



GLOBAL EDITION
May 2013
Number 54

British Columbia
Southern Gulf Islands

New Zealand
Lermontov Wreck

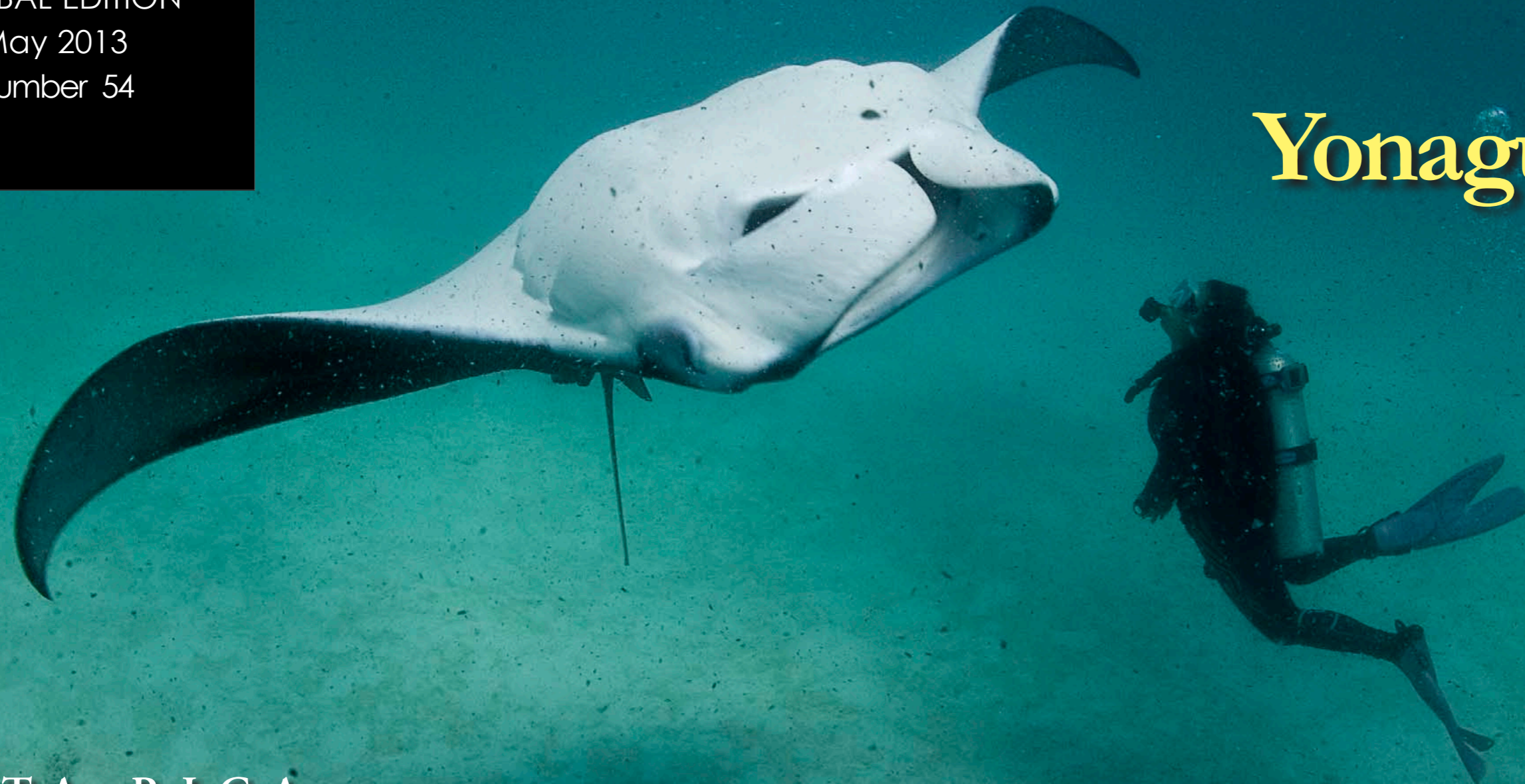
Japan
Yonaguni Jima

Finland
Ojamo Mine

Seals of
Farne Islands

Expedition
The Maldives

COSTA RICA
Cocos Island



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Photo by Michael Aw

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Rec-tekkies

— The Advent of a New Diving Middle-Class

Some 1½ years ago, on 31 Dec 2011 to be exact, I participated in a New Year's dive event at one of the nearby beaches. It was a fine day—frosty, theatrically misty and perfectly still, with the surface being smooth as a mirror.

The location was rather shallow and sheltered and was a popular site for basic training. Looking around me at the odd 50 divers gathered for the last dive of the year, I saw twin-tanks, sidemounts, big dive-lights with canisters and Goodman handles. At first, I almost giggled because everyone was surely overdressed for the occasion—I don't think it was possible to deeper than seven meters. At a glance, it just looked rather silly, like they were showing off.

But then I realised that I was *also* diving a twin tank, twin regulators and all the rest of my usual kit. And why not? All my 'usual stuff' is what I am comfortable with and routinely use. I know where everything is, everything is adjusted, balanced and weighted just to my comfort. It is also the exact same gear that I can use for deeper and more demanding dives, on which I have also received some of my advanced training.

I do not consider myself a technical diver, and I will probably never venture very far into this realm because my

personal interests lay more in the areas of photography and ecology. But the training I have undertaken over the years has provided me with skills, experience and confidence to conduct challenging dives and to handle various scenarios.

Together with having good equipment this instills in me both a sense of confidence and calmness, which ultimately translates into pleasure and ability to immerse myself into the sense of adventure and exploration of which all dives have some element—even those I have done many times before.

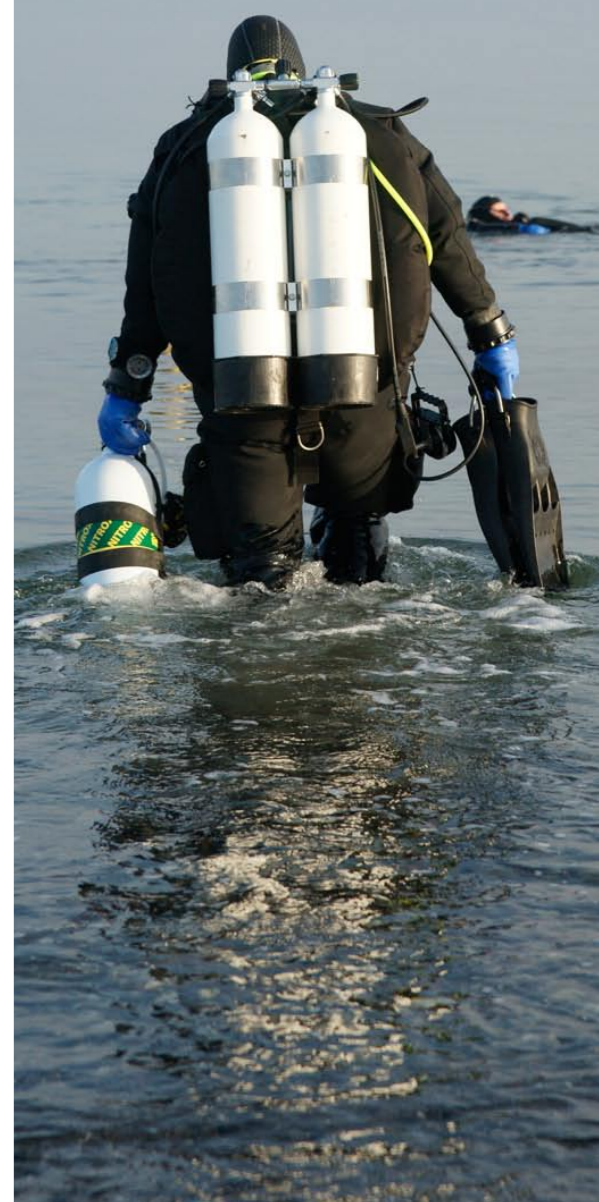
That event also made me realise how the advent of 'recreational tech' in the recent years quite evidently has been both softening and bridging the once significant gap between recreational and technical diving.

As such, I also suspect and hope that it represents a new opportunity for the dive industry to once more inject a sense of adventure and achievement into diving—two important elements that have been somewhat diluted since diving was made immediately accessible to almost everyone and presumably made it a less coveted activity.

This is a development this magazine both welcomes and supports. This is not to say that

technical diving is for everybody, because it isn't, and most of us probably shouldn't go there. But we should all take notice of the lessons learned from tech and, where we can, adapt and use the techniques and new gear to make all of our dives safer and more rewarding.

—The X-RAY MAG Team



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News edited
by Peter Symes

from the deep
NEWS

The coral bots are coming



Underwater robots tasked with saving coral reefs are being developed at Heriot-Watt University in Scotland.

Corals are delicate structures that are easily damaged by pollution and destructive fishing practices,

and it takes decades for them to re-grow. When they get damaged, divers can sometimes be deployed to re-plant broken fragments, helping

them re-grow. But this is very time consuming and mostly conducted by volunteers. Also this method is restricted to

shallow depths and is not applicable to deep water corals. Coralbots on the other hand will be a lot more efficient, able to repair the reefs in days or weeks, but as so often before, funding has been a challenge. Therefore, the team of scientists behind the coral bot are now turning to the crowd-sourcing website

Kickstarter to raise funds, hoping to raise GB£70,000 (US\$107,000) before June.

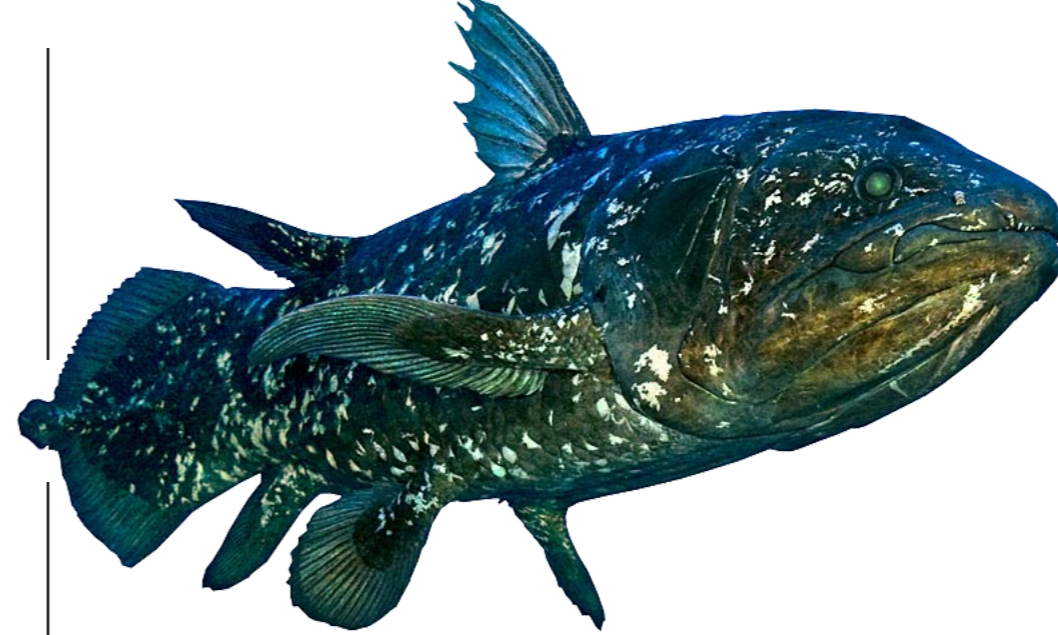
Tested technology

The robots have already been tested at sea, but the team is keen to move to the next stage—giving them computer vision to "see" healthy bits of coral and design arms to pick up and put down the pieces in the right places.

"Kickstarter funds will let us purchase and assemble this kit, and allow us to conduct our first live demonstration of the robot team on a coral reef in a public aquarium," said marine biologist and Coralbot team member Lea-Anne Henry. "This will provide a conservation solution that paves the way for coral reef restoration across the globe."

The team has developed several different coralbot models, but plans to work with one dubbed, Nessie. ■

► **Coralbots on Kickstarter**



Unravelling the Coelacanth

Scientists have decoded the DNA of the celebrated "living fossil" fish, gaining new insights into how today's mammals, amphibians, reptiles and birds evolved from a fish ancestor.

Coelacanths were thought to have gone extinct in the Late Cretaceous some 70 million years ago, but were rediscovered in 1938 when a live specimen was found off the east coast of South Africa. In 1999, a second extant species was described from Manado, North Sulawesi, Indonesia.

Analysis shows its genes have been remarkably slow to change, an international team of researchers reported in the journal *Nature*. Like lungfish, the other surviving lineage of lobe-finned fishes, coelacanths are actually more closely related to humans and other mammals than to ray-finned fishes such as tuna and trout. Ancient lobe fins were the first vertebrates to brave the land, and the coelacanth genome is expected to reveal much about the origins of tetrapods, the evolutionary line that gave rise to amphibians, reptiles, birds and mammals, says lead author Chris Amemiya, a biologist at the University of Washington in Seattle.

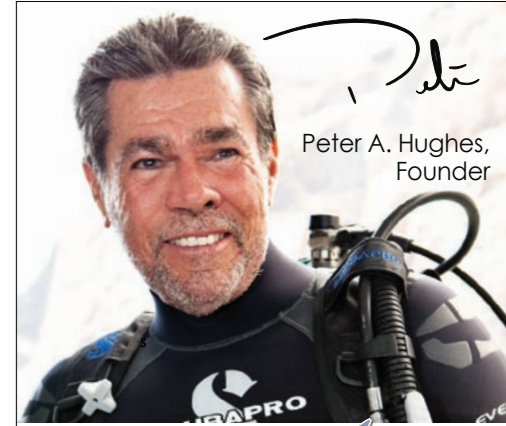
Gombassa Project

As of this issue goes to press a 40-day expedition named Gombessa Project after the coelacanth's local name is under way. The expedition, which is led by French marine biologist Laurent Ballesta and sponsored by Swiss dive-watch maker Blancpain.

Close encounters

The coelacanth is quite rare; living more than 100m down, it is a hard creature to study. The Gombessa expedition, which is the result of two years' scientific research, logistical and human preparations, will enable observations and scientific experiments to be carried out in contact with a living coelacanth.

In order to make direct contact with this enigmatic creature, Ballesta and his team of divers have to perform daily deep water dives to Jesser Canyon caves, 120 metres below the surface entailing long hours of decompression. ■



Peter A. Hughes,
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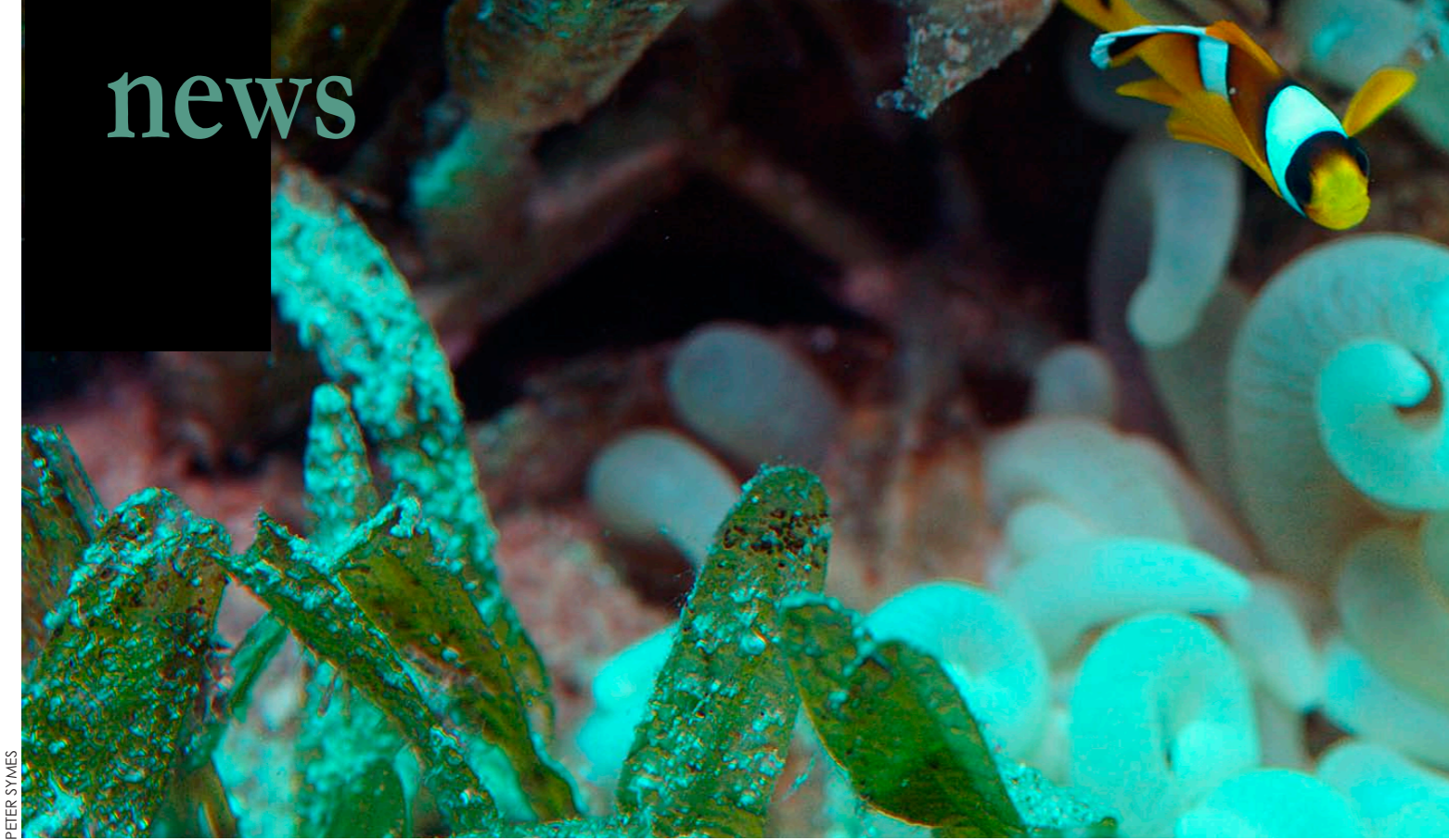
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PETER SYMES

Seagrasses may reduce the acidity of water around reefs, protecting them from erosion

Seagrasses reduce seawater acidity

Seagrasses may reduce the acidity of water around reefs, protecting them from erosion.

Research headed by Dr Richard Unsworth a Swansea University marine biologist has found varieties of seagrass that can photosynthesise carbon dioxide so quickly and efficiently that they actually turn the surrounding water more alkaline.

Within many shallow fringing reef-flat environments, corals are commonly found in close association with seagrasses, either as isolated colonies, or forming a gradient of habitat from reef to seagrass.

For seagrass to offset ocean acidification and increase the calcification rates of nearby corals, seagrass meadows must be in a state of net autotrophy—that is, photosynthetic utilization of dissolved inorganic carbon (DIC) exceeds respiration rates, not just in the seagrass plants, but in their

benthic and epiphytic faunal communities.

Increasing water depth and mixing rates will serve to reduce the impact of net seagrass DIC uptake suggesting that seagrass meadows where water is shallow and water movement is reduced may have a higher capacity to alter seawater carbonate chemistry.

Although there are many tropical reef systems adjacent to productive seagrass meadows where this concept has the potential to offer a novel future tool for marine park management in a high CO₂ world, it is unlikely that such a premise is applicable uniformly. The applicability of this will depend upon local physical conditions, as well as the spatial configuration of habitats, and the factors that influence their productivity.

The requirement to conserve seagrass meadows is commonly overlooked by the need to put meagre resources into charismatic habitats such as coral reefs. However, seagrass meadows not only provide ecological functions of nursery refugia for coral reef fauna, they also provide an environment potentially beneficial for calcifying fauna, a role that is likely to increase in the future. This investigation suggests that coral calcification in the presence of seagrass could be 18 percent greater than without seagrass. The study also provides evidence that coral reef managers should consider seagrass conservation as a means of providing resilience to coral reef biodiversity, productivity and function. ■

SOURCE: RICHARD K F UNSWORTH ET AL 2012 ENVIRON. RES. LETT. 7 024026 DOI:10.1088/1748-9326/7/2/024026

Remote reef underwent fast recovery from bleaching event

Isolated coral reefs can recover from catastrophic damage as effectively as those with nearby undisturbed neighbours.

Australia's largest oceanic reef system, Scott Reef—a remote coral system in the Indian Ocean—has largely recovered from a catastrophic mass bleaching event in 1998, according to the study just published in *Science*.

Coral reef recovery from major disturbance is hypothesized to depend on the arrival of propagules from nearby undisturbed reefs. Therefore, reefs isolated by distance or current patterns are thought to be highly vulnerable to catastrophic disturbance.

Spanning 15 years, data col-

lected and analysed by the researchers shows how after the 1998 mass bleaching the few remaining corals provided low numbers of recruits (new corals) for Scott Reef. On that basis, recovery was projected to take decades, yet within 12 years the cover and diversity of corals had recovered to levels similar to those seen pre-bleaching.

The initial increase in coral cover was the result of high rates of growth and survival of remnant colonies, followed by a rapid increase in juvenile recruitment as colonies matured. ■

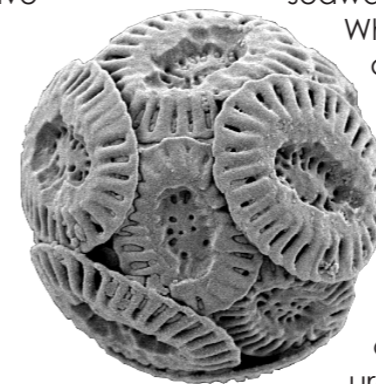
Resilience to ocean acidification found in microscopic plants

One species of a tiny single celled marine coccolithophore actually had bigger shells in high carbon dioxide seawater conditions.

A group of marine scientists led by U.S. University of California-Santa Barbara professor Debora Iglesias-Rodriguez has found a point of resilience in a microscopic shelled plant with a massive environmental impact, which suggests the future of ocean life may not be so bleak. "The story years ago was that ocean acidification was going to be bad, really bad for calcifiers," said Iglesias-Rodriguez, whose team discovered that one species of

the tiny single-celled marine coccolithophore, *Emiliania huxleyi*, actually had bigger shells in high carbon dioxide seawater conditions.

While the team acknowledges that calcification tends to decline with acidification, "we now know that there are variable responses in sea corals, in sea urchins, in all shelled organisms that we find in the sea". ■



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Protect mangrove and curb CO₂



Protecting mangroves to lock carbon away may be an economic way to curb climate change.

Dr Juha Siikamaki of the think tank Resources for the Future and his U.S. colleagues have shown that protecting mangroves and thereby reducing the amount of CO₂ released may be an affordable way for countries to mitigate their carbon emissions.

The research, which used new high resolution surveys of global mangrove biomass, suggests that protecting these habitats could be a viable means for reducing emissions

in comparison to other "carbon offset" methods.

Added benefits

"The bonus is that in doing so, we can preserve important habitats critical to coastal fisheries, rich in biodiversity, and home to hundreds of species of plants and animals, many of them endangered," co-author Professor James Sanchirico from the University of California, Davis said in a press statement. ■

Ghost crabs change camouflage from day to night

Scientists first suspected the crabs' unusual day to night colour change after noticing differences in images of them taken at different times.



In stead of reacting directly to ambient light, the crabs had a natural daily cycle of colour change in reaction to the colour of the surface they were on.

"This changes their camouflage so that they are very well camouflaged against the yellow sand during the day, and dark at night—we think to blend in with shadows on the beach," said Dr Martin Stevens, of the University of Cambridge.

"Individuals did not change colour when put into dark conditions, but they did become brighter when placed on a white versus a black substrate... Our findings show that ghost crabs have a circadian rhythm of colour change mediating camouflage, which is fine-tuned by adaptation to the background brightness," stated Stevens. ■

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South Africa designates Prince Edward Islands marine protected area

A biodiversity hotspot, sub-Antarctic islands are home to spectacular marine wildlife. South Africa has made marine conservation history by designating the Prince Edward Islands a Marine Protected Area (MPA). Consisting of Prince Edward and Marion Islands, the islands are situated approximately 2,000 kilometres south of South Africa in the Southern Ocean and encompass an area of 180,000 sq km. A biodiversity hotspot, the sub-Antarctic islands are a haven for spectacular marine wildlife including albatrosses, penguins, killer whales and Patagonian toothfish.



Unfortunately, the area's wildlife has been threatened due to illegal and unsustainable fishing practices. During

the late 1990s, Patagonian toothfish, also known as Chilean sea bass in northern markets, was subject to rampant poaching around the islands.

At 180,000 sq km, the new Prince Edward Islands Marine Protected Area is the first South African offshore MPA and one of the world's largest, significantly contributing to the protection of offshore and deep ocean areas.

Given the scarcity of landmasses in the Southern Ocean, the islands are home to vast numbers of seals and seabirds, which utilize them to breed and moult. The islands are critical to the conservation of such species, as they are forced to aggregate in high densities where they remain vulnerable to disturbance

and introduced predators or pathogens. The protected area will encompass a 12 nautical mile sanctuary (no take) zone; four restricted zones, in which

fishing is limited; and a controlled zone linking the four restricted areas. This zone is to be managed as a low impact zone that links the four zones spatially.

"This is a historic day for marine conservation in South Africa," said Dr Morné du Plessis, WWF-SA's Chief Executive. "This declaration demonstrates South Africa's new commitment to protecting the Prince Edward Islands, an important national heritage and a crown jewel of our oceans.

We praise the minister for her visionary leadership and commitment to securing

our marine biodiversity for future generations," he added. ■

Planned Kenyan whale shark 'enclosure' infuriates conservationists

Proposed scheme deemed 'flawed and misguided'.

A plan to capture whale sharks in Kenya so tourists can dive with them has infuriated conservationists. German dive instructor Volker Bassen, who runs a whale shark trust, wants to suspend 2,000ft-long nets off Kenya's Indian Ocean beaches. The enclosure would house two whale sharks, with visitors each paying GB£65 each to snorkel or dive with them.

However, group of conservationists and wildlife charities, including Britain's Born Free Foundation Britain, called Bassen's plans "flawed and deeply misguided" and have urged authorities in Kenya to stop it. Opponents deny Bassen's claims that whale sharks were increasingly endangered in East African waters, where their liver oil is used to seal fishing boats against rot.

"The conservation arguments for this project do not add up," said David Obura, Kenyan coordinator for regional

coastal research organization Cordio East Africa. "You cannot tell me that such a sensitive species, which is known to migrate more than 1,800 miles in a year and dive down to 3,200ft, can be happily confined to a shallow netted pond in the sea, with no possible escape from tourist stress, no ability to feed naturally, nor seek out the natural conditions that suit it at different times of the year, nor socialize," he added.

Situated south of Mombassa near the popular tourist beaches at Diani, the

enclosure would double as a marine rescue and rehabilitation centre. "This is not some hoodlum misthought project, my opponents are misinformed," stated Bassen. "We have been working on this for more than five years; it's a million-dollar investment, and we have the support of some of Kenya's leading conservationists."

In 2006, research by Bassen's East African Whale Shark Trust discovered 58 whale sharks off Kenya in a two-week period. However, the same study this

year identified only five of the sharks in a month of searching.

A portion of the proceeds would pay for local fishermen to process cashew nut shells into oil to be used to caulk their boats. "These beautiful animals are disappearing from our seas because of the demand for their liver oil. We must find an alternative," Bassen said. Final approval for the scheme is pending from Kenya's National Environmental Management Authority. ■

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THIS PAGE:
Divers explores the wreck of the *Lermontov*

Text and photos
by Kevin Davidson

Make way for the shoreline—the ship is taking on water and fast! Perhaps these were not the exact words used to describe the situation, but the sinking of the *MS Mikhail Lermontov* has now become one of the largest diveable wrecks in New Zealand for both recreational and technical divers.



Lermontov Wreck

The 155-meter-long *Mikhail Lermontov* was part of a fleet of five luxury liners named after famous Russian writers and was a regular cruise ship in New Zealand waters. On 16 February 1986, she left Picton accompanied by harbor master

Don Jamison. With the captain gone to his cabin and Jamison in charge, the harbor master took a course between the lighthouse and the end of Cape Jackson instead of clearing the rocky reef, which extended past Walker Rock and was

clearly shown on the charts.

The vessel was drawing about 27 feet. Captain Jamison claimed his understanding of the depth in the channel to be 35 to 40 feet. However, it would have been a very foolhardy course to take for anyone



Forests of kelp thrive along the hull of the *Lermontov* wreck (right); Diver (below) explores interior of *Lermontov*; Divers find abundant coral growth on the wreck (far right)



aware of the presence of the rocks. At about 5:37 PM, there was a thud, and the ship started to list, as water flooded through a 40-foot-long gash in the hull, entering three water-tight bulkheads. In the meantime, an announcement was made that dinner would be delayed, and the wine tasting session that was in progress would be extended. But the wine tasting stopped when the ship tipped over far enough to send glasses sliding off tables.

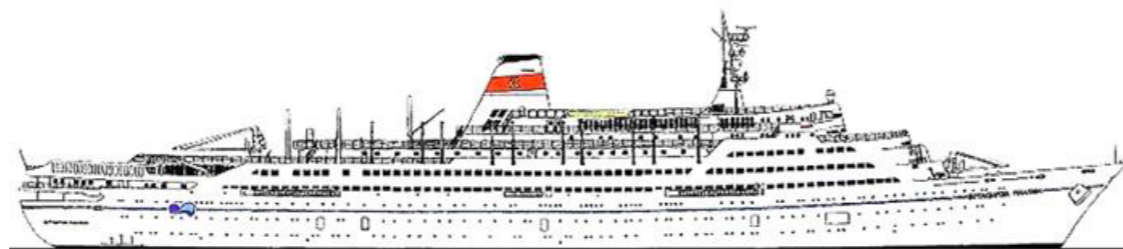
The loud noises that emanated from the *Lermontov* would haunt passengers forever, as the vessel sank. Items on deck rocketed to the surface, into the air and came down, causing a cacophony of violent sounds. Huge bubbles soared from

the surface adding to the deafening noises the *Lermontov* made while sinking.

Diving the wreck

How can one individual's mistake be a diver's delight? The answer: have an unfortunate accident resulting in one of the largest and most easily accessible wrecks at rest in only 36 meters of water. With diving depths starting in as little as 12 meters, the *Lermontov* wreck is suitable for both recreational and technical divers.

Our team of GUE divers were able to utilize all our skills to safely penetrate this wreck and photograph some of the more interesting artifacts. The GUE (Global Underwater Explorer) diver program teaches a



The MS Mikhail Lermontov



wreck rap



Beer cans with visible labels rest in a pile on the wreck



diver to refine their buoyancy skills, work as a team and get the most from wreck penetration or cave diving.

As a 24-year veteran of underwater photography, GUE skills have helped me get the most from the challenge of photographing shipwrecks. I highly recommend looking into this style of training for a diver looking to get better quality out of their diving, especially with respect to wreck and cave diving.

The *Lermontov* wreck

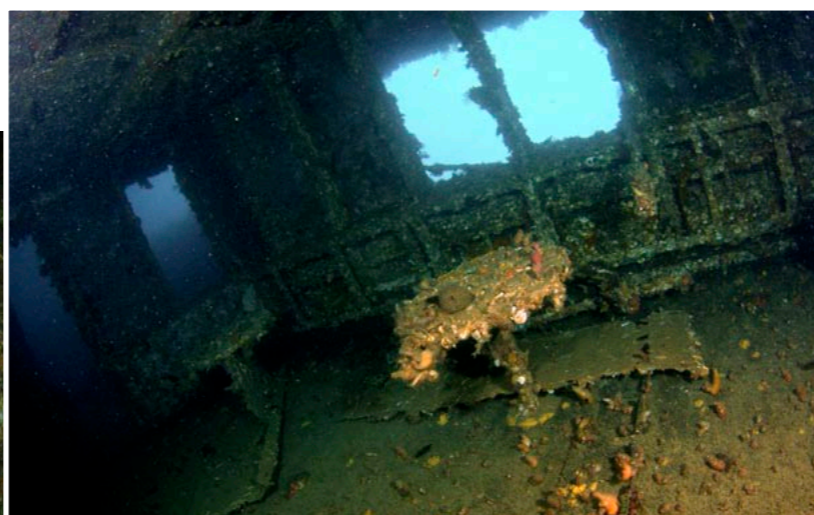
The vessel rests on her starboard side in the Marlborough Sound near Picton,

where water temperatures hover around 15°C. After 25 years on the seabed, a forest of kelp thrives along the hull and provides shelter for smaller fish life.

A drysuit is the best way to explore the *Lermontov* comfortably. After ten days of diving, it seemed I had only just scratched the surface in the exploration of the wreck. I found myself



Lermontov



THIS PAGE: Scenes from diving the *Lermontov*

A favorite panorama was the pool and skylights overhead. However, picture if you can, this gigantic room with a pool inside, now turned on its edge. The large frames from the skylights with a few glass windows still in place caused ambient light to pierce within. A stool bolted down next to the bar poked out from the side of the ship due to its 90-degree angle. Nearby, in a store room, beer cans had tumbled out in a pile, their labels still identifiable.

Even the best divers will create a certain amount of silt, so I moved my way through the gloaming using my "modified frog kick" (my favorite) hoping that I was the first to arrive, taking pictures carefully before my bubbles caused a change in visibility.

Moving along a companion way, I passed too quickly by the remains of various books from the library. I deftly employed a helicopter kick and came back upon them, photographed them in situ and refrained from moving them to

going back to familiar areas in order to get better images of the more identifiable areas within the ship.

Piles of foam backing from chairs was visible in the movie theater along with a set of stage lights. Visibility ranged from ten to 30 meters and changed throughout the day. The bow and stern had different levels of visibility, all within the same dive. Since my passion is photography, I prefer to get the best possible quality in my photos rather than try to see the whole ship.



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create better images. All the fabric and wood of the interior had caused decay, and the gentlest touch caused a good image to go bad, so I moved on in search of fertile grounds.

During a dive, I turned my focus to the exterior of the *Lermontov* and found the lines across the deck looked nice and allowed easy access around the super-

structure. A companion way ran along part of the ship, and I enjoyed the natural light images I saw.

Towards the bow, I looked up as my partner looked down upon the circular radar antennas, giving me a beautiful silhouette image. Poking its way out into the blue, the visibility also allowed a clear view of a mast suspended in



Marlborough Sound near Picton

Lermontov

operates Go Dive Marlborough Lodge and has made hundreds of dives on the *Lermontov* and the surrounding area.

After getting used to my first trip in a drysuit, I found the *Lermontov* to be an excellent location for photography and enjoyed a new challenge in my diving experiences. ■

Kevin Davidson is a widely published underwater photographer and dive writer based in Guam. For more information, visit: Kevindavidsonphotography.com



the water column.

The cooler waters were home to various forms of algae and cup corals that mix in with the kelp beds along the ship's exterior. I did, however, love finding great images on the deck areas where divers could get close. The prop was also easy to view. Divers can get the feeling of just how big a cruise ship really is. Occasionally, when navigating around a ship during a dive, it's easy to lose track of the immensity of these great hulks of metal until you try to swim from one end to the other.

Another dive was reserved for

the pilot house. It's a tight fit, but divers can pass from top to bottom and see the equipment used to steer the massive ship to its next location. The viewing windows allowed entrance through the port side.

Twenty-five years is still young for a shipwreck, so it was interesting to be able to see the ship's machinery with such detail. It almost appeared as if you could turn a switch and start an engine or generator.

The engine room became a favorite place for the team to visit, and I patiently waited for my chance to have a look. As one might imagine, the engine room in a vessel this size is a large and spacious place. But in near black out conditions, it's hard to take it all in. I was able to get an image of part of the engines. Knobs switches and levers adorned the walls causing one to want to go try them all to see if they work.

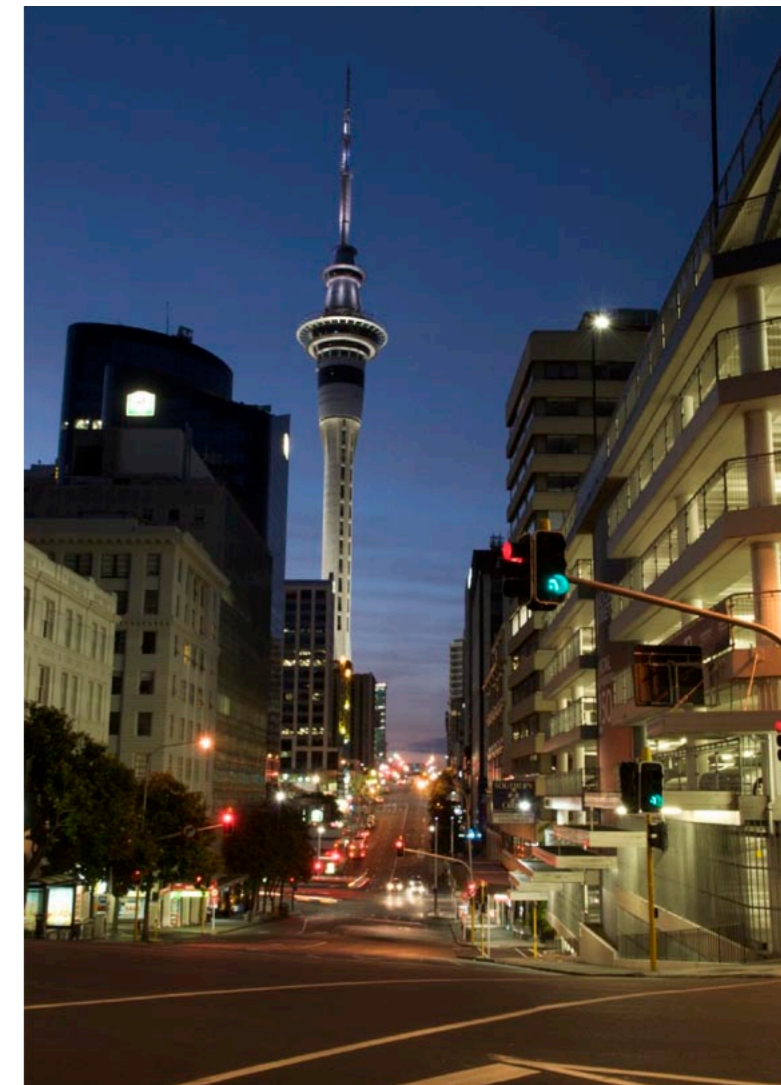
Afterthoughts

Overall the *Mikhail Lermontov* is an exciting wreck, and I highly recommend it as a must-see for

the serious diver.

Our stay in Marlborough allowed us the luxury of dining on a true marine delicacy. The shallow beach is home to scallops and sea urchins, both of which I enjoyed eating raw right from the hell. A 20-minute dive fetched us our limit of scallops and sea urchins, and we found ourselves in heaven, as we indulged in them.

Our guide for the week operated a live-on-shore dive lodge only a five-minute boat ride from the wreck. It's a fabulous way to get quick access to the *Lermontov*, and there are other fun dives along the reef within the sound. Brent Mcfadden



Auckland at night (above); Really fresh shellfish (center); Diver on wreck of the *Lermontov* (far left)



LIM HANSSON, SJÖHISTORISKA MUSEET (MARITIME MUSEUM, STOCKHOLM, SWEDEN)

Mystery wreck surfaces inside Stockholm

Two wrecks dating from the 17th century have been located just off Kastellholmen, a small island in the centre of Stockholm.

One of the wrecks had been sighted before, but the other one came as a complete surprise. "We believe it is a Danish warship," said Andreas Olsson, head of the Maritime Museum's archaeological unit. The bottom around Skeppsholmen and Kastellholmen in Stockholm seems littered with a large number of wrecks dating from the era when Sweden was a major military power. And it is also where the two wrecks of warships were found.

According to Olsson, the wrecks are probably those of warships from the 1600s, which were taken by the Swedish navy as prizes following a battle at sea.

"They brought them home, used them for a while and then scuttled them on this location. We believe one of the wrecks to be that of a Danish ship. The other one we already knew of so this new wreck only adds to the fun," said Olsson.

They literally just showed up recently due to an unusually low waterlevel in Saltsjön; it is currently at its lowest level since the 1940s, when the first vessel was last observed.

In the coming days, the Maritime Museum's experts will take samples and perform dendrochronology to establish when and where the wood in the wrecks originated.

Olsson, who has already been in contact with Danish colleagues, believes the wrecks are the remains of the *Grå Ulven* (Gray Wolf) and *Den Store Drage* (The Great Dragon), which were known to be in the area.

"We do not know for certain that these are indeed the vessels in question, but we do know that these wrecks should be located in this area," said Olsson. "If you go to the Armory, you can see the old banners and other artefacts captured from foreign armed forces, but so much more was sacked, and some of it lies here." ■

Another German WWII found off Norway

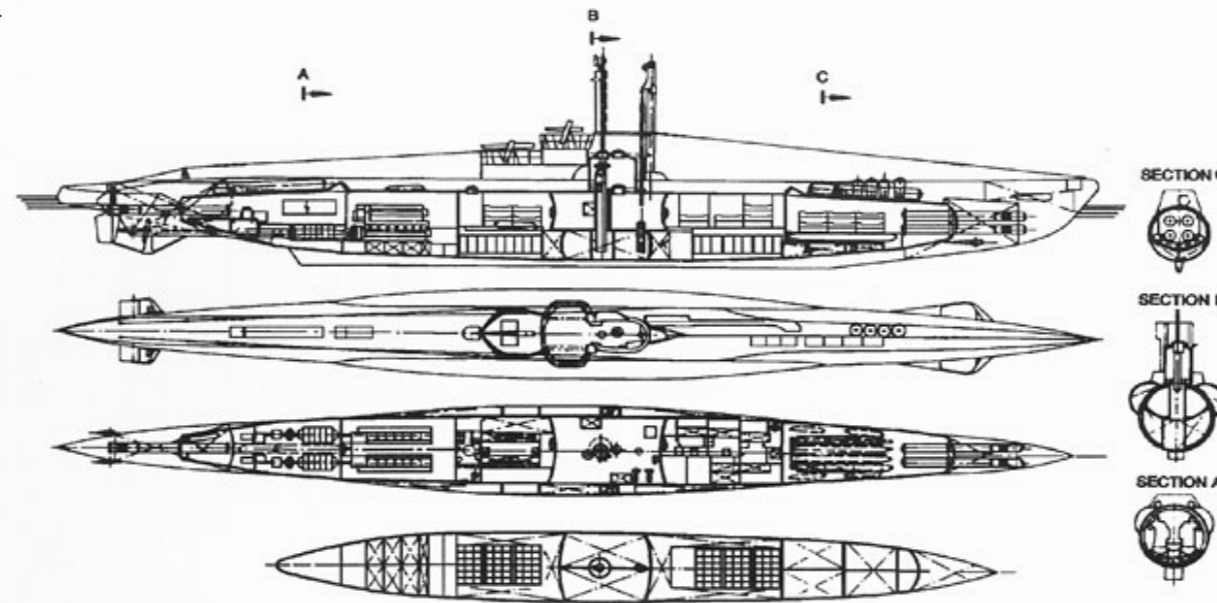
The *U-486* was torpedoed and broken in two by a British submarine in April 1945 shortly after leaving the western Norwegian town of Bergen. There were no survivors.

The oil company Statoil was working on a pipeline off the coast of Norway when they came across the remains of the sunken submarine.

The boat began training on March 22 with the 5th U-boat Flotilla but moved on to the 11th flotilla for operations. She was one of nine Type VIIIs that the Kriegsmarine fitted with an experimental synthetic rubber skin of anechoic tiles known as Alberich, which

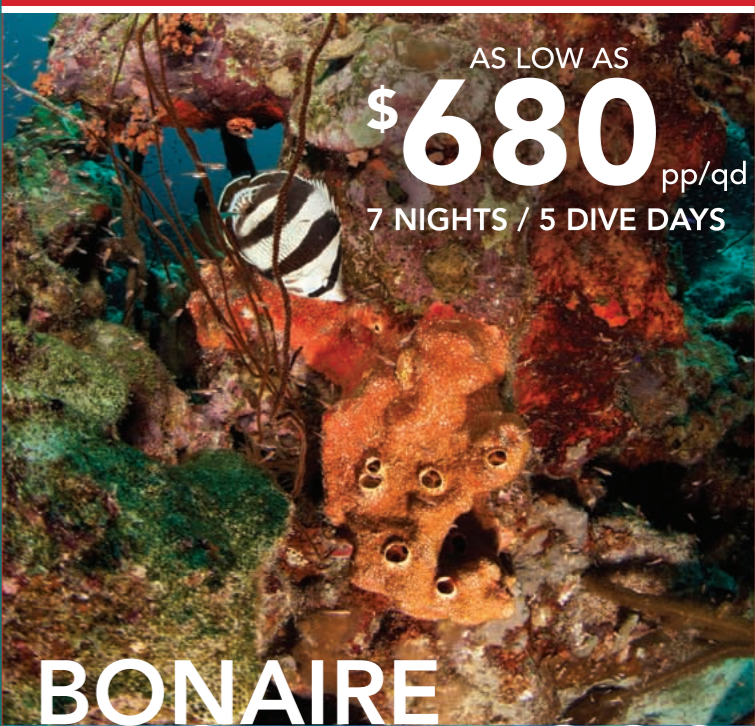
had been designed to counter the Allies' asdic/sonar devices.

Arild Maroey Hansen of the Bergen Maritime Museum told Norwegian radio station NRK, that the potential presence of fuel oil and unexploded torpedoes on the recently found submarine could pose a similar problem, while also raising the possibility of other sunken vessels that have yet to be found in nearby waters. ■



Generic drawing of a the German Type VIIIC uboat

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Plymouth Solstice

Got plans to celebrate this year's midsummer eve yet? Why not head for historic Plymouth and join in the fun at the Scuba Solstice. It is being held from Friday 21st – Sunday 23rd June 2013 at the Mount Batten Watersports Centre, Plymstock.

It is no surprise Plymouth has traditionally been a haven for the sports diver—the city boasts a number of dive centres. The area has some of the best diving in the United Kingdom, with sites ranging from shallow scenic reefs to the deeper technical wrecks. The *James Egan Layne* (a large liberty ship sunk in WWII by a torpedo) and *HMS Scylla* (Europe's first purpose sunk wreck) have been many a diver's first sea dive, and they are popular with seasoned veterans, too.

Scuba Solstice tickets will be going on sale shortly and will include all facilities at the Mount Batten Centre (car parking, showers, changing rooms, toilets, bar), live music, disco, a Plymouth Scuba Solstice t-shirt and food over the three-day event.

During the festival, charter boats will run from the Mount Batten pontoon. To secure your space, simply prebook your dive(s) via the website when you book your Scuba Solstice ticket. ■

► www.scubasolstice.com

Diving Pioneers headline TEKCamp 2013

It is hard to imagine but this year will be the third TEKCamp. This inspiring event is organised by and held at Vobster Quay in Somerset, England. (Monday 8 – Friday 12 July).

Winner of the prestigious Innovation Award at EUROTEK.2012, TEKCamp gives divers of all levels the opportunity to take their diving further via an intense week of workshops and lectures under the direct guidance of some of the tech diving industry's leading instructors and pioneers. In the last two years it has helped many divers—including dive professionals—achieve their diving ambitions.

Whether you're a recreational diver looking to 'go tech', or a technical diver who wants to broaden your diving horizons, TEKCamp is for you. TEKCamp provides a unique mentoring program that allows you to develop at your own pace. You don't need to be an "ardent, dyed-in-the-wool hardcore techie" to join in—just a temperate water diver who wants to get more out of your diving.

Big name guests

Some of the biggest names in technical diving will be attending the event including Lamar Hires, Mark Powell, Martin Robson, Phil Short, Rick Stanton MBE, Paul Toomer and Rick Walker, giving divers unrivalled access to top drawer training with most of the major tech diving agencies. It is little wonder that TEKCampees have travelled from Ireland, the

Netherlands and Germany to take part in this incredible event.

Many divers attend because they are thinking of beginning their transition into more technical diving. However, this is also the perfect event for divers to get a reality check on their current skills set and step up their game. During the week there are plenty of opportunities to attending workshops in sidemount diving, line laying, failure drills, ascents, rebreathers, DPVs and much more besides—if it's in the technical diving arena, it's at TEKCamp!

Equipment prizes

In addition, the ever popular raffle prize draw returns with some fabulous high-value equipment up for grabs, courtesy of Apeks, Hollis, BTS and Light For Me. The final night of TEKCamp will wrap up with a full-on Grand Cayman themed party—you'll get to kick back and share some diving stories over a glass of rum as you rub shoulders with diving gods!

If you have not booked your TEKCamp tickets yet then don't fret—there's still time! Two packages are available: a standard ticket and a 'deluxe' ticket for those of you who are particularly keen.

For further information log onto www.tekcamp.co.uk today—but don't hang about because tickets are going fast. ■

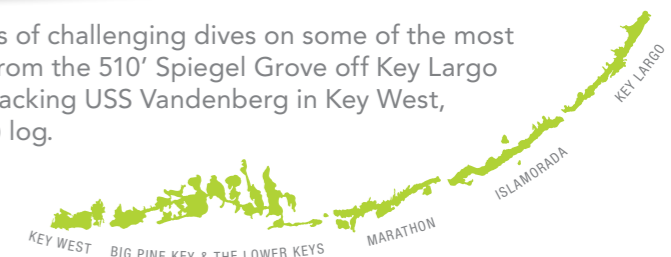


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So you want to be a Scuba Instructor

... just as soon as you get OW certified

Text by Steve Lewis

Do you remember your first reaction to being able to breathe underwater? What was the first thing you wanted to do when you caught sight of a coral head liberally seasoned with tiny, multi-colored bait fish? When your instructor handed you your very first c-card, did you get a strong urge to swap places with them?

Judging by regular postings on any one of the various scuba forums and diving message boards in Cyberland, a fair percentage of newly-minted divers suffer through an overwhelmingly strong urge to replace their current situation with the “romance and glamor” of life as a scuba instructor on a warm beach someplace exotic and far away from the nine-to-five rat-race, the daily commute along clogged highways, and the vagaries of a climate that features seasons... especially cold ones.

The wording of their memos varies a little but the core message goes something like: “I have just got my XYZ open-water diver certification, and I have decided to become a scuba instructor! Can you give me some advice?” Occasionally, time is mentioned, too, as in, “I already have six dives under my belt and have enrolled in the XYZ professional scuba school so that I can become a scuba instructor next week...”

Ah, who can blame them? I am not sure if diving is truly unique among “lifestyle” sports in this regard, but it really is quite amazing that scads of recent inductees to our little community (some still waiting for the mail to bring them the piece of plastic that tells the world they are a paid-up and checked-out member) want to teach others how to do it.

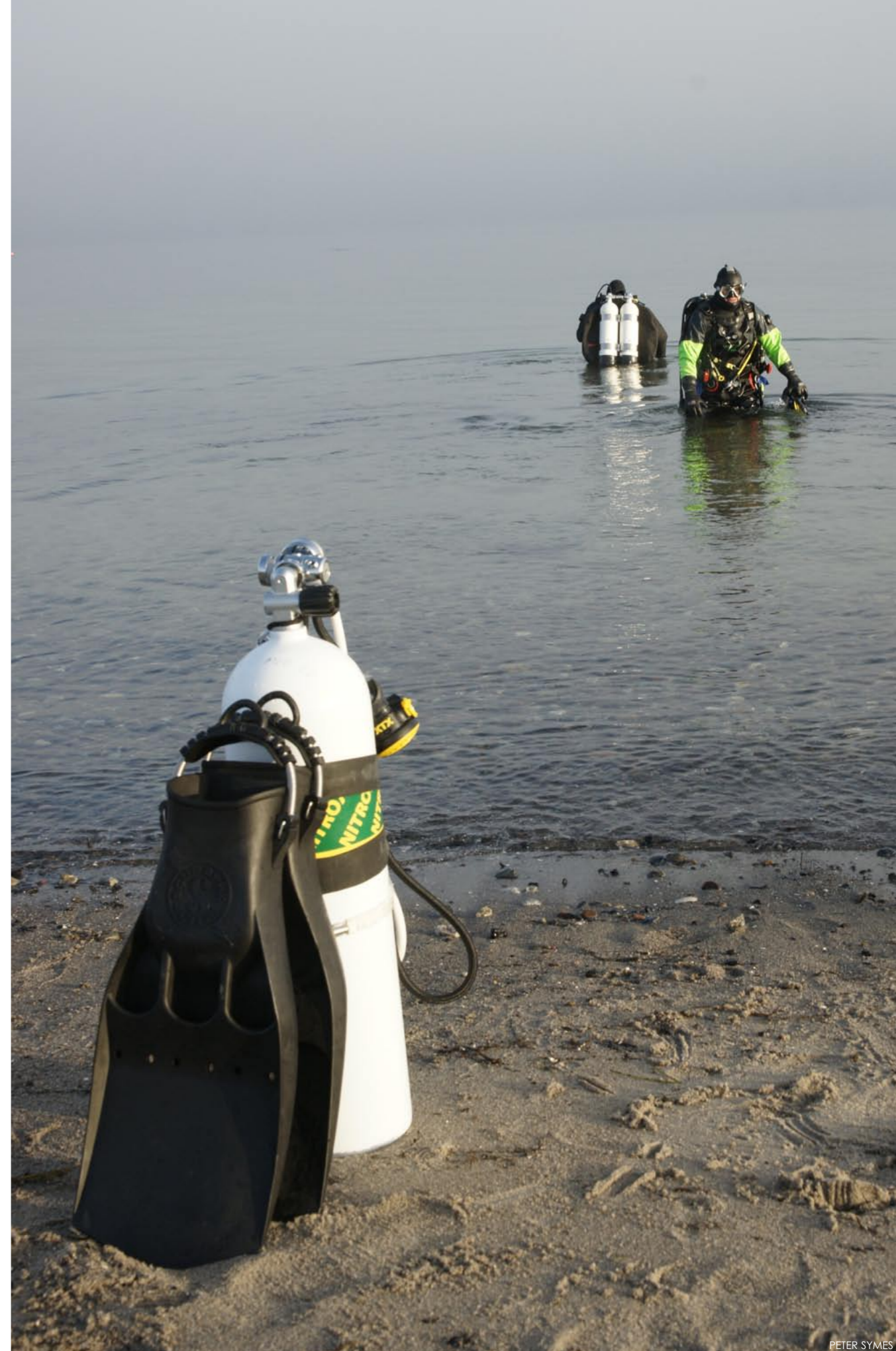
You simply have to love that level of enthusiasm, and when any of us get a chance to reply, we should take these requests seriously and actually try to help. However, I admit that my reaction can be hash sometimes. I have a slightly jaded perspective, and my view of the scuba industry—through what’s left of the rose-tinted spectacles I started

out with—is clouded by the much less attractive hard-edged primary colors of the real world.

Those of you who do actually teach scuba professionally—regardless of which level and to whom and where—will probably agree that the romance is a little white lie from a V-P of marketing someplace, and the glamor of climbing into slightly damp, slightly stinky drysuit underwear on day four of a six-day CCR Cave Program is severely limited. However, teaching people to dive has its moments.

Okay, so let’s put all that aside and instead, let’s concentrate on what advice we *should* give the neophyte diver who is hell-bent on becoming a diving professional, because “Forget about it!” or “You must be kidding” are simply unfriendly and unhelpful.

Your mileage may vary, but here are my suggestions for the enthusiastic newcomer who thinks being a diving instructor is something they simply have to do. These are things that a perspective employer (shop owner, resort operator or punter looking for an instructor) will probably find appealing. Oh, and a quick qualifier: these suggestions assume



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New courses



Diving Diseases Research Centre (DDRC) and SDI are proud to

announce that DDRC will now be able to offer SDI certification for CPR, First Aid, Oxygen Admin and AED training courses.

The combination of these two organisations means that divers will be able to receive training from the United Kingdom's leading hyperbaric research and treatment charity while receiving cer-

tification from one of the world's leading diving agencies.

Divers taking the DDRC Diving Accident Responder Course (DARC) will be able to benefit from receiving training from world-class diving doctors and trainers. They will then be able to receive certifications from SDI and gain recognition for their training. This certification can be recognised as part of their ongoing training towards Advanced Diver, Divemaster or even Open Water Instructor.

DDRC trainer recently completed a cross-over course to SDI non-diving speciality instructors with SDI/TDI Instructor Trainer Mark Powell. "DDRC are the perfect candidates for the SDI non-diving speciality instructor. This unique scheme allows SDI to make use

of the world's leading experts to deliver non-diving speciality courses. Who better to train divers on what to do in a diving accident than DDRC? We are very proud to have DDRC as an SDI training facility."

Jon Parlour, Training Manager at DDRC said, "We are very happy to be working with SDI on our DARC course. We were impressed with the structure of the SDI course and material as well as their training philosophy and are hoping to be running additional SDI/TDI courses in the future."

For details on other TDI/SDI courses contact:

Mark Powell
TDI Instructor Trainer #8532
Tel: +44 (0) 7770 864327
Email: mark@dive-tech.co.uk

that the perspective instructor considers teaching others to dive is a business rather than a charitable service.

Curiosity and empathy

The first and most important requirements (because we are taking enthusiasm as a given) are curiosity and empathy. I put curiosity first on the list because teaching—whether the topic is scuba diving or applied mathematics or car repair—requires both the student and instructor to have a real desire to learn. And certainly a new instructor has a lot to learn. Perhaps the most engaging thing about diving and certainly about teaching it is just how much there is to discover. Most of what presents itself for discovery is about people and how they react to being underwater... little of which is covered in your average diving textbook.

It is curiosity and what's uncovered by the curious instructor that adds value to a bare-bones scuba class taught by the incurious and complacent or—worse yet—fed-up instructor. The ins and outs of diving at a basic level really are not that complex: breathe in, breathe out, repeat, surface slowly. However, these skills are surprisingly difficult to get across

to the average student regardless of how strong their internal motivations might be.

Education is about changing behavior, and as long as the person delivering the education understands that different people respond differently to the same stimuli—and is enthusiastically curious as to why—most other things fall into place... sometimes.

Empathy is just as important, if for nothing else, for the times when things do not fall into place.

The most common trait shared by successful instructors is empathy with the people they are charged with looking after—and make no mistake, a class filled with open-water scuba students take some looking after.

The most common failing of instructors who do not enjoy success is lack of empathy. Just my opinion, but even at the most complex, risky, elevated level of technical instruction, there's room for understanding and empathy. The instructor's job is to identify what part of breathe in, breathe out, repeat and surface slowly is challenging his or her student. Indifference to their plight is not going to help the process along.

DAN Lectures

Divers Alert Network (DAN) America delivers a new talk on diving physiology, medicine and safety research on the first Wednesday of every other month. This is the third year of the bi-monthly public lecture series, where divers from the region have the perfect opportunity to hear from a variety of local experts. DAN's Senior Research Director, Dr Petar Denoble, will present, '*The Heart in Diving*', on Wednesday June 5, at 6 West Colony Place, Durham, North Carolina.

"Diving affects cardiovascular functions through the effects of hydrostatic pressure, thermal status, breathing efforts, increased oxygen partial pressure and various other stressors. Healthy hearts adjust well to these challenges but hearts affected by symptomatic or asymptomatic disease may be less able to cope. We will consider how common cardiovascular conditions may affect divers and their ability to enjoy diving and to stay safe. We will also discuss steps to maintain health and mitigate risks."

The evening kicks off at 18:15 with a pre-lecture social with light refreshments sponsored by 'Down Under', a local dive center. This is followed by a 45–55 minute talk and an additional 30 minutes for questions and discussion.

Dr Neal W Pollock, a Research Director at DAN instigated the series in 2011, said, "I felt it was important to reach the divers in our own backyard and this is a wonderful way to interact with the local community, letting them share in the evolution of new talks. Testing new material on a live audience is both fun and productive, frequently guiding revision or even new topics. Many people write to us

with questions, but the relaxed open venue prompts discussion

that can bring better understanding to both sides.

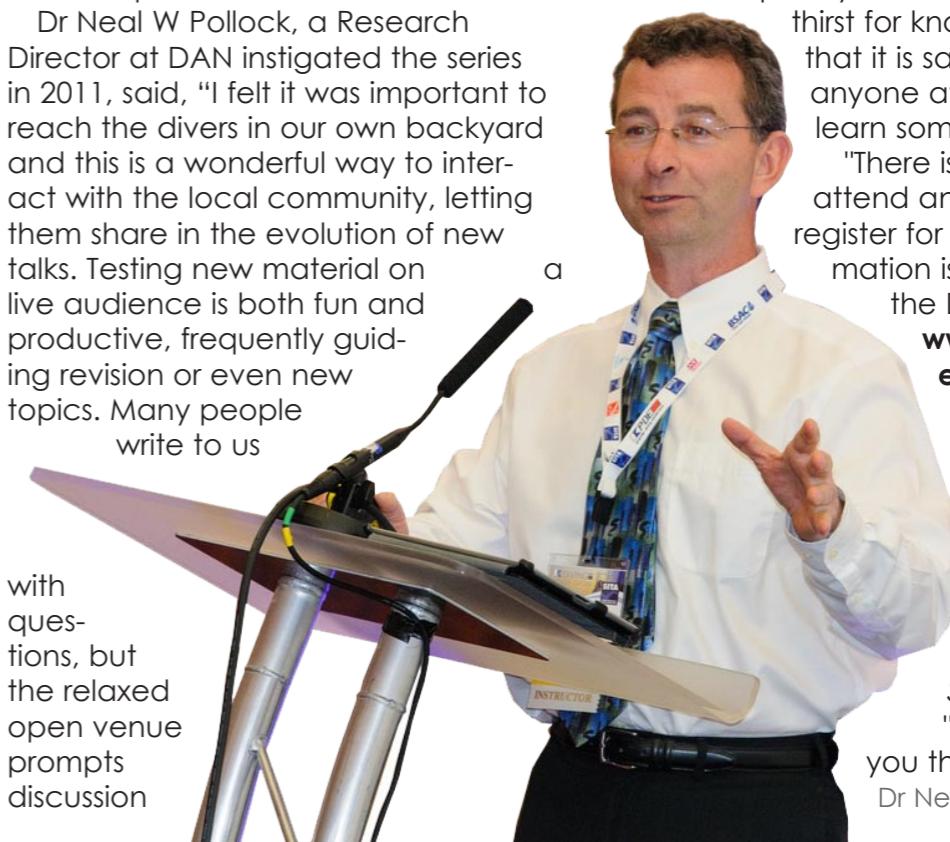
"The social preceding each talk provides the casual icebreaker to set the tone. The post-talk Q&A sessions frequently run over to meet the

thirst for knowledge. I think that it is safe to say that anyone attending will learn something of value.

"There is no charge to attend and no need to register for talks. More information is available on the DAN website:

www.dan.org/events. Looking ahead, August 7 will showcase Dr Matias Nochetto, presenting, *Critical Thinking of Post-Dive Symptoms*.

"We hope to see you there." ■
Dr Neal Pollock



Jason Brown - Bardo Creative

Scuba Instructor

Before the emergence of technical dive programs aimed at recreational divers like us, there wasn't much readily available for the development for superior diving skills outside of the standard sport diving pathway from rescue diver, dive master to instructor. And one could argue that the curriculum for those certifications lacked emphasis on the key areas that technical divers pay attention to.

Not to say that *all* sport diving instructors should be certified as cave divers or trimix CCR pilots or whatever, but *all* sport diving instructors should be logging a few dozen personal dives each year, and in a semi-perfect world, will gain a lot from earning advanced certs for themselves. If nothing else, being on the receiving end of a scuba course helps to build their instructor-student empathy.

Life beyond diving

In addition and finally, general life experience outside the underwater

world is useful for a dive instructor, too. If nothing else, it helps them to relate to their students and gives them something to talk about other than Boyle's Law!

There's really nothing to chuckle at when someone who has yet to finish their open-water checkout dives tells the world they want to become a scuba instructor. Our community needs those folks... desperately; however, there's slightly more to doing the job right than knowing how to work a projector and how to connect a regulator to a scuba cylinder. It just looks that easy.

Dive Safe. ■

Steve Lewis is a Technical Diving International (TDI) instructor-trainer based in Ontario, Canada, who has authored and co-authored several diving textbooks. In addition to serving as editor and contributor for several international dive publications, he has also served on the Training Advisory Panel for TDI, SDI and ERDI. Visit: www.techdivertraining.org



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Business sense

Another more tangible skill that will help any new instructor is a background in some type of business. An MBA in marketing, accounting, project management, human resource management and the like will be a bonus, but anything related will be a real asset. Even knowing how to use the latest version of the most popular bookkeeping software would be a start. So too would be some understanding of how retail works and knowing how to solve the basic equation: cost + value = price.

Language and communication

The next skill on this list involves language and communications. A second language is probably the best start—Mandarin, Spanish,

French, Russian, Portuguese. I'd vote for any of these, but with a real bias towards Mandarin. The world has changed, and English may be the lingua franca, but something besides it can help... a lot... especially since the growing world economies are no longer part of mainland Europe or North America.

However, even in cases where potential candidates are uni-lingual, a thorough knowledge of that one language is really key to being able to get a point across, and more importantly, listen and understand what's being said to them.

Being fluent and confident are required skills when standing in front of a group of people whose behavior you wish to change.

Experience

Lastly, experience as a diver is kind of nice for an instructor.

I think most of the sport agencies require inductees for instructor development programs to have a minimum of 100 dives logged. A hundred dives is not that many really but it hopefully allows time enough for the perspective instructor to have had a few things go pear-shaped while underwater. Since one "bad" dive has the potential to be a better learning experience than 15 or 20 perfect dives, perhaps we should be asking how many times they've been faced with the shock and awe of a dive that's gone so far from perfect that it's barely recognizable—and of course, what they learned from it.



PETER SYMES





Climate change could make for a bumpy flight

Fasten your seat belts! White-knuckle flyers may face an increasingly bumpier ride courtesy of climate change. According to a paper published in the journal *Nature Climate Change*, projected changes in the jet stream may intensify one form of air turbulence between 10 and 40 percent in the North Atlantic by 2050, increasing airline costs, plane damage and injuries to both passengers and crew members.

The study addresses clear air turbulence, a sharp upward or downward movement of air occurring in the vicinity of the jet stream, a powerful river of winds at speeds often exceeding 150mph in the upper levels of the atmosphere. Appearing virtually out of nowhere with no storms or clouds in view, clear-air turbulence doesn't appear on radar, making it difficult to avoid.

"It's not just about knocking your drink over," said lead author Paul Williams, an atmospheric scientist at the University of Reading in the United Kingdom. "Our results suggest that climate change will lead to bumpier transatlantic flights by the middle of this century," he said. Williams, along with co-author Manoj Joshi of the University of East Anglia, set out to explore how a warming planet could affect clear-air turbulence. "It's kind of surprising that no one has looked at this before," he added.

Focusing on the air over the North Atlantic, Williams and Joshi examined projections from a climate model developed by NOAA's Geophysical Fluid Dynamics Laboratory (GFDL). "It's one of the busiest air traffic routes in the world," said Williams, "with about 600 crossings every day."

According to the National Center for Atmospheric Research (NCAR), turbulence is the leading cause of weather-related injuries on aircraft, costing airlines tens of millions of dollars annually. ■

Social media booking

Want to be seated beside a Facebook friend? Finnair has introduced a new social check-in service, which allows the passengers to link their Facebook profile with the seat map. When doing so, other passengers can see the passenger's Facebook profile, and the passenger can see who else has checked in on the same flight and where they are seated.



After completing check-in, the customer can tell his friends in his or her social networks where they are heading and their estimated time of arrival. With KLMs Meet & Seat you can view other passengers' Facebook or LinkedIn profile details and see where they'll be sitting—long before your flight leaves the ground. "Simply share your Facebook or LinkedIn profile details to check other participating passengers' details and where they'll be sitting," it says on KLM's website. Of course you can also choose your seat. ■

LAX uses dogs to help passengers de-stress

Next time a delayed flight causes skyrocketing blood pressure, man's best friend may supply some much-needed relief. A program initiated at Los Angeles International Airport called Pets Unstressing Passengers (PUP) aims to calm stressed passengers waiting for flights. Trained dogs outfitted with bright red vests reading "Pet me!" will roam departure gate areas with their handlers in each terminal of LAX offering

passengers comfort and assistance.

"We are pleased to launch the PUP program in honor of National Volunteer Week," said Los Angeles World Airports Executive Director Gina Marie Lindsey. "It's a great opportunity to spread happiness to millions of travelers from all over the world. Expect to see the PUP's on a regular basis in terminals at LAX."



Research has shown that pet therapy helps promote relaxation by decreasing blood pressure and heart rate. All dogs are registered with Therapy Dogs Inc. of Cheyenne, Wyoming, a non-profit organization providing comfort and stress relief at hospitals, schools, senior homes and other institutions. Officials hope the dogs will help improve the atmosphere inside the airport, which was listed by *Travel Magazine* as second-worst airport for passenger satisfaction in 2012. ■



"Custer", one of Hope Crisis Response's therapy dogs offering comfort to displaced victims and relief workers


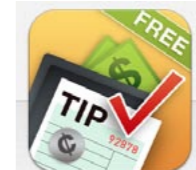
Apps for dive travellers

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Maldives Expedition

October 2013

Join an exclusive *X-Ray Mag / Ocean Geographic* expedition to the Maldives. Photographer and publisher, Michael Aw, author of two books and two broadcast documentaries about the Maldives, will lead this expedition to show you the mantas of Baa Atoll.



The expedition's liveaboard dive boat is the *MV Maldivian Princess*



Luxury accommodation on the *MV Maldivian Princess*



Paradise in the Maldives: Diver encounters a large manta ray

Text and photos courtesy of Michael Aw

Beneath the Indian Ocean is a long, huge ridge inundated by numerous far-reaching fractures. The ridge divides into two long arms east of Madagascar. One arm snakes around Africa and links up with the Atlantic Ridge while the other arm extends to south of Australia and eventually links up with the East Pacific rise. Between

East Africa and Western Australia, the midpoint of the Indian Ocean is the atolls of the Maldives.

Lying at the tips of a great-submerged mountain range that stretches from the Lakshadweeps Island to the Chagos islands, great migratory currents swish through the atolls, leaving behind rich plankton. Like an oases in the Sahara, pelagics congregate at the atolls to feed and to procreate.

Hammerheads, whalesharks, tunas and orcas are frequent visitors. Tidal currents flushing through the channels bring a constant food source into the atolls, sustaining spectacular coral growth, which in turn supports a realm of reef fishes in extraordinary abundance. The fish diversity of the Maldives is documented to be over a thousand species in 100 families.

The reefs of Maldives are among

the nature's underwater wonders where reef fishes to thrive in astonishing abundance, in density unrivalled anywhere in the world. Without the threat of spear guns, dynamite, cyanide, reef fishes swim blithesomely among divers and snorkellers.

Our beyond the ordinary expedition to the Maldives in 2013 will focus on interacting with the mantas of Baa Atoll. Documented by science and through photograph-





Making pictures underwater in the Maldives is akin to shooting in the world's largest aquarium teeming with fish life; many species are predictably found in enormous numbers. Not only is the profusion of fish life amazing, but also the predictability of seeing the same fishes at the same site within soft corals in colours of rainbow is the trademark of underwater Maldives. The Maldives is the fishpond of the Indian Ocean.



Lush coral reefs of the Maldives (left); Interior of MV Maldivian Princess (above)

ic evidence, the feeding phenomenon at Baa Atoll is unique and occurs nowhere else in the world. When the tide, moon, sun and wind are aligned, a vortex of over 100 mantas can be observed feeding on the broth of living, wriggling plankton. The expedition shall also visit signature sites of North Ari Atoll as well as offer the opportunity to dive a couple of the Northern Atolls that have just opened up for marine tourism.

The Expedition platform is the Maldives latest state of the art live-aboard, the MV Maldivian Princess. Exquisitely designed and furnished, the Maldivian Princess offers a boutique style liveaboard diving experience. Palatial cabins are equipped with LCD TV, en-suite and the spa-

acious lounge is set up with wi-fi internet, generous space for camera work, presentations and fine dining experience. Diving is supported on a spacious dive dedicated dhohi, three to four dives per day and nitrox is free. ■

Cost: US\$3,980 (plus 6% maldivian GST) (11 days / 10 nights / full board – twin sharing) Deposit US\$1,200. OG Members discount applies. Note: Maldivian GST is not shown on the online booking from and will be invoiced separately. To express interest or if you need further information email alison@oneocean.com. If you are a new client and ready to book please go to [booking link](#).

NB.

Bookings are handled entirely and solely by Ocean Geographic. Booking is not confirmed until deposit is paid. Payment details for payment of deposit will be provided once booking is completed. Booking username and password is not the same as your OG username and password. If you are new trip client you can leave the existing client login blank and complete the booking.

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MOBY 5



Costa Rica's
Cocos Island

— *An Epic Pelagic Adventure*

Text and photos by Matthew Meier



Cocos Island



Scalloped hammerhead shark (left) being cleaned by barberfish at Alcyone; Guineafowl puffer on reef (above)

PREVIOUS PAGE: Aggregation of blue and gold snappers, whipper snappers and burrito grunts fill the opening of a large underwater cave at Submerged Rock

Tucked behind rocks at 90 feet, my fellow divers and I were getting restless hoping for a visit from hammerheads or one of the resident tiger sharks, neither of which were cooperating. The dive master motioned for the group to follow, as he headed to another cleaning station and perhaps better luck. As I turned to make sure the videographer to my right got the signal, I saw him kicking in the opposite direction to deeper water. Figuring he saw something worth pursuing, I swam blindly after him through the haze of a shimmering thermocline. Emerging out the other side onto the sandy bottom at 104 feet, I was staring at my very first tiger shark as it swam past the videographer and straight towards me.

Instinctively reversing course in shock and with a slight pucker factor, I not so gracefully stumbled backwards over some rocks and fell flat on my butt. So much for those amazing tiger shark photos I had envisioned while staring with anticipation into the blue.

Happily all was not lost, the shark turned above me, seemingly oblivious to my plight, and continued on a wide circle that would bring it around for another pass between the videographer and myself. This time I managed to keep myself upright and captured a photo of the tiger as it slowly swam past the videographer—tiger shark 1, photographer 1.

Such is the diving at Cocos Island, where periods of waiting are punctuated by heart-stopping big animal interactions.

Cocos Island

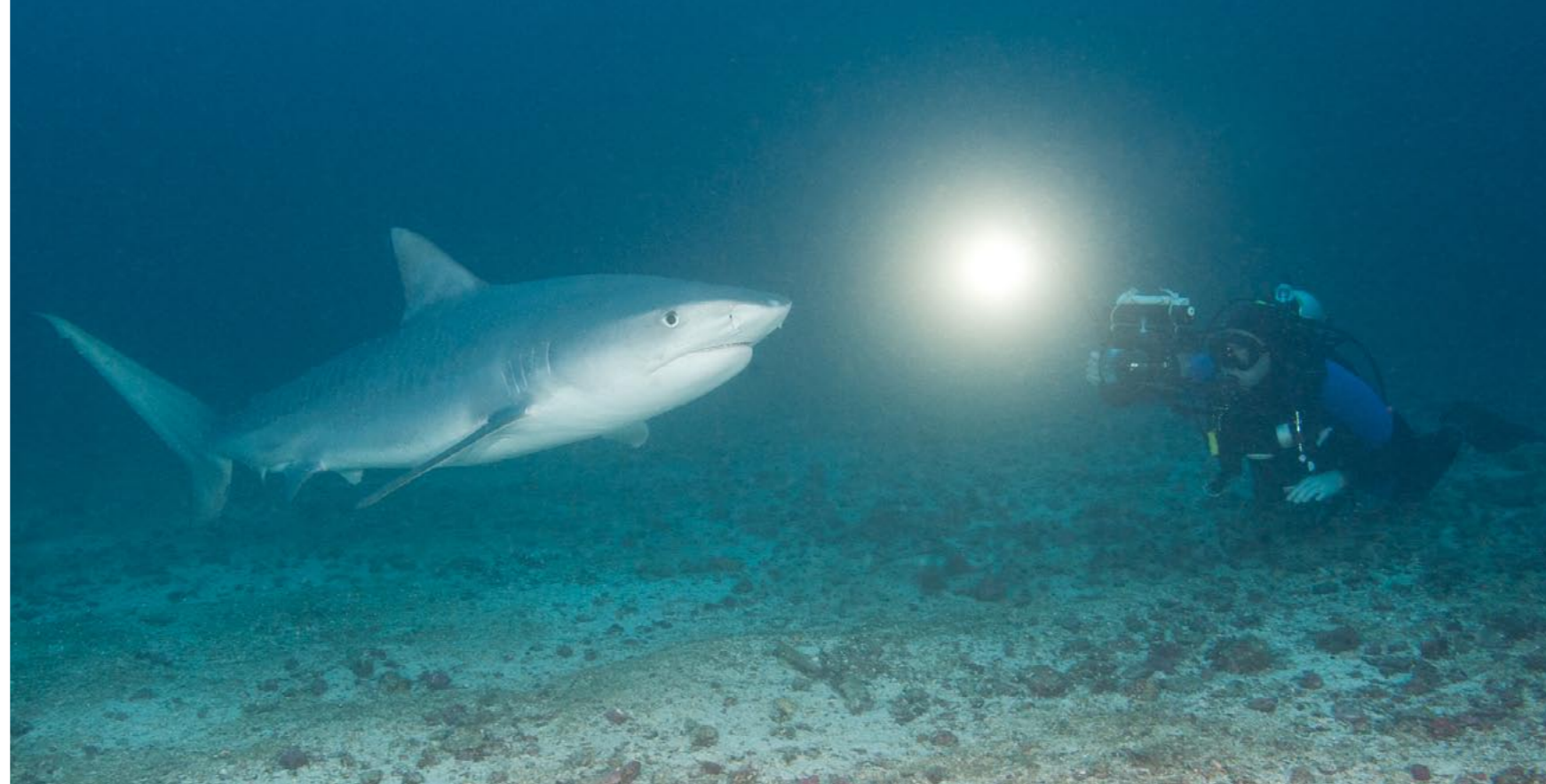
Cocos Island, or Isla del Coco as it is known locally, first became part of Costa Rica in 1832. It is uninhabited, except for a small group of national park rangers. The island became a Costa Rican national park in 1978 and

was designated a World Heritage Site by UNESCO in 1997. The marine zone around Cocos Island was added to the World Heritage Site designation in 2002. Legend states that over the years, numerous pirates buried treasure on Cocos Island, though despite several extensive searches, none has been recovered.

Irregular in shape, Cocos Island has an area of approximately 9.2 square miles (23.85 sq km). Cocos is tectonic and volcanic in origin, primarily composed of basalt. The island is incredibly green and lush due to its wet climate and is covered in tropical forests and cloud forests at elevations above 500m. The cloud forest ecosystem is unique to Cocos



Red-footed booby looks down from its perch (left); Palm trees lean out over rocky cliffs (above)



CLOCKWISE FROM FAR LEFT: Scalloped hammerhead shark with Pacific creolefish; Tiger shark swimming past an underwater videographer; Goldrim surgeonfish and razor surgeonfish forage for food; Pair of octopus on the rocky reef appear to be mating

ing scalloped hammerhead and silky sharks, innumerable whitetip reef sharks, Galapagos, silvertip and now tiger sharks. It is also not uncommon to see whale sharks, manta rays and dolphins. The fish life here is incredibly abundant and the main reason these apex predators are so prevalent.

Sightings of jacks and snappers in schools that block out the sun are routine. The ample marine life surrounding Cocos Island

is attracted to the nutrient-rich ocean currents that swirl around this small island 340 miles west of Costa Rica in the Eastern Pacific Ocean.

Accessible only by liveaboard dive boat, this remote island requires a 32- to 36-hour transit across potentially angry seas for the privilege of diving this holy grail of pelagic encounters. Once in the water, the currents can be fierce and more than once I had to pull myself down the mooring line just to get to a dive site.

The majority of the diving is deep, taking place between 60 to 90 feet and nitrox is recommended for extra bottom time. Rebreathers are also very useful if available and you

are properly certified.

Diving at Cocos Island can be absolutely magical, but this is not a destination for beginners or the faint of heart. Divers that venture here should be comfortable with their buoyancy in blue water and

capable of holding onto rocks at depth so as not to be blown away by the strong currents.

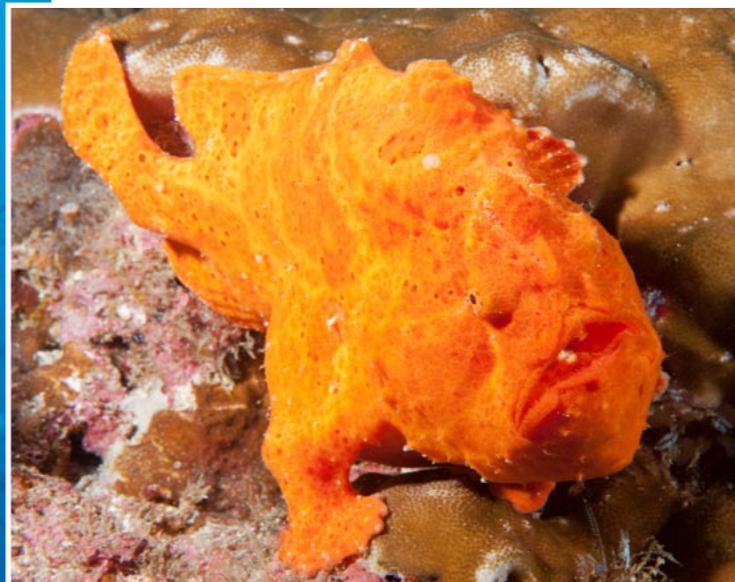
Cleaning stations exist at several of the dive sites and are a major attraction for viewing sharks. Successful interactions at cleaning

Island and does not exist on any other island in the Eastern Pacific Ocean. Of the four mountain peaks on the island, the highest is Cerro Iglesias at 2,080 ft (634m). The mountainous landscape and abundant rainfall creates dozens of waterfalls, which drain off every side of the island.

Rich marine life

Cocos is perhaps best known for its sharks, with hundreds of school-





Massive school of bigeye jacks (left) form swirling tornado over 60 feet high at Dirty Rock; Commerson's frogfish (above) at Manuelita Channel; Whitetip reef shark (lower left) resting under overhang, surrounded by Pacific creolefish

held my collective breath, at least a dozen barberfish

underwater swim-throughs filled with fish, marbled rays and whitetip reef sharks to explore. Rocky reefs are teeming with life including spiny lobster, octopus, urchins, sea stars and numerous reef fish. Sea turtles cruise past in the blue water, and huge schools of fish appear without warning, often swimming circles around you or swirling into a gigantic underwater tornado. If you are lucky, you may also find an endemic Coco's batfish or orange Commerson's frogfish.



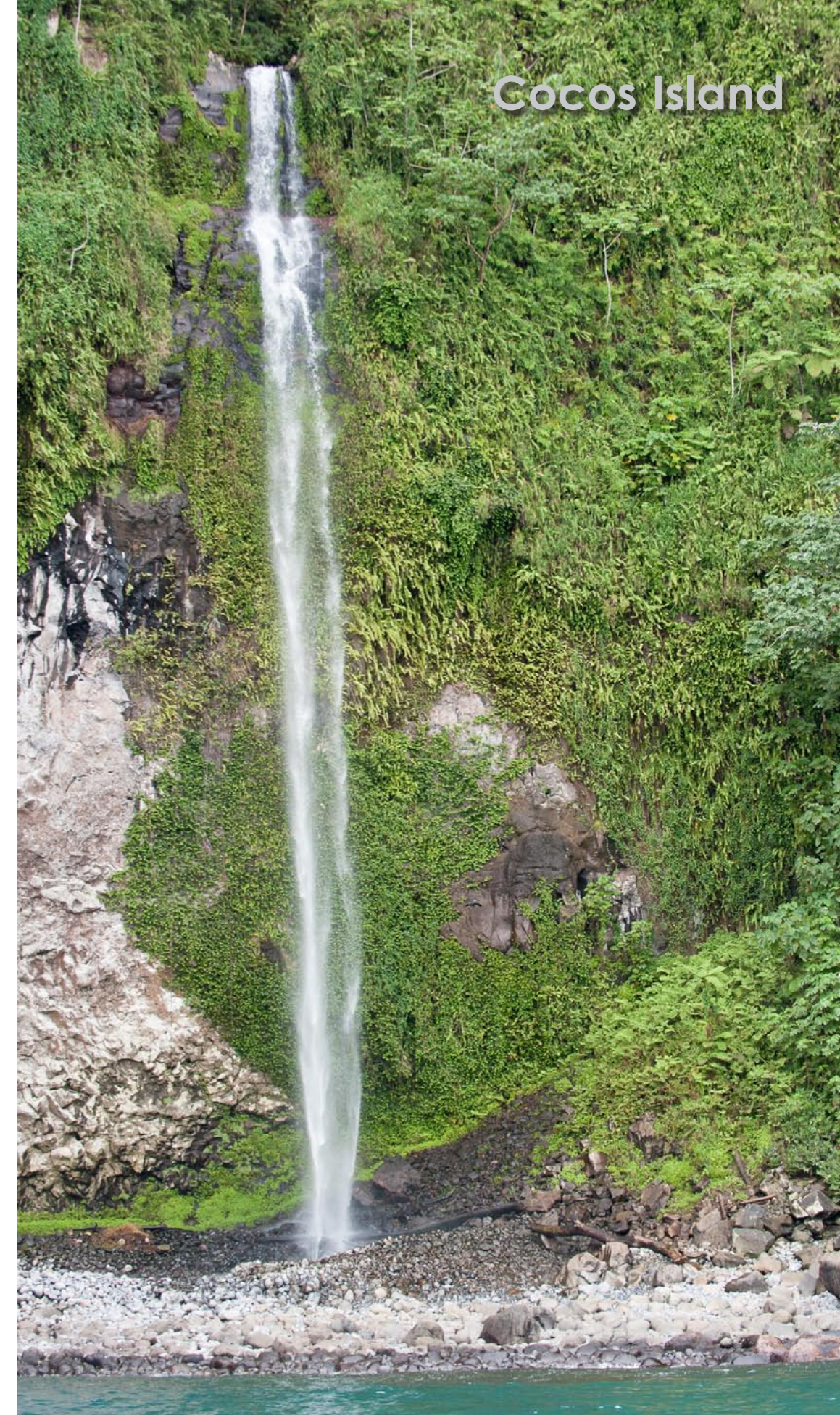
swooped in to clean off parasites and bits of dead skin. Just as the hammerhead began to turn away, I managed to capture a photo documenting this classic cleaning station behavior.

Not all diving at Cocos Island involves lying in wait at cleaning stations. There are several

stations require a collaborative group effort. Divers need to hide amongst the rocks, doing their best to control their breathing and wait patiently for the sharks to come in close to be cleaned by the lingering angel and barberfish. Most cleaning stations are at 90 to 100 feet, limiting the amount of dive time for all the

pieces to fall into place, and it only takes one diver swimming up in the water column or worse, swimming through the cleaning station to keep the sharks away.

I experienced idyllic conditions at Alcyone dive site while watching a scalloped hammerhead approach out of the blue and swim directly towards me. As I



Spotted eagle ray (left) at Submerged Rock; Waterfall (above) cascading off Cocos Island in the rainy season



Whitetip reef shark resting on the rocky reef during the day

Cocos Island



Whitetip reef sharks (*Triaenodon obesus*) pack hunting at night; Marbled ray (*Taeniura meyeri*) resting on rocky reef (right)



Tails of several resting whitetip reef sharks poke out of a hole in the rocky reef

Whitetip reef sharks

For the truly adventurous, a night dive with the whitetip reef sharks at Manuelita dive site is a must. Dropping into the water after the setting sun, I switched on my dive light and tried to remember the dive master's instructions. We were to stay as a group, using our flashlights in unison, highlighting a particular reef fish in hopes that we attracted the larger black jack fish to feed.

Black jacks are efficient hunters, fast and maneuverable, and the whitetip reef sharks follow them, as they hunt at night in search of food. It turns out the sharks are not very good at hunting on their own, but they have more success searching for food when they rush in

by the dozens once a black jack has crunched down on a fish.

The action takes place mere inches above the coral reef, and it is truly a sight to behold, as dozens of sharks pack hunt directly beneath you. I was tempted to get down on their level and experience the rush, as they swarm past, but we had been warned about becoming prey ourselves, and so I stayed slightly above the fray.

From experience, I have learned that it is also prudent to look behind yourself once in a while, as you float along in total darkness, just in case one of the larger species of sharks, which you were so eager to see during the day, comes to investigate the commotion at night.



ONCE UPON A TIME...

THERE WERE MEN WITH BRILLIANT IDEAS, DREAMS, INVENTIONS, STORIES, EMOTIONS, ADVENTURES AND AMBITIONS... AND A LEGEND WAS BORN.

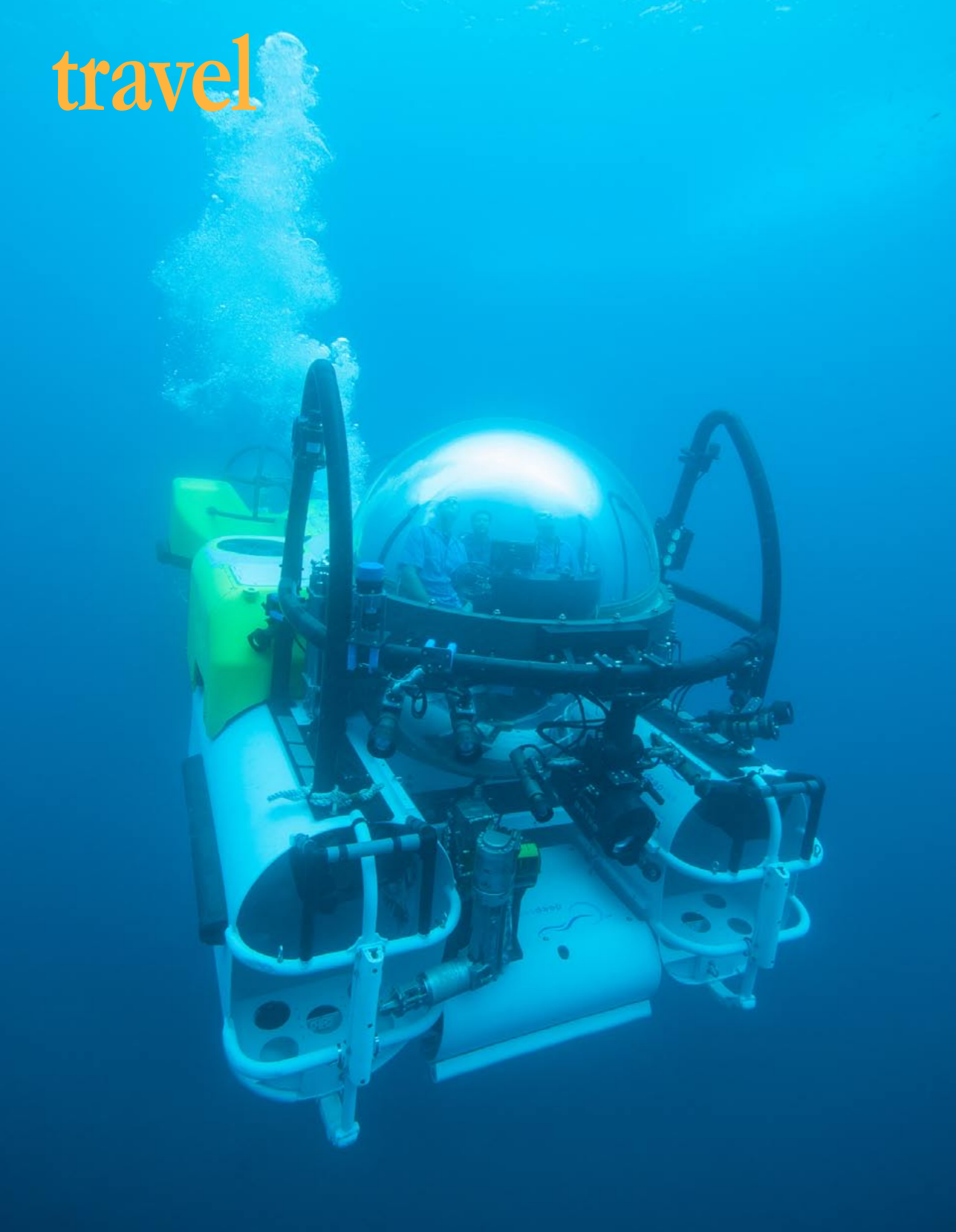


DEEP DOWN YOU WANT THE BEST

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© Wayne Levin





a short walk to the back of the mother ship, *Argo*, and a simple step into the cockpit while *DeepSee* floated on the surface in her protective U-shaped cut-out of the hull.

The submarine is unique in that it can operate as a boat on the surface and a sub underneath, but for longer surface journeys the support boat, *TopSee*, tows *DeepSee* out to the intended dive site. A second pilot on board *TopSee* helps to guide the submarine during the dive and communi-

DeepSee submarine venting air bubbles to control its buoyancy, as it resurfaces (left), and docking with its transport, the mother ship, *Argo*, (above); From the sub, a grouper is spotted along a wall at 600-1,000ft (right)



left simply to marvel at the 360-degree views of the pelagic passers by that wandered over for a curious look.

The *DeepSee* submarine holds two passengers and a pilot and is capable of diving to depths of 1,500 feet (450m). Created by Avi Klapfer, the founder of the Undersea Hunter Fleet, and Steve Drogin, real estate developer and passionate underwater photographer, *DeepSee* required three years of design and development in order for their vision to become reality.

Manufactured in San Diego, the submarine first began diving at Cocos Island in 2006. *DeepSee* is fully outfitted for scientific exploration with an articulated, manipulator arm capable of sample collection and instrument retrieval. It is also outfitted with an external HD video camera, digital still cameras and an assortment of 8 HID lights. In addition, passengers are able to use their own still and video cameras from inside the submarine.

The adventure started with a pre-dive briefing covering the functions of the submarine, safety procedures and the dive parameters. Next, passengers were

outfitted with an official cotton jumpsuit (imagine a cooler version of The Life Aquatic uniform, but without the hats) and comfy socks to protect the bottom half of the sphere from scratches. Then it was

DeepSee submarine

Another exhilarating way to see the undersea world at Cocos is in a submarine. Locked securely inside a four-inch thick acrylic sphere, I took the plunge and embarked on one of the most amazing experiences of my trip—a dive down to 1,000 feet on board the *DeepSee* submarine.

As we dipped below the surface, the confines of the sub melted away, and it was as if I was now part of my ocean surroundings. The optically corrected sphere had a refractive index that nearly matched the water, and it disappeared from view once fully submerged. As the submarine descended, I lost all perspective of depth in the blue water and was



Support boat, *TopSee*, approaches *DeepSee* submarine, before towing to dive site

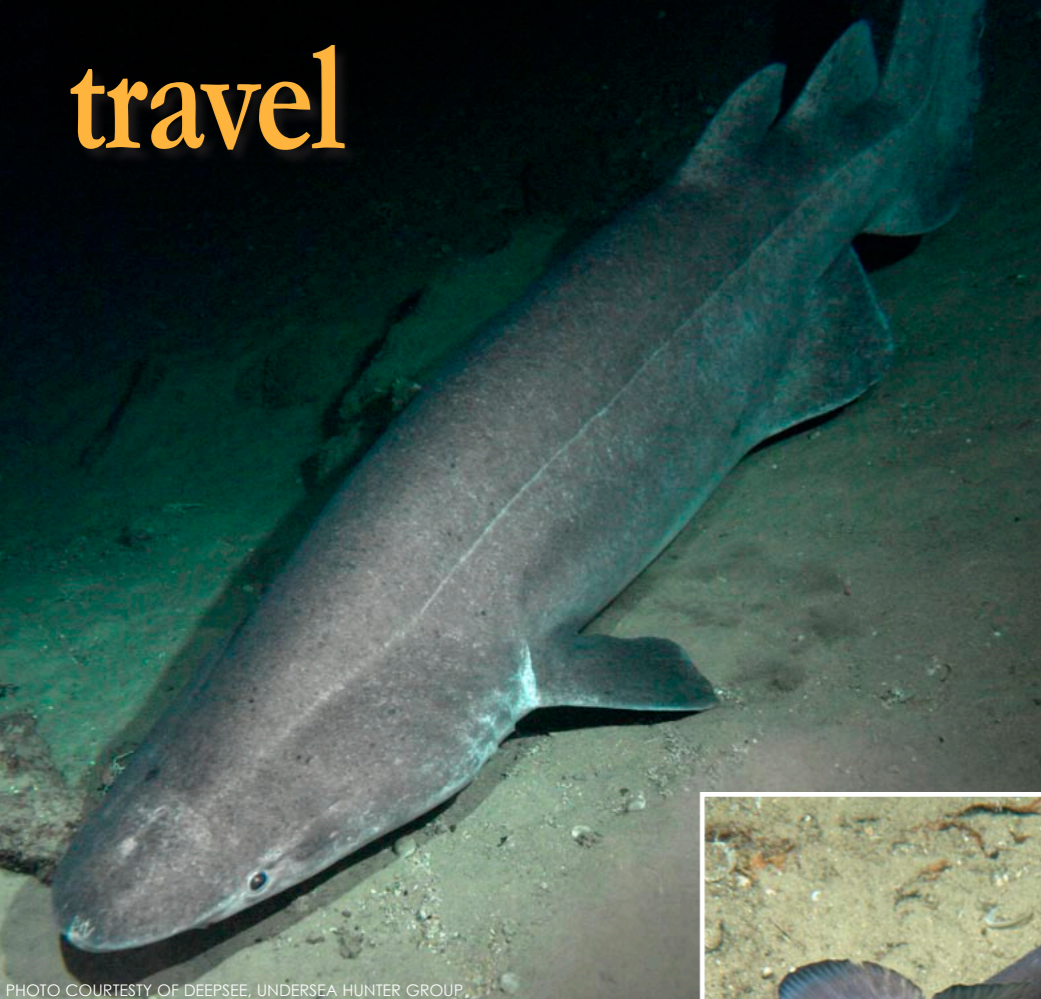
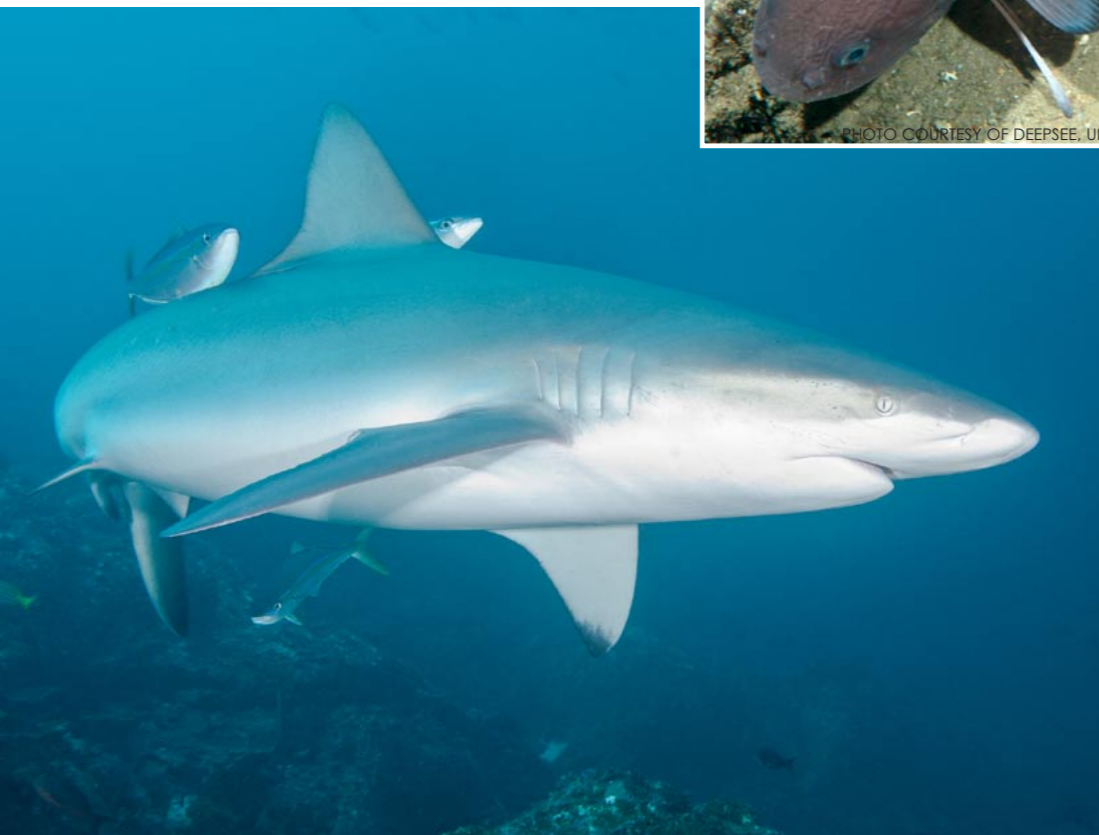


PHOTO COURTESY OF DEEPSEE, UNDERSEA HUNTER GROUP.



PHOTO COURTESY OF DEEPSEE, UNDERSEA HUNTER GROUP.

LEFT TO RIGHT: Prickly shark; The bottom-dwelling, deep sea jellynose fish; View from inside DeepSee submarine of two Galapagos sharks overhead at nearly 600 feet; Galapagos shark with rainbow runner fish at Dirty Rock (below)



cations are maintained between the surface and the sub at all times.

As we reached the sea floor nearly 600 feet down, the precise hover and maneuvering capabilities of *DeepSee* were put on full display. Eight electric thrusters, which move the submarine up and down, forward and

back and horizontally left and right, controlled the propulsion.

Our pilot guided us over the sandy bottom to the edge of a sheer, vertical drop called The Wall. Here several mobula rays, feeding in the deep ocean currents, soared above us, as we peered down into the abyss. Breaking our gaze, *DeepSee* deftly pivoted to face the wall, and we began our exploration down to 1,000 feet.

No sunlight reaches these depths, and the creatures down here have all adapted to living in total darkness. Hiding in the crevices, we saw colorful anthias, several species of crabs, groupers slowly hunting in our lights and the bizarre looking jellynose fish. Sadly, we

did not get to see a prickly shark. This deep-water species is often encountered on The Wall at depths below 800 feet.

As our journey back to the surface began, we were treated to a school of tuna swimming overhead, followed by several Galapagos sharks in silhouette against the faint daylight above. It was a once-in-a-lifetime opportunity, and I was sad to see it come to an end. Fortunately, there were many more epic diving adventures around Cocos Island, and I looked forward to getting back in the water.

Island life

Cocos Island is covered in lush greenery, tropical forests, mountains and waterfalls. It is perhaps the most beautifully, rugged landscape I have ever seen.

Park rangers give presentations on the



School of Moorish idols on reef, with a school of Pacific creolefish overhead



Cocos Island



Whitetip reef sharks (left) near a cleaning station at Alcyone; Common dolphin (above) porpoising across Pacific Ocean at twilight; Red-footed booby soars with rainbow over Cocos (right); Mantled howler monkey feeding in the trees, Ocotal, Guanacaste (lower right); Yellow trumpetfish on reef at Submerged Rock (below)

island's history, ecosystem, topography, World Heritage Site status and their efforts to protect its wildlife both above and below the surface. Land tours are possible with coordination by the rangers and offer a great chance to explore this tropical oasis.

The routine while on the live-aboard boat includes three to four dives daily, with meals and snacks in between. Surface intervals are spent prepping camera gear, exploring the island's coastline by skiff when available and relaxing

on deck. Bring a good book and take advantage of the opportunity to make some new friends.

Costa Rica

I would highly recommend including a mainland Costa Rican side trip to your Cocos Island adventure.

There is something for any outdoor enthusiast, and the Costa Rican people are incredibly warm and friendly.

Costa Rica offers a wide array of tourist activities, and the country has a diverse geography including mountains, volcanoes, tropical rain forests, cloud forests and beaches. The Pacific coastline offers world-class surf-



ing and scuba diving, while the Caribbean coast boasts gorgeous tropical beaches.

Costa Rica is world-renowned for its birdwatching and butterflies, including numerous species of hummingbirds. Walking tours are available in both the tropical rain and cloud forests. For the more adventurous, there are canopy tours and ziplining excursions. The areas around the volcanoes offer secluded resorts, yoga retreats and mineral hot springs. Whatever you choose, your Cocos Island experience will be enriched with the extra time spent.

Save me a spot at the cleaning station

I now understand why people revisit Cocos Island again and again. The big animal encounters are awe-inspiring, and the rush one feels underwater is addictive.

I can still picture the fleeting glimpse I had on my last day of diving at Dirty Rock, as the dozens of hammerheads in silhouette overhead faded into the blue long before I could even bring the camera up to my eye, or the anticipation I felt on the skiff, as we scrambled to get back to the mother ship amidst cries of "Whale shark! Whale shark!" over the radio, only to arrive just as the rest of the divers and crew members climbed back out of the water, stating that we had just missed her.

I know that I will return to Cocos Island one day and hope that you too get the chance to experience this magical place. ■

The author extends special thanks to the Undersea Hunter Group (Underseahunter.com), the crew of the Argo, the crew of the

DeepSee submarine and DivEncounters Alliance (Divencounters.com), and Blue Abyss Photo (Blueabyssphoto.com).

Matthew Meier is a professional underwater photographer and dive writer based in San Diego, California. To see more of his work and to order photo prints, please visit: Matthewmeierphoto.com



Green iguana, Isle San Jose

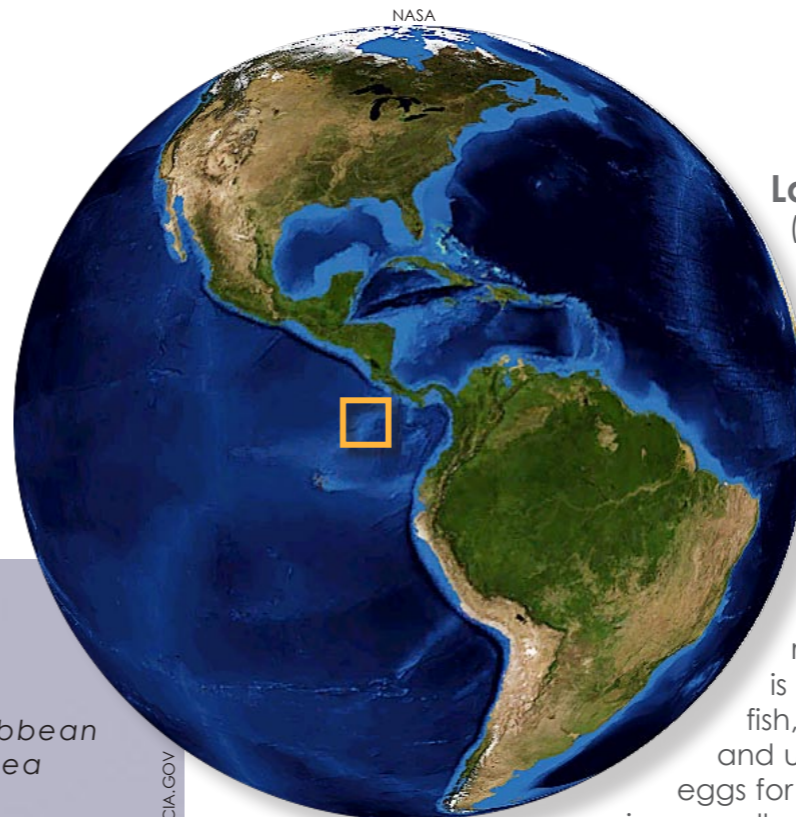
fact file



Cocos Island, Costa Rica



RIGHT: Global map with location of Cocos Island off Costa Rica
BELOW: Map of Costa Rica



History Early in the 16th century, Spain explored and attempted to colonize Costa Rica, but was thwarted by several factors including disease from mosquitos, extreme heat, pirate raids and resistance by natives. Eventually, in 1563 in the cooler, fertile central highlands, a permanent settlement in Cartago was established and remained a colony for over 250 years. Declaring independence in 1821, Costa Rica was one of several Central American provinces joining forces to do so. After a brief integration with the United Provinces of Central America, a federation which fell apart in 1838, Costa Rica established its independent sovereignty. Later in the 19th century, two brief periods of violent conflict challenged the developing democracy of the nation. The country's armed forces was disbanded in 1949. Agriculture remains the largest economic sector, but tourism and technology are quickly moving up. Costa Ricans enjoy a relatively high standard of living and ownership of land is widespread. Government: Democratic republic. Capital: San Jose

Geography Costa Rica is located in Central America, bordering both the North Pacific Ocean and the Caribbean Sea, between Panama and Nicaragua. Rugged mountains separate coastal plains. There

are over 100 volcanic cones, several of which are major volcanoes. Cocos Island is located roughly 340mi (550km) west of Costa Rica in the Eastern Pacific Ocean. It is accessible only by liveaboard dive boats and requires a 32- to 36-hour transit to reach its isolated location.

Climate Cocos Island receives an annual average rainfall of over 25ft (7.6m) and it rains every month of the year. It is less rainy from January to March and again from late September to October. The rainiest season is from July to early September. The air temperature is consistently between 75°F – 86°F (24°C – 30°C) and the climate is tropical and humid. Water temperatures at Cocos Island are on average 79°F – 84°F (26°C – 29°C) and will dip a few degrees cooler below the odd thermocline. A 3–5mm wetsuit is recommended for diving.

Economy Before the global economic crisis in 2007-8, Costa Rica enjoyed steady economic growth. In 2009, the economy contracted 1.3% only to resume yearly growth of around 4.5% in 2010-12. Agricultural exports like

bananas, sugar, coffee and beef remain the staple exports, while expansion into various industrial and specialized agricultural products is broadening trade. In addition, microchips and other high value added goods and services bolster exports further. Tourism is still a big player in fostering foreign exchange, and ecotourism is promoting Costa Rica, with its immense biodiversity, as a key destination. Costa Rica's political stability, free trade zone incentives, and relative high education of its people continues to attract some of the highest foreign investment per capita in Latin America. Even so poverty has

remained at about 20-25% for almost two decades, with an eroding social safety net due to decreases in spending as the government tightens its belt. Other challenges facing the current government include increasing legal and illegal immigration of mostly unskilled labor from Nicaragua, which is weighing down the social welfare system, and impediments in passing needed fiscal reform.

Currency Costa Rican colones (CRC). U.S. dollars and international credit cards are widely accepted. Exchange rates: 1EUR=643CRC; 1USD=500CRC; 1GBP=757CRC; 1AUD=524CRC

Population 4,695,942 (July 2013 est.) Ethnic groups: white (and mestizo) 94%, black 3%, Amerindian 1%, Chinese 1%. Religions: Roman Catholic 76.3%, Evangelical 13.7%, Jehovah's Witnesses 1.3%, Protestant 0.7%. Internet users: 1.485 million (2009)

Language Spanish (official); English is widely spoken.

Voltage 110 volts, with U.S. standard 2- and 3-prong plugs.

Cuisine A staple of Costa Rica cuisine is black beans and rice (gallo pinto). It is often served with fish, poultry or meat and usually accompanies eggs for breakfast. The food is generally quite healthy and often served with fruit and/or vegetables. Portions are modest, and lunch is typically the largest meal of the day.

Tipping Tipping is customary. A 10% service fee is often added at higher end restaurants. Tip an additional 10% for exceptional service. Shuttle drivers, dive guides and boat crewmembers are typically tipped at least 10%.

Driving Vehicles travel on the right side of the road. If you rent a car, you may use your home driver's license or apply for an international one. The main roads are in good shape and well paved.

Decompression chamber The nearest hyperbaric chamber is located on the mainland in the capital city of San Jose. There are no chamber facilities on Cocos.

Travel/Visa Valid passport required. Visas not required for most U.S., Canadian, E.U. and Japanese citizens. Departure tax is US\$29.

Juan Santamaria International Airport (SJO) in San Jose is the most convenient for travel to Cocos Island. The liveaboard dive boats typically provide shuttles from San Jose to Puntarenas, where guests board the boats for their long transit over to the island.

Web sites Costa Rica Tourism www.visitcostarica.com
SOURCES: U.S. CIA WORLD FACTBOOK UNDERSEAHUNTER.COM, WIKIPEDIA.ORG



Massive, polarized school of bigeye jacks in blue water at Dirty Rock

British Columbia's Southern Gulf Islands

Canadian Diving

Text by Barb Roy and
Wayne Grant. Photos
by Barb Roy

Located between the lower part of Vancouver Island and Mainland Vancouver in the Strait of Georgia, the Southern Gulf Islands of British Columbia, Canada, are made up of over 12 large islands and several smaller ones. The larger, more populated islands are accessible by taking an auto ferry from the Mainland to Nanaimo or to Sidney, just north of Victoria. Visitors can spend a day or several exploring by car, bike or hiking.

These islands offer visitors unique crafts from local artisans, excellent vineyards (many with restaurants) and an array of coastal activities. One such water activity rapidly gaining popularity is scuba diving, which can easily be done on a year round basis.

Red Flabellina nudibranch
at West Race Wall





Tiger rockfish near Wolf Eel Den in Porlier Pass

Together with business partner, Jessie Kunce, Pinnacle Scuba Adventures has been in operation for about three years. Scott also said, "Our most popular dive sites are three separate sites around Race Rocks (Victoria area). The first site and probably the most well known is West Race Wall. This site is an amazing wall covered in macro life—from sponges and soft corals to basket stars and sculpins. It is an amazing dive site with almost limitless life and is comparable to popular sites like Browning Wall in Port Hardy or Row and Be Dammed on Quadra Island in Campbell River.

"The second site is Helicopter Rock. This is the best place to experience sea lions in all their glory! You can dive other parts of Race Rocks for encounters but Helicopter really is the best. It is a shallow dive with a huge kelp forest, at times with more than a hundred sea lions! It's all about the interaction between them and the divers. I constantly refer to them as big puppy dogs—playful and inquisitive. It's hard for me to describe the feeling I get after years of being in the water with them. When I take someone, or a group of divers with me and we are bom-

There are several dive charter operators servicing the Southern Gulf Islands, offering two-tank day charters,



with assistance in arranging or will provide accommodations. Top this with a commonly mild coastal climate, friendly people and you have the makings of a relaxing BC dive getaway.

PADI Master Dive Instructor, Scott Stevenson, from Pinnacle Scuba Adventures has been diving in the area for over 18 years. "We accommodate all levels of diving from beginner to rebreather and technical," exclaimed Scott. "We will meet divers or pick people up as needed. Every group is different and we try to give each person the best experience both above and below the water."



Location of Southern Gulf Islands on satellite map of Vancouver Island, British Columbia, Canada, and on global map



barded with sea lions, the squeals of joy under the water and the smiles

British Columbia



Several lighthouses can be seen throughout the region; Frosted nudibranch at Race Rocks (left inset)



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Colourful tubeworm at West Race Wall (top left); Divers (above) prepare to descend in Portlier Pass; Wolf eel peeking out from its den in Portlier Pass (right)

on the surface are always awesome. "The third site is Great Race, where the lighthouse is. The small bay where the boat launch is located is the best place to dive. This is a common hangout for sea lions; however, the bottom is covered in colorful brooding anemones, lots of rockfish and greenling, as well as a few resident wolf eels and octopus."

As an accomplished underwater photographer and dive guide, Scott enjoys West Race Wall for its diversity of life and great colors: "The amount of fish and invertebrate life inspire me; I simply love shooting there. This is one of my personal favorites I have dived many times and still get excited every time I go out there."

Pinnacle's dive boat is 32 feet long, handling eight divers and is equipped with a cabin, camera rinse bin and toi-

let. Their range stretches from Victoria to Sidney and Saanich Inlet and even around to Port Renfrew, on the west side of Vancouver Island.

"If a group wants to dive a particular place, we will take the boat to wherever they want to go," added Scott. "We pride ourselves on our customer service, local dive site knowledge and versatility. We don't offer rentals, however, we have very good relationships with the local shops and believe that clients can get what they need from the shops."

When asked what other dive sites Scott likes to take his clients to, he replied:



"Swordfish Island is a very unique dive. The south end of the island has a naturally formed tunnel approximately 60ft long,



CLOCKWISE FROM ABOVE: Divers explore the interior of 737 airframe; *SS Del Norte* wreckage in Porlier Pass; Chemainus 737 airframe is encrusted with life

20ft wide and about 20ft deep. Because of the large amount of current flow in this area the tunnel is filled with life—red soft coral, brooding and plumose anemones, rockfish and nudibranchs. We also have several wrecks in the area other than the ones in Sidney. The *Swordfish* and the *Barnard Castle* are two often requested due to their age and unique pieces still left on the bottom.”

Chemainus

Another dive charter service with the option of accommodations is the joint efforts of Cedar Beach Lodge and 49th Parallel in the Chemainus area, south of Nanaimo. Andy and Virginia Lamb run the quaint bed-and-breakfast on Thetis Island offering divers and their traveling companions a quiet seaside environment with excellent views. The lodge has a drying room for gear and a hot tub for after the dives.

The dive charter portion of the relationship is conducted by Peter Luckham and his wife Simone. With over 12 years of diving experience, Peter tenders professional day adventures in Stuart and Trincomali Channels, which also include current dependent sites in Porlier Pass (the *Point Gray*, the *Peggy McNeill*,



Alcala Wall).

Currently 49th Parallel uses a 17-foot boat, accommodating four divers with two dives per day.

“Peter can still service all the usual sites,” informs Andy Lamb, “But can actually and efficiently go farther due to the smaller faster boat.”

Andy also told us he likes the underwater visibility best in the fall and winter months but assures it is usually good from late June through February too.

One of the many wreck dive selections Wayne and I enjoyed was the wreck of the *SS Del Norte*, at Canoe Islet in Porlier Pass. This historic vessel was a 190-foot long sidewheel passenger steamer that went down in 1868. Although there is not



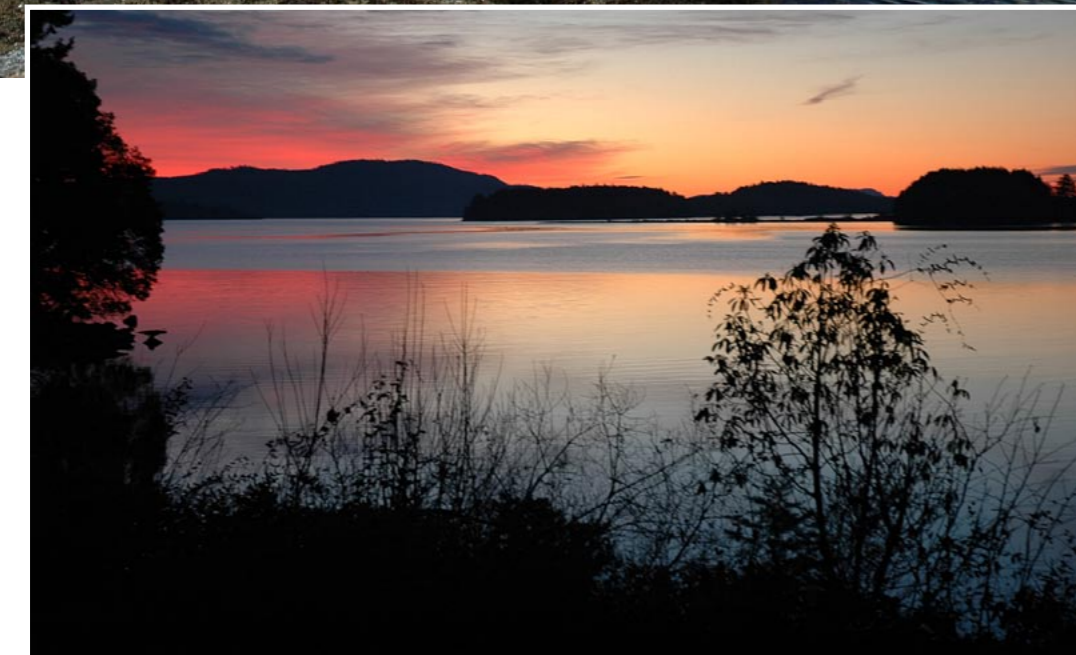
much structure left of the ship, you can still make out the paddle wheel, covered with life, nourished from the high currents in the area. Of course, we waited until the current stopped to dive!

Another site my daughter Tallen really

Diver checks out what is left of the *SS Del Nort*es sidewheel



CLOCKWISE FROM LEFT: Cedar Beach Bed and Breakfast on Thetis Island; Painted anemone found near Thetis Island; Sunset view from Cedar Beach Bed and Breakfast; Andy Lamb and Peter Luckham offer dive charters in the Chemainus area



liked was wreck of the *Point Gray*, a 105-foot long steel tugboat that ran aground in 1949. The tug lies upside down in Porlier Pass at Virago Rock, blending in with the natural kelp forest surrounding it. On her dive she observed huge lingcod, tiny Puget Sound king crabs and empty sea urchin shells. What was left of the remaining structure, including a few propeller blades, were coated with an assortment of invertebrate life!

Topside excursions

When we finished our diving we decided to check out the Shaw Ocean Centre in Sidney. This small public Aquarium was completed in June of 2009 housing 87 tons of seawater in 17 aquarium habitats. Resident critters on display represent marine life found living in this region. Two of our favourites were a wolf-eel and a giant Pacific octopus. At the time of our visit the octopus was tending to a mass of eggs. Each egg was no bigger than

a grain of rice! The thin delicate strands hung by the hundreds from within her rocky den on the ceiling. In the wild we have photographed octopus eggs with visible eyes in them! It was quite a treat to see some of the fish we were diving with the day before.

Sidney

Wrecks in the Sidney area include the *GB Church* and the retired *HMCS Mackenzie*, both placed as artificial reefs. The 175-



Diver Tallen Patrick with her treasure of urchin skeletons

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Photos: Bill Coltart and Lee Newman



CLOCKWISE FROM LEFT: Zanthids around huge rock scallop; Sydney to Vancouver run on BC Ferries; Wayne Grant searches for critters on reef near Sidney; Victoria is the capital city of British Columbia; Wayne reaches up to octopus on eggs at Shaw Ocean Discovery Centre in Sidney



foot freighter *GB Church* sits upright in 65-99 feet of water on the east side of Portland Island, scuttled in 1991.

During the early spring months, divers may find lingcod or cabezon guarding clusters of eggs on the decks of the *GB Church* and quite often octopuses under the hull on the bottom near the bow. I have always been fortunate to find several different types of nudibranchs and sculpins on this wreck. A diver can easily swim the length of the ship and even have time to check out the propeller as well.

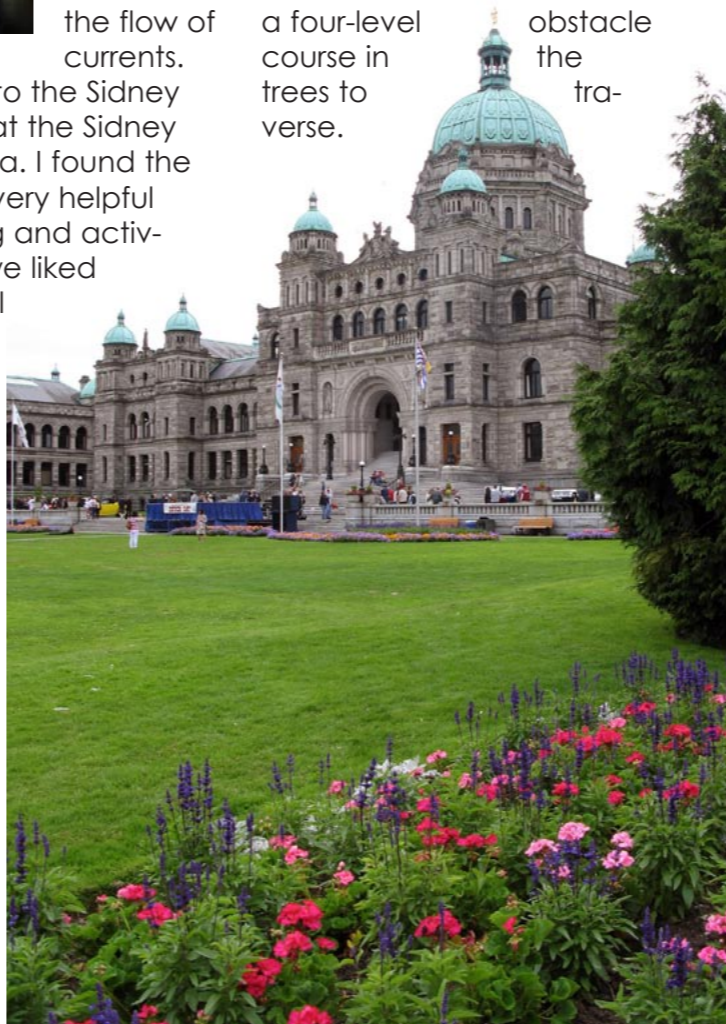
The 366-foot *Mackenzie* was scuttled in 1995 and rests upright in 50-105 feet of water off Rum Island. We have experienced currents on several dives here, causing us to select calmer slack-current dive times (when the water stops to change direction). As with the Nanaimo reefs

of steel, the *Mackenzie* is full of resident marine life, except these tend to thrive in the flow of currents. During our trip to the Sidney area we stayed at the Sidney Pier Hotel and Spa. I found the hotel staff to be very helpful with local dining and activity advice, and we liked the fact the hotel engaged in earth-friendly practices, committed to eco-friendly sustainability.

Another exhilarating activity in the southern region is ziplining. Adrena Line offers tree-top excitement above 100 lush acres of diverse temperate rainforest in the Sooke area. When I brought

my teenage granddaughter for a visit, we were treated to a day of ziplining through the treetops. What a blast!

Not long after we checked out Wild Play near Nanaimo, this time with my teenage grandson. Nanaimo's location offered a four-level obstacle course in the trees to traverse.



Again, we spent the whole day having a wonderful time of bonding. Places like this provide awesome activities to do with family members who do not dive.

Afterthoughts

With the amount of dives possible and the varied locations found in the Southern Gulf Islands region, I would advise several trips over time to see it all. Since we usually travel dur-

ing off-season when water clarity is at its best, weather can be a challenge. Communicating with the dive and tour operators before you leave will assure you have a good experience upon arrival. ■

Associate editor and underwater photographer Barb Roy and Wayne Grant are dive writers based near Vancouver, Canada.

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POINT & CLICK ON BOLD LINKS



Equipment



Edited by Rosemary 'Roz' E. Lunn

Halo 3D ♀

Time to rejoice if you are a fan of fourth element, and a passionate temperate water female diver. Fourth Element has just launched the ladies version of the Halo3D. This one-piece biomapped thermal protection garment has been made with functionality in mind—no more having to strip off in a cramped head to relieve yourself. The female Halo3D has an inverse "U" zip at the back, starting at the mid-thigh that runs above the buttocks, and down to the other mid thigh. Apparently, the diver also benefits from warmer hands because of the three layer enhanced thermal protection system located on the inside of the forearms. This helps minimise the cooling of the blood before it reaches the hands.

Fourthelement.com



LX Wing

Hollis continues to expand their equipment range with the launch of the LX Wing. This product has taken three years of research and development, and comes with a lifetime warranty. Available in both single tank and double wing versions, the LX Wing has a 360° internal retraction system to ensure a more streamlined configuration. (The diver may remove the retraction system if they wish). The low-pressure inflator elbow is centrally located to avoid tank valve or regulator interference, and the corrugated inflation hose is oval. Hollis states they have used enhanced materials for the external bladder (1680D Cordura) and internal bladder (420DPU Nylon). **Hollisgear.com**



50 limited edition

To mark it's 50th anniversary, Scubapro is launching an exclusive limited edition 'gold' version of their best selling, top performing regulator combination—the Mk25 S600. It does look rather striking. The Mk25 is a balanced piston first stage (5LP ports, 2HP ports), whilst the S600 is a balanced second stage with VIVA. (Diver-adjustable Venturi-Initiated Vacuum Assist and diver adjustable inhalation effort.) If gold is not your thing, this popular combination is also available in 'black-tech', 'chromed-brass' and titanium. **Scubapro.com**



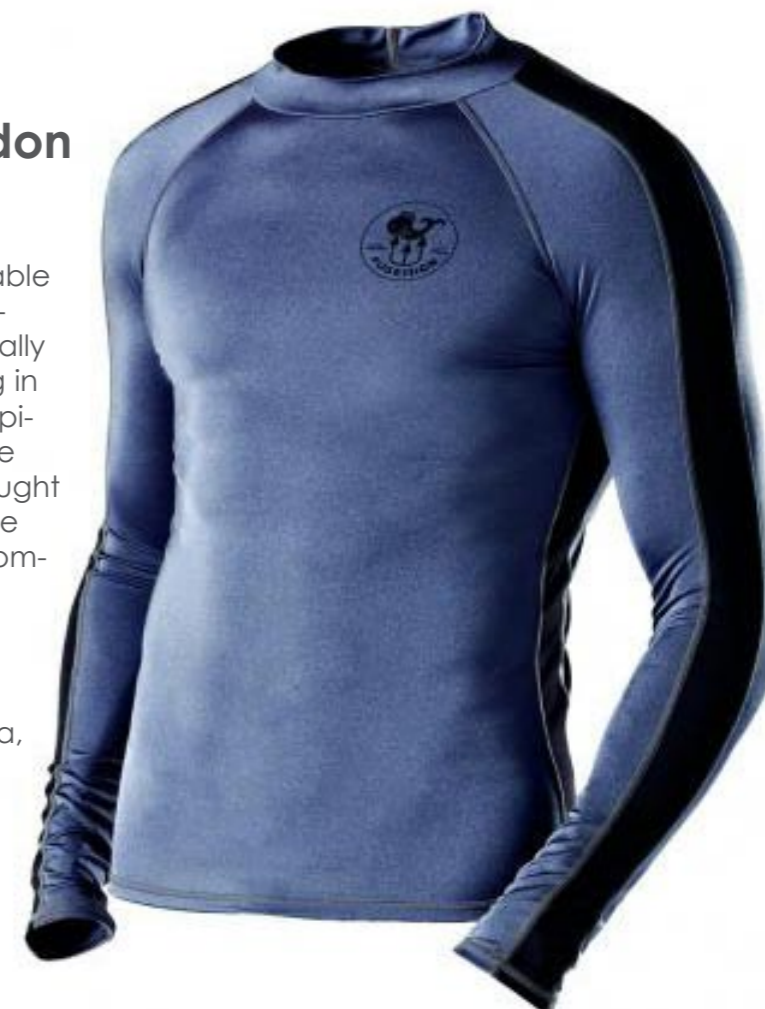
FAS-t

We spotted this on the Dive Gear Express stand at the 2013 Beneath the Sea dive show. 'The FAS-t' from White Arrow. This device aids a diver to quickly measure existing deployed cave line at a rapid pace. It can be operated with one hand and will be a useful tool for cave explorers, cave scientists and surveying enthusiasts. The nice thing about the FAS-t is that it does not require pre-knotted line or measuring tapes to be attached to the line. The four-digit resettable counter is bi-lingual (feet or metres), and can even measure in centimetres for archaeological purposes. The FAS-t has also been designed to accommodate a variety of line thicknesses, and includes attachments for a compass and survey pad. **Whitearrow.eu**



Poseidon top

Everyone needs reliable sun protection, especially when playing in and around tropical waters. Active wear garments ought to be flexible, durable and give lasting comfort, and it looks as though Poseidon's shirt ticks all these boxes. Constructed from high quality lycra, Poseidon's offering comes in two colours—luscious red and muted grey. Comes with the signature ONE stripe down the arm. **Poseidon.com**



Peter Hughes

The Comeback Kid

Edited by Peter Symes. Head shot by Peter Symes. Company photos courtesy of Peter Hughes

Dive pioneer Peter Hughes sat down with X-RAY MAG to give insight into his 40-plus years in the dive industry, what has inspired him and his thoughts on the future.

X-RAY MAG: Why? What is so cool about diving?

PH: The general silence, bubbles only, the weightlessness allowing three dimensional freedom of movement, the colours, the behaviours of the life we see... So many things...

X-RAY MAG: What does it do for you?

PH: Major stress buster! Allows one to clear one's mind of just about everything except the "here and now" of the experience at the time.

X-RAY MAG: You have spent 40 years in the dive industry. What have been the highlights?

PH: My greatest "high" or achievement after so many years might be receiving the 2011 DEMA Reaching

Out Award and being entered into the Diving Hall of Fame.

X-RAY MAG: And lows? What are the most significant lessons you have been able to draw from your long career?

PH: There have been many highs and, indeed, many lows over those years. One lesson that I think I learned early on is to always face your "lows" (and highs) with honesty and integrity, and in the end, you will persevere.

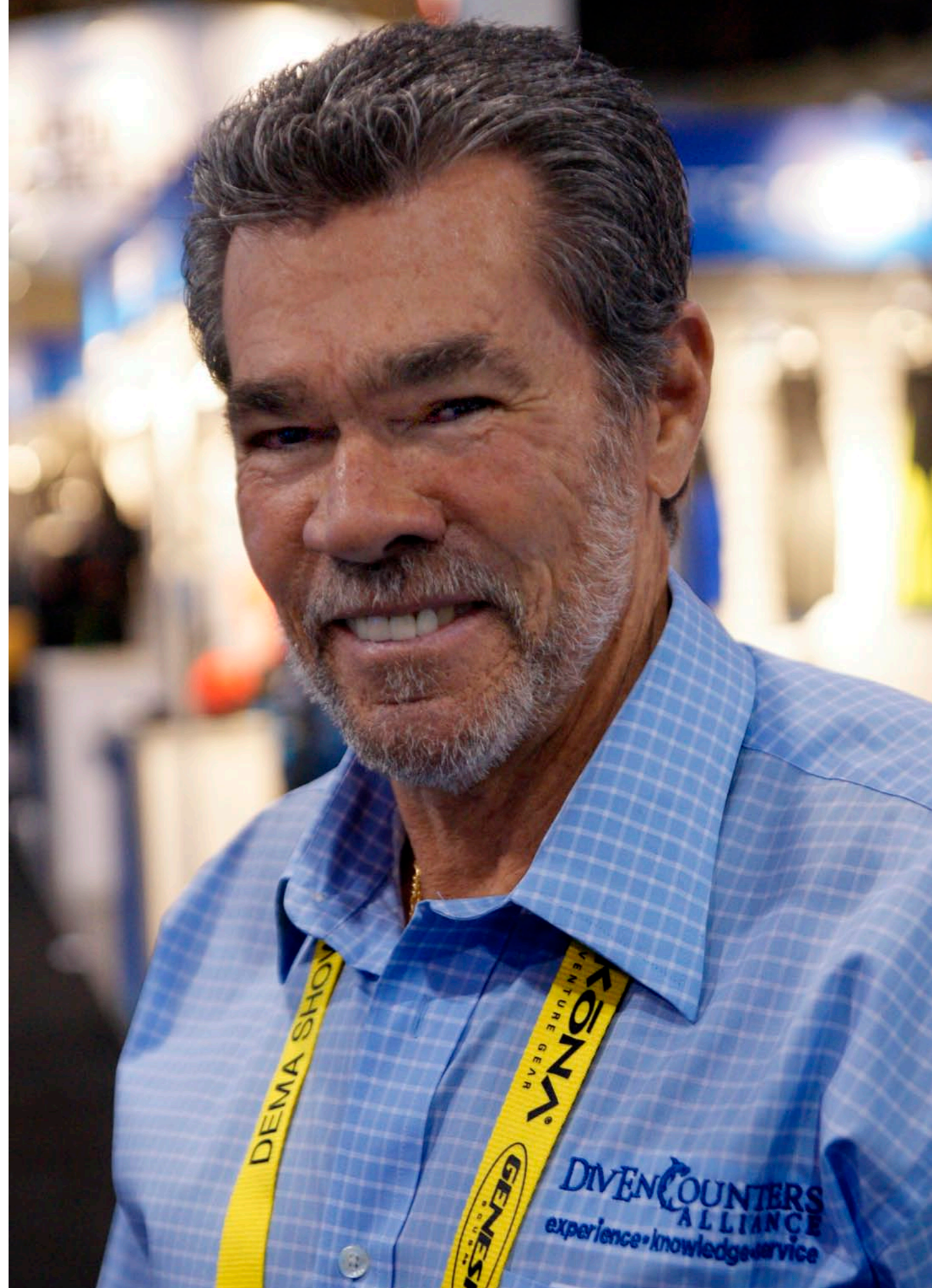
X-RAY MAG: Is there any particular wisdom or advice you would like to pass onto start-ups in the dive industry?

PH: Remember, it is a business—not a hobby! Good business practices must prevail if you want and expect success. In my side of the business, the customer is *priority number one*—treat them at all times as you'd want to be treated when you are on vacation. Remember always that your job is their vacation. They have entrusted you with their hard earned dollars and their equally valuable time. You have a responsibility, having accepted both to deliver what is expected. Again, honesty and business integrity must always take precedence over ducking the truth, or

your responsibility to your customer. Think of them as invited guests in your home.

X-RAY MAG: You mentioned to me, that watching Jacques-Yves Cousteau at a young age had a great influence in setting you off on a career in recreational diving, and you are not alone. I have spoken to many other dive industry veterans who say the same thing, and his TV shows were an early inspiration for me, too. It seems to me that he probably did more for making diving a popular past-time than any other person, living or deceased. But most people under 40 only seem to have distant notion of him.

PH: So true. As I clearly seem to remember it, my father who never dived, saw my immediate love of the ocean as soon as we boarded that 11,000 GT oil tanker in Sept 1951 on our family voyage of immigration from the United Kingdom (Scotland) to Trinidad and Tobago and did everything to encourage it—teaching me to swim aboard the ship in their above deck, canvas, salt water pool. It was within only a few years, as I became an accomplished swimmer, that he bought my first pair of goggles (no mask), a nose clip (which looked like a clothespin with pads), and a snorkel (a long aluminium



S-shaped tube with a simple mouthpiece on one end and a rubber cage with a ping-pong ball in it to prevent ingestion of water. On the other hand for my tenth birthday, he bought me Jacques Cousteau's, *Silent World*, and I was hooked for life!

X-RAY MAG: What is your take on his influence on the steady growth of diving in the late 20th century and the subsequent on-going contraction of the dive industry we have seen since the turn of the millennium? Considering that the downward trends in our industry began many years before the onset of the current financial crisis and also went on during the early years in this century where the general economic climate was quite positive. How much do you think we can attribute to the 'Cousteau-effect' fizzling out? Are role models and public figureheads really all that important? Or should we predominantly look into more mundane explanations such as bad management, or the sport just falling out of fashion?

PH: I think the Cousteau-effect and the Mike Nelson television series *Sea Hunt*-effect, for example, brought diving and adventure into the minds and homes of millions. We have nothing like that any more. Diving has maybe lost the glamour of adventure and is seen as something too mundane for adrenaline junkies.

Today, we have many more activities and sports competing for the attention of our young people. Our dive demographic is aging—never a good thing! I may be a perfect example, along with some of my closest friends and colleagues—65 years old and still playing the game.

Maybe there should be—like in the animal kingdom—some young buck vying for my position, fighting to throw me out into retirement, so he or she can take my place. Just a thought...

Back at the beginning when Cousteau gave us the regulator—I still have my Calypso camera from the mid-60's—things were simple, different, new, exciting. I learned to dive with a double hose regulator. I still have two perfectly good ones...

Back at the beginning when Cousteau gave us the regulator—I still have my Calypso camera from the mid-60's—things were simple, different, new, exciting. I learned to dive with a double hose regulator. I still have two perfectly good ones, a harness—I had to learn how to use a safety hitch for quick release in case of an emergency—a J-valve (which mechanically gave you 300 psi

after it became hard to breath—plenty of time to ascend safely), and a weight belt (always worn over the crotch strap of the harness so it could be dumped in an emergency).

Today, diving has perhaps and unfortunately become a bit mundane, as you put it. Nothing terribly exciting and nothing really new—except for, of course, the dive computers, and thank God for them—has come on line. We are just trying to build a better mouse trap.

Those into rebreathers and technical diving will disagree with me—and I can agree with them—but rebreathers and technical diving is not for the majority. Diving has become an increasingly expensive sport-hobby-activity.

So perhaps, with this said, much of the excitement has gone, in this respect. But, the

good news is that the underwater experience is now easier than ever. Diving can be a family activity like few others. Four generations can dive together, all together, on an even playing field in many world-class dive destinations, and the better mouse traps that the manufacturers are coming out with make diving so very much safer for all to enjoy.

X-RAY MAG: What was your first dive like?

PH: WOW! That was in 1957—some 55 years ago—off the beach in Tobago at a place called Batteaux Bay. I was taught by one of the YMCA's earliest instructors, a man called Bill Petry. We still keep in touch today. Bill is about 85-years old living in La Grange, Georgia.

The only time I have ever

remembered feeling quite as excited was maybe when I made my first solo flight in 1981. I am sure I was terrified on that solo flight, but there was absolutely no fear on that first dive and after it. At ten years old, I knew I wanted to be a diver when I grew up. I started a career in diving, and at 17 years old,

...the good news is that the underwater experience is now easier than ever. Diving can be a family activity like few others. Four generations can dive together, all together, on an even playing field in many world-class dive destinations...

The Pro behind Techni-Pro.

Peter Hughes discovers the first and only fog free mask.



that had bought the British oil company Regent Oil that my parents immigrated to Trinidad to work for—and I entered the oil industry as an apprentice oil field production engineer.

This lasted until I was 21 years old, when the call of the ocean was too great. I quit and returned to Tobago to work for the man that had taught me to dive, and my career in recreational diving was off and running—been at it ever since!

X-RAY MAG: What is the best memory or experience diving has been giving you?

PH: This is difficult to answer. I have had many, many exceptional experiences. Along the way, I have lost hundreds of thousands of dollars and gone broke a couple of times. I have made excellent money from time to time, too. I lacked any type of advanced education but learned

along the way from my better educated colleagues and even served as Vice President, an officer of a public company for five years. I learned so much while there about business, but I also learned corporate America was not for me.

X-RAY MAG: Are there any new places you would like to see?

PH: Due to my choice of career, I have been more fortunate than most. I have

I was an apprentice diver on the dock in Port of Spain, Trinidad, working for South American Marine Operators and Salvage, Ltd., making TT \$50.00 a week—about US\$25.00 a week at the exchange rate at that time. I loved it, but the job did not last. One year before hard times hit the company, I was laid off at only 18 years old.

My father now insisted I get a real job and used his influence with Texaco Trinidad, Inc—the American oil company



dived in so many exceptional places, but I am always ready for a new dive experience—as long as the water is clear and warm-ish! This becomes ever more important the older I get, and I'm not sure I'll ever get excited about cold water diving.

X-RAY MAG: What were the differences in creating your former liveaboard company, Peter Hughes Diving/ Dancer Fleet, and setting up DivEncounters, and how did your past experiences aid you in setting up your new venture?

PH: Peter Hughes Diving was the U.S.-based marketing, sales, reservations and management company for the entire Dancer Fleet. At its prime, there were eight vessels in the Dancer Fleet, and all were controlled by Peter Hughes Diving. Five of the eight were owned directly by my wife, myself and the bank, and three were operated under a marketing/management agreement.

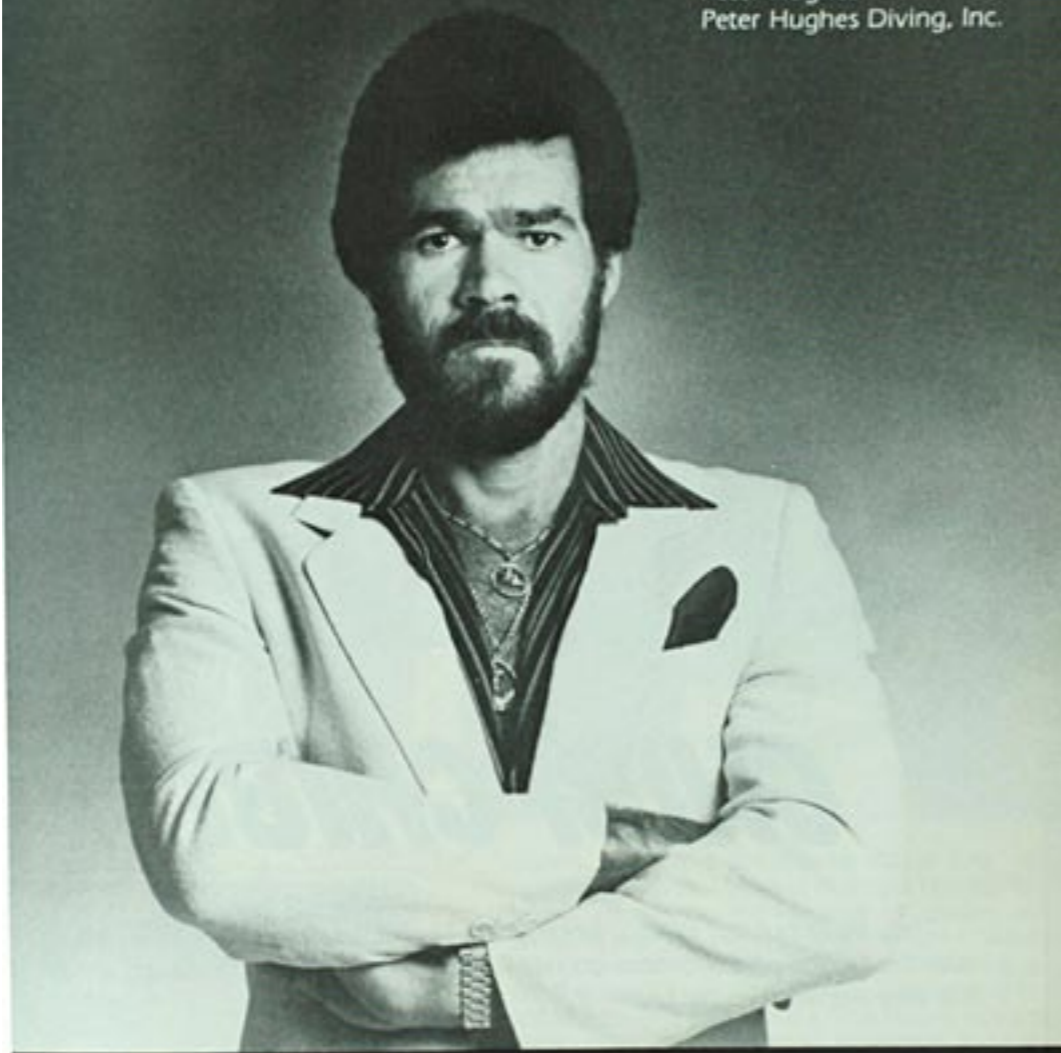
This business model allowed for Peter Hughes Diving to make all but the most basic sales and operational decisions for all vessels in the fleet. We set what I call cookie cutter standards that all vessels had to comply with—sometimes a good thing but more often a bad thing, as no two vessels or destinations are ever the same environmentally, geographically, politically or socially, and that could and did lead to problems.

It also had certain on-board advantages,

and the Fleet prospect developed a certain trust along with expectations from our guests. It was a full time and never easy task to maintain those standards and meet those expectations, and I think we did a darned good job. But after so many years at the helm, and seeing the different economic conditions developing, I felt I could do things differently and better. So, I sold my company in 2008, remained employed as president for two years to assist the new owner wrap his arms around it, and

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resigned in 2010.

Knowing the Fleet mentality, knowing the Fleet operations strengths and weaknesses, I was confident I could build a better mouse trap. With this conviction, I set about approaching who I had come to recognize as the "Best Live-aboards in the Best Destinations" around the world with my plan and idea for the DivEncounters Alliance, taking full advantage of the upsides to a fleet approach but dumping the many downsides, encouraging independent owners and operators—all experts in their respective areas—to come together, offering an Alliance of experience and expertise, with all the guest advantages of fleet operations but none of the disadvantages.

With the Alliance, the partners benefit from each other's extensive experience, as do our guests. Our guests also benefit by way of our Alliance Awards program. Through the Alliance, guests can travel with a great sense of confidence when choosing an Alliance vessel for their live-aboard vacation.

X-RAY MAG: What kind of commonality do the DivEncounters partners share, or what criteria must potential new partners meet to join the alliance?

PH: All partners have been deemed to be the most, or at least among the most, experienced in their respective area. All must have an unquestionable business reputation. All must have all operating per-

mits, licenses, etc, firmly in place. All must adhere to recognized safety standards, as determined by the IMO (International Maritime Organization). All must own and operate a vessel of modern standard and capability. All must recognize the value of their partners to them and of them to their partners, and so never see any as a competitor but as an ally. This allows for some incredible cross-marketing opportunities and builds a sense of confidence in the Alliance within the consumer side of our industry.

X-RAY MAG: I understand that you were a primary consultant in the design of M/V Galapagos Sky. Which particular considerations go into the layout of a live-aboard vessel?

PH: Correct. The M/V Galapagos Sky was launched in 2000-2001 as the M/V Sky Dancer, operating with me in the Dancer Fleet under our standard marketing/management agreement until 2010, when the owner decided to trigger his escape clause in the Dancer Fleet agreement and join us as founding member of the DivEncounters Alliance.

It was in late 1998-early 1999 (approximately) that the owner approached me in my Miami office with his plans to expand his Galapagos operation from three beautiful and very successful 20 pax live-aboard eco-yachts with a live-board dive yacht.

We worked on the blue prints together with his naval architect over several weeks, changing the excellent but basic eco-yacht into a luxury, purpose-built live-aboard dive vessel. There were many criteria that we looked for, but first and foremost was guest comfort and convenience while never compromising on safety for either.

The words, "guest comfort and convenience", cover just about everything, as the details include everything from dive deck layout, to galley layout, to cabin format,

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to en-suite facilities, to safety equipment, to engines, generators, compressors, water makers, etc., etc. A good liveaboard dive vessel is a working, self contained boat, giving the guests on board a yacht-like living experience between their dives.

X-RAY MAG: *In which ways are today's clientele different from the early customers? Are their expectations and needs different? Do they now come already equipped with a better or different environmental understanding and awareness?*

PH: There are two answers to each of your three questions: yes and no. For the most part, today's clients, or guests, are very different from those from the earlier days. But refreshingly, sometimes there are those that are almost exactly the same. But these are in the minority.

Today, many more women travel on liveaboard dive vessels than in the early days, and I think my wife is greatly responsible for this. In 1991, with only the *M/V Sea Dancer* in our fleet, I told her I intended to build or convert a second liveaboard. After telling me that I was "nuts", she further informed me that if I was indeed intent on such a silly idea, I "better damn well build a boat she could live on when we went broke". And she immediately got involved in integrating the "comforts of home" into our second vessel!

These comforts of home have since become the benchmark for the industry. With this upgrade to the industry benchmark some 20 years ago, guests today have

much higher expectations of what their living quarters will offer while on board, including their culinary expectations (there are some amazing dietary request sometimes, with guests forgetting that many liveaboards operate in truly third world countries), ease of and access to the diving, etc.

Environmentally, thankfully, many are much better informed and therefore caring. But unfortunately, we still see too many poorly trained divers with little or no buoyancy control, doing damage to the environment. Others are too intent on their own pursuits to care. But again, thankfully, these are the minority. Divers are the world's eyes to our deteriorating ocean conditions and are our best ambassadors for change.

X-RAY MAG: *I have often heard that people may i.e. put off getting their kitchen renovated for another year, or not get a newer car model, rather than give up their vacations, or trips,*

Today, many more women travel on liveaboard dive vessels than in the early days, and I think my wife is greatly responsible for this. In 1991, with only the M/V Sea Dancer in our fleet, I told her I intended to build or convert a second liveaboard. After telling me that I was "nuts", she further informed me that if I was indeed intent on such a silly idea, I "better damn well build a boat she could live on when we went broke". And she immediately got involved in integrating the "comforts of home" into our second vessel! These comforts of home have since become the benchmark for the industry.

or down-size a bit and go for a cheaper offer. Do you recognise this picture, and going forward, how do you respond to the challenges of the current economic climate?

PH: We certainly see the trend referred to and realize the discounted trips present a challenge. We respond by our educational efforts: price vs value—know the difference.

Yes, in the short term, deep discounts as we see flooding the market these days look good to the consumer, especially those with a limited vacation budget. But the reality is, we know what it costs to operate a world-class liveaboard dive vessel. And while (as aforementioned) no two destinations are ever the same costs are higher today, everywhere, than they have ever been, none of us get into business for "charitable purposes" only, and so have the

right to make a reasonable return on the considerable investment represented by the costs involved in owning any decent liveaboard dive vessel.

If a reasonable price and therefore return on investment cannot be realized, then something must give. I have always said the same about the airline industry. I'd rather pay a reasonable fare amount than see aircraft maintenance or personnel training suffer when I'm going up 35,000 feet in the air. So, the public needs to always keep that in mind when pressuring for discounted, cheap trips.

X-RAY MAG: *Outside of the dive industry, who are your role models*

Divers are the world's eyes to our deteriorating ocean conditions and are our best ambassadors for change.

and where do you seek inspiration?

PH: I have been so deeply focused and involved in the dive industry and for so long, I unfortunately

cannot point to any individual I can say gives me inspiration. I do, however, look to huge companies, handling thousands of customers for inspiration and direction—companies such as Disney World, Royal Caribbean Cruise Lines, any major airline—comparing our U.S. airline operations to some of the overseas (Asian in particular) airline operations, etc. There is so much to be learned from these companies, and some really do inspire you to the next level. ■



The Galapagos Sky

Diving with Seals Farne Islands

United Kingdom

Text and photos
by Lawson Wood

The Farne Islands are a small group of some 33 rocks and islets (depending on the state of the tide which has a rise and fall of over 6m or 20ft) located off the north Northumberland coast of England. At full tide, only 23 larger rocks and islands are visible, but all of those are eye catching. The entire group are a National Trust protected area and have numerous wildlife preserves, notably for their seabirds and seals.

There are over 50 historic shipwrecks found directly around these islands, however, it is for the encounters with grey seals that divers and underwater photographers keep returning to this picturesque group of islands just 3km offshore.

There are numerous sightseeing boats and dive boats that run regular trips to the islands, but Paul Walker of Farne Discovery (www.farneisland-divers.co.uk) I personally feel, has the most experience and empathy for the seals and the most knowledge about the hidden shoals, wrecks, reefs and currents, which can play havoc for inexperienced divers and boat skippers.

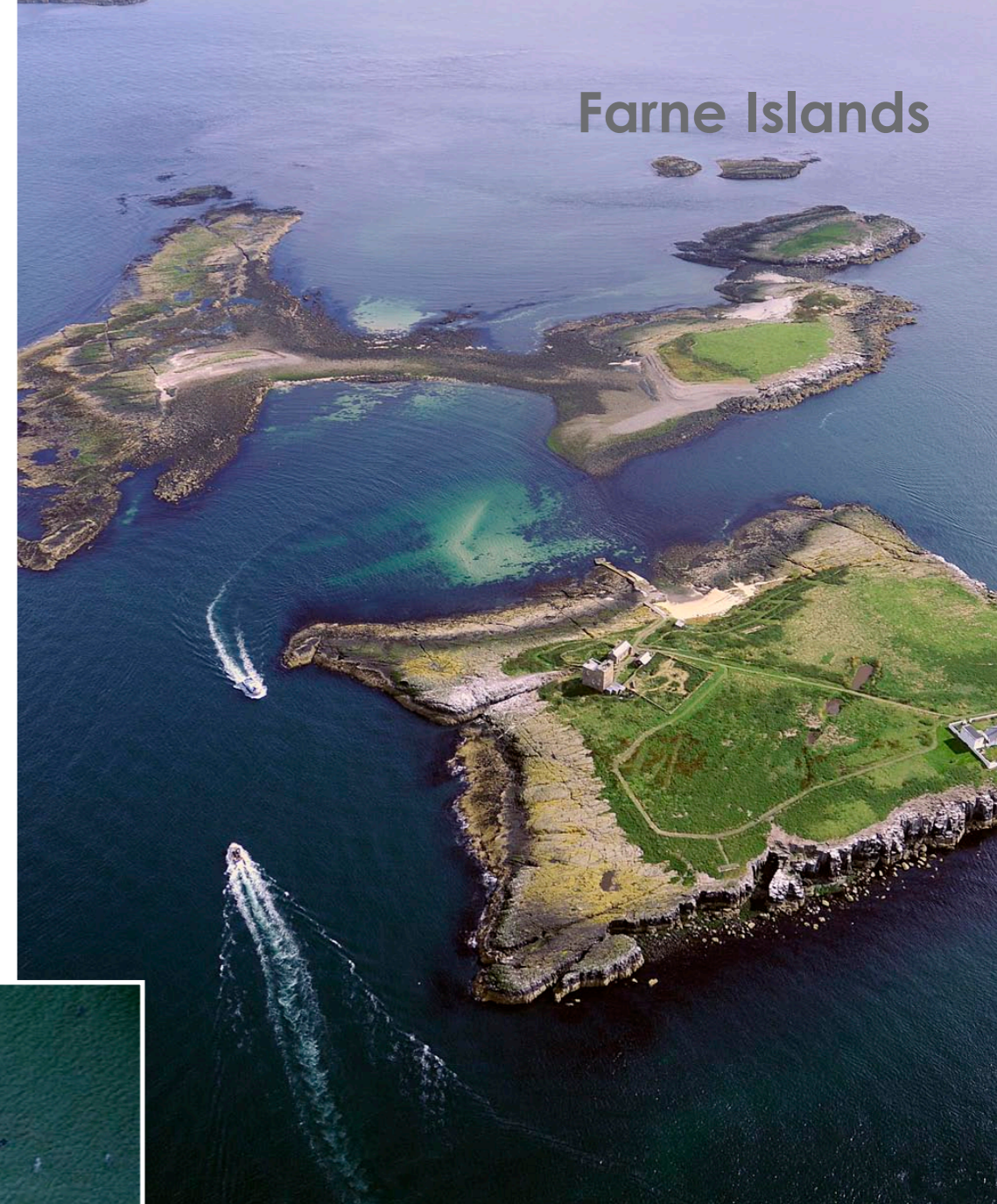
Playful grey seals in the waters off the Farne Islands, Northumberland, England





Grey seals (left) resting on rocks, Holy Island; Aerial view (right) of the Farne islands

Farne Islands



Lindisfarne. St.Cuthbert followed in his Holy footsteps and settled on the islands in 676AD where he built a 'cell' for himself, a well for fresh water and rooms or 'hospitium' for other visiting monks.

In ancient legend, St.Cuthbert drove out all the evil demons and spirits from the inner islands, yet their strange wails and screams could still be heard on the farthest rocks and were thought to be the spirits of drowned sailors; now it is more generally accepted as the sounds from the huge colony of grey seals.

St.Cuthbert was also the first person to officially protect wild birds and

Geologically, the islands are part of what is known as The Great Whin Sill, a 30m (100ft) thick seam of diamond hard dolomite that was formed in recent geological time. Its aspect is of columnar shape cut with numerous fissures, the most obvious being 'The Stack' off the southern edge of Farne Island, which is over 20m (66ft) high. Staple Island has three huge individual stacks called The Pinnacles. Most of the larger islands are now topped with peat and are very fertile with the droppings of the seabirds mixed with seaweeds.

Built in 1811 and 1826, there are two lighthouses on the islands—one on Farne Island and the other out on the Longstone. Now fully automated, the very early lighthouses first burned their rudimentary light to warn sailors of the treacherous reefs and shoals

back in the 16th century.

Most people know of the Farne Islands from the outstanding heroism of Grace Darling and her father William Darling, one of the lighthouse keepers of the Longstone Lighthouse. On 7 September 1838, Grace Darling and her father rowed out to the shipwrecked *Forfarshire* and managed to rescue nine seamen in absolutely atrocious sea conditions. This act of selfless heroism attracted massive media attention and made Grace Darling a national heroine.

The Farne Islands were first inhabited by St.Aiden in 635AD, before he became the Bishop of



Massive colony of grey seals on beach, Holy Island

laid down the rules for the safety of the eider duck population, which was so vital for the collection of eiderdown, still known worldwide for its thermal properties.

Seals, or 'celys' as they were first known, were actively hunted by the monks as a high protein food source as well as providing oil for their lamps. Seals also provided the monks with a very profitable income—that and the salvage of

shipwrecks of course! The monks also farmed, raised cattle, fished, collected seabirds' eggs, and peat for their fires and kept one island reserved for the burial of lost sailors who had drowned and washed up on the islands' shores.

The name *Farne* is a derivative of the ancient Celtic name *Ferann*, which roughly translates as *land*. I imagine that this group of large rocks was the first point of contact that raiders or settlers from Europe first saw of this beautiful low lying coastline. Individual names to the rocks date back to the sixth and seventh cen-



There are massive colonies of sea birds such as puffins (left) on some of the islands; Farne Islands from above (right); Location of Farne Islands on map of British Isles and global map (below)



NASA

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most cod species, salmon and sea trout, flatfish, herring and sandeels. Being opportunistic

feeders, when fish are in short supply, they will eat almost anything, including crab and lobster, octopus and squid. There are huge aggregations of sandeels to be found around the Farne Islands in the spring months, and this massive natural resource is also very important to the colonies of puffins and other seabirds found on the ancient rookeries on the islands.

turies and have remained almost unchanged to this day with names such as Swedman, Wamses, Knavestone, Wedums, Crumstone, Glororum Shad, Brada and Callers, to name but a few of these evocative sites. Some are more known for the massive colonies of terns, eider ducks, gulls and puffins, whilst others have a shifting population of itinerant grey seals.

These seal colonies are entirely dependent on the weather and height of the tide, as they like to bask in the sun on flat rocky outcrops that have direct access to deep water, directly off the shore.

Sheltered locations and snug little bays are also favoured by the seals, and with a resident population of over 4,000 grey seals, there are plenty of opportunities for everyone to experience the thrill of a lifetime.

On nearby Holy Island or Lindisfarne, there are two more massive colonies containing another 5,000 grey seals. Over 1,600 seal pups were born in the 2012 season. While the mortality rate in the first year alone is very high at over 50 percent, the number still puts a tremendous strain on the population's food source, resulting in large numbers

of seals migrating to other parts of the United Kingdom. Tagged individuals from Scotland have been found as far away as the Norfolk coast of England and the Baltic Sea. One particular individual was recorded as moving from the Moral Firth in northern Scotland to the Farne Islands, back up north to the Faroe Islands on the way to Iceland and southwest again to Ireland before the transmitter's battery failed!

The grey seal

Known as *phoque gris* by the French and *foca gris* by the Spanish, the grey seal (*Halich-*

oerus grypus, meaning "hooked-nosed sea pig") is the most common seal found around British coastal waters—in fact, much more common than the common seal (*Phoca vitulina*).

The grey seal is a true seal—the only one classified in the genus *Halichoerus*—and is the largest carnivore recorded in British waters. It is found on both sides of the Atlantic and is also known as the Atlantic gray seal or horse-head seal.

It is one of the largest seals with bulls reaching 2.5 to 3.3m (8.2 to 11ft) long and weighing 170 to 400kg (370 to 880lb). The females

or cows are much smaller, typically 1.6 to 2.0m (5.2 to 6.6ft) long and 100 to 190kg (220 to 420lb) in weight. The males have a straight head profile—a classic arched 'Roman' nose with large wide-set nostrils—and few spots on the body, which is generally darker than the females. They often have many scars around their necks earned from either protecting their harem or gaining superiority in a group. The females are generally a silver grey colour with light brown patches.

Diving down as deep as 60m (200ft), seals require an estimated 5kg (11lb) of food each day, but the females never feed during the breeding season, until their young pups have weaned. They feed on a wide variety of fish including



Puffin returns with fish from the sea





THIS PAGE: Diving with grey seals in the waters of the Farne Islands

Farne Islands

Islands. Other large colonies on the east coast include the Isle of May in the Forth estuary of Scotland and Donna Nook in Lincolnshire.

The pups are covered in long, soft, silky cream hair, and although they are quite small when first born, they rapidly put on weight, suckling their mothers five to six times each day for the first three weeks. This fat rich milk ensures the rapid growth rate of the pups, and the mother will lose a quarter of her body weight during this period. Within a month, the pups have tripled or quadrupled their weight, have replaced their sleek hair with the dense, waterproof, adult seal skin and are abandoned by their mothers to fend for themselves.

The females soon become fertile after weaning the pups and may mate with a number of different bulls. Pregnancy lasts for 11.5 months, with the fertilised embryo remaining unattached for the first 3.5 months. This delayed implantation is common in a number of aquatic species, resulting in seal pups all being born around the same time each year.

Seals can grow quite old, with records held for males over 35 years and females, less so, at 25 years. As usual, there are always exceptions to every rule, with one old female in the Shetland Islands reaching 46 years of age!

Normally, females give birth to only one pup and are known to abort additional fetuses. However, it was recorded on the Farne Islands in November 2012 that twins were born for the first time known to scientists.

As grey seals are at the top of the food chain in British waters, they are also susceptible to the accumulation of pollutants and heavy metals such as PCB's (polychlorinated biphenyls). Females feeding on polluted fish may fail to breed resulting in hindering the recovery of some populations that have been reduced by disease.



Pups are born from September to November from Canada down as far as the U.S. state of Virginia and from November through February in the western Atlantic. It is widely understood that the rising seal populations in the Cape Cod area of the U.S. state of Massachusetts were the reason that great white sharks started to be seen so frequently.

Protected under the Conservation of Seals Act of 1970, no hunting is allowed of the seals, but the rising numbers are causing increasing alarm to inshore fishermen who are complaining about dwindling fish stocks and are urging governments to take a fresh stance on the numbers and allow for culling to take place. Seals are allowed to be hunted legally in Sweden and Finland.

The largest colonies in the eastern Atlantic are found in North Rhona off the Hebrides in Scotland, and approximately 12 percent of the world's population is found in the Farne



Diving with the seals

Paul Walker of Farne Discovery has an empathy with the seals and great knowledge of their habits, habitats and movements. He is able to find the best

Farne Islands

THIS PAGE: Scenes from diving with grey seals of the Farne Islands; Numerous sightseeing boats and dive boats (below) run regular trips to the islands



fins, or even try and pull your dive hood off! As soon as you turn around to confront your attacker, it scoots off or just stays in mid-water acting all innocent.

Turning around to photograph your first subject, you discover that it has disappeared in a cloud of bub-



est hunters in the coastal waters.

Conservation status

The grey seal is classified as Least Concern (LC) on the IUCN Red List. They are protected in Europe under Annex II and V of the EC Habitats Directive and Appendix III of the Bern Convention. In Britain, the grey seal is protected under the Conservation of Seals Act 1970 (closed season from September 1 until December 31) and listed under Schedule 3 of the Conservation Regulations (1994). In Scotland, it is still legal—within reason—to shoot seals that are damaging fish nets as long as it is outside the closed (breeding) season, although there is provision in the Act to completely protect them. ■

A founding member of the Marine Conservation Society, Lawson Wood has authored and co-authored over 45 books mainly on the underwater world. He is the founder of the first Marine Reserve at St. Abbs and is the first person to be a Fellow of the Royal Photographic Society and the British Institute of Professional Photographers solely for underwater photography.

sheltered conditions for great underwater wild animal interactions with these massive sea mammals. Depending on the rising and falling tide as well as current conditions, Walker will lead a small group of divers from his Rib Farne Discovery to the best locations for two dives.

Seals are everywhere. There are often literally hundreds of seals in the water, all of them looking at you on the bright orange boat (have you ever had that feeling of being watched? Well, multiply that a hundredfold). The younger yearlings and sub-adults are the most curious, often coming right up to the side of the boat before

you even get in the water.

However, once in the water and approaching the first seals on the surface, they are quite skittish and will quickly disappear beneath the waves and vanish into the kelp covered canyons. Swimming slowly, it pays just to stay still mid-water or crouch on the seabed and wait for the seals' curiosity to overtake them. They just cannot help themselves and soon come right up to you and seemingly pose for the camera.

As seals can slow their heart-beat down whilst underwater, they can stay submerged for around 15 minutes and often appear to be asleep on the sea-



bed or amidst the shallow kelp. This is just a ruse to ambush you! Whilst you are 'sneaking' up to photograph the resting seal, another seal has circled behind you and may start to tug at your

bles, only to have your attacker have another fun go from behind at your expense. They clearly have enormous fun doing this, and it gets quite infectious, with the divers enjoying the experi-

ence just as much as the seals. These encounters are not to be missed, and the Farne Islands are one of the best and safest locations for in-water wild animal encounters with one of the sleek-



turtle tales



Edited by
Bonnie McKenna

Heat could be stifling turtles' swimming abilities in Australia

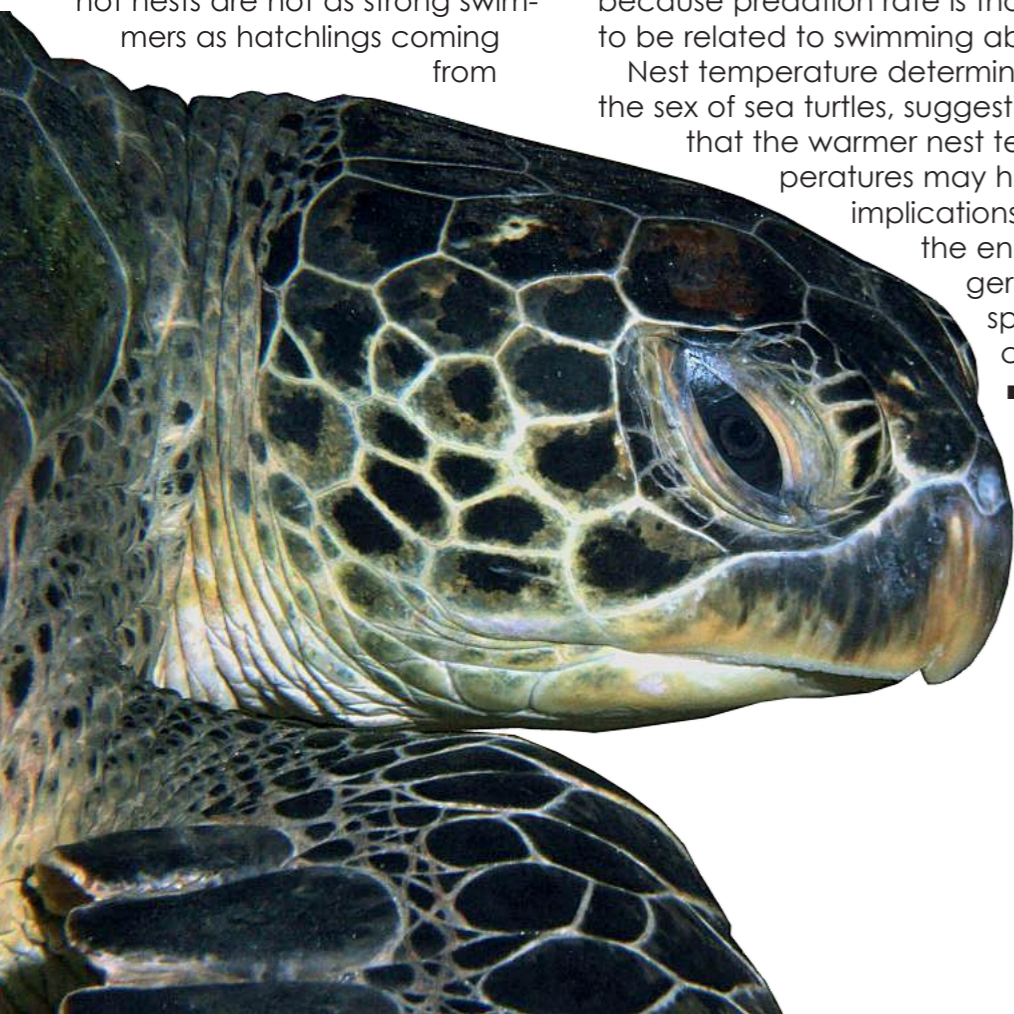
Zoologist Dr David Booth, for the University of Queensland's School of Biological Sciences, said green turtle hatchlings from Heron Island did not seem to be swimming as well as usual.

"Initial impressions are that hatchlings emerging from these hot nests are not as strong swimmers as hatchlings coming from

cooler nests recorded in previous years," said Booth.

Booth noted that if climate change results in consistently high nest temperatures, then the poorer swimming ability of hatchlings may have a negative impact on the number of hatchlings because predation rate is thought to be related to swimming ability.

Nest temperature determines the sex of sea turtles, suggesting that the warmer nest temperatures may have implications for the endangered species. ■



Leatherback sea turtle will be extinct in 20 years

The western Pacific leatherback turtle a common sight in waters outside the San Francisco Golden Gate could be extinct in 20 years if more is not done to protect its habitat and nesting sites, a team of international experts concluded.

The worldwide population of the Pacific leatherback has declined more than 90 percent since 1980 because of commercial fishing, egg poaching, destruction of nesting sites, degradation of foraging habitat and changing ocean conditions.

Marine biologists believed the global population had stabilized but a new study shows the popu-

lation is in decline.

In 2011 researchers counted 1,532 nests on the Bird's Head in Indonesia as compared to 14,455 in 1984. That averages out to a 5.9 percent drop in nests per year. The study estimates that are now only 500 turtles nesting on the Indonesian population. If this trend continues the species will be extinct in 20 years.

"Our view is that if we don't take dramatic action to eliminate threats to the leatherbacks both in our waters and abroad, we will lose this incredible, iconic animal forever," said Geoff Shester, the California program director for Oceana. ■

Georgia beaches 'critical' for loggerheads

Twenty-three miles of beach along the East and Gulf Coasts beaches of North America are proposed for critical habitat for marine turtles.

The beaches were chosen are those able to support the highest density of nest among the genetically and geographically distinct populations of loggerheads.

Loggerheads were listed as a threatened more 30 years ago. Today, the species is recognized as nine distinct population segments.

Later this year National Marine Fisheries Service is expected to designate the marine portions of the critical habitat as foraging areas offshore.

According to a study in the journal of *BioScience*, published in 2005, species with critical habitat for more than two years were more than twice as likely to have an improving population trend as those species without. ■

Loggerhead turtles threatened by gillnet fishing in Baja, Mexico

Endangered loggerhead sea turtles migrate thousands of miles across the Pacific Ocean through deadly longlines and plastic pollution from their nesting grounds in Japan.

They arrive along the Baja California Peninsula in Mexico to

feed on red crabs and many stay for decades to grow and mature. The red crabs attract intense fishing, and the loggerheads are confronted with thousands of gill nets stretched across the Baja coast.

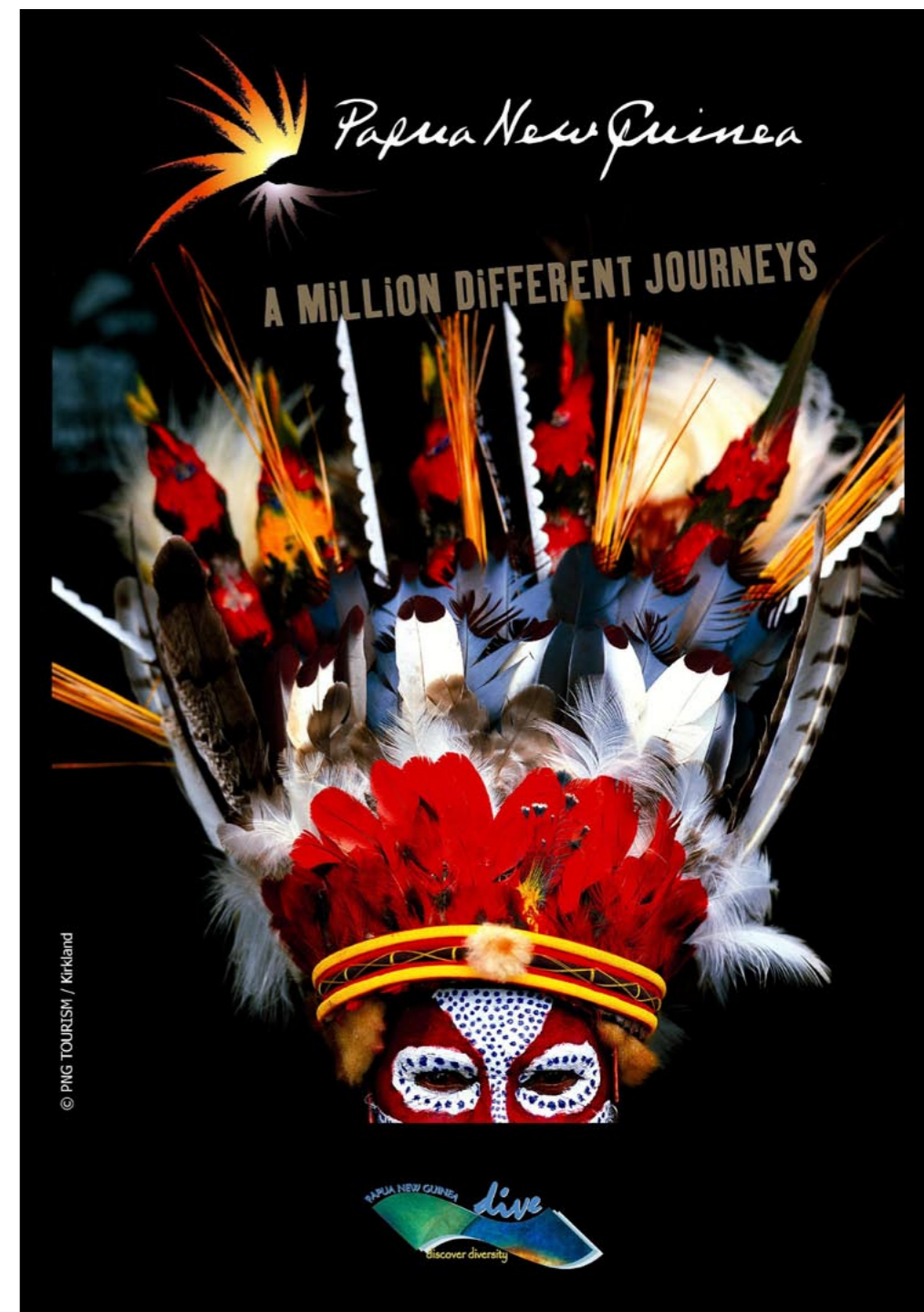
Last summer a 600 percent

increase in dead sea turtles was observed along the Baja coast, an area famous for gray whales and an important eco-tourism destination.

A shocking 483 loggerheads washed up on 40 km of shoreline last July and scientists estimate

more than 2,000 loggerheads were killed last year in gillnets alone.

The bycatch rate of loggerheads in Mexican gillnets is among the highest in the world and it is jeopardizing the survival of the turtle species. ■



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Hawksbill sea turtles are monogamous

Scientists from the United Kingdom have gained insights into the secret sex lives of hawksbill sea turtles. Little has been known of the mating behavior of this endangered species, as they spend most of their lives underwater in the far reaches of the oceans. The researchers studying the turtles in the Seychelles were surprised to find out that the animals were, for the most part, monogamous.

According to the study, which was published in the journal *Molecular Ecology*, the female hawksbill stores sperm from one male and uses it for fertilising several clutches of eggs. There are other species that practice this type of "sperm storage" including birds, reptiles and some tortoises, terrapins and turtles. But the females of these species store viable sperm from multiple partners for an extended period of time, which means that their eggs are at times fertilised by several males.

So the researchers from the University of

East Anglia, Norwich, studying the hawksbill turtles on Cousine Island in the Seychelles did DNA testing on hawksbill turtle hatchlings to find out how many fathers were involved in fertilised the eggs. Their findings showed that most of the egg clutches were fertilised by only one male. In addition, no males during the 75-day mating season had fertilised the eggs of more than one female.

Research team member Dr David Richardson told the BBC, "We were surprised that they were so monogamous

because ... genetic monogamy is actually the exception in most animals, not the rule."

But there isn't a lack of males for females to mate with, according to the study findings. "It's very unlikely that it's just a few males hanging around offshore," said Richardson. "We think they're mating with males a long way away, wherever they're normally foraging and feeding which can be all over the western Indian Ocean," he said.

It is important for the survival of the species that there is a large number of males contributing to the next generation of turtles. The more males, the more genetic variation. The higher the level of genetic variability, the better the turtles can respond to changes in environment, new diseases or other threats, said Richardson. ■

State of California seeks more science before opening protected sea turtle habitat to swordfishing

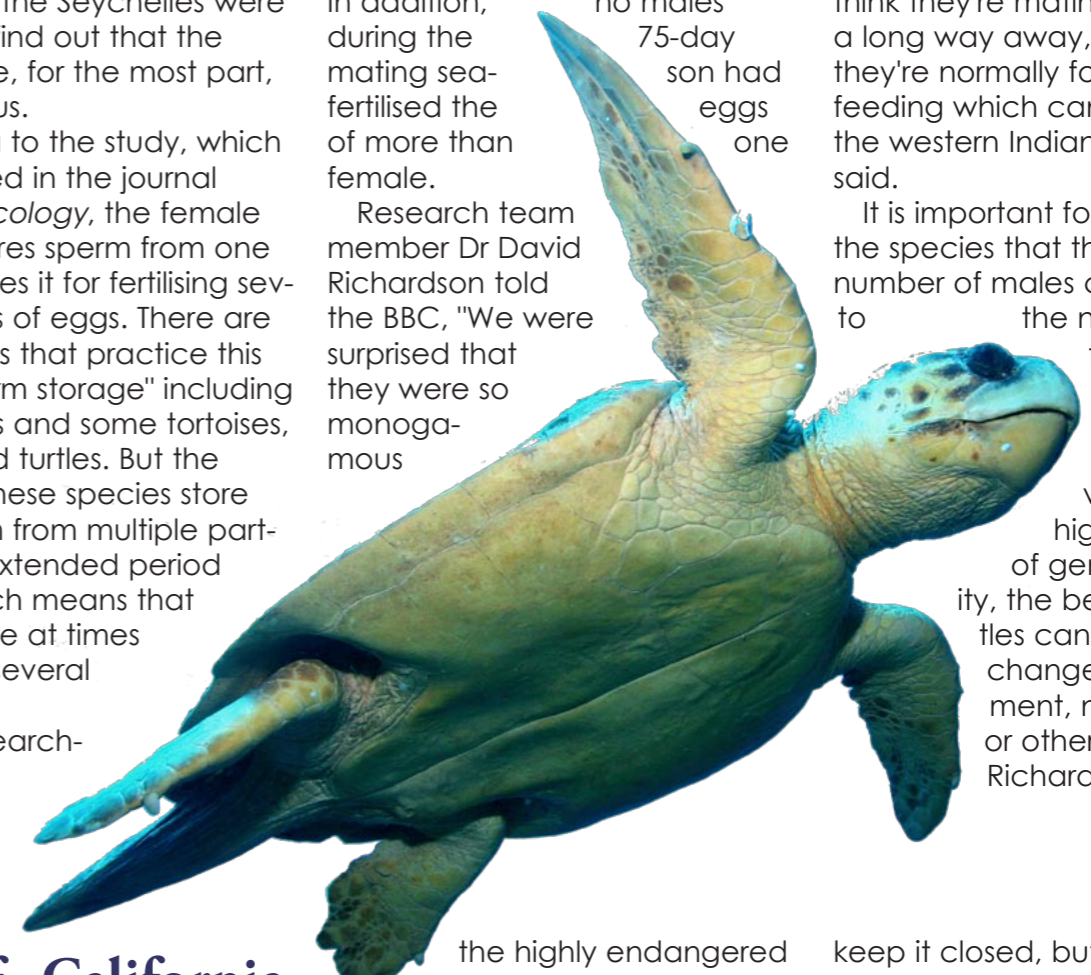
The U.S. federal fishery management voted to maintain the no-fishing zone along the California and Oregon coasts to protect

the highly endangered leatherback sea turtle for at least a year while they gather more scientific data. The fishery delayed immediate actions on expanding the California gillnet fishery into the Pacific Leatherback Conservation Area, but decided to take up the swordfish gillnet expansion in 2014 after another year of study.

Teri Shore, program director of the Turtle Island Restoration Network said, "If they look seriously at the science, they will

keep it closed, but we fear politics, not science may dictate the ultimate decision."

Ocean conservation groups, the California Coastal Commission, California State Assembly, scientists and thousands of people have registered opposition to any expansion of the drift gill net fleet into protected sea turtle habitat. The action would increase the risk of entanglements of endangered sea turtles, whales, dolphins, sea lions, sea birds and thousands of unwanted fish including sharks. ■



Edited by
Catherine
GS Lim



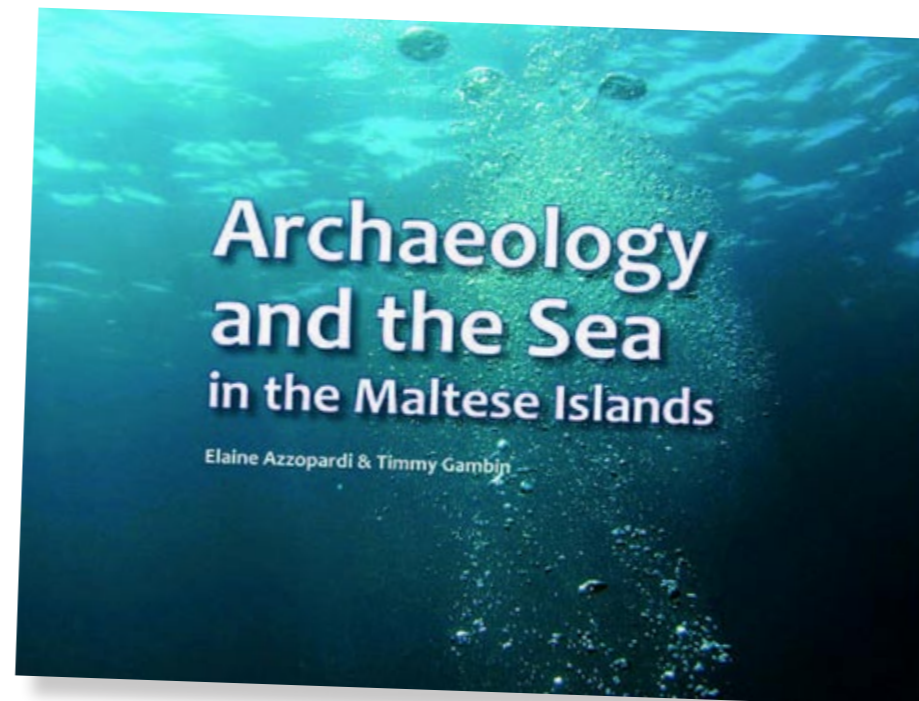
Beautiful Whale

Photographer Bryant Austin's method of photographing whales is a testament to his dedication to his art and the passion he feels toward the whales. By immersing himself underwater for hours each day, remaining motionless, these giants of the oceans are more likely to approach him, sometimes coming as close as ten feet. The result is this impressive book featuring many close-ups and full-body portraits of these magnificent creatures. If the cover photo is anything to go by, this book is truly a beautiful work to be cherished by all.

Hardcover: 124 pages
Publisher: Abrams
Publication date: 2 April 2013
ISBN-10: 1419703846
ISBN-13: 978-1419703843

Underwater Archeology

Being in the centre of the Mediterranean Sea, Malta and Gozo are a familiar sight to ships passing through the islands' waters. In contrast, the region's maritime archaeology has not been in the limelight – till now. Thus, this book attempts to remedy the situation by examining the history of Malta's underwater archaeology and providing an overview of the some significant discoveries of the archipelago's seabed. If you intend to dive in this region soon, having a knowledge of its maritime archaeology can definitely enrich the experience even more! Read *Archaeology and the Sea in the Maltese Islands* by Timmy Gambin and Elaine Azzopardi.



Paper-
back: 64 pages
Publisher: Midsea Books Ltd, Malta
Publication date: 28 Mar 2013
ISBN-10: 999327402X
ISBN-13: 978-9993274025



Frogmen

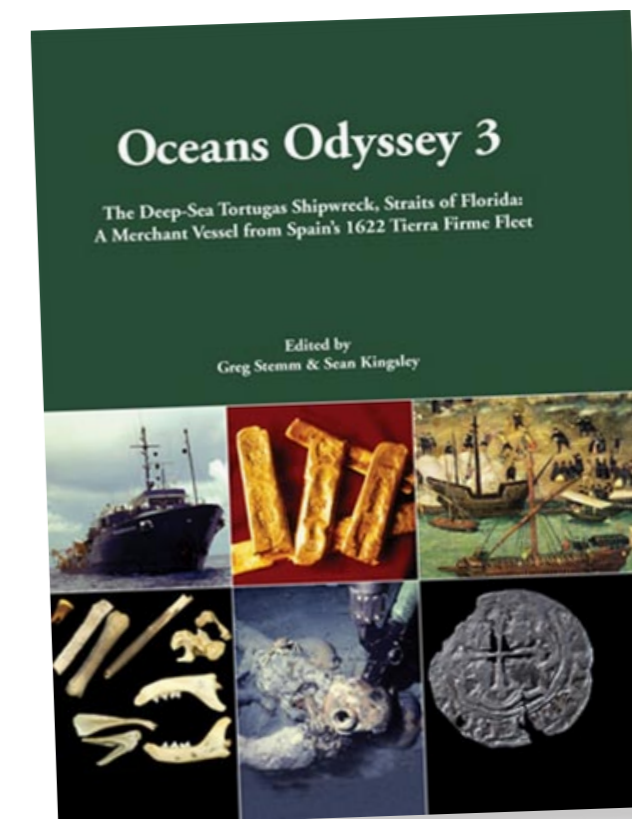
Never mind that their name could have been better chosen, naval frogmen are often key to the success of many naval missions. Completing their mission at great risk to their lives, they disregard all for the sake of their country. This book, *Naval Frogmen: Wartime Underwater Operators* by T.J. Waldron and James Gleeson, chronicles such clandestine missions during the Second World War, undertaken by the navel frogmen around the world. From British commandos seeking to defeat the German Navy, to the kamikaze frogmen of the Imperial Japanese Navy waiting for enemy warships with explosives attached to a pole. No matter where their allegiance may lie, their bravery and dedication is indisputable.

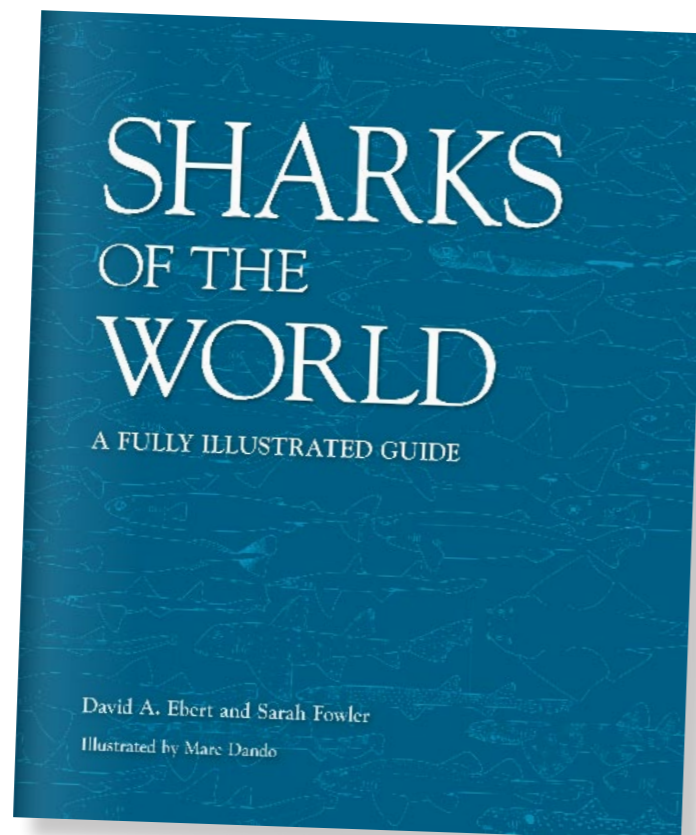
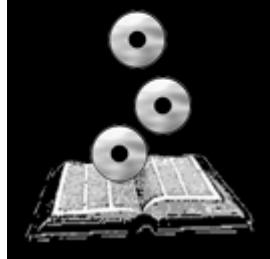
Paperback: 160 pages
Publisher: Fonthill Media
Publication date: 23 May 2013
ISBN-10: 1781551723
ISBN-13: 978-1781551721

17th Century Shipwreck

In 1990, an underwater excavation of a 1622 shipwreck took place beneath the Straits of Florida. Yet, this was no ordinary archeological dig (figuratively speaking), as this was the world's first robotic archeological excavation of a shipwreck, conducted by scientists controlling a remotely-operated vehicle. The wreck was the *Buen Jesús y Nuestra Señora del Rosario*, a Spanish-operated merchant vessel lost in a hurricane. The recovered artefacts ranged from gold bars, silver coins to beads, glassware and seeds, allowing us a glimpse into the daily life at the end of the Golden Age of Spain. To learn more, read *Oceans Odyssey 3: The Deep-Sea Tortugas Shipwreck, Straits of Florida—A Merchant Vessel from Spain's 1622 Tierra Firme Fleet* by Sean A. Kingsley.

Hardcover: 201 pages
Publisher: Oxbow Books
Publication date: 28 April 2013
ISBN-10: 1782971483
ISBN-13: 978-1782971481





Sharks

At more than 520 pages thick, *Sharks of the World: A Fully Illustrated Guide* by David A. Ebert and Sarah Fowler, promises a very detailed account of sharks. Before the writers plunge headlong into the specifics of every shark species, they first provide a comprehensive round-up of the shark's ancestry, biology and habits, as well as its history, relationship and interaction with people. All the sharks are depicted in colour, and there are also line illustrations alongside the descriptions. Be sure to save some space on your bookshelf for this book!

Hardcover: 528 pages
 Publisher: Wild Nature Press
 Publication date: 31 Mar 2013
 ISBN-10: 0957394608
 ISBN-13: 978-0957394605

Text by Peter Symes

Innovative Methods of Marine Ecosystem Restoration

Edited by Thomas J. Goreau and Robert Kent Trench

Haven't we all been there? Feeling exasperated and just wanting to do something to heal or fix wild nature which has been deeply affected, damaged or significantly altered by anthropogenic activities? I sure have.

Enter this *Restoring Marine Ecosystems*, which I cannot help think of as some sort of 'God's cookbook' or 'manual to creation'. As the title implies, various case stories and techniques are described as to how we can increase settlement, growth, survival and resistance to

stress in marine environments, to maintain diversity and productivity, and to rapidly restore devastated places where there has been no natural recovery.

Some subjects, such as the Birock technology has already been described in this magazine, and as such, this book presents a deeper background and puts techniques and technology into a wider context. To a large extent, it is all about using electricity to facilitate or catalyse healing or creation of natural or artificial structures in marine ecosystems, most notable artificial coral reefs.

Various chapters also describe how it is not only the growth of coral that is being sped up by application of electricity but also other flora and fauna is positively affected such as seagrasses and oysters. Electricity also seems to protect coral from overgrowth by encrusting sponges.

This is not a sexy coffee-table book laden with spreads of gorgeous underwater photography that you can casually browse through while comfortably reclined in a couch. This book provides you with the scientific insights and

backgrounds and as such it requires study and immersion. Fortunately, it is not so sauced all up in scientific lingo and terminology that so often renders scientific publications incomprehensible to the broader masses.

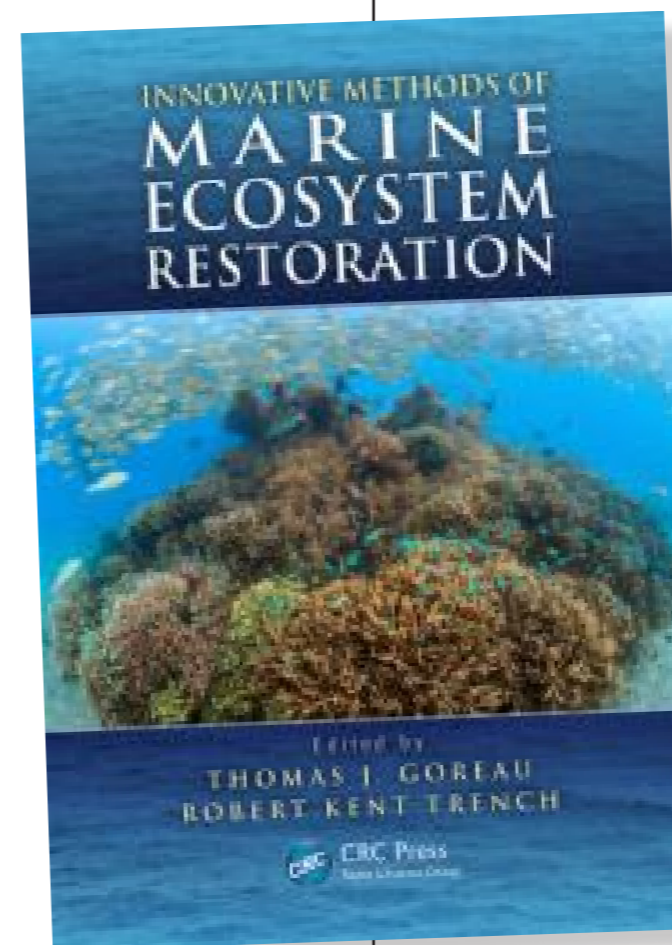
Hardcover: 312 pages
 Publisher: CRC Press; Har/Cdr edition
 Publication date: 4 December 2012
 ISBN-10: 1466557737
 ISBN-13: 978-1466557734



Cave Diving

Classic Darksite Diving: Cave diving sites of Britain and Europe, by Martyn Farr, focuses on 140 underwater caves and mines found in the United Kingdom and across Europe, detailing their precise locations, characteristics, exploration history and useful contacts. There are also more than 300 photos to entice you to visit the sites, as well as practical information like where to get an air refill to reacting to emergency situations. This book was written as a companion volume to the author's cave-diving manual *Diving in Darkness*, published in 2003.

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 Publication date: 6 April 2013
 ISBN-10: 0952670186
 ISBN-13: 978-0952670186



backgrounds and as such it requires study and immer-



Finland's **Ojamo Mine**

Text by Antti Apunen. Photos by Janne Suhonen



Divers at the surface prepare to dive Ojamo Mine. PREVIOUS PAGE: Diver inspects wheelbarrow in Ojamo Mine

—Diving the Ojamo lime mine in Finland, 138 meters of water, 4°C.

Imagine sub-zero temperatures and a hole in the ice. That is your entrance to the underworld of Ojamo, the most popular diving site in Finland.

Ojamo lime mine is situated 60 kilometers west of Helsinki. It attracts thousands of visitors every year. The mine area is part of the city of Lohja, known for its industry.

The mining operations began here in the 19th century. When the open pit got too deep, mining was taken into the tunnels. More technology was introduced to boost the human powered opera-

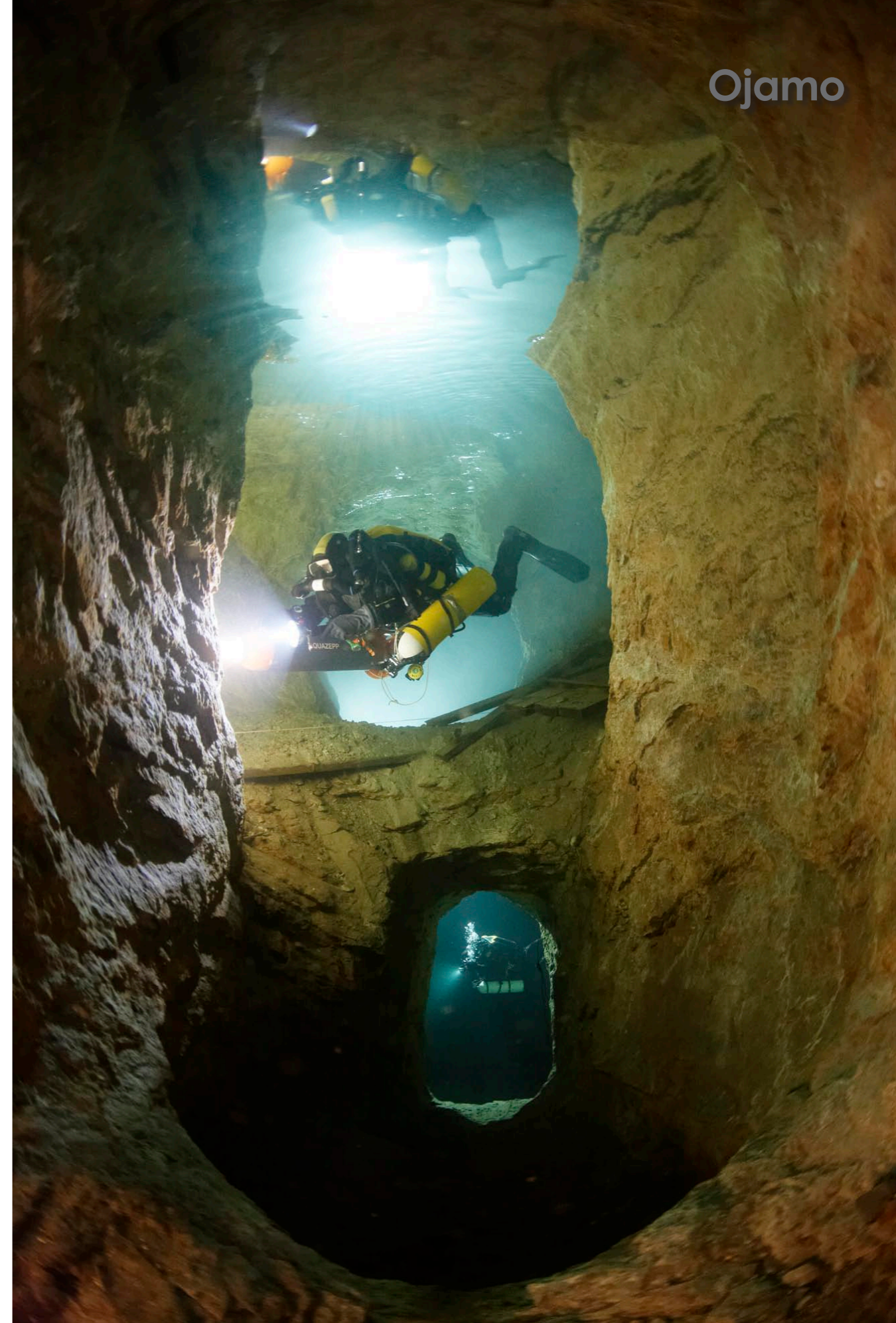
tions. Ojamo mine was a key driver of development for the area for decades. It fuelled the local economy and provided work for the locals.

When Finland entered the war with Russia in 1939, the mine was turned into a prison camp. The prisoners worked in shifts and lived miserably in tents at the bottom of the open pit. There weren't enough clothes for everyone, so the prisoners exchanged mantels between shifts.

Today, since water filled the mine, it looks just like another small lake inside the forest. The shallowest tunnels start



at a depth of 28 meters, from the bottom of the open pit. The mine reaches a depth of 250 meters at the bottom of the main mining shaft. The exact depth



Exploring passageways of the mine; Historical image of Ojamo Mine (left)

Mario World is one of the most visited areas of Ojamo Mine; Historical image of workers in Ojamo Mine (below)

All this makes planning dives easier than in a natural cave, as the multi-level plans can be reasonably accurate compared to natural tunnels going up and down all the time. It means that there are no reverse profiles either.

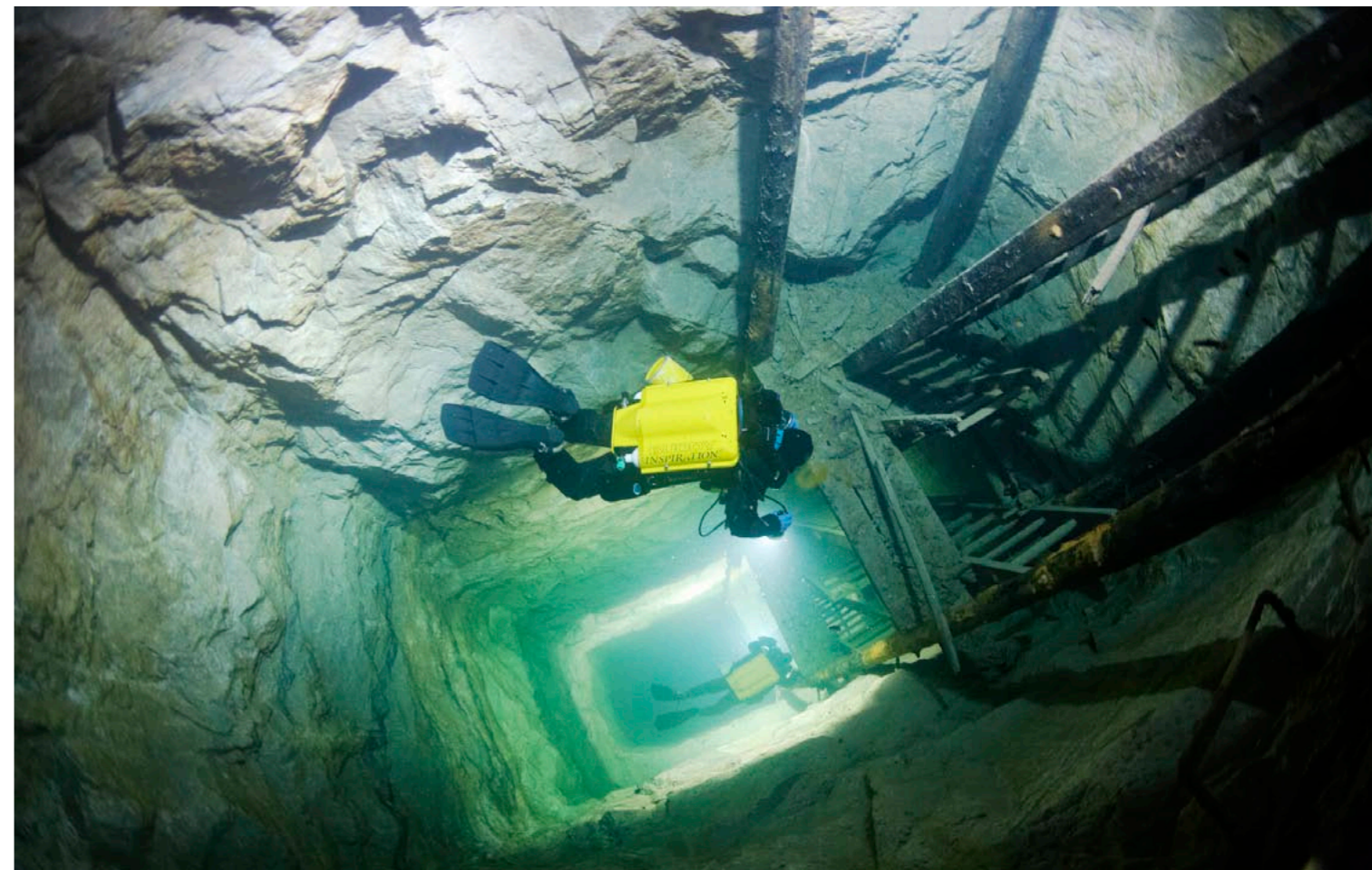
In Finland, there are no natural caves suitable for diving. The ground is solid granite, which is too hard for water to carve underground rivers into. Even the limestone at Ojamo is tightly squeezed inside hard rock where carbon dioxide cannot eat its way through the stone. From the mine diving point of view, granite has many benefits. The corridors



and vast halls are stable even without supporting structures.

There are many closed mines suitable for diving in Finland. Many of them have been closed only recently, or there is no required diving infrastructure for various political or geographical reasons. One example of these kinds

of sites is the Outokumpu mine, a name known globally because of the mining company that started its operations from that very spot. Today, Outokumpu is one of the leading stainless steel and copper manufacturers in the world. For



Divers explore ventilation shaft in the mine going down from the 28 to 56-meter level

is not known, as there was some land-fill done in the shaft after the mine was closed. The deepest recorded dive at the mine is 160 meters.

The water level reaching ground level makes diving easy at Ojamo. Divers can park their cars next to the lake and jump into the water. In many other places, like the popular Tuna Hästberg iron mine in Sweden, gear needs to be lowered deep into the mine with winches, tens or even hundreds of meters, before reaching the water level.

The huge mining halls are quite an experience. I remember vividly my first dive into one of these huge cathedrals. My hands started moving in circles, as if I was falling down from a cliff. The crystal clear water and dark depths deceive the eye of the inexperienced. When in operation, the mine was not a place for a

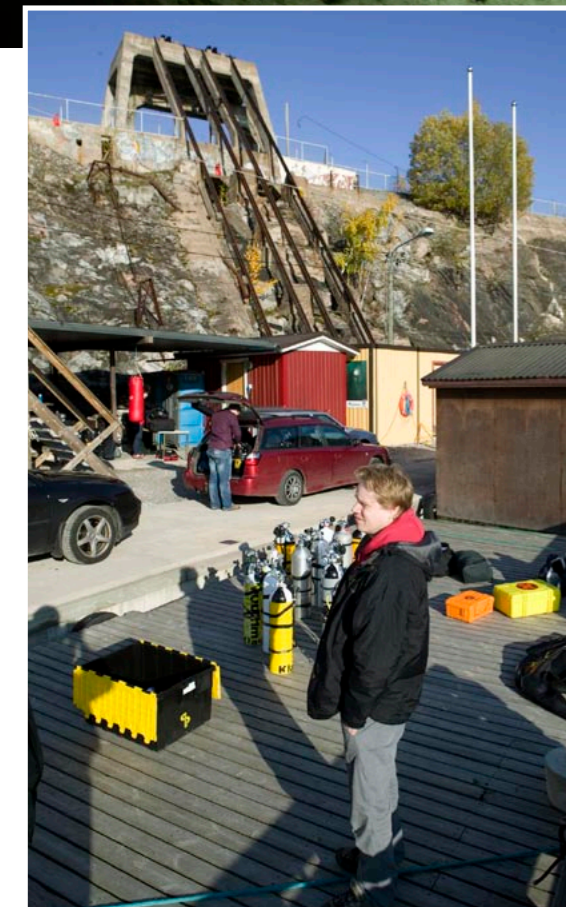
person with bad nerves or a phobia of heights.

The halls are sometimes so big that no walls can be seen when crossing them. The only guide is the white line running through the emptiness. These chains of halls can be quite confusing. In a natural cave, it's sometimes easier to remember details. In a mine, the mechanical marks of mining all look the same.

A country without natural caves

There are many kilometers of tunnel at Ojamo, although the longest continuous stretch is only 1.7 kilometers, at the 88-meter level.

There's also little variation in depth on each level; the tunnels run almost horizontally. There are plenty of shafts and mining halls that are used for travelling from one level to another.





Personnel elevator shaft at 56-meter level (above)



divers, the name means multiple kilometers of unexplored territory.

Many of the mining sites are in remote places. This means that their number of visitors is low compared to Ojamo, even when they are otherwise quite suitable for diving. One of the popular sites, Montola, was closed for a while because of a recent fatality—one of the few ones in the short history of Finnish cave diving.

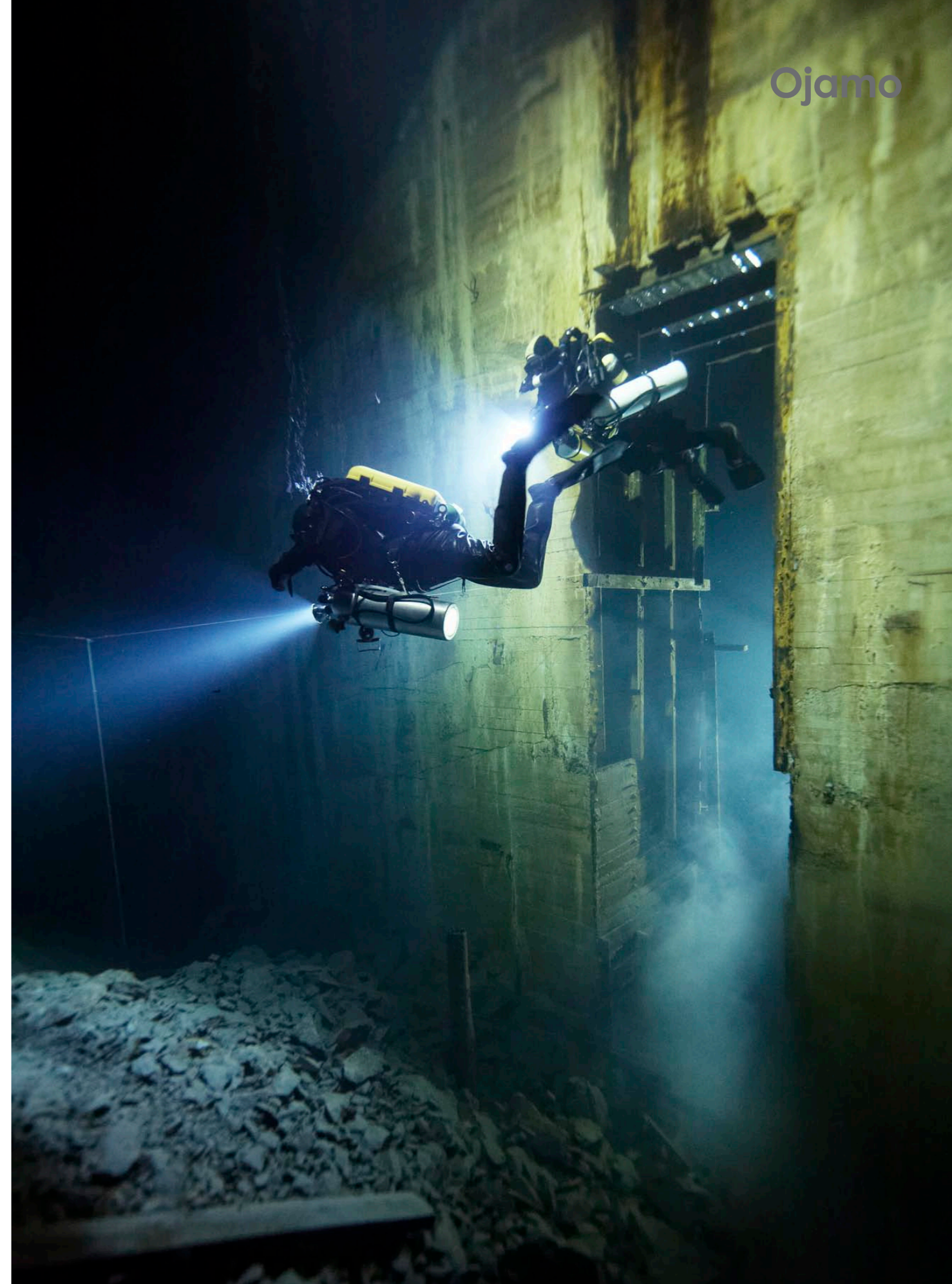
The Montola accident was a typical cave diving accident, with the added local environmental characteristics. The water in the open pit was very murky, with a summer time visibility of only one meter or so (during winter the water is clearer, as there is algae in the water in the summer). The visibility probably played a part in the accident, as the team members got separated and did

not recognize the shortest way out, even though the entrance was never very far away. So even in mines with almost no flow, the circumstances can be treacherous.

Great halls of dark granite

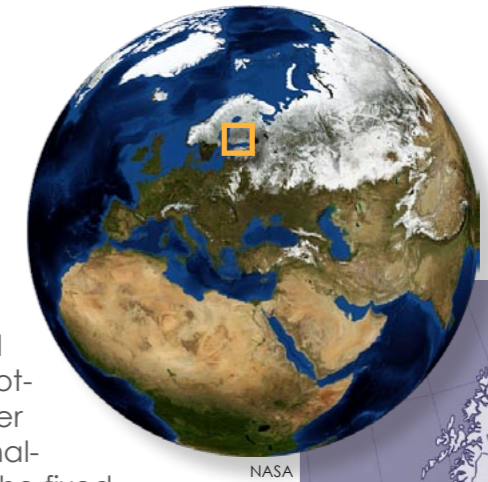
Ojamo mine has been dived for almost 40 years. The mining came to an end in the mid-1960s. The market price for lime had declined, and there was no financial point in continuing operations. After the mine closed, it slowly started to fill with water. With many kilometers of tunnels, it took quite a number of years before the water reached ground level.

The good news was that the mine was filled with ground water that had been filtered by thick top soil and gravel. The water inside the mine tunnels was crystal clear. The northern



Hell's Gate was built to support rock between the mine and the lake bottom above

Diver explores workshop at 88m level



Ojamo

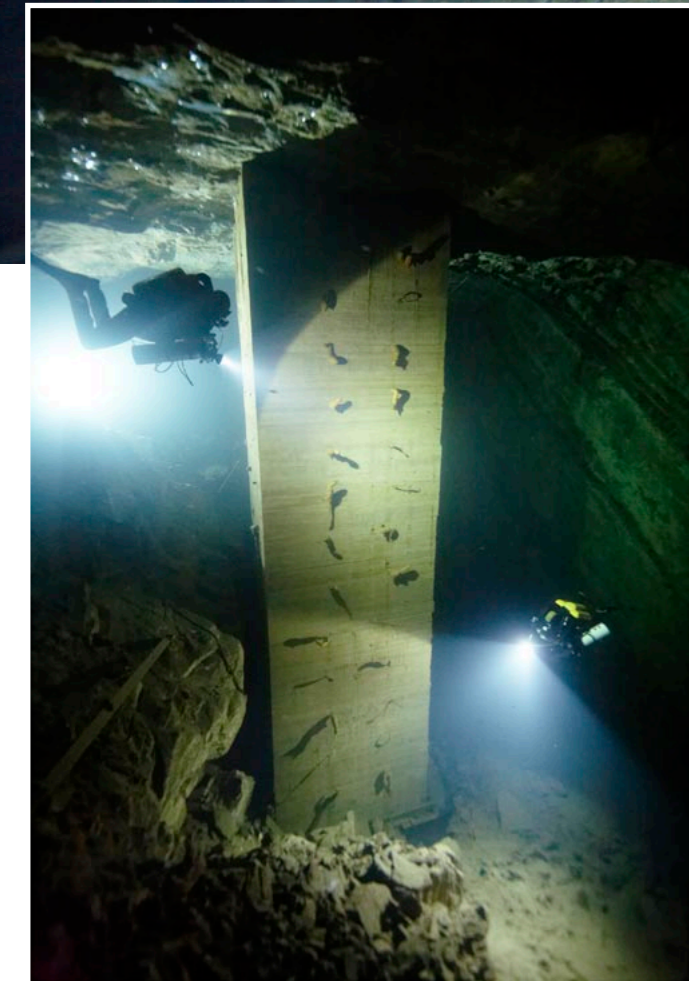
Location of Ojamo mine on global map and map of Scandinavia



were considered remarkable by the standards of the time. Today, with all sorts of rebreathers around, these two to three-hour dives don't seem anything out of the ordinary.

The major limiting factor at Ojamo has always been the cold water. The constant 4°C at the bottom makes sure that any dive over three hours is always a bit of a challenge. Today, heated vests and the fixed habitat make things easier. But even now, five or six hours in the chilling water can be torture—not to mention, hazardous, if anything goes wrong with the suit. Dry gloves are imperative. Wet gloves simply can't protect against water that cold for hours.

The traditional Finnish style is to dive with thick, custom-made rubber suits. These *Loitokari* suits are a Finnish phenomenon, which often amuse foreign divers. But there are certain advantages. The rubber suit seems to be almost impossible to tear. Remembering the cold water, this consideration is quite important.



lakes lack large mammals and other animals for the most part, but perches, northern pikes and burbot quickly populated the open pit and its murky waters. Crayfish followed soon after.

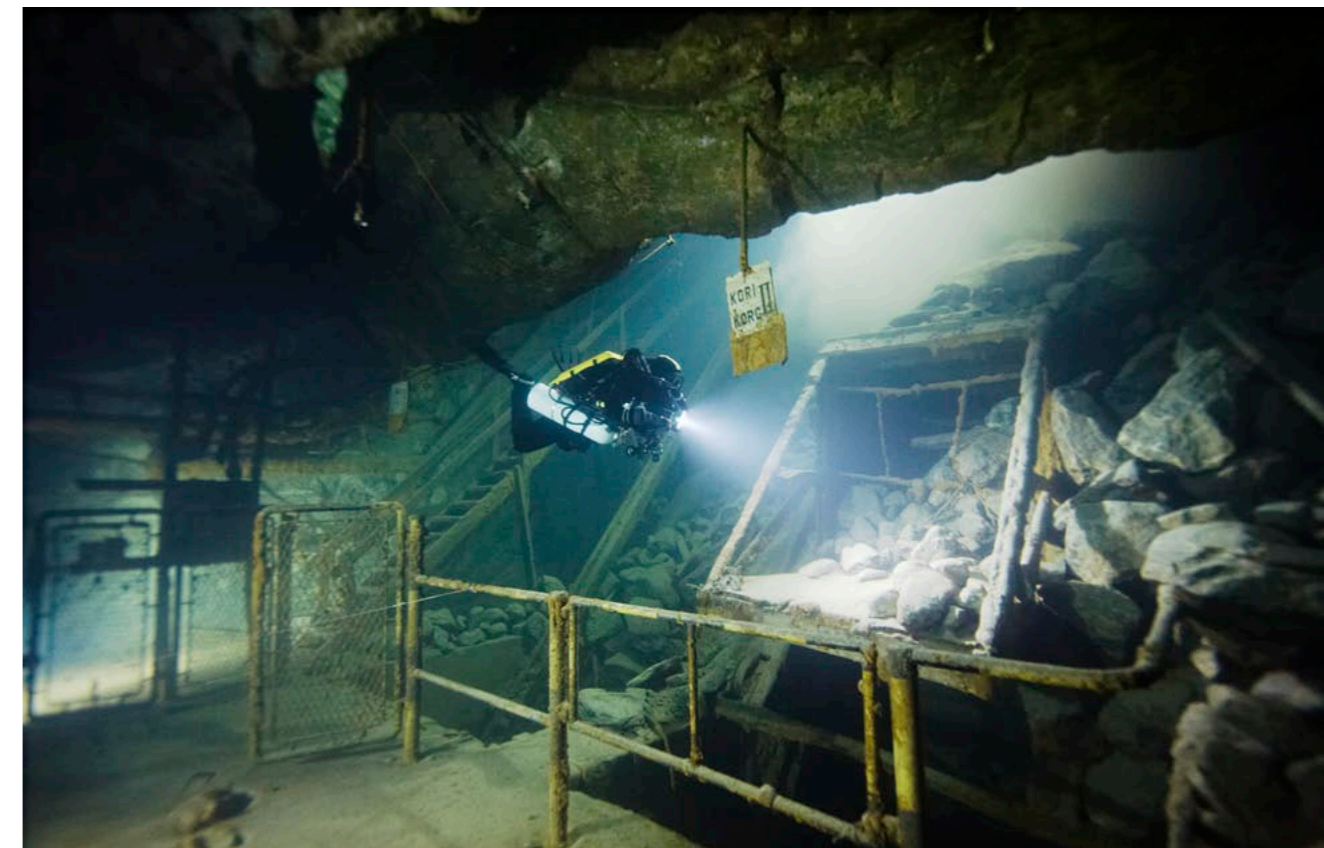
The early attempts to explore the mine were restricted by primitive cave diving equipment. Finland was far away from the influence of central European and North American cave diving communities. Diving was done mostly in the Baltic Sea by military and professional divers, and they were not too interested in exploring very deep into the mine. Their techniques and equipment were tuned to wreck diving and typically lacked the redundancy and capabilities required for deep cave diving.

In the beginning of 1990s, mixed gas technical diving started to take hold.

First, non-military rebreathers were imported, around the turn of the millennium. That was also the time when cave diving training became more popular among Finnish divers. Before that, local rules and personal relationships primarily dictated who could dive and where.

The first expeditions charted the mining level at 28 meters. The largest part of the level became known as the Pearls, consisting of 13 big mining halls connected to each other with narrow passages. The level was suitable for open circuit nitrox diving, so it was mapped quite quickly.

The next step was the 56-meter level. Air was still the most common diving gas, so the level remained well inside the air diving limits. It was explored all the way back in the beginning 1990s. The dives



Lucifer's Pillar supports the Hell's Gate at 75m

Old mining cart at the 138-meter mining level is still waiting for the next load



Divers use underwater scooters to navigate mine (above and right)

Scooting around the forest

Some exploration was done at the 88-meter level in the early days, but the exploration came to a halt when the practical limits for open circuit dives were reached. It took a few years before rebreather diving techniques were updated to the requirements of 88- and 138-meter level push dives.

The 88-meter level was explored all the way to the end beneath Lake Lohja in 2008. After that, the focus has been on the 138-meter level. There are still plenty of tunnels to explore.

Most techniques used in diving the mine are similar to those used in diving natural caves. Divers follow maps when they dive in natural caves, unless exploring. Similarly, in a mine, you typically have quite a clear idea of the routes, as the mines are well documented. Of course, the maps don't reveal everything, and three-dimensional reality

is often surprisingly different from the old drawings.

The conditions in a mine don't vary much. The temperature is constant at depth. Only the surface water in the open pit warms up in the summer time to about 20°C. Fins primarily use argon as the drysuit gas. Bigger molecules seem to insulate better, although there is no precise scientific evidence supporting the habit. Staying warm is the main priority on any dive. Even just one hour in cold



Tool cabinets at the 88-meter level

water, unprotected, can be fatal or at least a main contributor to decompression sickness (DCS).

There are no currents in the mine, and the visibility at depth rarely changes. However, the surface water is a different story. During summer, it's all murky. The visibility drops to a meter or sometimes even less. Even though the decompression hours are warmer, the zero visibility poses a different challenge.

There is silt, as in a natural cave. With no current, the ceiling in the previously un-dived sections of the mine can release plenty of silt when hit with bubbles.

The mine is full of signs of human presence. Tools have been laid down where work was last performed. The rails and mine wagons still seem like they are waiting for another cargo load to take to the surface. At the 138-meter level, nothing has been touched. Layers of silt cover everything, but you can still recognize most details.

The light bulbs hang from the ceiling as if the lights could be turned on again.

Hammers wait for their users. Neatly piled dynamite boxes seem like they were placed there yesterday.

In the open pit, trees still stand. During the winter, when there is an ice cover on top of the lake, the light plays its own tricks. It is a wonderful scooter ride through the silent forest. It makes the long and cold decompression hours easier to manage. ■

For more information about Ojamo mine and the authors, please visit Diversofthedark.com. Further details about visiting Ojamo mine can be found at Kaivossukeltajat.com.



Author / speaker Rod McDonald launched his latest book about the Force Z wrecks at OZTek.2013 (lower left). John Garvin presented a "behind the curtains" story of James Cameron's successful "Deepsea Challenger" project (www.deepseachallenge.com). The filmmaker / explorer reached a depth of 10.9 km down in the Marianas Trench.(top right); A view of the 2013 OZTek Exhibition (lower right)

Tales of 'Daring Do'

— *And a Sobering Lesson from OZTek 2013*

Text by Rosemary E Lunn
Photos by Paul Morrall



Although Facebook is a useful tool, it can never replace physical interaction with friends, colleagues and peers. Without a doubt there is a need for a regular gathering of the clans. Events like EUROTEK and OZTek serve a vital role drawing people in from all over the globe, bringing together briefly a good part of the technical diving village, and reinforcing the strong sense of community we share. We meet to discuss information, tell stories, share ideas, celebrate success, learn and laugh from our collective mistakes, and mingle with the top explorers, pioneers and exhibitors in our field.

Michael Menduno made a valid point when he suggested "these conferences may even be more important today when a preponderance of misinformation, in many cases perpetuated by self-proclaimed Internet experts (the online equivalent of TV's talking heads), seems to reign supreme."

OZTek.2013 dive conference and exhibition certainly successfully played its part by delivering accurate, relevant, educational and entertaining content. Over the course of two days (Saturday 16 and Sunday 17 March)

over 50 talks were held at Sydney's Australian Technology Park, with delegates sorely tempted by four halls of concurrent talks—talks that covered so many aspects of diving, from technique, such as *Stick maps to virtual cave diving: Instruments and techniques for constructing maps, 3D images and even virtual cave models* by John Dalla-Zuanna, to exploration, such as *Bermuda's Deep Water Caves* in which Professor Tom Iliffe talked about how this project is employing sonar, ROV's and CCR divers to explore and document the island's extensive network of underwater passageways.

Safety was reviewed, as in *CCR Bailout: How much?* in which Ben Reymenants took a fresh look at every CCR diver's worst scenario. Is the current thinking of bailout gas volumes realistic, conservative or otherwise?

To getting au fait with the latest technology, as in *Mastering the Light* in which Kevin Deacon discussed a new genre—images shot using black light equipment.

With some amusing anecdotes along the way: *Carry on diving: The lighter side of diving*, with Martin Robson's entertaining view of the minor hiccups and diplomatic incidents that can only happen on a dive trip.

Dive safety and rescue

For once I got to sit and enjoy some of the talks. (When you are organising an event, you rarely get to enjoy this privilege). The talk at the very top of



my personal wish list was *Rescue of an unconscious diver from depth: The new UHMS Diving Committee guidelines, their findings, and the arguments supporting them*, delivered by Associate Professor Simon J Mitchell.

The UHMS—Undersea and Hyperbaric Medical Society at www.uhms.org—is an incredible source of information for diving and hyperbaric medicine physiology worldwide. Approximately three years ago, a number of members of the UHMS Diving Committee (Simon Mitchell,

Mike Bennett, Nick Bird, David Doolette, Gene Hobbs, Ed Kay, Tom Neuman, Richard Vann, Richard Walker and Alan Wyatt) came together to discuss questions posed by the AAUS (American Academy of Underwater Science) and PADI. (PADI was revising its Rescue Diver manual at this point.)

There had also been much discussion by armchair forum divers on 'the question'. The great question posed—and no, it was not "what is the meaning of life, the universe and everything?"—was





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"what are the recommendations for rescuing a submerged unresponsive compressed gas diver?"

The team started looking into this and found that it was hard to find anything written in diving literature on rescuing an unconscious diver. A project was set up to develop definite guidelines, and three years later a paper was published.

Simon Mitchell's presentation (and the paper) covered a number of questions:

- If the regulator is out of the mouth, should it be replaced?
- If the diver is in the tonic (rigid) or clonic (grand mal) phase of a seizure, should the ascent be delayed until the clonic phase has passed?
- Are there any special considerations for rescuing CCR divers?
- What is a 'safe' ascent rate?
- If the rescuer has a decompression obligation, should they take the victim to the surface?
- If the regulator is in the mouth and the victim is breathing and has decompression obligations,

does this change the ascent?

- Is it necessary to hold the victim's head in a particular position?
- Is it necessary to press on the victim's chest to ensure exhalation?
- Once you reach the surface, is it possible to assess breathing in the water?
- Can effective rescue breaths be delivered in the water?
- What is the likelihood of persis-



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tent circulation after respiratory arrest?

- Does the recent advocacy for 'compression-only resuscitation' suggest that in-water rescue breaths should not be administered to a non-breathing diver?
- What (if any) rules should guide the relative priority of in-water rescue breaths over accessing surface support where definitive CPR can be started?

Normally we (every day recreational and technical divers) would not get access to this paper for a few years, until it was made available to the Rubicon Foundation (www.rubicon-foundation.org). However, the UHMS has kindly given The Dive Forum (www.thediveforum.com) permission to upload the paper on their forum.

It should only be printed once you have downloaded it. This is because the UHMS wants to track the downloads of this paper, so please send everyone to this link: <http://www.thediveforum.com/incidents-safety-information/1329-uhms-39-paper-unconscious-diver-recovery.html> (You will need to register on The Dive Forum before you can download the paper.)

Once you have downloaded the paper, you will find a very use-

ful flow diagram on page eight. It is a summary of the important recommendations and decision-making processes in the rescue of an unresponsive diver from depth. The authors have stated this chart should be considered along with the relevant comments made in the related sections of the paper.

This flow diagram was created so that it could be printed out and pinned to every diving club or dive centre notice board, laminated and put in with their first aid and oxygen kits, and included in every emergency action plan. It is an exceptionally useful rescue resource for all divers.

Safe exploration

Another presentation came from another diving doctor—this time Dr Richard 'Harry' Harris. Having briefly observed Harry Harris in action at Rebreather Forum 3, I was curious see more. He teamed up with fellow Wet Mule team member Craig Challen for a talk on extreme exploration entitled, *Beyond 200 metres*. The Wet Mules discussed the factors limiting safe exploration at these depths based on their experiences diving New Zealand's Pearse Resurgence.

The Pearse River Resurgence is

An excited OZTek audience waiting in anticipation to hear Simon Mitchell begin his presentation.



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located at the northern end of New Zealand's South Island, near Mount Arthur. It is Australasia's deepest underwater cave with 'summer' water temperatures of less than 7°C. Exploration has been going on here for a number of years, with various teams of experienced cave divers coming together to progress the cave at regular intervals. Back in 2007, a major leap forward was achieved by David Apperley and Rick Stanton MBE.

Over the years, expeditions had repeatedly pushed this cave system, and in 2011 during a nine

Another view over the OZTek exhibition

hour dive, Craig Challen set a new record depth of 194 metres, with the cave continuing to 'go'. A year later, the Wet Mules team again comprising David Bardi, Craig Challen, John Dalla-Zuanna, Harry Harris, Ken Smith and Sandy Varin returned, armed with two objectives. They wanted to see if Pearse was connected with nearby Nettlebed Cave. With the assistance of Nelson's Speleological Group, dye tracing from the Spillway in Nettlebed confirmed a deep connection at >120 metres.

Jayne Jenkins, OWUSS Rolex Australasian Vice President, received an OZTek Industry Recognition Award



Scuba Industry stalwart (and previous OZTek award winner) Terry Cummins, presented explorer Jill Heinerth with the OZTek Media Award for her sustained work on 'We Are Water'



Attention then focused on pushing the cave once again. Four habitats were installed at 7, 16, 28 and 38 metres, gas was staged and build up dives commen-

Craig Challen two days later. He tied off to the end of Harry Harris' line and scooted on a short distance

only to discover another steep descent. Craig Challen made the final tie off at 221 metres and returned to the surface. His total runtime was 17 hours.

The passage way continues to go, and the technology is capable of going deeper. The obstacle to on-going exploration is human physiological limits.

Two short videos were played of the lines being tied off at depth—one of Harry Harris' dive, the other was Craig Challen's. What struck me was the soundtrack of the video, because of the grunting and coughing. These noises may not sound much to you, but it indicated a real and significant threat to both divers.

We are right on the edge of

Whilst the technology still functions, the body does not. Extreme pressure causes respiratory complications—in a nutshell, the gas is so dense that the body perceives it as an issue when breathing, and therefore starts coughing to deal with the problem. It can tragically lead to an inability to match ventilation with the demands of physical work at great depth - see reference 1 in footnote.

I sat there drinking in the tantalising crystal clear deep-water footage Craig Challen and Harry Harris had shot, showing a cave continuing to go, with my heart noticeably thudding. I have nothing but admiration for the Wet Mules; they quietly get on with remote exploration. To push the cave depth by another 27 metres is a significant achievement at these depths. However, I personally hope that this extreme project is put on hold until technology is able to catch up and support the body far more effectively and efficiently.

REF. 1): MITCHELL SJ, CRONJE FJ, MEINTJES WAJ, BRITZ HC. FATAL RESPIRATORY FAILURE DURING A 'TECHNICAL' REBREATHING DIVE AT EXTREME PRESSURE. AVIATION, SPACE AND ENVIRONMENTAL MEDICINE 2007; VOLUME NUMBER (78) 2



Richard Taylor received an OZTek Industry Recognition Award from AUP's Tony Davis

ced. Dave Bardi and Sandy Varin dived to 180 metres followed by seven hours in-water deco.

The next day, Harry Harris tied off to the end of Craig Challen's 2011 line in 194 metres, and proceeded to lay a further 70 metres of line in large passageway, tying off at 207 metres. He had a total run time of 10.5 hours in-water, in reasonable comfort, thanks to the habitats and surface supplied suit-heating systems.

Weather stopped play, with the final push dive being done by



Gala hosts Michael Menduno and David Strike

Daring do

Time for a change of tempo and location. Enter stage left OZTek Speaker Paul Haynes. His delicious rip roaring yarn of 'daring do' had me giggling in my seat. It was entitled, *Operation Reclaim: The gripping story of the race by a combined British civilian and military expedition to recover the ship's bell from HMS Prince of Wales.*



Simon Mitchell presented Pete Mesley with the OZTek Outstanding Achievement Award for "exceptional contributions to the growth and development of technical diving"

Very briefly in the early 2000s, during a British expedition to the Force Z wrecks, diver Gavin Haywood chanced upon *HMS Prince of Wales* ship's bell. It was protruding from the sand beneath the starboard gunwale at the forward end of the wreck. Haywood was instantly faced with a moral dilemma. He knew he was diving a protected site—'look, no

touch'. However, the bell was in a visible place, and the wreck would inevitably be visited by divers who do not always respect British laws. What to do?

Haywood left the bell on the seabed, surfaced and rang the Receiver of Wreck (the U.K. Government Agency that oversees U.K. shipwrecks by satellite phone). Their reaction? The bell should remain with the ship.

Then the word went around that good money could be made for recovering the bell. A non-British private collector wanted it in his board room. The Ministry of Defense realised that this historical bell was in imminent danger of being claimed as 'a trophy'.

An urgent case for salvage was made by Lord Clifford, the Chair of the Force Z Survivors Association, who requested full U.K. Government support should be given to a U.K. civilian dive team preparing to recover and return the bell to the Royal Navy. This support turned into a full-scale military operation, following an initial conversation with the U.K.

civilian dive team, that included Paul Haynes.

Haynes' story could have been taken straight out of any *Boys Own Manual*. It had everything in it. The danger, the toys, the failure, the boys, and the ticking clock. In cinematic terms think *Where Eagles Dare* meets Michael Caine's *Italian Job* featuring James Bond 007. I was enraptured. If you ever get the chance to listen to Haynes regale this story in the future, grab it for the sheer irreverent giggle factor of hearing how the bell came home in time for tea and medals.



Pioneering shark expert, photographer and cinematographer, Valerie Taylor received a standing ovation when she was given the OZTek Lifetime Achievement Award by Jayne Jenkins

Happiness to heartbreak

For me, one of the most significant moments of the conference was a rebreather accident analy-

tech talk



Brian Kakuk waxing lyrical about scientifically significant underwater Bahamian caves.

sis session. Billed as *Oxygen cell failure in rebreathers: Critical safety lessons from relevant cases*, this was a very rare and exceptional presentation and a key teaching moment for the 200 odd delegates crammed into the room. Thanks to the kind permission of the coroners, police and the families, two recent rebreather deaths were broadly analysed to help prevent future deaths.

The packed, standing-room-only audience listened to Drs Mitchell and Fock, as they lead a discussion on the fatalities, with supporting comments from rEvo CEO Paul Raymaekers. Data from both final dives was available because of the on-board Ambient Pressure Diving recorder, or black box.

It should be noted that the official cause of both deaths was not known at the time of this presentation,



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though a potential contributing factor in both fatalities appears to be a double O₂ sensor failure. Most rebreathers use three sensors and a voting logic algorithm. Both divers had sensors more than two years old in their units.

The session began with a very strong statement from Fock requesting that attendees do not post he-said/she-said facilitator opinions, as the coroner had not yet ruled on at least one incident, adding that there was "already too much misinformation online". Fock then dived into a presentation of the circumstances of both accidents.

The handset data of both dives was shown and evaluated, and the hushed audience was able to observe the PP02 readouts for all three cells throughout the dive. It was also noted that the divers had suppressed alarms given by the unit.

The doctors then asked the audience to consider what decision they personally would have made if they had seen the same data on a dive, and take time to step back and reflect on this. Fock and Mitchell neutrally observed that these divers believed at the time, that they were making reasonable and rational decisions both pre- and during the dives, even though they would probably agree that these decisions do

It seemed fitting that Liam Allen received the OZTek Technical Diver of the Year Award from the EUROTEK Technical Diver of the Year, Richard Lundgren

not stand up well in the harsh cold light of day.

All too often we as divers discount such analysis when we are safely seated in our warm armchairs, because we feel that we would not make the same decisions. Yet, here are two divers, in quick succession, who have done exactly the same thing.

It was a sobering session, and we left the room older, wiser divers appreciating that data from accidents is not typically forthcoming, or even made available to the general diving community, because of litigious factors. Both cases and conclusions are currently being written up for publication, after the coroner's determination is released.

So what was the take home message from this talk? Be prepared to recognise, diagnose and deal with double sensor failures, because they WILL OCCUR with existing sensor technology.

The manufacturers present at this talk (APD, VR, Innerspace Systems, rEvo) recommended not using sensors older than 18 months because they are prone to failure. One advocated way of dealing with sensor replacement, which was promulgated at the session, is to replace your sensors one at a time in six-month intervals (to maximize the probability of independence between sensors).

My personal suggestion? We are all busy people with many good intentions. Give your rebreather manufac-



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It was a bittersweet conference. Event organiser David Strike announced that he was retiring and this would be his last OZTek



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turer your credit card details, and ask them to automatically dispatch a new cell to you every six months.

As an aside, last year an international safety meeting was held about rebreathers called Rebreather Forum 3. A number of the presentations are now available online for free for you to download. Follow this link—www.rf30.org/presentation—and you will find a talk by Dr Arne Sieber on *O₂ Sensor Technology for Rebreathers*, Kevin Gurr on *Knowing Your Limits: CO₂ Sensors*, and Nigel Jones on *Redundant Oxygen Sensors: Theory and Heresy*. Click on 'Video Link' and you will hear the talk illustrated by supporting slides. In addition, there is also a PDF download available for both Arne's and Kevin's talks. Please pass this website onto anyone you know who is interested in or dives a rebreather.

Moving forward

There are times when I wish I could be cloned. During the run up to

EUROTEK would be a good time to have 'extra Roz hands'. At OZTek my clone could have sat in on other presentations I wanted to watch. It didn't help the suffering much either when I caught up with delegates who had seen my second choice talks, because they raved about what a riveting presentation I had missed. As is always the case, I didn't get to hear everything, but I was certainly spoilt for choice thanks to OZTek organiser David Strike.

So I had been educated, inspired, and seen all the latest new toys in the exhibition. The only thing left was to celebrate success at the OZTek Gala Awards Dinner. This is held on Sunday night, at the conclusion of the conference at a wow of a venue in Cockle Bay Wharf. (Unfortunately, there is no way that Broad Street on a wet Sunday night in Birmingham could ever compete with Darling Harbour.) We enjoyed the view over pre-dinner drinks in the balmy dusk, whilst catching up with friends.

It was clear to everyone present that David Strike and Michael Menduno gleefully enjoyed being the joint

The OZTek.2013 Speakers and MC's

Master of Ceremonies for the OZTek 2013 Awards. The evening was a very happy one, with much playful banter and laughter from the audience and those present on the stage.

The OZTek Award Winners were Liam Allen (Diver of the Conference), Jill Heinerth (Media Award), Jayne Jenkins (Industry Recognition Award), Pete Mesley (Industry Recognition Award), Liz Rogers (Image Award), Richard Taylor (Industry Recognition Award) and Valerie Taylor (Lifetime Achievement Award).

There was however a bittersweet moment, because it was the night that Strike announced his retirement from organising OZTek. Whilst most people can take a good guess at just how much work goes into making the magic happen, they never really see the whole of the trick. To consistently pull off a successful conference through these harsh economic times certainly does take experienced wizardry. No wonder Menduno presented Strike 'The Wizard of OZTek' Award.

I sincerely look forward to seeing OZTek continue to flourish in the future, whilst wishing David and Sylvia Strike a very happy retirement, and many thanks for all they have done to serve the recreational and technical diving industry. ■

The author acknowledges and wishes to thank Graeme Gourlay and Michael Menduno for their assistance with this article.



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'Yank Tek ahead'

TEKDiveUSA.2014

TEKDiveUSA LLC is excited to announce that they have retained The Underwater Marketing Company to help organise and promote TEK Dive USA, a two-day advanced and technical diving conference and specialist exhibition, similar in approach to both EUROTEK and OZTek.

Randy Thornton, CEO of TEK Dive USA LLC stated, "We decided to launch TEK Dive USA after being inspired by some great experiences we've had at other events around the world. And after seeing just how popular Rebreather Forum 3 was last year, it seemed the obvious next step to take. It has been many years since we have had a technical diving conference in this country and it felt like the right time for the USA to have it's own home grown event.

"The prime focus of TEK Dive USA is to educate and entertain. We want to help further the educational aspects of advanced

Randy Thornton



and technical diving, while giving people who are out there doing exciting projects, a platform to share their story with others. This is the perfect opportunity to get the entire technical community engaged—regardless of agency affiliation or philosophy—together as one unified group. It will be great to see everyone sharing experiences, and be motivated by, and from each other. It's truly going to be an inspirational diving conference."

Rosemary E Lunn, Business Development Director of The Underwater Marketing Company stated, "I am delighted to say we have already got a number of top drawer speakers on board. Associate Professor Simon J Mitchell, (Head of Anaesthesiology at the University of Auckland), Richard Lundgren, (deep wreck explorer), The Phantom Cave Team and Dr Neal W Pollock (Research Director at DAN) have already said, 'Yes we'd love to come and talk, Roz.'

"We are currently drafting a really interesting lecture schedule covering everything from physiology, cave diving, imaging and wreck diving, through to equipment,

Associate Professor Simon J Mitchell, Head of Anaesthesiology at the University of Auckland

rebreathers, safety and techniques.

"TEKDiveUSA will be held on Saturday 17 and Sunday 18 May 2014 in Florida, so scribe the date down and reserve that weekend now. We will be announcing the venue, website, sponsors and exhibitor details soon. However, we can confirm that TEK Dive USA will be held every two years, and we will be considering a west coast venue for TEK Dive USA.2016.

"One of the things I love about these big international advanced and technical diving conferences is

Even though this conference is called TEK Dive USA, it is not going to be America-centric.

the camaraderie, quality face time and exposure that you get with leading pioneers and explorers. It is a bit like being back stage at a top rock concert when you bump into the likes of Bill Stone, Richard Pyle, Rick Stanton or Evan Kovacs. The really cool



JASON BROWN - BARDO CREATIVE

thing is that because we are all divers, we love talking about diving and everyone is very friendly. I've seen delegates have some really in-depth conversations with the speakers on the stairs, at the bar or over breakfast."

"We have been involved with diver education for many years. It is the foundation of everything we do," observed Randy Thornton. "By learning about our craft, we are able to push boundaries of exploration further in the safest manner possible. I look forward to opening the door and giving new divers who are curious about advanced and technical diving, a peek at this genre. You certainly don't need to be a hard core tekkie to come to TEK Dive USA, just someone who wants to get more out of their personal diving.

"Even though this conference is called TEK Dive USA, it is not going to be America-centric. We consider

Rosemary 'Roz' E Lunn,

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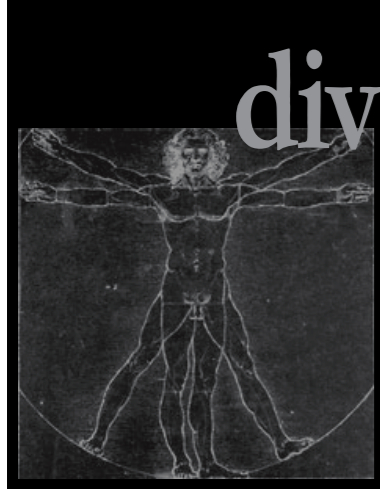
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this to be an international event. After all, when you look at the major exploration teams around the world, they are comprised of people from many countries. Since we belong to a global community, we are confident the international diving community will feel most welcome! So please join us on Saturday 17 and Sunday 18 May 2014 in Florida for TEK Dive USA." ■



JASON BROWN - BARDO CREATIVE





dive fitness

ED.— ALWAYS CONSULT A PHYSICIAN FIRST BEFORE BEGINNING ANY EXERCISE OR FITNESS PROGRAM.

Text by Gretchen M. Ashton, CFT, SFT, SFN, NBFE. Founder of ScubaFit®

Fitness for diving is not one-size-fits-all. Just as important as the proper fit for a wetsuit, BC, fins and mask, it is essential for divers to find the best combination of exercise for good health, diving performance and other personal fitness goals.

The ideal fitness for diving program addresses the health of the individual diver, reduces the risks on human physiology associated with the stresses of the underwater environment, develops the strength, stamina and coordination for handling gear and improves performance for diving. All of this can *only* be accomplished with a balanced exercise program that incorporates aerobic exercise, good nutrition, strength training and flexibility.

Exercise is preparation for diving. Pushing the body through training adaptations of physical exertion to improve stamina, strength and endurance exceeding the physical demands of diving does not always feel good. But workouts on dry land are necessary so that divers can feel comfortable in the water.

Diving is *not* a workout, nor should divers think of it as such. If diving feels difficult for any reason in any condition, the

diver needs to improve their fitness level. Further, the consensus among medical dive professionals is that the weight loss sometimes experienced when diving is not permanent weight loss, and the increased hunger following diving activities is typically not the result of a profound caloric expenditure because of diving.

Exercise can feel natural and be fun. While training is key for optimum performance, genetics also plays a role in predisposing divers to be 'good at' various physical activities. Participating in fitness activities in which the individual diver excels will bring greater success and enjoyment.

A wide range of fun and socially supportive group exercise classes such as

Zumba, water aerobics, belly dancing and kick boxing are available to divers. Training with a partner or dive buddy is also a great way to stay motivated.

If fun equates to competitive sports, remember that divers who are athletes may need to change their exercise routine in preparation for diving. This can translate into adding weeks to a pre-competition training schedule but can

be as simple as cross training.

Exercise methods and results may be different for men and women. Depending on individual goals and fitness level, women seem to benefit more from moderate exercise sessions every day, while men can produce results with high intensity and perhaps shorter duration workouts a few days each week.



Fitness Programs *For Divers*

PETER SYMES





Exercise has some risk. Like any form of physical activity exercise, if not properly performed, may result in injury. Fortunately, the benefits of traditional exercise outweigh the risk.

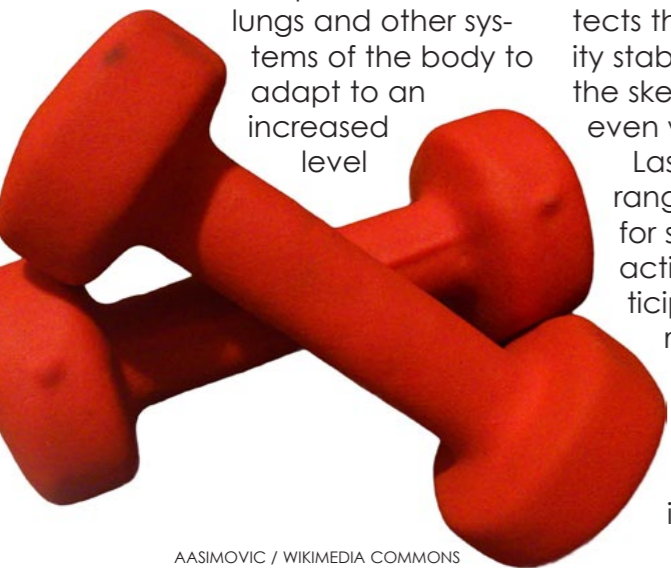
Some exercise programs are higher risk than others. The health and fitness of the individual diver is significant when selecting an exercise program. The type and intensity of exercise must be appropriate to the individual diver.

Remember: Exercise is not recommended for 24 hours before or after diving activity.

Criteria of fitness for diving

The greatest positive impact of exercise for divers begins with activities that maintain good health and reduce the risks associated with the underwater environment. This is best achieved by improving cardio-respiratory fitness (fitness of the heart and lungs) with aerobic exercise.

Aerobic exercise is performed by moving the large muscles of the body repeatedly and for a duration that requires the heart, lungs and other systems of the body to adapt to an increased level



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of functioning beyond that required of the body at rest and to prepare for a particular increased level of physical activity.

The next priority is maintaining a healthy body weight, which is primary in reducing the risks associated with poor health and diving. Being fit may include some aspect of weight loss. Weight loss done well always incorporates a balanced program of aerobic exercise, resistance training and just the right amount and type of nutrition.

Also important is overall body strength and increased levels of physical endurance. Placing demands on the body with resistance training maintains, prevents loss and/or adds muscle.

Resistance training comes in many forms both static and dynamic including variations of weight lifting and body weight movements. It is best to train muscles with movements similar to the way they are used in diving. Muscle moves, supports and protects the body throughout all activity stabilizing joints and protecting the skeleton. Muscle burns calories even when the body is resting.

Last but not least, flexibility and range of motion are important for strength when performing activities of daily living and participating in fitness, athletics and recreational activities such as diving. Flexibility and range of motion are maintained with stretching exercises and by strength training muscles in proper balance.

Exercise combinations

Divers will find a wide variety of exercise activities to choose from. Most of these activities singularly do not meet the criteria for fitness for diving but can be combined to accomplish the best training for divers.

It is very important for divers to know as much as possible about their health and the type of exer-



cise they are considering. The purpose and appropriateness of an exercise program is defined by the needs, preferences, goals and best interests of the individual diver.

Divers may encounter both dive and fitness professionals who sell themselves as the one-and-only-best instructor or recommend a specific exercise method as the 'answer for everything'. This be-all-and-end-all approach is a red flag. There are a number of successful ways to learn to dive, many forms of exercise to choose from, and numerous quali-

fied instructors that can contribute to the skill, safety, health and fitness of the individual diver.

When divers are researching and selecting diving and exercise activities it is important to remember the criteria for fitness for diving. Along with good nutrition, divers can best prepare for diving with a combination of exercise methods that provide aerobic exercise, strength training and flexibility.

Fitness facilities (including home gyms and outdoor exercise circuits) usually offer all of the components of fitness

for diving under one roof (or sky). A diver can participate in aerobic dance classes and indoor cycling sessions, utilize cardio machines including treadmills, bikes, rowers, and ellipticals,

develop strength with free weights, benches, cables and resistance equipment, and if they wish, benefit from the supervision of both exercise and nutrition professionals.

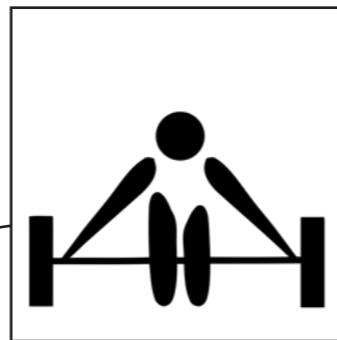
For divers wishing to exercise outdoors, there are endless options from hiking to road cycling, swimming, running, walking, stroller strides, and boot camp style programs in parks and on beaches.

While traditional exercise pro-

CRITERIA FOR FITNESS FOR DIVING

Develops and maintains:

1. Cardio-respiratory fitness
2. Healthy body weight
3. Overall strength and endurance
4. Flexibility and range of motion



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grams are deemed the safest and remain the mainstay of a sound fitness for diving plan, other physical activities in which divers are known to participate include yoga, crossfit and kettlebells. Each of these interests must be combined with other forms of exercise for a balanced and safe exercise program and to meet the criteria for fitness for diving.

Yoga with its various body postures primarily meets the criteria of stretching for diving. Yoga does not replace cardio exercise or strength training for diving and (along with good nutrition) must be supplemented with both. The practice of yoga includes breathing techniques and spiritual meditation based in ancient Indian philosophy.

Research on the benefits and risks associated with yoga vary widely because of the many forms, teaching styles and intensities of yoga. A good source for the science of yoga is the National Center of Complementary and Alternative Medicine (NCCAM), an agency of the National Institutes of Health (NIH).

The NCCAM also describes other relaxation techniques such as "progressive relaxation, guided imagery, bio-feedback, self-hypnosis and deep breathing exercises". Divers can combine these techniques with traditional stretching exercises for improved flexibility, breathing control and stress reduction.

Other options for spiritual meditation, breathing and body pos-

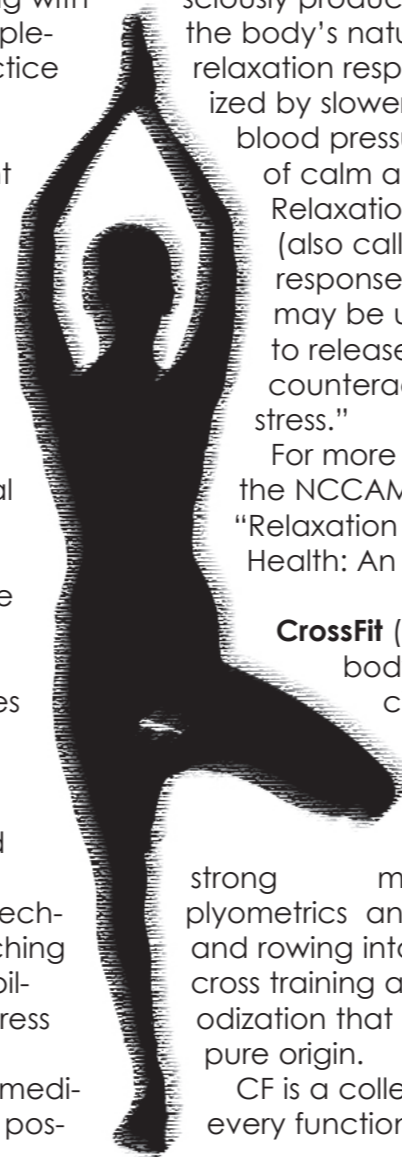
tures that improve flexibility include those body postures described for praise and worship in the Bible and Tai Chi. Tai Chi originated in China as a martial art with focus on body awareness and breathing and is described as moving meditation.

According to NCCAM, "The goal is similar in all: to consciously produce the body's natural relaxation response, characterized by slower breathing, lower blood pressure, and a feeling of calm and well-being. Relaxation techniques (also called relaxation response techniques) may be used by some to release tension and to counteract the ill effects of stress."

For more information see the NCCAM fact sheets on "Relaxation Techniques for Health: An Introduction".

CrossFit (CF) combines body weight exercises, gymnastics, Olympic weightlifting, calisthenics, power lifting, strong man movements, plyometrics and some running and rowing into a hybrid of cross training and a form of periodization that deviates from its pure origin.

CF is a collection of nearly every functional exercise in



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Crewmembers at sea aboard USS Nimitz doing calisthenics inside hangar bay



U.S. NAVY PHOTO BY PHOTOGRAPHER'S MATE 3RD CLASS ELIZABETH THOMPSON

the fitness portfolio combined with bursts of high intensity, momentum and varying duration. The fitness achieved with CF happens the same way it does with any of its individual components if they were performed at the same fast pace and high intensity. Divers who participate in CF may or may not be in better physical condition than divers who participate in more conservative forms of exercise.

The 70% and 80% training heart rates are the most effective in preparing the body for diving. Typically, CF works the individual above these heart rate ranges, and the body begins to adapt to the exercise method itself. Depending on the selected activities, the short 20-minute brackets of exercise utilized by CF may not produce the same results as aerobic exercise maintained for a sufficient length of time to complete all of the adaptations of the body to prepare for diving.

The weight loss from CF has to do with energy expenditure. Generally speaking, the harder an individual exercises (at any form of exercise)

the more calories burned and the likelihood that more fat is burned. However, ideally fat reduction is accomplished with aerobic exercise as oxygen is necessary to metabolize fat as fuel. Intense exercise can become anaerobic (lack of oxygen) and therefore not as efficient for fat loss.

Research discounting CF is abundant, while research supporting CF is limited. Some units of the U.S. Army embraced CF for military preparedness, while the U.S. Navy Center for Personal and Professional Development advised caution because of the high incidence and severity of injuries with CF. The Navy also stating CF is not in line with their 'core values' because of the exercises named after women.

While some say CF changes lives, i.e. helping participants go from being unfit to healthy, CF crosses all boundaries of proper form and safe use of equipment. For most, it is considered too high risk versus the benefits of exercise.

Fitness professionals have known long before CF came along that



exercise improves health. The results achieved with CF can be achieved with a wide variety of proven exercise methods including sophisticated applications of periodization and cross training in a more efficient and safe manner.

CF participants are more likely to have sustained serious injury to internal organs, life threatening break down of muscle fibers—called Exertional Rhabdomyolysis (ER)—and injury to joints.

ER can be experienced when participants are not well adapted to a fitness activity, from military type training or long-distance events such as marathons. Some individuals are more susceptible to ER than others.

Instructors must know their client well. Divers who choose CF are best served by instructors with a broad fitness education over and above a CF certification. That

being said, some divers love CF and participate regularly without injury.

Kettlebells (KB) Although KB have been around as long as dumbbells, they seem to be growing in popularity. Recent studies reported in the *Strength and Conditioning Research Journal* sought to “determine whether performing continuous two-handed KB swings would create an energy cost capable of improving cardiorespiratory fitness” and the “effects of weightlifting vs. kettlebell training on vertical jump, strength and body composition”.

The studies revealed that the KB workouts show some cardio, strength and weight loss benefits. Yet, the treadmill and traditional weightlifting produced a slightly lower heart rate (more conducive to training for diving), “significantly higher oxygen consumption and calorie expenditure” and “significantly greater strength and performance gains”.

The first and only biomechanical study assessed spinal loading during various KB exercises. “The KB swing (regardless of style of swing or snatch) appears to create a hip-hinge squat movement pattern together with patterns of rapid muscle activation-relaxation cycles that elicit considerable magnitudes of load on the spine,” stated researchers. “This type of exercise results in unique compression and shear load ratios in the lumbar spine which may explain why it causes discomfort in the lower backs of people who otherwise tolerate very heavy loads.”

As with yoga and CF, KB

needs to be supplemented with one or more of the exercise criteria for diving. Aerobic exercise in the heart rate training zones recommended for divers and good nutrition should be added to all three of these activities.

Yoga also needs to be supplemented with strength training. CF and KB provide strength training, but also need flexibility to create a balanced exercise program for diving. Further, CF and KB are typically forms of strength training with higher risk of injury than traditional resistance training and according to research may not produce better results.

Exercise programming for diving is as unique as the individual diver.

The health profile of the diving community, an understanding of the stresses of the underwater environment on human physiology, and sound research provide divers with a great deal of information. Using this information, divers can participate in a wide variety of safe, fun and effective forms of exercise to become and stay fit for diving.

Just as each piece of dive gear has its purpose and must fit properly for successful and enjoyable diving, each component of a balanced exercise program

is essential for fitness for diving, and the type of exercise performed must be a good fit for each individual diver. ■

Gretchen M. Ashton is registered with the National Board of Fitness Examiners. An advanced diver, International Sports Sciences Association Elite Trainer, and world champion athlete, Ashton developed the ScubaFit® program and the comprehensive FitDiver® program, which includes the first mobile app for scuba diver fitness. Ashton is the co-author of the PADI ScubaFit Diver Distinctive Specialty course. For more information, visit: ScubaFit.com



PETER SYMES



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marine mammals



Edited by Kelly LaClaire

Baleen filters differently than previously supposed

U.S. scientist Professor Alexander Werth recently published a study in the *Journal of Experimental Biology* investigating how bowhead and humpback whales capture prey using baleen.

He found that, in flowing water, the fringed edges of the baleen of filter-feeding whales actually tangle

together to form a food-trapping net and do not remain motionless as previously thought.

"People presumed that baleen was simply a static material, but my work showed that it is a highly dynamic material whose porosity (empty space between the baleen) depends on the force and flow rate of the water

moving through the whale's mouth," said Werth from Hampden-Sydney College, Virginia.

"When I began testing plates of baleen in my circulating flow tank, I found that the fringes moved dramatically and became tangled together."

To understand more about feeding behavior, the biologist studied the unique structure of baleen material. Whales have 300 baleen plates inside their mouths that are composed of keratin—the same protein that makes hair and fingernails in humans.

Werth placed sam-

ple plates from both bowhead and humpback whales in a purpose-built flow tank to test how they behaved in conditions similar to the wild, and despite their different feeding styles, he found that the bowheads' and humpbacks' baleens performed in almost identical ways.

His experiments revealed that both the flow speed of the water and angle of the baleen had a significant effect on their food trapping effectiveness. Further testing proved that, at the normal swimming rates of both types of whales, the fringe on a single plate swayed and tumbled to catch prey as effectively as possible. But at faster speeds the hairs simply streamed through the water and filter efficiency was lost.

"When I did these experiments," Werth told BBC Nature, "I found that the multitude of fringes from all the plates got all tangled up and greatly decreased porosity (empty space), making it like a very finely meshed plankton net to catch very small planktonic creatures."

"This is an important finding because it shows how complicated the story of whale feeding truly is. There is so much that we have yet to learn about the biology of these huge creatures." ■ SOURCE: BBC



Baleen plate

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Photo: SDA/MIDE TTL Photo Competition 2012
Vanessa Mignon (Australia) Portfolio Honorable Mention



Edited by
Kelly LaClaire

New study sheds light on pilot whale strandings, but questions still remain

It has been the prevailing theory among researchers that the mass strandings of pilot whales was linked to familial connections. Scientists believe that pilot whales (the most common species involved in large strandings) live in pods consisting of members who are all descendants of the same maternal ancestor.

For this reason, it was thought that if just one whale was to become beached due to sickness or disorientation, the extended family would rush to the aid and attempt to “save” the confused whale.

If this older hypothesis is correct, then all the whales involved in the beaching would have to be related.

New evidence presented by conservation geneticist Professor Scott

Baker in the *Journal of Heredity* suggests this is not the case.

“It has been assumed that when you have a pod of 100 or 150 pilot whales strand that they were part of a single matrilineal social group and our results suggest that is not the case,” said Baker.

Baker said mass strandings, which can involve more than 150 whales, are now assumed to be natural events and not always caused by human activity, such as sonar and ship noise—although these things are known to cause beaching from time to time.

“The mass stranding of pilot whales and probably sperm whales and some of the other species has been documented for hundreds of years all

the way back to Aristotle,” said Baker.

“In general, without human assistance, these large mass strandings are almost always fatal. The curious thing is whales appear to mass strand intentionally, and even after humans re-float them, they will often return to the beach.”

Baker and his colleagues studied 490 pilot whales involved in 12 strandings around Tasmania and New Zealand. By analysing mitochondrial DNA, which is inherited through the maternal line, the researchers revealed the stranding groups were descended from more than one ancestral mother.

“You’d expect to have a cluster of individuals that were of close relatives supporting a central individual that might be the matriarch. We just didn’t see that,” said Baker. “Mothers and calves were very often widely separated on the beach,” he added. “And in some cases we had dependent calves dead on the beach, and no mother that matched those calves dead on the beach.”

According to the researchers, these findings do not call the theory that pods members come from the same maternal ancestor but it does suggest that unrelated groups of pilot whales are coming together at some stage, possibly to mate or feed.

Just why the whales beach themselves remains a mystery. “It is an enigma,” said Baker. “This is the word we’ve decided best describes it.” ■

SOURCE: ABC NEWS



Stranded pilot whales



Pod of sperm whales

for whatever reason,” said Wilson. “They were being very sociable.”

Dolphins are usually the most social among the ocean-dwelling mammals, and they’ve been spotted foraging and interacting with a wide variety of other sea life, including many whales. On the other hand, sperm whales are shy deep-water hunters who travel great distances and have never been reported being so gregarious with another species.

The puzzle here is why these sperm whales have accepted the dolphin into their pod. “Sometimes some individuals can be picked on,” Wilson said. “It might be that this individual dolphin didn’t fit in, so to speak, with its original group.” Another theory is that the spinal defect prohibited the mammal from staying with its pod.

The fact that large sperm whales swim far more slowly and always leave a member near the surface with the calves while other adults dive for food could be making it far easier for the dolphin to keep pace with them.

Very few predators can be found in Azorean waters, so the scientists doubt that it was using the whales for protection. It could be that the spinal malformation could have put the dolphin at a serious disadvantage among its own kind—possibly it had a very low social ranking and had been exiled.

Whatever the reason, the show of cross-species solidarity and acceptance is nothing short of remarkable. ■

SOURCE: SCIENCE NOW

Sperm whales adopt deformed dolphin

Nature continues to surprise us, as does the propensity for animals to take in injured or lost members of another species.

Behavioral ecologists Alexander Wilson and Jens Krause of the Leibniz-Institute of Freshwater Ecology and Inland Fisheries in Berlin have discovered a group of the sperm whales in the Azores that seem to have taken in an adult bottlenose dolphin with a spinal malformation.

The researchers were 15 to 20 kilometers off the island of

Pico in the Azores when they came upon a small group of sperm whales that included several calves and an adult male bottlenose dolphin with a mal-formed spine that twists into an “S” shape near its tail. Over the next eight days, they watched, as the dolphin swam with, rubbed and nuzzled the cetaceans. And surprisingly, the whales seemed fine with it; at times even reciprocated the dolphin’s affections.

“It really looked like they had accepted the dolphin



Best anti-whaling season yet for Sea Shepherd – Lawsuits still flying

The Sea Shepherd fleet came to port in Australia claiming its biggest victory of Japan to date.

Captain Peter Hammarstedt of the *Bob Barker*, one of the groups central vessels, said it had been the most successful and most dangerous campaign of the nine they have carried thus far, with Japanese whalers only able to haul in

75 animals—the lowest kill total ever. This is far short of their intended harvest of 1,000 minke and fin whales.

“It’s been a long campaign. It’s certainly been the most dangerous,” he told the Melbourne press. “Never before have the Japanese whalers been as brazen, as reckless, as violent as they have been this year.”

In addition, lawyers for the environmental group have started legal proceedings, claiming the Japanese fleet repeatedly rammed the anti-whaling boats during refueling operations.

Japan’s Institute for Cetacean Research has responded with its own recriminations, saying Sea Shepherd was to blame for the collision and was deliberately targeting its vessel, the *Nisshin Maru*.

It is the second time Sea Shepherd has attempted to have Japanese whalers prosecuted. But a win in court will not be easy, especially after a recent defeat from the 9th U.S. Circuit Court of Appeals, who publicly denigrated Sea Shepherd founder Paul Watson for his group’s militant like tactics in disrupting the annual Japanese whale hunt in the treacherous waters of Antarctica.

The court’s leading judge said: “You



The members of the International Court of Justice

Australia takes Japan to court

Australia’s case against Japanese Antarctic whaling to be heard at the International Court of Justice in the Hague.

Australia took Japan to court, alleging “Japan’s continued pursuit” of a large-scale whaling hunt, which Japan calls scientific research, put the nation in breach of international conventions and its obligation to preserve marine mammals and their environment.

Japan’s annual whale hunt has long drawn worldwide criticism, but Tokyo defends the practice saying that eating whale is a culinary tradition. Commercial whaling has been banned for 25 years, but Japan catches about 1,000 whales annually in what it terms a scientific research program.

Australia, along with other critics, calls Japan’s activities commercial whaling in another guise and has asked the U.N. court to halt a Japanese whale research program, which includes hunting in Antarctica using a special permit. ■

don’t need a peg leg or an eye patch. When you ram ships; hurl glass containers of acid; drag metal-reinforced ropes in the water to damage propellers and rudders; launch smoke bombs and flares with hooks; and point high-powered lasers at other ships, you are, without a doubt, a pirate, no matter how high-minded you believe your purpose to be.”

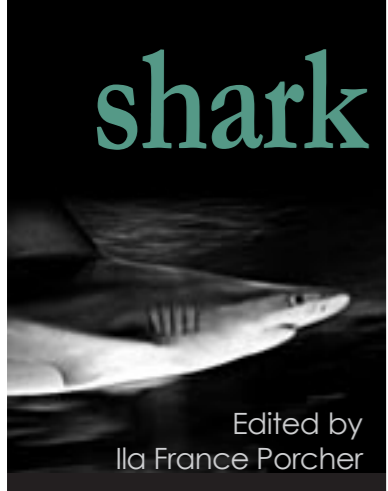
But Watson seemed unconcerned and unphased by the ruling in a recent interview with Canadian news media. “Well, I might play the part of pirate for the media if that helps,” Watson said. “Seriously though, come on, there is no parrot on my shoulder. No wooden leg. I have always acted for one reason and that is to protect whales from human predators like Japanese whalers.

“It does seem to raise the ire of some people,” he continued. “Well, OK, lots of people actually, but what can I say—somebody has to act to stop the bloody whale slaughter.” ■

SOURCE: BBC NEWS, ASIA ONE, C-NEWS CANADA



BIELLA “GABRIELLA” COLEMAN / WIKIMEDIA COMMONS



Edited by
Ila France Porcher

Where and why sharks attack

Text by Ila France Porcher

The reasons for shark attacks and the question of when and where they might occur has always been the subject of intense scientific interest in the effort to make seaside recreation as safe as possible.

Now, Erich K. Ritter of the Shark Research Institute, and Raid Amin, Peter Kennedy, and Laura Cossette of the University of West Florida, have approached the problem in a new way and have discovered that there are definite high and low risk zones involved. They have localized several such areas along the coastlines of Florida and California, where more than two thirds of all shark attacks

take place in the United States, examining the regions where attacks rarely happen as well as those already known to be dangerous. This has resulted in a more comprehensive understanding of shark attack patterns along these shores.

The researchers used data from the Shark Research Institutes's Global Shark Attack File and the records of attendance at beaches to determine the ratio of shark attacks to the number of people using the water. They used the modern cluster analysis software SaTScan™ to find the relative risk of being bitten by a shark, termed the "shark attack rate", which was not possible before this tool was

available.

This new method revealed regions with significantly higher or lower sharks attack rates than would have been predicted by examining just the numbers of shark bites. Though they varied over time, the clusters were clearly defined and remained in place year after year.

Application

On the eastern coast of Florida, for example, 345 shark attacks were recorded between 1994 and 2009, and of these, 210 incidents involved surfers, and 114 involved swimming and bathing. The remainder did not fit the criteria and were excluded. No attacks on divers were mentioned. The SaTScan™ analysis revealed two high risk zones, and two that are low risk areas.

Applying the same method to the Californian coastline resulted in similar clearly defined clusters being identified. Since 90 percent of the attacks on that coastline are due to the great white shark, the shark attack clusters seemed to be linked to the nearby presence of colonies of seals and sea lions where great whites congregate to hunt for food. The coastal region between San Mateo and Del Norte is one such region. The presence of the pinniped colonies continuously attracts the great seal predators to the area, some of which likely circle closer to the shores and come into contact with humans.

On the other hand, the low risk regions occurring south of Santa Barbara and

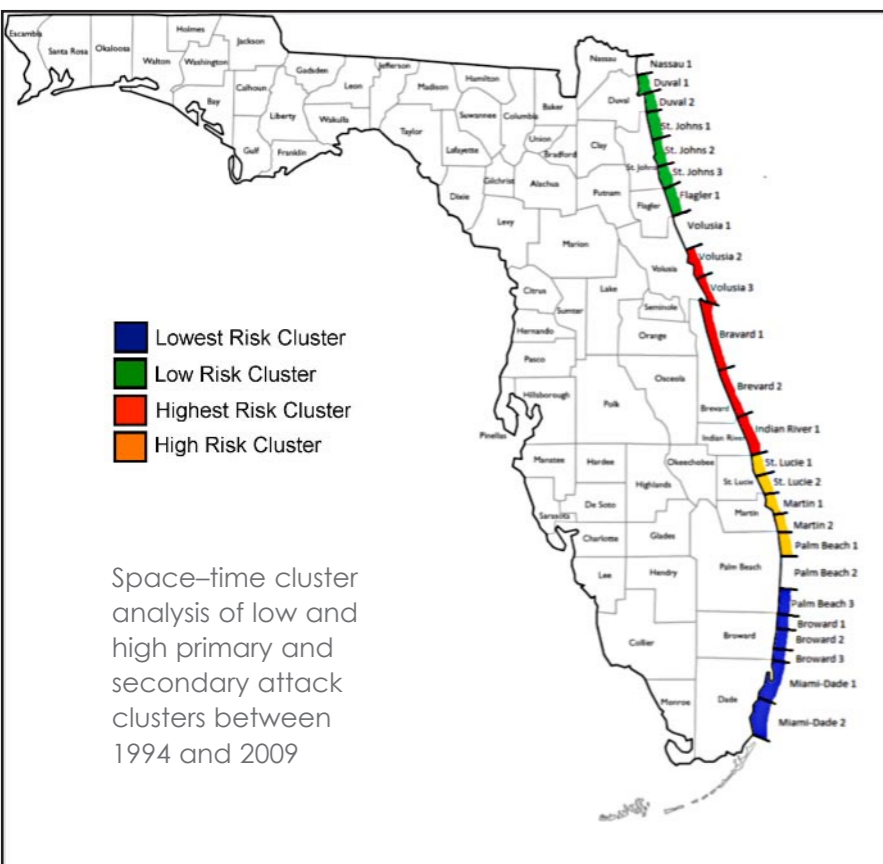
Conception Point, where the low attack rate has remained stable over many years, were associated with regions dominated by female white sharks migrating to a shark nursery in the area to give birth.

Noting that many of the attacks were by smaller sharks, the researchers postulated that they might be due to very young ones hunting fishes along the sea floor and into shallow waters where people were swimming and surfing. They could also have been driven inshore by cannibalistic adults, though such speculation is yet to be proven. Little is known about the social patterns of the species.

As Ritter explained, "It is the constellation of factors that determine the likelihood of an incident—be aware of those and the chances are greatly reduced."

From innovation to insight

SaTScan™ was initially developed by Martin Kulldorf for the purpose of analysing



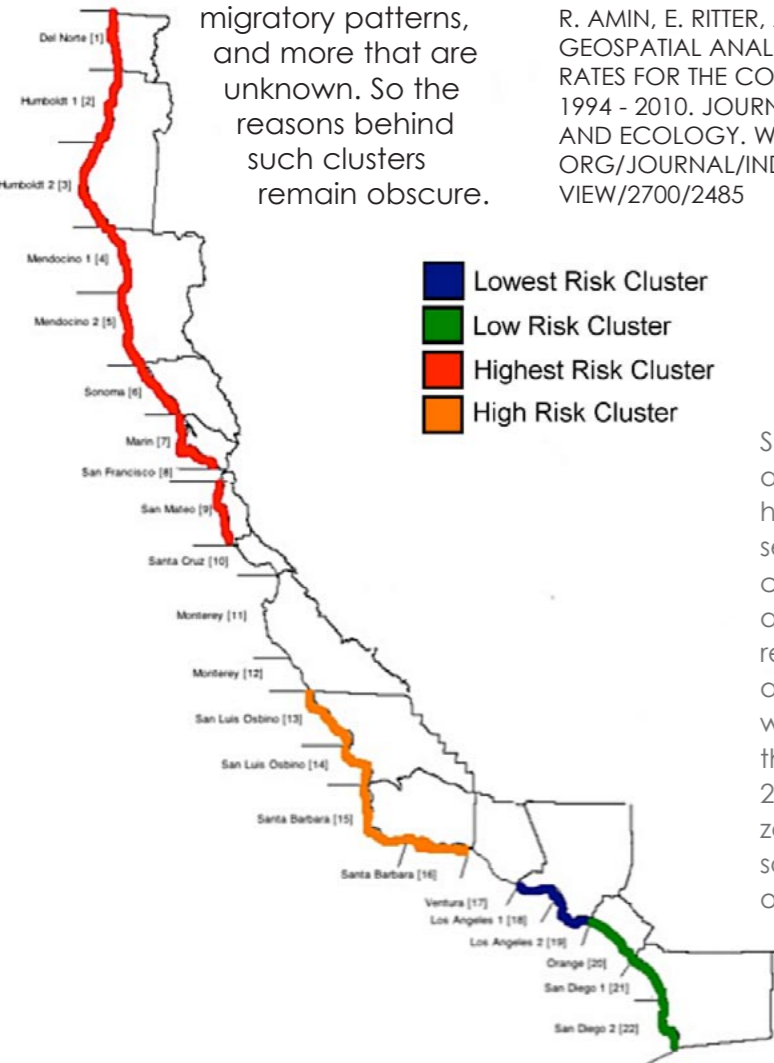
outbreaks of diseases to see whether they are random or not, and to evaluate them geographically and over time. The software can also be applied in other fields of research, but this is the first instance of it being used to generate information about the likelihood of being bitten by a shark.

Sharks travel widely under the influence of a variety of factors that include food sources, reproductive cycle, migratory patterns, and more that are unknown. So the reasons behind such clusters remain obscure.

But now that the shark attack rates for these coastlines have been established, beach goers looking for the safest places to swim and surf have definite information on which to base their decision at last. ■

SOURCES:
R. AMIN, E. RITTER, AND P. KENNEDY. A GEOSPATIAL ANALYSIS OF SHARK ATTACK RATES FOR THE EAST COAST OF FLORIDA: 1994-2009. MARINE AND FRESHWATER BEHAVIOUR AND PHYSIOLOGY. WWW.TANDFONLINE.COM/DOI/ABS/10.1080/10236244.2012.715742

R. AMIN, E. RITTER, AND L. COSSETTE. A GEOSPATIAL ANALYSIS OF SHARK ATTACK RATES FOR THE COAST OF CALIFORNIA: 1994 - 2010. JOURNAL OF ENVIRONMENT AND ECOLOGY. WWW.MACROTHINK.ORG/JOURNAL/INDEX.PHP/JEE/ARTICLE/VIEW/2700/2485



Space-time cluster analysis of low and high primary and secondary attack clusters between 1994 and 2010. The highest region of risk was along the north coast with higher risk during the years 2003 to 2010, while a lesser risk zone occurred farther south, as shown in orange



Great white sharks as scavengers

Great white sharks love whale blubber more than seals and gorge on it whenever they can, a new study finds.

University of Miami scientists Dr Neil Hammerschlag and Austin Gallagher, in collaboration with Chris Fallows of Apex Expeditions, South Africa, observed the feeding activity around four dead whales that appeared in the False Bay region during a period of ten years. They concluded that such bountiful sources of energy-rich blubber may be a significant food source for the great sharks.

A whale carcass trails a rich scent flow for miles, which continuously attracts sharks to the feast. The sounds made by feeding sharks carry a long distance too, and will rouse the curiosity of any other sharks within range. The resulting gathering presents an opportunity for researchers to document the behaviour of white sharks feeding together over long

periods of time. The researchers were able to watch up to forty sharks scavenging on one whale over the course of one day.

No aggression

Yet though these apex predators are usually solitary creatures, and large individuals were often attracted to eat, no wild feeding frenzy ever occurred. There were no signs of aggression, and the great white sharks left no inter-animal space between them.

However, a size hierarchy was identified in which the largest sharks took charge of the parts of the carcass where the blubber was richest, so that the smaller ones had to feed on the less fatty parts. Those who could not gain a place among those devouring the carcass, such as the juveniles,

were left snapping up the crumbs which, it seems were sizeable.

The sharks tore into the carcass as only great white sharks can do, taking huge bites, tasting them, spitting them out, and biting again, displaying unexpected fussiness as they picked over their meal, searching for the best titbits. One was filmed tearing a fetus from the huge cadaver.

The researchers observed that the sharks often fed on the flukes first but could offer no explanation since the flukes contain comparatively little fat.

While the sharks were occupied with the whale blubber, pressure was taken off their usual prey, the local seals, who were freer to roam in search of their own food. Thus, the feeding event affected the ecology of the rest of the food chain.

No waste

Carcasses in nature are never wasted, and scavengers are well known among terrestrial animals. But it is uncommon for marine researchers to come across the spectacle of marine life feeding on large carcasses.

The researchers found that at least in this region off South Africa, great white sharks are the dominant feeders on dead baleen whales and suggest that in spite of the rarity of coming across a whale carcass, shark populations may actually rely on such finds to supplement their usual diet of seals.

Hammerschlag said, "By attracting many large white sharks together to scavenge, we suspect that the appearance of a whale

carcass can play a role in shaping the behaviors, movements, and the ecosystem impacts of white sharks. These patterns may shed some light into the ecology of this often studied—yet still highly enigmatic—marine predator."

Their study entitled, *White sharks (Carcharodon carcharias) scavenging on whales and its potential role in*

further shaping the ecology of an apex predator, was published in *Plos One*. ■

By attracting many large white sharks together to scavenge, we suspect that the appearance of a whale carcass can play a role in shaping the behaviors, movements, and the ecosystem impacts of white sharks.



Wobbegongs of Raja Ampat

— Celebrating West Papuan Carpet Sharks

Text and photos by Andrea and Antonella Ferrari, courtesy of ANIMA MUNDI: Adventures in Wildlife Photography, Animamundimag.com

Beautifully adapted to an ambush predator existence, wobbegongs rely on their exquisitely cryptic coloration to avoid detection and catch their prey by surprise.

Wobbegongs—also commonly known as carpet sharks due to their velvety and highly ornamented livery—are currently grouped into three genera and eleven species. All are found in the Western Indo-Pacific, mostly in shallow Australian and Indonesian waters. Their common name derives from the Australian aboriginal language meaning “shaggy beard”, referring to the flaps and tassels growing around their wide mouths.

The specimens featured in these pages were all photographed during several separate dives in the Raja Ampat

area (an archipelago of four large islands and several islets located in front of the Vogelskop Peninsula) and are easily identified as tasselled wobbegongs, *Eucrossorhinos dasypogon*, a species frequently observed in West Papuan waters where it reaches a maximum size of 1.3 meters. The largest species of carpet shark, the spotted wobbegong, *Orectolobus maculatus*, is found in Western Australia and grows up to an imposing 3.2 meters.

Only one—clearly identified in the caption of the image—is a very rare and apparently still undescribed species which we photographed in Bali.

Most carpet sharks are rather small, but in fact they belong to the same order—the *Orectolobiformes*—of the whale shark, *Rhynchodon typus*, the biggest living fish in the world.

The wobbegong's muscular body is wide and flat, finely patterned in yellowish and pale blue spots, with bands and rosettes neatly arranged on a tan background. Wobbegongs are a true wonder of nature to behold, as they lie immobile in ambush on large table corals—a far cry from the popular image of the shark as a torpedo-like, steel-grey, sleek predator patrolling the blue void of the open ocean.

Their incredibly wide, highly compressed head and mouth profile is broken by an array of dermal flaps and tassels. Their small, beady and slightly malevolent eyes are cleverly hidden in a confusing maze of reticulations. Their broad, paddle-like pectoral fins are widely spread out, and their dark, ribbon-like tails are curved at a sharp angle.

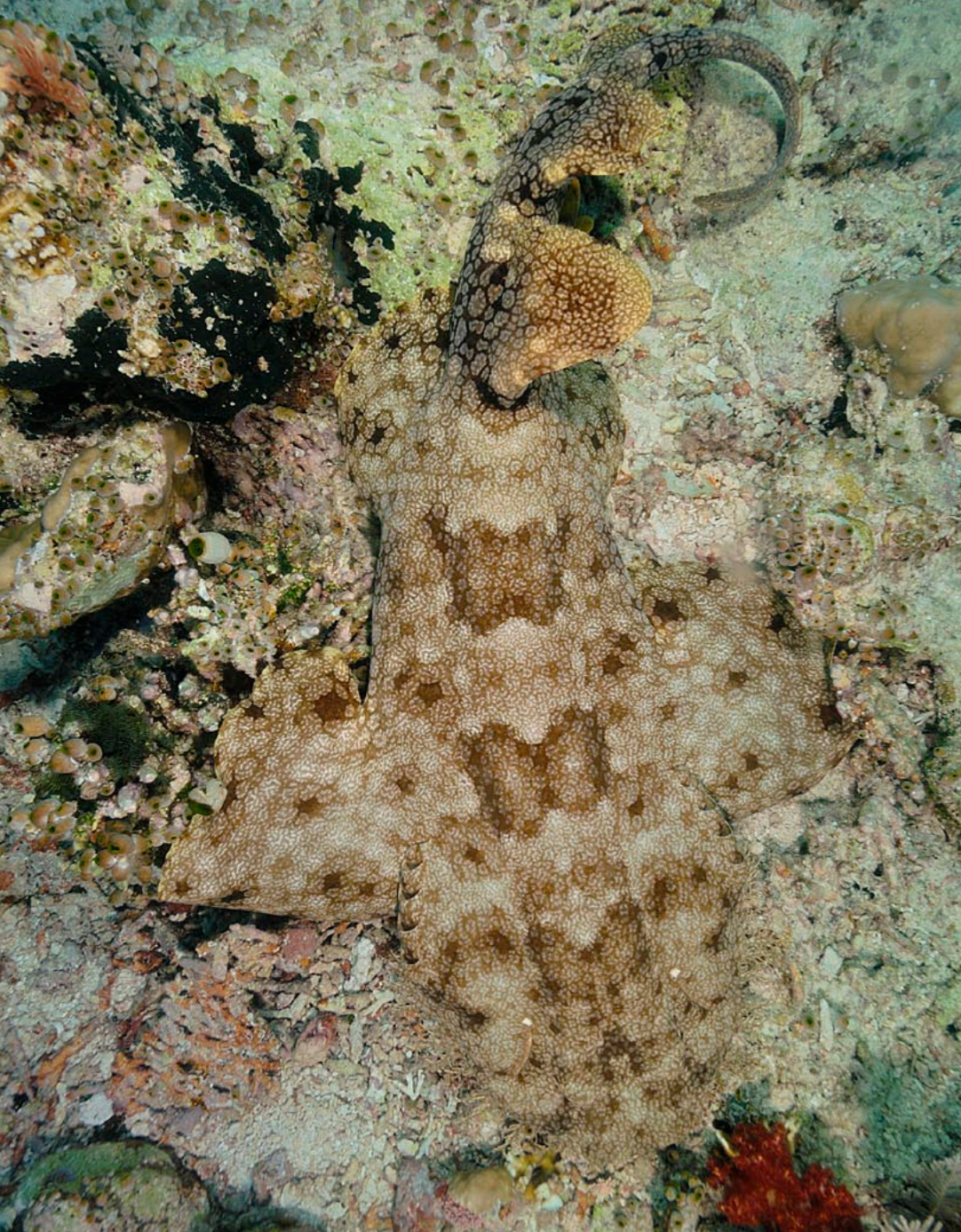
Spotted wobbegongs are almost impossible to detect in the



In ambush position, a wobbegong lies in wait for prey under an overhang



Diver with wobbegong, commonly known as a carpet shark



Wobbegongs are masters of camouflage

layered, highly structured environment of West Papuan coral reefs—despite sitting out in the open and in full sunlight most of the time, as if brashly defying divers and prey alike to find them. Their apparently peaceful, even torpid attitude—as it usually happens in nature—can be mortally deceptive, however, as when needed, they will unexpectedly explode into action and strike with lightning speed at fish passing within reach of their cavernous mouths, usually gulping prey down in a matter of seconds.

Diving with wobbegongs

Territorial and sedentary, carpet sharks make wonderful and obliging subjects—careful divers moving slowly and cautiously can actually approach them within inches—but one must never forget that these sharks are perfectly adapted and highly evolved sit-and-wait ambush predators after all, gifted with an exceptionally big mouth displaying a formidable array of sharp teeth including a set of frontal snake-like curved fangs to get a better grip on

Wobbegongs

their slippery prey and a supple, muscular, highly flexible body. Wobbegongs can easily bend over and bite their own tail, so don't pull it.

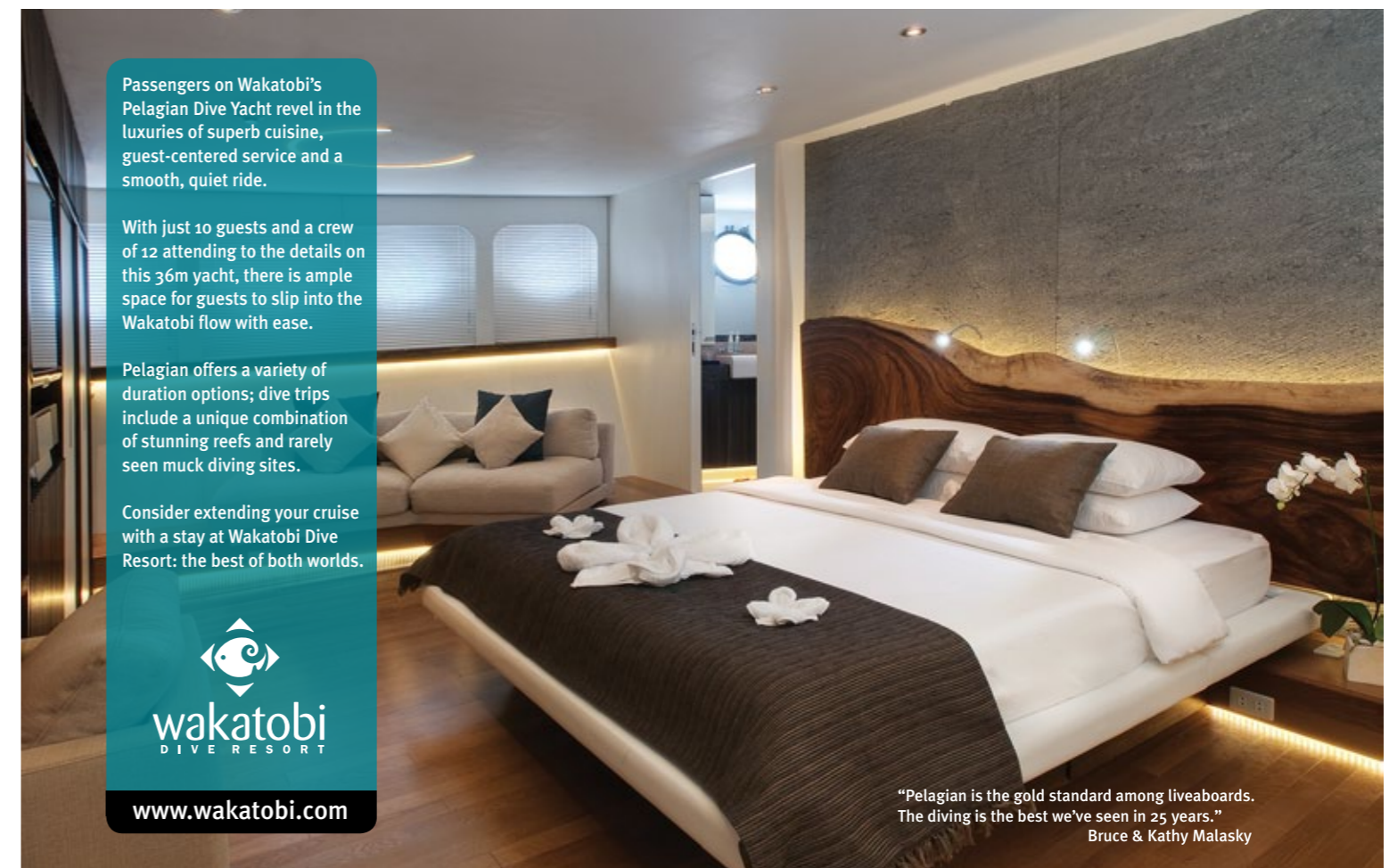
Reluctant to move if not unduly disturbed and relying on their spectacular camouflage to avoid detection instead, wobbegongs are also well known to inflict serious bites on waders and snorkelers who step on them in coastal waters.

As most ambush predators (one only has to think of several arboreal snakes to remark the striking similarities), wobbegongs not only have fearsome front fangs but also show a worrying tendency to hold tight with pitbull-like tenacity once they have bitten, so one has to be very careful in dealing with them as camera subjects.

Divers also have to remember, as with most other large fish, never to block their escape route when one is found in a cave or under an overhang. However



Close-up of carpet shark tassels



small, a shark intent on leaving its lair in a hurry will not hesitate to thrash violently and strike blindly at anything obstructing its way.

Regularly sighted on the colorful, overwhelmingly rich coral reefs of Indonesia's easternmost province, the tasselled wob-

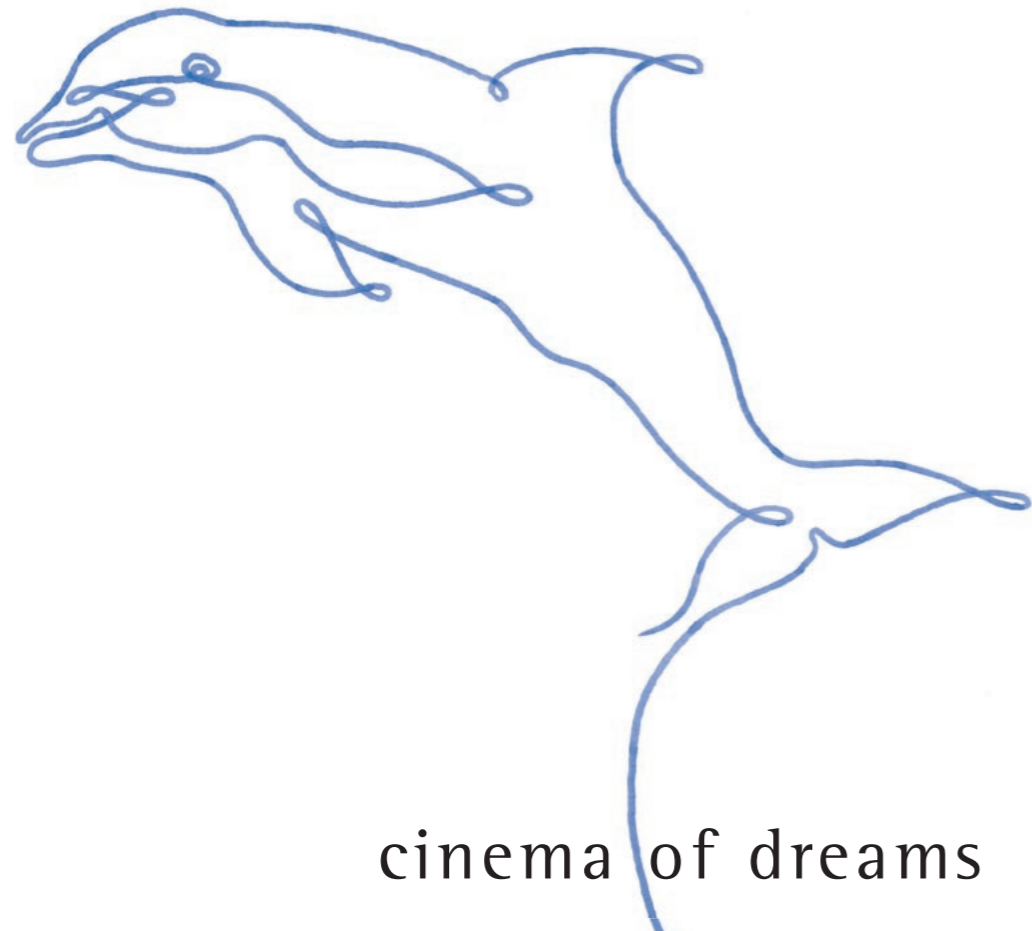
begongs of West Papua are a source of endless wonder and amazement to divers. Stunning examples of the science of camouflage in its most evolved form, superbly adapted to their sun-dappled shallow water habitat, they lie still on flat table corals like

some exquisite work of abstract art, the weird and wonderful creation of an underwater interior decorator gone slightly mad. Wobbegongs are marvelous icons of nature's whimsy and a wildlife photographer's dream. ■

"Pelagian is the gold standard among liveaboards. The diving is the best we've seen in 25 years."
Bruce & Kathy Malasky



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Tourists alter stingray behaviour

Stingrays living in Stingray City in the Cayman Islands have profoundly changed their ways.

The researchers found that Stingray City's stingrays show distinctly different patterns of activity than their wild counterparts, who don't enjoy daily feedings or close human contact.

Wild stingrays are active at night and solitary; they forage through the night over large distances to find food, and rarely cross paths with other stingrays. To see if Stingray City's fed stingrays stray from this behavior, Mark Corcoran—lead author of the study who did the research as part of his graduate work at NSU—and the research team tagged and monitored both wild and fed stingrays over the course of two



PETER SYMES

years and compared their patterns of movement.

They found that fed stingrays swapped their normal night-time foraging for daytime feeding, and in contrast to their wild counterparts, began to rest at night. They also didn't mind rubbing shoulders with their neighbors. At least 164 stingrays abandoned the species' normal solitary behavior, crowding

together in less than a quarter square mile of space at Stingray City.

They even formed schools and fed together. The fed stingrays mated and became pregnant year-round, instead of during a specific mating season, and also showed signs of unusual aggression, biting each other more frequently than their wild counterparts. ■

Sharks and manta rays win protection

CITES restrict cross-border trade in the oceanic whitetip, the porbeagle, three types of hammerheads and the manta ray.

The agreement, which must still be formally approved by the CITES plenary session, delighted conservationists who warn that Asia's voracious appetite for shark fins is causing their popula-

tion to plunge. Manta rays are killed for their gill plates, which are used in Chinese medicine. Shark supporters have been attempting to get Cites to protect these species since 1994. But there has long been strong opposition to the move from China and Japan who also tried to block the proposals, which were pushed by countries including Brazil, Colombia and the United States.

Regulation, not ban

While the vote to upgrade these shark species to Appendix 2 does not ban the trade, it regulates it. Both exporting and importing countries must issue licences. If a nation takes too many of these species, they can be hit with sanctions on the range of animal and plant products that are governed by CITES. ■



A team of divers working well together

Text by Mark Powell
Photos by Gareth Lock and Chris Sterritt

One of the most contentious issues amongst technical divers is the difference between the self-sufficiency and team diving approaches to diving. Like a number of other issues in technical diving, it seems to polarise opinions, often along agency boundaries. This often leads to exaggerated positions that can take on a similarity to religious fundamentalism.

The self-sufficiency mindset is where the diver is fully self-sufficient and approaches the dive with the view that they can perform the dive on their own and would be fully able to complete the dive without a buddy. The approach is summed up by the mindset that if you can't do the dive on your own then you should not be doing the dive at all.

The other approach is team diving where strong team work and cooperation are the focus of the

dive, and you plan to dive with a team of divers, and the team works as a well coordinated whole.

These two approaches seem to have a very different emphasis, and many divers think that they are contradictory. That is, you have to decide whether you have a self-sufficient approach or a team-based approach and that it is a choice of one or the other. Both approaches have their extremists who will go to great lengths to explain why their approach is right and the other approach is wrong.

In some areas, technical diving in the United Kingdom has evolved into a culture of solo diving where many experienced technical divers dive solo. All equipment choices are made on the basis that you will be diving alone or that your buddy will be

of no use. Gas planning is based on the principle that it is impossible or unlikely that your buddy will be any use in an emergency and so all procedures are based on individual action.

The team diving approach also has its extremists who focus on teamwork as the primary goal and consider self-sufficiency to be a sign of weak teamwork. These

divers will only dive with divers who follow the exact same team procedures.

In reality, these two extreme positions are not very realistic, and when taken to extreme, counteract the very point of the principles. This can cause significant problems, as the advocates of self-sufficiency can refuse to see some of the benefits of team

diving, whereas the advocates of team diving refuse to see any benefit in self-sufficiency.

Self-sufficiency vs solo diving

In particular, the principle of self-sufficiency does not mean the same thing as solo diving. For example, pioneering technical diving instructor Kevin Gurr

What are the differences between the self-sufficiency and team diving approaches to technical diving?



One for all or all for one?

says, "Assume all dives are solo dives; do not get into the water if you feel you can't do it without someone else to rely on." This is a clear endorsement of the self-sufficient approach, and many people have taken this to be a recommendation for diving solo. However, Gurr then goes on to say, "This does not mean you should not dive in a team;



You may have to finish a dive without your buddy



you should. Be prepared to be separated and to have to look after yourself." Similarly, those who advocate team diving do not mean that you should not be able to deal with situations on your own or need to rely on your team.

Two sides of a coin

So despite initial impressions, the self-sufficient and team diving approaches are not as contradictory as they might at first seem. In fact, they are just two sides of the same coin.

The best technical divers obviously have to have good individual skills. Building on your own level of buoyancy control, familiarity with kit and ability to deal with dif-

ficult situations are fundamental for anyone wanting to progress in technical diving. No diver who has thought about this question for more than a millisecond would ever suggest anything less.

Team sports such as football, rugby or cricket are a perfect example of the team approach, but players still ensure that they work on their individual skills. Players with weak individual skills would never make it into the team in the first place.

Diving with someone who is not self-sufficient is not team diving. If one of the team cannot deal with an emergency situation, then they are going to weaken the overall team rather than strengthen it. This means that self-

sufficiency is clearly a prerequisite for team diving.

The self-sufficiency extremists however go further than this. They claim that all divers should be self-sufficient because you can never rely on a buddy to provide any assistance in an emergency. They will often cite examples of where an individual buddy has not been able or willing to provide assistance in an emergency, and from this conclude that no buddy will ever be able to provide assistance. Furthermore, they argue that a poor buddy might cause an incident that would not have happened had you been on your own. As such, their argument is that it's better to be completely solo and never have a buddy

than to have a poor buddy.

In some ways, this argument has some merits in recreational diving, as there are a whole range of abilities. Inexperienced or out-of-practice divers can certainly fit this description, and many instructors and dive guides will tell you that they feel safer on their own.

Certain recreational training agencies even support the concept of solo diving in the recreational area and provide training courses on self-sufficiency and solo diving.

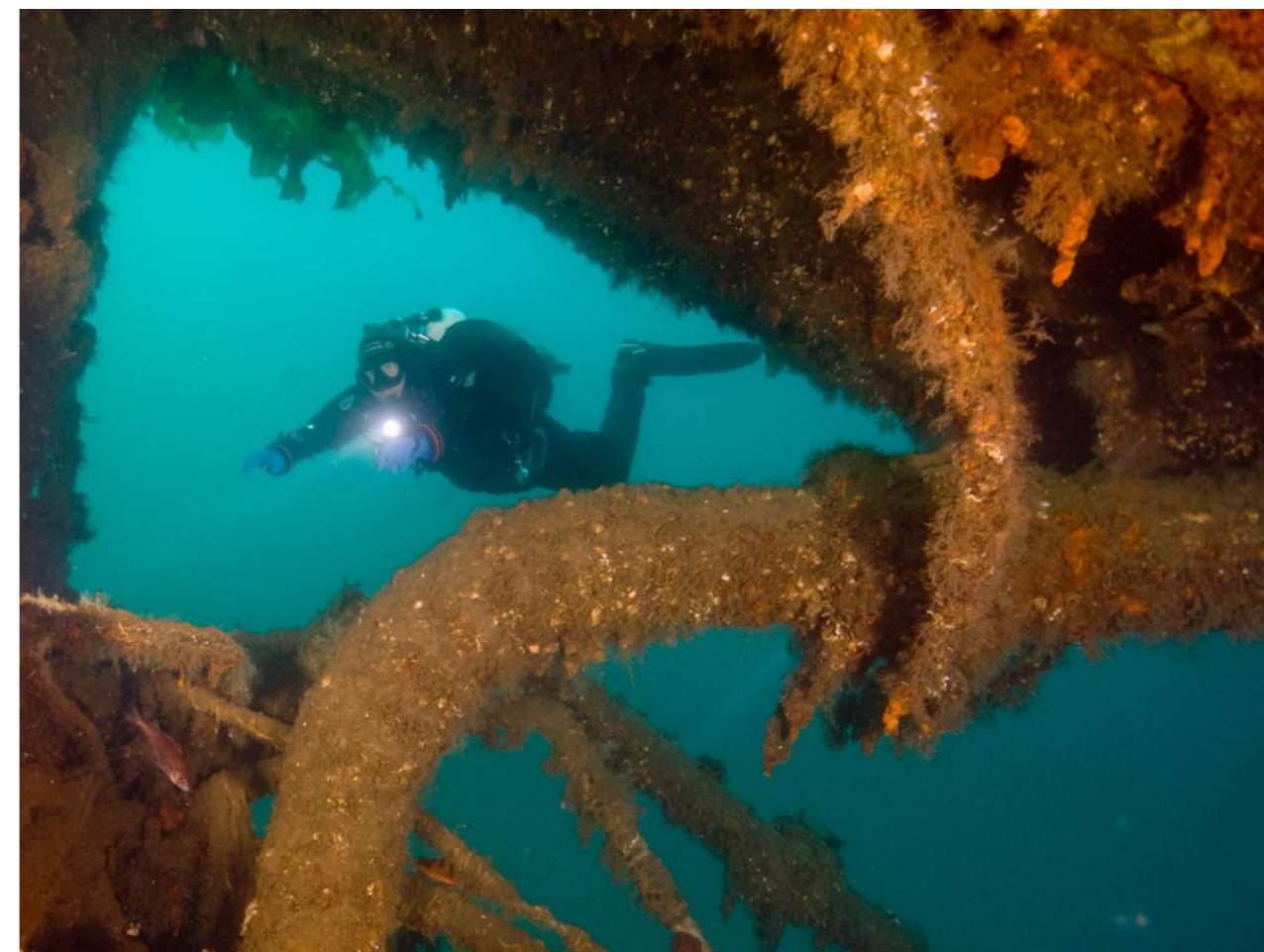
However, this argument breaks down for technical diving. At this level, any divers undertaking these types of dives require a higher level of skill and abilities. Divers who are unable to help their buddy are clearly operating at the limits of their own ability and so do not have enough self-sufficiency to undertake that dive, whether they are alone or with a buddy.

Self-sufficiency in a team environment

The best approach then is to aim for self-sufficiency within a team environment. Each diver should have enough capacity to resolve any problems they may have and have enough spare capacity to be able to offer assistance to the

other members of their team. If their buddies also have enough capacity to resolve their own problems and have enough spare capacity to be able to offer assistance to the other divers, then you have a very strong team.

The strongest teams usually consist of experienced individual



It is essential to be self-sufficient



tech talk

Some agencies allow solo diving for recreational diving



divers with good self-sufficiency and self-awareness skills that have practiced working together in a team. Training and practice are essential in order for team diving to work successfully. Each member of the team should have similar views, so they are following the same general approach.

In addition, good teamwork only comes with practice. You can see this with national sports teams. Each player is amongst the best player in the country yet, unless they train together as a team, they will not be able to perform well as an effective team.

When team diving is carried out by experienced, trained divers then it is a very safe way of diving. In the case of a problem, you have more options available to help out; more

gas available, more chance of spotting the problem and more ideas on how to solve it.

In the case of an incident, one member of the team can be initiating a rescue while the other sends up a delayed SMB and another provides a visual reference to ensure the rest of the team can maintain depth.

It is when problems occur that the benefits of diving in a team

become apparent.

Of course, this is very easy to say. Of course, this raises the question that if self-sufficiency within a team environment is the goal, how come it is not that common? The reason for this is that it's not easy to develop these two aspects.

Time and effort

The time and effort required to master your own skills to the point where you are truly self-sufficient and then the additional time and effort required to maintain those skills is more than most people can commit to. We all have jobs, families, other hobbies and commitments, which are all competing for our time.

It is entirely feasible to be a recreational diver and just dive a few times a year on holiday or

go quietly, amid the noise and haste...

[3 hours @ 20m - no deco]



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A buddy can be very useful in an emergency

You need to invest time and effort to develop your skills

on a couple of dive club trips. However, this is not the case for technical diving. If you are involved in decompression diving, trimix or rebreathers, then it is essential to ensure that you put in sufficient practice to build up and maintain your skills.

Some people may take to diving more easily than others, but no one is born with all the skills

and knowledge they need to become a technical diver. There are some people that may have more innate cricketing skills than others, but if you want to play for one of the premier league teams, you will need to put in a huge amount of practice in order to refine your skills and reach the level required. Once you have reached that level, you then need to put in

even more effort to maintain those skills.

The development of a strong team also requires time and effort. If it is difficult to ensure that a single person can dedicate the time and effort, it is even more difficult to gather a group or team to practice together.

The individual commitments of each team member and the



Strong individual divers in a strong team is the safest option



logistics of getting them together can be difficult. However, the same principle applies. If you want to become a true technical diver, then it requires a certain commitment in terms of time and effort. Irrespective of how good a cricket player is and how much time they spend working on their individual skills, they spend more time in team training.

Alternative approaches

It is because developing strong self-sufficiency skills and teamwork require such a commitment that alternative approaches have sprung up. If individual divers and their buddies do not have the individual or team skills required, they take alternative approaches to try to overcome these problems.

Teamwork is made more prescriptive, so that it removes the

emphasis on the individual diver. Alternatively, teamwork is ignored all together and divers adopt a solo diving mentality. Each of these approaches might seem easier in the short term and more appealing to those who cannot commit the time and effort to develop their individual and team skills, but it is a poor solution to the problem.

In the case of emergencies, the lack of personal skills and self-sufficiency can cause problems for you and any buddies you are loosely teamed up with. Equally, the lack of team skills may cause confusion and often makes the situation worse. So even though those alternatives might seem more attractive in the short term, and maybe acceptable for the majority of divers where nothing goes wrong, they are a poor long term solution, as they can fall

apart in times of emergency.

There is no getting away from the fact that for technical diving there is a need to invest time and effort in developing your personal skills and your team skills to a higher level than is normally required for recreational diving. Playing cricket in the park with our kids, or in a pub team is great fun. In this environment you will sometimes find very good players, but the level of play is nowhere near the same level as in the Premier League. As technical divers, we should use Premier League cricket as our model, rather than a game in the park or the occasional pub team game. ■

For more information on any aspect of technical diving contact Mark Powell at www.dive-tech.co.uk



Mirrorless & Macro

Text and photos by Don Silcock

In this article, the fourth in the series on mirrorless cameras, we will look at the potential of these cameras for macro underwater photography.

Underwater photography is undoubtedly a journey and one where the destination always seems to be just around the corner. For no sooner does it seem you may have finally mastered the art, than some new technology or concept appears, effectively moving that destination around the next corner!

Most underwater photographers start their personal journey with some form of macro set-up because it offers the cheapest and easiest way to achieve consistent results that are both sharp and properly exposed with vibrant eye-catching colors—which is usually when the bug really starts to bite.

Consistent results open the door to the finer points of underwater photography such as composition and isolating the subject, which

really are the difference between a good photograph and a stunning one.

Defining macro

Macro means anything large in scale, scope or capability, but in the world of imaging, macro photography refers to extreme close-up photography, usually of very small subjects, in which the size of the subject in the photograph is equal to or greater than life size.

Life size means a ratio of 1:1 between the actual subject and how it appears in the image. It is this high magnification, combined with the minimal amount of light-absorbing water between the subject and the camera, which produces visually stunning images.

Some of the most vibrant colors to be observed underwater are found in macro photography, due

to the dual effects of strong flash illumination and marginal color filtration.

In addition, a good macro lens will reveal details that are simply not visible to the naked eye, but are recorded on the image, adding to the overall visual impact.

Many underwater photographers never move past macro. Quite content searching dive sites for little critters, they are usually looking down, as that whale shark passes overhead.



However, that bug bites deep. Over time, “gear lust” often sets in, resulting in a migration to a DSLR with a macro lens and a desire to create the professional quality images that the technology is capable of making.

Therein lies the problem; the compact camera was nice and small, but you want truly professional results. To get them, you have to use something that appears massive and unwieldy.

What if you had the potential for professional results, but it all came in a mid-sized package? Enter mirrorless cameras and housings.

The Golden Rule

Get close and then get closer is the oft-repeated mantra of macro photography. Doing so fills the frame and minimizes the

Where to start?

High-end compact cameras such as Canon's S100/110 and Sony's RX100 in an underwater housing

offer an excellent entry point into macro photography and quickly achieve results that will soon be hanging on your wall.



Macro shot of nudibranch

7.4 inches for the 60mm.

It was the availability of these two lenses that convinced me to opt for the Micro Four Thirds standard when I was deciding which mirrorless system to use underwater.

Assembling a mirrorless macro system

My decision to “invest” in a mirrorless system was driven by wanting to have a second camera rig dedicated to macro photography, which could also serve as an emergency back up for my new D800 DSLR based wide-angle rig.

For me there was only one real choice—the Olympus OMD complete with the Olympus 60mm and the Panasonic 8mm fish-eye lens for wide-angle back up. Unfortunately, my budget would not stretch to include the Panasonic-Leica 45mm macro lens, but it is the next cab off the rank when my bank balance is restored.

To house the camera, there was also only one real choice with Nauticam’s OMD housing, ticking all the right boxes with its small form factor, excellent functionality and, most importantly, a dedicated

Olympus OMD with 60mm macro lens



SONY

Sony 30mm lens

port for the Panasonic 45mm that can also be used with the Olympus 60mm by adding a 20mm extension ring.

In another nice touch, the port features a 67mm thread, allowing external wet diopters to be screwed directly on to the port’s end without having to use an adaptor.

One of the apparent advantages of mirrorless cameras for underwater photography is the ability to use their large LCD display to compose the image. I was personally undecided about this, as I am a firm believer in using a 45 degree viewfinder so that the image can be composed from the lowest possible per-



amount of water between the subject and camera.

To do so effectively requires a good macro lens. By far, the most popular ones are around the 100mm focal length, such as the Nikon 105mm and the Canon 100mm. Both are of stellar quality and coupled with a high end DSLR, produce stunning images.

However, the price you pay for that capability is a bulky housing that often intimidates both subject matter and user alike.

As we consider the much smaller mirrorless cameras and their excellent functionality, the real question to be answered is the availability of lenses to match the performance of the Nikon and Canon flagships.

Mirrorless macro lenses

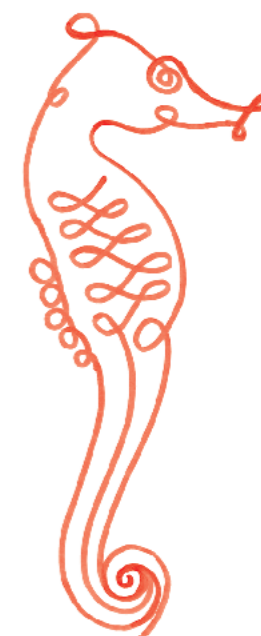
As explained in previous articles, there are currently only two real choices when considering a mirrorless camera for

underwater photography: the Sony NEX range or the Micro Four Thirds format from the Panasonic and Olympus alliance.

Sony is presently limited to one true macro lens: the 30mm f3.5, which is equivalent to a full-frame focal length of 48mm. Although its minimum focus distance is just 3.74 inches (9.5cm), it is not really the best choice for underwater macro photography, as it is too wide.

Sony’s 18-55mm (27-82.5mm equivalent) kit-lens has a close-focus distance of 9.8 inches and is used by many NEX owners for their macro needs.

Over in the Micro Four Thirds stable, there are two excellent choices with the Panasonic-Leica 45mm (90mm equivalent) and the Olympus 60mm (120mm equivalent). Both lenses offer true macro capability with 1:1 reproduction ratios, bright f2.8 maximum apertures, high quality glass and excellent close-focus distances of 6 inches for the 45mm and



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Macro shot of crab



Lure, full frame, Olympus 60

spective and you “shoot upwards” to isolate the main subject as much as possible.

So, I decided on installing Nauticam’s excellent 45-degree viewfinder, which added significantly to the overall cost but I considered it justified. Time will tell if it was the right decision.

The Nauticam housing uses fibre-optic strobe cables, which requires the small external Olympus flash supplied with the OMD to be installed on the camera to trigger the strobes. This meant that I was able to use my Inon 240 strobe and its STTL capability.

Underwater testing

To say that I was keen to try out the new macro rig would be somewhat of an understatement. I had planned to spend a weekend up on the north coast of Bali, where I now live, testing it at the Puri Jati and Secret Bay critter sites.

The plan was to get some real

world macro and super-macro images for inclusion with this article, but that was before the “gentleman” in the seat behind me on the flight from Singapore dropped his duty free on my head, keeping me out of the water for three to four weeks on doctor’s orders.

Magazine deadlines must be met, so as a

again the 60mm focused quickly and accurately and the STTL exposure was perfect.

Then, I noticed the tiny bug in an equally small bubble of air on the lure, and I moved in to the minimum focus distance of the 60mm to record it—again fast focus and perfect exposure.

Conclusion

Although I have yet to fully test my new macro rig, my initial impressions from the pool testing are very positive.

The auto-focus of the Olympus OMD and the 60mm macro lens is fast and accurate, the lens is tack sharp, and the STTL of the Inon 240 strobe is first class.

You will have

to wait for my head to heal and the next installment of *X-Ray Mag* to see the real-world examples, but they are definitely coming! ■

Don Silcock is an underwater photographer and dive writer based in Sydney, Australia. Visit: Indopacificimages.com



Lure, close up, Olympus 60

substitute, I visited the local fishing tackle shop and purchased a nice, bright 4-inch-long lure to test the macro rig in the pool.

The exercise proved interesting, as it allowed me to back off and fill the frame to test both the 60mm lens and the STTL capability, both of which performed superbly on the very first shot. Then I moved in for a close-up of the lure’s head and

Lure, close up, Olympus 60

FAR RIGHT: Nauticam OMD macro rig





photo & video

Aquatica AD4 Housing

Canadian housing manufacturer Aquatica has announced the specifications and renderings of their new housing for the flagship Nikon D4 DSLR. The new AD4 housing has access to both the Fn and Pv buttons that are situated on the front of the camera body, a new smoother operating lens gear, a new camera tray that indexes with a push-tab and a left-hand lever that adjusts the camera's ISO. Aquatica has not provided any shipping dates for the AD4 as yet, but have confirmed a retail price of US\$4,590.



10Bar Olympus EPL-5 Housing

Hong Kong based manufacturer 10Bar has announced the release of their new housing for the Olympus EPL-5 mirrorless camera. The new housing features all the usual 10Bar functionality and is priced at US\$850, complete with a 17mm lens flat port. The semi-dome zoom port version of the housing retails for US\$1,000.



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Nauticam Canon EOS-M Housing

Nauticam has announced the release of their housing for the Canon EOS-M mirrorless camera. The Canon EOS-M uses a DSLR sensor which, with the soon-to-be-released adapter, allows the use of SF and EF-S lenses in addition to the dedicated EF-M lenses. The EOS-M's hybrid sensor allows for phase detection AF while video shooting, which enables live autofocus while recording—a huge bonus for underwater shooters. The Nauticam housing is designed so that Canon's Speedlite90EX flash can be mounted on the EOS-M's hotshoe and used to optically trigger strobes. In a nice touch, Nauticam has designed a port and focus gear that allow Canon's EF-S 60mm macro lens to be used with the EOS-M housing.

Mocean Armor

Capture the Amazing **iSea4**
Professional Cinematographers housing for the iPhone 4 - 4S - 5



photo & video



Gates Canon HF G-20 Camcorder Housing

Gates has announced its new housing for the Canon HF G20 consumer camcorder. The new housing supports the Canon Vixia HF G20, HF G10, XA10 and Legria HF G25 camcorders. A significant feature of the new housing is the large window that allows use of the built-in LCD monitor at wide viewing angles. The housing uses Gates' non-vignetting ports and an internal flip filter for natural light shooting color correction. It also allows all available battery sizes for the Canon camcorders to be used, which means less battery changes are required—reducing the number of times the housing has to be opened. The Gates HF G20 Housing is available now for US\$3,170, which includes the housing and the GP32A Wide Angle Port.



Gates Sony F55 Housing

Gates has announced their new F55 housing for the Sony F5 and F55 CineAlta cameras. The new housing is machined from aluminum and supports a wide variety of Canon and PL mount lenses, plus it uses Gates Precision Ports, which provide vignette-free shooting. The Gates F55 housing, like all Gates Pro housings, feature the SealCheck system to ensure seal integrity before entering the water. The new housing will also support the integrated RAW recorder or Sony, the AXSR5 and access to all camera functions. The F55 housing will be available from June 1 at US\$18,000 for the housing, port and port rings.

Vacuum system to ensure seal integrity before entering the water. The new housing will also support the integrated RAW recorder or Sony, the AXSR5 and access to all camera functions. The F55 housing will be available from June 1 at US\$18,000 for the housing, port and port rings.



Canon EOS 100D/Rebel SL1

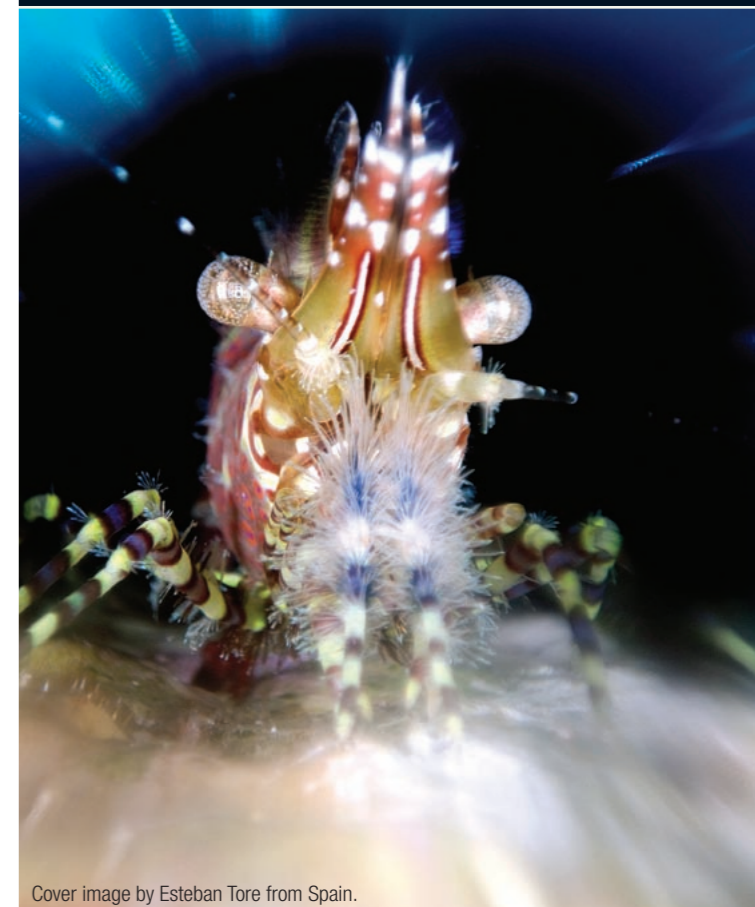
Canon has announced the world's smallest, lightest DSLR—the EOS 100D/Rebel SL1. The SL1 shares the 18MP resolution, DIGIC 5 processor, 3-inch touchscreen and 1080p30 video capability of the EOS M, Canon's belated entry into the mirrorless camera space. The really small form factor of the SL1 is clearly designed to create a wedge between the burgeoning mirrorless cameras and DSLR's. Mirrorless cameras key selling point to date has been functionality close to that of a DSLR but without the size and weight. Now Canon has created a DSLR that is only slightly bigger than a mirrorless camera. Canon's engineers appear to have done a tremendous job shrinking all the internal components like the shutter mechanism, sensor modules and circuit boards, without impacting any of the DSLR functionality or quality. The EOS 100D/Rebel SL1 has a recommended price of US\$799.99.



Amphibico Genesis FS700 Housing

Canadian video housing manufacturer Amphibico has announced the release of its Genesis housing for the Sony NEX-FS700 camera. Image monitoring is available through the top-mounted window, and the Genesis FS700 housing will be compatible with a wide variety of Sony E-mount lenses. The housing also features a bayonet port lock system that is compatible with Aquatica ports. Amphibico states that the Genesis FS700 housing will be available in April at a U.S. retail price of \$6,395.

The HP Red Sea and World Shoot-Out 2012 competition album is now available!



Cover image by Esteban Tore from Spain.

Stunning images submitted by HP Red Sea & World Shoot-Out 2012 nominees and winners were all gathered into one album, featuring color and creativity at their best.

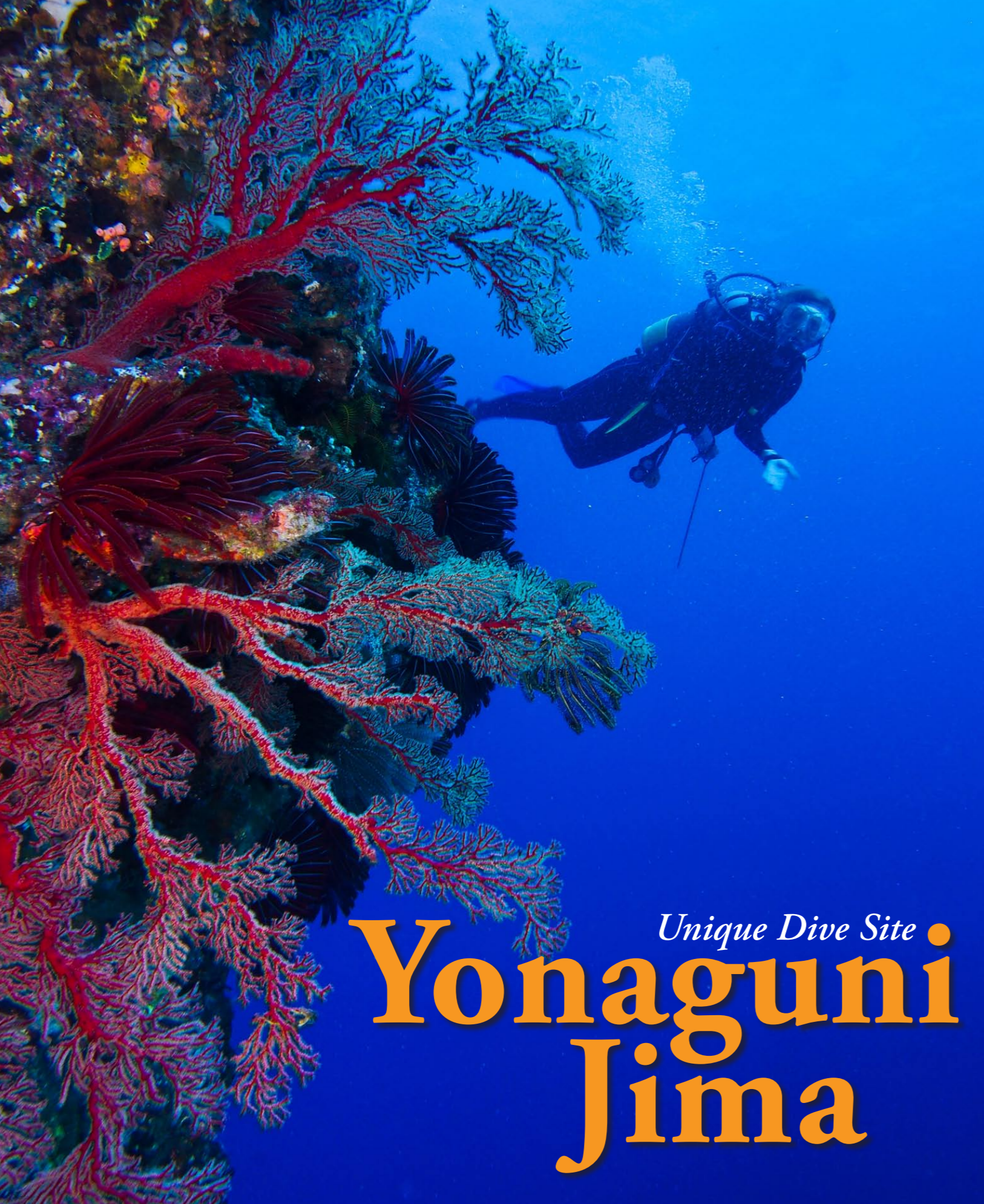
The album consists 176 Chrome pages. It's the perfect gift and a must-have for any underwater photographer, diver, fan of the sea or fan of art.

Special Introductory Offer:
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Unique Dive Site Yonaguni Jima

Japan is home to some excellent cool water diving in winter—currents, 21°C water, and rocky—but it is so worth the journey



Shota 2—the excellent, purpose-built dive boat of Sou Wes Dive Centre

—Lured by stories of schooling hammerhead sharks and a lost city submerged below the surface, Farhat Jah headed out on the long journey to Japan's westernmost island.

The sun rose on a small outcrop of rock in the Pacific Ocean. The sea was calm, but a steady roll of small waves slid up to the coast and then petered out on a seemingly invisible reef. The sun was warm but muted at this hour. A fishing boat motored slowly out of the tiny harbour and headed for the horizon. I looked out over the balcony and saw a cow chewing on grass in the garden. It was January and at 7:45 in the morning, the sun had just risen on Yonaguni Jima—Japan's forgotten isle.

Text and photos by Farhat Jah
Yonaguni rose up out of the ocean floor. This was no coral atoll, it was a solid rock. One small town, two very small villages and two sheltered harbours made up the human addition to the island. It was cold, 16°C, and a gentle wind blew at all times

over the rocks. The atmosphere was quite bucolic.
We were 60 miles from Taiwan, 1,800 miles from Tokyo and yet, due to the similarity in vegetation, I felt as though I was in Micronesia. Sugar cane and tropical scrub covered most of the land, while fields and the airstrip took up what remained.

Rocky cliffs dominated the coast, punctuated by the most idyllic, white, sandy beaches with clearly visible coral bommies sitting in the shallow water. Best of all, not a person was to be seen anywhere.
We arrived in an old and greasy Canadian-made DASH 8 turboprop. After a low flight over



Yonaguni



LEFT TO RIGHT: One of two tiny harbours on Yonaguni Island; Serene landscape and rugged rocks of Yonaguni coast; Lionfish on Yonaguni reef

water, the aircraft circled the island before lining up on the new runway. Passengers were treated to a view of the waves crashing relentlessly on the black cliffs. Winds gusting over the rock, made for an interesting landing.

We had come here to look for schooling hammerhead sharks and to see the ruins at Iseki Point. The whole expedition rested upon two people: Douglas Bennett, a 42-year-old ex-U.S. Marine who runs Reef Encounters 300 miles away on Okinawa; and Kihatchiro Aratake, the 65-year-old owner of Sou Wes Dive Centre and director of the Yonaguni Tourism Association.

We loaded up a rusty Toyota minibus and trundle along the road to one of the two tiny harbours. The dive master carried some of the kit down. Rather than watch

him, we pitched in and carried extra tanks, BDC's and general bits. I was getting the impression that the Japanese way of doing dive things is a little different to the western world. I needed to borrow a BCD and was given an old Sea Quest that had not been made for 15 years and was a size or two too small. Regardless, it went on, and I could just get the clips done up—perfect. I smiled to myself at the thought of what some less flexible diver might have thought.

Diving

Kihatchiro piloted his own boat. Stricken with polio, he dropped his crutches and nimbly disappeared up into the bridge of a 50ft metal hard boat made in Taiwan. We put our own kit together. This is Japanese style diving. It's a bit like a British dive club

renting a boat but with no one who can speak English.

At Iseki Point, Doug briefed us: "Move away from the boat as soon as you can go down and move away." He gave me the choice of a backward roll down two metres or a giant stride. Like a fool I choose the giant stride, the precarious jump into the water was done avoiding the three ladders that hung off the stern. Cisca had short legs and cleared hers by six inches. I needed a camera. Unfamiliar with the system I wondered what to do when Doug came to my rescue.

"I'll take it," he said. And when I took a giant stride in, he merely rolled in backwards and took the pressure of the water on his back. "I could have done that," I muttered, as we submerged below the surface.





Divers explore the upper terrace at Iseki Point (above), at 30ft (right)



The cool 23°C water seeped slowly into the wetsuit. Doug handed me my Olympus OMD. It's as small as my G12 housing and actually lighter. I clipped it

on, and we started to descend. Cisca's Suunto dive computer turned on and then died. Needless to say, she was not overly happy, but

she's old school and always dives with her Momentum dive watch. She grimaced at me, as she twisted the bezel round and double checked her air and depth gauge. Day one of diving in Japan, and we really were back in the early 1990s!

The other divemaster, Takashi San, took off with his Japanese client, a quiet but delightful vet from Nagoya. Doug let him go and took us slowly forward along a rock wall towards a swim through. But this was no ordinary swim through; it consisted of blocks of stone placed here in an arch. We went through these and popped out into what looked like a street.

The rock was smooth and barely covered with algae. It differed from every other part of this island and had steps. I was bewildered, trying to take in a scene similar to the Mayan pyramids,



THIS PAGE: Scenes from Yonaguni diving



Detail of the steps of the Upper Terrace



Angelfish off Yonaguni Jima

but underwater. I twisted around and looked at the walls, steps and cut terraces.

A group of small fish sat on an anemone and a big angel fish came up to us, said hello and wandered off. We came to a dead end, turned around and went around a corner at 67ft.

The current picked up, exactly as Doug said it would, and I flew along. I wanted to descend, but Doug motioned to me urgently to come up and round to him. I did as instructed. Just then, we were all caught in a surge of sea and sped down the wall together! Had I carried on, I wouldn't have made it back. We ended up on what the

divers call the Upper Terrace—the top of the man-made structures.

The carved steps gave a dramatic backdrop to the entire scene, but soon enough, our air was running low and it was time to surface. As my hand broke the surface, the cool January wind met it, and I momentarily contemplated staying under the surface. But surface we had to do and moments later, we were sitting in the comfortable “wet cabin” of the vessel.

A healthy wind blew over the sea making for a chop. Takashi produced some gorgeous spiced green tea, and we all sipped away at this, while Kihachiro motored slowly to the middle of the sea.



Lots of nudibranchs can be found at Yonaguni

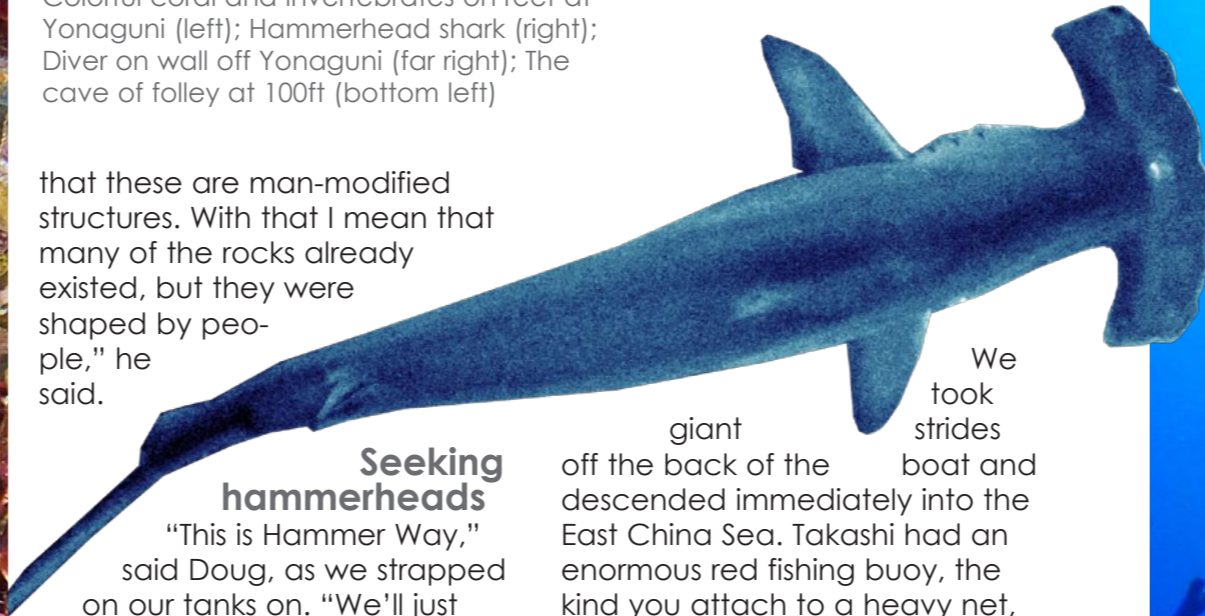


Colorful coral and invertebrates on reef at Yonaguni (left); Hammerhead shark (right); Diver on wall off Yonaguni (far right); The cave of folley at 100ft (bottom left)

that these are man-modified structures. With that I mean that many of the rocks already existed, but they were shaped by people," he said.

Seeking hammerheads

"This is Hammer Way," said Doug, as we strapped on our tanks on. "We'll just cruise around in the currents and see if we can find some hammerheads. We may not, so get ready for 40 minutes of blue."



We took strides off the back of the boat and descended immediately into the East China Sea. Takashi had an enormous red fishing buoy, the kind you attach to a heavy net, which he dragged behind him on a reel of thick rope. I looked everywhere and could see nothing but blue. In order to



Yonaguni



"Are you sure these sites are real?" I asked Doug, as the tea slid down and warmed my insides. "Some people say that this is natural," he explains laconically,

"but you saw where there were piles of rock. That rock came from the other side of the island. The lines, the steps, the carving... I definitely believe



Detail of soft coral on reef at Yonaguni; Hammerhead shark (right)

avoid becoming disorientated, I alternated between looking at Takashi the vet, Doug, Cisca and the surface. We swam lazily, in a box-like search. It really was blue. I clutched OMD and

my wondered what this meeting would be like.

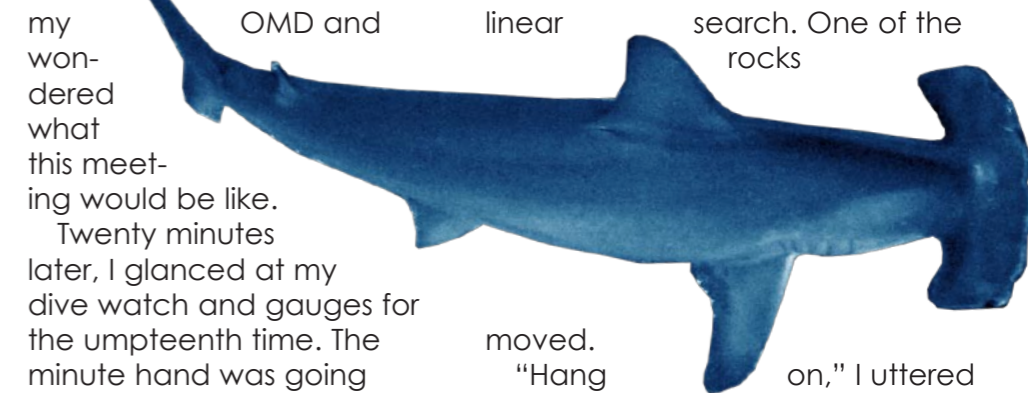
Twenty minutes later, I glanced at my dive watch and gauges for the umpteenth time. The minute hand was going around inexorably against the bezel, and my air was moving in the opposite direction with equal strength. In addition to these concerns,

all I had seen so far was loads of blue. Just then, we saw a shape, a shadow... It was the bottom.

We had dropped to 60ft, and at 160ft, sand and rock seemed to combine. At least now I had something to look at. We followed the rocks and continued our now linear search. One of the rocks

moved. "Hang on," I uttered into my reg. "Rocks do not move."

I peered down again, released the smallest amount of air from my BCD and looked again. The





Colourful fans abound all over Yonaguni



Yonaguni

Yonaguni Jima is full of nudibraches

rock was a very slow moving and rather giant 18ft hammerhead.

I fumbled with the OMD, and swam a bit deeper. I checked my air and saw that I had enough, and dropped again. The clip on the OMD finally came undone, and I fired. Snap, snap, snap—the camera shutter fired repeatedly, as three, no, now four enormous hammerhead sharks swirled below us.

One of them turned towards me and gently swam upwards. Separated from the animal by my camera, I felt no worry, until I looked over the top of the camera and saw it in its full girth. Now I felt extremely worried. I was 90ft down. But the

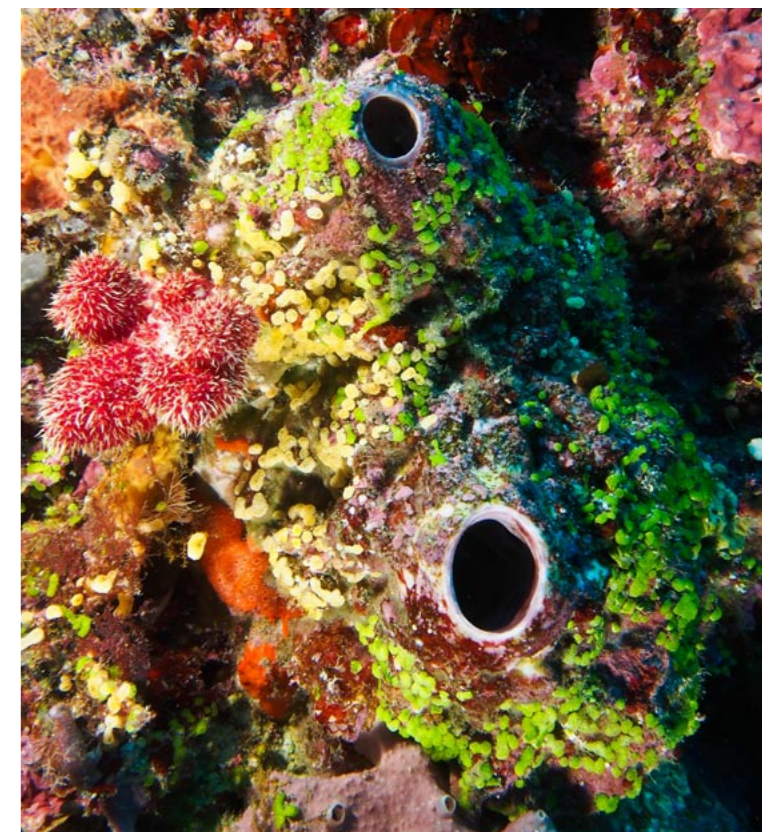
shark turned and wandered off.

I needed to make sure I maintained my depth and inflated my BCD. Doug was down with me. Cisca was even further below me, but we kept shooting. And then, after multiple circles and passes and as quietly as they had arrived, the hammerheads were gone.

Thankfully, their departure coincided with the needle on my pressure gauge getting to the red line. I sent up my surface marker buoy and climbed slowly back up the line to the surface and my safety stop.

Vibrant diving

There was more to Yonaguni than seasonal hammerhead sharks and the ruins at Iseki

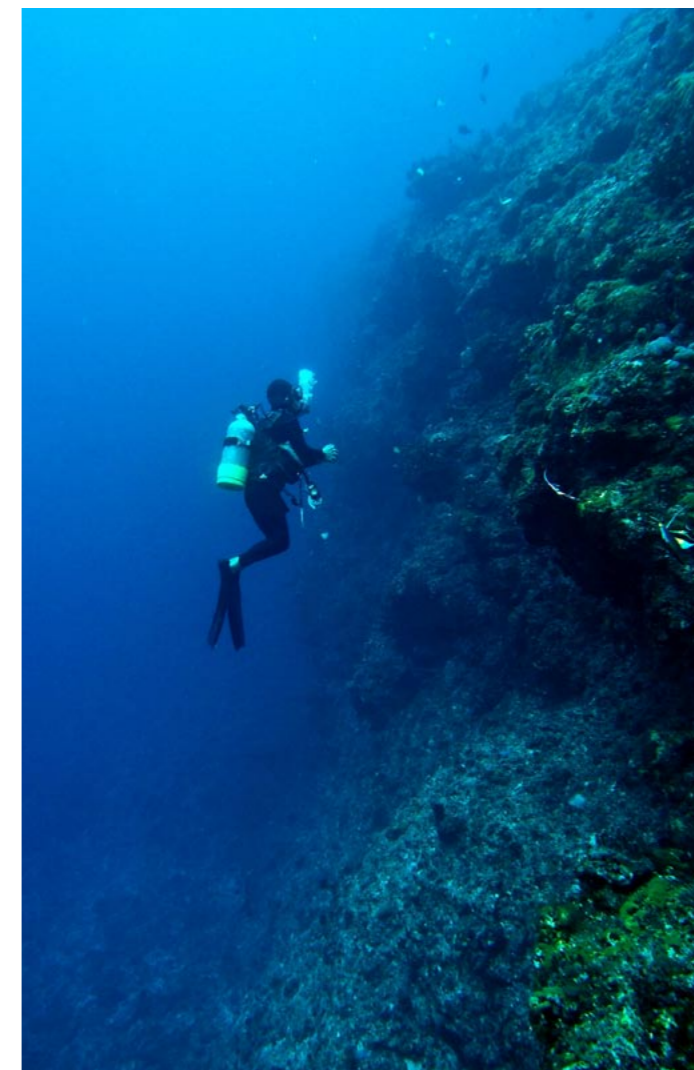


Sponges and soft coral decorate reef





Yonaguni



NASA



CIA.GOV

Divers cross from one ruin to another; Yonaguni island, the lighthouse represents the westernmost point of Japan (top right)

Point. The next few days saw us diving on steep walls covered with hard coral, brittle stars and sea fans, and then, under the most enormous boulders.

Yonaguni seemed to be a rock with a pile of boulders dropped around it. We were not inundated with schools of snapper, but below the bounders, in semi caves, fat grouper and some blue fin trevally sat waiting for their food.

Yonaguni was a place to watch your dive computer; the cold, clear water was deceptive. Being under a boulder at 90ft, snapping away at the nudi-branches felt like 30ft.

The diving in Yonaguni was exciting. The waves were big. The surge was powerful and felt at depth. But the water was clear, and the underwater

landscape was dramatic and colourful. The marine life was also vibrant.

Afterthoughts

On the evening before the turboprop flight to Okinawa, Kihatchiro drove us to the westernmost point (and almost the southernmost) of Japan. A lighthouse dominated the high cliffs, while a wild horse chewed at the shrubbery.

The sun sets here later than any other part of Japan. We stared out over the East China Sea. The sun was lower, and we strained our eyes to see the peaks of Taiwan. We saw a shape, but it moved—it was a large freighter in the sea lane steaming north to the home islands. The wind blew and the horse moved along the hedge. Yonaguni

Jima was truly unique, and I started to regret our impending departure. ■

Farhat Jah is an underwater photographer based in Pemba, Tanzania. He leads specialist bush walking safaris and operates a dive resort on the island of Pemba. See: www.swahilidivers.com



Yonaguni Jima has impressive walls; A two-propeller plane transports visitors to and from Yonaguni (left)

Location of Yonaguni Jima on global and regional maps



Amanda Brisbane



P O R T F O L I O

PREVIOUS PAGE: *Blue Wave Sculpture*, by Amanda Brisbane. Sand cast glass, 40cm
BELOW: *Blue Lagoon*, by Amanda Brisbane. Sand cast glass, 38cm



Text edited by Gunild Symes
Photos courtesy of Amanda Brisbane

Inspired by nature, the sea, the waves, the water itself, British artist Amanda Brisbane creates stunning, one-of-a-kind glass sculptures and vessels with a unique glass-making process working with sand. The results capture the fluidity and motion of water frozen in time.

X-RAY MAG: Tell us about your artwork and how you developed your artistic process in connection with themes of the sea and the underwater world.

AB: The process I use is sand casting, which allows me to make negative patterns and designs in the sand using textured items. Shells have a wonderful form, so we developed a range of Seaform vessels using decorative shells as impressions into the sand mould.

X-RAY MAG: What about the sea and its

creatures inspires you?

AB: Nature is a great informer. The colours and textures of the sea and shells give me much inspiration. The fluidity of the ocean and colours are reflected in my work. The molten glass takes on a natural feeling of water when poured.

X-RAY MAG: What is your artistic mission or vision?

AB: To create one-off, beautiful art glass sculptures, pushing the boundaries of



Coral Lagoon, by Amanda Brisbane. Sand cast glass, 36cm

Spiral Seaform, by
Amanda Brisbane
Sand cast glass,
40cm

Olive Coral Fan, by
Amanda
Brisbane
Sand cast
glass, 38cm



the material and the technique to its limit.

X-RAY MAG: Are you a scuba diver? If not, what sources do you use to inspire or inform your art works related to the underwater world?

AB: I do not dive, but I snorkel. My inspiration comes from travelling, reading books about the ocean, and visual pictures taken by others.

X-RAY MAG: Who are your favorite photographers whose works speak to you?

AB: The books I have been inspired by are *Light In the Sea* by David Doubilet and *The Earth from the Air* by Yann Arthus-Bertrand.

X-RAY MAG: What are your favorite dive sites, underwater subjects, locations?

AB: Any coral rich seas. The Caribbean and Egypt are two places that have given me sources of visual delight.

X-RAY MAG: What locations in the Caribbean and the Red Sea/Egypt have you

Aqua Frozen Water, by Amanda Brisbane. Sand cast glass, 35cm

Swimming Fish Vessel, by Amanda Brisbane. Sand cast glass, 38cm



Seaform Pink and Black, by Amanda Brisbane. Sand cast glass, 40x18cm



Brisbane

from start to finish, or do happy accidents happen along the way that help shape the work?

AB: The sea forms are made by building up a textured design in the sand with shells and other natural textures, never knowing exactly how the pieces will turn out, as we let the glass take on its own form as it is slumped and pulled. We have a very short window of time before the glass hardens, therefore each piece is a one-off. Many happy accidents arise.

travelled to and what attracts you about the coral reefs?

AB: Shark-El-Sheikh [Egypt] was a rich snorkelling place to view colours under the sea. Jamaica and its reefs also provide a wonderful colourful source. The coral forms and variety of fish seen are all a great inspiration to me.

X-RAY MAG: Please give us insight into how an idea becomes a beautiful Seaform vessel. Is there control



Toazaz Seaform, by Amanda Brisbane. Sand cast glass, 40x18cm

Sea Bed Seaform, by Amanda Brisbane. Sand cast glass, 38cm

X-RAY MAG: Can you tell us about your fish sculptures. How did you come up with the idea and what was your inspiration or intention in creating them?

portfolio



ABOVE: *Tropical Gar*, by Amanda Brisbane. Sand cast glass, 35x38cm
LEFT: *Mango Fish*, by Amanda Brisbane. Sand cast glass, 35x38cm
BELOW: *Pink Spotted Fish*, by Amanda Brisbane. Sand cast glass, 35x38cm

AB: The fish sculptures came about from a commission I did for Royal Caribbean cruise lines back in 1990—Monarch of the Seas. The fish I make are colourful and fun, trying to capture the exotic shades they display.

X-RAY MAG: In the creation of your glass pieces, what materials do you use and how do you prepare them?

AB: I make all my own glass from raw materials, therefore totally in control of the way the glass behaves. And with oxides, I can colour the glass at the source, making each piece unique. Each piece is signed. The technique and way I work is very unusual.



ABOVE: *Underwater Fantasy Vessel*, by Amanda Brisbane. Sand cast glass, 42x16cm

Amanda Brisbane

X-RAY MAG: How do you mean “unusual”? Do you mean it is unique in method or that it is different from conventional glass-making processes? How is it different?

AB: The technique I use is unusual, as I cast the glass into a sand mould as a flat sheet with the textures made in the sand, then pick the glass up while it is still hot and fluid. We pull and stretch the piece and let it move by itself as it hardens. My work is very recognisable, as most sand casters make solid blocks of glass. When I cast, I essentially “draw” with the hot molten glass.

X-RAY MAG: What else do you want to tell our readers?

AB: My web site is constantly updated with new designs and information on where my work can be found. We take on many private and public commissions.

For more information or to purchase or commission art works directly from the artist, please visit:
Amandabrisbaneglass.com ■

