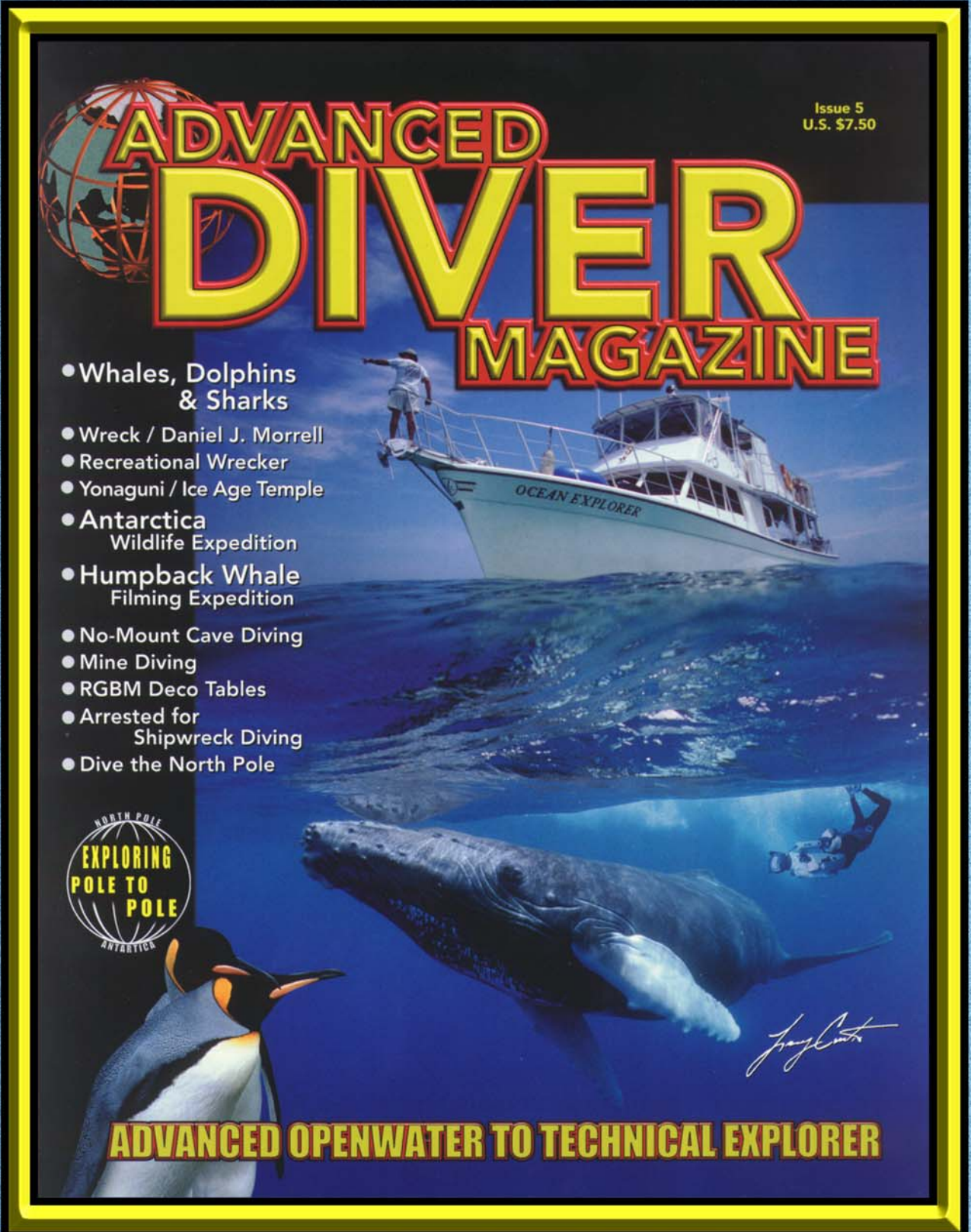
ADVANCED
DIVER
MAGAZINE
Issue 5
U.S. $7.50
• Whales, Dolphins & Sharks
• Wreck / Daniel J. Morrell
• Recreational Wrecker
• Yonaguni / Ice Age Temple
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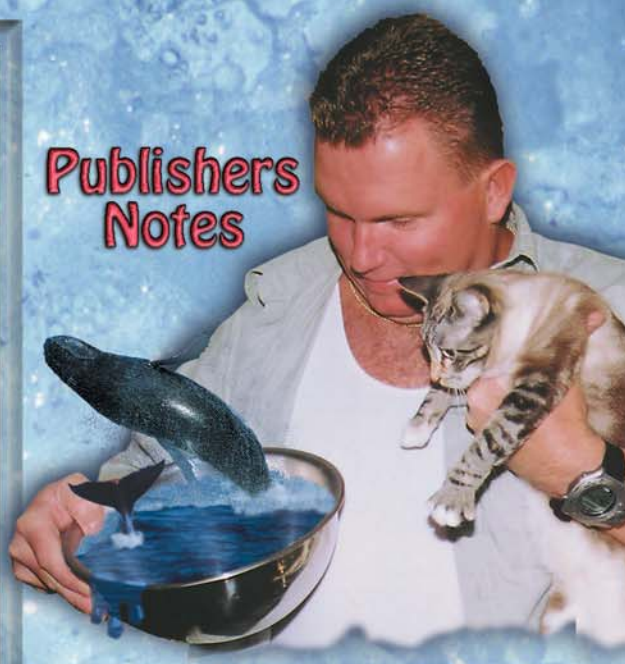

Goals for the second year of ADM includes bringing our readers a good mix of advanced recreational information for those divers moving up through the ranks of experience along with continued reports from the worlds leaders in technical diving. This balance along with superior graphics, rich colors, impressive photography and informative text makes ADM the best dive magazine available.

This might be a bold statement, but as the founder/publisher of ADM and an experienced technical diver who actually dives I pride myself in providing the best quality magazine possible. Compare others to ADM and I am sure you will agree.

The goals for the year 2000 also include increasing the number of pages in ADM from 52 to 68 and possibly even higher allowing us to deliver even more dive information. We are also planning on providing a members' section in ADM Online exclusively for our subscribers where they can access even more dive information, links, training courses and up and coming exploration projects.

Many new and exciting dives await as the northern hemisphere dive season roles around. ADM encourages you to share your experiences and knowledge with the rest of the advanced dive world. Our staff is eager to assist in any way possible to help you publish your discoveries.

Curt Bowen
Publisher ADM

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WARNING

Diving is a potentially dangerous activity. Neither Advanced Diver Magazine, its contributors nor its staff accept liability for diving related injuries by our readers. All Materials within Advanced Diver Magazine are for informational purposes only and not a substitute for dive training.

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Silver Bank, Dominican Republic

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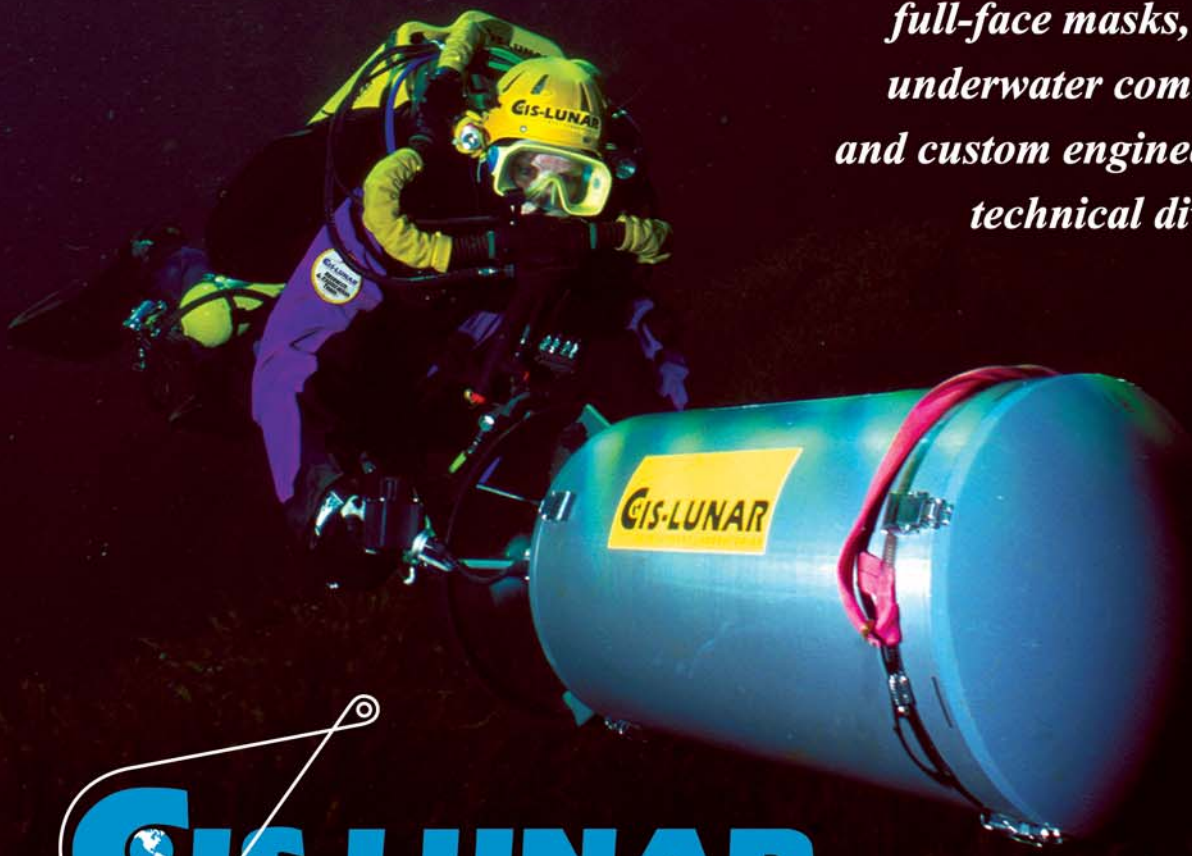

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Daniel J. Morrell
LAKE HURON

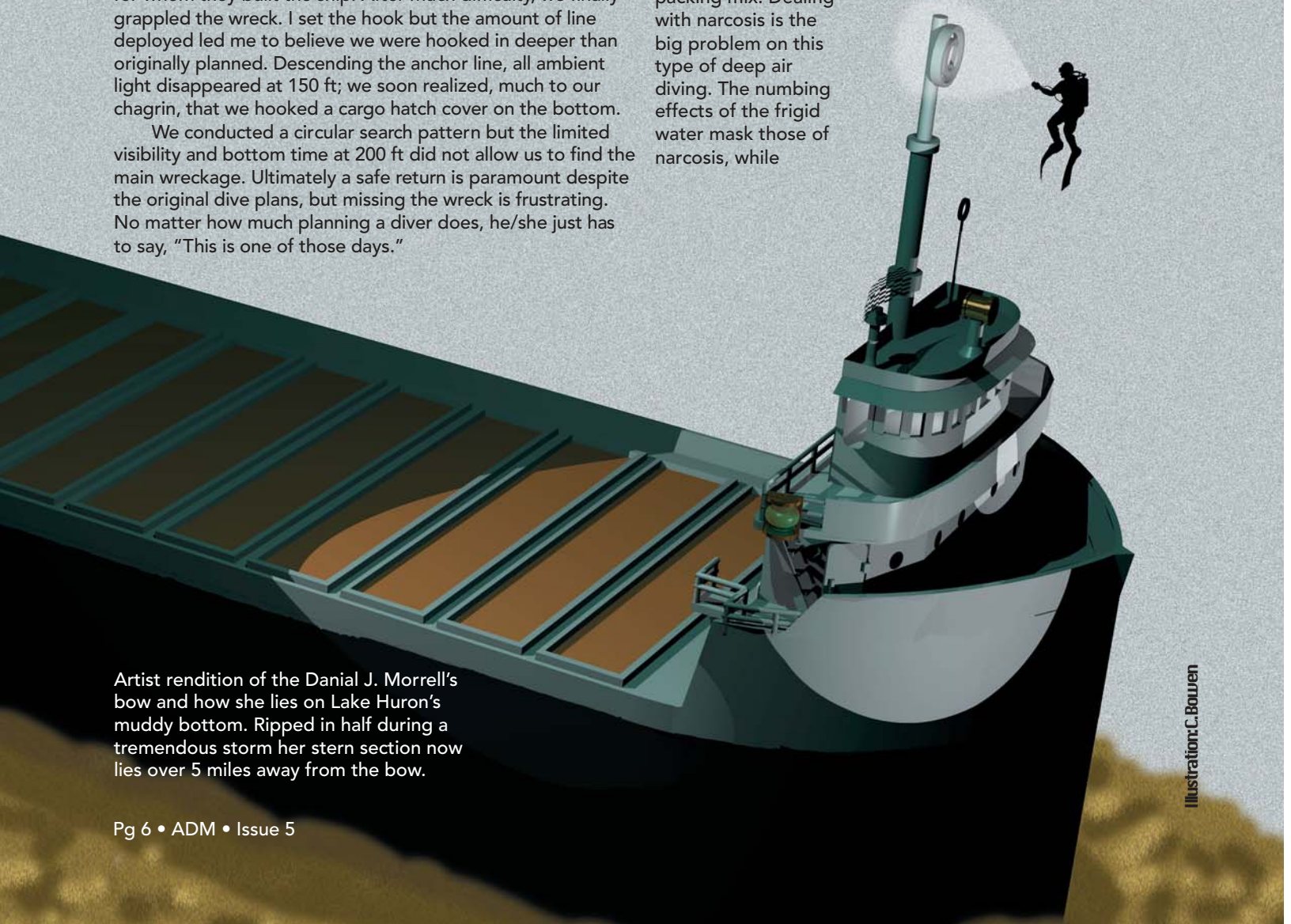
By Richard J. Reichenbacher

Photos by: William Robinette

A hot August day produced perfect conditions for my first attempt at diving the wreck of the Daniel J. Morrell. Scarcely a ripple was visible on the surface of Lake Huron. I first learned of the Morrell from a fellow diver who, with a crisp Canadian accent, suggested a dive on this incredible wreck. From information he supplied us, we learned that the Morrell, a 600-foot freighter, foundered during a storm then broke in half and sank. The bow and stern sections, in different locations, are both sitting upright in 200 and 220 ffw. Our planned dive was the deck of the bow, at 160 ft. A prominent feature is the large "C" on the masthead which represents the Cambria Steamship Company for whom they built the ship. After much difficulty, we finally grappled the wreck. I set the hook but the amount of line deployed led me to believe we were hooked in deeper than originally planned. Descending the anchor line, all ambient light disappeared at 150 ft; we soon realized, much to our chagrin, that we hooked a cargo hatch cover on the bottom.

We conducted a circular search pattern but the limited visibility and bottom time at 200 ft did not allow us to find the main wreckage. Ultimately a safe return is paramount despite the original dive plans, but missing the wreck is frustrating. No matter how much planning a diver does, he/she just has to say, "This is one of those days."

Morrell's bow and stern sections are located in Michigan's Thumb Preserve. Diving this area requires a bit of foresight. Our target depth of 160 ft became an exploration dive at 200 ft. This seems to contradict the rule "Plan your dive and dive your plan," but on these trips we always build in contingencies. The dives beyond the 130 ft range are extremely weather dependant. On the day of the dive, we might change sites or cancel completely. Air in the tanks allows for a degree of flexibility and, if all else fails, a river or quarry dive on the way home. Generally, if the target depth of the dive is in the 150-180 ft. range, I'll use air; anything deeper then I'm packing mix. Dealing with narcosis is the big problem on this type of deep air diving. The numbing effects of the frigid water mask those of narcosis, while



Artist rendition of the Danial J. Morrell's bow and how she lies on Lake Huron's muddy bottom. Ripped in half during a tremendous storm her stern section now lies over 5 miles away from the bow.

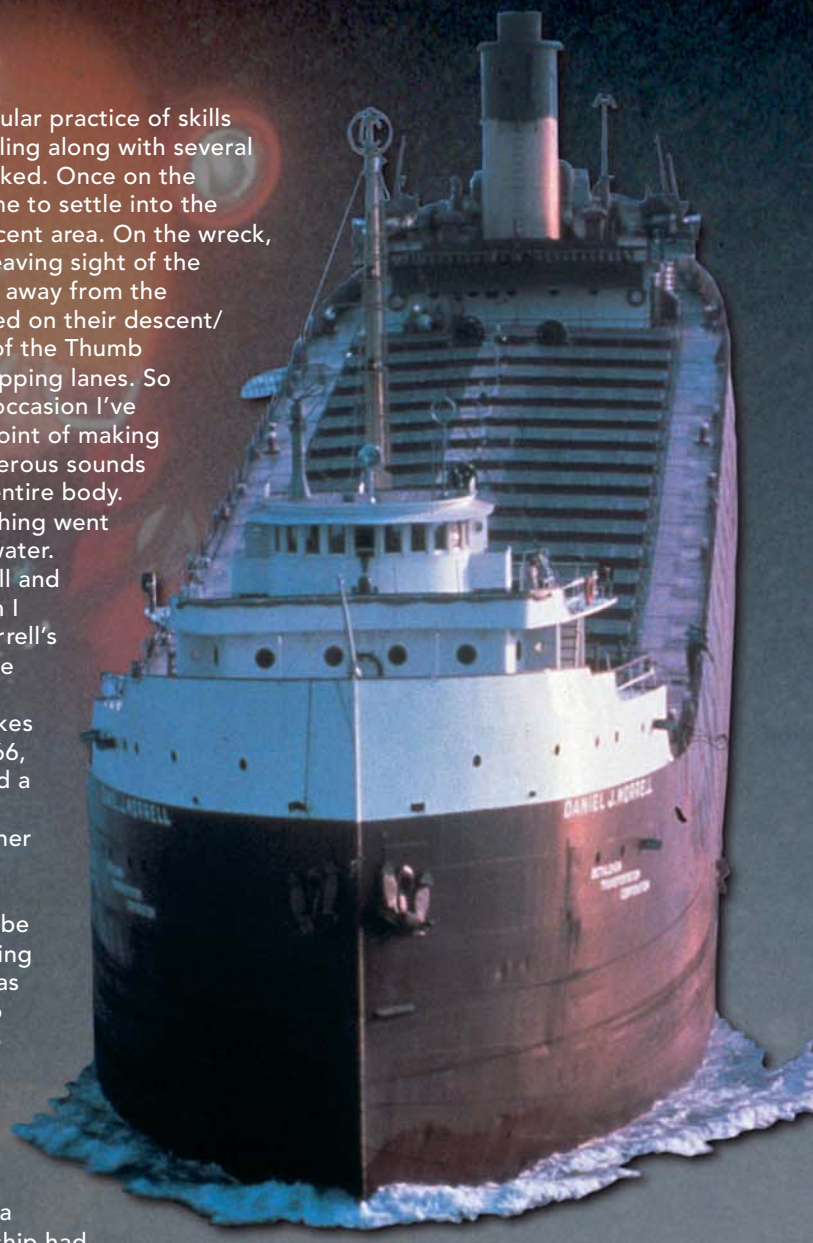
Illustration: C. Bowen

the water's darkness conceals the feeling of narrowing. Regular practice of skills with a lift bag, regulator shut downs, and stage bottle handling along with several tasks on the actual dive can relieve the tension of being narked. Once on the bottom, I set a strobe light on the anchor line. This allows me to settle into the dive, perform a gear check, and focus on a task in a safe ascent area. On the wreck, arm pulls instead of strong kicks minimize narcosis. When leaving sight of the strobe I'll use an exploration reel. Keeping your line off and away from the anchor line is important. Other divers may become entangled on their descent/ascent or the anchor may pull free from the wreck. The tip of the Thumb Preserve is unprotected from weather and in the normal shipping lanes. So most of the dives are of short duration. On more than one occasion I've surfaced to find that the weather had deteriorated to the point of making it impossible to board the boat with my gear on. The thunderous sounds made from the passing freighters reverberate through the entire body. Gripping the anchor line a little tighter, thankful that everything went well and that one is not off gassing from a lift bag in open water.

Several months usually separate my dives on the Morrell and the short bottom times leave me with feelings of "Sure wish I could have accomplished more." I've heard the story of Morrell's sinking and, while gliding over her decks, I am mindful of the tragedy others endured. Built in 1906 by the Bay City Ship-building Company, the Daniel J. Morrell sailed the Great Lakes for the Bethlehem Steel Corporation. On November 28, 1966, with sixty years of service under her belt, the Morrell carried a crew of twenty-nine men on her final voyage. Arriving at a spot twenty miles north of Grindstone City, she would end her days shortly after midnight. Frigid temperatures, thirty foot waves and winds approaching sixty knots would greet the crew on their arrival. Accounts from the lone survivor describe the tragedy as it unfolded. Asleep in his quarters after reading a book, a loud thump awoke him. Thinking that the noise was a large wave slapping the bow, he tried to fall back to sleep when another loud thump and the ship's alarm jolted him to his feet. Looking outside, he was horrified to see the Morrell buckling amidships.

While he returned to get a coat, the waves broke the back of the Morrell like a giant bread stick filling the night with sounds of destruction. The two sections of the now dead ship separated while several crew members waited in a life raft on the deck. One man mistakenly thought another ship had come to their rescue but it was the stern sailing away with lights still burning. When the bow slipped beneath the surface, only four men managed to stay in the raft. Adrift thirty-six hours, exposure would claim the lives of three before the Coast Guard could rescue Dennis Hale, the last remaining man. Twenty-two bodies were recovered; six men remain missing. Although the stern section was found soon after sinking, thirteen years would pass before the bow would be located, five miles to the north. Clocks on each section, stopped one and one-half hours apart, revealing how long the stern drifted before sinking.

Early one September morning, I was preparing to dive the Morrell again. Over a year had past since my last trip down the anchor line toward her stern. Having several dives on the wreck, I will be leading this one, taking a friend on his first 200 ft dive. The cold damp air and choppy water helped to mask the underlying nervousness present on the boat. Plunging below the surface, a chill from the cold water covered my entire body as I pulled myself down to the



The 600 foot *Danial J. Morrell*, with a crew of 29 men heads toward Taconite Harbor on November 27, 1966. Unknowingly to the captain and her crew, this would be her final voyage.

Photo contributed by the Dossin Great Lakes Museum in Detroit, Michigan

Bottomland Preserve Shipwrecks

Vessel Name	Depth	Date Sunk	Type	Loran #
Gov. Smith	180 ft	1906	Steamer	30763.3 / 49141.3
E.P. Dorr	175 ft	1856	Tug	30780.0 / 49145.5
Albony	145 ft	1893	Steamer	30773.1 / 49166.8
Philadelphia	120 ft	1893	Steamer	30786.2 / 49183.7
Iron Chief	135 ft	1904	Steamer	30777.9 / 49172.0
Dunderburg	155 ft	1868	Schooner	30740.9 / 49257.5
Glenorchy	120 ft	1924	Steamer	30750.4 / 49314.2

Background Photo: William Robinette

superstructure. Once on the wreck, we are encompassed in total darkness. Only the noise our regulators made from the thick air being pulled through them was present. The first flash of our marker strobe revealed the outlines of the upper deck through the murky, blue green water. Morrell's pristine condition and a full head of narcosis gave me the eerie feeling that I've boarded an abandoned ship

in the dead of night. Making our way to the starboard railing, we tied off and started descending to 200 ft. Huge white letters spelling the ships name, seemed to glow in the darkness while verifying that we were indeed on the Morrell. Ascending into the walkway, I stopped at a doorway covered with a wooden screen door that looked like it just came off my grandmother's house. Peering inside, remnants of life more than thirty years prior were still visible. Pulling ourselves to the upper deck, we saw the pulsing flashes of the distant marker strobe. We made a brief stop at the auxiliary steering before leaving the ship. During our final decom stop, I could see the bottom of our dive boat, The Down Under. The weather changed and she was taking a terrible beating. Worried that the anchorage may break free, we wasted no time boarding the boat. During the ride back to port, I visualized the dive and remembered grasping the auxiliary steering wheel. Thoughts of the lost crew came to mind with images of bustling activity on the deck that is now resting silently beneath the cold dark waters of Lake Huron.

The resources listed below can provide additional information about the tragic sinking of the Danial J. Morrell.

The book Sole Survivor
Dennis Hale's own story as told to Tim Juhl and Pat & Jim Stayer
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Huron County Visitors Bureau
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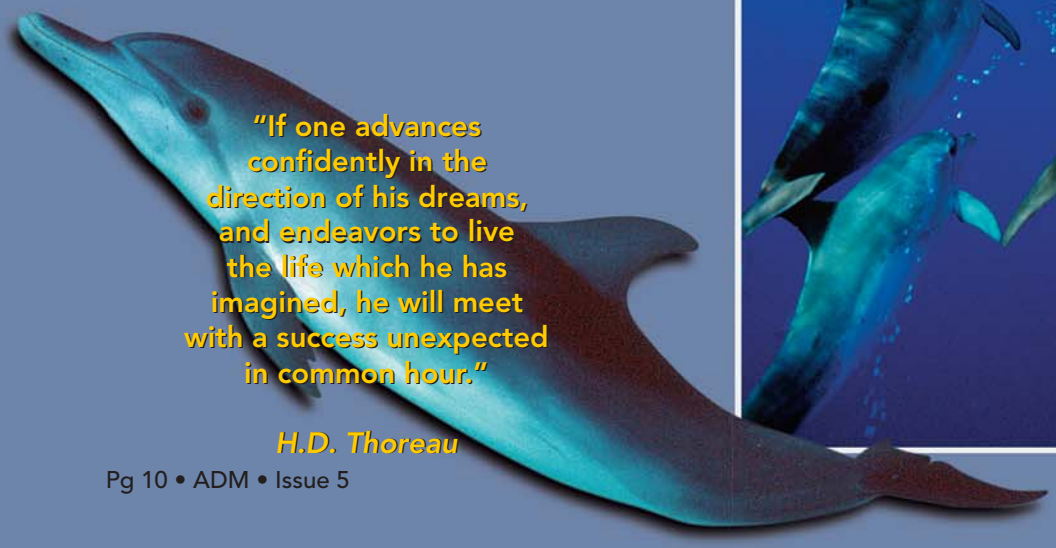
WHALES·DOLPHINS·SHARKS
LARRY CURTIS
Photography

Afternoon at the Silver Bank provides magical opportunities to experience Humpback whales diving in the afternoon sun. Light dances off the water droplets to signal another glorious day.

Each individual has their unique sense of what is visually beautiful upon this Earth. Perhaps this is so because humans rely predominantly upon sight to interpret their world. Then again, some believe our perception of beauty emanates from a deeper source other than our senses. For example, if many individuals were to view an image of a reef shark, varying interpretations would emerge about the shark. Interpretations would depend



"If one advances confidently in the direction of his dreams, and endeavors to live the life which he has imagined, he will meet with a success unexpected in common hour."

H.D. Thoreau

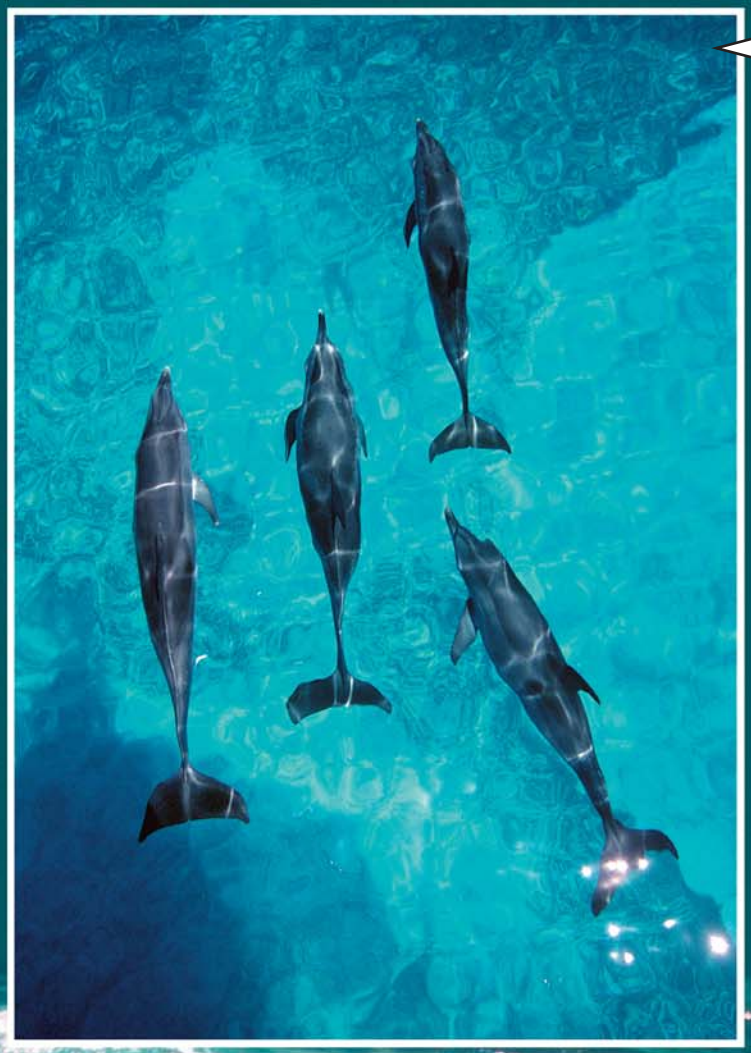
Young spotted Atlantic dolphins do not get their namesake spots until after their first year of life. It is these youngsters that find humans most interesting and move amazingly close for social interaction.

Atlantic spotted dolphins (Family: Delphinidae; Species: Stenella frontalis). Photo was taken in the Bahamas on the white sand ridge near Grand Bahama Island. These are a pod of some of the friendliest wild dolphins in the world. Newborn dolphins are typically 2 to 3 feet in length, while adults grow to 5-8 feet and can weigh between 220-310 lbs. Spots usually appear on the dolphins when they are around one year old, and by the second year, most of the body is covered by spots. As the dolphin ages, more spots appear, creating a more mottled appearance. Spotted dolphins are still very much threatened by tuna purse-seine nets which are responsible for killing millions of dolphins.

upon each individual's perception of the shark. Understandings and interpretations may be drawn from personal experiences, general knowledge, and pre-existing associations. The shark becomes much more than just an image of one. It is this principle of imagery that I try to express in my photography. I want the viewer to not just see the image, but to encounter the animal on another level than just the two-dimensioned one.

Like many that follow their passions, I know how fortunate I am living my dream of being an underwater, wildlife photographer. Along with my wife, Celia, I travel to far away places in search of sharks, whales, and dolphins. Together we share a passion for the environment as well as the people and places in which we travel. Our respect for the underwater realm, coupled with our ongoing pursuit to educate others about the natural world, allow us to live our passions and see our dreams become reality.

These sharks are Pacific Blacktips. They are very commonly seen on reef dives in the Pacific. This particular image was taken in the beautiful waters of Moorea, French Polynesia. Pacific Blacktips can grow to over six feet in length and are non-aggressive. The main threat to these sharks, as with many sharks, is the Asian shark finning industry, where only the fins of the sharks are consumed, however, the remainder of entire carcus is discarded.



Spotted Dolphins of the Bahamas - View of bowriding dolphins from the pulpit of the M/V Ocean Explorer. Mixture of water, light, and dolphins are all one needs for an awe-inspiring scene.

Mating Sperm Whales in the Azores - (Family; Physeteridae; Species; Physeter Macrocephalus) These whales are more well-known from Herman Melville's famous American novel, Moby Dick. The Sperm Whale is one of the most impressive animals to ever have lived on this planet. Adult males can grow to be as large as 60 feet and weigh as much as 50 tons! The whales are often seen in "Pods" of as many as 25 whales. They are known to be the best diving mammal in the world, reaching recorded as deepths of 9,845 ft (3,000 m) on a single breath of air. Additionally, the sperm whale is impressive because it is not only the largest toothed animal existing, but it also has the largest brain, which suggests high intelligence. Sperm whales feed at great depths, dinning on squid and other fish. Whaled in the Azores as recently as the 1980s, the sperm whale has come back from the brink of extinction to being the most populas whale in the world today. (Estimated Population worldwide: 2,000,000)

Despite the best efforts by the Marine Mammal Protection Act, sharks, whales and dolphins are still threatened by human ignorance. As divers, we know the wonders of the underwater realm. Therefore, we should become more vocal and involved in the protection of our precious waters.

For more information on what you can do or to join me on one of these amazing expeditions, please call, write, or e-mail.

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YONAGUNI

Pre-Ice Age Temple?

By: Gary Hagland

Often, as I swam along a reef or wall, a nagging sense of familiarity interfered with the routine of the dive. I sensed something out of place. The wall is a bit too flat and vertical. A corner is too right angular. Nature is supposed to abhor straight lines, and I wonder whether nature was really responsible for that which I see. In most cases, it is. Nature has its aberrations also, such as the Giant's Causeway in Northern Ireland and the octagonal columns in eastern Washington State. However, in the waters off Yonaguni, Japan, the geological aberrations appear to be something other than natural.

Yonaguni is located 60 nautical miles (111 kilometers) east of Taiwan. It's the most distant island in the Ryukyu Island chain, of which Okinawa is the most prominent. Orientated east west, it's about 12 statute miles (19 km) long and three miles (5 km) wide. Yonaguni is noted for schooling hammerhead sharks, housing the world's largest butterfly species, having a unique breed of small horse, and sporting great marlin fishing.

In 1985, Kihachiro Aratake, a dive operator in Yonaguni, was scouting for a new spot to view hammerhead sharks. He encountered a huge rock formation that looked almost entirely man-made. Rising from a depth of 90 feet (27 meters), he saw a monolithic structure over 300 feet (100 meters) long, with steps cut at right angles, extensive terraces, circular holes, symmetrical trenches and depressions, and raised extensions in the rock that appeared uniformly angular.

Although the discovery was a sensation in Japan, it was pretty much ignored elsewhere for over ten years. Those who took an interest in it were primarily on the fringes of archaeology and anthropology. They are the ones with beliefs that tend to place advanced ancient civilizations on submerged continents and who consider Machu Picchu as a possible alien spaceport.

Except for the Japanese, most of the traditional scientific community stayed away. The issue of a massive stone structure carved by prehistoric people was, I suspect, too volatile a subject. However, Professor Masaaki Kimura, a geologist with the University of the Ryukyus on Okinawa, has been conducting research there since 1996. His team has been involved in surveying not only this site, but also reportedly another five others in the Yonaguni area, as well as looking for signs of human involvement.

Photo: Gary Hagland
Illustration: Curt Bowen, extrapolated from original drawing from Professor Masaaki Kimura and Kihachiro Aratake

How could something this large be carved from solid rock with its upper level under 20 to 30 feet (6 to 9 meters) of seawater? What manner of ancient aquanaut-stonecutters could dive down, hold their breaths, and spend enough time to chisel wedge holes? How could they move and surface the huge stones without modern technology? For that matter, if it was natural occurrence that created this, how then could undersea erosion forces cut rock at 90 degree opposing angles?

Some have suggested that the phenomena was as a result of seismic fracturing activity. There is an area of shale and sandstone on the island that displays some of the characteristics of step-like structures. However, that area has nowhere near the uniform angularity of the underwater megalith or its clean flat expanses. The answer is that it was not underwater at that time.

Ten thousand years ago, at the end of the last ice age when glaciers till covered much of Canada, having retreated from our mid-western states, ocean levels were 130 feet (40 meters) lower than in present day. At that time, the structure at Yonaguni, as well anything else above what is now the 20-fathom mark, was sitting on dry land.

Who were the people who cut stone so well and who lived on what was once a much larger Yonaguni island? There is speculation that they may have been related to the ancient Jomon culture, a clever and innovative group who inhabited Japan before the Japanese. Their only surviving descendants may be the Ainu, an indigenous people now confined to the northernmost Japanese Island of Hokkaido. Some scientists also believe that the Okinawans may be distantly related to the Jomon. The Jomons were not known for their ability to carve rock on a grand scale. Still, no one is certain who created it.

Yonaguni
Continued on Page 48

Artist rendering of Yonaguni's underwater structure. Note the sharp right angles cut into the stone.

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WILDLIFE EXPEDITION
ANTARCTICA

By: Henrik Lovendahl

On November 16, 1998 a group of recreational scuba divers successfully completed the first ever recreational Scuba dive in Antarctica. The dive took place in Potter's Cove on King George Island, off the Antarctica Peninsula. Surrounded by rugged peaks covered with centuries-old ice and rocks, and hanging glaciers reflecting turquoise colors in the deep blue water, King George Island is truly a wonder to behold. Sharing our dive site was a colony of Gentoo and Chinstrap Penguins who strode unperturbed over our diving equipment, looking at us and wondering what kind of strange creatures we were. We also enjoyed the constant company of small groups of Elephant seals, Crab-eater seals and Weddell seals that seemed to enjoy lazily passing the long, warm summer days. In route to the daily dive sites, we negotiated small Zodiacs through an archipelago of ice flows and giant icebergs, that when hit by the bright Antarctic sun, reflected all the colors of blue imaginable. At one point, a curious three-meter long leopard seal poked its giant head up right next to the Zodiac, carefully inspecting each person in the boat. Unlike the traditional diving holiday experience, this trip was a unique adventure, more akin to a sequence from a David Attenborough documentary or a dream.

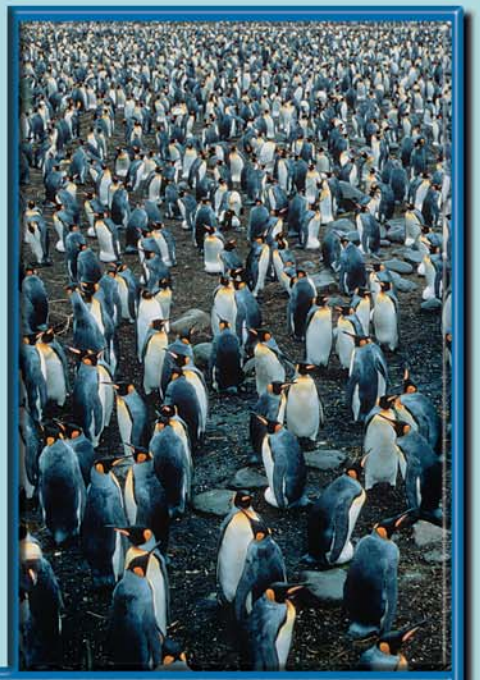
Antarctica is the coldest, windiest, driest place on Earth, with an annual precipitation less than 12cm (4 3/4in), all falling as snow. Two-thirds of the planet's fresh water is locked up here in the form of ice. Antarctica is twice the size of Australia and it is the highest continent in the world, more than half of the land is over 2000m (6500ft) above sea level; the ice covering it reaches up to 3500m (12000ft). This harsh environment is plagued with katabatic winds, which can spring up without warning, roaring across the ice at speeds up to 80km/h (50mph). Antarctica is surrounded by the Southern Ocean. Between latitudes 40 to 65 degrees south, an uninterrupted wind circulates vigorously to developing into the notorious "roaring forties" and "furious fifties." This interaction between wind and sea currents creates a region of turbulence and, as a consequence, the Southern Ocean is richly productive. An abundance of plankton supports the world's greatest concentration of wildlife. Millions of sea birds, penguins, seals, and whales appear in glorious abundance with the coming of spring. Most of Antarctica's life clings to the edge of the continent, where beaches and cliffs offer snow-free nesting places for birds and pupping places for seals. Most of this is concentrated on the sub-Antarctic islands and the islands of the Antarctic Peninsula.

For a group of 24 international recreational scuba divers, aboard the 72-meter Russian icebreaker, Professor Molchanov, this was a dream come true. They were all participating in the first ever commercially organized and planned expedition for recreational divers to dive in Antarctica. Previously, this experience has been exclusive to scientific divers and documentary filmmakers. The group had gathered from all four corners of the Earth, both sexes and a diversity of ages were represented. Although the experience level was quite varied, we all had two things in common - our dream of diving in Antarctica and our sense of adventure.

In charge of the dive operation was Goran Ehlme from Sweden. Goran has had many years of experience as a PADI Instructor and as the leader of similar expeditions in Greenland and the high Arctic for Oceanwide Expeditions.

As the expedition's assistant dive leader, November 16, 1998 was to be a very special day for me. After many months of planning and preparing, a lifetime dream was about to come true and history was also in the making. I was here in Antarctica, surrounded by mountains, snow, ice, penguins, and seals while we were getting ready to do our first dive in "The freezer." The air was static with excitement and a little apprehension as the 24 divers geared up and prepared to enter the sub-zero degree water. With three layers of thermal undergarments beneath a dry suit, a 7mm hood, dry gloves and almost 20 kg's of lead strapped around each of our waists, we looked a bit like the resident penguins when waddling around on the ice.

Some divers were more apprehensive than others about getting into the icy cold water. Just having to gear up in this much equipment is an experience in itself, and can take some time, but eventually we all entered the water. Perth PADI Instructor, Mark Walawski, was among the first divers to enter the big chill. Mark reflected upon the dive, while defrosting in the warm Antarctic sun after the historical dive. "During the first few minutes of the dive the burning pain you experience when you submerge your exposed face into the icy water was almost unbearable. Once you fight through that, the feeling in your face goes numb, but when a group of playful penguins surrounded us, we forgot all about the cold and pain for awhile. After half an hour in the freezing water, the pain from the cold started again, this time it included the fingers and toes. However, it was a sensational experience worth it all." Mark continued, "We have just dove in Antarctica for the first time, there is more to come and I just can't wait."



Photography Courtesy of Oceanwide Expeditions

During our crossing back home over the Drake Passage towards Cape Horn, Jan Brown explained, "All the dive sites we went to offered different experiences - shore dives over small boulders with fine kelp and penguins, a steep wall falling away to the deep icy blue, Zodiac dives beside icebergs, and a dive beside an active volcano at Deception Island. I was also amazed at the diversity of wildlife that flourished on the shores, and in the subzero waters of Antarctica. Everywhere we looked there were seals and millions of penguins. Under the water we encountered the most beautiful colored sea stars, some with a hundred arms, nudibranch, sea urchins, sea anemones, giant sea spiders and sea lice, lobster krill, kelp, limpets, and bizarre looking fish." Jan continued her excitement, "To be able to visit Antarctica was a wonderful experience, but to be able to go as explorers, as we did in a small way, was a major life experience.

The trip to Antarctica was not just about diving. The diving was more like an added bonus when compared to the trip as a whole. Sydney located, PADI Divemaster Linda Thomson explained, " One of the highlights of the trip was when a pod of Killer whales frolicked within a hundred yards of the bow of our ship. The call went over the speakers and we all rushed out to watch in awe, many of us neglecting to grab our parkas in our excitement. We were frozen solid within minutes but no one was budging until the Orca's sped off somewhere else on their own mission." Linda elaborated, "Antarctica itself was phenomenal, the purity and grandeur defies description. The penguins and seals were so unafraid of us, as if were given a glimpse of what the Garden of Eden might have been like."

During our weeklong stay in Antarctica we completed more than half a dozen unforgettable scuba and snorkel dives. When filming penguins underwater, snorkelling proved to be the method of choice since we found that these rotund waterbirds were shy to the exhaust bubbles created by our regulators. The small flightless penguin looks very awkward when walking about on land, but under water it is a totally different story. Using their otherwise useless wings for propulsion the penguins zoomed in high speed past us, making it very hard for us to frame them through the viewfinder of our cameras. Whether on land or under water, penguins are a true delight to watch.

Diving around icebergs was another highlight of the trip. Even before entering the water one knows he/she is in some kind of paradise. It is like diving a huge endless wall of crystals. The play of light against the ice, the sunlight spilling colors everywhere, rainbows dancing off the cracks and crevices. The ice forms into amazing shapes under water, like cathedrals, caves and giant golf balls. It is a dream to most divers to be out there breaking new ground, finding and exploring new dive sites, places that no one has ever dove. This is what diving in Antarctica is all about and will continue to be for many years to come. The place is enormous, unspoiled, and totally undiscovered by divers. The number of divers visiting Antarctica will always be limited due to the short season and the distance, but we now know that it is possible and accessible.

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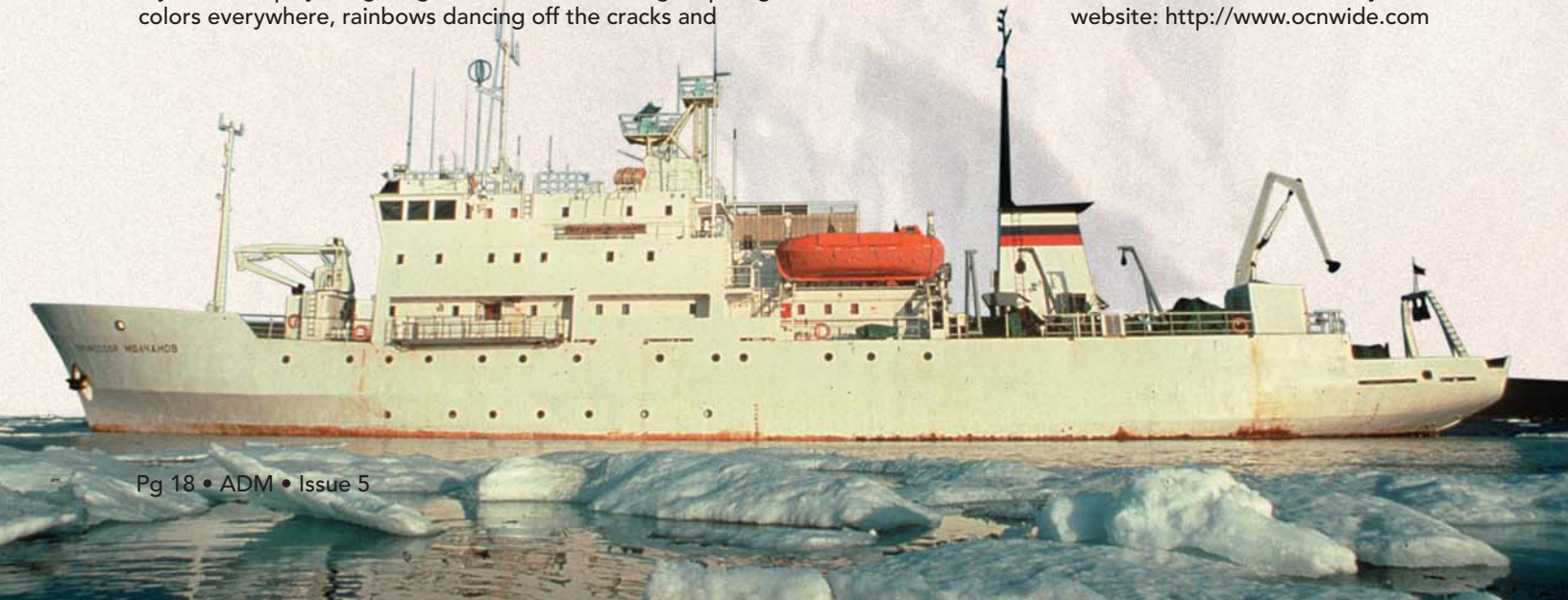
Houston, TX 77032.
1-800-453-7245, fax: 281-987-1140,
e-mail: oceanwh@infohwy.com
website: http://www.ocnwide.com



SILVER BANK

HUMPBACK WHALE FILMING EXPEDITION

By Curt Bowen and Wes Skiles

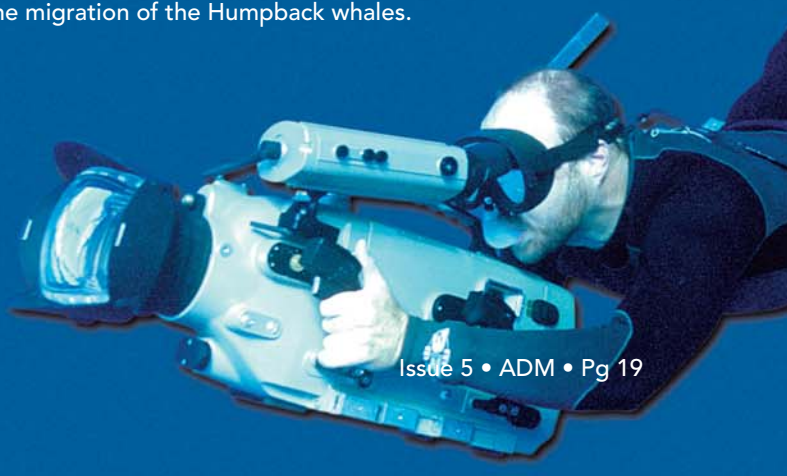
Slipping quietly into the water from the side of the rubber zodiac with my Nikon N90 in hand, locked in its Aquatica housing, I was ready for some shots of a lifetime. My ears sank below the water's surface and for the first time in my life, my head was filled with the musical rhythm of high-pitched wines and low grumbles of the whale song. The powerful vibrations seemed to penetrate into my inner core and become increasingly intense as I slowly drifted towards a giant, dark blue object suspended fifty feet almost directly below me.

Motionless, I patiently waited for the 50 foot, 35-ton mammal to finish its breathing cycle and surface for another breath. Temptation to dive down and snap a few quick photos of the sleeping animal was hard to overcome. However, according to the crew aboard the M/V Ocean Explorer, who for the past several years have conducted filming expeditions, the whale would quickly feel threatened and move away leaving my companions and I floating alone in open blue water.

A few small bubbles appeared from the whale's blowhole. It's head turned towards the surface. Like a submarine, the whale's bus-size body slowly rose towards me. I fired off twenty quick shots with my 18mm wide-angle lens, which makes the whale appear much farther away than it actually was. The wide-angle lens allowed my camera to get as much of the 50-foot animal into my frame as possible, while also making the water visibility appear clearer. Once the whale surfaced, I pulled my eye away from my camera's eyepiece and the realty of its immense size hit me. Caught up in the excitement of the moment, I found myself within arm's length of one of the largest mammals in the world. A few kicks of the whale's tail fin sent me reeling in a stream of turbulent bubbles as the whale moved away.

Surfacing, I cleared the sea water from my mask and realized that few can claim that they have been a few feet from one of these majestic creatures, let alone had his or her butt kicked by its powerful tail. Move over extreme sport fanatics, now that's an adrenaline rush!

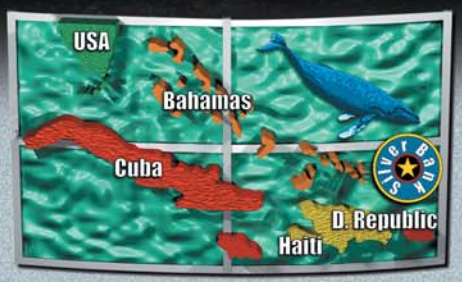
The staff of ADM, Rusty Farst, Jim Rozzi, and I joined world renown underwater film producer Wes Skiles and Larry Curtis, underwater photographer of large mammals, for the first time ever high definition film production about the migration of the Humpback whales.



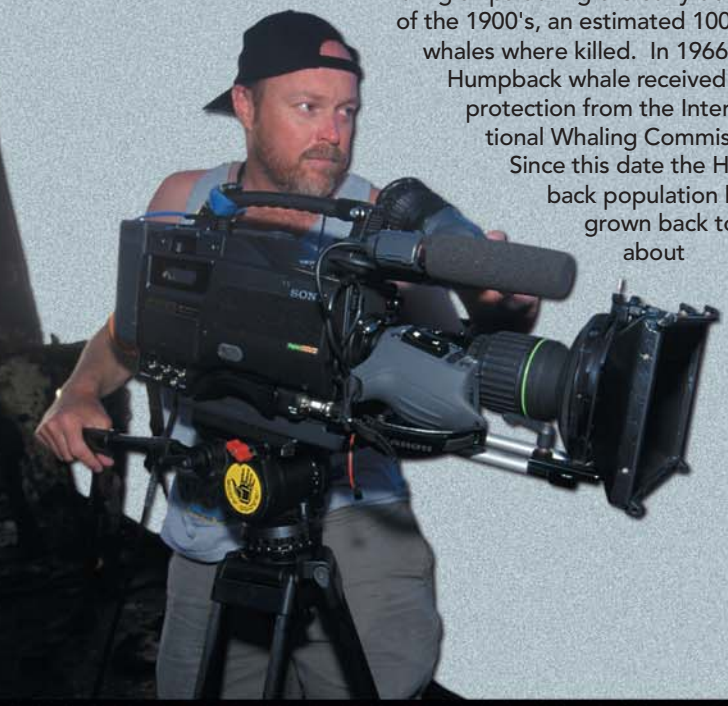
Photography Larry Curtis and Curt Bowen

The sun's rays pierce through the clouds during a stormy morning sun rise.

The setting was the Silver Banks, a large reef system located 85 miles north of the Dominican Republic. Every year, between the months of December to April, thousands of Humpbacks migrate from the northern waters of the Gulf of Maine, Canada, Iceland, and Greenland to the Silver Bank, to these warmer protected waters to procreate and give birth to their calves.



Almost brought to extinction by whaling ships during the early decades of the 1900's, an estimated 100,000 whales where killed. In 1966, the Humpback whale received protection from the International Whaling Commission. Since this date the Humpback population has grown back to about 10,000 animals world wide, with the largest concentration of whales congregating in the Silver Banks every year.



Humpbacks are one of the most energetic whales. Known for their breaching, flipper slapping, and lobtailing, these impressive animals can provide a spectacular white water show and a lifetime shot for any photographer's portfolio. Easily identified by its knobby head and long white flippers, which can reach up to 16 feet long on large adults. The Humpback is propelled seemingly with ease from its extra large fluke (tail), which can produce enough power in just a few kicks to completely remove a 40 ton animal from the water for a spectacular breach.

Moving at speeds from 3-9 mph with short bursts to over 16 mph, the Humpback can travel great distances and for many days without rest. Adults must return to the surface every 15-22 minutes to breathe, while newborn calves must surface every 3-7 minutes. Because of this, Humpbacks became easy prey for whalers with sophisticated cannon harpoons and sonar tracking devices.

Breeding occurs in later winter and early spring while they migrate towards or are in tropical waters. The gestation period is between 11 and 12 months. The calf is born tail first, weighing in at a whopping 2 1/2 tons and over 14 feet in length. The newborn instinctively swims to the surface for its first breath. Within 30 minutes, it can keep pace with its mother.

Photography: Larry Curtis and Curt Bowen

Dominican Fishermen in their dilapidated vessel on the Silver Bank, 85 miles off shore.

Film crew aboard the Ocean Explorer's zodiac, filming the breathing pattern of the Humpback.

Amazing reds and yellows fill the sky during a sunset in the Silver Bank.

Wes Skiles filming the people of the Dominican-Republic and their life-styles.

Like other whales, Humpbacks feed on plankton, schools of small fish and krill. During the period of time while the whales are in the Silver Banks, they do not eat. Only the calves suckle on its mother's fat rich milk.

Wes Skiles organized this filming expedition to test a new high-definition camera system. ADM interviewed Wes about this new technology and how its changing the quality of television.

Wes Skiles:

I got my first real taste of high-definition photography over three years ago when it was first introduced to professional photographers at the annual NAB conference in Las Vegas. At this conference they presented one short underwater clip taken in three feet of water somewhere out in the Pacific Northwest. That clip was all I had to see to know that high definition was going to be part of my future. I recall the image as so vivid and clear, I could practically sense the cold water coming through the screen. The details of the fish in the scene were so crisp and sharp that the illusion that one could actually reach out and touch it was compelling. Next was a shot of an eagle flying within a fjord, surrounded by awesome redwoods. Instinctually, I breathed deeply expecting to inhale the rich aroma of the trees and their surrounding elements. It seemed as though the scene was a magic portal that swept the vision from its surroundings. Only contact with monitor screen broke the spell that had quickly captured the visual imagination.

Upon my return to Florida I contacted my dear friend and equipment designer Val Ranetkins of Amphibico about the possibility of building housing for the Sony HDW series. It took a bit of arm-twisting and a second motion by George

Wes Skiles slips beneath the waves for a high definition face-to-face whale encounter.

Lucas. Lucas confirmed my belief that this was much more than a new camera; it was a whole new way to experience the world. Shortly after this vote of confidence, Val began work on the housing for the first underwater high-definition system. I was thrilled by the prospect of moving into the new landscape of digital cinematography, but at the same time, nervous about the potential learning curve.

The new high-definition cameras are more like complex keyboardless computers fitted with a lens rather being viewed as video cameras. After twenty years of shooting film and video, it is an odd sensation to hear a hard drive spin close to your head while you are shooting. Unlike typical video cameras, HiDef systems have set-up cards that allow the user to write complex-color correction data to a disc. In turn, this allows the user to create "looks" for different scenarios. This is extremely useful underwater, where water filters out a majority of the most vibrant and brilliant colors of that world. Each diving situation may require a different set-up to realize optimum quality. A skilled and well-informed operator can correct all problems associated with blue, green, or gray water, multiple Kelvin light sources, caves, and deep water. Overriding automatic functions, one can make many additional corrections. This is extremely valuable to purists who like to make critical decisions about exposure and color balance. One of the greatest benefits of this system is its ability to "learn" about personal preferences and to store that information permanently in memory. Unlike most other video cameras, the HiDef camera is capable of morphing into a look and feel that best suits the user or client. Film lovers will also be impressed at just how close these cameras can come to making them believe it is film they are watching.

To join in on future whale, shark, dolphin, and blue hole expeditions contact M/V Ocean Explorer.

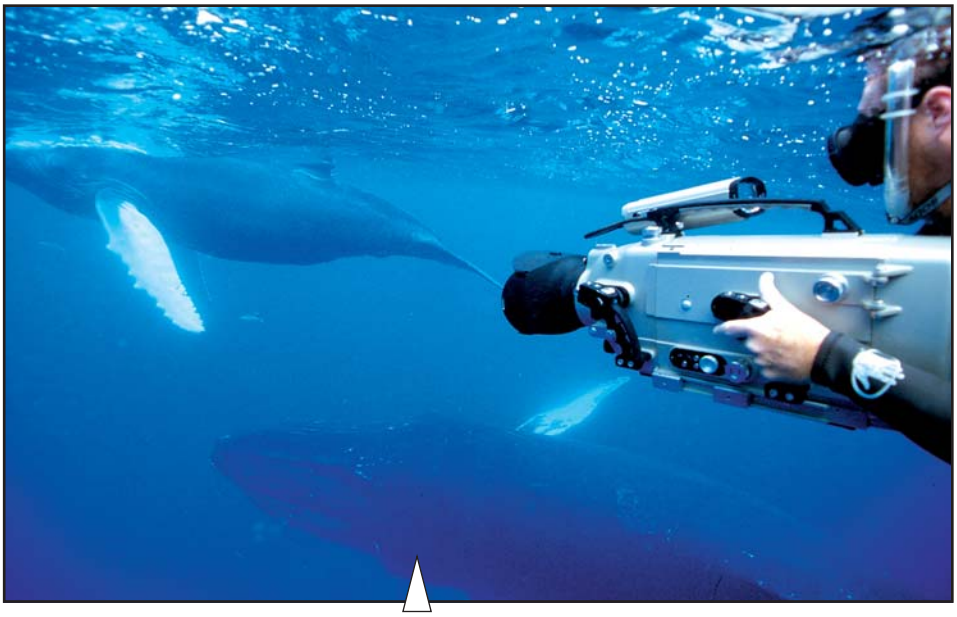


Photo: Larry Curtis

Wes Skiles shoots the mother Humpback and her calf with the newest in digital high-definition cameras secured in a prototype Amphibico underwater housing.

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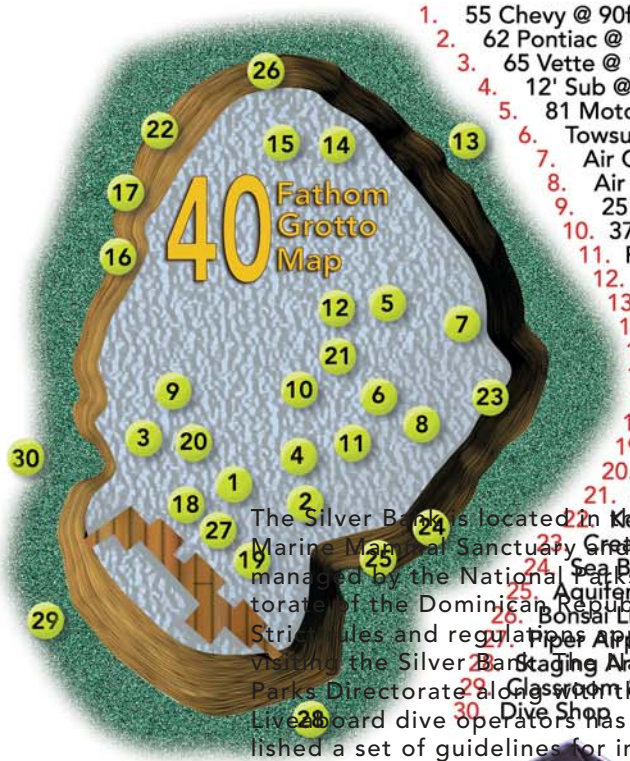

1. 55 Chevy @ 90ft.
2. 62 Pontiac @ 100ft.
3. 65 Vette @ 110ft.
4. 12' Sub @ 80ft.
5. 81 Motor Cycle @ 40ft.
6. Towsub @ 60ft.
7. Air Chamber @ 35ft.
8. Air Chamber @ 32ft.
9. 25' Cabin Cruiser @ 110ft.
10. 37 Chevy @ 140ft.
11. Falcon/Nova @ 150ft.
12. Chevy Van @ 150ft.
13. 28 Chrysler @ 200ft.
14. 53 Dodge @ 175ft.
15. 64 Corvair @ 187ft.
16. 62 Olds @ 200ft.
17. VW Bug @ 210ft.
18. 8 x 16 Platform @ 15ft.
19. 8 x 16 Platform @ 30ft.
20. 8 x 16 Platform @ 40ft.
21. 8 x 16 Platform @ 60ft.
22. Key Hole Cave @ 236ft.
23. Creature Cave @ 55ft.
24. Sea Biscuit Cave @ 50ft.
25. Aquifer Entry Cave @ 100ft.
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The Silver Bank is located in the Marine Mammal Sanctuary and is managed by the National Parks Directorate of the Dominican Republic. Strict rules and regulations apply when visiting the Silver Bank. The National Parks Directorate along with the Liveaboard dive operators has established a set of guidelines for interacting with the Humpback Whales. All vessels engaged in whale watching must have a valid permit from the National Parks Directorate. The following guidelines ensure the safety of the whales and participants.

WHALE WATCHING REGULATIONS

1) All participants are given a briefing, which describes how to approach the whales.
2) The vessels should move parallel to the mammals and maintain the same speed and direction.
3) It is not allowable to approach a whale or group of whales head on.
4) Only three vessels watching the same group of whales at the same time.
5) All the vessels must stay parallel to the whales and should avoid surrounding

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BACK MOUNT•SIDE MOUNT
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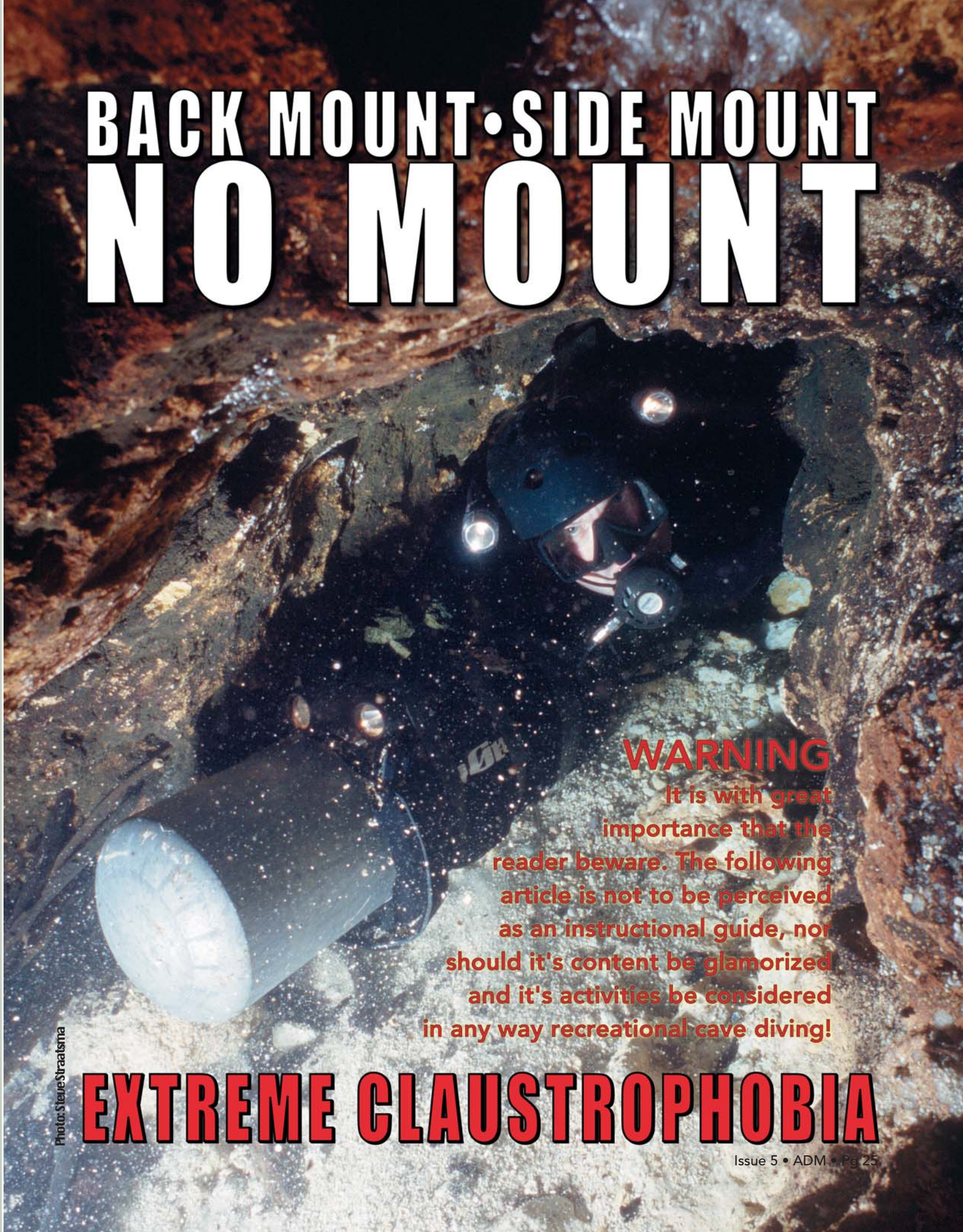
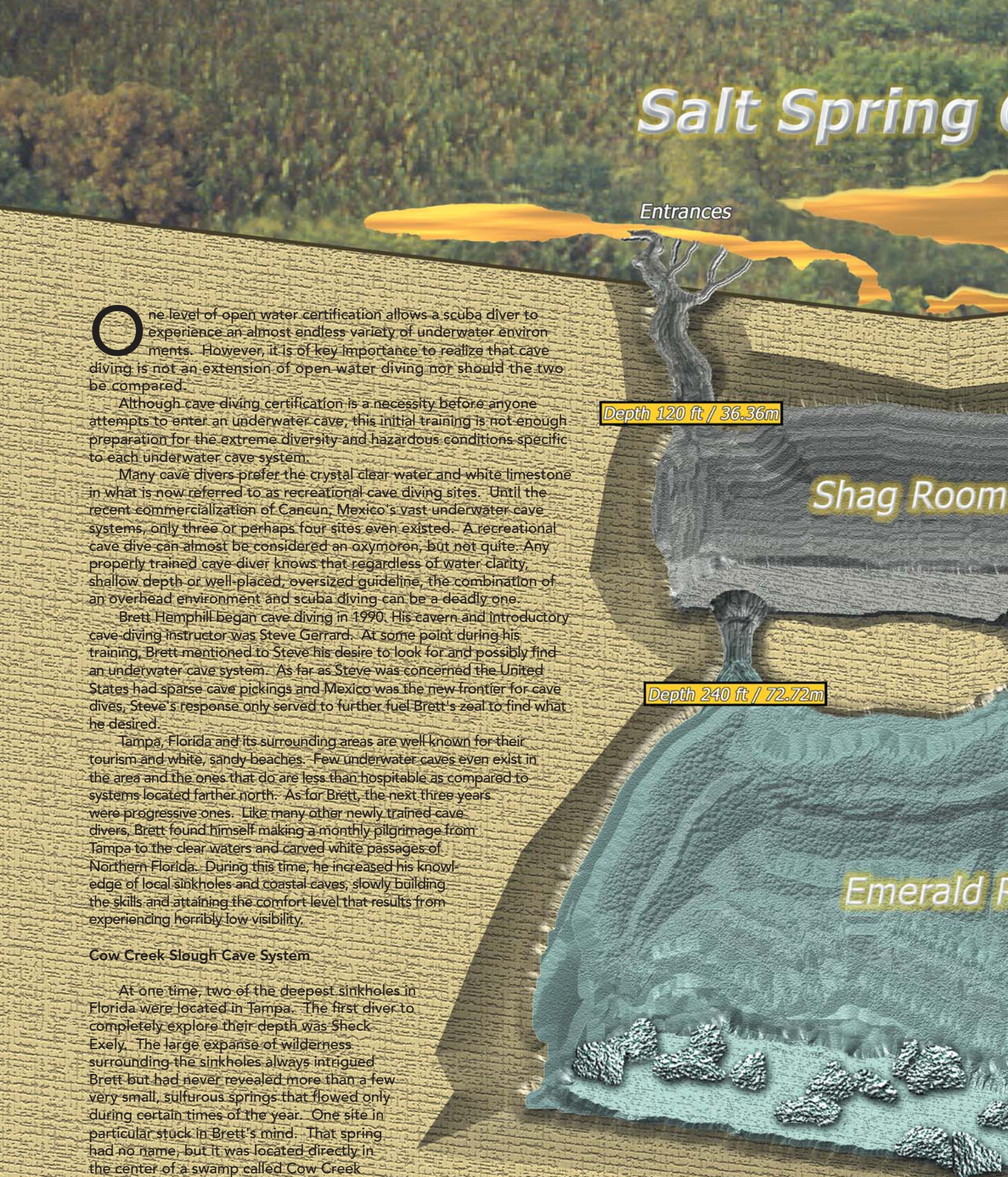


WARNING

It is with great importance that the reader beware. The following article is not to be perceived as an instructional guide, nor should it's content be glamorized and it's activities be considered in any way recreational cave diving!

Photo: Steve Straatsma

EXTREME CLAUSTROPHOBIA



One level of open water certification allows a scuba diver to experience an almost endless variety of underwater environments. However, it is of key importance to realize that cave diving is not an extension of open water diving nor should the two be compared.

Although cave diving certification is a necessity before anyone attempts to enter an underwater cave, this initial training is not enough preparation for the extreme diversity and hazardous conditions specific to each underwater cave system.

Many cave divers prefer the crystal clear water and white limestone in what is now referred to as recreational cave diving sites. Until the recent commercialization of Cancun, Mexico's vast underwater cave systems, only three or perhaps four sites even existed. A recreational cave dive can almost be considered an oxymoron, but not quite. Any properly trained cave diver knows that regardless of water clarity, shallow depth or well-placed, oversized guideline, the combination of an overhead environment and scuba diving can be a deadly one.

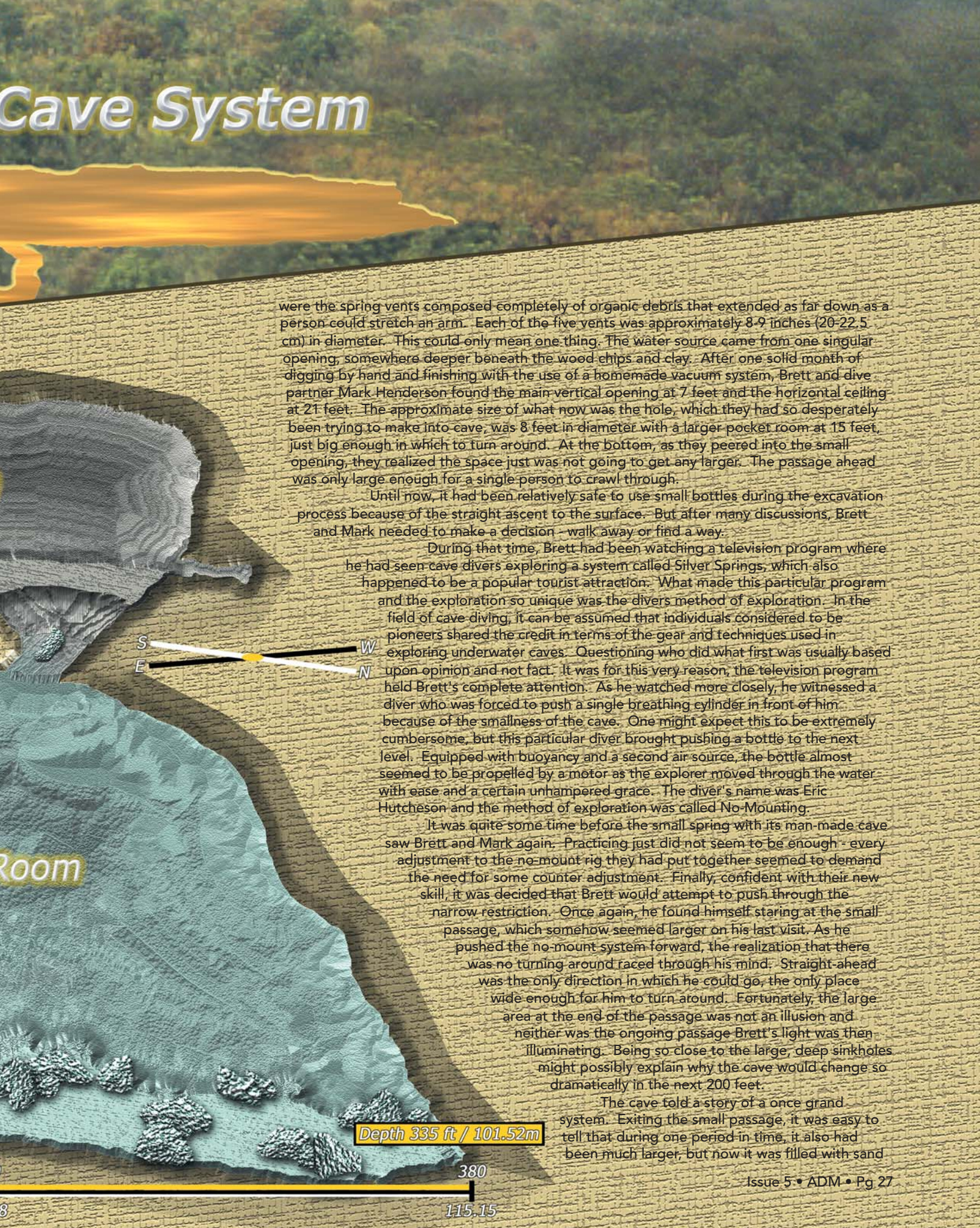
Brett Hemphill began cave diving in 1990. His cavern and introductory cave-diving instructor was Steve Gerrard. At some point during his training, Brett mentioned to Steve his desire to look for and possibly find an underwater cave system. As far as Steve was concerned the United States had sparse cave pickings and Mexico was the new frontier for cave dives, Steve's response only served to further fuel Brett's zeal to find what he desired.

Tampa, Florida and its surrounding areas are well known for their tourism and white, sandy beaches. Few underwater caves even exist in the area and the ones that do are less than hospitable as compared to systems located farther north. As for Brett, the next three years were progressive ones. Like many other newly trained cave divers, Brett found himself making a monthly pilgrimage from Tampa to the clear waters and carved white passages of Northern Florida. During this time, he increased his knowledge of local sinkholes and coastal caves, slowly building the skills and attaining the comfort level that results from experiencing horribly low visibility.

Cow Creek Slough Cave System

At one time, two of the deepest sinkholes in Florida were located in Tampa. The first diver to completely explore their depth was Sheck Exely. The large expanse of wilderness surrounding the sinkholes always intrigued Brett but had never revealed more than a few very small, sulfurous springs that flowed only during certain times of the year. One site in particular stuck in Brett's mind. That spring had no name, but it was located directly in the center of a swamp called Cow Creek Slough. What made this site so intriguing

Illustration: Michael Hemphill



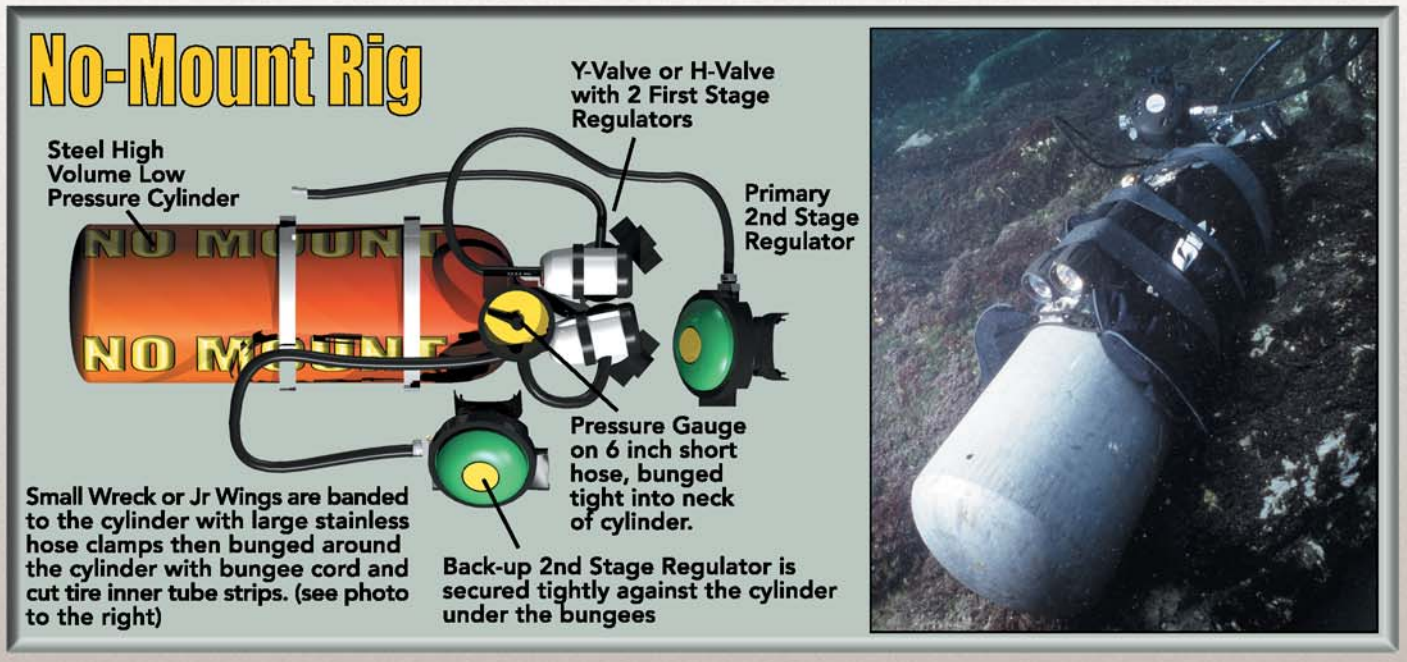
were the spring vents composed completely of organic debris that extended as far down as a person could stretch an arm. Each of the five vents was approximately 8-9 inches (20-22.5 cm) in diameter. This could only mean one thing. The water source came from one singular opening, somewhere deeper beneath the wood chips and clay. After one solid month of digging by hand and finishing with the use of a homemade vacuum system, Brett and dive partner Mark Henderson found the main vertical opening at 7 feet and the horizontal ceiling at 21 feet. The approximate size of what now was the hole, which they had so desperately been trying to make into cave, was 8 feet in diameter with a larger pocket room at 15 feet, just big enough in which to turn around. At the bottom, as they peered into the small opening, they realized the space just was not going to get any larger. The passage ahead was only large enough for a single person to crawl through.

Until now, it had been relatively safe to use small bottles during the excavation process because of the straight ascent to the surface. But after many discussions, Brett and Mark needed to make a decision - walk away or find a way.

During that time, Brett had been watching a television program where he had seen cave divers exploring a system called Silver Springs, which also happened to be a popular tourist attraction. What made this particular program and the exploration so unique was the divers method of exploration. In the field of cave diving, it can be assumed that individuals considered to be pioneers shared the credit in terms of the gear and techniques used in exploring underwater caves. Questioning who did what first was usually based upon opinion and not fact. It was for this very reason, the television program held Brett's complete attention. As he watched more closely, he witnessed a diver who was forced to push a single breathing cylinder in front of him because of the smallness of the cave. One might expect this to be extremely cumbersome, but this particular diver brought pushing a bottle to the next level. Equipped with buoyancy and a second air source, the bottle almost seemed to be propelled by a motor as the explorer moved through the water with ease and a certain unhampered grace. The diver's name was Eric Hutcheson and the method of exploration was called No-Mounting.

It was quite some time before the small spring with its man-made cave saw Brett and Mark again. Practicing just did not seem to be enough - every adjustment to the no-mount rig they had put together seemed to demand the need for some counter adjustment. Finally, confident with their new skill, it was decided that Brett would attempt to push through the narrow restriction. Once again, he found himself staring at the small passage, which somehow seemed larger on his last visit. As he pushed the no-mount system forward, the realization that there was no turning around raced through his mind. Straight-ahead was the only direction in which he could go, the only place wide enough for him to turn around. Fortunately, the large area at the end of the passage was not an illusion and neither was the ongoing passage Brett's light was then illuminating. Being so close to the large, deep sinkholes might possibly explain why the cave would change so dramatically in the next 200 feet.

The cave told a story of a once grand system. Exiting the small passage, it was easy to tell that during one period in time, it also had been much larger, but now it was filled with sand



and debris due to the lack of flow. The rest of the system would tell the same story. Two large rooms were filled almost completely with light green silt, their ceilings covered in bacterial stalactites. Near the end of the system, one final passage headed down to a ceiling that continued on but the floor contained silt so loose and deep that a diver could completely submerge his or herself from head to toe. The once great flow of water that had sculpted the system no longer existed. Within a year, the entrance to the cave had filled itself in completely. Eighty feet down and 295 feet in, an exploration reel still hangs, waiting for the exploration that could have taken place but only a thousand years earlier.

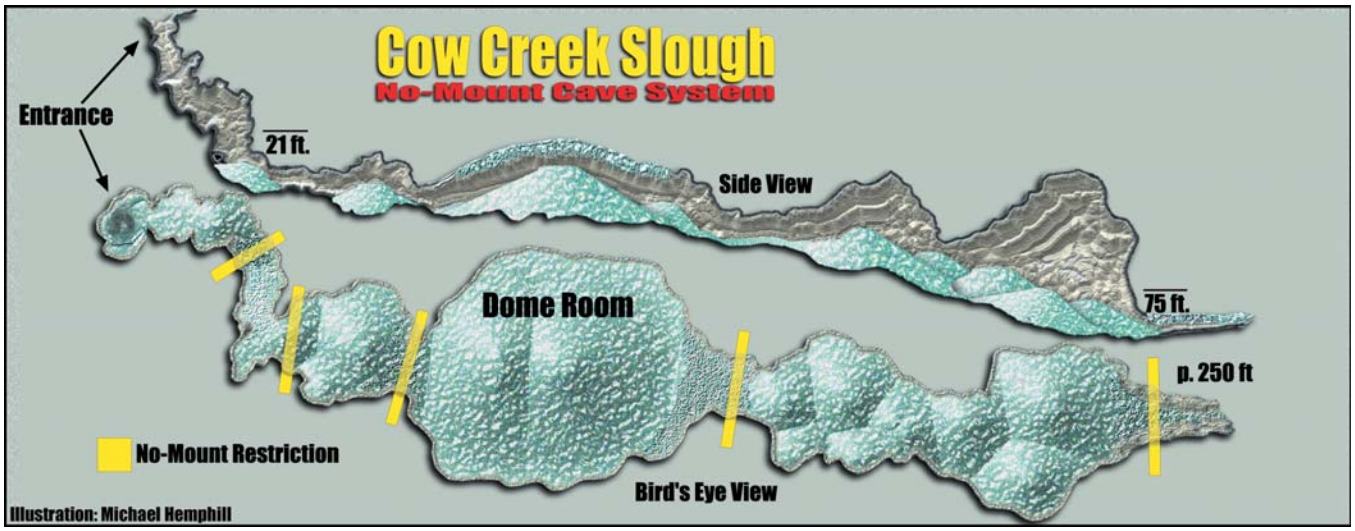
Salt Spring Cave System

Salt Spring is located approximately three-quarters of a mile east of the Gulf of Mexico in New Port Richey, Florida. Although this site was considered to be well known locally, it had never produced more than a few small impassable leads to cave divers over the past 15 years.

Mark Steingard, a long-time friend of Brett Hemphill, mentioned Salt Spring to Bret during the fall of 1997. The springs are spread out along a naturally formed creek, spanning roughly 100 feet between a small pond and coastal lake. The creek bed consists completely of limestone. Within the creek bed, roughly 7 small vents exist, but each is too small for conventional cave diving methods. During high tide, the vents would siphon water into the ground and during low tide, water would spring outward. However, the water never becomes completely fresh.

Brett decided, after snorkeling the spring run, to return to the area with his no-mount rig. He chose to enter the most distant inland spring vent in the creek. A small bit of initial digging was necessary before he was able to slide into the vent. The passage opened quickly within the first 7 feet. He continued to move forward another 5 feet. The passage hooked back hard to the right. Suddenly the floor of the cave system disappeared! Caught off guard, Bret dropped nearly 30 feet before gaining control of his buoyancy. Additionally, the walls were covered in a dark brown

Photography: Steve Straastma
Illustration: C. Bowen



bacterial growth that broke free after each breath left the regulator. As the brown cloud of bacteria descended upon Brett's head, he continued downward into the endless abyss while searching for a possible tie off. Finally, at 90 feet, with still no bottom in sight, he managed to find a tie off.

After a small excavation on the entrance and nearly a year since its original exploration, Michael Garman, Alex Warren and Brett Hemphill returned to Salt Spring to discover and explore one of Florida's deepest cave systems with depths in excess of 300 feet.

Sponsors: American Underwater Lighting, Zeagle

RECREATIONAL WRECKER

By Ed Dilger

The lure of shipwrecks draws the attention of even novice divers who are eager for discovery and adventure.

These submerged hulks of steel and wood provide a time capsule into the past, each having their own intriguing life stories and final demise. In short periods of time these man-made objects draw an abundance of marine life from soft corals to large predator fish. Their darkened hallways, silenced engine rooms, and abandoned crews' quarters provide the experienced underwater explorer with a thrill of discovery.

To the inexperienced and unequipped diver however, these silenced, man-made structures can become a death trap. Many dangers abound on all shipwrecks, such as thousands of feet of fishing monofilament, lost shrimper nets, sharp twisted metal, collapsed decks, dangling electrical wires, and unstable walls. Many divers have perished from becoming entangled, trapped under weakened wreckage, or lost in the interior of shipwrecks.

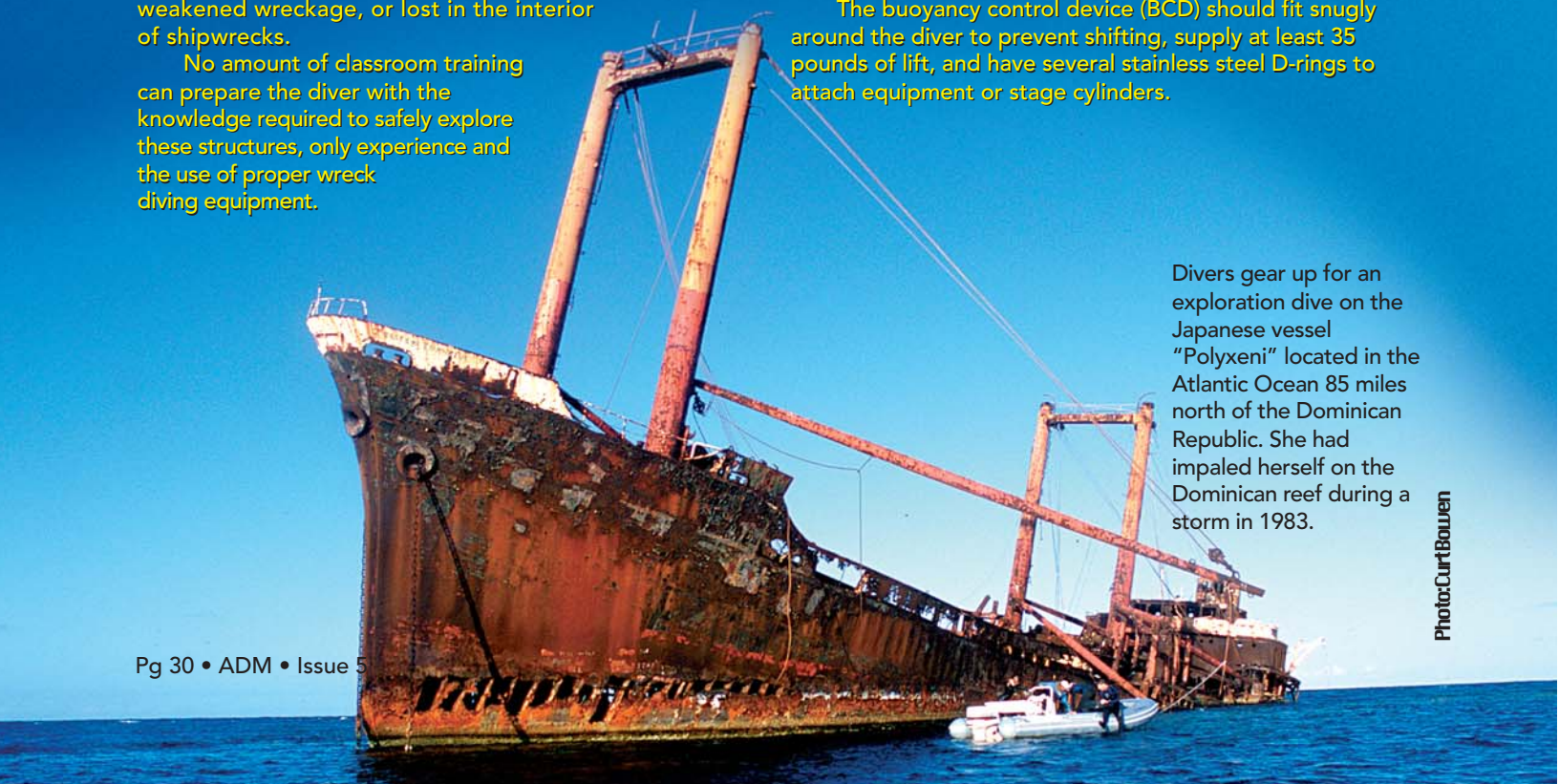
No amount of classroom training can prepare the diver with the knowledge required to safely explore these structures, only experience and the use of proper wreck diving equipment.

Any dive site with the potential of becoming an overhead environment should be treated as such. Overhead environments require all divers to carry a completely redundant air supply, such as a pony cylinder with its own 1st and 2nd stage regulator and two or more light sources. Failure to comply with these simple standards can result in an out-of-air situation deep inside a wreck or a lights out emergency, leaving the ill-prepared diver in a pitch black maze of hallways, rooms, and stairwells.

With the increased chances of entanglement on or in a shipwreck, a diver's equipment should be held tightly against his/her body with the least amount of dangling equipment. This is called streamlining, something that the open-water training agencies or instructors seemed to have lost in their instructional guidelines over the past 15 years.

Streamlining starts with the purchase of proper wreck diving equipment, then rigging it in a fashion that prevents snags.

The buoyancy control device (BCD) should fit snugly around the diver to prevent shifting, supply at least 35 pounds of lift, and have several stainless steel D-rings to attach equipment or stage cylinders.



Divers gear up for an exploration dive on the Japanese vessel "Polyxeni" located in the Atlantic Ocean 85 miles north of the Dominican Republic. She had impaled herself on the Dominican reef during a storm in 1983.

Photo: Curt Bowen

Recreational Wreck Diver Gear Configuration

The Pony Cylinder, not to be confused with a stage tank (used for planned decompression), is filled with the exact bottom gas the back-mounted cylinder contains. The pony is to be used for emergency purposes only and not calculated into the bottom gas volumes. Depending on the dive, it could range from 13cf. to 40cf, the key is not to carry any extra bulk, material that is unnecessary to the dive. Remember that the pony cylinder must contain the volume of gas required to safely remove the diver from the wreckage and to the surface at all times during the dive.

Pony Regulator: The pony cylinder should have its own 1st and 2nd stage regulators. A pressure gauge is not required for the pony, but its pressure should be checked prior to every dive. The second stage regulator should be attached to the diver by a regulator necklace and NOT in a BCD pocket. The necklace will keep the 2nd stage within the life triangle on the diver's chest, making it available at all times in case of an emergency.

Primary Cylinder: The depth and duration of the dive will determine the size of the primary cylinder required. Remember that when in an overhead environment, away from natural light or a quick escape, the rule of thirds applies, even in a wreck! The rule of third states that when entering an overhead environment, the diver should only use 1/3 his/her air supplies to penetrate in, leaving 2/3 for a safe exit. This should allow ample time in the case of entanglement, out of air emergency, or becoming lost within the wreckage. In recreational wreck diving, only one large cylinder is used and not a set of doubles as a diver would in a cave. Upon entering the wreck, the diver should calculate the rule of thirds to determine his/her turn around pressure. The primary regulator second stage can be either a short or long hose, however, the long hose (5-7 ft.) would be the preferred. In the case of a total equipment failure or a complete out-of-air emergency where the pony cylinder was also empty, the divers may have to share air. A long hose will allow the divers to exit in single file, thus allowing for easier negotiation of doors, stairwells, and tight wreckage.

Tank D-Rings: Two 3" stainless D-rings can be attached to the bottom of the primary cylinder with two stainless hose bands. The D-rings should be positioned, one on each side close to the diver's body, helping to prevent possible snags. These D-rings can be used to attach reels, lights, etc., to help prevent equipment from dangling in front of the diver's body.

Wreck reel: A reel containing at least 200 ft. of #36 line. This is used when penetrating deep into an unknown wreck, allowing the diver a known exit or escape route. It is also used to send a liftbag to the surface if drift decompression is required. This reel can be attached to the tank D-ring to help prevent it from becoming entangled.

Lift Bag: A 50-pound capacity lift bag for emergency drift decompression should be tucked between the diver's cylinders and his/her back. Bungee cords can hold it in place, while some manufacturers produce a small pouch system that allows for tight-bag storage and easy deployment.

Pressure Gauge & Compass: Large consoles containing pressure, depth, compass, slate, dive knife are large and bulky and should not be used for wreck penetration. They are easily snagged and in tight situations hard to maneuver. The wreck diver should have only a small round pressure gauge and maybe a compass attached to the high-pressure hose. This hose should be pulled in tightly, clipped in against the diver's body, and in a location easy to reach and read.

Cutting Device: The main cutting device of a wreck diver is not his/her utility (Rambo) knife normally attached to the inside of his/her leg. It's a small, very sharp line-cutting device able to cut 3/8 line with ease, and is attached to the diver's upper chest where it is easy to reach. Wire shears are suggested when diving a shipwreck. Electrical wires and steel fishing leaders are impossible to cut even with the sharpest of knives.

Dive Decompression Computer: A wrist-mounted dive computer is suggested for ease of viewing while in tight, low visibility areas.

Dive Lights: Wreck divers should carry a minimum of two lights when penetrating a wreck. One being either a large hand-held light or preferably a canister light with a light handle. HID lights will provide the brightest, longest lasting light available today. The backup lights should be small and easy to store. They should be easy to retrieve in case of an out-of-light situation. Avoid helmet-mounted lights, they drastically cut the visibility within a wreck by bouncing the silt particles back into the diver's eyes.

All other desired equipment, such as slates, goody bags, cameras etc., should be thought out and attached where they are least likely to become entangled while on or in the wreck. Rule for wreck penetrations: If you don't absolutely need it, don't take it!

Wreck diving can be fun, exciting, and provide some of the best photography opportunities and underwater experiences. Streamline equipment before going wreck diving again!

LOST MINES OF WISCONSIN

By Tamara Ebert, Keith Meverden, Aaron Gesell

The lead/zinc-mining era came to Southwestern Wisconsin with the signing of the 1827 Winnebago Peace Treaty at Fort Crawford. With the signing of this treaty, settlers began rushing into the Mississippi Valley with hopes of striking it rich. As more and more miners flocked to the hollows in search of fame and fortune, towns with names such as New Diggings, New Prospect, and Lead Mine sprang up along the way. In 1848, many of these mining operations closed down due to a cholera epidemic and the Gold Rush in California began drawing early residents away. With resurgence in prices, however, several miners returned to the hills, and mining operations continued in the area well into the mid-1960s. Although very few active mines remain, it seems as though every small town in Wisconsin's driftless region now has its tour mine, where guides explain the local history of the town and early lead/zinc mining. Many of the old mines are now boarded up and closed to the public. However, many others were partially or entirely flooded, now appearing as little more than a small pond lined by dairy cattle in a farmer's field. Enter the divers.

In March 1999, Aaron Gesell and I (Tamara Ebert) were driving through the Wisconsin countryside in search of new springs to dive. Several weeks had passed since our last cave diving trip to Northern Florida. Moreover, the previous weekend of searching for springs in Missouri had been disappointing. On this day we followed a stream along an old roadbed back into a hillside. We discovered the mine known as the Frances Piquette Mine #1. After securing permission from the landowner, we suited up to check the prospect of our discovery.

The entrance to the mine is now a small pond in the hillside, and as we swam away from the shallow end of the pond, we followed the bottom to 30'. Steep walls were on either side, and as we swam into the dark shadows of the steep hillside toward the far wall of the pond, we found that for which we had been looking. The large, wide mouth of the mine loomed out of the wall with an enticing blackness. Large steel bars had been placed across the mouth of the mine to keep vehicles from driving into the mine prior to its being flooded. The spaces between the bars were wide enough to allow the passage of a diver wearing back-mounted doubles and stage bottles. We tied off a reel to one of the bars, turned on our lights, and swam into the tunnel. As the line spun off, and the third exploration reel was emptied, we realized that this was more than we had expected. It was time to set goals for the project and develop a team to explore it.

We had no idea how far the tunnel extended into the hillside, or what kind of artifacts may remain inside the mine. Therefore, our first goal was to discover the layout of the mine and what, if any, artifacts were present. The assembled main dive team consisted of Tamara Ebert, Aaron Gesell and Robert Clark, with support from divers Keith Meverden, Jerry Ebert, Alan Ebert, and Craig Carlson. We began a more thorough exploration, which lasted throughout most of 1999. In our explorations, we discovered that the main entrance tunnel split into two separate mining sections at a penetration distance of 600', and a water depth of 65'. From this point, the northernmost tunnel ascends into an older, shallower section of the mine, while the southernmost tunnel descends into a newer and deeper section. The main

Illustration: C. Bowen

entrance tunnel consists of a rectangular cut approximately 10' high by 20' wide. The floor and walls of the tunnel are smooth, with a gradual descent from a depth of 30' at the mouth to 110' in the deeper, southern section. The ceiling of the tunnel is also smooth, but instead of a gradual descent, there are abrupt angular drops in the ceiling as the mine descends deeper into the hillside.

In the older, shallower section to the north, a line had been laid to a distance of 1500'. Depths in this section range from 65' to 10' deep. In the shallower passages, it is possible to surface into air pockets and large air rooms the size of football fields which appear with air that is surprisingly fresh and breathable. Quartzite lines the walls and stalactites can be seen forming from the ceilings in these air sections. Many discoveries of artifacts have been found here, including five ore cans, shovels, several wooden crates, light bulbs and fixtures, pipes, a pair of gloves and several old glass bottles. This section also includes two shafts, the Wilson and Gills Shafts. The Wilson Shaft is a vertical shaft that is 6' x 6' square that ascends from 65' to the surface, and from there it extends another 10' to an entrance that is capped with a trapezoid-shaped wooden cover. The Gills Shaft is backfilled and not explorable.

The newer, deeper section to the south ranges in depth from 65' to 110', with the vast majority of the tunnels at the 100' level. Line has been laid to a distance of 3600', and the tunnel continues on from there. This deeper section represents the more recent area of the diggings. More modern artifacts are found in this section. Tire tracks still mark the floor as if the vehicles ran in this section of the mine just yesterday. Artifacts found in this section include wooden pallets, wooden boxes, gloves, pipes, bottles and a Shell gasoline container. Many side passages parallel the main tunnel throughout this deeper section, and it is possible to see large numbers painted on the walls of the tunnel.

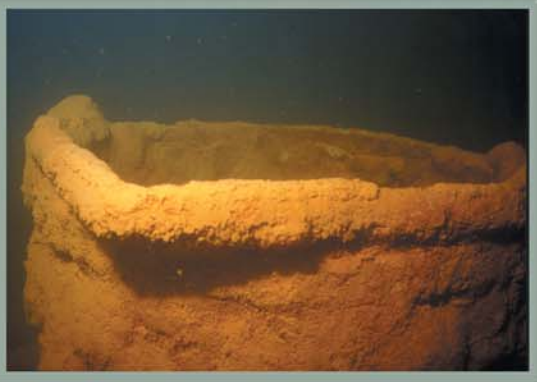
As the length of line installed in the deep section began approaching the 3000' mark, and the dives became increasingly long and complex, we began researching the history of the mine to discover its expansiveness. With the help of local mining historian Mark Langenfeld, we obtained a map of the mine. We learned that we were actually diving the remnants of two separate mines, the older Wilson mine and the newer Frances Piquette Mine #1. Mining began at this location as the Wilson Mine in 1912, and continued until its closing in 1918. The Frances Piquette Mining Company then reopened the mine in 1953. This Piquette prospect resulted in a new entrance that connected with the Wilson mine via a westward driven tunnel, and then continued on to the south/southwest underlying the town of Tennyson, WI. Mining operations continued in the Frances Piquette Mine #1 until 1968, by which time almost 2 miles of underground tunnels had been dug beneath the hillsides. Our assumptions were confirmed that the northern tunnel was indeed much older than the southern tunnel. We also found that we still had quite some distance to go before we walled out the extensive, deep tunnel to the south.

Cave diving techniques were used in the exploration of the mine, but it was discovered that the logistics differ in diving in mines when compared to a natural cave. The most obvious (and usually most difficult) difference is the lack of good tie-offs. The rock walls are basically smooth, and the floors of the mine, once used as highways for trucks, are

Old mining artifacts such as the shovel (left) and the Ore Can (right) can be located throughout the mine. Most all floor surfaces are covered with this orange slime.

Above: Slimes take on the form of Stalactites in the Wilson section of Piquette #1.

Photos by: Robert Clark



completely flat and obstruction-free, therefore, there is an absence of projections on which to tie off. Team members have instead opted for wooden or steel projections, formerly used for running lighting and electrical wires that protrude from the walls. Although this makes for convenient tie-off locations, they also become a potential hazard - entanglement! The wires and lines hanging from the ceiling are an ominous threat to the divers, and although the passages are relatively large and square, care must be taken while scootering to avoid some of the low, angular drops in the ceiling.

Water temperatures hover around 47 degrees Fahrenheit year-round, forcing the divers to take precautionary measures against hypothermia. Drysuits inflated with argon, heavy thermal underwear, and thick gloves are necessary equipment. Even with the implementation of scooters, the prolonged exploration dives into the deep tunnel can last well over three hours due to decompression obligations. Additionally, even with precautions, hypothermia is a serious threat and limitation to the dives. Enriched air mixtures and oxygen are now utilized to reduce decompression, and, thus, the exposure to the frigid water.

Due to the lack of water flow within the mine, silt is a major consideration in the already low visibility, which typically ranges from 10 to 20 feet. Compounding the threat from the silt is an orange "goo," or biological slime that grows on the walls, floor, and ceiling. Hanging from the ceiling and walls like drapery, this material is easily dislodged by the bubbles of passing divers, quickly reducing the visibility to zero. Conical mounds of this substance have been found on the floor underneath sampling drill holes in the ceiling. At times resembling coral formations, the slimes seemingly defy gravity, growing out from all surfaces and hanging in motionless suspension. As interested as we were in the composition of this orange substance, we joined efforts with Dr. Jillian Banfield of the University of Wisconsin Department of Geology to collect and examine samples of this organic substance and the surrounding water from within the mine. This proved to be more difficult than anticipated. Our first attempt at collecting this substance involved simply opening a sterile collection jar and scooping the substance into the jar. Unfortunately, we found that as soon as the water surrounding the goo was disturbed, it dissipated into very fine silt that was impossible to collect in any quantity. After a little brainstorming, we came up with the idea of a "slurp gun." This is basically a sterile, open-ended syringe used to suck the substance up, and then inject it into a separate collection bottle for transport out of the mine. Unfortunately, this, too, was not as easy as we had hoped. Not only was it very difficult to capture a quality sample and transfer it intact to the collection jar, the logistics of safely and securely transporting a large quantity of small, floating collection bottles was enormous. We finally developed a combination of our two methods with a sterile, open-ended syringe that could be capped once a sample had been collected and a special collection bag that could securely carry the bottles with minimal effort and loss. This proved to be the best of our three methods and quality samples were finally captured and analyzed.

It was found that the orange goo contains rather unusual iron-oxidizing microbes that tend to be quite elusive and difficult to culture in a laboratory setting, and resulted in much excitement from the scientists working on the samples. The study of this substance is currently being continued, with fresh samples being taken regularly from the mine (for more information, see www.geology.wisc.edu\~jill\tennyson\tenn.html).

Future project goals include documenting and recovering artifacts left in the mine for the landowner, Curtis Fetzek, to donate to a local mining museum located in Potosi, WI. The sampling of the organic slime formations and water in both the Wilson and Piquette sections of Frances Piquette Mine #1 will continue, and the installation of deterrent signs and a locked gate at the entrance will be completed for the increasing numbers of untrained divers showing up at the sight. A second phase of the project involving Frances Piquette Mine #2, located a half-mile to the east, is slated to begin in the spring of 2000. This phase will include the recovery of any remaining artifacts for the mining museum and the sampling of water and slime formations.

This project appreciates the support from Diversions Scuba in Madison, WI for donation of breathing gases (air, enriched air, and oxygen), line markers and exploration line, and "Prevent Your Death" signs donated by NACD, NSS-CDS and PADI.

Photo: Allison J. Mautz

Lost Mines Dive Team preparing for an exploration dive.

Front right to back left
Robert Clark
Tamara Ebert
Aaron Gesell

RGBM
Full Up Phase Model Decompression Tables

By Bruce R. Wienke, PhD
and Timothy R. O'Leary

Since NAUI Technical Operation's release of the ranged trimix RGBM full-up phase model tables, by Dr. Wienke at DEMA, we have been barraged with requests concerning origin, validation, and purchase from all points of the globe. Phase modeling is rapidly gaining worldwide acceptance as an alternative to the dissolved gas models such as Haldane. In the past we have been left with a smorgasbord of Haldane dynamics and discretionary stop insertions that are no longer applicable. This has been evidenced by the collective comments of a very vocal, competent, and experienced technical diving community.

This year will usher in a new era regarding the manner in which we think about compression/decompression and the availability of full up RGBM phase tables, including nitrox, heliox, trimix, and air over the net crossing the alphabet soup of training agencies.

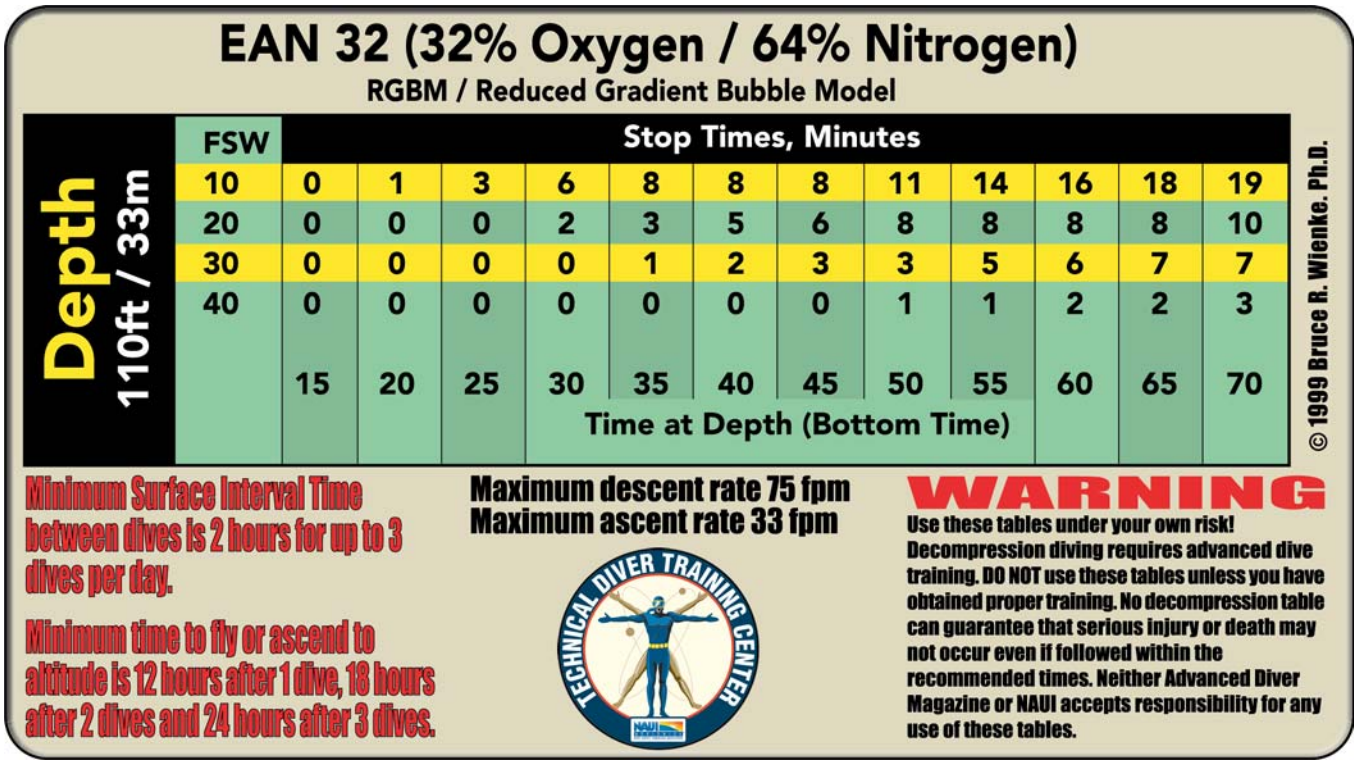
Phase mechanics and bubble dissolution time scales first came to light with the Hawaiian fisherman divers and the Australian pearl divers. Pearling fleets, operating in the deep waters off Australia, employed Okinawan divers who regularly made dives to depths of 300 fsw for as long as one hour, two times a day, six days per week, and 10 months per year. Driven by economics, Le Messurier and Hills observed that these divers developed their own decompression schedules with deeper stops but shorter times than would be called for with the dissolved gas theory. These profiles were entirely consistent with minimizing bubble growth and the excitation of nuclei through the application of increased pressure.

According to Farm and Hayashi, similar schedules and procedures evolved in Hawaii among diving fisherman. Hawaiian divers made between eight and 12 dives a day to depths beyond 350 fsw, making up to three repetitive dives a day. Consistent with bubble and nucleation theory, these divers made their first dive deepest with following excursions shallower. A typical profile might start with the first dive 220 fsw, the next two dives to 120-fsw, and dives 3 band 4 to 60 fsw. Obviously, these profiles literally clobber conventional tables, but when examined within the framework of bubble and phase mechanics, they acquire some credibility.

As Bruce Wienke stated, "Real pioneers very often go without proper recognition. Those of us who follow, reap the benefits of their insight and perspectives, and our benefits of hindsight and modern diving developments. RGBM was built upon the work of Brian Hills and David Yount, skillful work performed on phase mechanics, bubbles, and ultimately, the first translations of their findings to the diving arena and particularly diver staging. They didn't have all the answers (who does), but they underlined the basics. Both applied computer studies and simulations to diving profiles, though much has not been recognized until recently. True warriors, they labored in difficult times, and under enemy fire, so to speak. Hats off to you Brian and David and all your co-workers."

The following information represents important facts about RGBM validation and testing:

1. Counterterror and Countermeasures (LANL) exercises have used the RGBM (full up interative deep stop version) for a number of years, logging some 327 dives on mixed gases (trimix, heliox, nitrox) without incidence of DCI. Thirty-five per cent of these were



EAN 32 (32% Oxygen / 64% Nitrogen)

RGBM / Reduced Gradient Bubble Model

Depth 110ft / 33m

FSW	Stop Times, Minutes											
10	0	1	3	6	8	8	8	11	14	16	18	19
20	0	0	0	2	3	5	6	8	8	8	8	10
30	0	0	0	0	1	2	3	3	5	6	7	7
40	0	0	0	0	0	0	0	1	1	2	2	3
	15	20	25	30	35	40	45	50	55	60	65	70
	Time at Depth (Bottom Time)											

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Minimum Surface Interval Time between dives is 2 hours for up to 3 dives per day.

Minimum time to fly or ascend to altitude is 12 hours after 1 dive, 18 hours after 2 dives and 24 hours after 3 dives.

Maximum descent rate 75 fpm
Maximum ascent rate 33 fpm

TECHNICAL DIVER TRAINING CENTER

WARNING

Use these tables under your own risk! Decompression diving requires advanced dive training. DO NOT use these tables unless you have obtained proper training. No decompression table can guarantee that serious injury or death may not occur even if followed within the recommended times. Neither Advanced Diver Magazine or NAUI accepts responsibility for any use of these tables.

decompression dives, and 25% were repetitive dives without decompression with at least two-hour surface intervals.

2. NAUI Technical Diving has been diving the full up deep stop version for the past two years, some estimated 200 dives, on mixed gases down to 250 fsw without a single DCI hit. This includes a solid week of aggressive diving by NAUI Technical Instructors in Cavailare, France while diving six straight days in cold water and rough seas.

3. Modified RGBM recreational algorithms (Haldane imbedded with bubble reduction factors limiting reverse dive profiles, repetitive, and multiday diving), as coded into SUUNTO, ABYSS, Cochrane decometers lower an already low DCI incidence rate of approximately 1/10,000 or less.

4. A cadre of divers and instructors in the mountainous New Mexico, Utah, and Colorado have been diving the modified (Haldane imbedded again) RGBM at altitude, an estimated 350 dives, without incidence. Again, not suprising since the altitude RGBM is slightly more conservative than the usual Cross correction used routinely up to about 8,000 feet elevation and with estimated DCI incidence less than 1/10,000.

5. Within deco implementations of the RGBM, not a single hit has been reported in the multidiving category. Up to now this encompasses 1000 or more dives.

6. Extreme chamber tests (300 fsw and beyond) for mixed gas RGBM are in the present works. Less stressful exposures will be addressed in the near future.

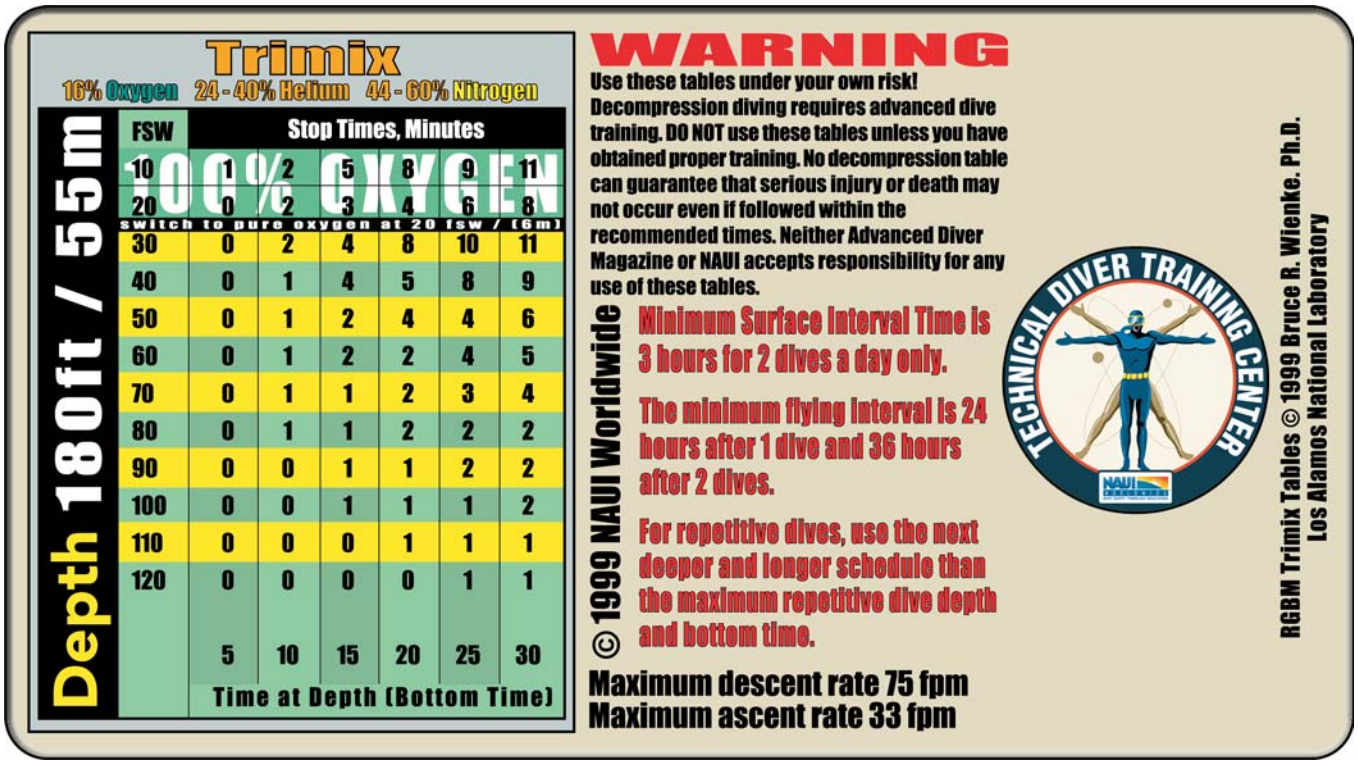
7. Probabilistic decompression analysis of some selected RGBM profiles calibrated against similar calculations of the same profiles by Duke, help validate the RGBM on a computational basis. This suggests that the RGBM has no more theoretical risk than other bubble or dissolved gas models (ala Weathersby, Vann, and Gerth methodology at USN/Duke). This will be reported in a very technical paper/journal.

8. All divers and instructors using RGBM decometers, tables, NET software are being advised to report all their profiles to DAN Project Dive Exploration (Vann and Gerth and many others).

The NAUI Nitrox and Trimix tables contained within this article are full-blown RGBM calculations yielding deeper stops but shorter overall decompression times as compared to Haldane type staging. Ascent maximum ascent rate is 33 fsw/minute (10 msw/minute) and maximum descent rate is 75 fsw/minute (23 msw/minute). These tables are for illustrative purposes only and should not be used without training from a qualified technical diving instructor.

The ranged trimix table is for 16% oxygen and 24% to 40% helium, with a switch on ascent to pure oxygen at 20 fsw (6 msw) to the surface. Should oxygen supply be lost the diver need only double the 20 fsw (6 msw) and 10 fsw (3msw) decompression times and continues decompression on trimix. One repetitive dive is allowed (shallower and shorter) with a minimum of three hours of surface interval. Minimum time to fly surface interval is 24 hours or 36 hours after a repetitive dive.

The EAN 32 tables are based on 32% oxygen (plus or minus 1%) and 68% nitrogen. Minimum surface interval between dives is at least two hours for up to 3 dives.

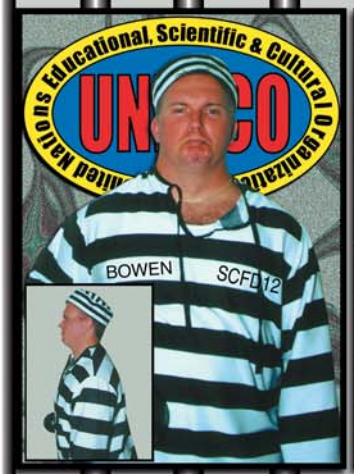


Minimum time to fly or ascend to altitude is 12 hours after one dive, 18 hours after two dives and 24 hours after three dives.

When cutting-edge technology and ideas can be transmitted to minimize risk in such a high-risk arena, these become very exciting times for both divers and agencies (regardless of alphabet soup politics). It seems like only yesterday that nitrox was discussed in Key Largo. Today phase modeling will revolutionize the way we look at decompression physiology regardless of gas mixture.

For more information on phase modeling you may contact NAUI Technical Training Operations at nauitec@aol.com. Ph: 956•761•2030

ARRESTED FOR

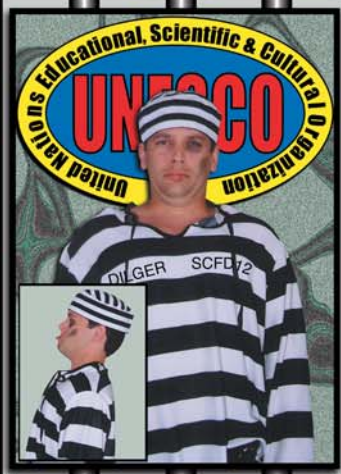


Capt. Curt Bowen

Arrested for researching, diving and documenting hundreds of shipwrecks worldwide for publication in Advanced Diver Magazine.

Steve Cantu

Arrested for removing fishing line, old shrimper nets and trash from local Gulf of Mexico shipwrecks. Pleaded guilty to attempting to clean up the environment.



Ed Dilger

Arrested for planning and organizing artificial reef programs using decommissioned military and commercial ships. Pleaded guilty to attempting to produce fish havens for stressed fishing areas.

Denny Howard

Commercial diver arrested for removing toxic waste, fuel and hazardous chemicals off shipwrecks. Pleaded guilty to attempting to protect our marine environment.

Although the arrests pictured above are false and for entertainment, divers' future rights to dive ship wrecks are truly at stake.

The long-standing view of shipwrecks is that they are abandoned sites whose previous owner(s) is no longer living or who have long since given up any claim of title to that site. A diver's right by admiralty or maritime law of Law of Finds to search the oceans, find and claim title to goods discovered or just to dive for enjoyment wrecks in international waters is now under the gun by international bureaucrats, archaeologists, and other organizations. They want all traces of human existence located under the world's oceans, lakes, and rivers to themselves. These laws will take away the diver's right to remove any man-made object from any body of water for any reason under penalty of law, no matter its insignificance or rate of deterioration.

At dawn on October 24, 1995, the F.B.I., U.S. Marshal's Service, an elite SWAT team, and the Department of Justice burst into the private residence of Peter Theophanis in Jupiter, Florida. Handcuffed and dragged away in front of his pregnant wife, he was jailed without bail as a flight risk and a threat to the community. His crime was the salvage of a former U.S. Navy SBD Dauntless Dive Bomber airplane that had been stripped of any useable equipment and dumped overboard into Lake Michigan in 1942.

In December 1990, New Jersey antique dealer, Richard Steinmetz, facing heart bypass surgery, reluctantly listed for auction his prized artifact, the bronze bell recovered from the shipwreck of the Confederate raider, C.S.S. Alabama. Having purchased the bell from an English dealer, Steinmetz offered to sell the only Confederate ship's bell in existence to the U.S. Naval Academy Museum, but was declined. To his surprise, instead, the NAVY seized the bell, claiming that it belonged to the United States and the government has no obligation to pay Steinmatz for it.

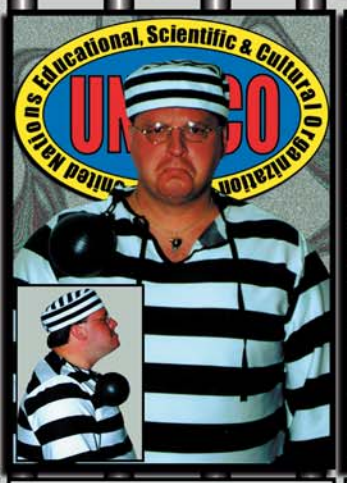
In 1988, an individual's rights to keep any object recovered from any abandoned shipwreck within 3 miles from shore (international waters), rivers, bays, harbors, or lakes (including the Great Lakes) was taken away with one quick stroke of the pen. All materials located within these waters instantly belonged to the state in which they were discovered. The finders keepers rule of the Law of Finds was abolished.

DIVERS LOSE THEIR RIGHT

SHIPWRECK DIVING!

Charlie Nickols

Arrested for teaching NAUI sanctioned wreck diving courses. Pleaded guilty to conducting proper wreck training for openwater dive students.

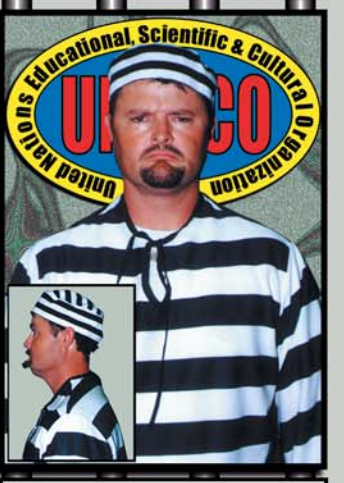


Leroy McNeal

Arrested for producing and selling underwater shipwreck videos. Pleaded guilty to producing high quality, informative videos for education and wreck dive training.

Linda Bowen

Arrested for conducting extensive fish and soft coral counts on sunken artificial reefs. Pleaded guilty to scientific research for marine growth of artificial shipwrecks.



Matt Mong

Arrested for locating, excavating and documenting an unknown Spanish shipwreck in international waters off Florida. Pleaded guilty to 10 years of searching for sunken shipwrecks the government would have never looked for.

Today an international organization known as UNESCO, United Nations Educational, Scientific & Cultural Organization, is attempting to pass a new world law to extending the 3 miles limit to all bodies of water on the Earth. Future laws may also prohibit the right to dive certain shipwrecks with historical value (over 50 years or older) for any reason without proper permits. Their intention is to preserve all shipwrecks for proper excavation by trained archeologists and also to preserve artifacts by the government.

Rights as a diver are by no means guaranteed; it is a must to be ever vigilant to protect them. To sit back and take no action or raise any voice in objection, then all rights to own any piece of maritime history will be abolished. It could even go as far as the government confiscating all artifacts one may have in his/her personal collection or even around one's neck. If this law is passed, it will force all discoveries underground and fuel the already large black market for maritime artifacts, therefore, destroying any chance of proper excavation and documentation of maritime history. Instead of working side-by-side with commercial salvers and recreational divers who make all the discoveries, UNESCO wants all the riches of the oceans for themselves.

We have an organization going to bat for divers' rights. ProSea was created to represent shipwreck explorers by presenting an articulate and diplomatic approach to reversing UNESCO's planned international ban (seage). If this law passes, it would wipe out recreational shipwreck diving as it is known, and drastically effect the dive industries' marketing capabilities.

ProSea is the lone voice in a forest of foreign bureaucrats wishing to stomp out shipwreck sport divers and commercial salvers worldwide. To do so they need help and support to successfully defeat the shipwreck monster and its intent to keep all goods in all oceans for themselves.

Save our rights to explorer the oceans, support ProSea

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Beneath the Top of the World

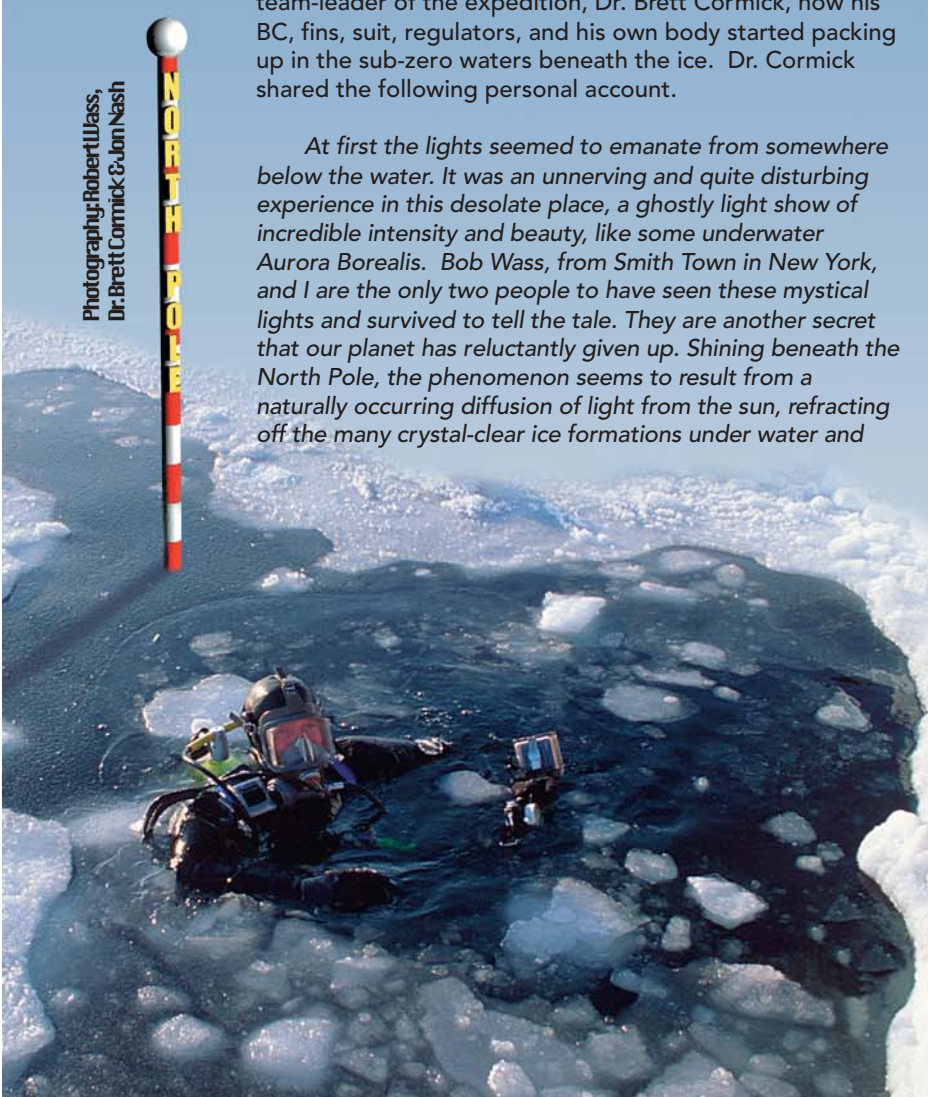
Personal Account by Dr. Brett Cormick
Edited by Curt Bowen

Talk about cold. Two divers have made history as the first to scuba dive beneath the geographic North Pole and return alive. In an exclusive interview, **Advanced Diver Magazine** was able to discover from team-leader of the expedition, Dr. Brett Cormick, how his BC, fins, suit, regulators, and his own body started packing up in the sub-zero waters beneath the ice. Dr. Cormick shared the following personal account.

At first the lights seemed to emanate from somewhere below the water. It was an unnerving and quite disturbing experience in this desolate place, a ghostly light show of incredible intensity and beauty, like some underwater Aurora Borealis. Bob Wass, from Smith Town in New York, and I are the only two people to have seen these mystical lights and survived to tell the tale. They are another secret that our planet has reluctantly given up. Shining beneath the North Pole, the phenomenon seems to result from a naturally occurring diffusion of light from the sun, refracting off the many crystal-clear ice formations under water and broadcast through the ever-moving cracks in the surface ice. I believe it was these lights that were seen by the Russian diver Andrei Rozhkov in April 1998, and which drove him to dive to 5Om, trying to ascertain their source. With the eventual equipment failure, that we must now take as inevitable when diving at the North Pole, his fate was sealed.

Rozhkov was one of the best divers in the Soviet Union, and his was the first attempt to dive at the Pole. The tragedy was heightened by the fact that his support team from Moscow State University, the same group that was to accompany our own expedition a year later, had to sit on his body for three days in a portable oxygen-filled tent-cum-dive-chamber, waiting for rescue during one of the frequent Polar storms that hit the ice at this time of year.

Since Admiral Peary first set foot on the geographic North Pole early this century, a number of people have ventured into this beautiful place. It has a way of drawing you back. I first decided I wanted to dive at the Pole while tumbling through the air above it. On that free fall parachute expedition, I witnessed the breathtaking beauty of the curvature of the Earth. I started to wonder what it would be like to invert myself under the ice and walk beneath it. It took two years of meticulous planning. Diving the North Pole is not something you do lightly. Contrary to popular impression, there is no geographical land mass there. The Pole is simply an assigned point, surrounded by a frozen ice cap some 1200 miles across. This mass of unstable and continuously shifting frozen sea water, between several centimeters and many meters thick, covers a drop of nearly 2 1/2 miles to the ocean floor.



Photography: Robert Wass, Dr. Brett Cormick & Jon Nash

Regulator Freeze-Up

The water temperature in the Polar Ocean is constantly 14° F, and sea water freezes at 0° F. Normal scuba regulators are useless at these temperatures, as their water-regulated air supplies freeze as soon as they hit the water. The external air temperatures of late spring, the most suitable month for weather and ice conditions at the Pole, regularly drop to - 40° F. So the diver has to submerge himself below the freezing water every time he wishes to take a simple breath from his specially constructed regulator because the water is much warmer than the air, and this keeps the air stream from freezing. Additionally, the change in air pressure over the second-stage regulator causes any moisture within the tank to freeze immediately, and stop the flow of air to the diver. So all tanks must be filled in situ, at the exact North Pole itself, or the humidity differential between the air-filling site and 900 North will cause the regulator to fail.

Polar divers also risk being trapped under a vast, moving sheets of ice, miles wide. The tectonic plate-like pressure can move millions of ton of ice cap in an instant, causing the dive hole to close at any time. This is coupled with the constant danger of free-floating underwater ice structures, frequently more than 33 ft. high that separate from the ice cap and drift in the currents beneath the ice. Polar divers must also contend with the powerful currents beneath the floes, which could sweep them miles away or deep under water in minutes. Once lost, they would never be found. ... water temperatures below 36° F trigger survival reflexes. The heart rate drops, breathing accelerates, circulation is restricted to vital organs and muscles fight for heat by shivering. At each declining degree, these reflexes become more and more ineffective. At zero they are useless. If you were to jump off the ice into the Arctic Sea, even in a wet suit, you would be glad to be unconscious in about 40 seconds. You would be dead in two minutes.

Diving in the high Arctic has been going on for years, but none of these dives ever came closer than about 93 miles to the North Pole because of the unique logistical requirements of mounting a Polar diving operation. The only way to get to the Pole is by helicopters from the seasonal ice airport, which is about 50 to 100 miles away on relatively firmer and older ice. The Pole itself is always shifting: one day it might consist of ice as thick as 40 ft, the next day, hundreds of meters of open water.

The divers on this project were Bob Wass from the USA and me, representing the UK. We carried out multiple training exercises in the frozen White Sea during the Russian winter and in the frozen lakes north of Tver, about 120 miles north of Moscow. After extensive testing we decided on two separate diving systems. Our favorite was the common half-mask with double airflow. This comprised a dry suit with neoprene hood, a tank with a V-shaped valve (two entries), and two non-freezing regulators. Hoses from the left side connected to the main pressure gauge and suit inflation valve, while those from the right connected to the octopus and BC. The advantage of this set-up was that it was more familiar to divers.

The second and warmer configuration was a surface-fed air system through a deployment hose. The tanks for the air feeds were to be located in a warming tent on the surface to protect from freezing. The diver carried an additional 3-liter tank and regulator on his back for safety. This configuration had the advantage of allowing constant communication with the diver, thanks to an AGA mask with a built-in microphone connection to the surface, hard-wired to the air-hose feed. The only drawback was that with an AGA only one regulator can be used, and that is the point most prone to freezing.

The main choice of dry suit was Nordic Pro (Trilaminate) with Nordic Pro inner suits (Thinsulate). Trilaminate is still the only material that does not stiffen in sub-zero water temperatures after being exposed to -100° F surface temperatures. For convenience, the Thinsulate inner suits were also to be used as our main working clothes at the Pole while preparing for the dive. The suit could function as a BC should the need arise, but we would always use a BC as

well, with both suit and BC inflated by separate air feeds for additional safety. We used the Sea Quest-Aqua lung Black Diamond, Tusa Imprex Pro 4900, and Spiro Narval.

The regulator first stage had to be isolated from the water, and the second stage provided with a special device to prevent icing and freezing during the dive. We used the Cousteau D Regulator with dry chamber (Supra D Arctic), which had proved very reliable, as well as the Spiro-Aqua lung Automatic Breathing Arctic. The regulators were re-engineered in Moscow to enhance their performance.

Race Against Time

Time and space are the main factors in a Polar dive, and everything must be completed before the fatigue caused by the cold takes away your ability to function, and before the fuel supply for the generator and heater is exhausted. So our idea was to fly in, set up camp some three miles from the Pole, dive quickly as the dive site floated over 900 North, and return to camp. Because of delays caused by the weather, however, we ended up having to make a dash for the Pole with only one helicopter instead of the two we had intended to use. That meant abandoning all survival equipment such as tents, rations, heating gear, sleeping bags, and other necessities, and taking only what we needed to make the dive. The helicopter was forced to withdraw, leaving us, thanks to solar-storm activity, with no means of communicating with base. We were effectively stranded for at least 40 hours. We spent 18 of those hours preparing for the dive, which included erecting the air-filled rubber chamber in which divers would be revived on their return. Without this we would risk going into shock and spasm immediately. With no survival equipment, we had to sleep on the icy Polar surface without tents, relying on our survival suits to protect us from the cold....

The Sun Never Sets

With the sun traveling around our horizon, April 24 was a bright day like every other. We might have had 24 hour sunshine but we also needed 24 hour awareness because the ice was constantly cracking and shifting. One member of the team was always assigned to look out for major cracks developing. These can part in seconds, exposing the ocean below. It took three hours to hack through the ice to form a "lead' the size of a standard door through which to dive. I was alarmed to note that even before I entered the water my BC had failed completely and my fins were curling, cracking and disintegrating, as they had become so brittle. The physical properties of rubber change at - 40°F.

Once under the freezing water, I found I had been unprepared for the sheer visibility and the reality of that 4 kilometer drop into which I looked with awe and foreboding. As I descended, my Russian teammates were already busy breaking up the ice that was reforming overhead. Even a 1 inch layer would prevent me resurfacing, and if my equipment failed, as it inevitably would, I could not survive more than a few seconds. The ice pack was moving visibly towards the dive hole and could cover it under more than a meter of ice in minutes. In the water, first to go were the rubber seals on my dry suit around my neck and left wrist. Freezing water seeped in, sending the left side of my body into spasm. I signaled to the surface team by pulling on my lifeline and was hauled to safety from a depth of 60 ft. I replaced the equipment and made two more descents, experiencing further equipment failure each time and with my left side still in spasm.

My weight belt dropped off towards the end of the second dive, as the metal buckle was burst off by the cold. We estimated that it was still dropping towards the ocean floor some 40 minutes after I had been carried to the dive chamber to recover from the dive. And on the third descent, at about 60 ft, my regulator finally froze, forcing me to turn to my backup. After a few seconds this also failed, so I was forced to take it out of my mouth and signal with four sharp tugs on the lifeline that I needed to be pulled to the surface as fast as possible.

I made a free ascent, expelling excess air. I believe it was Rozhkov's failure to do the same, probably because he was already unconscious, that ultimately killed him. The support team dragged me to the chamber and revived me. Within 10 minutes of the final dive being completed, the shifting ice pack had covered the dive site permanently.

Even after two years preparation, no words could express the beauty and majesty of the ice castles we witnessed floating surreally under water. We saw jellyfish the size of a man's palm, and shrimp, both totally transparent in this new world, ... brown and red seaweed growing on the bottom of the thinner and newer ice. A seal swam by 100 m from our dive position. Amazing to think that it would be there at all, but then again, why not?

Being the first group to dive the geographic North Pole was a life-defining experience. The camaraderie, the previous fatality, and the opportunity to combine years of Polar training with technical diving were irresistible. Perhaps it's a new sport, perhaps not. It doesn't really matter as we are going to do it again later this year.

Continued from Page 15

The preferred way of entering the water above the "monument," which is what the Japanese call it, is a back roll with BC completely deflated. This allows the diver to plunge as fast as possible straight down to an assembly area. The currents can be very strong and a few seconds on the surface prior to descent can move the diver far off course. At the bottom, only 40 feet (12 meters) or so, the diver first swims through a shallow tunnel before being confronted with a rectangular, vertical rock with a straight incision extending all of the way down its 20 foot (6 meter) length. If the incision had continued completely through, the rock would have split into two equal pieces. Schools of fish congregate in this area because it is protected. During my last dive there, a large barracuda hovered above, almost at the surface, until seeing us approach and then swam away. However, it was this particular structure that made me first think that this was a quarry rather than a pyramid, a castle foundation, an ancient port facility or anything else, as others have speculated. The almost divided rocks were apparently in the process of being cleaved in two. The stonecutters had abandoned it in mid-cut, so to speak.

Not everyone agrees with the quarry theory. Professor Kimura believes that the monument may have been intended as an ancient shrine. He thinks that the vertical rock with the incision down its center was possibly some kind of gate marker that indicated the entrance. He also notes the presence of a stone fence around the western edge, with the shallow tunnel through which we entered the area, may have been fashioned in the same manner as entryways to ancient Okinawan castles.

One sees while traveling along the monument, the remarkable angular features that cause all the excitement and causes many of us to conclude that it is man-made, or more properly, "human modified." However, most of the steps are too high for the average-sized person to climb, and there seems to be no coherent plan to the structure. At one time, the upper level could have been the location of a stonecutter camp or village, but the entire megalith itself seems to be carved too haphazardly.

Below the megalith, in a gorge that separates the primary structure from a smaller and less modified one, is a debris field of both natural boulders and large slabs of angular cut rock. There is also a place along the wall, shaped in the form of a semicircle that is completely clear of any rock, including small stones and pebbles. Some of the divers in our party thought that it might make a good meeting place or a site for a campfire thousands of years ago when it was above water. Professor Kimura points out, as additional evidence for the artificiality of the structure, that rocks that would have been carved out during the formation of the structure are not found lying in the places where they should be, if only natural forces were at work. In fact, there would be many more of them in the gorge than there is presently. Additionally, there are no loose slabs or large rocks on any level of the monument itself.

Other significant features include two-meter deep round holes dug into the rock on the upper level, which we thought were ancient cisterns. There is even a slot carved into the rock at the top where one could insert a wooden cover. A symmetrical channel carved in the rock nearby might have provided drainage. Further on, rectangular and

triangular-shaped slabs of raised, angular, shallow rock point at each other. On Okinawa, you see the same thing, although not cut as well, in areas such as Bolo Flats (Zanpa) or Maeda Flats. The Okinawans used to obtain building material by excising rock at low tide. The raised slabs that remain are what they did not cut and haul away.

One sees while nearing the end of the structure, signs of fresh water erosion. The most striking example is a large, cylindrically-shaped hole, about 20 feet (6 meters) deep, which I call the "well." From it, a narrow channel leads toward the gorge. Cut into its upper part, is an absolutely flat ledge where someone could have stepped down to draw water. Finally, at the very end, there is a large oval rock that sits squarely on a flat rectangular platform. It is away from any other structure and looks completely out of place. It points due north. On the island of Kume, just 45 nautical miles west of Okinawa, someone a long time ago placed a remarkably similar rock in a grove of trees. It is called the "Sun Rock," and is thought to have helped ancient people with determining time.

The currents over the monument are intense. That is probably the reason for the lack of coral and other forms of sessile life. It also makes the diving challenging. Divers try to find handholds on the mostly featureless rock while they wait for the moment to move. When they let go, they can be swept along the terraces like leaves blown across a road on a windy day until they find another hold or duck into the lee of an outcropping. The current is unlike others I have encountered; it surges. At times, a diver can maintain his or her position against it. Moments later, one feels his or herself forced backwards, no matter how hard one kicks. One of our team members while traveling with the current, found his mask pulled away from his face momentarily. Even the fish seem to tire and hang out in areas blocked to the current. Yonaguni is not for those who are unsure of their skills and lack composure in difficult water conditions.

Yonaguni is an enigma. Its true nature is obscured by thousands of years and is no longer a part of human memory; it is prehistory. Whoever created the structure we dove on and the others, not only had the motivation but also the means to do so. Obviously, they didn't walk around with their knuckles scraping the ground. To carve rock on that scale took ingenuity, planning, and a surprising level of expertise. The purpose of its creation remains a mystery, and probably will be for a long time to come.

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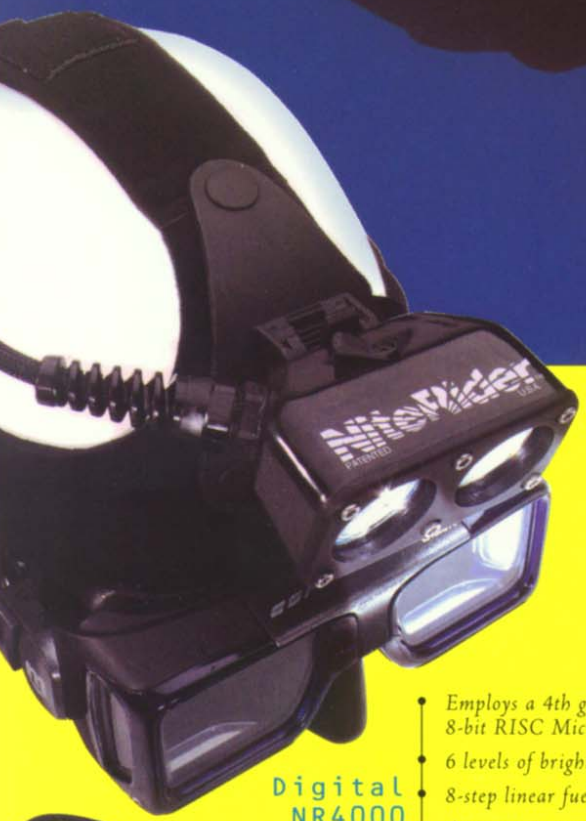
With powerful NiteRider dive lighting, ROY G. BIV becomes a thing of the past. Enhance your dive experience--see vivid detail and color on every dive, day or night. Put powerful light right where you need it. NiteRider makes a variety of hands-free, high-intensity Halogen lighting systems for all dive situations, recreational or professional.

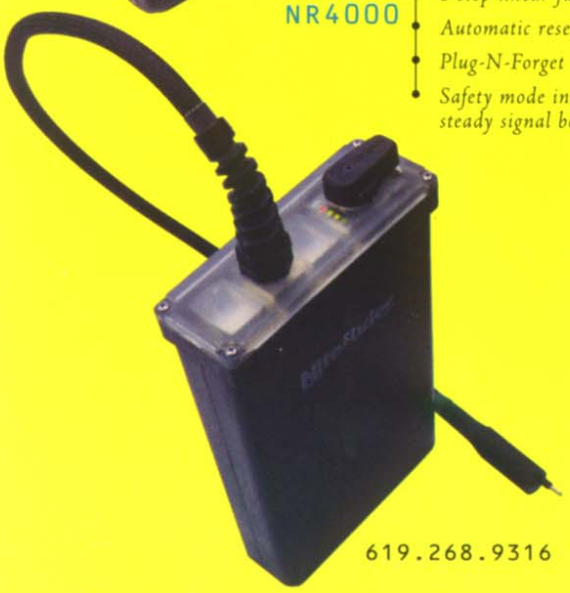


Digital NR4000

- *Employs a 4th generation 8-bit RISC Microprocessor*
- *6 levels of brightness*
- *8-step linear fuel gauge*
- *Automatic reserve tank*
- *Plug-N-Forget charging*
- *Safety mode including SOS and steady signal beacon*

Blackwater 3000

- *3 light levels: 12w, 20w, 32w*
- *Rated to 500 ffw*
- *Plug-N-Forget charging*
- *Soft wrist mount for putting light right where you need it and reducing the backscatter effect*
- *Head or Helmet mountable with optional mounts*



NiteRider®
TECHNICAL LIGHTING SYSTEMS

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