



GLOBAL EDITION  
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Number 59

Honduras  
**Miskito Cays**

Washington State  
**Hood Canal**

Sweden  
**Mars Wreck**

Sinkholes of  
**Namibia**

UW Mirrorless  
**Wide-Angle**

Profile  
**Gary Gentile**

Conservation  
**Ghost Fishing**

SARDINE RUN & CAGE DIVING

**South Africa**



# DIRECTORY

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COVER PHOTO: School of Glass Fish, Taba, Egypt  
Photo by Peter Symes

Wild dolphins hunting at Sardine Run, South Africa. Photo by Andrey Bizyukin



# contents

**19**  
SARDINE RUN & CAGE  
DIVING IN SOUTH AFRICA  
BY SCOTT BENNETT

**52**  
MISKITO CAYS  
HONDURAS  
BY GEORGE STOYLE

## columns...

**63**  
SCUBA CONFIDENTIAL:  
BREAKING THE CHAIN  
BY SIMON PRIDMORE

**33**  
MARS THE MAGNIFICENT  
SWEDEN  
BY VERONICA PALM

**64**  
WASHINGTON STATE'S  
HOOD CANAL  
BY BARB ROY

**87**  
TECH TALK: LISTENERS,  
WATCHERS & DOERS  
BY STEVE LEWIS

**39**  
RICHARD LUNDGREN:  
THE MAN FROM MARS  
BY MICHAEL MENDUNO

**72**  
NAMIBIAN  
SINKHOLES  
BY PIERRE CONSTANT

**90**  
UW MIRRORLESS  
WIDE-ANGLE  
BY DON SILCOCK

**41**  
GHOST FISHING:  
CAN WE PREVENT IT?  
BY HEATHER HAMZA

**70**  
THE BASKING SHARK  
SCOTLAND  
BY LAWSON WOOD

**95**  
PORTFOLIO:  
MICHAEL FRANK  
EDITED BY GUNILD SYMES

**45**  
PROFILE:  
GARY GENTILE  
BY MICHAEL MENDUNO

<b>plus...</b>	
EDITORIAL	3
NEWS	4
WRECK RAP	11
TRAVEL NEWS	16
EQUIPMENT NEWS	50
BOOKS & MEDIA	69
MARINE MAMMALS	70
TURTLE TALES	82
SHARK TALES	83
PHOTO NEWS	93

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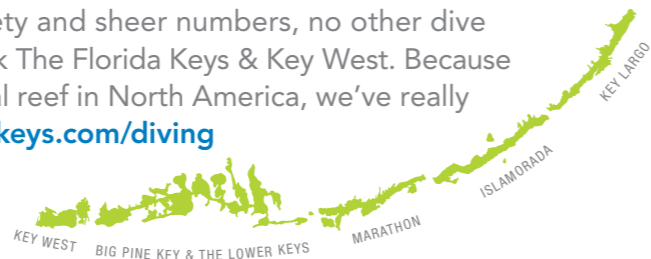
# Learning the lessons



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The commonality of aviation and diving keeps intriguing me.

It is not so much that these technologies have allowed us humans who evolved firmly planted on terra firma to also conquer the skies and move underwater, but that we are able to do so with such high levels of safety.

Commercial aviation has in particular become commonly known for its stringent emphasis on safety issues. Not only is the hardware being held to the highest standards in manufacturing and subjected to rigorous testing, but accidents and incidents are scrupulously investigated in order to learn and make air travel better and safer.

This includes looking into where and why the interface between machine, methodology, man and system breaks down: a.k.a. the human factors. Or putting it more plainly, finding out what caused, for example, a crewmember to forget important steps or actions, get distracted or whether it was unclear whose responsibility or role it was to undertake a task. Importantly, this process is not just limited to the pilot in the cockpit, but the dispatch team, the roster manager, the training system, the airline management and their culture.

Hence the aviation industry has come up with concepts such as cockpit resource management to better deal with roles in complex scenarios, and enacted guidelines forbidding airline pilots to talk about anything in the cockpit unrelated to fly-

ing the plane while being below 3,000m. And that is on top of using and adhering to checklists in every phase of the flight—not just reading them, but using a challenge and response methodology.

In diving, buddy check procedures are taught by the various training agencies aided by mnemonics such as BWRAF ('Begin With Review And Friend') for Bcd, Weights, Releases, Air and Final check. But other than that we don't see much, if any, use of checklists or procedures until we get into technical diving, and unfortunately their use often falls by the way side once we move past entry level diving.

But who hasn't at some point become distracted, sidetracked or just forgot to turn something off or tighten a knob or a strap? Or felt compelled to go into the water because you have made it all the way out to the dive site or because of social pressure or rushed because other people are waiting?

This is why things go awry. In most cases matters can be corrected without any further ado or interruptions, but sometimes the consequences are dire. Accidents happen for a reason. But many more scenarios don't end up with a bad outcome because 'the chain' wasn't

complete; this can lead to a false sense of security about our own decision making.

Aviation has shown us how good decision making practices can allow divers to identify and cope with personal attitudes, stresses and external pressures that are hazardous to safe diving. Effective risk management is based on being honest about our own skill levels and proficiency, and it follows suit that we must be able and willing to back out rather than attempt or continue a dive under conditions in which we are not comfortable. This also applies to being honest about your buddy's or peers' skills and proficiencies.

Aviation has also demonstrated that we must recognize that fatigue—which often follows demanding, modern day jobs—constitutes a safety hazard and that we must strive to eliminate or minimize these contributors of stress in our lives.

Only once we fully appreciate all of these factors that are at play, and are able to modify our behavior accordingly, can we effectively use our resources and immerse ourselves in the wondrous experiences with which diving can enrich our lives.

—X-RAY MAG







News edited  
by Peter Symes

# NEWS

*from the deep*

## Pacific reef thrives in acidic water

Two unexpected discoveries could provide insight into corals' resistance and resilience to ocean acidification.



MATT KIEFFER / CREATIVE COMMONS

Corals living in the bays around Palau are unexpectedly diverse and healthy, despite living in waters that are quite acidic; Coral diversity, cover and calcification rates are maintained under chronically low pH levels. Ocean researchers working on the coral reefs of Palau collected water samples at nine points along a transect that stretched from the open ocean, across the barrier reef, into the lagoon and then into the bays and inlets around the Rock Islands of Palau, in the western Pacific Ocean. With each location they found that the seawater became increasingly acidic as they moved toward land.

Through analysis of the water chemistry in Palau, the scientists found the acidification is primarily caused by the shell building done by the organisms living in the water, called calcification, which removes carbonate ions from seawater. A second reason is the organisms' respiration,

which adds CO<sub>2</sub> to the water when they breathe.

"These things are all happening at every reef," said WHOI biogeochemist Anne Cohen, one of the study's co-authors. "What's really critical here is the residence time of the sea water."

The scientists' next steps are to determine if these corals are genetically adapted to low pH or whether Palau provides a "perfect storm" of environmental conditions that allows these corals to survive the low pH.

"If it's the latter, it means if you took those corals out of that specific environment and put them in another low pH environment that doesn't have the same combination of conditions, they wouldn't be able to survive," said Cohen. "But if they're genetically adapted to low pH, you could put them anywhere and they could survive." ■

## Palau bans commercial fishing within its waters

The president of the Republic of Palau has declared the waters of Palau's Exclusive Economic Zone as a marine sanctuary.

President Remengesau explained this initiative with very distinct words: "Palau's economic potential lies in tourism, not tuna. Tourism, in fact, already provides more than half of our GDP, and it depends upon our pristine marine environment."

The declaration further stressed Palau leading the way in conservation efforts. The country was the first nation in 2009 to declare its EEZ a shark sanctuary, and article 6 of Palau's constitution requires its government to "take positive action" to conserve "a beautiful, healthful and resourceful natural environment".

Dermot Keane, founder of conservation organization Palau Shark

*Palau's economic potential lies in tourism, not tuna.*

Sanctuary and ardent protector of sharks, commented: "This is another great step in the right direction to protect Palau's pristine environment and its healthy marine ecosystem. Eighty percent of global fish stocks are now fully or overexploited. Strengthening sustainable ecotourism makes perfect sense for Palau and can hopefully be a role model to be studied by other nations in the Pacific region to follow the direction our nation is taking." ■



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BARB ROY

Healthy sunflower starfish off Nanaimo, British Columbia

## Mystery disease wipes out scores of sea stars along America's Pacific coast

**Sea star wasting syndrome a mysterious illness that first appeared in June in Washington state has now spread from Sitka, Alaska, to San Diego. The disease spread with astonishing speed—a healthy group of starfish can die in just 24 hours.**

The progression is predictable: white lesions appear on an animal and become infected. Within hours or days the sea star becomes limp, and its arms may fall off. Necrosis eventually takes over and the animal dies. Predatory species were the first to succumb, but now the mysterious ailment is appearing in species once thought to be resistant to its effects.

### Bacterial infection

Researchers believe the sea stars' actual disintegration and death is caused by bacterial infection, but they have no idea what's suddenly making them susceptible. The cause could be a toxin, a virus, bacteria, man-made chemicals, ocean acidification, wastewater discharge or warming oceans.

### Unknown reasons

Whatever is killing the sea stars is highly lethal. "We've had populations go locally extinct overnight. Literally. Some species go from

completely fine to a mush ball in 24 hours," said Benjamin Miner, a professor of marine biology at Western Washington University in Bellingham, Washington, who's organizing the mapping project.

The fact that the ailment is so widespread is what's most troubling, Miner said "Every time you come up with what seems like a reasonable hypothesis, it's challenged because other affected places don't match." ■

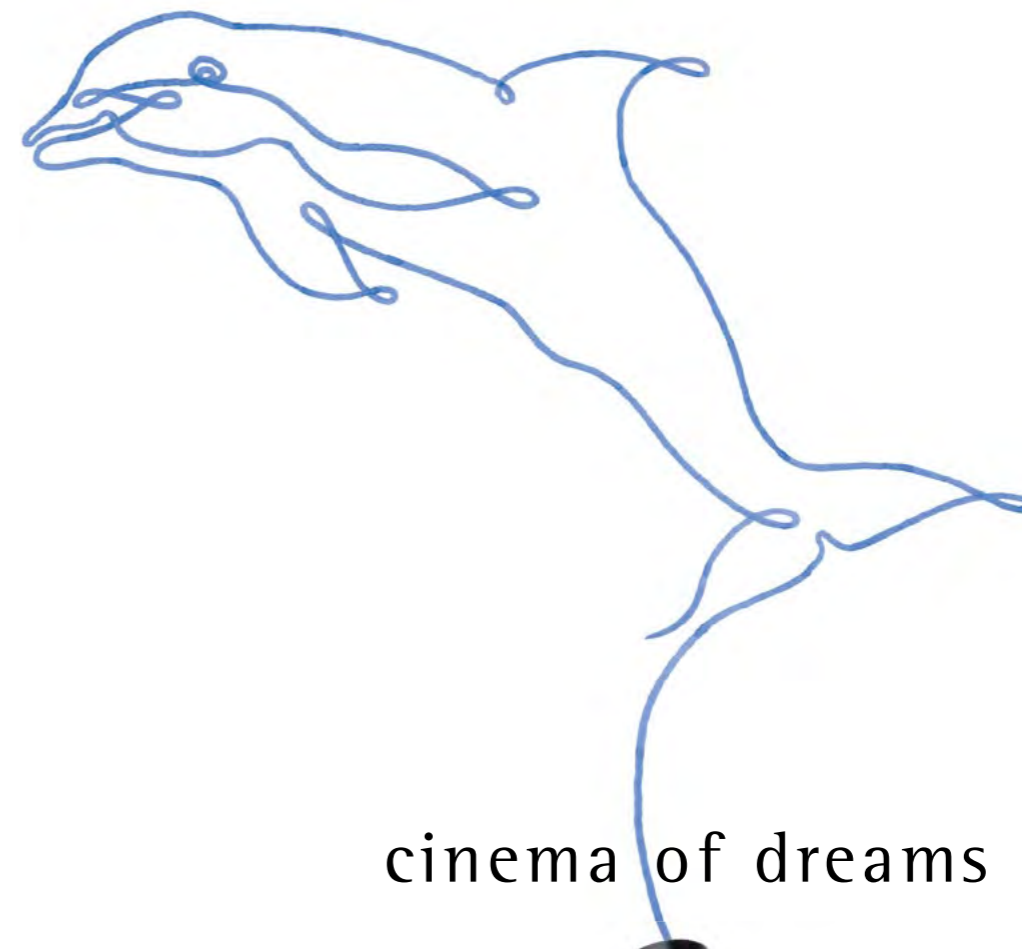
*These kinds of events are sentinels of change. When you get an event like this, I think everybody will say it's an extreme event and it's pretty important to figure out what's going on*

—Drew Harvell  
Professor  
Cornell University

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## Bald reef gets seaweed transplant

Marine ecologists in Sydney manage to restore the missing crayweed onto two barren reef sites where it once grew abundantly.

Macroalgae, or seaweed, are the dominant habitat-forming organisms on temperate coastlines, providing habitat and food to entire communities. In recent decades, however, there has been a decline in macroalgal cover along many urbanised shorelines, leading to a shift from diverse algal forests to more simple turf algae or barren habitats.

Along the urban shores of Sydney, its disappearance coincided with heavy sewage outfall discharges along the metropolitan coast during 1970s and 1980s. Despite significant improvements in water-quality since that time, *Phyllospora* did not re-establish in the area.

### Restoration appears successful

Early reports on the initial efforts at the restoration of *Phyllospora* in Sydney are encouraging and suggest that restora-

tion via transplantation, using the methods described by the researchers, is possible and also relatively cost-effective. ■



Transplanted seaweed is attached to a reef by a team member

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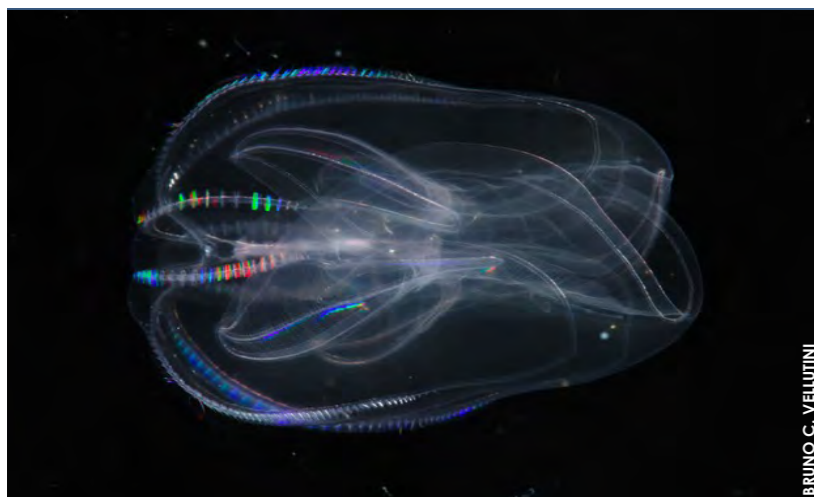
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## The battle of the comb jellies



BRUNO C. VELLUTINI

Sea walnut (*Mnemiopsis leidyi*)

The warty comb jelly or sea walnut (*Mnemiopsis leidyi*), a creature related to jellyfish, is a native of the waters on the eastern shores of the United States to the

As a generalized feeder, which eats fish eggs and larva, kilka (a collective name for sardine-like fish), anchovies, zooplankton and horse mackerel, it led to a collapse of

West Indies. While it is not a problem in its native waters, it has caused enormous economic damage in some European waters, which it has invaded.

the food web and fisheries in the Black Sea in the 1980s. The comb jelly eradicated the zooplankton. Anchovies and brisling sardines were deprived of their food source, and once they disappeared, other species such mackerel and tuna followed.

### Counter strike

It was not until another invasive and predatory comb-jelly, the American melon jellyfish (*Beroe ovata*) which feeds on the sea walnut also turned up in the Black Sea that the ecological balance became somewhat restored.

The melon jellyfish *Beroe ovata* does not eat crustacean zooplankton, but prefers dining on other ctenophores. The primary food source for *Beroe ovata* is *Mnemiopsis ledyi*

Now the melon jellyfish has been spotted in Danish waters at the entrance to the Baltic, presumably having hitched a ride in the ballast tanks of ships. It was only in 2007 that massive populations of sea walnut were reproducing in Danish fjords and invading the inland seas clogging fishing gear with jellyfish rather than fish. ■



## Staying alive

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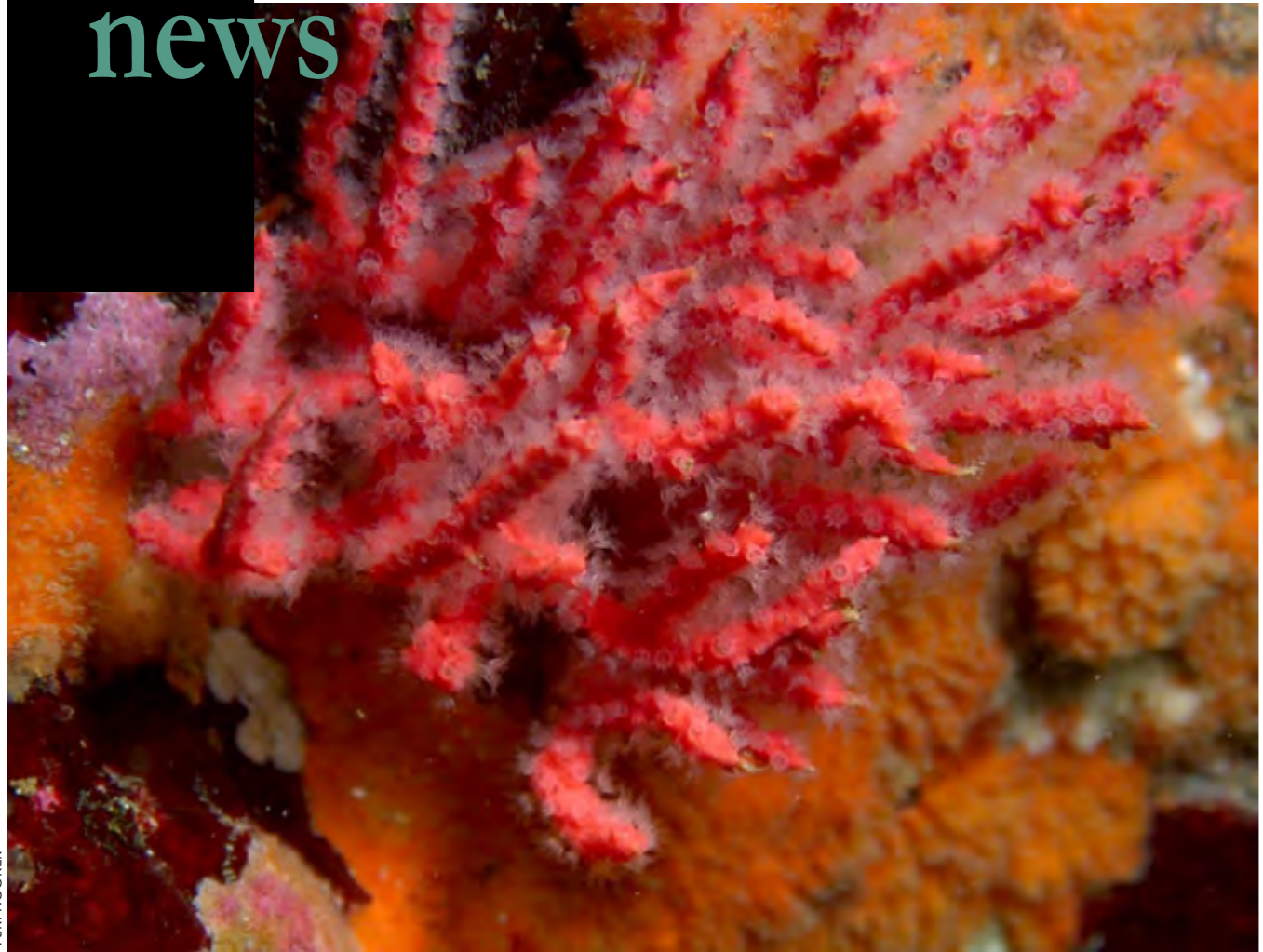
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YURI HOOKER

## New species of red coral discovered

*Psammogorgia hookeri*, was discovered along rocky ledges by scuba divers at depths of 25 meters (82 feet) in Peru's Paracas National Reserve.

This new species may be an endemic—found nowhere else in the world. But coral reefs and coral communities in Peru have never been systematically studied. "We expect more surprises as we look at new collections," said Hector M. Guzman, marine biologist at the Smithsonian Tropical Research Institute.

### 25 new species

Guzman and Odalisca Breedy, lead authors of the new species report have discovered nearly 25 new species of soft coral in the Pacific. Their new species was identified based on colony

characteristics and examinations of the coral using both light and scanning-electron microscopy. Some comparisons were based on museum specimens that were more than 90 years old, because no one has collected in this area in recent times.

### Knowledge still poor

"As we move across the eastern Pacific, we realize that our knowledge about soft corals still is poor," said Breedy. Both scientists agree that, "We need to continue exploring new shallow and deep water sites but funding is always a limiting factor." ■

## Coral reef found off Greenland, a first

By chance, scientists found a live cold-water coral reef in southern Greenland. Located off Cape Desolation, or Cape Brill, the reef lies at 900m with strong currents. A team of marine scientists aboard the Canadian research vessel, CCGS Henry Larsen, made the discovery when they retrieved an oceanography instrument with a large piece of live coral caught in it.

"It's been known for many years that coral reefs have existed in Norway and Iceland and there is a lot of research on the Norwegian reefs, but not a great deal is known about Greenland," said fellow researcher, Helle Jørgensbye,

a doctoral student from DTU Aqua, Denmark. "In Norway, the reefs grow up to 30m high and several kilometers long. The great Norwegian reefs are over 8,000 years old, which means that they probably started to grow after the ice disappeared after the last Ice Age. The Greenlandic reef is probably smaller, and we still don't know how old it is."

Eye-coral, or *Lophelia pertusa*, makes up this cold-water reef. It is home to various marine species including hydroids, sponges, crustaceans, polychaetes, echinoderms and bryozoans.

While the discovery is new, it was not totally surprising,

according to the researchers. Jørgensbye, co-author of the article published in the journal ICES Insight said,

"There are coral reefs in the countries around Greenland and the effect of the Gulf Stream, which reaches the west coast, means that the sea temperature get up to about 4°C, which is warm enough for corals to thrive. In addition to the comparatively warm temperature, a coral reef also needs strong currents. Both these conditions can be found in southern Greenland." ■

SOURCE: SCI-NEWS.COM



BEDFORD INSTITUTE OF OCEANOGRAPHY

The reef is formed by a species of cold-water coral called the eye-coral (*Lophelia pertusa*)

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Jennifer O'Neil



## Success: First species listed as threatened to go off the list

The Oregon chub, a tiny minnow that lives only in Oregon backwaters is the first fish ever taken off U.S. Endangered Species Act protection because it is no longer threatened with extinction.

Fewer than 1,000 remained in just eight wetlands in 1993 when the Oregon chub gained protection under the U.S. Endangered Species Act and the U.S. Fish and Wildlife Service published a recovery plan for the species.

### Protecting habitats

The goal of this plan was to reverse the decline of the Oregon chub by protecting existing wild populations, re-introducing chub into suitable habitats throughout its historic range and increasing public awareness and involvement.

The recovery plan focused on establishing partnerships with landowners to restore key habitats, breeding and transplanting fish to those places, and getting the U.S. Army Corps of Engineers to alter dam releases to more closely resemble natural river flows. Private landowners who agreed to have chubs introduced on their property and to follow some guidelines were given safe harbor agreements guaranteeing the presence of the endangered fish would not interfere with their use of the land. The species' status has recently improved. ■



OREGON FISH AND WILDLIFE OFFICE

The Oregon chub was listed as endangered in 1993. The species' status has recently improved. It lives off aquatic insects like mosquitoes and has a lifespan of up to ten years

*This is an excellent example of how the Endangered Species Act is intended to function: partners working together to recover an endangered species.*

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## Alabama's ancient underwater forest could become marine sanctuary

**Ten miles off the coast of Baldwin County in 60 feet of water, an ancient cypress forest was uncovered by the waves of Hurricane Ivan. The cypress stumps are believed to be at least 50 thousand years old.**

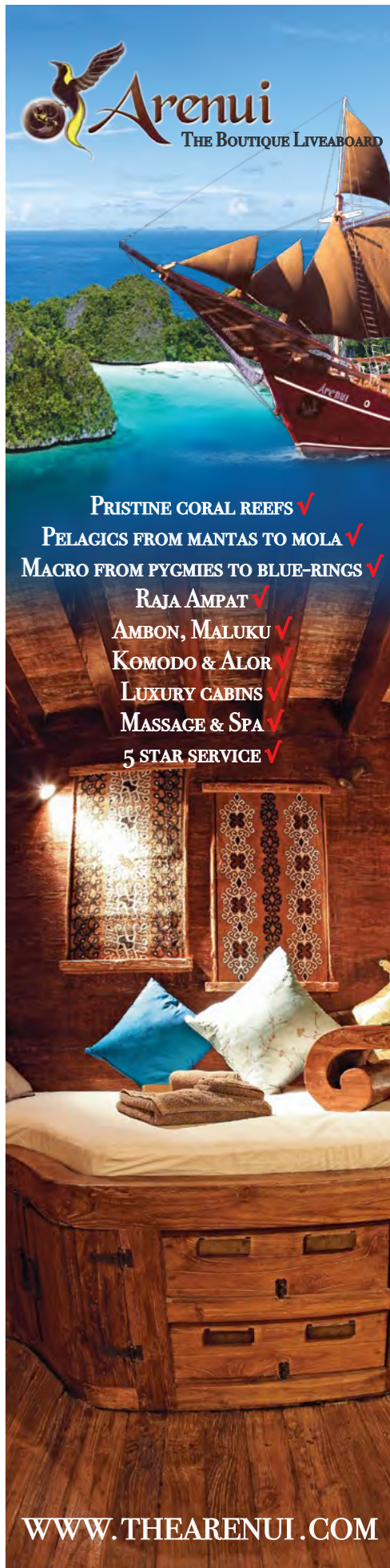
The Bald Cypress forest was buried under ocean sediments, protected in an oxygen-free environment for more than 50,000

years, but was likely uncovered by Hurricane Katrina in 2005, said Ben Raines, one of the first divers to explore the underwater forest and the executive director of the nonprofit Weeks Bay Foundation, which researches estuaries.

With the Gulf of Mexico Fishery Management Council already being in support of designating the forest, located in 60 feet of water ten miles off Alabama's coast, as a marine sanctuary, the next step is getting NOAA's approval.

Currently the forest's exact location is not disclosed in order to protect it from divers and salvage companies wanting to remove the cypress stumps and logs. Until protection is in place, the forest and natural marine ecosystem it now supports could be imperiled if the forest's location were somehow revealed.

There is only one other marine sanctuary in the Gulf of Mexico. The Flower Garden Banks sits 115 miles off the coast of Texas and Louisiana. ■



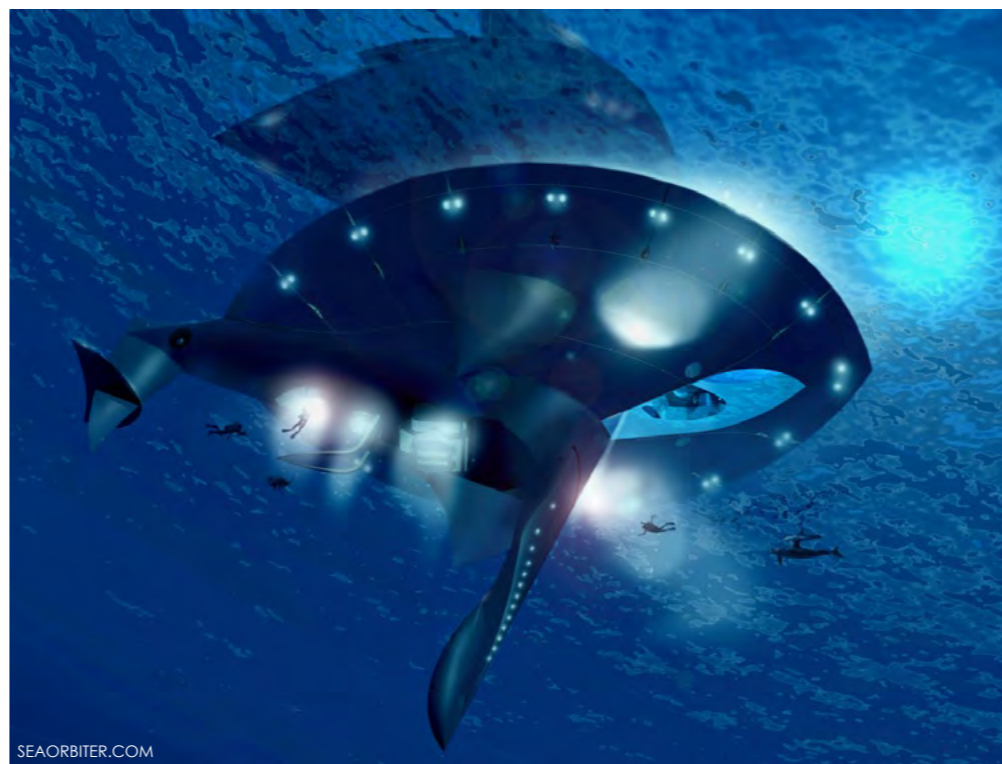
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When not underwater, visitors on the 190-foot (58-meter) SeaOrbiter can relax in open air in areas of the structure above the surface of the sea, including a

dining room and lookout posts. In addition to scientific research, the SeaOrbiter has facilities for astronauts to train for space exploration in a pressurised space simulator below water.

However, the SeaOrbiter is not just for scientists and astronauts. The vessel will be open to other adventurous individuals who wish to travel the seas and seek new experiences in the depths of the planet's oceans. ■

SOURCE: THE TELEGRAPH

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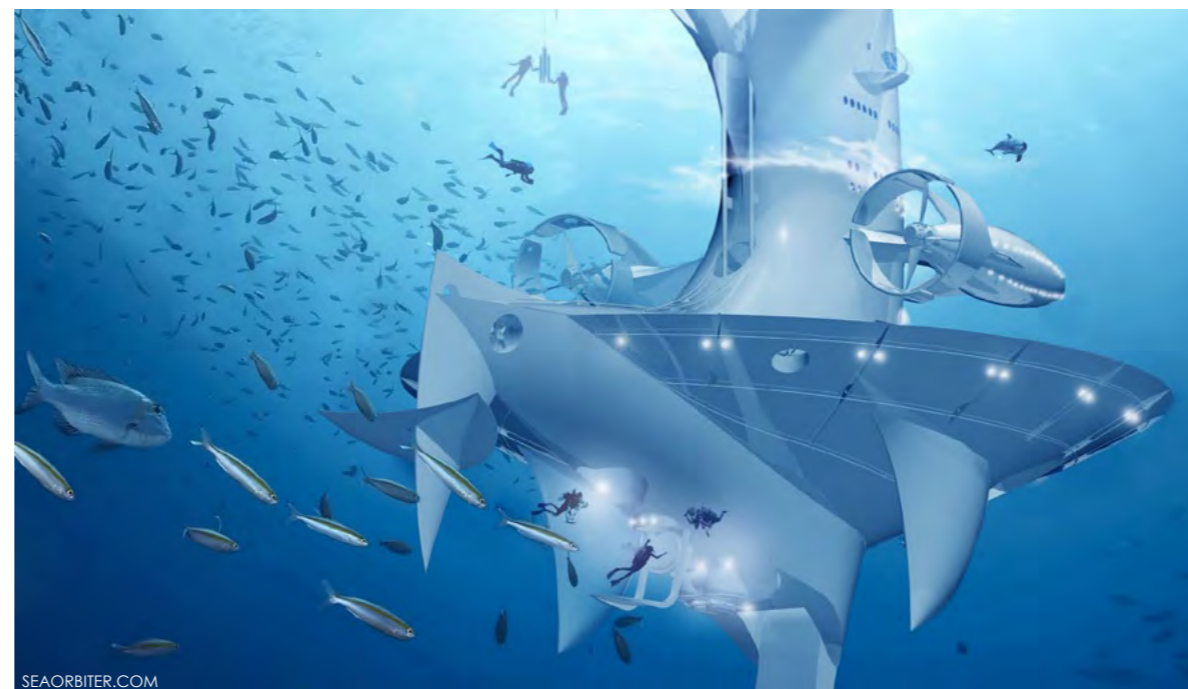
# The SeaOrbiter

French architect Jacques Rougerie has acquired funding through crowd-funding for the development of the oceanic observation vessel, SeaOrbiter, which will sail around the world exploring uncharted seas and the depths of the oceans where few have gone before.

It is said that fewer people have explored the deepest part of our ocean, the Mariana Trench, than have launched into space. Soon adventurers who want to explore the unknown

depths of our oceans will be one step closer in doing so, as construction of the towering structure of the SeaOrbiter is scheduled to be completed in around two year's time.

Financial support for the project came from hundreds of people who responded to the architect's call for funding. The top 600 donors are invited aboard the vessel once it is completed. When it is on scientific missions, the SeaOrbiter can accommodate a team of 22 researchers, who will have



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# Coral bleaching turns juvenile fish reckless

Instead of staying hidden at home, they stray out, making them easy prey for predators.

In an experiment juvenile damselfish in dead corals displayed risk-prone behaviours, sitting further away and higher up on the reef patch, and failed to respond to predation cues, compared to those on live coral patches.

Oona Lönnstedt of the Australian Research Council's centre for coral reef studies

who studied the behaviour of pallid damselfish (*Pomacentrus amboinensis*) on the Great Barrier Reef suggests dead coral masks key chemical signals, so the fish move away to access them. The results highlight a mechanism through which habitat degradation can impact the relationship between prey and predators in the coral reef ecosystem. As the proportion of dead coral increases, the recruitment and

replenishment of coral reef fishes will be threatened, and so will the level of diversity in these biodiversity hotspots.

"I don't think that dead corals have to mask cues per se, but the lack of live coral cues clearly affects their orientation and behaviour," Aaron MacNeil of the Australian Institute of Marine Science, told *New Scientist*. "The larger question is whether the rate of reef distur-

bance has increased to the point that they never fully recover. If hard corals were to be lost, then much of the diversity of reef fish would be lost too. Many reef fish need specific habitats that only coral reefs can provide." ■

*Juvenile damselfish on dead coral habitats had a 75% increase in predation-related mortality, compared to fish released on live, healthy coral habitats.*

# Salmon use the Earth's magnetic field to navigate

A study suggests that Pacific salmon are born with an in-built "magnetic map" that helps them to migrate over thousands of kilometres.

A particular challenge is explaining how juvenile salmon with no prior migratory experience are able to locate specific oceanic feeding habitats that are hundreds or thousands of kilometers from where they hatched.

Although adults reproducing in the vicinity of favorable ocean currents can facilitate transport of their offspring to these habitats, variation in ocean circulation makes passive transport unreliable, and young animals probably take an

active role in controlling their migratory trajectories.

### Magnetic sense

A U.S. team of researchers led by Dr Nathan Putman, from Oregon State University believes the fish are sensing changes in the intensity and angle of the Earth's magnetic field to establish

*We put the fish in buckets, we change the magnetic field around them, and the fish change direction in response to the field.*

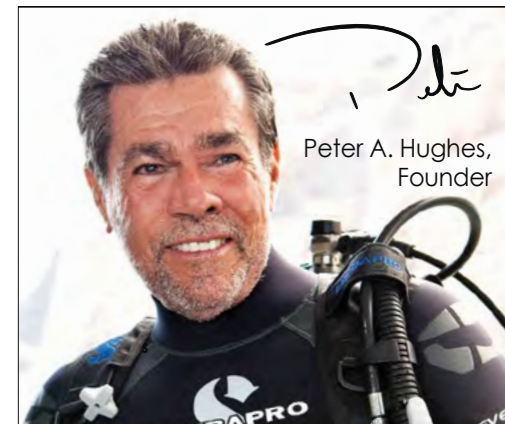
their position in the ocean. "The migration is a lot of effort and it is definitely challenging, and looking at it from the outside, it doesn't seem necessarily intuitive how they could manage that," Dr Putnam told BBC news.

### Turned around

In an experiment it was shown that juvenile Chinook salmon (*Oncorhynchus tshawytscha*) respond to magnetic fields like those at the latitudinal extremes of their ocean range by orienting in directions that would, in each case, lead toward their marine feeding grounds.

It was also shown that the fish use the combination of magnetic intensity and inclination angle to assess their geographic location. The "magnetic map" of salmon appears to be inherited, as the fish had no prior migratory experience. ■

SOURCE: CURRENT BIOLOGY



Peter A. Hughes, Founder

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# wreck rap



Diver on the wreck of the *Dyle* at Scapa Flow; Registry of 1909, with no *Doyle* (lower right)



# Scapa Flow Discoveries

Text and photos by Lawson Wood

As the author of the *Scapa Flow Dive Guide* by Aquapress, the work never actually stops after the book has been published as there are always new and exciting discoveries to be made. Now gearing up for the third edition, new and important information has come to light by the extensive research of Kevin Heath and through both of us painstakingly going through all of the archival photographs during WWI and WWII and War Department records.

Heath, in particular, discovered in one instance that back in 1914 when the Admiralty were sinking some of the first blockships in Burra Sound, they made a dreadful spelling error! This is not the first time that such mistakes have happened, as I found out doing my research on the book *Shipwrecks of The Cayman Islands*.

## Doyle or Moyle to Dyle

But let's get back to Scapa Flow and trawling through the National Archives in Kew and the Maritime Museum in Greenwich in England. We have discovered that there was no such ship as the *Doyle*. Sometimes confused with the *Moyle*, which was a 1,761-ton steel,

79.3m(260ft)-long, single screw coastal steamer built in Troon, Ayrshire, registered in Belfast and was used as a Blockship, but not in Scapa Flow; she was sunk in the approaches to Dunkirk on 4 June 1940. Ian Whittaker who compiled the excellent wreck resource book, *Off Scotland*, confirmed these details for me.

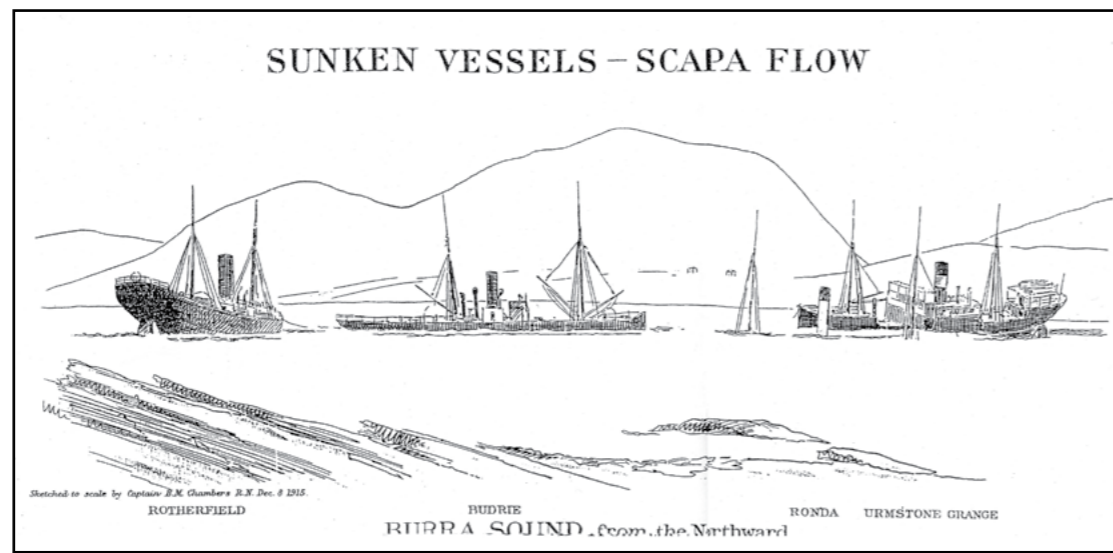
That spelling error has contributed to the wrong name being used from the date of her sinking in 1915. The ship that was actually sunk in Scapa Flow on 7 October 1914 is now to be known as the *Dyle*.

Built in Newcastle by A. Leslie & Co. Engineers in 1879 for W. Johnson in yard No.209, she was sold to Turner Brightman

& Co in 1886 and finally became the *Dyle* when she was subsequently sold to De Clerck & Van Helmeryk in 1902 and registered in Antwerp, Belgium. She was eventually sold to a British shipbreakers in

308...	<b>Dovre</b>	Bk	Nor	Tvedstrand	409	'85	Tvede-	A. B. Olsen	P.O.Y.P;Gief;ek b,	...	Lvpl	4, '97
UTDM	<i>Dovre</i>				190.8	88.8   18.8	strand, Nor					
309...	<b>Dovre</b>	Bk	Nor	Flekk'fjrd	304	'78	Arandal,	A. Jakobs-	F.K.O.H;	5	Exp	Gtbg
HTSL	<i>Dovre</i>				107.8	97.8   10.0	Nor		son	8.1900		8, 1900
310...	<b>Dowan Hill</b>	Bk	Br	Glasgow	1978	'93	Pt. Glac-	J. M. Camp-	St;1BH	...	San F	4, 1900
108,000	<i>Dowan Hill</i>				197.8	40.8   18.8	gow, Scot		bell & son			
NCW					213	8						
311...	<b>Dowgate</b>	Sow	Br	London	1988	'94	Stockton,	H. W. Dillon	1111234,39,84x42;	...	Pacta	8, '98
116,000	<i>Dowgate</i>				211	47   24.4	(Holland; Eng		son	260818 P.		
HOFK					230	1504 P20	ton Dock & Co.)					
D.S.					81	8						
312...	<b>Doyo Maru</b>	Sow	Jap	Tokio	1848	'80	Glasgow,	I. Kubo	2Cyl(28,82x45;	...	PtdO	8, '91
1,417	<i>Doyo Maru</i>				306.5	35.   18.8	(A. (Brit		248511 P.			
BAW					232	308' P38	St;1BH)					
313...	<b>Drachenfels</b>	Sow	Ger	Bremen	4704	'99	Newcastle,	Deutsche	1011234,35,56,81x54;	...	N Y	1, '98
108,000	<i>Drachenfels</i>				470.4	70.4   18.8	(W.German; Eng		260811 P. (W.German)			
QDWM					232	1110' P31'	(Holland; & Co., Lim.)					
314...	<b>Dragoman</b>	Sow	Br	Liverpool	2215	'68	Newcastle,	W. & R.	3Cyl(28,40,64x40	...	N Y	10, '70
108,000	<i>Dragoman</i>				221.5	45.2   28.8	(W.German; Eng		Thomson	267511 P. (Deep Fringing		
QDFW					232	878' P48'	Co., Lim.)					
315...	<b>Drammenseren</b>	Bk	Nor	Drammen	899	'77	Sunderland	E. B. Aaby	1;1BH	...	Lvpl	4, '97
108,000	<i>Drammenseren</i>				89.9	32.4   19.8	(Graham & Co.)					
QJKN					89.9	8						





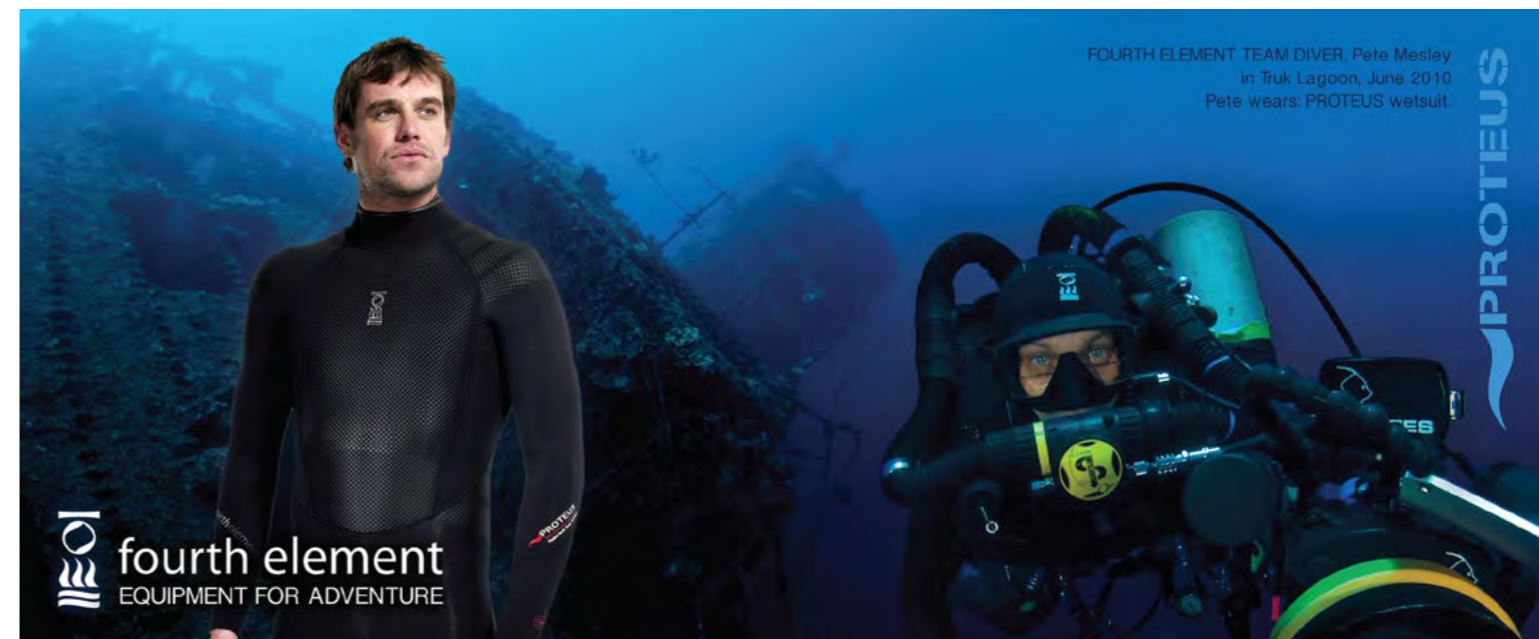
Burra Sound sketch, 1915

1914, who resold her to the Admiralty for use as a Blockship. Of iron construction with five bulkheads and a 177NHP 2-Cylinder engine and one propeller; she weighed 954 tons and

was 260ft (79.25m) long.

Many regard the *Dyle* as being the best of the diveable blockships in Burra Sound. As the smallest of the three most intact blockships (The

*Gobernador Boreis* and the *Tabarka* being the other two), the *Dyle* is completely open in aspect. Lying on her port side and fairly well embedded in the gravel seabed, her



Interior view of the stern on the *Dyle*

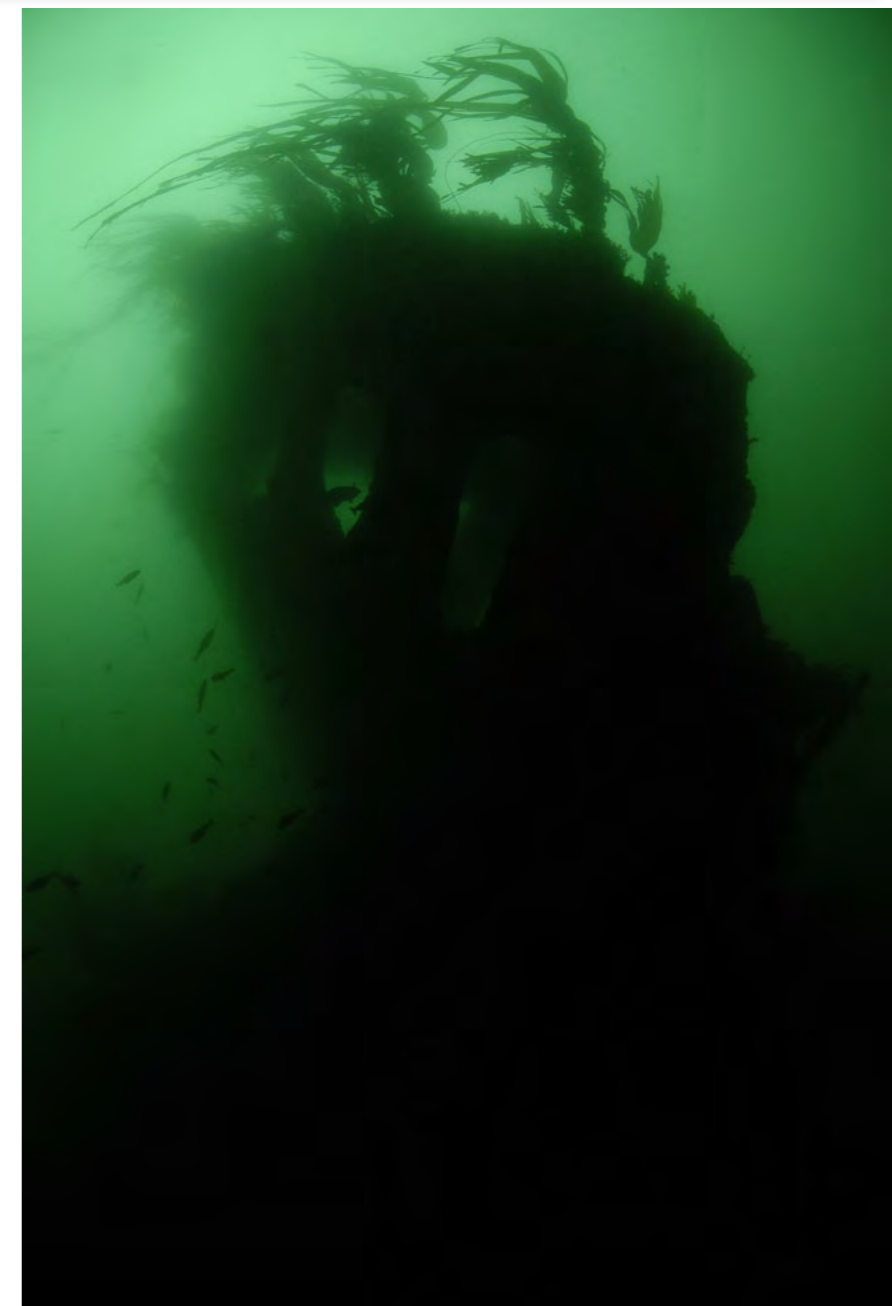
propeller is very distinctive, covered in miniature plumose anemones. Her wooden decks are long gone, creating easily managed swim-throughs between the supporting iron ribs. Both the bows and stern are relatively intact and topped with kelp making for some excellent photographic opportunities.

### *Clio I and Clio II*

Other discrepancies have also occurred in the descriptions of the *Clio (I)* and the *Clio (II)* over at the opposite side of Scapa Flow at the Churchill Barriers. Both ships were thought to be steamers, identical in size at 2,733 tonnes, 70m (230ft) long, built in Hartlepool in 1889, but sunk ten months apart.

The records should now show the following. *Clio (I)* is a 2,733-ton steamer, at 90m (300ft) long, built in West Hartlepool in 1889 and sunk in Water Sound on 29 April 1914. (She was scrapped prior to the construction of Barrier IV. Confused with the identically named S.S. *Clio* that was sunk ten months later at Barrier III on 27 February 1915).

S.S. *Clio (II)* was a 793-ton steamer at 70.1m (230ft) long. She was built in Kinghorn in 1873 and sunk in Weddell Sound on 27 February 1915. (The firing circuit failed and the *Clio* was swept out to sea. A wreck out to the east of Glimps Holm may be this ship.



*Gobernador Boreis* stern











Historical image of the TS37 (right); Diver on the wreck of the Karlsruhe (far right)



dunes have covered virtually all of the ships, excepting for the bridge of the Collingdoc and a small part of the steel mast of the Carron.

### Warwick aircraft

The Warwick aircraft which ditched after engine trouble on the 10 of June 1944 was always a mystery, and we searched for her relentlessly over several seasons. Over near Lyness on the Isle of Hoy she has finally been found, or what is left of her remains. She actually ended up on the shore and parts of her bomb bay are still underwater, but what was left on the shoreline was all salvaged.

### TS37

Finally, a more contemporary shipwreck is located near Houton to the north west of Scapa Flow. A small fibreglass cabin cruiser with the registration numbers TS37 sunk apparently in 1995, however, the photograph that we have managed to get from the Orkney Image Library was taken in December 1995.

She once belonged to the late Kenny Bain

and was driven ashore in bad weather. Subsequently towed off from the shore by a local pilot boat, she was so badly damaged that she sank on her way back to Scapa Pier. She's now lying on the bottom of the flow just off Greenigoe in 29m (97ft) of water, relatively intact and upright on the seabed.

### Final thoughts

Undeniably, some of the ancient High Seas | Battle Fleet are seriously deteriorating, but with due care and caution, there is no reason why we cannot continue to enjoy these superb shipwrecks in an area

which can be dived all year round and suitable for all levels of diver.

The shipwrecks of Scapa Flow are some of the most important historical shipwrecks accessible to divers in the whole of northern Europe, and the fact that we are still discovering information on their history is fascinating enough to make you want to go back and dive them all again. ■

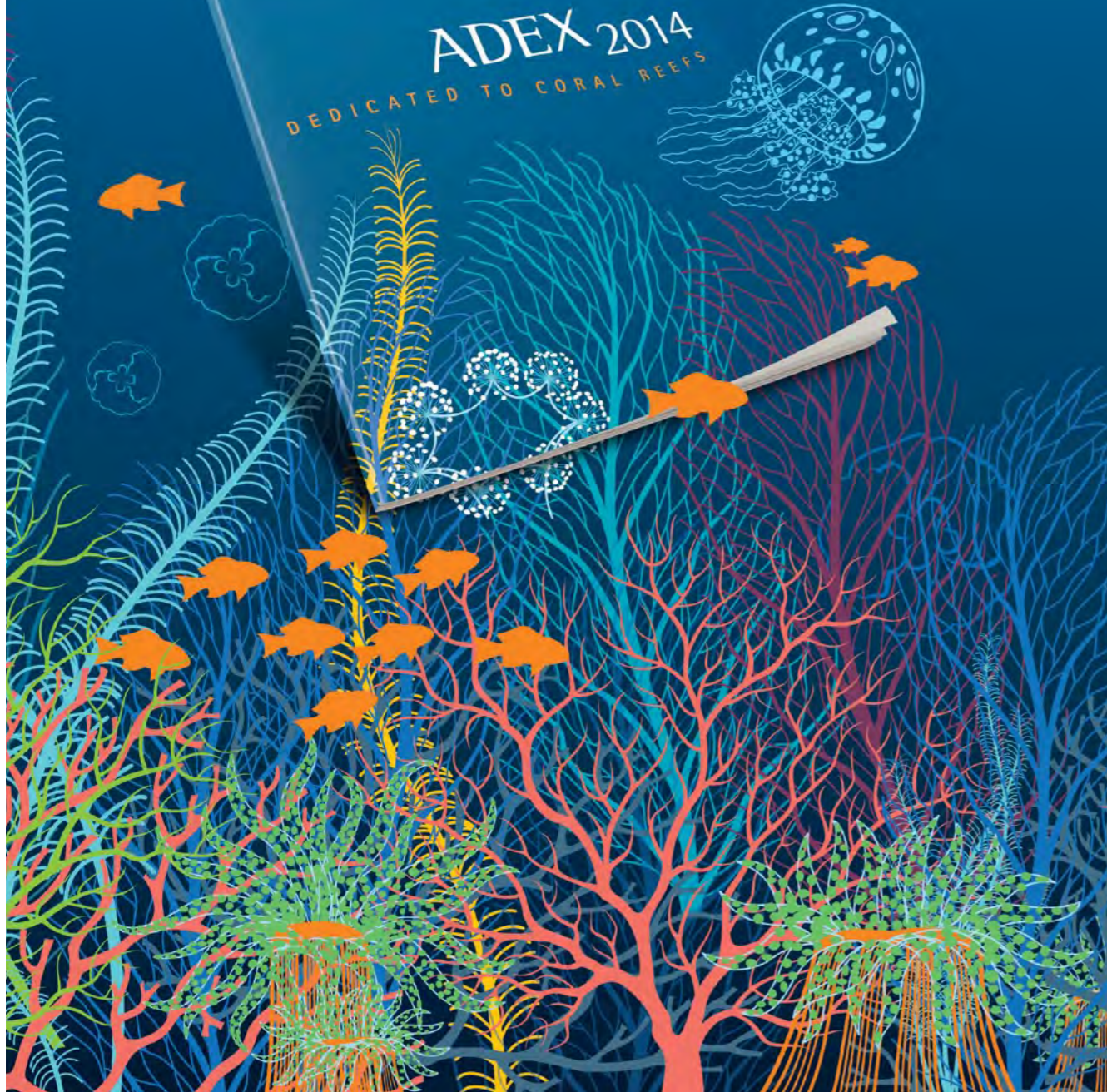
Author Lawson Wood  
diving Scapa Flow



Divers check out the anchor at the stern of the wreck of the Dresden







GARETH LOCK

## Proving the obvious — How hard can it be?

It is recognised across a number of industries, including diving, that we need to understand what happened during an accident, incident or near-miss if we are to improve safety. However, more importantly we need understand why they happen. If you don't solve the 'why', then it is like treating the effects of venomous poison but not removing the snake.

Text by Gareth Lock

This is what my PhD research programme is about. Understanding the 'why' behind the incident and provides structured, robust and defendable arguments for the work which I started through Cognitas. When I speak with those in the industry about this research, they support it but say the causality is obvious—complacency, not following training, poor equipment and maintenance. I say, where is the proof about why this is the case?

### Survey

The research has been going on for two years now, and one of the two major data collects is underway through a survey at [https://cranfielduniversity.eu.qualtrics.com/SE/?SID=SV\\_aVl0quHU6pdJ69n](https://cranfielduniversity.eu.qualtrics.com/SE/?SID=SV_aVl0quHU6pdJ69n). If you haven't taken part, please visit the link. It will take about 15 minutes to com-

plete and looks at the issues faced by the individual diver when near-misses or incidents are encountered, not just the *what* but the *why*. The more respondents, the easier it is to make robust arguments to prove the obvious. The second data collect will look at organisational or supervisory problems faced and will be a little more challenging in ensuring honest answers are provided. A very first cut of the data collected from 318 of the 1,000 respondents needed can be found at <https://experiment.com/u/wwQ9vw>

### More funding needed

This five-year part-time PhD research programme is being conducted under the supervision of Cranfield University and is currently wholly self-funded at a cost of GB£3,500k per year. To help

part-fund the next two-year's research, I approached the SciFund, which aims to fund academic research projects through crowd-sourcing. This is the second request of this article. If you are interested in improving diving safety, please consider donating a small amount to the project at <https://experiment.com/projects/the-role-of-human-factors-in-scuba-diving-incidents-and-accidents>.

*The more respondents, the easier it is to make robust arguments to prove the obvious.*

Ten to 20 dollars isn't much at an individual level, but if 200 people donate US\$20, that would meet my \$4,000 target. (More would always be welcome, which some backers have already done, thank you). This project has the endorsement of individuals like Dan Orr, Dr Simon Mitchell and Phil Short. Backers get a small gift as a token of my thanks. ■





Edited by  
Scott Bennett



## Taiwan launches free WiFi for tourists

**Local free Wifi program in Taiwan being expanded to give tourists equal online access.**

In a bid to curtail sky-high costs for foreign visitors, Taiwan has become the latest country to roll out free Wifi. The improvements, announced by the Taiwan Tourist Board, allow visitors to register online before arriving in the country, making it easier for them to utilize the island nation's wireless network. To enroll, tourists can present their passport at Travel Service Centers at major airports, train stations and mass rapid transit (MRT) stations across the country. Visitors are initially granted 30 days of free WiFi access, although this can be extended to 90 days upon application. ■

## Travel services too good to be legal?

**Popular community marketplaces fight back at allegations of illegations of running illegal services.**

For the budget conscientious travellers, sites such as Airbnb, which lets people find, list and book accommodations at private homes and Uber that connects passengers with drivers of vehicles for hire and ridesharing services and their likes have revolutionised tourism, allowing travellers to stay with locals in cities around the world for a fraction of the price they would pay for a hotel. Airbnb which was founded in 2008, now boasts 500,000 listings in 33,000 and 192 countries.

But officials in a number of cities

such as New York City and Sydney have been seen cracking down on short-term sub-letting, arguing that the practice is illegal, undermines the hotel industry, evades occupancy tax and could endanger visitors. In the same manner Uber has been accused in several jurisdictions of operating an illegal taxicab service or unlicensed limousine dispatch but have also reached agreements and licenses in a number of cities.

Airbnb which remains embroiled in a dispute with New York state regulators over a subpoena for information on thousands of "hosts" in the city, says that 87 per cent of its users stay at home while hosting paying guests, and describes the subpoena of customer information as an 'unfounded fishing expedition'.

## European Union strengthens air passengers' rights

A new set of rules has been implemented to better protect the rights of travellers while on holiday abroad. Under the new rules, travellers should be guaranteed assistance getting home if their travel agency goes bankrupt while on holiday. They also stressed that organizers should not be able to change flight times or prices significantly after a sale is concluded. However, if possible, they should have the option of continuing their trip.

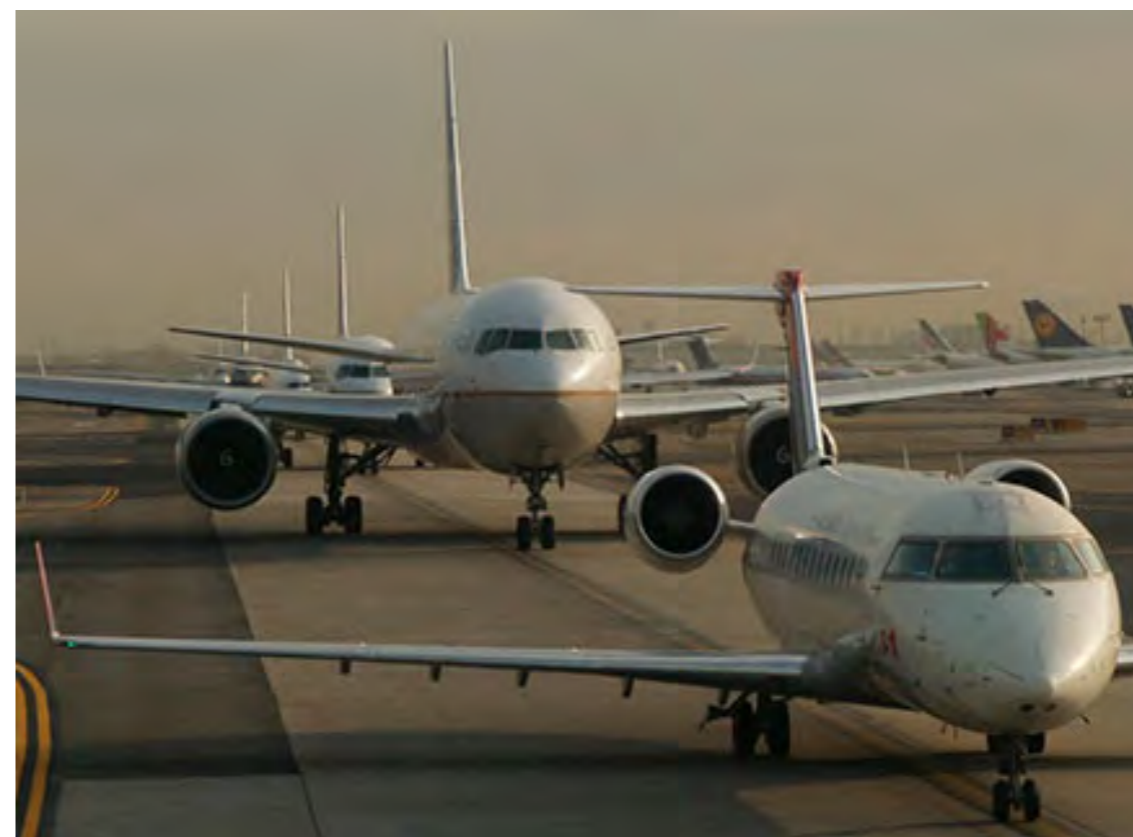
### Amended definitions

"With the amended definitions on package travel and linked travel it is now clear what package travel is," stated rapporteur Hans-Peter Mayer (EPP, DE). "Travellers need to be informed about their rights and how they are covered. The whole package foresees a high level of consumer protection and information," he added.

In addition, travellers in difficulty should get help during their holiday even if the travel organizer is not at fault. Assistance should include information on health services, consular assistance or making alternative travel arrangements.

### Reimbursements

Prices can only be raised after the sales contract has been concluded if fuel prices, taxes or airport fees go up. If the price increases by more than 8%, travellers should have the option to be reimbursed. In case the traveller is not able to return home due "unavoidable" and "unforeseeable" circumstances, the organizer must arrange accommodation at a similar level to the originally booked accommodation. Alternatively, they must pay for a five-night stay of up to €125 per night where the organizer is unable or unwilling to make a booking. ■



Under the new rules in the European Union, travellers should be guaranteed assistance getting home if their travel agency goes bankrupt while on holiday

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Products that humans use to protect their skin, or toiletries, can reach the sea from wastewater discharges, and shut down coral reproduction

## Beware of your soap, shampoo and cosmetics; They may kill the reef

**A chemical used to manufacture many soaps, shampoos and other products, is killing young coral reefs at concentrations commonly found in the environment.**

New research shows that something humans use to protect their skin, or toiletries, can reach the sea from wastewater discharges, and shut down coral reproduction.

Benzophenone-2 (BP-2) is an additive to personal-care products and commercial solutions that protects against the damaging effects of ultraviolet light. The chemical is used to protect bath salts, body fragrances, lotions, shampoos, soaps and laundry detergents from ultraviolet light, which make products lose their colour. The levels of BP-2 used in a new international study—ranging from 24 parts per billion to 246 parts per million—are within what

has been found in U.S. wastewater effluent.

### Killing juvenile corals

Once in the environment, BP-2 can quickly “kill juvenile corals at very low concentrations—parts per billion,” the authors wrote.

“What’s worrying is that if this chemical harms young coral, we won’t get coral recruitment around the world. This will create coral zombies—where there’s adults but not recruited young, so the reef will eventually go away,” said Craig Downs, a researcher at Haereticus Environmental Laboratory in Virginia who led the study. ■

## Japanese whaling a threat to Kaikoura tourism

**Humpback whales frequenting New Zealand’s Kaikoura coast at risk in Southern Ocean. Hunt poses economic threat to whale watching tour operators**

Up to 50 humpback whales observed off New Zealand’s Kaikoura coast could soon be killed in the Southern Ocean. Migrating to the region for food, the whales face an immediate threat from Japanese whaling vessels.

### Tour operators at risk

The result could pose an economic risk to whale watching tour operators such as Ngai Tahu, which made nearly US\$16 million last year. The concern is

not just for Ngai Tahu alone but for all whale tourism ventures.

Labour Party Maori Development spokeswoman Nanaia Mahuta questions what the Japanese have yet to learn about whales after killing so many already. “It’s been a very successful tourism initiative down there, not just for, but on behalf of New Zealand,” she added. An expanding tourist industry worldwide, whale watching grosses over \$700 million annu-

ally. In New Zealand, sperm and other whale species make regular visits to the deep waters off the Kaikoura coast. Japanese whalers target the species as part of their annual hunt in the name of research. ■

*We’ve got to question what’s being done under the guise of scientific research.*  
—Nanaia Mahuta

## Shark cull in Western Australia will put off tourists, Richard Branson says



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In a radio interview, British billionaire entrepreneur Branson said WA’s Premier Colin Barnett’s decision to cull sharks will backfire, driving tourists away from the area rather than enticing them back to it.

“I’m sure one of the reasons

he did it was because he was thinking it would encourage tourism. It’s going to do quite the reverse, I think,” said Branson on Fairfax radio. “You’re advertising a problem that doesn’t exist in a major way

and you’re deterring people from wanting to come to Perth and your beautiful countryside around it. All you’re going to achieve, I think, is to worry people unnecessarily.”

In addition to deterring tourists, Branson who is active in the

campaign against shark finning in Asia, remarked on the bad press that the state is garnering internationally.

“Last year Australia was praised all over the world for creating the biggest marine reserves. This year, the world is looking at Australia—and particularly Western Australia—and wondering what on earth is going on,” said Branson.

Meanwhile in the waters off Perth, WA state Fisheries Department has placed baited drum lines. The state government claims that a sharp rise in shark attacks that are frequently fatal have negatively affected tourism. According to dive operators in the area, there has been a decline of 90 percent in people who want to learn how to dive. ■ SOURCE: THE GUARDIAN



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# Roddenberry Dive Team and X-Ray Mag go to Fiji — Join Us!

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WHAT: RDT and X-Ray Mag  
Fijian Adventure

WHEN: April 28 – May 8, 2014

WHERE: Volivoli Beach Resort  
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COST: US\$3,399 per person  
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NOTE: 8-night trip (10 days  
including travel time)

Join Rod Roddenberry, the Roddenberry Dive Team, and X-Ray Mag for an eight-night tropical escape to Volivoli Beach Resort: April 28 – May 8, 2014.

Join Rod Roddenberry, the Roddenberry Dive Team, and X-Ray Mag for an eight-night tropical escape to Volivoli Beach Resort. We will explore some of Fiji's most famous and exhilarating dive sites in Fiji's Bligh Waters and the famous Vatu-I-Ra Passage. Divers will see first hand why Fiji is known as the "soft coral capital" of the world!

Professional photographer and X-Ray Mag's contributing photographer and editor Matthew Meier will also be on hand offering underwater photo workshops and image critiques to help improve your underwater photographs.

Divers will have the option of adding a day trip to Beqa Lagoon for their world famous shark dive (at an additional cost).

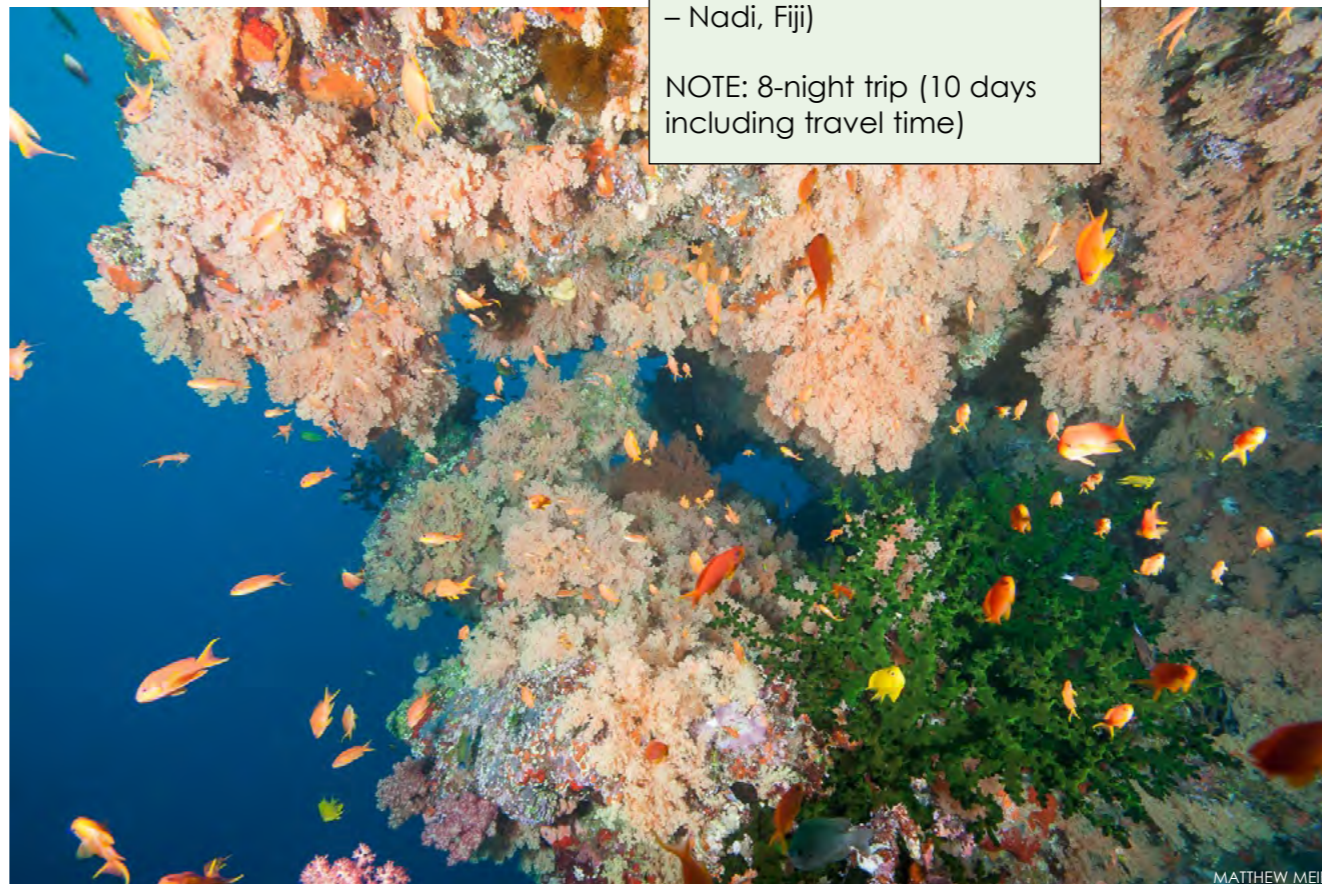
This wonderfully relaxed and remote

beach resort is located in a truly unspoiled and spectacular corner of Fiji. The white sandy beaches, turquoise water, mangroves and coral reefs are just waiting to be explored. Divers and non-divers will enjoy this coastal escape with the perfect blend of relaxation, water sports, cultural activities, village tours, spa appointments and sunbathing on the beach and by the pool.

The trip is escorted by Jennifer Black of the Roddenberry Dive Team and Matthew Meier of X-Ray Mag. ■

For full trip details, please visit the RDT Events page at: <http://roddenberry-diveteam.com/>.

Contact RDT at: [diveteam@roddenberry.com](mailto:diveteam@roddenberry.com)



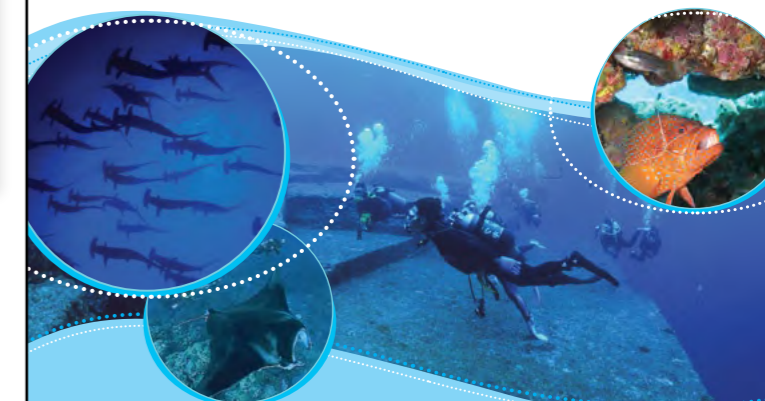
THIS PAGE: Scenes from Fiji's lush coral reefs; Rod Roddenberry of RDT (top center inset)

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# *Sardine Run & Cage Diving* South Africa

Text and photos by Scott Bennett.  
Supplemental photos by Andrey  
Bizyukin and Morne Hardenberg







Ballito Beach; Bait ball at the Wild Coast (right). PREVIOUS PAGE: Anemones and sea urchins, Partridge Bay

**The world in one country is an oft-used quote to describe South Africa and is not unwarranted. Along with dramatic scenery and a rich cultural heritage, it is a nation renowned for its diversity of ecosystems and wildlife. However, its undersea environs rival the terrestrial abundance. From northern subtropical reefs to the chilly waters of the cape, South Africa offers a wealth of marine life few nations can rival.**

I had a brief introduction several years earlier, visiting Aliwal Shoal and Protea Banks in KwaZulu-Natal and the Kruger National Park [see X-RAY MAG issue #46 -ed]. The diving was unlike anything I had done before not to mention challenging. And there were sharks—lots of sharks! From that moment, I planned to make a return visit.

**Sardine Run**

Like an aquatic version of the Serengeti's wildebeest migration, South Africa's Sardine Run is one of the world's utmost

undersea spectacles. During the winter months from May to July, a cold south to north-flowing current develops off the east coast, moving inshore and counter to the warm Agulhas current. After spawning in the cool waters of the Agulhas Bank, millions of sardines surge up from the Cape, following the current to the Transkei and KwaZulu-Natal province. The migration fuels an explosion of life, with all manner of predators partaking in the rich bounty, including dolphins, sharks, whales and seabirds. However, this is no guaranteed event; sardine numbers vary on a yearly basis and is only considered a "run" when the shoals are

large enough to be seen at the surface.

Having seen the spectacle on nature documentaries, I was eager for an up close and personal experience. When my good friend Sonja Newlands announced she would be leading a group from the United States and invited me along, how could I refuse? Factoring in time for additional activities, the biggest challenge was narrowing the options. With Sonja's help, I decided on some Zululand game reserves and Cape Town.

After a grueling trip from Toronto to Durban via London, I arrived in the morning. A recuperation day was welcome and Sonja couldn't have chosen a nicer place. An hour's drive north of Durban, the holiday town of Ballito featured green hills cascading to golden beaches reminiscent of Sydney's northern suburbs. "The Vineyard at Ballito" was a beautiful bed-and-break-

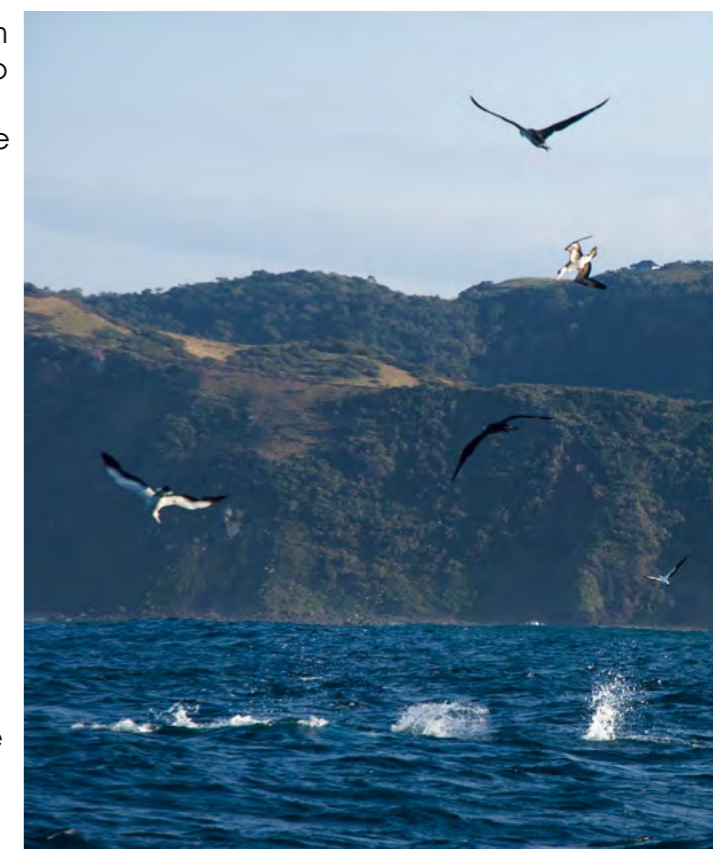
fast nestled on a hillside a short walk from the beach. For my first night, I decided to splurge with dinner and Al Pescatore, situated right across from the beach, came highly recommended.

The seafood platter was the epitome of extravagance, replete with mussels, prawns, oysters, fish and lobster. A Ballito iced tea, a concoction of ginger ale, sprite and five unknown spirits, necessitated another notch to my belt. People were very friendly, especially the owner, coming over to chat with the poor lone Canadian. If this was winter, I'll take it!

The following morning, Sonja arrived at 8:30, and it was a challenge packing all of my gear into her small car. We then headed to the airport to meet the Enfield scuba group from Connecticut. Right away, I could see it was a diverse but very nice group. With over 18 people and a ton of gear, Sonja had chartered them a bus, although two, Laura and trip leader John Langlois, rode with us.



Dinner decadence at Ballito



Fishing gannets, Wild Coast







Crashing surf (left) and the rugged landscape (above) of the Wild Coast; N'taba River Lodge (right); Wild Coast highway (center left)



ing two-laned and potholed. We soon crossed into the Eastern Cape or Transkei, which, until the early 90's, had been a separate region like Swaziland and Lesotho. Towns became fewer and further apart. The landscape was striking, with golden hills of grass dotted with numerous houses. Many were round with thatched roofs. Sonja informed us that this was deterrence against evil spirits, as they had

no corners to hide in. As the road gained elevation, the locals were bundled up in hats and heavy coats. No matter how remote, every town seemed to have a KFC.

Arriving at N'taba Lodge outside of town, we were greeted by owners Ivan and his wife, Bugs. (No, not her real name. Sonja has known her for years and *still* doesn't know it.) Situated alongside a river flanked by rugged peaks, the location was stunning. In the midst of renovations, severe floods had damaged the dining room and terrace overlooking the river four months earlier. Most of the damage was wrought by sand, but optimist Ivan regarded it as free building material.

As the mountain of gear was unloaded, we enjoyed a welcome drink. Also on hand was boat captain Ant and partner Lauren and dive guide Mike. Prior to dinner, Ant gave a briefing on what we could expect for the

ensuing week. Right away, I knew this would be no walk in the park.

### By zodiac

Like most South African diving, we would journey by zodiac. Being in the middle of nowhere necessitated all gear, zodiacs included, must be brought in. With our large group, Sonja chartered two zodiacs from different operators in Umkomaas, outside of Durban. On average, we would spend six hours at sea daily, returning around 3:00. Fortunately, as the action occurs near the surface, deco issues would not be a problem. With temperatures around 15°C to 21°C, the water was warm enough for a 5mm wetsuit with boots, gloves and hood.

The sardines would not be a gigantic unbroken mass, but fragmented schools.

Ravenous for plankton, the fish converge close to shore, constrained by a preference for water temperatures of 20°C or less. Shoals may exceed 7km in length, 1.5km wide and 30m deep. To minimize chances of predation, they mass together in bait balls 10-20m in diameter. Clearly visible from the surface, they are ideal targets for bottlenose and common dolphins, Cape gannets and a range of sharks including bronze whalers, black-tips, dusky, ragged-tooth and zambezis. Even whale sharks and great whites have been observed on occasion.



On the Wild Coast, diving is by zodiac

Our destination was the town of Port St. John's in a region of the easterly Transkei called the Wild Coast. Here, the continental shelf plunges sharply close to shore, resulting in enormous waves and tempestuous seas. I was soon to discover the name was highly appropriate.

Travelling on the motorway, the first few hours were easy. Past Shelly Beach, the motorway ended abruptly, becom-





View of the Umzimvubu River; Dolphins hunting at Sardine Run (top right); Close-up of dolphins (right)

With such a big coastline, they could be anywhere. Assisting in our endeavours were ultralights conducting air searches. Dispatched almost daily, the pilots kept in close contact with the various captains by phone. While operators generally work in tandem, there is a definite “first come, first served” protocol, as latecomers must wait until the first group is finished. With the forecast sounding favourable, everyone was raring to go.

The morning was cool and grey as I geared up for our 9:00 departure. There would be seven people per boat plus dive masters and crew; I would be with Ant, Lauren and Mike. Getting aboard necessitated a slippery descent down the muddy riverbank created by the recent flooding. Overnight, the weather took a turn for the worse, with rainy, unsettled conditions in the immediate forecast. Undaunted, we set out with a palpable sense of excitement.

Translated as “Land of the Hippos”, the Umzimvubu River has fashioned a gorge of towering 300m ramparts known as the Gates of Port St. John’s. The hippos are long gone, having been eradicated back in the 50’s. On the other hand, it could be re-named river of bull sharks, as the brackish water is an important nursery for young sharks. Definitely not a place one would care to wade across!

Getting out to sea faced some navigational challenges. Along with shallow water near the river’s mouth, offshore surf was intense, with Ant timing our exit to steer clear of the cresting waves. A second attempt was necessary, but Ant was a master, getting us through with minimal discomfort.

Binoculars raised, Ant scanned for signs, with congregations of dolphins and Cape gannets harbingers of imminent action. Right away, things looked promising. A large pod of

dolphins cruised alongside us, while a distant flock of gannets circled expectantly. We were off!

We arrived to discover an avian holding pattern; some birds were diving for fish but most lounged on the surface or circled overhead. False alarm. The radio soon crackled to life—another swim-bait ball 30 minutes away. Roaring down the coast, we discovered the other group had dived it, but we were late for the party.

With sardine action still lacking on the second day, we decided to concentrate on humpback whale encounters—and there was plenty,



with many breaching or swimming past throughout the morning. This time we would be on snorkel only. Sensing our presence, the whales would make a quick detour. I wouldn’t have thought seeing something so large would be so problematic.

At the surface, my camera and



Humpback whale breaching





ANDREY BIZYUKIN



ANDREY BIZYUKIN

## South Africa

Hunting gannets at Sardine Run above (lower left) and below the water (far left); Sharks also join in the fray at Sardine Run (left)

top of one. Regrettably, we managed only one more bait ball dive, and no predators were to be seen. Although there were



the plunge. As the whales advanced, he cast me a mischievous grin. "They are going to shit themselves!" he chuckled. Moments later, snorkels muffled delighted whoops as the whales passed to within a few metres.

The next time, I opted to go and with camera clasped to chest, did a back roll in. Scanning frantically, I wheeled to dis-

strobes proved unwieldy, acting like a sail and making swimming difficult. After several false starts, a trio of whales headed right in our direction. "Go, go!" commanded Ant, and everyone but me took

cover a humpback heading right at me. At such close range, it was enormous! Then, the unthinkable happened; my camera's autofocus ceased working. With the whale's massive head filling my

viewfinder, there were no hard edges for the focus to lock on. Seconds later, it was out of range and I missed the shot. Curses!!!! Now there is a situation one doesn't confront every day: a whale too close to photograph.

An hour later, Ant spied common dolphins gathering at the surface. We finally heard the magic words: "Bait ball!" I geared up in a flash. As this was no controlled environment, we were instructed to stick close to our buddies, staying back to back in case any sharks got over inquisitive. This would be wild and woolly!

About 4m down, we found the bait ball of sardine, and it was under attack. Like sheepdogs herding a flock, common dolphins made repeated passes, striking it with precision accuracy. I was immediately aware of their high-frequency squeaking, commu-

nication to coordinate the assault. Their ranks perforated, the sardines regrouped in a seething panicked mass. Bronze whalers and blacktips joined the fray while Cape gannets attacked from above, zooming through the water column like feathered torpedoes. The water boiled in the onslaught.

Incredible! My elation proved short-lived. My steel tank, combined with an excessive weight belt, wreaked havoc on my buoyancy. Bobbing up and down like a yo-yo, I managed a few shots before making a hasty retreat to the boat to remove some weights. The sardines were rapidly decimated—glittering scales the only indication they had existed at all. To commemorate our first bait ball, everyone was treated to a Sardine Run tradition—a green (cream soda) lollipop. I was unsettled to learn a bronze whaler had taken interest in my erratic buoyancy.

Back on land, we headed to the airstrip atop Mount Theisger for sundowners. Despite the overcast conditions, the view was magnificent, offering a clear view of the gorge and Indian Ocean

beyond. Back at the lodge, Ivan whipped up a tasty Cape Malay/Greek fusion dish of mixed seafood in a yellow curry sauce along with BBQ ribs and vegetable curry. I hoped the next day would provide some much-needed exercise.

### Changing weather

Unfortunately, conditions worsened as the week unfolded. Along with a rain and brisk wind, the roller coaster swells made snorkelling a real challenge. The sardines were around—just not where we were. Nevertheless, there was always something to see. Cape gannets put on a spectacular display, plummeting at dizzying speed before striking the water like machine gun fire. A few dead individuals indicated that not all succeeded; an erroneous trajectory could easily result in a broken neck. One unfortunate member of our group did a backwards roll right on



ANDREY BIZYUKIN

Humpback whale, Wild Coast







White rhino (left) and giraffes (right) at Hluhluwe-Umfolozi Game Reserve; Serval (far left) and cheetah (below) at Emdoneni Lodge

even allowed to pet them. The cats clearly enjoyed the attention, purring like electric motors. Without warning, one flopped over, rested its head on my foot and fell asleep.



South Africa

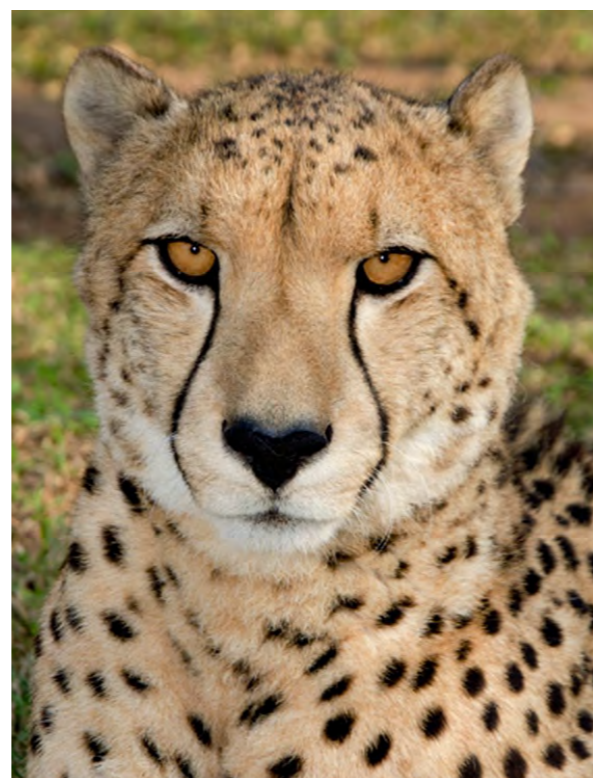
plenty of whales, we missed one notable. Measuring up to 15m, Bryde's whale is Africa's largest predator, capable of ingesting huge quantities of sardines in a single gulp. According to Ant, they have occasionally surfaced right beside the boat.

On our final morning, I nearly went out, but the prospect of a rainy, dive-free excursion didn't entice, and I opted out. Big mistake! Although no one left the zodiac, several humpbacks put on quite a show with repeated close breaches. Lesson learned: Always go! In the afternoon, everyone hiked into town

to explore the local market. We were intrigued to check out the local witch doctor until discovering the fee was \$30.00 each. Pass.

**Topside activities**

Before my journey to Cape Town, Sonja had arranged me a few nights at some Zululand safari lodges. After all, the very idea of visiting South Africa and not going on safari was virtually sacrilegious! Bidding the Enfield group adieu in Umkomaas, I transferred to another vehicle for the three-and-a-half-hour drive to Zululand.



**Falaza.** My next stop for two nights was at the nearby Falaza Game Reserve and Spa. An afternoon excursion visited Lake St. Lucia, part of the World Heritage iSimangaliso Wetland Park. Boat cruises are popular, and we arrived in time for the day's final cruise. Crocs and hippos were the prime attractions, with copious numbers basking on the muddy riverbank. The air was nippy on the upper deck, and I was glad to have brought my fleece jacket. The poor crocs must have

been frigid!

The next morning featured a visit to the Hluhluwe-Umfolozi Game Reserve, Kwazulu-Natal's oldest and largest game park and home to the Big Five (elephant, lion, leopard, buffalo and rhino). The park's northern sector, known as the Hluhluwe, features hilly topography with altitudes ranging from 80 to 540 metres, a far cry from the flat savannah one associates with Africa.

Although some of the big five remained elusive, white rhinos were highly visible as well as buffalo, impala, spotted hyena and plenty of giraffe. An afternoon drive at Falaza's private reserve yielded nyala, warthogs, impala, blue wildebeest and red duiker. The star attraction was the reserve's resident white rhino, a real bruiser that was the biggest I have ever seen.

**Thanda.** For my final overnight stop, Sonja saved the most luxurious for last. Located within a 14,000-hectare private reserve, the Thanda Safari Lodge proved to be a real stunner. Another big five reserve, this one was private, giving the feeling



Young male lion at Thanda



Hippos at Lake St. Lucia

**Emdoneni.** My first stop was Emdoneni Lodge, a private lodge famous for its cat breeding program. Four species are bred at the centre including African wildcat, caracal, serval and cheetah. On a supervised tour, it was possible to enter the enclosures, allowing for some amazing photo opportunities. The highlight was the cheetahs—two brothers long habituated to people. We were







Main Street, Simon's Town (left); Boulder's Beach (right); Penguins of Simon's Town (below)

including a mother and calf. After a sundowner in the bush, spotlighting revealed seven more rhino wallowing joyfully in the mud alongside a waterhole. Back at camp, a glass of wine beside a rearing bonfire was a great prelude to a gourmet dinner. This was a safari with style.

**Simon's Town**

The next morning, I returned to Durban for the two-hour flight to Cape Town. Occupying a dramatic seaside posi-



of your own private wilderness. My room for the night proved jaw dropping. To call it a "tent" was akin to calling the Burj Khalifa a "building". With a verandah overlooking the distant hills, the airy rotunda interior featured a huge bed and ensuite bath. With only a one-night stop, it was a shame I wouldn't have

more time in it.

Despite only one afternoon game drive, it proved extraordinary. Within the first hour, we encountered two groups of lions, including a lioness and three cubs at a kill, my first in three Africa trips! In addition to impala, zebra, giraffe and buffalo, there were plenty of white rhino,



Simon's Town Harbour



entire area.

My final destination was Simon's Town, nestled alongside False Bay on the Cape Peninsula's eastern coast. An important naval base for more than two centuries, the town is rich in history, its main street flanked with charming Victorian architecture.

My accommodation was the Quayside Hotel, situated right on the harbour. My balcony offered superb views of the harbour and rugged coastline. Plus, how can one

fault a hotel that offers a welcome glass of sherry?

That evening, I had dinner at Bertha's, a restaurant right on the water below my room. The springbok medallions with mushroom sauce were outstanding, ensuring a return visit every night at mealtime. By week's end, the entire staff knew my name.

After breakfast the next morning, a phone call from Dave prompted a change in itinerary. "May I humbly suggest we do Table Mountain today

instead of the Cape? The afternoon weather forecast calls for clear conditions, a high of 26° and no wind." As unsettled weather can thwart a visit to Table Mountain, especially during the winter months, I readily agreed to seize the moment.

My morning free, I headed for Boulders Beach, home to view some decidedly un-African wildlife: African penguins. Arriving just after 9:30, I paid for my ticket and walked in. I wondered if something was wrong, as I seemed to be the only one there.

A sheltered cove of white sand punctuated with granite boulders, Boulders Beach is part of the Table Mountain National Park. From just two breeding pairs in 1982, the penguin population has since ballooned to 3,000. To protect both penguins and the environment, a wooden boardwalk has been erected along the beach. Close observation was not an issue, with penguins often an arm's length away. Despite their comical appearance, razor-sharp beaks are capable of inflicting a nasty bite.

I photographed in contented solitude





Crossing the peninsula, we headed for Chapman's Peak drive, touted as the country's most scenic. Hugging the vertiginous cliffs of the Constantia Mountains, the 9km road was constructed by convicts between 1915 and 1922. A series of fatal accidents involving boulders prompted a four-year closure for maintenance. The road was re-opened in 2004 as a toll road, a move deemed controversial amongst local residents.

for an hour as the birds went about their business of tending chicks, preening, waddling and squabbling. Then, a busload of tourists arrived and the viewing platform was promptly overrun. It didn't last long, and peace and quiet resumed, apart from the occasional powerful bray. It was easy to see how they received the name jackass penguin.

For lunch, I opted for a favourite South African delicacy: biltong. The local version of beef jerky, the air-dried salted meat comes in many varieties. Dave recommended a shop near my hotel called Biltong and Bake. Along with the usual beef and pork, there were plenty of exotic game versions, and I selected gemsbok, ostrich and springbok. Although initially tough, all proved delicious. Take that, beef jerky! My beverage was Iron Brew, a soft drink regarded as South Africa's favourite. How can one refuse a drink billed as "rosy vanilla, fruity flavoured"? Definitely unique!



From the lookout at Noordhoek (North Corner) Village, the impressive sweep of Long Beach stretched 6km to the 30m Slangkop Lighthouse, the highest on the South African coast. Despite the chilly Atlantic temperatures, Cape Town's beaches are thronged during the summer months. Even during my winter visit, hardy souls could be seen battling the surf on body boards. The locals call them shark biscuits!

Approaching the city proper, we passed Clifton and Bantry Bay, home to some of the country's most costly real estate. Signal Hill revealed superlative views of the city, hugging the coast below and sprawling to the north and east behind Table Mountain.

Majestic yet temperamental, Table Mountain is the city's most iconic landmark. Prior to the Cableway, the only way up involved an arduous hike of several hours. The cable car is unique as it has a 360-degree revolving floor, which allows everyone the opportunity to photograph from a couple of open windows. Not enamoured with heights, I did okay until the very last leg. Skimming a sheer rock wall provided an unwanted dose of vertigo!

A World Heritage Site, the Table Mountain National Park is part of the Cape Floristic Region, the smallest and richest of the world's

six floral kingdoms. Known as Fynbos (Fine bush), it occurs only in the Western Cape's Mediterranean-style climate. Consisting of scrubland and heath, diversity is extraordinary, with over 9,000 recognized plant species, around 6,200 of which are endemic.

I could also discern the distant silhouette of Robben Island, famous as the set-

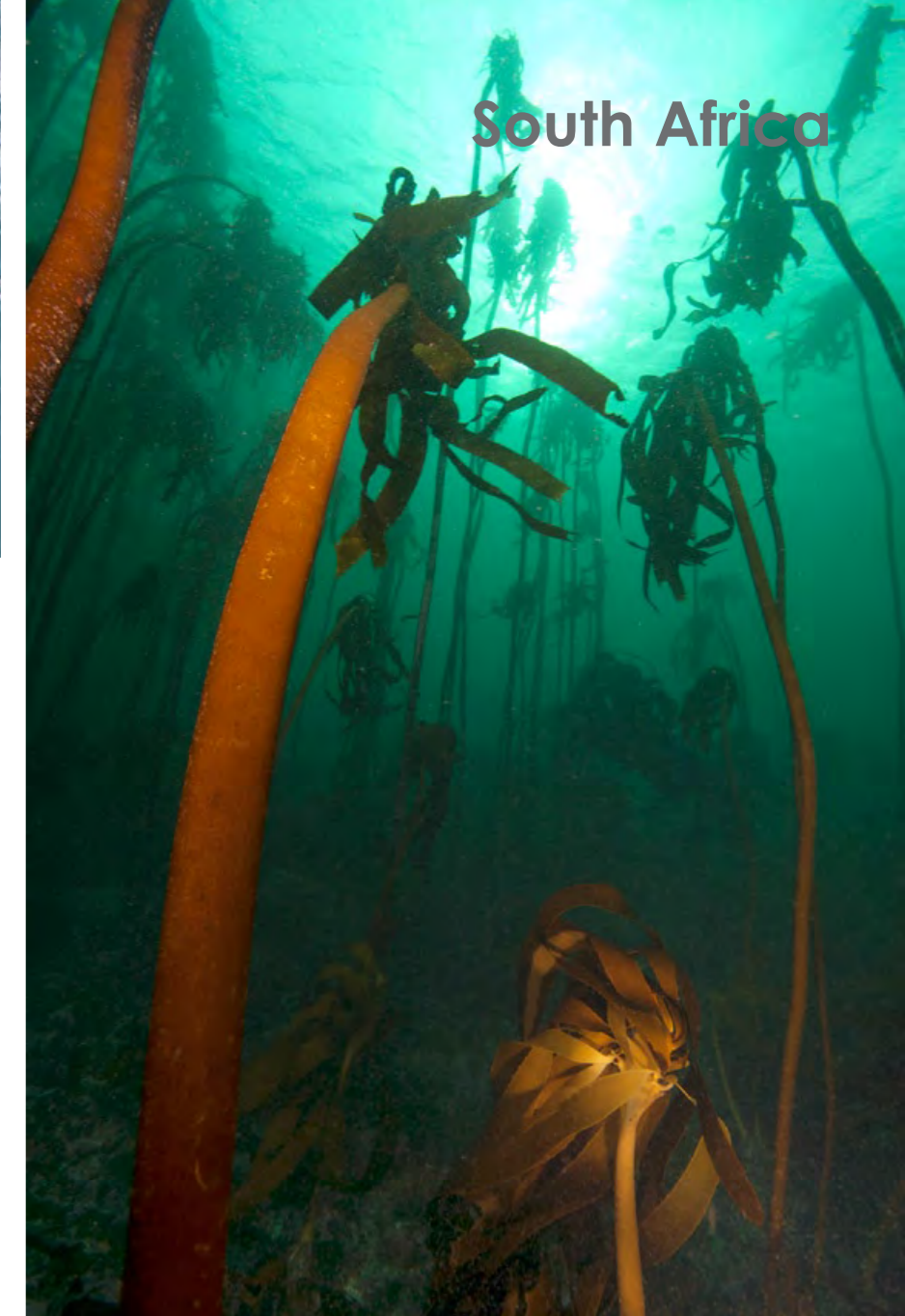
ting of Nelson Mandela's incarceration. Although I didn't see one, the mountain's most common mammal residents are hyraxes, locally known as dassies. Incredibly, the rodent-like animals are related to elephants. An amazing day was concluded with a spectacular sunset over Table Bay from north of the city.



CLOCKWISE: Twelve Apostles; Sunset over Table Bay; Chapman's Peak Drive; Table Mountain panorama







Breaching great white shark (left); Fur seal at False Bay (above); Kelp forest at Miller's Point (right); Author Scott Bennett armed with camera in shark cage (lower left)



**Shark diving**

After nearly five days, it was finally time to get wet. I would be diving with Shark Explorers, established in 2008 by Morne Hardenberg and Stephen Swanson. With the motto "Change your perspective", the company has been committed to providing visitors a positive shark experi-

ence to counter perpetual media negativity. The Cape's waters are a mecca for sharks and a number of trips are offered to see them depending on the season. My winter arrival coincided with the big boys—the great whites! In addition, excursions would be made to dive with fur seals and to kelp forests for sevengill sharks.

Arriving at the shop, I was pleasantly surprised to see a familiar face—my friend Linda Ferwerda, who was visiting from the Netherlands. Unfortunately, Morne was still at the Sardine Run, but did meet his niece Monique. Also on hand was divemaster Ernest Salima, who hails from Malawi (my next stop after South Africa). With gear sorted, it was time to head to the jetty.

water turned out to be a balmy 15°C. I was fitted with a 5mm suit along with an outer shell. Learning my lesson from the Sardine Run, I opted for fewer weights to compensate for the steel tank. There was also another South African first. We would be on a real boat, with entry via a giant stride and a ladder to get out. Sweet!

**False Bay**

False Bay is one of the few places in the world where it is possible to dive with sevengill sharks. An ancient species attaining lengths of 3m and weighing up to 335kg, sevengills are normally deep water residents. Opportunistic predators, they prey on everything from rays, chimaeras and bony fishes to carrion and other sharks. They are especially formidable predators of Cape fur seals, which I was hopeful they could differentiate from wetsuit-clad divers. According to Stephen, it isn't unusual to see more than ten on one dive, and being naturally curious, chum or bait isn't necessary.

The group was big, with a number of international students from an ocean studies course participating. During the

briefing, we were told visibility can range from 6-12m, so staying in close proximity to your dive buddy was essential. As Linda would be my dive buddy, her camera set-up would make her easy to spot. All was good.

**Miller's Point**

The boat trip to Miller's Point was short but scenic, passing alongside the Cape Peninsula's rugged coastline. Our destination was jammed



Cow shark at Miller's Point







Silhouette of cow shark at Miller's Point; Colony of seals at Seal Island (right); Red Roman at Miller's Point (lower right)



Detail of kelp at Miller's Point

with bobbing kelp, buoyed to the surface by gas-filled bladders. The largest and fastest growing of the world's seaweeds, kelp thrives on nutrients churned up by the Cape's cold, rich waters. Having never dived such an environment, I had unhappy visions of being entwined in a tangle of stems and fronds.

With Linda ready to go, we plunged in and descended to the bottom. Entanglement concerns were promptly replaced by wonder. Shafts of light flickered from above, creating the ethereal atmosphere of an underwater cathedral. Visibility was good, with the surface clearly visible from the bottom.

With everyone assembled on a sandy patch at 18m, it didn't take long to see the sharks; they soon found us! Approximately eight appeared, some coming to within an arm's length. None showed aggression, only benign curiosity. The upturned corners of their mouths gave the appearance of a goofy smile.

After watching the sharks, we spent the

remainder of the dive exploring the kelp forest. Fronds undulated in the mild surge, while red Romans made arresting photo subjects. A member of the seabream family endemic to Southern Africa, their numbers have been severely depleted due to excessive fishing.

Unfortunately, my dive was cut short when my weight belt slid off, and I shot to the surface like a rocket. Fortunately, Linda found it, the orange weights glowing like a beacon on the sandy bottom. Someone was the recipient of a well-earned beer!

### Seal Island

Surface interval completed, a short boat ride brought us to Seal Island at Partridge Point. Many of the shivering students opted out, but I couldn't wait to get back in the water. The dive would be very shallow, only 6m along the island's drop-off. Before weighing anchor, a legion of brown, whiskered heads bobbed expectantly at the surface.

"Don't worry," said Ernest with a chuckle. "They will come to you."

He wasn't kidding. Descending the wall, we were immediately besieged, and the dive proved to be one of the most memorable I have ever experienced. I surmised the seals would be moving too quickly to photograph, but was pleasantly surprised. Although many zoomed past, others came in for a closer look.

Boasting big brown eyes, their playful antics reminded me of mischievous dogs. I couldn't get over their sheer grace, gliding and pirouetting while we clumsy humans were buffeted by the relentless surge. Some were real characters; looking up from my camera's viewer, I caught one chewing on the end of



one of my strobes. The mark remains to this day.

With the relentless seal action, it was easy to overlook the reef. Very different from the tropics, the rocky walls were ablaze with colour, jam-packed with star-





MORNE HARDENBERG

fish, clams and urchins. The later proved especially photogenic with hues of lavender, yellow and orange. Marveling at the array of shapes and textures, I practically ignored the seals.

**Great white shark cage diving**

Finally it was time for the main event: the great white cage dive! After my 5:30 wakeup call and a quick coffee, I grabbed my housed camera and headed down to the jetty for 6:00, which was already abuzz with activity, with several operators gearing up for morning



MORNE HARDENBERG

trips. Along with eight passengers, the boat had a full crew. With Stephen at the helm, along for the ride were divemasters Ernest, Corne Ligtermoet and Nina Daniels.

Departing the jetty at 6:30, we set out for Seal Island. Situated eight nautical miles from Simon's Town harbour, it is home to 70,000 furs seals, along

with cape and bank cormorants and even a few penguins. The morning's excursion would feature three distinct segments. First, we would search the bay for predations, as the majority occurs prior to sunrise. Next, a seal decoy would be towed behind the boat to entice a breach. The final stage was the cage dive.

Arriving just after 7:00, Stephen gave a briefing on shark hunting behaviour and what to expect. After weeks of feeding at sea, the seals head for home, exhausted and highly vulnerable. This

is what the sharks are waiting for and gather in large numbers during the pre-dawn hours. The seals are unable to discern the sharks below, but are highly visible to the sharks, rocketing to the surface to snatch their unsuspecting prey.

Predations can last anywhere from seconds to several minutes. While the sharks possess the brute force, agility is the seals' trump card. On many occasions, the shark will miss its mark, with a wild chase ensuing at the surface. The seal will often outmaneuver the shark, tiring it to the point of giving up.

With multiple crewmembers on the lookout, all directions were covered for potential shark action, specifically, "porpoising" seals. With sinister motives, seabirds shadow their movements, anticipating leftovers from a potential attack. It didn't take long before the first breach. Then the second. Then the third. I lost count of how many times I heard "Predation, three

o'clock" and turned to discover it was all over.

One predation proved particularly gruesome. "Lots of blood," winced Ernest, as I quickly averted my eyes. The gulls descended in seconds, frantically snatching up blubber and undigested fish bits. Stephen estimated that approximately 50 great whites reside in False Bay. Judging from the number of predations, it appeared they were all around Seal Island.

**Trolling with seal-lure**

It was then time for stage two of our excursion, as Ernest prepared "Frank", a life-size seal mockup.



Fur seal at Partridge Bay; Great white shark attacking seal lure (left); Great white and cage divers (top)







Fur seal at Partridge Bay (left); Ostrich at the Cape of Good Hope (above); Smitswinkel Bay (right); Baboon (lower right)

viewpoint.

With everyone in position, Ernest lowered some hefty frozen fish chunks into the water. Another decoy was employed, this one a flat seal silhouette called "Susie." The action

commenced quickly, with the first shark appearing within minutes. "Okay, standby, standby...DOWN, DOWN!" commanded Stephen. Gulping a breath, I submerged to the window, frantically trying to position my camera. Glancing to the curtain of green, the unmistakable sil-

houette came into view—a great white.

Seeing this magnificent predator up close was mesmerizing. Swooping in gracefully, the great mouth opened wide, swallowing the bait in one gulp. At least seven individuals appeared during an hour, including one specimen over 5m long. Another got a bit rambunctious, thrashing the cage with its tail and soaking everyone on deck. Several other boats were in the vicinity; it seemed there were more than enough sharks to go around.

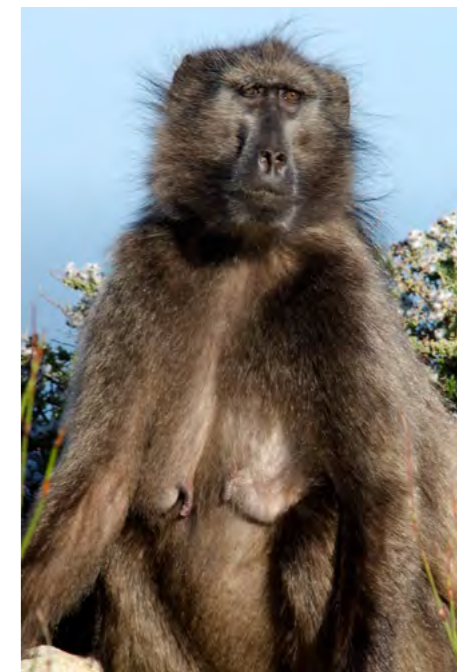
### Cape of Good Hope

Unfortunately, a second trip for the following morning was cancelled due to rough conditions. Dave arrived after lunch, and we headed for the Cape of Good Hope. Famous as Africa's southernmost point and the convergence of Atlantic and Indian Oceans, in reality, it's neither. The actual meeting point fluctuates according to ocean currents, which doesn't actually happen at the Cape. As for the continent's southernmost point, that honour belongs to Cape Agulhas, a peninsula some 150 kilometers to the southeast. Just don't tell the tourist literature.

Wending curvaceously, the road

offered frequent lookouts, providing stupendous views. The beauty also bore an ominous side; a large sign emphatically proclaimed "DANGER: BABOONS." Large and aggressive, chacma baboons are a real problem in the area, attacking people and even breaking into homes causing extensive damage. Further down the road, we encountered a "baboon squad" trying to frighten some off a property by firing blanks. After that, I was afraid to get out of the car for the rest of the morning.

From the graceful sweep of Smitswinkel Bay, the road turned inland, entering the Cape National Park. Stopping to pay the entry fee, a sign announced closing



Essentially, we would troll with a seal-sized lure. "Come on Frank, give us joy!" enthused Steven. With Stephen, Ernest, Come and Nina on the lookout, all directions were covered for potential shark action. Somehow, I couldn't imagine the seals echoing his enthusiasm.

At 9am, the guys started chumming with fish oil to lure in the sharks. The moment of truth had finally arrived. It was cage time. Donning wetsuit, boots, gloves and hood, I was perplexed as to not only where the cage would be positioned but also how I would actually get in. I soon had my answer. The cage was suspended from the vessel's side, and we would step down like on a ladder. It was a lot narrower than expected, holding four people lengthwise, with barely enough room to turn around. No scuba was involved; with heads and shoulders above the water line, a window below the surface provided an unobstructed



Tourists visit the Cape of Good Hope



time was 17:54. Not 18:00, but 17:54? Windswept and carpeted by Fynbos vegetation, the landscape was stark yet beautiful. An eland bolted across the road, while along the coast, we encountered all four of the park's ostriches.

Normally associated with dry savanna, the birds made for an incongruous sight along the seashore. Seeing one relieve itself was practically awe-inspiring; the sheer force appeared capable of shattering a car windshield. Stopping for a photo at the

Cape of Good Hope, the wind actually knocked me off balance.

With daylight waning, our final stop was Cape Point Lighthouse. Not wanting to hike up in the wind (coupled with a dose of laziness), I opted for the funicular.



Painfully slow, the ascent was further impeded by the driver-in-training that stopped short of the platform, resulting in a 15-minute wait. With extreme irony, I noticed the tram's name was "Flying Dutchman." From the look-out, the views were spectacular and winds even stronger. With surf pounding below, the "Cape of Storms" certainly lived up to its name.

### More seals, sharks and kelp

During my final days in Simon's Town, I managed additional seal and kelp dives along with a second shark trip that proved even more thrilling. Conditions were rougher, testing everyone's seasickness threshold. I was okay, but one poor woman vomited for the entire trip. This time I finally witnessed a full breach where the shark caught a seal. Despite having seen footage on BBC's *Planet Earth*, nothing quite prepared me for witnessing the event in person. The sheer force displayed as the sharks erupted from the surface was mind-boggling.

Stephen counted 15 predations and five fatalities. I must admit, watching the proceedings left me with decidedly mixed feelings. Although observing predations was an incredible experience, one can't help but sympathize with the seals. It was definitely exhilarating to see one escape.

Describing the experience to friends



LEFT TO RIGHT: Detail of colourful reef at Partridge Bay; Cape Point lighthouse; Fur seals at Partridge Bay

back home on Facebook, it was always the same question. "Was it scary?" Not at all. Pure exhilaration was a more apt description, with participants on both excursions utterly thrilled by their close-up encounters. Shark Explorers means to transform peoples' perception of these amazing creatures and seeing them up close in the wild is just the ticket.

### Afterthoughts

During my 19 days in South Africa, the wealth of different experiences proved exhilarating. When it comes to the Sardine Run, fair weather divers beware. Truly nature in the raw, it was hard work; each evening, I could feel muscles I didn't know I had. Like anything in nature, nothing is guaranteed, with rain and rough conditions making for uncomfortable days out. However, that tantalizing glimpse of action was enough to whet my appetite for more. With so much more to explore, both under and over the water, I will definitely be back. It is the world in one country, indeed. ■

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# fact file



## South Africa

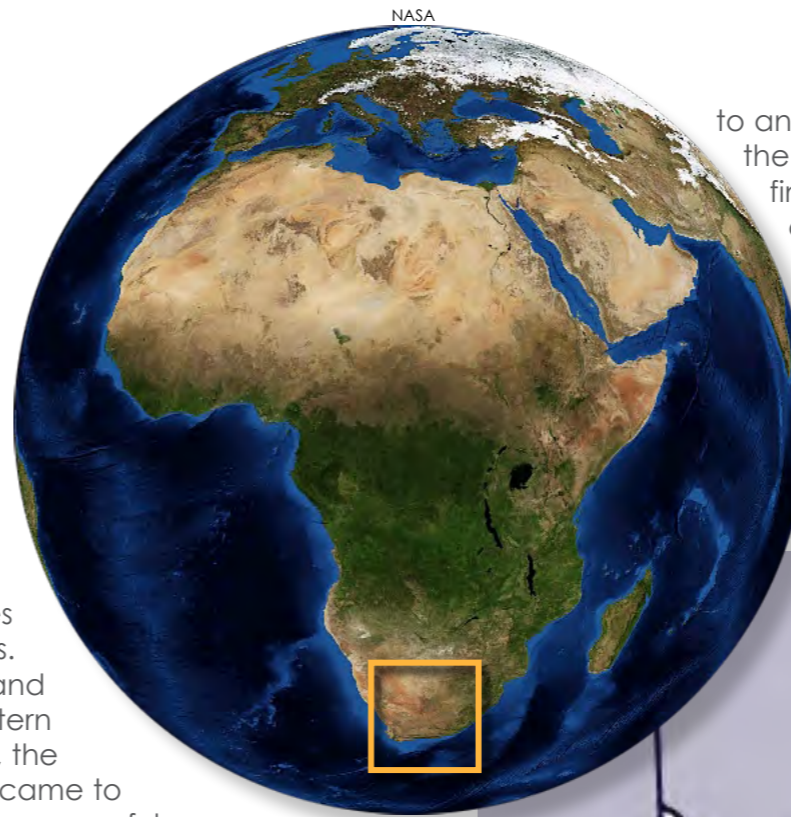


SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM

**History** In 1652, Dutch traders landed at the southern tip of what is now South Africa. They established a re-supply station here at this point on the spice route to the Far East from the Netherlands. It eventually became the city of Cape Town. In 1806, the British seized the Cape of Good Hope, compelling many Dutch settlers (the Boers) to move north to establish their own republics. Diamonds and gold were discovered in 1867 and 1886 respectively, spurring immigration and wealth. As a result, subjugation of the native inhabitants intensified. British encroachments

were resisted by the Boers, but they were eventually defeated in the Boer War, which took place from 1899 to 1902. But in 1910 the Boers, or Afrikaners as they came to be known, ruled together with the British under the Union of South Africa, which in 1961 became a republic after a referendum by white voters. A policy of apartheid (segregation) was instituted by the elected National Party in 1948. This policy favored the white minority over the black majority. Opposition to apartheid was led by the African National Congress (ANC) of which Nelson Mandela was a leader who was

RIGHT: Global map with location of South Africa. LOWER RIGHT: Map of South Africa, BOTTOM LEFT: Fur seal in Partridge Bay



imprisoned for decades for his political activities. After years of conflict and boycotts by some Western nations and institutions, the ruling party eventually came to the table to negotiate a peaceful transition to majority rule. The end of apartheid came in 1994, when the first multi-racial elections were held, ushering in majority rule under a government led by the ANC. The country still struggles with apartheid-era imbalances in education, health and decent housing. Infighting in the ANC has led to abrupt changes in leadership. Government: republic. Capital: Pretoria

**Geography** Located in Southern Africa, the country occupies the southern tip of the African continent. Terrain is comprised of a vast plateau in the interior, surrounded by rugged hills and narrow coastal plain. Coastline: 2,798km. Lowest point: Atlantic Ocean 0m. Highest point: Njesuthi 3,408m.

**Climate** Primarily semiarid, South African climate is subtropical along the east coast, with sunshine during the day and cool nights.

**Environmental issues** Extensive water conservation and control measures are required due

to the country's lack of important lakes and major rivers. Demand for water is outpacing supply. Other challenges include pollution of rivers due to urban discharge and agricultural runoff, acid rain due to air pollution, desertification and soil erosion.

### Economy

A middle-income, emerging market, rich in its supply of natural resources, South Africa has well-developed sectors in finance, law, communications, energy and transportation as well as the 15th largest stock market in the world. Despite the country's modern infrastructure, which supports efficient goods distribution to major urban centers, there are obstacles that slow economic growth. In 2007, aging electrical plants led

to an electricity crisis and slowed the economy. Then the global financial crisis hit, reducing commodity prices and world demand. In 2009, GDP fell almost 2% but has since recovered. Current challenges include poverty, inequality and unemployment at nearly 25 percent of the work force. However, improvements

**Currency** Rand (ZAR)  
Exchange rates: 1EUR=15.14ZAR, 1USD=11,16ZAR, 1GBP=18.41ZAR, 1AUD=9.80ZAR, 1SGD=8.75ZAR

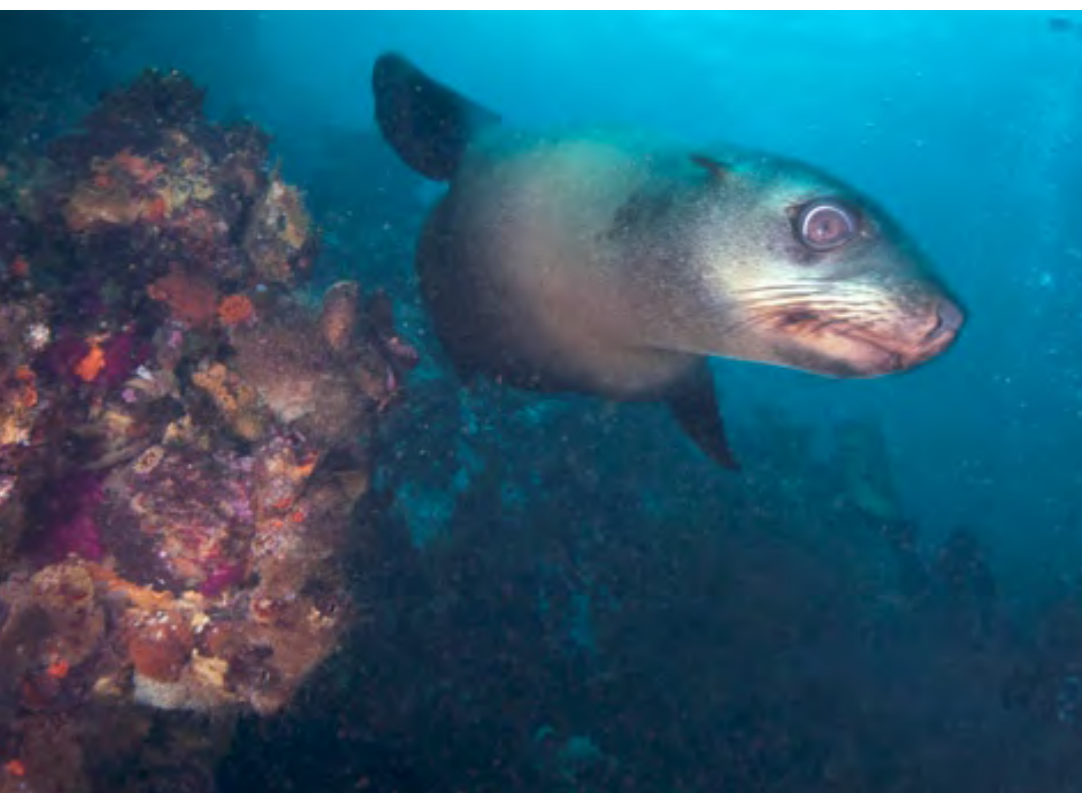
**Population** 48,601,098 (July 2013 est.) Ethnic groups: black African 79%, white 9.6%, mixed 8.9%, Indian/Asian 2.5% (2001 census). Religions: Protestant 36.6% (Zionist Christian 11.1%, Pentecostal/Charismatic 8.2%, Methodist 6.8%, Dutch Reformed 6.7%, Anglican 3.8%), Catholic 7.1%, Muslim 1.5%, other Christian religions 36% (2001 census). Internet users: 4.42 million (2009)

**Language** Official languages include: IsiZulu 23.82%, IsiXhosa 17.64%, Afrikaans 13.35%, Sepedi 9.39%, English 8.2%, Setswana 8.2%, Sesotho 7.93%, Xitsonga 4.44%, siSwati 2.66%, Tshivenda 2.28%, and isiNdebele 1.59% (2001 census)

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A diver carefully enters the admirals quarters on the *Mars*. In this space the most vicious and desperate fight occurred while surrounded by raging flames from the incinerating fires

# Mars the Magnificent

16th Century Swedish Warship

Text by Veronica Palm, Project Leader, Västerviks Museum  
Translation by Millis Keegan  
Photos by Carl Douglas, Ingemar Lundgren, Richard Lundgren, Thomasz Stachura, Mattias Vendlegård

**The Swedish warship *Mars*, otherwise known as *Makalös* (peerless), sank in a sea battle during the Northern Seven Years War in 1564. For many years, there were attempts to find the vessel in order to salvage the wreckage, but none were successful. Then, in the summer of 2011, the Västervik-based dive team, Ocean Discovery, located a large wreck at a depth of 75 meters just east of Öland. This wreck was eventually identified as the *Mars*. The discovery made headlines in the national and international press and generated great interest in the scientific community.**

The discovery of *Mars* has not only lifted the city of Västervik to prominence as the base of an internationally reknown dive team but has also contributed a very exciting and important part to the history of the region—a history that the state is now in a position to

research and highlight. During the 16th and 17th centuries, Västervik had one of the most significant naval and commercial ship-

yards in which many of the great ships of the era were built and launched. With so much focus and attention now on *Mars*—one

of the greatest archaeological finds from this period—there is also the opportunity to highlight the region's historical importance

as seen from both a local and national perspective.

Västervik Museum has been entrusted with developing an

exhibition project on *Mars*, acting as the principal arena for mediation of new research findings that emerge in connection with



THOMASZ STACHURA







MATTIAS VENDLEGÅRD

Diver measures the end of one of over 120 cannons on board *Mars*

Battle of Öland in 1564; Two of over 220,000 silver coins found on *Mars* (lower right)

from the *Mars*: two bronze cannons, a gun carriage and timbers from the wreck itself, a large number of photographs, a unique photo mosaic of the wreck site and a 30-minute long film about the wreck and the surveys. In the exhibition, the *Mars* is presented together with previously known and excavated wrecks from the same era found in the Baltic Sea, such as the merchant ship *Ringaren* (1530) which sank just north of Västervik and the warships *Kraveln* (1525) and *Elefanten* (1563).

The research provides new insight into the formative period of Sweden's history as a nation-state. They also shed further light on the way this process played out and in

upper classes from different parts of Sweden. Most of the crew were drafted sailors from all over the kingdom. Several of them came from Västervik.

The Nordic war of 1563 erupted between Sweden and an alliance of Denmark, Lübeck and Poland during the years 1563-1570. Several conflicts took place at sea, but there were also battles held inland and also in Västervik where evidence still can be found of the destruction wrought by Danish forces. On 30 May 1564, the Swedes led a naval attack with *Mars* under the leadership of Admiral Jacob Bagge. They clashed with the Danish-Lübeck fleet off the northern tip of Öland, a battle which ended with the defeat of Sweden and the ship's destruc-

tion. To the depths the *Mars* sank, with more than 700 crewmen and several hundred Danes.

Current knowledge of the 1500s is limited. *Mars* will therefore—in addition to providing facts about the warship, its design and assembly—also make a major contribution to the research of 16th century Sweden. The ongoing find-

doing so, reveal not only the ship's principal role in European state building, but more generally as both manifestation and agent of social change. The condition of the wrecks also emphasize their violent demise and the chaotic environment on board during the battles.

## History

*Mars* was built at Björkenäs shipyard, north of Kalmar, and launched in 1563. She was a ship of the era, with a displacement figure estimated at 1,800 tonnes, almost 600 tons more than the warship *Vasa*. *Mars* was about 50 meters long and about 13 meters wide, equipped with at least 120 cannons of various types. The ship had a crew of nearly 700 men on board and included representatives of both the lower and



Mars

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ings will gradually document how the crew, officers and senior management of the ship lived on board, and what tools, equipment and personal effects they used. It was also during this time period that guns and other weapons were being developed using iron and bronze. On *Mars* and the wreck site, old and new weapons technology can be found. To date, it is the largest source of knowledge on guns used in the 1500s, as there are only a handful available on land today.

The discovery of the *Mars* wreck has brought to the fore not only research on the wreck itself, life onboard and the crew, but also the naval art of the period and its history—something that is particularly important for Västervik, which has historically been a major shipbuild-

Most of the cannons were cast in bronze, which, at the time, was a very precious metal

the *Mars* project over the coming years. Efforts to produce films, exhibitions and publications on *Mars* and its contemporaries have begun. Through generous contributions from Sparbanksstiftelsen Tjust district and Västervik, as well as the efforts of scientists from the MARIS maritime archaeology research institute at Södertörn University and the Swedish National Defence College, several divers and maritime companies, and the Swedish Maritime Museum, the first exhibition project was implemented in 2012.

The research team has only begun uncovering the true facts about the *Mars*. The first archaeological surveys on the wreck site were carried out in 2012 and 2013, and the results are now on display at Västerviks Museum. Here you can see the first salvaged items







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Cannon still sits in its carriage. To the right are rolls of lead, stacked. The lead was used for hull repairs but also for casting ammunition for muskets and small caliber cannons; Diver exits the admirals quarters on *Mars* (top)



Mars

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On *Mars*' starboard side, the hull lists towards the seabed. Cannons still point out through their portholes; Cannon ball (below) made of stone most likely used in back-loaded iron cannons

received substantial orders for repairs and rigging of ships.

## Vision

The Central Baltic region has a vast and yet relatively unexplored heritage. MARIS, the centre for maritime archeological research at Södertörn University in Sweden, has recently started a major research project called *Ships at War: An Archaeological and Historical Study of Early-Modern Maritime Battlefields in the Baltic*, which includes the warship *Mars*, Baltic maritime heritage in general, and

the emergence of the Swedish naval fleet.

The research presented in this project will need to be disseminated through various channels to researchers, students and professionals and to schools and the general public. Västervik is a convenient central location to build the field competencies for this research through collaboration with MARIS. The city can thus become a center for maritime archeology in the central Baltic Sea area, providing research vessels, technical divers and adequate facilities to impart knowl-

edge and research findings to the general public and to schools.

A platform for major activities in the future can be established by having different partners and institutions come together to develop the themes of the research projects, which over the years have been important elements in Västervik Museum's historical mission and the Västervik region's local history.

Findings can be channelled through a modern visual museum of marine archeology and maritime



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ing and seafaring town. The reconstruction of the city in the 1540s was primarily due to the establishment of the shipyard and dry dock on Slottsholmen by Gustav Vasa [the King of Sweden from 1523 to 1560 –ed.]. It was in this shipyard that most of the fleet he created was built. But it was under King Erik XIV (1560- 1568) that the city established itself as one of the leading naval yards in the Kingdom of Sweden. In the 1560s, three of the Swedish Navy's largest ships were built at Västervik shipyard—the *St. Christopher*, *Tantheijen* and *Mars*' successor, *Neptune* (later named the *Red Dragon*).

The building trend continued into the 1570s when the Swedish Navy launched its biggest project yet—*Smalands Lion*, at 1,100 tons. According to the ship lists, a variety of vessels were completed over the following decades in Västervik, which during the early 1600s was one of two sites for the building of large ships in the Kingdom of Sweden. The shipyard also







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Revolutionary mosaic of *Mars* (left) built from 640 individual photos; Various vessels (above) were used on the project, all with different objectives and capacities; One of the mid-size cannons (lower left) being recovered using the A-frame apparatus of the RS *Triad*



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history publications. This may then increase visibility for the Västervik region resulting in the growth of employment in the city of Västervik and the surrounding community.

The development of exhibitions on 16th and 17th century Swedish maritime history is creating something that is lacking in the country today. Västervik Museum will partner with other museums in the country that specialize in maritime history, such as the Vasa Museum and the Maritime Museum in Stockholm, the Kalmar County Museum and the Naval Museum in Karlskrona.

### The project

The exhibition—*Mars the Magnificent: Maritime History During the 16th Century*—is an ongoing project that will evolve during the years, conveying

knowledge about *Mars*, its present and future research, as well as Västervik shipyard and 17th century Sweden from a maritime perspective. The exhibition project will highlight the national importance of the *Mars* discovery as its base and widen out to both the Baltic perspective and the region's history.

The 2012 exhibition focused on *Mars* with themes about the ship—the battle, the wreck, and the find. Based on current research, the 2012 exhibition told the story of the ship, the Nordic Seven Years War and the Battle of the northern tip of Öland, as well as the story of the *Mars* wreck, its sensational discovery and important source of knowledge it represents. The exhibition was comprised of text and image banners, underwater films and slides. It was illustrated with finds salvaged from

the wreck site and shipping details from structurally similar wrecks of the same era.

Produced exclusively for this exhibition was also a hefty 20-minute-long documentary that was presented in a newly built showroom. The exhibition project had its own unique logo and was inaugurated on 8 July 2012.

In 2013 the exhibition was expanded and moved from the small showroom to the museum's main exhibition hall covering about 400 square meters, supplemented with the additional items and wrecks from the same period. The aforementioned themes surrounding the warship *Mars* will remain but will be updated as new findings emerge.

At the time of the 2012 exhibition, the archaeological documentation of *Mars*' hull had just begun. During the summers of 2012 and 2013, new dives were conducted documenting the wreck further through underwater

footage, photographs and measurements. Meanwhile, archival research continued.

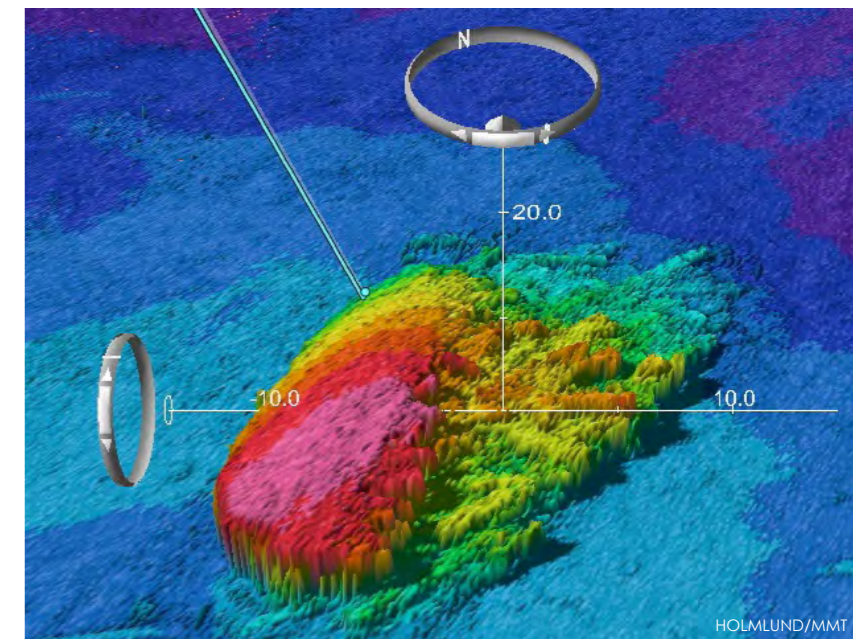
The potential source of knowledge from the *Mars* wreck is immense, and in time, we will learn more about the sinking of the ship and what life was like on board a large warship in the 1500s.

### The *Mars* wreck site

The wreck site is vast and complex, extending up to 500 meters beyond the hull itself. Cannon balls, pieces of rope and masts as well as personal artifacts and skeletal remains reveal the brutality of the events sur-

rounding the sinking of the *Mars*. The wreck is in good condition, and both sides of the ship are almost completely intact. In many places, the cannons are still visible in their gun ports.

The documentation of the wreck is complex due to its depth at 75m and requires great exper-



HOLMLUND/MMT

Multi-beam sonar image of the *Mars* wreck site





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Cannons were documented and measured, providing important data for artillery expert and scientist Ingvar Sjöblom; Professor Johan Rönnby and project leader Richard Lundgren check detailed computer analysis of recovered coins (below)

tise and technical skill in diving. In order to document the wreck, divers are employing a new and revolutionary technology. Among other things, they devised a new method for documenting the site with digital photography, from which 3D projections of various

kinds can be developed, thanks to high resolution images.

Divers from different teams and Ocean Discovery have already logged hundreds of hours underwater in order to photograph the wreck site. Over 600 still images have been merged into a single summary screen where one can see the wreck site in its entirety. This mosaic is unique and is one of the central pieces in the exhibition, printed on 10x5m large canvas. Västervik Museum is the first to demonstrate this

unique mosaic technique in an exhibition.

Each dive also generated a large photo and video. Two documentary films have been produced and are presented in the showroom. Parts of the extensive photo documentation are shown on screens and iPads in the exhibition hall, alongside underwater film and ROV-footage. The material will be updated as the documentation of the wreck is completed and additional findings come to light, made by the two collaborating dive groups working on the site. Västervik Museum will also present some of the research findings from the MARIS project.

This year we can also display artifacts salvaged from the ship, which were not at all part of this year's plan at the beginning, but have now presented viewers a great opportunity. In 2012, three



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silver coins dated to 1562 were salvaged from *Mars*, which after scanning can now be exhibited in the security booth for public viewing. The coins are unique, and there are only a few like them in the world. In addition, objects such as salvaged ship parts and two cannons will be on display in a specially built pool inside the 400-square-meter exhibition hall. This display will be complemented by objects from wrecks of the same era as well as salvaged wreckage from, for example, structurally similar vessels.



CARL DOUGLAS

Included in the exhibition on *Mars* and the Baltic area's marine history and underwater world is a newly built and extended portion of the merchant vessel *Ringaren*. *Ringaren* sank north of Västervik in the 1550s and was investigated archaeologically in the 1970s through a project led by Tjustbygdens cultural association. Today it is represented by a model and salvaged items in a small exhibition in the museum's maritime hall. Last but not least, the city of Västervik, the Västervik shipyard and local history have been researched and featured in

the 2013 exhibition.

In conjunction with the exhibition, several lectures are presented by divers and leading researchers in marine archeology and maritime history, which will be further developed in the coming years to include a conference on marine archaeology. The exhibition will be a great asset in the museum's efforts to bring Swedish history to life, especially for children and young people, and further its investment in educational experiences, particularly for schoolchildren in the Västervik community.

## The future

For the third year of the project, there are already several concepts developing



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beyond the completion of data collection and images. These include a model of the warship *Mars* at a scale of 1:10; a 3D studio where one can view the wreckage from different angles on a big screen or explore it on one's own via an iPad; a new film about the wreck and other archaeological objects in the Baltic Sea; displays of preserved artefacts salvaged from the wreckage; a display of a salvaged cannon and its preservation process; and finally, a ready, developed teacher lesson plan program that can

be applied and used in conjunction with the 2014 exhibition.

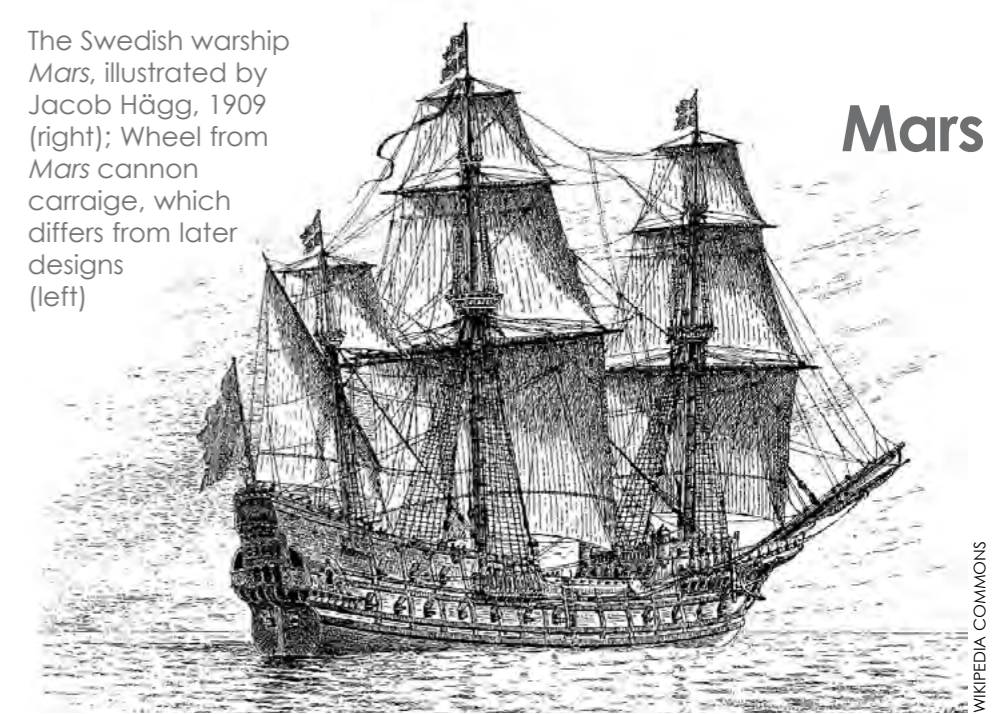
By using new digital visualization techniques to create 360-degree views, the visitor will be able to have an interactive experience of the wreck and get an idea of what it's like to be there. In this method, still photographs are taken in a circular sequence and then processed, or "sewn together", by computer so that



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Cannons onboard *Mars* were all individually cast. They were all uniquely ornamented. The handles, or dolphins, all have different motifs, in this case a sea monster; Professor Johan Rönby (left) inspects silver coins recovered by Jarrod Jablonski, Fredrik Skogh, Liam Allen and Richard Lundgren; Cooking pot illustrates life onboard (top left)

The Swedish warship *Mars*, illustrated by Jacob Hägg, 1909 (right); Wheel from *Mars* cannon carriage, which differs from later designs (left)



Mars

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a visitor using an iPad as a controller can turn full circle within the 360-degree panorama. Spectators will also see the image projected on a big screen TV. Objects in the panorama can also be made clickable so the visitor can get more information in the form of text or video.

This technology already exists, and the exhibition of the *Erik Nordevall* wreck in Vättern has a demonstration of the technology. Dialog with the Visualization Centre in Norrköping has already started regarding the development of digital visualization of the *Mars* wreck for the 2014 exhibition. The center is a leader in visualization technology in Northern Europe. Through the collaboration, we can recreate the warship *Mars* as it once appeared and present the ship and the battle in spectacular fashion via 3D technology viewed in a spherical room, for instance, in future exhibitions.

In addition to a model of the warship *Mars*, the future exhibition plan also includes a built-up section of the *Mars* gun deck and admirals salon at 1:1 scale. There will be cannons placed here, and visitors can check out the gun ports where a naval battle will be projected on a large screen using realistic computer graphics. With added sound and smoke effects, it could prove to be a powerful experience, all based on the findings and objects recovered in dives on the incomparable *Mars*. ■







# Richard Lundgren

## *The Man from Mars*

Text by Michael Menduno  
Photos by Ingemar Lundgren

**You could say that Richard Lundgren's destiny was cast when his parents took the precocious, then eight-year-old Swedish schoolboy to visit the Vasa Museum in Stockholm. The young Lundgren walked the oak decks of the 69m (226ft) long, 17th century Swedish warship *Vasa*, which has been painstakingly reconstructed following its salvage in 1961. Enthralled by the experience, Lundgren vowed that one day he would find Sweden's most famous shipwreck—*Mars the Magnificent*—King Erik XIV's warship that was lost in battle in 1564 in the Southeast Baltic Sea.**

True to his word, and remarkably, more than 30 years later Lundgren and his team from Ocean Discovery, Lundgren's not-for-profit organization, discovered the shipwreck in May 2011, 447 years to the month from its sinking. It may prove to be one of the most significant maritime discoveries in history. Equally remarkable: though finding the *Mars* surely represents a career pinnacle, 44-year-old Lundgren and company have discovered more than 120

shipwrecks in the Baltic Sea since the late 90's, arguably making him one of the most prolific shipwreck explorers of our times.

Lundgren began his diving career working as a commercial diver for his father in 1986 at age 16, less than a decade after first surveying the *Vasa*. He later joined the Swedish military. Then in 1995, Lundgren took the plunge as the emerging technical diving revolution swept Europe and founded the first Scandinavian tech diving group, Baltic Sea Divers. That was the year he began his search for the *Mars* in earnest. Two years later he joined the Woodville Karst Plains Project (WKPP), in North Florida, which in addition to world-class cave exploration served to develop and refine training, equipment and operational standards during the early days of tech diving.

In 1997, Lundgren was a project leader and cameraman in one of the early expeditions to the HMHS *Britannic* and again in 1999. His video was later aired on National Geographic, the BBC, The History and Discovery channels. He also worked on the BBC series, *Journey To The Bottom of Sea*, where he filmed Britain's M1 Experimental Submarine in the English Channel, and in 2000, led a search to locate Spanish gold galleons in the Florida Keys using side-scan sonar. All the while, Lundgren and his team kept finding shipwrecks in the frigid dark waters of the southeastern Baltic Sea. Did I mention that LUNDGREN FOUND THE MARS?

In 2012, the intrepid explorer was inducted into the prestigious Explorers Club for his achievements,

and was awarded EUROTEK's most coveted "Diver of the Year" at their traditional gala dinner. A beaming, tuxedoed Lundgren took the stage, thanked the audience, and then thanked and gave the credit to his team.

Lundgren is a founding member of the Global Underwater Explorers (GUE) and was one of its first instructors. In addition to his active teaching practice, he currently serves on GUE's advisory council and is their point man for their closed circuit rebreather program, which is under development. The tall muscular blond is also funny, gracious and one of the most amicable people that you could meet.

Recently, I caught up with Lundgren during one of his frequent trips to Florida and asked him about life on *Mars*.

*MM: Now that you and your team have found the Mars, do you have an ongoing role in its study and excavation?*

RL: Yes, I share the role as project leader together with Professor Johan Ronnby. We are heavily involved in the research and scientific efforts together with MARIS, the research arm of the Sodertorn University in Stockholm supported by the National Defense College.

*MM: What are the next steps for the project?*

RL: In 2014, *Mars* will represent the largest marine archeological project in the world, with more than 60 participants, including more than ten

Richard Lundgren





Lundgren pre-breathing his rebreather before a dive (left) and preparing for a video shoot with Red Epic camera (below)

eration between my company Ocean Discovery and MARIS.

*MM: Last time we talked, you mentioned the possibility of doing a Mars documentary. Is that still in the works?*

RL: The first documentary movie will air in 2015. Reenactments will be shot this year and more underwater video. The giant screen 3D production is in the works together with a prominent U.S. production company.

*MM: Has the discovery made a splash at home in Sweden?*

RL: Yes, the first museum exhibition has opened in Vastervik with great success, and work is underway on a Mars-themed amusement park and much, much more.

*MM: Are there any take away lessons that you have drawn from the Mars project?*

from the Mars project?

RL: That cooperation is the key to success and that nothing is impossible!

*MM: Are you planning any new exploration projects?*

RL: One of the most important projects we are planning this year is linked to the Mars project. On the first day of the naval battle in 1564, Mars sank one of the opposing armadas admiral's ship. This was probably the first time in history a warship actually sank another using artillery alone. Even though this casualty of war is probably smaller than Mars, it would still add to our knowledge of what actual occurred during the battle if we can find it. Since the ship didn't burn and explode, the wreck may actually be found in near perfect condition on the seabed.

GUE is also planning several exploratory projects during the year in the Bahamas, Azores and in the Mediterranean. 2014 will be the year of global exploration for us.

*MM: What would you say are the biggest challenges in being an explorer?*

RL: Finding time to prepare and participate in all the fantastic opportunities that present themselves and to make the most of them. I'm, for one, not interested in just diving a target; I always want to know more!



*MM: I see from Facebook that you are spending a lot of time in Florida. What else are you doing these days?*

RL: Yes, I created a closed circuit rebreather (CCR) class for Global Underwater Explorers that we are beta testing. The class is based on five years of testing and getting input from many other users and manufacturers. GUE has not yet made the

## Lundgren

decision to go with CCR, but we are well prepared if we do.

*MM: How many GUE members have been through the training?*

RL: So far the entire training counsel and many senior instructors have been through the program in addition to some GUE divers. To date close to 50 people have been through the program.

*MM: Have you gotten any insights or lessons re: CCR safety as a result?*

RL: We have, so far, been pleasantly surprised about how well the units tested performed. There have actually been very few glitches. I have found that some individuals work better with complex technologies than others. Everyone can learn, but for some, it's easier. This has been a challenge we've worked to overcome in designing the classes.

It's hard to say too much about the safety of the units. Most of the incidents we've seen find their roots in poor practices and user errors. The GUE system is particularly good at addressing these types of issues, so we hope to help future rebreather divers become more safe.

*MM: Are rebreathers the future for deep (tech) diving?*

RL: Rebreathers will definitely play a vital role in the future of tech diving and exploration!

*MM: I hear that you are on a diet and working out like crazy. What's going on with that?*

RL: It's my secret diet. I eat less and work out more! [Lundgren chuckles]

Actually, it's pretty basic. I've stopped eating foods that aren't healthy, reduced my intake and started doing daily two-hour workouts. This year will be challenging for me, and I'm preparing for it! ■

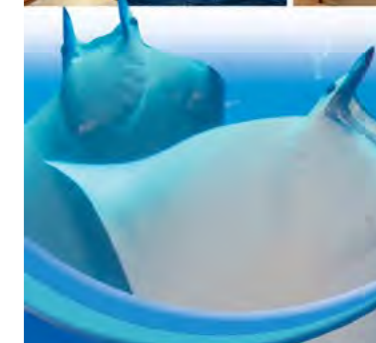


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Crab trapped  
in purse seine  
ghost net

# Ghost Fishing

*Can we prevent it?*

Text by Heather Hamza  
Photos by Tom Boyd, Shingo Ishida

There are certain images of marine life that consistently conjure up a predicted response from the general public, whether they are scuba divers or not. Consider the bloody waters resulting from the dolphin slaughter at Taiji, Japan. Picture a massive whale, having just breached, with a high-powered harpoon impaled in his or her body. Imagine hundreds of dead sharks lined up with their dorsal fins sliced off. These stories and images typically elicit anger, rage, devastation, sadness, and/or feelings of powerlessness. Now, what if I told you that there are additional human-induced atrocities against these creatures, happening all over the world, every single day? These everyday events not only affect marine mammals and elasmobranchs (sharks, rays), but also turtles, sea birds, fish, crustaceans, and benthic (bottom-dwelling) marine life.

These common, daily occurrences are a direct result of the commercial fishing industry and actually pose a greater threat to our oceans than the aforemen-

tioned "sensationalized" activities.

As a side note, many people justify their seafood consumption by saying that they catch it themselves. Interestingly, the combined efforts of "anglers" are just as devastating as commercial fishermen

warranting an entire chapter on recreational fishing in *The Empty Ocean* by Richard Ellis.

Commercial fishing—whether it is gill netting, trawling, purse seining, or long-lining—inevitably results in varying

degrees of "non-target" catches, or "by-catch" amounting to anywhere from 60 to 90 percent of the total catch. Every year there are easily billions of these unintended catches, considered to be of no commercial value, causing incalculable

and very likely irreparable damage to fragile aquatic ecosystems.

The other devastating secondary effect of commercial fishing is the issue of ghost nets, which will be the focus of this article.



TOM BOYD







TOM BOYD

Newly lost nets on the *African Queen* wreck near Long Beach, California (left); Rescuing a trapped crab (below)

## Ghost Fishing

that the world will ever cease to consume seafood; therefore it is reasonable to assume that there will always be some degree of ghost gear.

Ghost Fishing, the organization,

was founded in the Netherlands by Pascal van Erp and Cas Renooij, two Global Underwater Explorers (GUE) technical divers. They dive mostly in the North Sea, spending a lot of time cleaning up



TOM BOYD



SHINGO ISHIDA

### The problem

*Ghost fishing* is a term used to describe what occurs with abandoned or lost commercial fishing gear that inevitably continues to fish.

Ghost fishing first gained global recognition in 1985 at the 16th session of the Food and Agriculture Organization (FAO) Committee on fisheries. Across the scientific literature, ghost fishing is universally recognized as detrimental to the environment and the fish stocks. When commercial fishing gear

is lost or abandoned, it will continue to fish for months, years, perhaps even indefinitely. This is due to the sturdy, non-biodegradable materials that fishing nets and pots are typically made of.

The true extent of the ghost fishing problem cannot ever be quantified, due to lost gear that is never retrieved, therefore becoming lost data. There are also ghost nets well beyond scuba diving depths.

Despite lost data, there are still plenty of numbers to work

with. The effects of ghost fishing stem from two resources: reports from deliberate clean-up efforts and from controlled studies. In both instances, numbers and species of animals killed or trapped are recorded. With deliberate cleanups, tonnage and type of gear are tracked. On a somewhat happier note, an Australian publication lists the numbers of sea turtles rescued from recovered ghost nets.

Over the last few years, our dedicated volunteers in

Southern California have been responsible for cleaning up thousands of pounds of ghost nets, and saving innumerable lives. While this may seem impressive, it would actually be far more impressive if we did not have to conduct such activities in the first place.

### The solution

The origin of abandoned or lost commercial fishing gear stems from the incessant demand for seafood. It is highly unrealistic to believe

Karim Hamza and Nir Maimon on *Infidel* wreck—an ongoing project off Catalina Island, California





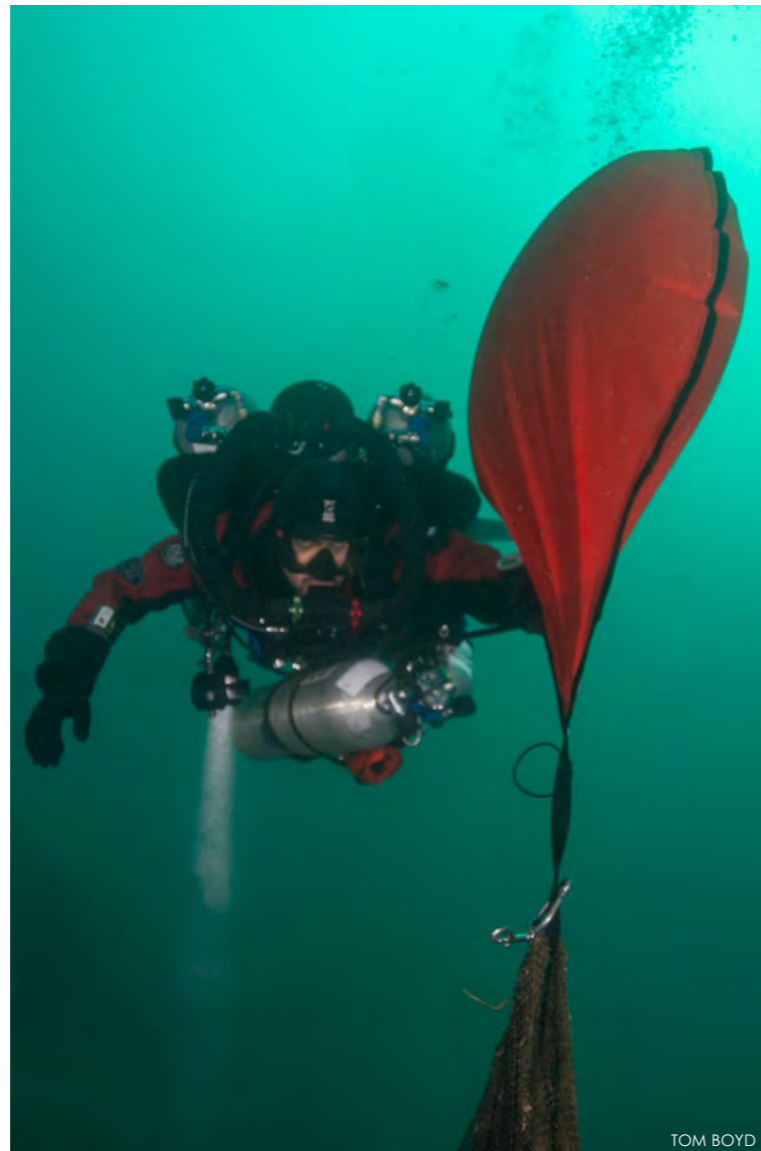


SHINGO ISHIDA

ghost nets. Ghost Fishing now has projects in 14 countries, all using GUE trained divers.

There are many groups that interact to make the work possible. For starters, we have Star Sock and Aquafil; together they founded Healthy Seas ([www.healthyseas.org](http://www.healthyseas.org)). Healthy Seas' main objective is to turn ocean waste, namely ghost nets, into sustainable products such as socks, bathing suits, carpets. Partners of Healthy Seas include Ghost Fishing and Los Angeles Underwater Explorers (LAUE).

Ghost Fishing gets worldwide support from GUE divers working in their respective areas. In Southern California, that includes LAUE and San Diego Underwater Explorers (SDUE). We are fortunate to have such an impressive pool of volunteers. Each and every one has played an integral role in the work that we do, whether it is their diving qualifications, seamanship, journalism, or photography and videography skills. It is critical to mention that ghost



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Karim Hamza working on Radio Tower, San Pedro, California



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net removal is incredibly hazardous work, and we do not endorse such projects without having had proper training.

Unfortunately there is no shortage of work for us to do. We have several dive sites (usually shipwrecks or other sunken structures) in recreational and technical depths that have ghost nets. Since we are a very active group of divers, we are intimately familiar with numerous sites and are privy to updates on a regular basis (such as, a newly discarded net) through word of mouth in

the diving community.

A ghost net removal project begins with a reconnaissance dive. We must ascertain depth, type of net, condition of the net, and draw a basic sketch of the structure along with video and/or photos. All of this information will be used in the dive briefing for the actual cleanup.

In Southern California, we usually organize a cleanup dive once a month. We are now recycling our recovered ghost nets through Aquafil/Healthy Seas.

### Can we prevent this?

Since it is highly unlikely that the world will stop consuming seafood, we must work harm reduction into the equation. This would require

Karim Hamza working on the *Infidel* (far left) off Catalina Island, California; Author Heather Hamza working on *African Queen* near Long Beach, California (left)

## Ghost Fishing

a collaborative relationship with commercial fishermen so that we can understand where the nets are coming from and why they are being lost. Furthermore, initiating a connection with policy makers is critical so that the mandatory early reporting of lost gear

can be established, which has already been implemented in Washington State and has been largely successful.

Our own personal experience has shown us that the sooner we can get to these ghost nets, the easier they are to clean up. Additionally, the



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Decomposing sea lion who died in this net. Based on the shape of the skull, it can be identified as a female





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Topside volunteers working hard to pull the nets on board (above); followed by a thorough search for trapped sea creatures (right)

sooner we can get to these nets, the less time they have to keep trapping and killing marine life.

While "top down" tactics are more likely to be effective at generating change, a "bottom up" approach should not be overlooked. This includes education and promoting awareness in school-age children. We have already had children come on the boat with us, and they love the work that we are doing. They genuinely enjoy participating, such as helping to manage the nets and rescuing trapped creatures. Our presentations at schools and Boy Scout meetings have also been well received. The children are enamored with our scuba gear and the other "show and tell" items that we provide (lift bags, scraps of nets, etc).

At the time of this writing, there has been a government grant submitted in order to obtain desperately needed funding for the work we are doing. In California there are currently no laws to protect the ocean from ghost fishing, nor do we have mandatory reporting of lost fishing gear.

As mentioned earlier, the problem of ghost fishing stems from the demand for seafood. One way to counter this is to eat a plant-based diet. There are actually no nutrients in seafood that one cannot obtain from plant-based foods. As a vegan for over five



TOM BOYD

years, I practice what I preach!

For more information, please visit: [www.ghostfishing.org](http://www.ghostfishing.org) or [www.facebook.com/ghostfishing](https://www.facebook.com/ghostfishing). ■

*Heather Hamza is a technical wreck and cave diver based in Los Angeles, California, USA. She began cleaning up ghost nets in 2010 and soon after started recruiting teams and organizing cleanup trips.*

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**DIVE &  
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# Gary Gentile

—Deep Wreck Diver

Text by Michael Mendunno  
Photos courtesy of Michael Mendunno and Gary Gentile

**Gary Gentile not only helped pioneer deep wreck diving, but also documented its art and craft, in addition to his finds so that others may follow in his footsteps. They are big shoes, err, fins to follow. The 66-year explorer and author has made over 2,000 decompression dives including more than 200 dives on the *Andrea Doria*, and has published 58 books—38 on diving including his best sellers, *The Technical Diving Handbook*, *Shadow Divers Exposed*, and *Shipwreck Dive Guide* series, along with 17 science fiction novels. He has also published more than 3,000 photographs. The man is truly prolific!**

*His latest book, NOAA's Ark: the Rise of the Fourth Reich, which was released in May 2013, details the National Oceanic and Atmospheric Administrations efforts to expand and restrict access to divers and sportsman to the U.S. National Marine Sanctuaries. It's a battle that Gentile's been fighting for nearly three decades since his successful six-year battle with the federal Government to dive the USS Monitor back in the early 90's. Here is this 1991 interview reprinted in its original form from aquaCORPS N3 DEEP, Gentile who now resides in Jim Thorpe,*

*Pennsylvania, explains the early development of deep wreck diving and the impact that the advent of mixed gas technology was having on the community. You can find his writings and photographs at [www.ggentile.com](http://www.ggentile.com). (—ed.)*

"Deep diving is a matter of mind, not physique." Gary Gentile should know. As one of the pioneers of deep wreck diving, Gentile, a 20-year veteran, has logged over 1,000 decompression dives—70 on the *Andrea Doria* alone—and spends six months out of every year diving wrecks from the eastern seaboard to the Great Lakes in the United States.

When he's not diving, Gentile, 44, father of one, is busy at the library researching lost ships, giving lectures, or writing. With 16 titles under his belt, including seven science-fiction novels and two new shipwreck guides on the way, Gentile's writing is as prolific as his 200-foot plus working dives. One of his books, *Advanced Wreck Diving Guide*, which covers everything from decompression techniques to artifact recovery, has become almost a bible in serious

wreck diving circles.

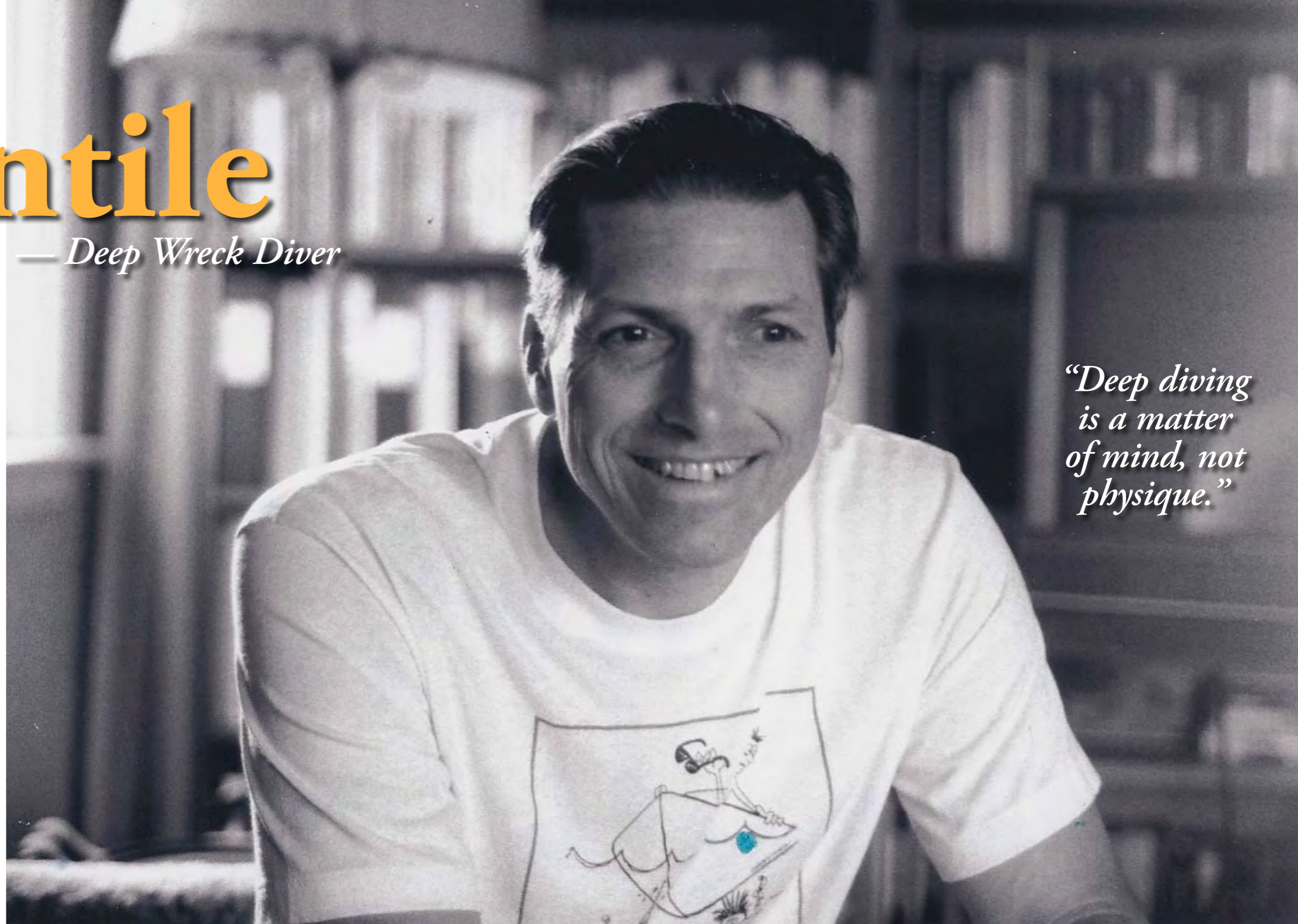
Long regarded as one of the crazies, Gentile began his deep diving career back in the early 70's, and was regularly making hour hangs before recreational divers could even pronounce the "D-word." Since helping put together his first charter to the *Doria* in 1974, he's had a lonely sojourn waiting for the rest of the industry to catch up. Perhaps it finally has.

Like the old adage, "You can always

tell a pioneer from the arrows in his back," Gentile's depth is easily recognizable. With a well-worn pair of Beuchat Pros strapped to his console, double over-pumped Gen 100s, a Luxfer Slim 30 pony, a 300-foot decompression reel, and a rust-covered BC that's seen its share of flooded corridors, Gentile is as comfortable shooting turrets alone at 250 feet as he is explaining, in methodical detail, the history and stature of a ship he's planning to dive.

Quiet and self-directed, with a tendency to keep to himself, Gentile gained notoriety through his protracted six-year battle with the federal government to dive the USS *Monitor*, a civil war ironclad, 16 miles off the coast of Cape Hatteras, North Carolina, which was declared a National Marine Sanctuary in 1975. Recounts Gentile, "It's what I call bureaucratic territoriality. The people at NOAA who are working in the Marine Sanctuary Program feel they own the wreck. They

*"Deep diving is a matter of mind, not physique."*







local people—the people in dive clubs—looked at me as a madman. I've gotten back on the boat many times only to have people say to me, "What were you doing down there? Why were you just hanging on the anchor line?"

People didn't know anything about decompression dives. And those who did didn't approve because I was doing long decompressions. It wasn't that I liked decompression diving; it was that I wanted more bottom time. I was willing to sacrifice for it.

*How did you get trained in decompression?*

I had the good fortune of falling in with a small group of divers who were doing deep decompression dives. At the time, deep was considered 160, 170 feet. That was the group I first dove the *Doria* with back in '74, and we took a lot of flak for it. People looked at us as crazies because we were doing dives no one else would do.

That's how I picked up most of my early experience in the water—the things I wasn't taught in courses. I studied their

techniques and developed my own, just like everybody else does. Wreck diving tends to be an evolving sport; everybody who gets into it looks at what other people are doing and adds his own little improvements. I got into that as well. I was really fortunate to get in with a group of expert divers.

*Would you say that deep wreck diving as practiced today is fairly safe?*

Absolutely. It's much safer than it was. Of course, it all depends on your level of expertise. The people that are serious about diving deep wrecks and doing decompression are as comfortable with what they're doing—probably more comfortable—than the common tourist reef diver who dives to 25 feet, but only goes to Florida or the Caribbean once a year, and is out of shape.

*How many serious wreck divers are there?*

I'm finding, as I travel more, that there are many thousands. For example, when I first traveled to the Great Lakes a couple of years ago, I discovered a whole new group of wreck divers I had never known existed. I was astonished at how many good deep wreck divers

were there. And that's just one area. The same is true all around the country.

*Communication has been a problem, then?*

A real problem. Most wreck divers are just doing their own thing. They're not seeking publicity; they're not in it for an ego trip (some are, of course, but most aren't). So, there's not a lot of publicity about it.

*Would you say it's a competitive field, people looking at what others are doing and wanting to be the "first" or wanting to be acknowledged? That's certainly the case in the cave diving community.*

It's funny, when I first got into diving, I thought it was the greatest sport in the world because everyone was working with everyone else, and everyone was trying to see that everybody had a good safe dive—no competition. I very quickly found out that wasn't true.

There were people who wanted to be the first to discover a wreck, or the first to collect an artifact. Artifacts have ruined more friendships than anything I know.

don't want private sector encroachment. They look upon it as their wreck, and they view me—the public—as a trespasser."

But the *Monitor* battle was more than a struggle for the diving public's right of access; it became a struggle for the recognition of technical diving as well. NOAA refused the 11 permit applications filed by Gentile and others on the grounds that diving the wreck, which lies in 220 feet of water, was too dangerous using ordinary scuba, placing it beyond the limits of sport diving.

Gentile's court victory earlier this year and long-awaited permit to dive the *Monitor* was a professional and personal vindication. The verdict? NOAA's standards were deemed antiquated and failed to account for advances in diving technology and techniques. Furthermore, the court found that Gentile and his colleagues were wrongly and improperly classified as recreational divers.

Interestingly enough, Gentile's July victory dives on the *Monitor* were conducted as practice runs for a deep dive on the *Ostfriesland*, a German battleship lying in 380 feet of water, which he and his diving partner, Ken Clayton, successfully conducted on mix a month later.

His motivation? "It's about freedom," explains Gentile, "a battle I've been fighting all my life. There will always be people who'll tell you, 'You shouldn't be doing this. It's dangerous. It can't be done.' That's their problem. I just want to live my life the way I want to and for me, that's what these dives are all about."

*aquaCORPS: Gary, you've been on the cutting edge of wreck diving for 20 years and you were one of the first people to dive the Andrea Doria back in 1974. Did you take a lot of heat for your diving back then?*

Gary Gentile: My entire diving career, the







On the other hand, a certain amount of competition is probably good. It means people are interested in exploration and are willing to go out and do something—take action. That helps advance the sport.

*It's my impression that the cave diving community is generally better organized than the wreck diving community, and, I would guess, has a much better safety record. Is this true?*

If that's true, I think it's mostly because of better communication among cave divers than among wreck divers—communication of techniques. And that means safety efforts would naturally evolve faster.

But there may be another factor involved in the safety issue. By and large, wreck

diving tends to be done in an uncontrolled environment. There are a lot of factors that can compromise safety. Storms can kick up very quickly at sea when divers are in the water; currents can come in when divers are decompressing. A lot of things can go wrong. It's the changeable conditions that wreck diving necessarily encounters—being out there in the ocean or on a boat—that compromises safety. There are a lot of injuries just on the boat—getting on, getting off—that kind of stuff. All in all, I think it's probably true that the safety record among cave divers is better. But it doesn't have so much to do with the diving as it does with the conditions under

which the diving is conducted.

*What are the skills and expertise required to be a serious wreck diver?*

Number one is awareness. There are a lot of potential hazards in wreck diving that can be created simply by being unaware of them. For example, entanglement in monofilament—fishing nets—is a very serious problem for wreck divers.

After awareness, I would say it comes down to experience. When you talk real wreck diving, you're talking about a combination of penetration, deep diving, and decompression diving. Put all three together and you've got quite a package.

You have to be an expert at decompression diving. And you've got to have the proper equipment for each one of those disciplines, including emergency back-ups, like decompression reels and ponies.

Equipment is important. That's something you learn only through experience. Get out there and do it; find out what equipment is necessary for decompression when an anchor line breaks loose, for example. You can't stage bottles like you can in a cave, so you've got a problem there if you want to set up a deep dive. And, like the caves, you can't come right to the surface. So, once you gain awareness and then gather experience, you also need to be properly equipped.

*you say most wreck divers are well equipped?*

The average wreck diver isn't equipped—not for technical diving. But you have to understand that the average wreck diver is still the kind of person who dives on a weekend once or twice a month. He doesn't get that many dives under his belt. He's under economic constraints and probably won't be buying the top-of-the-line regulator or BC. He buys equipment he can afford.

Most of these divers are diving wrecks in the 80 to 100-foot range, and a few in the 100 to 130-foot range. Then there are the people who are diving 130 feet and beyond. You'll find that their equipment, generally speaking, is far superior to the so-called "tourist divers" running the shallow wrecks.

Shallow wreck diving is essentially the same as reef diving in terms of the kind of expertise that's required. It's when you start doing things—recovering artifacts, inflating lift bags, penetrating wrecks, getting into decompression—then you're talking about a different area. Then you really need the proper equipment.

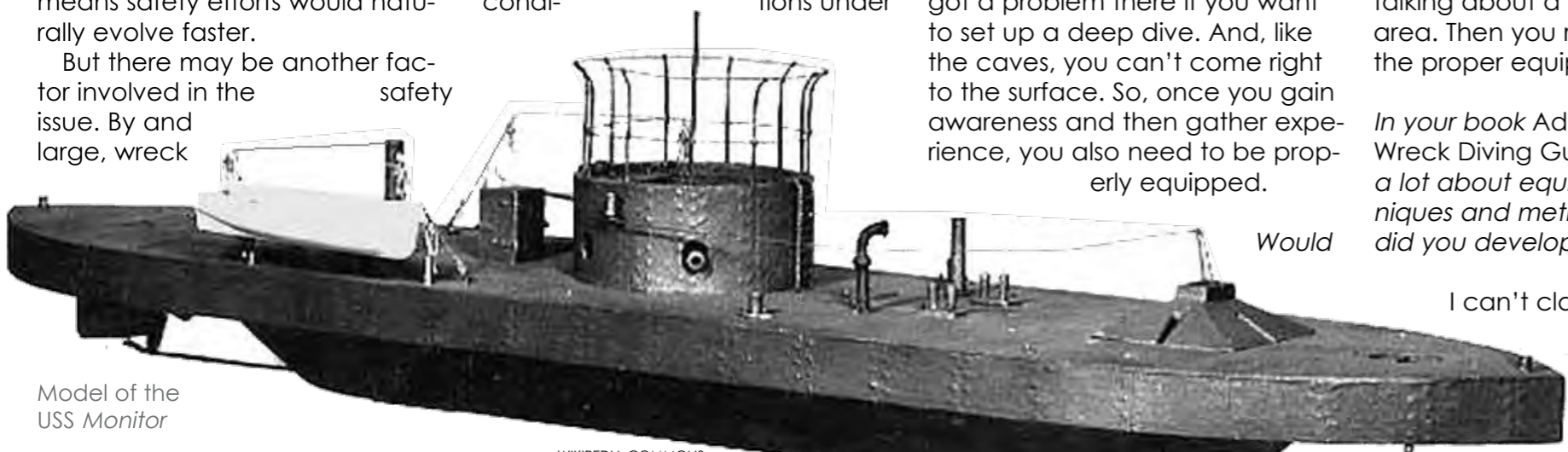
*In your book Advanced Wreck Diving Guide you talk a lot about equipment techniques and methods. How did you develop those?*

I can't claim to have developed all those techniques. I was part of the



wreck diving community when those techniques were being developed. What I can claim credit for is setting them down in

writing. Some of the things I worked on myself, but it was an evolutionary process. To make a decompress-



Model of the USS Monitor

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sion reel, you'd look at what someone had said and say, "That's good, but I can add this and make it better." Then someone else would look at it and say, "Yes, but let's do it this way."

I saw the development occurring; I was in the middle of it. I remember one time trying to retrace who actually developed the idea of making a decompression reel with the disks on the end to prevent the rope from coming out around the pins. No one knew. It had evolved; no one had any awareness of who had done it. It was a group effort that was done incrementally.

*Do you think recommended procedures and techniques will eventually evolve?*

Yes I do. Most of the procedures in *Advanced Wreck Diving Guide* are now the lowest common denominator. That book is not the end result. It's a take-off point for the next generation, and I expect to see evolution coming from that. In fact, the sport is evolving already. Some of the things we're doing now, like using oxygen to add a safety margin in decompression—mostly for deep diving—or using nitrox decompression and cus-

tom tables for accelerated decompression times, are still being worked out.

*How about mixed gas?*

I think mixed gas diving is going to be the wave of the future in wreck diving because people are already reaching or exceeding the limits of air diving, and yet, they still want to venture further to the deeper wrecks. The only way to do it is with mixed gas; at least, it's the only way to do it and remember it!

*What do you see as some of the advantages of mixed gas besides "remembering what you saw"?*

I've had a very curious thought about mixed gas. It's clearly the wave of the future, but for some people, I think it may also become an end in itself; becoming proficient in managing the technology. I see people wanting to do mixed gas diving as much to do the dive as to see the wreck. They want to do something that other people haven't done. That's what the new frontier is all about; to do something that other people haven't done. That's exciting; a real challenge.

*How about you?*

Personally, I'm a wreck diver. My goals are to be able to use mixed gas to get to a wreck, not to gain the expertise in mixed gas diving itself.

*You mentioned that "deep" used to be considered 160 or 170 feet. What's considered deep today in the serious wreck community?*

These days 200 is not considered deep in the crowd that I dive with. A 200-foot dive...is something you talk about between bites of a sandwich. "Oh, 200? Okay." If one of them jumped in the water, and you told him he would be diving 200 feet, he'd say, "Okay," glance at his tables to refresh his mind on what decompression schedules he'd be using, and then go do it. What I'm seeing as deep these days is 250-foot plus. Now we're talking deep.

*You're planning to dive the Ostfriesland. Would you talk about the project?*

The *Ostfriesland* is a German battleship that was brought to this country as part of reparations after World War I. The United States Navy did some tests on it and had it sitting in dry dock until Billy Mitchell decided to use it to prove to the Navy that Army bombers could sink Navy capitol ships. So, in 1921, the *Ostfriesland* was towed some 70 miles off the Virginia coast and Billy Mitchell successfully sank it with an aerial bombardment.

Its position had been lost since that time; nobody cared about it. But it's been relocated, first through historical records, and then by taking the boat out there and checking the various fishermen's LORAN coordinates that coincided with the records. It appears to be in some 380 feet of water, so it's definitely a mixed gas dive.

*...if you really want to accomplish something, you need to switch to mix. And that's my concern: accomplishing something. Not just getting there and saying you did it; but doing something when you get there.*

We dove another battle-ship last year in Washington. That was 290 feet. It was sunk in 1924 as a naval target.

*You did it on air?*

Yep. We did it on air, down to 290 feet. I personally felt that it was pretty close to stretching the enve-

lope. Beyond that, if you really want to accomplish something, you need to switch to mix. And that's my concern: accomplishing something. Not just getting there and saying you did it; but doing something when you get there. That's what we're planning for the *Ostfriesland*.

*What do you hope to accomplish?*

For me, it's an historical event. I'm a researcher and I've written about the *Ostfriesland* in my upcoming book, *Shipwrecks of Virginia*. I get a great deal of satisfaction out of doing research; concluding that, yes, a wreck is supposed to be in such-and-such a location, then going out there and verifying and identifying the wreck to prove that my research was valid. That's what'll give me the most satisfaction on the *Ostfriesland*; to actually locate it from when it was lost in 1921.

There's also the minor satisfaction of conducting a deep dive like I've never done before. But if you were to ask Ken Clayton, who I'll be diving with, the same question, he would give you a different answer. I think Ken's answer would be that his satisfaction will be to dive deeper. Mine is not; I'm coming from the historical perspective of actually being on that wreck. And I don't mean driving an



Historical image of the SMS *Ostfriesland*

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*Work hard. Work hard to gain the experience necessary to do what you want to do. Everyone can enjoy these experiences if they're willing to put in the time. Just gain the expertise to do them safely.*

came, it wouldn't have been so emotionally difficult to handle. That's why I think the first thing people can do is to take a course or read up on the literature that's available so they can practice on their own.

Of course, there's only a certain amount you can do in a course; most of what you learn has to be gained in the field. You've got to get out there and do it. That means getting in the water a lot, practicing techniques, doing the diving, gaining the experience—you can't get that from a book. You just have to go out there and do it. ■

*Writer and technologist Michael Menduno published and edited aquaCorps: The Journal for Technical Diving (1990-1996), which helped usher tech diving into the mainstream of sports diving, and coined the term "technical diving." He also organized the first Tek, EuroTek and AsiaTek conferences, and Rebreather Forums 1.0 and 2.0. Menduno, who is based in Palm Springs, California, USA, remains an avid diver.*

thing this means to us is that we have to come back to the anchor line.

*What will your total decompression time be?*

Two hours and 15 minutes.

*That sounds pretty reasonable. It's probably not any longer than a lot of your deep air dives.*

We did a two hour and 45-minute decompression on the *Monitor*. After a 25-minute bottom-time on air, we used computers and O<sub>2</sub> as a safety factor.

*There's some complicated logistics.*

Mixed gas diving is complicated, and complicated means expensive—much more expensive. But remember, what

we're talking about is not just your everyday adventure. It's not for people who just sit at home and watch the boob tube. It's for the kind of people who want to go out and experience something that not everyone can have. We're willing to do what is necessary to have that experience!

*Are you going to take pictures on the Ostfriesland?*

Unfortunately, we don't have a camera that'll go that deep.

*What are your personal diving goals over the next 12 months?*

Aside from the *Ostfriesland* trip, I'm in the middle of writing two books: one is a science fiction novel and the other

contained. On air, you go down, come up, and decompress on your own air. But once you get into mixed gas diving, in order to not have to decompress for something like four hours or more, you've got to go into an accelerated decompression schedule that requires multiple gas switches during the ascent to several nitrox mixes, and finally O<sub>2</sub>, based on custom tables.

It means you need surface support personnel: support divers who are going to go down to 100 feet to clip off the nitrox bottles and have the oxygen hoses ready for our 20-foot stop. It means you're no longer just jumping off the side of the boat, going off on your own, and coming back with your dive done. There's a lot of set-up when you get there and you can't do the set-up yourself.

We're taking clip-on stage bottles, of course, as a back-up. But the biggest

*Mixed gas diving is complicated, and complicated means expensive—much more expensive. But remember, what we're talking about is not just your everyday adventure. It's not for people who just sit at home and watch the boob tube. It's for the kind of people who want to go out and experience something that not everyone can have. We're willing to do what is necessary to have that experience!*

ROV on it. I'm a person who enjoys the experience of being there myself. I want to be on the *Ostfriesland* myself.

*What are some of the planning issues you've had to confront in putting together the dive?*

The most difficult part was planning the mix, staging, and decompression. The initial step was arranging for the gas mix; Dr Bill Hamilton worked with us on that. I see Bill and others like him as being the guiding lights on the evolution of mixed gas diving in the future because they're the ones that are providing us with the wherewithal to do it. I'm not the expert on it. I rely on his expertise, just as I rely on the captain's expertise to run the boat out there and locate the wreck.

It all has to be put together. But once you do, the dive itself becomes relatively simple because there are no narcotic effects. It's just like making any other dive, except it'll take you longer to get to the bottom. Once you get there, you'll feel just as comfortable as you do on a 100-foot dive.

*As I understand it, you'll be making a fairly short dive to that depth.*

Eleven minutes. But the complication comes in that you're no longer self-

is *Shipwrecks of North Carolina*. That keeps me busy when I'm not diving. As for diving, I'm still adventuring looking for dives that I haven't done before. Not necessarily wrecks that no one has seen, but photogenic wrecks that I haven't seen. My emphasis is photography. It's hard sometimes for me to say that. My interests are split between adventure and photography; I blend the two together. Sometimes I feel guilty having an adventure without taking pictures. It's like having a good time without anything to show for it, so I always temper myself. I want to share those adventures with other people.

*What's your advice for the people who are interested in expanding their wreck diving skills?*

Work hard. Work hard to gain the experience necessary to do what you want to do. Everyone can enjoy these experiences if they're willing to put in the time. Just gain the expertise to do them safely.

*From a practical point of view, how should people go about doing that?*

There are not a lot of courses, but there are some. I know several dive shops teaching wreck diving courses and actually showing people how to make a decompression dive. So, you don't have to do it the way I did it the first time; suddenly finding myself in decompression, scared to death because I'd never done it before.

If I'd done it a half dozen times when it didn't count, when the real time



USCG / WIKIPEDIA COMMONS  
The SS *Andrea Doria* sinking after collision in the Atlantic, 1956



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# Equipment

Edited by  
Rosemary 'Roz' E. Lunn

## Victory

At 12.4 cm / 4.9 inches long, the Cressi Victory is a medium-sized dive knife. When it comes to steel and salt water, it is a balancing game. You need a sharp blade, and you don't want it to rust. You can't have both. The blade is made from Japanese 420 stainless steel. This is a popular steel with knife makers because it is easy to sharpen and it has good corrosion resistance properties. The knife is encased in a sheath that has a push-button 'secure lock' release system that keeps the knife secure, whilst allowing easy removal when required. Cressi states that the plastic sheath can be attached to a diver's leg, tank or BCD. [cressi.com](http://cressi.com)



## MK21 / S560

As with all Scubapro balanced first stages, the MK21 standard configuration is two high pressure ports and four low pressure ports. For those divers wanting a fifth LP port, the static end cap can be replaced with one having five LP ports. This five-port cap also has a slightly different angle on each of the LP ports to enable a more optimal hose routing when diving a twinset or doubles. This first stage is available in both 300 Bar DIN and A Clamp/International. The MK 21 first stage has excellent resistance to freezing due to the external fins that work as an efficient heat sink. Apparently the S560 follows the 'S' range performance characteristics in that it has a very low inhalation effort, and high flow exhaust that cuts down the work of breathing. Divers can also 'personalize' their airflow with external diver controls and the VIVA that is present in all current Scubapro second stages. This lightweight techno-polymer-constructed second stage weighs in at 182 grams. As a result you benefit from less weight in your mouth and your luggage. Scubapro's attention to detail extends to the new 'comfort mouthpiece' and this comes as standard on the S560. The mouthpiece is specifically designed to allow high airflow. It should also reduce jaw fatigue. [Scubapro.com](http://Scubapro.com)



## iDive analysor

It seems that iDive has delivered the first dive computer watch that you can use for analysing your gas. Simply plug the gas analysing stick into your iDive via a USB connector, and the mix is shown on the watch face. This Italian made computer is also rechargeable. The Li-ion battery provides 25 days of power in watch mode, or 30 hours in dive mode. Then you simply use a USB connector to charge it at home or in your car. The user has the option of diving air, nitrox and trimix modes, with eight different gas mixtures and it runs on the Bühlmann ZHL-16B algorithm. Finally the data appears to be fairly easy to read courtesy of the large figures and LCD 100% matrix display.

[divesystem.com](http://divesystem.com)



## Ladies first

The most radical thing that Santi has done with this 'Ladies First' suit is to re-route the front plastic T zip. It runs from the top right shoulder down to the left hip instead of the usual route of top left shoulder to bottom right hip. Why is this so special? If the front zip is routed in the traditional way on a petite female, the manufacturer can struggle to get the shoulder dump in the right location because the zip can be in the way. By simply switching sides, Santi can ensure the shoulder dump is located in the best place, whatever size of female. This membrane suit is based on the current Santi E.Motion drysuit. It is constructed from an ultra flexible material and is ultra lightweight. A number of nice features come standard: a warm neck collar, bib and braces or suspenders, a choice of seals (latex, neoprene and silicone) and two cargo pockets on the thighs. The pockets are slightly narrower cut to ensure a more optimal fit on a petite leg. Both pockets benefit from a metal D-ring and a couple of bungee loops. The complete package comes in a practical bag, and you also get a limited edition woolly hat. [www.santidiving.com](http://www.santidiving.com)





## 26W LED

Light Monkey's 26W LED Primary Lighting System took three years of research and development. The boys from Lake City in Florida were looking to create the right reflector/emitter combination. Apparently the Luminus SST-90 emitter has a bespoke custom reflector. This produces two effects. A tight 6° center hot spot that penetrates low-visibility or gin clear water, providing the diver with optimal signalling capabilities. Plus there is a bit of spill around the edges giving more peripheral light. There is a choice of three batteries with this TSA air travel compliant model: 10 Amp, 15 Amp and 20 Amp. We have heard the most popular model seems to be the 15 Amp, which provides 1,700 Lumens with a 345-minute burn time.

Lightmonkey.us



## Dive Rite

The Nomad LT Extreme is a low profile sidemount BCD with 35lbs of lift. Dive Rite states that the shape and contour of the bladder helps the diver achieve decent trim, because the lift is in the lower back. Should a diver want a redundant source of buoyancy, an optional 22lb lift backup bladder is available. The integrated deluxe-style webbing harness can be customised to fit nearly any size diver, whilst the padded shoulder straps and crotch strap provide comfort when diving in minimal exposure protection. Divers have the option of dumping gas from the wing with either hand via two dump valves located on the lower outer corners of BCD.

diverite.com

## No it's not a flag!

The OWUSS European Scholar, Chloé Maréchal, and Jim Standing of fourth element unveiled this new changing mat at the 2013 DEMA Show. The community is divided. Some divers like to make their own. Some divers like to buy their own. When it comes to buying, there is quite a choice of manufactured mats available. This fourth element mat is constructed from a hard wearing fabric. It is soft and safe to walk on, and looks to be comfortable to get changed on. The mat doesn't absorb water, and is simple to clean. Just wipe it or give it a quick rinse and after a few minutes in the sun and wind, it will be dry. Finally this mat can be rolled up and secured using elasticated loops, making it extremely packable.

Fourthelement.com



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*Honduras'*

# Miskito Cays

Text and photos by George Stoye



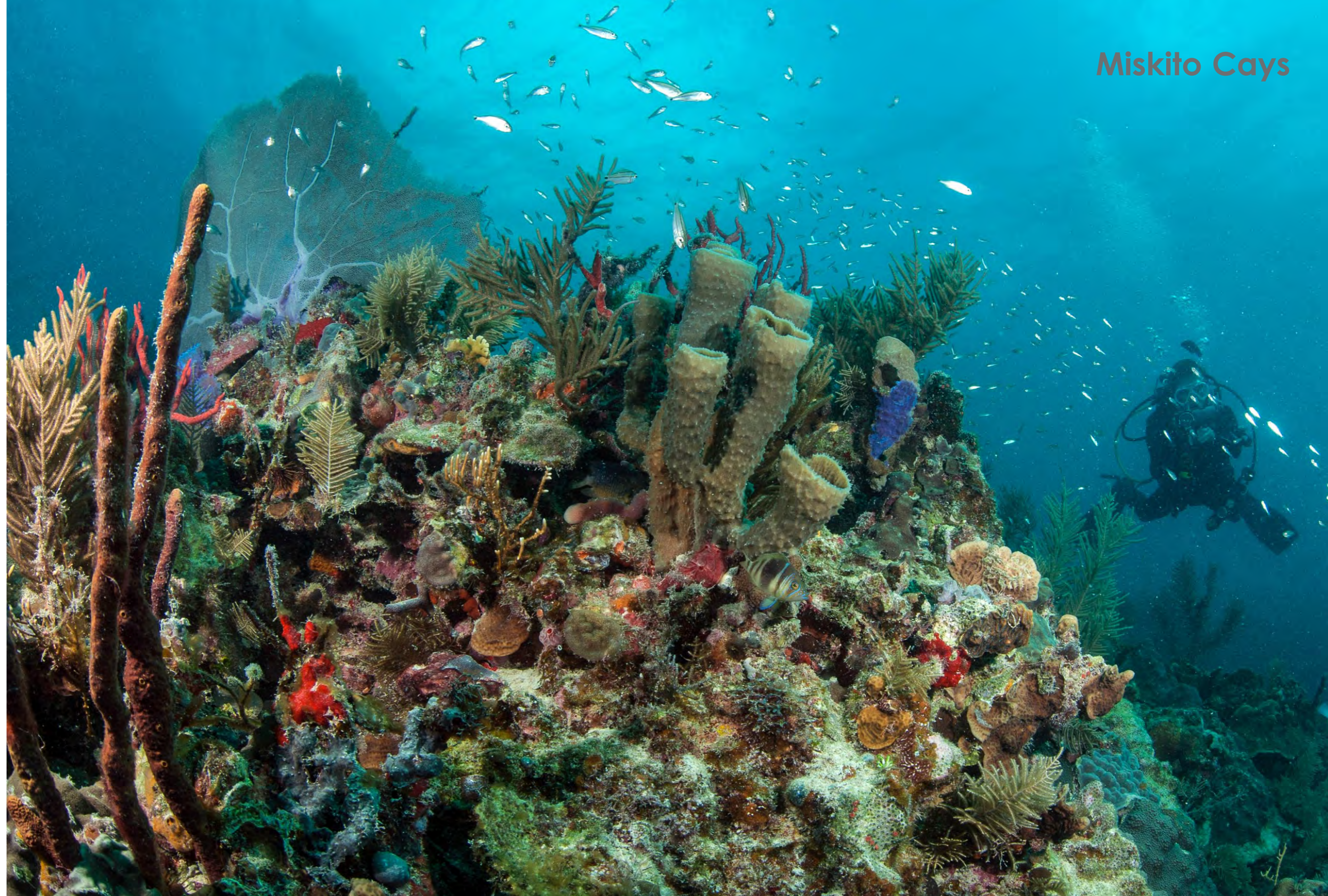
Diver swims along the edge of a reef covered in marine life, Miskito Cays, Honduras

PREVIOUS PAGE: Rope sponges cling to a boulder

Following six flights, two nights and a 30-hour boat trip, I found myself approaching a relatively uncharted group of small coral cays about 60km off the northeast coast of Honduras, not far from the Nicaraguan border. I joined a group of scientists from various institutions around the world, assigned to document their activities and photograph the habitats and associated wildlife both above and below the water.

Embarking on the *Caribbean Pearl II* from Utila, one of the Bay Islands a few miles off the north coast of Honduras, we made our way along the coast to an area unknown to the region's tourist diving operations. As we got close to the cays, our crew grew increasingly nervous, perhaps justifiably so.

This part of Honduras has long been a major route for cocaine trafficking into the United States from South America, and the region through which we were sailing was well-known for its use by certain cartels who preferred moving their cargo by sea. However, the apparently efficient military presence in the area (we



were boarded ourselves by five soldiers armed to the teeth, carrying out a pre-arranged search) provided a vague form of comfort, and so we continued.

### The archipelago

The Miskito Cays form an archipelago spanning both Honduran and Nicaraguan waters. On the Honduran side, 49 tiny coral

islands and sand bars are dispersed across 750 sq km of shallow seabed. The area is named after the indigenous people of the region, the Miskitos, who

inhabit communities along the coast of both countries. The region is known as the Miskito Coast, or more accurately (the name has nothing to do with

the blood-sucking insects) La Mosquitia.

La Mosquitia is in some ways the wild west of Central America. The region is tropical rainforest





wilderness forming the greatest continuous expanse of tropical forest north of the Amazon. Sparsely populated the area has an exceptionally high diversity of flora and fauna. It is only accessible by water or air and much of it remains unexplored.

Although tourism exists, the region only attracts a few hardy explorers each year, so there is no actual tourist infrastructure to speak of. The area's inhabitants include four indigenous groups (the Pech, Tawaka, Garifuna and Miskito) with the majority composed of Miskito people who live on the coast. With few available livelihoods, many of the men from these remote villages work in the industrial fisheries for lobster and conch, and more recently, sea cucumbers.



### Risky fisheries

For over 40 years these fisheries have continued with exceptionally poor management resulting in unsustainable exploitation not only of the marine resources, but also of the fishermen themselves.

The primary method of fishing

and conch have been driven into deeper waters. Human casualties from diving associated incidents have risen as a consequence, and now there are around 120 diving accidents per fishing season with around 20 being fatal.

Industrial fishing vessels around

LEFT TO RIGHT: Christmas tree worms; Social feather-duster worms; Midnight and rainbow parrotfish

is scuba diving, but this remains relatively primitive and dangerous, relying for the most part on basic, poorly maintained equipment with little regard for the safety of the diver. As the populations have been overfished, the remaining lobster

80ft in length are packed with 100 men. Divers, assisted by canoeists, who follow them from the surface, make multiple dives to depths of 120 feet or more. Incidents resulting from incorrect procedures or malfunctioning equipment have become common-place.

Many divers have lost their lives, and many more have permanent, debilitating injuries resulting from decompression related illness. More than 1,000 permanently disabled men are left scattered in remote communities of La Moskitia as a result of diving for these fisheries.

### Proposed protected area

The effect this is having on many communities is now becoming apparent, and now many of the indigenous groups are calling on the Honduran government

to close the waters surrounding the Miskito Cays to industrial fishing. They are proposing an area of 1.45 million hectares to be the exclusive use of a locally managed, small-scale artisanal fishing fleet using improved fishing methods, that don't include scuba.

In order to realise this ambitious proposal, the relevant Miskito communities will not only require retraining in new fishing methods but also a solid management strategy that combines fishing regulations with marine spatial plans. Community leaders have specified these plans must identify and protect critical habitats, nursery grounds and other ecologically important areas.

As with many remote locations, the environmental impact of sustained exploitation of industrial fisheries around the Miskito Cays have,



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to date, largely been ignored. Due to the relative isolation of the area, the past and current condition of the ecosystem and its regional significance is essentially unknown. This lack of information is one of the largest hurdles preventing these communities from developing their plans further.

### Research program

In collaboration with a team of international researchers from the Smithsonian Institution, Harbor Branch Oceanographic Institute, University of Queensland in Australia, University of Manchester in the United



Yellowline goby peering out from a great star coral colony

Kingdom, and a Honduran non-governmental organisation—the Centre for Marine Studies—Dr Steve Box, a marine biologist from the Smithsonian Institution has developed a multi-disciplinary research program in order to provide the missing informa-

tion to enable the Miskito communities to move forward with their sustainable fisheries and marine management proposal.

A central part of this program is to gather essential ecological data of the Miskito Cays region in order to establish a baseline

for the condition of the coral reefs and associated biodiversity. Ultimately, the objectives are to assist both local groups and the government of Honduras move towards the sustainable use of their marine resources and improve understanding of

how these reefs are connected to other Honduran and western Caribbean marine ecosystems. The study will also be used as part of ongoing comparative research programs across the entire Caribbean.



### Research activities

The schedule was rigorous, involving both underwater and terrestrial surveys. A small team took the tender vessel and landed on as many of the cays as possible to ground-truth various satellite imagery and bathymetric charts.

A team of divers conducted surveys to assess the abundance of corals, algae and fishes using a standardised reef monitoring protocol, while individual divers were responsible for collecting various samples for later lab analyses. These were used to assess the severity and prevalence of coral diseases along with the diversity and abundance of sponges and algal communities. Genetic analyses was used to uncover patterns of dispersal for three commercial fisheries species and an endangered coral species among the reefs of the northern and southern areas.

Combined, this research will greatly improve understanding of the physical, environmental and ecological context of the proposed Honduran Miskito Cays marine area.

### Diving

Following our slightly un-nerving run-in with the Honduran Navy, we approached the first of the northern group of cays. Some were no more than slightly elevated patches of sand, only just visible above the water, while others were well-established small islands with



Chain moray eel; Solitary gorgonian hydroid (right)

dense vegetation providing habitat for large numbers of breeding seabirds. Ringed by thin strips of white sand gently sloping into vivid turquoise lagoons, the cays were almost stereotypically beautiful—exactly what one would expect from remote coral islands in the Caribbean.

An air of excitement and anticipation filled the boat as we prepared for our first dive. Due to its relative inaccessibility, this region was largely unknown to divers, and reports describing the

area were scarce. Although not thought to be vastly different from other coral reefs in the Western Caribbean, nobody really knew what to expect.

Many reefs throughout the entire Caribbean have suffered significant declines over the last 30 years. This decline, however, is mostly described on reefs close to areas of human population and thought to be caused partly by a combination of human-induced pressures such as overdevelopment, pollution and overfishing.

Although the Miskito Cays are known for fishing, they are far away from the mainland, which limits direct land-based human impacts. These reefs therefore have the potential to be comparatively healthier than their counterparts in other locations.

Secretly hoping for crystal clear water, whale sharks, manta rays and pristine coral reefs like no living soul has seen before, my descent onto the first reef was one of mixed emotions. While still excited to be diving this unex-





Diver examines life on cliff face; Knobby sea rod (below)

## Miskito Cays

als die, faster growing species such as algae quickly become established leaving little room for new corals to settle. Although a major problem now affecting all the world's coral reefs, the lack of species diversity, in comparison to reefs of the Indo Pacific, means some parts of the Caribbean have been particularly badly affected.

Massive boulder coral forma-

tions were a common feature on many of the dives, some in better condition than others. The last dive of the second day was particularly memorable, not so much for marine life encountered but rather the ancient towering coral colonies, formed from layer upon layer of growth, where the upper surface is alive built on top of previously deposited rock skeleton. The pinnacles formed



cathedral-like structures creating a labyrinth of pillars, caves and tunnels almost eerie in the fading daylight.

Gliding underneath some of these imposing coral masses, I frequently noticed impressive bushes of black coral, a

plored region, my initial reaction was one of slight disappointment. A storm from a few days earlier had stirred up the water, and the visibility was not as good as expected. The main purpose of my visit here was to provide habitat images of the coral reefs, so my intention was to shoot almost exclusively wide-angle. The amount of suspended sediment in the water column was going to make this task slightly more challenging than anticipated!

Impressive reef structures, at first silhouetted in the gloom, came into view, covered in myriad forms of life. The intricate shapes of black coral bushes and delicate wire corals hung from the sides of massive colonies of *Montastraea*, large reef-building corals that provide a foothold for numerous smaller coral species. Sea whips, sea fans, sponges, tunicates, macroalgae, encrusting algae and fire corals also competed for any available space.

### Reef health

These highly competitive interactions are what make coral reefs among the most biodiverse ecosystems on the planet. Conversely, they are also responsible for a fundamental, and relatively recent problem. Maybe no more than 50 years ago, coral mortality on well-established reefs was not a major issue. Indeed, mass mortality as a result of coral bleaching or disease is a comparatively new phenomenon. For mil-

lions of years, coral communities have been highly resilient, able to recover from most major environmental disturbances. Nowadays, however, much of that resilience has been lost, most probably due to increasingly frequent and persistent human-induced disturbances. As cor-



Elkhorn coral





Juvenile parrotfish on staghorn coral reef

## Miskito Cays

natural stressors. Due to their dramatic decline, *Acropora* corals have become something of a rarity, so it's always a pleasure to find areas where they still thrive.

Although not as dense a thicket of elkhorn as I

was expecting, there were some massive formations here, some with branches a metre or so in diameter, perhaps the largest I've ever seen. Amazingly, many of the colonies here, as I've seen in other areas, were growing just beneath the surface. Because



species known as *Antipatharia* which, despite their name actually look like giant red sea fans. Unlike other areas I've dived in the Western Caribbean, these striking black coral bushes were a regular sight on many of the dives here and were reminiscent of some of the dense gorgonian forests I've encountered in the Pacific.

Although we encountered a fair share of reefs in less than favourable condition, either besieged by algae, soft corals and sponges, or deteriorating as a result of disease or bleaching, we also noted some encouraging signs of resilience providing a little optimism that the reefs here could have potential to sustain themselves. In many parts of the Caribbean, indications of

healthy reefs or reefs in a state of significant growth or recovery are becoming all too scarce.

### Elkhorn and staghorn coral

A number of fine stands of staghorn coral (*Acropora cervicornis*), intricate branching corals that were almost completely wiped out by white band disease in the early 1980s, were seen on a number of dives. Prior to the 1980s, these corals were responsible for much of the structural complexity of Caribbean reefs providing numerous species with shelter from predation. Loss of this complexity has profoundly altered the biodiversity of many reefs so to see even small, healthy patches of *Acropora* anywhere in the Caribbean is reassuring indeed.

I skipped one dive in favour of a snorkel in shallow water close to a cay called Caratasca. A small team had gone ashore earlier that day and reported a number of elkhorn coral colonies in the shallows. Elkhorn coral (*Acropora palmata*), like its close relative staghorn, was once an abundant reef-building species common throughout Caribbean reefs providing much of the foundation and structure. Suffering the same fate as staghorn, elkhorn coral also died off at an alarming rate and before long 95 percent of both species had declined. White band disease, which only affects these two *Acropora* species, is still something of a mystery although almost certainly has some connection to increased human and



of the depth, or rather lack of it, I relied on natural light for photography. Hampered once again by fairly poor visibility and struggling to compose shots due to being underweighted, and possibly not as proficient at breath-holding as I used to be, I managed one or two acceptable images.

### Heading south

After two days diving the northern group of cays, we made our way to the group in the south closer to the Nicaraguan border, much to the consterna-

Elkhorn coral (above); Detail of staghorn coral branch (top right)





TOP TO BOTTOM: Shoal of blue tang; Christmas tree worms; Hermit crab

number of striking similarities with more isolated reefs found further to the south around Panama.

Some of the reefs around the southern group of cays, at least the ones we dived, were markedly different from those in the north in that they adhered more to classic 'spur and groove' formations rather than massive boulders and towering pinnacles.

Reef fish abundance also appeared slightly higher, although some species such as grouper were still noticeably absent—not surprising, as they are a valuable fisheries target. Another noticeable aspect of these southern reefs were the sheer number of different species crammed into relatively small areas. Although this was evident on the reefs to the north, as it generally is in any coral reef community, some of the reefs here appeared particularly muddled and chaotic.

In comparison to their Indo Pacific counterparts, which, to me, appear neat, tidy and somewhat well-organised, many Caribbean reefs looked like they had been haphazardly thrown together by a madman. Diversity of sponges on these southern reefs was particularly striking with numerous forms and colours covering many of the *Montastraea* colonies in a tangled profusion of bright purple, yellow and red, often stretching out into the water column like ancient wizened fingers.

Closer inspection on these southern reefs, and most in the north, revealed the usual array of Caribbean macro species. Exquisite feather duster worms gently swaying in the current, yellowline bobies

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capital, our crew were put slightly at ease after we were assured that the Honduran Navy was still on exercises in the area and were nearby should we need them.

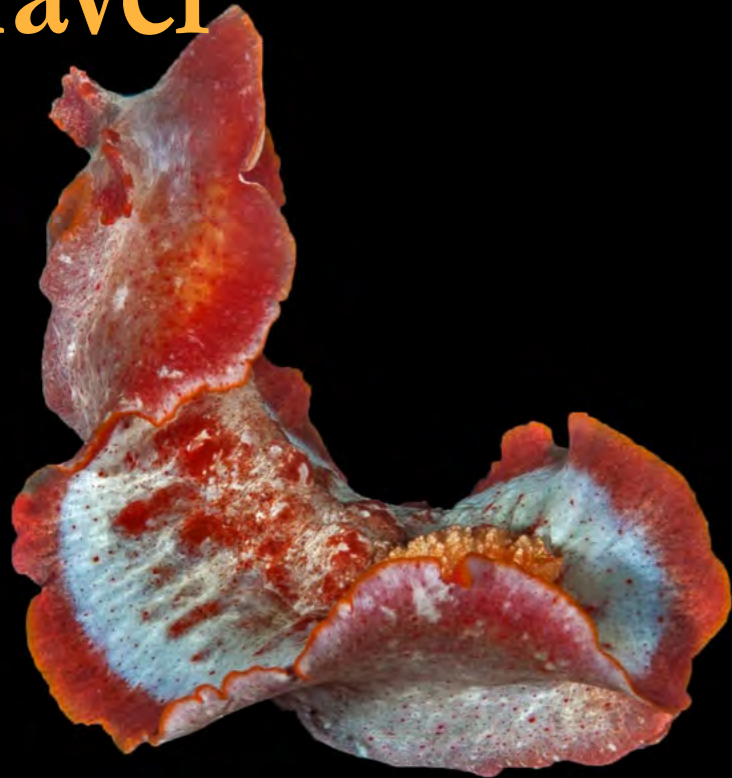
Part of the research being undertaken here was to assess whether the reefs around the northern and southern Miskito Cays are connected, not only to each other but also to the Mesoamerican

Barrier Reef System (MBRS). The MBRS stretches all the way from the Yucatán Peninsula in Mexico apparently ending at the Bay Islands in Honduras. If data collected during the survey could show that the Miskito Reefs were connected to the MBRS, this boundary could effectively be extended by about 400km. Interestingly, casual observations during the expedition suggested the northern group of cays may well be connected, whereas the southern group showed a



tion of our crew who were becoming more anxious by the day. Reluctant to go much further due to security concerns, we were fortunate that one of our team worked for the U.S. Embassy. Following a quick call via satellite phone to his office in the Honduran





Spanish dancer nudibranch

mon sight on most Caribbean reefs, but others are a little more enigmatic, and in many locations, either completely absent or just downright rare.

Two of the largest and most strikingly beautiful parrotfish species are the midnight and the rainbow, which fall into this category. I had seen one or two midnights before, but only occasionally and only ever at one dive site on an island about 400km northwest. I had never seen a rainbow parrotfish. Imagine my surprise then as I

Stoplight parrotfish cleaned by juvenile bluehead wrasse; Sea lettuce nudibranch (lower right)

was suddenly faced with a roving shoal of 60-70 midnight parrotfish, with a number of juvenile rainbows amongst them, swooping over the reef like a cloak of black, iridescent blue and green.

Undeterred by my presence, the fish were feeding voraciously, scraping algae from rocks and coral heads, circling an area again and again to ensure all food was consumed. This is what makes parrotfish so crucial on coral reefs. In sufficient numbers they can keep large areas of reef clear of algae opening up crucial settlement space for new corals. Without these keystone species, many reefs quickly become overwhelmed by algae, which soon replaces corals as the dominant species—a process known as a phase shift, and one which is very difficult to reverse.

Large shoals of midnight parrotfish were seen on at least three dives.



Miskito Cays

and the highly appropriately named lettuce sea slug, to mention but a few.

A number of docile nurse sharks were also seen and, a real treat for me, were the discovery of two spectacular nudibranchs I had not seen before: a purple-spotted sea goddess and a Spanish dancer, the latter of which provided some great photo opportunities, as it twisted and gyrated through the water column.

## Caribbean parrotfish

Although general reef fish diversity was not strikingly different to reefs in other areas of the Western Caribbean, there were some unusual and encouraging encounters on a few of the dives. Having spent some time studying Caribbean parrotfish and their role in maintaining healthy reefs, I'm always on the lookout for this charismatic species, particularly when in large numbers.

Some species, such as the small and unassuming striped parrotfish, are a com-



Redband parrotfish cleaned by juvenile bluehead wrasse

Photographing them was initially fairly exhausting. I soon realised trying to chase them over the reef was futile and so attempted something a little more strategic.

On each encounter, the fish seemed to circle the area a number of times. After watching them at a distance for a few minutes, I would choose a suitable position and lie in wait, trying

to minimise my breathing to reduce bubbles and hoping they would swim toward me. This ambush technique worked with limited success, as the fish would invariably detect me from a distance and usually swim the other way. As ever, the visibility wasn't great, but I managed a few acceptable images.

## Sea urchins

Another encouraging sign that the reefs here may have slightly higher resilience than those elsewhere in the region with potential to sustain themselves, were higher than average numbers of long-spined sea urchins (*Diadema antillarum*).

With a function similar to parrotfish these urchins are, or rather were, an important herbivore throughout the Caribbean, freeing up critical settlement space for new corals by consuming algae. In 1983, however, the species declined by over 97 percent across the



entire Caribbean due to an unidentified pathogen. The consequences in some areas were devastating, as large areas of



CLOCKWISE FROM RIGHT: Researcher on Becerras Cay ground-truthing satellite imagery with dive boat in the background; Magnificent frigatebirds roosting on low branches and coming in to land; Extensive roots of mangroves; Forest clearing on Becerras Cay



## Miskito Cays



On the beach, the decrepit remains of an old fishermen's hut provided a perch for a few frigates while the rest sat on nests or branches among the mangroves at the wider end of the cay. It was nesting season, so the majority of birds were tending their young, which sat, dinosaur-like waiting for their next meal.

Frigates, at least when they reach adulthood (the chicks aren't the most attractive looking creatures), are majestic birds, appearing almost spectre-like, as they circle above scouting

for suitable prey. Although commonly using their large talons and hooked beaks to catch fish by skimming the surface of the water, they are also piratical in nature, frequently harassing other birds forcing them to regurgitate their stomach contents, which

they then catch and consume as it falls. Having the opportunity to walk among this colony with my camera and experience the sights, sounds and smells was a rare treat and an absolute pleasure.



coral reef were quickly overgrown by persistent mats of algae.

Although still not recovered to anything like their pre-1983 numbers, some recent reports have described a number of local recoveries and signs of associated regeneration of coral reefs. It is possible some of the Miskito reefs could be included.

### Stinky Cay

During another brief respite from

diving, I had the opportunity to join the terrestrial team on an exploratory excursion to one of the cays. Appropriately named Stinky Cay by the locals, the tiny island was a thin strip of sand and low-level vegetation teeming with seabirds. Magnificent frigatebirds accounted for most of these but there were also a number of brown boobies and masked boobies most of which were nesting on the ground.



### Afterthoughts

This was hopefully the first in a series of expeditions to the Honduran Miskito Cays. Surveys will need to be repeated throughout the year in order to build up a solid picture of the past and current condition of the area's ecosystems as well as to identify critical habitats, nursery grounds and other ecologically important areas. This information is crucial if we are to assist the Miskito

Communities in achieving their goal of establishing a solid management strategy to protect their fisheries from continued exploitation and their fishermen from further harm. ■

*George Stoye is a marine ecologist, coral reef researcher and underwater photographer based in the United Kingdom. For more information, visit: [Earthinfofocus.com](http://Earthinfofocus.com)*



# fact file



## Miskito Cays, Honduras



SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM, WIKIPEDIA.ORG

**History** Named for the Miskito Indians who live in the region, the Miskito Cays are found on the Caribbean Mosquito Coast (or Miskito Coast), which historically comprised an area on the east coast of today's Honduras and Nicaragua. Long dominated by British interests, it wasn't until in 1894 that the Mosquito Coast was incorporated into Nicaragua. Finally, in 1960, the northern part was granted to Honduras by the International Court of Justice.<sup>1</sup> Honduras was itself part of the vast Spanish empire in the New World, and finally gained its independence in 1821. It wasn't until 1982 that there was a freely elected government following over 20 years of military rule. The country experienced conflict in the 80's, as anti-Sandinista contras fighting the Marxist government in Nicaragua used Honduras

as a safe haven. Honduras was also allied with the Salvadoran government against leftist guerrillas. In the late 90's, Hurricane Mitch hit Honduras causing vast devastation and killing 5,600 people. The Honduras economy has made a slow recovery since then. Government: Democratic constitutional republic. Capital: Tegucigalpa

**Geography** Honduras is located in Central America. On the east side, it borders the Caribbean Sea, between Guatemala and Nicaragua. On the west side, it borders the Gulf of Fonseca, leading to the North Pacific Ocean, between El Salvador and Nicaragua. Terrain is comprised of narrow coastal plains, with mountains in the interior. Coastline: Caribbean Sea 669km; Gulf of Fonseca 163km. Lowest point: Caribbean Sea 0m. Highest point: Cerro Las Minas 2,870m.

**Climate** Lowlands are subtropical while mountainous areas have a temperate climate. Natural hazards include earthquakes that are frequent but mild, for the most part, as well as hurricanes and floods on the Caribbean coast.

**Environmental issues** Challenges stem from the expansion of urban population; logging and

clearing of land for agriculture result in deforestation; uncontrolled development and farming of marginal lands further degrade the land and erode the soil; mining operations are polluting the country's largest freshwater source, Lago de Yojoa, and many rivers and streams, with heavy metals.

**Economy** With 65% of its population living in poverty, Honduras is one of the poorest countries in Latin America. It also has the highest murder rate in the world. Rural and indigenous people in the south, west, and along the eastern border suffer higher poverty rates than those in the north and central areas, where the majority of the country's infrastructure and industries are based. Education, while enjoying nearly 100 percent enrollment, is poor in quality, and hence, slow to improve the situation for the poor. Unequal distribution of income is extreme, and there is high underemployment. Honduras has diversified its export base beyond coffee and bananas to include automobile wire harnessing and apparel. Almost half of the country's economic activity is tied directly to the United States. In 2006, the U.S.-Central America-Dominican Republic Free Trade Agreement (CAFTA-DR) came into effect helping to foster

foreign direct investment. However, political and physical insecurity, crime and the perception of corruption, may scare off potential investors. Modest economic growth from 2010 to 2012 was not enough to improve living standards of a majority of the country's poor. A growing budget deficit, weak current account performance, unpaid salaries of public sector workers, and several hundred million in unpaid contracts to suppliers continue to plague the government.

**Currency** Honduran lempiras (HNL). Exchange rates: 1EUR=27.25HNL, 1USD=20HNL, 1GBP=32.80HNL, 1AUD=17.87HNL, 1SGD=15.74HNL

**Population** 8,448,465 (July 2013 est.) Ethnic groups: Tmestizo (Amerindian and European mix)



RIGHT: Location of Honduras on global map. BELOW: Location of Miskito Cays on map of Honduras



90%, Amerindian 7%, black 2%, white 1%. Religions: Roman Catholic 97%, Protestant 3%. Internet users: 731,700 (2009)

**Language** Spanish is the official language, plus there are Amerindian dialects.

**Health** Travellers should talk with a doctor for latest inoculation recommendations and anti-malaria advice.

**Miskito Cays area** At the moment, the area has not established any tourism diving, so no stated limits are in place. In the Miskitia itself, there are no dive facilities, so

guests go by liveaboard from the Bay Islands. When the area is zoned for Miskito use, authorities may charge a user fee for divers, as a way of generating revenue, and then specify dive sites and other things as part of their marine spatial plan, but that is a way off.

**Websites** Honduras Tourism [www.letsghonduras.com](http://www.letsghonduras.com)

Frigatebird chicks in the nest (right and bottom left), Miskito Cays, Honduras







Scuba Confidential

# Breaking the Chain



Text by Simon Pridmore

**Last year I was invited to deliver a lecture at the Oztek show in Sydney, Australia. I spoke on the topic “What Makes a Good Technical Diver”, and one particular point I covered on accident avoidance drew a very positive response and provoked a number of questions from the audience. It applies not only to the technical community but to divers of every level.**

Every diving accident has a chain of events that lead up to it, but often the chain is only visible afterwards when you reflect on what happened. You don't always see a chain before an accident takes place, but if you do see one or if you only think you see one, you need to have the courage and determination to break it, even though you might be criticized by others for doing so.

Cave divers have a rule that seeks to eliminate the fear of recrimination and saves lives. This rule is that any diver can abort any dive at any time for any rea-

son without having to explain themselves to anyone. When one of your team gives the up signal (or turn signal in the case of cave diving), the rest of the team acknowledges and complies immediately—no questions asked, either at the time or subsequently. You can always offer an explanation, of course, but no one has the right to demand one.

It does not matter if the threat to safety is genuine or not. For example, a diver may abort a dive simply as a result of misreading his contents gauge. The principle is that if one member of the team believes there is a threat, then that belief in itself is enough to put the team at risk if it continues.

This is a rule that all divers could apply to their diving whether technical or otherwise. Here is an example of an instance when I felt I had to break the chain even before the divers got into the water.

### Bad news

A few years ago, I was at my dive centre in Guam with two students preparing for

the final dive in our TRIMIX course when one of my dive-masters arrived with the news that a diver that we knew from another dive centre had died in the recompression chamber following an incident that had taken place the day before.

The students were nearby and overheard the conversation but said nothing. On the boat, they were quieter than usual and I was concentrating on keeping everything normal and following the pattern of their earlier training dives, but the news of the diver's death was playing on my mind. He was a friend and we had dived together plenty of times.

On arrival at the dive site, I saw that a strong current was running and that it had carried the line and buoy, which was to be our ascent platform, underwater. I noticed the students exchange a glance of concern.

I knew that the fact that they were undertaking a big dive would already be creating a certain level of anxiety, and that a strong current might lead to additional task-loading. I also guessed that the news of the diver's death might be a distracting factor for them, especially if they started to become stressed during the dive. I was also concerned at the impact the news might have on my ability to concentrate fully.

I went over to where they were preparing and explained that I was cancelling the dive, citing all the reasons, including my doubts about my own state of mind. I was afraid that they might be unhappy and object to this change in plan as they were due to fly out the following night, and this cancellation would mean they couldn't complete the course on schedule. But instead, they

responded with smiles of relief and thanked me. The diver's death had been weighing on their minds, but they had not wanted to say anything.

In the end, they managed to change their flights, and a couple of days later, we ran the final course dive and everything went perfectly. Who knows? Plan A might have turned out fine, but aborting the dive before any of us had even entered the water made it absolutely sure that what looked like a steadily cumulating series of stressors didn't end in disaster. ■

*Simon Pridmore has been around the scuba diving industry in Asia, Europe and the United States (well, Guam) for the past 20 years. His latest book, also called Scuba Confidential, was published in September 2013 and is available on Amazon. He is now working on the follow-up book, provisionally entitled Scuba Professional.*



Text and photos by Barb Roy

Over ten years have past since my last dive in Hood Canal. I'm not sure why, probably because I've been so focused on exploring the pristine waters of British Columbia that the extra effort of driving so far south has always deterred me. But when Adventures Down Under, a dive shop in Bellingham, invited me to join their group for a Hood Canal dive charter, I was too curious to say anything but yes. What I do remember from my last visit is seeing a field of tall, spindly sea whips during a shore dive and admiring the amount of octopus on another. I also remember how good some raw oysters were after picking them up from a beach during a community seafood festival, especially when they were covered in red cocktail sauce!

But for this trip our group of seven met up with Don Coleman, owner and operator of Pacific Adventure at the Pleasant Harbor Marina on the west side of Hood Canal,

off Highway 101. It was a typical chilly January day where air temperatures may have climbed to a balmy 30°F (-1°C). I was just happy for the warm sunshine and

pleasant attitudes all around. The distance to carry our gear from the car to the boat was short, and the 38-foot (11.5-meter) boat had plenty of covered deck space

to spread out on. A warm cabin below was great for changing into our dry suits.

During the 30-minute run to Pinnacle, our first dive site, Don

explained a bit about himself and how he got started in the dive business.

"I learned to dive in 1997 in San Carlos, Mexico, with my son

while on a four-year family sailing trip. We crossed to Hawaii in the spring of 1998 where I became an instructor, then we went back across to Washington State in the



*Washington State's*  
**Hood Canal**







Ron Akeson (left) filming a large lingcod at Hood Canal; Pacific Adventure dive boat, *Down Time* (above); Divers Connie and Jay ready to test new drysuits (top right)

### Pinnacle

Fortunately the Pinnacle site yielded calm water, fairly clear visibility and the sun was still smiling! The boat utilized one of the mooring buoys placed by Washington Scuba Alliance (WSA) and tied up to it. The mooring buoy would also be used as a descent line to directly drop onto the pinnacle below.

“Currently we have four WSA buoys in Hood Canal—Pulali West Wall, Pinnacle, Broken Leg and Flagpole,” added Don, just before his briefing.

“Pinnacle is my favorite site for the variety of struc-

tures at the location and the abundance of critters. The site is large enough that I don't have to see the same parts each dive. For me it takes at least three 50-minute dives to completely explore the entire site, I move pretty slow.”

He continued to tell us more about the site, directions to find critters and depths. As soon as Don mentioned a

pair of wolf-eels with eggs, everyone instantly became enthusiastic about jumping in as soon as possible. Only during a behind-the-scenes tour at the Vancouver Aquarium had I ever seen a ball of wolf-eel eggs before.

To increase my chances of actually finding the wolf-eels, I joined up with Ron Akeson, the group organizer and a marine biologist, figuring if anyone can find them he could. Although my Nikon camera is housed in a fair-sized Aquatica housing with duel strobes, it seemed small in comparison to his massive video housing with duel lights as they sat next to one another on the deck.

Nevertheless we began our descent to 40ft (12m), passing several immense lingcod resting on slabs of rock—I would guess probably females because of their size, ready to disperse clusters of eggs if the right guy comes along. When I approached for a photograph, they didn't budge. We even came across several small males, already guarding batches of eggs. They too were docile except for one that became fixated on my yellow Force Fins, swimming around several times before

spring of 1999 where I learned to dive in cold water. In the spring of 2002, I started my dive charter business and have had a blast exploring and sharing Hood Canal since then,” he said.

When asked how many boat diving sites he frequents in Hood Canal, he replied, “We have six dive sites that are favorites—Pulali East, South and West Walls, Pinnacle, Broken Leg

and Black Point. Another four we do on request as weather and current allow—Rosie's Ravine, Arrowhead, Flagpole and Elephant Wall. Most sites are not current sensitive except Rosie's and Flagpole. For us, wind is the major factor when choosing a site. Our popular shore dives include Sund Rock, Octopus Hole, Jorstead Creek, and Point Whitney.”



Diver with vermilion rockfish







escorting us away.

Large black, copper and yellowtail rockfish were very prevalent at all depths, some free-swimming and some perched on rocky outcroppings of the sloping terrain. Then all of the sudden a bright orange fish swam by. We were both in awe. Probably one of the most colorful of all the rockfish is the vermilion, displaying deep rich colors of red and orange, like this one.

To our delight more appeared. Judging from their size and quantity, this might be a resident population. They didn't seem to mind having divers around, because I was able to collect numerous shots

as they gracefully swam about.

According to the book *Coastal Fishes of the Pacific Northwest* by Andy Lamb and Phil Edgell, a large female vermilion is capable of releasing as many as 2,600 tiny young, usually during the winter.

Since Ron and I were the last ones in the water, we didn't really see much of the others on our dive. I spotted a lone adult male wolf-eel in a den and was taking advantage of its tolerance to my camera when Ron signaled me over. Okay, maybe he found the pair of wolf-eels!

At first I did not see the smaller female wrapped around a yel-



lowish-white ball of eggs, until I got closer. The male quickly let us know where the parameters were and as long as we respected the distance, he was content. The egg mass was about the size of cantaloupe melon. Unfortunately using a wide-angle lens on my camera didn't help much, but Ron acquired some fabulous footage which he later shared.

"I have not done a lot of diving in Hood Canal previously," admitted Ron, "But after doing a day of diving with Pacific Adventure, I wondered why not. Naturally I survey an area for the health of its marine life while diving, trying to note its diversity. Seeing the pair of wolf-eels and lings with eggs tells me this area is doing okay. The wolf-eels were a real treat to see and they were exactly where Don said they would be during his briefing, so it just was a matter of finding them."

The rockfish were a big hit with Ron as well, "The biggest surprise for me was the health of the rockfish populations in Hood Canal. At Pinnacle there were numerous

large vermilion rockfish, a species I rarely, if ever, see in Puget Sound or the San Juan Islands."

Later Ron sent me several images of the wolf-eels with their

them how they enjoyed their dive. Jim Copher and Mike Meagher, also from Bellingham, were out on the boat testing a new housing Mike has constructed for the

## Hood Canal

bundles of life, which he took from his video. Very cool.

### Pulali Point

The second dive location, Pulali Point, was not far away, marked by another WSA buoy. As we enjoyed a hot cup of soup and a delicious sandwich, I chatted with the other divers, asking

GoPro camera.

Mike commented, "While Hood Canal does not appear to have the invertebrate life the San Juans do, I am still looking to do more dives here. I love diving at Pinnacle because there are always wolf-eels and lings when we visit it. And I like Don's boat and his crew. He does a very professional job of briefing the divers, and tells you with great accuracy where to find subjects. That sort of knowledge is beneficial to the underwater filmmaker, allowing us to go right to the subjects we desire to get shots of. Jim and I will be back on Don's boat soon. I do have some decent video posted on YouTube from the Pinnacle site and Hood Canal." [See <http://www.youtube.com/wolfeeldiver>]

More of Mike's videos can be found on YouTube by doing a search for "MikeMeagherProduc-



Wolf-eels protect their eggs and nest (above); Male wolf-eel hiding in crevasse (far left); Striped sea perch (top)





LEFT TO RIGHT:  
Sunflower seastar;  
Vermillion rockfish;  
Lingcod, starfish  
and sea cucumber  
on rocky reef

in many parts of the world.

When checking out a crab crawling around a possible octopus den, I noticed a small painted-greenling fish, camouflaged upon some dark red and brown pieces of kelp. Sometimes I just like to pause, admiring little creatures like this (I still had my wide-angle lens on) and watch how they go about foraging. Even the huge boulders we found covered with



## Hood Canal

tions" to locate his channel.

Mike hopes to have his new housing available to market in a few months, which according to him will be "unique in the world". He also states it will have improved underwater optics and oversized controls for divers wearing gloves, not to mention it has already been pressure tested to 330 feet.

Another buddy team was Connie Zastrow and Jay Lonner, testing out their new drysuits. "In my heart of hearts, I'm a tropical water diver," said Connie, "but, that being said, I want to love cold water diving, and I thought Hood Canal was a great place to take the plunge. It really was a good place to start—small boat, attentive crew, no current and plenty of interesting things to see." Both Connie and Jay hope to return this spring for more exploration.

Ron and I entered the water (was it colder?) at Pulali and followed the mooring buoy line down to the site. Tall white

plumose anemones decorated the rocky landscape. Connie and Jay waved as they passed by, heading deeper. The descent was not as steep as the previous dive but a nice stretch of wall allowed me to get below more large lingcod. I've always loved the emerald green hue of northwest water when shooting upwards to frame my subjects in.

Lately I have heard there are dwindling sea star populations in many parts of the northwest, baffling scientists. Some areas have been devastated. Here in this part of Hood Canal they all seemed fine. Many believe pollution is the cause and others feel it is a natural cycle since it has happened before. My bet is that pollution is the culprit, because other marine species are also dwindling in some areas—a trend I am seeing



yellow zoanths had tiny critters between their tiny yellow bases when you look close.

After coming across Mike and Jim with their new proto-type on a quad-pod and waving at the camera, we headed for a group of copper rockfish. Each fish seemed to have their own special area on

the reef, as did the vermilions. However, black rockfish were everywhere.

Before long it was time to ascend. While hanging around the 20-foot depth (six meters), I watched a dozen striped perch bounce about from one rock pile to the next like the small groups of fish do in the tropics with coral heads. Their silvery irides-





Painted greenling resting on rocky reef (above); Diver with video camera at Hood Canal

## Hood Canal

needing air or Nitrox fills, Don is able to accommodate at his dock and can provide rental tanks for those diving with him. Be sure to reserve before hand. Divers can also rent gear and have their tanks filled at Hoodspot 'N Dive.

Another oceanfront fill station can be found at Mike's Beach Resort in Lilliwaup, on Highway 101. They offer accommodations and beach access (fee applies to non-resort guests) to the site called Flag Pole. I watched a couple of video clips on their website and now want to dive there to photograph their cloud sponge gardens! Ron ad-

vises to bring a dive kayak though. Next trip...

For more information visit: [www.pacadventure.com](http://www.pacadventure.com) or [www.pleasantharbormarina.com](http://www.pleasantharbormarina.com). ■

rooftop seating."

One of the things I always like to ask local operator about their special segment of the diving world is if they have ever experienced any awe-inspiring encounters. Don answered, "Hard question, too many memories,

like my first yelloweye rockfish, first wolf-eel eggs, first six gill shark, and many special memories diving with new and old friends. But one dive in January of 2011 I sighted three six gill sharks on one dive!"

"Yes, yes?" I persisted.

"I was fortunate to see three six gills on one dive, the site however is at or just beyond recreational limits for depth so I hesitate to say much more. Over the years six gill sightings have not been uncom-

mon at several of our sites. If we wanted to name one site with the most sightings within recreational limits it would be Rosie's Ravine. We have also had sightings at Pulali Point, Rosie's, and Flagpole. Usually the most likely time to see them has been mid to late summer."

I was happy with my one-day dive charter in Hood Canal and plan to return in March when Ron and his group will spend two days exploring the area. I am excited to check out some of the other sites where I can also take my kayak out when not diving. The water is calm enough, at least where we were, paddleboards can also be enjoyed. Don has suggested other activities like a drive up the river valleys or a day hiking in the Olympic National Park.

Just last year I spent a couple of days hiking the Mt Townsend

trail and Hurricane Ridge where I was able to collect some breathtaking imagery of wildlife and scenic mountain views.

For visiting divers to Hood Canal

cent blue bodies shimmered in the sunlight to the point I had to catch a few images of them.

### Upgrades, awesome tales and topside excursions

On the way back to the marina, after another cup of hot soup and a couple of freshly baked chocolate chip cookies, Don said, "My wife Diane manages Pleasant Harbor Marina. Over the past few years upgrades included replace-

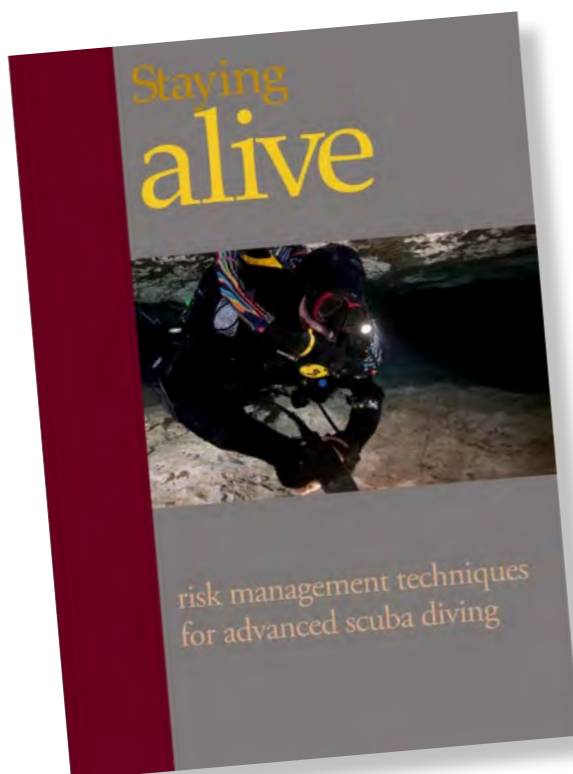
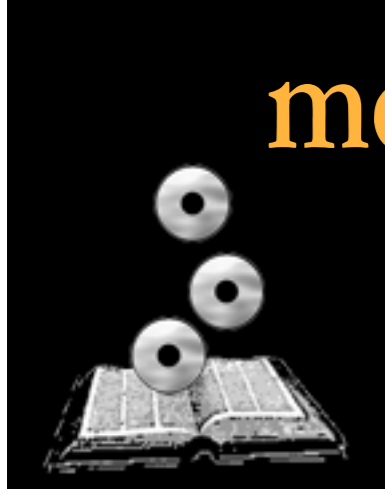
ment of old wooden/Styrofoam floats with composite docks, a new fuel dock, a new pool and hot tub for tenants, remodeled restrooms, showers and a laundry facility. We offer permanent and transient deep-water moorage for boats up to 120 feet. By mid-June we will complete replacement of our old main building with a new building where we will have a restaurant (we're famous for our pizza) and an upstairs pub with outdoor

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## Don't become a statistic

*Staying Alive: Applying Risk Management to Advanced Scuba Diving*, by Steve Lewis.

Follow author and technical diving instructor-trainer Steve Lewis as he outlines eight straightforward steps that both sport and technical divers can follow to stay safe on a dive. Originally proposed by cave and deep diving legend, Sheck Exley, these guidelines help divers avoid the mistakes that are often the result of ignoring established limits. There are very few diving accidents, according to Lewis. Many unnecessary deaths were completely avoidable. This is a must-read for every conscientious diver, whether recreational or technical.

Paperback: 196 pages  
 Publisher: Techdiver Publishing (First Edition)  
 Date: 7 Jan 2014  
 ISBN-10: 0981228046  
 ISBN-13: 978-0981228044



## Plastic Gyre

*Gyre: The Plastic Ocean*, by Julie Decker

The oceans are awash with our plastic debris. Huge gyres of plastic garbage are swirling with our trash. But a few clever artists are creating new art out of the litter and raising awareness to the issue at the same time. This book explores the relationship between people and the ocean, where the cast-offs of our culture of consumption are creating an ever-growing environmental catastrophe.

Hardcover: 200 pages  
 Publisher: Booth-Clibborn Editions  
 Date: 24 Feb 2014  
 ISBN-10: 1861543557  
 ISBN-13: 978-1861543554

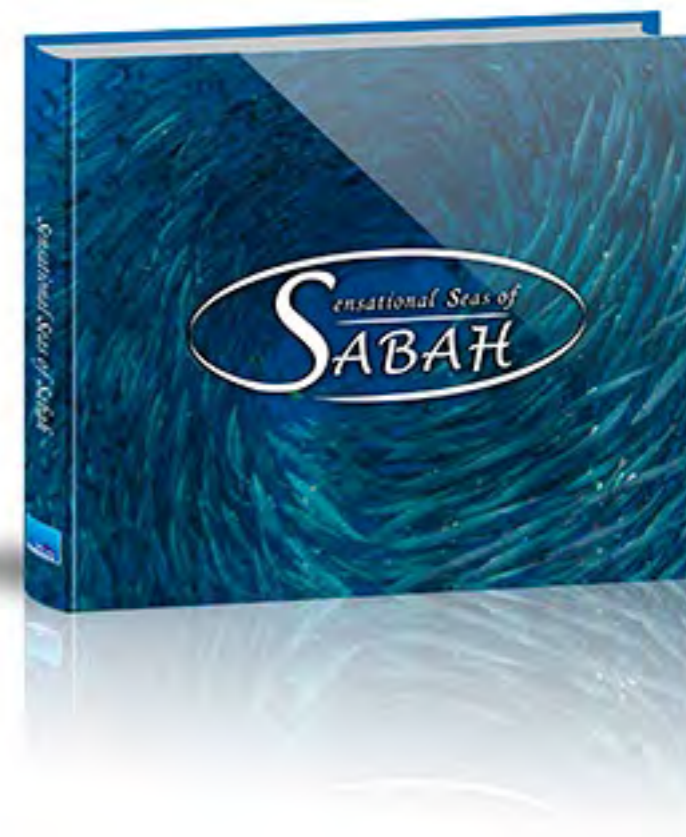


## Sea Adventure

*Bahamas Blue*, by David Poyer.

Dive fiction at its best, according to notable sources such as Clive Cussler and the New York Times Book Review. Best-selling author Poyer's sequel to his previous novel, *Hatteras Blue*, takes the reader into the world of salvage diver and ex-con Tiller Galloway who finds himself working again for "The Baptist"—a menacing kingpin Galloway vowed never to work for again. But it was an offer he could not refuse—raising 50 tons of sunken cargo off the Caribbean Sea floor. The plot takes our hero on a dive teetering on the edge of death, amid conflicts, hostile islanders and government corruption, as the sinister scenario unfolds in a captivating and vivid underwater escapade.

Paperback: 354 pages  
 Publisher: CreateSpace Independent Publishing Platform  
 Date: 17 Jan 2014  
 ISBN-10: 1494808854  
 ISBN-13: 978-1494808853



## Biodiversity hotspot

*Sensational Seas of Sabah*, by Scubazoo.

Compiled by Scubazoo—an independent production company of underwater cinematography and photography based in Kota Kinabalu, Sabah, Malaysian Borneo—this beautiful coffee table book will entice any diver hungry for the biodiversity and rich coral reefs found in the heart of the Coral Triangle. A magnet for divers, Sabah boasts glorious tropical islands, clear warm waters and sandy beaches. Species such as the endangered hawksbill and green sea turtles, sharks and thousands of jacks and barracuda can be found here, as well as rare creatures such as the mimic octopus, harlequin ghost pipefish and flamboyant cuttlefish, images of which you can find in the brilliant, colorful pages of this book.

To order, go to: [www.scubazoo.com](http://www.scubazoo.com)





Edited by Kelly LaClaire

## Extinct mammals of the Ancient North Pacific revealed in study

Robert Boessenecker, a Geology PhD student at New Zealand's University of Otago, has released in the international journal *Geodiversitas*, revealing that before the last Ice Age, many strange mammals, now long extinct, lived in the waters of the North Pacific.

Studying hundreds of fossils he excavated from the San Francisco Bay Area's Purisima Formation, Boessenecker pieced together bones and teeth of 21 separate marine mammal species including: dwarf baleen whales, bizarre double-tusked walruses, odd porpoises with severe under bites and a dolphin closely related to the now-extinct Chinese river dolphin

Among his finds, which were

fossilized 2.5 to 5 million years ago, was a previously undiscovered species of cetacean named *Balaenoptera berate*.

According to Boessenecker, his discovery belongs within the same genus as minke and fin whales, indicating that the *Balaenoptera* lineage has lasted for three to four million years. *Balaenoptera bertae* would have been approximately five to six meters in length, slightly smaller than modern minke whales.

### Excavation

The recent publication represents eight years of research by Boessenecker, who at the age of 18 was tipped off by a local surfer about bones near Half Moon Bay. When

he discovered the fossil site, he was astonished by the numerous fossil beds and hundreds of bones sticking out of the cliffs.

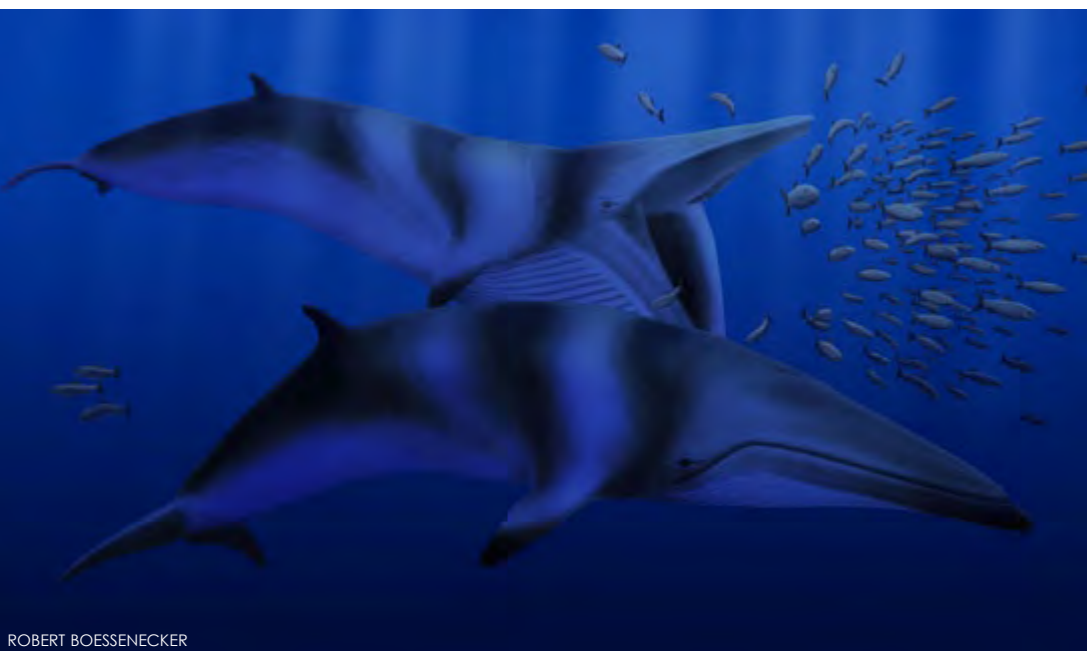
He excavated the incomplete skull of *Balaenoptera bertae* during early field research there in 2005, and it was encased in so much built up rock and earth that it took five years to remove.

"The mix of marine mammals I ended up uncovering was almost completely different to that found in the North Pacific today, and to anywhere else at that time," he said.

Primitive porpoises and baleen whales were living side-by-side with northern fur seal and right whales as well as beluga-like whales and tusked walruses, species far geographically removed from their modern relatives who now live in the Arctic.

Boessenecker said these species most likely began separating once the Bering Strait opened and the equatorial Pacific cooled during the Ice Age. "Modern marine mammals were able to migrate from other ocean basins into the North Pacific," he said, "leading to the mix we see today." ■

SOURCE: ROBERT W. BOESSENECKER



Artist's rendition of a pair of *Balaenoptera bertae*



Humpback whale breaching

WIKIPEDIA COMMONS

## How whale poop makes breathing just a bit easier for humans

Before we get to the whale poop, a quick science review is in order—I apologize to any biology majors out there, but you're just going to have to bear with me for a moment.

Our science lesson begins with phytoplankton. Phytoplankton are microscopic plants that survive just like land plants, capturing sunlight and turning it into energy by the process of photosynthesis. In doing so, they actually consume carbon dioxide and release oxygen back into the atmosphere. In fact, phytoplankton are responsible for producing half of the planet's oxygen supply, so they are critically important to life on earth.

But sunshine alone isn't enough for the tiny little plants that make up the foundation for the entire aquatic food web (small marine life and fishes graze on the phy-

toplankton and those are then eaten by bigger and bigger predators), they need nutrients as well—and lots of it. The more nutrients an area of ocean has, the more phytoplankton grow. The more they grow, the more small fish populate the area. The more fish, the more sharks, rays, eels, dolphins and, you guessed it, whales.

This is where the poop comes in.

### The power of poo

Whales, as you can imagine, eat literally tons and tons of food and they release incredible amounts of excreta as well, which is filled with massive quantities of nutrients the phytoplankton need to survive. But the whales don't just "go wherever", they are much smarter than that.

Dr Joe Roman, a biologist at

Duke University explains the process. "The whales poop at the surface, increasing productivity of phytoplankton that use the nutrients in the feces. So you're going to get more fish and of course that's going to help the whales. So in a sense, they are fertilizing their own gardens."

The surface of the oceans receives far more sun than deeper waters, and by spreading their leavings across the surface, the whales are factually creating the perfect balance of light and food for the all important phytoplankton to thrive in. And the more these little plants eat and photosynthesize, the more oxygen they create for us humans to breath.

So, the next time you're out at sea, breathing the fresh salty air, take a moment to thank the whales for being so smart—and so regular. ■





## Blue whales off New Zealand

Rare blue whales were spotted off the coast of New Zealand by scientists from the National Institute of Water and Atmospheric Research (NIWA). The researchers were on an expedition to study the blue whales in the South Taranaki Bight. The team observed almost 50 blue whales.

"It is very exciting to see these whales and start the process of collecting important data on this undescribed population and poorly understood foraging habitat," said marine ecologist and research team leader, Dr Leigh Torres. "In addition to finding the whales, we were able to detect their prey visually on the surface and at depth using hydro-acoustics."

The research team's goal is to collect important data to further current understanding of the blue whale population in the area. Recent studies have showed that there were more blue whales in the area than expected, probably linked to a major upwelling system which causes large clouds of plankton, upon which the blue whales feed. It was thought that the whales only passed through the area upon their migration to other feeding grounds.

"Blue whales need to eat vast amounts of plankton to support their energy demands. But there are just four confirmed blue whale foraging grounds in the Southern Hemisphere outside of Antarctic waters," said Torres. ■ SOURCE: NIWA

## Brazilian River Dolphin

**It is the first time in a nearly 100 years a new species of river dolphin has been discovered in the Araguaia River basin of Brazil.**

Scientists warn that it is highly endangered. Named after the Araguaia river where it was found, the species is only the fifth known of its kind in the world.

### Extinction looms

True river dolphins are some of the rarest and most endangered of all vertebrates. They comprise relict evolutionary lineages of high taxonomic distinctness and conservation value, but are afforded little protection. Three of the four other known species are listed as "threatened" by the International Union for Conservation of Nature (IUCN). One of the best known species, the Yangtze river dolphin or baiji, is believed

to have gone extinct in about 2006.

In the study, the Brazilian team concluded that the DNA of the Araguaian river dolphins is sufficiently different from that of other botos to warrant designation as a new species. The degree of difference suggests that the Araguaian boto most likely separated from other dolphin species more than two million years ago. Physical and genetic differences from other dolphins, they write, represent "strong evidence that individuals from the Araguaia River represent a distinct biological group."

The researchers propose that the new species be called the Araguaian Boto, or Boto-do-Araguaia. The scientists in Brazil observed about 120 of the Araguaian dolphins over 12 weeks. They estimate that there are about 1,000 of these creatures living in the river that flows northward for more than 2,600km to join the Amazon. ■

## New species of whale discovered

**With the re-discovery of *Mesoplodon hotaula*, there are now 22 recognised species of beaked whales.**

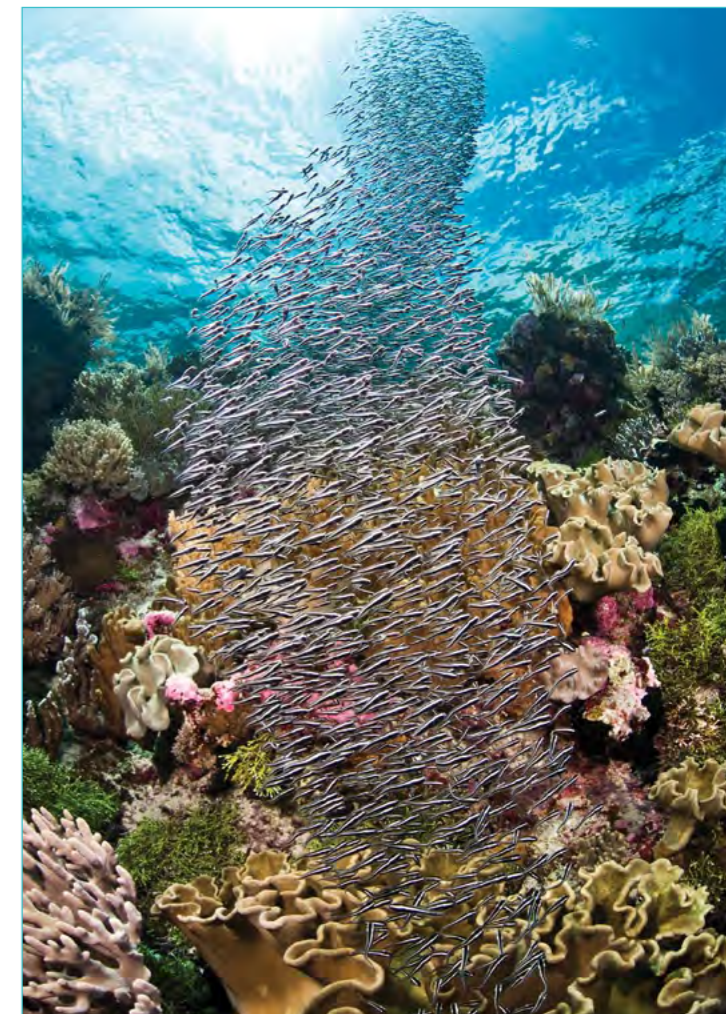
The discovery is based on the study of seven animals stranded on remote tropical islands in the Indian and Pacific Oceans over the past 50 years. The researchers used a combination of DNA analysis and physical characteristics to identify the new species from seven specimens found stranded in Sri Lanka, the Gilbert Islands (now Kiribati), Palmyra Atoll in the Northern Line Islands near Hawai'i, the Maldives, and the Seychelles.

The first specimen was a female found washed up on a Sri Lankan beach more than 50 years ago. At the time the National Museums of Ceylon, P.E.P (Paulus) Deraniyagala, described it as a new species, and

named it *Mesoplodon hotaula*, after the local Sinhala words for 'pointed beak'.

However, two years later, other researchers reclassified this specimen as an existing species, *Mesoplodon ginkgodens*, named for the tusk-like teeth of the adult males that are shaped like the leaves of a ginkgo tree.

"Now it turns out that Deraniyagala was right regarding the uniqueness of the whale he identified. While it is closely related to the ginkgo-toothed beaked whale, it is definitely not the same species," said international team leader, Dr Merel Dalebout, a visiting research fellow at UNSW. ■



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Marlies and Wolfgang Liebau, November 2013



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Text and photos by Pierre Constant

# Namibian Sinkholes

*Exploring the Magic Triangle*







Aigamas cave entrance



PREVIOUS PAGE: Tetsu at Guinas sinkhole, with three pumping stations

**Who could imagine for a minute that Namibia is a diving destination? Nobody. Despite its 2,000km of coastline, this is the mere truth. The marine temperatures are about 13°C on average, with an almost nil visibility resulting from stirred up waters and omnipresent sand. There is nevertheless a light of hope at the end of the tunnel. Some 30 years ago, caves and sinkholes were discovered, a peculiar reminder of the ‘cenotes’ in Mexico. In the old days of the German colony (1890-1915), the farmers of the north-east would draw water from these sinkholes, with electric pumps, for their cattle and in order to irrigate their farms. A hundred thousand years ago, San or Bushmen knew about their existence, too, for they gave names to these natural pits. Somehow, these inspired fear. The belief was that, whoever fell in would not come out alive!**

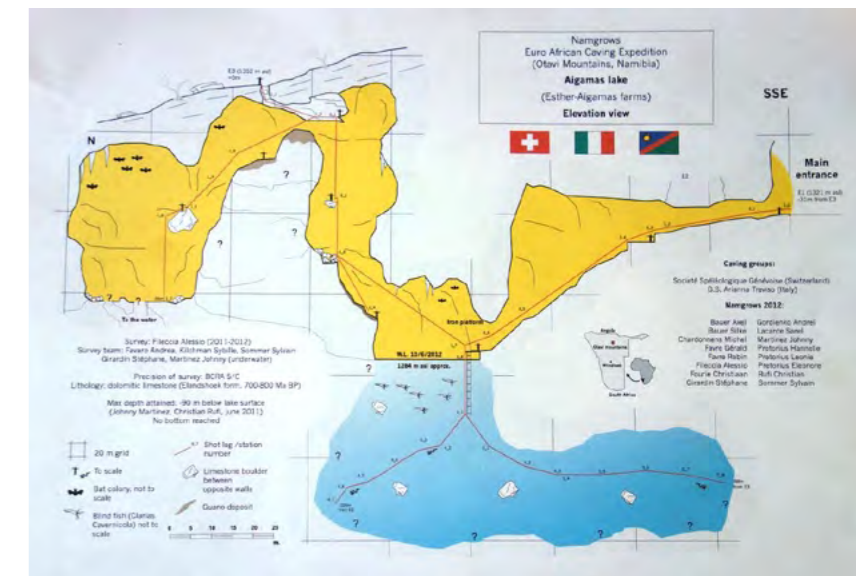
Originating in Antarctica, and born roughly five million years ago, the cold Benguella current flows from south to north along the Atlantic coast, creating a coastal desert. For sure, these waters are rich in fish and marine life, due to the upwelling of the Benguella current. Twenty species are currently harvested—hake, monkfish, sole, king-clip, snoek, but also horse mackerel (*Scomber japonicus*), pilchards, anchovies, skipjack tuna, albacora, spade-fish and pelagic sharks. Aquaculture is prolific, with a substantial production of oysters in Walvis Bay, Swakopmund and Luderitz (six million per year), abalone farms, mussels and agar agar in Luderitz, not to mention rock lobsters and deep water crabs. All in all, conditions that favour fishing, but which are resolutely a ‘no no’ for divers.

**Geology**

Once upon a time, the region was called Süd-West Afrika by the Germans. The actual territory of Namibia is a very old land, geologically speaking. Before the creation of Gondwanaland, some 540 million years ago, Earth was a huge ocean with some isolated ‘cratons’, which are commonly referred to as the original crust of the planet. Two thousand five hundred million years ago, southern Africa was made of two cratons: the Congo craton in the north

Axel's briefing before the dive; Survey map of Aigamas cave, by Alessio Fileccia (below)

**Namibia**



and the Kalahari craton in the south, both separated by a southwest-northeast extension of the ocean, known as Damara Sea.

Limestone like deposits were then generated. The Kalahari craton then collided with the Congo craton, with the subsequent subduction of the former under the latter.

Three hundred million years ago, Namibia was located near the South Pole and affected by tremendous glaciations. These ended 280 million years ago, when this part of the continent broke off from Antarctica.

The calcareous reef thus created in the Damara Sea 750 million years ago, were not made of coral—since it did not exist yet—but were secreted by cyanobacteria, better known as stromatolites. These encrusting algae are the oldest living forms on the planet (3,500 million years). Deposited over a period of 100 million years, these sediments formed layers of dolomite 5,000 metres thick. Mind blowing, right?

The intensive erosion that followed over the next 500 million years and during the humid phases of the Cretaceous and Tertiary, brought about the dissolution of the carbonates, a process known as karstification. Lime or dolomite, are eroded by an acid carbonic solution, related to rainfall.





Catfish swimming, displaying blue eyes (left); Carcass of bat underwater (above); Metallic stairway into Aigamas Cave (right); Tetsuaki in front of climbing ladder, neck deep in floating guano, Aigamas cave (lower left)



### The magic triangle

The "magic triangle" is found in the region of the Otavi Mountains, located between Tsumeb, Grootfontein and Otavi. At least 83 caves, chasms or sink-holes have been listed since 1974. A good number of those have been surveyed by Germans, South African, and Swiss speleologists since 1967 and even earlier.

Upon the occasion of one of my numerous trips to Namibia since 1992—being myself a cave diver since 2003—I decided eventually to find out about this. Accompanied by my Japanese client and friend Tetsuaki Masuda, we showed up at Aigamas farm one morning on 1 April 2013.

Cordially welcomed by Axel Bauer, a tall German farmer who could be straight out of the movie *Out of Africa*. We also met Chris and Steff, the fine team of technical divers from Namibia who will be responsible for logistics and security during our diving explorations.

### Aigamas sinkhole

*Aigamas* is a local name, which in Herero language means *big water*. We

drove up a mountain ridge of the farm with the 4x4 to get to it. The proper access did not look like much. The cave had a tent-like shape, pointed like a teepee, along a south-north fracture in dolomite limestone.

"It will be a 120 metres progression in the dark," said Axel referring to a sketched map before we ventured inside. We all had to sign a liability release as well.

The gradual slope was negotiated partly with a metallic stairway, then we made our way with some ropes on slippery boulders covered with debris, until we reached the platform. An iron grid overlooked the pool of water about 18 metres long. From here an iron ladder plunged 5m below, down to the water level.

"The exploration and a survey attempt was done by a Swiss-Italian team in 2011-12," said Axel.

Lead by Gerald Favre of the Swiss Société Spéléologique Genevoise, the survey map was done by Alessio Fileccia from Italy. The maximum depth of the dive was recorded at 93 metres, but the bottom was not reached. The fact is that Aigamas is a very narrow fracture

that plunges into a void.

### April fish

My quest today was stimulated by an encounter with the April fish (from the French saying, "Un poisson d'Avril") and that one is no joke!

Fortunately we found it, for it is endemic to the site.

*Clarias cavernicola*, or giant cave catfish, is a very unique species. Mostly found at the surface of the water, where it feeds on the floating guano of bats, which falls from the roof of the cave. A priori blind, the fish is about 16 to 25cm long, sulphur yellow in colour, with two pin-like turquoise blue eyes. The rounded head has the shape of a bony helmet, pointed like an arrow behind the nape.

Eight conspicuous barbels are found around the mouth, which enable the

cave catfish to detect its food. It possesses a long dorsal fin, two small pectoral fins, two pelvic fins and a long anal fin that ends towards the tail, which is short and straight. Clear chevron markings are visible along the sides. The body is compressed, fusiform and eel-like. These characteristics are enhanced by the undulating movement of the catfish. Some specimens show an atrophy of the eyes, which become globulous and obviously useless.

The ancestor of *Clarias cavernicola* is most certainly from the Kunene or







CLOCKWISE FROM LEFT: Diver at the winch at 40m; Chris displaying the permit of National Heritage Council; Otjikoto dive platform and pumping station; Return to Otjikoto base after first dive; Tetsuaki inspecting the toilet bowls at 40m



cave man, covered in bat guano, to the delight of Steff who recorded the scene on his Go-Pro, as soon as I dropped the scuba tank.

### Otjikoto sinkhole

Some 20 minutes north of Tsumeb, is Otjikoto Lake—an historical site that depends on the National Heritage Council of Namibia, a government body which governs research and archeology. A diving permit is

the site was a trading post. Later on, the surrounding hills were guarded by armed men to prevent any exploitation of the copper ore, which was plentiful there.

Otjikoto was officially discovered in May 1851 by Charles Anderson and Francis Galton.

For the geologists, Otjikoto is a perfectly circular dolomitic sinkhole in the karst of the Damara Belt. Shaped like a calabash, the lake has a diameter of 102m and a surface of 7,075 sq m. As the depth at the centre has been estimated at 71m, the maximum depth on the sides went well beyond 145m, and to this day remains unknown.

“Come on, I’ll show you the dive plan!” shouted Chris with excitement, as we neared the edge of the cliff for a panoramic view. “The idea for the first dive is The Reef, an acclimatization dive

Okavango River further north, from the time when these rivers were flowing into the Etosha Pan (3 million years ago). Etosha was once a huge lake part of the Ovambo basin.

I sank down to a depth of 37 metres, in a crack that is hardly two metres wide. The water temperature was exquisite at 25°C. A number of bat corpses were found lying on the edges underwater, complete and apparently undisturbed by the catfish. It is said that the fish has also a cannibalistic behavior on the young individuals. I exited Aigamas as a true

compulsory. Delivered by the Namibia Underwater Federation, it is submitted for approval by the National Heritage Council, which controls all dive activities at Otjikoto. After Chris presented our permits to the authorities and we each paid the N\$25 entry fee, we were welcome to proceed.

Originating from the Otjiherero language, the name *Otjikoto* means, a *place too deep for cattle to drink*. The San called the site *Gaisis*, or *very ugly*, as it inspired fear in the bushmen.

Before the arrival of the first Europeans,



at 40m on the southern part of the sinkhole.”

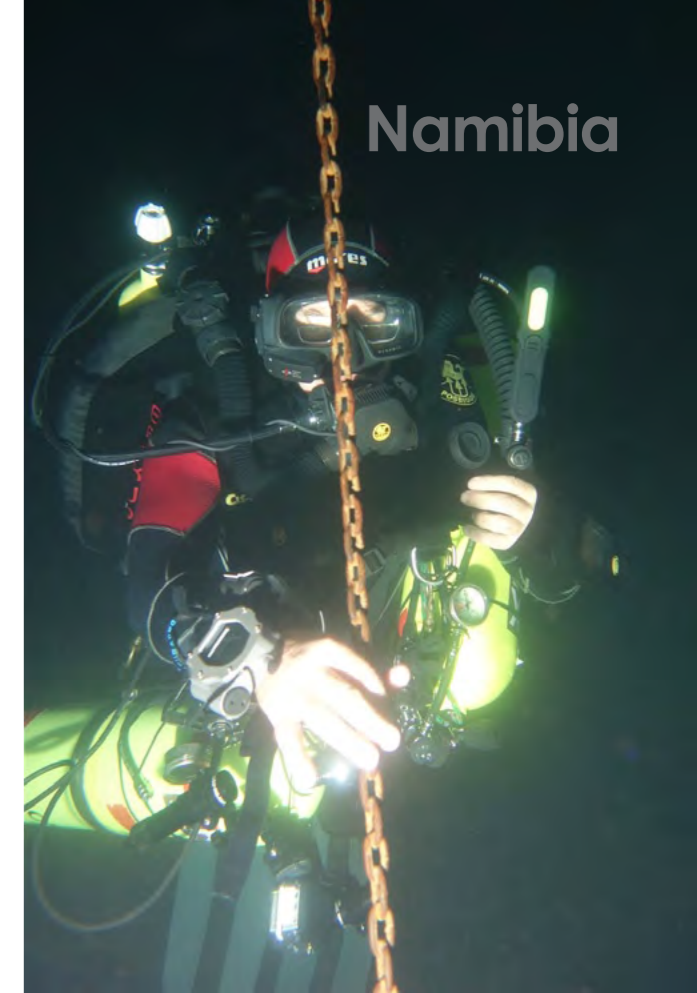
Carrying the 15-liter steel tank, we accessed the water by a small

metallic stairway. “The level of the lake has never been so high, since the heavy rainfall of last year,” commented Steff. The level would normally have come up ten metres or so.

Finning on our backs, we crossed the lake from north to south. Hovering above







CLOCKWISE FROM LEFT: WWI German 3,7cm machine gun upside down at 57 metres in Otjikoto sinkhole; Chris and Tetsuaki at decompression stop; Chris coming up along the anchor chain in Otjikoto sinkhole; Shells in between the wheels of the machine gun; Shells and ammunition box



Kudu horns (an antelope).

From here, a line had been extended horizontally over the silty ridge, passing by various markers that had been ditched into the sinkhole—a bicycle wheel, a 40km speed limit signboard (reminder of the depth), an old rusted winch and finally a couple of toilet bowls, that shone like ivory jewels in the light beams.

The temperature of the water was very

acceptable at 20°C. The dive time was 41 minutes, with 15 minutes along the bottom. A safety stop of three minutes at six metres was followed by a four-minute stop at three meters and a 99 percent O<sub>2</sub> bottle was shared between Tetsuaki and myself—"To flush your excess nitrogen out!" warned Chris laughing. In fact, we

came out of the water with a delightful sensation of well being.

After a three-hour interval, the afternoon dive promised to be serious stuff. Twin tanks were used this time, with a mix of 19 percent oxygen and 30 percent helium.

During WWI, the Deutsche Schutztruppe of the German colony was attacked by the forces of the new Union of South Africa, fomented by the British crown. The army of the Reich was

pushed north as far as Tsumeb, where the Germans finally capitulated. To prevent their armaments from falling into the hands of the enemy, the German army dumped all their canons, ammunitions and guns, late June 1915 (Gunther Walbaum).

Since then, a number of these war relics have been salvaged in the 1960s and in the 1980s by intrepid recreational divers from Tsumeb. These items are on display today at the small Tsumeb Museum. It is a colourful history, which has left



its mark on Namibia forever, for even today the influence the German presence had is evident in the country.

### Night dive

A night dive to 57m was done over a highly volatile sedimentary bottom. Resting upside

down on the bottom was the so-called 'Cannon' and its two wooden wheels. Built by the company Friedrich Krupp in 1903, the 3.7cm automatic machine gun (POM-POM) shot projectiles of 1 pound (450grams), with a maximum range of 2,750 metres. A perfectly restored specimen can be admired at the Tsumeb Museum, as well as other pieces of artillery.

The Germans would have thrown away between 300 and 400 wagons of ammunition, 24 cannons and 85,725 Mausers. One of the wagons is now on display at the "Alte Feste" in Windhoek, the old German fort of 1890.

Suffice it to say that the stay at 57m depth was rather short, a fortiori when the visibility was soon disturbed by the presence of divers. Particles in the water was not conducive for flash photography, therefore I had to take pictures in ambient light, i.e. with a torch.

A few boxes of ammunition lay about, as well as a few live shells. The return to the surface required three deco stops at 9m, 6m and 3m, the latter two on pure oxygen. Despite it all, my Aladin comput-

The Reef, we eased ourselves down with the help of a chain anchored to the bottom. The colour of the water was a psychedelic apple green; the visibility was rather limited.

Soon we entered the pitch black darkness, and the underwater torch was a must. The first sight was that of a pair of





Guinas sinkhole and entry ladder (above); Endemic *Tilapia guinasana* (left)

er was not satisfied with the treatment and added a 22-minute safety stop at 3m.

Steff helped me understand with his slate: "You are on oxygen, not air!" My computer was not adapted to these advanced gas mix calculations.

I came up to the surface to the great relief of Tetsu who reckoned that it was taking too long. However, my Aladin,

frustrated beyond words, started beeping madly and went into SOS mode for the next 24 hours, depriving me of my computer for the next day's dives. Tech diving is such another world.

"How about some 'Fire Water'?" suggested Steff with a laugh, to celebrate the event. After a polite refusal, Tetsu complied and ended up tipsy, as was expected!

### Guinas sinkhole

A bird's flight away in the direction of Etosha National Park, Guinas Lake is an elliptic sinkhole at 140m by 70m. To be politically correct, we pay a visit to the new owners, Nyck and Ludye of Cando Farming, producers of onions and potatoes, a farm of 700 hectares.

"The access to the sinkhole belongs today to three different partners, each one having his own pumping station,"

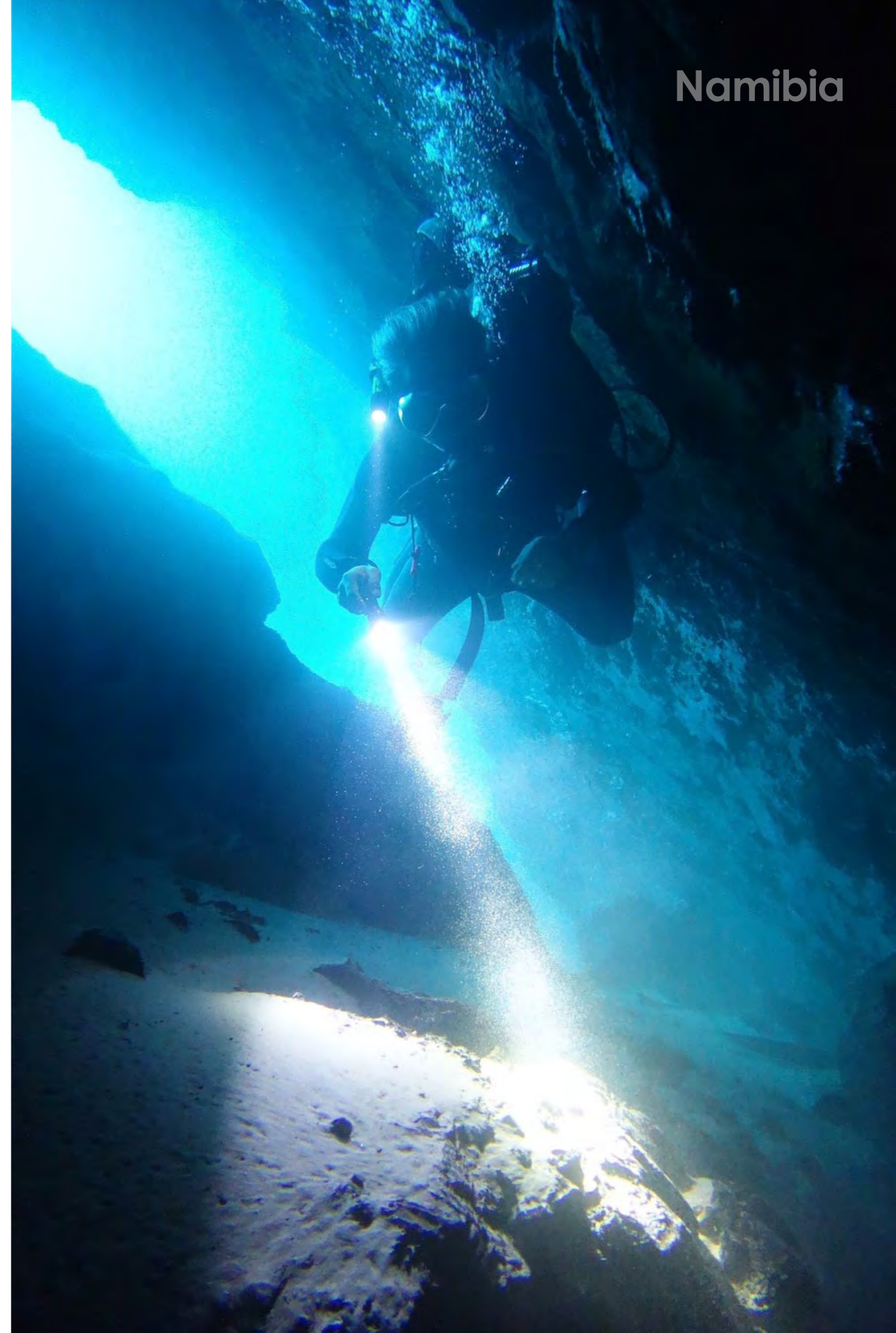
explained Chris. "In the old days, the best entry point was on the side of an angry farmer, who had the habit of shooting at any diver who attempted to cross his territory secretly," lamented Steff.

Twenty years have passed, and thank heaven, the angry bird is no more! "Before independence, Guinas was a food production farm for the South African army," added Nyck.

A striking difference to Otjikoto is the crystal clear appearance of Guinas Lake. The water has a cobalt blue colour and the visibility is optimal, an underwater photographer's dream come true.

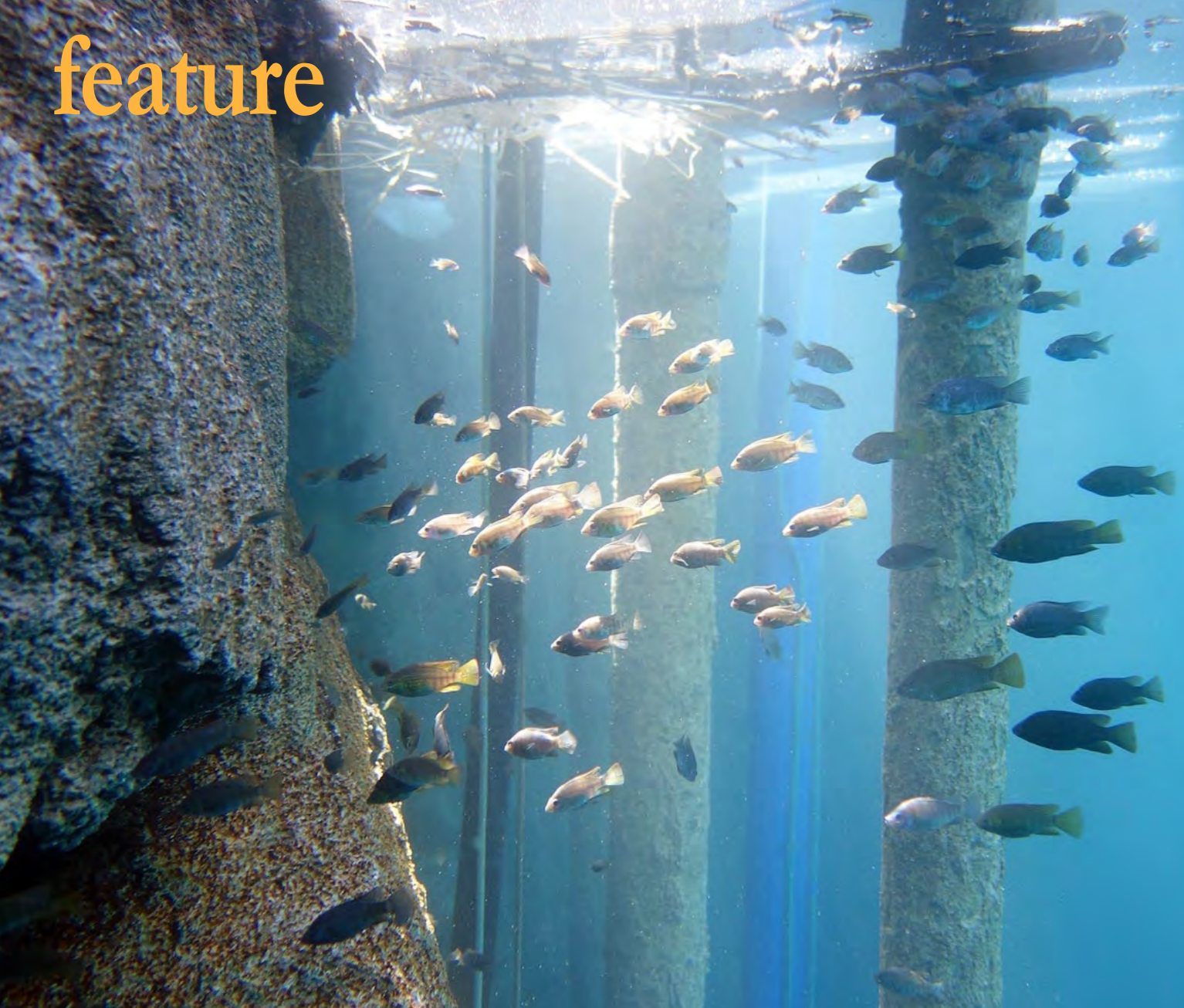
We drive the 4x4 to the lower end of a rocky slope, near an old pump station in a landscape of aloe and spiny shrubs.

Chris had the 15-litres tanks ready with a 26 percent oxygen mix. Since the level of the lake was much higher this year, we could access the water with a rusty staircase, missing each and every step



Tetsuaki at the entrance of the underwater cave at Guinas sinkhole





Stalactites on roof of cavern, Guinas (left); Tetsuaki exploring cave entrance (below)

## Namibia

The second dive at Guinas with Tetsu was done clockwise, starting from a pipe on the north side. The cliff there was carved into a vast cavern where I observed some stalactites on the roof—proof that the cave was out of the water for some time. A proper tunnel disappeared underground at 40 metres, clearly too deep for a sensible cave diver.

An endemic species of Cichlidae fish was discovered here—*Tilapia guinasana*, which is about 10cm long, with colour variations from white to almond green, yellowish, brown, grey to black. The fish move about in small groups, close to the surface waters.

### Diving Guinas

The entrance of a cave caught my attention at 31 metres. A slope of sediments came down to 40m into the darkness. A line extending across a passage underground told me that prior explorations had taken place there.

To my astonishment, I gazed upon a long bone lying on the cave floor—perhaps an oryx? Then I fell upon the upside down blackened skull of an old warthog. At



Ore deposits (above) on the 'cooked' walls, Guinas; Endemic cichlid fish in school at Guinas (top left); Stalactites with ore deposits, Guinas (right)

for convenience.

Chris and Steff decided to dive with their rebreathers and gave us a free ticket to have our own dive the way we pleased.

I chose to have it counter clockwise at first. Impressive, the walls of the sinkhole dropped vertically into the abyss. From hearsay, the maximum depth—up to 120m—was still beyond human reach.

Carved into dolomite 700 million years ago, the typical karst environment of Guinas reveals the spreading of various caves underground. According to geologists, Guinas would be the 12th largest cave in the world, something to make you wonder.



once, I recognized the widening of the nostrils towards the end of the head (or muzzle). They were very ancient bones that I refrained to collect. A couple of photos should satisfy my curiosity.

The tunnel continued at depth, blowing away any illusions I may have had of venturing in myself. The curiosity killed the cat.

To my bewilderment, from the beginning of the dive, the walls of the cavern were covered with a metallic dark silver sheen that reminded me of galena (PbS or lead sulfur). A thought sprung up in my mind that the walls had a conspicuous 'cooked aspect'.

Recollecting my university background in geology and considering that the temperature of the water in Guinas was abnormally high at 27°C, I came to the conclusion that the sinkhole was an active hydro-





Dolomitic landscape at Dragon's Breath Hole; Horseshoe-nosed bats inside cave (left)

remains uncertain to this day. A visit to the Geological Survey Museum in Windhoek confirmed the occurrence of galena in the region of Tsumeb, already famous for its copper mines, zinc, lead, silver, nickel and other minerals exploited by the Germans.

As the day faded to an incandescent sunset, the bush seemed on fire.

"Time for 'Fire Water!'" joked Steff, who had not lost his sense of humour. He handed a drink to Tetsu who could not refuse.

"Oh no, I will be drunk again!" he moaned and laughed at the same time. We returned joyfully to Tsumeb after dark. Tonight was our farewell dinner at the Drus campsite restaurant.

**Otavi**

The Otavi Mountains form parallel ridges

extending east to west. This mountain range is a mine of karstic treasures, and some like Ghaub Cave, have been classified as national monuments.

At 1,643m above sea level, Harasib Chasm on top of a limestone ridge is truly impressive. A vertical pit of more than a 100m, which is only accessible to highly skilled speleologists. In June 2012, Gerald Favre and his team led an exploratory mission with a technical dive to a depth of 147m underwater—still bottomless.

Not far from here, another marvel of nature is hiding in the darkness of Dragon's Breath Hole. The dolomite karst is a reminder of the erosion of the Tsingy in Madagascar, carved like Swiss cheese, with very sharp stone needles.

Back in 1986, the cavers of the South African Speleological Association (SASA), discovered a gigantic underground lake of 19,000 sq m (i.e. 200m by 145m).



Ladder climbing down into Dragon's Breath entrance

thermal vent, related to some ancient volcanic activity.

The magmatic process combined with the Damara orogenesis 550 to 580 million years ago—a mountain building event—bringing ore deposits from a solution of hot water, the source of which







The striking deep pit of Harasib; Andreas' assistant and Tetsu creeping inside Ghaub cave with dive gear; Overview of the chasm, Harasib

Appearances are misleading for the entry hole is a chimney only one metre in diameter!

We climbed down five metres underground with a red metallic ladder. A colony of tiny horseshoe-nosed bats welcomed us under a ledge. A horizontal progression of ten metres led us to a crack and a dead end. "From here, it is a 120m vertical drop, abseiling (rappelling) to the level of the lake," confirmed Chris with a smile.

Following the departure of Chris and Steff, our last exploration was done at Ghaub Cave, a national monument on the top of a ridge. Ghaub Guestfarm leads guided tours inside the cavern.

"We'll have to make our way for about 100 metres underground before we get to the water," said Andreas, the guide. Of course, we had to carry the tanks and the dive gear, with a helmet and a head lamp through a maze of narrow corridors and boulders, which we needed to climb up and down.

"It can be a bloody affair," I was told. To make things easier, I donned a 5mm wetsuit and a 15-liter tank on my back; plus, I carried a camera and a mesh bag in my hands.

The sustained effort made me sweat profusely. I was literally overheating. My heart beat like a drum. I suddenly gasped for air and realized that I could not breathe. I felt like I was very close to having a heart attack; my survival system was on high alert with a red light blinking.

So, when our guide Andreas pointed out to the waterhole some 2.5m down an almost vertical narrow pit, I was in shock. If we ever made it down to the bottom, it would be impossible to come out of the water. We would be drowned like rats.

"We won't make it—it's too risky!" I puffed, as I glanced sideways to a dumbfounded Tetsu. While the water was gin clear and appealing, I decided to call it off. We turned around, to the

great relief of Tetsu, who did not really feel like going for it either. A wise decision indeed.

### Afterthoughts

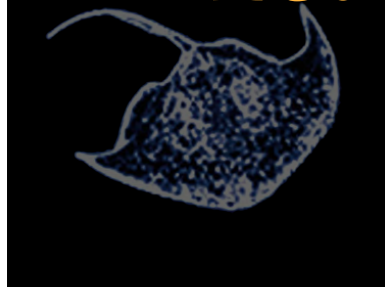
The return to the outside world was a painful affair. The tank was heavier to carry. The fresh air of the surface brought me back to life, though. "In extremis," I thought to myself.

This chapter in our exploration of Namibian caves and sinkholes was closed for now. Back at Ghaub Guestfarm, we recovered from our emotional adventure. A dip in the cool waters of the swimming pool and a cold beer on the lawn did the trick and brought smiles back to our faces. ■

*Pierre Constant has been leading trips to Namibia for over 20 years. He will organize a dive trip there in April and October 2014. For more information, email [calaolife@yahoo.com](mailto:calaolife@yahoo.com) or visit [www.calaolife.com](http://www.calaolife.com).*



# fact file



## Namibia



SOURCES: U.S. CIA WORLD FACTBOOK, XE.COM, MIDLANDSDIVINGCHAMBER.CO.UK

**History** In 1884, the Germans established a colony in South-West Africa in the region that is now called Namibia. During WWI, South Africa occupied the colony and managed it as mandated by the League of Nations (precursor of the United Nations) until after WWII. South Africa then annexed the territory. In 1966 the guerrilla group called the Marxist South-West Africa People's Organization (SWAPO) initiated a war of independence for the region that is now Namibia. A U.N. peace plan for the entire region finally spurred South Africa to agree to end its administration in 1988. Since the country won independence in 1990, SWAPO has governed Namibia. President Sam Nujoma led the country during its first 14 years of self rule, until 2004, when Hifikepunye Pohamba became president after a landslide victory. He was reelected to office in 2009. Government: Republic. Capital: Windhoek

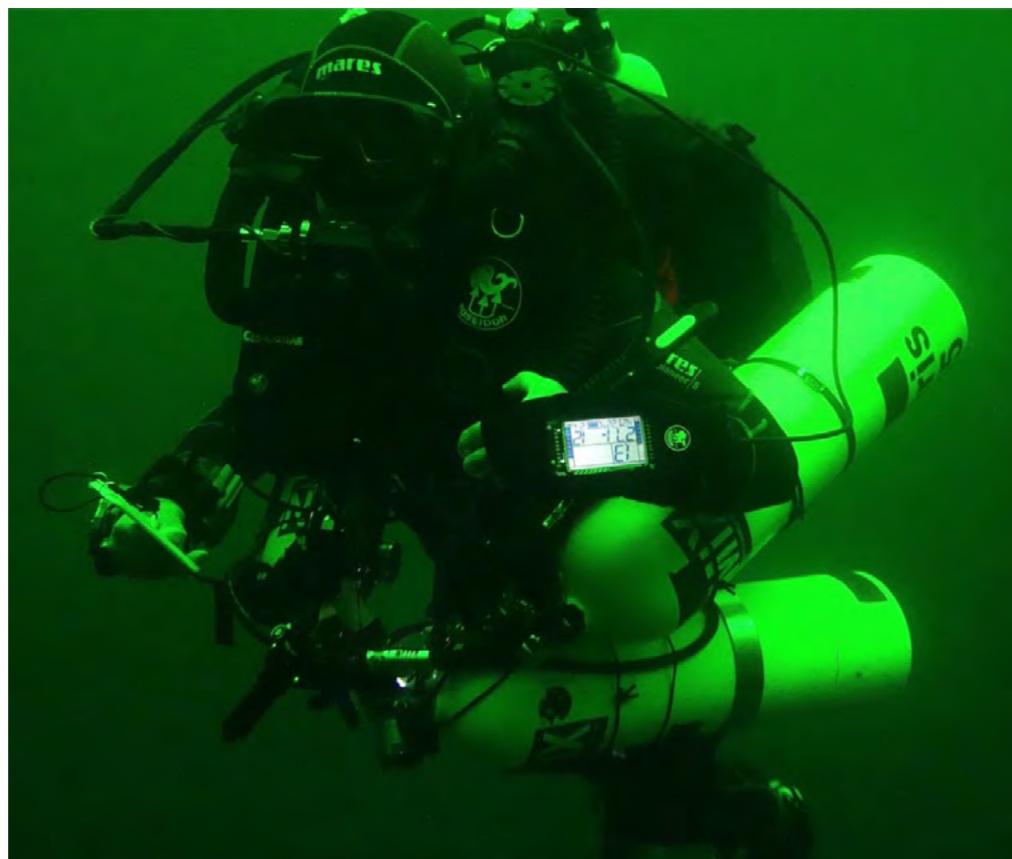
**Geography** Namibia is located in Southern Africa. It borders the South Atlantic Ocean, between South Africa and Angola. Terrain is primarily high plateau with the Kalahari Desert in the east and the Namib Desert along the coast. Coastline: 1,572km. Lowest point: Atlantic Ocean 0m. Highest point: Konigstein 2,606m.

**Climate** Namibia has a hot, dry desert climate with occasional, sporadic rainfall. Natural hazards: lengthy periods of drought.

**Environmental issues** Challenges include limited resources of natural freshwater, desertification, poaching of wildlife, degradation of land leading to few areas of conservation.

**Economy** Namibia's economy is heavily dependent on mining. The region is also rich in diamonds. In addition, marine

diamond mining is gaining importance as the supply of terrestrials diamonds is disappearing. The country is a major producer of uranium, the world's fourth-largest, as well as large amounts of zinc and smaller quantities of gold and other minerals. Three percent of the population is employed by the mining sector. Food shortages are a big problem in rural areas during drought years, leading to the necessity of importing half of the country's cereal needs. There is a wide discrepancy in income



RIGHT: Location of Namibia on global map. BELOW: Map of Namibia. LOWER LEFT: Chris on The Reef in full gear, Ojikoto sinkhole



**Population** 2,182,852 (July 2013 est.) Ethnic groups: black 87.5%, white 6%, mixed 6.5%. Around 50% of the population are members of the Ovambo tribe and 9% belong to the Kavangos tribe; additional ethnic groups include Herero 7%, Damara 7%, Nama 5%, Caprivian 4%, Bushmen 3%, Baster 2%, Tswana 0.5%.



distribution, despite a high per capita GDP relative to the region. The Namibian dollar is linked to the South African rand, as 30%-40% of Namibia's revenues comes from the Southern African Customs Union (SACU). Volatility in the price of uranium affects the country's economy, while profit margins have decreased with the rising cost of mining diamonds, particularly in the ocean. The government is responding by emphasizing the need to increase manufacturing, higher value raw materials and services, such as logistics and transportation.

**Currency** Namibian dollars (NAD). Exchange rates: 1EUR=15.17NAD, 1USD=11.13NAD, 1GBP=18.25NAD, 1AUD=9.94NAD, 1SGD=8.79NAD

Religions: Christian 80%-90% (half are Lutheran); indigenous beliefs 10%-20%. Internet users: 127,500 (2009)

**Language** English is the official language spoken by 7%, but Afrikaans is the common language of most citizens and around 60% of the white population; 32% speak German; and 1% speak indigenous languages

including Oshivambo, Herero and Nama

### Decompression chamber

Erongo Primary Health Services Limited  
Welwitschia Hospital  
Walvis Bay  
tel. +264 (0)64-218-914

### Travel/Visa

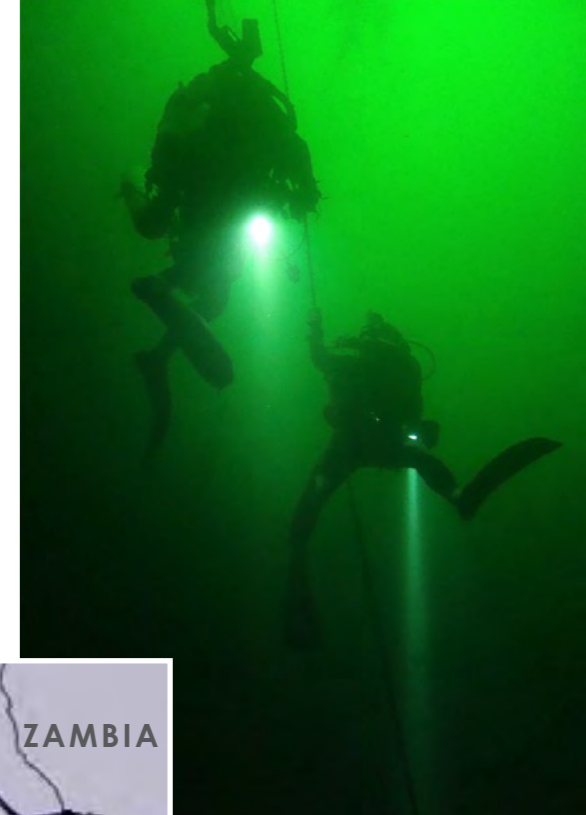
For tourist trips under three months, a visa is not required for visiting tourists from most countries. See your local embassy for more information.

### Health

There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A, and typhoid fever; and vector-borne disease such as malaria; as well as water contact disease such as schistosomiasis (2013)

### Websites

Namibia Tourism  
[www.namibiatourism.com.na](http://www.namibiatourism.com.na)





# turtle tales



Edited by  
Bonnie McKenna

Leatherback  
sea turtle



B KIMMEL / WIKIPEDIA COMMONS

## Pigments from fossils hold key to colors of ancient sea creatures

For the first time, a team of international scientists have found out the colors of extinct marine animals, the predecessors of today's leatherback turtle, by using fossilised skin pigment from marine reptiles millions of years old.

Prior to this study published in the journal *Nature*, researchers could only guess what the colors of huge reptiles, such as the ichthyosaurs and mosasaurs, were. Now analysis of preserved fossilised skin at the SP Technical Research Institute of Sweden and MAX IV Laboratory at Lund University in Sweden have revealed the dark color of a 55 million-year-old leatherback turtle as well as mosasaur 85 million years of age and a ichthyosaur 190 million years of age.

"The most sensational aspect of the investigation is that it can now be established that these ancient marine reptiles were, at least partially, dark-coloured in life, something that probably

contributed to more efficient thermoregulation, as well as providing means for camouflage and protection against harmful UV radiation," said study researcher and senior lecturer in vertebrate paleontology Dr Gareth Dyke of the University of Southampton.

In the study, researchers from Denmark, Sweden, England and the USA analysed dark skin patches of fossils containing a vast amount of oblate bodies a micrometer in size. Previously thought to be the fossilised remains of bacteria contributing to the decomposition process, scientists now know they are in fact remains of the creature's own skin color, the pigment of which is found in these small micrometer bodies.

"Our results really are amazing. The pigment melanin is almost unbelievably stable. Our discovery enables us to make a journey through time and to revisit these ancient reptiles using their own

biomolecules," said co-author of the study Per Uvdal who works at the MAX IV Laboratory. "Now, we can finally use sophisticated molecular and imaging techniques to learn what these animals looked like and how they lived."

Aside from assisting in camouflage, the dark color of the pigment of the skin helped ancient leatherback sea turtles get warmer faster at the surface of the sea, especially in colder climates. "The fossil leatherback turtle probably had a similar colour scheme and lifestyle as does *Dermochelys*. Similarly, mosasaurs and ichthyosaurs, which also had worldwide distributions, may have used their darkly coloured skin to heat up quickly between dives," said lead researcher of the study Johan Lindgren from Lund University in Sweden. ■ SOURCE: UNIVERSITY OF SOUTHAMPTON

## Leatherback turtle by-catch hotspots identified in new study

Researchers tracked 135 tagged sea turtles to find areas of high contact with fishing vessels in the Pacific Ocean. Satellite data collected could help decrease the amount of endangered turtles killed as by-catch. The study pub-

lished in the journal *Proceedings of the Royal Society B* collated data from a number of projects from 1992 to 2008.

"To really get an idea about

where the leatherbacks go, you have got to have turtles tagged from multiple locations," said lead author Dr John Roe from the University of North Carolina's Pembroke campus. "So it took getting just about everyone who has put a satellite tag on a leatherback for other research purposes to collaborate to get a sample size large enough to allow us to answer that question."

Researchers wanted to find out where turtle populations and fishing vessels were most likely to come into contact in the Pacific. They found that areas of potential risk include a corridor between Costa Rica and the Galapagos, as well as the waters off the nesting beaches in north-west New Guinea.

"We used that data to over-

lay with the data of the areas the turtles were using in order to figure out where the turtle hotspots matched with the fisheries hotspots to identify the areas where by-catch was most likely to occur," said Roe.

While the analysis of the study was the largest compilation of data of its kind, scientists say more tagging data is needed to get a better, more detailed picture of the problem.

"We need to target these areas to see if the turtle persistently use these areas over and over again," Roe said. "That would provide really useful information in the management of by-catch because the fisheries authorities would have that knowledge and adjust their fishing efforts accordingly." ■ SOURCE: BBC

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Ann Donahue, October 2013



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Text and photos by Lawson Wood

First scientifically described by Gunnerus in 1765 from a specimen in Norway, there is an earlier published reference to the shark in 1739 in Ireland. The basking shark (*Cetorhinus maximus*) is one of the world's largest sharks found in temperate waters, with only the whale shark (*Rhynchodon typus*) being larger. It is the only species in the genus *Cetorhinus*. Its name is derived from the Greek *ketos*, meaning marine monster, or whale; *rhinos*, meaning a long nose; and *maximus*, kind of gives the game away, meaning *great*. Although massive in size at lengths up to 12m (40ft) long, the basking shark is harmless, eating only microscopic plankton, which it sieves through its gill-rakers at the rate of 2,000 tons of water an hour.

Unlike the scientific findings that there are now recognized several different species of killer whale (orca) there is only one distinct species of basking shark,

despite their wide ranging distribution. Along with the whale shark and megamouth shark, the basking shark is one of only three sharks which are known to filter-feed. But unlike the whale shark and megamouth shark, which are also known to use 'suction' to aid their feeding, the basking shark only feeds by swimming and allowing the water to pass through its gills which trap the zooplankton, small fish and fish eggs.

### Life of a basking shark

Little is known about the life of this massive shark, other than that it was born to travel. Whilst we know that some of the larger whales travel thousands of miles between their breeding grounds and birthing bays, basking sharks are similarly adept and have been electronically tracked to cover massive distances also. Their common name derives from their habit of 'sunning' themselves on the surface with their backs and fins clear of

the water.

One female in particular had been tagged off the west coast of Scotland and proceeded to travel into the Mediterranean during the winter months where it is thought that they have their pups. That spring, the shark travelled around the United Kingdom, went north to Iceland and travelled south past Greenland, the east coast of the United States and the signal was finally lost somewhere off Cuba!

They are distributed widely throughout the world and are recorded on the eastern United States from Newfoundland to Florida and Cuba; from Alaska to Mexico along the western flanks of North America; from Ecuador to Chile; Argentina and the Falklands; South Africa; Southern Australia and Tasmania; north and south New Zealand; around Japan, China and Korea and from the Canaries, right through most of the Mediterranean, all around the

## The Basking Shark







United Kingdom and Ireland, around Scandinavia to the White Sea and onwards to Iceland and Greenland.

Travelling at around two to three knots, they feed at the surface, or just below, and are usually spotted by the tell-tail signs of their pointed snout out of the water as well as their large triangular

dorsal fin and tail fin, making three distinct surface contacts all at the same time. They are also known to feed in the various zooplankton levels found off the continental shelf and are thought to migrate between deep



Basking shark hotspots in the United Kingdom (left); Gaping mouth of a basking shark feeding on plankton (right); View of the basking shark from the side (lower left)

hotspots, such as Cornwall, the Isle of Man and Ballyshannon in Ireland.

### Hunted

Once hunted extensively for the oil from their livers, the most famous fishery was at Achill, County Mayo when the fishery caught over 9,000 individuals between 1950 and 1964. Unfortunately, the last targeted fishing for these sharks was done by the Norwegians in 2006, but they had been catching around 4,000 sharks each year

prior to this. When prices dropped worldwide for the liver oil, the fishermen more than made up the loss by selling the fins with prices at around US\$1000 to \$2400 per fish caught. You can see why their plight is of international importance.

Thankfully there is now no active fishery in European, American or Australasian waters, although Norwegians are still allowed to land them as bycatch. New Zealand still allows finning and basking sharks are sometimes caught as bycatch over the hoki spawning grounds. These fins are sold under licence.

Absent from British waters from November through to March or April

water and the surface to take advantage of various migrating plankton populations.

### Hotspots

Scottish Natural Heritage have discovered that there are a few 'hot-spots' on the west coast of Scotland with shoals of over 50-100 basking sharks in each group including the Isle of Coll and an offshore group of rocky mounts called Hyskeir found near the Isle of Canna. Further research has discovered that there is a deep trench that runs between the Outer Hebrides and mainland west Scotland, and this undersea highway is being used by all manner of marine mammals, too, such as sperm whales. A recent electronic triggering survey has indicated that over 900 basking sharks tripped the trigger as they moved north past Hyskeir. These figures are quite phenomenal, and it is now reckoned that there are more basking sharks found in Scottish waters than any other place on the planet. It is also widely understood that if we look back at historical records of where the sharks used to be hunted for their livers, these should also indicate other

## Basking Sharks



(depending on the water temperature and subsequent zooplankton bloom), it was widely thought that they all migrate beyond the continental shelf, however on a deep dive off Fort William in Loch Linnhe on the west coast of Scotland, my dive buddy and I received one of those life defining frights when we came face to face with a simply massive basking shark, which seemed to be resting at a depth of 42m (140ft)—until we startled it!

### Reproduction

Limited information is available on their reproduction, but one caught female shark was reported to have given birth





Feeding basking shark (below); Detail view of the gills that filter the water passing through the gaping mouth of the basking shark (lower right)



to around five live young all around 1.8m (6ft) long. This would indicate that the sharks are ovoviparous with a gestation period of around three years. The young hatch from the eggs inside the female and their long pointed snouts are thought to be an adaptation to help them feed whilst still in the womb. It is also estimated that males will be around 12-16 years of age before they reach sexual maturity and females at around 18 years old. What looks like mating behaviour has been observed with several individuals swimming nose to tail, actually touching each other and seemingly appearing to be so much 'in the zone' that they are completely oblivious to their surrounds. Like many sharks, copulation wounds are quite obvious during our summer months, indicating that this is the

prime time for reproduction with warm waters, an abundance of food and hundreds of sharks all living and eating together.

Off the Isle of Coll, I personally witnessed at least one basking shark breaching similar to a whale, as there were five breaching all in quick succession. Is this part of the same sexual frenzy, was it just jumping for joy; was something much larger and more sinister after it, or was it clearing itself of parasites? It is quite clear that we still have an awful lot to learn about this wonderful shark.

### Tourism

Since I live in Scotland, I have personally witnessed basking sharks in a number of locations on the west coast as well as the east coast where I live. I am also very

aware of the increase in 'eco-tourism' interest in the basking sharks, and when a friend, Shane Wasik, founded Basking Shark Scotland, it seemed only natural for me to tag along and see what all the fuss was about.

During the last week of August, Shane managed to squeeze me onto his last trip of the season to try and photograph the basking sharks that congregate off the Island of Coll each summer season. Sightings had been rather sporadic and very few individuals had been seen from Cornwall all the way up the west coast of Scotland due to the water temperature being much colder than normal, earlier in the year, hence the annual plankton bloom was also delayed.

Thankfully for me and the others on the boat, this late plankton bloom had brought an abundance of sharks. On a quick check of the area, Shane had counted around 60 basking sharks all feeding on the surface within a small area of about a mile of coastline off the south of the Island of Coll.

For the first time, I now had a true appreciation of the behaviour of the animal whilst it is feeding. The 'Money Shot' is the open mouth feeding on plankton view. My observations showed that their forward facing eyes were placed very close to the end of their long pointy noses, which gives them more spatial vision to avoid anything big in front of them—namely



an old clumsy fart of a diver like me, snorkeling in my drysuit!

The sharks would also avoid the large lions' mane jellyfish where they were abundant, and if they accidentally

swallowed one, they would sort of hiccup to spit the jellyfish back out. Clearly they were interested in only microscopic plankton.

The boat's captain maneuvered us





Topside view of the basking shark fins and pointed nose above the water's surface (below); Swimming with a basking shark (right); Side view of feeding basking shark with gaping mouth (lower left)



somewhere in the path of where we thought that the sharks would pass, to allow for as minimal contact as possible. Shane told us to enter the water quietly with as little splash as possible to avoid

scaring the sharks away from their intended trajectory.

Once in the water, it took a while to understand some of the behaviour and to hopefully allow the sharks to get used

to you. The more you swim after the shark, the more it is aware of you, and the more it will turn away from you, necessitating you to swim faster and turn tighter circles with the shark until you are absolutely pooped!

Stopping to catch my breath, taking stock of what was happening and getting more air into my old tired lungs, I heard Shane shouting at me (AGAIN!) "It's behind you!" This became a bit of a standing/swimming joke between us and the, "He's behind you—Oh no, it's not!" rang loud off Coll.

Close observation showed that the sharks would turn circles anyway, when there were large concentrations of plankton, so by waiting quietly and conserving my strength, I could gauge which direction the shark was moving and try and head it off at the pass (but remember that the open mouth and nose are about five metres in front of the pointed dorsal fin).

Gradually the shark's awareness includes you in its forward vision, and by waiting (whilst swimming), the shark will



## Basking Sharks

come closer and will avoid you, just like it avoids the lion's mane jellyfish. Damn it, but I didn't. I got stung around my wrists and hands. Wear protection!

With my 'money shot' in the bag, plus some very nice moving images, I am so definitely coming back next year where (believe it or not) there are more basking sharks in Scottish waters than any other place on the planet!

### Photo notes

My camera for this trip was the top end micro four thirds camera (Olympus OMD EM5) in a Nauticam housing supplied by Alex Tattersall. The main beauty of this rig is that it is small—about half the size and weight of a conventional DSLR camera and housing, therefore easier to lug around with less drag. In addition, it is able to take numerous photographs on its motor drive, but at the press of

one button, it will immediately switch to movie mode.

My first encounters with the sharks taught me so much about what to do the next time, but the encounters are really exhausting, as these grand beasts are swimming constantly and not hanging back waiting for you to catch up with them. After several attempts, perseverance, empathy and understanding, plus a lot of luck, I was able to fulfill a lifelong dream and photograph one of the largest fish in the sea and in Scottish waters!

Since 1998, the basking shark is fully protected under Appendix II of CITES (Convention on International Trade in Endangered Species of flora and fauna). Sadly, it is still hunted in Asian waters for their fins.

For more information, visit: [www.baskingsharkscotland.co.uk](http://www.baskingsharkscotland.co.uk) ■







# Listeners, Watchers & Doers

— *Is it the agency or the instructor that's important?*

Text by Steve Lewis  
Underwater photos by Kate Clark

**So, there we sat—my buddy, a friend of hers, and I. Cups of good German coffee in front of us, the reassuring murmur of passing tourists behind us, and the slightest hint of spring blowing in over the Rhine. As we settled down to relax and work out whether the rest of the day would be spent shopping or sightseeing, my buddy's friend asked that most basic of questions, one that most divers who have decided to venture into more advanced, so-called technical diving ask, "What's more important: a good instructor or the agency?"**

I told her the answer is simple. "But," I said, "Do you mind if I ask you a really important question before I answer yours? How do you learn? What type of "student" are you?"  
In their most basic form, the triggers or stimuli that change our understanding of a topic and cause us to modify our behavior based on new-found knowl-

edge fall into three broad categories: auditory, visual and experiential. Based on this, we can say that students are either Listeners, Watchers or Doers. I suggested she sip her coffee and allow me to explain in a little more detail, because to answer her question, I needed her to think about mine.

I told her that in academic sessions, each of these broad learning groups identifies themselves as follows.

## Listeners

Auditory learners listen to instructions attentively. During classroom sessions, they take notes, sit in the front of the room, avoid outside distractions, and—as my university classmates would confirm—often repeat important points to themselves in a mumble (sub-vocalize) as they take notes.

I explained to her that if like me, she too was a listener, she will rehearse and repeat information out loud some- times read- out loud. She will make



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extensive use of mnemonics, often ones she makes up herself. Listeners do better on a test if they read the questions out loud to themselves much to the annoyance of folks around them. And listeners may memorize key points and terms by thinking how the words sound as much as what they mean.

## Watchers

On the other hand, visual learners often make charts or diagrams covering key points. These folks think in pictures. They highlight notes with big arrows, underlinings, stars and asterisks. If you are a visual learner, you doodle on printed notes and handouts, draw boxes around and circle key points. You scribble in the margins of textbooks. You scan those books for diagrams, graphs, charts and pictures and study these before anything else.

You tend to link basic concepts and new information to things and concepts you already know and understand. You may make flash cards to help memorize new ideas. Your books sport Post-it notes, and you often study "the basics" before sitting in a classroom. Oh, and if your pre-classroom studies use the so-called "Cornell Note" system, chances are you prefer this style of learning.



BATHOLITH / WIKIPEDIA COMMONS

## Doers

Kinesthetic (or experience) learners are doers. They fidget in a classroom setting and get distracted during straight lectures, preferring to ask questions and participate in the discussion. They ask what-if type questions and personalize concepts, often asking for examples of how the topic under discussion applies to them or imagining personal scenarios and asking if they have the "right idea."

During a break, these folks get up and amble about, stretching, bending and generally "shaking out the cobwebs." They do better when classroom sessions are short and sweet, punctuated with hourly "breakout sessions" during which they can bounce ideas around with classmates. If you have one of those squishy stress balls in one hand and a book in the other while studying, chances are that you are a kinesthetic learner.

## Real world approaches

Once out of the classroom and faced with a challenge to solve—a practical test or having to apply a recently learned concept to real-world circumstances—these three learning types present more distinctive approaches. I gave an example

of how that works. Let's say the "problem" presented to a group of recently certified open-water divers is to go away and research how many litres (or cubic feet) of gas are needed for a 30-minute dive to 18 metres (60 feet).

The listeners will call a more experienced buddy and ask for his or her advice. They may call a shop or drop in and speak face-to-face with an instructor to learn how to solve the problem. These folks best respond to the administrations of mentors.

Seeing learners will go online and use Google. They may go to a dive shop, but their preference would be to find a book on dive planning. They might find a YouTube video that explains the concept via charts and diagrams. These folks do best studying alone.



Doers will strap on a tank, go to 18 metres and use a stop-watch to time how long it takes to drain a tank! They were the kids who jumped off their parents' garage roof trying out their new glider design.

TOMASZ SIENICKI & EVAN AMOS / WIKIPEDIA COMMONS







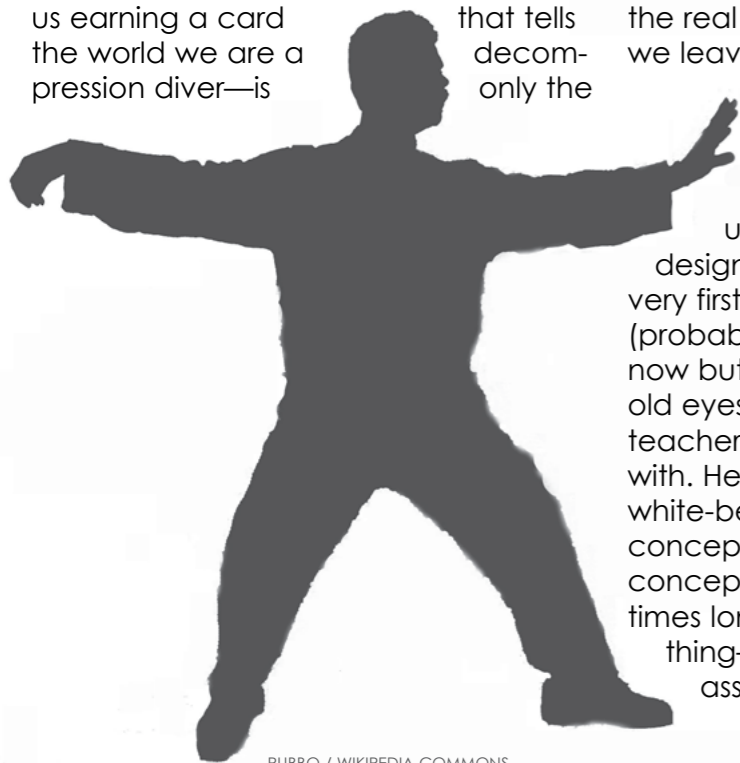
# tech talk

Of course, to add a level of complexity to the situation, most of us are a mixed breed and have a little of each type of learner in us. But, in general, I told her that the first step in providing an answer to her question would be to identify which learning type she is.

## Optimization

The whole point of identifying one's personal learning style is that once it is defined, there are ways to improve one's uptake and optimize one's future learning. For example, by knowing our weaknesses and trying to enhance skills in these 'soft' areas, we can improve our ability to soak up information next time we want to learn something.

It might also do some good for those readers who are asking the instructor-agency question to understand that a scuba program—let's take as an example a course that will end with us earning a card that tells the world we are a decompression diver—is only the



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FILE PHOTO: KATE CLARK

beginning of the journey into becoming an accomplished deco diver. At the end of the program, you have simply earned the right to continue your training. And by definition, that training will be mostly self-directed. In effect, the real learning process begins when we leave the class; it does not end there.

### 10,000 hours

Around 40 years ago, I signed up for the first of many classes designed to teach me Tai Chi. My very first teacher was an old dude (probably a little younger than I am now but he looked old to my 23-year old eyes). He was possibly the best teacher/instructor I've ever worked with. He instilled in us—his enthusiastic white-belted charges—two valuable concepts. The first is the 10,000 hours concept. It takes that long, and sometimes longer, to become expert at anything—including martial arts, and by association, the collection of

basic skills required of scuba diving. Therefore, if one is looking for instant gratification and "gain without pain" look for another pastime.

Looked at from a slightly different perspective, but sticking with the martial arts theme, Bruce Lee is quoted as saying: "I fear not the man who has practiced 10,000 kicks once; I fear the man who has practiced one kick 10,000 times." If we subscribe to this philosophy—and I do—practice is key to any training regimen and any success.

### Owning it

The second concept was about owning a skill. It follows on from the 10,000 repetitions or 10,000 hours idea. My martial arts teacher told a story—one of those Zen or Chan parables. A student of martial arts was enjoying some success, and was asked to go away and practice by his master. A couple of years later, the student returned and the master asked how he was doing.

"Fine," he said, but he admitted that a couple of the moves caused him problems.

"I think I am doing them a little differently to the way you do them," he said. So the master sent him away to practice some more. A couple of years later, the student returned and when asked, admitted that things had gotten worse. "Now there are several more moves that I am doing differently. Not sure what's going on," he said. This cycle of going away and doing more practice, and coming back to his master went on for several more years until finally, the student sat at his master's feet and explained that he no longer did anything exactly the way his master originally taught him. "It is all completely different, he moaned. The master asked the student to go through the exercises, and when he was finished the master stood up, bowed to him and congratulated him. "You are now a master," he said.

Either way you look at it—skills devel-

# CAN'T RESIST THE CALL OF THE UNKNOWN?

## ...neither can we!

Photo courtesy of Jill Heinerth



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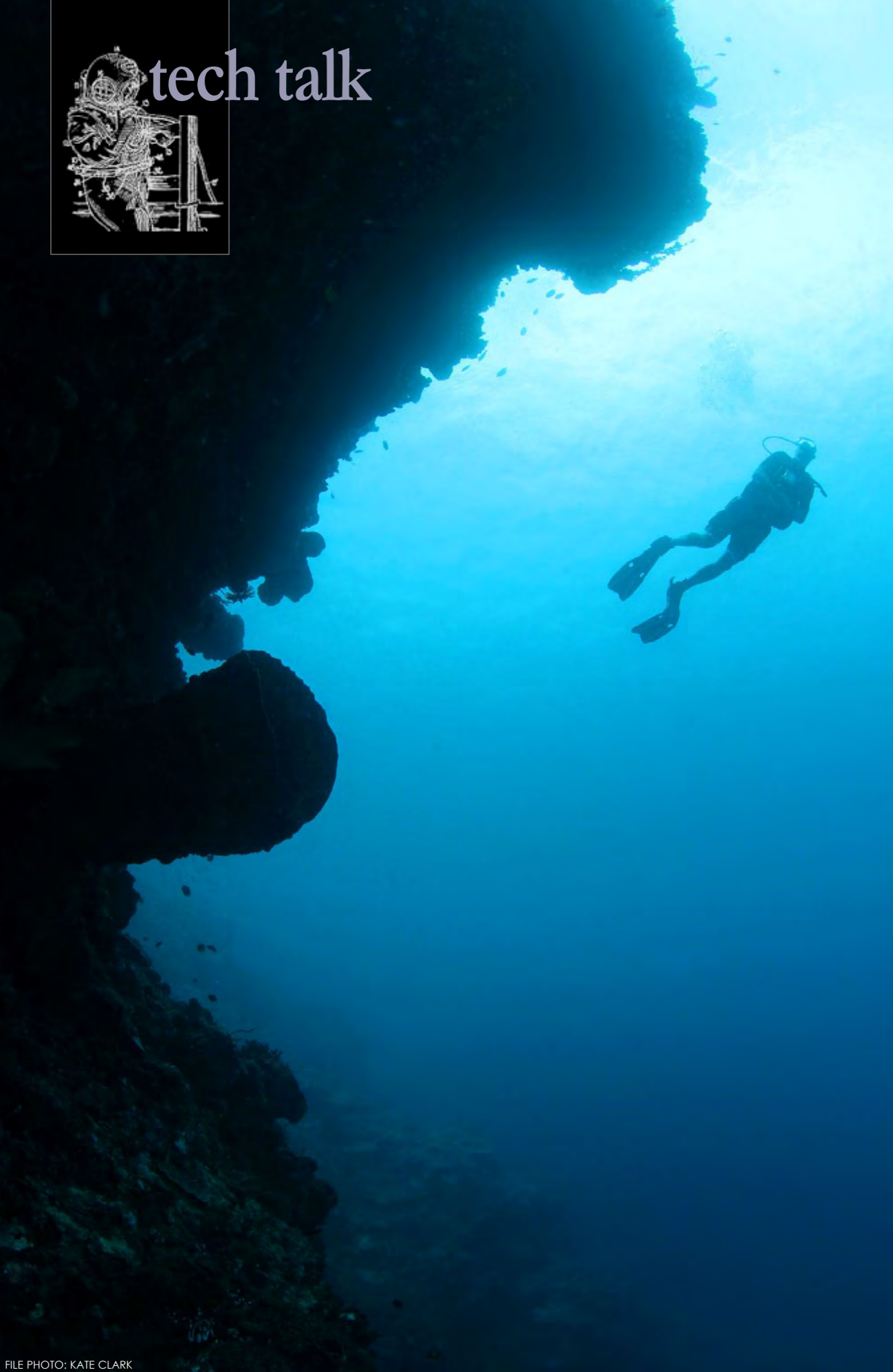
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opment—a five- or six-day zero to hero program, regardless of the agency, and to some extent even the instructor, is not going to achieve much. In truth, training—which is at the core of my friend's question—is not at all about the instructor nor the agency.

### Self-motivation

Adult learning is actually about self-motivation. We get the most out of a learning situation if we understand the process of learning, and if we also understand that different situations and environments often require different learning (and teaching) strategies. We get more out of a learning opportunity if we develop the largest possible repertoire of classroom and practical tactics from which to draw. And when we understand, it's up to us to learn and grow.

In other words, a large part of the responsibility to learn and improve understanding—whether the topic is diving or quantum physics—is on our shoulders, and the structure of the curriculum and attentions of the instructor begin to fade into secondary or tertiary importance.

### Agency relevance

For an instructor running a business, choosing the “right” agency may have some significance. An instructor has to find an organization that suits her business model and her comfort zone.

But even that is somewhat mitigated by other issues. For example, a decent instructor is going to modify how she presents course materials and what constitutes a pass or a fail based on her personal understanding of what works for her students, the environment in which the programs are conducted, and the best long-term strategy for the student to develop after the course is over.

For a student interested in developing



FILE PHOTO: KATE CLARK

skills rather than flashing pieces of plastic around, the agency becomes rather immaterial, and the chemistry with the instructor is important—initially that is.

Unfortunately, in an age of instant gratification and the suppression of individuality, a lot of us look for shortcuts and the easy way out—or in. We want to join a club. We are perfectly willing to wear a badge even at the risk of compromising our personal talents and our personal growth. A badge lets the world know we belong. It also does not require us to teach ourselves. The questions are all answered for us in the one-size-fits-all club members rule book. We don't even need to think.

There really is no difference between paying US\$200 for a \$40 sweater because of the logo on the front or telling folks you are an XYZ diver or an ABCD diver. It is in effect, all a fallacy, but people do it because it's an easy sell to themselves and their mates.

So, after more coffee and a lot of prattling on, I finally explained to my buddy's friend: “Before we ask ourselves what's more important—the agency or the instructor—it's important to have some understanding of one's personal

preferences, because people learn most effectively when the strategies used are closely matched with their preferred learning style. Moreover, we can be a little proactive and we can improve the effectiveness of our learning by knowing what our strengths are and, initially at least, putting some bias on what works best for us.”

With a little tap on the tabletop, and the sound of the U-bahn rolling by she said. “Okay, now I get it. It's not about the agency or the instructor. It's about me.”

And that's exactly what I should have said initially. ■

*Steve Lewis is an active technical diver and instructor based in North America. He is an author, blogger and workshop host with a special interest in diver education and the development of safe diving protocols. He first tried sidemount scuba as a young dry-caver in the United Kingdom, and now many decades later, carries a TDI sidemount cave instructor rating and is an open-water/overhead environment Sidemount Instructor for PSAI. See [Techdivertraining.org](http://Techdivertraining.org)*





photo &  
video

Edited by Don Silcock

Text and photos by Don Silcock

*In this series of articles on mirrorless cameras, we have explored the potential of this new technology by, first of all, looking at what it is and why it may be suitable for underwater photography. Then we looked at the various cameras, lens choices and available underwater housings, which quickly narrowed down the field to the Micro Four Thirds (MFT) technology from Olympus and Panasonic and the NEX cameras from Sony.*

*I used those initial articles to help define my personal choice—opting to buy the Olympus OM-D EM-5 camera, the Panasonic-Leica 45mm and Olympus 60mm macro lenses together with a Nauticam housing and macro port. In the subsequent articles, I documented my initial experience with those lenses, together with the Panasonic 20mm and Sigma 30mm “pseudo” macro lenses.*

*In this article, the final one in the series, I will explain my personal experience with wide-angle underwater photography using the Olympus OM-D EM-5 camera.*

### **Dynamic range**

When it comes to underwater wide-angle photography, probably the single most important technical characteristic of a digital camera is its dynamic range, which is basically the capability of its sensor to record detail in both the shadows and highlights.

With macro photography, the dynamic range is rarely very wide, as there are typically no extreme highlights if an image has been properly exposed, so virtually all modern digital cameras are eminently capable of doing a good job of macro with the right lenses and in the right hands.

Wide-angle photography, however, is quite different—with many of the best images in this genre, and certainly the ones that really have that “wow” factor, having a broad or even extreme dynamic range. A typical example being that in addition to the main subject of the image, the sun (or at least its rays) is

included in the image to provide a dramatic backdrop and create a vibrant and emotive photograph. Recording detail on the main subject is largely a function of using strobes to properly illuminate it, while capturing detail in the extreme highlights of the sun is very much related to the capability of the digital

camera's sensor.

Digital technology continues to advance rapidly, and the latest generation of full-frame sensors has really moved the goalposts on dynamic range, with the current overall champion being the Nikon D800, which the camera ratings site Dxomark.com measured at an



## *Mirrorless Cameras &* **Wide-Angle** *Underwater Photography*





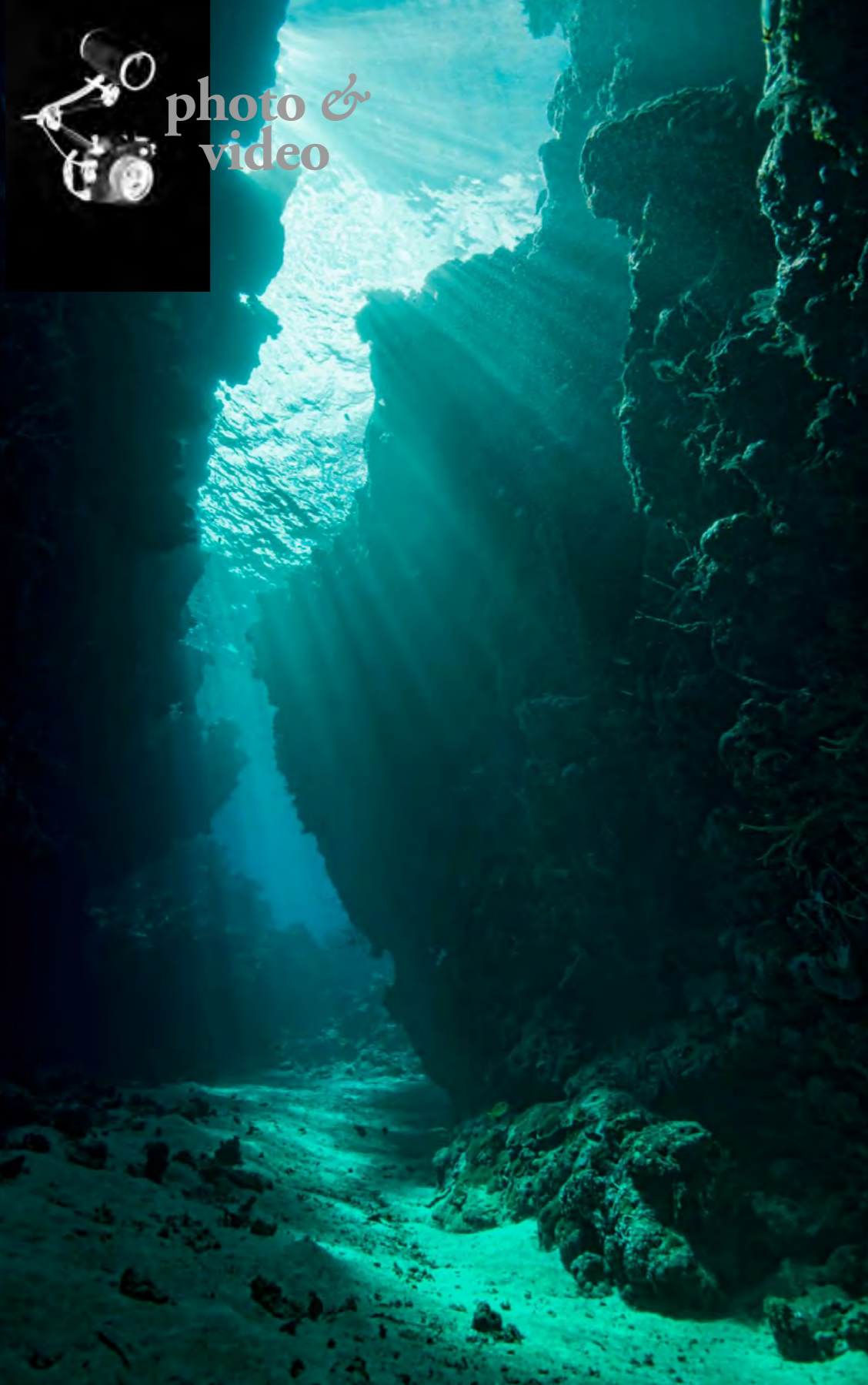


photo & video

Example of the Nikon D800's dynamic range

desire to have a small and dedicated macro rig that could also double-up as back-up to my main D800 wide-angle outfit. Overall, my experience to date with the OM-D E-M5 has convinced me that mirrorless cameras offer a great alternative to DSLR's for macro photography because they are capable of producing excellent images but are smaller, lighter and most importantly cheaper, which lowers the entrance bar and has to be a good thing.

However, I was less convinced about wide-angle photography, as I doubted whether the Olympus' relatively small sensor had adequate dynamic range—although Dxomark.com did measure the E-M5 at a very capable 12.3 Evs. A recent trip to Raja Ampat, Indonesia, provided me with the chance to try out the E-M5 on sites I knew would provide numerous wide-angle photo-opportunities.

**Lens and port options**

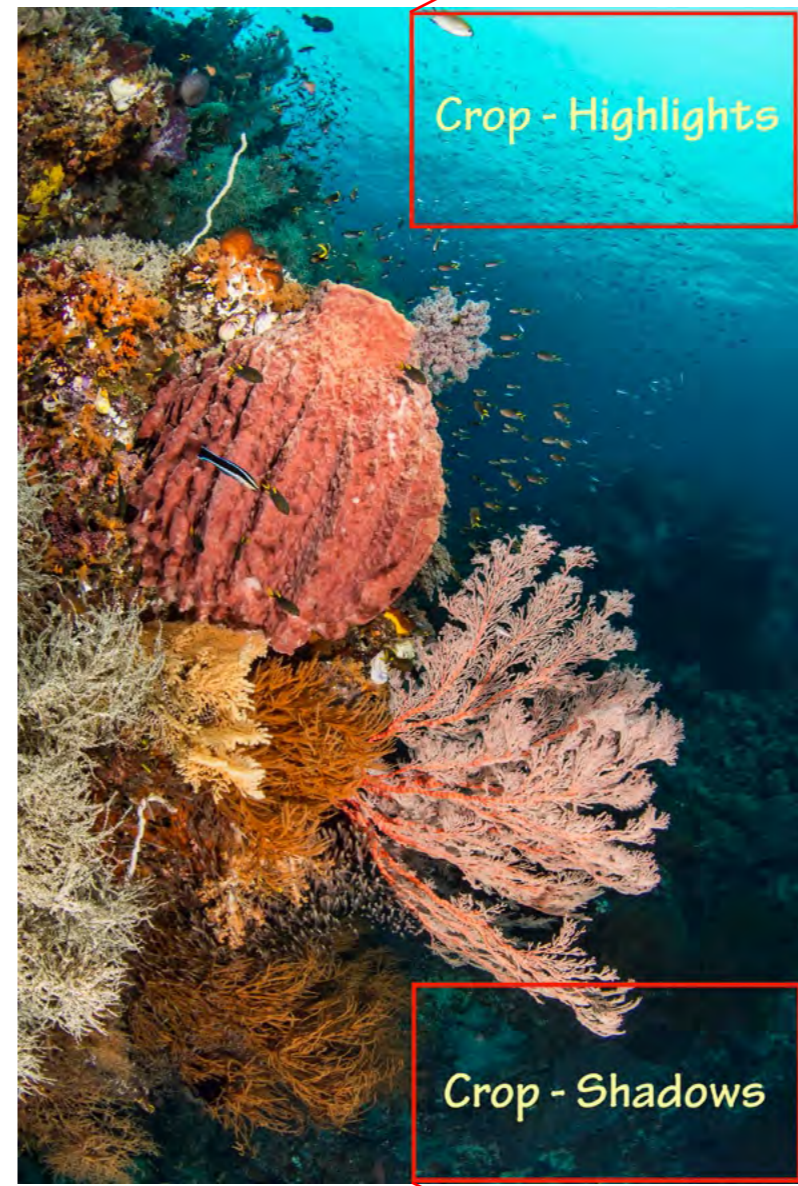
The Olympus-Panasonic Micro Four Thirds technology has by far the best range of lens options for wide-angle underwater photography, with Panasonic offering

its 8mm (16mm equivalent) fish-eye lens with a bright f3.5 maximum aperture and close-focus distance of just four inches. Panasonic also offers a very nice

large, can now be captured. **Can mirrorless cut it?** My personal journey with mirrorless cameras was driven by a

incredible 14.4 Evs. This means that images that were not previously possible, because the dynamic range between the shadows and highlights was too

Example of the OM-D E-M5's dynamic range: Cropped highlights (right); Cropped shadows (lower right)



opted for the Panasonic 8mm fish-eye and the small Nauticam 4.33-inch dome port that is designed specifically for it.

**Testing**

I will spare you all the gory details, but a variety of unplanned and unpleasant surprises

I was pleasantly surprised at the overall result, with the E-M5 producing a very nice image, while zooming in to 100 percent showed both detail and clarity in the highlight and shadow areas. While not at D800 levels of performance, the E-M5 produced a very nice image that could easily grace the walls of your living room or the pages of a magazine.

From there I wanted to see how the E-M5 would cope with strong highlights right in the image and a dive at Blue Magic in the Dampier Strait provided a quite unique photo-opportunity when one of the boat boys decided to check out who was on the deco line.

Similar crops of the highlights and shadows demonstrate that the OM-D E-M5 does a very credible job in



extreme rectilinear zoom lens—the 7-14mm zoom—which is their equivalent of Nikon's very highly regarded 14-24mm zoom. While Olympus offers their 9-18mm (18-36mm equivalent) zoom lens, which is both small and compact plus has a close-focus distance of just six inches.

The good news is that Nauticam supports all of these lenses. However, the bad news is that dedicated ports are required—not one dome port and different extension rings as is usually the case with DSLR's. So, I

turned my 28 days of diving in Raja Ampat into just 12, and all my carefully laid plans for a variety of different tests had to be boiled right down to the bare minimum. So, I decided to start by establishing how the E-M5 would perform on a clear water reef scene with a bright highlight in one corner of the image and dark shadows in another.

such situations—again, not D800 quality but most acceptable.

**What about the ISO?**

No review of a camera's ability to capture wide-angle images would be complete without some discussion on what happens to the quality of the image as the ISO is increased.





# photo & video

In today's digital age of full-frame sensors, ISO has become just another adjustable parameter that is used along with shutter speed and f-stops. But with the smaller sensors used in mirrorless cameras, there is not the same latitude to simply increase ISO as is the case with full frame sensors.

With my D800 I do not hesitate to increase the ISO up to 1600 or more when necessary, however, my experience underwater with the E-M5 was that above ISO 400 there was a noticeable deterioration in overall image quality. The results were still usable at ISO 800, but pixel peeping at 100% showed some serious noise in the shadows and over ISO 1000 was questionable in my opin-

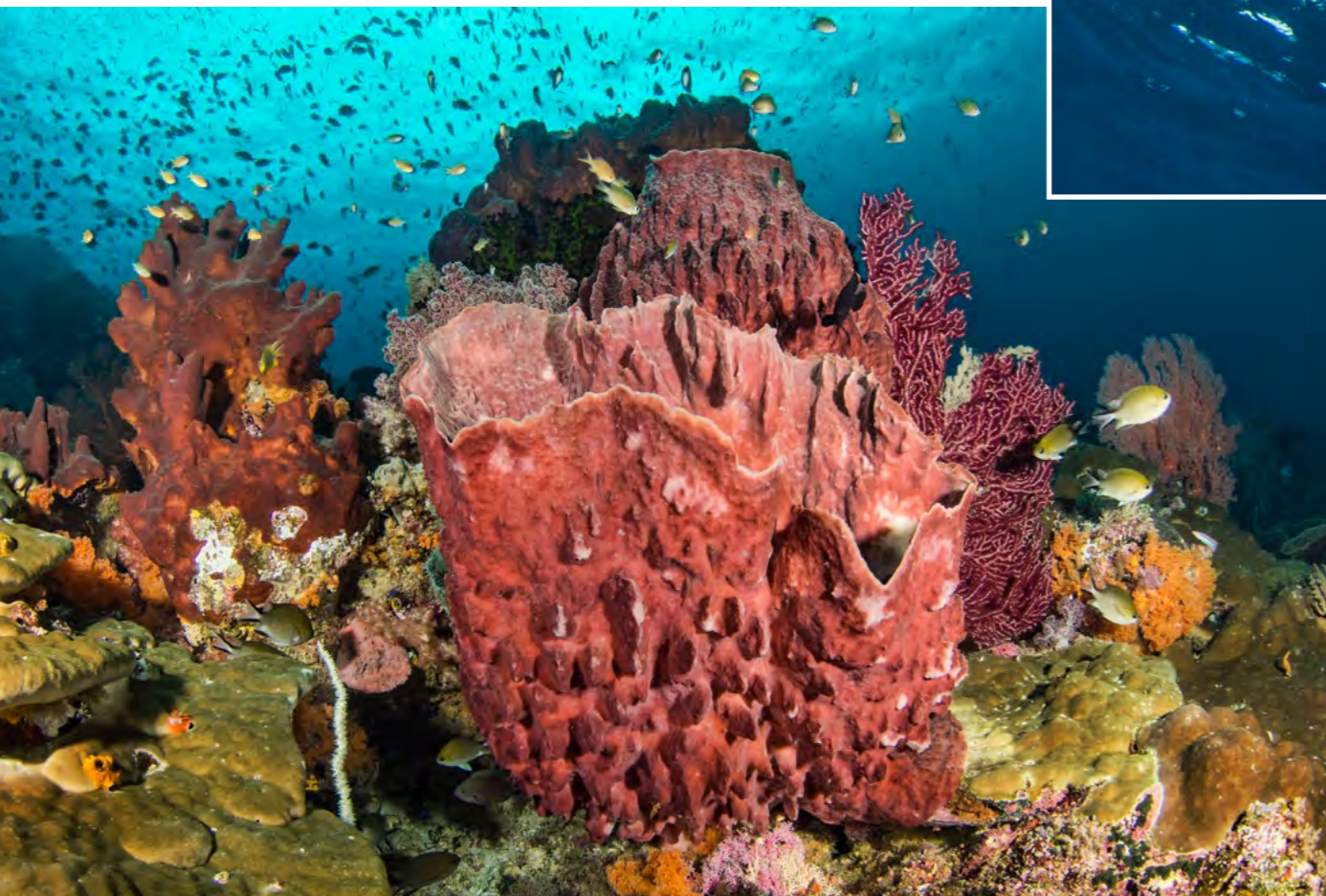


Example of wide-angle photography with the OM-D E-M5 (below) at Blue Magic dive site in the Dampier Strait at Raja Ampat; Cropped highlights (left); Cropped shadows (lower right)

ion. All the OM-D E-M5 images used to illustrate this article were taken at ISO 400.

### Conclusion

Alltogether the Olympus OM-D E-M5 is a very impressive camera, and I have been very pleased with its performance. It's not perfect and comparing it to the D800, which costs almost three times as much, is not really fair, but wide-angle photography can be a challenge, and very often the



best technology wins the day by enabling the user to take the best image.

So would I give up my D800 for the E-M5 for wide-angle photography? No! Do I consider the E-M5 as a great back-up for the D800? Absolutely, yes!

It will be very interesting to see what results come from new mirrorless cameras as the manufacturers push the technology envelope—particularly the very impressive Sony A7 and A7R full-frame cameras and the Olympus top of the range OM-D E-M1 camera.



Watch this space... ■

*Don Silcock is a Bali based photo-journalist who specializes in underwater and travel photography. His articles and images can be seen on his websites [www.indopacificimages.com](http://www.indopacificimages.com) and [www.nomadicpixel.com](http://www.nomadicpixel.com).*

Example of wide-angle photography

## Wide-angle



cinema of dreams



[www.seacam.com](http://www.seacam.com)







Edited by  
Don Silcock

PRODUCT SHOTS  
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## Gates Deep Dragon Housing

Gates Underwater Products has released their housing for the Red Digital Epic Dragon digital cinema camera. The quite exceptional Epic Dragon camera features 6K lines of resolution, more than 16 stops of dynamic range and native 2000 ISO. The Gates Deep Dragon housing includes a housing for the Red Pro external monitor and uses the Redmote remote control to provide access to all camera controls. The Deep Dragon housing is available now at a U.S. retail price of \$18,280.



## Nauticam Sony A7 Housing

Nauticam has announced the releases of their new housing for the Sony A7 and A7R full-frame mirrorless cameras. The NA-7 housing is provided with a switch that allows the user to choose either the Sony's LCD or EVF, plus it has a Nikonos 5-pin bulkhead allowing strobes to be directly connected to the camera.

Nauticam is also in the process of producing an adaptor that will allow the use of both the Sea & Sea 12mm fisheye and Nikonos 15mm lenses. The NA-7 housing is shipping with a U.S. retail price of \$2,850.

## Aquapazza APSO-DPM Housing

Japanese manufacturer Aquapazza has announced the release of their new APSO-DPM Housing. The new housing is designed for the Sigma Merrill DP system compact cameras, which feature a high resolution Foveon APS-C sensor. The new APSO-DPM housing has a modular lens port system to allow it to be used with all three cameras in the Sigma Merrill DP system, which is supplied with a choice of three fixed lens options. The Aquapazza housing also features a rail for the attachment of a sun shield for the LCD screen and a fibre optic port for strobe triggering.



## Aquatica AE-M1 Housing

Canadian housing manufacturer Aquatica has announced they will release their new housing for the very highly regarded Olympus OM-D E-M1 mirrorless camera at the end of March. While it will be some time before the new housing is actually available, the news that Aquatica is again producing housing for mirrorless cameras is a welcome development and another indicator that these cameras have real traction. The Aquatica AE-M1 housing is machined from aluminum, black anodized and then for further protection, a resistant polyester electrostatic powder coat paint is provided. Rated to a depth of 300 feet and will have the small form factor that mirrorless cameras enable, plus Aquatica has also announced a new range of ports that will be used on the housing, thus enabling the use of the extensive set of lenses available for the OM-D E-M1. The AE-M1 housing is priced competitively at US\$1,699 and will be available in March 2014.

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## Ikelite D5300 Housing



Ikelite has released a housing for the new Nikon D5300 mid-level entry DSLR. The housing is constructed from Ikelite's signature clear polycarbonate, has access to all the important camera controls and features built-in TTL strobe triggering when used with the company's DS-series strobes.



## Olympus OM-D E-M10 Mirrorless Camera

Olympus has announced the third mirrorless camera in its flagship OM-D range, the OM-D E-M10. The new camera is positioned as the entry-level to the highly regarded OM-D range but still features most of the functionality of the OM-D E-M5, which has won multiple awards for its overall functionality. The OM-D E-M10 features the TruePic VII image processor, a 16 megapixel Live MOS sensor, Wi-Fi technology, a large, high-speed electronic viewfinder, 3-axis image stabilization, ultrafast autofocus and a built-in flash. Olympus also released the MCON-PO2 macro converter that can adapt six Olympus Micro Four Thirds lenses for close-up shooting. The OM-D E-M10 will be available from March at a U.S. retail price of \$700 for the body only.

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## Aquatica A1D-C/X Housing

Aquatica has announced details of their A1D-C/X housing for the Canon EOS-1D C and 1D X professional grade cameras. The new housing features a redesigned, next-generation, lens gearing system with a smaller housing pinion gear and a larger lens gear, allowing for a much smoother action while zooming in a video sequence. In addition, it has five bulkheads, two of which are occupied with Nikonos or Ikelite connectors as standard plus the housing is provided with Aquatica's pressure leak detection "check" circuitry. The housing is only available from Samy's Camera in the United States and retails at \$4,599.



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# Michael Frank



## P O R T F O L I O



# portfolio

## Michael Frank

Text edited by  
Gunild Symes  
Photos courtesy  
of Michael Frank

PREVIOUS PAGE:  
*Undersea Creatures V*,  
by Michael Frank. Acrylic  
on canvas, 24x30 inches  
(61x76cm)

Inspired by the magical ambience in the works of early American artists painting scenes with great attention to detail, color and dramatic light, Michael Frank works layer upon layer on canvas to produce brilliant underwater scenes echoing the sumptuous yet mysterious nature of marine life on reefs and in rivers and streams. *X-RAY MAG* interviewed the artist based in St. Louis, Missouri, to gain insight into his art and perspectives on the underwater realm.



*Undersea Creatures II*, by Michael Frank. Acrylic on canvas, 24x30 inches (61x76cm)

*X-RAY MAG*: Tell us about your background and how you developed your artistic process.

MF: I have been painting for over 35 years. I do not have a formal education in art. Some college and art workshops. I developed my artistic skills mainly from the study of an early American artist group of the mid-19th century known as the "Hudson River School".

*X-RAY MAG*: What is your artistic mission or vision?

MF: My artistic vision is to use my imagination to its fullest extent.

*X-RAY MAG*: What is it about the underwater world and its creatures that inspire you?

MF: My inspiration comes from the vast colorful variations of plant and coral

formations and the enormous variety of undersea creatures that many of us have little knowledge of—their beauty and life dramas.

*X-RAY MAG*: Tell us about your experience in the underwater world, scuba diving or snorkeling. How and why did you start diving/snorkeling?

MF: I have been to the Caymans, Belize, Virgin Islands, Oahu, the

*Undersea Creatures II* by Michael Frank. Acrylic on canvas, 24x30 inches (61x76cm)







*Undersea Creatures IV*,  
by Michael Frank. Acrylic  
on canvas, 24x30 inches  
(61x76cm)

*Undersea Creatures VI*,  
by Michael Frank. Acrylic  
on canvas, 24x30 inches  
(61x76cm)

*Undersea Creatures III*,  
by Michael Frank. Acrylic  
on canvas, 24x30 inches  
(61x76cm)



Mexican coast of Yucatan and Cozumel. I have not had the courage to scuba dive, but I do snorkel whenever I visit these places. My interest in the underwater world was stirred over the years by TV's *Sea Hunt* and movies like *The Deep*.

*X-RAY MAG:* What are your favorite dive sites, underwater subjects, locations?

MF: My favorites are the beaches of Barbados and Cozumel. I also like the areas around Mexico's Cancun and Tulum where you can see a wide variety

of fresh and saltwater fish.

*X-RAY MAG:* Tell us about your paintings. How are they made? Please describe what is unique about your method or concept. How do you compile your underwater scenes? What informs your art?

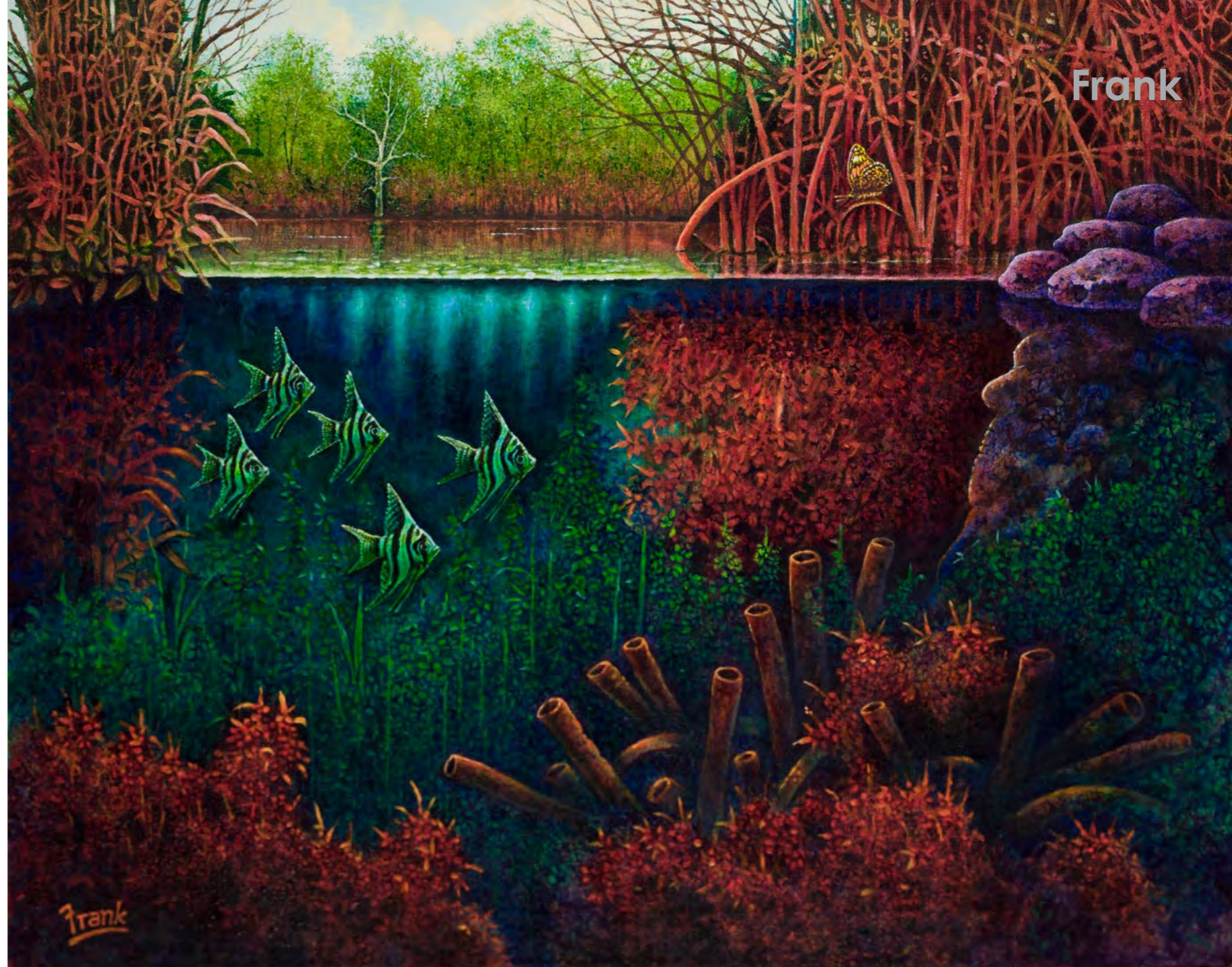
MF: First I draw several composition sketches. Then I will start to paint with many layers of thin glazes of acrylic paint on canvas. Sometimes I will start with acrylic fluorescent paints to get the brilliant colors needed to portray fish and

coral dynamically, then tone them down with darker shades of the same color.

*X-RAY MAG:* Do you use underwater photography—your own or someone else's—and how is it incorporated in your art work? If it is your own underwater photography, what camera equipment do you use and why?

MF: My underwater photography is very low tech (disposable plastic encased cardboard cameras). I mainly rely on photos in magazines and the Internet (permission freely given) of individual





Amazon, by Michael Frank. Acrylic on canvas, 24x30 inches (61x76cm)

fish, underwater plant life and coral formations. I then take these many different pieces and arrange them to my liking. Then I add my own background to come up with my own composition with dynamic lighting for each painting.

*X-RAY MAG: How does your art relate to conservation or environmental issues facing our oceans and reefs?*

MF: I hope my paintings make people aware of the beauty and importance of undersea life—not just the popular large whales and sharks but the smaller less known delicate wildlife of the deep. Also I hope to inspire people to do what they can to preserve nature above and below the water surface.

*X-RAY MAG: Why art? Why is art important? What are the challenges and*

*benefits of being an artist today?*

MF: There is a tremendous challenge to become a popular artist. The competition for recognition (among millions) is overwhelming. You must develop skills not only with your art but with self-promotion and unique ways to get your art in front of the viewer. The monetary rewards for an artist may be few. Art is important to me because it gives me

Kingfisher, by Michael Frank. Acrylic on canvas, 36x24 inches (91.5x61cm)





*Sunset*, by Michael Frank. Acrylic on canvas, 24x36 inches ((61x91.5cm))

the power to touch someone. To bring back fond memories. To make people aware of their beautiful surroundings. To alter a mood. To dramatize the quest for survival or happiness. I think each artist must decide for themselves whether to measure their success with money or how their artwork touches others. Many artists (including myself) measure with both.

*X-RAY MAG: What's next? New? Upcoming?*

MF: To continue to paint our world's creatures, both large and small, in their natural surroundings. To do my best to glorify them. To warm our hearts to them and be thankful for their creation.

I like to do paintings in series. I hope you not only view my *Undersea Creature* series but my

other series as well: *Little World*, *Forest Never Sleeps*, *Bird in Paradise*, *Jungle Harmony*, *Sunshine Traveler*, *Romantique* and my new upcoming series *Baby Love*. ■

For more information and to purchase originals and prints, visit the artist's website at: [www.Michael-frank.artistwebsites.com](http://www.Michael-frank.artistwebsites.com). Or email: [mfrank1026@aol.com](mailto:mfrank1026@aol.com).

*Blueboy*, by Michael Frank. Acrylic on canvas, 24x18 inches (61x46cm)

