ADVANCED DIVER MAGAZINE

ISSUE 22 / 2006

- Petr Vaverka Photography
- Born to be Wild
  Sarakata Resurgence
- P4Y-2 Privateer Bomber Wreck
- The 1000 Islands, Brockville Canada
- Bashkiria Cave Expedition - Russia
- An Infinite Palette of Colors
  Raja Ampat Islands
- IGLESIA
  Hidden Passages Expose Mayan History
- Diving OC like a CCR
- Schooner Daniel Lyons Wreck
- Dive Xtra's X-Scooter
- Radek Husak Photography
- Entomed Maritime History
  Weck of the North Wind

EMERALD IMMERSION
BRITISH COLUMBIA'S PACIFIC DREAMS

$7.50 U.S. Issue 22
61>
0 74470 56000 5

Exploring Our Underwater World

InnerSpace Systems Corp.

Megalodon CCR

Closed Circuit Mixed Gas Rebreather

Customized CCR Systems

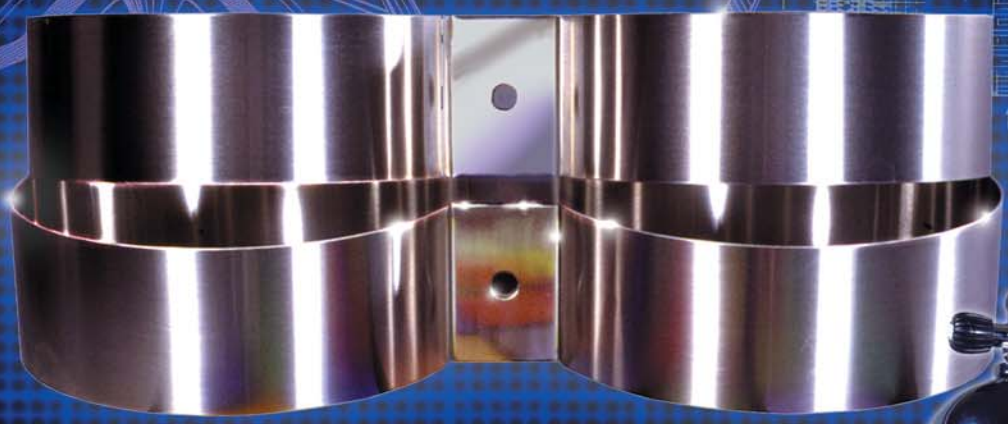
The only multi-mission, multi-tasking CCR in the world.

Features:

- Customized electronics and decompression systems
- Custom CO2 scrubber assemblies
- Custom breathing loop and counterlung systems
- Modularized sub systems
- Highly suitable for travel
- Suitable for Science, commercial, and recreational diving

www.customrebreathers.com
Ph: 360-330-9018
info@customrebreathers.com

HIGHLAND



Life Insurance

. . . for your manifold

Manifold-specific tank bands that provide optimal protection for your manifold.

Built to maintain critical spacing, parallelism & plane. No bolt contact with cylinder walls.

Designed to isolate your manifold from destructive mechanical stresses.

Unmatched quality, materials, workmanship. The most substantial tank band available.

HIGHLAND MILLWORK, INC.

Gear Management Solutions For Serious Divers

Highland

www.highland-millwork.com

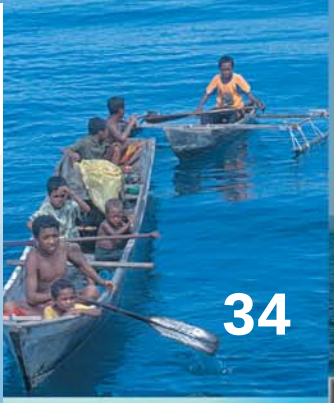
NEW! LARRY GREEN SIGNATURE SERIES BC®

This 60 lb. lift BC is the first in the line of the new Larry Green Signature Series BC's® and incorporates the latest thinking in hydrodynamic engineering. Deep Underwater cave explorer Larry Green conceptualized this innovative design after many years of deep cave diving experience. The BC is designed and tailored to fit the full length of the cylinders providing increased control over trim and the reduced width of the BC dramatically reduces drag. This is the first BC to be produced that is specifically tailored to fit longer cylinders.

Ocean Management Systems

P.O. Box 146 Montgomery, NY 12549

Phone 845.692.3600 ~ Fax 845.692.3623 ~ www.omsdive.com



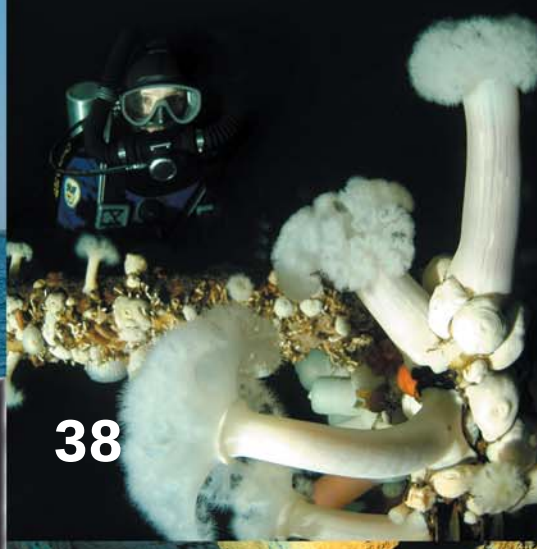


Table of Contents

www.DIVERITE.com

Dive Rite

Publisher's Notes

It was a damp, foggy January morning. I found myself sitting on the wet stone steps of Homun's 400-year-old church, dead smack in the middle of the Yucatan Peninsula. The sun's light was trying to split the fog as it climbed above the horizon, directly behind the church. The loud chimes of the church bells echoed throughout the small Mayan village. Sitting there, I watched the villagers peddle their merchandise in the town square. Children dressed in matching uniforms made their way towards school, and a group of elderly women dressed in customary white, hand-made, cross-stitched dresses, shuffled their way towards the church. According to American standards, all the locals are considered poverty stricken. Living in old, block, single room homes with thatched roofs, some running water—if lucky—and, maybe, a single light bulb.

As I watched, they all seemed to be cheerful, laughing between themselves, as they conversed in a language I do not understand. Taking care of their daily chores, buying and selling their goods amongst each other. Even though many live in homes with dirt floors, they seem to pride themselves on personal hygiene and amazingly clean clothing, even without a Maytag washer and dryer.

I wonder, are they really poverty stricken or have we, as Americans, become a spoiled culture. We are rude and demanding, if little things do not go our way. Aggressive and angry, if something should delay our daily commute to and fro. God forbid our steak is not cooked exactly how we demanded, or the power goes out for three minutes during the evening movie.

Every time I return from a foreign country whose people seem to be less fortunate than I, it provides me with a renewed thankfulness for what I do have, and a strengthened dedication towards further exploration.

Another year is upon us, and I already have a calendar full of new destinations to explore, photography projects to complete, and video productions to shoot. Am I a spoiled rotten American? Maybe, but I do my best to treat all others less fortunate with respect and dignity. There is nothing worse than a pushy, stuck-up, demanding American; you can pick them out of a crowd a mile away.

Curt Bowen / Publisher ADM

ADVANCED DIVER MAGAZINE
© 2006 ALL RIGHTS RESERVED

Publisher Curt Bowen
Co-Publisher Linda Bowen

Text Editor Victoria Leigh
Master Pull-Ups Savannah Bowen
Pacific NW Writer John Rawlings
Web Master Jakub Rehacek

Staff Writers / Photographers / Videographers

Michael Barnette, Thad Bedford, Kevin Denlay, Rusty Farst, Richard Harris, Jill Heinerth, Brett Hemphill, Jitka Hyniova, Dr. Thomas Iliffe, Tom Isgar, James Kelderman, Brian Kakuk, Cass Lawson, T.R. O'Leary, Eric Osking, Jim Rozzi, Wes Skiles, Tamara Thomsen, Dr. Bruce Wienke

Contributors & Assistants

Jon Bojar • Jack & Karen Bowen • Ethan Brodsky
Sparky Campbell • Rich & Doris Chupak • Mel Clark
Roberto Hashimoto • Radek Husak • Rick Krazel
Keith Meverden • Rick Murcar • Gavin Newman
Tracy Raz • Chrissy & Jason Richards • Phil Short
Kim Smith • Enrique Soberanes • Jeff Toorish
Charley Tulip • Petr Vaverka

Crew at SCFD Station 5:
BC. Kevin Dillon • Lt. Chuck Joseph • Eric Kent
Mitch Thorne • Jeff Friday • Erich Leipold
Dennis Schnack • Mike Herrygers

Subscription Rates
$25.00 (4 issues) • $50.00 (8 issues) • $75.00 (12 issues)
ADM On-Line Membership $10.00
Canada and Mexico add $25/yr
Other foreign add $35.00/yr s&h.

YOU MUST NOTIFY ADM PERSONALLY IF YOU ARE CHANGING YOUR MAILING ADDRESS!!!!
ADM is not responsible for missed issues due to failure to notify us about a change of address.

Contact Information:

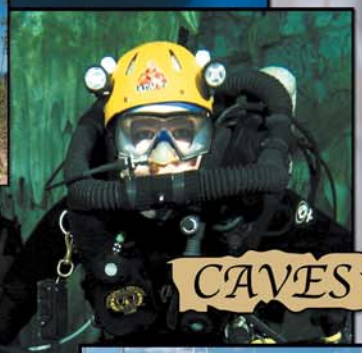
Write Advanced Diver Magazine
327 SnapDragon Loop
Bradenton, FL 34212 USA
Phone 941-748-3483
E-Mail AdvDvrMag@aol.com

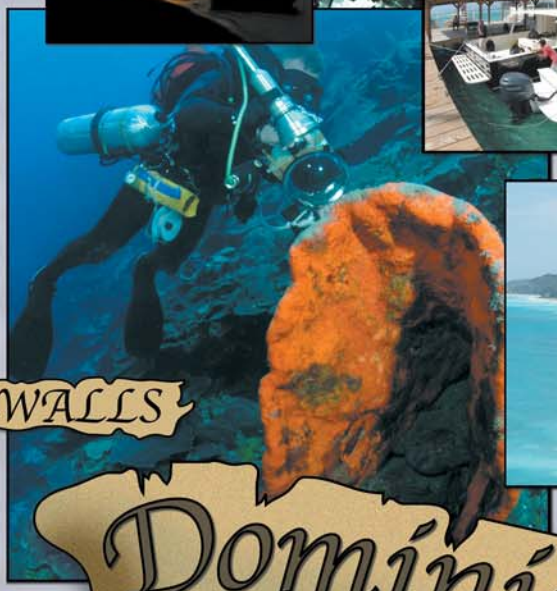
Advanced Diver Magazine On-Line
www.AdvancedDiverMagazine.com

1492

Where the Adventure Began

PIRATE'S COVE DIVE CENTER





500 years of ship wrecks
Pristine reefs, walls, pinnacles
Beautiful caves and caverns

- *Dive with the only SDI/TDI Technical Training Facility in the Dominican*
- *Rebreather Training Facility*
- *Dive with the most modern fleet of USCG certified vessels*
- *OMS, Poseidon, Scubapro, DiveRite and Inspiration*
- *4000 sq meter training facility*
- *Wide variety of accommodations available*
- *Individual and group rates available*

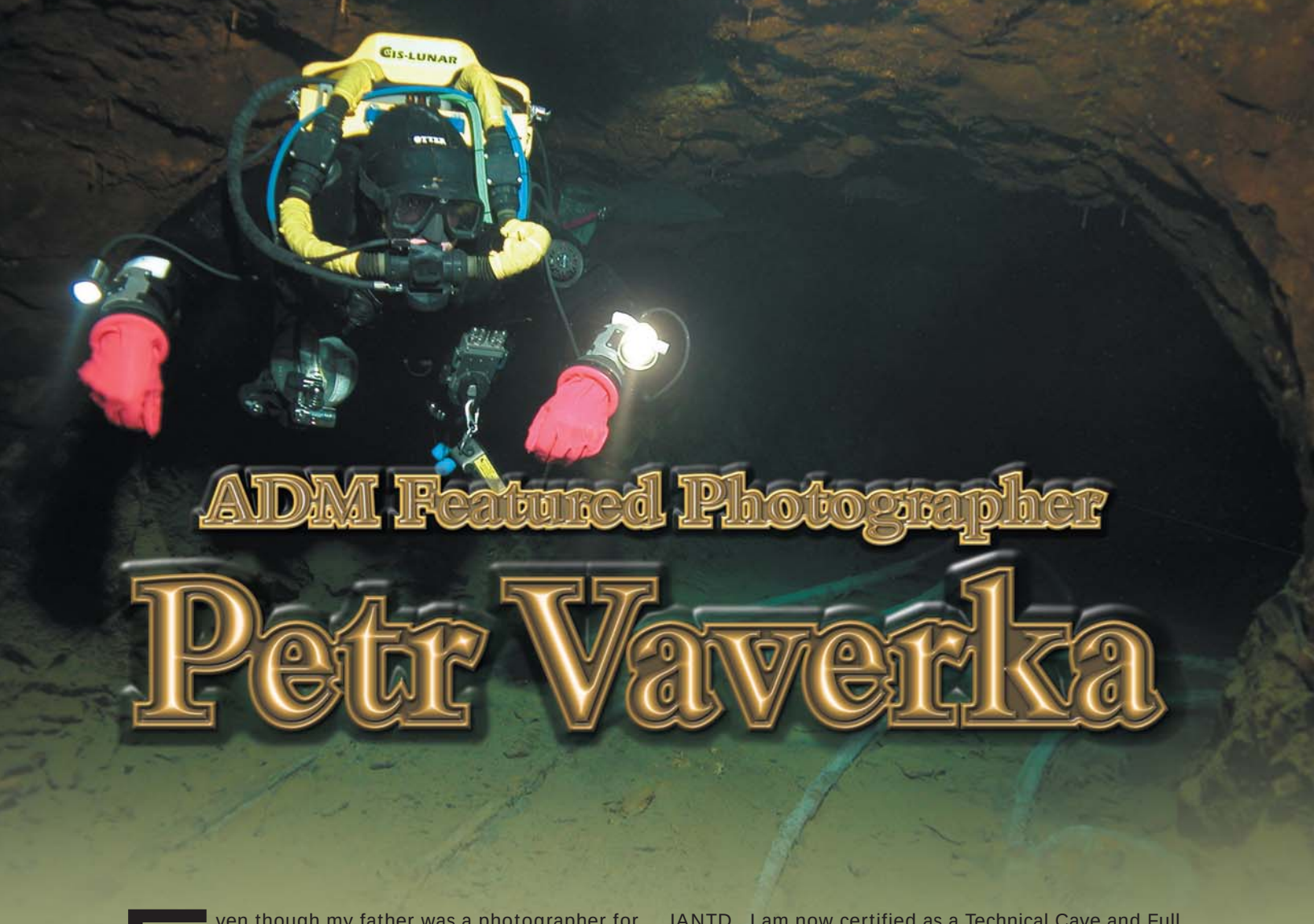
2006 Rebreather Week
April 25th to May 2nd
$1750.00 All Inclusive

Includes: Hotel, meals, boat dives, oxygen, helium, scrubber material.
(Airfare not included)

Ph: 809•417•4257
www.PiratesCoveDiveCenter.com

Dominican Republic

See ADM issue 20 for a complete article on Pirates Cove



ADM Featured Photographer

Petr Vaverka

Even though my father was a photographer for many years, my first camera came from a friend. That was around 1970. I was slowly getting into photography, and beginning to work in the darkroom as well. In the darkroom, I was so excited! I could hardly breathe as I waited to see what would show up on the photo paper in the glow of the red light. Films were hanging on the line—who has even seen that these days?

I was born in the Czech Republic, and still live there today. As a diver, I grew up in the local fresh waters where it is always cold and dark. I took my first diving course with the CMAS, and later continued with the IANTD. I am now certified as a Technical Cave and Full Trimix Diver. In 1999, I established my own divers association, IWD, of which I am president. I'm a member of the Czech Speleological Society (Cave Diving Section), and on the Board of Advisors of the IANTD Central Europe.

When I started diving, naturally I took a camera underwater with me. After a few years of work with film and a cine 36mm camera, I just decided to jump into digital technology. That was in 1999. Currently, I'm using a digital SLR Nikon with several spectacular super wide-angle Nikkor lenses. For waterproof cases, I've chosen products made by Sealux, and lighting by Subtronic.

The primary targets for my photographs these days are caves and wrecks, discovered on locations and dive sites beyond recreational limits. It is a challenge for me, but also a pleasure to visit unknown or seldom visited places, and bring back good quality pictures. I publish articles and photos about my diving experiences on unusual dive sites in adventure and diving magazines in the Czech Republic, Poland, Switzerland, Germany, Austria, and the United States of America. To discover the beauty of flooded caves, and bring the vision and experience of them to others, is a big motivation for me.

More and more people are now getting into cave or wreck diving because of its magic. You can get an idea of the marvels to be seen—thanks to all the videos, photographs, or by listening to stories; however, your first experi-

ence will leave you breathless. The natural beauty of the caves, wrecks, and other monuments will draw you back to dive again and again. The colors and rock formations that have been built over thousands of years will stay in your memory forever.

I have found totally new dimensions in photography and diving. Working with lights in enclosed spaces is very difficult. Darkness, and the highly reflective and ever-changing colors of the cave walls are a challenge, especially for pre-exposure. And, of course, the requirement for illumination engineering is increasing. All of us are pushing our limits—but we cannot forget the danger inherent in diving in caves or on wrecks. But overcoming these challenges and exploring new possibilities...this is what pushes me to do more dives, and to discover more photo opportunities.

Born to be Wild

The Sarakata Resurgence, Vanuatu

By Richard (Harry) Harris

Just over a month earlier, John "Norbert" Currie and I had made our first foray into the source of the mighty Sarakata River on the island of Espiritu Santo, Vanuatu. Since that time, I had been scheming and dreaming how to get myself back into the cave. When the opportunity arose to get back up to Espiritu Santo from my base in Port Vila, I jumped at the chance.

May 2005: Norbert was long gone, back in "civilization" in Australia, his holiday well and truly over. So I called on the services of my good mate, Barry Holland, in Santo to support me with the next dive. Barry is a TDI trimix instructor whose dive shop, Aquamarine, primarily caters to those who choose to dive the remarkable wreck of the SS *Coolidge*. He has logged many thousands of dives on this historic liner, at depths to 70 meters. He and I have spent a lot of time laying line in and exploring this giant rusty "cave."

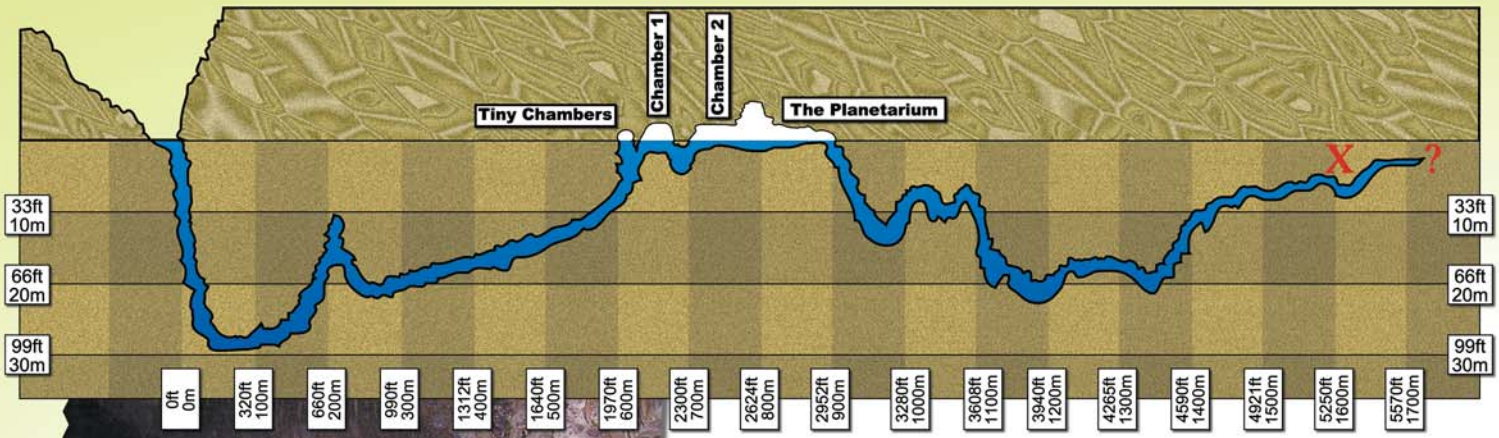
Roma and his trusty NiVanuatu friends came out in force to carry in the increasing volumes of dive gear for the second push, and to cut again the track through the jungle which had grown back in the six short weeks since our last visit. On this occasion, in order to increase the distance of my penetration into the cave, I had chosen to dive my KISS closed circuit rebreather, using air diluent and with two 12-litre air tanks as open circuit bailout. Barry would dive with four 12-litre cylinders of nitrox 36%, giving him a maximum PO2 of 1.41 in the deepest section of the cave. A cylinder of nitrox 60% would be staged at the cave entrance for decompression. The plan was for me and Barry to reach the large lake chamber (at approximately 580 meters), and then

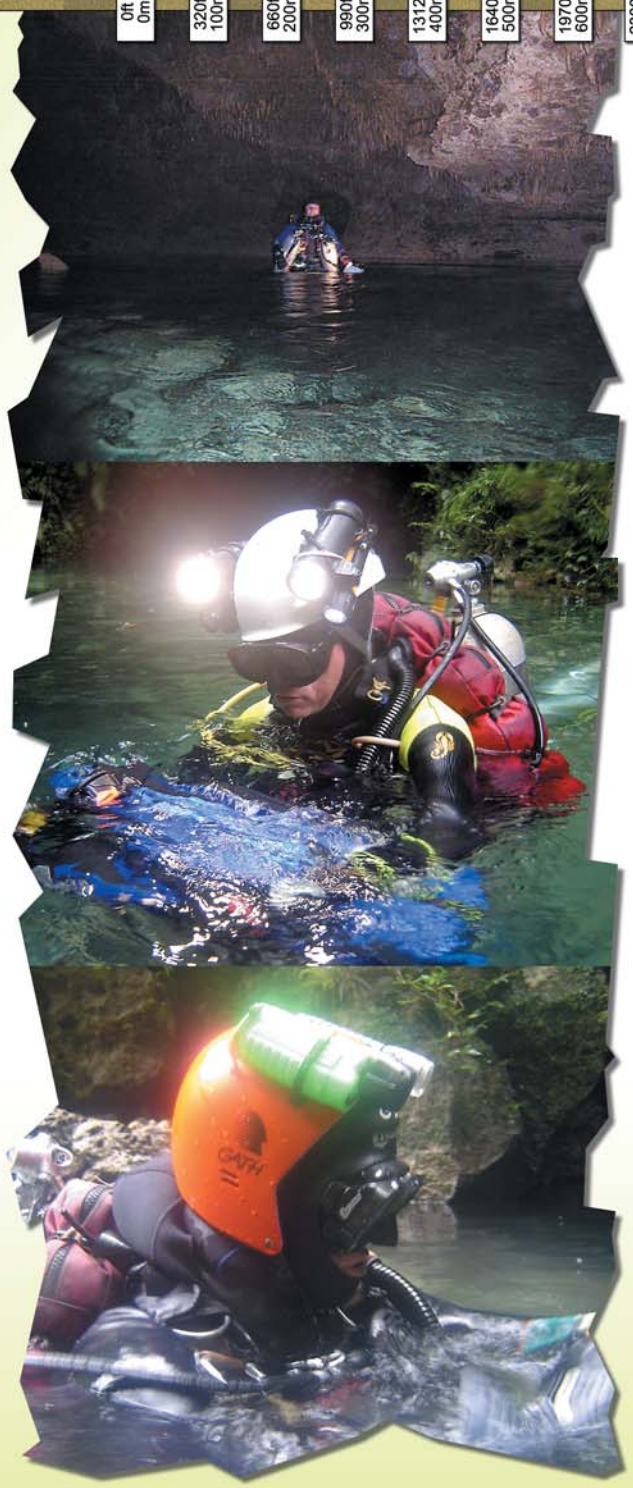
for me to push on as far as possible thereafter. This would leave considerable gas reserves in the lake chamber for us both on the return trip, should a problem with the CCR occur. A survey of the cave would be performed on the way out.

The day of the dive dawned bright and sunny. Fortunately, the rain had held off for nearly a week, so expectations were high! On this day, I was armed with a thicker wetsuit, gloves, and hood as the memory of the chilly 80-minute decompression after the last dive was fresh in my mind. On arrival at the resurgence, we were greeted by almost crystal clear water welling up from the cliff base, but the water level looked significantly higher than last time. After kitting up and catching our breath in the pool…disaster! I looked down in horror to see my rebreather mouthpiece open in the water. How had I done that?! The rebreather was flooded and useless, the sorb transformed to soup. After all the effort of flying up to Santo, the cost of the porters, and the thought of that bloody hill, I could have cried. But all was not lost. Barry valiantly offered me his open circuit gear so I could continue my exploration of the cave. Half an hour later I was kitted up, cheered up, and ready to go.

I sank down through the entrance pool into the opening of the cave. My line from the previous dive lay twisted like a spider web around the logs at the entrance…no easy starts today. I battled my way up the left side wall to the “Garage,” laying new line, getting a much better appreciation for the shape of the entrance this time. Then came my first attempt to move out into the main streamway, and things started to come unstuck. My right stage tank kept undoing itself at my hip D-ring due to a faulty clip. The force of the water made it impossible to move forward…far harder than the last dive, even allowing for the increased number of tanks on this occasion. Just then, my main light failed and my other back gas reg started to vigorously free flow! My head was beginning to pound from rising CO2 with the exertion. Enough! I could feel my stress levels rising, and decided that today was just not my day. I beat a hasty retreat and spent a little time relaxing in the base of the pool to settle myself down. Cave one, Harry zero!!

I had plenty of time to reconsider my next assault, as I would not return to the cave for another seven weeks. The use of CCR was clearly not going to be easy in the first stage of the cave, given the work





involved to pass the early restriction. So we needed to come up with plan B. I had my doubts that scooters would be able to battle through the current either. After many round table discussions, we decided that we must visit the cave a couple of days before the expedition with a pony bottle and check the flow. I did just that in early July, and decided that the flow was fine, the viz was good, and all was go. On the day of the expedition, the porters failed to appear and the dive was cancelled! Will I ever get to the back of this system?

August 2005: This is it. Five days set aside to tackle the cave towards the latter part of the dry season. Barry Holland, Sean Pittaway, Kevin Green, and I planned another assault on the cave — and only earthquake or flooding would stop us! After the usual slog down to the site, we were greeted with low water levels and good viz - perfect conditions. Barry donned a single tank and swam down into the restriction at 26 meters, armed with two lengths of heavy nylon rope to tie off inside. Meanwhile, Sean and I donned our gear and readied ourselves for his return. Barry reappeared, and gave us the thumbs up: all go!

So we started the dive, me on CCR and Sean with five open circuit tanks of nitrox, plus a deco mix staged at the entrance. We flew into the light current and good viz, along my old line to the T-junction where Norbert and I had turned earlier in the year. Turning left along Kevin Green's orange line, we pushed into the cave along new territory for both of us. For the most part the passage was large, maybe 8 meters across and 2-5 meters in height, with a maximum depth of 30 meters. In sections, the roof flattened down to 1.5 meters, in other areas the ceiling vanished into massive fissures disappearing out of sight, possibly terminating in cave lakes. Around 250 meters from the entrance, we entered an area of magnificent honey-combed limestone with numerous alternate routes open to us. An exquisite square window on the right wall begged to be investigated to see what lay beyond, but we had no time to stop and smell the roses! We pushed on along the line into the light but tiring flow. On several more occasions the tunnel forked, offering an opportunity for original exploration, but we stuck to the plan and pushed along the old line. In many sections, the line was broken, hanging in the breeze waiting to trap the unwary. This slowed our progress significantly as we stopped to tidy the line and make the necessary repairs.

At 63 minutes into the dive, and 450 meters into the tunnel, I spotted a small shimmering lake above us. We cau-

tiously rose into a small air bell about five meters in diameter. High fives and a chance to catch our breath in what we assumed was the "small" chamber described by the previous group. We sank back down into the water and pushed on into the current, laying new line at this point as the old one was missing. 50 meters later we rose into a pretty chamber, roughly L-shaped and around 80 meters long. One end seemed to be a blind passage; the other was shallow with high flow that made walking in all our gear difficult. We found a spot in the lee of a boulder to sit down in waist deep water, and took a moment to take stock, eat some much-needed chocolate, and consider our situation. At this point, we believed we were in the "big" chamber. Beyond here lay at least 500 meters of submerged cave passage. Sean had just started the last of his "thirds," so probably had about 20 minutes of gas, depending on depth, before we needed to turn. We decided to stage one of my bailout cylinders at this point and turn for home, rightly figuring that the trip home would be very fast going with the current, and without the need to lay line. Even with some surveying and photography on the homeward push, the going was nice and easy.

On arrival back at the T-junction, I decided to briefly explore the other leg of the "T." So Sean turned for home and followed the line out. I moved down current and continued on. The old line stopped soon after, so I lay new line as I went. Several forks appeared in the steadily narrowing passage, which gradually curved to the right. I ended up at a low flattener better suited to side mount diving, and decided to call it quits and turn the dive.

Just as I had made the decision, I suddenly saw Sean's light on the other side of the restriction!! My immediate concern was that Sean had become lost, had turned and followed me in, and had taken another fork to end up on the other side of this narrow flattener. He seemed equally surprised to see me! Whilst sitting there thinking how best to manage this potentially dangerous situation, I caught a brief glimpse of a blue rope next to Sean's shoulder…the nylon rope Barry had laid in the entrance! I had come full circle and was re-entering the entrance tunnel! I decided to test the restriction rather than retrace my steps, worrying that if I turned tail, Sean might worry about me and try to follow. Sean saw me start to winkle through, and came forward to push the back of my CCR down to get me through. Once through, I moved away from him into the main passage to give him a bit of space to turn around. He stayed in there, seemingly reluctant to move. He told me afterwards he had something caught up on the limestone and couldn't move! Once out of the water, we exchanged our very different versions of the same story. Sean had followed the line home as planned, but had ended up on a broken piece of line that led straight into a line trap. He retraced his steps, found the correct line, and was happily on his way out when he saw the unexpected sight of my light on his left, me apparently "trapped" on the wrong side of a restriction. Oh, for reliable underwater communications!

Day 2: Sean had a "rest" day, pottering around on the *Coolidge*, whilst Barry and I pushed the cave. Same basic plan as the day before, except Barry was armed with six bottles of gas, including the one staged in the cave. With no new line to lay in the first long section, we expected to make good progress. Instead of 63 minutes to the dry chamber, we made it in 46, well ahead of schedule, and plenty of gas to spare. More chocolate and a brief rest, and we prepared for what we thought would be the next big push. I tied off my line, and we submerged into the pool at the end of the cave. 10 meters further on, we emerged straight into another chamber: the true "big" chamber! Laughing aloud after being mentally prepared for a long dive, the 15-second dive we had just done

seemed fairly amusing. The big chamber was simply stunning. Calcite straws glittered like jewels on the ceiling. Larger shawls and draperies decorated the ceiling in various places. The chamber ran in a serpentine fashion for 200 meters, 5-10 meters wide and the same in height for most of its length. Just 60 meters along, a vast domed chamber arose on the left hand side, the glistening decorations on the ceiling reminding me of the Planetarium. Swimming along the surface of the lake was exhausting in the strong flow. Towards the end of the chamber, large fallen boulders obstructed the passage, with rapids flowing around them. By the time we had battled our way to the end we were exhausted, and had to rest for 15 minutes to catch our breath.

We prepared again for the long push, and started to swim. The character of the cave changed constantly with many different styles of limestone. Smaller tunnels were the rule, plenty of forks and junctions, but still the main tunnel continued in a southwesterly direction. Finally, at around 300 meters past the chamber, Barry signaled he had reached his gas turn around, and we headed out of the cave. An uneventful and swift trip out brought us back to the surface at four hours total time. The scrubber on the KISS had performed perfectly for over three hours, and we were only moderately chilled in the 21-degree water.

Day 3: A rest day to allow my aching bones to recover, fill tanks, and plan our third and final day's diving in the cave. The big question was whether to try and push to the known end of the cave at 1700 meters and beyond...a big challenge without scooters...or to explore some virgin passage to the side. And I had not surveyed the passage beyond the big chamber (too tired!).

Kevin Green was to be my dive buddy, one of only three people to have been beyond the large dry chamber. We decided to go for the end of the tunnel, pushing out the gas rules in the knowledge that the way home was taking around half the time of the way in. Armed with my CCR and nine 12-litre cylinders between us, we started our long swim into the current. Smooth sailing until the first dry chamber: As I surfaced and pulled the DSV out of my mouth, the open circuit regulator came away in my hand! A very small amount of water entered the loop as I swam over to a rock clutching a handful of screws and parts! Twenty minutes later, we were back underway, thanks to a couple of cable ties and the tip of a knife as a screwdriver!

The passage that Barry and I had swum 2 days earlier passed quickly, and then I was in new territory once again. Still, Kev's old line stretched tantalizingly away in front. The cave continued to branch and narrow, taking us through high oblique fissures (requiring me to perform a weird sideways Spiderman impersonation), and then finally a series of high silt mounds, and three flat restrictions which took a lot of skin off the back of the rebreather, and necessitated the removal of sling tanks to pass. Finally, I reached a restriction that I simply could not pass with this gear configuration, and the old line sat just in front of my nose wrapped around a rock in a final tie off. The end of the known cave! We had made it with gas to spare — and without the use of scooters. Three years of dreaming had come to an end, and I felt a huge sense of relief.

No time to relax yet, with 1.7 kilometers of cave behind me still to negotiate, including three tight restrictions, in viz that was going to be questionable at best. Ummm...zero would be a better term, as it turned out. Suffice to say, the next thirty minutes required significant mental effort on my part to stay cool whilst I felt my way out of the cave. Kevin Green never looked so lovely when I finally saw his (worried) face again! After the restrictions, we zoomed out with flow, immensely enjoying the view on the way. We noted the location of a major side passage to the left, 60-80 meters from the end of the cave. Methinks the Sarakata has more to offer yet! I might manage a couple of days in October....

That night I managed about three beers at the dive shop before collapsing into bed, tired but happy. Success for me in a quest like this only happened because of a big team effort: Our generous sponsors Aquamarine Dive; my buddies John Currie, Barry Holland, Sean Pittaway, and Kevin Green; the cave divers Craig Challen, Steve Sturgeon, and Kevin Green who had reached the end of the cave previously, and laid all that line; Brian Farrell and Andy Larsen for their midnight vigils in the compressor shed; and, finally, the kastom owners of the beautiful Sarakata River.

Thank you, one and all.

KISS

REBREATHERS & GAS BOOSTERS

for recreational and technical diving

KISS Classic and Sport Rebreather

- Designed for simplicity, durability, and ease of transport
- Classic KISS and Sport KISS are two of the lightest and smallest, CCR's on the market
- Can be disassembled, cleaned, and prepared within minutes

Jetsam Baby Gas Booster

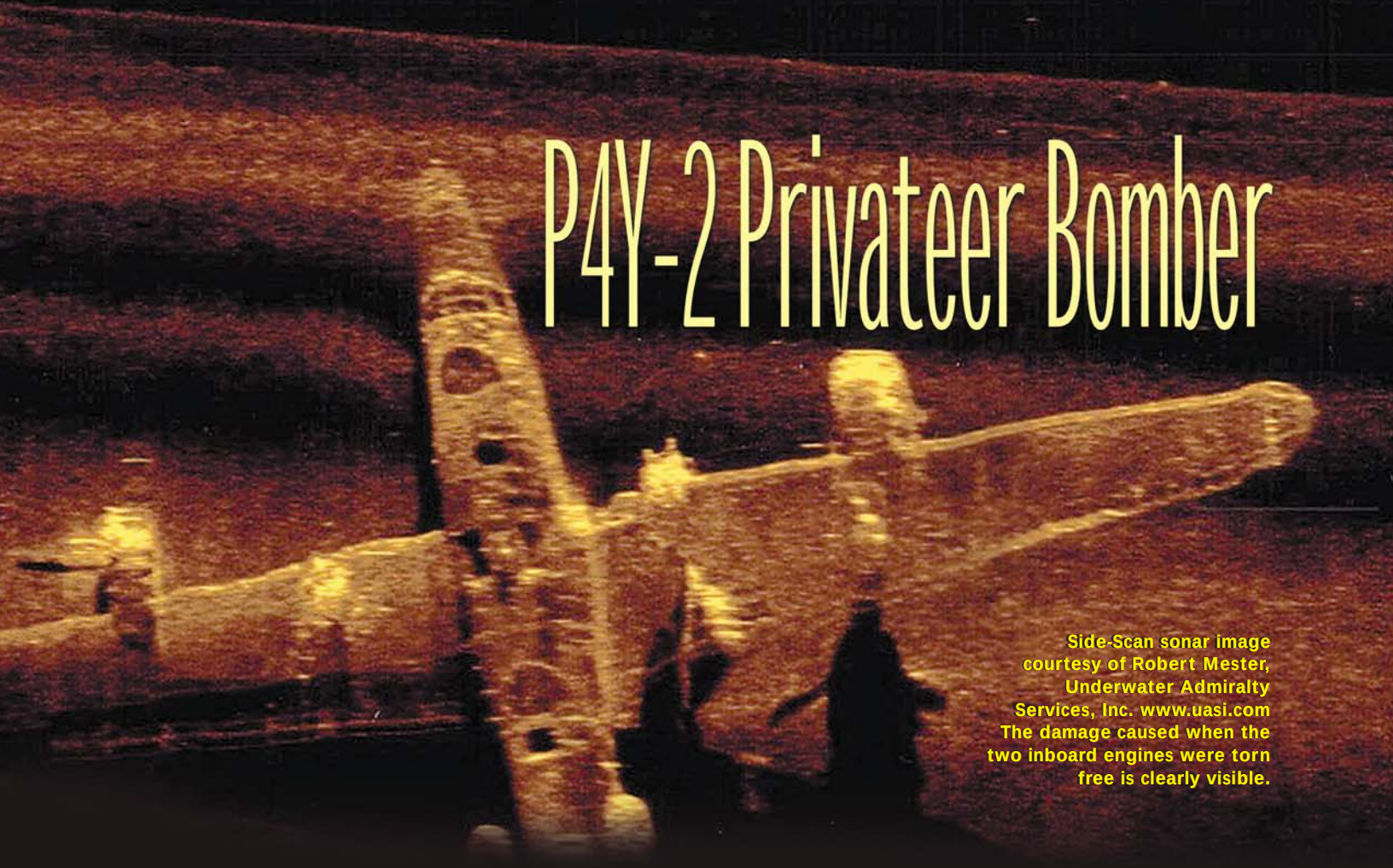
- Designed for the traveling rebreather diver
- Small, lightweight, easy to use and transport
- Compatible with air, oxygen, and helium mixtures

Jetsam Technologies, Ltd.
2817 Murray Street
Port Moody, BC
V3H 1X3 Canada

Ph: 604-469-9176
E-mail: Info@jetsam.ca

www.jetsam.ca

P4Y-2 Privateer Bomber



Side-Scan sonar image courtesy of Robert Mester, Underwater Admiralty Services, Inc. www.uasi.com
The damage caused when the two inboard engines were torn free is clearly visible.

Text by ADM Staff John Rawlings
Photography by Mel Clark

August 25, 1956 – Naval Air Station Seattle at Sand Point

Lieutenant Thorson sighed. As usual, everything was SNAFU (**S**ituation **N**ormal – **A**ll **F**%*$#d **U**p!), and again they were sitting and waiting to take off on what was supposed to be a routine training flight. Next to him in the right-hand seat was his co-pilot, Lieutenant Shook. Shook was fairly new to the reserve squadron – having been assigned in January after being away from flying since 1948. While Thorson was a highly experienced P4Y pilot with literally hundreds of hours, Shook had only a few hours of time in the Privateer during his initial training and the May and June drill weekends. Privateers were huge 4-engine aircraft, 74 feet in length and with a colossal 110-foot wingspan. They were the US Navy's version of the Army's B-24 Liberator bomber, and flying them required an intense level of experience and skill. The flight had been scheduled for 0930, and was a golden opportunity for the new man to gain some much needed experience and flight time. The first delay occurred when a problem was found with a circuit breaker, and the plane remained stationary until it was repaired. Now they were waiting for the weather to open up, rules for instrument flying in effect. With his lack of experience in the Privateer, it was deemed better to wait for visual flight rules to be in effect before Lieutenant Shook made his take-off. Using the extra time, the two pilots went through the engine run-up and the take-off checklist. For some reason, they missed the flaps as they went through the checklist – a fateful error.

At 1025 visual flight rules were declared to be in effect on the field, and minutes later the tower cleared the aircraft for take-off. Lieutenant Thorson taxied the huge Privateer into take-off position, and turned the aircraft over to the junior man. Lt. Shook began the take-off at 1034. Unknown to both men, the flaps were still up; that step somehow having been missed as they went through the checklist. Engines roaring, the gigantic aircraft shot down the runway, becoming airborne only just prior to reaching the end due to the raised flaps. The two men struggled to get the huge Privateer into the sky, not realizing that the deployed flaps were holding her down. Behind them in the fuselage, the crew knew that there was a problem. The rumblings felt startlingly different this time, and the cries from the pilot and co-pilot as they struggled to control the aircraft echoed back to them. Launching at 110 knots off the very end of the 5000 foot long runway and out over

the waters of Lake Washington, the plane only remained airborne for a few seconds, crashing into the water only 300 feet past the end of the runway itself. Inertia kept the fast-moving plane going for almost 5000 yards past the point of initial impact, water spraying out on either side as if from a monstrous speedboat. Finally coming to a halt, the Privateer immediately began to take on water and sink. The crew followed their training and ditched the aircraft within 45 seconds – watching their mighty plane disappear beneath the surface of the lake a few minutes later from their deployed life rafts. They were rescued within minutes and to everyone's relief only minor injuries had been sustained by Lt. Shook and one crewman.

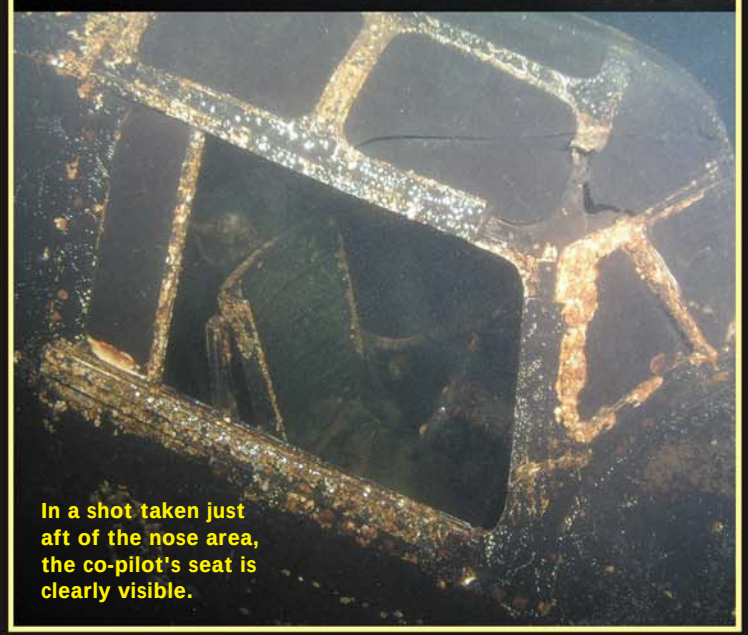
The huge aircraft was salvaged five days later on the 31st, brought up from 175 FFW. During the crash, the bomb bay doors had been ripped open and one bomb bay tank had been torn loose. The propeller blades had been bent slightly back due to the impact, but otherwise no further damage appeared to have occurred. It was upon the plane reaching the surface that it was first discovered that the flaps had in fact been deployed, and were in the up position. In that position, a take-off would have been virtually impossible. Shortly after this, a shackle pin gave way while the salvors were attempting to tow the Privateer into shore. This sudden jarring of the 37,000+ pound aircraft caused it to break free, once again plunging to the lake floor. Heavy lines had been wrapped around the two inboard engines on either side, causing them to tear free of the wings – the lines proving stronger than the aluminum cowlings. After this second sinking, the US Navy judged salvage of the plane to be "uneconomical" and further efforts were abandoned. The official investigation report determined the cause of the crash to have been pilot error. Lieutenants Thorson and Shook thereafter disappeared into history, but their mighty aircraft remained at the bottom of Lake Washington awaiting teams of divers actively in search of history itself.

December 4, 2005 – Off Former NAS Seattle at Sand Point, Lake Washington

I could feel my excitement brewing as we approached the unmarked spot in the lake – my twin passions of history and diving blending together once again - and I grinned from ear to ear as I made a few adjustments to my equipment. I had been invited to dive the Privateer by my friends, Curt McNamee and Mel Clark of Silent Scuba, and had gleefully accepted. The exact location of "the Bomber" is known to but a few, and the exact coordinates are a well-guarded secret amongst the local technical dive community around Seattle. Curt was able to figure it out by using aerial photos of the NAS in the 1950s showing the location of the runway, and comparing them with modern photos of Sand Point. Taking the description of the incident, and

A diver peers into the starboard cockpit. The seat occupied by Lt. Thorson is in the foreground.

Encrusted with rust, twin machine guns jut out from the aircraft's tail-gun mount.



In a shot taken just aft of the nose area, the co-pilot's seat is clearly visible.

Team Leader Mel Clark emerges from Lake Washington, typically grinning with excitement.

Additional side-scan images of the P4Y-2 Privateer, in addition to other aircraft and shipwrecks worldwide, can be found on the Underwater Admiralty Services, Inc. website at www.uasi.com

attempted salvage found in the US Navy accident report, he considered where the airplane would have been towed at the time of its second sinking, and plotted a likely area that he thought it might be. Using the "fish-finder" on his boat he soon located the wreckage, and has been diving it ever since with friends "sworn to secrecy." (I had to swear that I didn't have a GPS in my gear bag!) Today we were diving from the MV *Dash*, owned by Porthole Charters, a company that specializes in charters for technical and rebreather divers. The weather smiled at us as we arrived at the dive site, Mount Rainier glistening in the sunshine to the south of us against a bright blue sky. It was that rarest of rare events – a perfectly sunny day in Seattle in December! Dropping the down line attached to a chain rather than to an anchor so as not to damage the thin aluminum skin of the airplane, it was announced by Skipper Troy Sterrenburg that the "pool was open." We dived as three teams of two, with a planned 20-minute bottom time – each team spaced so that the second team would enter the water as the first team turned their dive, with the third team entering the water after the first team had completed deco and was back on the boat. Mel and I entered the water first, and after a quick buddy check descended into the deep black gloom that is Lake Washington. By the time we passed 75 FFW, the surface light was completely blocked and utter darkness enveloped us, only the beams of our lights showing the existence of anything other than complete blackness. As I dropped deeper down into the murk, I realized how easy it would be to miss the wreckage of the plane if you were not following a line straight down to it – in addition to the pitch darkness, there are no bottom landmarks to follow, only a deep layer of fine silt. Passing 140 FFW, I began to cast my light around beneath me – Mel had told me that the plane lies upright around 155 FFW, so I knew that soon it would enter my vision. Almost instantly, from out of the gloom a huge object appeared below me. I tickled my inflator button to slow my descent, hovering directly over what I realized later was the center of the main fuselage. I found myself slightly claustrophobic in the pitch black as well as disoriented. I had studied period photos of P4Y-2 Privateers, but the huge length and wingspan of the bomber made it almost impossible for me to orient myself with only small bits of it visible at any one time in the beam of my light. Acting as my "tour guide," Mel led me alongside the main fuselage past the wings, where I photographed the gaping hole left when one of the inboard engines tore away, and toward the nose and cockpit. The landing gears are thrust down into the silt, sunken but with most of the wheels still visible. Machine guns still jut out from glass domes, the steel of the guns bright orange and encrusted with rust — unlike the aluminum used on the airframe and skin of the aircraft. Through the open window on the side of the cockpit, I could see the seats and controls used long ago by Lieutenants Thorson and Shook as they struggled futilely to control the giant aircraft before it crashed into the water. Huge numbers and letters appeared in the beams of our lights as we turned and slowly swam past the opposite side – presumably aircraft and squadron numbers. Nearing the end of our planned bottom time, we slowly approached the upline and began our ascent through the blackness. While conducting the first of our deep stops, team 2 descended past us toward the bomber, greeting us as they passed by on their way to visit another era. Much later, following the last of our stops, my faceplate emerged back into the sunshine. All I could see were the huge grins on the faces of team 3, eagerly waiting their turn in the water. Their questions came fast and furious...the visibility...the silt...the condition of the plane.... As we prepared for our second dive, Mel and I just grinned at each other, knowing that within moments our buddies would be dropping down into history.

Porthole Charters offers technical and recreational dive charters to virtually any destination in the Pacific Northwest with their trailerable 28-foot dive boat. Amongst other sites, they will take divers to dive the P4Y-2 Privateer in Lake Washington so long as the dive team ALREADY has the correct site coordinates.

www.portholedivecharters.com

SDS
SILENT DIVING SYSTEMS LLC
SILENTDIVING.COM
CLOSED CIRCUIT REBREATHER DISTRIBUTOR

www.silentdiving.com sales@silentdiving.com
1-603-569-3467

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

Diving slightly off the beaten path.

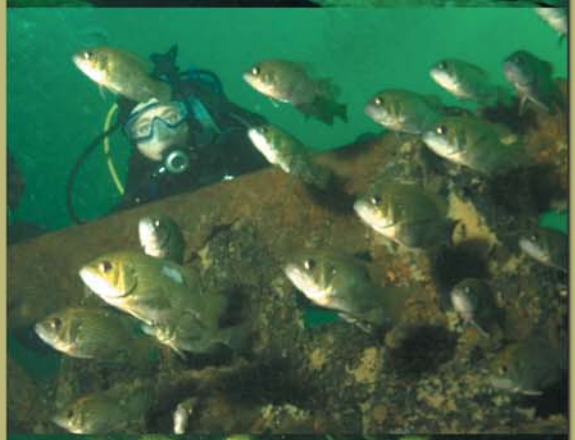
The 1000 Islands, Brockville, Canada.

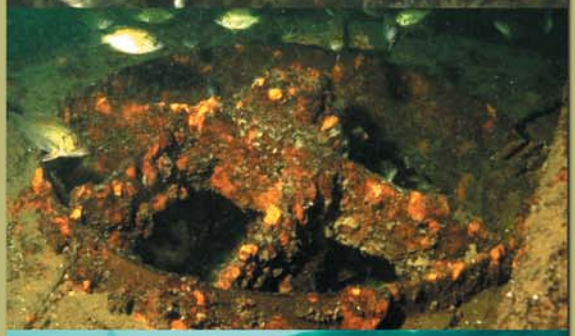
Text and Photography by Cass Lawson

I don't usually use the phrase "warm water diving" and Canada in the same sentence. However, I've just returned from a long weekend enjoying underwater temperatures of 75°F, air temperatures of over 80°F, and all in one of the most scenic parts of Canada — the 1000 Islands area. This region runs along the St. Lawrence Seaway from Kingston, Ontario, in the west to Morrisburg in the east. Ottawa International Airport is only 70 miles to the north, just over an hour's drive to Brockville, known as the Eastern Gateway to the 1000 Islands.

My buddy John had been urging me to dive the area for some time. So, one weekend, I loaded my trusty Inspiration rebreather, wet suit, clothes, and beer vouchers into John's truck, and we drove from Washington D.C. to Brockville.

Helen Fowler runs the Dive Brockville Adventure Center located almost on the St. Lawrence waterfront, just a short drive from the marina we would be using. Her staff filled my oxygen and air bottles for my Inspiration rebreather, I packed my scrubber container, reconnected everything, and we headed to the dockside. Captain Vince introduced himself, and told us that we would be diving on the *Muscallonge* (or the *Musky* as she is known locally) and *Robert Gaskin* wrecks.





The wood- and steel-hulled tugboat *Valiant* was launched at Port Huron, Michigan, on April 23, 1896, but in 1913 she was renamed *Muscallonge*. On August 15, 1936, the tugboats *Ajax* and *Muscallonge* were towing the barge *Bruce Hudson* from Montreal to Toronto when the *Muscallonge* inexplicably caught fire; it quickly spread to include the barge's cargo of 9,000 gallons of crude oil. The captain of the *Muscallonge* was able to steer his tug into the shore, and the crew abandoned ship onto the *Ajax*. Attempts to save her with a fir e pump from Brockville failed, as the *Muscallonge*'s fuel tanks erupted in a huge conflagration.

She now rests, broken but almost upright, a short distance from the Brockville shoreline in about 100 feet of water. The day we dived her, the current was negligible and visibility about 50 feet. We used the bow mooring line to descend, and almost immediately saw what appeared to be the remains of a porthole lying on the clay bed. Oh, for a lift bag and strong rope! Just as well I didn't have either one as most of the wrecks belong to the Province of Ontario, and the removal of any property is illegal. Oops. Moving over the bow, I soon saw the remains of the boiler that exploded so spectacularly on the evening of the tug's demise. Mostly in one piece, it is easy to navigate over and around it, eventually coming to the expansion engine just to the rear of the boiler. Moving towards the stern, the remains of the drive shaft is recognizable. We explored the remains of the hull, eventually returning to the mooring line. The propeller lies within the shipping lanes, southwest of the wreck, along with the rudder and the steering linkage.

Originally, the *Musky* was 128 feet long and about 25 feet wide, so it's not a strenuous swim around the whole wreck. It is a great dive: clean, safe, and interesting. Ascending the line we boarded our pontoon boat, the *Helen C*, and enjoyed a hot drink and snack while we moved on to our next wreck, the *Robert Gaskin*.

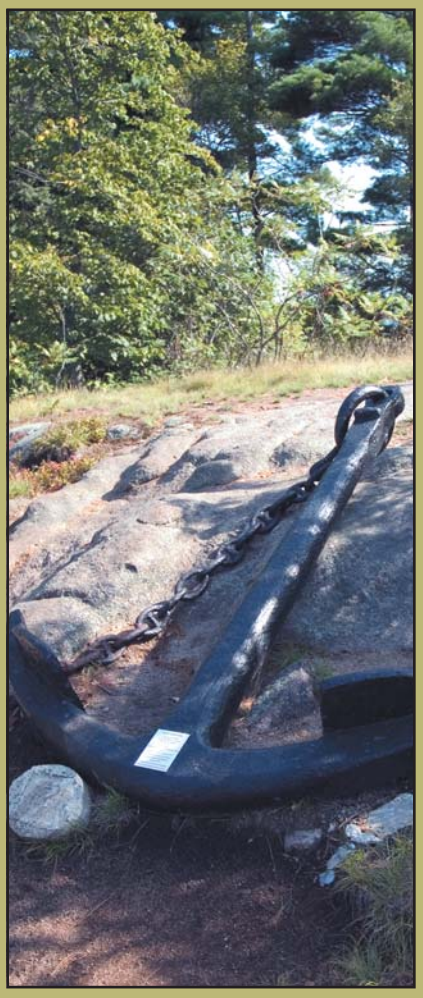
The *Robert Gaskin* was built in 1862, a three-masted barque with a length of 130 feet. (A barque is a type of sail-rigged boat that doesn't fit into the normal nomenclature of general navy shipping.) In 1889, the *Gaskin* was helping to raise a sunken railroad ferry called the *William Armstrong* by pumping steam down to some pontoons affixed to the *Armstrong*. One of the pontoons broke loose and rocketed to the surface, effectively torpedoing the *Gaskin* in the stern. With a gaping hole below the waterline, the *Gaskin* soon began to sink. Efforts to save her were nearly successful, when a hose broke free. The *Gaskin* started to sink again. The second time raising the *Gaskin* was going well, and she was being towed back to shore when she finally gave up the ghost and sank for the third and last time.

The *Gaskin* lies upright at 55 to 65 feet on a hard clay riverbed. The hole where the pontoon torpedoed the ship is immediately visible, if you descend the stern mooring line. Entry here is easy, and it is possible to swim the entire length inside the wreck in order to view the interior. Numerous holes in the deck above and in the sides of the wreck offer quick exits, if needed. We cruised around inside fascinated with the many fish who appeared to have little fear of us. Mind you, they weren't very big, so you'd need quite a few for a decent meal. Emerging from the bow end, we explored the deck area where a large post, with an information plaque on it, still stands upright. This post was used to attach the barge to the one in front by a long rope. Large rectangular lifting beams lie askance on the deck, offering a relief from the generally flat deck. Off the starboard bow lies the anchor that is just waiting for a lift bag and a couple of naughty divers. We had about 35 feet of visibility, about the average for the weekend.

Back on board the *Helen C*, Captain Vince had fired up the barbeque; soon the smell of grilling hamburgers and hot dogs drifted over the water, enticing other divers to beg for hot food. Oh, and did I mention the abundance of chocolate chip cookies? Wow, this is a dive operator who knows the way to my heart!

We made our way back to the dock, unloaded our gear, and started the process of preparing for the next day's diving. Brockville appears to be a small town, but we soon found that there are plenty of bars and restaurants in which to partake of some Canadian hospitality. We stayed at a Comfort Inn less than one mile from the dive center, and near several restaurants...so we didn't have far to stagger home in the evening.

The following morning, we arrived early so that my buddy could get his doubles filled; I was okay, as I had used less than half of the gas in my Inspiration's cylinders. Then off to the *Helen C* for another day of diving: the *Henry C. Daryaw* and the *Lillie Parsons* wrecks. The wreck of the *Henry C. Daryaw* turned out to be one hell of a roller coaster of a dive. This 220-foot steel-hulled freighter lies upside down, exposing her twin screws to the world, along with an impressive rudder in full view. What makes the dive exciting is the current that sweeps over the wreck, often at three knots or more. We were lucky — the current was only about one and a half knots. As we descended, visibility dropped to about 20 feet until we reached the bottom, where it increased slightly. Just to the left of the descent line, near the propeller, is another line that leads to the bow of the wreck. Following this line allows you to explore the whole side of the wreck, and examine the interior through the many portholes that are still in



place. It is essential to have a good light on this dive, as the interior of the wreck is full of odds and sods to see. I ventured a short way into the machine room, but because previous divers had disturbed the unstable bottom terrain, the viz was down to only a few feet – definitely not conducive to a pleasant dive nor good photography.

There are a number of fish species inhabiting the wreck, sheepshead, bass, walleyes, and some I could not identify. Rumor has it that there are lake sturgeons nearby, but we didn't see any. Neither did we see the alleged ghost of the one crewmember who lost his life when the boat went down. This unfortunate fireman was trapped when the *Daryaw* crashed into the local shoals in heavy fog on the morning of November 21, 1941. Spooky, huh?

Towards the end of the dive we were at the bow, and allowed the current to drift us down to the mooring line at the stern where we ascended, did our safety stop, emerged to the welcoming warm Canadian air, and coffee freshly prepared by Captain Vince.

Our last dive of the weekend was one of the most interesting. It was on the wreck of the *Lillie Parsons*. The wreck itself is nothing spectacular, a Great Lakes centerboard schooner that used to carry coal, barley, lumber, and other products up and down the St. Lawrence Seaway in the late 19th century. At 130 feet long, she is not one of the longest, being upside down is nothing spectacular, and at 40 to 60 feet deep you certainly don't need any special training; however, the whole method of getting to the wreck is worth the dive. The *Lillie* lies against the banks of Sparrow Island with her bow wedged into the bottom, and her anchor on the ground above her, attached to the wreck by a long chain. One way to get to her is to follow the chain down to the water's edge, avoid tripping on the rocks, try to enter as elegantly as possible, then grope along the chain until you come to the wreck.

Or you can do it the way we did it. Captain Vince suggested that we kit up on board the boat about 50 yards away from the wreck. He swung the boat around so

that we could drift down stream in the current for a short way, then we did a free descent watching Sparrow Island wall until we came to 50 feet. We leveled off and gently drifted along until the *Lillie* appeared. The current was fairly strong when we started at the stern section alongside the rudder that is still very visible. Exploring near the wall, we saw a display case of artifacts from the boat that had been accumulated by the local 'save our shipwrecks' society, and neatly gathered in one place. Exploring further, you can see the stove, now beneath the stern, that must have given a lot of comfort to cold sailors. Gently drifting in the current, we penetrated the wreck a little. There is still some coal lying on the bottom, remnants of her last cargo. As we drifted along the wreck's starboard side (opposite the wall), we saw the mainmast disappearing into the distance. We learned later that the crow's nest is still at the end of the mast. Other masts litter the area as well as the bowsprit that is still firmly attached to the bow. Near here are two information plaques, one attached to the wreck and the other just alongside; yet another plaque is near the anchor with information about the *Lillie*.

Following the captain's advice, we drifted along from the wreck and looked for a length of rope attached to the wall. We followed it around the island wall, and ascended slowly into the warmer waters of Sparrow Island bay where Captain Vince had moored the dive boat.

We found nothing of great interest, but it is a lovely wreck to explore. In all, this was a great dive, made even better by the aroma of barbequed food that drifted from our dive boat. Our lunch was grilled and ready for us! What more can a diver ask for? Great diving, good company, and being well looked after by the people of Brockville Adventure Center. Plus, I can buy some duty free cognac on the way home. Excellent!

For information about diving the 1000 Islands, contact Helen Fowler at Abucs Scuba Group Inc. at 1-877-982-2827, or visit their web site at **www.divebrockville.com.** They offer a full service; and are rebreather friendly, supplying pure oxygen and scrubber material.

Versatility

Compliments any level of certification

Picture: Rudy Van Geldere

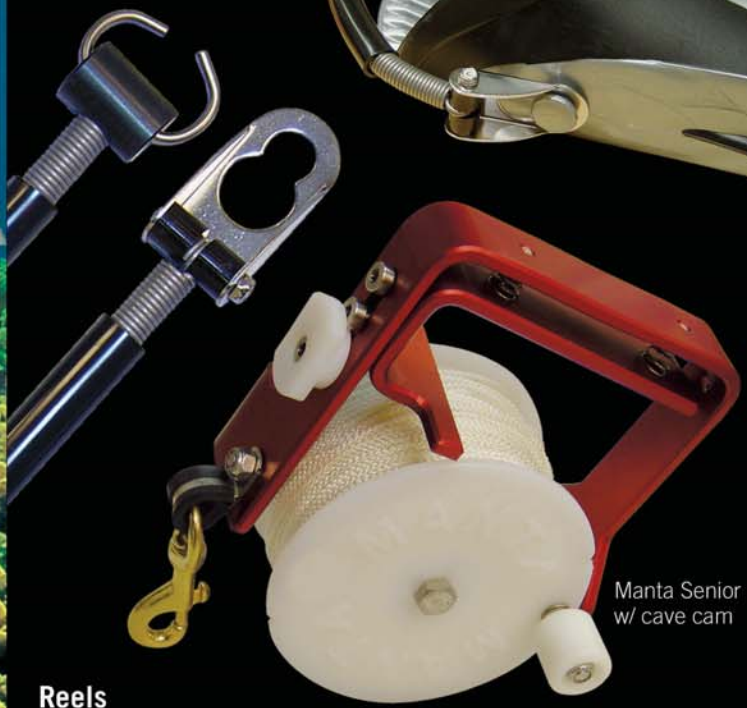
Custom Modular Lighting Systems

Bulb types from LED, Halogen, Xenophot to HID.

Determine your needs and build your system. Select from a variety of power options and expand with useful accessories. Mix and match between a series of lights with burn times from 90 minutes - 90 hours.
Manta is the U.U.S. Distributor of
Green Force Underwater Lighting Systems

Spring Fin Straps

For any diver, foot and majority of fins. Comfort fit. Depth compensating. Marine-grade stainless steel. Slim profile. Wet or drysuit boots.



Manta Senior w/ cave cam

Reels

Manta manufactures a broad range of dive reels designed to support any level of certification or preference. Their user friendly features make them the choise of divers worldwide.

Green Force®

MANTA INDUSTRIES

Manta offers a comprehensive line of diving solutions

www.mantaind.com **1-800-397-3901**

Bashkiria Cave Expedition RUSSIA

Text by
Phil Short
Photography by
Gavin Newman

Though impressive enough on an atlas, the sheer vastness of the Russian Federation doesn't truly sink in until you travel across it. Our destination was the Bashkir Republic in the Southern Urals. This was my fifth cave diving expedition in Russia, but my first in the summer months. After arriving in Yekaterinburg, a day's drive brought us to a small settlement of wooden houses, our campsite for the first night. Excited, and looking forward to the planned exploration of several resurgence caves in the Bashkiria region, we wasted no time after breakfast the next morning.

VERHNIY GREBESHOK

We loaded the necessary equipment into a Gas 66 4x4 (the Russian military equivalent of a Mercedes G Wagon), and set off on a rough track following the Nugush River. At one stop we met an old, weather-beaten peasant who lived alone in a wooden hut near the river, producing honey for part of his livelihood—some of which we bought for our journey. Finally, on a pebble beach on one of the large meandering bends in the river, we unloaded all the gear, and pitched camp for the night with a good open fire of driftwood to cook over.

This was as far as the 66 could go. So in the morning, we built a light catamaran-style raft consisting of two banana tubes and ten lightweight aluminum tubes. The four 12-litre cylinders, 3 cfm compressor and generator made up the floor between the tubes. Numerous dry bags of dive, camp, and personal kit stacked on top left the four corners free for the four-man team who would paddle and haul the raft. We also built two zodiacs to carry additional gear and outboard motors;

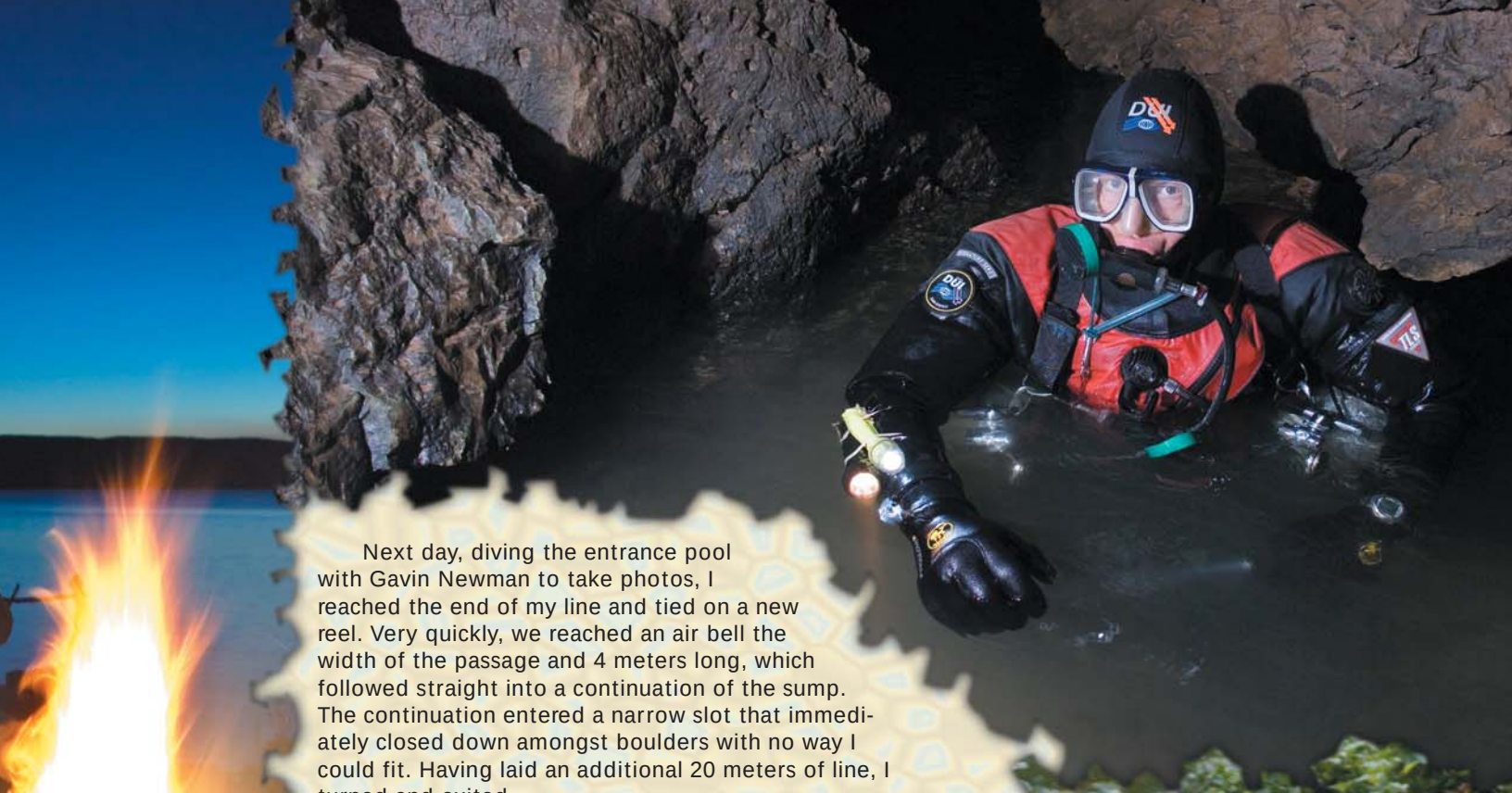
useless for the next three days of travel, but essential for when we'd have to tow the raft.

We set off down river, travelling between high limestone walls and thick forest, birds of prey riding the thermals above, and fish swimming in the warm waters around us. Rarely was the water deep enough to take the additional weight of passengers; for the most part, we walked the boats in a meandering zigzag through the sections of water deep enough to take their weight. It was a very tired team that set up camp by our first resurgence. Even so, I couldn't wait to head up the inlet gorge to check out the dive site, Verhniy Grebeshok, a small circular pool of clear turquoise water that emptied into a small shallow stream, disappearing into reed banks at the far end of the meadow, and eventually joining the waters of the Nugush.

Alex and the rest of the team had spent several days the previous summer using a hand-operated winch to remove dead trees and some of the larger boulders from this pool. They had revealed a slot too small to pass through among the boulders, and an even smaller slot between sloping gravel floor and rock ceiling to the right of the pool. The plan was to dig a way through to the larger passage that could be seen beyond.

I entered the water, dropped down to the gravel floor, and passed under the arch of grey limestone that formed the entrance. Where the ceiling and floor met, I could look between boulders into a larger space beyond. Turning around, I entered feet first, kicking gravel and rocks aside, pushing myself into the slot and running my line in front of me as I went. Each time my cylinders got caught, I reached down to the obstruction and pulled or pushed it out of the way. Soon, I could feel a larger passage around my legs. After moving a couple more of the larger rocks, I was able to turn around and look into the passage. The visibility was very clear, considering the amount of forest detritus that littered the walls and floor of the pool.

The passage was a bedding averaging 4 meters in width, and between half to one meter high. From the entrance depth of 11 meters, I followed the passage along the centre, slowly ascending, with around 5 meters of visibility. Occasionally, the floor rose in small steps, and two small blind rifts were passed in the ceiling. At 3 meters of depth, with the passage still ascending, I had laid 90 meters of line, and my reel ran out. I turned the dive and exited.



Next day, diving the entrance pool with Gavin Newman to take photos, I reached the end of my line and tied on a new reel. Very quickly, we reached an air bell the width of the passage and 4 meters long, which followed straight into a continuation of the sump. The continuation entered a narrow slot that immediately closed down amongst boulders with no way I could fit. Having laid an additional 20 meters of line, I turned and exited.

In the morning we broke camp, and loaded the zodiacs and rafts for the river journey to the second cave. The method of travel was the same—long sections of walking and towing the vessels in ankle or knee deep water, very rare and short sections of water deep enough to sit in them and paddle.

Throughout the day we were getting more and more water in the two zodiacs; however, we had no choice but to carry on, and quickly developed a system of bailing with one of the billy cans. After about four hours of hauling, we stopped on a pebble beach, got a fire going for a brew, and just flaked out in the sun for a short rest. We carried on throughout the afternoon through increasingly stunning scenery to finally reach our campsite. Warm and dry beside a big fire, a welcome pot of grishka cooking on the campfire; we gazed at the Milky Way in the crystal clear night sky, watching the bats dive and spiral around us.

SAUKA TAMAK

The next morning we were able to assess the damage to the zodiacs. Uri had ripped a flap in the floor large enough to put his head through, and Alex had over twenty small holes, explaining why the constant bailing the previous day had been so spectacularly unsuccessful. Alex and Uri got to work with a large sheet of patching material and glue, whilst Gavin and I filled cylinders and ferried gear up to the resurgence of Sauka Tamak.

It was a glorious sunny day, and the clear water of the resurgence flowed noisily over boulders via couple of cascades to join the main river. Following the flow through the woods to the base of the limestone cliff, we saw that it issued from a slot under a large boulder. A small, clear pool of static water behind it was the entrance into the sump.

Descending feet first into a narrow chimney, back and chest touching the walls, I dropped into a much larger passage and joined the water flow. When Gavin joined me, both of us diving side-mount aluminum 12-litre cylinders, we followed Sergey's line from the previous summer to the boulder choke 50 meters in.

At the choke, I tied on my line reel and passed between the ceiling and the top of the boulder pile to rejoin the main passage. Gavin and I swam side by side with ease in the 5 meter wide by 1 to 2 meter high passage. I continued to lay line whilst Gavin acted as light man; until, having descended a gravel slope and passed an elbow at 11 meters of depth, the line reel ran out. I tied on my second, and continued in the now ascending passage to a rising silt bank that ended where the only obvious way on was a half-meter wide ascending chimney. I entered this, visibility reducing to zero as silt fell from the ceiling. Moving forward, I laid another 30 meters of line and tied off on a flake of rock. I then reversed out of the chimney to rejoin Gavin in the larger passage where we turned the dive.

Early next morning, after a quick brew, I kitted up and entered the water again. I followed my line very slowly, carefully checking both walls until I arrived at the chimney. In the poor visibility of the previous dive, what had looked like the left wall of the passage was actually a large step, the main passage continuing above it. I tied off a fresh reel and entered, following a low silty passage to a depth of 6 meters. The line reel ran out, having laid 120 meters of line. On the exit swim, I removed the line into the chimney—now that the way had been established.

Whilst the team broke camp, I went back in for a second dive. This time, with additional line, I followed the passage down to 9 meters. It began to rise again, and I soon surfaced in a large air bell, 10 meters long by 5 meters wide. Crossing this, I entered the second sump, which was only 10 meters long, and surfaced to the roar of water—just as the last meter of line spooled off my reel, having added another 60 meters. I was waist deep in the stream, but knee deep in silt. The only place to tie off was under water, just under the rock ceiling of the sump. From here, I could see more than 20 meters along a 10-meter high stream passage to a large cascade. I turned here, and swam out. Time to pack, load my gear on the raft, and move on to our next objective.

SAKASKA

A recently completed dam construction on the Belaya River had two implications: first, getting to the cave was now much easier as the dam authorities would take us the 20 kilometres up the lake to the resurgence; second, the flooding of the valley had put the resurgence 9 meters underwater—increasing the depth of the sump to 49 meters so far.

A two-hour journey by jet boat up the lake gave us high vertical limestone cliff that plunges into the lake, marking the point where all the feeder caves on the plateau above resurge into the lake. The nearest is Sungan, 7 kilometres across the limestone plateau, as the crow flies. 100 meters from the cliff wall, the jet boat beached on an overgrown flood plain. We unloaded diving equipment and camping gear; then our escort returned to the dam, leaving us here for the next three days.

The next morning, Gavin and I assembled a pair of isolation manifold twin 18-litre cylinders and a pair of 15's, and slowly filled them. We prepped and set up all our gear, primary and backup 10-litre oxygen cylinders for decompression; by midday, we were kitting up for a dive to assess the line condition after the spring melt. We were taken across to the cliff face by zodiac, and dropped into the half-meter visibility of the lake water at a balmy 19 degrees centigrade.

Gavin tied off the line on the tip of a silver birch tree, and we descended along the underwater trunk, then followed the cliff wall down. At a depth of 9 meters, we dropped out of the peaty orange lake water into the clear, cold resurging cave water. The arch of the cave passage roof came into view. We descended to the sloping gravel and boulder floor, and at 37 meters found Alex and Uri's primary line from the previous summer. The cave at this point is over 10 meters in width and up to 5 meters high; so in the 6 meters of visibility, we could see only the left-hand wall as we followed the left line. Alex had laid a line along both walls to aid in surveying the cave. The left wall was a shorter and shallower route; we chose this option since our objective was to find the terminal chamber where the lines joined again, and the dam had added 9 meters to the depth of the cave.

The lines join 300 meters into the sump, and the passage ascends to 36 meters where it passes through a window, roughly 2 meters in diameter, formed by a car-sized slab of rock that leans up against the left wall. Gavin turned back at this point, but I continued to where the line is tied off to the wall at 19 meters of depth, and takes a 90-degree turn to the left. At this point, one third of my gas was used. I returned to the exit side of the window where I tied on a line reel to check an alcove in the left wall...after 5 meters, it proved to be blind. I returned to the entrance slope after a bottom time of 60 minutes at an average depth of 45 meters to complete a further 60 minutes of ascent and decompression. After 85 minutes in 6-degree water, the 35-minute oxygen stop at 6 meters in the 18-degree lake water was very pleasant.

Back at camp, I found Gavin, who had exited half an hour previously after completing his shorter decompression, with nausea, vertigo, and malaise. I

immediately got a 10-litre oxygen tank, and began oxygen administration. After 30 minutes, we established that he could urinate, administered oral fluids, and returned him to breathing oxygen. After four hours of breathing oxygen, and drinking four litres of water, Gavin's symptoms had resolved. He had an uninterrupted twelve hours of sleep, and felt back to normal in the morning. We determined that dehydration was the most likely reason for his symptoms. The success of our response was due to no delay between development of symptoms and treatment. In normal circumstances, we would have arranged for helicopter evacuation to the nearest hyperbaric facility as soon as his symptoms were noticed; however, we were nearly five days travel to the nearest reliable facility.

The final dive of the trip I made solo, set up with two 10-litre tanks of oxygen to cover a possible failure, and the 18-litre twin-set of air. Gavin took me to the cliff wall in the zodiac. I descended, leaving one oxygen cylinder clipped to the line at 6 meters, and the other at the primary belay in the cave at 37 meters, both pressurised and turned off. I swam directly to the line belay beyond the elbow reached on the previous dive, via deep stops to control micro bubble formation at 36 and 19 meters, and tied on my line reel to head up the right hand wall following the scalloping in the limestone. This led over a bulge in the rock, into the continuation of the main passage with a rippled sand floor that gradually ascended to a depth of 9 meters. Having laid 60 meters of line, my reel ran out. At this point, by resetting my VR3 to calculate deco from here on my bottom mix of air, I found I had 40 minutes at 6 meters; so I turned at this point, and returned to 50 minutes of ascent and decompression with the last stop on oxygen at the 49-meter elbow.

Sadly, we had run out of time on our Russian adventure. The jet boat would collect us in the morning for the return to the dam, and then a two-day drive to Yekaterinburg for our flight home. It was a memorable experience in a beautiful wilderness, certainly some of the most remote cave sites I've visited.

As always, the trip would not have been possible without the hard work of Alex, Uri, and Sergey.

Additional photographs and information on Phil's previous winter expeditions to Russia can be found on **www.philshorttechnical.co.uk**

An Infinite Palette of Colors

RAJA AMPAT ISLANDS

Text and photography by Tom Isgar

The Raja Ampat archipelago, part of Indonesia's largest national marine park, encompasses more than 9.8 million acres of land and sea off the northwestern tip of Indonesia's West Papua Province. The seas around Raja Ampat hold possibly the richest variety of species in the world.

In 2002, The Nature Conservancy conducted a scientific survey of the Raja Ampat Islands. The survey confirmed 537 coral species (75% of all known coral species), and recorded 899 fish species, raising the known total for Raja Ampat to 1,074. Dr. Gerry Allan from the Western Australian Museum, an expert on coral reef fishes, set the world record for the number of species identified in a one hour dive (283) at Raja Ampat.

Adventure Komodo

Raja Ampat is served by a limited number of live-aboards. The newest and nicest is the *Adventure Komodo*, an aluminum catamaran built in 2002 in Australia. She is 75 feet long, 23 feet at the beam, and cruisesat 9 knots with a top speed of 20 knots. *Adventure Komodo* is driven by two 430 hp Cummings engines, has two 40 kVA generators, and two Shiflauer scuba tank compressors, including nitrox. The two freshwater makers deliver 10,000 liters per day.

Amenities include a Cordon Bleu chef, and complimentary Australian wines, six cabins with individually controlled air conditioning, small windows, or portholes, semi-private bathrooms, 220V and 110V outlets available 24 hours. *Adventure Komodo* accommodates ten divers, but will sleep twelve guests. The cabins are great, and the lounge is large and well equipped with books and video gear. However, the food was the highlight - fresh produce, fresh fish, brilliant presentations,

homemade desserts, and wine from the owner's Australian vineyard. Many guests took more photos of the meals than of the fish.

The Diving

In 2005, the itineraries were still exploratory. Some dive sites had been dived before and were wonderful, and others we dove for the first time. We dove everything from shallow coral gardens and muck sites to 100-foot channels with raging current and outrageous coral walls. All of the dive sites had photographic opportunities. Many were teeming with a wide variety of reef fish. The muck and sandy sites had lots of fish species, which I ignored because the real targets were the more exotic ghost pipefish, spiny devilfish, and crocodile flatheads.

In twelve days, we saw no other dive boats and only a few fishing boats, mostly local. In Raja Ampat the headlines tell the story: "The World Center of Biodiversity!" "The highest number of fish counted anywhere in the world in a one hour dive!" Did I mention hanging in the water with dozens of Mantas? Or that the dive master on board is Larry Smith? Larry is one of the most knowledgeable diver guides in Indonesia. He has pioneered efforts to explore new areas throughout Indonesia for nearly 20 years.

With all the underwater diversity of the rest of Indonesia, Raja Ampat also offers the beauty of island after island with few or no inhabitants. We stopped at two islands where we were the fifth group of Caucasians they had seen. When we asked if we could dive

under their docks, which is where the trash gets dumped, they were sure we were either crazy — or knew about treasure and weren't telling them.

One of the villages, made up of one family with a dozen or so members, invited us to use their beach for a bar-b-que. They contributed a broiled fruit bat to the feast. It didn't taste like chicken – more like duck

A trip to Raja Ampat allows you to explore other wonderful Indonesian sites. On my trip, I dove a few days from Manado

in Sulawesi's famed Bunaken Park where I photographed the rare Lacy Scorpionfish (*Rhinopias aphanes*). Some divers on the trip went to Kungkungun Bay, while others did land tours of Bali. Getting there isn't easy. My route was Sarasota-Los Angeles-Singapore-Manado-Sorong. But to dive unexplored sites with amazing diversity, in a pristine unexplored area, was worth the travel. However, Song Airlines does have a card in the seatback with prayers from the five great religions, in several languages, seeking assistance for a safe landing.

www.adventureh2o.com

EMERALD IMMERSION

British Columbia's Pacific Dreams

Text by Kim Smith
Photography by Curt Bowen & John Rawlings

It had been a while since Gordon and I had a chance to dive in the emerald sea of our home. Too long, actually; our work schedule had been a bit crazy, and we hadn't made any time for diving. Yes, we have had some good dives in some great places, but this was home. This was where we both started diving, learned to love it with a passion, and made it part of our lives. So, we were both pretty excited when we found out that Curt Bowen had arranged to be in the Pacific North West in December 2005, and that he wanted to come up to British Columbia to dive with us.

As we had only a couple of diving days, we decided to book a charter close to Vancouver. We decided on Nanaimo as it is only a ferry ride away from Vancouver's Lower Mainland. Like many cities and towns on the west coast, Nanaimo was first settled by Aboriginal people, in this case a Coast Salish people. The area had an abundance of natural resources such as timber, fish, and animals which were hunted for food and fur. Nanaimo's growth began around the mid-1800s when coal was first discovered in the area by the British. The settlement grew over several years; and in 1860, the town was given its current name of Nanaimo, which is derived from the name of the original Coast Salish tribe. It was incorporated in 1874. Industry at that time, besides coal mining, was fishing, logging, lumber mills, and rock quarries. Over time, industry in Nanaimo has changed. Today shipping, tourism, and a variety of industrial, commercial, and service industries support this city.

There are tons of things to do in this beautiful city, such as kayaking, rock climbing, and golfing. Or take some time to hike, bike, or run some of the amazing trails that run by the ocean or up to the mountain summits. Maybe try some of the best fishing on the planet. You can go for salmon, cod, or red snapper. Looking for some excitement? Go visit the Bungy Zone and jump off a bridge! Those who enjoy sailing, boating, and, yes, scuba diving will find this part of the world amazing. One of the prettiest places here above water is Newcastle Island Park. It is accessible via boat or foot passenger ferry. Both Gordon and I have many fond memories of this incredible area. It was a shame that we were to be here for only two days of diving. Exploring Newcastle Island again would have been a treat! But, for most of us that visit Nanaimo, we come here to experience the breathtaking beauty of the ocean.

Photo Curt Bowen

Those who choose to dive in Nanaimo and the surrounding area have the option of easy recreational or more technical diving. As we have some incredible wall diving with endless depth, you can choose your own comfort level. Along with our stunning walls, we have an incredible artificial reef program in British Columbia. In the Nanaimo area alone, three vessels have been sunk over the past few years.

Our diving was booked with BC Pacific Dreams, which is owned by the husband and wife team of Belinda and Chris Miller. I had first contact with Chris about a week prior to Curt arriving in our neighborhood. The charter operator we had originally planned to dive with had to cancel at the last minute, and BC Pacific Dreams was recommended by friends. So, by the time I got Chris on the telephone to explain my dilemma, I was more than a little anxious! But Chris was great! Since we were diving during the week, he had an opening and was happy to take us out with only a few days notice.

It was a cool, bright morning on December 12, 2005, when we met up with Chris at the Bluenose Marina. We quickly unloaded our truck and sorted through our mess of dive gear. It didn't take me long to realize that I had forgotten my brand new Weezle drysuit undergarment. How disappointing, as I was really, really looking forward to being nice and toasty warm! But, life and diving goes on. I burrowed through the various clothing that both Gordon and Curt had brought along, and layered as much as I could. It would do for the day's diving, but I knew that I was going to freeze my butt off! Cold water diving in this area is beautiful and spectacular; however, you need the proper gear—and a good drysuit undergarment is certainly a key part. We finally loaded up our KISS rebreathers and the rest of the gear into the dive boat, and headed out for our first dive.

Middle: KISS rebreather manufacturer Kim Smith hovers alongside the 336-foot HMCS *Saskatchewan*, sunk as an artificial reef.

Below: A Widehand hermit crab scuttles long a rocky ledge, displaying the fluorescent colors that identify this species.

Photo John Rawlings

Photo John Rawlings

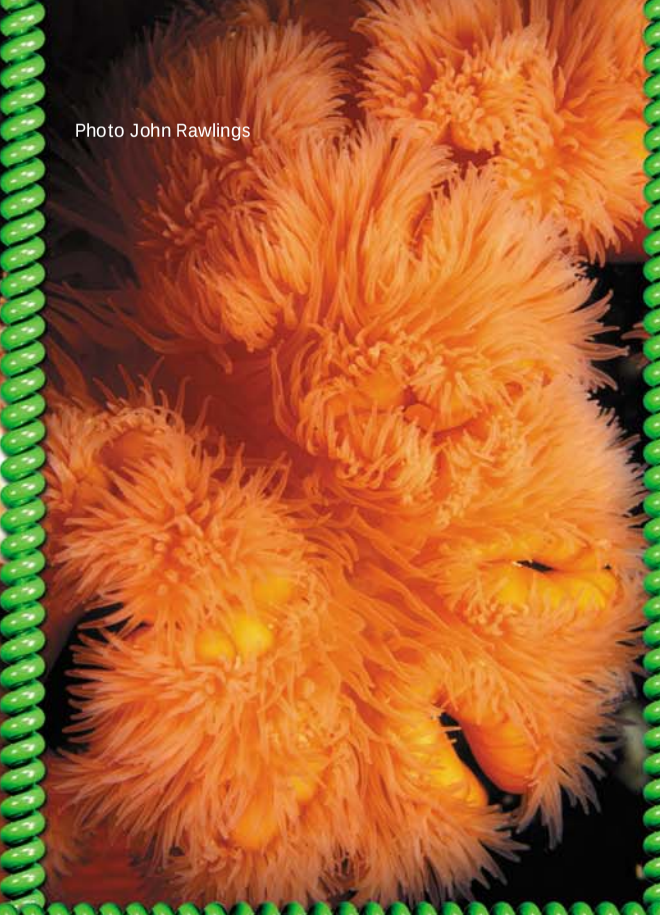


Photo John Rawlings

Photo John Rawlings

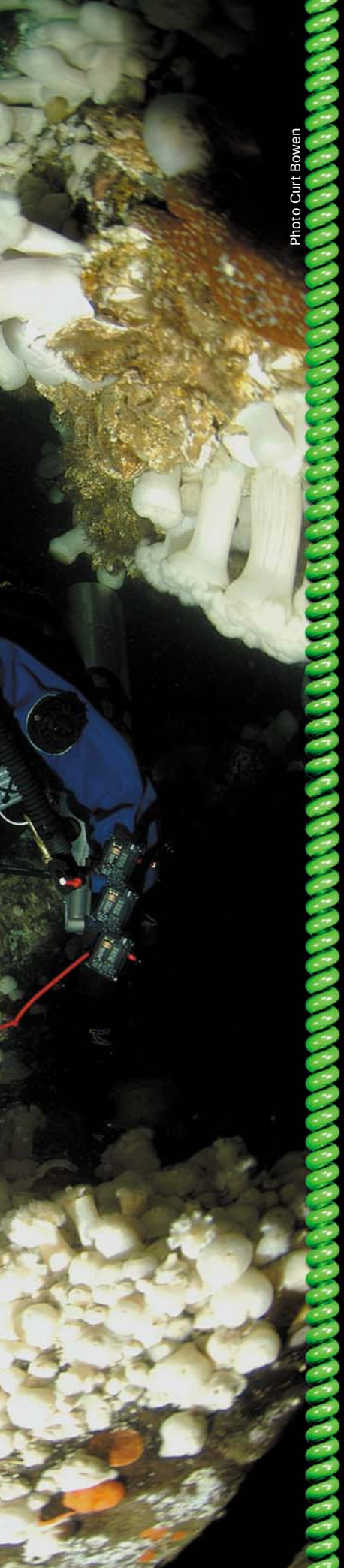


Photo Curt Bowen

Our first dive was Clarke Rock, and here we hoped to see a variety of different critters and sea life. So it was with much anticipation that we geared up, checked out our units, and jumped into the dark ocean. We quickly descended to see a shallow wall and a field of boulders scattered on the bottom. I love to creep up to the rocks slowly, careful not to disturb the bottom with my fins, and run my light over the crevices to see who is about. When my light beam hit the little red rock crab in its cubbyhole, I am sure its little brain was saying, "What is that huge thing!! I am going to kick its butt!!" And it faced off to me, lifting its tiny little claws to warn me not to get too close. Too funny! In these cubbyholes, you will also see numerous hermit crabs, spider crabs, juvenile rock fish, nudibranches of all colours and sizes, and if you are lucky, a wolf eel or octopus. Unfortunately, we were not that lucky. But we did see plenty of evidence that these creatures were about. Across the bottom were also plenty of the large swimming nudibranches. They are amazing to watch as they lift themselves off the bottom, turning and twisting their bodies in an amazing dance in order to move through the water. It was a pleasure to be home and diving again.

Our second dive of the day was on the artificial reef, the HMCS *Saskatchewan*. This is one of my all time favorite dives. She was sunk on June 14, 1997, and went to her resting place in a record time of under three minutes. She is 336 feet in length, and is 36 feet across. She sits upright with a 15-degree list to the port side in about 130 feet of water. While most of this dive is in the 80 to 110 foot range, the top of the mast is at about 45 feet. To make this wreck safe for divers of various experience levels, holes have been cut into her sides for easy penetration. From any of these entry points, the diver should be able to see an exit point. Still, any diver considering penetrating this or any wreck, should seek proper training first.

This incredible wreck is completely covered in life. As you descend the mooring line to the *Saskatchewan*, the first thing you notice is the glow of the white plumose anemones against the emerald green of the ocean. From the top of the mast to the superstructure, she is just covered with a field of these beautiful animals. Mostly white, with the occasional orange one, they group in large clusters. As you swim up closer to them, you can see their delicate tendrils with which they feed. As I move closer to the deck of the *Saskatchewan*, I look down and wonder why it looks as if it is shifting. A second look brings into focus the many brittle stars which cover the surface. When one moves, it causes a chain reaction with all the others. Amazing to see! As we start to swim around her hull to explore, I glance up to the mast, shining against the green of the ocean. It is a truly remarkable sight. It shines like a huge cross standing guard over us. Even after many dives on this wreck, year after year, she still takes my breath away. And as with every other time I have gazed upon this cross, I realize how precious life is, and how fortunate I am to be able to experience the amazing beauty of our oceans.

Our second day of diving starts out at Snake Island wall where we see an abundance of life growing. More clusters of plumose anemones, cloud sponges, boot sponges, crabs of all types, massive ling cods, rock fish, sea stars, nudibranches. Again, plenty of colour and texture and clear green water. As there are seal habitats close by, the odds of seeing one of these graceful creatures underwater is pretty good.

Left page top: A brightly colored Longfin Sculpin flits along on its encrusted perch, trying to avoid the camera.

Left page center: A cluster of orange-phase anemones (Metridium senile) gather nutrients from the passing currents.

Left page bottom: A tiny Scalyhead Sculpin peers out at the photographer from within its home - an old vacant barnacle shell.

Center photo: Strong tidal currents bring nutrients to millions of white plumose anemones as the water rushes through Dodds Narrows. KISS diver Kim Smith escapes the current by ducking between the large anemone-covered boulders that make up the bottom of the channel.

After an enjoyable dive, we head back to Nauticals Seafood for a quick lunch with Chris. It is a great opportunity to sit down with him and hear a bit more about his charter operation. Chris and B split their time between chartering in the Nanaimo area and in the northern area of Vancouver Island called Port Hardy. Diving in Nanaimo consists of day trips from the marina, and accommodations are the local hotels. In Port Hardy, your trip includes all meals and accommodations. This is a true dive destination, and having heard all about it from Chris over our hot meals, we have decided that we are ready for a trip up north! Anyone interested?

Our final dive of the day and for this trip is at Dodds Narrows. This is an exciting current dive with lots of colour, texture, and turbulence! Gordon, Curt, and I drop down in the narrows to the multi-coloured carpet of anemones in shades of red and purple, hundreds of white plumose anemones, encrusting sponges, purple star fish, ling cod, rock fish, and the list goes on. This is truly a photographer's paradise with an abundance of colour, texture, and incredible rock formations.

As always, our diving holiday came to an end. Two days here with just four dives isn't enough to appreciate what Nanaimo and the emerald sea have to offer. While I would have wished for a longer stay, it was still a pleasure to be here again, and to have the opportunity to share it with our friend from the south. If you plan a trip to this area, give yourself some time to experience the beauty above water as well as below. You will not be disappointed.

Getting here: BC Ferries run from both North Vancouver and Tsawwassen and take about 1.5 to 2 hours. For those who are flying in, Vancouver International Airport is a short drive to the ferry terminal. Seattle-Tacoma Airport is approximately a 2.5 hour drive to the Tsawwassen ferry terminal.

Contact Information:

Chris & Belinda (B) Miller: **www.bcspacificdreams.com**

Nanaimo: **www.tourismnanaimo.com**

BC Ferries: **http://www.bcferries.com/**

Photo Curt Bowen

Center photo: The vertical walls of snake island drop straight from 60 feet to over 700 feet in one step. Sun light shining through the emerald green water silhouettes the rebreather diver hovering close to the plumose anemone-covered walls at 145 feet.

Right page top: Displaying the "horns" that gave it the nickname "Devilfish", a Giant Pacific Octopus nestles upon a rocky reef, surrounded by other invertebrate life.

Right page center: An eel-like Crescent Gunnel peers from a tiny hole on one of the many walls.

Right page bottom: A tiny male Hermit Crab tries to "get lucky" with a female on a bed of bright crimson Strawberry Anemones.


Photo John Rawlings
Photo John Rawlings
Photo John Rawlings

Photo Jeff Toorish

IGLESIA
Hidden Passages Expose Mayan History

Text by Tracy Raz

For thousands of years the Maya Indians thrived throughout the Yucatan Peninsula, a platform of layered limestone over 200 miles wide that is located in eastern Central America. Due to the porous nature of limestone, this platform contains virtually no rivers or streams. All water movement occurs below ground through a labyrinth of underground cave systems. The only access to this water is where the rock has broken or eroded and exposed these natural wells. The Maya called these openings cenotes. Given the lengthy dry season, the cenote was considered a sacred opening into the underground because it supplied life-giving water; and they took advantage of these natural sources of water, and built their villages and cities—and especially their temples—around these life-giving cenotes.

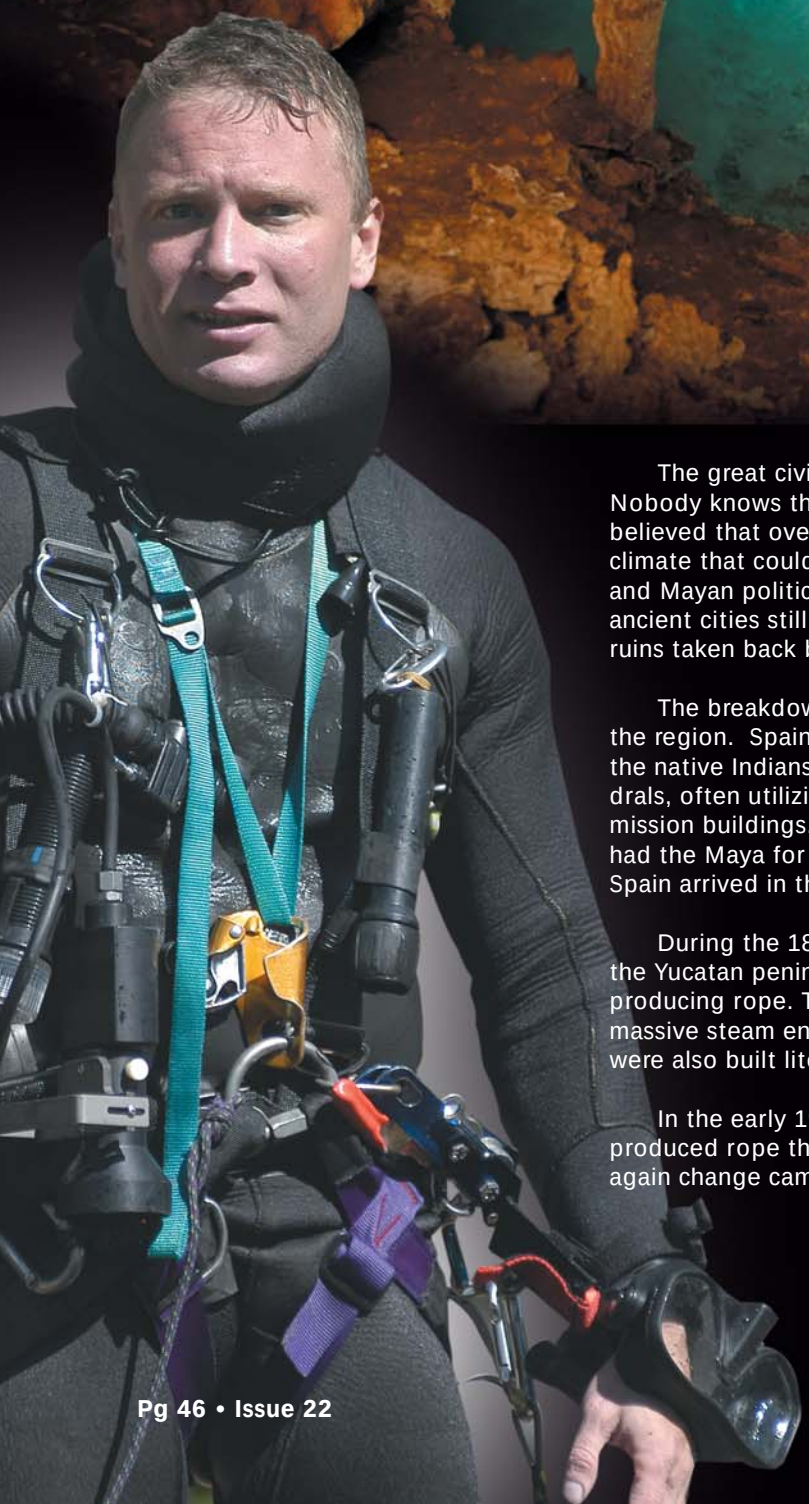
At the height of the Mayan civilization, more than two million people are believed to have lived and flourished throughout the lands of the Maya. The rulers held power as divine kings, ruling over permanent cities filled with art, monumental architecture, centers of commerce, and great temples. The Maya participated in human sacrifice and brutal games in which the loser (or, some would argue, the winner) would pay the ultimate price of death. During these religious events, the Maya offered special sacrifices into these cenotes in an effort to satisfy their gods. These offerings included religious artifacts, animals, and even human sacrifices.

Above: An evening lightning storm illuminates the Yucatan's horizon. Photo taken from the roof of the Homun church.

Left: An exploration diver ascends out of a newly discovered cenote.

Photo Jeff Toorish

Photo Rusty Farst



The great civilization of the Maya did not survive into the 10th century. Nobody knows the exact reason for the collapse of this culture, but it is believed that over-population, perhaps disease, a dramatic change in climate that could have led to drought and then famine, decline in trading, and Mayan political battles could have contributed to the downfall. Their ancient cities still remain in the Yucatan. They are forgotten now, the great ruins taken back by nature and covered with thick jungle growth.

The breakdown of this society continued until the Spanish conquered the region. Spain justified its presence in Mexico on the basis of converting the native Indians to Christianity. The Spaniards built large Catholic cathedrals, often utilizing the very stone taken from Mayan temples to erect their mission buildings. And all the while using the same cenotes for water as had the Maya for thousands of years before the priests and conquerors of Spain arrived in the Yucatan.

During the 18th century, large sisal plantations developed throughout the Yucatan peninsula. Sisal was the primary plant used at the time for producing rope. This process required large amounts of water to supply the massive steam engines and the hundreds of field workers. These haciendas were also built literally on top of the cenotes.

In the early 19th century, man developed synthetic materials that produced rope that was much cheaper and stronger than the old sisal. And again change came upon the Maya as the haciendas fell into ruin. Today, the

Above: Diver illuminates a possible virgin underwater passage

Left: Explorer Jon Bojar returns for another exploration dive into a new cenote

Photo Curt Bowen

thousands of years of Maya history can be seen scattered along the poverty stricken village streets. 150-year-old dilapidated sisal haciendas surround the 400-year-old Spanish church, whose foundation is built upon the ancient base of a 2000-year-old Mayan temple. Stand beside the church and throw a rock as far as you can in any direction, and someplace within this radius will be the ever-present cenote that has provided water for thousands of years.

While the surface of the Yucatan has gone through multiple changes in human culture, the Maya underground has remained practically untouched by human hands—with the exception of what has been lost, discarded, or sacrificed. Our team of explorers was guided into this unfamiliar territory by native Sherpas. We would be the first humans to ever enter the mysterious underground world inside those caves, so excitement was building.

Introduction of the modern day explorer

With the invention of scuba, and its evolution into modern underwater cave exploration, the once impassable environment of submerged passages beneath the Yucatan's surface has opened into an explorer's dream world of endless untouched cave systems. Many of these openings reveal the secrets of the Maya with artifacts, and the remains of both animals and humans from past cultures.

Curt Bowen, publisher of Advanced Diver Magazine, and his team of eager explorers have been visiting the Yucatan peninsula for many years. The team explores under permit from Mexico's Department of Ecology, and within strict regulations from INAH - (Instituto Nacional de Antropología e Historia). All cave systems explored are recorded, documented with GPS, photography, video, and illustrations. All significant archeological discoveries are left undisturbed, documented, and reported to the proper authorities.

The January 2006 Yucatan expedition returned the team of twelve explorers to the small village of Homun, located about 70 kilometers to the southeast of Merida, the Yucatan's capital city. In past expeditions, Bowen had gained permission to set up base camp in the village's 400-year-old Catholic church. The Homun Hilton, as Bowen calls it, provided the team with large rooms, electricity, showers, and ample hammock hooks for sleeping accommodations. The priest of the church and his smiling round-faced apprentice greeted the team each morning as they prepared their equipment for the day's activities.

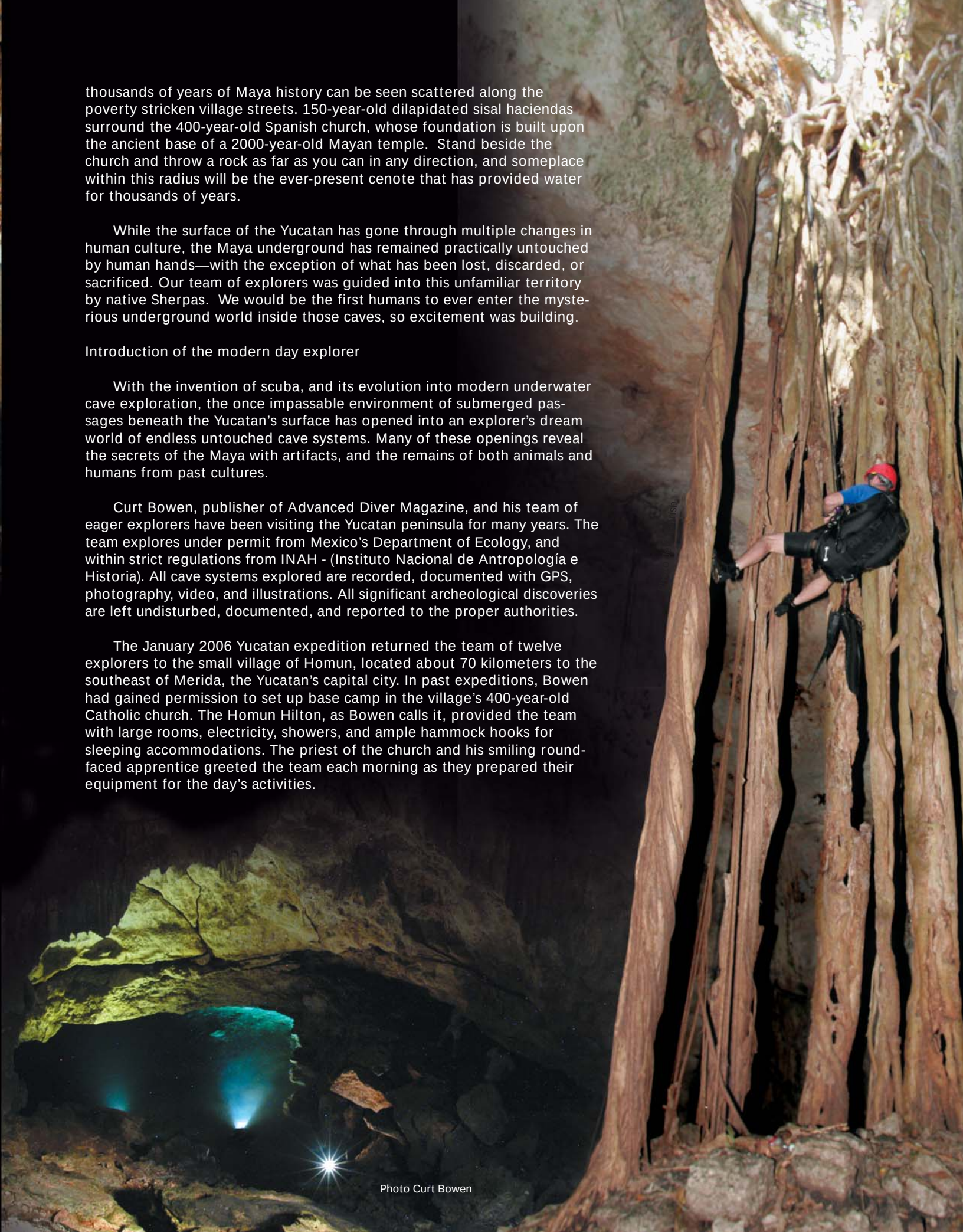


Photo Curt Bowen

Photo Jeff Toorish

Photo Jon Bojar

Photo Curt Bowen

Photo Thad Bedford

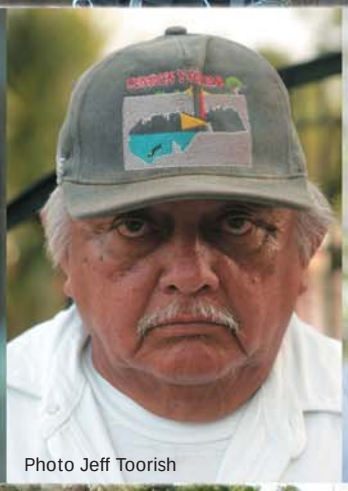


Photo Jeff Toorish

Photo Jeff Toorish

Photo Curt Bowen

Left Page:
Top photo: A weathered Mayan herds his cattle down the roadside.

Second photo down: Diver Rusty Farst prepares for a dive inside a farmer's well shaft.

Third row down (left to right):
A local policeman watches the foreign strangers descend into the village cenote.

Intrigued by something she has never seen, a young Mayan girl watches as an explorer prepares for a dive in the church cenote.

Elmer, the local well pump fix-it man, and our main guide, is our secret weapon for discovering new cenotes.

An unusually large Mayan joins our team as a Sherpa and helper.

Bottom left: Children gather around the church's well / cenote as an explorer returns with news of underwater caves the locals never knew existed

Above: A makeshift ladder was built from old railcar tracks providing the local children access into the cenote for swimming.

Below left: Explorer Tamara Thomsen returns from an exploration dive into a farmer's well.

Below: Rick Murcar prepares for another drop into a new cenote. He discovers an enormous water-filled pit with depths in excess of 240 feet.

Below right: James Kelderman returns to the surface after a quick recon dive into a small pit. He discovers a large underground air chamber and a small water pool.

Photo Curt Bowen

Photo Jon Bojar

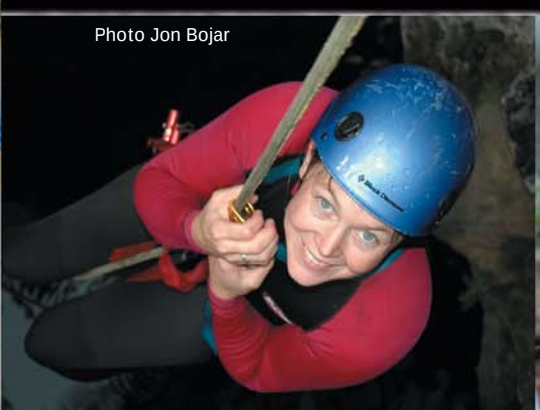


Photo Jeff Toorish

Photo Curt Bowen

Photo Jeff Toorish

Each day the twelve-member team split into two exploration groups: the film team and the digger team. The film team came initially to explore for new cenotes, then using the newest in HD video technology capture footage for an up-coming documentary about the team's discoveries, the lives of modern day Maya, and the role the cenote has played throughout time. The digger team consisted of a group of agile explorers; experts in both dry and wet caving, survey, and cave biology. These diggers scrambled quickly from cenote to cenote. Like a pack of happy monkeys in caving helmets, they crawled, climbed, and plunged into the dark underground in search of new passages and old mysteries.

The Yucatan's surface is not a friendly place. It contains many poisonous plants designed to inflict pain and horrible rashes, such as the chechen tree whose black dripping sap creates a nice blister rash, and the ever-eye-awakening pica-pica plant whose leaves deliver an exciting dispensation of pain.

The Yucatan also provided our team with a wide selection of biting and stinging insects. Small black wasps that build their nests just inside the cenote entrance are sure to deliver a red-welt welcome to those who venture too close to their nest. Swarms of freckle-sized ticks are eager to jump from plant to leg as you swish your way through the low underbrush. Ample spray bottles of white cattle dip and dog flea / tick soap help to control the inevitable

Photo Curt Bowen

Above: The crystal clear, cobalt blue water invites Jason Richards in for an exploration dive. He discovers a few hundred feet of low sidemount passage.

Left: Curt Bowen prepares for a rappel into a cave with the Armadillo sidemount harness.

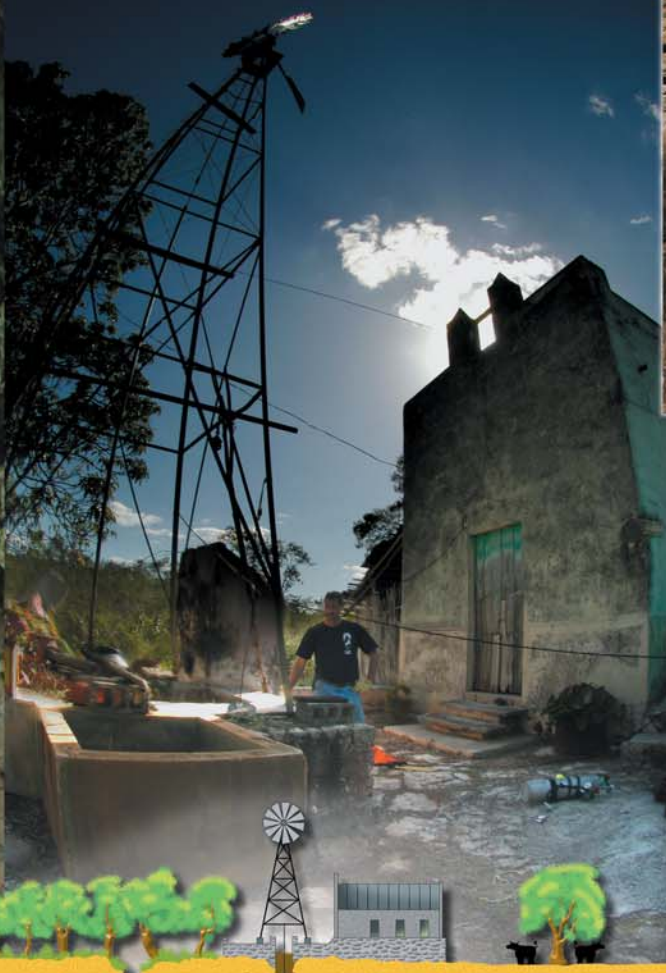


Photo Curt Bowen

Photo Jeff Toorish

Photo Jon Bojar

infestation of tick bites you will receive up your legs and under your underwear line. Worst of all are the Africanized killer bees that build their VW Bug-sized nests into the cenote walls. Each cenote must first be evaluated quietly so not to disturb these easily angered bees.

The water table in this area of the Yucatan is usually 45 to 70 feet below the surface. Access into many of these cenotes requires the use of climbing and specialized cave diving equipment. Standard back-mounted double cylinders normally used for cave exploration could no longer be used due to the weight, and difficulty in hauling them on a long trek through the jungle and through dry cave passages. A new system called the Armadillo harness was designed on past expeditions just for this type of exploration. This system provides the exploration diver with a stable harness in which he/she can easily climb, rappel, and squeeze through tight cave passages, then simply attach side-mounted cylinders once in the water.

Above left: James Kelderman waits for the return of explorer Rick Murcar from a rancher's windmill well. Below the photograph is an illustration of what Rick discovered.

Above middle: Tracy Raz gets covered in bat poop as she explores some dry cave passages.

Above right: Chrissy Richardson climbs out of a farmer's tight well shaft

Bottom left: Professor Thomas Iliffe returns from a cave biology collection dive with a possible new species of life.

Bottom right: Capturing the action as it happens in real life, Thad Bedford, the expeditions HD videographer, sets up for another shoot inside a newly discovered cenote.

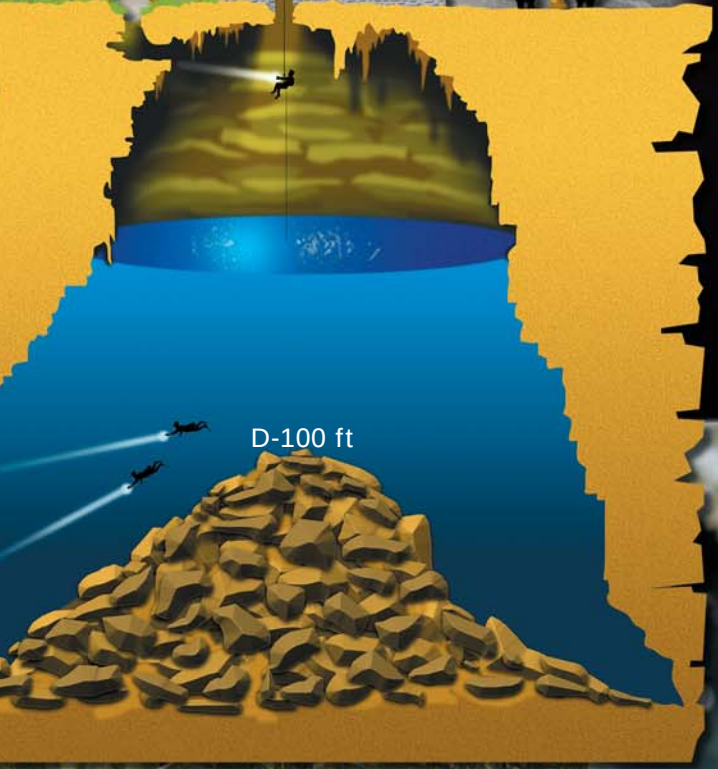


Photo Jeff Toorish

Photo Curt Bowen

Photo Rusty Farst

Photo Jon Bojar

During the twelve-day expedition, the team covered over 200 kilometers of roads, trails, and jungle brush. They were able to document and explore over 60 new uncharted cenotes. The film team managed to capture 12 hours of film footage for the upcoming documentary, and shoot 4000 still photographs. The biology teams captured and preserved dozens of possible new cave specimens.

While many of the cenotes explored turned out to be small cave pools with no extending passages, many require additional exploration due to their size, passage, and extreme depths. Several of the cenotes discovered yielded archeological discoveries from pottery to animal and human remains.

For an extended story with hundreds of additional photographs, illustrations, and cenote data sheets visit **www.advanceddivermagazine.com**

Above left: Curt Bowen captures a beautiful jungle cenote with his 10.5 mm Nikon.

Above right: Explorer Chrissy Richardson prepares for a recon dive. She discovers a massive underwater passage that comes to an abrupt end at 145 feet.

Bottom left: Ethan Brodsky and Professor Thomas Iliffe pose beside a massive root system of the Banyan tree.

Yucatan 2006 Team Members
Back row (left to right)
Rusty Farst • Curt Bowen • Rick Murcar • Jon Bojar
Front row (left to right)
Jeff Toorish • Enrique Soberanes • Prof. Thomas Iliffe • Thad Bedford
Tracy Raz • James Kelderman • Tamara Thomsen • Ethan Brodsky
Not Shown: Chrissy and Jason Richards
Special Thanks: Roberto Hashimoto, Elmer, Leonor, Ana, & Lady,

Photo Jeff Toorish

Photo Curt Bowen

DIVING OC LIKE A CCR

by
Bruce R. Wienke
LANL C & C Dive Team Leader
Los Alamos, New Mexico
and
Timothy R. O'Leary
NAUI Technical Operations
South Padre Island, Texas

Rebreathers, as we know, hold oxygen partial pressures, ppO_2, or oxygen fractions, fO_2, constant in the breathing mix. Open circuit regulators operate at constant breathing mix fractions of oxygen, helium, and nitrogen, that is, fO_2, fHe, and fN_2. Rebreathers have decompression advantages over open circuit devices because oxygen fractions or partial pressures can be held at higher levels, while forcing inert gas levels of nitrogen and helium lower. Not withstanding oxtox concerns at higher oxygen partial pressures, divers on rebreather systems can optimize dive time by minimizing decompression requirements. This is certainly well known in the tech, scientific, military, and commercial sectors.

Open circuit divers also optimize their dive time, while minimizing decompression requirements, by making gas switches at various depths. Obviously, gas switching can be dialed to hold gas fractions constant on ascent; or, we should say, relatively constant on ascent, with constancy increasing with the number of switches. The limit to the number of switches is logistic, of course, depending on depth, time, and the capacity of divers to carry switch gases, and/or tie switch gases off on an ascent line. The former limitation more likely confronts technical divers operating without support teams able to string decompression tank lines. The latter limitation is likely one of cylinder availability. Or bodies. Not discounting logistics problems, it might be interesting to compare rigging open circuit diving to mimic rebreather diving, particularly as far decompression debt versus gas switching at relatively constant ppO_2.

Comparative Dive Profiles

Let's compare a test dive to 250 fsw for 15 min, using a CCR with set point of ppO_2 = 1.2 atm, and a set of doubles (triples) filled with 14/56 trimix. The diluent is also taken to be 14/56 trimix. At 250 fsw, ppO_2 = 1.2 atm, and ppN_2 = 85 fsw = 2.6 atm for both open circuit and rebreather divers. With that said, we first compare raw RGBM decompression profiles for the exposure; that is, no gas switches on open circuit. This gives the rebreather baseline, too. Descent and ascent rates are 90 fsw/min and 30 fsw/min, respectively. Both central nervous system and full body oxtox are not concerns here, just minimization of decompression time. The comparative decompression schedules are given in Table 1. These are nominal RGBM profiles, consistent with released RGBM Tables and commercially licensed software.

Table 1 15 min @ 250 fsw Trimix 14% O2 / 56% He

Rebreather (CCR) And Open Circuit (OC) (no switches) Profiles

Rebreather depth (fsw)	Rebreather stop (min)	Rebreather ppO2 (atm)	Open Circuit stop (min)	Open Circuit ppO2 (atm)
250	15.0	1.2	15.0	1.2
160	0.0	1.2	0.5	0.9
150	0.0	1.2	1.0	0.8
140	0.5	1.2	1.0	0.8
130	0.5	1.2	1.0	0.7
120	0.5	1.2	1.5	0.6
110	0.5	1.2	1.5	0.6
100	1.0	1.2	2.5	0.6
90	1.0	1.2	3.0	0.6
80	1.5	1.2	3.5	0.5
70	1.5	1.2	3.5	0.4
60	2.0	1.2	6.5	0.4
50	2.0	1.2	8.0	0.4
40	3.5	1.2	8.5	0.3
30	3.5	1.2	15.5	0.3
20	4.0	1.2	19.5	0.2
10	7.5	1.2	33.0	0.2
	55.6 TDT		136.1 TDT	
	OTU = 58.8 (min)		OTU = 23.4 (min)	
	CNS = 22%		CNS = 9%	

Next, let's make a switch on open circuit at 125 fsw, the midpoint of the dive, to 25/45 trimix. Here ppO_2 = 1.2 atm, as required, while ppN_2 = 47.5 fsw = 1.44 atm. Table 2 tabulates the rebreather and open circuit decompression schedules for quick comparison. The single switch on open circuit reduces decompression time by roughly 35% compared to the previous schedule.

Table 2 15 min @ 250 fsw Trimix 14% O2 / 56% He OC Switch @ 125 fsw to Trimix 25% O2 / 45% He

Rebreather (CCR) And Open Circuit (OC) (One Switch) Profiles

Rebreather depth (fsw)	Rebreather stop (min)	Rebreather ppO2 (atm)	Open Circuit stop (min)	Open Circuit ppO2 (atm)	
250	15.0	1.2	15.0	1.2	
160	0.0	1.2	0.5	0.9	
150	0.0	1.2	1.0	0.8	
140	0.5	1.2	1.0	0.8	
130	0.5	1.2	1.0	0.7	
120	0.5	1.2	1.0	1.2	
110	0.5	1.2	1.0	1.1	
100	1.0	1.2	2.0	1.0	
90	1.0	1.2	2.0	0.9	
80	1.5	1.2	2.0	0.9	
70	1.5	1.2	2.5	0.8	
60	2.0	1.2	3.5	0.7	
50	2.0	1.2	5.5	0.6	
40	3.5	1.2	6.5	0.6	
30	3.5	1.2	7.0	0.5	
20	4.0	1.2	15.5	0.4	OC Switch to Tx 25/45
10	7.5	1.2	20.5	0.3	
	55.6 TDT		98.6 TDT		
	OTU = 58.8 (min)		OTU = 36.4 (min)		
	CNS = 22%		CNS = 13%		

Photo Curt Bowen

Finally, let's make gas switches on open circuit at 200, 150, 100, and 50 fsw to 17/53, 22/48, 30/40, and 48/22 trimix, respectively. Note that the nitrogen fraction stays constant, fN_2 = 0.30, as we increase oxygen and decrease helium, keeping ppO_2 = 1.2 atm. We come back to this point at the end of the comparison. Table 3 now clocks rebreather and open circuit decompression schedules with the four gas switches indicated. Further reduction in decompression time on open circuit is clearly evident. Decompression time has been cut in half, only 20 minutes longer than the rebreather decompression time.

Table 3 15 min @ 250 fsw Trimix 14% O2 / 56% He
OC Switch @ 200 fsw to Trimix 17% O2 / 43% He
OC Switch @ 150 fsw to Trimix 22% O2 / 48% He
OC Switch @ 100 fsw to Trimix 30% O2 / 40% He
OC Switch @ 50 fsw to Trimix 48% O2 / 22% He

Rebreather (CCR) And Open Circuit (OC) (Four Switches) Profile

Rebreather			Open Circuit	
depth (fsw)	stop (min)	ppO2 (atm)	stop (min)	ppO2 (atm)
250	15.0	1.2	15.0	1.2
160	0.0	1.2	0.5	0.9
150	0.0	1.2	0.5	1.2
140	0.5	1.2	0.5	1.2
130	0.5	1.2	1.0	1.1
120	0.5	1.2	1.0	1.0
110	0.5	1.2	1.0	1.0
100	1.0	1.2	1.5	1.2
90	1.0	1.2	1.5	1.1
80	1.5	1.2	2.0	1.0
70	1.5	1.2	2.0	0.9
60	2.0	1.2	2.5	0.8
50	2.0	1.2	3.5	1.2
40	3.5	1.2	4.0	1.1
30	3.5	1.2	4.5	0.9
20	4.0	1.2	8.5	0.8
10	7.5	1.2	12.5	0.6
55.6 TDT OTU = 58.8 (min) CNS = 22%			73.1 TDT OTU = 56.1 (min) CNS = 19%	

Apart from purposes of illustration, holding the nitrogen fraction to 0.30 also eliminates ICD problems on all open circuit switches. More complex rules take a generic form, as discussed in previous articles, and can be summarized in broad hierarchical fashion. Holding fN_2 to 0.30 induces a range for ppN_2 of 85 fsw at the bottom to 20 fsw in the shallow zone. But what's more important, there are no large (ingassing) countercurrents of nitrogen on top of outgassing helium, possibly leading to super saturation and isobaric counter diffusion (ICD) problems and bubbles. The simple cases described above are consistent with a zeroth order rule for ICD problem amelioration.

Mixed Gas Rules Of Thumb

The consideration of both oxygen toxicity and decompression sickness in mixed gas diving play off against the need for fast and efficient decompression for arbitrary exposures. Detailed analyses of all mixed gas diving variables, mix switches, highest oxygen fractions, and couplings require desktop computing power at the least—plus experience. From field experience in the technical and commercial diving sectors, a few broad rules of thumb have emerged over recent times. And some tests have been performed in the chamber and underwater.

1. Zeroth Order Rule – No N_2 Switches

Early work by Lambertsen suggested that the best rule for safety, especially in the saturation realm, was no switches off helium to nitrogen. Therefore, both the partial pressure of nitrogen, ppN_2, and nitrogen gradient, £G ppN_2, produce zero ingassing. This fail-safe rule pervades much of commercial, military, and scientific diving. For very deep and saturation diving, violation of this rule often resulted in helium inner ear DCS. The same can be said for heliox and trimix divers violating the following prescriptions. Additionally, as depths increase beyond the 400 fsw range, problems with helium to nitrogen switches compound at alarming rates of DCS, as reported in many quarters.

2. First Order Rule – No N_2 Switches Below 100 fsw

Backing off the limit point of no N_2 switches, world navies had terrible experiences on deep air and nitrox switches off heliox, as did the technical diving community. So a modified rule is no N_2 switches off heliox and trimix below 100 fsw.

3. Second Order Rule – No N_2 Switches Below 70 fsw, and END Less Than 50 fsw

Over the past 15 years or so, with extensive diving in the 200 fsw depth range, a modified rule has emerged, coming from all quarters of the technical diving community worldwide. Switching to EAN50 at 70 fsw, keeping the ingassing gradients for N_2 as small as possible off bottom mixed rich in helium for switches, and maintaining END in the 50 fsw range, has become popular for trimix diving. For deeper dives, HPNS needs to be factored into the bottom trimix.

Actually, in the above scenarios with switches to nitrogen based mixes, recent protocols use a helium based switch mix in the same proportion as the nitrogen based mix. For instance, in the Second Order Rule, EAH50 (helitrox) is efficiently substituted for EAN50 with rather minimal increases in overall decompression hang time from the 70 fsw level up to the shallow zone with a switch to pure O_2. A switch to pure O_2 in the shallow zone is standard these days for mixed gas decompression diving.

After plowing through all of the above, do you get the impression that diving rebreathers is perhaps best overall from a vantage of efficiency and dive time management? Maybe so….


Salvo
4.5 Amp
21 Watt HID
NIMD
300 Min Burn
4.8 Amp
21 Watt HID
Li-Ion
180 Min Burn
7.2 Amp
21 Watt HID
Li-Ion
270 Min Burn
9.6 Amp
24 Watt HID
Double Video
Li-Ion
150 Min Burn
Superior HID Lighting
& Accessories
for the
Technical Diver
www.salvodiving.com
705 NW Santa Fe Blvd. High Springs, FL 32643 sales@salvodiving.com Phone: 386-454-1440

Schooner Daniel Lyons
Lake Michigan

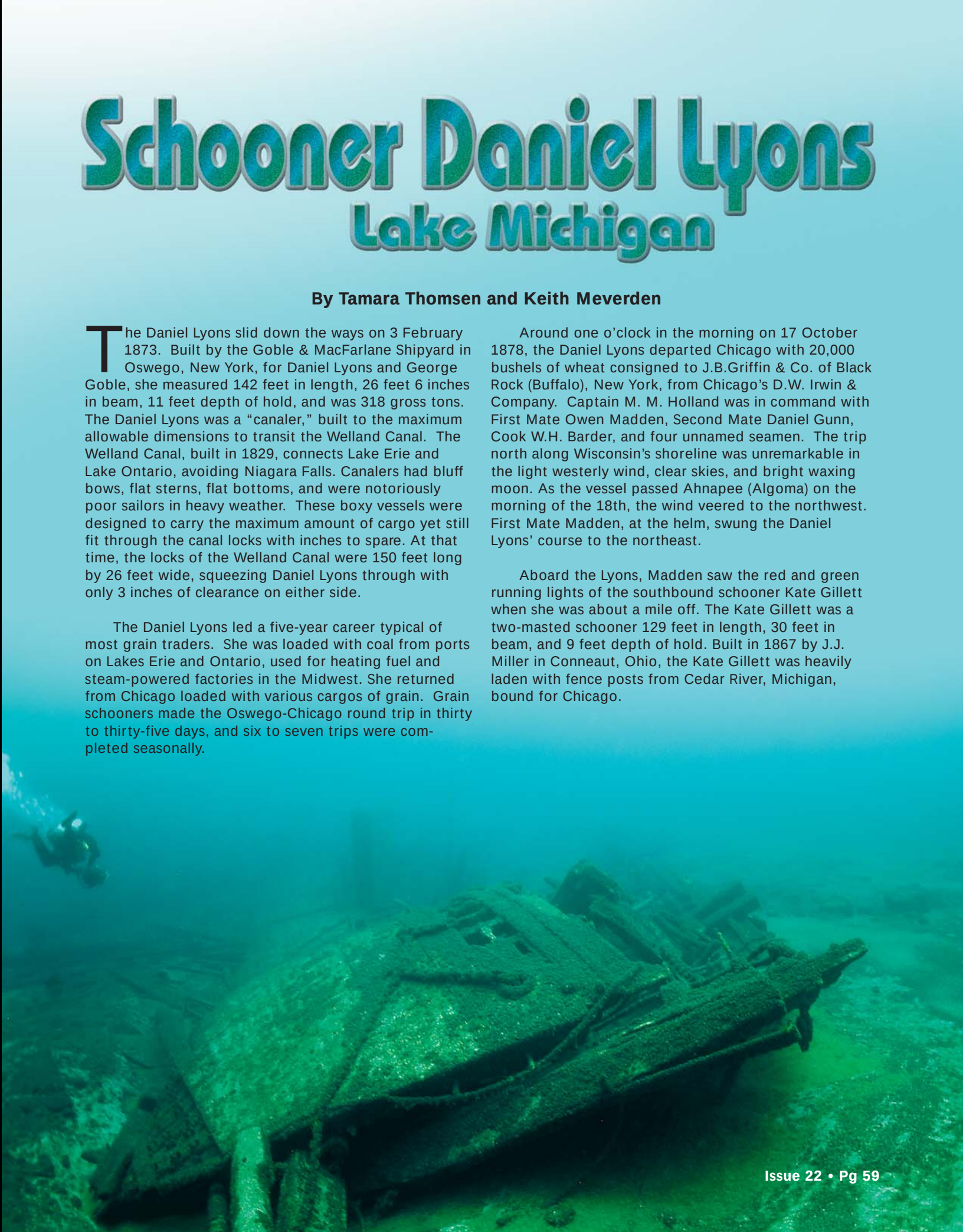
By Tamara Thomsen and Keith Meverden

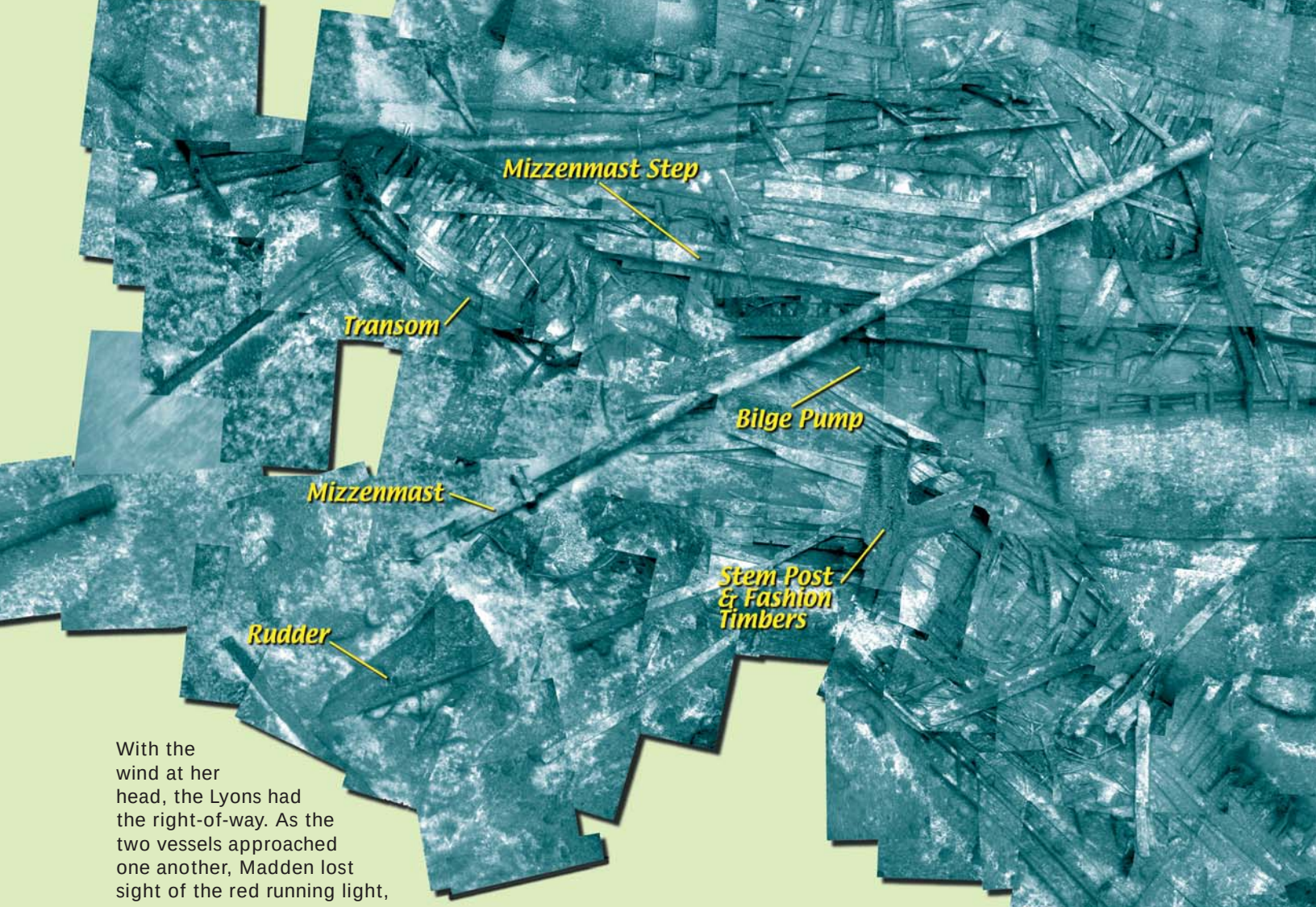
The Daniel Lyons slid down the ways on 3 February 1873. Built by the Goble & MacFarlane Shipyard in Oswego, New York, for Daniel Lyons and George Goble, she measured 142 feet in length, 26 feet 6 inches in beam, 11 feet depth of hold, and was 318 gross tons. The Daniel Lyons was a "canaler," built to the maximum allowable dimensions to transit the Welland Canal. The Welland Canal, built in 1829, connects Lake Erie and Lake Ontario, avoiding Niagara Falls. Canalers had bluff bows, flat sterns, flat bottoms, and were notoriously poor sailors in heavy weather. These boxy vessels were designed to carry the maximum amount of cargo yet still fit through the canal locks with inches to spare. At that time, the locks of the Welland Canal were 150 feet long by 26 feet wide, squeezing Daniel Lyons through with only 3 inches of clearance on either side.

The Daniel Lyons led a five-year career typical of most grain traders. She was loaded with coal from ports on Lakes Erie and Ontario, used for heating fuel and steam-powered factories in the Midwest. She returned from Chicago loaded with various cargos of grain. Grain schooners made the Oswego-Chicago round trip in thirty to thirty-five days, and six to seven trips were completed seasonally.

Around one o'clock in the morning on 17 October 1878, the Daniel Lyons departed Chicago with 20,000 bushels of wheat consigned to J.B.Griffin & Co. of Black Rock (Buffalo), New York, from Chicago's D.W. Irwin & Company. Captain M. M. Holland was in command with First Mate Owen Madden, Second Mate Daniel Gunn, Cook W.H. Barder, and four unnamed seamen. The trip north along Wisconsin's shoreline was unremarkable in the light westerly wind, clear skies, and bright waxing moon. As the vessel passed Ahnapee (Algoma) on the morning of the 18th, the wind veered to the northwest. First Mate Madden, at the helm, swung the Daniel Lyons' course to the northeast.

Aboard the Lyons, Madden saw the red and green running lights of the southbound schooner Kate Gillett when she was about a mile off. The Kate Gillett was a two-masted schooner 129 feet in length, 30 feet in beam, and 9 feet depth of hold. Built in 1867 by J.J. Miller in Conneaut, Ohio, the Kate Gillett was heavily laden with fence posts from Cedar River, Michigan, bound for Chicago.



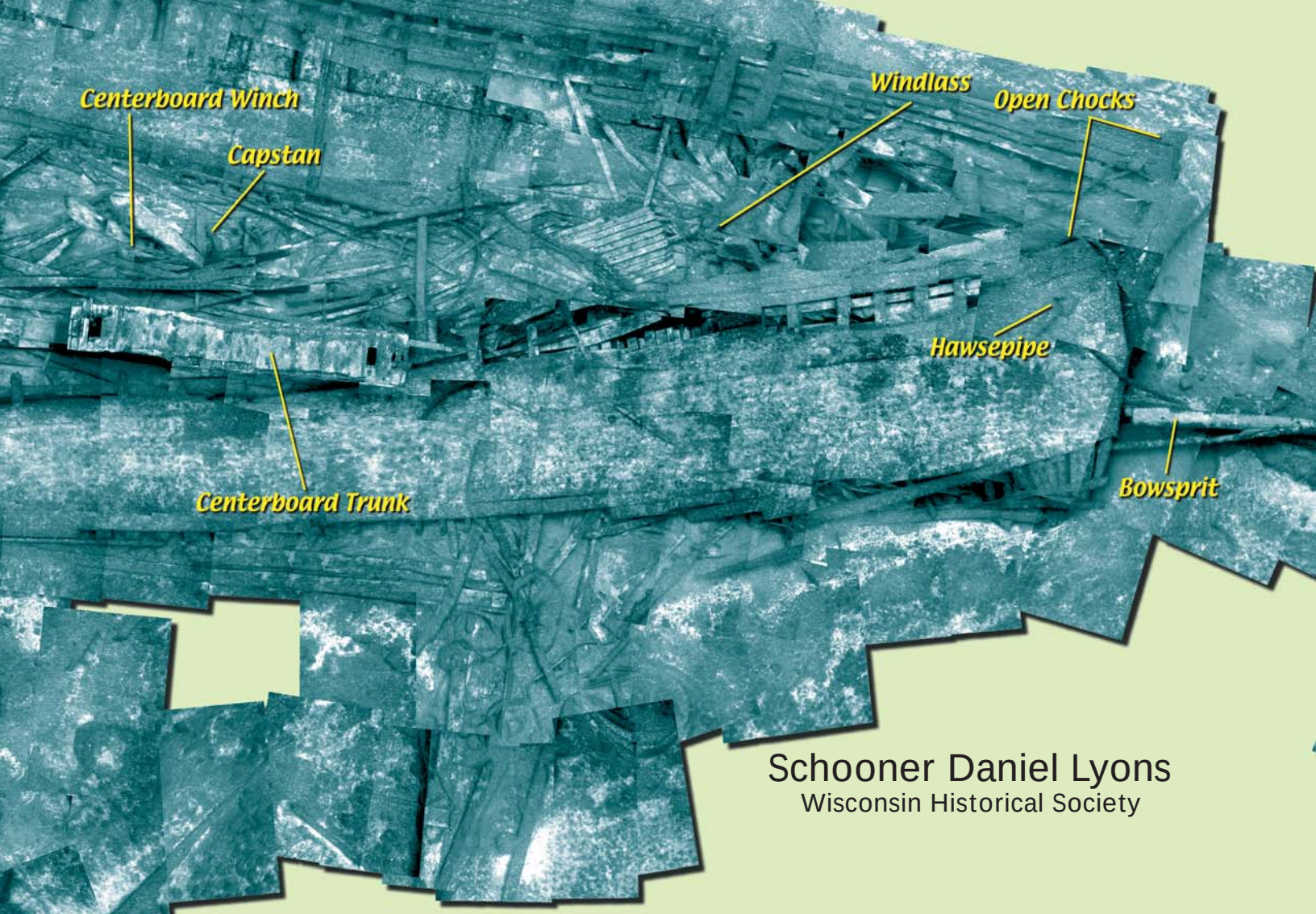


With the wind at her head, the Lyons had the right-of-way. As the two vessels approached one another, Madden lost sight of the red running light, indicating the Kate Gillett altered her course to port so the two vessels would pass starboard to starboard. Minutes later, however, only the Gillett's red light was visible and a collision was imminent. Madden swung the helm, but the Kate Gillett struck the Lyons' starboard side at nine knots, lodged between the main- and mizzenmast, and pushed her stem nearly halfway through the Lyons' hull. The collision's force threw the cook from his bunk. The Kate Gillett's jib boom had pierced the Daniel Lyons' mainsail, and lay broken on the Lyons' deck along with much of the Kate Gillett's head gear; her starboard bow also suffered damage and began leaking.

There was no question the Daniel Lyons was mortally wounded. The Gillett's Captain Jerry McCarthy worked to keep the Kate Gillett's bow deep in the Lyons to keep her from flooding until her crew could escape onto the Gillett. The two vessels remained locked for 15 minutes, and Captain Holland was able to save some of his clothes and ship's books, and the crew saved a portion of their belongings. Separating about four o'clock in the morning, the Daniel Lyons quickly settled at the stern, rolled onto her port side, and sank.

The schooner Skylark encountered the Lyons' wreckage the following day while en route to Racine, Wisconsin. Eight miles north of Ahnapee and about five miles from shore, the Skylark's Captain Councer reported that the Daniel Lyons' white painted topmasts were protruding from the water, still topped with gilt balls and flying her new red and blue pennant. Her cross trees were submerged, and the foremast had been carried away. Dispatches went out announcing the hazard to navigation.

The Kate Gillett continued toward Chicago. Leaking badly at the bow, both the Gillett's and the Lyons' crew worked continuously at the pumps, and made Chicago at five o'clock in the afternoon on 19 October. At Chicago, Captain McCarthy refused to accept responsibility for the accident, and blamed Madden's actions in causing the collision. Captain McCarthy stated that upon seeing the Daniel Lyons' lights, the Gillett changed course one point to the west, or 11 degrees of the compass. In turn, Madden adjusted the Lyons' course and lost the wind, preventing the Gillett from safely crossing the Lyons' bow. McCarthy then maneuvered to clear the Lyons' stern, but was too late. The Gillett was legally required to keep clear of the Lyons. If the Gillett had altered her course to port rather than starboard, a clear starboard-to-starboard passage would have occurred.



Schooner Daniel Lyons

Wisconsin Historical Society

The Kate Gillett was eleven years old at the time of the collision. An aging vessel, she carried no insurance. A suit taken out against the Gillett by the Lyons could only recover the Gillett herself, whose value was one-seventh value of the Daniel Lyons and her cargo. The Daniel Lyons' cargo was insured by the Chicago Marine Insurance Pool for $10,500. Her hull was valued at $15,300, and insured by both the Orient Mutual Insurance Company, and Detroit Fire and Marine Company for $4000 each. It is uncertain whether a lawsuit was ever filed against the Gillett.

The Daniel Lyons was soon forgotten, and her remains lay undisturbed for 107 years until 1985, when diver Kent Bellrichard relocated the Daniel Lyons from local fishermen's tips. Andy LaFond, an Algoma commercial fisherman, assisted the divers in recovering the Daniel Lyons' two wooden stock anchors and assorted rigging. These anchors were placed outside LaFond's Algoma fish house.

The Daniel Lyons lies in 110 feet of water, mostly broken up, but nearly all hull structure and rigging is present and easily examined. Bottom temperatures range from 40-42∞ Fahrenheit, with visibility varying from 40 to 100 feet.

Despite having a collapsed hull, the Daniel Lyons site represents a nearly complete Great Lakes schooner. The collapsed hull exposes many construction details not visible on more intact vessels. Both hull sides have collapsed to port, and the stern area is scattered off the starboard quarter. The centerboard trunk remains intact and standing, complete with centerboard chain that runs from the centerboard inside the trunk to the centerboard winch that lies off the trunk's port side. Both stem and sternposts are intact with deadwood. Much of the running rigging is present, including masts, topmasts, gaffs, booms, and wire rope – all strewn about the wreck site.

The Daniel Lyons' bow is the site's most visually impressive feature. Before toppling to port, the bowsprit and jib boom dislodged from their location atop the stempost and split the bow in two along the stempost's starboard side, coming to rest atop the keelson. The bowsprit lies beneath the jib boom, and extends from the starboard side hull to the jib boom's fastening ring. The bowsprit continues beneath the starboard side hull, which lays somewhat flattened over the stempost, bowsprit, and windlass. A tangle of wire rigging lies around the bowsprit, as well as a sail gaff complete with jaws that lies immediately to starboard of the jib boom.

The canaler's bluff bow is readily apparent. The stempost is rabbeted for the outer hull planking, and its leading edge is protected with a stem iron that is beginning to separate at the stempost's upper end. The stem iron has a 90-degree bend at the top that hooks onto, and partially covers, the stempost's uppermost surface. Starboard bow planking is intact with the exception of the bow's foot, where six starboard cant frames are visible where the outer hull planking is absent. The starboard anchor chain runs through the hawse pipe, and lays in a small loop on the starboard hull before ending in the sand. An iron open chock is fastened atop the railcap. The starboard side lies ceiling down and is mostly intact from the bow to where there is a nearly clean break from the collision with the Kate Gillett. Three foremast chainplates with deadeyes remain on the starboard side. The mainmast had four chainplates, two of which remain.

Immediately aft of the starboard side's collision damage is the aft section of the keel, complete with deadwood, cant frames, outer hull planking, and fashion timber. The Daniel Lyons struck the bottom stern first, breaking her keel aft of the mizzenmast step. The present location is likely the result of fishing nets dragging the large structure along the bottom. The fashion timber, which supported the transom, rises ten feet above the lakebed.

Immediately outboard of the sternpost is the starboard quarter, lying ceiling up on the bottom. This section spans from the collision damage to the transom. A pin rack with belaying pins remains on the starboard quarter, as well as a pin rack fragment that lies on the lakebed between the starboard quarter section and the forward starboard hull section.

The intact transom lies abaft of the keel. The outermost ends of the transom retain the vertical ends of the fashion timber that followed the transom's perimeter to the rail cap. The single-sheave mizzen sheet block is still attached at the transom's center.

The port side hull has collapsed outward. The port side is largely intact from the transom to the bow. At the vessel's bow, sandwiched between the port and starboard sides, are the remains of the forecastle deck, sampson post, windlass, and chain locker. The starboard side is supported off the bottom, allowing access to the forward keelson and foremast and sampson post steps.

The sampson post has fallen to the port side and towards the stern, and the windlass now rests atop the forecastle companionway. The windlass is covered with anchor chain, sampson post, and other hull structures and debris. The crosshead remains attached to the forward side of the sampson post, complete with the two purchase rods connecting the

crosshead to the purchase rims' ratcheting mechanism. To weigh anchors, two hand levers were inserted in either side of the crosshead. Crewmen would then work the hand levers up and down, which would ratchet the purchase rims and revolve the windlass. The windlass' pawl locked the windlass, and kept it from reversing between purchases. The anchor chain whelps retain four turns of the anchor chain. The windlass was supported by two carrick bitts braced by a standard knee. A fragment of the windlass strongback that joined the sampson post to the carrick bitts remains attached to the aft side of the sampson post.

The centerboard trunk remains upright and is the site's most dominant feature. The trunk is mounted atop the keelson on the vessel's centerline. A carling remains that supported the centerboard winch, and has a hole through its center through which runs the centerboard's chain. Through this hole, the centerboard is visible in a retracted position. The centerboard chain is attached to the centerboard, and runs down the trunk's port side, still attached to the centerboard winch. The winch is heavily encrusted with zebra mussels, and nearly indistinguishable except for the presence of the centerboard chain. The Daniel Lyons was sailing to windward at the time of the collision, and the centerboard trunk would have been at least partially deployed. The impact with the bottom drove the centerboard into its retracted position. The centerboard's pivot pin remains in place.

Immediately forward of the centerboard winch lies an inverted capstan with an attached deck beam and capstan partners. The capstan is heavily encrusted with zebra mussels that obscure many fine details. The capstan data plate, with patent dates, was removed in 1985 by divers.

The stern's double-acting bilge pump lies off the keelson's starboard side slightly aft of the pump shaft holes. The cast iron pump has a square base, and its mounting flange lies beneath the mizzenmast a short distance away.

The intact mainmast lies off the starboard quarter. A fragment of the boom stop remains attached, and the triangular hounds still support a trestle tree. The intact mizzenmast lies across the keelson between the mainmast and mizzenmast steps. The wooden boom stop ring is intact, and although no hounds are visible at the base of the masthead, the trestle tree remains attached.

The rudder lies off the wreck site's starboard quarter. The rudder's base is covered by an iron strap that wraps around and covers the rudders aft edge. The rudder lies amidst a tangle of wire rigging that lies on the lakebed of the wreck's starboard quarter. The rudderpost was snapped by the impact with the bottom.

The Daniel Lyons is best visited by launching from the City of Algoma's Municipal Ramp. The site is marked seasonally by an official state shipwreck buoy placed by the Wisconsin Historical Society. GPS: N 44° 40.241' W 087° 17.712'

Tamara Thomsen manages the U.S. office for Delta P Technology, Ltd., makers of the VR2/VR3 Dive Computers (**www.vr3.co.uk**), and owns Diversions Scuba in Madison, WI. **www.diversions-scuba.com**

Keith Meverden works as an underwater archaeologist with the Wisconsin Historical Society, and owns Points North Diving, a dive charter operation on the Great Lakes.

www.diversions-scuba.com/pointsnorth

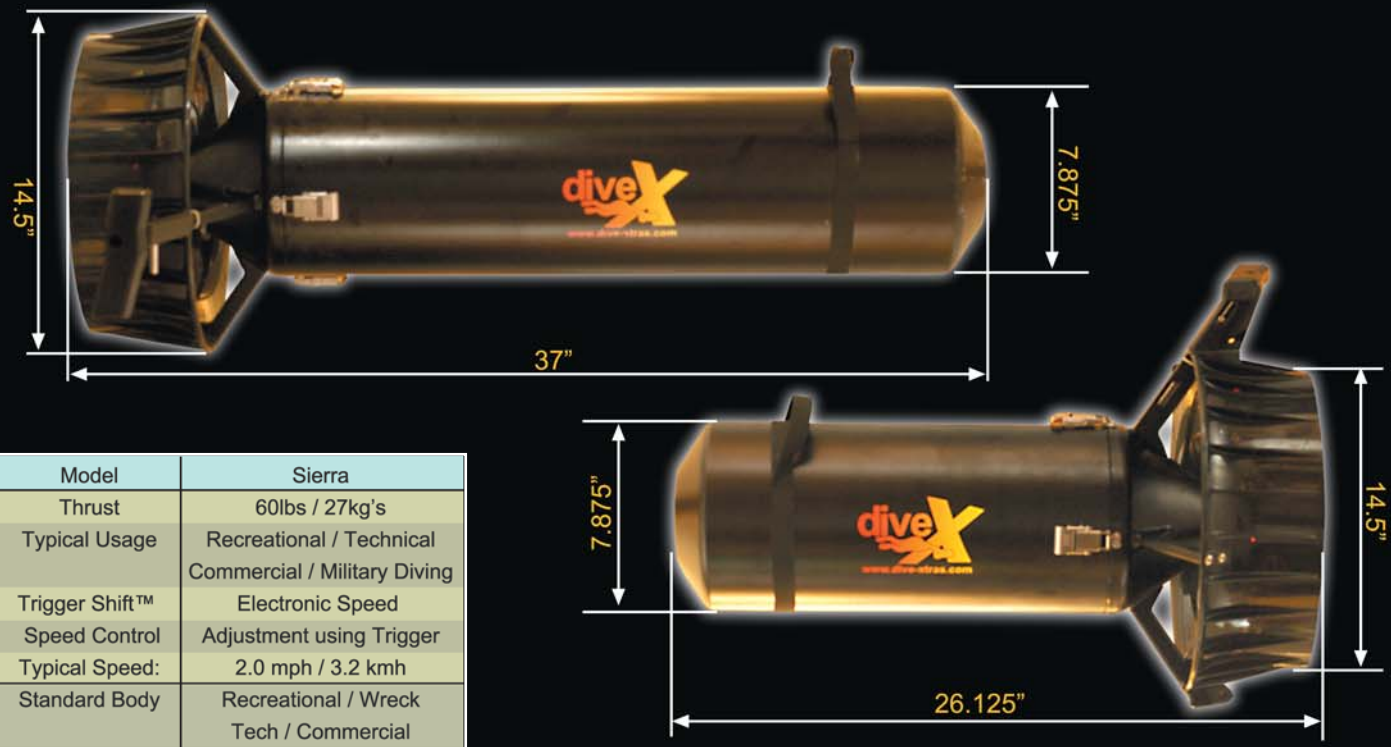
X-SCOOTER
by Dive Xtras Inc.

The development of the X-Scooter began in 2003 when the designer, Ben McGeever, was diving frequently on the deeper wrecks in the Seattle Washington area. Ben, an aerospace engineer by trade, wanted to build two (2) tow behind style scooters for himself and wife, Deb Frisco.,

Researching and diving the "other " scooter designs available on the market, and using his engineering knowledge from many years of designing aircraft automation and subsea oil and gas equipment, he was convinced that he could improve on these older scooter technologies and design a scooter that would meet the following improved criteria:

1. Reduce the overall weight of the scooter by using newer batteries technologies and using a smaller more efficient motor. This would make is it possible to design a balanced scooter that was significantly lighter and yet still capable of the thrusts and burn times needed to pull technical divers using large loads of equipment.

2. Reduce the number of overall penetrations (leak points) and thereby reduce the risk of flooding. He felt that a scooter did not need the four (4) external O-rings found on most other models.



Model	Sierra
Thrust	60lbs / 27kg’s
Typical Usage	Recreational / Technical Commercial / Military Diving
Trigger Shift™	Electronic Speed
Speed Control	Adjustment using Trigger
Typical Speed:	2.0 mph / 3.2 kmh
Standard Body	Recreational / Wreck Tech / Commercial
Weight	35lbs / 16kgs
Battery	One (1)
Length	26” / 66cm
Burntimes*	NiMH: 45 min Li-Ion: 90 min
Long Body	Cave / Overhead Long range
Weight	55lbs / 25kgs
Batteries	Two (2)
Length	37” / 94cm
Burntimes*	NiMH: 90 min Li-Ion: 180 min

* Burn times are based on Max Pitch and Max drag.

Below Background: Jakub Rehacek drives the X-Scooter into Devils Eye cave.

Below Foreground: Curt Bowen carries the standard body X-Scooter to the dive site.

Above Right: Cave explorer Brett Hemphill takes the X-Scooter for a test run into the high flow tunnels of Devils eye.

3. Use a brushless motor, giving more reliability, efficiency and less weight than traditional brushed motors. Brushless motors have a 10 000 hour life vs. a brushed motor of only 500 hour life. They also have no brush board and the associated moving parts, reducing servicing and more importantly minimizing damage if flooded. Brushless motor can simply be rinsed with fresh water and put back into service.

4. A direct trigger mechanism that wouldn’t rely on pulleys and wires for operation, reducing the amount of possible failure points. A much more simple design of a direct trigger action with magnetic switching.

Shortly after two (2) proto types were completed Ben contacted his technical dive instructor and current business partner, Andrew Georgitsis to continue to improve on the scooter design. Andrew, who has being technical diving since the early 90’s and was part of the Britannic ’99 expedition had extensive deep diving experience while utilizing the older types of scooter designs. His insights and experience could be very useful in continuing to drive the development of scooter technology to the next level. It was during these following months of discussions and meeting that Dive Xtras as a company was formed, and their goal defined. The company mission was to develop new diving equipment by combining their extensive diving experience while utilizing the latest in design technologies.

As partners, they continued to develop the X-scooter design with additional features such as: electronic clutch, watertight battery bulkheads and an integrated Owners manual DVD that contains a 100 page PDF Owners manual and over one (1) hour of instructional video on the proper use of the X-Scooter. They also developed an instructional class that certified scuba instructors can use to teach their own scooter diving classes.

The culmination of this work was the release of the "Silver Bullet" during 2004, this scooter weighed 35lbs, (1/2 the weight of comparable competition), with 60 lbs of thrust and 1 hour burn time for an average diver. It was extensively tested for one (1) year and In January of 2005, Dive Xtras released the first 20 test team units. These were tested worldwide and feedback incorporated into the design. With very few changes, the production model was released In March of 2005 over sold in their first year production forecast.

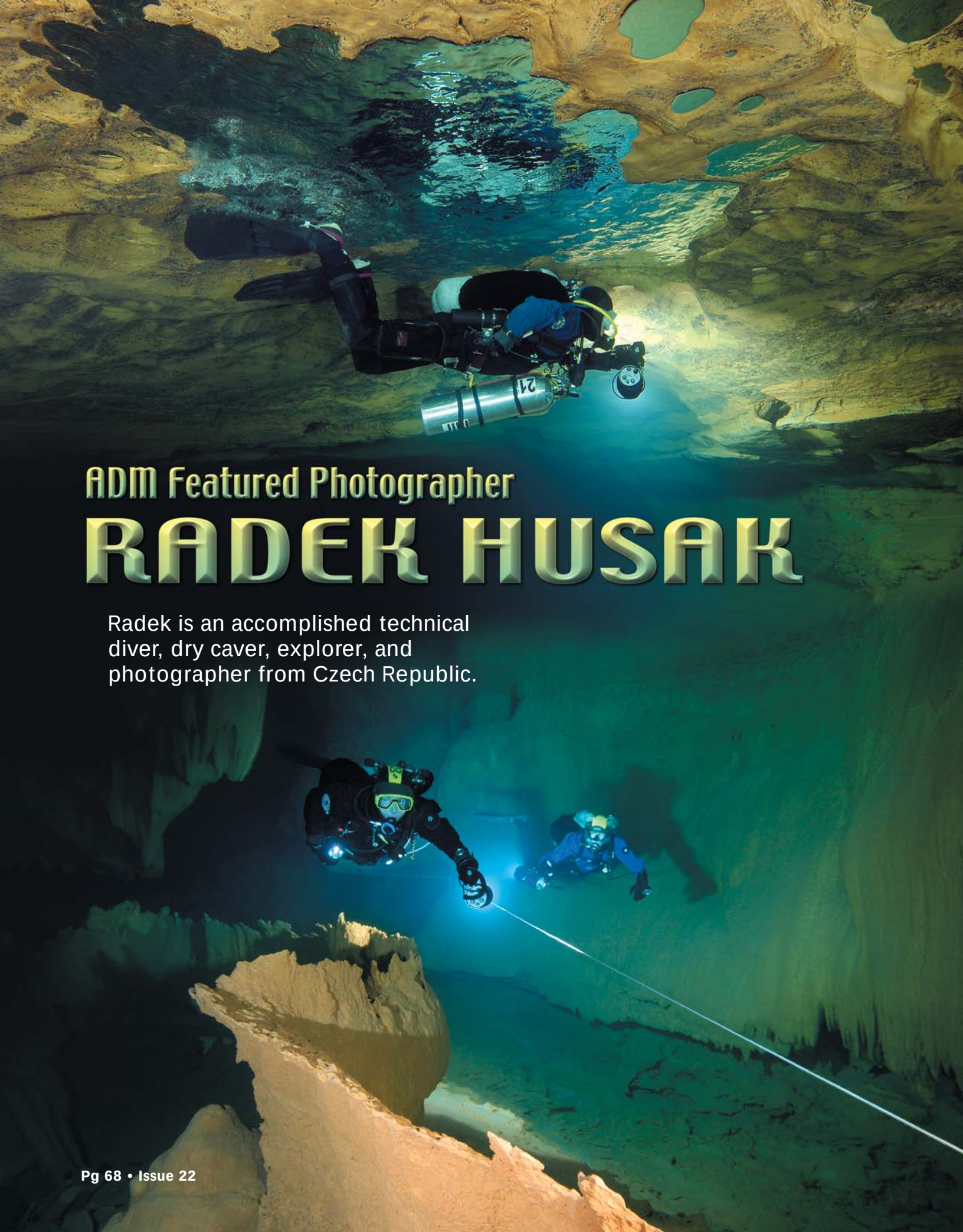
In October 2005 they purchased the special tooling needed to create an entirely new tail section (that is backward compatible), as they wanted to again improve and strengthen the current design of the shroud and propeller system and ensure they controlled the entire supply chain. They now use all their own parts and technology in the X-Scooter, something very unique to their scooter. The X-scooter is now being used globally on a recreational and technical level and is sold through their Website, Premier Partners and X-Men programs. An accompanying X-Scooter class was also design and approved by NAUI and is a formal speciality class, with materials, power points and other teaching materials available for use from Dive Xtras. Dive Xtras also produced a number of articles, scooter diving resources and Demo DVD's that are available on their website to help consumers understand their use and the amount of fun an X-Scooter can be.

Dive Xtras is a new company striving to integrate and innovate evolving technologies as seen in the X-Scooter, They plan to produce other products and continue in the same fashion.

www.dive-xtras.com

Dive Xtras Swivelable universal Video Camera & light Mounting System

Dive Xtras Sunnto SK-7 Compass Mount



ADM Featured Photographer

RADEK HUSAK

Radek is an accomplished technical diver, dry caver, explorer, and photographer from Czech Republic.

He has been involved in multiple exploration projects from the Moravian Karst in Czech Republic, the Macocha Abyss karst region, and the Yucatan's Quintana Roo.

Wherever he travels he brings along his cameras to document the beauty of the underwater world. His wandering nature has taken him several times around the world and he has pictures to prove it.

Radek is the owner and designer of the DTD Diving Equipment Company.

www.dtd-dive.cz

Entombed Maritime History
The Wreck of the North Wind

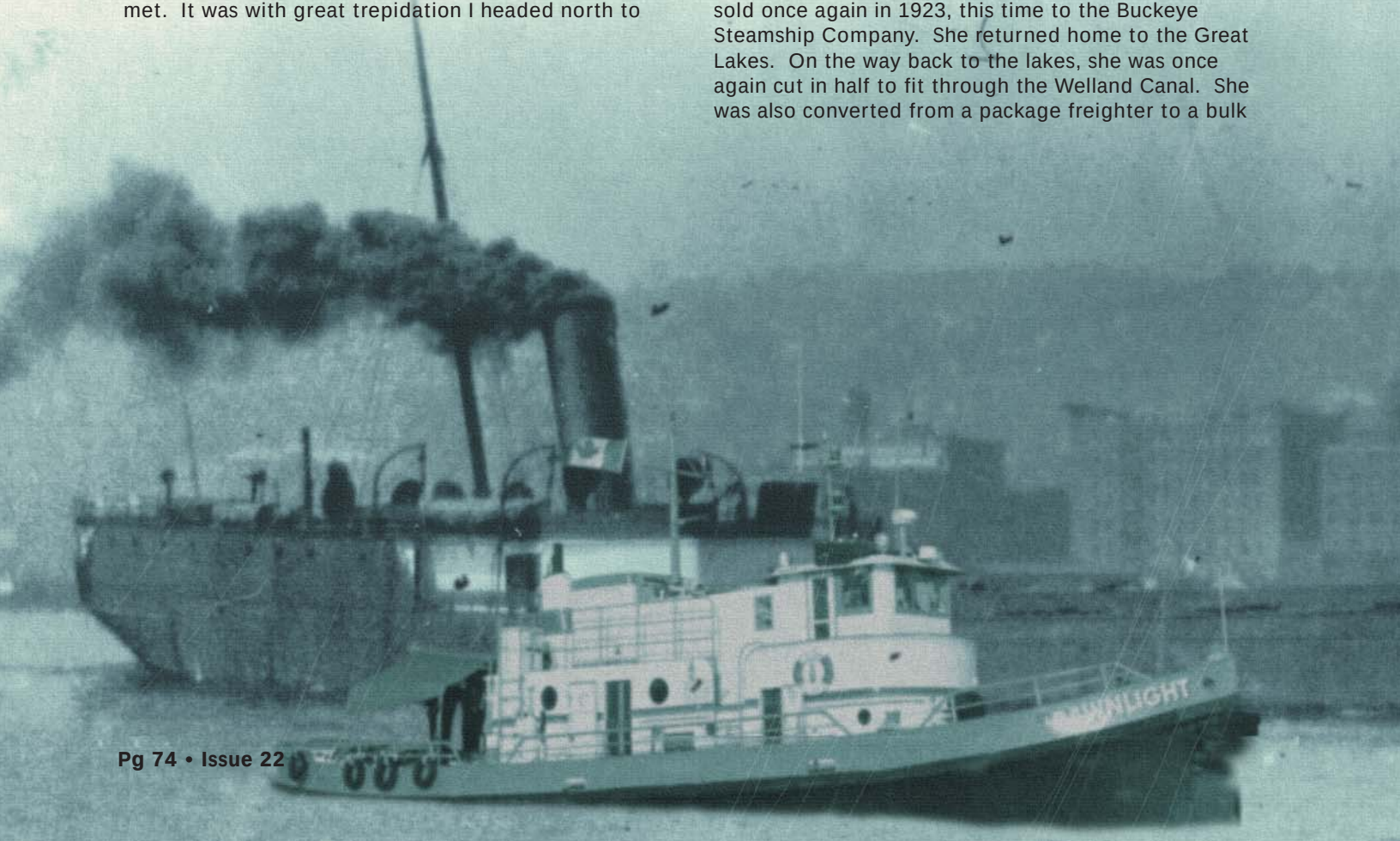
Text and Photography by Rick Kruzel

"So how was that?"

I was floating on the surface of Lake Huron's North Channel, looking up at Captain Ray Davis of the dive vessel *Dawnlight*. He repeated his question as I dumbly looked up at him. For once, words eluded me and I blurted out, "Great!" or something equally lame.

I could not find words to adequately describe my first dive on the freighter *North Wind.* It was everything I had expected and more. I had heard of the *North Wind* for years. It was sort of a holy grail of tech diving in the Great Lakes. Due to its remote location, it was a difficult trip to plan. With no regular charter boats or dive stores anywhere nearby, only the most creative and intrepid divers made it to the *North Wind*, leaving the rest of us to drool in envy. In 1994, I heard that a new live-aboard dive boat operating from Tobermory in Ontario, Canada, was running trips up to the *North Wind.* I was able to get the last space on a charter with a group of Canadian divers, none of whom I had ever met. It was with great trepidation I headed north to Tobermory to board the boat. Five days on a boat with a group I'd never met before. What had I gotten myself into? I needn't have worried. The trip was one of the best dive trips I've ever taken, and I remain friends with all of the other group members from that original trip. In fact, I enjoyed the trip so much, I've returned every year since.

The *North Wind* was built in 1888 by Globe Iron Works in Cleveland, Ohio. She was one of six sister ships: *North Star, Northern Queen, Northern King, Northern Wave,* and *Northern Light*. She was a 299-foot package freighter built for the Northern Transportation Company. She primarily plied the waters between Duluth, Minnesota, on Lake Superior to Buffalo, New York, on Lake Erie. In 1917, she was sold to the Intercoast Steamship Company of Boston, Massachusetts, and taken to the east coast of the United States. She had to be cut in half to fit through the locks of the Welland Canal which connects Lakes Erie and Ontario. She saw six years of service on the Atlantic before being sold once again in 1923, this time to the Buckeye Steamship Company. She returned home to the Great Lakes. On the way back to the lakes, she was once again cut in half to fit through the Welland Canal. She was also converted from a package freighter to a bulk



freighter, ready to carry coal, grain, or perhaps iron ore. She toiled on the lakes for three more years.

July 1, 1926, was a clear day. The *North Wind* departed Little Current, Ontario, in Lake Huron's North Channel. She was "light" (not carrying cargo), and bound for Fort William, Ontario, on Lake Superior. Here's where the story gets interesting. She was steaming along in the early afternoon not far from Little Current when she encountered a fog bank, and ran aground on Robertson Rock near Clapperton Island. About two hours after running aground, the crew took to the lifeboats; and the *North Wind* slid stern first into the depths. The crew returned to Little Current, where a crewman sold one of the lifeboats to a local and disappeared.

Almost from the beginning, rumors swirled. A fog bank on a clear sunny day? Funny no one else in the area noted such a strange meteorological phenomenon. The *North Wind* was an old ship. All five of her sisters had already gone to the scrap yard or had been lost. Had she been brought to this remote area to be scuttled? Nothing ever came of the rumors; and, short of any solid proof, all we have to go on is the report made by the captain and crew.

Whether lost due to grounding or something more nefarious, the *North Wind* is an incredible dive. She sits at an angle. The bow is only 80 feet deep. The stern hit the lake bottom first, and is partially buried in the bottom, so it's a little deeper at about 120 feet. If you penetrate the stern and descend, say, into the engine room, you will actually be below the lake bottom!

The wreck is very intact. The only real damage is to the forward cabin area. The wooden pilothouse blew off during the sinking, leaving the forward cabin area a mess. The pilothouse washed up on Clapperton Island, intact, where the lighthouse keeper was able to retrieve the ship's log, which hadn't even gotten wet.

The bow is quite intact. The anchors are still in the hawse pipes, and the huge windlass still stands on deck. The forecastle can be penetrated. This area contains a small workshop, and mooring lines still hanging along the walls.

The hatch covers are missing from the cargo holds on the spar deck, revealing empty holds. The most unique feature on this wreck is the spare propeller chained to the deck about two-thirds of the way to the stern. It seems to make up for the fact that the ship's real propeller is buried under about 20 feet of clay.

The stern area is by far the most interesting and intact. The smokestack has been torn loose, but lies across the roof of the boiler house. The engine room skylight offers one way to access the engine room. Dropping inside, one lands on top of the *North Wind*'s engine. A narrow ladder leads down another deck level to the bottom of the engine room. This area is very tricky. The access is very tight, and visibility is almost always poor. There is a rust colored haze that never seems to settle completely. In this part of the engine room, you can see the electrical panel, the dynamo used to generate electricity, a tool room, and such oddities as intact glass light bulbs hanging from the ceiling.

There are hallways on each side of the aft cabin. I guess on a cruise ship you'd call them "promenades." These passageways offer us a glimpse into the past. Swimming down the port passageway, a fire axe still hangs on the wall. We swim past cabins half filled with silt, but we can still make out beds, bathtubs, chairs. In the starboard passageway, there is a drinking fountain. You can still read the sign above it that says, "Drinking Water Only."

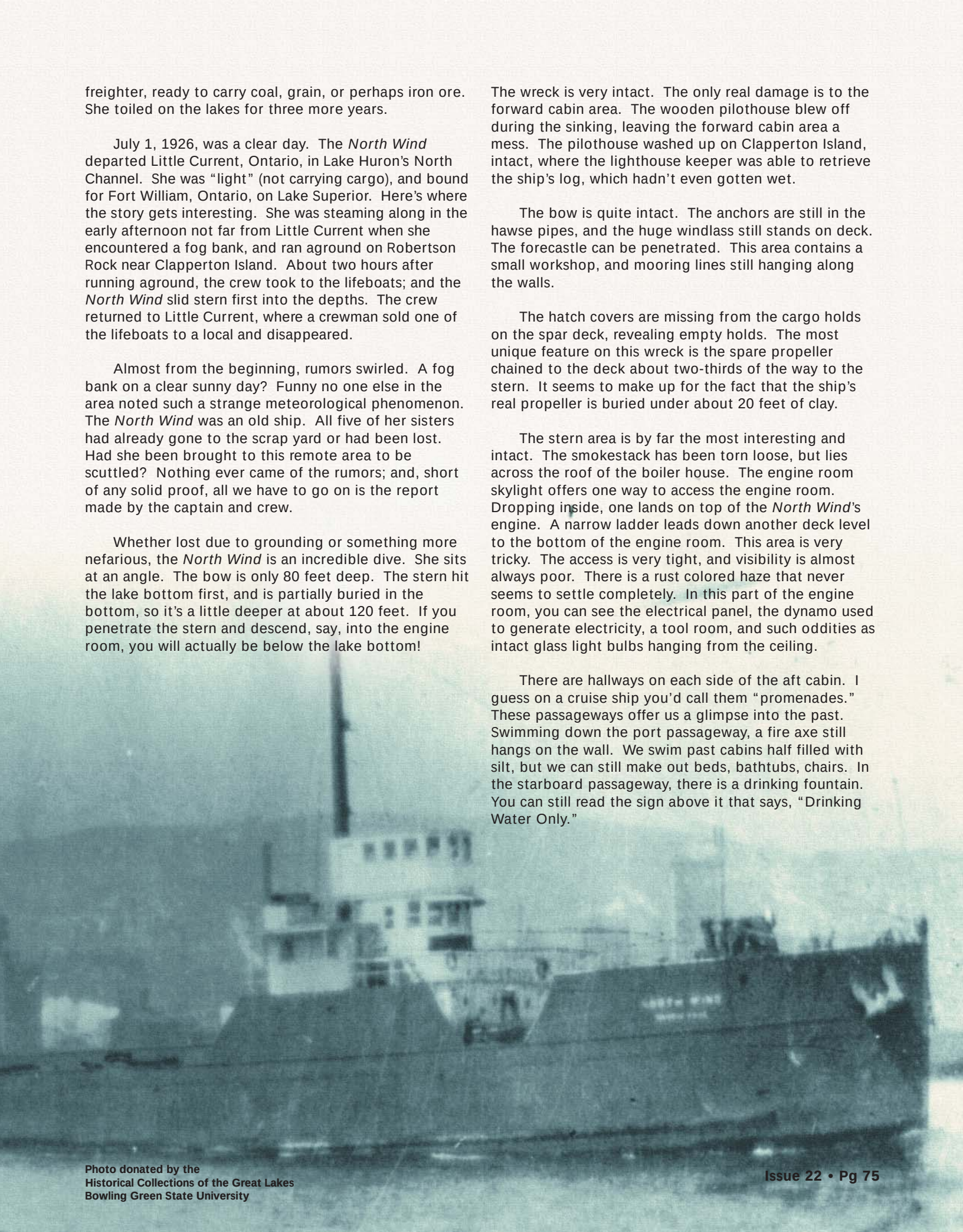


Photo donated by the
Historical Collections of the Great Lakes
Bowling Green State University

Also located in the aft cabin area is the galley and crew's mess. The crew's mess lives up to its name: it's a mess. However, swimming up a short hallway, the galley is more recognizable. The door to the walk-in freezer is open. Broken china sits on the counter next to the sink. The massive iron stove is covered in silt. It's a tiny room, just large enough for one diver.

One of the most impressive sights is at the very stern of the wreck. Swimming aft over the fantail, you find it hard to tell where the wreck ends and the lake bottom begins. When the ship sank, it drove the stern into the lake bottom with such force that it piled mounds of clay onto the fantail of the ship and made waves in the lake bottom.

I've been fortunate to be able to dive the *North Wind* many times over the past 10 years or so. No story about diving the *North Wind* would be complete without also mentioning the story of the *Dawnlight.* She is the oldest certified Inland passenger vessel on the Great Lakes, with almost 115 years of service. Craig Shipbuilding Company of Toledo, Ohio, built her in 1891 as a steam yacht. Mind you, that was just three years after the *North Wind* was built. Over the years, the *Dawnlight* has had four names: *Leroy Brooks*, *Henry Stokes*, *Aburg*, and *Dawnlight*. She has had five major appearance alterations, four hull rebuilds, four different engines, the first two of which were steam. Most of her career was as a tug for McQueen Marine Ltd. of Amherstburg, Ontario, on Lakes Erie and Huron, as well as the Detroit and St. Clair Rivers. Tobermory Adventure Tours acquired the *Dawnlight*, and began operating in 1994.

A dive trip on the *Dawnlight* today is a Great Lakes diver's dream. The boat offers cozy accommodations for up to 10 passengers. There is an air compressor on board as well as a continuous-blend nitrox system. Captain Ray Davis is never content with the status quo. He's always making improvements. Recently, he's added a deco bar which can supply six divers with surface-supplied oxygen. The food served on dive vacations is perhaps the most widely recognized yardstick, and the *Dawnlight* doesn't disappoint. You can look forward to some of the finest meals you've ever enjoyed on a dive trip. Sometimes, while enjoying my steak fresh off the barbecue, I find it hard to believe I'm on a boat in northern Lake Huron. It's been my experience that Captain Davis and the crew of the *Dawnlight* will do anything within reason to guarantee a successful dive trip.

The quality of the diving combined with the convenience of a top-notch live-aboard is difficult to beat. And after many dives on the *North Wind*, I still can't seem to come up with a good answer to Captain Davis' question from so long ago, "So how was that?"

Rick Kruzel is a technical diving instructor in Toledo, Ohio. He specializes in training divers for the Great Lakes environment. He offers courses from Nitrox Diver through Advanced Trimix Diver. Rick has been diving the wrecks of the Great Lakes for 29 years. For more information, visit **www.greatlakestechdiving.com**.

Tobermory Adventure Tours operates the live-aboard dive vessel *Dawnlight* from Tobermory, Ontario, Canada. See **www.tobermory.com**

A video about the North Wind is available from **www.badfrogdivers.com**

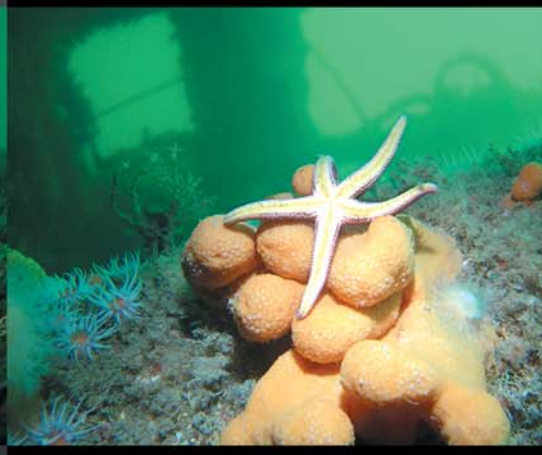
Green Force

Flexi Digi Pack 3 in 1

The Green Force 'Flexi Digi Pack'* doesn't only provide the amateur underwater photographer with a flexible lighting systeem, it can also be transformed swiftly and easily into a handy HID umbilical or handheld torch.

Photo lighting
Umbilical torch
Handheld torch

The handle and video arm can be removed swiftly and easily in order to transform the 'Flexi Digi Pack' into a very compact and powerfull umbilical torch.



The 'Flexi Digi Pack' comes with a Flexi I batterypack (12 Volt - 2 Ah), an HID 50 Pro lighthead (50 Watt - 6.200 Kelvin), a Lockline videoarm, a handle, an umbilical with polyacetal connection and a charger. The HID 50 Pro is equiped with a floodlens and provides a soft and equally spread light. In combination with the Flexi I, the HID 50 Pro has a burntime of 2 hours.

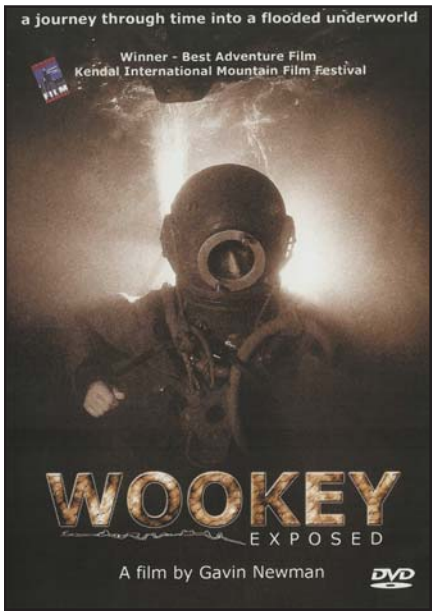
Green Force®

MANTA INDUSTRIES

www.mantaind.com

Without cable and video arm the 'Flexi Digi Pack' becomes a compact and powerfull handheld torch.

* Camera housing not included.



WOOKEY EXPOSED

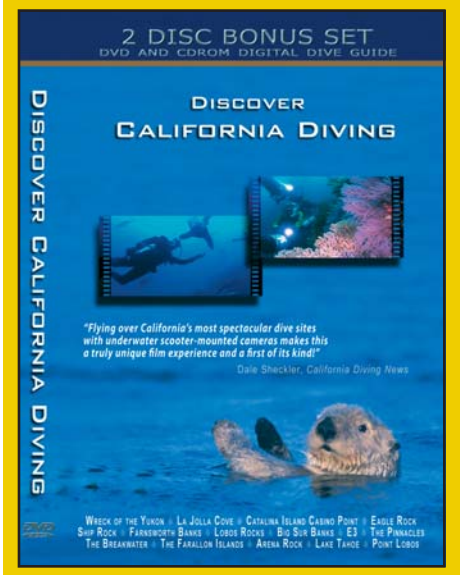
Beneath the Mendip hills of Southern England lies a cave system that has challenged explorers since the earliest times, and continues to do so today. As one of the UK's most popular show caves the public can venture as far as the ninth chamber, but from this point onwards much of the cave lies underwater and is the sole domain of the cave divers.

Filmed and produced by Gavin Newman, this award winning film looks at the spectacular discoveries made by successive generations of explorers and joins the latest team to take up the challenge. Using specially designed camera systems we follow the divers to the very limits of the exploration as they attempt to push on into the darkness beyond the end of Wookey Hole.

"If you enjoy cave diving history like I do, Wookey Exposed presents an increadable production full of outstanding video footage only Gavin Newman could pull off".

Curt Bowen / Publisher ADM

For more information
www.wookeyfilm.com



DISCOVER CALIFORNIA DIVING

Twenty of California's best dive sites are featured in a new DVD and CD-ROM dual cassette dive guide. Hosted by Susan Bird and Alberto Nava.

The guide covers the popular spots Wreck of the Yukon, La Jolla Cove, Catalina Island Casino Point, Eagle Rock, Ship Rock, Farnsworth Banks, Lobos Rocks, Big Sur Banks, E3, The Pinnacles, The Breakwater, The Farallon Islands. Arena Rock, Lake Tahoe, and Point Lobos.

The 60-minute production covers shallow dives and dives exceeding 200 feet (61m). Experienced divers will find a track labeled, "For Certified Divers" only. This is a commentary-style audio track and it plays with the video from the main feature. This audio track is where you will find "diver-styled" facts, including many important dive details.

The multimedia DC-ROM includes site descriptions, video of each site, underwater maps for each site, in-depth coverage of Point Lobos, which is considered by some America's premier underwater park, links to weather, sea conditions, topo map of reef system and how-to articles.

For more information
Call: (707) 255-DIVE
email: adventure@interx.net or
www.divesitevideos.com

For advertisment rates
Contact ADM at 941-748-DIVE (3483)
or e-mail AdvDvrMag@aol.com
or visit our web site at
www.AdvancedDiverMagazine.com

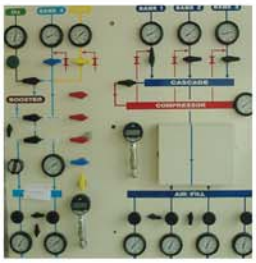
CAVE EXCURSIONS

PADI

Full Service Dive Facility

The Premier Gas Station in North Florida

(maybe even the USA)



We offer:

- Hyper pure air
- Custom mix gas to your specifications
- Banked 21/30 Trimix
- Banked 50% Nitrox
- Banked 32% Nitrox
- 3000 psi Oxygen
- Trimix blended through the compressor to achievee the most accurate, cost effective means to mix your gas

Facility Instructors
Bill Rennaker
John Orlowski
Shelly Orlowski
Fred Berg
John Jones
John Faircloth
Bill Dooley
Jim Wyatt
Jeff Johnson
Richard Courtney

We are a PADI Resort Facility with daily, weekly, and monthly home rentals.

Located within minutes of over
15 world renowned cave systems.

You want it... We teach it!
From Openwater to Trimix
Cavern to Full Cave and Rebreather Instructor

Full service gear rentals
Over 40 sets of doubles, HID Lights, Regulators, scooters. Any equipment you need to do your dive!

Internet access available to our customers!

Cave Excursions East is just 2 miles west of Ginnie Springs Road.

Cave Excursions (386) 776-2299
Cave Excursions East (386) 454-7511

www.CaveExcursions.com


Dive Rite
You don't dive
DEEP WRECKS
or explore
VIRGIN CAVES
every day...
but your equipment should be BUILT LIKE YOU DO.
DiveRite.com