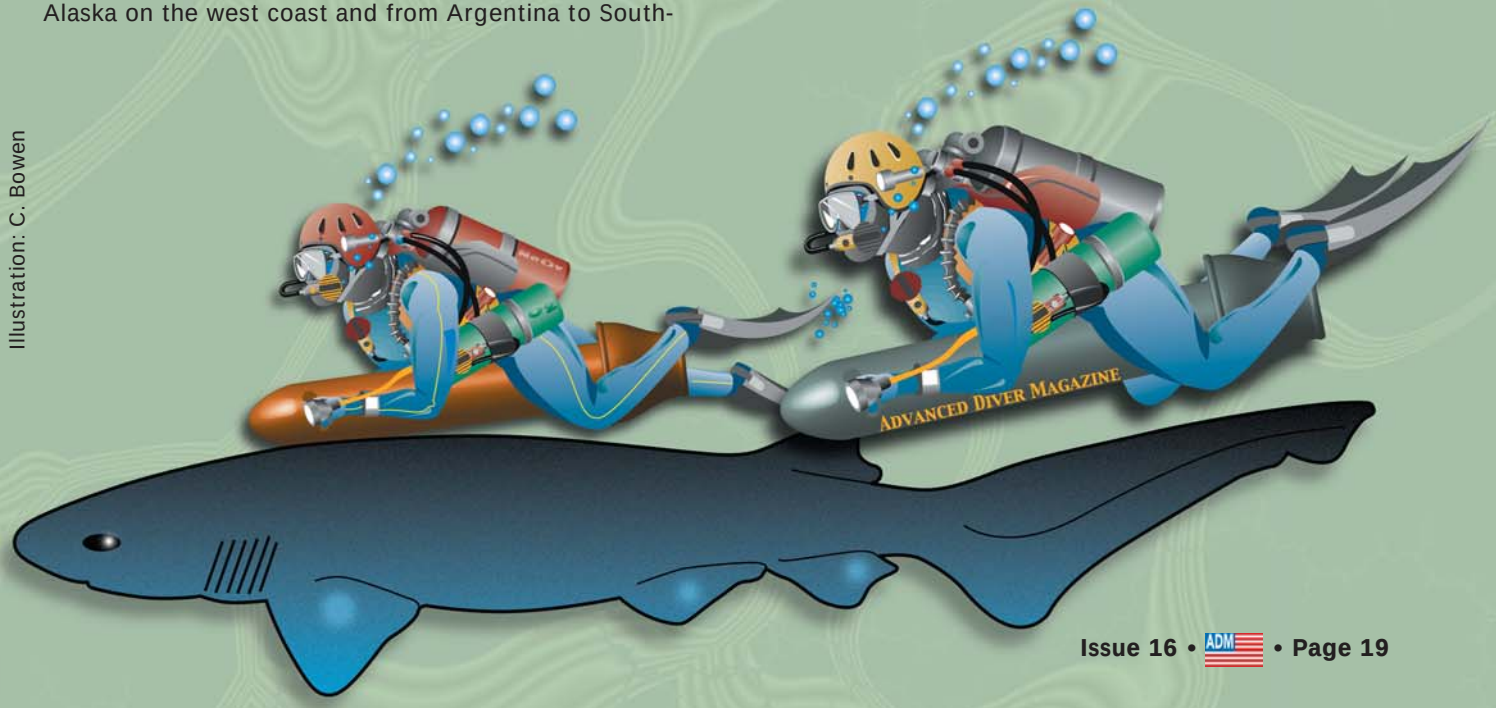


Illustration: C. Bowen

Sixgill diet and hunting strategies

The Sixgill's food preferences vary from region to region based on both availability and abundance. Mollusks, crustaceans, hagfish, and other small to medium sized fish head the list in most parts of the world. However, it is in the Pacific Northwest that the menu becomes truly interesting. In the waters of Washington and British Columbia, the species known to be a regular part of the Sixgill diet include Pacific Hagfish, Pacific Salmon, Lingcod, Cabezon, rockfish, Spiny Dogfish sharks, and Harbor Seals.

Two things stand out amongst these prey items: most of them are fairly large and all of them but the hagfish can be extraordinarily fast. Watching a Bluntnose Sixgill swimming underwater, it will seem slow, even lethargic. Clearly, however, from the prey it eats, the Sixgill is capable of bursts of speed. Although observations of Sixgill predation are not common, one current theory is that, similar to the White Shark, the Sixgill approaches prey relying on stealth. It then launches an attack from close-range, striking the victim suddenly and by surprise, leaving it with little time to react. The species has also been observed pinning prey to the bottom with its snout.

The Sixgill's teeth are as unique as the species itself. The upper and lower teeth are astonishingly different from each other (see illustration on page 19). The upper teeth are relatively simple: the middle teeth have one cusp, the outer teeth have two cusps, and the corner teeth have three or four cusps. The lower teeth, however, are completely different, having multiple cusps (7 or 8) and are almost trapezoid in shape. The lower teeth are almost comb-like and are likely used to saw chunks of flesh from prey too large to be swallowed whole.

Reproduction

Research and observation have shown that Bluntnose Sixgill sharks reach sexual maturity at approximately 11 feet in length for males and 14 feet for females. No ironclad, verifiable data yet exists regarding growth-rate or longevity, but most researchers agree that the species is slow growing and probably has a long life span, perhaps over a century.

Some researches believe that the species comes into shallower waters to both pup and breed, and in fact newborn Sixgills are often found in shallow waters in the pacific northwest in the summer and early fall. This corresponds with the time frame in which divers regularly find adults in shallow depths in both Washington and British Columbia waters. Females are also often observed during this time bearing scars similar to other shark species in which amorous males nip at the gill area, pectoral fins, and sides of prospective mates prior to mating. Virtually nothing is known regarding the gestation period for this species, but the assumption is at least twelve months and possibly up to two years.

Being ovoviviparous, the Sixgills give birth to live young, which, when born, are approximately 27 to 28 inches in length. The Sixgill is one of the most fecund of shark species, second only to the Blue shark in terms of the potential size of its litters. In fact, one female has been documented as having 108 embryos in her uterus.

A Pacific Northwest oddity: An annual trip to shallow water

It is well documented that Sixgill sharks in the Pacific Northwest migrate into shallower waters and remain there during the summer and early fall months, probably to drop their litters and mate. This annual migration into shallower waters is not known to occur anywhere else within the Sixgill's range. It is believed that this is partially due to the surface and bottom waters of the Pacific Northwest being well mixed and uniformly cold. Another supportive reason is that plankton levels dramatically increase during the summer months, allowing these light-sensitive sharks to enter shallow water without the extreme discomfort higher levels of light associated with shallower depths would cause. Further, during this time frame major salmon runs are normally taking place in the Pacific Northwest in both the U.S. and Canada.

Photographing the Sixgill

Towards the end of summer 2003, my dive buddy, John "Sparky" Campbell, and I traveled north to British Columbia's Barkley Sound on the western coast of Vancouver Island. Our goal was to find and photograph Sixgill sharks during their seasonal migration into shallower waters. Unlike Puget Sound and Hood Canal in Washington, the visibility in Barkley Sound generally remains outstanding at depth despite the heavy layer of plankton at the surface, so the opportunities for successfully photographing these sharks would be far greater. Also, a major salmon run was underway within the Sound. Orcas, sea lions, bald eagles, and bears were all arriving for the feast, along with, hopefully, large numbers of Sixgill sharks.

We dived with our Canadian friends, Dave and Renate Christie of Rendezvous Dive Ventures. After several frustrating days of beautiful dives and outstanding photography, we had seen no sharks at all. Dave decided to take us to dive the "spot." He has fondly named this particular site "Shark Alley," telling me that "It isn't good for much else, John, but there's usually a few big old sharks down there. Don't know why, but that's just the way it is."

Dropping down the anchor line at the "spot" into the rich, green depths, the contours of the bottom became focused. The cold water caused my face to

tingle until numbness set in. As we approached 80 FSW, I couldn't believe my eyes! There, not 30 feet away was a huge, barrel-shaped female Sixgill slowly cruising by the upper edge of the rock wall, almost begging to be filmed. Sparky and I swam toward her, and as we swam abreast of the shark we were able to judge her length at approximately 10 feet. I felt detached from the scene as I looked at everything through my viewfinder. Happily, I fired off two or three shots once I saw both Sparky and the Sixgill in my frame.

The flash appeared to visibly annoy her, however, and it was not long before she turned and began to head down the wall toward deeper water. Desperately trying to get as many shots as I could before she was gone, we plunged down the wall after her, only to find that she was moving far faster than she appeared to be. My final shots were of a long, slender tail disappearing into the inky blackness below.

Ascending the wall, we reached the upper ledges. Flashing beams of light signaled us that something else was going on. We hurriedly kicked in that direction and found our Canadian friends swimming with three smaller Sixgills, all of them females. Once again I found myself swimming with my eye glued to the viewfinder and happily clicking away. The camera flash again apparently bothering their light-sensitive eyes, this group of sharks also soon headed for deeper water. We quickly found ourselves alone, grinning like absolute fools, and began our ascent.

Upon surfacing, the first thing I saw was Dave Christie's broad grin and heard a loud shout delivered in a Scottish brogue, "Well, John, I didn't lie to ya, did I? That's why we call her Shark Alley."

I would like to thank Dave and Renate Christie of Rendezvous Dive Ventures for their skill, hospitality, and friendship. They can be reached at http://www.rendezvousdiveventures.com. Special thanks also to Marine Biologists Cindy Tribuzio and Jeff Christiansen for their kind advice and assistance.

SIX GILL TAGGING PROGRAM

The Seattle Aquarium and its research partners, Pt Defiance Zoo and Aquarium, The University of Washington, and Washington Department of Fish and Wildlife are studying sixgill shark populations in Puget Sound. Information about population structure, home range, breeding pattern, and phylogenetic relationships with other adjacent six gill populations (coastal and Georgia basin) began in summer 2003. Two tagging programs are underway and local divers are asked to contribute to the research by reporting any sightings of tagged sharks while diving or fishing. Aquarium tagged sharks are recognized by the presence of a yellow streamer tag inserted into the back of the shark. Fish tagged by WDFW have a round disc tag attached to the dorsal fin. Divers sighting a tagged shark are asked to report it to the Seattle Aquarium via its website or through calling 206-386-4359. Aquarium tags are read from the head to tail of the shark (e.g. circle-circle-square). WDFW tags have visible numbers on the disc tags. Note the time of day, location, depth of water, and a description of the encounter in the report.

The Discovery of Diamond Rock Cave
Sarasota Florida, USA

By Eric Osking

"My regulator just about dropped out of my mouth," Al Barefoot recalled. "I thought, what in the heck have we discovered here." Just moments before, he had swum head first down a restrictive chimney that punctuated a depression in the sea floor at 180fsw. Following several strands of encrusted monofilament fishing line; Al worked his way deeper and deeper into the cave. Thousands of years of silt and crumbly rock fragments, disturbed by the upward flight of his regulator's exhaust bubbles, clouded the water and streamed down around him. A few moments later the passage became horizontal and he found himself hovering above a rock balcony at 240 fsw, overlooking a large subterranean chamber. Even though the room was full of clear water, his light was unable to illuminate either the bottom, or the distant side. "It was obvious from the lack of a guideline, and the undisturbed nature of the passage, that no one had been down here before. I took a long last look, and then I swam back up the chimney through the silt cloud toward daylight. I couldn't wait to tell the rest of the group what I had seen".

The excitement that was that moment of discovery, finding a cave system that had yet to be described, did not come easily. Al Barefoot has been cave diving as long as just about anyone. For the better part of the last twenty years Al has explored known submerged cave passage up and down the Florida peninsula, the Bahamas and Mexico. Along the way he has chased many leads with the promise of new discoveries to eventual dead ends. This time, the outcome was entirely different.

Cave diving is one of the most, if not the most, gear intensive sports known to man. Logistically, preparing a group of cave divers to explore the depths offshore is a task of mammoth proportions. Long hours of gear preparation, gas blending, assembling back gas, deco and stage bottles, and checking and then rechecking equipment finally gives way to the back breaking hassle that is loading the boat. Deep cave diving offshore of the west coast of Florida begins hours before sunrise and ends with the sun setting in the boat's wake.

Our days are long, not only due to gear preparation, but also because of the distance that must be traveled by boat to reach depths of any significance. The continental shelf off Sarasota, Florida has a very low gradient. One hundred miles due west and the

Illustration: Curt Bowen

depth to the sea floor is just 300 fsw. Although, at first glance, this seems to be a hindrance, it is also a blessing. First, when the weather cooperates and you can get out to distant dive sites, you are one of few that are willing to go through the bother of a long boat ride to get there. Dive sites far offshore are particularly abundant with marine life and notably absent of man's influence.

Second, and most important in regards to future discoveries, the expansive carbonate rock sea floor off the west coast of Florida undoubtedly holds many more treasures waiting to be discovered like Diamond Rock Cave. During the Ice Ages (1.8 million years ago until 10,000 years ago), sea level was anything but static. Shorelines moved up and down the continental shelf, allowing vast areas of previously submerged carbonate rock to be subject to weathering and the development of sinks, springs, cave systems, and other karst landforms. At the end of the Ice Ages, the ancient shoreline was located where we now have a depth of 300 fsw. Since that time, sea level has been marching steadily higher to its present location. If you take a look at a bathymetric chart of Florida and locate the 300 fsw isobath, you will note that Florida was roughly three times its current size 10,000 years ago. The vast majority of that extra land mass is now submerged off the west coast of Florida.

Now enters modern man and his rapidly changing technology. In a world full of "modern" sports, cave diving is still in its infancy. Gear and gear configurations constantly evolve, and techniques once thought to be some sort of ancient voodoo ritual become accepted practices. Although difficult to believe, only in the last decade has Nitrox become mainstream. The increase in the number of divers breathing Trimix, to depths previously considered risky breathing air, promises to open vast areas of the continental shelf off the west coast of Florida to exploration.

On this trip, weather was definitely on our side. Our boat ride offshore, approximately 60 miles west of Sarasota, Florida, had been in absolutely flat seas. For most of the day, it was hard to tell where the Gulf of Mexico ended and the sky began, the horizon had a mirror-like quality to it. It's hard to complain about calm seas. But in the absence of even the slightest breeze, gearing up into our doubles and exposure suits, midday, in September in southwest Florida, was unbearably hot.

The discovery of Diamond Rock Cave came on our second and last dive of the day. Just a few hours earlier, three of us dove to depths in excess of 300 fsw at a near-by drowned sinkhole known as the "Green Banana" (*see ADM On-line for Green Banana article*). Visibility was excellent - the bare rock walls of the Green Banana were covered with yellow and orange encrusting growth interspersed with the occasional coral polyp or sea urchin. Even the time spent during deco was interesting. Dozens of different types of jellyfish floated past in the current, some with bioluminescence. Al Barefoot had wisely deferred his deep dive of the day, just in case the GPS coordinates he had been given to check out by a local commercial fisherman hit pay dirt.

Left Page: Artist rendition of Diamond Rock Cave. Original survey completed by Al Barefoot. Illustration by Curt Bowen
Top right: Eric Reintsema climbs aboard after the dive of discovery
Middle right: Chuck Gullick prepares to dive into the unknown
Bottom right: Alan Barefoot reflects back after the discovery of Diamond Rock Cave

Our next dive site was thought to be a drowned spring due to the fact that pelagic fish species are known to congregate there during the winter months. The theory is that these open ocean fish are attracted by the relatively warm groundwater discharging into the much colder surrounding Gulf water. Groundwater flowing into the Gulf would indicate a drowned spring, and as such, held the remote possibility of offering unexplored cave passage. Few things in the life of a cave diver can compare with the opportunity to dive where no one has been before.

Pulling hand over fist down the anchor line against a slight current, Al and I began our drop toward a small sandy depression in an otherwise flat, featureless, Gulf sea floor. Beneath the surface, the visibility was in excess of 100 feet, as it often is this far from terrestrial input. We could see the structure we came to investigate several minutes in advance of our arrival at depth. We passed through a thermocline at 80fsw, dropping through the nauseatingly warm 84º F surface waters to a pleasant 78º F.

Continuing our descent, we reached the sea floor at 165 fsw, swam over a small rock ledge, then into the middle of the depression at a depth of 180 fsw. At its center, a large, angular rock almost completely covered what appeared to be a solution shaft about 10 feet in diameter. Having already done my deep dive of the day just a few hours earlier, I could only look on in envy as Al descended head first into the restricted opening.

Al was disappearing into the cave system as two more divers from our party, Eric Reintsema and Chuck Gulick, swam toward the depression and began to inspect the rock-occluded opening. I decided to explore a little of the surrounding sea floor and found several more drowned karst features about 100 feet to the west of the main depression–a small cavern with two solution shafts in its floor at about 180 fsw. One of the shafts dead-ended at 200 fsw, but the other took a hard turn back toward the east. The small cave appeared to be scoured by fish activity, current, or both, quite possibly leading back to the original cave entrance. My bottom time being just about up, I headed back to the cave entrance. There I met up with the three other divers and we began the lengthy decompression stage of our return to the surface. Even during deco, you could tell that Al would have quite a story to tell once we assembled topside.

Eric Osking - Tech/Cave Instructor-
www.fishdiveflorida.com

Summary

Since that first dive, we have collected additional data about the system now known as Diamond Rock Cave. The large room is 50 feet wide, has a ceiling at 230 fsw (with a large fissure in it), and has a slight hourglass shape with its narrowest point at 300 fsw. There is a slight hydrogen sulfide layer at 330 fsw and the highest point of the debris mound is at 360 fsw. Mainline has been extended to 390fsw. The rock walls are covered with an orange and yellow encrusting growth, similar to what we observed at the Green Banana. The presence of this growth, and the slight variance in visibility inside the system from dive to dive, suggests tidal pumping of some sort. From observations of fish life and physical characteristics of the system, it is thought that there are at least two entrances into the large room.

CAVE EXCURSIONS

PADI

Full Service Dive Facility

Openwater to Trimix Instructor Training
Specialist in Sidemount Instruction.
Cavern to Full Cave
Equipment Service & Repairs

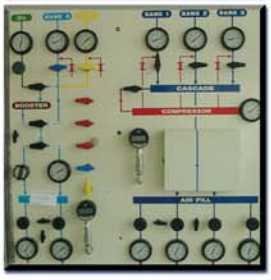
"Try before you buy!" Rental Equipment

- Cylinders (singles and doubles)
- Regulators
- BCD's
- Scooters (Mako, Gavin, Silent Submersion)
- Cave Lights (HID)
- Dolphin Atlantis Rebreather

21,000 cuft
34% EAN Storage

10,000 cuft
Air Storage

1,200 cuft
Normoxic Trimix
21O2/30He storage



Custom Gas Blending
- **Nitrox**
- **Trimix**
- **Argon**
- **Oxygen**
- **Heliox**

24 Hour Fill Station
(with prior notification)
K-15 & K-14 Compressors
Nitrox / Helium Stik
Liquid Oxygen Bank

8 Facility Instructors
- Bill Rennaker
- John Orlowski
- Shelley Orlowski
- Fred Berg
- Herb Sugden
- John Jones
- John Faircloth
- Bill Dooley

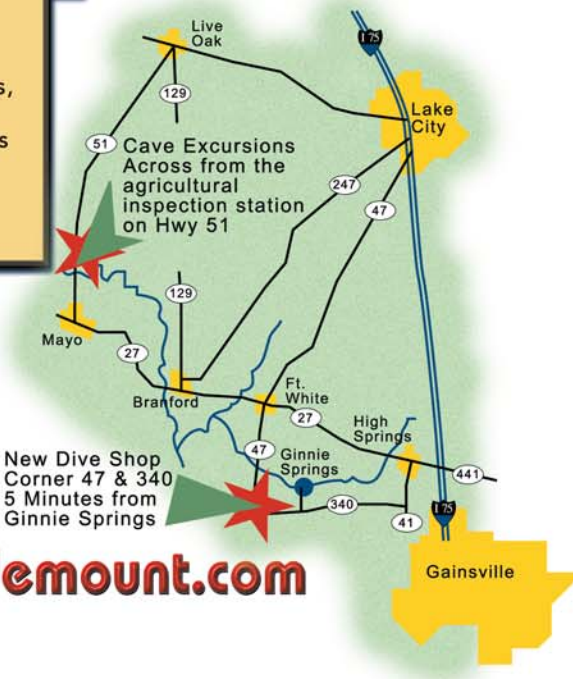
Rental Homes by the day, week or month.

Four Complete homes with full kitchen, bath, 2-3 beds, microwaves, satellite TV, etc. Perfect for groups of 2-8 divers
Reservations Required

Located in the Center of Cave Country

NEW 2nd LOCATION

Minutes from Ginnie Springs



Ph: 386•776•2299 **www.sidemount.com**

Cruisers For Breakfast
THE DISCOVERY OF THE DUTCH

What made us change course that morning I'll never know. We were steaming due south on a set course, west of Bawean Island in the Java Sea and had been since late the previous evening, heading for a known dive site. Having just spent a couple of days without diving, side-scan sonar searching–without luck–for the famous British heavy cruiser HMS *Exeter,* we wanted to 'get in the water'. Our group consisted of a mixed bunch of divers from Singapore, Australia, USA, and the United Kingdom. Our plan was to steam directly south almost to the coast of the island of Java, turn to port (left) and proceed east until we arrived at what remains of the destroyer HMS *Jupiter*. After diving *Jupiter,* we then planed to carry on to Bali, with a few more dives along the way, as our expedition only had three days before we had to disembark. However, on a whim, rather than proceed to the Java coast as planned, we turned to port much sooner so as to cut across at a slight angle and save some time getting to the dive site. As usual on our transits, we were towing a side scan sonar 'fish' and within half an hour of changing course we had imaged a very large wreck in about 69m/226ft of water! Where we changed course had been a completely random decision, had we waited just another minute before altering course, we would have steamed right on by the wreck, unaware that it was even there.

That's right, sometimes you just get lucky. It was December 1, 2002.

We were on board MV *Empress*, the renowned South East Asian wreck diving vessel, with the very experienced skipper Vidar Skoglie at the helm. He now spent about half an hour slowly going back and forth over the site until he was happy with the lay of the wreck and the prevailing current before dropping anchor and letting the current align *Empress* directly over the top of the wreck. Breakfast would just have to wait, and an air of anticipation permeated the dive deck as divers excitedly readied their gear and a down line was hooked into the wreck. Vidar was first in, as usual going ahead to make sure the line was set. I followed soon after. What were we going to find?

Dropping through the water column, anticipation mounted even further until suddenly at around 60m/197ft, I came to a massive jagged hole–on the now upturned side of the ship–which had that familiar look of being from torpedo damage. Visibility was only about 6m/20ft or so, so Vidar had laid line from the tie off point, and I followed this over to the deck side of the ship which was now orientated vertically. Within moments, I had swam by a large gun mount, a single barrel pointing defiantly upwards with huge shell casings scattered about beneath it. This was a warship! Swimming further on, I passed a funnel with a very unusual 'baffled' base and another large gun mount, identical to the previous one with even more shell casings scattered about. Not only was this a warship but a large one at that and she had gone down fighting. After spending some

Below: The cruiser HNMS *Java* at anchor in more peaceful times. Australian War Memorial Photo 305839

CRUISERS *JAVA* AND *DE RUYTER*

Text and photographs by Kevin Denlay

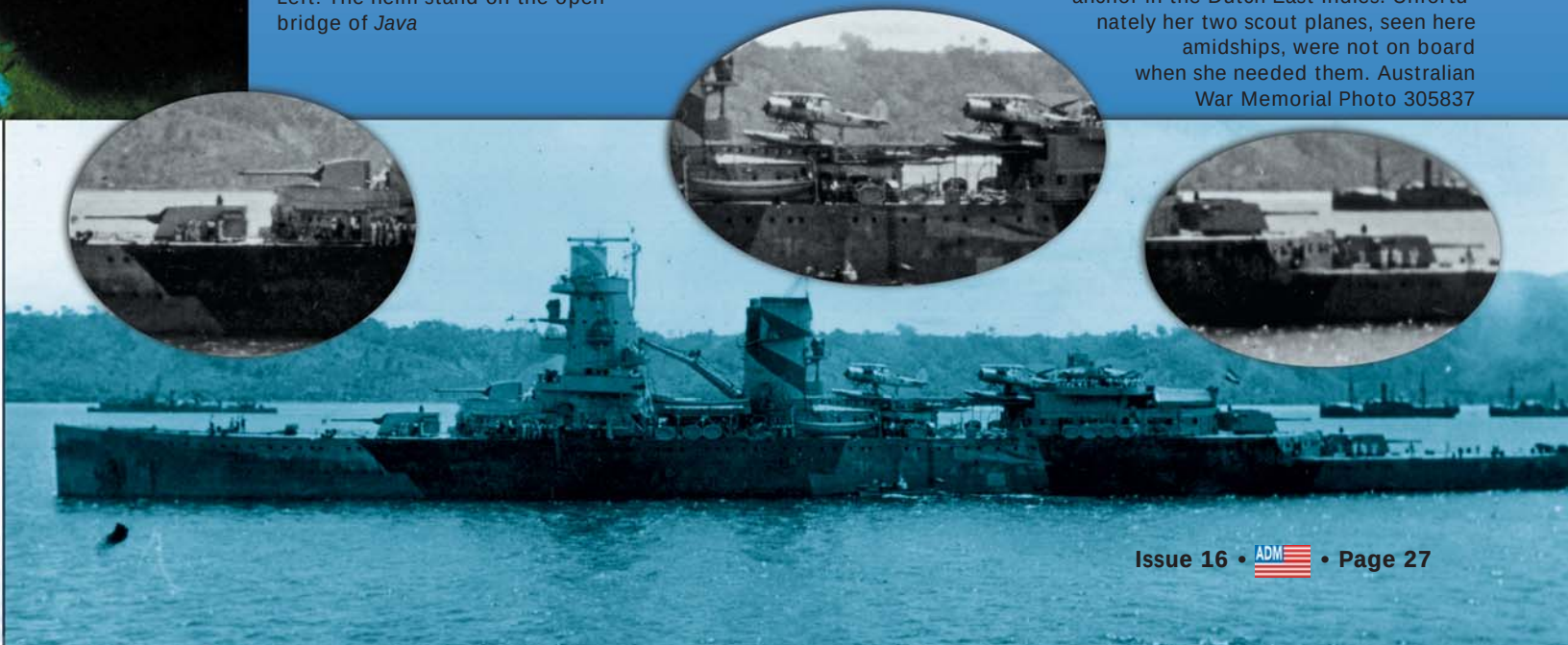
time in this general area, I now slowly retraced my steps towards the down line, videoing as I went, marveling at what I was seeing and our good fortune. Venturing further on past where our down line was tied in, the wreck appeared to end abruptly in a jagged mess, from what must have been a terrific explosion. (As it turns out almost 40m/130ft of the wrecks stern is missing, sheared off by the torpedo hit that sank her.) Returning back along what was once the centre line of the ship, slightly deeper than before, I passed several twin mounted 40mm/1.55" Bofors guns, much smaller than the single main guns I had seen previously, all arrayed fairly close together. My bottom time had now run out and with some lengthy deco ahead of me, I headed for the down line and the inevitable slow ascent to the surface. Large schools of Batfish and Jacks circled the line as I ascended, and, upon reaching the deco station, numerous Remoras were circling that to. And much to the consternation of several divers, they were darting in and attaching themselves to a divers leg or fin whenever they could!

Back on board, everyone was elated, stories were swapped at what we had seen and the reference books pulled out. It was soon obvious, from her unusual gun layout and 'baffled' funnel bases, that we had discovered HNMS *Java*, a Dutch light cruiser that was sunk in the Battle of the Java Sea. Another dive that afternoon had us exploring the intact open bridge–with the helm and telegraphs still in place–and the surrounding forward area**.** Large searchlights that had festooned the foremast lay collapsed beneath it on the seabed and her main fore guns were still trained menacingly to port. (*Java* lies on her starboard side, her shallowest spot about 57m/187ft.) Doorways beneath the bridge lay open and rows of portholes were evident, some of them also open. However, all too soon, it was again time to ascend.

Now came the quandary, we had only one day left to dive before having to make haste for Bali, what should we do? From the historical records, we knew that lost nearby at the same time was another Dutch cruiser, HNMS *De Ruyter*. Should we stay and explore *Java* further or initiate a search for *De Ruyter*? Our answer came from an unexpected quarter. All day we had noted a group of Javanese fishing boats sitting in one spot on the horizon, so on a hunch Vidar decided to go over and use the side scan to 'see' what they were fishing on. If it was nothing, we would continue searching through the night and at worst come back and dive *Java* in the morning. Arriving just on dusk and making a close pass by the anchored fishing boats we were astounded to see another large wreck in approximately 67m/220ft, but from the shape of the side scan image possibility sitting upright! Could we really be so lucky? It was now almost dark and too late to dive that day, so we anchored up and, straining to contain the excitement, settled in for the evening already quite pleased with ourselves.

Left: The helm stand on the open bridge of *Java*

Below: The cruiser HNMS *De Ruyter* at anchor in the Dutch East Indies. Unfortunately her two scout planes, seen here amidships, were not on board when she needed them. Australian War Memorial Photo 305837



It took no time in the morning for *Empress* to be in position over the wreck and a down line secured. Conditions were ideal on the surface, glassy calm with just a slight current. As usual, Vidar was in first and the rest of us wasted no time in following. Visibility seemed superb, but upon reaching about 40m/130ft a strange site confronted us. From above, a thermocline that started at about 50m/164ft looked for all the world like a layer of dense fog, and protruding up through this 'fog' was a large rangefinder–looking for all the world like the conning tower of a submarine sticking above the surface–its base simply disappearing into the milky layer. Another warship! Dropping beneath the thermocline, visibility again gradually dropped to around 8m/26ft and the temperature dropped 6º C also! It was *De Ruyter*, recognizable by her unique bridge superstructure and the large searchlights surrounding it. She had settled on an angle, tilted over to starboard with her deck now at about sixty degrees from horizontal. As luck would have it, we had snagged the grapple into the upper level of this superstructure at about 50m/164ft, just a few meters deeper than the rangefinder which is the shallowest point**.** Given that I was very unfamiliar with the layout and condition of the wreck, I decided to spend this first dive exploring the bridge and surrounding area to get my bearings.

Many doorways lay open, and swimming through one I came to the helm and telegraphs, obviously the wheelhouse. Exiting through the lower (starboard) door at around 60m/197ft, I turned left and swam around the front of the bridge, coming almost immediately to a single barreled gun turret. Its rear door was open and behind it lay a pile of large empty shell casings. One can just imagine the gun crew throwing the empty casings out in haste as they fired round after round during their final battle against the Japanese forces. Swimming further forward, another turret came into view, this time with two barnacle encrusted barrels pointing downward and large optical rangefinders protruding out either side at the rear of the turret. If there was any doubt as to the identity of the wreck, this confirmed it, as only *De Ruyter* had this unusual configuration of forward turrets. (Because of political wrangling in Holland at the time of her design, *De Ruyter* was fitted with one single and one dual gun turret forward so as to save money in construction.) Returning back past the single turret, where the forward superstructure meets the main deck, I saw what looked like a small torpedo. That seemed strange to say the least. However, upon closer inspection, it turned out to be a paravane, a towed device used for sweeping moored mines. Looking at my VR3 dive computer, I saw it was time to go as I had spent almost thirty minutes poking around videoing and the decompression penalty was steadily mounting. How time fly's when you're having fun!

On the surface, while the others relaxed and we swapped stories of what we had seen, I repacked my scrubber with carbon dioxide absorbent (I was diving a Mk15.5 closed circuit rebreather) and mixed up another batch of trimix 10/50 (10% oxygen, 50% helium, balance nitrogen). At a depth of 65m/213ft, this mix would give me an equivalent nitrogen depth of only 28m/92ft (e.g. the equivalent narcosis effect to diving air at 28m/92ft), just right for exploring at depth with a clear head! After a surface interval that seemed like a lifetime, but was

1. Inside the enclosed bridge of *De Ruyter*. In the foreground is the helm stand, the helm wheel itself having long ago rotted away, while in the background can be seen her dual telegraphs.
2. The remains of one of *Java's* 120cm (47 inch) searchlights lay on the seabed next to her foremast
3. A targeting device, its enclosure coral encrusted, on the port bridge wing of *De Ruyter*
4. The unique 'baffled' base of the funnel that helped quickly identify *Java*. Sticks of cordite can still be seen protruding from the 15cm (5.9 inch) shells.

only several hours, it was time to get back in the water and explore some more. Dropping down abaft the bridge, the first thing to come into view was the funnel, broken at the base and partly collapsed onto the seabed. Nearby was the large crane used for retrieving the two scout/observation float planes the ship normally carried. (These two planes were not on board when *De Ruyter* sunk as they had been taken off just prior to the battle.) A short way further aft the tracks that the float planes were launched from were clearly visible and they terminated upon meeting the aft deckhouse. Atop this sat five sets of twin 40mm/1.55" Bofors antiaircraft guns arranged around a central fire control director–from which the upper rangefinder had fallen off–above which a massive school of Jacks circled leisurely.


5

It was just aft of a similar Bofors station on *Java* where that wreck terminated abruptly in a tangled mess, would it be the same on *De Ruyter*, as she had also been hit aft by a torpedo? Dropping down deeper into the gloom, I came to the top of the third main turret, its twin barrels pointing directly astern. Dropping down yet another level, I encountered the fourth or last turret, its dual guns also pointing astern. Looking upwards, I could just make out the silhouette of what looked like a split in the port deck edge, just aft of this last turret. Swimming up to it, I could see that a large gash ran down the port side of the ship, possibly the result of the torpedo hit and/or magazine explosion. However, unlike *Java*, *De Ruyters'* stern did not appear to be completely severed, more like the hull had just been fatally holed.


6

I now retraced my steps along what was once the port deck, again passing empty 15cm/5.9 inch shell casings, the odd 40mm/1.55 inch shell, and open doorways and hatches all leading into the bowels of the ship. As I neared the base of the bridge, it was comforting to see my See Blitz strobe flashing away, guiding my path to the downline that lead to the decompression station and surface supplied oxygen.


7

On board that night, we reflected on how fortunate we had been to have discovered these two cruisers when in fact we weren't even looking for them. It's not every day that you get to dive a virgin wreck before breakfast, let alone two of them! However, Lady Luck still had one hand to play and another surprise in store for us. During the day, some local fisherman had come onboard and in return for some fuel that Vidar gave them they had reciprocated with the location of one of their fishing positions, supposedly another wreck about one hundred miles away. Although it was not directly on our course to Bali, given how lucky we had been, we decided to do a small detour while traveling that night and see if our fortune held. Sure enough, the next morning found us over another wreck, this one in almost 75m/246ft. We had only time for one dive and it turned out to be an armed Japanese merchant vessel, possibly the *Manyo Maru*, sitting upright with its stern almost severed, a victim of the relentless U.S. submarine offensive against Japanese shipping in this area as WWII gained momentum.

8

5. Looking down onto the turret face of one of the port side single 15cm (5.9 inch) guns on *Java*
6. Live warheads from the 15cm (5.9 inch) guns lay piled in a corner on *Java. The long 'sticks' are cordite from the shells*
7. Clive Merifield prepares to deploy the side scan sonar 'tow fish'
8. The liveabord dive vessel MV *Empress*

We now had to make haste for Bali as time was of the essence. We had dived three new uncharted wrecks in three days, two of them warships, it just doesn't get much better than that! All told, on our journey down from Singapore, we had actually found twelve uncharted wrecks with the side scan, but only had the time to dive five of them. The others would just have to wait. Why is it so often the case, on so many expeditions, that it is not until the expedition is winding down that the discoveries are made, leaving little time to explore? I guess it's so that you have no choice but to mount another expedition in the future to go back and explore them properly!

Expedition Members. Vidar Skoglie, Alice Skoglie, Phil Yutter, Clive Merifield, Steve Merifield, Maurice McAulife, Mark Steele, Peter Daykin, Kevin Denlay. Vidar Skoglie/MV Empress can be contacted at vidar@octa4.net.au

2004 Java Sea Expedition. Another MV Empress expedition to the Java Sea during November 2004 will revisit De Ruyter and Java and also HMAS Perth, USS Houston, a Soviet built destroyer and other recently discovered (2003) virgin wrecks. At the time of writing, a few spaces still remain and interested parties should contact the author at altdive@ozemail.com.au

The author travels exclusively on Garuda Airways whenever he is diving in Indonesia and finds them very helpful.

The Sinking of the Dutch Cruisers *De Ruyter* and *Java*

The Battle of the Java Sea had waxed and waned since mid afternoon and it was now late in the evening of 27 February, 1942. Admiral Karel Doorman, the Dutch commander of the allied fleet, had already lost three destroyers and had been forced to dispatch his remaining ones for refueling, along with the damaged heavy cruiser HMS *Exeter* which had also limped off into the darkness. What was left of the Allied Striking Force or 'ABDAFLOAT' was a single all cruiser column now lead by the flagship HNMS *De Ruyter*, followed in line by HMAS *Perth*, USS *Houston,* and HNMS *Java*. These ships were also low on fuel and ammunition and their sailors exhausted from being at their battle stations for much of the previous twenty–four hours. However, Doorman's orders were unequivocal; to stop the Japanese invasion of Java at all costs. He intended to carry out those orders or die trying. This would soon come to pass.

Doorman's determination showed as he tried again and again to break through to get at the Japanese transport fleet now to his north. Shortly before midnight, HIJMS *Nachi* and HIJMS *Haguro,* the Japanese heavy cruisers protecting the transports, fired a brace of torpedoes at the luckless allied column. Suddenly, astern of *Houston*, *Java* erupted in a terrifying explosion. A torpedo had hit port side aft near an ammunition magazine, completely severing her stern. *Java's* bow immediately reared high in the air and she very quickly sank, taking almost all her crew with her. Less than 50 of her crew of 560 were rescued by the Japanese! Just moments later, another deafening explosion erupted ahead of *Perth*. This time it was *De Ruyter*, also hit aft by a torpedo, and *Perth* had to veer off sharply to avoid a collision with the stricken flagship. Soon *De Ruyter* too was gone, and with her Admiral Doorman and 344 of her crew of 435. *Perth* and *Houston* respectfully followed Doorman's last order "not to stop for survivors" and retired to Tanjong Priok (Jakarta) to refuel. Regrettably, twenty–four hours later they too would be sunk in a fierce battle at the mouth of Sunda Strait and, later the same day, *Exeter* would also be lost in another separate engagement. So ended the desperate naval defense of the Dutch East Indies. The island of Java, along with much of Asia, would soon be completely in the hands of the Japanese, and the war in the Pacific was but three months old!

Footnote: Although his battle experience was limited, the Dutch admiral had fought as gallantly as any in his country's history. However his 'Allied Striking Force's assembled of ships from several nations, had been hamstrung from the start; they had no common signal procedures, they had never operated together, and they had no air reconnaissance. For this they paid the ultimate price.

Statistics – HNMS *De Ruyter*

Launched	11/5/35
Length	171m/561ft
Width	15.7m/51.5ft
Weight	6962t
Guns	7 x 15cm/5.9in (3 x 2, 1 x 1)
	10 x 40mm/1.55in (5 x 2)
	8 x 12.7mm/.5in (4 x 2)
	Compliment 435
	Lives lost 345

Statistics – HNMS *Java*

Launched	9/8/21
Length	155m/473ft
Width	16m/48.9ft
Weight	6670t
Guns	10 x 15cm/5.9in (10 x 1)
	8 x 40mm/1.55in (4 x 2)
	4 x 12.7mm/.5in (4 x 1)
	Compliment 560
	Lives lost 510+


THE COLD WATER SPECIALISTS
WHITES
SINCE 1956
DIVE DRY
OUR POLAR FLEX DRYSUIT IN ACTION
www.whitescoldwater.com

B-29A SUPERFORTRESS

By Gregg Mikolasek

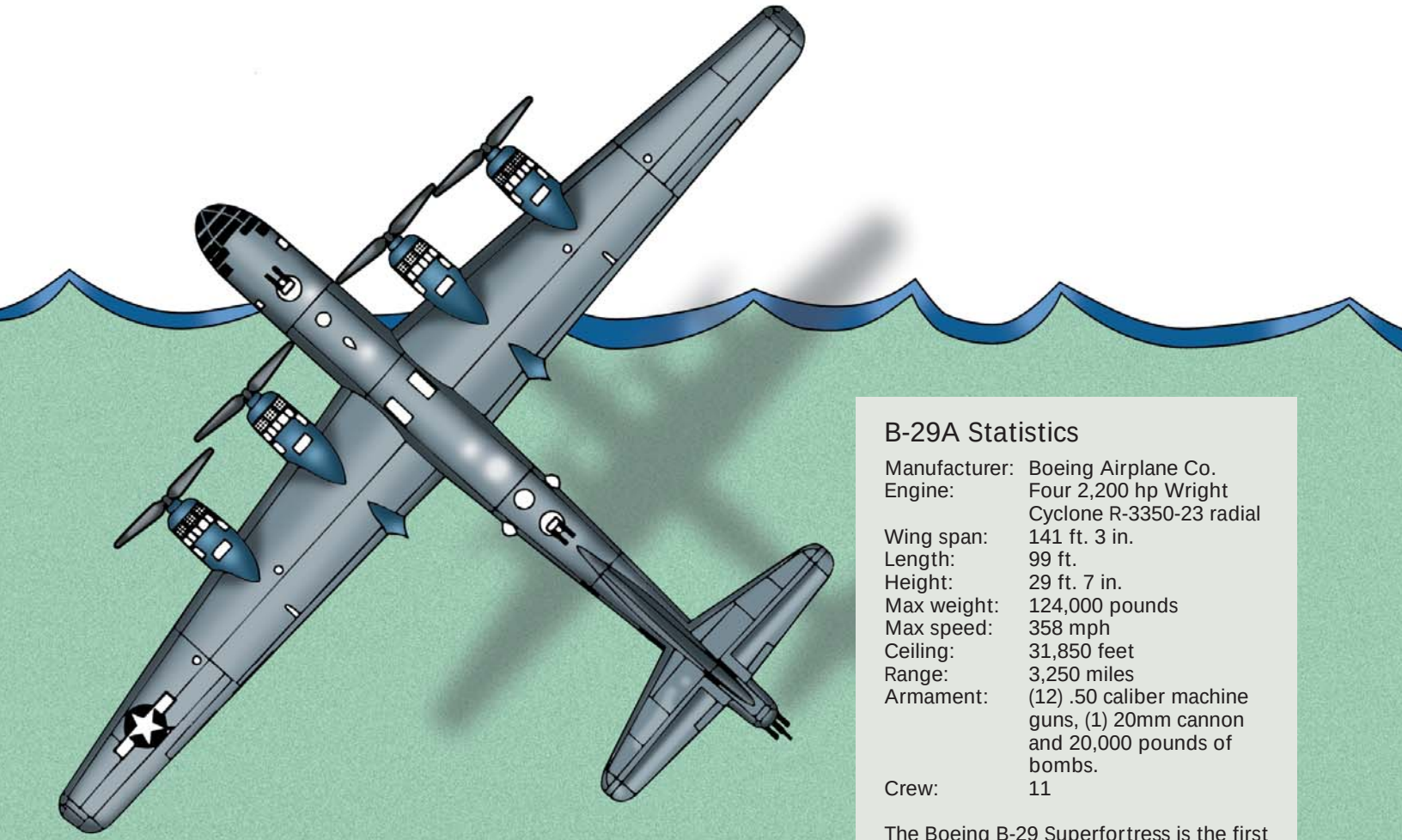
On July 21, 1948, a hot day over the deserts outside Las Vegas, a specially outfitted B-29A Superfortress bomber went down in Lake Mead. Gregg Mikolasek and Steffan Schulz describe how their team became the first to find the wreck over a half-century later.

The B-29 bomber was on a research mission studying solar radiation as part of Upper Air Research Project #288. It was recording data from 30,000 feet to as close to the ground as possible.

On the last run of the day, a low pass over Lake Mead went seriously wrong. The pilot misjudged his altitude and the plane struck the surface of the lake at nearly 250 miles per hour. Miraculously, the captain and co-pilot were able to lift the plane off the water, but the damage was done. One engine was on fire and the other three were gone, literally torn from their mounts. Momentum enabled the crippled plane to gain perhaps 200 feet of altitude, but its fate was sealed. The pilots did not even have time to warn the entire crew to brace for impact as the 50-ton bomber was ditched.

In the 12 minutes that the plane remained afloat, all five of the crew managed to escape and survive the ordeal. The plane, however, sank in excess of 250 feet of water. Early attempts at locating the plane were unsuccessful due to the crew's unfamiliarity with the area and confusion regarding the precise crash location. As a result, Lake Mead's B-29 soon became one of the area's most enduring mysteries.

Over the years, a number of attempts to find the bomber were made by private individuals, organizations, commercial divers, and even the National Park Service. All of the searches proved to be unsuccessful, and it was assumed that the plane was lost in close to 400 feet of water, perhaps buried under many feet of sediment.



Finding the lost Superfortress

Recently, a local Nevada dive team announced the discovery of the bomber and released proof that they had explored the sunken aircraft. Project leader Gregg Mikolasek, of Henderson, Nevada, discovered the plane in December 2000. Realizing that he would need to use a different approach than his predecessors, Mikolasek incorporated a combination of archival research (including the official accident report), flight path simulations, and deductive reasoning.

The bottom of Lake Mead consists of very rough terrain characterized by steep cliffs, buttes, deep valleys, and crevices. The flatter areas are deeply carved alluvial floodplains. These factors made searching for the elusive B-29 a challenge. The tool of choice was a Marine Sonic sidescan sonar system with a 300khz towfish equipped with only 550 feet of cable, and the search would need almost every bit of it. In order to reach its target depth, the cable had to be fully deployed. The survey progressed slowly at a speed of less than two knots, with the towfish more than 200 feet behind and below the 16-foot survey vessel. Search tracks were run with nearly a 50 percent overlap to account for the rough topography. Even an object as massive as a B-29 bomber could have been easily concealed from sonar by the unevenness of the terrain.

A review of the official accident report showed that the aircraft likely sank nearly intact. How the bomber had settled or the violence of its impact with the bottom and the subsequent resulting damage was not known. Hence, the target size was a variable. It could only be hoped that the search target would have the profile of an intact

B-29A Statistics

Manufacturer:	Boeing Airplane Co.
Engine:	Four 2,200 hp Wright Cyclone R-3350-23 radial
Wing span:	141 ft. 3 in.
Length:	99 ft.
Height:	29 ft. 7 in.
Max weight:	124,000 pounds
Max speed:	358 mph
Ceiling:	31,850 feet
Range:	3,250 miles
Armament:	(12) .50 caliber machine guns, (1) 20mm cannon and 20,000 pounds of bombs.
Crew:	11

The Boeing B-29 Superfortress is the first of the true "Heavy Bombers." It was designed as a replacement for the B-17 and B-24. It was the first pressurized bomber, and it differed from its predecessors by the use of remotely controlled turrets for its machine guns. Development problems delayed its introduction to combat service. Although it made its first flight in September, 1942, the first B-29 combat missions against Japan did not come until June 15, 1944. A total of 3,967 were built by Boeing in Wichita, KS and Renton, WA and by Glenn L. Martin Co. in Omaha, NE and Bell Aircraft Co. in Marietta, GA.

The Superfortress was used almost exclusively in the Pacific theater of World War II, and caused much destruction against the Japanese home islands. The B-29's "Enola Gay" and "Bock's Car," became the only two aircraft to drop atomic weapons during wartime. This occurred in August of 1945, thus bringing the Japanese to surrender in September of that year. B-29s also served during the Korean War, flying 21,328 sorties from bases on Honshu and Okinawa and dropping over 167,000 tons of bombs from 1950 to 1953.

aircraft. It was very possible that the B-29 could have broken apart, been partially buried, or come to rest at a steep angle or even in a deep underwater canyon. Consideration of these possibilities helped determine sonar range settings and search track overlap.

For the past several years, the U.S. Geological Survey (USGS) has conducted a sedimentation study at both Lake Mead and Lake Mojave as part of a joint program with the University of Nevada, Las Vegas. In their study, the group found that as much as 140 feet of sediment had accumulated in some areas. If the plane had come to rest in the main Virgin River channel, the accumulated sediment (estimated at 40 to 80 feet deep) would have long since engulfed the aircraft, making a sidescan search pointless.

On the third search day, a target was detected on the first run. It had the appearance of a small cross resting on uneven terrain. A repeated pass confirmed the first image and pinpointed the location. A third pass, made at a higher resolution, proved unforgettable, as the profile of an intact B-29 bomber scrolled across the screen.

Image measurements showed the wingspan to be a width of 141 feet, but the fuselage length roughly 20 percent shorter than a B-29's 99 feet. Damage to the aft section of the fuselage and empennage, and the orientation of the wreck on a downward slope was later determined to be the cause of the discrepancy.

Higher resolution imagery revealed remarkable details. These features included the attached remaining engine and propeller, damage to the nose and empennage, and the excellent state of preservation of the wings and majority of the fuselage. Depths in the search area ranged from 100 feet to almost 330 feet. The plane was located in approximately 260 feet of water.

Getting it on film

Visual documentation of the wreckage now became the challenge. Due to budget limitations, complimentary use of two ROV systems was promised. In one case, the ROV was plagued with problems before ever arriving. The other failed repeatedly at the site, costing valuable time and funding without returning a single usable image.

The combination of these repeated failures and no additional prospects led to the formation of a technical dive team. The objective was to reach the site and obtain primary footage through diver-held cameras. Melody Gritz, a Las Vegas based technical dive instructor and explorer, was brought in as the Dive Safety Officer and to conduct training for the team. A series of technical dives was planned, with 20 to 30 minute bottom times and decompression on up to 80 percent oxygen to shorten the lengthy air decompression to roughly 90 minutes. Decreasing lake levels over the 2000 to 2002 seasons made reaching the B-29 significantly less complicated. While the B-29 was found during peak water level, drastic drops during 2001 made for a 40-foot shallower dive, and on September 16, 2001, the team descended to view the wreckage. Filming dives were attempted soon afterwards.

Filmmaker and producer Steffan Schulz was brought in to oversee the visual documentation. Initial dives to the site proved a lack of sufficient illumination of the bomber in the pitch-black depths. The 18–watt HID lighting systems on the underwater digital video cameras simply could not light large enough portions of the aircraft to capture a feeling of perspective of the incredible size of this plane. Mikolasek and diver Alan Bruns spent months in the design and fabrication of supplemental systems, constructed of sealed beam halogen flood lights, PVC, and ABS piping and silicone. All of which had to withstand the 260 feet of pressure present at the site. After building the prototype, improvements were made on the subsequent final three pods resulting in 1.2 kilowatts of additional battery-powered lighting, enough to adequately light selected portions of the bomber. These new tools enabled the team to complete filming by August 2002 and a news conference was held on
August 9, 2002 to announce the find to local media.

Through 54 years and numerous attempts to locate the B-29 Superfortress, Lake Mead refused to give up its long-held secret, until now. The pinpoint accuracy of the sidescan sonar, coupled with successful research methods, made precise location of the sunken craft possible. The dedication of the team allowed completion of all dives without incident and made obtaining the stunning images possible. The combination of these efforts granted the team the opportunity to be the first crew to visit Lake Mead's lost bomber in over half a century.

Gregg Mikolasek started In Depth Consulting in 1996. He holds two degrees from the University of Michigan including a Masters in Atmospheric and Oceanic Science. Gregg is a licensed private pilot, EMT, and an avid technical diver. He divides his time between the Southwestern U.S., where he is the regional sales representative for Trelleborg-Viking & Poseidon Diving Equipment, and Panama, where he has served as a Dive Safety Officer for several years on the M/V Coral Star.

Steffan Schulz is the Executive Producer of the Destination Diving Television Series and a number of other television programs. He has filmed in over 20 countries spanning four different continents. His programs have been aired in almost as many markets.

Gregg Mikolasek
http://www.indepthconsulting.com

In Depth Consulting
PO Box 91393 Henderson, NV 89009
Email: ScanMan@InDepthConsulting.com

ADM Featured Photographer

David Evans

David Evans is an award-winning underwater photographer based in Mukilteo, Washington, just north of Seattle. David and his wife Laurynn are the proprietors of Puget Sound Diving and together are experienced photographers, videographers, and professional diving instructors.

David and Laurynn started diving in the summer of 2001 in anticipation of a vacation to St. Lucia. Neither expected to fall in love with diving the cold, current-swept waters of the Puget Sound. Now, with more than 300 dives in the Puget Sound later, both are avid diving professionals who spend their spare time sharing their love of diving with anyone who will listen (or have a look at their website).

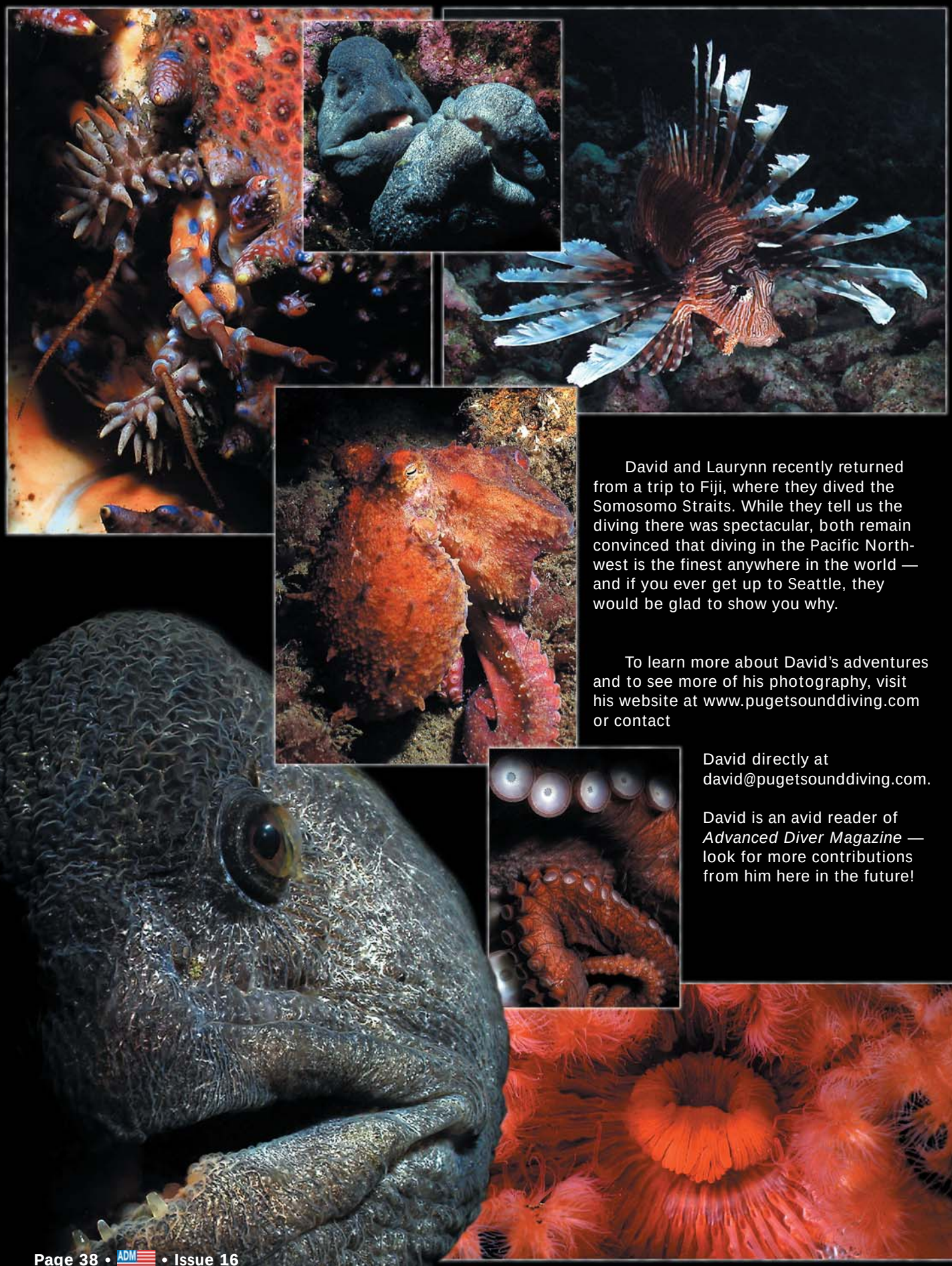
David is the "trigger man" for this diving couple — all of the images seen here are his — but David is quick to credit Laurynn for her contribution to the photos he takes. True to their training, they are an extraordinary team in their approach to diving. David is quick to acknowledge Laurynn's extraordinary eye for spotting critters, and their intuitive communication underwater lets David capture images that he states would be impossible to capture otherwise.

David was a serious amateur photographer for more than 20 years prior to taking up diving, so it was a logical step for him to take a camera underwater. He bought a Nikonos V before even completing his open water

certification. He now has made a complete transition to digital, shooting Olympus gear housed in a Light and Motion Titan housing. In addition to his professional photography and dive instruction, David is also a graphic design instructor at the college level in Seattle.

David and Laurynn are advanced wreck divers with training through GUE and are starting their transition to mixed gas diving this winter. While they love the ins and outs of wrecking, it's the wildlife of the Pacific Northwest waters that they find most thrilling. From the encounters with the Giant Pacific Octopus to the friendly local wolfeels, the size, color, and variety of life in the Northwest is stunning. But David says their greatest encounter to date was snorkeling with a pod of 22 Orcas in British Columbia — an experience he describes as nothing short of "religious."

The Evans believe that diving has forever changed the way they look at the world around them. David's primary mission with his photography is to show the people of Washington the treasures beneath the green waters of the Sound, in the hopes of raising awareness and concern for environmental issues that plague the health of the oceans. David believes that if people come to learn about the life beneath the green surface that they will cherish and care for it. As such, he is a photographer with a mission. "Conservation," Evans says, "is vital to the health of the oceans" — in fact, portions of the proceeds from every image he sells is contributed to the Ocean Conservancy (www.oceanconservancy.org).



David and Laurynn recently returned from a trip to Fiji, where they dived the Somosomo Straits. While they tell us the diving there was spectacular, both remain convinced that diving in the Pacific Northwest is the finest anywhere in the world — and if you ever get up to Seattle, they would be glad to show you why.

To learn more about David's adventures and to see more of his photography, visit his website at www.pugetsounddiving.com or contact

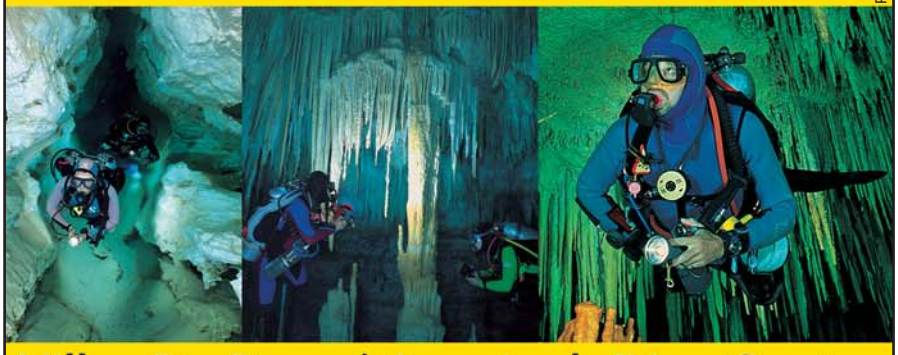
David directly at david@pugetsounddiving.com.

David is an avid reader of *Advanced Diver Magazine* — look for more contributions from him here in the future!

WORLDS BEST CAVE & CAVERN DIVING!

- Deluxe Ocean Front Accommodations
- Gourmet Meals & Roof Top Cantina
- Professional Dive Facility
- Nitrox Blended on Site
- Openwater to Full Cave Instruction
- Pristine, Highly Decorated Caves and Caverns
- Rental Equipment
- Experienced Cenote and Cave Guides
- Reef Diving and Blue Water Fishing
- Beach Front Property
- Snorkel Tours
- Freshwater Pool
- One and Two Bedroom Rooms

Photos by Steve Gerrard



Villas De Rosa / Aquatech Dive Center

Aventuras Akumal, Mexico
Ph: +(52) 984-87-59020 Fax: +(52) 984-87-59021
Toll Free in MX 01-800-509-4376
Toll Free in USA 1-866-619-9050
e-mail: Dive@Cenotes.com
www.cenotes.com

Dive Patches International

Dive Facilities • Dive Certifications
Dive / Fishing Charters • Fire / EMS
Business Patches • Schools • Police
Aviation • Sports • Security • etc...

Toll Free: 888-577-8980
Fax: 352-694-9742
E-mail: info@divepatches.com

www.divepatches.com

OCEAN TECHNOLOGY SYSTEMS

LEADER IN UNDERWATER COMMUNICATIONS

- Boat Captain
- Dive Master
- Safety Officer
- Surface Support

Surface to Diver

Diver to Surface

Diver to Video

- Student
- Model
- Photo Assistant
- Training Assistant

Diver to Listen Only

- *EMMY Award Winning Technology*
- *Over 30 Years of Experience in U/W Communications*
- *First Company to Address the needs of the Sport Diver.*
- *Produces Equipment for the Military, Search & Rescue, Commercial, Technical & Recreational Diver.*
- *Depth Tested to 315 feet by Advanced Diver Magazine*
- *U.S. Navy Approved*
- *Priced for the Recreational Diver*

2950 Airway Ave., Ste. D-3
Costa Mesa, CA 92626
Tel: 714•754•7848 Fax: 714•966•1639
Toll Free: 800•550•1984

Diver to Diver

- Instructor
- Cameraman
- Dive Buddy
- Dive Team
- Explorer

www.OceanTechnologySystems.com

Exploration Discovery Documentation Preservation

Explorer • Scientist • Archeologist

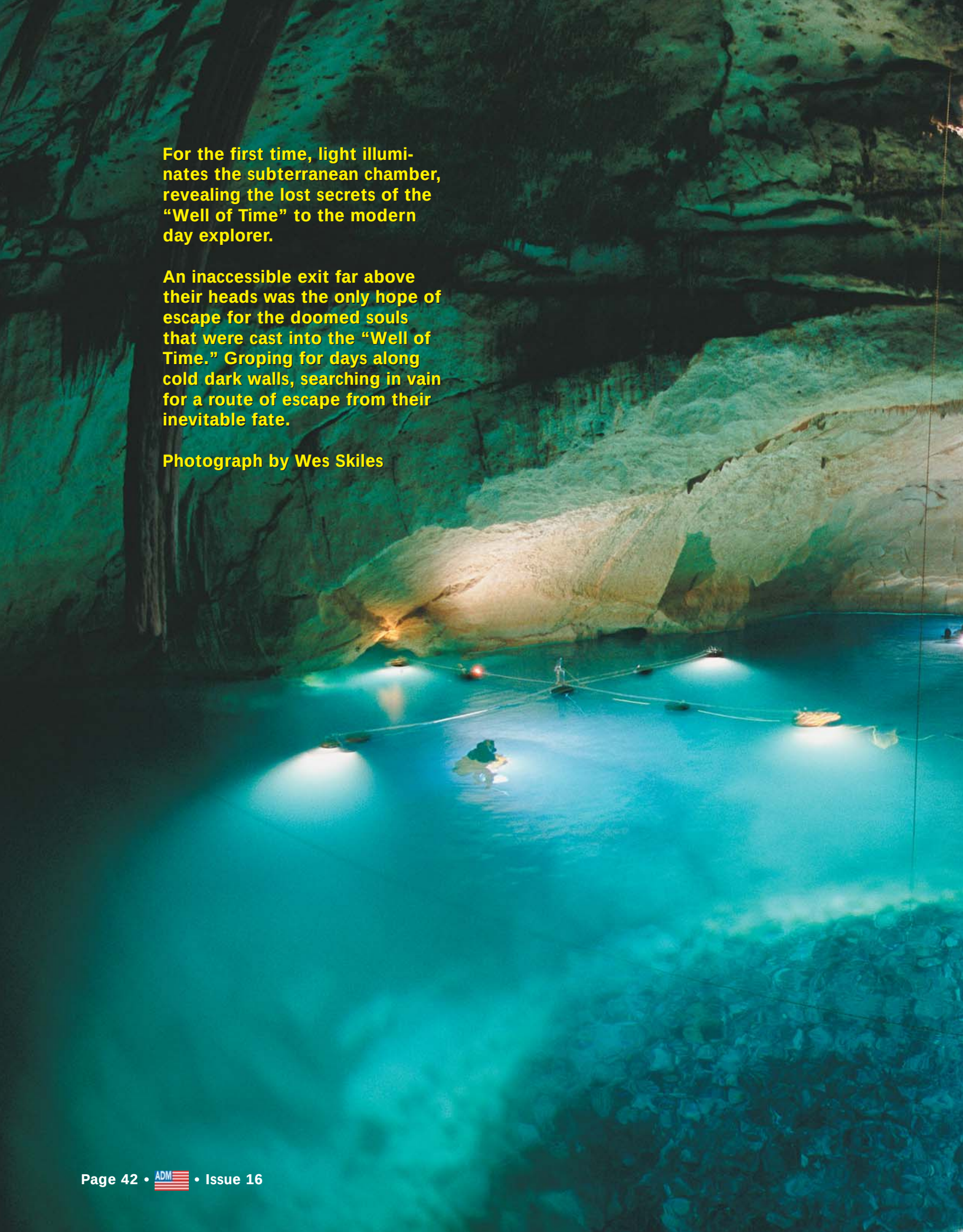
Editorial: Jill Heinerth
Photography: Wes Skiles

The catalyst behind countless great discoveries is not the scientist or the archeologist, but rather the explorer — the individual or group of dedicated individuals who spend innumerable hours and personal finances just for the thrill of discovery. Large universities, government grants, and private investors do not fund these individuals. They are the typical, hard working, Monday through Friday individual with a couple of odd jobs on the side to assist with their uncontrollable habit.

This irrepressible desire is not learned; it is genetically installed at birth. To forcefully contain this drive or attempt to prohibit these individuals from seeking their obsession would be akin to taking away an artist's canvas, a photographer's camera, or a wild animal's territory.

Since the beginning, mankind was nomadic — chasing the seasons across the planet. He explored, wandered, and extended his tribe around the globe, investigating almost every inch of dry land and leaving only the most challenging environments

Underwater archeologist carefully excavate human remains of ancient Maya from where they have laid undisturbed for over 800 years



For the first time, light illuminates the subterranean chamber, revealing the lost secrets of the "Well of Time" to the modern day explorer.

An inaccessible exit far above their heads was the only hope of escape for the doomed souls that were cast into the "Well of Time." Groping for days along cold dark walls, searching in vain for a route of escape from their inevitable fate.

Photograph by Wes Skiles

untouched. With the development of technology, man opened up otherwise impervious realms, and for the first time in the history, the whole world became accessible, both above and below the surface.

For all of history, humanity lived alongside and depended on the natural waterways for survival. All major civilizations were constructed within arms reach of a water source. But along with man's quest for prosperity came loss, destruction, and death. Man has either lost or intentionally discarded much of his possessions beneath the water's surface either by acts of nature, human tragedy, or even intentional sacrifices.

After the advent of SCUBA, divers gained a reputation for being scavengers — raping and pillaging the oceans and natural waterways for personal glory and financial gain. Scientists, archeologists, and government agencies shunned the recreational explorer because of their belief that the common diver was not capable of offering intelligent assistance.

Today, cave and wreck divers are forging a different path by getting involved in science and fostering a better understanding of our environment and human history. More and more explorers are working closely with scientists, archeologists, government agencies, and private foundations on projects that combine efforts in synergistic relationships.

Because of their dedication to the sport, technical divers often have tools and experience that agencies lack. The ability to safely push the envelope further, dive deeper, discover new places, and retrieve previously unrecoverable items make technical divers an important asset to science at the extremes.

In May of 1999, *Advanced Diver Magazine's* publisher, Curt Bowen, coordinated a cave diving expedition to Mexico's Yucatan peninsula. The goal was to explore and document as many new cenotes as possible during a ten-day excursion.

The Yucatan peninsula is a unique place. Sixty-five million years ago, the real estate of our planet was dramatically rearranged in a cataclysmic event that changed the course of evolution forever. When the Chicxulub meteor struck Earth it burrowed a 30-mile deep gaping wound in the Gulf of Mexico, vaporizing debris through a hole in the atmosphere and out into orbit.

The event was so grand that it caused the immediate demise of the great dinosaurs, as much of the planet

was shrouded in fires and dust, choking out life. But, when one door closes another seems to open. And at that remarkable point in life history, tiny mammals tipped the balance and began to seize a foothold on the planet — ensuring the eventual rise of mankind.

Now, in the shadows of Chicxulub rests a circle of openings leading to a labyrinth of underground rivers and caves harboring untold secrets about the history of the Earth. Deep beneath the limestone bedrock, the blemish caused by Chicxulub reaches its tendrils to the surface leaving a pock-marked ridge that we now call the Ring Cenotes. Of the two to three thousand holes that we can view from space, only a handful has been explored, thus leaving a lifetime of work for cave explorers to uncover and document. It may well be the most promising undiscovered subterranean territory left on earth.

Early one morning, a Mayan guide took Bowen's team to an abandoned hacienda not far from base camp. Built in the early 1800's, these haciendas were enormous plantations overflowing with thousands of employees growing and producing the world's supply of sisal.

The production of this natural rope required vast quantities of freshwater, thus many of the haciendas were built directly above cenote openings — a prime target for new exploration.

In the center courtyard of the hacienda was a raised platform surrounding the main well shaft. Closer examination proved that deep below the opening was a large subterranean cavern filled with cobalt blue water. Team member Scott Carnahan was lowered into the well for a quick reconnaissance. Within minutes he returned with promising news of a large dry cavern zone, deep water, potential underwater cave passage and lots of animal bones and pottery.

Team members Merika Jasper and Curt Bowen grabbed survey reels and slates and rappelled into the cenote. Tying off to the large pile of rocks located 70 feet below the well opening, they swam towards the perimeter in hopes of finding unexplored passage. While scanning the cave floor for pits, the team discovered an unusual pile of bones. Closer inspection revealed a practically complete human skeleton and a few pottery shards. Excited about this unusual find, the team examined the surrounding area closer, charting eleven additional skeletons and an assortment of broken

Center: INAH's underwater archeologist undertakes the methodical duty of sketching the arrangement of a newly discovered Mayan skeleton prior to excavation

and intact pottery. Several skeletons appeared to have sloped foreheads, betraying their origin as Mayan. In an ancient custom of beautification, Mayan children's heads were bound tightly between boards and cloth at birth in order to flatten and elongate their heads.

Once the team returned to the United States, Curt Bowen contacted film producer/explorer Wes Skiles about the discovery in hopes of inspiring a film documentary and supporting suitable archeological excavation. In addition to being a talented photographer and high definition film producer, Wes had the contacts to connect the right archeologists and organizations with the project.

After scouting the site with Bowen in June 2001, Skiles and filmmaking partner Jill Heinerth set out to secure the proper permits with INAH (Mexico's National Institute of Anthropology and History) representatives in Mexico. Their interest was to fund a multi-disciplinary scientific team from Mexico that would study the submerged artifacts of the sites that Bowen and his colleagues had discovered. With support from *National Geographic Magazine,* Skiles and Heinerth set out on a seven-month odyssey of phone calls and trips to secure the trust and participation of the INAH crew. In the eleventh hour, it took a personal visit with INAH Director, Pilar Luna to secure the final permission, thus allowing the expedition to take place.

Even as twenty scientists with truckloads of equipment began arriving in the state of Yucatan, there were doubts about the level of interest in Bowen's well site. But as the cave diving team began to reveal the site to the scientists from INAH, their interest peaked.

The mysterious well could in fact change the way anthropologists look at the Mayan civilization. Far from the great temples and ancient cities, the Maya are hardly a lost race. They live on in rural places like this practicing religion and ritual in their own way. Archaeologists had spent plenty of time excavating temples and palaces, but never revealed the life and death rituals of the rural Mayan farmer.

As local residents relentlessly pumped water from the well, the high tech team of paleontologists, underwater archaeologists and anthropologists descended to the shadowy depths unraveling a great mystery of how these people lived and how they died. Debate continues, but it is clear so far that the science team has uncovered evidence of accidental death, ritual burial, and even human sacrifice. In one remote niche, the exploration divers led scientists to a chamber containing more than one body placed carefully in a funerary position with simple offerings that were meant to accompany the lost soul through the difficulties of the underworld.

Left: Diver excavates the ancient remains of a human skeleton from the Well of Time

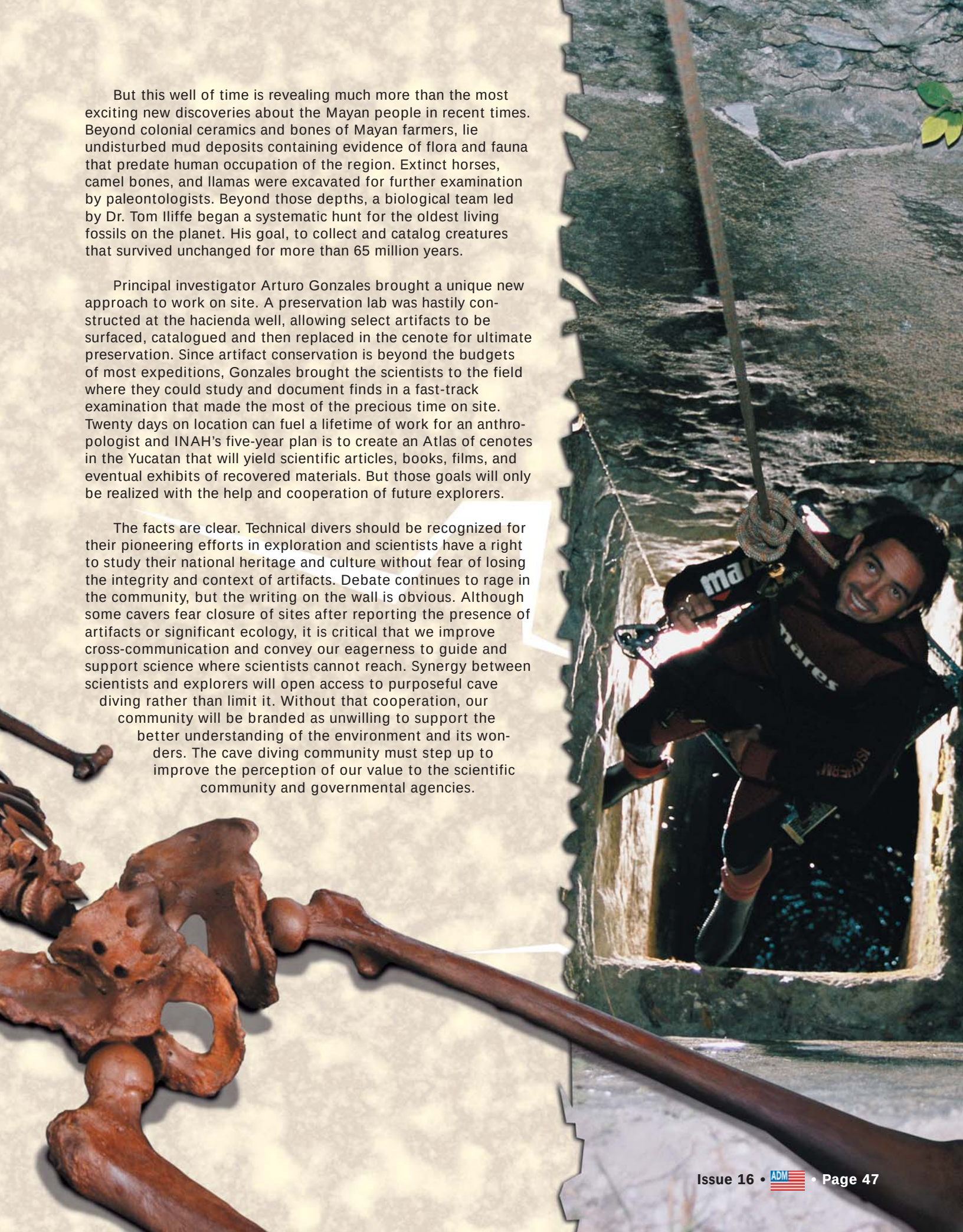
Right Page: The only access to the "Well of Time" and it's giant subterranean chamber, is through this small man made shaft. Without the use of a rope, escape back to the surface would be impossible.

Methodically exhumed from its ancient resting place, present day archeologist and anthropologist piece together the Mayan past of religion, culture and human sacrifice

But this well of time is revealing much more than the most exciting new discoveries about the Mayan people in recent times. Beyond colonial ceramics and bones of Mayan farmers, lie undisturbed mud deposits containing evidence of flora and fauna that predate human occupation of the region. Extinct horses, camel bones, and llamas were excavated for further examination by paleontologists. Beyond those depths, a biological team led by Dr. Tom Iliffe began a systematic hunt for the oldest living fossils on the planet. His goal, to collect and catalog creatures that survived unchanged for more than 65 million years.

Principal investigator Arturo Gonzales brought a unique new approach to work on site. A preservation lab was hastily constructed at the hacienda well, allowing select artifacts to be surfaced, catalogued and then replaced in the cenote for ultimate preservation. Since artifact conservation is beyond the budgets of most expeditions, Gonzales brought the scientists to the field where they could study and document finds in a fast-track examination that made the most of the precious time on site. Twenty days on location can fuel a lifetime of work for an anthropologist and INAH's five-year plan is to create an Atlas of cenotes in the Yucatan that will yield scientific articles, books, films, and eventual exhibits of recovered materials. But those goals will only be realized with the help and cooperation of future explorers.

The facts are clear. Technical divers should be recognized for their pioneering efforts in exploration and scientists have a right to study their national heritage and culture without fear of losing the integrity and context of artifacts. Debate continues to rage in the community, but the writing on the wall is obvious. Although some cavers fear closure of sites after reporting the presence of artifacts or significant ecology, it is critical that we improve cross-communication and convey our eagerness to guide and support science where scientists cannot reach. Synergy between scientists and explorers will open access to purposeful cave diving rather than limit it. Without that cooperation, our community will be branded as unwilling to support the better understanding of the environment and its wonders. The cave diving community must step up to improve the perception of our value to the scientific community and governmental agencies.



The successful exploration of Bowen's cenote has now been documented in the annals of *National Geographic Magazine* (October 2003) as a prime example of how exploration guides science. The remarkable Well of Time has done more than just reveal secrets about ancient Mayan burial practices. It will serve as a model of how two communities can work together in a synergy that allows the best technology and imaginations to meet the best scientific minds.

Dr. Tom Iliffe, world leading underwater cave biologist snares another subterranean specimen

Exploration Team / March 2001 (photo below)
Top back: (left to right) Andreas Matthes
Benja Sacristan • sherpa • driver
James Rozzi • sherpa • Curt Bowen
Bottom front: (left to right) guide • Linda Bowen
Scott Carnahan • Merike Jasper
sherpa • sherpa • Dan Lins
Not in photo: Roberto Hashimoto

U.S. Film Crew: (Karst Productions)
Wes Skiles - Producer
Sylvia Caminer • Jill Heinerth • Paul Heinerth
David Strayer • Joel Tower • Tom Morris
Scott Shepherd • Scott Braunsroth • Jitka Hyniova
Dr. Tom Iliffe • Scott Webb • Rusty Farst

VideoRay Team: Bob Christ • Marcus Kolb

National Geographic: Priit Vesilind • Emory Kristof

Project Payoffs

Archaeology:
- First cenote ever found with articulated bodies
- Definitive evidence of human sacrifice (the finest and most complete skull recovered from a cenote and perhaps the finest example recovered dry or wet that shows clear evidence of decapitation and removal of the flesh from the skull)
- Evidence that some people may have been sacrificed by throwing them in alive and letting them drown.
- Discovery of a burial chamber containing an elderly man and a young person with a pot with a dog and bird skull inside that gives clear evidence that it was placed in the cenote intentionally as a ritual burial. (This skeleton was the most complete articulated Mayan skeleton ever recovered underwater.)
- Discovery of Pleistocene animal bones, some which are now extinct (camel, extinct horse, jaguar, and llama)
- First study of the largest underwater deposit of Mayan bones ever found (Cenote Las Calaveras at Punta Laguna)
- Discovery that periods of drought drastically affected the landscape and lives of the Mayans
- Discovery of definitive evidence that Mayans used cenotes as Houses of the Dead or mortuary deposits

Biology:
- Discovery of live relic organisms within the Ring Cenotes region that predate the extinction of the dinosaurs
- Collection of new species

Exploration diver's accomplishments:
- Assembly of the most diverse and talented multi-disciplinary team of scientists and explorers ever brought together
- Discovery of unexplored caves within the Chicxulub crater rim, teeming with life and information about the hydrogeology of the region
- Discovery of significant cenotes filled with human bones and artifacts
- Exploration of the first mangrove and sea caves on the North Coast of the Yucatan peninsula

For additional photos and editorial on the Well of Time, see ADM On-Line.
www.AdvancedDiverMagazine.com

Sartek's Super Bright LED EBL1000C

- Luxeon™ Star LED emitter 1 Watt
- 100,000+ hours lamp life
- 15+ hours of battery life at full power, 100+ hours at reduced power
- Batteries: 3 x C Alkaline
- Vapor, vibration, dust, and shock resistant rugged ABS and LEXAN® construction
- Visible double O-ring seal and waterproof to 1,000 ft
- Proprietary optics to tighten beam
- Simple "Twist" on-off
- Wrist strap loops for use with optional strap for "Hands-Free" use
- Slip resistant grip, adjustable cushioned wrist lanyard included
- Lifetime warranty

Dive Rite's New NiTek Duo Dive Computer

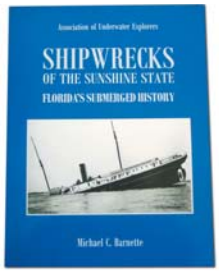
The NiTek Duo is a sophisticated and comprehensive dive computer that is designed to offer you the latest in dive computer technology, safety, and reliability.

The NiTek Duo is a multifunctional two-gas dive computer for recreational diving, providing information on depth, dive times, no-decompression and decompression times, and nitrogen and oxygen absorption and elimination during all dive phases, including ascent, surface interval times, and subsequent dives.

The NiTek Duo comes standard with a number of modes, including a time mode, dive set mode, dive plan mode, log mode, profile mode, PC transfer mode, and dive mode. Mix1 in the NiTek Duo can be programmed from 21 to 50 percent oxygen and mix2 can be programmed from 21 to 99 percent oxygen.

For more information on the NiTek Duo, go to **www.diverite.com**.

"Barnette digs deep into the tantalizing undersea mysteries of Florida shipwrecks. He is a researcher and teller of sea disasters second to none. The imagery he casts of these lost ships will completely absorb the reader on what lies beneath." *Clive Cussler*



Paperback; 8.5 x 11";
195 pages; 119 color images;
178 b/w images; & 4 site maps
ISBN: 0-9743036-0-7
http://www.mikey.net/aue/

British Columbia "Wreck-Trek"

By ADM Staff Writer &
Photographer John Rawlings

Beer and Creative Thinking

Maybe it was the volume of beer consumed, or maybe it was simply a great idea waiting to happen. In 1989, a group of friends from the British Columbia Underwater Archeology Society decided to hit a pub in Vancouver following a meeting. While quaffing down a few pints, as so often happens, someone brought up a fascinating topic, and the entire group chimed in as though it was the only thing that mattered in the entire world–in this case, the subject was how absolutely GREAT it would be to sink vessels as artificial reefs for diving. Excited and enthusiastic, that night they planted the seeds that would become the Artificial Reef Society of British Columbia, an organization respected worldwide for their expertise in the art of sinking ships.

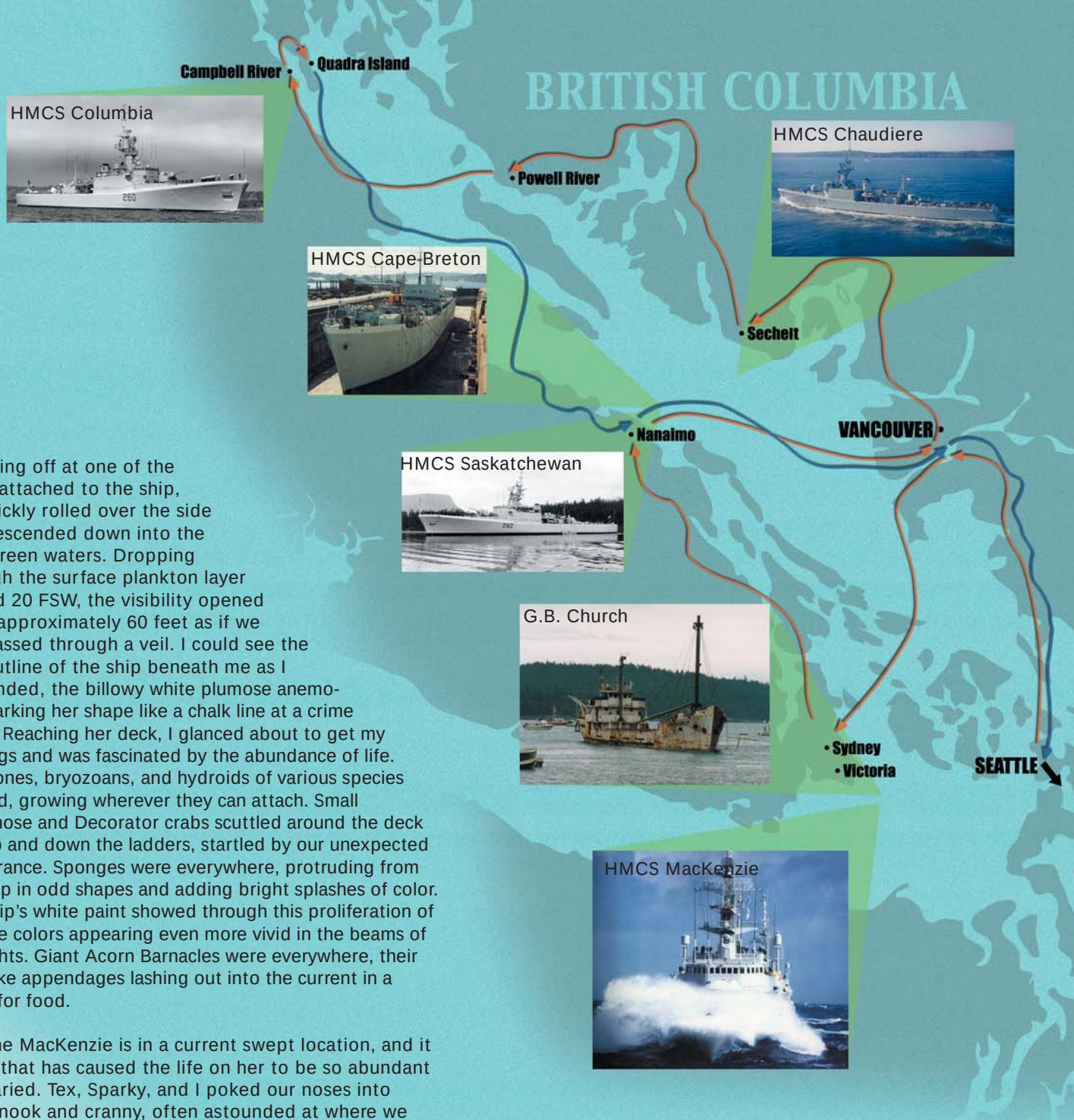
Almost 15 years later, John "Sparky" Campbell and I crossed the border with a specific goal–to dive every single one of the ARSBC's artificial reefs within a week. Our trip was planned out with the help of the Vancouver Island Department of Tourism, the BC Ferry system, and several dive charter operations. During our journey, we became more and more amazed at what a small group of dedicated volunteers has been able to accomplish.

"Dumb Luck" and Lessons Learned—the GB Church and HMCS MacKenzie

We began at the southern end of Vancouver Island, spending the night in Victoria and heading out in the morning aboard a charter boat from Erin Bradley's Ogden Point Dive Center. Erin regaled us with tales of past trips as we shot out of the harbor toward the dive sites. Also aboard was Tex Enemark, current President of the ARSBC, who throughout the week would provide us with information regarding the ships we were to dive on.

Our first dive was the HMCS MacKenzie, a 366-foot Destroyer Escort sunk in 1995. She was one of 13 "River-Class" vessels that were built during the Cold War designed to survive and fight in an atomic environment. All were named after Canadian rivers, hence the common name of the class of ships, although since the MacKenzie was the first built, the official name for the class was the "MacKenzie Class." The MacKenzie was the third vessel sunk by the ARSBC and benefited from the knowledge gleaned from previous sinkings. According to Tex, one of the key factors in sinking large ships is speed, and in this case, she sank in less than four minutes, coming to rest upright and level in about 100 FSW.

Emerging from a hatchway on HMCS MacKenzie, ADM Team Member "Sparky" Campbell finds himself surrounded by invertebrate life .



Tying off at one of the floats attached to the ship, we quickly rolled over the side and descended down into the rich, green waters. Dropping through the surface plankton layer around 20 FSW, the visibility opened up to approximately 60 feet as if we had passed through a veil. I could see the dim outline of the ship beneath me as I descended, the billowy white plumose anemones marking her shape like a chalk line at a crime scene. Reaching her deck, I glanced about to get my bearings and was fascinated by the abundance of life. Anemones, bryozoans, and hydroids of various species abound, growing wherever they can attach. Small Sharpnose and Decorator crabs scuttled around the deck and up and down the ladders, startled by our unexpected appearance. Sponges were everywhere, protruding from the ship in odd shapes and adding bright splashes of color. The ship's white paint showed through this proliferation of life, the colors appearing even more vivid in the beams of our lights. Giant Acorn Barnacles were everywhere, their claw-like appendages lashing out into the current in a quest for food.

The MacKenzie is in a current swept location, and it is this that has caused the life on her to be so abundant and varied. Tex, Sparky, and I poked our noses into every nook and cranny, often astounded at where we would find life growing and thriving. Rockfish and perch hovered about the hull, and small sculpins darted everywhere, while the occasional ling cod or cabezon would peer at us from their hiding places as we'd drift by. One big cabezon was established on top of the forward turret, staring out along the two big "guns."

Themselves enshrouded with invertebrates of all kinds. All too soon, it was time to ascend, and we made our way toward the ascent line. Once at the surface, Tex told us that the "guns" on the ship were in fact not what they seemed to be! The Canadian Navy will not allow working guns to leave their care and the barrels were removed and replaced with pipes in an effort to provide the right effect! It certainly worked for us, and the cabezon didn't seem to mind!

Our second dive was on the G.B. Church, a 185 foot World War II freighter that participated in the D-Day landings. She was the first vessel to be sunk by the ARSBC and, as Tex describes it, their success was pure "dumb luck!" No one really knew what to do, so they simply did whatever seemed right at the time. No holes were cut in the vessel as would be done with later ships to allow timed sinking and safe penetration. Volunteers stripped the vessel of everything salvageable and on the appointed day they simply pumped the cargo area full of water, towed her out to the site, and opened up a sea valve. The ship sank in 25 minutes and settled to the bottom perfectly upright in about 85 FSW. Tex reminisced, "It was deceptively easy....but later sinkings would show us just how much we didn't know."

The dive on the G.B. Church proved to be different from the one on the MacKenzie, the freighter being partially constructed of wood that has since been mostly eaten away by marine organisms. Once again, white plumose anemones enshrouded the wreck, dominating the seascape and looking like large balls of cotton. Much of the wreck is open, and I found the anemones to be prolific both inside and out of the pilothouse. As Sparky swam by the vessel's framework, he disturbed a colossal ling cod, and with a swish of her massive tail she disappeared into the gloom. With a slight kick, I passed over a side railing and sank slowly down toward the ship's keel.

Heading back toward the stern our lights danced along the base of the keel, searching for octopus dens. Finding one, a hole in the sand surrounded by crab and clam shells, we paused momentarily and used our lights to check out the interior only to find that no one was home. Looking around, we saw that we were being investigated by a cluster of some of the largest Quillback Rockfish I had ever seen, their curiosity apparently piqued by our activity at the mouth of the den. As we ascended, some of them followed us up toward the ship's aft mast. Covered with anemones, as I followed the mast upward it felt like I was climbing a giant Q-Tip. Clambering aboard the boat, we began discussing the next leg of our journey with Tex – Nanaimo and the next two wrecks of our "trek."

The Long and Short of it:
HMCS Saskatchewan and HMCS Cape Breton

Our arrival in Nanaimo was greeted with howling wind and rain coming down in buckets. Things weren't looking good weatherwise that night, but the next morning the rain had stopped and the sea was calm. We linked up with Ocean Explorers Diving and headed out to the dive sites with skipper Terry at the helm. A classic character, Terry entertained us with tales of the "northern long-necked penguin," the "only natural predator of the Orca whale," and the "double-fanged British Columbian Sea-Snake" that coils itself around unwary divers. It's not often that I see Sparky at a loss for words, so I found Terry to be doubly entertaining! Securing the boat to a mooring buoy over the Cape Breton, Terry assisted us with our gear and soon we rolled over the side and plunged down into the green depths.

HMCS Cape Breton is also a veteran of the Second World War. Built in 1944 with a similar design to the famous "Liberty Ships," the ARSBC sank her in October of 2001, with the vessel going down in under three minutes in 140 FSW. The Cape Breton is 442 feet long and 10,000 tons, which at the time of her sinking made her the largest ship ever sunk as an artificial reef. Since the sinking of the USS Spiegel Grove down in Florida, the ARSBC jokingly refers to the Cape Breton as "the largest, sitting upright!"

Within moments of leaving the surface, the stark white shape of the massive ship became readily apparent, and we gleefully saw that our visibility would approach 70 feet. My first impression, as we drifted downward, was that there was no life on her at all. As we drew closer, however, I saw that I was mistaken and that invertebrates are slowly taking her over. Her deck literally crawled with tiny brittle stars and white anemones and brown Feather Stars were clearly well on their way toward becoming dominant species. Prior to sinking, the Cape Breton had numerous holes cut into her in an effort to make an exit visible from every entry point and the vessel is now extremely popular for penetration dives. In fact, despite the fact that the ship rests in 140 FSW, it is possible to penetrate her and dive BELOW that depth since she hit the bottom with such force that her keel now rests deeper than the surrounding bottom. The size of the ship is simply immense and one dive simply cannot do her justice. During our ascent, I stared downward at the huge ship and felt small–even with the visibility we had that day I could not see either end of her. As more marine life accumulates over the years she will become absolutely remarkable.

Following a surface interval, we found ourselves dropping down onto the HMCS Saskatchewan. Also a member of the "River Class" of Destroyer Escorts, the Saskatchewan was sunk in 1997. During the sinking, she went down fast, hitting the bottom with such force that the bow was plunged over 17 feet into the mud and a furrow 12 feet high and 100 feet long was created.

Again, Feather Stars and Plumose Anemones are present, although in far greater numbers than on the neighboring Cape Breton. Thousands of Colonial Tube Worms are everywhere and various types of colorful sponges have also made the ship their home. The bow is enshrouded with orange and white anemones, with clusters of scallops and the occasional urchin. While slowly swimming across the deck of the Saskatchewan, I could easily imagine what the decks of the Cape Breton will look like in a few more years.

As we ascended we spent some time on the ship's superstructure leading up to the radar and mast. This area is literally covered with life and I found myself wishing that I brought down a macro set-up as we found a brilliant array of tiny creatures darting here and there amongst the railings and structure. Sparky found a small octopus peering out of a rectangular metal box mounted to a side railing and we took turns making finger contact with a tiny arm that snaked out in response. Looking down as we ascended, I couldn't help but that think, "Nanaimo has a true treasure here."

The HMCS Chaudiere – a Veteran of Bikini

The next morning, we departed Nanaimo for a ferry back to Vancouver to meet up again with Tex Enemark. Together, we traveled north to Sechelt Inlet to meet our host Kal Helyar of Porpoise Bay Charters and to dive the HMCS Chaudiere. The Chaudiere, another of the "River Class" Destroyer Escorts, is fascinating for a number of different reasons. She participated in the Bikini atomic testing, during which her hull was literally BENT by the force

of a blast! Now unusable, the vessel was used for parts for the other ships. She ultimately became the second vessel sunk by the ARSBC and the one that taught them the most about what NOT to do. "The Chaudiere was literally a comedy of errors from beginning to end," said Tex Enemark as he recalled the fiasco. Problems with contractors, scrap dealers, and sinking methods all led to a great deal of frustration, short tempers, and time wasted. "We managed to make every mistake it was possible to make and were absolutely exhausted after the Chaudiere". Today, one aspect of the ship stands as a permanent reminder of the mistakes made–because of the methods used, she is the only one of the ships that came to rest on her side rather than upright.

The weather was flawless as we departed the dock to head up Sechelt Inlet. Leaving the town behind, the scenery opened up into an astonishing vista. Upon arrival at the dive site, the water was like glass without even the slightest ripple. Bald eagles flew overhead as if to grant us good luck, and Sparky, Tex, and I hurriedly geared up for the dive. Shortly, the three of us were plunging down the line on our way down to the wreck, passing through an absolutely thick surface layer of plankton that blotted out virtually all light from the surface. Beneath it, the visibility opened up to 60 feet or more and within moments the ship came into view. Each of the ships thus far seemed to have had their own biological "personality" and the Chaudiere was no exception.

Even though she has been down the longest of the Destroyer Escorts, she appeared at first to have very little life on her compared to the others. This location has very little current, so many animals that thrive in current are either rare on the Chaudiere or completely absent. Plumose anemones are present, but in nowhere near the abundance as on the other ships, with the orange anemones rivaling the white in their numbers. Again, Feather Stars are numerous and seem to hang off every ladder or stairway. The most interesting, and dominant, form of life, however, seems to be Glassy Tunicates, which appear in clusters all over the ship, looking like groups of small glass jars. I had not even noticed them on the other ships and to see them in such abundance was fascinating. Prior to this trip, I had imagined that the ships would all be similar, but in fact each of them was proving to be unique.

The following morning, Sparky and I turned our way north to Powell River to catch a ferry back across to Vancouver Island. This was the travel day from Hell, with long waits on ferry docks, nasty weather, and long distances to travel. Looking like drowned rats, we finally staggered into our hotel in Courtenay just before midnight, (The next day we dived the beautiful wreck of the Capilano, a steamship that went down in 1915. A story will appear in the next issue of ADM about the Capilano. From Courtenay, we turned northward again toward Campbell River, where we met our next host of the week, Earl Lowe of Abyssal Dive Charters, who would take us on the final dive of our trek, the HMCS Columbia.

The Final Leg–a Visit to HMCS Columbia

Campbell River is known mostly for its fantastic wall and current dives. The HMCS Columbia is often dived when the currents are too harsh elsewhere, as it is sheltered in the lee of an island. She is another of the "River Class" ships, sunk in 1996, and sits in approximately 117 FSW. She came down upright on a rocky bottom, with

Two views of HMCS Saskatchewan, which is enshrouded in life. The top view shows some of the bridge superstructure while the bottom view shows some of the invertebrate encrusted deck structure located near her bow.

a 40-degree tilt to port, which adds an interesting aspect to a dive. Following a lively (and gorgeous!) drift dive, Earl swung his boat into the protected waters behind Maude Island and we began preparing the camera equipment and gearing up. With a quick stride we found ourselves dropping downward into water that was perfectly calm – without even a whisper of current. After the amazingly fierce current of our previous dive, it seemed anti-climactic. Again passing through a thick surface layer of plankton that cut down ambient light, the visibility this time proved only to be about 30 feet as we slowly descended to the ship. My initial impression was that she was coated with tiny barnacles with only the occasional anemone or Feather Star. Once again, though, we found that this ship had a unique biological personality. Swimming across the bizarrely tilted deck we found giant Sunflower Stars stalking in search of prey and isolated Crimson Anemones, their colorful tentacles extending into the water like dreadlocks. Over by a massive cleat on the starboard side we found a large Cabezon patiently waiting for dinner to scurry or swim by. Tex had told us about extensive damage that was done to the bow when the ship struck the rocky bottom and we swam toward it to see for ourselves. Arriving there, we examined the bizarrely twisted metal, still bearing its tonnage numbers, providing mute evidence of the violence of the ship's collision with the bottom. A cluster of anemones have taken hold there, taking advantage of the curled ledges of metal and adding color to the green paint of the hull.

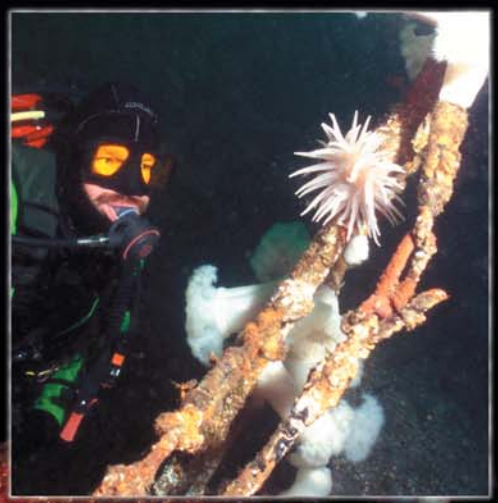
Checking our bottom time, we realized that the time had come and simultaneously signaled each other to begin the ascent. Passing the ship's radar dish, I found myself not wanting it to end. Once we hit the surface the trek was done....the adventure over. Slowly sliding up the ascent line, I found myself glancing back down toward the fading outline of the ship below. A realization hit me....these ships had served their country faithfully in times of both war and peace. They are now continuing to serve, only in a different way.

As you might imagine, the logistics for this trip were incredible! The author would like to thank the following for their help and assistance, and would recommend their services to all:

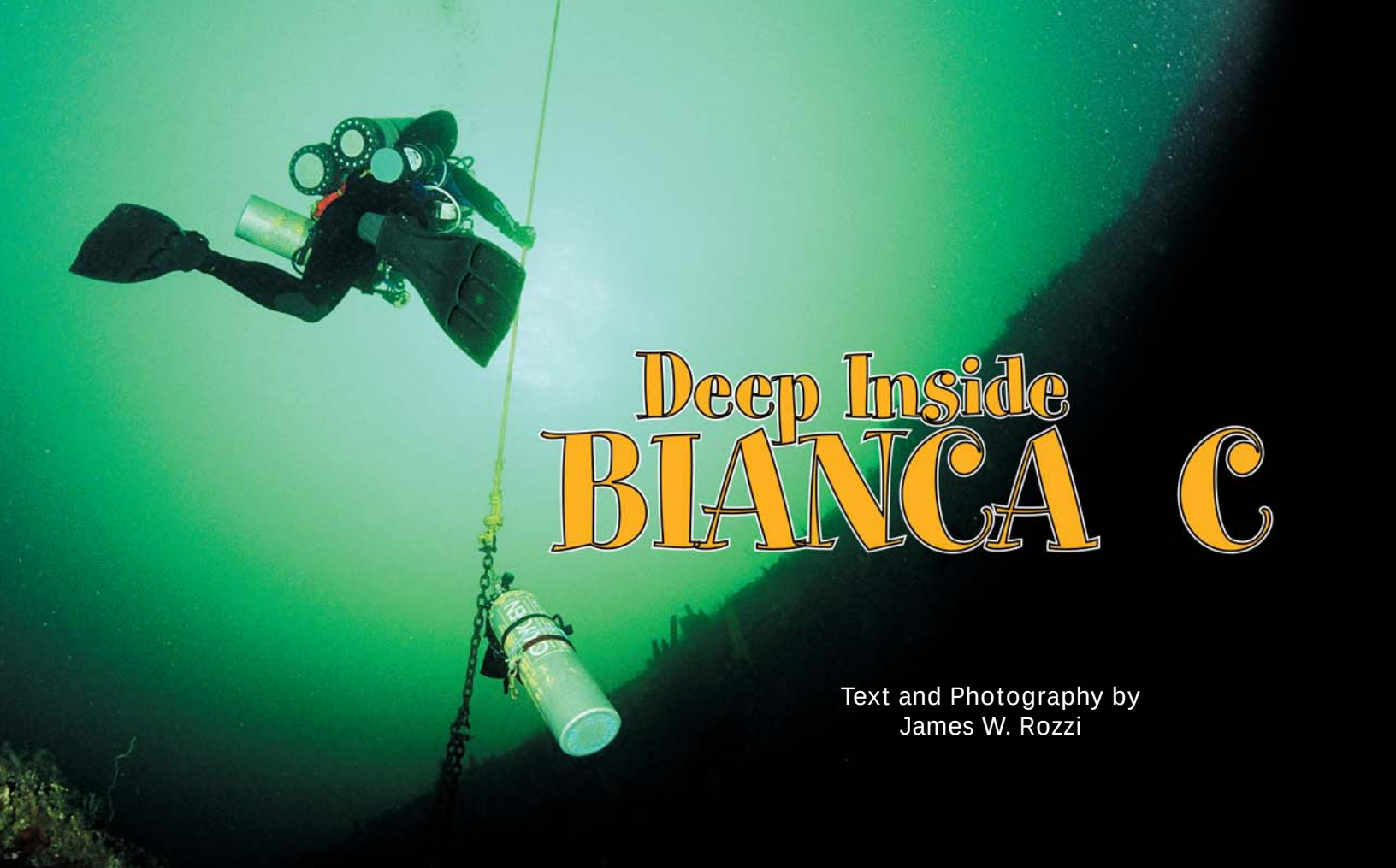
Vancouver Island Dept of Tourism..... www.islands.bc.ca
Vancouver, Coast and Mountains..... www.vcmbc.com
The BC Ferry System ..... www.bcferries.com
The Artificial Reef Society of BC..... www.artificialreef.bc.ca/
Victoria:
Ogden Point Dive Center.....www.divevictoria.com
Accent Inn, Victoria ..... www.accentinns.com
Nanaimo:
Ocean Explorers Diving..... www.oceanexplorersdiving.com
Buccaneer Inn..... sleepwell@thebuccaneerinn.com
Sechelt:
Porpoise Bay Charters..... www.porpoisebaycharters.com
Courtenay:
Pacific Pro Dive.....www.scubashark.com
Coast Westerly Hotel.....www.coastwesterlyhotel.com
Campbell River/Quadra Island:
Abyssal Dive Charters and Lodge..... www.abyssal.com

Above: Two views of HMCS Cape Breton, inside and out. Being the most recent of the vessels to be sunk, life is just beginning to take hold on her. Dwarfing the other ships, the Cape Breton's sheer size is an awesome sight to behold underwater.

Below: "Sparky" examines a Crimson Anemone perched on part of the structure of HMCS Columbia.



A huge predatory Ling Cod stakes out its claim to a portion of HMCS Chaudiere, patiently waiting for its prey to swim past. Large fish such as this have taken up residence on all of the ships, along with large numbers of prey species.



Deep Inside BIANCA C

Text and Photography by
James W. Rozzi

The wreckage came into view through the murky, green waters of the most southerly of the Wind ward Islands, Grenada — the spice island. My depth gauge showed eighty feet. Descending further, steel beams and massive sheets of metal appeared laying twisted and torn as if struck by some massive primeval force. Abundant varieties of sponges and corals were growing everywhere on the massive wreckage.

My descent line was tied at 120 feet near the torn stern section of the 600-foot passenger liner Bianca C that sunk in the Saint George Harbor in 1961. Weakened by fire and explosion, 150 feet of the stern lay twisted on its starboard side. The stern section was separated from the bow and remained connected by only pieces of torn metal and the ships propeller shafts. The forward section of the wreck stood perfectly upright on its keel at a depth of 160 feet.

Before I could penetrate and explore the interior of the Bianca C, I first needed to continue my survey of the exterior of the wreck. The water was full of microscopic sea life and cloudy, which limited visibility to about 40 feet, and everything was shrouded by a greenish hue. Ascending to the main deck area and looking forward, the outline of the funnel appeared surrounded with schooling jacks and black coral was in abundance.

The superstructure of the ship was collapsed to the main deck. Only the funnel, a small deckhouse and mast, remained standing on the forward part of the main deck. At the mast, the bow of the ship became visible, and I finned forward and dropped below the bow to the sand at 157 feet. A section of anchor chain dangled out of the hawse pipe and on the sand below rested the ships anchor. Looking up, the bow appeared proud and majestic, silhouetted in the ambient light 60 feet above.

Bottom time was accumulating, so I decided to proceed with the survey. Gas was not an issue because I was using my rebreather, but I wanted to avoid an excessively long decompression.

The port side of the bow section offered several entry points for exploration through the wide-open hatches. The outline of one of the ship's two swimming pools could barely be seen as it was collapsed inward in a jumble of steal, approximately 20 feet below the main deck.

About 450 feet aft, the twisted stern section appeared. Dropping to the sand, I hoped to see the ships three massive propellers. Approaching the stern, I followed the exposed propeller shaft along the sand until it disappeared within the hull of the wrecked stern section. Continuing on to the stern, I saw that the propellers were gone. The shafts had been cut. It was explained later that a Trinidadian firm had salvaged the props in the 1970's.

As I returned to the ascent line to begin my decompression, fresh images of the incredible wreck flashed through my mind. Although the promenade and upper

decks were collapsed inward, most of the bow section appeared intact. There were several visible points of entry, which brought a smile, because there were eleven more scheduled dives on the Bianca C.

Penetrating the Bianca C

A black, jagged shard of the ship's metal plating hung fanglike before me, guarding the entrance to the ship's shaft alley. The entryway was discovered and shown to me by expedition leader, Andrew Driver. The white sand shimmered below me as I carefully made my way past the sharp sheet of hanging metal. I noticed the old style rivets used to hold the plates together. The opening was just large enough for me to swim carefully through without becoming entangled. I looked up and into the interior. It was pitch black inside. My 10-watt HID light illuminated the passageway. One of the ships 12-inch shafts lay to my right, stretching forward into the space facing the ship's engines. I located the line that Andrew and I had laid on my previous dive, as this was my lifeline in the event of silt out.

The deck, bulkheads, and machinery were all covered with a layer of fine silt. On the deck in places, the silt appeared to be as much as six inches thick. Much like a fine powder, if disturbed by the slightest misguided movement, the silt would cloud the water instantly making the visibility zero. The overhead was low and ahead was a ladder. Stalactites of rust grew from the iron interior hanging from the handrails and machinery.

I swam past the ladder and turned left into a passageway. Just ahead, on my left, was the ship's machine shop. A grinder appeared illuminated by my light. To the right, was a lathe and next to it was a drill press. As I reversed to exit the compartment, I noticed a workbench and vise. Visibility was diminishing, so it was time for me to continue.

Large propeller shafts were connected to the ship's engines. I returned to the shaft alley passageway and turned inward following the 12-inch diameter shaft. Around a ladder and further down the

Top Left: Diver, Neal Stevens ascends back towards the surface after a 25 minute dive

Top Right: Propeller shaft leading to main engine and ladders that extend to the upper engine room space

Middle Right: Drill press in the machinery room

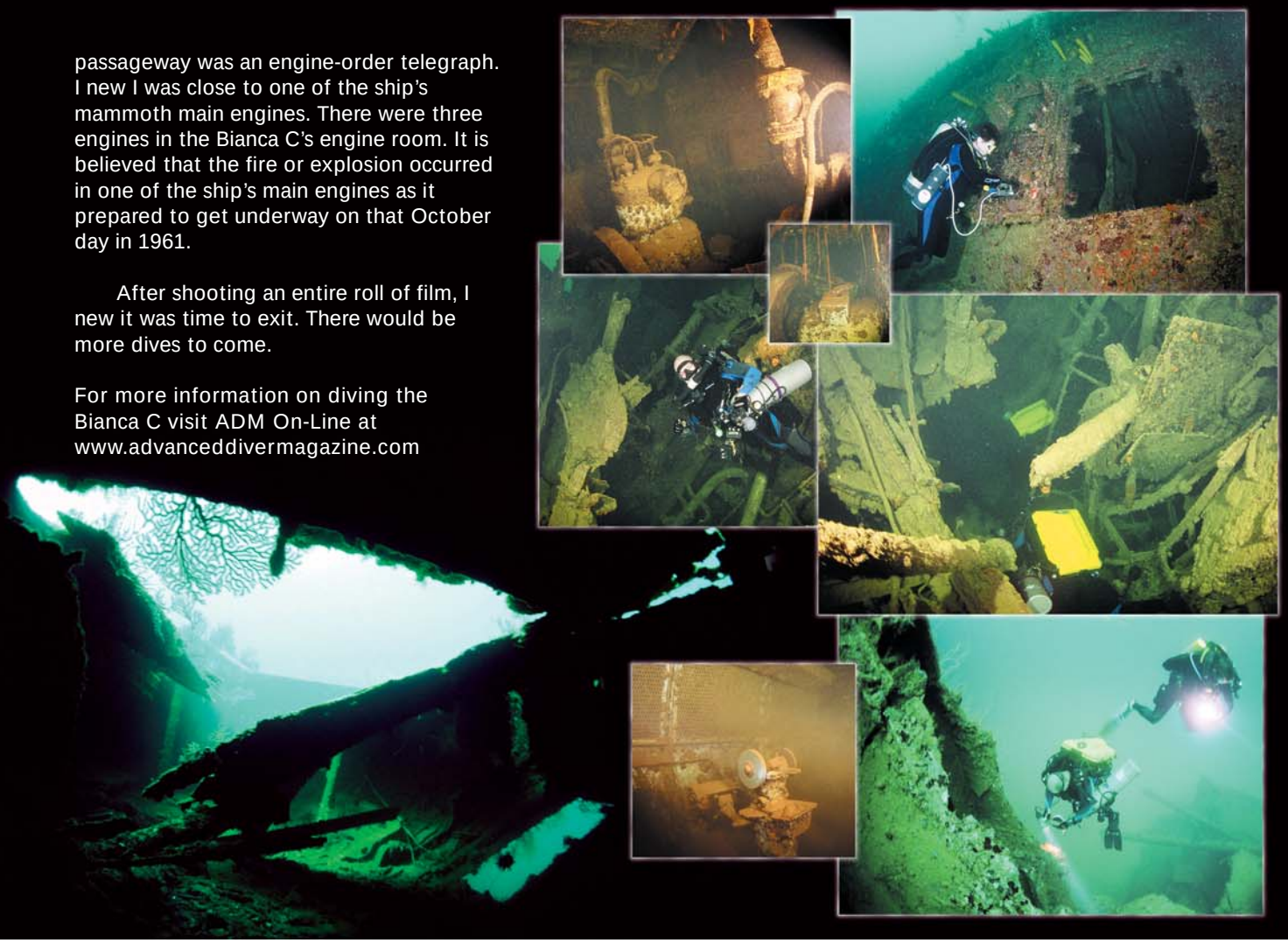
Lower Middle: View looking out at the entrance to the shaft alley

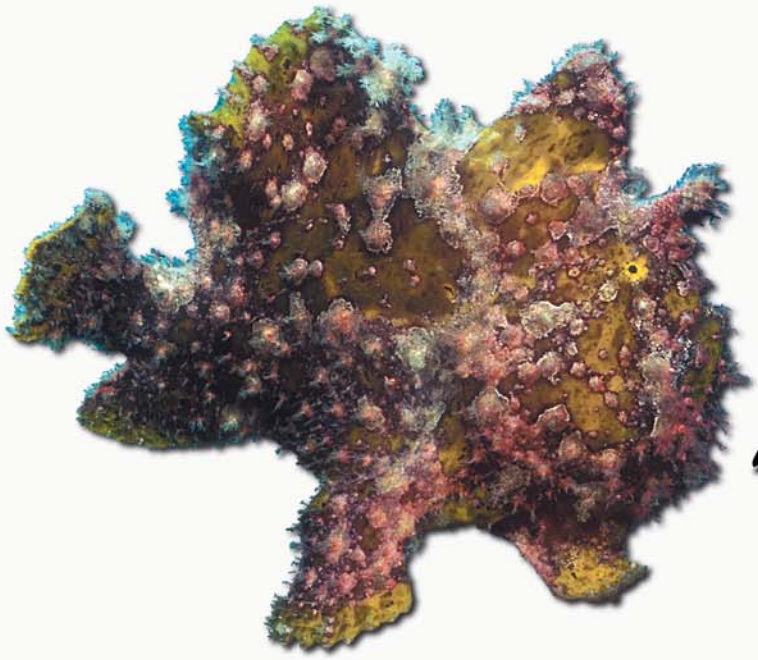
Bottom Right: Bianca C safe

passageway was an engine-order telegraph. I new I was close to one of the ship's mammoth main engines. There were three engines in the Bianca C's engine room. It is believed that the fire or explosion occurred in one of the ship's main engines as it prepared to get underway on that October day in 1961.

After shooting an entire roll of film, I new it was time to exit. There would be more dives to come.

For more information on diving the Bianca C visit ADM On-Line at www.advanceddivermagazine.com





FEATURED PHOTOGRAPHER
Ziggy Livnat

Ziggy Livnat is not just an artist; he is an advocate for the sea. Ziggy is a professional photographer, an environmentalist, an educator, and an award winning documentary filmmaker. Because his vision is to create compassion for preservation of the marine ecosystem, he devotes his career to the protection of aquatic environments. For Ziggy, photography is not just a form of expression; it is also a tool to achieve these goals. He believes that a fusion of art and science has a positive impact on social change. "I am a very lucky man to hear and follow my calling."

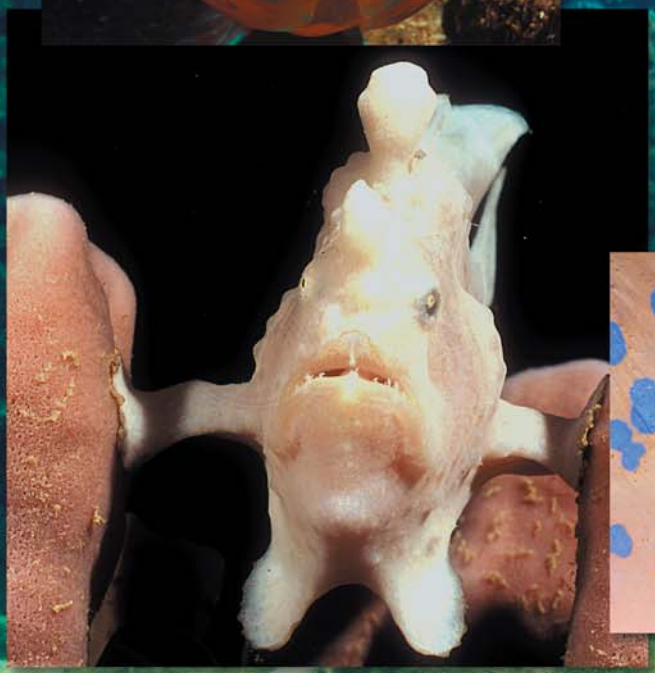
It all started in 1987 when Ziggy was taking pictures of tourists during introductory dives to the Red Sea. While waiting for them, he discovered the magnificent world in the details of the underwater oasis. Within a couple of months, he was paying his employer for all of the photos that he was taking for himself of the natural wonders of the ocean realm rather than getting paid for the tourists photos. "The Red Sea is my guru. It taught me and inspired me so much."

When Ziggy lived in St. Croix, U.S. Virgin Islands (1995-1996), he worked successfully with the St. Croix Environmental Association to provide slideshow lectures on the local marine environment to more than 1,100 elementary school students.

Ziggy graduated with a Masters of Fine Arts (MFA) in Photography from the School of Visual Arts in New York in 2002. His recent film, "Learning to Sea," is the culmination of hundreds of dives in the Red Sea and the Caribbean, two years of independent production, and an immense amount of passion and respect for the aquatic

realm. The viewer enjoys captivating footage never before seen including a fish that appears to be walking! The 48-minute documentary shows the co-evolution of species in the two seas and examines the human impact on the delicate balance of sea life while illustrating that WE ARE ALL ONE. The Animal Behavior Society awarded it the Best Non-commercial Film at their film festival July 2003 and it also won the Best Feature Length Documentary at the Celebrate the Sea film festival in Kuala Lumpur August 2003. "The similarities between different seas always intrigued me. My understanding that people watch TV more than anything else motivated me to create this film."

In addition to his photographic works that are exhibited around the world and published in such magazines as *National Geographic*, Ziggy has also appeared on the *National Geographic Today* show in March 2003.



Ziggy now lives on the big island of Hawaii with his wife, Laura. They enjoy night diving as a team, experimenting with lighting, and pursuing new and exciting footage for Ziggy's next film.

Ziggy shoots with a Nikonos RS with SB 104's and Fuji Velvia 50 ASA.

All of these images, as well as the film are available for sale. If you are interested in purchases or information please contact Ziggy & Laura Livnat at:
www.learntosea.com
www.hawaiipanoramics.com.

Port Washington's Mystery Schooner

Lake Michigan

by Rob Polich

On December 11, 1998 the commercial fishing vessel Linda E. disappeared without a trace on Lake Michigan while fishing off the coast of Port Washington Wisconsin. The weather was clear yet no distress call was sent. The unanswered questions surrounding her sudden and shocking disappearance created much local interest that kept the search alive for her well after the incident.

As a result, local shipwreck hunters generously donated their equipment, expertise, and time scouring the bottom of Lake Michigan off the Port Washington area for any sign of the vessel. Soon, a new target was located in over 300 feet of water, a target the searchers believed might very well be the remains of the Linda E.

The ROV findings

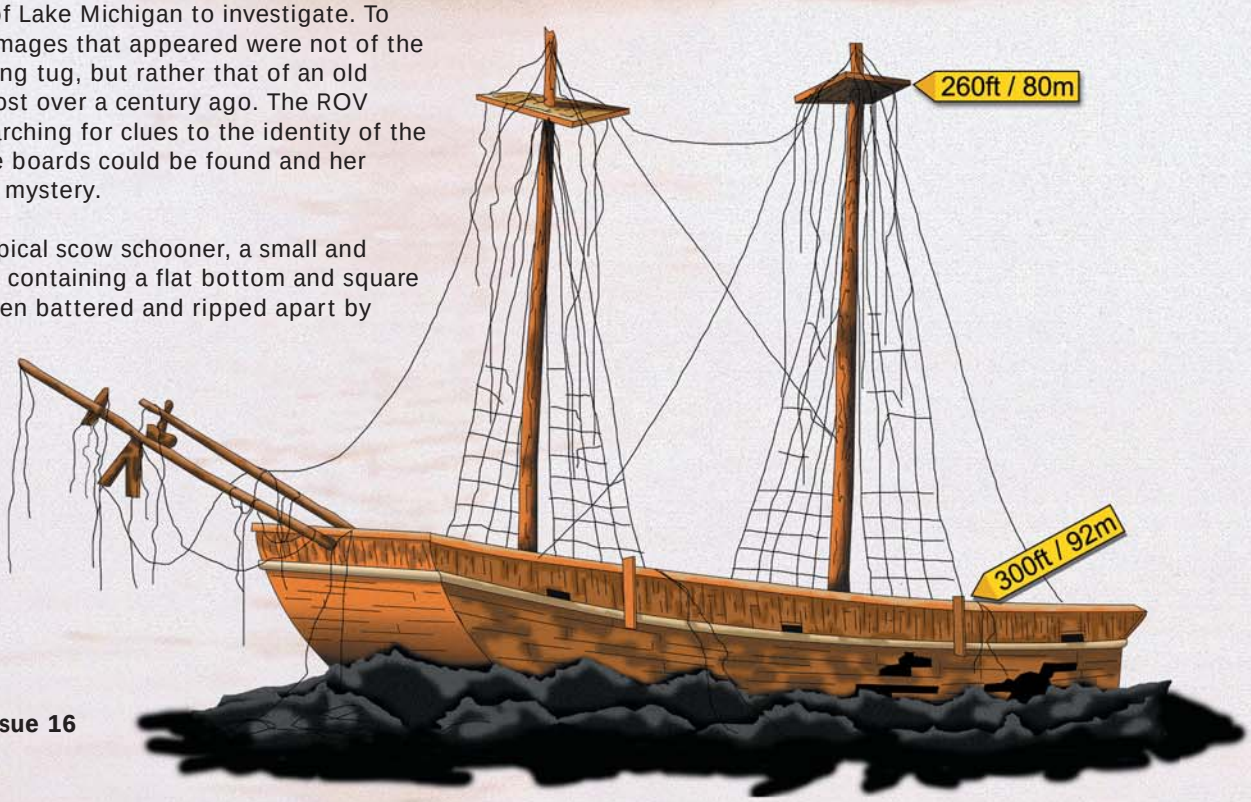
In January of 1999, with much anticipation, the United States Coast Guard Cutter Acacia lowered a ROV in the cold waters of Lake Michigan to investigate. To their surprise, the images that appeared were not of the expected steel fishing tug, but rather that of an old wooden schooner lost over a century ago. The ROV made two dives searching for clues to the identity of the vessel, but no name boards could be found and her identity remained a mystery.

The vessel was a typical scow schooner, a small and unglamorous vessel containing a flat bottom and square stern, which had been battered and ripped apart by whatever storm had sunk her. The wreck contained a single erect mast draped in cable rigging indicating that she probably sailed sometime between the early1880's and 1900 and her cargo of wooden posts still remained within her holds.

Scow schooners were a common sight on the Great Lakes in the late 19th century. They were small sailing vessels usually no more than 100 feet in length with a narrow beam, two masts, and an unusually rectangular bow and stern. One of the more distinguishing features of the scow Schooner was her extremely flat bottom; this frying pan like design enabled the vessel to tread into very shallow water.

Divers take a look

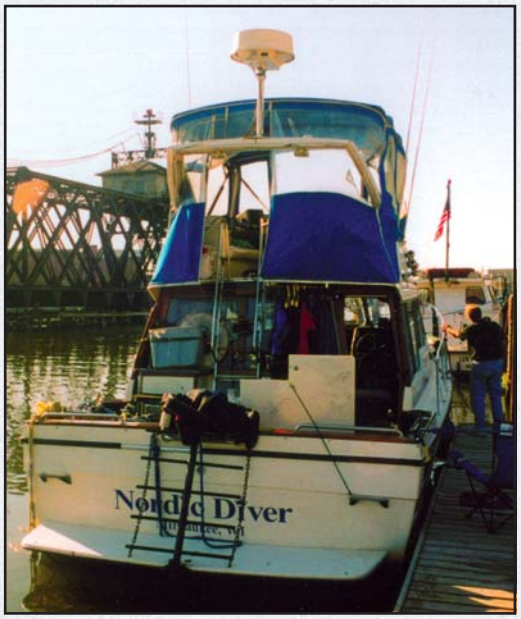
In October of 2002, I anxiously set out from Milwaukee aboard the Nordic Diver, a 32-foot dive boat captained



by Bill Prince along with divers Tom Doubleday, Ken Wagner, and Phil Patz. We had located the wreck earlier in the year but time and weather had not afforded us a more appropriate date.

Tom Doubleday and myself would set the hook and get our bearings then head down the wrecks stern rail looking for some indication of a name board along her hull and transom. Final gear checks were made, and soon I was rolling over the rail into Lake Michigan. While surface swimming toward the decent line, I switched on my primary light and peered into the reflector. Seeing no sign of ignition, I tried to restart it; nothing, my heart sank. I had checked the light in the back of my truck prior to boarding the boat and it had functioned perfectly. I unclipped one of my three back up lights and pessimistically reviewed its glow. Apparently the low-tech halogen light would lead me on my first tour of the wreck.

I settled into my familiar fast decent not expecting to see the wreck until my depth gauge reached nearly 300 feet. At 260 feet, the top of a mast emerged out of the inky blackness standing amazingly straight with a small and intact crows nest. Cable rigging draped from her upper yard, stretching out in all directions. A few feet above the yard, the mast was broken off.



As I dropped down toward her deck, visibility decreased rapidly to around 10 feet. Much of her rigging remained, and the inside of her gunwales had a surprising number of century old turnbuckles still drawn taught to their cables. Many belaying pins and various short cross sections were still visible within the rigging itself. Perhaps the crew hastily added these sections during their battle with the storm that claimed her. The deck had an erupted appearance, this damage most likely the result of her wood cargo floating and shifting from the incoming water. I discovered a fair amount of these wooden posts still lying neat in her stern hold. On her quarter-deck lay a cast iron stove along with an enamel coffee pot and other galley related artifacts lightly covered in the ever-preserving silt. These objects, once part of a warm hospitable cabin, now lay in stark contrast on the cold, murky, black bottom of lake.

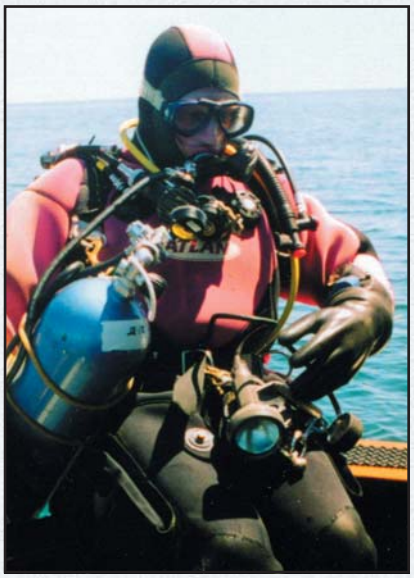
Turing the dive, I headed back to our anchor line. With a little more than a minute to spare, I decided to pass our up line and take a brief look around. At approximately 15 to 20 feet past the anchor line, the wreck abruptly ended. Her hull seemed flat and featureless and didn't appear splintered or broken; the missing area seemed to indicate an apparently clean break. I quickly shined my light across her beam and followed it a few feet toward starboard. In the distance, I thought I could just detect another dark section of the wreck, but my bottom time was at an end and there was no time to investigate.

I was curious about the dark section near where the wreck ended. Could it have been a bow sprint? That seemed unlikely. At the break, the hull showed no signs of angling forward toward an intact or even partially damaged bow. Scow schooners had much more rectangular bows in contrast to brigs and other schooners of the era, but some short, blunt angles should have been visible.

Post dive impressions

After my first dive on Schooner X, I spoke extensively with Great Lake historian and author Brendon Bailod. I gave Brendon an account of our dive, stressing that the wreck was much smaller than I had expected and more intact as well. All of us agreed that her beam was quite narrow, around 20 feet. Ken Wagner was convinced that he had seen what could have been the remnants of a name board. Unfortunately the paint had deteriorated and was no longer legible, but it did seem to be comprised of two words.

With little hesitation, Brendon explained that he was convinced we had discovered the wreck of the schooner Tennie and Laura. The Tennie and Laura was a small, two masted scow schooner built for the lumber trade in 1876 in Manitowoc Wisconsin. She was 73 feet long and had a beam of 19 feet. The vessel left Muskegon Michigan bound for Milwaukee Wisconsin with a cargo of wooden slabs on Saturday, August 1, 1903. Sometime that evening, she began to leak severely. Just after midnight, the wind increased, and the seas began to rise. At approximately 3:00 AM, her topmasts were torn off and her cargo of wooden slabs began to float about within her holds rupturing her hull and decking. The Tennie and Laura sank some ten miles short of her destination.



The Tennie and Laura definitely fit the wreck's anatomic description and general location. However, the account of her sinking, given by sole survivor James Sather, stated that the wreck had capsized and while in the heavy seas floated upside down for some time before finally slipping under the waves. This seemed to suggest an unlikely ending for Schooner X, which contained an upright mast and a stove with other cabin related artifacts lying on her stern deck. I was familiar with schooner stoves and had observed that they generally were attached to the deck in a fairly weak manner, suggesting to me that they would not have stayed with the wreck all the way to the bottom, nor would have her cookware and other more delicate effects.

Subsequent dives and discoveries

On our next visit to the wreck site, we were thrilled by the discovery of a second mast, standing upright reaching some 60 feet toward the surface. At first, I was not certain if this was in fact a second mast, hedging a bit due to the petite nature of the wreck and the seemingly ever-present poor visibility. With the exception of the first dive that Tom and I had made, the wreck had been plagued with miserable visibility. It was not uncommon to have 30 feet of clear water below the last thermocline down to around 260 feet only to watch it disappear to a demoralizing 1 to 2 feet by the time we reached her deck. After discussing the matter with Bill, I was convinced this was in fact a second upright mast.

On our following dive, we encountered a strong current. The heavy particulate was blowing broadside across the wreck from starboard, streaming flakes past my facemask reminiscent of a winter storm. Ken and I were trying to shoot some film on her port side and stern, finding little luck in the dismal water. Bill impatiently swam past us disappearing around her starboard corner. Heading back, Bill popped out from the opposing side of the up line as we started our ascent.

Upon surfacing, I was stunned to find Bill excited. "The bows intact, the rail and deck were continuous." "You're kidding me," I said. "Rob, I swear. I even saw the starboard anchor and the chain led straight to the bow sprint!" No doubt I felt surprised, but I also had a hint of expectation — my apparition in the dark had just become tangible. To our amazement, we would discover that the bow was actually the most intact portion of the wreck. The deck area showed little damage and was complete with a small windless and complimented by her anchors and a thin, delicate bowsprit.

Eventually, the wrecks identity would also be revealed. A partial name board would be located on her port side near the bow (only a few feet from where I had ended my first dive with Tom) the word "Tennie" in white paint just legible. It seemed Brendon was correct; we had been diving on the wreck of the Tennie and Laura after all.

Dissecting a Hammerhead

Advanced Diver Magazine's first look at a new electronic closed circuit rebreather controller.

by staff writer Jakub Rehacek

I do not know about you, but the best Christmas presents I get are from myself. This year, Santa has really outdone himself. In one of the boxes under the tree I found the Hammerhead electronics CCR controller for my rebreather. I knew about the Hammerhead electronics, made by Juergensen Marine, for some time. The Hammerhead electronics were originally designed as a complete replacement for the Inspiration scrubber head, handsets, and solenoid controller. Just remove the Inspiration head, screw in the Hammerhead, and go diving. It's that simple.

Hammerhead is also available as a custom head for the KISS manual CCR, converting it to an electronic CCR. There is also a replacement pod for the MK-15 and -16 series of rebreathers, as well as a replacement kit for the Megalodon rebreather.

I have built several rebreathers and a couple of PPO2 monitors, but I eventually came to the realization that in order to have reliable life support equipment, I have to turn to the professionals. Naturally, my search for the ultimate CCR controller brought me to Juergensen Marine and their Hammerhead electronics. The decision was simple; the Hammerhead has a feature set unlike any other controller available:

- Totally independent Primary and Secondary display (all electronics are in the wrist modules)
- Each display has its own power supply and single AA batteries are available anywhere in the world
- Each display is insulated from the rest of the system by a high quality water and helium proof cable
- The Hammerhead uses an isolation circuit, which completely isolates the Primary from the Secondary. The Primary can be removed and the cable end can be immersed in seawater and the Secondary sensor display will not be affected.
- DIVA heads-up display (tri-color LED, vibrating) serves as a third independent PPO2 monitor
- Multiple levels of alarms: vibrating DIVA, LEDs on Primary and Secondary, and a blinking backlight on the Primary and Secondary (see

Juergensen's Threat Matrix in the sidebar article)

- Advanced fast precise solenoid control based on depth and set-point deviation
- Integrated fourth sensor holder for independent PPO2 monitoring (VR3 or Explorer)
- Auto-on and solenoid override at 0.19 PPO2 — Hammerhead will keep you alive whether you want it to or not
- Built-in trimix decompression computer with Bühlmann Gradient Factors algorithm

The trimix computer feature is really neat and totally unparalleled in any other CCR controller. The Primary handset has a trimix decompression computer built in. The computer can be programmed to use the Bühlmann algorithm with Gradient Factors, enabling very fine control over the deep stops in the dive profile. The decompression profile is adjusted from the actual PPO2 during the dive, maximizing the deco advantage from the CCR operation, or it can recalculate the decompression obligations in open circuit (OC) mode if needed. The Primary Hammerhead display shows "NO STOP" until the diver crosses into a decompression dive, then the duration and depth of the next decompression stop as well as total time to surface (TTS) are displayed.

The deco algorithm employed in Hammerhead electronics tracks very closely to many of the gradient factor (GF) based desktop deco software packages. The Primary electronics handset can be disconnected from the rest of the Hammerhead and be used as a standalone decompression computer.

When I was researching the Hammerhead electronics, I contacted several experienced HH divers and asked them to share their thoughts about the Hammerhead electronics. All of these individuals are Inspiration divers, because that was the first HH modification available. But since all of the HH functionality is encapsulated in the handsets, the experience applies to any HH fitted CCR. Here are their thoughts:

Joseph A. Radomski • ANDI Trimix Inspiration Instructor Trainer • USA

The latest version of the Hammerhead, in my opinion, is the most polished CCR controller currently available. The combination of an integrated gradient factor deco computer, heads up display, removable wrist units, and a truly independent secondary display is hard to beat. The Hammerhead does so much more than the standard Inspiration controllers.

The current implementation used for PO2 set point maintenance far surpasses the standard electronics as verified by independent PO2 monitoring computers. The PO2 control on the Hammerhead is unaffected by depth.

Stuart D. McLean • Australia

The Hammerhead PO2 controller sets new standards in terms of set point maintenance. The built in decompression computer makes on-the-fly dive plan changes safe and easy. User functions such as solenoid on/off makes diving with low batteries or a faulty solenoid much more practical and having the fourth cell within the lid makes connecting a second integrated computer much easier.

Mike Dyson • United Kingdom

All of my diving is mixed gas wrecks around the UK coast at 60 to 80msw, so one of the considerations is system visibility and the ability to respond to alarms quickly if they occur. The HH gives me all of this. The design of DIVA really is a stroke of genius and is perfect when visibility is bad and you are task loaded with other activities such as lines and reels. I've used my unit for repeated extended cold water dives to six degrees centigrade (42°F) to 89m (294ft) with no problems.

For more information see http://www.electricfilm.com/dive.html

See the extended Dissecting a Hammerhead article at www.AdvancedDiverMagazine.com

WEEZLE An Undergarment for Northern Climes

A Product Review by ADM Northwest
Writer & Photographer John Rawlings

This review starts with a "shocking" story. My buddy, "Sparky", came by his nickname honestly, electrocuting himself a few years back while working on power lines and losing a great deal of both skin and nerve endings. Along with the nickname, another result was that he gets cold....VERY cold....when exposed to low temperatures. It has been a challenge for him ever since to continue the cold water diving we cherish.

Until about 6 months ago……

I'd been diving with my Weezle Extreme undergarment for almost 2 years and was overjoyed with it. On a trip to Canada I developed a leak at my inflator valve and emerged wet from every dive. My trip might have been ruined, but with my Weezle I was blissfully unaware of the leak underwater, its fibers retaining my body's warmth despite the leak and wicking the moisture away from my skin. I was easily able to dry out the undergarment during surface intervals. Bottom line.....I didn't miss a dive and my trip was saved. Sparky immediately ordered one of their suits, opting for their "Extreme +", a version designed for additional warmth.

Made and marketed by a small family firm in the U.K., the Weezle undergarment is an intriguing mix of modern fibers. The results are little short of remarkable. The outer layer is made of Pertex, the threads spaced in such a way that millions of microscopic "pores" are created that allow perspiration to be wicked away from the skin while at the same time preventing water from coming in. The filling is actually a unique combination of water-resistant fibers that "fluffs up" like fine down, but that also compresses easily and readily – it's shocking to see how much it can compress, the stuff sack for the suit being only slightly larger than a football! Finally, the lining fabric is also a combination of different yarns, woven in such a way that air and body heat is held in while moisture moves outward. Weezles are plump like a sleeping bag, and whenever I don mine I feel like the "Pillsbury Doughboy", but once my drysuit is on it compresses down to seemingly nothing.

Despite its down-like appearance and great insulating properties I found that I needed no additional weight to adjust my trim. This is common with other Weezle owners I have spoken with. "Sparky", in fact, was able to drop weight from his belt! Further, compressibility does not mean that movement is hindered and in fact my flexibility was even enhanced. I wear the Extreme for short, recreational dives and the Extreme + for winter diving as well as long decompressions.

Recently, Sparky and I made still another week-long trip to British Columbia (see this issue of ADM) and we put our Weezles to the test. Sparky's conclusion? **"You couldn't pry my Weezle out of my hands with a stick of dynamite!"**

www.weezle.co.uk

WHY OMS¤ DIVELIGHTS SUCCEED WHILE OTHERS FAIL

OMS¤ uses high reliability engineered connectors rated to 2000+ feet with a solid water blocked electrical cord rather than plumbing fittings, hot glues and shrink tubing. Our optional micro lens that changes 6 degrees to 15 degrees for superb center to edge beam uniformity provides excellent video lighting as it eliminates beams with black holes.

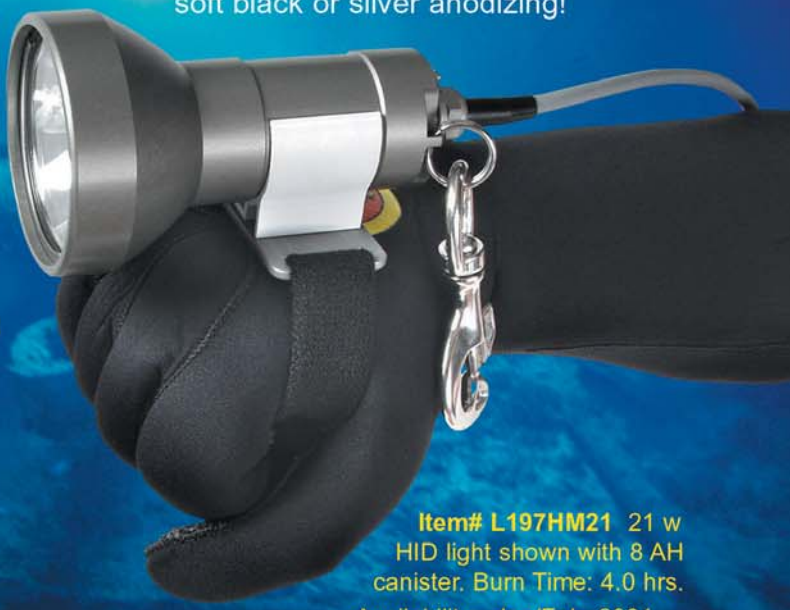
The **OMS¤** reflector maximizes lamp output while "they" use an inefficient "off the shelf reflector", that reduces light output.

OMS¤ offers an international charger. "They" use USA chargers that require aftermarket adapters and plugs for overseas use.

OMS¤ has engineered a unique mechanical light head switch with a safety switch lock (patent pending) to prevent accidental " turn on" to prevent fires and "gear bag" meltdown. Our competitors use unreliable leak prone rubber covered toggle switches on the battery canister, that turn-on accidentally and do not have a safety switch lock.

OMS¤ battery housings use high impact PVC that if dropped will not distort, dent or crack. Many competitors use brittle plastic or dent prone stainless steel canisters (drop it, it may deform and not seal).All Phantom light heads and canister caps are Mil Spec Hard Coat anodized while our competitors continue to use soft black or silver anodizing!

Item # L197HM10 10 w HID light shown with 4 AH canister. Burn Time: 4.5 hrs.



Item# L197HM21 21 w HID light shown with 8 AH canister. Burn Time: 4.0 hrs.
Availability: Jan/Feb. 2004

OMS¤ eliminates (2) points of failure by machining in the male threaded nipple on the light head and canister cap. Conversely all of our competitors lights have (2) extra points of failure at the point where the cord enters the light head and canister areas due to extra holes.

OMS¤ completely wet pot pressure tests every light. Do "They"?

Finally the OMS¤ revolutionary SMART™ battery technology incorporates themisters (to prevent fires) and click devices to prevent overcharging! OMS¤ the best that money can buy.

Ocean Management Systems Inc. 1625 Route 211 East, Middletown, N.Y. 10941

Phone 845.692.3600 ~ Fax 845.692.3623 ~ e-mail info@omsdive.com ~ www.omsdive.com

SS Cumberland Expedition

The Sydney Project

Editorial by Samir Alhafith

Historical information:
Tim Smith, Heritage Office
Photos: Mark Spencer
Video: Samir Alhafith,
David Apperley, Kevin Okeby

SS Cumberland was a steel twin-screw steamship that weighed 8,993 gross tons and measured 144.4 meters (474 feet) in length. Built by Hamilton & Co. in Glasgow, Scotland in 1915, the vessel was registered in London with Official No. 139102. With four masts and owned by the Federal Steam Navigation Company Ltd., *SS Cumberland* was powered by four steam turbines.

The steamer had picked up cargo in Townsville, visited Sydney, and was heading down the east coast for a voyage to the United Kingdom carrying a cargo of frozen meat, wool, and ore. A terrific explosion occurred below the waterline as the steamer passed a few miles off Gabo Island on July 15, 1917. With water flooding into the forward section, SS Cumberland was run aground on Gabo Island for urgent repairs. The origin of the explosion was believed to be caused by either a torpedo attack or a bomb placed onboard. It is now generally considered that SS Cumberland struck a mine laid by the German raider Wolfe that had been active in the area.

After five weeks of strenuous repair by divers and a dedicated salvage team, the tugs *James Patterson* and *Champion* were in attendance when the steamer was towed back to Eden for further repairs. However, a storm caused the temporary patches to break, and the tugs had to run for safety. Two larger steamers, the *Merimbula* and *Bermagui*, stood by to offer their help. *Merimbula* urgently evacuated *SS Cumberland's* crew when the steamer began to sink bow first — described by onlookers as an "awe-inspiring sight." The *SS Cumberland* is Australia's first casualty of war at sea.

CSIRO imaged a large wreck that matched *SS Cumberland's* size and approximate position in 2000 and contacted Tim Smith from the NSW Heritage office with the discovery. All of the records supported that this may indeed be the final resting place for the SS Cumberland.

Tim had known a member of the Sydney Project, Mark Spencer, through a previous expedition to the Australian Submarine AE2 in Turkey, and proposed that Sydney project divers carry out a reconnaissance expedi-

tion to identify if this was indeed the final resting place of the *SS Cumberland*.

Phones rang hot as we exchanged ideas and excitement for having the opportunity to see this ship and a meeting followed a week later. The only people to see the wreck was the salvage team recovering the cargo in 1951, the same salvage company to recover the gold of the Wreck *RMS Niagara*, and then the same bell technology was used to recover the gold of the *RMS Egypt*.

The home base for the expedition was the small coastal town Eden located near the NSW – Victoria border, eight hours from Sydney. The closest dive shop was located north of Eden in Merimbula, approximately 45 minutes away. The shop had no gas mixing facilities available, so all of the gas, compressor, and the rest of the equipment were brought with us. Another important piece of equipment that needed to be organized was a stable diving platform with ample space for eight divers with all of their equipment. The vessels chosen were a 40 foot Cougar Catamaran from Spirit of Eden and a 16 foot RIB chase boat.

On 25 October 2003, David Apperley organized a trip with Greg Hodge and Mark Ryan from Melbourne to the site of the wreck to verify the GPS coordinates. Greg then compiled the information into a graphical representation of how the wreck lay on the bottom. It was showing that the wreck might be lying on its side. The best indication that this was the *SS Cumberland* was to see if it had two props.

With the team assembled and ready, the boat was loaded on Friday 7 November 2003. The next morning at 6:00 AM, we loaded the rest of the gear and departed. Once on site, we sounded for the most obvious part of the wreck and prepared shot line to be deployed, including our Depth Accelerant in the form of a one-meter railway track with fins welded to it to help the track fall vertically. The sea conditions being calm and absolutely no current was a real bonus for this part of the coast, where such conditions may occur just once a year.

The team consisted of five divers on mixed gas, closed-circuit rebreathers (three Inspirations, one MK15, and one MK15.5), and the other three divers on open circuit. All backup gas was staged on shot lines. Maximum depth on site was 97 meters (320 feet).

Once the deco station was deployed and support crew David Apperley and Peter Szyszka gave the okay, bottom divers prepared to enter the water. Bottom divers were in two teams of three; the first team consisted of Simon Mitchell (MK15.5), Paul Garske (Inspiration), and Samir Alhafith (Inspiration). The second team consisted of Jason Mc Hattan (MK15), Mark Spencer (open circuit), and Kevin Okeby (open circuit).

The water was a refreshing 52ºF/11ºC on the bottom and visibility in the 30-50 ft /10-15 meter range with very little ambient light. The depth accelerant was found sitting vertically with the fins pointing upwards, showing how well it worked. The wreck was broken up significantly from the salvage operations and covered in a healthy marine growth and blankets of fish. We agreed that Simon would run a line from the shot, and Paul would look for any parts of interest, which would enable me to concentrate on shooting video.

Since there was no clear shape to tell us what direction the bow or the stern was in, we guessed a direction and ended up swimming into the bridge area. The area was every wreck divers dream, with portholes, gauges, crockery, and all types of brass fittings. Simon tied off the line to an open porthole, and we began to swim back to the shot line. Simon and Paul started their accent after a 25-minute bottom time, while I had an extra five minutes to look around. I stayed close to the shot line and filmed anything that I thought would give us a clue what this

wreck was. I was delighted to find bones, which was the frozen meat cargo that the *SS Cumberland* was carrying. Later Mark, Jason, and Kevin found a copper ingot, which further indicated that this was the *SS Cumberland*. A long two and a half hours followed on deco with whale songs filling the boredom and a huge jellyfish swimming around kept everyone on their toes.

Once all of the day's diving was complete, we packed the deco station and released extra slack on the shot line in case the current picked up during the night. We steamed back to town and prepared the gear for the next day's diving.

The next day's departure was late due to the extra filling we had to do for open circuit divers, so we decided to cut the bottom times to 20 minutes. Simon had a theory on which direction the bow might be, so we decided to test this theory. Once again, Simon laid new line until we reached the winches and then the bow, which had collapsed to its port side where three brass letters had fallen into one pile (the U, M, and E). We shook hands, filmed it with big smiles on our faces, and proceeded back to the shot line and our deco. Unfortunately, Mark had a strobe implode and only one picture was developed from this dive.

With time running out, we removed the deco station and the shot line, all of us having achieved our goals for this expedition. Not only did we dive this wreck with extended bottom times, but we also positively identified the wreck as that of the *SS Cumberland.*

Local police paid us a visit and were excited by our achievement. They said they would be informing all of the trawlers in the area to ensure that divers remove no artifacts from this wreck in the future.

The NSW Government's Heritage office was informed of the results, and Heritage Minister announced the news with a press release.

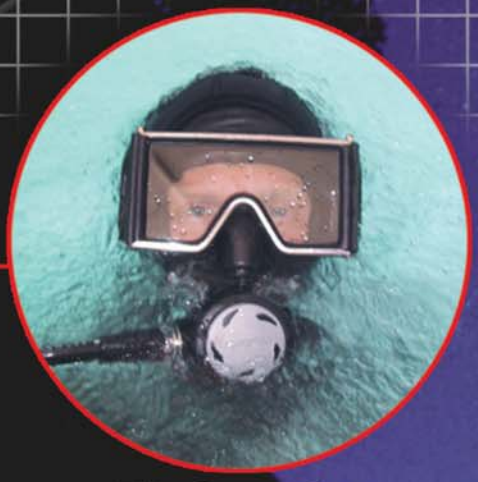
I would like to thank everyone involved for such a successful expedition, in particularly David Apperley, Paul Garske, and Kevin Okeby for their extra efforts in organization. Also huge thanks to Brett and Peter from Spirit of Eden Charters for their absolutely fantastic hospitality and seamanship. Last, but not least, Mark Spencer, Tim Smith, and the rest of the team for making this happen.

The Sydney Project will continue to search and bring new wrecks to public attention. With Australian maritime history yet to be discovered, the search continues...

Environments:
- Extended Range
- Technical
- Public Safety
- Military
- Research

•Technical•

Zeagle®
SYSTEMS, INC.



Diving the Antarctic

Buoyancy Systems
Instrumentation
Regulators
Drysuits

ZX-Flathead VI

911 BC

Zeagle Systems, Inc.
Zephyrhills, FL
www.zeagle.com
photo: Chip Lambert
Ph: 813•782•5568

Made with pride in the U.S.A. since 1979

Exuma Cave Expedition

Article and Photography by Curt Bowen

Dr. Thomas Iliffe, the worlds leading cave biolo gist, invited some of the staff of Advanced Diver Magazine to assist with his ongoing project of searching for new cave life. The Exuma Islands are a hot spot for unique cave adapted animals found nowhere else on earth.

With limestone layers over a thousand feet thick, it's no surprise that the Exumas and Bahamian islands are littered with giant blue holes. Blue holes are the Bahamas term for cave, cenote, or spring. Many of these blue holes move massive amounts of water in and out between low and high tide in the earth's never-ending attempt to equalize water pressure. Unlike solution caves, most blue holes are surface entrances into submerged fracture cracks. These cracks where caused by weakened limestone ridges that fractured due to their own weight during past ice ages when ocean levels were up to 300 feet shallower than today. These cracks are normally narrow from side to side but can be extremely tall and deep, many times in excess of 400 feet.

The Caribbean Marine Research Center (CMRC) located on Stocking Island, Exuma was our base of operations for the 15-day expedition. The typical daily team activities included searching and exploring new cave entrances, collecting specimens, and then analyzing our discoveries during the dusk hours.

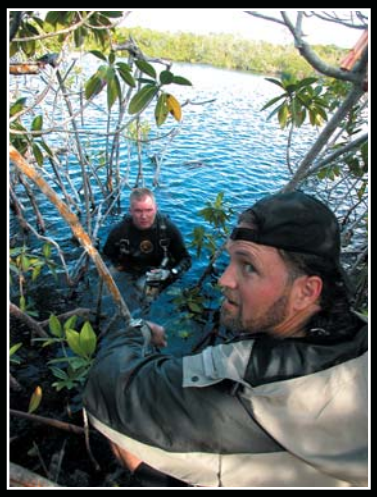
Accessing the cave entrances became a challenge in itself. The landscape consists of a dry rough and rocky limestone base covered by thick mangrove, scrub brush, and poison wood trees. Poison wood is a species of small shrub that when touched or rubbed with bare skin causes a nasty blister rash that can take several months to clear up.

Normans Pond (photo below) is located only a couple of miles from CMRC, right on the shore of Normans Cay. First explored and mapped by Brian Kakuk, Normans Pond Blue Hole drops straight into a deep, fracture-crack cave with depths in excess of 270 feet. Water visibility is normally 100 feet or more below depths of 130 feet. The cave system heads inland towards the center of the island.

Cave Survey: Brain Kakuk

Examining the topographical map of Normans Cay showed an interesting pond just over half a mile from Normans Pond cave and on a straight fracture line. Obtaining the best GPS numbers possible from the topo map, we headed out to hack our way through the thickets in an attempt to reach the mysterious pond. After an hour of weaving a path through the thick brush, we found ourselves standing on the mangrove-covered banks of a small salt pond. A quick snorkel dive revealed a small cave entrance on the side facing Normans Pond cave.

Transporting the required sidemount equipment in for a quick reconnaissance and collection dive proved even more difficult. Once the team reached the pond, two divers entered the small cave entrance and into a medium sized passage covered with plant debris and heavy silt. Continuing on, the cave dropped to a depth of 70 feet and into a large room at about 400 feet from the entrance.



Curt Bowen and Brett Hemphill reach the mysterious pond located through the thick mangrove patches of Normans Cay, Exumas.

At the end of this room, a very small no-mount restriction dropped straight down through a slice in the floor. Opting not to squeeze through the restriction, the team returned to the surface with their newly discovered news and collected specimens. The team named the new cave system Normans Blue Hole.

Explorers and scientist prepare for a collection dive into Normans Pond cave system.

Photo: Curt Bowen

How the above photo was taken.

A Sony Mavica digital camera and tripod were positioned in the selected location allowing the entire dry chamber to be photographed in small sections.

Photography assistants systematically illuminated (painted) selected sections of the cave with LED and HID lights for a series of 107 photographs each wath a three to eight-second explosure.

Like a giant jig saw puzzle, all the photos were digitally pieced back together using Adobe Photoshop.

Photographer: Curt Bowen
Assistants: Brett Hemphill
Joris Van der Ham
Dr. Thomas Iliffe • Jitka Hyniova
Collin Kliewer

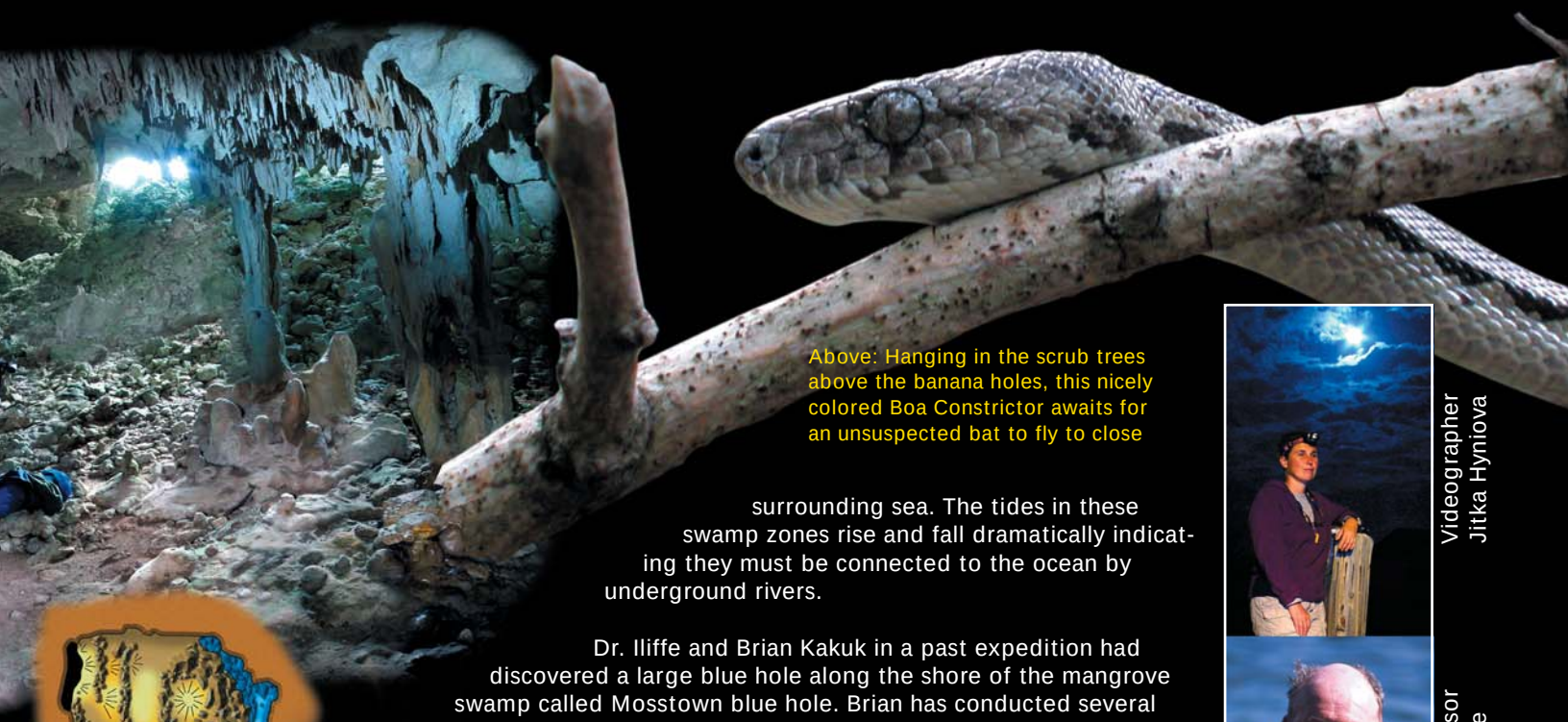
EXUMA BLUE HOLE UTM's		
Angel Fish	18422425E	2601859N
Basil Mins	18423306E	2595954N
Crystal	18408662E	2606245N
Mosstown	18413403E	2602736N
Mosstown Twins	18413200E	2603289N
Mystery	18422601E	2601831N
Normans Blue Hole	18384240E	2630738N
Normans Pond	18383715E	2631289N
Oven Rock	18364973E	2653093N
Rainee	18415202E	2601896N
Subway	18423169E	2594871N

Twenty-five miles north of CMRC is a large desolate island containing one of the few Exuma solution caves that was created by the erosion affects of flowing water. Ovenrock Cave contains the largest dry cavern zone in the Bahamas and is featured above with a multi-exposure, time lapse, and light cave painting.

Dr. Iliffe considers Ovenrock a gold mine for isolated cave animals with several new species never before discovered. Pristine cave formations highlight the first several hundred feet of underwater passages. Large deposits of prehistoric bat bones are scattered throughout in room number two, a sign of life activities when the passages were dry. This specific cave is protected and off limits to diving without the proper scientific permits.

Continued exploration on the large island of Grand Exuma revealed large inland mangrove swamp zones by the small village of Mosstown. These swamp zones are surrounded by tall hills cutting off their direct contact with the

Below: Dr. Iliffe seaches for new dry cave passage through small solution tubes known as banana holes
Below right: Iguana Cay is home to hundreds of wild Iguanas that emerge from the thick underbrush once you arrive on the beach looking for free handouts



Above: Hanging in the scrub trees above the banana holes, this nicely colored Boa Constrictor awaits for an unsuspected bat to fly to close

surrounding sea. The tides in these swamp zones rise and fall dramatically indicating they must be connected to the ocean by underground rivers.

Dr. Iliffe and Brian Kakuk in a past expedition had discovered a large blue hole along the shore of the mangrove swamp called Mosstown blue hole. Brian has conducted several exploratory dives into this blue hole, discovering a steep slopping passage dropping through layered limestone and into a large river tunnel at a depth of 220 feet. Due to the swift water currents during the tidal changes, continued exploration of Mosstown blue hole would require precise dive planning.

A trick to exploration in unfamiliar countries is to talk to the local residents. Find the oldest fisherman or farmer possible that has lived in the area their whole life; they know every inch of ground within 30 miles of their property. A small donation will save your team hours of bush beating.

To our luck, just such an elderly gentleman was sitting on his porch in the center of Mosstown. After a few minutes of conversation, we actually convinced him to jump into the truck and show us two new holes within a couple of miles from his porch.

Blue hole one (photo below) was located down a small dirt road just on the edge of a mangrove swamp. The locals called this blue hole Crystal, for its cobalt blue watercolor. A quick recon dive into the system revealed a tight, sidemount breakdown that skirted along the cave ceiling and pinched off at a maximum depth of 102 feet. No passable passage was discovered unless you desired to attempt a no-mount push.

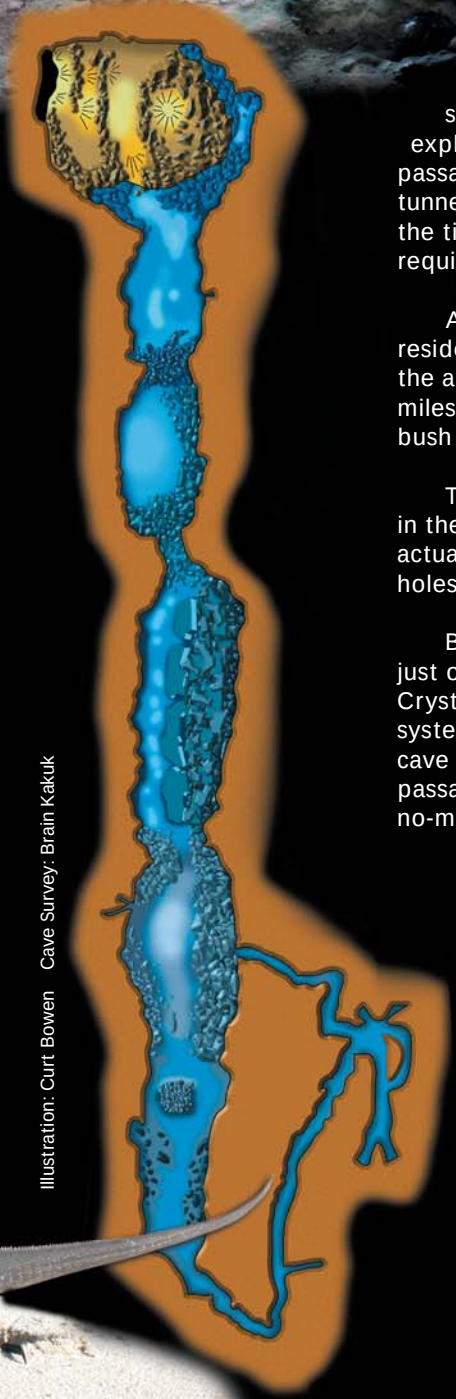
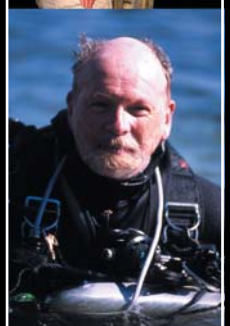


Illustration: Curt Bowen Cave Survey: Brain Kakuk

Below: A local elderly gentleman shows the team Crystal Blue Hole entrance, located within a few miles of Mosstown, Grand Exuma

Videographer
Jitka Hyniova



Texas A&M Professor
Dr. Thomas Iliffe

ADM Publisher
Curt Bowen

Explorer
Brett Hemphill

Scientist Joris Van der Ham
Not shown / Collin Kliewer

Blue hole two actually turned into blue holes two and three located in the main water channel in the mangrove swamp, just a stone's throw from the bank. The team discovered and named the new discovery Mosstown Twins. Two separate holes lay within 60 feet of each other and both were pumping large amounts of water into the swamp at the time the team explored them. Explorer Brett Hemphill conducted the first exploratory dive in both holes. Hole one, located in the center on the channel, dropped at a 45-degree angle until it hit a flat 14-inch tall by 25-foot wide bedding plain at a depth of 222 feet.

Above: Explorer Brett Hempill gloats about his almost empty reel as he returned to the surface from the first exploration dive into Mosstown Twins blue hole

Below: Surface shot of Rainees blue hole, located just a few miles from Mosstown blue hole. The main entrance is located on the left side of the photograph and drops to depths in excess of 200 feet. First discovered by Brian Kakuk .

Returning to the surface, Brett had enough line left on his exploration reel to drop into the second hole located against the far bank of mangroves. The passage continued down like hole number one, but with larger tunnel and increased water flow. Brett's line ran out in large dropping tunnel at a depth of 70 feet, requiring him to end the dive. Of course, luck has it, this was our last day on the expedition, leaving Mosstown Twins blue holes for other future eager explorers.

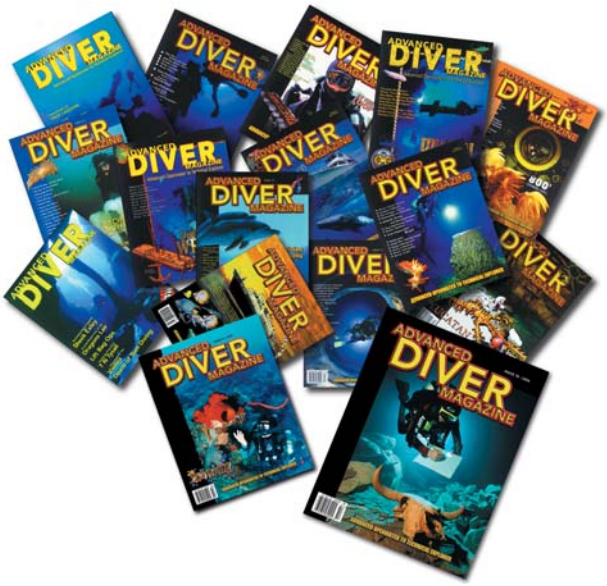
Don't miss a single issue of ADM.

All back issues available for $7.50 each + p&h

For a complete list of issue content please visit ADM's web site.

Reach over 20,000 readers each quarter by advertising with ADM.

See ADM On-Line for rates and deadlines.



Foreign Distributors

Australia, New Zealand, and Pacific
Tony Davis, Aqua Tech Australia
E-Mail: sales@diverite.com.au
Tel 03•9775•0400

France, Italy, Belgium
Aldo Ferrucci www.bubnotbub.com
E-Mail: bubnotbub@aol.com
www.xpeditionteam.com
011-33-6-07272267

Germany, Austria & Switzerland
Underwasser Kleemann
011-49-6062-913-688

Japan
Torii Beach Scuba Locker
Okinawa, Japan
Fax. 011-81-98-956-4964
E-mail. haglandg@toriitraining.com

Netherlands, Luxemborg & Benelux
DiveNow
Gerard Been Venezuelstraat 78
2408 MB Alphen aan den Rijn
The Netherlands
www.divenow.nl mail@divenow.nl

ADVERTISER INDEX

Advanced Diver Magazine Subscription Card

Complete card, place in an enclosed envelope and mail to:
Advanced Diver Magazine
P.O. Box 21222 Bradenton, FL 34204-1222
or call toll free: 877-808-3483
or e-mail: AdvDvrMag@aol.com
or subscribe on-line: www.AdvancedDiverMagazine.com

Check One
- ☐ 4 Issues $25.00
- ☐ 8 Issues $45.00
- ☐ 12 Issues $65.00

Canada & Mexico add $25 per 4 issues / Other foreign add $35 per 4 issues

PLEASE PRINT CLEARLY

Name _____

Street _____

City _____ State _____ Zip _____

Country _____

Phone _____ E-Mail _____

Payment Method ◯ Visa ◯ MC ◯ AMX ◯ Disc ◯ Check

Card No. _____ Exp. Date _____

Signature _____

Subscribe On-Line: www.AdvancedDiverMagazine.com

Hey! You Eye Balling Me!

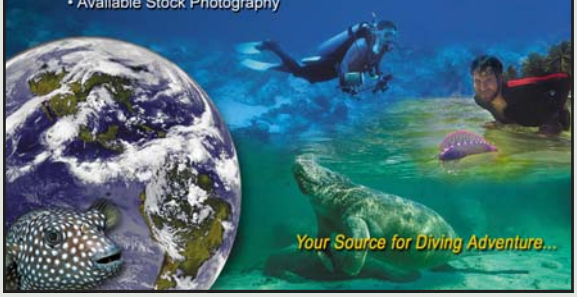
Eco-Photo Explorers

Bringing the world to you!

Eco-Photo Explorers
P.O. Box 679, Upton, NY 11973-0679
Bus: 631.467.5305, 631.941.0471
Web: www.ecophotoexplorers.com Email: epe@fcc.net

Eco-Photo Explorers is a New York based organization formed in 1994 to help promote public interest in protecting the underwater environment through knowledge and awareness with the use of underwater photography. Photography, multimedia presentations, lectures and freelance writing are all utilized to achieve this goal.

Specializing In:
- Underwater and Wildlife Photography
- Slide Presentations and Speaking Engagements
- Technical Support in Research Projects
- Magazine & Technical Articles
- Available Stock Photography



Boosters for Oxygen, Helium, Nitrox, Trimix & Argon

The RIX MicroBoost is the first small oil-free motor-driven compressor capable of filling gas cylinders to 2,200 psig. Motor-driven means you don't need a drive air or nitrogen source. And, the motor drive will use as little as 1/7th the kW h of a pneumatic driven compressor.

- Fill high pressure cylinders
- Top choice for precision gas blending
- Ideal for rebreather support

Features
Suitable for continuous duty
No need for drive air or N2
3-stage design for low T's
O2 cleaned to IGC/CGA
Quiet (65 db @ 1 m)
Safe & Reliable
Light weight
Portable

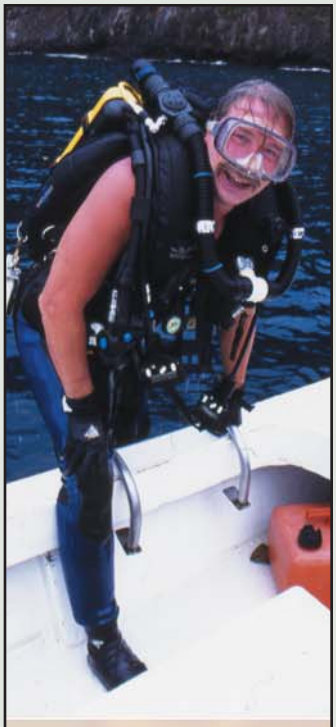
RIX INDUSTRIES
From RIX, the oil-free compressor specialists
Visit our website at www.rixindustries.com
or call 707-747-5900.

Advanced Diver Magazine On-CD

All articles are accessible by alphabetical order, title, issue and are in PDF format. PC or Mac
Order On-line at www.advanceddivermagazine.com

$29.95

The first 12 Issues of Advanced Diver Magazine on One CD Rom



SEARCHING

Get involved and become part of the ADM staff.

Advanced Diver Magazine is constantly searching the globe for new discoveries made by divers like yourself.

Historical or interesting shipwrecks, unexplored caves, on going exploration projects, remote dive locations, advanced dive travel, underwater video and photography, new products, etc....

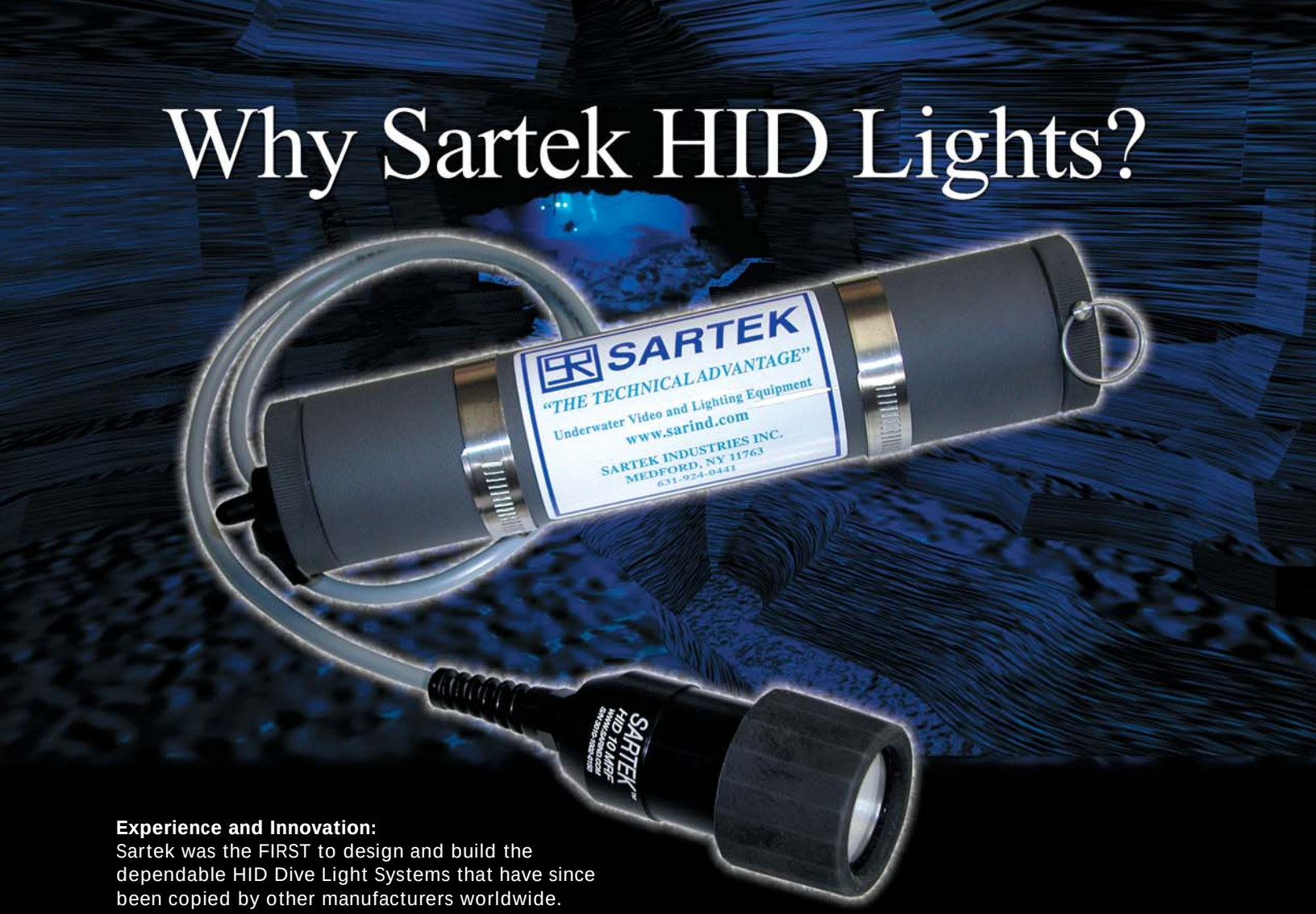
GET EXPOSURE!

Advanced Diver Magazine wants to write about your dive locations and resorts.

Get world wide exposure for your dive facility, charter service or resort by inviting ADM's staff to visit and dive.

Contact ADM
AdvDvrMag@aol.com
941•751•2360

Why Sartek HID Lights?



Experience and Innovation:
Sartek was the FIRST to design and build the dependable HID Dive Light Systems that have since been copied by other manufacturers worldwide.
U.S. Pat. #6,679,619

Features:

- Sartek HID lights are focusable and can be configured as a dive light or video light
- Sartek systems are available with wetmate connectors, which permit changing (even underwater) of light heads, battery canisters, or operation of multiple light heads
- Sartek HIDs have been depth tested to 5400 feet. Every Sartek system is wet tested to 360 feet.
- Sartek HIDs can be used out of the water
- Sartek uses the highest capacity NiMH cells to produce the longest burn times available
- Sartek battery packs are 13.2V not 12V and have always included a built in circuit breaker and temperature sensor
- Sartek's supplied international trickle charger guarantees complete charging and maximum battery life
- Sartek screw top canisters (CBPS series) are double "O" ring sealed and designed to allow easy access for charging
- Sartek latch top canisters (CBPL series) have 1-inch thick recessed top and bottom plates, locking latches, and O-ring sealed screws (rated to 13,000 feet) to ensure a leak free system
- All Sartek canisters can be configured for belt, back plate, or tank mount
- Sartek warrantees their systems against manufacturing and material defects for as long as you own it
- Recently four out of five sales reps, of a major competitor, purchased Sartek HIDs for their personal lighting systems over their company's own HID system…Obviously, they must know something!

When you compare features, reliability, and price…
Sartek will always be your best choice!

SARTEK INDUSTRIES INC.
3661-M Horseblock Rd. Medford, NY 11763
www.Sarind.com E-Mail: info@Sarind.com Ph: 631•924•0441 Fax: 631•924-2959

Dive Rite

WHO WANTS TO LOOK AT TABLES?

www.diverite.com