



GLOBAL EDITION
November 2013
Number 57

Pacific Northwest
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Madagascar

Iceland
**Alexander
Hamilton**

Russia
Star City

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Tom Ingram

Rebreathers
**The Future
of Diving?**

JAPAN
Okinawa

DIRECTORY

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COVER PHOTO: Diver and gorgonian on reef, Okinawa, Japan
Photo by Farhat Jah

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Soft coral on reef near Okinawa, Japan. Photo by Farhat Jah



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Who are we kidding?

Simon Pridmore has pretty much already written my editorial for this issue. I am referring to his chastising analysis of the appalling service too often rendered in the dive industry (on page 65 of this issue), but let me add my own two cents worth from a different perspective.

Over the past few years, I have taken part in various efforts and groups formed by trade bodies in the industry, such as DEMA, with the aim of identifying challenges and moving the industry forward. In these meetings, trends are analyzed and discussed, measures are weighed, and many good ideas are put forward. I am just afraid that we've been barking up the wrong tree and have grossly misdiagnosed the nature of the problem.

Quite frequently I hear from members of the dive industry whom I meet at various dive shows and events—and I have daily dealings with a good number of them. Often I hear that the financial crisis is to blame for the sorry state of the industry.

Hogwash, lame excuses and a good example of selective memory, I say.

The industry was ailing and dysfunctional even when times were booming, so who do these people think they are kidding? Surely the current state of affairs does not exactly make matters easy, but the challenge is no greater than savvy entrepreneurs

in the industry have thankfully also been able to rise to. There are a good number of well-managed and quality-oriented companies out there—good brands which have expanded even in times of adversity. I don't think I need to name any names—just look around and see who is making the good stuff and see how they are faring. Look in this very magazine, if that makes it easier.

The malaise from which the diving industry is suffering has nothing, or only very little, to do with the macro-economic trends. We can spend our time until hell freezes over analyzing these trends and pondering how to get a grasp of, and make the most of, the rapidly changing media landscape. But that is not where the problem lies.

As Simon Pridmore describes, there are not only serious issues with the service provided by some operators but worse still is the underlying attitude and ineptitude, which is outright depressing.

From where I am sitting, I too have widespread disappointing experiences such as ordering gear that never gets delivered because my order gets 'misplaced'; or situations in which you have to be the one calling the shop innumerable times to check on the whereabouts of your order; when repairs and

deliveries take not days or weeks but months or even years; or classes get postponed and repeatedly deferred over half a year.

In our company, we utilise a CRM system to keep track of all our communications, orders and processes. From analyzing the traffic, it has become apparent that it now takes, on average, 5.7 outgoing communications (emails, phone calls, etc) before a reply is received. In most cases, it is not even a qualified one, so we have to get back at it again. Only rarely do people even acknowledge the receipt of a dedicated letter or requested proposal where even a short 'thank you' would have done the trick. It is like tossing coins into a bottomless well and waiting to

hear the splash. So what a waste of time it has become getting answers out of people, let alone conducting any kind of conversation.

Poor husbandry, lousy service and sloppy procedures is what dogs the industry—it is as simple as that.

And until these basic issues are addressed, it will not make much difference whether or not the economic downturn turns into a blooming upswing.

"Perhaps the industry should be looking closely at its own procedures to see if the recruitment and retention problems are partly self-generated."

SIMON PRIDMORE,
SCUBA CONFIDENTIAL, PAGE 65

—X-RAY MAG Team



News edited
by Peter Symes

NEWS

from the deep

Ocean Management — More Protection, Less Economic Impact

The California Current System is among the richest ecosystems in the world but it is also heavily impacted by human activity. A new study shows how and where to focus management efforts, so that we can minimize the economic impact on people.

Marine mammals and other predators are critical to the health of marine ecosystems. A new study led by scientists at the University of California—Santa Cruz reveals areas along the U.S. west coast where human impacts are highest on ma-

rine predators such as whales, seals, seabirds and turtles. The researchers found that many of the high impact areas are within the boundaries of the National Marine Sanctuaries.

This means there are good opportunities for improving

management strategies. The studies also showed that many marine predators travel thousands of miles every year, yet often concentrate within small-scale "hotspots" to breed or feed on fish and other prey.

Many such hotspots are found within the California Current System.

The analysis yielded maps showing where the greatest impacts on each species are likely to be.

"Areas where key habitats and human impacts overlap represent important areas for conservation efforts," said first author Sara Maxwell. "In other cases, areas of high human activities are not key habitats for predators. As a result, we can maximize both conservation of marine predators and human uses that our coastal communities depend on."

The study suggests that protecting key habitat without considering human uses may result in missed opportunities for sustainable resource use.

"Having this detailed spatial information will help us move toward a more sustainable management approach," said coauthor Elliott Hazen. ■

California sea lions are among 23 species whose movements have been tracked since 2000.



DAN COSTA / UC SANTA CRUZ



NOAA

Researchers find key to reef prosperity

Scientists in the Netherlands have found the key to what feeds reefs in clear blue tropical waters devoid of nutrients—sponges.

"A coral reef is sort of an oasis in the desert," said researcher Jasper de Goeij of the University of Amsterdam. "Now we already knew that old energy and food that is on the reef is recycled constantly, but we didn't know who did that and how that was done, and, basically, what we discovered

is that sponges are sort of the key."

It is a mystery that has puzzled scientists as far back as Charles Darwin in the 19th century. It turns out that the humble sponge plays a critical role in supplying the reef with dissolved organic substances produced by plants converting the energy of the sun into nutrients, said de Goeij. The sponges use these organic substances then recycle them back onto the reef.

"They make new cells, and old cells are shed into the water, and basically these old cells, or the detritus, is raining down on the reef and that is actually a nice food for other organisms," said de Goeij.

Ancient they may be, but sponges are resilient. They are not threatened by climate change the way corals are. In fact, they might thrive.

"There [are] actually some people that believe that, slowly, most of the coral reefs, if we don't do anything, will change into sponge reefs," said de Goeij. "I actually, recently, found a lot of sponges, in the Amsterdam canals. ... Those are not the cleanest places." ■

SOURCE: PRI.ORG

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NASA space shuttle image of twin islands Ofu-Olosega in American Samoa

Small flying drone maps 300-year-old reefs

Researchers now have at their disposal the use of a shoebox-sized flying drone to take stunningly detailed photographs of 300-year-old coral reefs around the South Pacific islands of American Samoa. What is enabling the imaging of these reefs under waves is a technique that digitally removes ripples on the surface of the sea in order to sharpen images.

From these enhanced images, scientists may now be able to map the coral reefs around the world, thereby giving researchers a chance to analyze the health of the reef ecosystems.

"These corals are time machines that were living before European culture discovered the Samoan Islands," said Stanford Woods Institute researcher and participant in the study Stephen Palumbi in a statement. "What do they have to tell us about that long-

ago time? What do they tell us about the likely future?"

Scientists say coral reefs are incredibly important, as they provide shelter for over 4,000 species including many fish which are food staples to nearly 500 million people worldwide, yet the reefs are for the most part uncharted. Mapping by hand up to this point has been tedious, time-consuming and in many cases inaccurate. Waves muddle satellite images, sonar cannot map shallow areas, and radar is not able to penetrate the surface of the water.

New imaging technology

Luckily, Palumbi and Stanford aeronautics graduate student Ved Chirayath came up with a solution—a tiny, remote-controlled drone that films coral reefs from altitudes up to 200ft (61m) above the surface of the sea. To further clarify images, Chirayath used

a technique called fluid lensing, which digitally removes distortions made by waves.

"The lensing takes a huge problem in looking through the surface of the water and turns it into an advantage," said Palumbi. "It not only removes the ripples, but uses their magnification to enhance the image." Due to how light bends when it passes through water, objects underwater appear closer than they actually are.

In addition to the drone images, underwater photographs of reefs were taken with a 360-degree camera. These were then combined to produce extraordinary panoramic images of the reefs. Data on water temperature and water flow will be combined with the panoramic images to find out how climate change is affecting the reef ecosystem. ■

SOURCE: MNN.COM

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Marine protected areas surpass size of Europe

Almost three percent of the Earth's oceans are under protection, according to the International Union for Conservation of Nature (IUCN). New data shows a marked increase from 2010, when only 1.2 percent of the seas were protected. But the additional zones might not be of much conservation value.

Marine protected areas (MPAs) limit or forbid fishing or the extraction of minerals within their borders. The quick increase in MPA coverage may mean that the world could soon meet the ten percent target of the U.N. Convention on Biological Diversity.

"It's encouraging to see the progress we've made so far," said the director of the IUCN's Global Marine and Polar Program, Carl Gustaf Lundin. "If we continue to increase this area by one percent each year, we should be able to reach the agreed 10 percent by 2020."

But size isn't everything. According to conservationists, enforcement is an issue in a number of protected areas, the lack of which allows overfishing and pollution to threaten MPA ecosystems. Quality is also more important than quantity. Governments who want to reach

the 2020 target focus more on the size of a location rather than the existing ecosystems of a location, leading to protection of large areas with meager conservation value, many of which are not even threatened.

"If you look at the no-take zones [off Australia], you find them way offshore in deep water and you find them in areas with no oil or gas interest," said marine conservationist Bob Pressey of James Cook University in Townsville, Australia. "In the world

map, we see a repetition of that. The big MPAs are remote as hell," he said.

But Pressey has hopes that negotiations on a marine protected area in the Antarctic will protect areas of important biodiversity from overfishing—such as the Ross Sea, for example, which is home to seals, orcas, minke whales and penguins.

■ SOURCE: NEWS SCIENTIST.COM



TOBY HUDSON / WIKIMEDIA COMMONS

Corals, the 'smell of the ocean', can make clouds in the sky

Corals emit a sulfur compound that gives the surrounding water its typical odor and protects the coral from global warming, a new study finds. In addition, researchers have discovered that this compound affects cloud formation in the skies over the seas.

According to researchers at the Australian Institute of Marine Science (AIMS) and colleagues who conducted the study published in the journal *Nature*, the compound produced by coral is dimethylsulphoniopropionate (DMSP), which can change local climate. Even a single baby coral emits

the smell of this compound, said AIMS chemist Cherie Motti, co-author of the paper.

"This is the first time that an animal has been identified as a DMSP producer. Previously it was assumed that the large concentrations of DMSP emitted from coral reefs came solely from their symbiotic algae," said lead author of the study, Jean-Baptiste Raina of AIMS, in a press release.

When the corals were exposed to heat stress, their production of DMSP increased in order to protect the corals from deleterious effects of heat, the

study team found. DMSP also acts as a seed for the formation of clouds. If there is a decline in DMSP, there could be a decrease in clouds.

"Cloud production, especially in the tropics, is an important regulator of climate—because clouds shade the Earth and reflect much of the sun's heat back into space. If fewer clouds are produced, less heat will be reflected—which ultimately will lead to warmer sea surface temperatures," said Raina. ■

SOURCE: NATUREWORLDNEWS.COM

Corals of the Great Barrier Reef, Australia



Ho Ho Ho!

It's time to dig out your Santa suit and get involved in the biggest and best festive charity Santa dive this side of Lapland at Vobster Santas 2013.

Run in aid of the Royal National Lifeboat Institute (RNLI), Vobster Santas 2013 will take place on Sunday 15 December 2013 at Vobster Quay Inland Diving Centre near Radstock in Somerset, United Kingdom.

Once again, Vobster Quay is aiming to raise some serious money for the RNLI by getting as many sponsored divers dressed in their finest Santa outfits onsite and in the water in a mass of fluffy beards and red suits. The event continues to grow in popularity with a record-breaking number

of Santa divers donning their finest festive gear to raise over GB£20,000 in the last three years alone. In recent years, Vobster Santas smashed the record for the most Santa divers in the water at once with 161 festive divers taking the plunge—a record that Vobster still holds!

Santa divers attending the event will be invited to seek sponsorship for their endeavours through either individual sponsorship or via JustGiving. Vobster Quay will also be raising extra money for the RNLI by raffling off a

selection of great prizes. Every Scuba Diving Santa that attends the event will automatically be entered into the prize draw and additional tickets will be available on the day for just £1 a pop! If previous years are anything to go by, this year's event is going to be another fun-packed day full of festive belly-laughs!

Divers wishing to participate in the event can get involved by simply registering their attendance at: www.vobster.com/santas ■

Apply now for WDHOFF and OWUSS Rolex Scuba Diving Scholarships

Women Divers Hall of Fame

Every year the Women Divers Hall of Fame (WDHOFF) grants scholarships to women who are pursuing a professional career in which diving plays an important part. Open to individuals of all ages, the scholarships offer financial assistance and educational support.

In total, there are six scholarships in four fields ranging from marine biology, underwater archaeology and conservation to journalism, graphic arts and photography. The scholarships pay for tuition and fees, independent research and/or internship

programs at accredited universities. The WDHOFF also offers nine Training Grants, with funds that go towards training and diving equipment.

Applicants must submit completed forms through the WDHOFF website by 23 November 2013, midnight U.S. Eastern Standard Time. For more information go to: www.wdhof.org/scholarships/scholarships.shtml

Our World Underwater

The prestigious Our World Underwater Scholarship Society (OWUSS) Rolex Scholarship is awarded to divers 21 to 26 years of age. Awardees get

to work with leading educators, renowned explorers and premier diving centers around the world. It is probably safe to say that many working in the diving industry today wish they were 20-something again just so they could apply for this one-of-a-kind grant that can change lives.

You must have high academic standing and a minimum of 25 logged dives in order to apply. Deadline for submission is December 31 for applicants in North America and Europe, and January 31 for those in Australasia. For more information go to: www.owuscholarship.org ■



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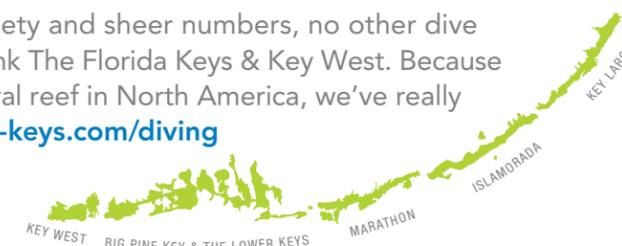




PHOTO COURTESY OF STIG SEVERINSEN

Stig Severinsen sets a new Guinness World Record – on a single breath of air

Stig Severinsen swims 250ft under 3ft of ice in speedo

Severinsen sets a new Guinness World Record.

Despite being a freediving world champion, Severinsen said he still suffers the same anxieties as any kid holding his breath at the bottom of the pool.

“Of course, I still feel that burning desire to head for the surface, but I’ve trained myself to let the diving response kick

in.” His belief that feeling fear is inescapable but controlling that fear is quite achievable has become a personal doctrine and a metaphor for life.

Severinsen’s approach to transcending mental limitations was put together in a book. Originally published in Denmark, *Breatheology—the Art of Conscious Breathing* explains his belief that any one of us can do what he’s done:

create a link between the mind and body through proper breathing and drive the self to achieve much more than we ever thought possible.

The book was a best-seller and went on to be published in English, Chinese, Spanish and Russian; Arabic and Portuguese versions are in the works. ■

British diver sets new world record

Sean McGahern spent 49 hours and 56 minutes at the bottom of the Mediterranean off the coast of Malta.

McGahern, from Brighton, United Kingdom, kept himself

busy by cleaning debris that had accumulated on the bottom of the sea bed in St. George’s Bay. The 38-year-old managed to drink energy drinks through a fluid pack with a straw and ate food like sausages, which do not lose consistency in water. He spent

hours removing rubble including bottles and deck chairs, which were brought up to the surface by the dive team from World Record Diving Malta team and the St. John’s Rescue Corp, who assisted him in his record breaking attempt.

■ SOURCE: EXPRESS.CO.UK

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DIVE & DISCOVER



Expedition *Alexander Hamilton* — by Ocean Reef

You are not forgotten

Text and images by Chris Haslam

It is not every day one gets to be involved in an expedition that touches the hearts of so many, where a collaboration of people from all over the world sacrificed time and resources for the good of a common goal—to give closure to those who lost loved ones on board the U.S. Coast Guard Cutter *Alexander Hamilton*, which was destroyed during WWII.

Three weeks after attacks on Pearl Harbor, the *Alexander Hamilton* was reported for special naval duty in the North Atlantic. On 29 January 1942, while escorting a convoy to Iceland, she was left fatally wounded after being torpedoed without warning by an undetected German U-boat, which had been patrolling the Icelandic coast near Reykjavik. The explosion killed 20 men instantly, with the total death toll rising to 26. Salvage attempts were unsuccessful, and the American destroyer USS *Ericsson* fired upon the wreck three times to send her to the bottom of the sea, 45km from the coast. The *Hamilton* became the first U.S. loss in the Atlantic after the Pearl Harbor attacks.



67 years later

Shortly after receiving a new aircraft with specialized pollution detection equipment in July 2009, the Icelandic Coast Guard detected traces of oil on the sur-

face invisible to the naked eye in an area not known to contain any wrecks. Soon thereafter a survey vessel was dispatched to the area, which did a multi-beam sonar survey using a relatively low fre-

quency system to scan the ocean bed. Although this survey did not provide high resolution on contacts, it did reveal an uncharted wreck.

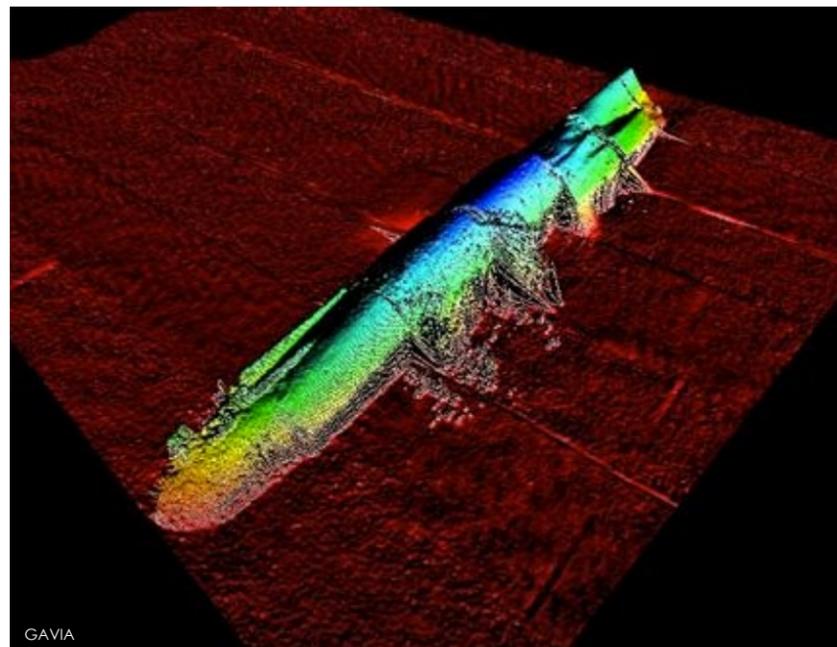
As a result of these findings, a subse-

quent operation was planned with the Icelandic Coast Guard Cutter *Ægir* in order to identify the wreck and to try and obtain a higher resolution side scan and bathymetric data from a Gavia Autono-





Scan of wreck site of the USCG Alexander Hamilton



GAVIA

ous Underwater Vehicle (AUV) as well as video footage from an accompanying Remotely Operated Vehicle (ROV).

From the data gathered, it was possible to ascertain that the vessel was lying on its starboard side, roughly at a 45 de-

gree angle in around 95 meters depth. It was also possible to see the evidence of the massive damage from the torpedo, which left roughly an 11-meter-long hole in the bottom of the ship. Further video data from the ROV determined without a doubt that this was the *Alexander Hamilton*.

After receiving information about the identification of the wreck from Icelandic friend, Sigurdur "Sigge" Harlsson, Team Blue Immersion (TBI) members Jonas Samuelsson (Sweden) and Aron Arngrímsson (Iceland) knew that they had to dive this historically significant wreck. On the 26 of June 2011, Samuelsson and Arngrímsson joined Valgeir Petursson (Iceland) to become the first team of divers to dive the *Hamilton*. This was the start of an amazing journey, which brought all involved memories for life.

Memorial

After researching the *Hamilton* in 2012 for her 70th anniversary, Dave Downey, cousin to Michael T. Vas who perished in the attack, discovered that TBI had successfully dived the wreck and immediately contacted them. As a result of these conversations, it was decided that TBI would plan a second expedition back to the *Hamilton*, this time on behalf of the family members who lost loved ones in the tragedy.

The expedition mission would be to



USCG Alexander Hamilton

attach a memorial plaque to the wreck, documenting the story of the men who sacrificed their lives for the freedom of people all around the world and provide long awaited closure to the family members of the perished. Downey wanted the team to succeed, but he thought the idea was more of a dream, or a fantasy, and there was no way it could be done due to politics, regulations, risk and cost.

"I knew TBI was capable," said Downey, "but the deck was stacked against them, and that doesn't even take into account the other obligations a crew like TBI must have, let alone weather in the North Atlantic. There are lots of reasons people don't do these kinds of things."

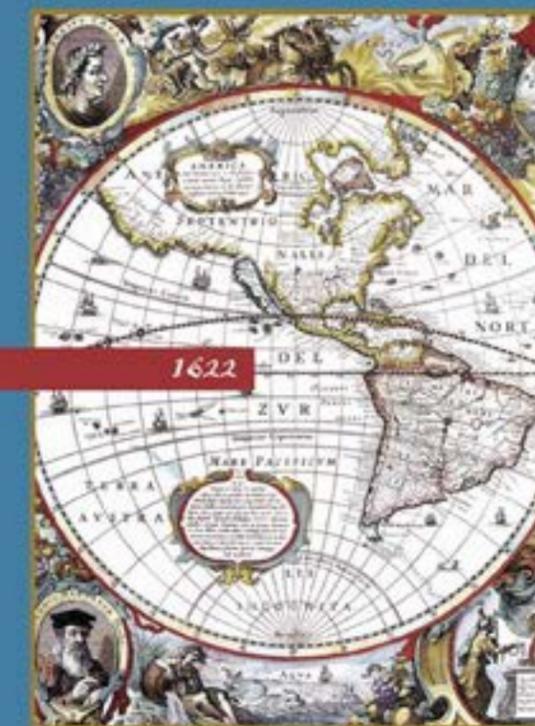
Due to the complexity and degree of risk, fellow TBI members Erik Brown (Canada) and myself, joined the expedition team not only to contribute our technical diving and video skills but to help out with logistics. The expedition would take nothing less than a highly dedicated team to implement.

As family members and others connected to the vessel found out about the expedition, the list of supporters was forever growing. Thoughts and prayers flooded the team's email inbox. It had now become very personal, and failure was no longer an option.

After nearly two years of countless hours of planning, arranging logistics and trying to raise much needed funds, it seemed like the expedition was never going to happen. It wasn't until Samuelsson started talking with Ocean Reef about using their Integrated Diving Mask (IDM) and communication system for the dive and explaining the heartfelt story behind the expedition that the ball really started rolling. Not long after, Ocean Reef was proud to announce full sponsorship of the *Alexander Hamilton* expedition.

Ocean Reef has a company based in San Diego, which is quite well known to be one of the most important U.S. naval bases in the world. They stated, "We are proud to technically and financially support this mission to honor the members

Treasure Coins of the *Nuestra Señora de Atocha* & the *Santa Margarita*



Carol Tedesco

In 40 succinct pages, *Treasure Coins of the Nuestra Señora de Atocha & the Santa Margarita* answers all the most frequently asked questions, including what the coins look like when first discovered, the meaning of the various markings, how they are cleaned, conserved and graded, what they were worth in the 17th century, and the most up-to-date information on the names and periods of office of the men who made them. Of particular interest to 1622 fleet coin enthusiasts is a section devoted to the exceedingly rare Old World minted coins discovered on the *Atocha* and the *Santa Margarita*.

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One of the crew on the *Alexander Hamilton*



Diving in Sifra with its amazing visibility of 80 meters or more



Team members Aron Arngrímsson, Jonas Samuelsson, Chris Haslam and Erik Brown running through the dive plan for the *Alexander Hamilton* wreck

of the U.S. Coast Guard Cutter *Alexander Hamilton*."

The expedition

On 4 August 2013, our team landed in Iceland for Expedition Hamilton/Ocean Reef. Arngrímsson, Samuelsson and Brown departed from Egypt, while I flew in from Sweden where I ran TBI Sweden.

Upon exiting the airport, Iceland's Mother Nature was there to greet us at the doors. Its bare landscapes highlighted the four basic elements—earth, air, fire and water—in the most dramatic way. Active volcanoes, bright green valleys, magnificent snow-capped mountain ranges, glacier-cut fjords, black sanded beaches, spectacular waterfalls and geysers were so accessible yet remained virtually untouched by human civilization. This rugged beauty really complimented the Ocean Reef slogan, "Go for the adventure", and painted the perfect location for such a rewarding project.

The use of specialised equipment was essential for the trip, which included Ocean Reef's Integrated Diving Mask and communication system, underwater camera gear and varying gas mixtures. To increase safety and minimize problems, our team planned a series of warm-up dives. The dives were used to test equipment and make adjustments, rehearse the dive on *Hamilton*, including transporting and attaching the plaque and an elaborate run-through of emergency drills.

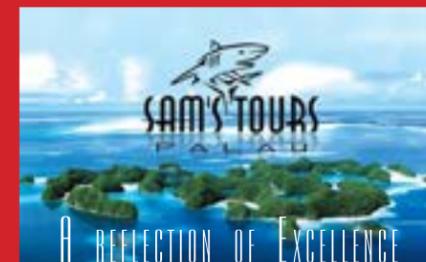
The IDM and communication system increased safety by allowing easy communication between divers and surface support. The IDM also helped defend against the cold conditions.

"Dives to a depth of 95 meters (311 feet) present dangerous challenges," explained Brown. "Extreme environmental conditions, a complex task of carrying and applying the memorial and film equipment complicate this tenfold."

Our team was not leaving anything to



Team member Aron Arngrímsson surfacing after diving *Tordenskjold* wreck



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wreck rap



Team members Jonas Samuelsson and Chris Haslam in one of the many pre-dives in Silfra using the Ocean Reef Integrated Diving Mask and communication system



chance, and we did everything in our power to ensure a successful mission.

Daily log

August 5-8. Warm-up dives in Silfra, a site made famous for its outstanding visibility. This site was chosen due to the similar water temperatures as the *Hamilton* dive and its visibility (the good viz was one less thing to worry about in the essential warm-up dives). Brown would be responsible for capturing all the trip footage and used these dives to also work on his techniques and operating the camera with dry gloves.

Brown had a leaking drysuit dur-

ing the first dive, which ended the dive quite quickly. It was a reminder that even a slight leak in these extreme conditions could become very serious. A backup suit was used, and no further problems occurred.

On the morning of the August 7, AGA (Aktiebolaget Gasaccumulator industrial company) turned up at the expedition house in Reykjavik with three bottles of oxygen and helium, and everyone was quite relieved. It was only weeks earlier our team was informed that an expected shipment of helium would not make it to Iceland in time for the dive. The problem didn't stop there; helium is in short-age in Iceland, and what was available was reserved for scientific and medical purposes. Without helium, the dive would not be possible. Helium is used in deep diving to offset the effects of narcosis. After many calls and near begging, AGA came to the rescue.

August 9-10. Our team drove five hours northeast of Reykjavik to a

The team dives the geothermal chimneys in the middle of Hjalteyri



small coastal town called Strýtan. The views were amazing on the drive up—rugged mountains laced with snow, valleys with rushing rivers and waterfalls cascading into the ocean from steep costal cliffs. On August 9, our team met up with Icelandic local Erlendur Gudmundsson who took us out

to dive the geothermal vents in Hjalteyri.

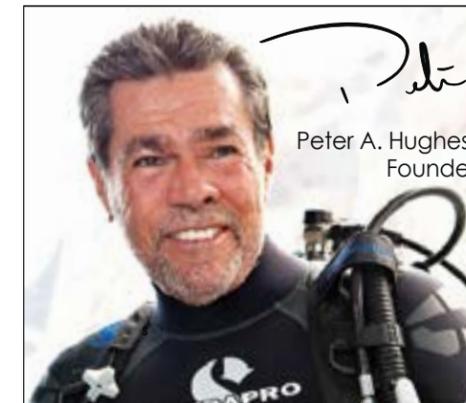
Hot springs have been releasing fresh hot water into the ocean, and as soon as the dissolved minerals get in contact with the cold ocean water, they coagulate. Throughout the last approximately 10,000 years, this process has cre-

ated chimneys up to 55 metres tall, made of limestone. It is the only known place in the world where recreational divers can explore this phenomenon and well worth the trip. During one dive, the visibility was low, and the current was flowing, which was great practice if our team would encounter the same conditions on the *Hamilton*.

On August 10, our team was invited to dive the wreck of great Danish battleship *Tordenskjold*, which was built in 1854. Gudmundsson discovered the virgin wreck, which had only been dived by him until our team had the privilege. Its location is still kept secret for protective purposes until local government and historical interests can be accomplished. Not much can be revealed about this wreck apart from that it was an awesome dive and fit perfectly



The folks at Kustom Glass in Crystal River, Florida, USA, made the memorial plaque



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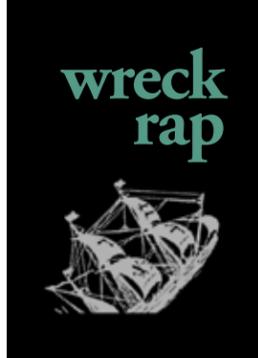
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into the expedition theme of diving virgin wrecks.

August 11. A change in the weather moved the dive of the *Hamilton* forward a day to the August 12. Today, our team prepared for the dive and mixed gases, worked out final logistics, visited the yacht from which we would be diving, loaded our equipment and discussed the best way to dive from it. Everything ran smoothly and helped create a less stressful experience the following day.

August 12. Today was the day and what two years of planning had come down to, attaching the plaque to the USCGC *Alexander Hamilton*. Our team had done everything in our power to make sure it

was a success; the rest would be up to the gods.

We had a gap of good weather, everything was prepared with precision, and our team was feeling good. Brown and I were excited to visit the wreck for the first time, and for Samuelsson and Arngrímsson, it was a chance to make her re-acquaintance.

After a two-hour boat ride, travelling at 20 knots, our team reached the area where the vessel had lain in silence for some 67 years. The captain scanned the area, while all boat crew and divers looked at the sonar screen in anticipation. All of sudden there she was, a clear picture of her lying on her side at 95m—it was a beautiful.

It wasn't long before our team was heading down the shot line into the darkness. The visibility was not the best, and we could not see very far in front of us. The computer was reading 50m, 60m, 70m, as we made our quick descent, but there still was no site of the *Hamilton*.

Everything was running

LEFT TO RIGHT: The expedition vessel; Team member confirms gas content; Finding the spot where the *Hamilton* rests; Technical diving equipment used in the expedition;

smoothly, as everyone dropped peacefully into the abyss. Then, at 85m, the *Hamilton's* outline started to emerge, a couple meters more, and there she was—all 2,350 tons of her.

Crew member Sigurjón Veigar Þórðarson was responsible for attaching the shot line to the vessel, and for a second time, placed the divers directly on the ship. Now all that was left was to find a good location to attach the granite plaque and start the ascent back to a



Team member enters the water to dive the *Alexander Hamilton*

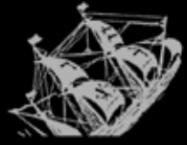


Dive team members attaching the memorial plaque to the *Hamilton*



Sonar showing the *Hamilton*





world that felt so distant.

Being down there was like visiting another world. It was a dark, cold, eerie resting place for the *Hamilton* and some of her crew. Being the first four divers to stare at this piece of history was truly unforgettable.

The memorial plaque went on without a problem thanks to Dave Downey and Kustom Glass in the U.S. state of Florida, who designed the plaque to be attached with strong magnets to the super structure of the ship.

It was a very satisfying feeling for our team to be down there looking at the plaque attached perfectly to the *Hamilton*. The mission was completed, and it was time for the long journey back to the surface.

Afterthoughts

Over a month has now passed, and the expedition still feels alive. Everyday our team receives more emails from people congratulating us on a job well done and telling us what the expedition has meant to them. David Downey is touring America informing other veterans of the team's achievement. Ocean Reef will have

a private screening of the documentary at the DEMA show this year.

Our team wishes to thank everybody from the bottom of our hearts who made this remarkable story possible—the list is long, but you know who you are. ■

Chris Haslam is an SSI Course Director/Technical Instructor Trainer and TDI Advanced Trimix Instructor based in Strömstad on the west coast of Sweden, who runs Team Blue Immersion (TBI) Sweden. For more information, visit: www.facebook.com/tbisweden, www.worlddiveteam.com, www.blueimmersion.org or www.facebook.com/teamblueimmersion

IN THANKS

—Messages from living family members and people connected to Alexander Hamilton.

"We thank you from the bottom of our hearts. You will be in my prayers forever."

—Helen M Butler, cousin of Michael T. Vas.

"Thank you. Now we have closure, we'll never get Mike's body back, but he and his crew now have their mark. I have no idea what it is like to do what you do. I know only few can. I know it took a lot of work and sacrifice from a lot of people behind the scenes whom I will never get the honor of meeting, but I think they know they done good."

—David Downey, cousin of Michael T. Vas.

"It's incredible and amazing what you divers have done. I prayed for your safety. A great tribute to the men that went down with the ship."

—Elma M. Vas, widow of a cousin and had a friend on *Hamilton*; the friend survived.



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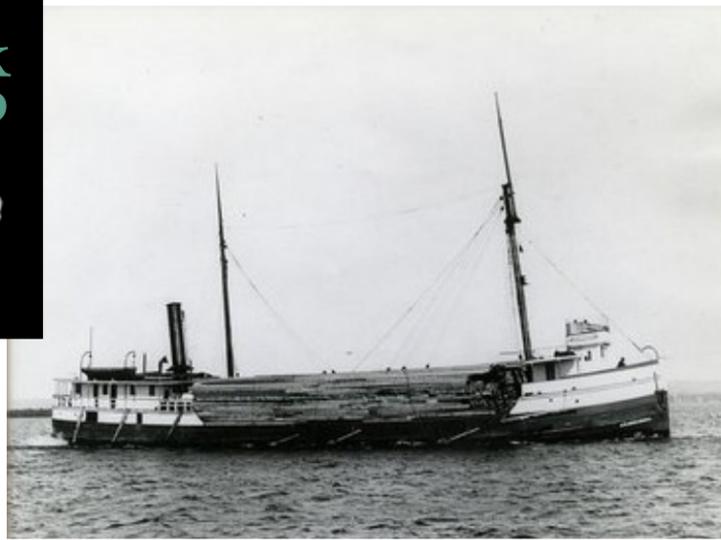
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CLOCKWISE FROM ABOVE: Joy on the boat after a successful dive attaching the plaque to USCG *Alexander Hamilton*; Chris Haslam and Aron Arngrímsson celebrate after the dive attaching the plaque; The memorial plaque on the *Hamilton*



The *J.D. Marshall* was built in 1891



Shipwreck site becomes Indiana's first underwater nature preserve

The wreck site of the *J.D. Marshall* has been dedicated as the U.S. state of Indiana's first underwater preserve in the Indiana Dunes State Park. Divers and fishers can enjoy the site, but treasure hunters will be thwarted from taking items as the wreckage is protected. The mission of the preserve is to educate the public on the state's maritime history along Lake Michigan shores.

Built in 1891 in South Haven, Michigan, the *J.D. Marshall* was a sand barge converted from a

timber hauler. On 11 June 1911, the ship capsized in a storm and sank, with the loss of four crew members. Discovered in 1970, the ship was raised by salvage crews in 1982 who planned to sell the wreckage for scrap. However, conservation police halted the operation, but only after the propeller and other parts were already removed. During the investigation, lines that held the ship snapped, and the vessel sank back down into Lake Michigan. ■ SOURCE: NWITIMES.COM

ROVs to search for fallen WWII airmen

After almost 70 years resting on the ocean floor of the Pacific, fallen WWII combat pilots may finally be found. The search for the remains of WWII airmen is now getting the help of high tech remotely operated vehicles (ROV).

BentProp Project, a self-funded volunteer organization that repatriates the remains of military personnel to the United States, has been provided with ROVs with side-scan sonar by the University of California, San Diego's Scripps Institution of Oceanography and the University of Delaware, who received a grant from the U.S. Office of Naval Research for the project, which

they call, Project Recover. In the project, oceanographers can test new technologies while they assist in locating the WWII airmen.

Pat Scannon of BentProp said one of the aims of the project is to find a B-24 airplane shot down on the reef on the west side of Palau. The ROVs greatly increase the chances of finding it.

"On land our major technology was a machete, and underwater it was scuba tanks," said Scannon. "The ability to extend our mission is ... I don't know how to describe it. It's like starting out walking, and suddenly you're in a supersonic jet."

■ SOURCE: POPSCI.COM

Underwater archaeologists to verify Ptolemy's account of ancient ports in south India

On the coast of south India, a survey is being conducted by a team of researchers looking for clues to ancient ports mentioned by Ptolemy, the Greco Roman geographer who lived around AD 90-168.

The team is comprised of underwater archaeologists from Tamil

University in Thanjavur. Funding from the study is provided by the Central Institute of Classical Tamil.

"We are presently surveying coastal towns, near where we believe ports might have existed. If they have existed, there would have been a heavy traffic of boats and ships. Also in towns, we are looking for pot shreds and other remains, which can indicate a lot," said N. Athiyaman of the Centre for Underwater Archaeology in Tamil University. "Based on ... information from fishermen, we would employ scientific equipment including SONAR to detect objects under the sea. There are state-of-the-art equipment, which will help us detect objects, if any, under sheets of clay," he said.

Ancient literature from the region suggests that around 20-25 ports existed along the coast, whereas Ptolemy's writings mention 15 ports. "We want to find out whether these

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ports mentioned in the Sangam era literature and by Ptolemy are the same," Athiyaman said. ■

SOURCE: DECCANCHRONICLE.COM

Fifteenth century map shows Ptolemy's description of the Ecumene, or the known world

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Edited by Scott Bennett

Discount comes at a price

Fees now make up 38% of airlines earnings.

If it sounds too good to be true, it probably is. In these days of expensive air travel, airline claims of bargain fares definitely warrant closer inspection. According to a recent study, airlines worldwide generated in excess of US\$27.1 billion from service fees, an amount representing more than 38% of a carrier's total revenue.

IdeaWorksCompany, a consultant specializing in so-called "ancillary" revenue, discovered a total of 53 airlines reported their ancillary revenue for 2012 from activities such as frequent flier miles sold to partners, fees for checked

bags and commissions from car rentals. The 23 airlines that first reported such revenue to IdeaWorks in 2008 made just \$2.45 billion off fees.

"Once largely limited to low-fare airlines, ancillary revenue has now become a financial necessity for airlines all over the globe," said report author Jay Sorensen. Budget airlines dominated the list of airlines whose ancillary fees made up the highest percentage of their total revenue. Spirit Airlines' ancillary fees made up 38.5% of its total revenue. Despite that, traffic was up more than 22%. ■



London Heathrow to track late-running passengers

In a bid to cut delays and cut costs, passengers at London's Heathrow Airport will be tracked through security checkpoints and terminals. The new system will inform airlines if a passenger is late or at which stage of the check-in process they are. Those that have less than 30 minutes before departure, will be directed back to the check-in desk. Travellers spending

too much time browsing in duty free shops will be issued with a warning and will be prompted to the right gate. It is hoped that common delays will become a thing of the past, as airlines will be immediately informed if a passenger will not make a flight, allowing time for bags to be withdrawn from the plane's hold. ■

Soon portable electronics may remain on during take-off and landing

Due to increasing public pressure the U.S. Federal Aviation Administration (FAA) may consider easing restrictions on the use of electronic devices such as smart phones and laptops by passengers during take-off and landing of airplanes. The agency is investigating the current policies to find out when these devices can be safely used during a flight, without interfering with the airplane's sensitive communications, flight control and navigation systems.



"The FAA recognizes consumers are intensely interested in the use of personal electronics aboard aircraft; that is why we tasked a government-industry group to examine the safety issues and the feasibility of changing the current restrictions," said the agency in a statement. ■ SOURCE: DOTWNEWS.COM

No more jetlag?

A team of researchers at Kyoto University in Japan have found a key area in the brain that can be manipulated to reset the body's clock to a new time zone in just one day. Researchers developing drugs that help with jet lag are now a step closer to making this a reality. The size of a grain of rice, a group of 10,000 brain cells constantly communicate with

one another to keep control over the body's clock. Dr Michael Hastings, a Medical Research Council body clock researcher, told the BBC: "Our results identify vasopressin signalling as a possible therapeutic target for the management of circadian rhythm [body clock] misalignment." ■

Body clock 'reset button' found.
— BBC News

T-Mobile to eliminate international data fees

Tired of trying to find local SIM cards to avoid excessive roaming charges when you are travelling? Starting on October 31, T-Mobile business customers and consumers on the Simple Choice plan will have unlimited data and texting and pay a flat fee of only 20 cents a minute for voice calls

in 100 countries. Plan members won't have to remember to activate the service or pay extra for international roaming. ■



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Oneworld launches global booking app

Oneworld has become the first airline alliance to enable customers to book multi-airline round-the-world trips via their tablet computers. Oneworld Explorer enables passengers to travel around the globe utilizing the flights of any of the alliance's member airline or affiliates, serving nearly a thousand destinations in 150 countries.

Oneworld Explorer's price is based on the number of continents visited (three to six) not the mileage flown, making planning and pricing journeys simpler. The changes to its booking engine make the tool easier and faster to use, drawing heavily on feedback from users since the original online booking engine was launched five years ago. ■

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Text and photos by Farhat Jah

Okinawa

—*Diving the Kerama Islands of Japan*





Okinawa



The rugged landscape of Okinawa makes the island look a lot like the western isles of Scotland

Text and photos by Farhat Jah

Okinawa—simply saying the name has so many connotations. The island itself is huge, and yet it's an oceanic island far from the Asian continent. It takes two and half hours to fly from Hong Kong, the closest point on mainland China, to get here. The main Japanese islands are even further away, with Tokyo a good three-hour jet flight from Naha International Airport. Ostensibly part of Japan, Okinawa is very different from the main islands of the country. The air and sea temperature are warmer and the atmosphere is very different. The people are slower—the traffic and the public transport, basically non-existent.

Sea fans are abundant on Okinawa reefs; *Pseudoceros ferrugineus* flatworm (left). PREVIOUS PAGE: Yellow gargonian





THIS PAGE: Topside scenes of life in Okinawa, where military planes can be seen flying overhead to and from the U.S. military base



In the south, Ishigaki is the biggest island in the Yaeyama group with a small city, a large naval base disguised as a coastguard facility, a series of beaches, resorts and an airport that can handle the 737 jets. Irimote is a larger island of primal jungle and a hundred nautical miles to the west is Yonaguni Island (ed.— featured in *X-RAY MAG* #54.)

History

Okinawa's history is prevalent. Okinawa itself has scores of islands around what the locals euphemistically call the mainland. Originally called the Ryukyu Kingdom and independent from Japan, the islands were brought under Japanese control before WWII. The second World

Japan has a plethora of Pacific Ocean islands that are unknown to the world. There are three main sets of islands south of Kyushu: the Nansei Islands, the Sakishima Islands and the Yaeyama Islands.

War has indescribably shaped Okinawa ever since.

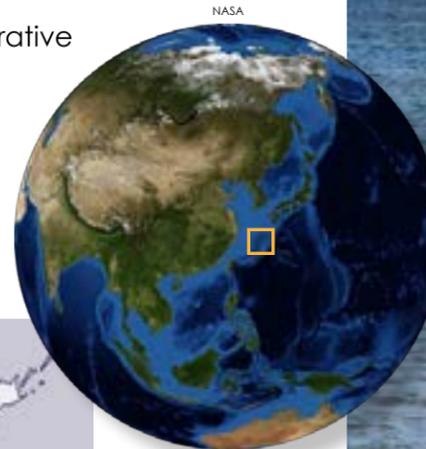
The American forces needed an island with which to bomb Tokyo, and so took Iwo Jima and Okinawa Jima. The battles were

long and bloody and explain the total devastation of Naha. The United States then went on to rule Okinawa until well after my own birthday in 1971.

In the early 1970s, Okinawa had a referendum in which the Okinawans were given the choice of reverting to the Ryukyu Kingdom and independence, joining Japan or becoming a U.S. protectorate. The vote was precariously close with many voting to remain with the United States. To this day, some Okinawans grumble about the authenticity of the vote.

In 1973, the islands were handed over to Japan, and the whole of Okinawa with ancillary islands became a prefecture of Japan. Regardless

of administrative power, the United States kept their military bases and



ABOVE: Global map with location of Okinawa, Japan
LEFT: Location of Okinawa on map of Japan



thousands of personnel on the islands.

In 1990, a young U.S. Marine called Doug Bennett was posted to Okinawa. He liked the people,

and he liked the diving. When he tired of protecting his nation's interests in Africa and Japan, he returned to Okinawa in 1995 and opened a new dive operation called Reef Encounters. Doug's

center became a ground-breaking business.

Japanese dive centres cater mainly to Japanese clients. They dive the Japanese style, with 30-minute, highly rigid guided dives.



Sunset over Sunabe Sea Wall



Lionfish at Sunabe Sea Wall

Diver swims over Sunabe Sea Wall, covered in an array of coral growth

Diving

We arrived in Naha Airport on a blustery day. Doug's youngest instructor, Daisuke, arrived to collect us. As we drove up north to Chatan, he briefed us on his surprisingly very positive take on Okinawa and the United States.

"When you see the demo's, it's just the same few people," said Daisuke. "The Americans are a huge part of the economy here, and they are generally very polite and nice people."

Our hotel was more like a motel in that the reception was tiny but the rooms huge. They were very American in their make up, with kitchenettes, microwave, bedrooms, lounges, and TV's.

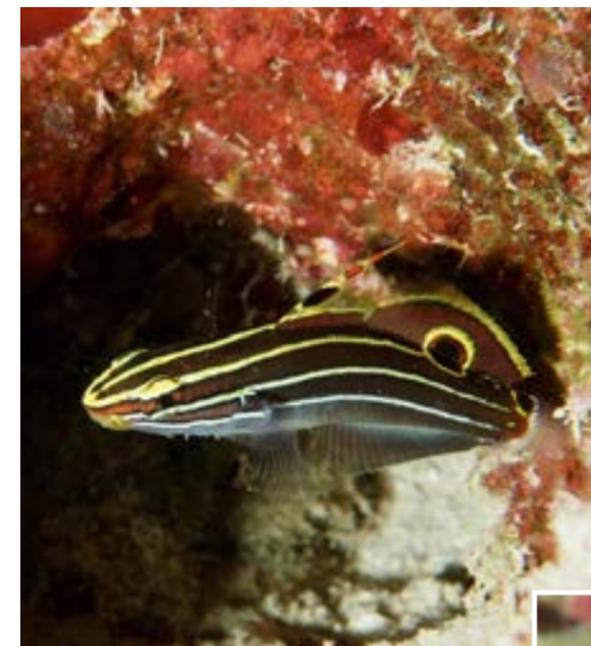
"This used to be U.S. officers'

accommodation for Kadena Airbase," Doug later told me.

The next morning, we arrived at the dive centre very late. Huffing and puffing, lugging our cold water gear, we had misjudged the distance from the hotel. Daisuke was amused and not bothered.

"Doug had to go to a meeting," said Daisuke. "He told me that I should take you to the Sunabe Sea Wall."

Sunabe Sea Wall. We loaded the Reef Encounters minibus with our kit and tanks and drove back to our hotel. We kitted up and climbed over the sea defence wall and walked over the reef top to drop in. This was weird—we were diving off a road, on the exact same place where the U.S.



21°C. I had no name 5mm Cambodian wetsuit combination that I had picked up in Istanbul on the cheap. It was good enough—my hood did its job, and I felt okay. The cold water seeped up my legs and arms, but 20-21°C was not cold enough to make it unpleasant. I twisted the bezel on my momentum dive watch. At least I did not have to wear gloves, I thought to myself.

In order to access the deeper water, we had to swim out through the cut. This was not at all onerous, as the walls were paced with hard and soft coral and abounded with fish. Daisuke tried to gather us together

forces had landed on the island.

The reef started just below the surface of the water. We entered by lying on our backs and paddling a few metres until we reached the edge of a long "cut" or channel that was about ten metres deep. We descended to eight metres and started to move along the sandy bottom.

I gasped. The water was a chilly



Saddled toby (above); Hector's reef goby (left)





Scorpionfish hiding in reef (left); Hard coral cover on reef (above)

some other hapless diver. The experience while disconcerting was quite unique.

Eventually, Daisuke managed to herd us out of the cut, and we popped out and turned right.

Okinawa is famous amongst the knowledgeable diving community for its macro life. I was expecting the scores of nudibranches and tube worms that we did see, but I found myself astounded by the marine life. Schools of small jacks and fusiliers sped by. The visibility has been promised to be ten metres, but even on this grey day, I could see 20m.

The soft coral was as exquisite and colourful as any in southeast Asia. It waved gently in the sea action, as we swam by. The end of the cut made a natural north-south facing wall,

but spurs of reef stuck out to sea in an easterly direction. These made for long shallow walls that started at 10m depth and went down to 20m.

Daisuke now came into his own. He knew exactly where we were, took us along the reef spurs into deeper and deeper water. Then we headed off into the blue to find a coral bommie packed with anthias, nudibranches, moray eels, and "critters various".

My air was not doing well with the excitement and the photography. I signalled Daisuke, and he led us back to the sea wall. We climbed out as a pair of F22 Raptors flew overhead and landed at Kadena.

We switched tanks over and had



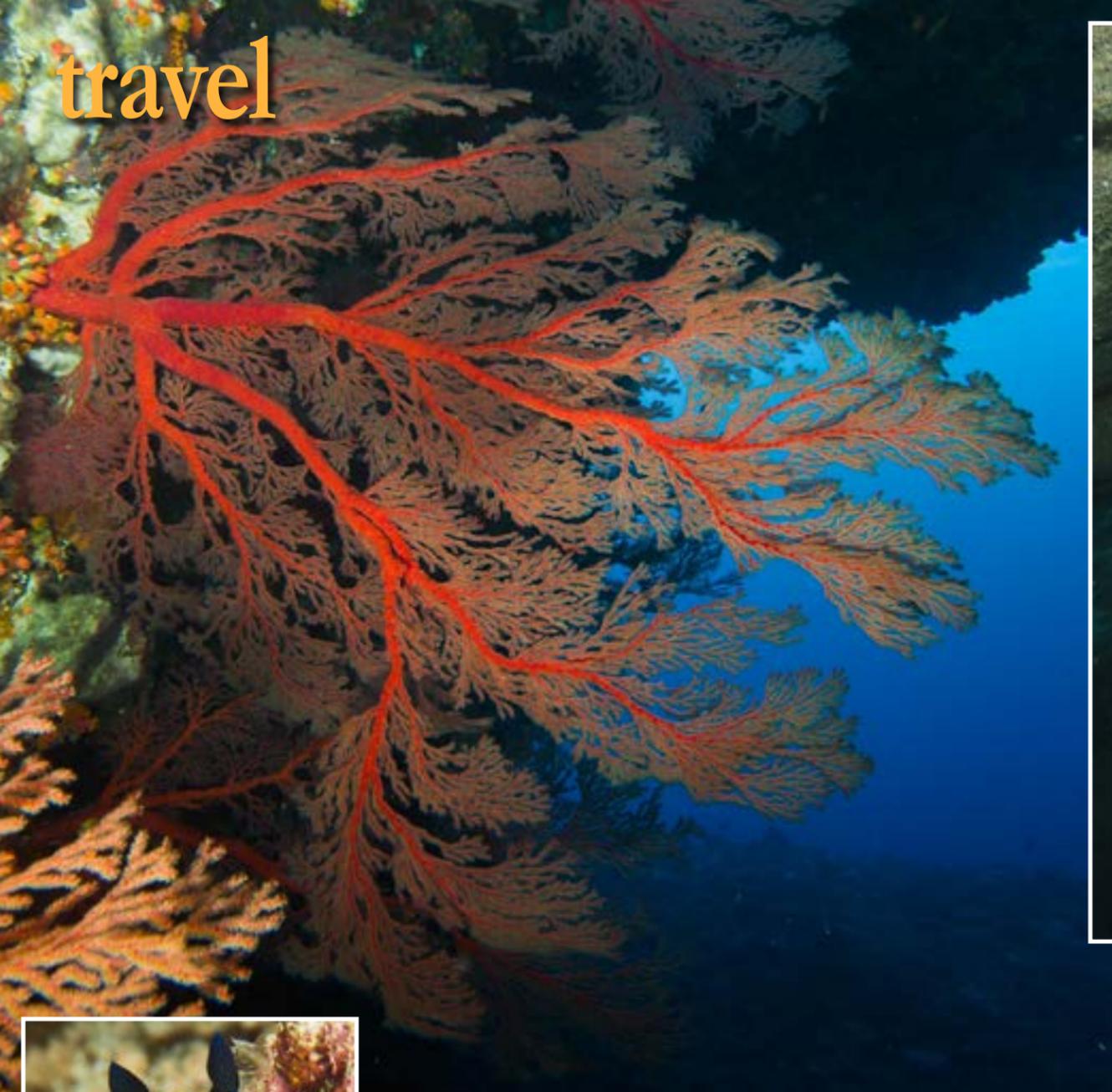
Chromodoris nudibranch

and lead us out, but I was mesmerised by some nudibranches and had my Olympus OMD snapping away happily.

Doug had briefed Daisuke well, and he gave me the leeway a photographer so craves. A highly venomous sea snake came by, and to my consternation, found me mesmerising. It played below me and then swirled around my legs giving me some excellent photo opportunities, but doing nothing for my air consumption! Eventually it left me in peace, and went off to play with



Cardinalfish at Sunabe Sea Wall



CLOCKWISE FROM LEFT: Large sea fan on reef wall; Pinnate batfish under ledge; Soft coral on reef wall; Nembrotha nudibranch (inset)



an *onigiri* for lunch—a ball of rice wrapped in seaweed with a salmon interior. A Hercules sailed lazily by as Daisuke told us that a decent interval had ensued.

We strapped our tanks on, I adjusted my bezel and swam out to repeat the experience. This time, we did not turn right but left. Again my air did not last as long as I would have liked. As we climbed out a second time, I was left feeling that I had barely touched the surface of the Sunabe Sea Wall diving area.

House Reef. Without wishing to sound overly dramatic, I was simply

blown away by what could only be described as Okinawa's house reef. Sure it was only 22m deep, it lacked massive pelagic action but under the flight path of a U.S. airbase and diving the most dived site in Okinawa, (which was still not crowded), we were presented with impressive tropical diving.

Kerama Islands. The Sunabe Sea Wall is one of the many dive sites on Okinawa, but the Kerama Islands—20 miles off the east coast of the Okinawa mainland—were reputed to be the special dive location of the Northern Ryukyu.

Reef Encounters has an impressive Taiwanese dive boat that looks suspiciously like a Bertram. A team of us were now assembled—Scots, English, American—along with our Japanese guides, Daisuke and Toyo. Doug was our skipper, and we assembled at the marina early in the morning. The weather was idyllic but the sun had not come out.

"I cannot believe this is February, man," Doug muttered, as our twin diesel engines opened up, and we

steamed into the channel. I sat on the flying bridge, ostensibly taking photos, but really just chatting to Doug, picking his brains about the Ryukyu Islands.

These islands and their beauty fascinated me. Their size was massive, and yet the Japanese had built carefully and with some taste. Naha was a city but a small

city, and the resorts on the northern coast were built with an eye to blend into the greenery. The only downside of Okinawa was that the tourism infrastructure was almost entirely designed for the Japanese.

The presence of the U.S. forces had created an English speaking section of the Japanese populous who made their business serving



Okinawa



LEFT TO RIGHT: Spotted grouper; Soft coral growth on reef; Brilliant yellow gorgonian



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Americans. These people were only too happy to adapt their services for tourists.

What made it all work was the sheer friendliness of the Okinawans. When we took a bus somewhere, the bus driver would explain in single words or hand signals what we needed to do next. Where communication failed, the sheer goodwill of the average Okinawan would bridge the gap—and we, as tourists, always felt extremely welcome and safe to get lost.

My thoughts were interrupted as a series of rocks appeared at the side of the boat. Classic Okinawa fishing boats sat at the edge of a clear light-green reef, with the men casting their nets as they always have. Away from the reef, the water was a gorgeous blue. We motored slowly on around the reefs and between some islands.

"Some say there are 27 Islands here and some say five," Doug

drawled. "It sort of depends upon how high the tide is."

"How many dive sites do you have?" I asked.

"Oh about 200," he replied nonchalantly. We were only to do three this day.

We circled a large rock masquerading as an island. Goats strolled around on the steep grass that came down to black rock cliffs.

Kuroshima. Doug stopped the boat and moored up. We rolled into the water—between twin rocks—a site called Kuroshima. We dived along a wall that led off onto a spur, which joined onto one of the other rocks making an island. Daisuke took his divers around the island, but we could not get past the main coral strewn wall.

The water was clear with 30m visible in all directions. Small yellow soft corals were surrounded by angelfish.

We descended lower and lower to some emperor angelfish that were sitting at depth—around a fan coral. They watched us lazily, not bothered by our

appearance at all. I snapped them, and the twin flashes of my camera popped and lit them dramatically.

I looked at my guage. We had reached

32m. My computer was downcalculating rapidly, and I did not really want to go into decompression. I signalled my dive buddy, Cisca, and asked what she





CLOCKWISE FROM LEFT: Varicose phyllid nudibranch under sea fan; Big-eye squirrelfish under ledge; Lush sea fans and anthias decorate a reef wall; Diver in swimthrough

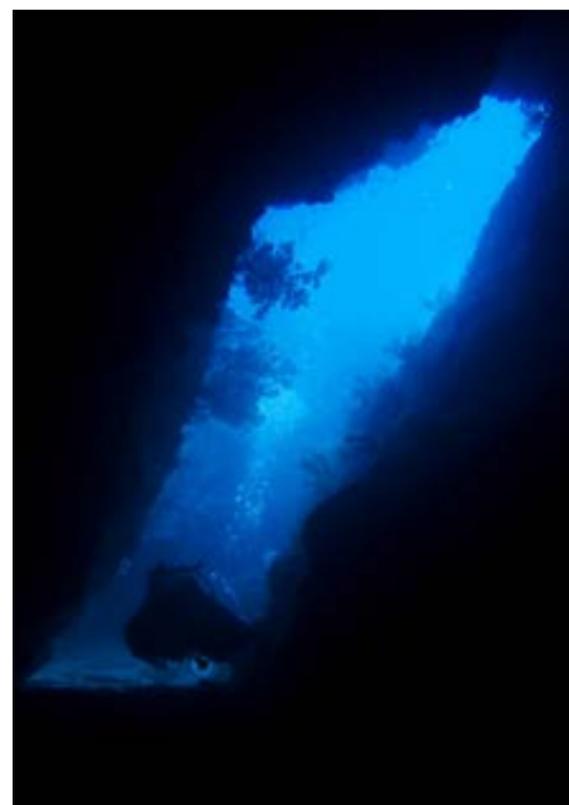
in this shallow location, but in our thick suits and heavy weights, every movement was an effort and my air consumption was hammered.

We swam back to the top of a coral cliff where the boat was moored and went to do our safety stops.

Azu's Cave. Our next dive was on a large square rock in the middle of the ocean. Named Azu's Cave, it was marked by a black and white post warning passing boats about the rock. The sea had picked up slightly, and we dropped in and entered the rock.

We literally swam 20 metres through the most dramatic swim-through. All the way along the tunnel emperor angelfish mingled around the large gorgonian sea fans. I kept stopping to look up, with my strobes on torch mode. I felt I could spend half an hour in here alone, but I did not want to test Daisuke's patience.

As we exited the cave, Daisuke led



the group forward. He motioned me and asked if we wanted to join. We could not. The rock was so large, and such a magnet of life, that we opted to stay there.

As he headed off, we circled it, slowly



at 20m depth, taking in the fan corals and fish. Daisuke had headed off down a sand river; I noted it for future reference, waved and he was gone.

The surge pushed us around the rock. This was big boys diving. It took all of our skill to stay stable and enjoy what we were looking at. Lionfish crawled all

wanted to do. She motioned up and along, so we slowly ascended to ten metres.

At that point Daisuke appeared out of the gloom and brought his divers back past us to head for the boat and reef top. We thought we should also return but took our time. We came shallower on the wall until we came to ten metres and then moved along what was the base of hill.

Just before coming back to the anchor line, we entered a narrow underwater defile with a series of small caves or cracks to the left and right. The surge pushed us up through the gaps, and we had to hang on to glance in at the sweepers and nudibranches. We managed to spend another 15 minutes



Okinawa

Diver follows the trail of a 'sand river' underwater

PLANNING YOUR TRIP:

The Kerama Islands are a hidden gem. Famous in Japan for their diving, they are a world-class destination with sharks, manta rays, orcas, schools of fish and macro creatures.

Japan, however, is unique. The public transport on the mainland is excellent, but in Okinawa, it is non-existent. You will end up hauling your kit all over airports train stations, and often enough, down the street. Divers are encouraged to take a single wheelie bag and keep kit down to a minimum, such as regulator, suit, mask and fins. Reef Encounters has excellent Aqua Lung BCD's and regulators.

Spring and summer are idyllic with tropical water and air temperatures. Dive operator, Doug Bennett, of Reef Encounters knows the Ryukyu Islands like no other diver. He and his team do packages to Okinawa, Irimote, Ishigaki and have tie-ups with local hotels of all comfort levels.

We also travelled on the main islands of Japan with the excellent Inside Japan Tours. They organised our entire itinerary from trains to planes to busses. They also do dive packages in conjunction with Reef Encounters and others. With their contracts and contacts, they are often cheaper than doing it independently. Registered in the United Kingdom and abroad, they are a first class outfit that knows Japan. You must, however, tell them that you are a diver and carrying dive gear. They will tailor your journey accordingly.

The Japan specialists offer a range of dive packages across the sub-tropical islands and the mainland to include the Iseki Stones of Yonaguni, the manta rays of Ishigaki, coral and stunning visibility in Okinawa and hammerhead sharks off the Izu Peninsula. InsideJapan fully tailors dive packages to suit all time frames, budgets and interests. ■

over one wall and soft coral and fans on the other—the leeward sides of the rock being more alive than the others.

After our circuit, we thought we should follow Daisuke. I thought I had selected the correct sand river and finned slowly up the coral trench. In this way, we kept our selves away from the current. Schools of jacks and emperors sped by clearly minding their own business. When our air was getting low, I looked around. There was simply nowhere to do a multi-level dive—nowhere to do a stop and look at anything. So, I sent a buoy to the surface, and we ascended to stop.

We surfaced, and the weather had taken a definite turn for the worse. I looked around and inflated my BCD even more. I could now see for miles. I saw a spot and waved the SMB. The boat was there, and turned towards us.

"Sorry dude," Doug shouted from the bridge. "The others came up miles away

and then a pod of whales turned up so we watched them."

"No stress," I gasped, as I climbed up the ladder laden down with my kit. "The dive was awesome, and we knew you were coming."

Nagando Reef. The weather had turned, and Doug wanted to be closer to home. Doug took us to Nagando Reef, North Wall, where we all jumped into 18m water and landed on a reef. We were in full drift.

This time, we stayed glued to Daisuke and sped along the reefs and sand.

A sea snake followed us for a while, and then a reef shark appeared. It swam alongside us and then wandered off on its own business. In the midst of the dive, we



Banded sea snake (top left); Resting scorpionfish (left)

was almost stormy. I climbed back onto the boat with the others, and we steamed the last few miles home.

Afterthoughts

A few days later Daisuke was roped into dropping us off at Naha Airport. It was sad saying goodbye to the Reef Encounters team; they were excellent professional divers who guided us and others through calm and advanced diving. They were super safe and took the time to demystify Okinawa for us. ■

spotted a leaf fish and had the interesting experience of trying to shoot a macro photo in a three knot current. I think I just about managed it.

By the time we surfaced, we had covered an impressive distance, and it

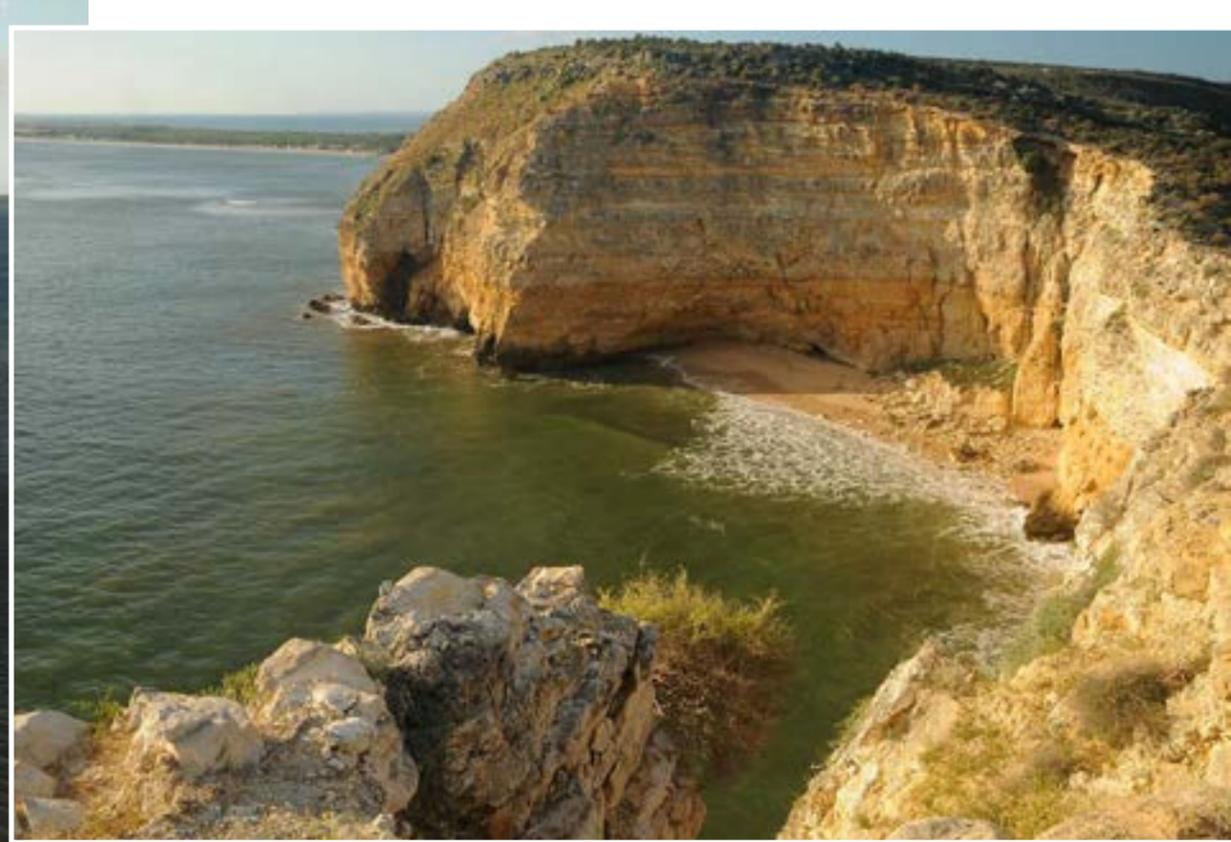
Farhat Jah is a dive writer and underwater photographer based in Pemba, Tanzania. He leads specialist dive safaris around the globe and operates a dive resort on the island of Pemba. For more information, visit: Orientafrica.travel.com



Text and photos by Pierre Constant

Madagascar

— *Diving Sinkholes & Caves on the Mahafaly Plateau*



Cargo passenger canoe, Onilahy River (above) and limestone cliffs (top), St Augustin



Entrance to Binabe Cave (above) is at bottom of cliff; Limestone cliff of the Mahafaly Plateau in St Augustin (top). PREVIOUS PAGE: The Mahafaly Plateau bush, with bottle baobab trees and *Alluaudia*

Text and photos by Pierre Constant

Stretching west and north of the Isalo Ranges, the Mahafaly Plateau runs like a dragon's tongue to the very tip of Madagascar's southwest coast. This is a remote country in the Great South, where numerous historical shipwrecks have lain below the waves since the 16th century. Created in the geological Eocene times, the limestone table is rather conspicuous when seen in Saint Augustin, south of Tulear. It conceals an extensive run-off of underground water, judging by the numerous springs encountered in the lower valley of the mighty Onilahy River.

The Mahafaly Plateau has been affected by post-Eocene tectonic movements with a northwest-southeast distension, which tops an older tectonic event on the underlying substrate. Seismic activity is a common occurrence there. The karst process is intense in the lower Eocene with very deep caving systems, whereas in the mid-Eocene, sinkholes are only visible.

A number of these sinkholes, or *avens* as they are locally known in the French language, were brought to light by aerial photography taken by the French (Battestini 1964, IGN 1966). Looking like cauldrons, these collapsed sinkholes, round or oval in shape, mea-

sure anything from a few dozen metres up to 500 metres in diameter, with depths ranging from 40m to over 100m. They are natural wonders that make one hold one's breath for a minute.

Tsimanampetsotse National Park
Crossing the Bay of St Augustine on a flat sea, our speedboat made a beeline to Anakao, a Vezo fishermen village under the sun. The white beach was fringed by a turquoise green lagoon, cradled between the historic

feature

Nosy Ve Island and the mainland. It looked like a picture perfect postcard, with local outrigger canoes sailing back and forth on their fishing trips—an impression of paradise rediscovered.

A coastal track follows the west coast 56km to Efoetsy—gateway to Tsimanampetsotse National



Madagascar



The 66m-deep sinkhole of Androinpany at Itampolo

Park, whose exquisite Malagasy name means, “there are no dolphins”. A nature reserve created in 1928 during the French colonial administration, the park is comprised of a huge lake—15km long and 2km wide—equaling a surface of 3,750 hectares, home to two species of flamingoes. The natural reservoir is fed by the springs coming out of the cliff, and by the avens as well.

A few caves and spectacular sinkholes are found in the park, home to giant banyans. Amazing roots climb down into the holes in search of water.

At Mitoho Cave, a small lake hosts some albino Eleotrid blind fish—pink and white—of the *Typhleotris* genus. These small creatures timidly skim the surface.

The hour-and-a-half loop circuit of

Tsiamaso (meaning “without eyes” and related to spirits) allows access to the cave of Andranolovy where a huge five-stemmed Madagascar palm tree (*Pachypodium geayi*) guards the entrance.

A stone’s throw away, one comes to the aven of Vintany where a curtain of roots of the aviavy tree spill down like a waterfall to the existing water table. A bit further along, the lone baobab (*Andansonia rubrostipa*), or “grand mère”, puffed up and covered with open warts, stands still like a matriarch lost in time.

The dirt road continues south into white sand, across an arid, sun-parched countryside. The spiny bush is a landscape composed of almond green silver thicket (*Euphorbia stenodacla*), with thorny branches, and rather exotic octopus trees of the *Didieracae* genus, which look like candelabra cactus. However, their trunks are made of wood, covered with spines and also tiny leaves.

Itampolo

The town of Itampolo, a name meaning “ten cameleons”, is another two hours further. Beyond the picturesque fishing village and the idyllic beach on the waterfront, the attraction here lays in the



The sea-shore at Itampolo (far left); Vezo outrigger canoes out for a fishing day, Itampolo (above); Vezo boys in a fishing canoe (left)

existence of two sinkholes worth visiting.

Avintany, in the lowlands, is an aven ten metres deep, full of water and accessible only through the roots of an aviavy tree. The clear water of the lake is enticing. The cream coloured limestone cliff is quite hard, present with flintstones, sandstone and sedimentary tuffs.

A second aven named Androinpany is found 5km inland, on the top of the Mahafaly Plateau, hidden in a forest of spiny *Alluaudia*, a species of octopus tree. Androinpany is a circular pit, 15 metres across, with sheer walls that plunge down to 66 metres in one drop. Impressive enough, it is inhabited by a

couple of maki lemurs, which live in cracks near the entrance of the sinkhole. The site is also home to rather inquisitive black vasa parrots and a couple of kestrel falcons.

“Some years ago, two Portuguese men came here with ropes and climbed down to the bottom,” said our guide, Dongary. I could make out a pile of debris at the centre of the sinkhole, with a ring of water indicating a possible cave underground.

Intrigued by these fascinating sinkholes, I returned to Itampolo four times in the course of two years.





Madagascar

VOAY ROBUSTUS IDENTIFICATION

Research done by Christopher Brochu in 2006 showed that a fossil specimen identified by Grandidier and Vaillant in 1872 belonged to a distinct species. *Voay robustus* is indeed an extinct species of horned crocodile from the Quaternary period—ranging from the Pleistocene (20,000 years ago) to the Holocene period—and related to the living African dwarf crocodile, *Osteolaemus tetraspis*, one of the smallest and least aquatic crocodylians.

Besides their small size, morphological characteristics include prominent triangular horns behind squamosals, dorso-ventrally deep snout and near exclusion of the nasals from external naris.

The ancestor of *Voay* must have rafted or swum across from mainland Africa, long after the separation of the big island from the continent during the Jurassic period. An endemic radiation occurred in Australasia at the same time.

Osteolaemus tetraspis, or African dwarf crocodile, were commonly found in forested settings, avoiding saline and brackish water. Their absence in marginal marine habitats reflects competitive exclusion by the larger *Crocodylus niloticus*.

But here's the 10,000-dollar question: "Was the extinction of *Voay robustus* related to the arrival of humans 2,000 years ago? Or was it due to predation from the larger *Crocodylus niloticus*?" ■



CLOCKWISE FROM LOWER LEFT: Pierre Constant prepares for a dive in Avintany; Avintany sinkhole, with aviavy roots climbing down; New species of brown blindfish, *Typhleotris mararybe*; Copper brown blindfish under overhang

ment with a rope and a camera in a bucket, then climbed down the roots of the aviavy tree like a lemur 'holding onto dear life'. The initial snorkel around the pit indicated a depth of 10m around a central mound crested with green vegetation—a mini forest of stems with whiskers.

Prehistoric looking, brownish copper blindfish, *Typhleotris mararybe*, (identified as a new species in December 2012) with a duck beak, swam about under

the overhangs in the shallows, together with what looked like an aquatic mantis (water scorpion). Streams of bubbles

rose from the sedimentary floor in places, proof of ancient volcanic activity.

Subsequent scuba dives revealed caves in the north, south and east ends. The larger, most accessible being the former one, which extended to 80m over a lunar landscape of silt ridges, down to a depth of 25m.

Bumping into a solid wall at the far end, I noticed a deeper passage that sank down to 30m, in a sort of bottleneck crowned with white sediments—a 'no-no' for a solo diver to attempt. At the top of the passage, dug into the silt, I gazed upon some blackened bones—vertebras of what could be an elephant bird (*Aepyornis*) or a crocodile tail.

For the Malagasy people, these avens are *fady*, which means *taboo* or *sacred* in the local tongue. Locals are afraid

of them, for they believe dreadful spirits inhabit them. Others come here to practice rituals—including the sacrifice of a black rooster or a goat—and bring offerings, such as a bottle of rum, cigarettes or money. "Women pray for fecundity, in the hope to have a child," I was told.



Vertebra of, most-likely, a dwarf crocodile, at 25m depth

Binabe Cave

The sun is at its apex when I left Tulear in a wrecked taxi, held together only by the grace of the Holy Spirit. Shortly, we sighted Sarudrano Spring. One hour later, a white signboard indicated with an arrow, "Binabe, grotte sacrée"—a sacred cave it is.

This is where, in search of the place a few months ago, I had climbed on top of



Avintany sinkhole

At Avintany, which is 34m by 22m across, I lowered a scuba tank and dive equip-



Madagascar

View of the mouth of Binabe Cave from inside (far left) and from underwater (left); Chimney going down to 31m (lower left); Entrance pond lit by sunbeams (below)



enchantment, from the nearby village. “Five thousand ariary for the two of you,” he demanded at once.

Tank on my back, camera bag strapped across the shoulder, Nikonos V at arm's length and a dive bag on the other shoulder, I followed in his footsteps for a ten-minute walk into the bush, expedition member, Christina, in tow with my fins and knapsack. An awesome sight, the cliff appeared 20 metres high, looming forward and reflecting a yellowish white light. I was already sweating profusely.

The trail snaked its way down a rubble slope with scattered rocks, into the shade of a hole. The few sunbeams striking through a pool of freshwater created a beautiful jewel blue aura. Nevertheless, I was filled with a bit of

fear at the thought of venturing into the dark unknown.

Moving through the water stirred up black sediment right away, which was, in fact, bat guano. Great caution would have to be used to avoid disturbing the visibility.

Under the surface, some small dark brown blind fish moved about shyly. Some time later, I noticed a bigger fish, 15cm to 20cm long, with two dorsal fins and a rounded caudal fin with a pointed tip, which looked just like a flame at the back of a rocket. My attempt to approach it was made in vain, as it fled in a flash! This one was certainly not blind.

Sinking in the depths,



Femur of an extinct dwarf hippo

I observed tiny crabs—1cm long—in the water column, then large shrimps 5cm to 10cm long, on the guano slope, quite intrigued by my other worldly appearance.

The bottom plummeted gradually east, opening into a vast chamber about 20 metres wide. I came to a dead end at a depth of 33 metres. The wall was soft and crumbled easily. The cave floor was like a dark desert, mottled like salt and pepper, and crisscrossed by tiny tracks of mysterious critters. Isolated specimens of blind fish cruised by at random over the guano landscape.

Making my way up along the north side,

I gazed upon what looked like a blackened fossil cast into the wall. I took a photo for memory. The dive into Binabe Cave lasted 30 minutes, and the water temperature was 26°C. At all times, I could

see the light from the surface. A few months later, I returned for another exploratory dive, and found—at a depth of 25 metres—the femur of an extinct species of dwarf hippopotam-





Vintany sinkhole with access vine (far left); Pink and white blindfish, Mitoho Cave (left); Mouse lemur (center inset); Guide Nicolas with giant Madagascar *Pachypodium*, Tsimanam-petsotse National Park (lower left)

2012, 16 years after Jean Michel Cousteau went in with his team.

blindfish, *Typhleotris madagascariensis*, were swimming upside down at the surface, as if trying to breathe: "It's impossible to dive here—the site is forbidden."

A stone's throw away was the aven of Filomeni, which was a narrow pit, maybe 2m in diameter, where roots of an aviavy tree plunged down vertically to an unknown depth. Penetration was risky and impossible without the proper gear. A fortiori—"The site is inhabited by spirits," explained Nicolas, pale as the specter of death.

The morning after, I was back with Ryan, an Australian diver, and his mate, Anthony, from a dive centre in Anakao. The aven of Vintany was explored by the latter two in May

The park newly grants permission to dive Vintany, following an agreement with Le Relais d'Ambola Hotel in Ambola. The site is a mere ten-minute walk from the Mitoho car park, on the top of the Mahafaly Plateau. Visually appealing, the sinkhole is ten metres deep. Ropes and harness are recommended to climb down into it, as well as to lower tanks and gear. Nonetheless, with helmet on for extra safety, I made use of a root of a banyan tree to ease my way down along the cliff side. Once into the pit, I could only marvel at the waterfall of roots, cascading down like a curtain of white stems. Quite a sight, indeed!

White and pink blind fish were skimming the surface. I had a feeling of *déjà vu*, as the floor sediment was



mus, *Hippopotamus lemerlei*, from southwest Madagascar. Identified as such by JR Boisserie, it was one of the three ancient species of Malagasy hippo that have disappeared over a thousand years ago.

I brought the hippo femur I discovered to a research lab at the Museum of Natural History in Paris and was fortunate enough to meet Dr Antoine Zazzo and his colleague Olivier Tombret, who agreed to do carbon-dating analysis of the bone. It was found to be approximately 1,394 years old, dating back to the 7th century, between 595 AD and 677 AD.



Vintany sinkhole

A few days later, I returned to Tsimanampetsotse National Park in search of new avens, or cenotes. On the Andranalamalaika circuit, Malagasy guide Nicolas took me to the collapsed sinkhole of Andrianamaniloky. There, at the bottom of a treacherous slope of slippery boulders, a pool of clear water hid in the darkness. A number of pink and white



CNRS scientist Olivier Tombret with hippo femur in lab at the Museum of National History in Paris. Carbon-dating found the bone to be around 1,394 years old (circa 595-677AD)

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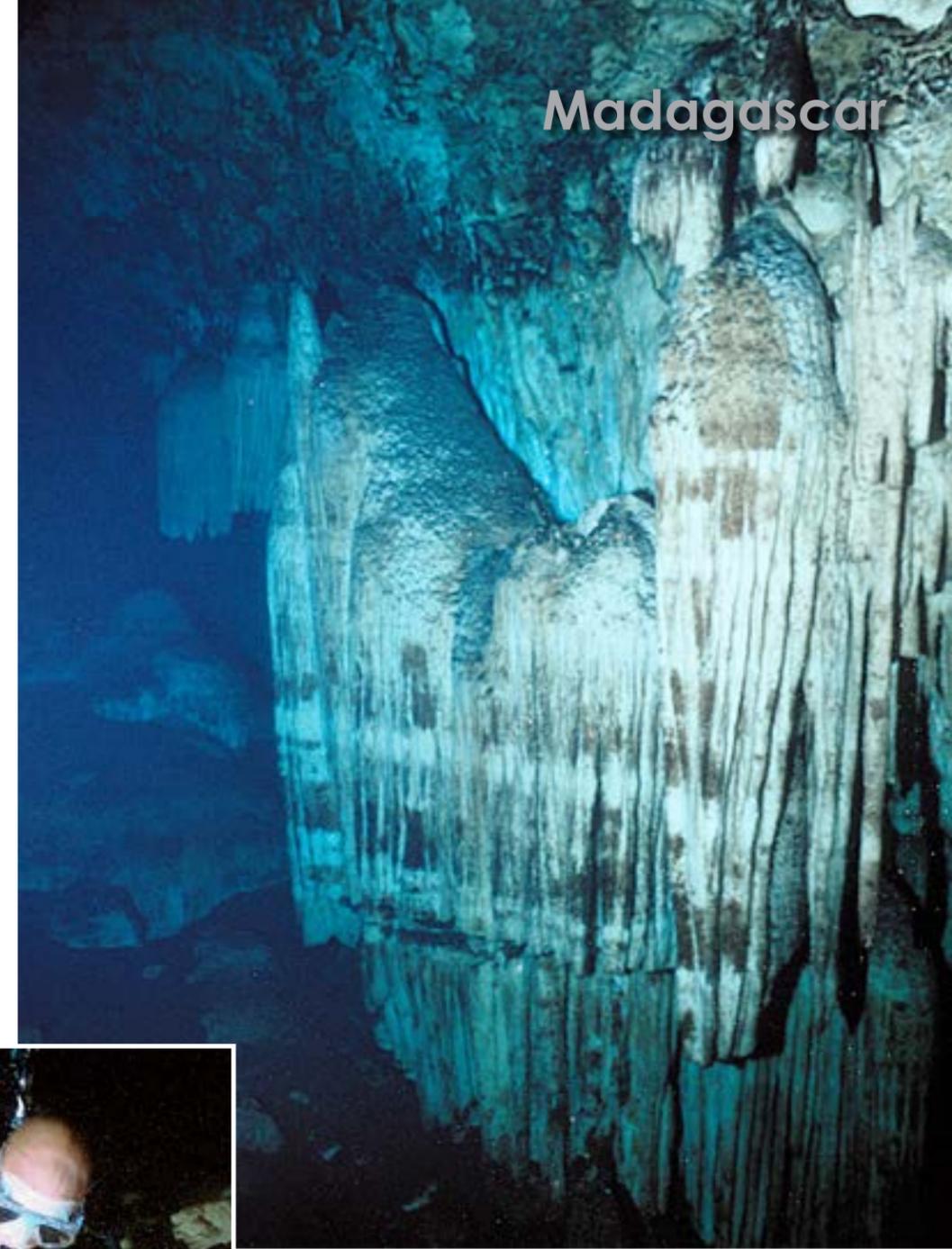
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THIS PAGE: Vintany sinkhole. CLOCKWISE FROM LEFT: Cluster of stalactites; Diver facing a stalagmite; Formations against the wall; Diver inspects crocodile skull; Complete skeleton of a dwarf horned crocodile with jaws

with all its teeth. A thrill ran up my spine at the thought that 1,000 years ago, or even 10,000 years ago, the site was a crocodile haven. By all means, there would have been fish as well, otherwise how could the monsters have survived?

Further down the slope, small lemur skulls lay here and there, once prey of the reptiles. The most visually striking piece was an almost complete skeleton of a crocodile with dorsal spine intact. The vertebra rings were just massive.

Majestically, the wonders of the cave revealed themselves at depth, as the cavern descended in various balconies. Clusters of stalactites came down from the

roof of the cave, with truncated stalagmites underneath—evidence that the aven was once a dry cave for at least 20,000 years, judging by the fact that some stalagmites were two metres tall, not to mention the amount of bat guano present. Other broken stalagmites attested to the occurrence of ancient earthquakes. It was, I thought, “Elementary, my dear Watson!”

At a depth of 28 metres, shawls of calcite gracefully decorated the walls at a height of two to three meters. The gin clear visibility was a definite plus in appreciating these geological wonders, preserved in their timeless shroud.

The progressive return to the surface was a vision of



fairlyland. The wide angle panorama of the curtain of roots, outlined against the backlight, was superb. One came out of the water with a sensation of bliss. Vintany was the magical aven—a

dive of 55 minutes, at a bath temperature of 29°C. Unbelievable, but true!

Upon exiting the sinkhole, I noticed a family of ring-tailed lemurs, or “makis”, frolicking joyfully in the foliage of the banyan tree. Curious of the day visitors, they fed actively on the capsules of the giant ficus. The lemurs gave me roguish glances and hopped swiftly from branch to branch, as if everything was going for the better in the best of worlds. I thought to myself, “By Jove!

again bat guano, easily stirred up. Anthony led me underwater, above a field of rocks and boulders resulting from the collapse of the roof.

For a while, he seemed to be searching for something. Then suddenly, he pointed towards a collection of bones. In a stupor, I

stared at the skull and jaws of a crocodile, a brownish golden colour, with an easily recognizable tooth. Dreadful. The specimen was probably 1.5 metres long.

A short distance away, I discovered another jaw of a younger specimen,





Guide and expedition member, Christina, sitting near the green pool at the bottom of Andramanoatse sinkhole (left) and carrying dive gear on return walk from Andramanoatse (above); Skull of a lemur, killed by a croc, Vintany (below); Skull and jaws of a crocodile, Vintany (bottom left)



When the crocs are gone, the makis dance." After my discovery of the femur of a dwarf hippopotamus at Binabe Cave in November 2012, I was keen to return to the area again and explore some more.

Andramanoatse

One sunny morning, on my way to Itampolo in our driver José's 4x4, we stopped at various villages in the heart of the bush, as I was trying to locate a new sinkhole far inland. The driver was helpful in translating my questions to a local man, who seemed

to have a clue to what I was talking about. "Yes, yes, big hole... clear water, good to drink, no cattle access," he said. That sounded good. Although it was a bit far and he didn't know how long we'd have to



walk on top of the Mahafaly Plateau, he was willing to guide me and help carry the scuba tank, for a reasonable fee. We made an appointment two days later, early in the morning, because I guess the sun would be a killer. I

found him, as promised, sitting under a tree, in the center of the village of Kuristy, a cluster of wooden huts that looked like a shanty town. We were off to Andramanoatse. The guide stoically carried the 15-litre steel tank attached to the BCD on his back. Christina followed with the fins and some water, and I took the rest of the dive equipment in a yellow mesh bag, in addition to a knapsack with the camera. Fifteen minutes later, we climbed up to the Mahafaly Plateau.

The somewhat clear trail divided into other trails across forests of *Alluaudia*, and *Didieracea*—octopus trees with the weirdest shapes. Isolated bottle baobabs dotted the landscape like giants. Blue couas—endemic birds with long tails—hopped across the trail once in a while, adding a touch of life to this apparent no man's land. One hour had elapsed when we started descending into a valley, stepping over slabs of hard white limestone. Suddenly, the guide turned around stretching his arms with a smile—we were here.

The collapsed sinkhole was about 100 metres in diameter. Facing east, the cliff was 50m high and imposing. Climbing down the slope of rubble and boulders among trees and shrubs, we came to a small lake covered by a film of green algae at the base of the massive wall broken by some slanting fractures. The place looked definitively prehistoric. Big banyan-like aviary trees with extensive roots bordered the sinkhole inside the pit. The number of dungs and other droppings scattered around left no doubt that cattle and goats came to drink here, not only humans! After I threw a stone into the pool, I noticed clear water below the film, and that was encouraging, at least. Venturing around the sides and on the top of the aven for photographic angles, I spotted some maki lemurs and black vasa par-

Makis lemurs attracted to the waterhole, Andramanoatse



rots in the area.

After getting ready for the dive, I entered the water cautiously. The first hole on the left plunged deep under the rocky overhang. The silt on the slope was very thick, fine and easily stirred up, troubling visibility immediately. I secured a tie-off to the roof of the cave, and I reeled my way in, down to 20 metres, soon to find myself in a silt storm.

"It doesn't make sense to continue into this madness alone," I thought to myself. The passage was too narrow. I turned around and tried the second hole to the left, as I exited. Funnel-like in shape, it was the same story in the second hole, and I gave up after a while.

At the third hole, I understood that I would have no luck there either, silting out the same as the last two. But just as I made my way back to the surface through a cloud of pastel green yellowish silt, I came to what looked like dead branches sticking

eerily out of the mud.

Not that I had ever come across that sort of curiosity before, but I recognized at once the forking truncated end of the jaw with four tooth holes in the middle and the two prominent outer holes of the tusks, with one still in place, albeit broken—it was the lower jaw of a dwarf hippopotamus. There was also a femur blackened with age.

Although the water temperature was a comfortable 27°C, after 22 minutes diving at 21m, I started shivering in my Lycra suit.



A few local people suddenly materialized out of thin air, coming down into the sinkhole to collect some water for their journey onward. They looked at us with inquisitive glances, and I decided to move on swiftly.

"I shall be back for some more explorations elsewhere next time!" I told the guide, as we shook hands heartily. We left in a cloud of dust, bound for Ambola where we would spend the night. On the way home, I was already planning another exploratory dive at the isolated Andrianamaniloka (sinkhole) cave in Tsimanampetsotse National Park. ■

Pierre Constant is an author, photographer, dive master, naturalist consultant and expedition organizer based in the Galapagos Islands. Constant will organise a trip to southern Madagascar in May and September next year. For more information, visit: Calaolife.com and Scubadragongalapagos.com

CLOCKWISE FROM TOP LEFT: Black vasa parrot on an octopus tree (*Alluaudia*); Red dirt road to Tsimanampetsotse National Park; Freshwater spring on the seashore at Kuritsky; Baobab trees, Tsimanampetsotse National Park

fact file



Madagascar



SOURCES: U.S. CIA WORLD FACTBOOK, NORTH-SULAWESI.ORG, D. SILCOCK

History Madagascar was an independent kingdom until it was colonized by the French in 1896. It regained its independence, however, in 1960. Free presidential and National Assembly elections were held during 1992-93, ending 17 years of rule by a single party. Didier Ratsiraka, who led the country in the 70's and 80's, was voted back into office in 1997. Half the country came close to secession in a row over the 2001 presidential election which was contested by followers of Didier Ratsiraka and Marc Ravalomanana. Ravalomanana was finally announced the winner by the High Constitutional Court in April 2002. Ravalomanana went on to win a second term in a landslide victory in 2006, however, he ended up handing over power to the military in early 2009, following protests over broaden-

ing restrictions on the press of the opposition and activities. The military then placed the mayor of Antananarivo, Andry Rajoelina, in office on in what many consider a coup d'etat. Political gridlock ensued, which has challenged regional and international organizations attempting to resolve the issue by forming a government in which power is shared. Independent presidential elections pushed forward by the electoral commission and the United Nations were delayed until late July 2013, due to logistical problems. Government: Republic. Capital: Antananarivo

Geography Madagascar, which is the world's fourth-largest island, is located in the Indian Ocean, east of Mozambique, in Southern Africa; It holds a strategic position along the Mozambique Channel. The island's terrain includes a narrow coastal plain as well as mountains and a high plateau in the island's interior. Coastline: 4,828km. Lowest point: Indian Ocean 0m. Highest point: Maromokotro 2,876m

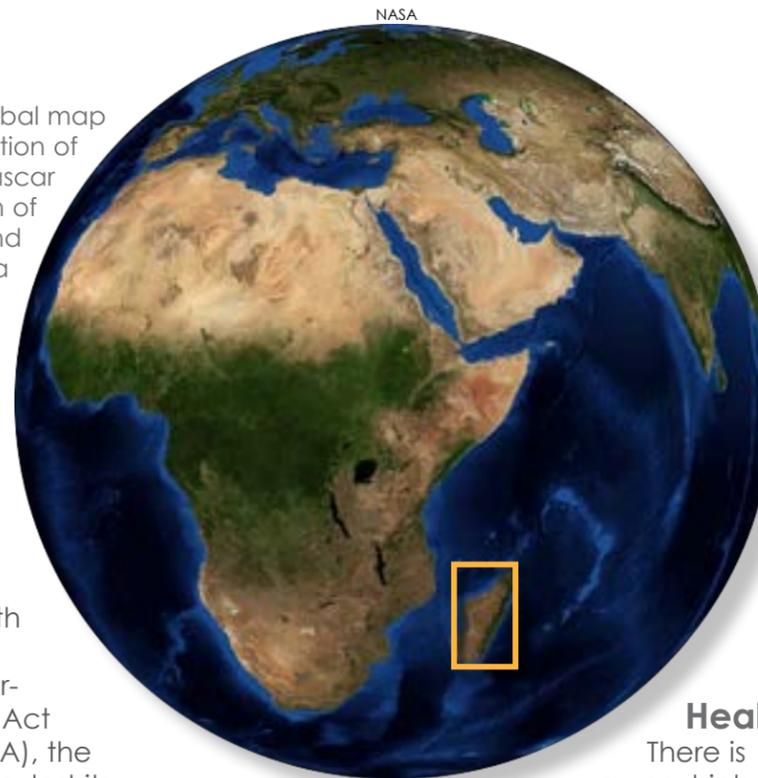
Climate Along the coast, it is tropi-

cal, with temperate climate inland, while the south is arid. Natural hazards include periodic drought, cyclones and locust infestation as well as the potential for volcanism, but volcanoes on Madagascar have not been active during historical times.

Environmental issues Deforestation and overgrazing have resulted in soil erosion. Other challenges include desertification, raw sewage contamination of surface water and water pollution from organic wastes. In addition, there are several species of flora and fauna unique to the island that are endangered.

Economy In the mid-1990s, the government abandoned socialist economic policies in order to pursue privatization and liberalization policies led by the World Bank and IMF—policies which have since been undermined by the current political crisis. However, the country is on a gradual mend, albeit from an extremely low level. The mainstay of the economy is agriculture (including forestry and fishing) which employs 80% of the population and accounts for more than one-fourth of GDP. A brief boom in apparel exports resulted from duty-free access to the United States, but because Madagascar failed to comply with regulations of the African

RIGHT: Global map with location of Madagascar
FAR RIGHT: Location of Mahafaly Plateau and Tsimanampetsotsa Nature Reserve (TNR) on map of Madagascar
LOWER LEFT: Water mantis (water scorpion) in the shallows at Avintany sinkhole



Health

There is a very high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and typhoid fever; vectorborne diseases such as malaria and dengue fever; water contact disease such as schistosomiasis (Bilharzia); and animal contact disease such as rabies (2013)

Decompression chamber

There are no hyperbaric chambers on Madagascar, and facilities in nearby Maputo, Mozambique, have limited access. The next nearest modern facilities are located in South Africa in Johannesburg, Durban, East London and Cape Town.

Travel/Visa/Security

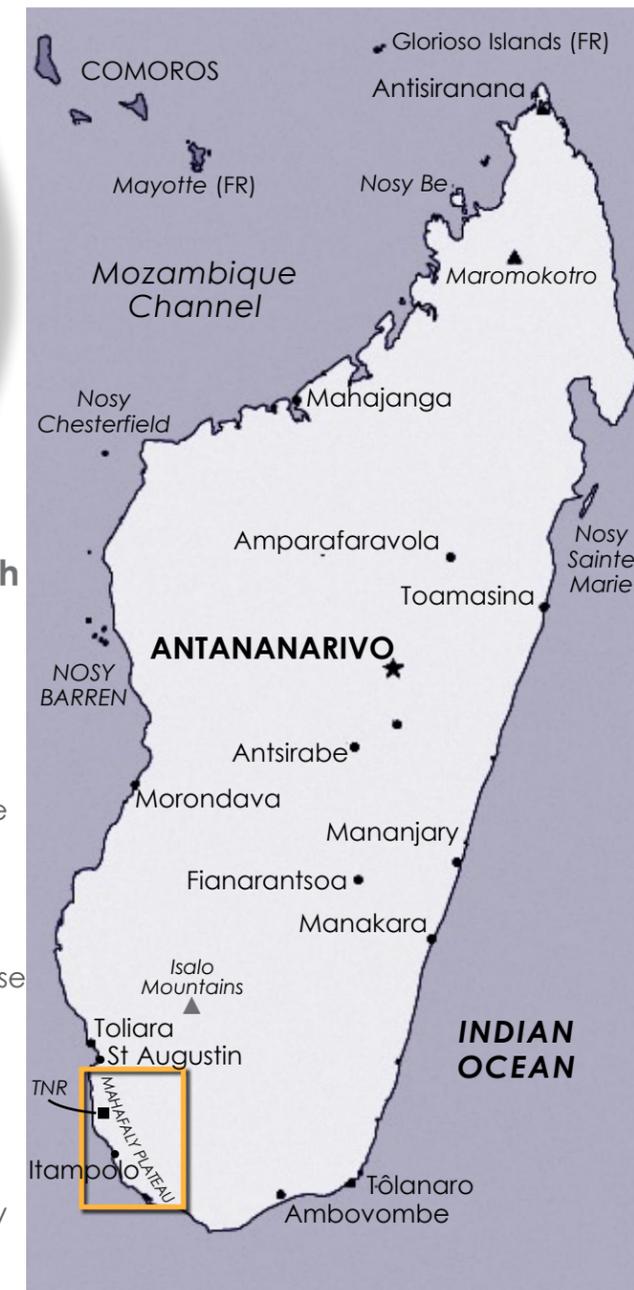
Passport valid for at least six months required. Free 30-day visa available to tourists upon arrival. Proof of yellow fever immunization required for all travellers coming from infected areas within six months prior to arrival in Madagascar. Check with your state

Growth and Opportunity Act (AGOA), the country lost its duty-free access in January 2010. A sharp decline in textile production followed. The economy is further embattled by the current political crisis, which began in early 2009. Tourism dropped by half in 2009 compared with tourism in 2008, causing wariness in investors. There was slow growth from 2010 to 2012, but expansion in agriculture and mining may spur more economic growth in 2013.

Currency Malagasy ariary (MGA). Exchange rates:
1EUR = 2,913.57MGA
1USD = 2,197.80MGA
1GBP = 3,458.29MGA
1AUD = 2,043.53MGA
1SGD = 1,732.90MGA

Population 22,599,098 (July 2013 est.) Ethnic groups: Malayo-Indonesian, Cotiers, French, Indian, Creole, Comoran. Religions: Indigenous beliefs 52%, Christian 41%, Muslim 7%. Internet users: 319,900 (2009)

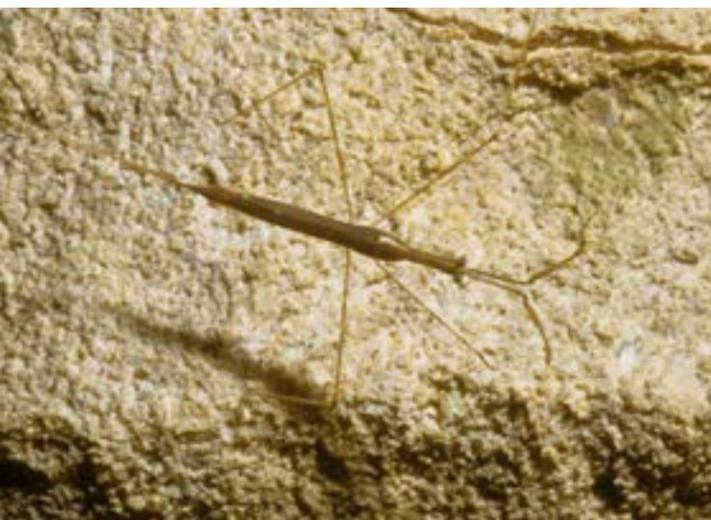
Language French and Malagasy are the official languages. English is also spoken.



department on security warnings, as there have been incidents of unrest in the capital in recent years.

Websites

Madagascar Tourism Board
Madagascar-tourisme.com/en
Tsimanampetsotsa Nature Reserve
Parcs-madagascar.com
OTHER SOURCES:
TRAVEL.STATE.GOV, DIVETRAVEL.CO.ZA,
LIQUIDADVENTURES.CO.ZA



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POINT & CLICK
ON BOLD LINKS



Equipment

Edited by
Rosemary 'Roz' E. Lunn



3D vest

The 3D Mesh inner lining that provided both insulation and pressure distribution in the revolutionary D1Hybrid drysuit, which Waterproof launched a few years ago, now comes in the form of a vest that can be used as a stand-alone undergarment. The two outer layers are kept apart by nylon springs, like in a bed mattress. The constant

distance and unrestricted airflow provided by Waterproof's 3D Mesh inner lining also keep the moist air away from your body. The 3D Mesh has exceptional resistance to pressure. It provides real pressure distribution and keeps the distance constant to the outer shell. This virtually eliminates squeeze and cold spots.

www.waterproof.eu



Pretty in pink

Smacking your skull on a stone during a high-speed scooter run does not make for a happy diver. Enter the Light Monkey high-density polyethylene (HDPE) helmet. Buoyancy has been considered because the helmet features nine ventilation holes on the top and sides (to release trapped air). The helmet is held in place by an adjustable soft nylon webbing chin strap, and fastened by a quick disconnect buckle. Light Monkey's helmet is already available in black, red, blue and yellow. The pink limited edition version is being launched at the 2013 DEMA Show, and proceeds from the sale of this helmet will be donated to Project Pink Tank: Rubicon-foundation.org



AP CO₂ Sensor

The CO₂ Sensor from Ambient Pressure Diving is an 'active warning device' designed to alert the diver when the CO₂ content of the breathing loop is approaching a dangerous level.

This could be due to depletion of the CO₂ absorbent canister or incorrect assembly resulting in CO₂ bypass of the canister. The CO₂ Sensor has been specially developed for use with AP Diving's range of rebreathers equipped with Vision electronics. The sensor is intended as an option that can be used with or without the APD Scrubber monitor.

APDiving.com/rebreathers/



Darkfin Gloves

Webbed gloves need to have a decent increased surface area to move the water efficiently and effectively. They ought to be lightweight, yet strong, whilst retaining flexibility to allow for dexterity. Finally, a webbed glove should have decent grip. It seems Darkfin has achieved this.

Darkfingloves.com



500E

The Hollis DC7 500E first stage has been stripped down to reduce size and weight without compromising performance. We have been advised that this has superior gas delivery thanks to an over-balanced first stage, combined with a dynamic intermediate pressure, that increases with depth. The DC7 DIN first stage ports (2HP, 4LP) have been optimally angled to encourage advantageous hose routing for technical and sidemount diving.

Hollisgear.com



Review — Waterproof D9 Breathable Drysuit

When Björn Elhmé, Waterproof's CEO, flung me a little pouch with a big grin on his face, I initially wondered why he would toss me a child's sleeping bag. But that couldn't be—given the context. Sure enough, inside the bag was their new ultra lightweight D9 breathable drysuit, which has been created specifically with travel in mind where luggage weight is becoming still more of an issue.

After a two decade long tenure as an editor of a dive

more like putting on a windbreaker than a heavy winter coat when donning it. With its telescopic torso, it's got a baggy loose fit, which is less streamlined in the water, but I didn't ever feel it was an issue—who is doing speed trials anyway? But it actually gave me more freedom of movement. Even through the breathable fabric is only marginally stretchy, I never felt my mobility was hindered, as is so often the case. Following a dive off Italy from a RIB, I also got to appreciate the breathability of the suit. Down under, the usual amount of humidity from perspiration is trapped and accumulates inside like in a greenhouse, but once topside, it started drying. In one case, I was completely dry and comfy when I doffed the suit 20 minutes after a dive except, that is, having one leg soaked because I neglected to pull the zipper completely tight. The wear layer is made from tough and tear resistant Cordura Nylon over what Waterproof calls a 'Quad-Lam Breathable Material'. Even so, Waterproof cautions that this is not a suit for sustained heavy duty use such as advanced wreck diving. I will have to agree, albeit only reluctantly, as it was so comfortable. But it will come with me on a lot of warm water trips where I would otherwise have brought my wetsuit. **Waterproof.eu**

magazine, it takes something to grab my interest, but I felt immediately that the Swedes were onto something worthwhile, and I asked if I could take it for a spin. Less than two weeks later, I tried it both in a frigid mountain lake in the Austrian Alps and in the lukewarm Mediterranean Sea. The suit is indeed light, and it feels



RB Mouthpiece retainer headstrap

The military has been diving mouthpiece retaining head-straps for a number of years now. However, it is only recently that this piece of safety equipment has migrated into the technical market. Today, some rebreather manufacturers supply their units with a mouthpiece retaining strap as standard. Many divers have remarked that a mouthpiece retaining head-strap is comfortable to dive and makes for a more enjoyable experience. For divers seeking this piece of safety kit and looking for options will be pleased to hear that Ambient Pressure Diving manufactures an adjustable mouthpiece retaining head-strap. This can be attached to the inhale and exhale hoses either by the supplied loops or cable/zip ties. **apdiving.com**



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Contour

Halcyon is based in High Springs, Florida, USA. Therefore, it is of little surprise that the Contour SM was designed as a cave rig by sidemount cave divers. The large bulky wing almost cradles the body and has huge amounts of lift (50lb).

Apparently, it is capable of supporting up to five cylinders, reflecting the Florida 'big steel cylinder' approach to sidemounting in caves. The Contour SM appears to be pretty much bombproof. It is very rugged and heavy duty and potential high-wear areas (behind the shoulders) are reinforced and protected with SuperFabrik. The Contour SM comes complete with four adjustable D-rings on the shoulder straps, and two D-rings on the waist strap that can be configured to an individual's requirements. Other adjustable items include the crotch strap, cylinder bungs and chest strap. There are also ten mounting holes and two rails. **Halcyon.net**



Text by Michael Menduno
Photos by Rosemary E Lunn, Mark
Powell, Barb Roy, Peter Symes

A rebreather dive begins before you enter the water. You strap on the machine, put on your mask, or pinch your nose, and “pre-breathe” the unit for five minutes while monitoring the sensors and heads-up display (HUD) for any signs of trouble. It’s usually one of the last checklist items to complete before commencing the dive depending on the rebreather. Many divers find that pre-breathing is centering, like a moment of Zazen. You can feel your connection to the machine as your lungs rise and fall in counterpoint to your rebreather’s counterlungs. Resistance is futile: you and the machine are one. The quiet hiss of the solenoid valve firing focuses the mind and everything settles down.

Many industry experts say that the paradigm for rebreathers is about to change making them more widely available for recreational divers.

It’s the silence that first catches the attention, as you descend in the water column. There are no noisy bubbles. You can hear the soft whisper and rhythm of your own breathing and almost detect the beat of your heart. You relax and slow down. Often divers don’t notice that they are breathing warm moist “air” (actually a dynamic mix of nitrox or heliox) until some time later in the dive. You feel warmer in comparison to scuba and not dehydrated.

“It’s like returning to womb of the mother,” said wildlife photographer and expedition leader Amos Nachum describing his early rebreather dives. To the wildlife around you, you’re no longer a noisy outside intruder but just another part of the food chain, so you can get up close and personal.

Couple this enhanced communion with the “silent world” with greatly extended bottom times (a combination of gas efficiency and minimizing inert gas uptake), and you can see why rebreathers have so much appeal.

Want to spend three hours exploring a reef system on a “no-stop” multi-level dive from 60 to 100 feet? Make two 90-min plus boat dives without changing out your cylinders? Or spend an hour at 100 feet with minimal decompression. You can!

Unlike open circuit scuba, rebreather dives are limited by the capacity of the scrubber—a canister containing absorbent material that removes the CO₂—not gas volume, and typically provides up to 3-4 hours of dive time depending on your metabolism and the water

temperature, essentially independent of depth.

As a result, the prospects of “running out of gas,” the number one factor in open circuit scuba fatalities, is no longer an issue. Nor is the stress of watching a dwindling SPG or buddying up with a heavy breather. For tech divers, the advantages of a rebreather are even more pronounced, enabling them to truly go where no open circuit diver has gone before.

A changing rebreather paradigm

Divers are hearing a lot more about the virtues of rebreather diving in the media. PADI Inc., the self-proclaimed “Way the World Learns to Dive,” is marketing a series of rebreather courses aimed specifically at recreational divers, and is supporting the effort with “Tec Xplorer Day” events and try-dives to promote rebreather div-



Are Rebreathers the Future of Diving?

— *A Report on the State of the Rebreather Nation*

BARE 2013
participant
test diving
an Evolution
rebreather by
Silent Diving



It's the silence that first catches the attention as you descend in the water column. There are no noisy bubbles.

PETER SYMES

ing. They also announced a series of technical diving rebreather programs.

Though other training agencies have offered "recreational" rebreather courses for some time, none have PADI's sheer reach and marketing clout with more than 135,000 instructors and divemasters, and nearly 6,000 affiliated dive centres worldwide. It is expected that they will significantly expand the market for rebreathers. Call it a "Rec Revolution."

Since their introduction to sport divers more than a decade and a half ago, rebreathers have become an essential tool in the technical diver's arsenal. In many

Many industry experts say that paradigm for rebreathers is about to change making them more widely available for recreational divers.

respects, they represent the ultimate fulfilment of the "technical diving (or mix) revolution" that began in the late 1980s, enabling divers to go deeper and stay longer than they could with conventional air-based scuba.

Today, rebreather diving represents the fastest growing segment of the tech diving market, and in some place like the United Kingdom, you're likely to see more divers sporting rebreathers than sets of doubles.

Though a few well-healed recreational divers have purchased rebreathers, until recently, their cost, complexity, maintenance requirements and poor safety record have limited their use primarily to tech divers who needed their extended range capabilities.

But now, with the advent of more user-friendly next-generation machines, a decade and a half of industry training experience, and the rudiments of a global infrastructure in place to

support rebreather travel, many industry experts say that the paradigm for rebreathers is about to change making them more widely available for recreational divers.

PADI's recreational rebreather protocol is based on two important prerequisites. First, that the rebreather conform to their new "Type R" specification making them "suitable" for recreational diver use. For example, a Type R rebreather helps automate the required pre-dive checklist process, and will turn

itself on if the user forgets. They also won't operate without a scrubber canister present or the gas turned off and they have a built-in open circuit bailout valve in case of emergency. Second, that diving operations are limited to "no-stop" diving within the recreational envelope of 130 feet.

Advocates say that PADI's entry

into the rebreather market will help revitalize sport diving and increase the number of new divers while raising the bar on rebreather training. They compare recreational rebreathers to the introduction of snowboards in the then stagnant skiing industry in the late 70's. Though resisted at first, the technology attracted needed young people to the sport which then grew by a factor of 60 times over the next 25 years.

"You're too old if you think rebreathers won't work for recreational divers," said U.S. Navy Commander Joe Diture, who serves as the vice president of the International Association of Nitrox

and Technical Divers Inc. (IANTD) and trained his 15-year-old daughter to dive a rebreather. "Kids are smarter on electronics than we ever were, and they are goal oriented. I say get on board now or be left at the gate." [Diture's views don't necessarily reflect those of the U.S. Navy].

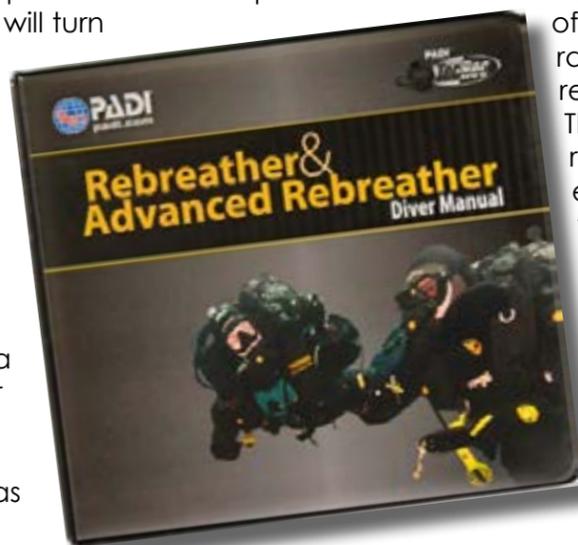
However, many industry watchers are concerned that with their operational complexity and poor safety reputation, the benefits of rebreathers may simply not justify the risks for recreational divers. Others like Technical Diving International (TDI) founder and former Uwatec CEO, Bret Gilliam, whose company marketed the Dräger Atlantis semi-closed rebreather

to recreational divers in the late nineties before the machines were discontinued, says that rebreathers can meet the standard of "acceptable risk" if proper screening is put in place to weed out the unqualified participants.

Not so forgiving

"Just because you can afford one doesn't mean that you possess the background of experience and skills to use a rebreather," he said. "The overwhelming majority of sport divers are better off on open circuit, which is far more forgiving."

But there is also trepidation. As the CEO of one rebreather manufacturer explained, "I am worried that it [PADI program] will result in a plethora of



Advocates compare recreational rebreathers to the introduction of snowboards in the then stagnant skiing industry in the late 70's.



PETER SYMES



dead dentists, which will set the rebreather business back just like the Electrolung in late 60's." [Beckman Instruments pulled the \$2,500 Electrolung—the first electronically-controlled closed circuit rebreather—from the sport diving market in 1970 after a series of high profile deaths.]

The work of (re)breathing

For all their benefits, rebreathers require more work and discipline than open circuit scuba. The late Dr Ed Thalmann, for senior medical director for the U.S. Navy Experimental Diving Unit (NEDU) who wrote all the physiological specs for U.S. Navy breathing apparatuses, once described

a scuba regulator as the steam engine of diving. "They've been honed to a high degree and are incredibly reliable. By comparison," he said, "a rebreather is like a space shuttle." Though Thalmann's analogy might seem far-flung, many people compare rebreather diving to instrument flying a small plane; the diver is in essence depending on his or her electronics to maintain and manage an artificial life-supporting atmosphere.

Rebreathers require more work and discipline than open circuit scuba.

Subtle ways

Unlike open circuit, where failures like a free-flowing regulator, burst O-ring, or simply forgetting to crank open a tank valve all the way is immediately obvious; rebreathers often fail in subtle ways. In fact, the user might not even be aware of the problem, particularly if they're distracted, until it's a matter of survival.

Conversely, a rebreather gives divers many options to solve any problems that arise at depth and either continue or abort the dive.

Though today's rebreathers are

Rebreathers do not eliminate the need for open-circuit scuba. In fact, you and your team need to carry, or stage all the open circuit gas required to bail out at the worst possible point in the dive.

much more reliable than those of a decade ago, probabilistic analysis suggests that a rebreather, which is an electro-mechanical life support system, is still 20-times more likely to fail than a set of doubles due to their complexity.

However, incorporating redundant systems, e.g. adequate bail out, can mitigate this risk.

Then there is the on-going pre-dive and post-dive maintenance

requirements, i.e. completing the 20-50 items on a pre-dive checklist, which includes a series of pre-dive tests and somewhat fewer post-dive, which can add up to a total of an hour or more of work per dive day compared to 30-45 minutes or less for conventional scuba gear.

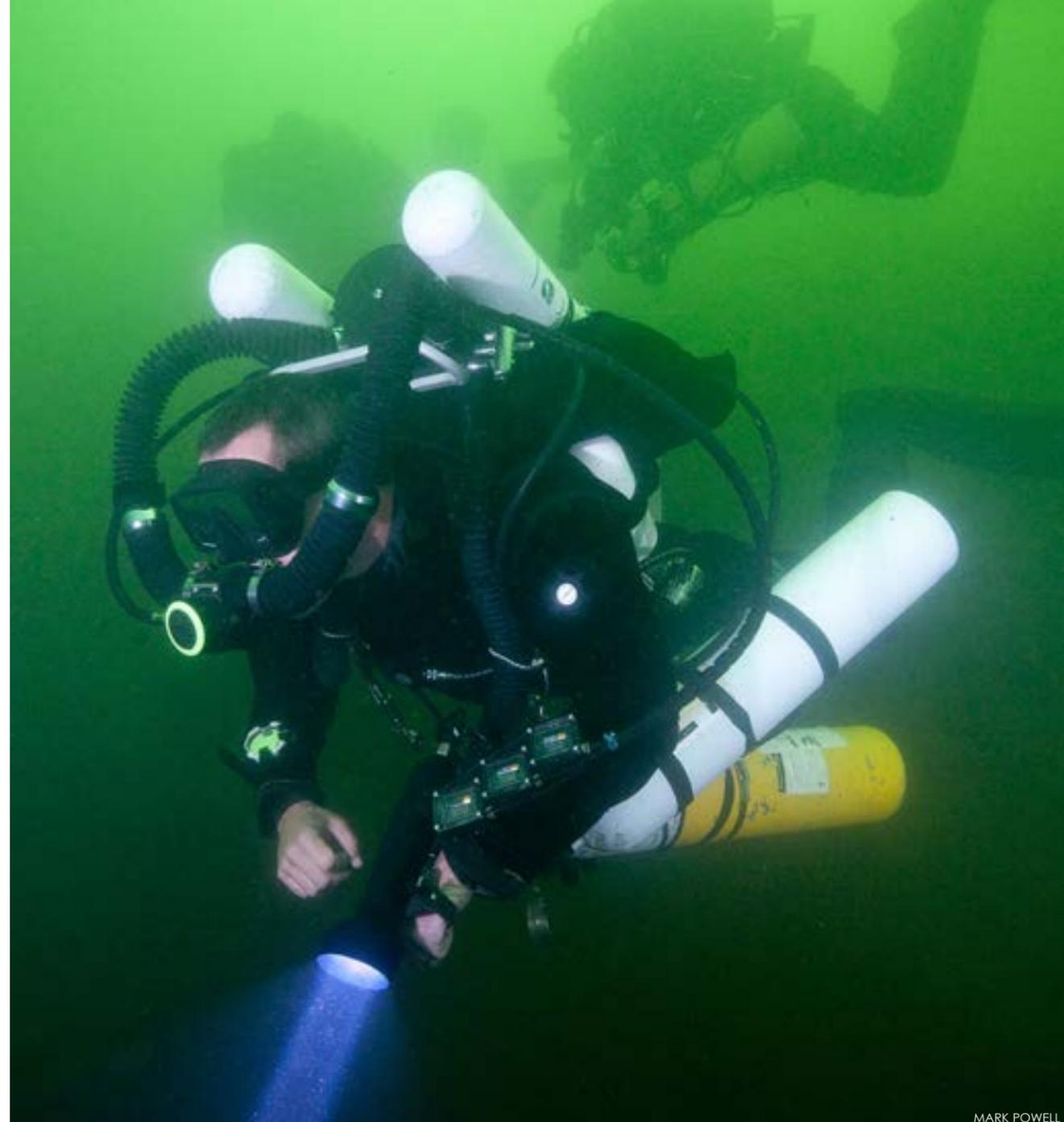
And guess what? If you don't complete the checklist each and every time you dive, when Murphy strikes, you could find your self in serious trouble or even die.

Still need tanks

Rebreathers do not eliminate the need for open-circuit scuba. In fact, you and your team need to carry, or stage all the open circuit gas required to bail out at the worst possible point in the dive. Rebreather veterans say that too many divers carry insufficient bail-out. Some rebreather veterans say that you should plan to carry as much as 2-3 times the bail out gas volume that you think you need. "People forget that bail

out gas is for themselves and their buddy," said TDI instructor trainer, Steve Lewis. "They also underestimate their bailout-breathing rate, particularly in the event of a CO₂ hit."

Finally, in terms of expense, rebreathers cost approximately 2-3 times their open circuit equivalent, though this differential is likely to decrease as manufacturers' volumes increase. Operations-wise, a dive day on the rebreather will likely cost you one and



MARK POWELL

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Rebreathers



PETER SYMES

Rebreather instructor assists a participant prepare to test dive a Hollis Explorer rebreather during the 2013 Bay Area Rebreather Experience

a half to two times as much as scuba.

For whom the bell tolls

At least one 181 divers died diving a rebreather between 1998 and 2010. Rebreather fatalities averaged approximately ten per year prior to 2005 and about 20 per year since, and it appears more than 20 rebreather divers have died since 2010 making the total number of deaths more than 200. Many of the deceased were diving's best and brightest, and the toll on the community and particularly those who lost friends has been particular heavy. No one has counted the near misses.

To put these numbers in perspective, there was a combined total of about 100-120 sport diving fatalities per year on average in the United States, Canada, United Kingdom and Europe over the same period, which represents a

large percentage of the worldwide sport diving market. (No one keeps worldwide diving fatality statistics.) On that basis, rebreather fatalities represent about 15 percent of the total each year.

But now consider that there are as many as 1-1.2 million active scuba divers in the United States alone, according to a 2007 analysis by Undercurrent (again there are no hard numbers) but likely no more than 10-15,000 rebreather divers worldwide. This would suggest that the fatality rate for rebreather diving is significantly higher than its open-circuit counterpart.

In 2011, Australian hyperbaric physician Dr Andrew Fock, an accomplished rebreather diver himself, set out to estimate the actual risk of rebreather diving

Divers are killing themselves because they made mistakes in their maintenance and pre-dive checks, or during the dive. Unfortunately, rebreathers require diligence to detail and are not very forgiving

by collecting and analysing data from the DAN, DAN-Asia Pacific, BSAC, Deep Life and Rebreather World databases. "They're really best guest numbers," explained Fock, who presented his findings last year at Rebreather Forum 3.0 in

Orlando, Florida. "There are errors and incomplete data. We know the number of fatalities but no one knows how many rebreathers are in the field, the number of rebreather divers or how many dives they made." In other words,

we know the number of incidents but not the relevant denominator.

Fock's conclusions? Rebreather diving may currently be as much as 8-10 times more risky than open circuit diving with a corresponding estimated incident rate of about 4 deaths/100,000 dives compared to a rate of .5 deaths/100,000 dives for scuba overall. Of course, some portion of this risk, is due to the fact that to date rebreathers have been primarily used to conduct deeper and longer "technical" dives. However, with scant data there is no way to quantify this extra risk.

Apples vs oranges?

It should also be considered, that historically fatality rates are often

disproportionately high in the early phases of many "civilian" adventure sports such as flying small aircraft and hang gliding until participants are able create suitable safety paradigms; early technical diving is a case in point. Using Fock's analysis to compare rebreather diving to other adventure sports, diving a rebreather is an order of magnitude less risky than base jumping at 43 deaths/100,000 jumps, but riskier than sky diving at .99, hang gliding at .86 and horseback riding at .57.

Exploding heads

Statistics like this make defence attorneys' heads explode. "Plaintiffs talk about safety sta-

tics and try to use them to argue their case," said David Concannon, who represents the Rebreather Education and Safety Association (RESA). "But they're based on faulty statistical assumptions because we don't know the denominator.

Concannon, a diver and ex-pilot who describes himself as "CCR Diver Zero" and consequently dives open circuit ("I'm 46, thick in the middle, only in the water 12-20 times a year, and I don't take care of my equipment), won three of the five lawsuits that have been filed to date against manufacturers and agencies, and settled a third for nuisance value [one other suit is pending].

"The more I see, the more I



Using Fock's analysis to compare rebreather diving to other adventure sports, diving a rebreather is an order of magnitude less risky than base jumping

believe that rebreather diving is similar to open circuit in that there are triggers that are the cause of death. The main difference is that there are more opportunities to get in trouble with a rebreather. It's like flying a multi-engine plane, or helicopter, compared to a single engine prop plane."

Tales of a non-compliant species

Over the last year, I spoke to more than a dozen manufacturers, engineers, instructors, hyperbaric doctors, defense attorneys

and explorers about the fundamental causes of rebreather fatalities and what needed to be done. Though I found differing opinions about the remedies, there was an overwhelming consensus of views as to causation. In a nutshell, though some problems can probably be addressed by human factors in engineering, the fundamental problem is operational i.e. the ability of divers to properly maintain and operate their rebreathers, and not necessarily a failing of the machines themselves.

"I've yet to do a forensic examination of a fatal accident and see where a unit failed. It's always "diver error," explained Gilliam, who has worked as an expert witness for more than two decades. "Divers are killing themselves because they made mistakes in their maintenance and pre-dive checks, or during the dive. Unfortunately, rebreathers require diligence to detail and are not very forgiving. If you, the operator, make a mistake there is very little room for error, and most divers don't recover. And that points directly to training and experience."

Leon Scamahorn, a former Special Forces diver and founder and CEO of Inner Space Systems Corp, which makes the Megalodon rebreather, or "Meg," compared diving a rebreather to packing your chute and jumping out of a plane. "If you fail to react, or react properly, the results are the same. Death by terminal velocity, or in the case of the rebreather, death by inappropriate gas mix." (Rebreather divers typically lose consciousness and drown as a result of having too little or too much oxygen or too much CO₂.) "I tell people, everything depends on your level of preparation and training," said Scamahorn.

Leon Scamahorn, Inner Space Systems Corp - maker of the Megalodon rebreathers,



Causes

Reading through available accident reports is reminiscent of the kind of problems that plagued the early days of tech diving. Divers failed to turn on their rebreather (lots of these), and went hypoxic and drowned. Divers failed to open their oxygen valve, analyse their gas, and/or used a diluent or bail out gas inappropriate for the depth. They packed their scrubber canister incorrectly, left out an O-ring, or reused spent scrubber material or forgot to install their canister at all. They went diving with only two of three oxygen sensors working, or used old sensors, or old batteries. They ignored visual and audio alarms. They carried insufficient bailout gas. They were diving alone. Most of these incidents could have been prevented if divers had worked through their checklist and followed protocol.

"The problem is that people take short cuts and don't follow the guidelines and best practices," explained Steve Lewis, author and current *X-Ray Mag* columnist "They get 40-50 hours and nothing happens because the units are so well made. So they stop using their checklists. They say to themselves, I know I should, but how

often does something go wrong? Of course, that's precisely when Murphy steps in."

Bruce Partridge, CEO of Shearwater Research, which builds rebreather electronics and dive computers, and is also a RESA member calls it the "normalization of deviation" because deviation from standards become normal. "It's a real problem," he said. "People go diving without having completed their checklist and nothing happens. They have significantly changed their risk, but they don't get any immediate feedback."

No longer scared

The reliability of today's rebreathers can give divers a false sense of confidence. "In the early days, the equipment broke all the

time, and so we expected problems," said filmmaker, explorer and instructor Jill Heinerth. "We were scared all the time and so tended to be prepared to make good decisions when we had a failure. Now the equipment is so incredibly reliable, there is nothing to scare people."

Jill Heinerth, filmmaker, explorer and instructor



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The technology also enables people to dive beyond the limits of their training and experience level. "The rebreather enables people to make expeditionary dives without the necessary operational support, and they get into trouble," pointed out Fock, who identified the Human Machine Interface (i.e. maintenance, training and high risk behaviors) as the source of most problems in part of his safety analysis work. "We found that in two-thirds of fatalities, divers exercised what could be considered high-risk behaviours [such as ignoring checklists, solo diving, or pushing limits]."

This begs the question that if the technical diving community, which is presumably more experienced, better trained and able to deal with more complex diving situations has been unable to reduce rebreather fatality rates, how will recreational divers fare?

Checklist mistress

Finding solutions is easier said than done. "We are a non-compliant species," lamented Heinerth who has been called the 'Checklist Mistress.' "How do you change that?" She says that training is partly responsible, but more of the issue is a matter of culture.

"I know that some of my students have stopped doing their checklist. But I don't know the cure. We have to police each other. If we don't, we're liable to wind up with minefield of dead

divers and more lawsuits, and it will only be a matter of time before land-owners and boat captains will no longer allow rebreathers," she said.

It may all come down to changing the mind-set of the community. "We need to get to a place where it's cool to do checklists, and people aren't afraid to say to a buddy—don't get in the water with only 2 of 3 sensors working," commented Partridge. "I really believe it's a community problem. If you're flying an aircraft, we can make a rule. If your equipment isn't working properly, you can't fly. But we can't do that with divers."

The problem is compounded by the fact there is no adequate community reporting system in place at the present time and rebreather incident data, particularly regarding fatalities has become increasingly scarce as a result of an increasingly vitriolic media environment and the fear and expense of litigation. And if a lawsuit is filed, everything gets closeted in confidentiality agreements unless a

trial verdict is brought forward in the public record. This raises the conundrum, "How do you improve diver safety if no one will tell you what caused the fatalities?"

Engineering in safety

Manufacturers say that some of the problems that have triggered accidents, for example, failing to turn the unit on, or reassembling a unit incorrectly, can be engineered out of rebreathers thus improving diver safety and making the machines more accessible to a wider range of

divers. Indeed, that is the focus of PADI's TYPE R specification, which requires that a "recreational" rebreather have certain features to be included in their program.

Though all of the manufacturers that I spoke with have incorporated unique features and innovations in their machines—there's no doubt that rebreathers represent a dynamic and innovative mar-

The problem is that people take short cuts and don't follow the guidelines and best practices.

Rosemary E. Lunn pre-breathing a Hollis Explorer at InnerSpace 2013 held at DiveTech, Grand Cayman

The question is whether the sport diving community is willing and able to make the changes needed to accommodate this technology within acceptable levels of risk.

Rebreathers

ket—I decided to focus on three areas of innovation that seem most promising in terms of diver safety.

Automating the checklist

The first major area of improvement is automating the checklist process. "The aviation and auto industries have long recognized that humans are fallible and susceptible to external influences and task loading, and have embraced automation," explained

Kevin Gurr, principal of VR Technology, which makes the Sentinel rebreather and is working with Hollis, which is manufacturing and distributing Gurr's latest creation, "The Explorer," an electronic semi-closed rebreather designed for recreational divers.

"When you turn on your car, you're actually turning on a computer, which then checks the brakes, the engine management system, fuel injection and other safety systems and tells you that

it's okay to go. You don't have to remember to turn on your brakes before you drive away. We concluded that rebreathers would benefit from the same type of automation," said Gurr.

Accordingly, the Explorer, and other units like the Poseidon Mark VI, not only walks the user through the checklist via their display but makes sure that he or she completes the steps like turning on the O₂ or pre-breathing the unit, and not let the user pass until checks



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are done properly.

The second innovation is in oxygen control. When cave explorer and engineer Dr Bill Stone and his colleagues were originally approached by Poseidon Inc. to develop a rebreather that could be safely used by recreational divers, they spent focused thinking about failure modes and concluded the most important thing was knowing exactly what the diver is breathing at any point in time, especially with respect to oxygen levels. With open circuit, a diver's breathing mix is fixed and known but with a rebreather the breathing mix is dynamic.

"One of the keys things a re-

breather diver must be able to do is read their oxygen sensors and know when to trust the results," said ichthyologist Dr Rich Pyle, who co-developed the Poseidon Mark VI rebreather with Stone. "It's easy to build a system that triggers an alarm when the oxygen values deviate by some amount. The hard part is knowing when the sensors are lying. That takes intuition and lots of experience."

Galvanic oxygen sensors, which measure the PO_2 in the breathing loop, are the most critical component of a rebreather, and are generally regarded as the weakest link of the system and can fail either high or low. Pyle said this led them to developing their "active sensor validation" technology: the software automatically validates the response of a pair of O_2 sensors, which are exposed to known onboard gas in one and five minute increments, and determines whether the sensors are accu-

rate or not.

As a result, said Pyle, the electronics are able to "think better" than a well-trained diver. "With the Mark V, there were a dozen incidences where my brain and the computer disagreed on what I was breathing. In each case, when I went back and analysed the log data, I was right and not the machine," he said. "Now with the Mark VI, I had six disagreements, and the electronics were right every time. So you could say that the Mark VI thinks better than me."

Pyle said that they are close to perfecting the technology, which he believes is superior to the three "voting" sensor system used by

virtually all other closed circuit rebreathers past and present: the logic being, if at least 2 of 3 sensors agree within a specified tolerance, they are regarded as correct. Jill Heinerth calls it an exciting advancement. "Without it," she said, "Divers are facing a bit of crapshoot as to what they are actually breathing."

Sensing CO_2

The third major innovation has been in CO_2 sensing. Experts now say that CO_2 build-up, or hypercapnia, a result of a spent or compromised scrubber for example, is much more of a hazard than originally thought and can result in disorientation, panic,

hyperventilation, convulsions, unconsciousness and eventually death. For that reason, PADI has included CO_2 sensing in its rebreather specs.

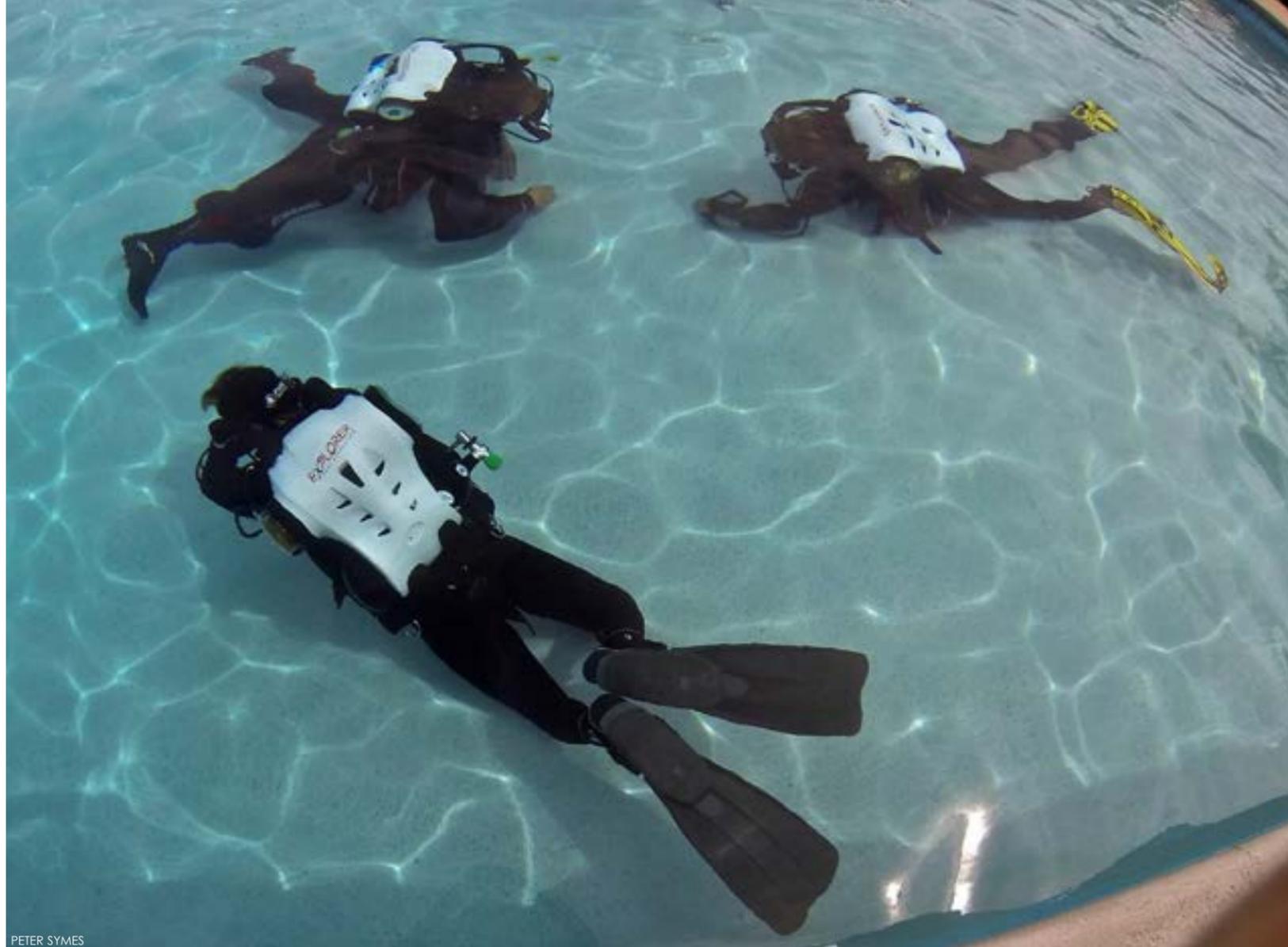
The first break through was the "temperature array," which was invented and patented by the U.S. Navy's NEDU and measures the exothermic reaction as it progresses through rebreather's scrubber canister. As such, arrays give a reasonable estimate of the life remaining during normal diving (e.g. no canister floods), but cannot respond to rapid changes in temperature, depth and workload.

As a result, some manufacturers say that they have already seen

Rebreathers

improvements in safety. Ambient Pressure Diving, the oldest and largest sport diving rebreather manufacturer, developed their "Temperature Stik" array in parallel to the NEDU. According to managing director, Martin Parker, "We've seen a dramatic reduction in incidents relating to overuse of the scrubber since we introduced the Stik. "There's something very comforting about being able to see your scrubber working properly, and we've developed it to give the diver warnings of high PCO_2 to give them plenty of time to ascend and bailout."

The second break through is due to Gurr at VR Technology who developed the first onboard gaseous CO_2 sensor, which measures the PCO_2 in the loop. VR uses the sensor in conjunction with a simple (scrubber) timer, a metabolism monitor (which measures canister loading based on O_2 consumption), and a temp array, which each measure slightly different variables. VR offers the CO_2 profile package as part of the sentinel. It will also be available on the Hollis Explorer. "Profiling the CO_2 removal system is complex



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Posedon MKVs lined up and ready for a class

Automation

With increased automation and improved O₂ and CO₂ sensing in a single machine, users will be able to know exactly what they are breathing with a high degree of certainty, which should help improve diver safety. However, insiders warn the responsibility still rests with the individual diver.

"I agree you can engineer out some problems, but the user can't get complacent," said Inner Space's Scamahorn, "They have to act appropriately when something goes wrong."

Training

Though insiders say that rebreather training has improved over the last decade, there continues to be some tension between manufacturers and training agencies. "Manufacturers can do quite a bit to make their machines require less training," acknowledged APD's Martin Parker, "but I do feel there will be a harsh learning curve until the instructors get on top of the important issues and emphasize the parts of the course that will keep the diver alive."

Gilliam said that agencies need to increase their prerequisites both for instructors and divers. "I think that an overall perspective should be a wake-up call to everyone that too many instructors and divers are being turned out that are not qualified," he said. "Their experience is too limited

"Manufacturers can do quite a bit to make their machines require less training, but I do feel there will be a harsh learning curve until the instructors get on top of the important issues and emphasize the parts of the course that will keep the diver alive."

as an initial qualifier, and that's one reason why things unravel so quickly when a problem manifests. Until the agencies wise up and put proper prerequisites back in place, we'll continue to see a disproportionate amount of deaths."

Others say that good training is available but there needs to be more consistency. "Some of the training has become a little too personal," observed Heinerth. "Everyone runs their own courses. That may be okay for someone like me with lots of experience but what about the new instructor?" Some of the instructors I spoke to also said there is a wide range of quality in training materials,

and some of it is not so good.

Many people I spoke to are excited about PADI's entry into rebreather training and felt they would help raise the bar. "PADI has specific standards and very high quality learning materials," said Heinerth. "They will force other agencies to follow suit."

Others like Steve Lewis also give PADI high marks. "I just read through the PADI Tec 40 CCR Diver manual. It was enlightening for a PADI manual, and I was impressed. By the end of Chapter One, I must have read 'if you screw up, you're going die' numerous times. The quality of the material was extraordinary."

Echoing Gilliam's point, several people expressed concern about the challenge of growing the

Briefing on the MKVI at Poseidons facilities in Gothenburg, Sweden



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pool of instructor trainers and instructors to serve a wider audience of divers while maintaining quality. "We'll have a problem if we, as an industry, allow the quality of instructors to dilute in order to build numbers," warned Lewis. "The instructors who fast-tracked their experience are the ones who are not prepared when Murphy comes calling."

The future of diving

From Walter Stark's first dive on the Electrolung in the late 60's, or Bill Stone's foray into the depths of Wakulla Springs sporting his first Cis-Lunar rebreather prototype 20 years later, it was inevitable that rebreather technology would find its way into the hands of so-called recreational divers i.e. diving consumers. It's a basic unstoppable paradigm of technology, whether its aircraft, trucks or computers.

Are we ready to change?

The question is whether the sport diving community is willing and able to make the changes needed to accommodate this technology within acceptable levels of risk.

Blueprint for survival

The situation is arguably parallel to the early days of cave diving where there were an unacceptably high number of fatalities. In response, the community came together to create a set of "best practices" based on accident analysis pioneered by the late great explorer Sheck Exley in his book, *Blueprint for Survival* (1979).

In essence, the community learned from diver deaths and was able to use that information to improve safety for other divers by encouraging, supporting and reinforcing best diving practices. The early technical diving community also faced significant safety challenges with open circuit mix diving and took a

because there are several components including valves, the absorbent itself and the seals," Gurr explained. "As a result, the sensing method must be multi-faceted." The ultimate solution he says is a sensor that would measure end-

tidal CO₂ at the mouthpiece. "And yes, we are working on it." [Editor's note: As this issue goes to press, Ambient Pressure Diving has introduced a CO₂ monitor. It is described in the New Equipment section in this issue.]

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Taking the first plunge. BARE 2013 participant is assisted into the pool with an Evolution rebreather by Silent Diving

similar approach with *Blueprint for Survival 2.0* a decade later.

Recently, there has been some discussion among some rebreather veterans that a similar set of voluntary "best practices" for rebreather diving, call it *Blue Print for Survival 3.0* should be created and promulgated. Codifying a set of "best practices" for rebreather diving is the first step towards creating a standards-based model.

However, to date, no one has compiled a Blue Print 3.0.

Another approach might be to create "operational standards" for rebreather diving similar to what groups like the Global Underwater Explorers (GUE) and other DIR (Doing It Right) groups have done for open circuit diving.

That is the approach that explorer and educator Mathew Partridge, owner of Pro-Tech Dive

College, Phuket, Thailand, which provides factory training for the JJ-CCR, Sentinel/ Oroborous, Megalodon and Inspiration/ Evolution, has taken with his Association of Rebreather Training (ART). More than just a rebreather-training agency, Partridge has developed a set of operational diving standards for rebreathers akin to GUE's standards for open circuit diving.

The standards include specifications for rebreather configuration, diluent and bailout selection, check lists and emergency protocols. ART also adheres to team diving. To date, ART has trained several hundred rebreather divers and conducted numerous workshops. Though the organization is still in its infancy, the work that Partridge has done shows promise for improving rebreather diving safety.

Unified team Diving (UTD) also offers a standards-based rebreather training program. GUE is currently in the process of developing a standards-based closed circuit program, which will likely be released in the next few years.

Some people argue that having operational diving standards create rigidity, and that having

standards makes it difficult to incorporate new information, for example, improvements to procedures on the basis of accident analysis. Though this is potentially one of the drawbacks of having standards, how can improvements based on new information be effectively disseminated and implemented when individual divers are left to their own devices to do whatever they believe is best? Another problem is that standards-based diving is likely

not applicable to all sport divers, the majority of which do not belong to a membership organization.

Nevertheless, standards-based rebreather groups may help to inform and raise the bar for others in the sport diving community to follow as they have, to some degree,

Nevertheless, standards-based rebreather groups may help to inform and raise the bar for others in the sport diving community to follow as they have, to some degree, with open circuit technical diving.

with open circuit technical diving. It's not inconceivable that organizations like PADI, the BSAC or other training agencies, may eventually take a similar approach in creating their own set of operational rebreather standards to be used after the class is over.

Individuals may also form local user groups or rebreather clubs that agree to adhere to a set of rebreather diving standards. Historically, standard-based diving



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has proven to be effective way to improve diving safety in a variety of communities. ■

Writer and technologist Michael Menduno published and edited *aquaCorps: The Journal for Technical Diving (1990-1996)*, which helped usher tech diving

into the mainstream of sports diving, and coined the term "technical diving." He also organized the first Tek, EuroTek and AsiaTek conferences, and Rebreather Forums 1.0 and 2.0. Menduno, who is based in Palm Springs, California, USA, remains an avid diver.



ROSEMARY E LUNN



Washington State's

San Juan Islands

Text and photos by Barb Roy



White plumose anemones cascade down the Wall at Whale Rocks underwater



Dive buddy Wayne Grant makes his way through the kelp forest (above); Alabaster nudibranch found in northern San Juans (right). PREVIOUS PAGE: Crimson anemones are often seen in the San Juan Islands

Every now and then I get an assignment close to home, which means my dive buddy and I can usually load up the car with dive and photography gear, and maybe a kayak or two, and head out for a full weekend of adventurous exploring. If the location is exceptional, like an assignment to dive in Washington State's San Juan Islands, we often allocate several days to experience all that's available.

When researching this unique area, I found there are over 170 different islands and reefs that have been named in the San Juan Archipelago. Of this spectacular array only four islands are serviced by the local ferry system—San Juan, Orcas, Lopez and Shaw—with daily departures from Anacortes. This would be great if we wanted to do some shore diving, since the ferries haul automobiles, but boat diving was on our agenda. To accommodate, we hooked up with a group of divers leaving from Anacortes on the dive charter boat, *Lu Jac's Quest*, run by Phil Jensen.

"Phil is an old sea dog, and I mean that in the best way," said Ron Akesson,



owner of the Bellingham dive store, Adventures Down Under (ADU). "On average, I book around 15 dive charters a year with Phil. He is thoroughly comfortable with being on the water and



San Juans

life is rich and thick wherever we happen to splash. There's always something to film—be it nudibranchs, lots of anemones, crabs, the occasional harbor seal or sea lion, octopus, or lingcod."

As we approached the lighthouse overlooking the dive site, my imagination ran wild, wondering how many shipwrecks might be hiding below. Or maybe this current affected site would be covered in life, similar to the sites around Victoria, British Columbia in Canada, only a few miles away. The flow of the current had not yet slackened, resembling a river of moving water full of overlapping kelp fronds.

Most divers wanting to venture underwater in this northwestern part of North America have come to

clear summer day in June complete with a few squawking gulls in the distance and two bald eagles flying overhead, as we motored past lounging harbor seals and black cormorants. San Juan Island is the largest of the islands, with the dive site located on the northern side. This gave me plenty of time to interview other divers onboard and see why they like the San Juans so much.

Mike Meager and his dive buddy, Jim Copher, are regular customers of ADU, joining them almost monthly on their excursions into the San Juans. As an avid diver and an underwater videographer, Mike explained:

"I like diving the San Juans for several reasons but mainly because I am susceptible to motion sickness and because it is so beautiful here! The inland waterways of the San Juans are very protected, and the norm is flat calm or close to it. There's rarely any swell. Also, the evergreen trees grow right down to the waterline, and during the summer, you can usually see Mt. Baker in the background, making it very scenic above and below the water.

"Once underwater, the invertebrate



Divers prepare for a dive in the San Juan Islands (above); Sea lions at Whale Rocks (top right); Burrowing sea cucumber can be found at most sites (top left)

Location of San Juan Islands on map of Washington State in northwestern United States

freighters and tankers to avoid our divers.

"He lets me choose where I want to take my groups and works with me to select a proper slack time of when to put the divers in, according to what the currents are doing. Since currents can be pretty tricky around here, the small groups of ten or so work well to keep track of everyone. His 42-foot (12.8-meter) vessel allows plenty of room to deal

with all the gear or move into the cabin if it is raining."

Lime Kiln Park. Our first destination was in front of the lighthouse at Lime Kiln Park on San Juan Island. It was a sunny

is very experienced. Phil is very low key, which has a calming effect on everyone around him. This is really nice if we are doing a tech dive out in the shipping lanes of the Strait of Juan de Fuca, and he is coordinating with captains of



NASA / WIKIMEDIA COMMONS

A collage of color beneath Deception Pass Bridge (right); Finger sponge cluster at Deception Pass below; Divers prepare for a shore dive at Deception Pass Bridge (lower right)

respect the power of these natural current flows, appreciating the rich nutrients that feed such an abundance of colorful marine life. Therefore, waiting for slack (when the flow of water stops to change direction) is a common practice as part of the dive's enjoyment. An experienced boat captain will know just when to put his divers in and for how long.

While we waited for slack, everyone donned their gear. The boat is set up so divers are positioned on the back deck where they can easily enter and exit the water. Once gear is on, you do a giant stride entry off the back between two ladders (which are pulled up and out of the way). Once in the water, you wait for your buddy to follow.

The water was clear and crisp at 48°F (8.8°C) as my dive buddy, Wayne, and I descended below the surface,



San Juans

making it easy to locate a pair of wolf-eels peeking out from a den of overlapping flat rocks. Before long, two other divers joined us. The wolf-eels appeared very curious of their bubble-blowing audience but didn't venture any farther from their shelter, perhaps because they may have been guarding a cluster of eggs or maybe just wary of the divers in general since this underwater site is rarely visited.

Staying at the same depth, we continued along a beautiful wall of large white plumose anemones that seemed to cascade down like a white waterfall. In the light of the video cameras, their long white columns and cotton-like plumes began to take on a regal appearance. Another section of the rock wall provided a foundation for clusters of yellow sponge, more crimson anemones, sea stars and deep red giant urchins within numerous cracks and jagged fractures. With the exceptional visibility, I could see



following golden brown fronds of kelp down to 40 feet (12 meters) where the terrain was covered in large boulders on a gently sloping decline. A closer look revealed each of the boulders supported a vibrant collection of invertebrate life like small orange tunicates, yellow zoanthids and several different species of anemones. We were now within a forest of kelp along with a school of large rockfish that ignored us, as they hovered in mid-water.

Needless to say, I wasted no time with my Aquatica-housed Nikon collecting shots. Wayne had his Go-Pro camera and was already absorbed in watching a morning sunstar heading for the siphon of a buried clam. A pair of bright pink crimson anemones and a delicate white alabaster nudibranch caught my attention.

The kelp forest thinned out as we descending to 60 feet (18 meters),



Lingcod discovered on dive at Deception Pass Bridge



Large male orca from resident pod in the San Juans (left); A morning sunstar next to burried clam siphon (right)

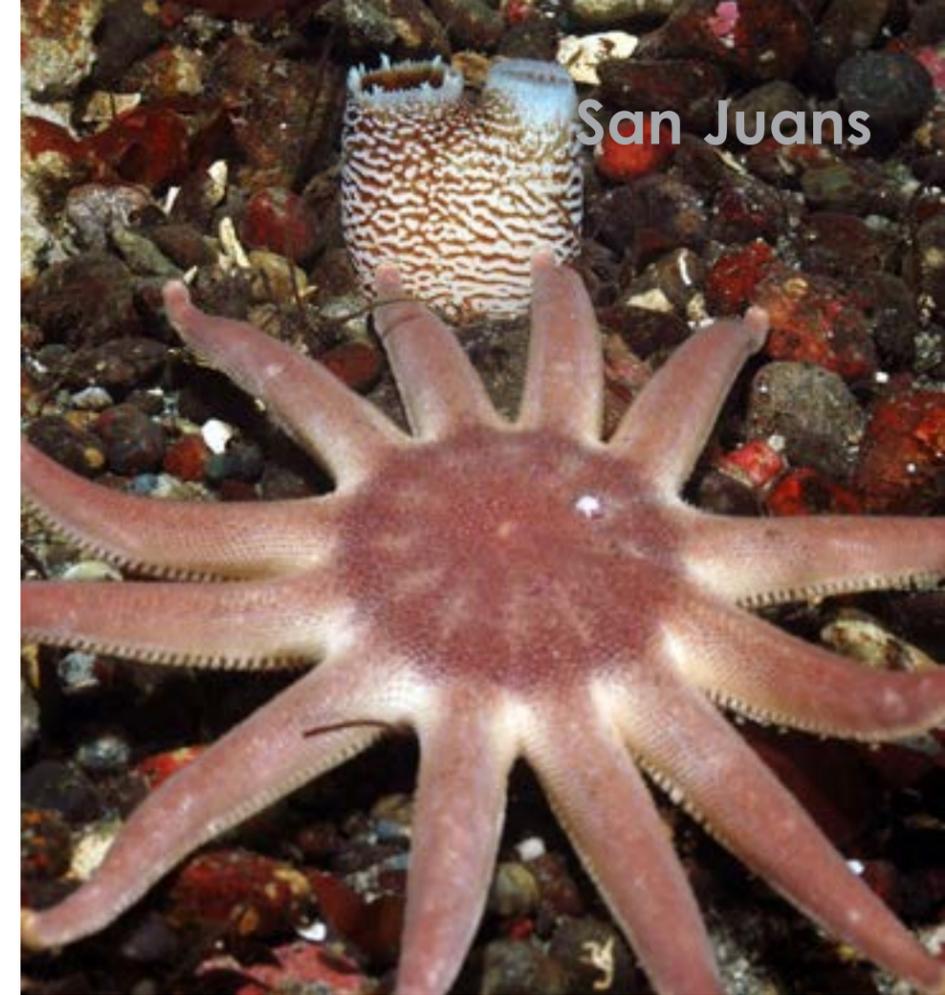
San Juans

Juans he responded:

"Long Island West Wall is my favorite. I just love that wall on the west side and the blanket of strawberry anemones (*Corynactis*) that carpet the bottom. For some reason, I love filming the little squishy critters, and you can see some of this beautiful scenery in my *Exploring the San Juans* video. Whenever I get to dive there, I stick to one spot and just concentrate on the anemones. The wall is full of other beautiful anemones also."

A collection of Mike's underwater videos can be found on his YouTube page: www.youtube.com/wolfeeldiver.

"I count nine specific San Juans videos," adds Mike. "I do have several specific videos on the San Juans posted on my YouTube channel. Just scroll down and



Wayne about 50 feet away.

As our dive time grew to an end, we slowly began our ascent back up the wall. Hidden within a mass of giant acorn barnacles was a cute tiny male scalyhead sculpin (fish) in an empty barnacle shell. Only its tiny head stuck out, possibly guarding a nest of eggs as well.

We ended our dive with a long safety stop back in the thicker part of the kelp forest next to shore. After getting situated with our buoyancy, we looked around at all of the hovering black rockfish, feeling like one of the crowd.

Before long, I could feel the tug of the current beginning to grow in strength. And as we waited at the surface for the boat to pick us up, a couple paddlers in kayaks paused to ask about our dive, curious of the critters we encountered. As usual, it was fun to watch their surprised expressions when we told them of the colorful variety residing just below their boats.

Whale watching

Time between dives can be equally as fun on a San Juan dive charter, especially if you have ever paid to be on a whale-watching boat, knowing how crowded they can be. Not so on Lu Jac's Quest during the months when the southern resident orca pod is cruising about the islands; divers are often treated to quite a show of activity.

In the past, Wayne and I have enjoyed photographing orcas passing so close Phil has had to turn off the engines. But orcas are not the only topside wildlife commonly seen; the occasional group of dolphins or pod of porpoises might also pass by. I don't think there has ever been a time on any of the trips when we have not seen huge

sea lions or harbor seals out on the exposed reefs enjoying some dry time.

"One of the best minke whale encounters was with Ron Akeson's group off Ice Berg Point," said Phil. "We watched a whale jump completely out of the water five or six times! 2013 is our tenth year of taking divers out, and you never know what you will see out here."

Long Island. When asked where Mike's favorite dive was in the San



It's not unusual to see a pair of wolf-eels in the San Juans (above) or moon snails (left)





CLOCKWISE FROM LEFT: Diver Ron Akeson adjusts video camera before descending; Male scalyhead sculpin likely guarding eggs in empty barnacle shell; Divers Nolan and David Grose enjoy diving the islands whenever they can

bridge is equally as full of life as Browning Wall.”

Deception Pass. This is another favorite dive destination Wayne and I like to visit, where we are able to dive beneath the huge Deception Pass Bridge. The 1,487-foot (453-meter) steel structure was completed in 1935, connecting Fidalgo Island to Whidbey Island. Today, over two million vehicles cross the bridge annually, and the bridge was declared a Natural Historic Monument in 1982.

Below extreme currents form impressive whirlpools and cause turbulent water to rush around Pass Island causing downdrafts and standing waves during low tide. For diving the area, good slack currents are limited to only a few days per year, making it a challenge for dive organizers like Ron to predict when the best dive time will be.

“Like any other location, when Phil and I put together a trip to Deception Pass, we give a thorough dive briefing and

only allow experienced divers to participate,” said Ron from ADU. “All the trouble we seem to go through to plan and organize the trip tends to pay off when we see what’s down there. The life is incredible!”

Incredible may not be the correct word to describe the dive—it’s more like spectacular!

I entered the cool clear water first, holding onto a strand of bull kelp in a protected part of the Pass, as I waited for Wayne to enter the water. Looking down, I thought I was in a huge tank at the Vancouver Aquarium. Multitudes of varying size fish freely swam about the kelp. Thirty feet below, swaths of lavender and pink covered much of the rocky terrain. Green and red sea urchins added texture while orange, purple and tan ochre sea stars seem to pile together on smooth rock faces.

Once Wayne was in, we followed Ron and the other divers underwater to the main part of the wall on the south side of Pass Island. Our time was limited to only 40 minutes, so everyone quickly moved to their favorite depths. The plan was to swim down the wall then turn around and head back, usually at a different depth because of the



look at the playlist for Washington State dives. Scroll that list to watch videos on: *Kellets Bluff*, *Exploring the San Juans*, *Strawberry Island*, *Invertebrates*, *Whale Rock* and *Deception Pass*. Also, *Colors of Cold* is a good sampling with some San Juan shots, as well as *Salish Sea Life on the Rocks* has lots of shots from the San Juans.”

“I don’t have just one favorite dive site in the San Juans,” said Ron Akeson. “But if I could only do one dive in Washington State, it would be Deception Pass. It reminds me so much of the Port Hardy area on Northern Vancouver Island, probably because the site we dive under the



Harbor seals are a common sight in the San Juan Islands



Divers emerge after a dive at Lime Kiln on San Juan Island

diverse variety of critters.

I was so enchanted with the colors; even the lingcod we came across were dappled in blue and orange spots. Heart crabs, painted anemones, orange burrowing sea cucumbers, pink brooding anemones, hydroids and giant barnacles were everywhere. Between the barnacles, tan finger-like sponge and assorted groups of feather-duster worms took up the remaining space.

Ron was busy shooting video of the wall when we came across him. Later he explained, "I am currently working on a film of under-

water life in Washington State, which will be followed by one portraying British Columbia diving. Third on the agenda is a film on diving high current sites of the northwest, not when the current is running, which commonly reach up to seven knots (8 mph)."

Afterthoughts

Overall, the diving we enjoyed throughout our San Juan adventure was delightful and so different at each location. At Whale Rocks, we had sea lions join us, as we checked out an excellent wall full of invertebrate life. Three wolf-

eels and seven different species of rockfish were counted at Bell Island.

Topside activities for us included a drive and hike at the top of Mount Constitution in Moran State Park on Orcas Island for a beautiful panoramic view of the islands and Mount Baker of the Cascade Range. It was also on Orcas Island where we met up with Tim Ferguson and his dive buddy, as they prepared for a shore dive.

"I like snorkeling here from my dive kayak so thought the diving might be good as well. We had to bring everything and no airfills are available. Boat diving is also a favorite too, but we felt like trying something different. We both like hiking, so when we're not diving, we have three great hikes to try: Mount Constitution, Turtleback Mountain and Obstruction Pass."

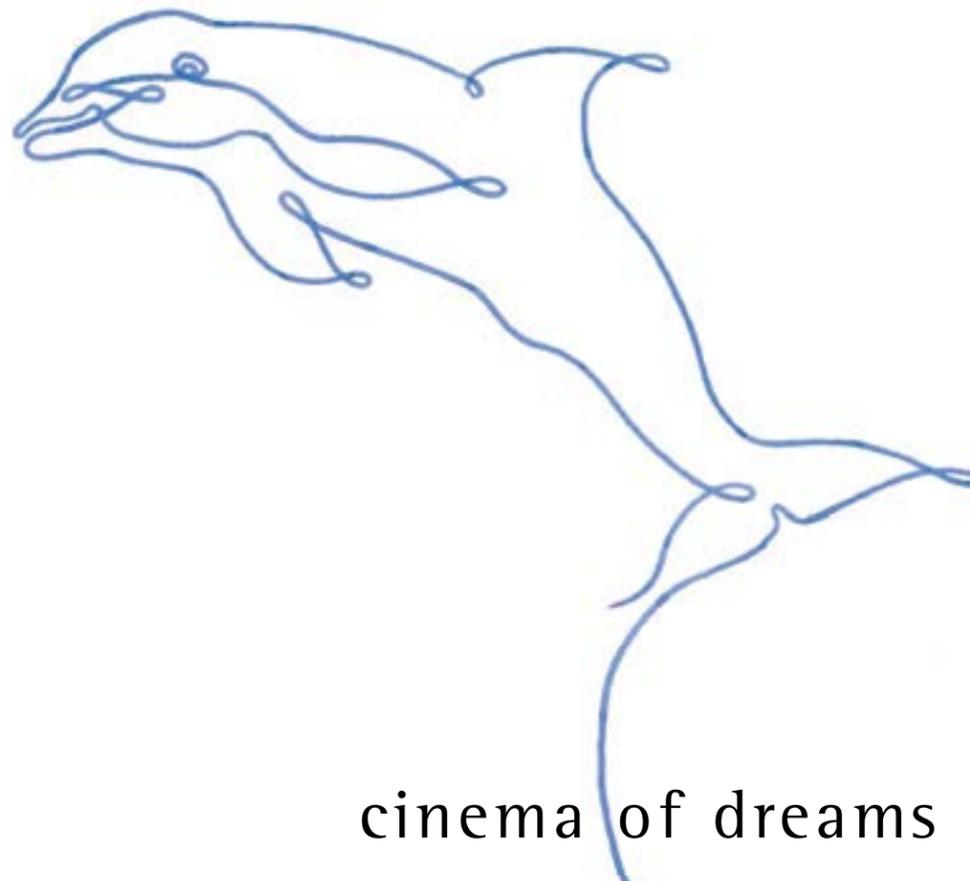
For those wishing to visit the San Juan Islands, they are located about 65 miles (105km) north of Seattle. They are conveniently in the rain shadow of the Olympic Mountains, yielding summer temperatures of around 70°F (21°C) and winter temperatures in the low 40's.

Group dive charters can be organized directly through Phil Jensen (Lujacsquest.com) or through Adventures Down Under in Bellingham (Adventuresdownunder.com). Expected pricing in 2014 will be US\$115 for two boat dives, which includes lunch—no dive gear included. Full rental (hire) packages are available on ADU charters for \$65 (wetsuit) or \$90 for a drysuit package (must already be trained in drysuit use).

Whether you are an underwater photographer, videographer, technical or recreational diver, the San Juans in Washington State offers a cornucopia of dive opportunities. ■



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Edited by
Catherine
GS Lim

Mid-Ocean Ridges

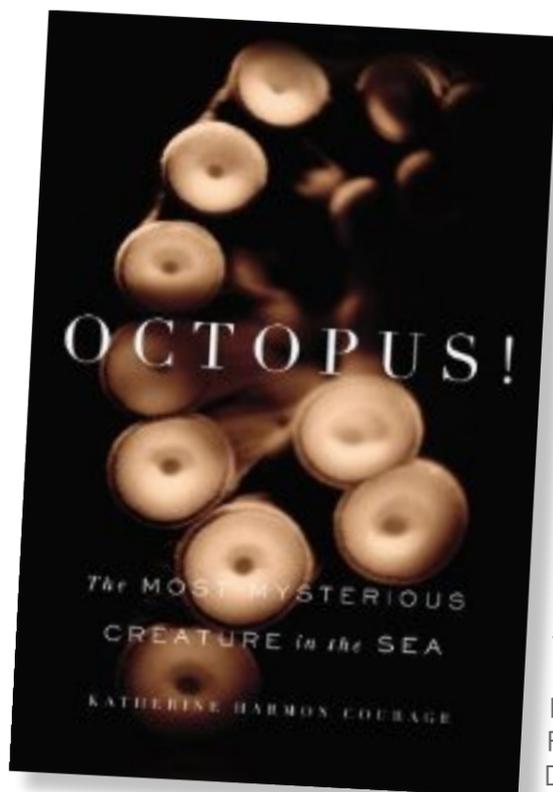
Mid-Ocean Ridge, by Roger Searle. Beneath the ocean surface runs a single, global ridge system that's the longest mountain range in the world. Constantly active, it is the site of tectonic movements that lead to seafloor spreading. This perpetually active

system is what this introductory coursebook, designed for undergraduate students, is about. Professionals working in related fields of marine geology, geophysics, volcanism and oceanography may also find the book to be a handy reference. Background chapters provide

an overview of research

techniques while succeeding chapters explore the structure of the lithosphere and crust, and the volcanic, tectonic and hydrothermal processes. A summary and synthesis chapter recap key concepts to aid new learning.

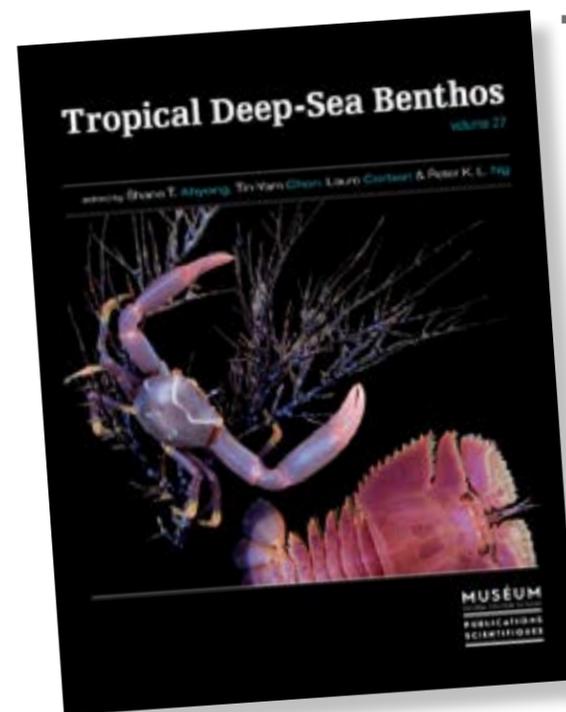
Hardcover: 330 pages
Publisher: Cambridge University Press
Date: 31 October 2013
ISBN-10: 1107017521
ISBN-13: 978-1107017528



Octopus!

Octopus!: The Most Mysterious Creature in the Sea, by Katherine Harmon Courage. The octopus is quite the peculiar creature. It can change colour at will. It has three hearts and eight long tentacles. The earliest fossilised remains date back 296 million years ago, and that's even earlier than the age of the dinosaurs. And also, it does look kind of ... weird. Find out more about this underwater wonder and hear from leading octopus experts in this 272-page book. Chances are it may cause you to think twice about ordering that octopus dish from the menu this weekend.

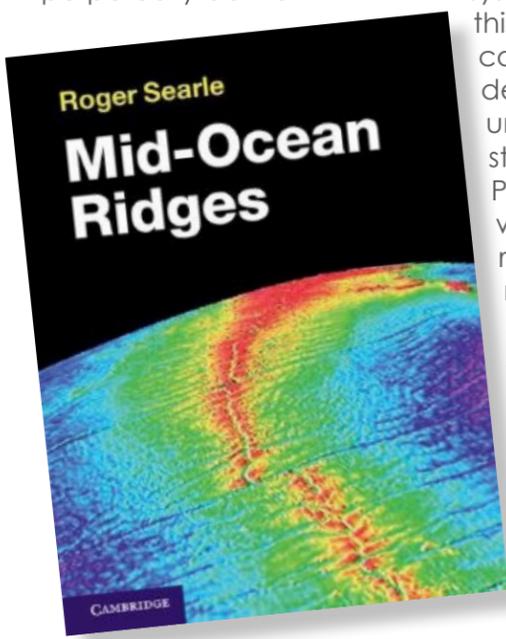
Hardcover: 272 pages
Publisher: Current Hardcover
Date: 31 October 2013
ISBN-10: 1591845270
ISBN-13: 978-1591845270



Tropical Deep-Sea

Tropical Deep-Sea Benthos 27, edited by Tin-Yam Chan, Laure Corbari, Shane Ayhong, Peter Ng. This is the 27th volume in this series dedicated to the world's deep-sea fauna, particularly those found in the Indo-West Pacific. This illustrated book provides an inventory of more than 200 species, including 27 new species of crabs, shrimp, lobsters, etc. It also contains essays by renowned researchers and scientists in the field of crustacean biodiversity research.

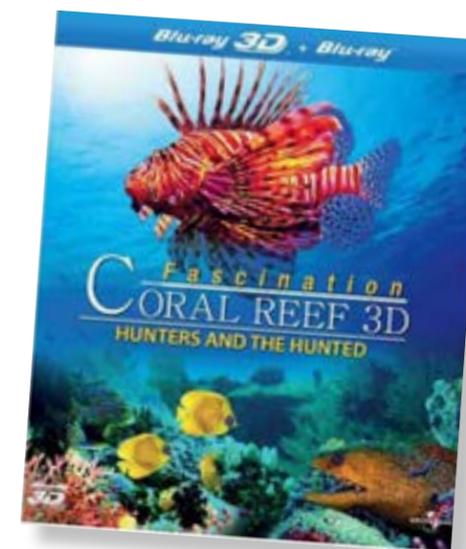
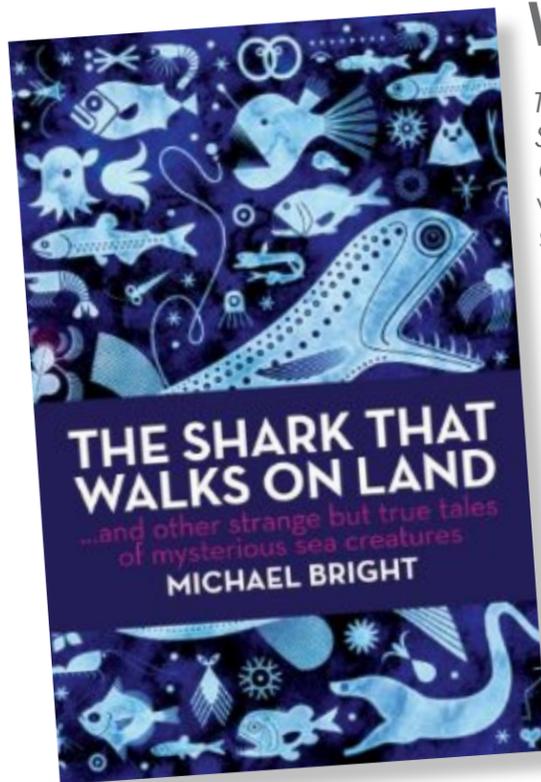
Paperback: 350 pages
Publisher: French National Museum Natural History
Date: 15 October 2013
ISBN-10: 2856536921
ISBN-13: 978-2856536926



Walking Sharks?

The Shark That Walks on Land: And Other Strange But True Tales Of Mysterious Sea Creatures, by Michael Bright. Behind its whimsical front cover lies tales of sea serpents, mermaids (and mermen!), sea dragons and even the legendary kraken. However, this is more than just a collection of seafaring myths and legends. This book blends the unknown with the familiar, mixing together facts, figures and anecdotes about the vast range of mysterious creatures that swim within the ocean depths. Be prepared to come face-to-face with the giants, the oddballs and the record breakers of the underwater world.

Hardcover: 288 pages
Publisher: Robson Press
Date: 17 October 2013
ISBN-10: 1849545987
ISBN-13: 978-1849545983

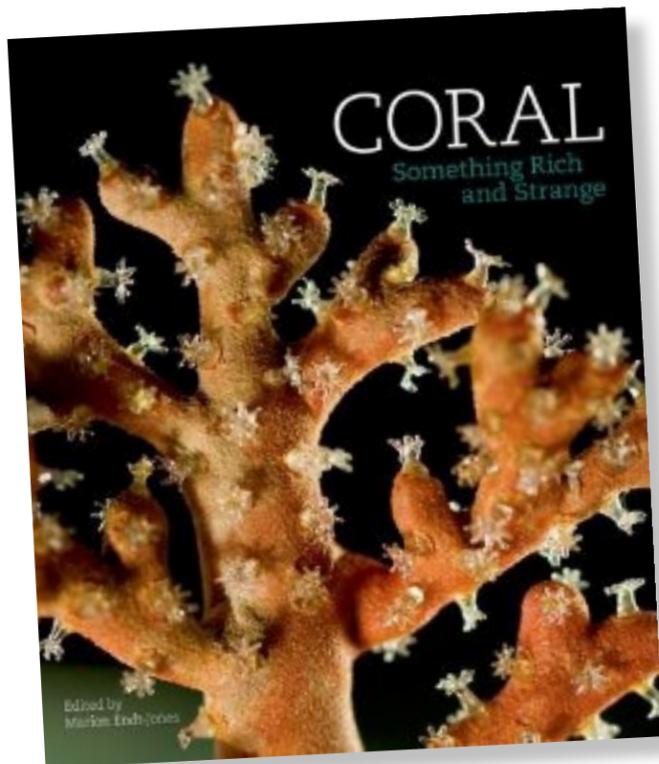
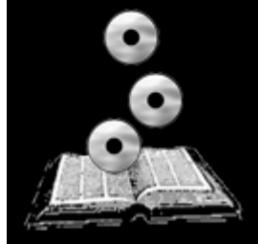


Coral Reef in 3D

Fascination Coral Reef: Hunters and the Hunted, directed by Rene Schoepfer. The title says it all. This documentary shows, in exciting 3-dimensional format—the eternal chase between the hunter and the hunted in the underwater world. Observe both the hunting and stalking methods of the hunters, and the defence and camouflage strategies of the hunted. Be prepared to be fascinated and amazed—all from the safety and dry comforts of your home.

Directors: Rene Schoepfer
Producers: Benjamin Krause
Format: Blu-ray, 3D, Widescreen
Languages: Hungarian, Portuguese, Turkish, Czech, English, Italian, French, French, Japanese, Spanish, Spanish
Region: All Regions
Rated: NR (Not Rated)
Studio: Universal Studios
DVD Release Date: 12 November 2013
Run Time: 106 minutes

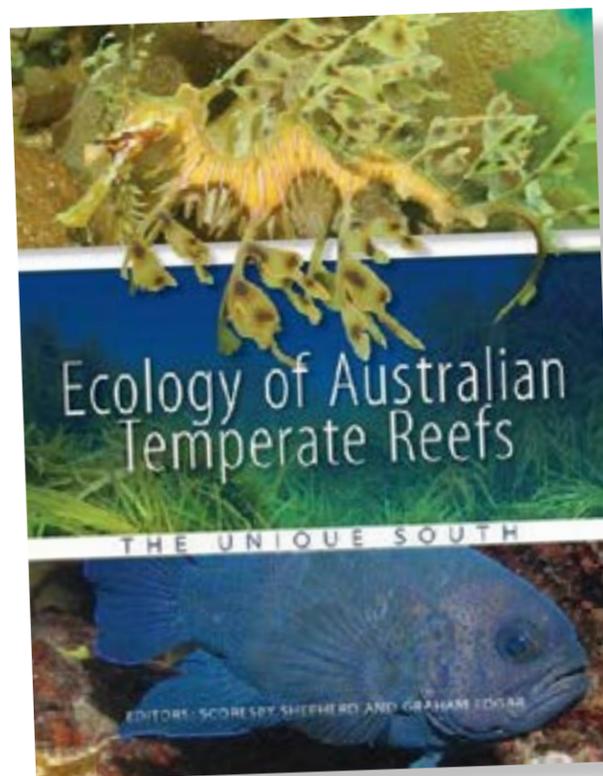




Coral

Coral: Something Rich and Strange, edited by Marion Endt-Jones. Although the coral species depicted on the front cover isn't exactly eye candy, this comprehensive book explores the coral in art and nature throughout the centuries. In addition to an interview with artist Gemma Anderson, there are essays and concrete objective stories covering the coral's mythical and metamorphic qualities, its resistance to classification, geological and architectural significance, religious iconography, etc. This illustrated publication launch has been scheduled to coincide with an exhibition at Manchester Museum from November 2013 to March 2014.

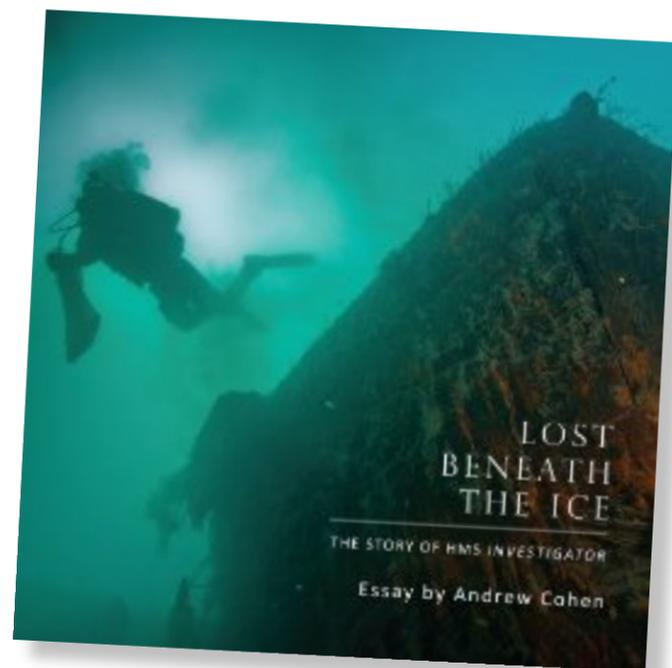
Paperback: 128 pages
 Publisher: Liverpool University Press
 Date: 31 October 2013
 ISBN-10: 1846319595
 ISBN-13: 978-1846319594



Australia

Ecology of Australian Temperate Reefs: The Unique South, edited by Scoresby Shepherd and Graham Edgar. This book starts by exploring the geological origin, oceanography and biogeography of southern Australia. Then, it elaborates on the origin and evolution of the flora and fauna as Australia separated from Antarctica, the region's oceanography, as well as the ecology of particular species at the various trophic levels. The concluding chapters cover conservation and management issues. Generously illustrated with line drawings, figures and colour photos, this book promises to be a useful reference for students and field researchers—in fact, anyone interested in the ecology and health of coastal waters.

Hardcover: 520 pages
 Publisher: CSIRO Publishing
 Date: 15 Oct 2013
 ISBN-10: 148630009X
 ISBN-13: 978-1486300099

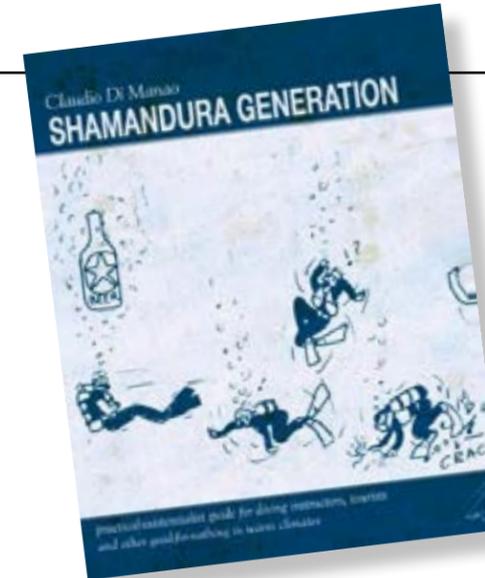


Arctic Shipwreck

Lost Beneath the Ice: The Story of HMS Investigator, by Andrew Cohen. When Sir John Franklin and his crew went missing in the Arctic in the 1840s, a rescue mission was dispatched. Among the ships that made their way was the HMS *Investigator*. Although the vessel failed to locate the men, the crew discovered the fabled Northwest Passage instead. Then, the ship itself became trapped in the ice of Mercy Bay. Some of the crew survived and were rescued three years later, and the HMS *Investigator* abandoned. In 2010, the ill-fated vessel made the news again, as archaeologists sought to uncover its fate. Alongside underwater photos, this book tells the story of endurance, daring, deceit and courage of the individuals—its crew, surgeon, missionary and captain—aboard the HMS *Investigator*.

Hardcover: 128 pages
 Publisher: Dundurn
 Date: 10 December 2013
 ISBN-10: 1459719492
 ISBN-13: 978-1459719491

REVIEW



Shamandura Generation

By Claudio Di Manao

This book is a fun read. Many times have I lamented that dive-speak is often so dreary, serious or technical. In contrast, Claudio Di Manao's anecdotes from working as a dive guide in Sharm el Sheikh provides entertaining insights into the often bizarre workings of the Egyptian dive industry. Having visited Sharm many times, I could certainly relate—I have witnessed their perplexingly weird ways in full bloom—but divers without the same frame of reference should also get quite a chuckle out of these tales. Sharm is a melting pot where innumerable cultures, mostly in the form of dive bums from all over the world, meet—and some times clash—with certainly colourful personalities pursuing often incompatible agendas. Not all is smooth sailing (pun intended) between the Egyptian crews, the European dive professionals and the often anal-retentive dive operation managers. But like a classic Woody Allen movie, the absurdities have high entertainment value. From a different perspective, Di Manao's accounts, which come with the quite appropriate subtitle 'practical-existentialist guide for diving instructors, tourists and other good-for-nothing in warm climates' would probably be the best 101 introduction for wanna-be dive professionals, if there ever was a class for such a subject in a business school. — Peter Symes. ■

Shamandura Generation e-book is available at Amazon.com for US\$3.00 or EU€2.68.

Tom Ingram

—An Interview With DEMA's Director

Text by Rosemary E Lunn. Photos courtesy of Tom Ingram, Cathy Church, Dan Orr, Alese Pechter, Barb Roy and Peter Symes

The month of November sees the return of the international dive industry trade convention, the DEMA Show, to Orlando, Florida, USA. In a peek-behind-the-scenes conversation with Tom Ingram, Executive Director of DEMA (Diving Equipment and Marketing Association), Rosemary Lunn's interview reveals an engaged, enthusiastic diver who is passionate about our industry and the business of diving.

RL: Where did you learn to dive?

TI: I was born in Florida, and grew up in Miami. I was fortunate enough to have an older brother who became a ready-made and long-time dive buddy.

We got started in diving because my Dad was the manager of a Woolworth store on Miami Beach, and Woolworth's actually sold dive equipment! As a result, Dad was connected to a local dive store, and we got "trained" to dive by one of the instructors there.

In 1965, I was all of 11 and "certification," as such, was "kind of optional" for most divers and operators. At the completion of the "course", we

were presented with a little green paper card that said we were divers, but the course itself was pretty basic, involving mostly "self-study," a couple of short pool sessions and diving off Miami Beach and in a rock quarry. The self-study itself was pretty short too—the book we studied was a thin green how-to guide called *Skin and Scuba Diving*. This was new at the time, and as I recall, featured a lot of Nemrod brand equipment. We also used the first edition of the U.S. Diver's publication, *Let's Go Diving*.

Sometime after receiving our "certifications," we also discovered an early edition of *The New Science of Skin and Scuba Diving*—a much more comprehensive book. After reading that one, we found out how much we really didn't know!

We bought equipment with our life savings (several hundred dollars judiciously saved after mowing neighborhood lawns and doing household chores). I cannot tell you how proud I was of my Mistral single-stage double-hose regulator and how long it took until I could finally afford a Mae-West style vest.

Eventually, I purchased a 1969 model Calypso single hose regulator, the last of the diaphragm first stage versions of that model. Later, I finally bought a tank pressure gauge and a capillary depth gauge. Luckily, in South Florida, wetsuits weren't critical, but I eventually did buy a Parkway

Sharkskin long sleeve jacket some years later.

Living in South Florida, a lot of our early diving was done in some of the local flooded limestone quarries, sink holes and marl pits nearby our house (complete with gators, snakes, and the occasional sunken car or other debris), off the beach in Fort Lauderdale and Dania (I saw my first shark there), and of course, in the Florida Keys.

We dove with several operators out of Key Largo. Later, when we could get a ride, we made the three hour trek to Big Pine Key, where we would rent a 13-foot open Boston Whaler with an outboard and motor. We would take it out to Looe Key Reef, seven miles away from the marina and what seemed like out in the middle of the ocean. Boy, did we get sunburned!

Eventually we bought a 1965 VW bug, folded down the back seat, filled the back to the brim with four scuba tanks and dive gear for two, and started driving to Key Largo and points south almost every weekend.

By far, one of my happiest moments in those early days of middle and high school was buying a camera and underwater housing. Looking back, that first set up wasn't much—an Instamatic Camera and a housing that allowed the use of "flash cubes"—but it took pictures and it was fun. I even took second place in



PETER SYMES





CATHY CHURCH

Tom Ingram diving the Cayman Islands

Dave Reidenbach attended—in fact, this is where Dave and I first met.

Over the years, I was fortunate to work in retail, divemastering with six-pack and larger charter dive operations, early liveaboard boats, manufacturing, and of course dive instruction in stores and later in universities.

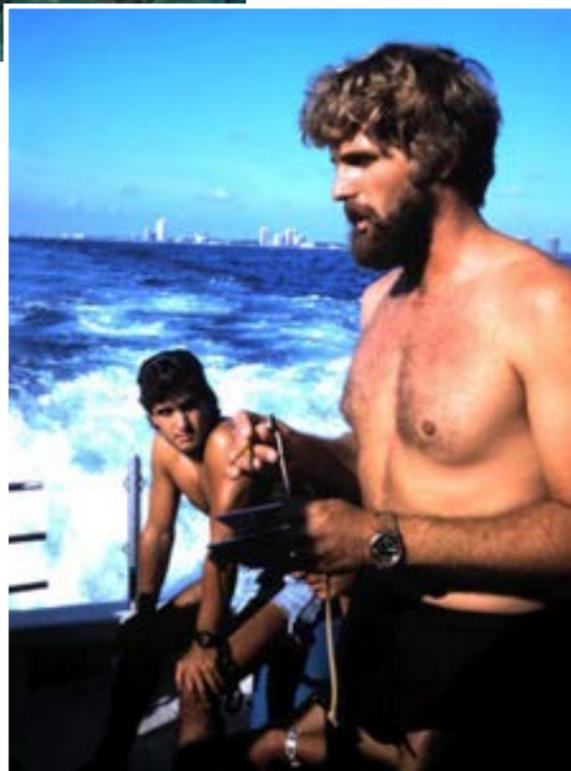
RL: "Divemastering with six-pack"—care to explain this in "English", Tom? I don't think you really said, "I went diving with six cans of beer."

TI: Well, there was, most certainly, beer... but a six-pack in

a school photo contest with a picture of a reef that was published in the school yearbook, using just that point-and-shoot system.

After diving for five or six years using that little green "certification" card, my brother and I decided to take a real scuba course from the local YMCA. The green card was becoming more problematic, as stores and dive operators started checking cards on a regular basis before we could get air or get on the boat. The YMCA course was pretty complete, lasting about six weeks.

Eventually, I found myself becoming an "advanced" diver, a PADI Divemaster in 1974, a NAUI Assistant Instructor in 1974, and a NAUI and PADI Instructor in 1976, as well as a NAUI Instructor Trainer in 1983 and a PADI Course Director in 1988. This was the same program that "Big Wave"



Ingram preparing for a dive in the mid-1980s

American "English" refers to a six-passenger dive boat. I spent a lot of time as a student doing weekend work as a divemaster and dive guide aboard those smaller boats in West Palm Beach, Florida and other places, too, and spent some time on bigger boats as well.

RL: What type of diver are you?

TI: I was involved with university dive programs beginning in the late 1970s through the early 1990s—first as an equipment repair technician and teaching assistant and much later as Department Chair. During that time, I tried (and taught) most everything, from open water to wreck div-



Tom Ingram at Trinity Caves, Cayman Islands (right); *Reflection*, by Tom Ingram, 1985 (below)

ing, using nitrox and heliox (heresy in the early 1980s), rebreathers, and I operated the university's recompression chamber both as an inside tender and outside operator.

I had access to an education in commercial diving at Florida Institute of Technology, so I went through the commercial diving program there, diving in nearly



CATHY CHURCH

every commercial rig one can imagine. I spent weeks at a time in the Mark V helmet diving in zero viz, in harbors and the like. I also dived the Superlite 17 for a variety of tasks and used other surface supplied equipment, which were state of the art at the time.

As instructors,

we regularly participated in deep and extended decompression diving in those days, and we had our fair share of sneaking into dive sites that were (at least theoretically) off-limits to most. We were involved in shark feeding and diving long before the advent of chain-mail suits, and before it became a commercially viable enterprise.

I was a geologist working in the mining industry before teaching at the universities, and one of my favorite places to dive was in the caves of northern Florida. As an undergraduate at the University of Florida in Gainesville, I even did my senior thesis based on the geology and make-up of the caves and springs and taught diving there to put myself through school.



Tom Ingram shark diving in the Neptune Islands, South Australia (left); Tom Ingram's images of the great white sharks of the Neptune Islands (below)

Ingram

for Scubapro for years, and when I left in 2000, the company made one of these for me (which, unfortunately was not made from the original orange material... but the design and fit were perfect). Along the way, I have always loved my extra-large Scubapro Jet fins and my Apeks and Scubapro regulators, too.

With the difficulties today of travelling with our favorite pieces of equipment, I have come to love my little (and highly transportable) GoPro video camera with twin Sola 1200 video lights. I have always had a passion for underwater photography, and while I love my Sea and Sea housing and Canon DSLR, GoPro cameras are just fun. Video (even as elementary as GoPro video) is still pretty new to me, but I enjoy it.

RL: Favourite dive site?

TI: I'll always answer this question the same way; it depends on what I am looking to do.

I love the Bahamas, the Cayman Islands and Hawaii for the warm water, sea life and clarity. San Diego has great wrecks and kelp and the Channel Islands in California was one of the most beautiful (and coldest) dives I have ever done.

Diving in Australia with Rodney Fox, Carl Roesler

and Geri Murphy was the dream of a lifetime for me and is one of my favorite diving memories. The water was cool, and the visibility was just perfect for the big white sharks to "loom in" out of the distance. Those sharks are amazing animals, and for me, it was an amazing adventure.

Just recently, I really enjoyed diving inland in a series of Texas lakes, while hid-



While teaching, we had our fair share of dives in the muck of the Indian River and in unexplored sinkholes around Florida. I was involved in sinking some of the artificial reefs/wrecks in the Martin County area in the early 80's. In those days, I also worked summers with the Mel Fisher operation, managing the East Coast Shipwreck project, and was fortunate enough to be around during the time when the structure of the *Nuestra Senora de la Atocha* was located down in the Keys. I was always fascinated by history and relished the chance to dive on these shipwrecks.

One of my greatest pleasures was teaching underwater photography at both FIT (Florida Institute of Technology) and Barry University in Miami, which I did for about 15 years. Part of that experi-

ence was teaching commercial diving applications in 'dirty water', and I became pretty good at that. I also photographed my share of catalogs and ads and even had the opportunity to shoot pictures for magazine articles over the years.

These days I dive as often as (and where) I can. I live in San Diego and there's great diving here, although it is different from the dives I did early in my career. Fortunately for me, my travels take me to some fun and interesting places, which have local/inland dive sites, and sometimes to places where I can ocean dive in warm and cold water. I usually try to dive if I am travelling—it gives me a sense of what the local dive operators are doing to teach their students and keep their customers active,

and I consider myself fairly flexible with regard to how and where the dive is conducted. Safety is the main concern, but we have fun no matter what! And since I intend to be around for a while, I have decided that I should stay more or less in shape and be conservative on my dives. But I am still up for a grand adventure where I can find one.

RL: What is your favourite piece of kit?

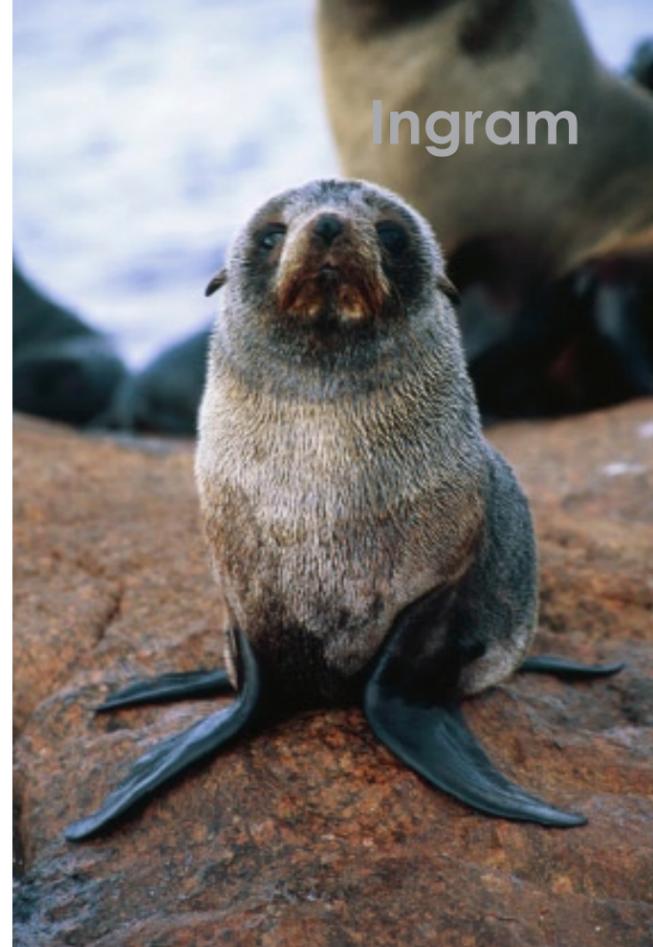
TI: It has changed over the years and has included photography equipment such as my trusty Nikonos III with a 15mm lens

and SubSea 150 Strobe, to my Hans Hass DecoBrain—one of the earlier micro-processing dive computers.

When they first came out, one of my favorite pieces of equipment was my Scubapro Stabilizer Jacket—you know, the orange one that laid flat against your body? When I was weighted properly, this was the most comfortable and easy to use BC I ever owned. I worked



THIS PAGE: Tom Ingram's images of great white sharks and fur seals of the Neptune Islands, South Australia



RL: Who is your dream dive buddy, Tom?

TI: Someone who shares my passion for diving and interest in the site, and who also doesn't mind that I am dragging 50 kilos of photo gear with me on the boat or in the water. If they are willing to help me find subjects to shoot, or willing to watch my back while I am shooting, that's all the better!

RL: Dream dive destination?

TI: I had the opportunity to realize one dream destination when I travelled to Australia and went white shark diving with Rodney, Carl and Geri. In the early 1970s, my brother and I must have seen [the film]

of Jacques Cousteau during which the late Philippe Cousteau visited the deeper wrecks in Truk Lagoon. I know that many of those ships are now in dilapidated condition after being submerged for almost 70 years. I want to see those WWII wrecks before they completely disintegrate.

Really, anywhere in the South Pacific beyond Hawaii would be a great start, especially if there are wrecks of any kind.

RL: Best dive book ever read?

TI: There are way too many good ones out there to pick just one.

Shadow Divers by Robert Kurson is one of the best-written most interesting of the recently published diving-related books.

Blue Meridian—The Search for The Great White Shark by Peter Matthiessen was a book about one of the first expeditions to seek and film the great white

diver, especially for a young teenager at the time, this book presented all the fun and adventure of diving and the activities around diving.

In the 1980s, I picked up a copy of Carl Roessler's book, *Mastering Underwater Photography*. I've tried hard to mimic

ing DiveCaches (underwater geocaches) there. And of course, diving in Fort Lauderdale, West Palm Beach and the springs in Florida were all favorites when I lived and taught diving there.

RL: Best country visited?

TI: The people I met in Australia were some of the nicest I have ever known. I also have great friends in Cayman and in the Bahamas. From a diving perspective, all these countries are first-rate in their own way.

RL: What motivates you to go diving?

TI: Lots of things come to mind; I love the social aspect of diving, meeting new people and finding out we have diving in common. I am a history buff, especially the American Civil War and WWII. Any chance to dive on submerged historic sites is welcome, even when the sites are cloudy, cold or deep.

Of all the different motivations, the one element that shows up for me again and again regardless of where I am diving

is the desire to take pictures. As I said, video is pretty new to me, and I am enjoying learning on a relatively inexpensive system. But whether I am shooting video or stills, I find myself a bit disappointed if I cannot take some sort of picture while I am visiting a dive site.

RL: You say you are into the Civil War. Did you get the chance to dive the Monitor? And if so what was the dive like?

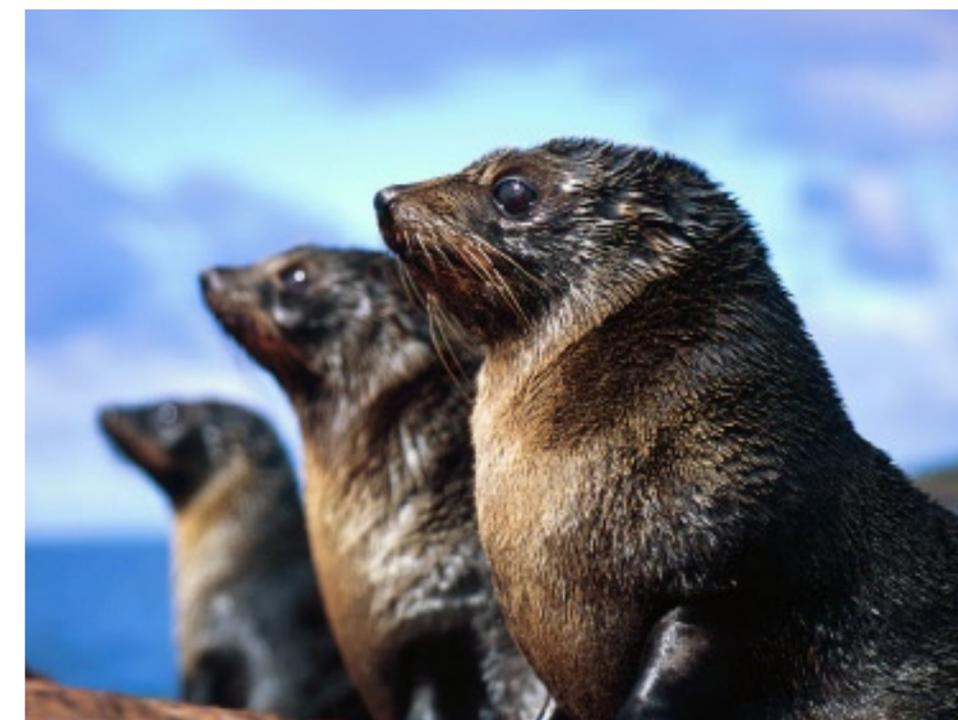
TI: Unfortunately, I never got the chance to dive the *Monitor*. I did a lot of diving on shipwrecks from the mid-1800s, but none that are as notable as the *Monitor*. I did have an interest in underwater archaeology. I managed to dive and map wreckage near Fort Pierce up in the springs in northern Florida and on some submerged sites in Missouri and Illinois.



Blue Water White Death ten times in the theaters. I swore I was going to dive with sharks and meet Rodney Fox one day. It took 35 years to get there, but thanks to those good friends, I made it!

The other dream destination that comes immediately to mind is Chuuk. I have been fascinated with that site since seeing an episode of *The Undersea World*

shark. It is the book on which the film *Blue Water White Death* was based. Many of the techniques used to film sharks today were developed during this time and for a





Carl's imagery ever since. He is the unquestioned master of the fish portrait.

I have a signed copy of *Sea Salt* by Stan Waterman which I treasure. It was fun to read Stan's take on his own adventures over the years.

I also have a cherished copy of *Silver Seas* by Ernie Brooks, which depicts diving in as beautiful a manner as I can imagine, with all his photographs in glorious black and white.

And finally, although not strictly a diving book, *Jaws* by Peter Benchley, was a real thrill ride. The book was better than the movie, which was by itself amazing for the time.

I understand there are some good

books about the founding of Body Glove and the early days of the Cayman Islands diving scene. I am looking forward to reading those!

RL: What bugs you most about diving?

TI: It's less about diving itself and more about the misinformation put out to the public about diving that bugs me. Sometimes that misinformation comes from expected sources like the media, e.g. "sharks are everywhere" and "diving is a deadly activity", and sometimes it seems to come from within our own industry, e.g. "all the reefs are dead" and "look how deep/far back/long I stayed/

many fish I killed, too bad you aren't as bad-ass as me".

I guess that's an ego thing, but these issues don't do the industry much good, and it seems to me that they often turn potential new divers toward some other activity. The idea of ego is problematic for a lot of reasons, and unfortunately, I have seen it make for instructional and customer service situations that are inappropriate or avoidable.

Then too, misinformation, especially when it comes from within, can have a larger impact, sometimes resulting in legislative or regulatory action detrimental to the industry.

Really, we should be welcoming to

anyone interested in diving. We have to be careful to balance good customer service and the need for access to dive sites with our concerns for the environment. Without taking such a stance, it is probably true that many potential divers are opting out of learning, and we as an industry are suffering as a result.

RL: How would you describe diving to non-divers?

TI: First of all, it's fun and safe for just about anyone who is comfortable in the water and healthy. The equipment is easy to use and light in the water, and with just a little bit of instruction and some basic equipment, people can adapt easily to seeing some of the cool critters and scenery.

I have had the privilege of working with folks such as the Wounded Warriors Project who aren't very mobile on land, typically due to an injury. But those same people can move easily in three dimensions underwater, which means almost

anyone can easily move about underwater.

Diving is unique in that the level of adventure is entirely up to the participant; divers can do as much or as little as they want because there are so many fun ways to enjoy the sport.

For families with kids as young as ten, they can all dive in shallower water and see lots of color and aquatic life. Those who want a different adventure can learn more, use diverse equipment, dive on historic shipwrecks or in natural caverns, or experience night diving. And those who want to take diving to the extreme can, with the proper additional training and equipment.

Diving can be for everyone, and unlike other sports such as snow skiing, the level of expertise doesn't strictly dictate the quality of the experience. Diving has something for almost everyone.

RL: What did you do before you worked for Scubapro?

TI: After Florida Institute of Technology's satellite campus at Jensen Beach shut down all programs (including the Sport Diving Operation Program I headed), I started the Recreational Diving Management Program at Barry University. It was the first four-year degree program in the diving industry.

After more than five years at Barry, I was offered a position as Coordinator of Business Curriculum, teaching business at a community college, and administering various adult education business programs while working with a nearby "business incubator". With graduate degrees in marketing and management and a long history of teaching at the college level, I decided to



Tom Ingram with sea turtle

DAN ORR



DAN ORR

Tom Ingram making bubble rings (left)

Tom Ingram with ScubaRadio staff at DEMA 2012



PETER SYMES

I also learned to develop SBA loan programs, work with lending institutions, did SBA business consulting and taught business programs at the college itself. At the same time, I was responsible for a non-profit (501c3) organization called Leadership Seminole (LS). Leadership Seminole brought in business up-and-comers in the region, acquainted them with the role of various local and statewide government and private entities and personalities, and generated revenue through business connections and education.

LS operated directly under the guidance of a volunteer board of directors, similar to DEMA, although DEMA is a trade association and a different tax structure. Leadership Seminole still exists today.

While at the SBDC, I received a call from a former FIT student who was working at Scubapro, and after an interview, I was offered a position teaching diving retailers more about business. The Retail Education Manager position was in Wisconsin (brrr!) but I took the job and moved from Central Florida to the Racine/Milwaukee area where I lived for three years. In 1998, several of us from the Wisconsin office moved the Scubapro operation to San Diego area.

Eventually I became Product Manager and then Director of Technical Marketing for Scubapro. I was responsible for creating the in-house technician training

programs and all the technical/regulator service materials. In addition, I coordinated the product catalog, illustrated price list, most of the dealer training and product sales materials issued through the company. I also oversaw the launch of the Scubapro website.

I was there for the development of the Twin Jet Fins, various Scubapro regulators and the purchase of UWATEC. We then launched that brand under the Scubapro name.

In 2000, I was offered a position at Aqua Lung (the U.S. Divers sporting goods division), launching the Aqua Sphere brand with the Seal Mask swim product, and developing a branding effort for the swim products in conjunction with Ironman.

Aqua Sphere was the first division at the company to open a website, and

I had the opportunity to work on the development of the Aqua Lung website launch, too.

After about a year, I went over to the Pro Dive division of Aqua Lung as Marketing Manager, making changes to the Aqua Lung catalog, and launching products such as the Surface Observation Signal marker and developing sales programs for the Suunto brand of computers.

RL: And then you joined DEMA?

TI: I started with DEMA in 2002. It was a great opportunity for me, combining my background in business consulting with the SBA, knowledge of non-profit trade associations, teaching business at the university and community colleges, and involvement with small business in general and the diving industry in particular. The position came open, and I applied for the job. After interviewing with DEMA Board members John

Cronin (PADI) and Werner Kurn (Ocean Enterprises), I went directly there from Aqua Lung.

Initially, I was hired as DEMA's "General Manager", but my title changed to Executive Director shortly after my arrival and has remained the same ever since.

RL: Tom, you have a vision for DEMA. What is it?

TI: My vision is really to accomplish the strategy and goals of the volunteer DEMA Board. DEMA is a trade association, so the focus is obviously making business better for the diving industry where possible.

Fortunately, the DEMA Board has been gracious enough to allow me to have volunteer involvement with several operations in the Association Community, both here in California and throughout the United States. That volunteer time has allowed me to learn more about associations and the changes occurring in the association market.

During my time at DEMA, I have been on the board of directors for the International Scuba Diving Hall of Fame. I have also been Chair of the Board and a board member for the California Society of Association Executives (CalSAE). This is the third larg-



BARB ROY

Tom Ingram speaking at DEMA 2006

take the position.

I truly enjoyed that time, and I still kept my hand in diving by teaching courses at the college. I also got more involved in the local business community, using the time to go to various retail and manufacturing businesses and teach a variety of business topics, from Statistical Process Control and Manufacturing Standards, to financial management for small businesses, and various management and marketing topics.

A few years later I was recruited to run a Small Business Development Center (SBDC) for the U.S. Small Business Administration (SBA) in the Orlando area. I became a Certified Business Analyst and worked with more than 200 local small businesses annually (including just about any business you can imagine—from diaper services to Bed and Breakfasts, and even a few dive stores).

est Society of Association Executives in the United States. I served as a volunteer and speaker for the American Society of Association Executives (ASAE) and for the International Association of Exhibitions and Events (IAEE). I was also speaker for the Professional Convention Management Association (PCMA).

Considering today's business "culture" and observing trends in the association community, it is clear to me that the need for associations is strong, but it is changing. For example, associations once provided one of the few opportunities for conversation, collaboration and collective action among members of a given business community. The need for these actions remains, but the means by which these needs are satisfied is different, by using social media and other channels.

Interestingly, the need for face-to-face contact is actually greater than ever, but "face-to-face" is being viewed differently by today's business person. Today, associations and their face-to-face meetings are part of a "participatory culture"—one in which many adults are online and expect information to be easily shared

with each other. This "culture" incorporates traditional face-to-face contact and much more.

Interestingly, it appears that face-to-face meetings are actually preferred by business people who want the opportunity to interact with veterans of an industry, as well as be involved with personal contact to form networks. Costs and other issues have had an impact on business' ability to attend face-to-face meetings, but the preference is still there. As a result, any face-to-face interaction must be more personal than ever.

With these major shifts in the business culture in mind, DEMA has been moving in a direction that should help everyone in the industry. Joining DEMA is one of the best investments a diving business can make and among the most important benefits that DEMA currently provides and will continue to in the future are:

Research – DEMA should be the place where industry participants (members and non-members) turn to understand all aspects of the marketplace. In fact, DEMA has more research projects in the works today than ever before. Some of



PETER SYMES

that will be readily shared with the industry, and some will be available to members only.

Membership Specific Services – DEMA is already providing access to services such as workers compensation insurance packages, health insurance, and shipping services because the DEMA Membership serves as a "class". This status allows DEMA to negotiate discounted benefits and spread risks to lessen costs.

Legislative Services – This is one of the most important services provided to DEMA members and the industry. It includes lobbying, monitoring of bills, and informing the members of changes in legislation impacting the industry—whether it is environmental, business or other topics. This is an essential service of any legitimate trade association and with a lifelong interest in politics and legislation, this is an area of interest and activity for me personally.

Becoming the "Hub" of Information and Engagement – Even though the five stakeholder groups that make up the industry and Association are often at (conflicting) odds with each other, DEMA is one of the few "neutral" territories for the diving industry. As such, there is an opportunity to use the trade association as a place to do more than just talk about a topic. DEMA can serve as a place for working through issues that have a real impact. Of course, this is not a simple task for a non-profit trade association in the United States due to the structure of anti-trust laws, but DEMA still represents the best place where such discussions can and should take place.

PR Events – Items that reach into the mainstream media can help keep diving visible to the general public and should continue to be utilized. Wounded Warriors and the Be-A-Diver pool have been good examples of getting media attention, as are efforts to get input from

celebrities to bring attention to important causes. One of the most recent examples of this is DEMA connecting with the VH1 "Band You Oughta Know", Youngblood Hawke, to develop a following of a younger audience and also bring forth the issue of trying to stop shark finning.

Business Education – Of course this is an area in which I have a keen and long-term interest. While DEMA has some great programs put on by really good presenters (especially at DEMA Show), we also recognize that one of the most important things we need to do is educate each other by learning from other successful members of the industry. DEMA does a pretty good job of education at the retail level, but there is more, especially with other stakeholder groups, that could be done.

Standard-Setting – DEMA is already involved in this area, investigating the



ALESE PECHTER / PECHTER PHOTOS



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Tom Ingram (left) presenting a marketing seminar at the DEMA Show in 2010; Tom Ingram testifies before the U.S. Senate in 2010 on the potential economic impacts of Ocean Acidification on the Recreational Diving Industry (below)

ent if they are to survive. The buying public, often through social media, make demands on every business, and they must address these demands to be viable in the long run.

Face-to Face Meetings/ Events/Shows – While these will be different than they have been in the past, and will require a fresh approach, they are vitally important. In fact, all social media should direct the participants to this impor-

Show is one of the most important opportunities for businesses to collaborate and learn.

RL: If you had a magic wand and could change one thing in DEMA, what would it be and why?

TI: I have always thought that having opinions and help from outside the DEMA Board of Directors (in the form of volunteers on committees) could give the board and staff more options for ideas. We actually did accomplish this over the last two years, including changing the structure of committees by developing written objectives and work plans. The result is that DEMA is able to accomplish so much more than we have been able to do in the past, stretching resources and generating new and fresh ideas that make a difference. The current Board of Directors is to be thanked for taking that chance!

DEMA has sometimes (often?) been accused of being a “good old boys club” (at some point that might have been deserved). That has never been the reality in my time with DEMA. I wish others in the industry could see how hard the members of the board and staff actually work to avoid that, while conducting DEMA business. Someone will likely accuse me of “sucking up” for that comment. I invite those people to serve on a committee or run for the board so they can see what really happens at board meetings.

RL: And has your input come out as you would have wished?

TI: I'd like to think DEMA has been helpful in getting more real business training and marketing data

out there and dispelling myths about such things as the classic diver dropout rate (it is NOT, by the way, 80%). I think we have had an impact on business through the trade show, and with fairly exacting standards for who may attend, I believe we have made the show about business, networking and education again.

I was fortunate enough to work with some industry notables such as Drew Richardson and Dudley Crosson in the early days at the universities, and of course, since being at DEMA I have had the chance to meet and work with some of my own heroes: Neal Watson, Zale Parry, David Doubilet, Bob Hollis, Carl Roessler, Rodney Fox, Al Hornsby, Valerie and Ron Taylor, Geri Murphy and

Stan Waterman.

I am proud of all my former diving students and colleagues, and count among them Tanya Burnett (noted underwater photographer), Sharon Kegeles (Women Diver's Hall of Fame and now at Barry University), Don Barthelme (Santa Barbara Maritime Museum), Guy Miller (formerly of Scubapro), Rob Pasqual (also of Scubapro) and many others.

Those university programs were designed to turn out people with a passion for diving and running a diving business. It's great to see former students like John Harman in Maryland and Rob MacDonald in West Palm Beach own and operate diving businesses today. That's what it was all about. ■

need for setting manufacturing and other standards in the United States through proper accrediting channels such as the American National Standards Institute (ANSI). Such standard setting could help the industry and should be an area in which the trade association should participate.

Money-Saving Benefits for Advertising and Other Promotions

– Since 2007 DEMA has been involved in trying to create templates that reduce the cost of advertising for members to reach potential customers. DEMA will continue to promote such ads, along with simple program ideas that keep divers active and encourage the fun of diving to consumers. As a trade association, most of this is necessarily conducted through our members, but DEMA does and will continue to provide access to inexpensive ads and programs, as long as industry members use them.

Transparency – DEMA has always had information available to



PHOTO COURTESY OF DEMA

those who really wanted it, but making this information more obvious must be the normal way DEMA does business. In fact, in my opinion, all companies—associations and all diving business included—must be transpar-

tant aspect of networking and participatory culture (face-to-face meetings are the original “social media”). These are the best form of promotion of the industry that DEMA can organize and provide, and the DEMA



ALESE PECHTER / PECHTER PHOTOS

Tom Ingram introducing the 2012 DEMA Reaching Out Awards



Scuba Confidential

Unselling the Product

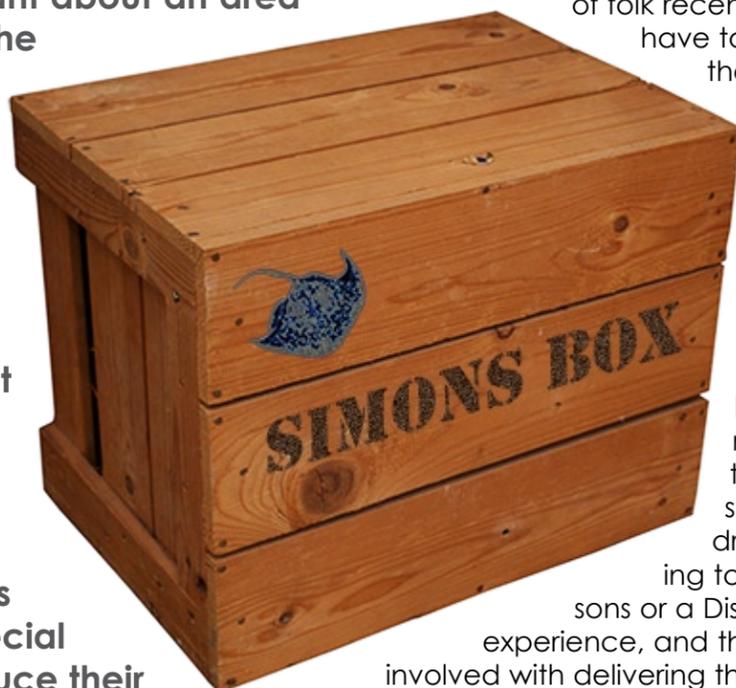
Scuba Confidential—A new regular column offering scuba diving tips and tricks, serious discussion of safety issues, insider revelations and provocative think pieces.

Text by Simon Pridmore

For the first article in this series, I have chosen to get up on my soapbox with a little constructive (I hope) rant about an area where I think the dive industry is failing itself and its customers. At a time when the dive industry is facing recruitment and retention challenges, to such an extent that it is asking divers to make a special effort to introduce their

friends and colleagues to the sport, (something most divers do anyway,) perhaps the industry should be looking closely at its own procedures to see if the recruitment and retention problems are partly self-generated.

I say this because I have met a number of folk recently who have told me that they tried diving once and found that "it wasn't for them". Let's examine that statement more closely. What they mean is that they were sufficiently drawn by diving to pay for lessons or a Discover Scuba experience, and the people involved with delivering that course



or experience managed to put them off ever doing it again. In other words, when they walked into the dive centre, the sale had already been made and the dive centre somehow managed to "unsell" them!

Deliberately providing poor service

This was in my mind the other day when I was chatting with a dive centre manager and remarked on the poor condition of the rental gear that his operation issued to beginners. "Of course," he said, "we do it deliberately. It encourages them to buy their own equipment."

I was stunned that he would make such a crass statement. Quite apart from his ignorance of economic realities (dive centres make much more in percentage terms from renting out equipment than selling it) his thinking is about as wrong-headed as you can get. If a new diver does not enjoy his experience or his course, if he is not made as comfortable as possible, he will not pursue the sport. He will not become a diver, he will not rent equipment again, and he certainly will not buy anything!

This dive centre manager evidently is not alone in thinking this way. A while ago, I was consulting for a hotel chain

that was looking for a local operator to run their on-site dive centre. One applicant, a very well known company with many branches, invited me and one of the hotel chain's directors to go diving with their flagship dive centre in order to impress us. The hotel director was a new-ish diver with 60 logged dives but did not own his own gear. "No problem," the operator said, "you can use ours."

Shabby gear

All the equipment was pretty shabby but it was the fins that drew our attention most. Where the foot pocket joined the blade, there was a wear line, and you could easily bend the blades up and down beyond 90 degrees. In the water, the fins just flapped around uselessly.

I noticed that my buddy did not have a dive computer, so asked if the dive centre could lend him one, but the staff told us they did not have rental computers. Anyway, they added, he didn't need a computer because the guide had one. Needless to say, the operator did not get



the job. Other anecdotal examples abound. One lady told me that for her first pool session (with a very large and successful dive centre in the Caribbean), she was not offered a wetsuit and ended the day with knee and elbow scrapes. She also had chafing marks from her BCD, which was so ill-fitting that the shoulder straps floated above her head on the surface. The depth gauge on her console did not work and when this was pointed out to the instructor he just said, "it doesn't matter, we are in a pool; we know how deep it is!" Luckily she persevered, found another shop and instructor and is now a



opinion

proud and certified new diver. But she is an exception; we rarely get a second chance at recruiting someone to the sport if we mess it up first time.

Try it yourself!

Instructors and dive centre owners should perhaps try diving with the equipment that they give beginners. They should experience for themselves how awkward it is and maybe then they will have some sympathy and improve the quality of their serv-

ice. Those who do not give every one of their divers, no matter how inexperienced, the means to record depth and time on every dive should reflect on how naked they would feel diving without a computer.

I can just imagine the excuses that dive centre managers will come up with on reading this, pleading financial and time constraints or complaining about competitors that force them to cut corners. But think of this, banks are hardly a benchmark for customer service these days, but even they know how important it is to

look after new customers with special treatment and services. What do we do in the dive industry? Make them feel uncomfortable and unappreciated. It's a wonder any of them stick around! ■

Simon Pridmore has been around the scuba diving industry in Asia, Europe and the USA (well, Guam) for the last 20 years. His latest book, also called Scuba Confidential, was published in September and is available on Amazon.



New dates set for EuroTek 2014

EUROTEK.2014—advanced and technical diving conference and exhibition—has announced that the dates for next year's event are changing.

Rosemary E Lunn, EUROTEK co-founder and co-organiser stated, "After careful consideration we are moving

EUROTEK.2014 to September. When we heard that the Birmingham Dive Show would be held on the same weekend, we were pleased because it would have meant that delegates had the opportunity of attending both shows.

"However we know that certain delegates want to devote themselves to a specific event and choosing can be tough. We felt the fairest option would be to change dates.

With EUROTEK.2014 now being held on Saturday 20th and Sunday 21st September, divers are free to attend both shows."

Deep wreck photographer Leigh Bishop has been busy pulling together a fabulous speaker list and this will be unveiled in due course.

In the meantime, tickets will be going on sale in the early part of next year via www.eurotektickets.com ■



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marine mammals



False killer whales team up with bottlenose dolphins to avert predators

Still mysterious and not well understood, false killer whales are a rarely studied species of ocean dolphin. However, a new study has revealed a unique relationship the whales have with bottlenose dolphins. According to researchers who followed 61 individuals for 17 years, groups of false killer whales were associating with bottlenose dolphins for five years or more and for up to 650km.

"The anti-predatory function of mixed species associations is mostly achieved through a greater chance of detecting a predator through more eyes watching out," said researcher Jochen R. Zaeschmar of Massey University in New Zealand. "However, it is hard to say if this is mutualistic or parasitic, that is whether the two species actu-

ally co-operate or whether one just opportunistically exploits the detection ability of the other. Lastly, as both species are highly social, sociality may also play a role."

The research published in Marine Mammal Science shows how a group of false killer whales off the New Zealand coast has formed partnerships with bottlenose dolphins.

"Given the level of site fidelity documented, a small and possibly closed false killer whale population in New Zealand waters cannot be ruled out," said Zaeschmar. "A reassessment of the current conservation status in New Zealand may therefore be prudent and further research warranted into the dynamics of this population." ■

SOURCE: SCIENCEDAILY.COM



False killer whale



DAN SHAPIRO / NOAA PHOTO LIBRARY / WIKIMEDIA COMMONS

Blue whale earwax reveals new secrets, study says

Unseemly as it sounds, whale earwax build-up can be a good thing for science, as researchers have found it a valuable source of information on the life of a whale. Taken from a blue whale carcass retrieved after the individual struck a ship off Santa Barbara, California, USA, in 2007, a 10-inch ear plug removed during necropsy showed what the whale had been exposed to in its lifetime. Chemical and hormone analysis revealed a story of exposure to DDT and mercury at different points in the whale's life.

The study, which was published in the journal Proceedings of the National Academies of Science, has raised excitement in the scientific community regarding the potential of the new

method "once they get past the 'eww!' factor of it being earwax," said lead author of the paper, Stephen Trumble, professor of biology at Baylor University in Waco, Texas.

Through analysis of the pollutants and chemicals in the layers of earwax, scientists were able to build a picture of the whale's life. When the animal is feeding, the earwax is dark in layer, when the animal is migrating and not eating much, the earwax is lighter. Researchers concluded that the whale was born around 1995 and exposed to a lot of organic pollutants including DDT while it was nursing in its first six months, the chemicals being passed through the mother. Around age 5 and 10, there were two spikes of mercury exposure,

possibly caused during migration past the California coast.

One of the Baylor researchers, Sascha Usenko, said that the new method makes measuring exposures in whales much more easy and precise, compared to previous methods such as analysis of whale blubber, feces, blood and blowhole spray. Indeed, offers from around the world are coming in, requesting analysis of whale earwax specimens.

"We're going to receive one hopefully this week that's about three and a half feet long from a bowhead whale from Barrow, Alaska," said Trumble. ■

SOURCE: USA TODAY

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Expedition team member Frédéric Vandenplas prepares for the dive

Text by Erik Wouters
Translation by Filip de Weerd
Photos by Hedwig Dieraert and Erik Wouters

Years of preparation finally paid off on 3 August 2013 when the first Belgian cave diving team reached deeper territory in Ressel Cave in Lot, France. This underwater cave—located in the heart of French cave diving paradise—is known to be one of the more engaging, difficult and technical cave dives. The expedition was an exploratory dive of several hours, with all its complications in logistics and difficulties.

There were intense preparations, including materials testing conducted by a few members of the Flemisch cave exploration group, Science Explorers, and the diving club, Technical Diving Antwerp. In addition to myself, our dive expedition team included

Ronny Breeur, Sannie Versweyfelt, Kenny and Angie Vandoorne, and Frédéric Vandenplas.

The cave system is comprised of a series of siphons or sumps with dry parts in between. Only a limited number of people

have dived beyond the first siphons.

Preparations

Before engaging in a challenging dive like this, one needs to be prepared. I have been diving in the trimix zone for years,

with and without a scooter.

Several dives have been done in Ressel Cave with open circuit and rebreather. Little by little, the cave has become familiar. Progression has been made step by step; the first dive to the other side of the

first sump took six hours. In subsequent dives, the timing could be reduced to three hours for the same dive. A careful but steady pace is important in cave diving, as it will reduce the decompression time. Several dives were undertaken in a



HEDWIG DIERAERT

Pushing the Ressel

—A Cave Diving Expedition in Lot, France





HEDWIG DIERAERT

The entrance to Ressel Cave. It has a wide entrance, good visibility and the temperature is 14°C. The passages are wide, which is the reason why Ressel is internationally renowned. A lot of technical cave divers have been trained here

Ressel Cave

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RESSEL CAVE SYSTEM, LOT, FRANCE
 The Lot region is a part of the Midi-Pyrénées, located in southwestern France, and is named after the river Lot. The river Lot streams through the limestone plateau and cuts deep valleys, in some places up to 100m deep. The region is littered with cave systems. The Ressel is one of the cave systems and starts in the bed of the river Célé. The entry is relatively wide at 150m and then splits into two arms, which join again about 300m from the entrance. A series of drops follow each other to a depth of 55m, eventually ending at 77m before ascending again to a dry section of the cave about 2km from the entry. The sumps after that have rarely been explored. Rick Stanton and Jason Mallinson reached sump five, 4.6km from the entrance, on 25 August 1998, and left the cave after 49 hours. ■

Map of France with location of the Lot region where numerous caves are found



HEDWIG DIERAERT

time span of several years and was crucial to memorization of the site, reducing the time loss and increasing efficiency and fluidness of the dive.

The target was to get as far as possible into the cave. Physical conditions of the push divers would determine how far one could go beyond sump one. In this exploration dive, we got to siphon five!

The logistics

Inspiration rebreathers were used to keep the volume of breathing gases to a limit. The gas mixes for the two push divers was a 10/60 diluent in three-liter bottles and pure oxygen. Open circuit bailout for sump one were placed by support divers Ronny Breeur and Sannie Verswyfelt. The bailout included:

2 x 12L 300 bar oxygen at 6m deep
 1 x 20L 240 bar 50/10 at 22m deep
 1 x 20L 250 bar 20/40 at 1,100m from the entrance

At 1,100 meters, additional tanks were left behind:
 12L 300 bar oxygen (with two wood logs attached to it to make it float)
 80 cbf tank with air
 40 cbf tank with air
 2 scooters for redundancy

The gear left at 1,100 meters in siphon one would be picked up for the actual push through to carry out the crossing of sump one and all further siphons.

The crossing itself started with one CCR for each diver and also one scooter and one 20-liter tank with

15/45. After 1,100 meters, the other materials left behind would be picked up.

Four scooters were used: three Bonex and one Silent Submerge. What we didn't know beforehand was that one scooter would not survive, and the other would be used until it was empty. Redundancy is a must!

The push dive

The start of siphon one is known to many cave divers; a lot of them have received their training there. Why? It is a relatively easy, wide entrance with good visibility. This first system is dived by most up to a distance of 400m where a well-known deep drop is located.

The primary aim of the expedition

The complexity of exploration cave diving, the gas planning and bail out scenarios are a challenge and part of the attraction of this type of diving



Ressel Cave



Author, Erik Wouters, prepares for a dive with a scooter

was to push through this sump and reach the end. The maximum dive depth was 75 meters, and the total distance was nearly two kilometers. The majority of that distance was at a depth between 50 and 78 meters. The second aim of the expedition was to reach the next siphons, and potentially, the end of the cave.

The vertical wall where the ascent starts of sump one was reached after 47 minutes. From previous experience, I knew this was quick. It was here that the deco in sump one started.

The air and oxygen, transported through siphon one, were used in the subsequent siphons and used to top up the CCR tanks. Kevin Haek was kind enough to lend a dry tube for the spare scrubbers, batteries, fill whip and oxygen cells. Drinks and food were also stored in the dry tube.

The time to start and finish sump one was 122 minutes. On the way back, 120 minutes were spent underwater in siphon one. The other siphons were dived within NDL limits. The total time to cross to siphon five and head back was 12 hours. In total, 5.5 hours were spent underwater, the rest of the time was spent hauling gear between the siphons. Two 15-minute breaks were built in for rest.

Dive wise, this was not too difficult, but transporting the gear between the sumps made this dive difficult. The space between the sumps has a high CO₂ concentration. The fitness of the divers was the determining factor in getting through all the sumps.

Despite all our preparations, things went wrong. Just past siphon four, one of the Bonex scooters was accidentally dropped and flooded as a result. It kept working

until the weight became too great. Another scooter was depleted on the way back in siphon three. One high pressure hose tore apart upon opening the tank. It was a brand new Miflex high pressure hose.

The challenge

It is a serious challenge to dive the Ressel Cave up to sump five. The sum of the years of training, getting fit, doing deco calculations, filling the tanks, making preparations and figuring out logistics made it all very complex but also highly motivating.

And the psychological challenge was also high—it was far, deep and physically exhausting. What if one of the CCR units failed catastrophically? A high volume lot of bailout gas was prepared just in case.

And still, the end of the cave has not been reached. The Ressel is still a challenge.



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Author, Erik Wouters, makes preparations for the dive

The team

An exploration dive of this complexity was not possible without the support of a team. Half of the pleasure of this dive was in the preparation and sharing the experience with the other team members. My buddy Frédéric is a young lion—eager, motivated and does not give up—an ideal buddy, and a name to remember. The support divers—Ronny, Sannie, Kenny and Angie—did the hard job of staging the tanks and the bailouts.

And the celebration dinner with lamb chops, after 12 hours of diving and carrying heavy gear, was exceptionally tasty. Those were the great moments to share with a team.

Thanks should also go to Greenforce, which supplied the lights for the scooters. Good illumination made the dive more comfortable.

Thanks goes also to Hedwig Dieraert, the photographer of the caving club, Science Explorers. He took incredible pictures thanks to years of experience and a keen sense in capturing the spirit of the moment.

A special thanks goes to Rik Vandeneynde, the blender of Technical Diving Antwerp, offering his years of experience, and despite recent surgery to his knee, he was always there. He provided accurate blends for every tank, from the three-liter CCR tanks up to the 20-liter tanks. They were always correct and filled to the max. It took away some of the worries when diving.

Epilogue

The end of Ressel Cave has not been reached—yet. No one knows what is behind sump five. There is no information, and clearly it is still a mystery—to be continued. The bailouts are already filled. ■

An active speleologist and rock climber Erik Wouters began diving in 1985 in the Mediterranean. He is a member of the Belgian caving group, Science Explorers, and the diving team, Technical Diving Antwerpen. An active cave diver since 1998, he is a certified IANTD IT Normoxic Diver, and since 2012, an IANTD CCR Trimix

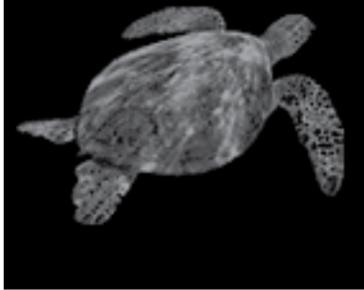
Cave Diving Instructor. Wouters has led or participated in numerous dive expeditions including the diving expedition with Dirk Roelandt of the Socotra Karst Project in Yemen where the team filmed for Discovery Channel, the Leopoldville where the team filmed for National Geographic, the HMS Victoria in Lebabon,

the Tollensesee where the team searched for remains of experimental torpedos of WWII. He has dived numerous cave systems in Belgium, France, Hungary, Florida and Mexico. In 2005, he undertook several expeditions in the Elefante Bianco Cave in Italy.



HEDWIG DIERAERT

turtle tales



JEFF POLLIN/MARINE PHOTOBANK

Puerto Rico reports record number of leatherback hatchlings

The year 2013 has been a good year for leatherback turtles on the beaches of Puerto Rico. The endangered species experienced the highest figures of hatchlings ever recorded in this region—68,000 in total, according to the Department of Natural and Environmental Resources of this Caribbean island. In addition, there was an all-time record of

leatherback nests at 1,390. That is 31 more nests this year than last year.

The department said that citizen participation was important in saving the species. In a communique, Carmen Guerrero Perez, the secretary of natural and environmental resources, said, "This season's success is largely due to

citizen participation." She added that there was full participation of local inhabitants in protecting the nests.

According to officials, Puerto Rico has the most leatherbacks in the United States and is second only to Trinidad and Tobago in the Caribbean. ■ SOURCE: HISPANICALLYSPEAKINGNEWS.COM



Thousands of sea turtles killed by longline fishery in Costa Rica

Not commercial fish, but vulnerable species olive ridley sea turtles are the second most caught species by longline fisheries in Costa Rica, according to a recent study published in the *Journal of Experimental Marine Biology and Ecology*. In addition, say researchers, the longline fisheries also catch more endangered green sea turtles than most types of fish.

The study analysed data of fish and animals caught by fishermen from 1999 to 2010, recorded by scientific observers. Maps were generated based on the findings as well as estimates of the total number of sea turtles caught in the fishery as a whole. A startling number of more than 699,000 olive ridley sea turtles and 23,000 green turtles were captured during that time.

The study showed that the Costa Rican longline fishery is a major threat to populations of sea turtles in the eastern Pacific. While up to 80 percent of the turtles are released and returned to the sea, the remaining 20 percent repre-

sents over a hundred thousand endangered sea turtles killed.

"It is common to see sea turtles hooked on longlines along the coast of Guanacaste in Costa Rica. We can set some free but cannot free them all," said Dr James Spotila, co-author of the study and Betz chair professor of environmental science in the College of Arts and Sciences at Drexel University. "The effect of the rusty hooks may be to give the turtles a good dose of disease. No one knows because no

one holds the turtle to see if it gets sick."

In light of the study findings, researchers are calling for area closures for the fisheries in order to protect the endangered animals and promote more sustainability.

The research team was compiled of scientists from Drexel University, Pretoma (non-profit conservation organization in Costa Rica) and The Leatherback Trust, a U.S. non-profit organization. ■ SOURCE: DREXEL.EDU

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BERNARD GAGNON / WIKIMEDIA COMMONS

Olive ridley sea turtle



Edited by
Ila France Porcher

James Abernethy **Deep Trust In Sharks**



PHOTO COURTESY OF JIM ABERNETHY



JIM ABERNETHY

Jim Abernethy, owner and operator of Scuba Adventures, was the dive operator who showed all of the others that sharks are peaceful animals who want nothing to do with humans as a food source.

He spends most of his time with wild sharks during dives from his liveboard ship, *The Shear Water*, at remote sites in the vicinity of the Bahamas, and is on land for only about 40 days a year.

In order to show people the true nature of sharks on his dives, Jim specifically targeted those with the worst reputations. He was the first eco-tourism guide

operator to do so. Soon he was taking divers to see great hammerhead sharks, tiger sharks, bull sharks, oceanic whitetips and lemon sharks. For roughly the first seven years of these interactions, the other operators who have now followed his lead, fought and voiced their opinions that people would soon be dying because of Jim's foolishness.

But Jim was right, and he was the one who showed all of the others that sharks are peaceful animals who want nothing to do with humans as a food source. Now there are at least half a dozen shark dive operators trying to replicate what he started decades ago. Jim's eco-tourism shark business is credited with being the first to offer night dives with all of these species, too.

As Jim became familiar with shark behaviour, he began caressing them gently on their faces when they curiously approached him. As they got over their fear of his touch, he was able to remove their parasites and massage their heads. The sharks clearly enjoyed these affectionate attentions and responded by returning to him more often and more confidently, apparently considering him to be a type of cleaning station.

Removing hooks

So when some of them appeared with hooks in their mouths, he was able to use these tactics to get them to swim up to him over and over, so that he could examine their hooks repeatedly before removing them.

One eight-foot male lemon shark was blind in his left eye, yet he had managed to survive in spite of this serious handicap. Jim named him Captain Ron, and always gave him special attention when he saw him. He knew how hard it is for an animal with any handicap to meet the challenges of living wild.

Jim had known Captain Ron for a decade when he appeared with a large "J" hook piercing his snout—the hook passed right through the flesh of his nose, and into his mouth. Jim started by touching his face whenever he passed with gentle caresses, and as Captain Ron relaxed, he began grasping his nose for short periods. The hook was close to the shark's teeth, so Jim was concerned about being accidentally bitten, and waited

for the right moment. When he sensed that the time was right, he held the animal's head still with his right hand long enough to remove the hook with his left hand, while Captain Ron remained relaxed and nearly motionless in the water. Jim released him, and the shark's response was to circle and come back.

It was a week before Jim returned to the area, and Captain Ron swam straight up to him, allowing him to examine the wound. It had nearly healed. The hole made by the hook had filled in, and the redness around it had gone. Captain Ron was even more affectionate as a result of the incident, repeatedly returning to swim close beside Jim and let him touch his face.

Text by Ila France Porcher
Photos by Jim Abernethy
and Ila France Porcher





shark tales

Though most of the sharks drawn to Jim's dives remain distant and never do approach closely to interact with him, he found that no matter what the species, a natural bond would form between him and certain individuals over time, facilitated by his affectionate gestures. In the wide region known as Tiger Beach, there are approximately 17 such tiger sharks, whom he calls "supermodels," who come to him on sight for the affection that he gives them on every encounter.

Emma

One of these is a matronly four-meter (14-foot) individual whom Jim named



JIM ABERNETHY

Shark Emma's dorsal fin wound (left); Healed dorsal fin (below) These two photographs, taken a year apart show the healing of the wound

THIS PAGE: Jim Abernethy examines the wound in the mouth of a shark named Emma

Emma, after his guest, Emma Finn. Over the years, the great shark has grown increasingly trusting and intimate with him and their bond has steadily deepened. She is clearly able to recognize him from among all of the divers present, and comes straight over to him whenever she sees him, while he strokes her head and face.

When Emma came to a dive with a fish hook stuck through her lower jaw, Jim gently touched her until he



JIM ABERNETHY

had the opportunity to pull it out. Twice he was able to remove hooks stuck into the outside of her mouth in this way, by caressing her gently first, and waiting for the right moment to coax out the hook.

Then, one day Emma appeared at the beginning of a dive with fishing wire hanging from the side of her face, and a large hook stuck deep into the muscle of the right hinge of her jaw. The hook was deep inside her huge mouth, and Jim observed her circling around him, wondering how he would be able to remove it, and especially about how he would protect his arm from her teeth when he reached inside. His first thought was to get a piece of PVC tubing to protect his arm, then open her mouth and remove the hook, but just at that moment, Emma came straight toward him, and just before she reached him, she bit down on a large coral head. This was an inexplicable move—sharks never bite down on coral in such a way. Yet, this unprecedented act permitted Jim, moving swiftly on the spur of the moment, to reach



ILA FRANCE PORCHER

inside her mouth, take the hook in his fingers, and rip it out!

Blood poured into the water. Emma took her jaw off the coral head, and soared around bleeding. She stayed in the area, and continued to approach Jim to be stroked as she always did.

Later that day, while Jim was stroking her head, he tried opening her mouth to get a look at the wound, by sliding his right hand onto her nose and using his left hand to open her lower jaw. Thus encouraged, Emma opened her mouth, and he was able to see that her wound was very swollen, and was between fifteen to twenty centimetres (six to eight inches) long.

A week later Jim returned to the area, and was again able to coax the huge tiger shark to open her mouth for him. The open wound had closed, to his great relief—he was impressed by the shark's ability to heal up quickly.

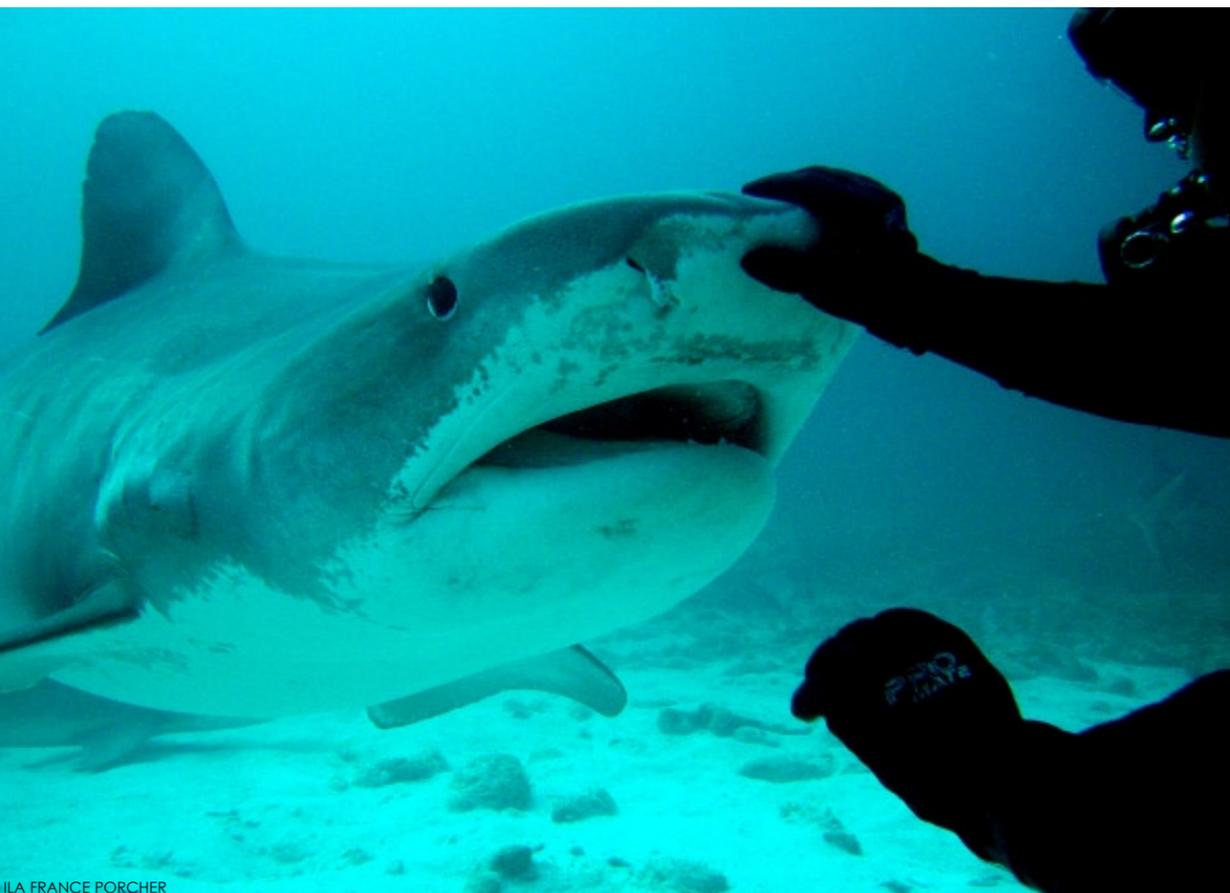
For the next four or five weeks he opened Emma's mouth to see how her wound was healing whenever he saw her, which was about five times a week. Eventually, she began swimming up to him and opening her mouth by herself.

But by the time this writer was able to visit, to observe Emma's behaviour, the tiger shark had not been seen for about six months.

But one evening, an enormous tiger shark passed swiftly just at the visual limit. I thought of Emma—the shark was so much bigger than any of the others. She was pregnant, and the tip of her dorsal fin was missing. Soon she reappeared and glided straight into the centre where the divers were watching. Jim was on board at the time, so word was sent that Emma had come. She was energetically roaming the area when Jim arrived on the seafloor, and she immediately swam to him.

Wounds and healing

Though I had found it hard to believe that a tiger shark would willingly open her mouth so that Jim could inspect her wound, that is exactly what she did. Jim was still reaching out for her when she opened her mouth. He rested his right hand on her head, and looked inside. She was remembering him and their complicity over her hook wounds from six months before!



ILA FRANCE PORCHER

shark tales



Shark with coral head that Emma bit

Emma appeared to be excited, roaming around energetically, and often approaching Jim. I saw her open her mouth when she approached him four times. Her momentum kept her moving forward so she rose upwards, Jim moving with her, so that by the time he was able to take a good look inside, she was rising nearly vertically.

Jim described how Emma had lost the tip of her dorsal fin. He and Emma had reunited soon after she had birthed the year before, and he noted that each week, she had another mating scar. (Females generally acquire significant mating wounds because the male holds

her with his teeth to stabilize the pair during copulation.)

One day a small male tiger shark of about three meters (ten feet) in length was with her, and kept trying to mate with her, biting her on the back of her head. Emma rejected him and eventually she swam away. Jim followed, trying to keep them in view, but he was left behind. When Emma reappeared, the upper part of her dorsal fin had been ripped off! Filaments of cartilage were coming out of the wound, and some of her fin was missing.

Jim was able to document the healing, which involved flesh replacement.

Shark advocacy

Jim described an incident in which a shark trophy hunter had visited one of the dive sites and fished some tiger sharks in the five-and-a-half-meter (18-foot) range, in hopes of setting a fishing record. As a result of the slaughter, the sharks disappeared from the area for a period of two months. Sharks of other species have also been documented to flee an area for a period of time, after some of their numbers have been slaughtered.

Knowing sharks in their liquid realm so well, and regularly witnessing such incidents, Jim has become a passionate and very powerful advocate for sharks. When he was disparagingly referred to as a "loose cannon" by one of his adversaries, Jim retorted that he was no cannon but an F-22 Tactical Fighter for sharks. And he is. As an award winning photographer, author and film-maker, his influence is growing and spreading. His original work for sharks, and his unique story is also being documented through different movies and films which will soon be available.

As well as fighting for sharks as an individual, Jim also works through a variety of important NGO's including Operation Blue Pride, which he founded in 2011. Operation Blue Pride invites military veterans to go underwater and discover the gravity-free submarine world and the sharks who inhabit it. These wounded, handicapped men and women fall in love with the majestic creatures, while the underwater environment relieves them of the pain they feel above the surface. This special combination is the key to its success, and the organization is now building a worldwide army to take



JIM ABERNETHY



ILLA FRANCE PORCHER

Emma opens her mouth so that Jim can examine her hook wound (below)

on ocean issues, starting with sharks. ■

Illa France Porcher is a self-taught, published ethologist. She began her career as a successful wildlife artist, documenting the behaviour of the wild animals she painted. In Tahiti she found sharks to be so intriguing that she launched an intensive study of them, systematically spending time with them and recording their

*actions, following the precepts of cognitive ethology. She is credited with the discovery of a way to study these much maligned predators that does not involve killing them, and has been called the Jane Goodall of sharks for her documentation of their intelligence in the wild. Her book about shark observation, My Sunset Rendezvous: Crisis in Tahiti, is available at: **Amazon.com***





Strange creature washes up on Spanish beach

A "strange creature" astonishes bathers, washed up on a beach in Spain.

A swimmer at Villaricos, Spain, found a 13 foot sea creature decomposing in shallow waters on the beach on August 15, 2013. Authorities pulled the cadaver onto the beach and cordoned off the area.

The pale body was very long and slender, and decorated along its length with what looked like horns. Its head, found separate from the body, was horned too.

The Spanish marine biologists who studied it were mystified. Several theories were put forward ranging from it being an oarfish to the backbone of a shark. But the true identity remains a mystery. Because of its state of severe decomposition, it had to be buried for safety reasons, so further efforts to identify it have only the photographs to work with.

The Association in Defense of Marine Fauna, (PROMAR) in Villaricos in Almería, southern Spain, continues to try to identify the animal. Spokesman Paco Toledano said: "It's hard to know what we're dealing with. It is broken up and we can not identify what it is. Maybe it's a bull fish," he joked.



"Perhaps if we were able to analyze the bones we might know more, but this specific genetic analysis is very expensive and who would pay? We've certainly never before seen anything like this."

A spokesman for the Marine Biological Association said: "A few people have said it could be the backbone of a shark with the rest of it decaying away. Really we would need a vertebrae to properly identify it. If it was a shark it would have a cartilage skeleton as opposed to bone. As for the horns - it's pretty inconclusive. No one knows of anything with horns in the sea. From the picture you wonder if it is even part of the creature." ■



Great white sharks fight and inflict wounds upon each other

Martin Graf, CEO of Shark Diver, sees the great white sharks of Guadalupe Island regularly, and is familiar with the different individuals who attend the shark dives. A year ago a male named Chuggy, appeared with a terrible head wound, which was clearly the bite of another great white. It was feared that he would not survive, but he recently reappeared alive and well. The second photograph shows the stage of healing now.

As shown, the wound is between his gill rakers and the back of his skull, so Chuggy was lucky that the teeth of his attacker missed his vital organs, in spite of removing a large chunk of flesh. Though a year has passed, he still has a lot of healing to do.

The ability of sharks to heal swiftly is well documented. Females are usually badly bitten while mating, so a superior ability to heal may have evolved over the aeons along with their teeth. Fights between sharks are virtually unknown in other species—the high cost of a fight, given the damage their teeth can inflict, has been thought to be too great.

Yet great white sharks do bite each other and inflict serious wounds. Martin has seen them appear to avoid conflict through head on confrontations and parallel swimming, after which the smaller shark retreats. But violence ensues at times. Martin says, "We see great white sharks with injuries that vary in severity, but they are common, not so much in younger sharks, but after they reach about 11 or 12 feet, it's rare to encounter one that doesn't have scars or mutilations. I have seen dorsal fins, pectoral fins, and caudals bitten, and even bitten off."

Chuggy's wound is much worse than those he usually sees.

In his book, *The Secret Life of Sharks*, researcher Peter Klimley describes how this unusual species uses a ritual to avoid physical conflict when a prey—usually a seal—comes under dispute. He filmed many events in which each shark slapped the water at an angle with its tail, and verified that the one who raised the most water, and blasted it farthest, won the seal. He was the first to document a ritualized conflict in any species of in this ancient line of animals. It was an unexpected finding,

because for the ritual to be effective, each shark must make an evaluation of the other's power, and accept the outcome. Klimley found that the winner was acknowledged by the loser without a physical battle for the seal, which would have badly hurt both sharks. ■



Chuggy's wound

RACHEL MONTERO / SHARKDIVER.COM



photo & video

You just bought a brand, spankin' new underwater photography kit... Now what?

Text and photos by
Lars Stenholt Kirkegaard

So... you have your new photo equipment. Cool... now what? Should we just jump in the water with it? The fact that underwater photography differs from traditional surface photography goes without saying. Most people know this and don't need anyone to tell them so. But if you ask the same people to list the vital points on how it differs and how one actually takes pictures underwater, they become a bit stumped.

Now, go and ask a completely new underwater photographer about how they have planned to actually carry out their first photo dive, and they usually have not even considered it. For that reason alone, many first photo dives are rarely successful.

Find the essence

Although it is quite different to take pictures underwater, it is not that hard to learn. But you need to put aside your



Smart Start

— *Preparing for Your First Photo Dive*

commonly held notions about photography and learn to prepare in a different manner.

You may well be an experienced photographer and know your camera well, but once you put it in a housing, the buttons and where they have been placed

become a whole new ball game!

So always start out by taking the time to get to know your housing, where the buttons are and (most importantly) be able to identify them with your eyes closed.

And let's be honest... You didn't really

read the manual, did you? You may think you have, and you might have told your friends that you did, but chances are more likely that you haven't done it.

The secret to camera manuals is not to try and read them all at once, but to get started by running over the table of

contents as fast as it takes you to read the letters. Then, do it again, just a little slower, so you now have the overview.

Most manuals repeat themselves forever. But, by knowing the main headlines, you will know where to start reading once you have the need for topic.





THIS PAGE: Adjust your aperture (or f-stop) and shutter speed and ISO settings *before* you enter the water



What you need to know

You will need to know how to turn the flash on and off, how to set the ISO and the basic settings associated with changing between Auto and Manual, as well as adjusting the f-stop and shutter speeds, plus how to enter the menu and run through the settings.

Just forget about the detailed menu settings for now, as they can wait until later.

Put it together at home

Rule #1, when you are about to go diving, is to make sure you have set up your camera equipment at home.

The majority of floods happen because the camera has been sealed in the housing in a rush and not checked properly. This important warning is usually written on the first page of every manual. But since you haven't read your manual, you won't have done it...

So by taking the time to mount the camera in the housing while at home, sitting at a

table with a clean surface, you will eliminate that risk.

Start by preparing the camera and housing completely for the dive. Then, take it apart again, so that you can learn about battery settings, how your buttons work and if the camera sits in the housing the way the manufacturer intended.

Taking these steps also increases the chances that you will get potential problems solved in good time before the day you want to go diving.

Eliminate your settings options

The next thing you need to decide is how you want to operate the camera. At this point, you might be thinking there are so many settings, how does one possibly decide on the right ones to choose? Well, when it comes to camera settings, there are three basic things that control your exposure: your aperture (f-stop), your shutter speed and your ISO setting—which are often collectively referred to as

the "ASI".

Although you may think your camera has none of these features, it is exactly these three settings that control the camera's operation when you choose one of the many shortcuts found on most cameras.

Virtually all cameras have an "Auto" button, usually called "P". It is important that you know where it is, because it is your back-up if every other setting you have decided to go for fails. It will make certain that you get out of the water with at least some reasonable images on your memory stick.

There are many other settings, such as the "Portrait" and "Sport" settings, which you will probably wonder about. The possibilities are many, but they all lead back to the three



Set your camera on the "P" setting

Smart Start

main ASI settings of Aperture, Shutter and ISO.

It is important not to be too concerned about the other settings, if you are not familiar with them, and keep things simple by using the settings you do know and then plan from there.

The long-term goal of any underwater photographer should be to use one's camera in the manual mode. Once you get there, you can always use short cuts to make things easier and optimise the camera's settings. But knowing exactly what happens when you press the



cinema of dreams

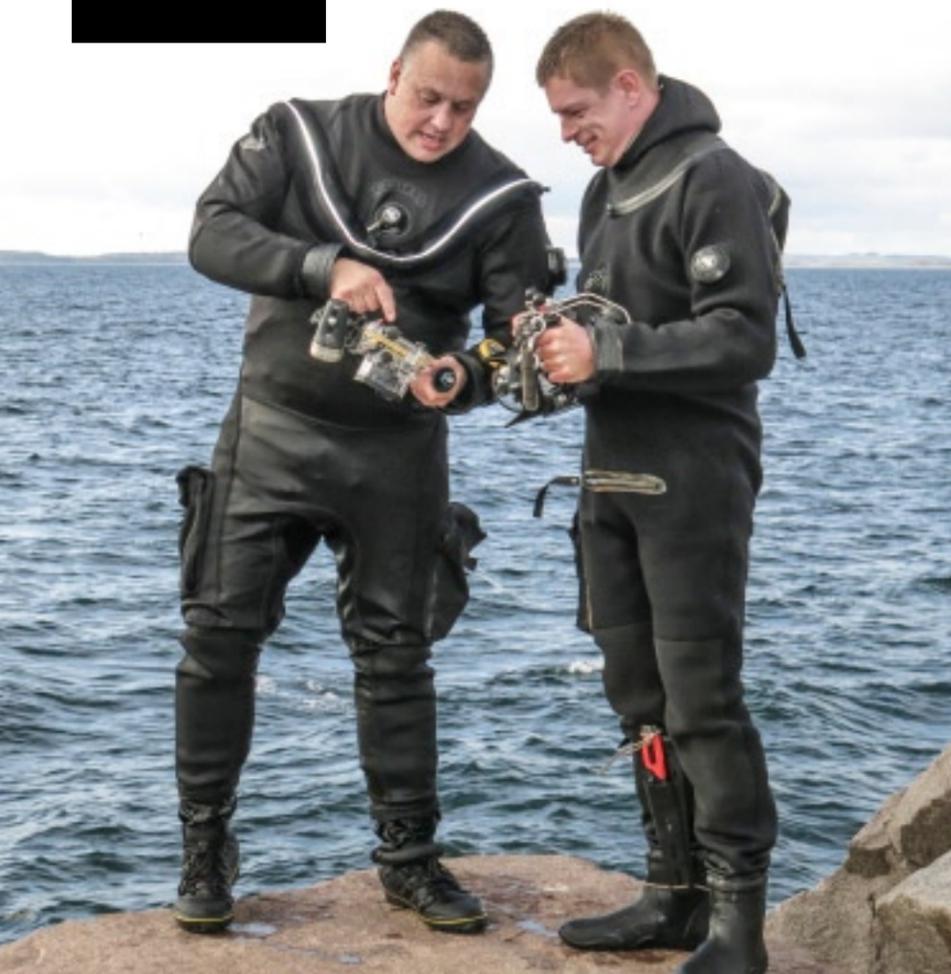


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photo & video



Oops! Did he forget rule #1?
Set up your camera and housing at home first *before* you go to the dive site—thereby avoiding possible flooding of your camera

same as making the sensitivity of your chip higher. If you are doing a deep dive, or one late in the afternoon, you will need the ISO to be as high as possible because of the low ambient light. But there is no free lunch in this scenario, as increasing the ISO will introduce “grain” into the image.

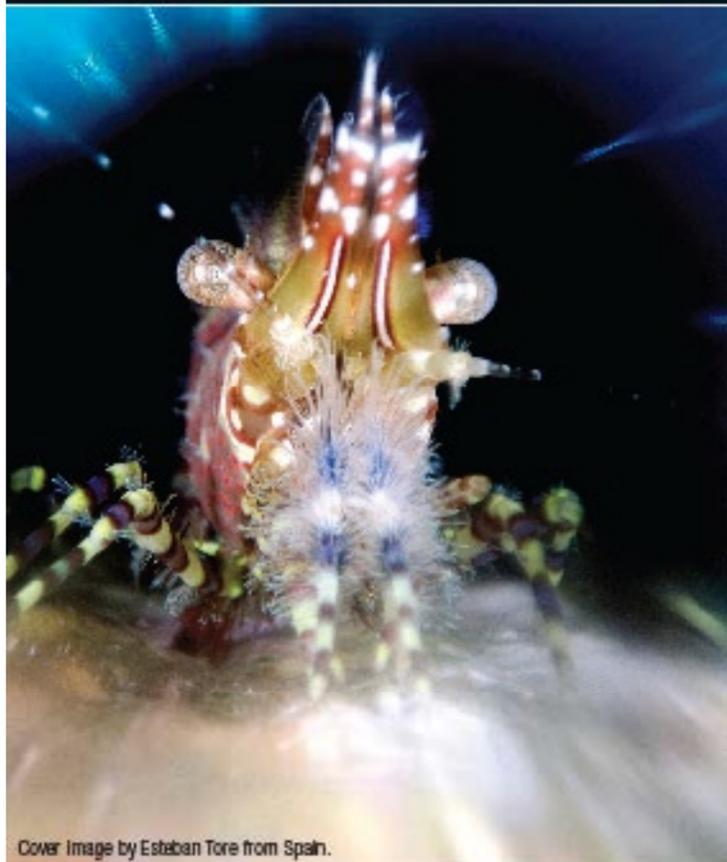
Grain is what used to happen in the old film-based days when “fast” film was used. Grain referred to the silver grains in the film’s emulsion that became visible at high ISO’s. With digital sensors, the grain is electronic noise that is introduced as the ISO increases. While a little bit is okay, a lot will ruin your image quality. How high ISO can be set in



your camera is relative to its quality. The old adage of you-get-what-you-pay-for really does apply here. As a rule, a cheap camera will deliver poor image quality in low light. This becomes a catch-22

for underwater photographers who dive in low light. As your experience increases, having the camera on Auto and manually setting the ISO will become your #2 setting—the one you can always revert

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Example of a *grainy* photograph, or a photo with “grain”

Choose the right partner—preferably someone with similar interests

button for manual mode is probably the most important step in mastering underwater photography.

The two setups

I teach my students to plan for two different settings at the start of their dive. The first one being the one you would like to be able to handle but still have not tried or would like to try more. While the second is the one you already know all about and can return to if everything else fails during the

dive. You should know exactly how to adjust these two settings even if you are deep down doing a cold dark dive and have lots of other things on your mind.

For a novice, the first setting should always be the “Auto” setting, but where you set the ISO manually, while the second setting should be full Auto, with the camera deciding everything.

The ISO is basically the light sensitivity of the camera's chip and increasing it is the





Before the dive, discuss the dive plan or routine with your dive buddy and how you will stick together for the entire dive

to. While your #1 setting will be one that teaches you how to adjust the f-stop or shutter speed to achieve good images.

Adjusting the f-stop and shutter speed are by far the most used settings for photographers using DSLR cameras. A lot of high-end compact cameras have the same ASI settings, but always check whether the housing you are considering actually supports all the settings!

There are lots of settings that you will learn about in time, but a lot of them are just short cuts to the three ASI settings. The really important thing is not to plan on doing too many things on your first dive—and to make sure that you

Before a dive, make sure you and your dive buddy have routines on how to dive together and how to stick together during the whole dive. If your buddy doesn't bring a camera, then he or she might become very bored after a while and get tempted to wander off.

Using a camera and really getting into photography is a time-consuming hobby, and you will probably end up connecting with other divers who enjoy taking pictures as well. Underwater photography is a buddy-sport and is best enjoyed under safe conditions with someone who shares the same interests.

If your buddy does not want to bring

have a setting to fall back upon, which you know by heart.

Keep things simple and avoid unnecessary complications, as your dive time is always too short to start playing with something completely new.

Choose the right partner

As an underwater photographer, you have to look upon yourself as a potential solo diver. Not that you should dive alone at all, but photographers have a tendency to get carried away with what they see and to stay with it and often lose their dive buddy during a dive.

a camera but you still want to dive together, she or he might participate anyway. Keeping track of time (so you don't forget your planned dive time), acting as an underwater model, spotting small creatures for macro images, or perhaps holding a photo lamp to create an interesting effect in the image are some of the many things your buddy can do.

—Leaving you is not one of them!

Find a productive photo dive site

I have often made the basic mistake of having too high expectations of the dive site where I teach, but choosing a very basic site when learning new things is vital. The phrase, "productive site", simply means a good dive site where you are comfortable and where the entry and exit areas are very easy.

Easy access is important in case you need to re-think your shooting strategy. Finding such a site is usually not too

hard. Most experienced underwater photographers usually have a local site they know very well, which they use to try out new equipment and techniques.

Doing a dive with the purpose of taking pictures is like putting on a new set of glasses. Things that were previously hidden are suddenly easy to find!

A productive site can be fun and very cozy at the same time. Find a little harbor with some stone formations, leftovers from construction, some nice vegetation or a little wall with a drop off just a few meters high—and your happiness is complete!

Lars Stenholt Kirkegaard is a professional photographer, graphic arts specialist and dive instructor based in Denmark. He is also a distributor and retailer of several underwater imaging brands in the Nordic Region through his retail shop: www.fotografit.eu



Pick a productive dive site—one that is easy to enter and exit

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photo & video

Sea & Sea RDX-100D Housing

Sea & Sea has released its new housing for the Canon EOS Rebel SL1/100D. The RDX-100D is made of black polycarbonate and is supplied with two fiber optic ports as standard, but can be fitted with Sea & Sea's internal YS TTL convertor. The new housing also features a redesigned focus/zoom control and is compatible with the company's magnified viewfinders.



Nauticam NA-70D Housing

Nauticam has announced the release of their new housing for the Canon EOS 70D. The NA-70D shipped from the 1st of October and features a new vacuum seal check and leak detection system as standard along with much of the new Nauticam functionality that was introduced with the NA-6D housing. The Nauticam NA-70D housing will retail for \$3,300 in the United States.



The New Nikonos?

After weeks of unconfirmed rumors, Nikon has announced what could be considered as the successor to the legendary Nikonos underwater film cameras. The Nikon AW1 is a rugged, waterproof mirrorless interchangeable lens camera, which has been released with a pair of equally tough lenses and all for a starting price under US\$800. The Nikonos film cameras were the state of the art for underwater photography from when they were first released in the 1960s through to the advent of modern housings in the mid 1990s and are fondly remembered by many who used them. The new Nikon AW1 is basically a ruggedized version of Nikon's 1 J3, but is only waterproof to 15m (49ft). It is, however, shockproof from up to 2m and protected against cold as low as -10°C. The two new lenses are ruggedized versions of the 11-27mm (30-74mm equiv) and 10mm (27mm equiv) which are part of the existing Nikon 1 System. Nikon is stating that the AW1 is compatible with all of its 1 System lenses, but it will not be water, shock or freeze-proof with any of the other lenses.



Sony A7 & A7R

In a move that has been somewhat anticipated through various media leaks, Sony has released its new Alpha A7 and A7R full-frame mirrorless interchangeable lens cameras. Virtually identical externally, the bodies of the two cameras feature a pentaprism-like EVF housing, generous handgrips and a nice assortment of manual controls for the enthusiast user. However, under the skin there are some significant differences with the A7R boasting a 36MP sensor with the optical low-pass filter removed to enhance the image sharpness—the sensor is rumored to be the same one in the Nikon D800E. The less expensive A7 has a 24MP and retains its low-pass filter. Both the A7R and A7 bodies are designed around the Sony NEX E-mount lenses, but if those lenses are used the image will be cropped and the new 'FE' lenses are needed to take advantage of the larger sensors. Sony Alpha DSLR lenses can also be used with either the LA-EA3 or LA-EA4 lens mount convertors. The Alpha A7 will be available as a body-only kit for US\$1,699 or with a new 28-70 F3.5-5.6 OSS lens for \$1,999. The A7R is not bundled with a lens, and is priced at \$2,299. Both cameras are expected to ship in December.



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Ikelite EOS 70D Housing

Ikelite has announced their new housing for the Canon EOS 70D. The new housing features built-in proprietary circuitry which, if used with Ikelite DS Substrobes, provides full TTL exposure control. The video record start/stop and AF lock controls are provided as levers on the side of the housing, which is also supplied with an aluminum tray and dual handles. Ikelite started shipping the EOS 70D housing from early October at a United States retail price of \$1,600.

Olympus OM-D E-M1

Olympus has announced the release of its new flagship mirrorless camera, the OM-D E-M1. The new camera features a 16 Megapixel Live MOS sensor, together with version VII of the TruePic image processor. Olympus is claiming superior auto-focus from the OM-D E-M1 because of its DUAL FAST system, which can use either phase or contrast detection depending on what lens is fitted. The OM-D E-M1 also features a very nice full magnification electronic viewfinder. Although larger than the very highly regarded OM-D E-M5, the new Olympus offers the ability to use both the Four Thirds lenses (with a new adaptor) and the Micro Four Thirds lenses, which will appeal to legacy Olympus owners.



Sealux Lumix GH3 Housing

Sealux has released its new housing for the high-end Panasonic Lumix GH3 mirrorless camera. The CSGH3 housing provides access to most of the high-end Lumix's camera functions, plus Sealux states that it can also be fitted with an optional HDMI bulkhead. The housing is small in overall dimensions to take advantage of the minimal size of the GH3 and features large o-rings and double control shaft seals to maximize overall integrity. The CSGH3 housing is made of a seawater-proof aluminum alloy and is CNC milled out of a monoblock, anodized in black and powder coated on the outside. Sealux are advising that the housing is available now at EU€1,799.



SeaLife

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SeaLife DC1400 with Fisheye Wide Angle Lens.

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sealife-cameras.com [facebook.com/SeaLifeCameras](https://www.facebook.com/SeaLifeCameras)

Nikon's D610

In a move that has been widely rumoured on the internet, Nikon has released its D610 Full-Frame (FX) DSLR camera. It seems that the new camera is the solution for the sensor oil spotting problem that occurred with its predecessor the D600. There



are only three new features on the D610 compared to the D600, with the major one being a new shutter mechanism allows for 6fps continuous shooting and a quiet continuous mode at 3fps. The new shutter is the solution to the oil spotting problem and the D610 is available from late October at a U.S. retail price of \$1,999.



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Diver from IAHD
Adriatic in the
Hydro Lab at
Star City in
Russia

Star City

—Hydrospace without barriers

Text by Svetlana Murashkina
Photos by Dmitry Sakharov

In late April 2013, a delegation of 16 people from IAHD Adriatic – International Association for Handicapped Divers visited Moscow in Russia to become the first disabled divers to dive in the Hydro Lab of the Russian cosmonaut testing facility located in Star City. It was the realization of a long held dream for the leader of the delegation, Branko Ravnak, who worked for years to make the event a reality. Svetlana Murashkina, the editor-in-chief of the Russian dive magazine *InVertum*, reports.

— *We did it!*

The delegation to Star City included Slovenians Damjan Peklar (CMAS Instructor), Barbara Slaček and Aleš Povse-Yoda, as well as Croatians Zoran Vlah—who gets around in a wheelchair in everyday life—and Peter Majcen who is on crutches. There were also several volunteers and helpers including Alenka Fidler, Blaž Ribič, Gaber Guna, Katarina

Richter, Matjaž Paj, Nevenka Richter Peče, Urška Gajšek, Rajko Prelog, Tomaž Bobik and Petar Vresnik.

The delegation was led by the president of IAHD Adriatic, Branko Ravnak, who flew to Moscow

specifically for the immersion event in the Hydro Lab (Neutral Buoyancy Training Facility) of the Gagarin Research and Test Cosmonaut Training Center in Star City. It was the first time wheelchair users have dived

in the facility. It was a dream come true for Ravnak—a dream he nurtured for several years and finally realized thanks to a friendship with the Foundation supporting the Russian federal program "Dostypnaya

Sreda" (Accessible Environment).

On the Russian side, disabled divers who participated included Nikita Vankov from Anapa, and Anna Demidova and Svetlana Fomicheva from Moscow. Volunteers included Elena Topyricheva

from St. Petersburg and Ilya Dubrovsky, Svetlana Konohova and Andrey Zaikin and Igor Murashkin from Moscow.

Underwater videography was taken by Vladimir Prokhorenko from Anapa, while underwater





Star City

12m, and a capacity of 5,000 sq m) filled with water at about 30°C, has a mounting plate with a capacity of 40 tons. The density of the water is less than that of a normal swimming pool thereby achieving exceptional clarity.

It was here that cosmonaut training and development of operations took place under simulated weightlessness in a water environment, providing solutions for the problems of cosmonaut training in extravehicular activity, performing experimental

photography was done by Dmitry Sakharov, with the help of assistant lighting diver, Anton Sakharov, and land photography was done by Zoya Pechorkina—all of whom were from Moscow.

The dive went as usual. A briefing was held by Valery Nesmeyanov, director of the dive centre, SPACE DIVE, and distinguished test pilot of the Space Technology agency of the Russian Federation. Each of the two groups of divers spent at least 60 minutes underwater, during which time each diver could check out the construction of the ISS (International Space Station) and experience for themselves what astronauts do in training (and even in outer space!).

The divers exchanged experiences and posed for pictures in front of the spacecraft. Now in their log-books two stamps appear: one for the dive center SPACE DIVE and, as a special, memorable experience, a stamp from the Foundation supporting the Russian federal program "Dostypnaya Sreda" (Accessible Environment) as well as the signature of the president of CRASA (Russian underwater federation), Valentin

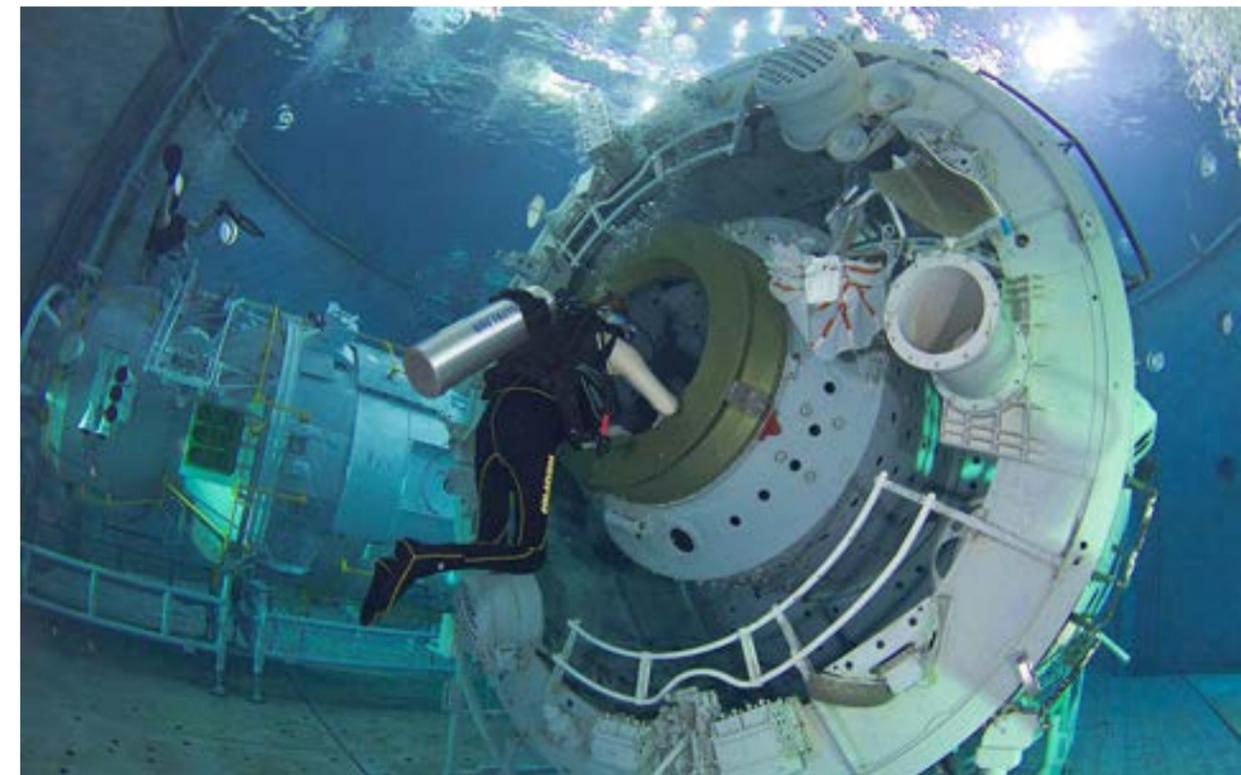
Stashevski, who personally observed the dives.

The famous Hydro Lab

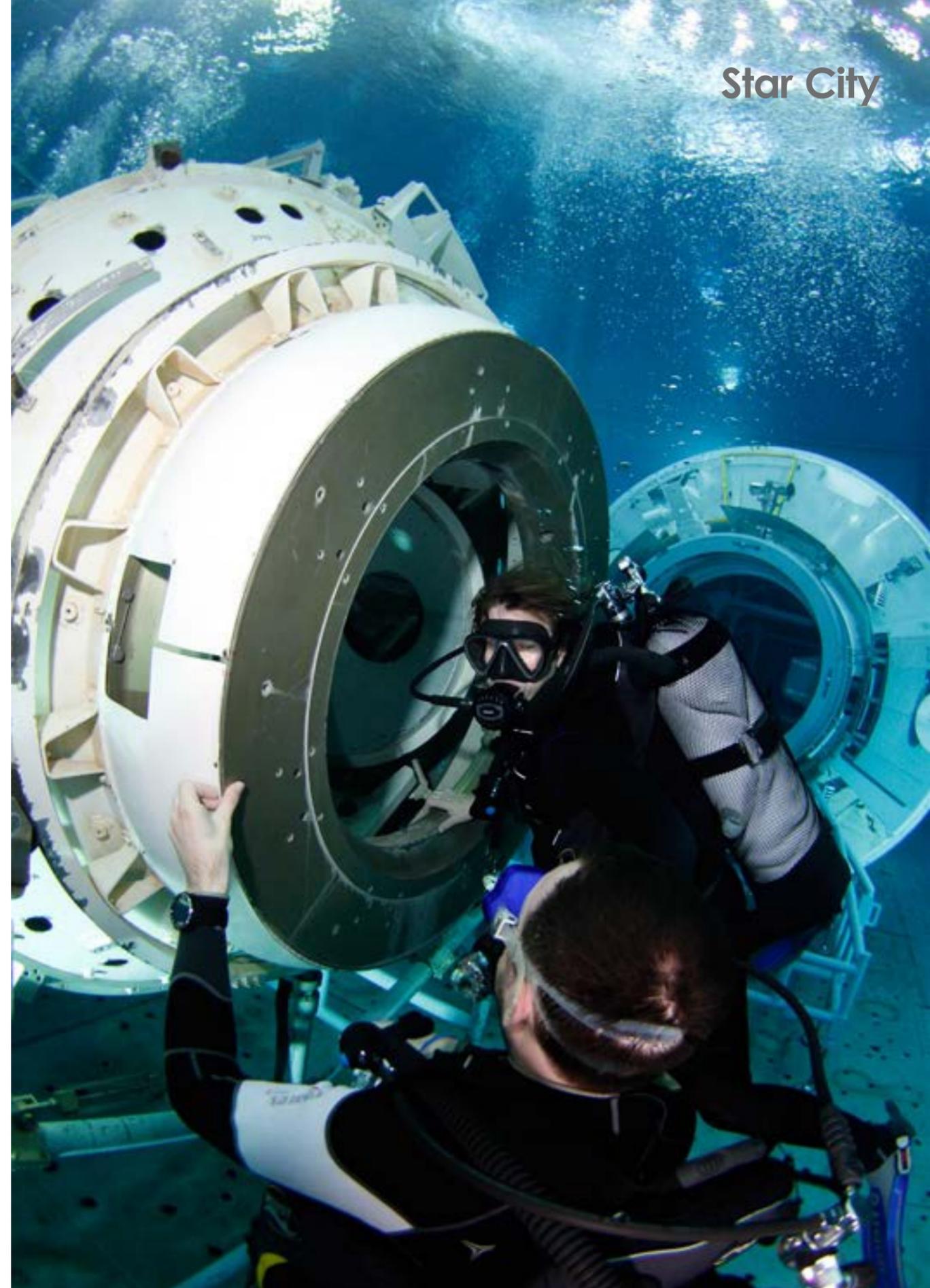
The Hydro Lab was commissioned in 1980. This unique structure, the central part of which is a cylindrical vessel (with a diameter of 23m, a height of

studies, ergonomic testing of objects of space technology, and simulating maintenance work performed by astronauts in outer space. The same building houses office space, technology systems, equipment and other means of cosmonaut training.

On the side of the cylindrical surface



With the help of instructors and assistants, divers of IAHD Adriatic enter the Hydro Lab at Star City



of the pool are 45 windows through which one can take photos and shoot video, watch and monitor the activities of the astronauts in the pool. The

hydrolaboratory is equipped with a set of experimental facilities (the overall layout of modules) that can be placed on a moving platform and lowered

down into the hydropool for training. All experimental settings are done in full size with full volume simulation of internal and external contours of the structure. (See: www.gctc.ru)

Itinerary for the visit

The delegation from IAHD Adriatic had less than four days in Moscow to complete the entire event.

On April 27, the delegation arrived in Moscow. They participated in the International specialised exhibit and congress "Integration. Life. Society", on the employment and benefits of disabled scuba diving, including a round table discussion on "The Road to Paradiving" (we use this word in Russia for 'disabled diving'). In the evening, the participants attended the ballet *Spartacus* at the Bolshoi Theater and then enjoyed a tour of the Moscow subway.

On April 28, the delegation met at Star City. The first event of the day was immersion and diving in the Hydro Lab,



THIS PAGE: Disabled divers from Croatia, Slovenia and Russia explore the various elements of the Hydro Lab





followed by a stunning tour of the training center, a visit to the museum in the House of Astronauts, and even the office of Yuri Gagarin, where astronauts have traditionally come before their flight. There was a meeting with the head of the Urban District Star City, Nikolai Rybkin, and a meeting with the cosmonaut commander and hero of Russia, Sergei Alexandrovich Volkov, and

specialists from the Department of Social Development Administration. In addition, there was a laying flowers at the monument of Yuri Gagarin, a promenade on the Walk of Heroes to the House of Astronauts, and the awarding of diplomas to participants by the head of the city district administration and the head of the city

Star City

chairs in churches) and toured Red Square. There was a reception at the Embassy of the Republic of Slovenia and a meeting with Mrs. Ada Filip Slivni, Ambassador of the Republic of Slovenia in the Russian Federation.

On April 30, the delegation had breakfast at the



district in Star City, Moscow region, for participation in the International Forum "Hydrospace without Barriers" program—"Social adaptation and rehabilitation of people with disabilities through scuba diving."

On April 29, the delegation toured the Kremlin (with stops to get wheel-

Embassy of the Republic of Croatia and a meeting with Igor Pokaz, Ambassador of the Republic of Croatia in the Russian Federation. Finally, the delegation got on their flight home to Ljubljana.

Barriers, the barriers...

There were stairs and steps everywhere in Russia—steps one does not notice until one starts thinking about disabilities, especially wheelchair users. The paraders

RIGHT: One of 45 windows around the lab through which observers can take photos and video



delegation was informed about this and prepared.

There were eight steps to the old entrance of the Moscow Hostel near metro station "Park Kultyri" where the delegation stayed (since the price was acceptable) and more at the entrance to the Hydro Lab pool, which was located on the third floor. There were ramps and lifts in underground passages; escalators in the subway; worn ancient steps on the entrance of the Cathedral of the Moscow Kremlin. The delegation had to overcome everything. However, they did manage to acquire the use of special buses with rising platforms provided by a partner—the Russian Union of Disabled Sports! In addition, the administration of the Bolshoi Theatre offered an "upgrade" of tickets to orchestra seats where wheelchairs were placed near the stage, right behind the orchestra.

Despite all obstacles, it was a chance to meet again with colleagues and friends, and added another link to the chain of international cooperation in paradiving.

The Star City event was organized by the Foundation supporting the Russian federal program "Dostypnaya Sreda" (Accessible Environment) (dsfond.ru) and the Russian Disabled Sports Association (Rssii) (sky-open.com). ■

Acknowledgements (in alphabetical order): Vladimir Ananyev, founder of the Foundation; Sergei Kovalev, excellent translator and expert on Moscow; Valery Nesmeyanov, head of the dive center SPACE DIVE; Nicholas Rybkin, head of the city district of Star City and specialist of the Department of Social Development District Administration; Valentine Stashevski, President of CRASA; and SUUNTO for support of the IAHD Adriatic delegation.

Divers from IAHD Adriatic pose for a group shot (top right) before exiting the Hydro Lab (above)

Diver poses with InVertum banner in Hydro Lab

Nancy Tilles



P O R T F O L I O



Nancy Tilles is an award-winning artist based in Florida who works in traditional oils, but captures on canvas a timeless vibrancy and immediacy in her underwater scenes, which highlight the diversity of marine life found on reefs but also their fragile nature. X-RAY MAG caught up with the artist to find out more about her work and artistic process, gaining insight into her experience of the underwater world.

Edited by Gunild Symes
Photos courtesy of Nancy Tilles

X-RAY MAG: Tell us about your background and how you developed your artistic process.

NT: I have always identified myself as an artist. I grew up in New York and moved to Florida when my husband and I were married. In 1977, I received my Bachelor of Arts degree from the University of Miami with a focus on printmaking. About 14 years ago, I began painting in oils. I love biology and had originally wanted to pursue a career in medical illustration. I suppose that is why my subject

matter is the natural world. My style has been described as "painterly realism" because brushstrokes are evident and my subject matter is represented realistically. Tropical South Florida has been my home for most of my life, and I have been greatly influenced by all the rich colors that surround me.

While working on underwater scenes, I realized that one painting seemed to continue to the next painting. I began pursuing this method deliberately, and I now have multiple series of connected paintings called diptychs and triptychs. Original paintings are sold together, as one unit. Signed and numbered giclees can also be purchased individually.

X-RAY MAG: What is your artistic mission or vision?

NT: My artistic mission is a journey and has been evolving over the years. Originally, I wanted to be a portrait artist. I wanted to create emotionally stirring representations of people. The more I painted, the more important color relationships became to me. I continued to devote myself to the individual and expanded to include sea life.

When I began painting underwater scenes, I would carefully render each creature. The personalities of the creatures were evident and influenced me to create visual stories,

Sea eEscape I and II Diptych by Nancy Tilles. Oil on canvas. Each panel is 48x36 inches (122x91.5cm)

PREVIOUS PAGE:
Fantastic Journey I, II and III Triptych, by Nancy Tilles. Oil on canvas. Each panel is 36x48 inches (91.5x122cm)



which became my diptychs and triptychs. Before completing any design, I critique my painting to make sure it is filled with vibrant light that can only be achieved with intense color relationships.

X-RAY MAG: What about the sea and its creatures inspires you?

NT: Another world exists under the sea. It is one of our most important resources. In addition to being beautiful and amazing, it provides our planet with its primary source of food. As an artist, I can help to keep the public aware of its wonder. At the very least, I can keep the conversation going.

I am so inspired by the colors. Sunlight through the water creates the most amazing

patterns of light on the reefs and the creatures who survive on them.

X-RAY MAG: Tell us about your experience in the underwater world, scuba diving or snorkeling. How and why did you start diving/snorkeling?

NT: My first experience with snorkeling was

about 18 years ago in the Florida Keys. The reefs were pristine, and the water was clear and gorgeous. I remembered how beautiful it was but did not go back until 2005 when waterproof cases became available for digital cameras. My family and I began making multiple snorkeling trips to Key Largo every year after that.

Sea eEscape III and IV Diptych, by Nancy Tilles
Oil on canvas. Left canvas 36x30 inches (91.5x76cm); right canvas 48x36 inches (122x91.5cm)



Lion Fish
by Nancy Tilles
Oil on canvas
20x16 inches
(51x41cm)

Marlin Frenzy
by Nancy Tilles
Oil on canvas
48x48 inches
(122x122cm)

*Leopard Shark
and Jellyfish*
by Nancy Tilles
Oil on canvas
20x16 inches
(51x41cm)



X-RAY MAG: What are your favorite dive sites, underwater subjects, locations?

NT: I have been fortunate enough to live only a few hours drive from the Florida Keys where some of the most beautiful snorkeling sites exist. I have also visited some of the islands in the Caribbean. That is the extent of my experience with underwater locations. However, we have hopes to visit many more places soon.

X-RAY MAG: Tell us about your paintings... how are they made? Please describe what is unique about your method or concept. How do you compile your underwater scenes? What informs your art?

NT: Inspiration for my paintings usually come from photographs that I have taken. I include all the primary and secondary colors in my palette, and I work to incorporate them in my painting so

that the colors are bright, pleasing and balanced. I am satisfied with my paintings only when the colors sing to me.

I use the Canon Powershot D10 underwater camera. I have had it several years, and it has always taken clear reliable shots.

Parrot fish, angelfish, seahorses, blue tang, yellow tail and many other colorful fish from the reefs fill my paintings. I have also painted deep sea creatures such as dolphin, marlin, mahi mahi and



sailfish. But my most loved paintings seem to be of turtles.

X-RAY MAG: How does your art relate to conservation or environmental issues facing our oceans and reefs?

NT: Since my first experience snorkeling, there has been an unfortunate decrease in the health of the Florida Key reefs. Under-

water parks, which were once bedazzling in color, have become grey with exposed rock. It seems to be a result of the rising temperature of the water, overuse of septic tanks and other reasons that are not completely understood.

There are many conservation efforts along the coast of the United States and their efforts seem to be having a positive effect on the turtle population. The Loggerhead

Marine Center is located just a few miles from me in Jupiter, Florida, and I have taken pictures of their rescue turtles from all different angles and used them as models in my paintings.

Living in South Florida, I have found that people are particularly fond of turtles, especially loggerheads. Turtles live almost 100 years. They are slow on land and fly through water. They are considered to be wise and

peaceful. With these traits they came to symbolize longevity, determination, wisdom and peace.

X-RAY MAG: Why art? Why is art important? What are the challenges and benefits of being an artist today?

NT: Art and design are everywhere. A good design eliminates confusion, brings beauty

Sea Food Chain I, II and III Triptych, by Nancy Tilles
Oil on canvas. Each panel is 36x48 inches (91.5x122cm)



and simplicity to our lives. Art inspires us in every way and encourages us to be inventive. Art can bring people to destinations and creates cultural excitement. For me, it is my own personal journey.

As a young person, I believed that I would never be able to earn a living making art, so I became a commercial artist to ensure that I would be paid. I could not imagine how I would be able to market my work. How

would people find me? When I finally began showing my work at art festivals, I realized that I was wrong. People crave art, and they are willing to pay for it.

Today, the Internet has enabled every artist to show and market their work in unique ways. Artists in one country can reach buyers in another country. It has made the world a smaller place.

X-RAY MAG: What's next? New? Upcoming?

NT: I am working on another triptych of colorful reef fish. This painting will be very decorative. I am contemplating a more abstract direction with a concentration on color.

I enjoy exhibiting my work at art festivals where I can meet people and exchange ideas. I have appeared in festivals through-

out Florida including Naples, Stuart, Jupiter, West Palm Beach, Delray Beach, Fort Lauderdale, Miami and the Florida Keys.

You can view my work at www.nancytilles.com, email me at nancy@nancytilles.com or come to South Florida and visit me in person at one of the upcoming art festivals. ■

Sail Fish Plunders Baitball I, II and III Triptych, by Nancy Tilles. Oil on canvas. Each panel is 36x48 inches (91.5x122cm)