



GLOBAL EDITION
August 2022
Number 113

Finland
Hanko Wrecks

Visualising Wrecks
Scapa Flow

Belize Wreck
The Wit

Baltic Sea
Ghost Nets

Ecology
Sea Turtles

UW Photo
**Wide-Angle
Lighting**

Contributors' Picks
Angling Up

UNITED STATES

Northeast Wrecks

COVER PHOTO BY MATTHEW MEIER

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X-RAY MAG is published by AquaScope Media ApS
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xray-mag.com

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COVER PHOTO: *Cuttlefish, Lembeh Strait, Indonesia*
 Photo by Matthew Meier (MatthewMeierPhoto.com)

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Gregory Borodiansky with his front-mounted rebreather, Dutch Springs, USA. Photo by Larry Cohen



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Respect for other life forms

Progressing age does not come with many positives except perhaps that one gains some perspective.

I live in the present and feel like the same usual me day to day, so I do not frequently think about the past. But, on occasion, something reminds me of how things used to be. Much to my own astonishment, it has already been 35 years since I started diving. When I look at old photographs, I usually have the same two initial reactions. Firstly, the hairstyles and fashions of the time (late 1980s) make me cringe and chuckle; and secondly, looking at the crude and clunky dive gear I was wearing in the beginning makes me feel thankful that we have got much better equipment nowadays.

I mean, just look at the horse-collar vests, the crude mechanical depth gauges, and the oversized Rambo-style dive knives we all awkwardly wore on the lower leg where it was quite hard to reach. Back then, an octopus regulator was a luxury but not a requirement, or even commonplace. We also used dive

tables, as computers were a thing of the future.

Do I feel nostalgic? Nah. Well, perhaps a little bit, as I think about the long, carefree and playful summers of my youth and some great concerts I attended, but surely not about the dive equipment or training standards. It is much better and safer now.

What does, however, spring to mind when I mentally scroll back over the decades, is the vastly improved appreciation of sentience and intelligence in other species we have today, including many of those we encounter on our dives.

Back in those early days, fish were just fish—animals with some basic instincts and reactions but without much thought or sentiments. Shrimps, and the like, could surely not have these characteristics.

How very mistaken we were.

We have over the years published a good number of articles and news posts about sentience, social behaviour, and intelligence in other species. It is a subject matter with

profound philosophical qualities, which I find deeply fascinating, as it keeps changing the perspective of what we are, in relation to other animals, and how we interact with our fellow beings.

It has therefore also greatly changed my experience and appreciation of diving, because I now have a much clearer sense that other species also think and feel to some degree, even small critters, and I can observe that we interact and even communicate.

Moreover, we now know that we should never stress or harm them. Instead, we should approach these beings with some respect, observe and seek to understand them.

They are all just trying to feed themselves, procreate and perhaps raise, protect and teach their young—just like us.

If anything, *that* would be the lesson I would pass on to the next generation of divers.

— Peter Symes
Publisher & Editor-in-Chief



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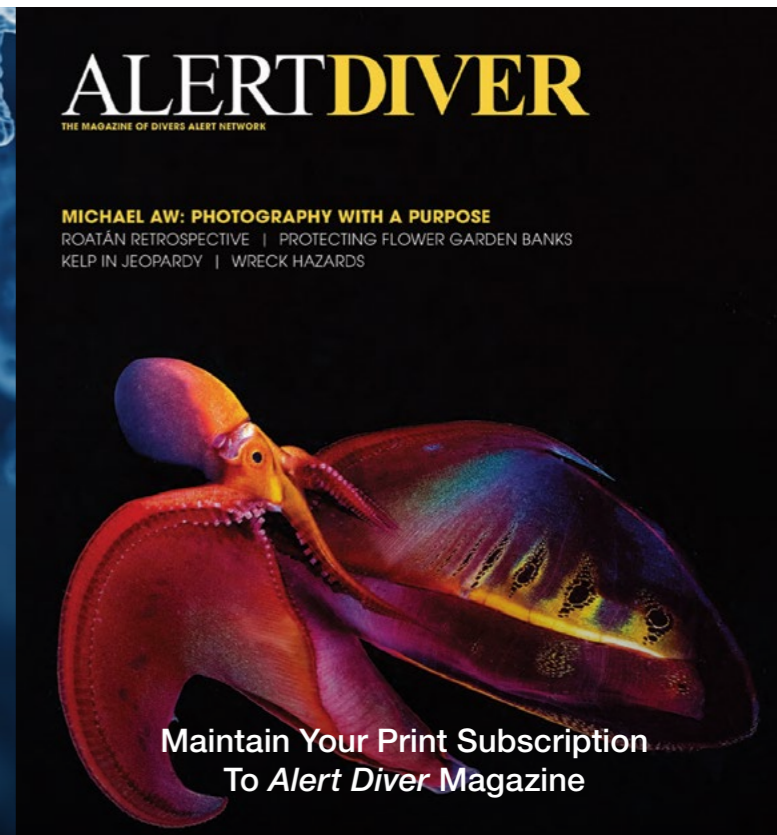
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NEWS

from the deep

Edited by Peter Symes

Several new coral species discovered in Hong Kong waters

Biologists have discovered in Hong Kong waters three new species of hard coral, which have never been identified anywhere else in the world. The findings come shortly after their discovery of one new coral and two new nudibranch species.

The three new sun coral species discovered this time by Biologists from Hong Kong Baptist University (HKBU) were named by the HKBU team as *Tubastraea dendroidea*, *Tubastraea chloromura* and *Tubastraea violacea*, and they all belong to the genus *Tubastraea*.

This genus currently has seven recognized species only.

All of these three coral species are non-reef-building corals. They do not host symbiotic algae that produce nutrients and energy via photosynthesis. Living in deeper waters at depths of between 10 and 30m, they gain energy and nutrients by capturing zooplankton from seawater using their tentacles.

Tubastraea dendroidea

Like most sun corals, *Tubastraea dendroidea* has a typical bright orange colour, but its shape is unique. Instead of growing in clumps like most of its related species, this new species has a tree-like structure, which is also reflected in its name, "dendroidea."

Tubastraea violacea

Covered with a thin layer of pale purple tissue on the corallites (skeletal cups), *Tubastraea violacea* stands out from other related sun coral species as its polyp wall tissues and skeleton are violet in colour, and it has been named "violacea" accordingly.

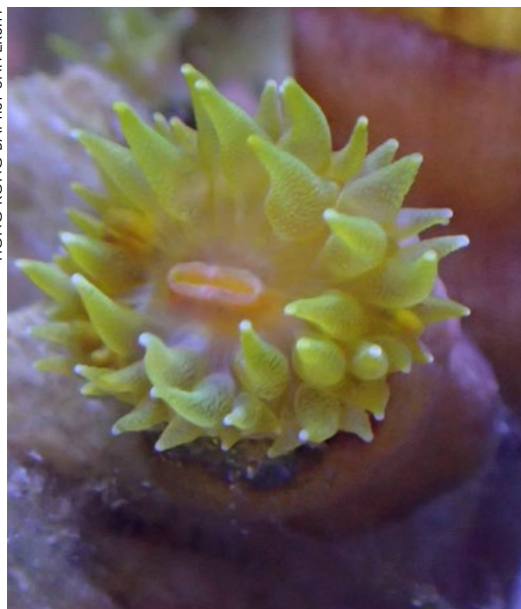
Tubastraea chloromura

This coral has a delicate olive green skeletal wall and a circle of yellow tentacles surrounding its mouth. As a result, the species has been named "chloromura," with "chloro" and "mura" meaning "green" and "wall," respectively.

The samples were collected when the team surveyed coral-eating nudibranchs at Sung Kong and Waglan islands in the eastern waters of Hong Kong.

The discovery is very encouraging as it provides strong evidence of the high marine biodiversity in Hong Kong waters, and it helps fill in the knowledge gaps in biodiversity, states Professor Qiu Jianwen of HKBU's Department of Biology. ■

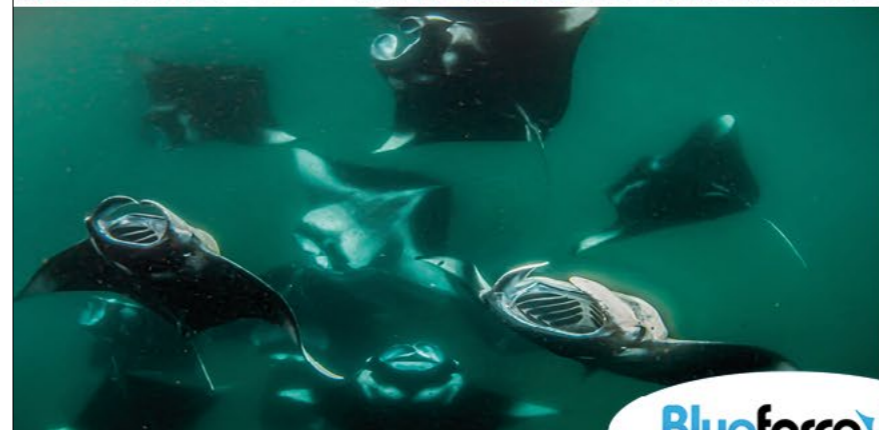
SOURCE: ZOOLOGICAL STUDIES



Tubastraea chloromura



Tubastraea violacea, with tentacles retracted



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This is a view of the tank after 22 months in conditions expected under climate change (left).

Hawaiian corals resilient against projected warmer temperatures in long term

A 22-month study of Hawaiian corals presents a possibility that the corals' survival rates amidst projected warmer temperatures and higher acidity may improve if given sufficient time.

A study of three species of coral species in Hawaii introduced the possibility that they might survive the warmer weather and higher ocean acidity predicted for the future.

This particular study took place over 22 months in 2016 to 2017. Its extended time period enhanced the accuracy of the results, compared with other studies involving Hawaiian corals,

which normally spanned only days or up to five months.

Andréa Grottoli, a distinguished professor of earth sciences at Ohio State University, attributed the difference in survival rates to the fact that there were aspects of coral biology that needed a long time to adjust, saying, "There can be a dip when they are faced with stressors, but after enough time corals can recalibrate and return to a normal state."

In the study, samples of three of the most abundant coral species in Hawaii—*Montipora capitata*, *Porites compressa* and *Porites lobata*—were collected between August and No-

vember 2015 from four sites around the island of O'ahu.

From February 2016 to December 2017, they were subjected to four different conditions: current oceanic conditions, ocean acidification of -0.2 pH units, increased oceanic temperature of an additional 2°C, and combined acidification and warming.

Resilience

At the end of the study, according to a press release, the coral species experienced much mortality, with up to about half of some of the species dying. Nonetheless, as much as 61% of corals exposed to the warmer conditions survived, compared to 92%

of those exposed to current ocean temperatures.

Of the three species, *Montipora capitata* turned out to be the least resilient, with a survival rate of 46%, compared to *Porites compressa*'s 71% and *Porites lobata*'s 56%.

Rowan McLachlan, who led the study when she was a doctoral student in earth sciences at the university, observed that the surviving *Porites* species maintained normal growth and metabolism, adding that they were "coping well, even thriving."

As for *M. capitata*'s poor survival rates, Grottoli said that this might be

because the coral relied heavily on plankton (as a food source) when it was under stress, and the amount of plankton provided during the study was less than what would have been available in the open ocean.

Although the study offers hope for the corals' survival, McLachlan cautioned, "We don't know how corals will fare if changes in temperature and acidity are more drastic than what we used in this study. Our results do offer some hope but the approximately 50% mortality we saw in some species in this study is not a small thing." In addition, the study did not take into account other factors like pollution and over-fishing. ■ SOURCE: SCIENTIFIC REPORTS

Edited by
Peter Symes
& Catherine
GS Lim



Ribbon weed, *Posidonia australis*, meadow in Shark Bay, Western Australia

Single seagrass plant stretches 180km

Seagrass meadow stemming from a single hybrid plant has extended its reach across more than 180km. This makes it the world's largest known plant.

Large, perennial, seagrass meadows of the Poseidon's ribbon weed and the wire weed (*Amphibolis antarctica*) dominate much of the marine ecosystem in the UNESCO World Heritage Site of Shark Bay, Australia.

Two years ago, scientists discovered some of the seagrass there was a clone of a Poseidon's ribbon weed (*Posidonia australis*) that had 40 chromosomes instead of the typical 20. They think half those chromosomes may come from the ribbon weed and half from an

unknown species.

"Our project began when researchers wanted to understand how genetically diverse the seagrass meadows in Shark Bay were, and which plants should be collected for seagrass restoration," said Dr. Elizabeth Sinclair, an evolutionary biologist in the School of Biological Sciences and the Oceans Institute at the University of Western Australia and the Kings Park Science.

"We often get asked how many different plants are growing in seagrass meadows and this time we used genetic tools to answer it. The answer blew us away—there was just one!"

Among oldest organisms

Based on its size and growth rate, the team suspects the clone arose 4,500 years ago and has been spreading ever since.

That would also make it among the oldest organisms on Earth.

The new polyploid clone probably formed in shallow waters after the inundation of Shark Bay less than 8,500 years ago and subsequently expanded via vegetative growth into newly submerged habitats.

Polyploidy is the heritable condition of possessing more than two complete sets of chromosomes. Polyploids are common among plants, as well as among certain groups of fish and amphibians. For instance, some salamanders, frogs, and leeches are polyploids.

Whole-genome duplication through polyploidy is a widely repeated mechanism of significant diversification throughout the evolutionary history of flowering plants. ■ SOURCE: PROCEEDINGS OF THE ROYAL SOCIETY B

"Lost" coral species resurrected

Curtin researchers make an encouraging discovery of a "lost" species of coral that had been hidden for more than 50 years.

Some 200 years ago, a coral species called *Plesiastrea peroni* was identified by scientists. However, over time, taxonomists classified it together with *Plesiastrea versipora*, another coral species.

This was because both coral species looked so identical that the only way anyone could tell them apart was through genetics and their morphological micro skeletal features.

The distinction came about after a team of researchers pored over 200 years of historical and modern-day literature and collecting samples at various sites in Australia and the

Indo-Pacific. They did so to first understand the larger morphological characteristics of the *Plesiastrea versipora*, and then using the samples to study the micro-morphology and micro-structure of the coral skeleton.

"After carrying out genetic sequencing, we found this species of coral actually contained a second, cryptic species, which we named *Plesiastrea peroni*," said PhD student David Juskiewicz, from the Coral Conservation and Research Group within the Trace and Environmental DNA (TrEnD) Laboratory in Curtin University's School of Molecular and Life Sciences.

He is the lead author of a paper describing the finding, published in the journal *Molecular Phylogenetics and Evolution*.

Juskiewicz said that by being able to accurately identify

Cryptic species: one of two or more morphologically indistinguishable biological groups that are incapable of interbreeding. They appear identical but are genetically quite distinct.

Plesiastrea versipora is an encrusting coral found in the Indian and Pacific Oceans. Inside this widespread coral a second, cryptic species has now been found hiding.

the new species, coral ecologists and biologists would know which species of *Plesiastrea* they were looking at, and this boosted biodiversity conservation and helped to prevent the loss of species diversity.

"We cannot protect species if we do not know about their existence or their present-day geographic range so this study is a step towards achieving this," he added. ■ SOURCE: CURTIN UNIVERSITY, SCIENCEDIRECT



NICOLE CAREY / CURTIN UNIVERSITY

Researcher David Juskiewicz with a *Plesiastrea* coral



© YI-KAI TEA

Popular species of fairy wrasse turns out to be previously unknown species

A case of mistaken identity causes a species of fairy wrasse to be incorrectly identified since the 1990s.

This is the story about the rose-veiled fairy wrasse (*Cirrhilabrus finifenmaa*), a species of fairy wrasse that has been hiding in plain sight.

Its striking colouration naturally made it a popular fish in the aquarium trade. However, ever since it was first collected by researchers in the 1990s, it had been mistakenly identified as the adult form of *Cirrhilabrus rubrisquamis* (known as red velvet

or rosy scaled fairy wrasse).

"What we previously thought was one widespread species of fish, is actually two different species, each with a potentially much more restricted distribution," said Yi-Kai Tea, a doctoral student at the University of Sydney.

He is the lead author of a paper describing the new species, published in the journal *Zookeys*. Prior to the study, when examining underwater footage taken in Chagos, Tea had noticed that the adult species of red velvet fairy wrasse in Chagos looked different from the ones in the Maldives.

He and fellow researchers investigated further, comparing the fish from the two locations and carefully examining and measuring every part of their anatomy. They then discovered that the species in the Maldives was an entirely different species from the one in Chagos.

Besides the identification of a new species, this discovery is also significant for another reason. The species' vivid colouration has caused it to be named after the Maldives' national flower, the

pink rose, which is called *fiyatoshi finifenmaa* in the native Dhivehi language spoken in the Maldives. It is also the first fish species to be formally described by a Maldivian scientist.

"It has always been foreign scientists who have described species found in the Maldives without much involvement from local scientists, even those that are endemic to the Maldives," said study co-author Ahmed Najeeb, a senior research officer at the Maldives Marine Research Institute (MMRI), who was born and had grown up in the Maldives.

"This time it is different and getting to be part of something for the first time has been really exciting, especially having the opportunity to work alongside top ichthyologists on such an elegant and beautiful species."

The study is the result of a collaboration amongst the California Academy of Sciences, the University of Sydney, the MMRI, and the Field Museum, as part of the California Academy of Sciences' Hope for Reefs initiative. ■ SOURCES: CNN, SCI-NEWS, ZOOKEYS



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Cirrhilabrus finifenmaa, also known by its common name rose-veiled fairy wrasse



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Photo: Eric Goh

The figurehead wreck
Osborn & Elisabeth, a
two-masted wooden sail-
ing ship from 1857, locat-
ed at Hanko in Finland

Text by Susanne Lundvall
Photos by Will Appleyard
and Jessica Olofsson
Translation edited by G. Symes

To help promote dive tourism in the Baltic Sea, the European Union's Project Baltacar, a collaboration between Sweden, Finland and Estonia, has developed underwater heritage trails for visiting a selection of unique wreck sites in the three countries. In Finland, the project has established buoys and created dive site maps for a group of five wrecks from the 17th to the 19th centuries, located just outside Hanko. Susanne Lundvall shares her experience diving this underwater wreck park.

The dive equipment was packed, and I would soon head to Gothenburg-Landvetter Airport to catch my flight to Helsinki in Finland. It was time for another wonderful weekend of diving in the spirit of history, under the leadership of Project Baltacar.

Arriving in Helsinki, I picked up my

fully packed dive bag. It weighed 22.5kg, and the maximum weight allowed by Finnair was 23kg. At the car rental company, I met my dive friends from Stockholm and England. The plan for the afternoon was to drive from Helsinki to Hanko, which

takes about two hours.

Hanko is as far south as one can get in Finland and is aptly named "Finland's Lysekil." In fact, I live in the small, picturesque city of Lysekil, located on Sweden's western coast.

Like Lysekil, Hanko is an old seaside

resort, located on a headland and surrounded by the sea on three sides. With its 130km shoreline and 30km sandy beach, it is a popular destination for fishermen, sailors, windsurfers, and sea and sun worshippers—especially during the summer season.

Old police station

We would be staying at Hotel Bulevard, which used to be an old police station, located in central Hanko. The hotel owners had taken inspiration for the hotel's interior design from well-known Finnish

17th to 19th-Century

Wrecks at Hanko

— Project Baltacar Underwater Park in Finland

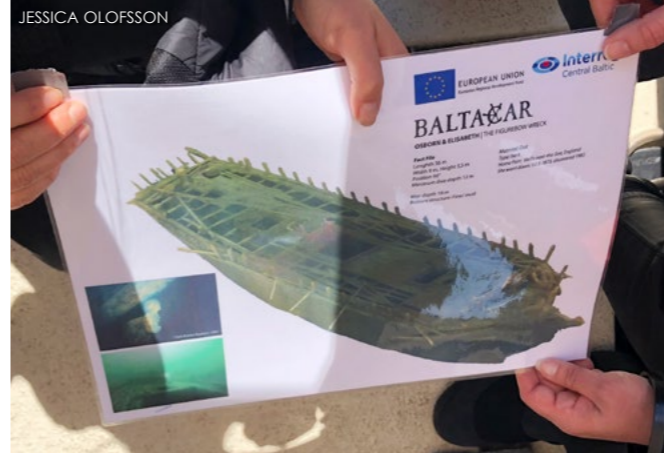
JESSICA OLOFSSON





JESSICA OLOFSSON

A copper nail is still visible in a timber plank of the *Garpen* wreck (above); Baltacar diagram of the figurehead wreck *Osborn & Elisabeth* shown in the dive briefing (top centre); Hanko Diving's dive boat, *Atlanta* (centre); Pizza with goat cheese, strawberries, rucola and pine nuts, at Skiffer Restaurant in Hanko (right)



JESSICA OLOFSSON



JESSICA OLOFSSON



JESSICA OLOFSSON

One of nine wooden cannon stages (gun carriages) at Meijerfelt Island near Hanko (above)

designers, such as Tapio Wirkkala and Nanny Still. Even the old prison cells had been renovated into charming rooms.

Canon Stages of Meijerfelt

After arriving at the hotel, Nina Pennanen, who was part of the Finnish team in Project Baltacar, met us there. We got ready to dive right away, because we were going to fly home on Sunday and could not dive on that day. Nina held a dive briefing on the day's dive site—the Canon Stages of Meijerfelt.

Then, we loaded up the car with all our dive equipment and drove the few minutes to the port, where

Hanko Diving's dive boat *Atlanta* was ready and waiting. The dive boat was a repurposed Kulkuri fishing boat. It had plenty of space and was well adapted for diving. The dive site was relatively close, so we got ready on land and loaded up the dive boat with our equipment.

Once at the dive site, we put on our dive gear, did a buddy check and jumped into the green and relatively dark waters. It was May and water temperatures in the sea were between 6°C and 10°C.

We swam down a slope and saw some small fish, a fairly large flatfish

and a wonderful pipefish, which posed and danced for us. We stayed quite a while to watch it.

The dive was so delightful, I could not help but laugh a little—and of course, when one laughs underwater, one has to empty the mask afterwards. It happens to me all the time; it is so wonderful and relaxing to be under the surface, I just cannot help myself.

Marine archaeologist Hanna Halonen, who was my dive buddy, guided me to the wooden cannon stages, or racks, also known as gun carriages. [ed.—According to

Halonen, all three sites within Project Baltacar at Hanko are wooden wrecks from the 17th to 19th centuries, in various states of preservation, and they are protected by the Antiquities Act in Finland. Old wooden remains are surprisingly intact underwater in this part of the world, due to the cold dark brackish waters, with low salinity and a lack of shipworm.¹]

This weekend, there were significantly more female divers and dive guides than male ones. In my experience, this

¹ Halonen, H. (2014). Mooring project: Protecting the underwater cultural heritage—Pilot project in Hanko and Kemiönsaari, Finland. Novia University of Applied Sciences. https://www.theseus.fi/bitstream/handle/10024/77469/Halonen_Hanna.pdf?sequence=1



WILL APPELYARD

Nina Pennanen, Finnish team member of Project Baltacar, gives a dive briefing for the figurehead wreck *Osborn & Elisabeth*, on the *Atlanta*, Hanko Diving's dive boat.

wrecks



Divers find a pipefish on the Cable Wreck (right). An arrow and guide line shows divers the way to each wreck in the underwater park (below).

WILL APPELYARD



WILL APPELYARD

was not that common.

There were nine cannon racks lying in a row on the sea bottom at a depth of 10m. There were some cannons next to the cannon racks, and we also saw a cannonball. It was overgrown and much larger than usual because it had corroded, but the clearly round shape still made it quite easy to distinguish.

Unfortunately, I had a leak in the right arm of my drysuit, and it was getting a little cold in the 6°C water, so after 35 minutes, we ended our dive. Back on the dive

boat, I disassembled my dry glove system. When problems arise with dive equipment, I often find that they are due to handling errors. I had not put the silicone seal in properly, so it did not seal as it should. But now, it was solved. One learns things all the time!

Time flew by, so for dinner, there would just be a hamburger at the fast-food restaurant a few blocks away from the hotel, and then it was bedtime.

Osborn & Elisabeth

At 7:45 on Saturday morning, there was breakfast and a dive briefing. The Project Baltacar had established buoys and made dive site maps for a total of five wrecks outside Hanko, in order to develop and facilitate dive tourism in the Baltic Sea. Nina showed us the map for the day's first dive, which was the galleon figurehead wreck of the *Osborn & Elisabeth*, an English two-masted schooner made of oak. Nina also

announced that bread rolls and snacks would be served on board the dive boat. Buns, this year? I love rolls, so I was super happy!

The wind was blowing, causing a choppy sea. I get seasick easily, so I took the precaution of taking a tablet for seasickness just in case. I prepared as much as I could while we were moored at the quay, assembling my dive gear, double-checking everything, and donning my undergarments and drysuit. It was quite hot, so I left the zipper open. My dry gloves and hood were set nicely in place next to me, and I felt ready for the first dive of the day. The archipelago was a bit reminiscent of Sweden's western coast, with its rocky little islands.

The dive boat swayed with the swells on the way out to the dive site, so I sat down so that I could see the horizon and get fresh air. I noticed that I had forgotten to moisturise my face with sunscreen, so I would be red later,

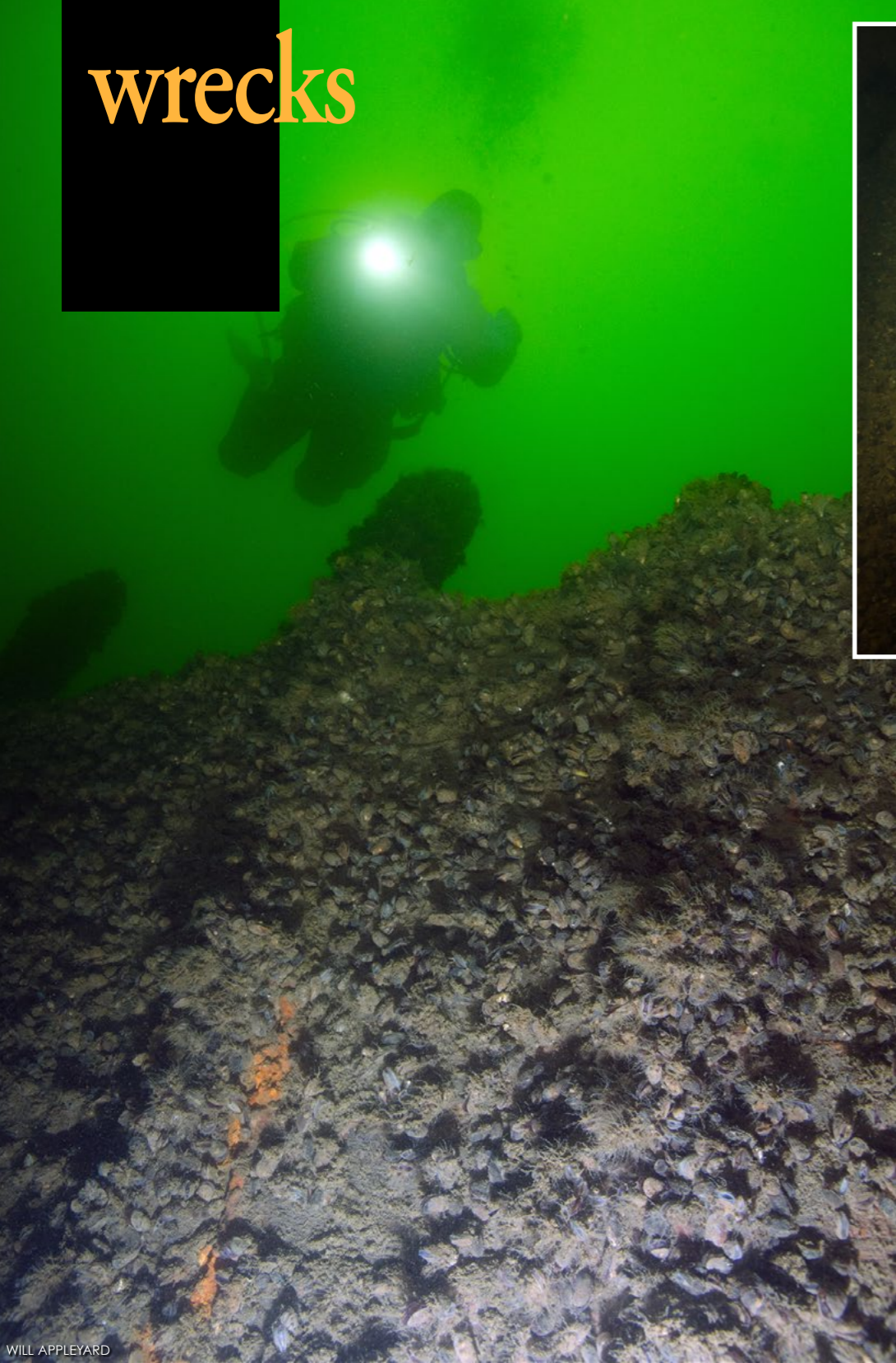


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Author on the figurehead wreck *Osborn & Elisabeth* (left), and diver on port side of the same wreck (far left)

then swam around to look at the wreck. Will took some photographs, and we found the remains of the galleon's figurehead. We had the wreck to ourselves for 20 minutes before the next dive pair joined us. It was magical to be down there in the peace and quiet.

This wreck from 1873 was quite well preserved. It stood upright and one could easily distinguish both the fore and aft, and also look down into the cargo spaces. After 40 minutes, Will's fingers started to freeze, and we had enjoyed enough of the dive to return to the surface.

Getting back on board the dive boat was clearly a challenge in the high seas. The dive ladder's steps were quite sparse between the rungs, and my total height of 158cm did not make it at all easier. But with the help of dive friends, one can solve anything.

Garpen

My second and last dive of the weekend would be on the

Garpen wreck. *Garpen* was a two-masted brig, which was believed to have originated from England, but this is still uncertain. It sank off the island of Garpen—hence, the name—in a storm in October 1847.

Before the dive, I had to solve my dilemma with the dive computer. My own spare parts bag contained extra valves, tools, dry gloves, inner gloves, silicone seals and a little more—but no extra dive computer. Fortunately, there were diver friends who had extra everything with them, so it was not a problem. Thank you, Jessica Olofsson, for the loan of a dive computer! Third time's the charm, and on this dive, all my equipment functioned as it should.

Unfortunately, on this day, there was poor visibility and a large amount of backscatter on *Garpen*. I discovered that I saw better without the dive light on. The wreck was not so well preserved, and it was difficult to distinguish what was what, but there were a number

PROJECT BALTACAR

Project Baltacar: Baltic History Beneath the Surface is an EU project that ran from 1 January 2017 to 31 December 2019. The project's aim was to develop dive tourism and interest in the Baltic Sea's underwater cultural heritage. This was done by developing and simplifying, in practical terms, the ways to visit the unique and well-preserved wrecks of the Baltic Sea.

WRECKS OF HANKO

The underwater park at Hanko has three buoys that mark a total of five different wrecks. The Cable Wreck, *Ajan* and *Lilla Ankargrundet* are located by the same buoy.

Osborn & Elisabeth is also called the "galleon figurehead wreck," after the female figurehead on the galleon, which adorned the wreck. The galleon's figurehead came loose in 2001 and was salvaged. It can be seen today at the Maritime History Museum in Kotka. *Osborn & Elisabeth* was a two-masted sailing ship built in England in 1857. It sank during a storm in 1873, when it was on its way from London to St Petersburg. The wreck is located at a depth of 10 to 18m, and measures 28m long and 7m wide.

Garpen is a two-masted brig. The wreck's history is uncertain, but it is believed that the brig was English and that it

was on its way from Glasgow to St Petersburg, loaded with barley. In October 1847, it sank off the island of Garpen—hence, the name of the wreck. The wreck is located at a depth of 9 to 14m, and measures 30m long and 11m wide.

Cable Wreck got its name after it was found with a large cable lying over it. Based on the porcelain found on the wreck, it has been dated to the 17th century, and it is believed that it has its origins in the Netherlands. It sank around 1647 to 1648 and is located off the island of Gäddtarmen (in Swedish) or Hauensuoli (in Finnish) in the Hanko archipelago. The wreck is located at a depth of 18m, and measures 18m long and 5m wide.

Ajan. There is still not much known about this wreck. The remains at the site are believed to have been part of a larger ship named *Ajan*. The wreckage is located at a depth of 15m.

Lilla Ankargrundet is named for the island where it is located. Beyond this, very little is known about the wreck, but it is believed that the remains at the site are parts from a larger ship. The wreckage is located at a depth of 11 to 15m.

DIVE OPERATOR
Aalto Diving School
sukelluskoulu.aalto.fi/en

but I would rather get red in the face, than seasick. It was sometimes quite quiet on the dive boat; some were noticeably affected by the high seas. After arriving at the dive site, my dive buddy, Will Appleyard, and I quickly got into the green sea. The galleon figure-

head wreck was angled down toward the sea bottom as well as tilted horizontally. Once down on the wreck, I saw that my dive computer had condensation; it was impossible to see what it displayed. I signalled to Will to make him aware of the situation. We

wrecks

Located on a headland surrounded by the sea on three sides, Hanko is an old seaside resort, which is a popular destination for tourists who love windsurfing, boating and fishing, as well as for sea and sun worshippers—especially during the summer.



MARIA KAUPPI / VISIT FINLAND



WILL APPEYARD

Marine archaeologists involved in Project Baltacar prepare equipment for loading onto the dive boat (right). The author on the *Garpen* wreck (far right) where visibility was unfortunately not optimal on that day.



WILL APPEYARD

of real copper nails that were original and fascinating to look at. The wreck was located in a bay, and along its edges at the bottom, there were several layers of different shades of whitish clay.

Post-diving activities

Back ashore, I decided to bring all my equipment to the hotel room, to make it easier to pack up for tomorrow's flight. After spending time in the shower with the dive equipment, it was time for dinner with fellow divers.

We walked down to the quay to Skiffer Restaurant, which had just opened for the

season. Fantastic oval sourdough pizzas were offered here, including innovative varieties with fresh strawberries, pears and goat cheese—but also the usual classics. As a rule, the restaurant did not allow one to add anything to their well-composed pizzas, but it was okay to remove some toppings. Nice concept! Satisfied and satiated, we went back to the hotel to enjoy a Finnish sauna.

Sunday morning came, and for the Swedish divers, it was time to pack up the equipment and head to the airport. The Estonians on the trip came by ferry, so for their part, there were two more dives.

We rounded off this pleasant weekend with a visit to the Finnish dive centre Aalto Sukelluskoulu, located in central Helsinki. ■

Susanne Lundvall is a diver and dive writer based in Lysekil on Sweden's western coast. She has been a diver since 1998 and works for the dive equipment manufacturing company SI TECH AB. She participated in Project Baltacar, which is a collaboration between Sweden, Finland and Estonia to promote wreck diving in the Baltic Sea. For diving, visit Aalto Sukelluskoulu at: sukelluskoulu.aalto.fi/en. To learn more about Project Baltacar, go to: projectbaltacar.eu.

Marine archaeologist and dive guide Hanna Halonen on the *Garpen*





Explosion of *San José* during Wager's Action (1708). Detail of 18th-century painting by Samuel Scott

Spain's *San José* galleon was loaded with a vast cargo of treasure when it was sunk by British navy ships in 1708 during the War of the Spanish Succession.

Colombian government releases new imagery of San Jose wreck

Colombia's Navy has shared unprecedented images of the legendary *San José* galleon shipwreck, thought to be carrying 200 tons of gold, silver and precious stones.

After the recent elaborate diving expedition at a depth of 950m (3,117ft), the Colombian Navy has

published new footage of the legendary ship and its treasures.

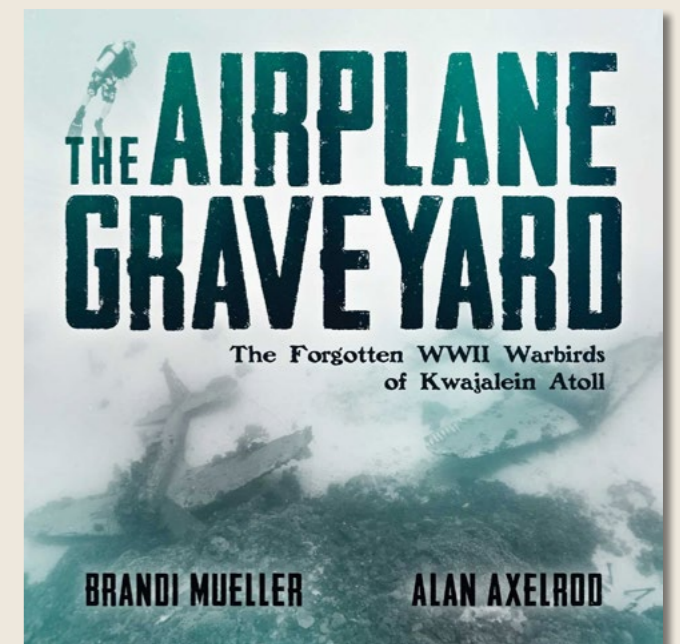
Video shared by the Colombian government in early June shows in detail the wreckage of the 300-year-old *San José*, a Spanish galleon that sank near the city of Cartagena in the early 18th century. The ship, a 64-gun, three-mast galleon of the Spanish Navy, was part of the Spanish treasure fleet during

the War of the Spanish Succession. It is believed to have been carrying at least 200 tons of treasure, including gold coins, silver coins, and emeralds, estimated to be worth up to US\$17 billion at today's prices.

Colombia President Iván Duque Márquez said new equipment allowed them to dive deeper and get better quality images. The video shows the best-yet view of the

treasure that was aboard the *San José*—including gold ingots and coins, cannons made in Seville in 1655 and intact Chinese dinner service, Reuters reported. The remotely operated vehicle also discovered two other shipwrecks in the area, including a schooner thought to be from about two centuries ago as we **reported previously.** ■

SOURCE: COLUMBIAN GOVERNMENT



Never before published in book form, see extraordinary images of the forgotten American WWII airplanes resting on the bottom of the Kwajalein Atoll lagoon, from award-winning underwater photographer Brandi Mueller. Available on: **Amazon.com**

Edited by
Scott Bennett
& Peter Symes



Swimming and diving at Hon Mun Island, Nha Trang, Vietnam

Vietnam halts diving off popular island to protect coral

Vietnam has banned swimming and scuba diving off Hon Mun Island in an attempt to revive its damaged coral reefs.

Recent photos taken off Hon Mun Island (also known as Ebony Island)—about 14km from the city of Nha Trang and popular with divers thanks to its diverse ecosystem—showed the reefs bleached and damaged.

Consequently, the Nha Trang Bay management authority has decided to halt swimming and scuba diving activities in areas around Hon Mun Island, Macau News

Agency reports.

In a statement, the authorities said the ban was to “evaluate the condition of the sensitive area so that an appropriate plan to enact the sea conservation area” could be made.

Around 60 percent of the coastal bed in the area was covered by living coral in 2020, according to state media, but more recent findings showed that had shrunk to less than 50 percent.

Authorities have blamed the shrinking ecosystem on climate change, noting that powerful storms in 2019 and 2021 had damaged the coral; they also blamed illegal fishing, dredg-

ing, waste disposal and the construction of industrial parks.

Divers disappointed

Divers have expressed disappointment and frustrations over the decision to close the waters. “Swimming and diving activities were the least influence on the coral reefs, compared to other activities,” diver Nguyen Son, from Ho Chi Minh City, told AFP.

Nha Trang is one of the most important tourist hubs of Vietnam, thanks to its beaches with fine and clean sand and the clear ocean water with mild temperatures all year round. ■

SOURCE: MACAU NEWS AGENCY

Egypt relaxes photography restrictions for tourists

Egyptian nationals and foreign tourists alike have complained that authorities have requested permits for shooting in public areas, and at times seized cameras and forbidden shooting even if a permit is in place.

In a statement, Minister of Tourism and Antiquities Khaled El-Enani announced that “photography enthusiasts,” foreign residents in Egypt and tourists will be able to take pictures in public without permits and that “no one will be allowed to ask you why you are filming in public.”

“Taking photographs using



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all kinds of traditional cameras, digital cameras and video cameras will be permitted free of charge. No permit needs to be obtained beforehand,” the statement said.

Three types

In a telephone interview broadcast on MBC Egypt, El-Enani explained that three types of photography are to be explicitly permitted.

The first applies to Egyptians, foreign residents in Egypt and tourists who are “photography enthusiasts”—which we take as being most dive travelers.

The second type is foreign reporters and news channels who will be required to obtain permits through the State Information Service, which will be in charge of setting rules and regulations for providing licenses for reporters and news channels.

The third type, El-Anani continued, is specific to film producers and cinematographers who will be charged license fees for filming inside Egyptian archaeological and touristic sites.

Remaining restrictions

Restrictions will remain in place for photographing children and for commercial photography, the statement said. It also noted that “it is completely forbidden to take or share photographs of scenes that can, in one way or another, damage the country's image”.

■ SOURCES: “EL-HEKAYA” PROGRAM BROADCAST ON MBC EGYPT



PETER SYMES

Giza pyramid and the Sphinx



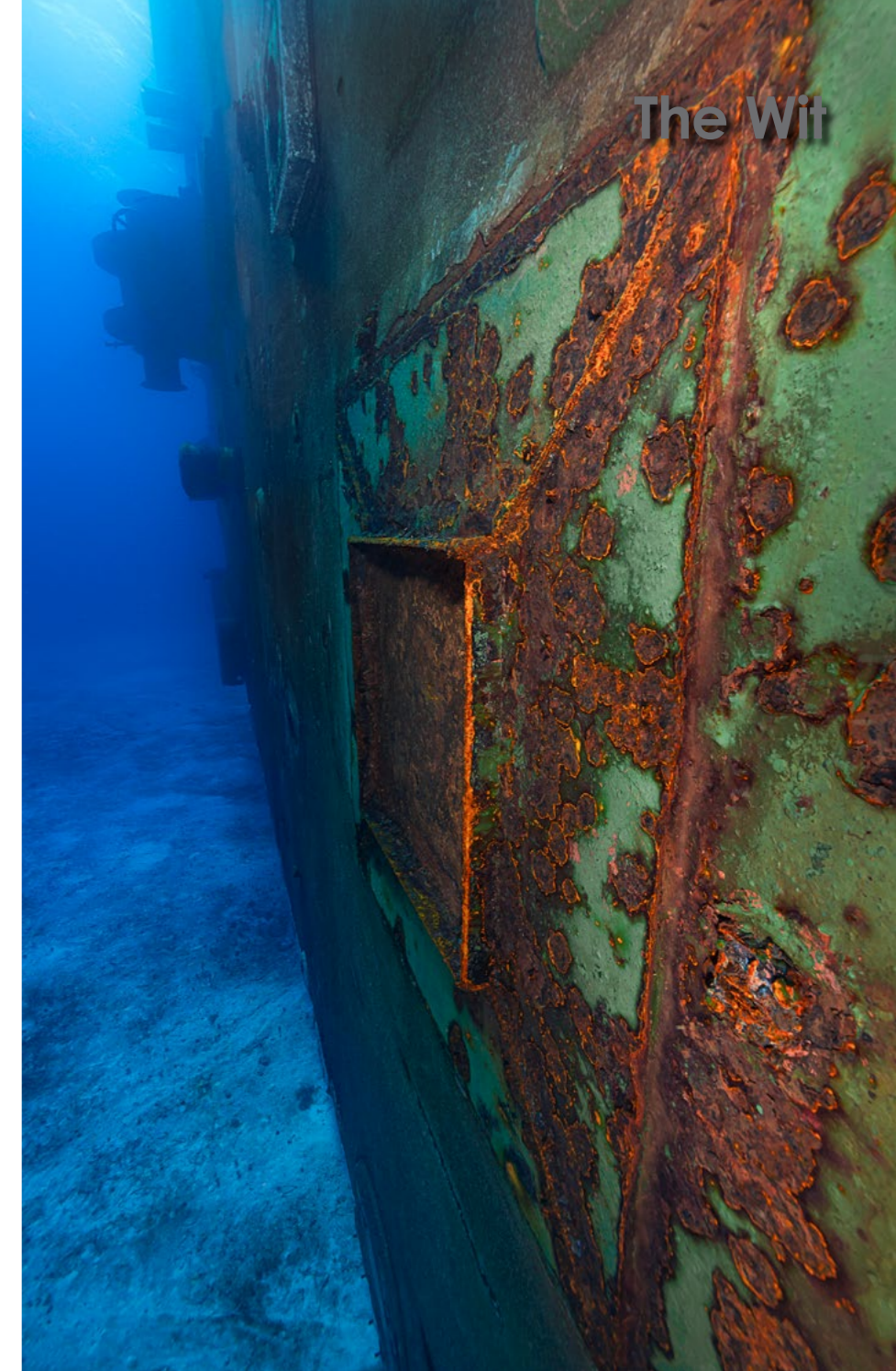
The Wit Wreck

— *A New Artificial Reef Dive in Belize*

Text by Angelique Brathwaite

Photos by Beth Watson





A tugboat helps manoeuvre the 5,400-ton ship into position for sinking (above); Diver at porthole of The Wit (top left); The Wit's final resting place at Turneffe Atoll (top centre); A portion of the deck, looking towards the ship's stern (right); The Wit was prepared before sinking with several access points for easy entering and exiting (previous page).



Sunset on The Wit's starboard side where marine life had already gathered a day after the sinking

Belize is a country blessed with an abundance of fabulous coral reefs, to which its newest underwater attraction—the sunken ship “The Wit”—adds another dimension. It is located at Turneffe, the island’s largest and most biodiverse coral atoll, some 32km east of Belize. Turneffe also encompasses a network of productive mangrove forests and seagrass beds within its flats, creeks and lagoons.

The *Witconcrete*, affectionately called “The Wit,” was a 5,400-ton ship, sunk within the Turneffe Atoll Marine Reserve (TAMR) in 75ft of water. The operation was carried out by Turneffe Atoll Sustainability Association (TASA),¹ the co-managers of the protected area, in association with Belize Sugar Industries Limited (BSI), Blue Finance and Blackbird Caye Resort, with support from the Ministry of Blue Economy and Civil Aviation, and the Ministry of Tourism and Diaspora Relations—Belize.

The Wit was born as YO-162 in 1943 and

¹ TASA (turneffeatollmarinereserve.org)

served the US Navy for around 20 years. It was used as a floating transfer station in the Second World War, transporting supplies around the Gold Coast and the Eastern Seaboard of the United States. After being struck from the naval lists in 1967, it was transferred to the Philippines and renamed *Witconcrete*. The ship was acquired by BSI and, after it outlived its usefulness as a sugar barge and storage depot for molasses, was gifted to TASA in 2021.

It was exactly the right time for TASA, who immediately saw its potential for wreck diving



The Wit came with its own ecosystem. The hull had been submerged for many years before the sinking and coral growth was still intact and could be found here (right).



The *Witconcrete* is an enticing subject for underwater photographers and videographers alike. Its structure offers many colours, shapes and textures, which make for compelling subject matter (below).



and as an artificial reef. Concrete is one of the most suitable materials for corals to recruit to, so it could easily form the base structure of a new coral reef. In addition, its many holds, cabins and surface structures would provide a new home for fish and benthic organisms—creating an artificial reef. It was a “no-brainer.”

TASA, working with Blue Finance, secured financing from the Sustainable Ocean Fund (SOF) for the preparation, cleaning and sinking operations. The Wit fit nicely into the portfolio of projects developing sustainable revenue for the management of the TAMR.

Cleaning and sinking
The Wit was extensively cleaned and

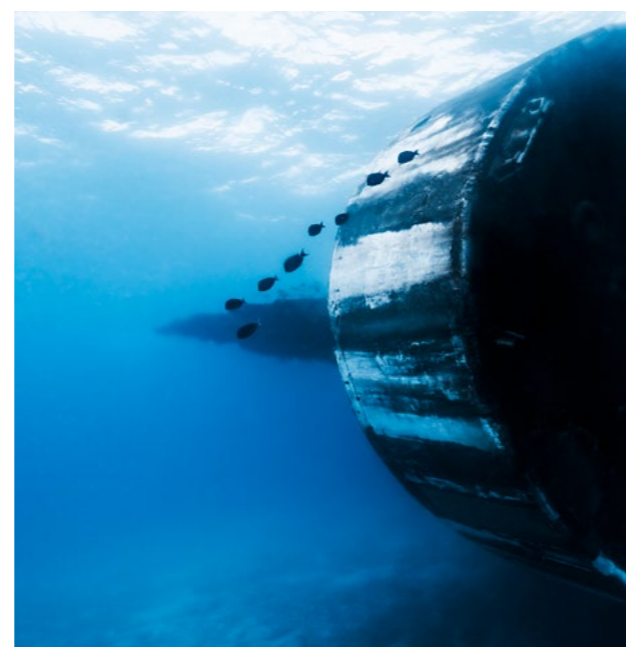
EXPERIENCED DIVERS DEMAND GREAT GEAR.



 **DIVE GEAR EXPRESS**

DiveGearExpress.com





Fish gather at the stern a day after sinking (above); The Wit finally came to rest on the substrate and landed on her side. It is a dynamic and breathtaking view (left).

prepped by local and international marine experts, and met both national and US Environmental Protection Agency (EPA) standards for hazardous materials prior to sinking. It was also made more

diver-friendly, by being widened and, in some cases, having access points specially created for ease of entry and exit. The Wit did not go down easily, which was exactly the opposite of what would be

expected from a concrete vessel—but sink it finally did on 10 December 2021. This was after a tremendous effort by 15 scuba divers, two freedivers, two tug boats, five surface vessels, eight huge, bespoke anchors, explo-



The sheer vastness and scope of The Wit is mesmerising (above); Proceeds collected from diving on The Wit will assist in maintaining TASA and other programmes and projects of the marine reserve (top left).

sives and cooperation from the elements. It finally chose its resting place in close proximity to the planned location, and that is where it now lies (between 30 and 80ft of depth). The Wit was not a dainty ves-

sel; it was a large, squat structure, some 375ft in length, 56ft wide and 38ft deep. Made of concrete and never designed to be self-propelled, it was also not designed to be sleek, but instead to carry maximum loads.



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Marine life

The Wit came with its own ecosystem, as the hull had been submerged for years prior to the sinking. Scores of fish immediately made it their home—from the resident, reclusive rainbow and blue parrotfish, hogfish and angelfish to the curious barracudas. All this, after only a few months of being submerged. It has a large exposed surface area, shallow enough in some places for snorkellers and suitable for divers of all levels to explore. Certified wreck divers can penetrate the inner holds for even more adventure. Lying on its side in a sandy expanse, The Wit is more than big enough to satisfy three or four dives.

Through the park entrance fee system, monies collected from diving The Wit will assist in funding TASA's operations and other programmes in the TAMR. We are also working on an impactful experience where divers can directly participate in monitoring The Wit as it grows into a reef; as well as protection of the area and other new, exciting opportunities.

Come dive The Wit and help us conserve Belize's largest atoll at the same time! Watch the **video >>>** ■

Thanks go to Nicolas Pascal and Taylor Bratton for proofreading.

Angelique (Angie) Brathwaite is a Barbadian marine ecologist—now based in France—with a focus on coral reef ecology, marine management and sustainable finance for marine conservation. Also a PADI Instructor with over 20 years' professional experience, she has worked at the policy and science levels, coupled with community and stakeholder engagement in both populated and remote areas. A former head of marine research for the government of Barbados, Angie is the co-founder of Blue Finance (blue-finance.org) and the director of science and management for this NGO.

SOURCE: ERLEND LARSEN BONDERUD, AUTHOR OF THE UPCOMING BOOK, CONCRETE SHIPBUILDING, VOL. 1-2

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Watch the dramatic video of the sinking, shot by Beth Watson. Screenshots from the video of the sinking (above and top right). Topside view of The Wit, as it awaited its final resting place at Turneffe Atoll (top left)

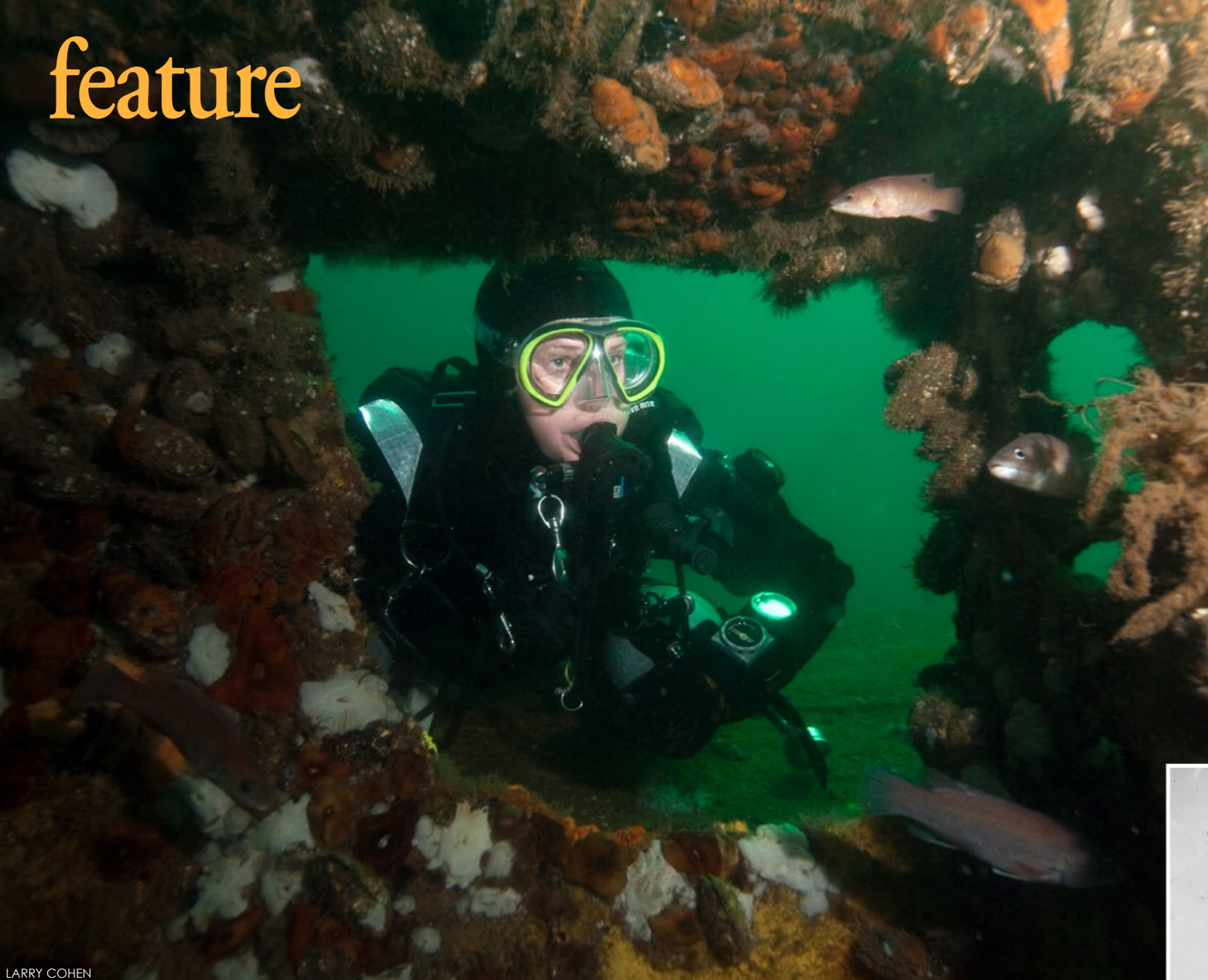


Northeast Wrecks

— *Shipwrecks of War Off New York & New Jersey Coasts*

Text and photos by Larry Cohen and Olga Torrey





LARRY COHEN



LARRY COHEN

Diver Olga Torrey exploring the USS *San Diego* (left), observing the interior (far left) and at her keel (below); Historical photo from 1915 of USS *San Diego* (center); Diver Mike Rothschild Exploring the *R.P. Resor* (previous page)

The waters running north to south from the Long Island coast to northern New Jersey are nicknamed “Wreck Valley” by local divers. Larry Cohen and Olga Torrey share the stories of some of the war shipwrecks found in these waters, located off the US northeastern coast.

Due to navigation errors, lousy weather and war, there are hundreds of shipwrecks in the waters of New York and New Jersey. These are unfortunate

marine disasters, but they do provide habitat for marine life. As a matter of fact, both New York and New Jersey have an artificial reef program, where they sink ships on purpose. Many of these wrecks are at depths of 24 to 45m (80 to 150ft).

Some hardy people dive all year round, but most diving is done between April and November. The water temperatures are between 13 to 5°C (55 to 40°F). It is possible to dive in a 7mm wetsuit, but to be comfortable, you will need a drysuit.

Most boats require single-tank divers to carry a pony

bottle, but most experienced local divers use doubles or rebreathers. Diving Wreck Valley is not for the casual diver, but to experience the history, mystery and local marine life, it is worth the effort. Let’s explore a few of the area’s most famous wrecks sunk in war.

USS *San Diego*

During history lessons in grade school, my teachers never talked about how close WWI and WWII came to US shores. We learned all about the war in Europe and the Pacific, but



US NAVAL HISTORY AND HERITAGE COMMAND / PUBLIC DOMAIN

we were never informed about German U-boats right off the US coast.

The USS *San Diego* was a heavy-armed cruiser built in 1907. On 19 July 1918, when traveling off the coast of Long Island, New York, it reportedly hit a mine laid by the German submarine U-156. The ship sank in 28 minutes, and six sailors out of a crew of 1,183 men lost

their lives.

The *San Diego* is the only major warship the United States lost during WWI, and she sits only 12.87km (8 miles) from the US coast. This large 153m-long, 21m-wide (503ft-long, 70ft-wide) ship turned turtle and sits upside down in 33.5m (110ft) of water. The keel comes up to 19.8m (65ft). Most

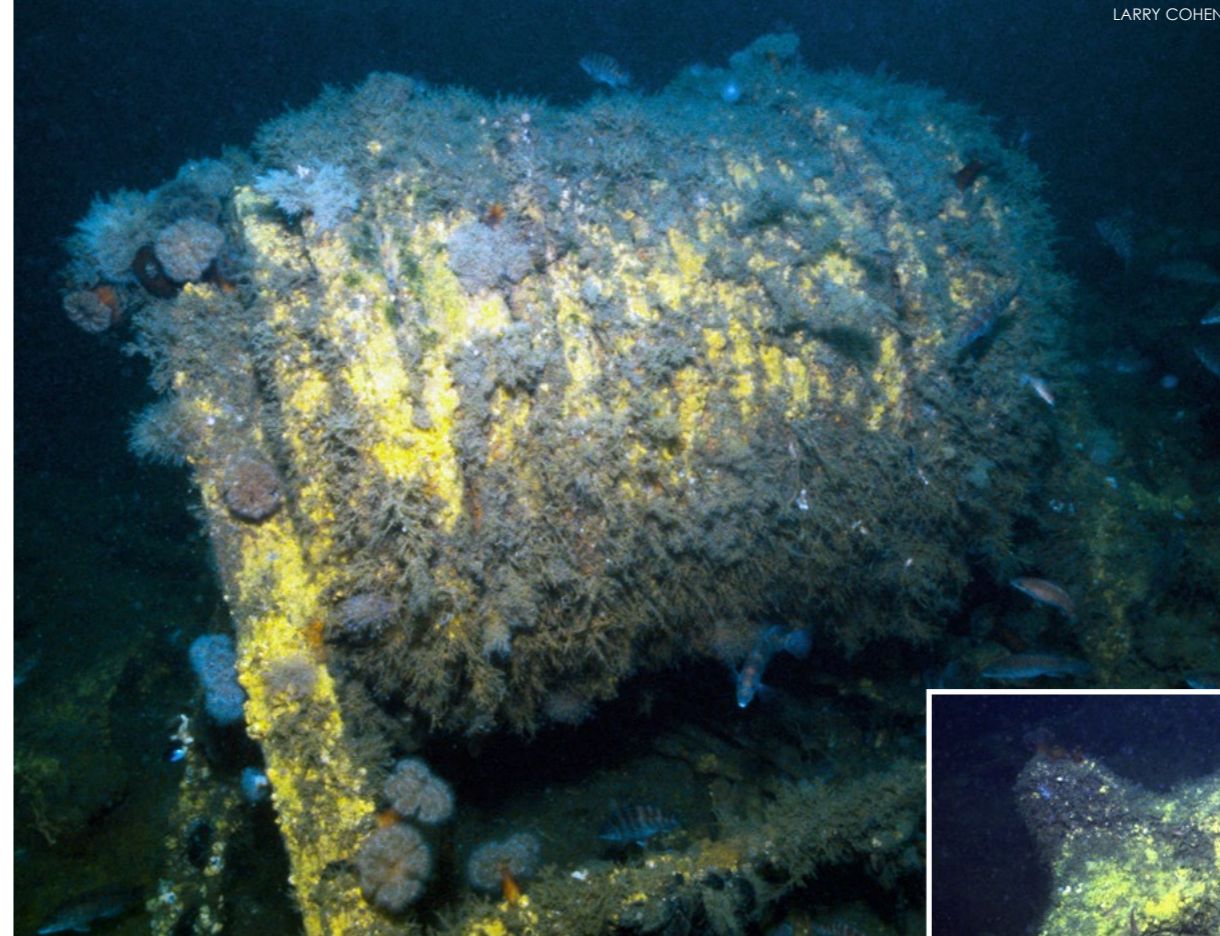


LARRY COHEN

dive boats tie into the keel.

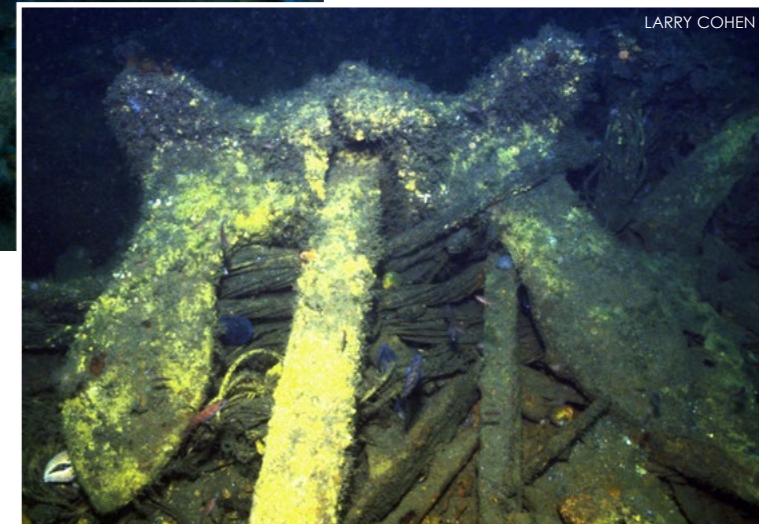
In recent years, the ship has deteriorated but is still easy to navigate. The superstructure is under the ship’s hull, but you can still see the large guns peeking out of the wreck. There are many openings for trained divers to penetrate

LARRY COHEN



Northeast

Winch (left), pair of ocean pouts (far left), and anchor (below) on the *R.P. Resor*



Lingcod on the *R.P. Resor* (left); Ocean pouts in one of the *R.P. Resor*'s boilers (below)



and explore the wreck's interior. The large shells can still be seen inside, along with other artifacts. Divers used to recover artifacts, but this is no longer legal.

R.P. Resor
German submariners called January to August 1942 the "Happy Time." This is because the U-boats off the eastern coast of the United States were very successful in sinking merchant ships. It was designated Operation Paukenslag ("Operation Drumbeat") by Admiral Karl Dönitz, the U-boat commander who implemented it. From January to March 1942, U-boats sank scores of ships off the US coast. The *R.P. Resor* was one of these casualties sunk on 28 February 1942. The 132.5m-long, 20m-wide (435ft-long, 66ft-wide) tanker was owned by Standard Oil Company, now Exxon

Corp. The U-578 fired two torpedoes at the ship. This ruptured the *Resor*'s oil tanks, setting her on fire, along with the oil-covered waters around the ship. Only two of the 49 crew members survived. The ship burned for two days before sinking in 39.6m (130ft) of water. The wreck is about 58km (36 miles) off the coast and is a long boat ride away. Most of the wreckage is low-lying and scattered along the bottom. Her stern is intact and rests at an angle. You can still see the deck gun on the stern. Midship, the boilers do have some relief. It is possible to swim inside the boilers where you can find giant lobsters.



Historical photo of *R.P. Resor*





LARRY COHEN

Remains of the Texas Tower 4, (above) photographed back when the wreckage started at 19.8m (65ft); Toilet inside Texas Tower 4 (right); Historical photo of Texas Tower 4 (top right)

Texas Tower 4

Not all wrecks off the north-eastern coast are ships. The Texas Tower 4 was a radar tower 136.7km (85 miles) in the middle of the ocean. This structure is underwater because of a “nor’easter” (storm), but the reason it was there in the first place and why 28 men died was the Cold War.

The Texas Tower 4 got its name because it looked like an oil rig, like the ones in the Gulf of Mexico, off Texas. The three rubber domes contained radar equipment. This extended the

United States’ monitoring range to almost 241km (150 miles) outwards into the ocean. This was necessary in case the Soviet Union attacked the country.

The problem was that the tower was poorly designed. Its legs penetrated only 4.5m (15ft) into the sand, and the tower had walls that were less than an inch thick. (This earned it the nickname “Old Shaky.”) However, the legs were not strong enough to support a large structure 18.28m (60ft) above 60m (200ft) of water.

In August 1960, Hurricane

Donna damaged the tower. Because of all the top-secret gear, the crew was not evacuated. Crew member Don Slutzky said, “The tower shuddered, and we all ran to grab our life vests.” In January 1961, the Air Force decided to shut down the Texas Tower 4’s operation, but they did not do it fast enough.

On 15 January 1961, another storm was predicted to hit the area with 30m (100ft) seas. The navy supply ship AKL-17 was sent to bring the crew safely to shore. While the AKL-17 was en

NOAA / WIKIMEDIA COMMONS / PUBLIC DOMAIN



LARRY COHEN

route at 7:28 p.m. on January 16, the radar blip that was the Texas Tower 4 disappeared from the ship’s radar screen. All 28 men, comprising airmen and civilians, perished under the sea with the tower.

Sitting at 60m (200ft) of depth for many years, the wreckage started at depths as shallow as 19.8m (65ft), propped up by its one remaining leg. Then,

over the winter of 1999, the leg collapsed. So, the wreck now begins at 36.5m (120ft) with all the interesting structures below 42.6m (140ft).

The Texas Tower 4 is close to the edge of the continental shelf and the Gulf Stream. For this reason, visibility is usually excellent, and the water is blue. The wreck is also visited by fascinating marine life.

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U-869 (The U-Who)

Not all German U-boats were successful. For example, the U-869 never sank an Allied ship. The dive boat Seeker, run by Captain Bill Nagle, was checking locations where fishing boats were losing nets when the crew discovered the wreck on 2 September 1991. This was a mystery since Germany had no record of a submarine being sunk at that location, and the United States had no record of sinking a U-boat. This unknown sub-

marine that should not have been there was nicknamed the "U-Who."

The wreck is 96km (60 miles) off the coast and is in over 60m (200ft) of water. On their third trip to the wreck, Captain John Chatterton and wreck divers Richie Kohler, Steve Gatto and Tom Packer found artifacts that proved the submarine was a German U-boat.

A few dives later, Chatterton found a knife with a wooden handle. The name "Horenburg" was carved into the handle. In December 1993, he sent the sketches and photographs to the Naval Historical Branch of the Ministry of Defence, London, England. The British sent the material to Berlin, Germany, to be assessed by Dr Axel Niestle, an authority on U-boats.

Dr Niestle reported that the "U-Who" was, more than likely, the U-869. The knife was the most important clue. Martin Horenburg, whose last name was on the knife handle, was the only U-boat sailor, and he was on the U-869.

On another dive, Chatterton, Kohler, Dan Crowell, John Yurga, Will McBeth, Pete Wohlleben, and other divers were filming a special for NOVA. On this dive, a spare-parts box marked with a plastic tag was recovered from the starboard side of the electric motor room. The tag was clearly marked U-869.

Now that the wreck's identity had been confirmed, the question remains: How did it sink off the New Jersey coast? The theory is the U-869 never received its orders to go to Gibraltar, so it headed to its original assignment off the US northeastern coast. At first, it was believed that one of the submarine's torpedoes malfunctioned, did a circular run, and sank the submarine. However, such self-kills are rare. It is also possible that a US Coast Guard convoy escort sank the sub on 11 February 1945. Since there was no confirmation of the sinking of a submarine, the US Navy denied the Coast Guard's claim that they had sunk a U-boat.

The boat ride offshore to the

U-869 takes a long time. Usually, this is a dark dive, but visibility is good. Most of the wreck is in one piece, but the plating is falling off. The conning tower is lying next to the main wreckage, and it is easy to swim into the conning tower. Besides being a tight squeeze, many cables and other hazards could cause a diver to get entangled.

This is just a tiny sample of the wrecks off New York and New Jersey sunk because of war. In our next article, we will explore wrecks sunk by collision or bad weather. ■

Larry Cohen and Olga Torrey are well-traveled and published underwater photographers based in New York City, USA. They offer underwater photography courses and presentations to dive shops, clubs and events. For more information, visit: liquidimagesuw.com and fitimage.nyc.

SOURCES: NJMARITIMEMUSEUM.ORG, NJSCUBA.NET, SHIPWRECKWORLD.COM, VIRGINIAPLACES.ORG, WIKIPEDIA.ORG



LARRY COHEN

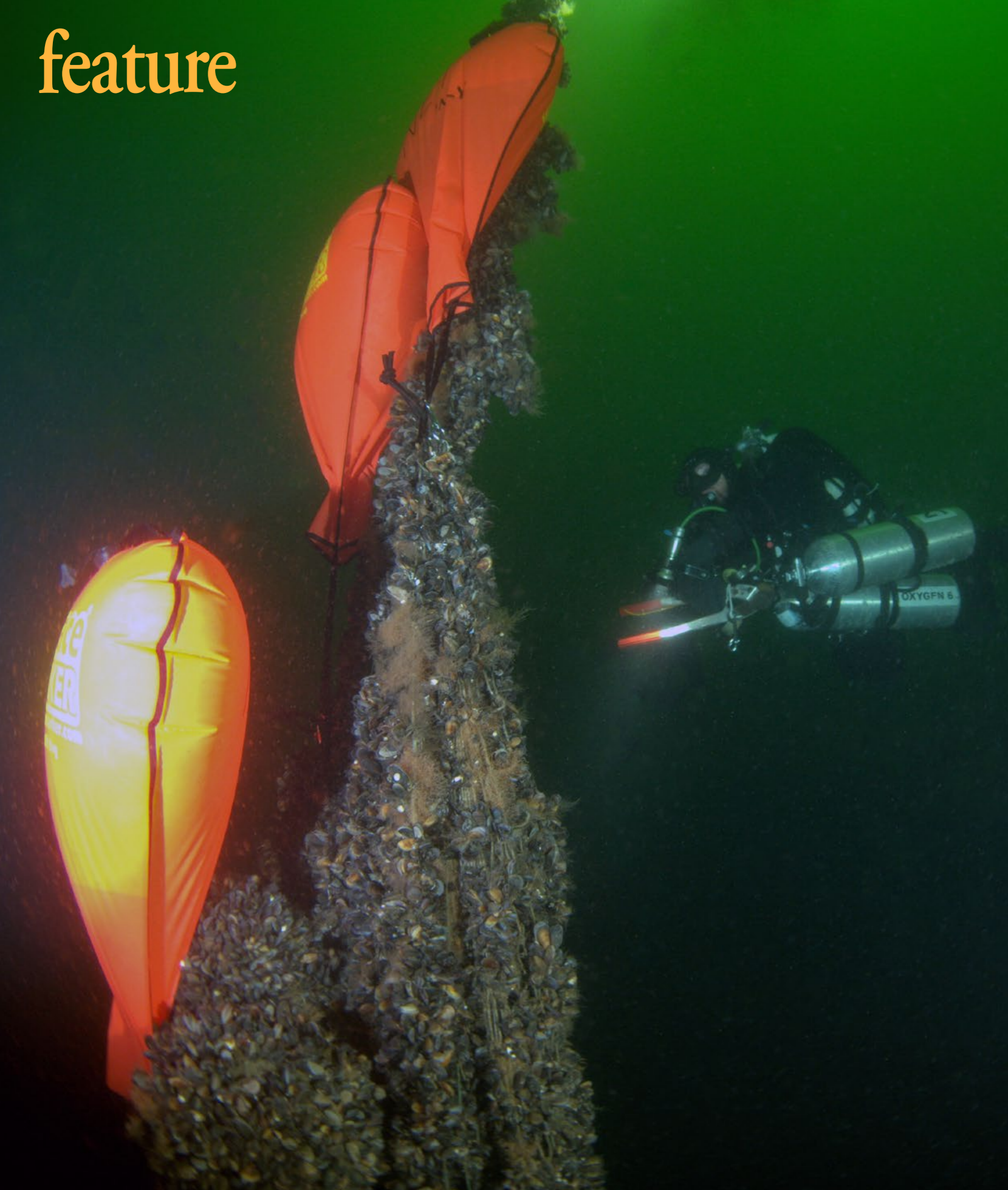
The periscope (above) and ocean pout (top right) inside the U-869's conning tower; Diver exploring the U-869 (top left); Historical photo of U-869's crew (left)

Ghost Net Recovery

in the Baltic Sea

Text and photos by Sabine Kerkau





Just the tip of the iceberg—tons of ghost nets are caught on Baltic Sea wrecks, some historical in significance. Here, lift bags are used to lift ghost nets off the SS *Elbing IX* in Lithuania.



A ghost net at the stern of the *Elbing IX* floats 20m above the wreck, trapping and killing marine life (above); Divers salvaging a net on the wreck of the SS *Elbing IX* (previous page)

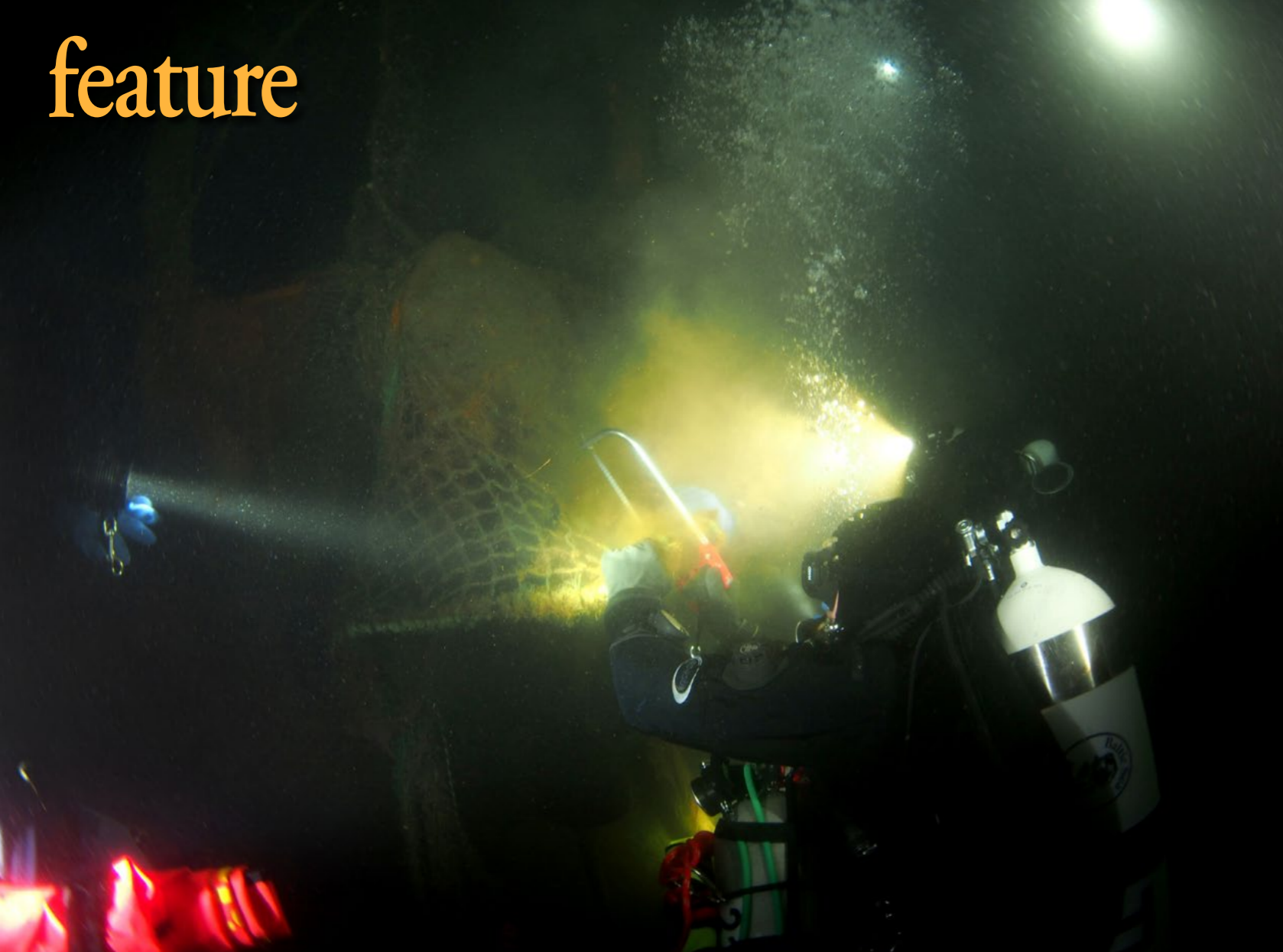
It is estimated that hundreds of thousands of tons of ghost nets lie at the bottom of the Baltic Sea, often caught on shipwrecks, many of which are historical in significance. The Baltic Sea Heritage Rescue Project brings together volunteers from all over the world with the drive to locate, document and remove such ghost nets from wrecks in the Baltic Sea, thus saving marine life, protecting the wrecks and keeping their stories alive. Sabine Kerkau, one of the co-founders of the project, reports.

You can come across them on any walk along the beach—small pieces of torn fishing nets. But they are just the tip of the iceberg,

here in the Baltic region. Hundreds of thousands of tons of ghost nets are most likely lying on the bottom of the Baltic Sea or have gotten stuck on shipwrecks.

With their weight, these nets not only destroy wrecks—some of which are historic—but are also a deadly trap for fish, porpoises, seals and birds, which get caught in them and die miserably. Meanwhile, with ocean currents and the constant movement of water around them, small pieces of plastic from the nets degrade and accumulate as microplastics in fish, which we consume, and thus, accumulate also in us.

The Baltic Sea Heritage Rescue Project (BSHRP) is a project of the non-profit German association Baltic Sea Nature and Heritage Protection Association (BSNHPA), a registered organisation. People from many countries who care about protecting the Baltic Sea above



Diver uses a saw to clear a ghost net from *Elbing IX* (above). The expedition boat's convenient lift takes divers back aboard after a dive (right)

and below the water's surface are volunteering for this project.

We find and remove lost ghost nets, searching, identifying and documenting wrecks along the way, to protect them and keep their histories alive. The BSHRP works closely with universities, government ministries, archaeologists and museums.

The dive expeditions are carried out at depths of up to 100m. Only divers who are trained and experienced for the respective depths are deployed.

Our goals include:

- Tracking down ghost nets, salvaging them and ensuring that they are properly disposed
- Seeking, identifying, documenting and protecting wrecks
- Establishing joint projects with fishing associations and local fishermen to protect the ecosystem of the Baltic Sea

Our campaign against ghost nets on the deep wrecks of the Baltic Sea started five years ago in Lithuania. At first, we just wanted to draw attention to the



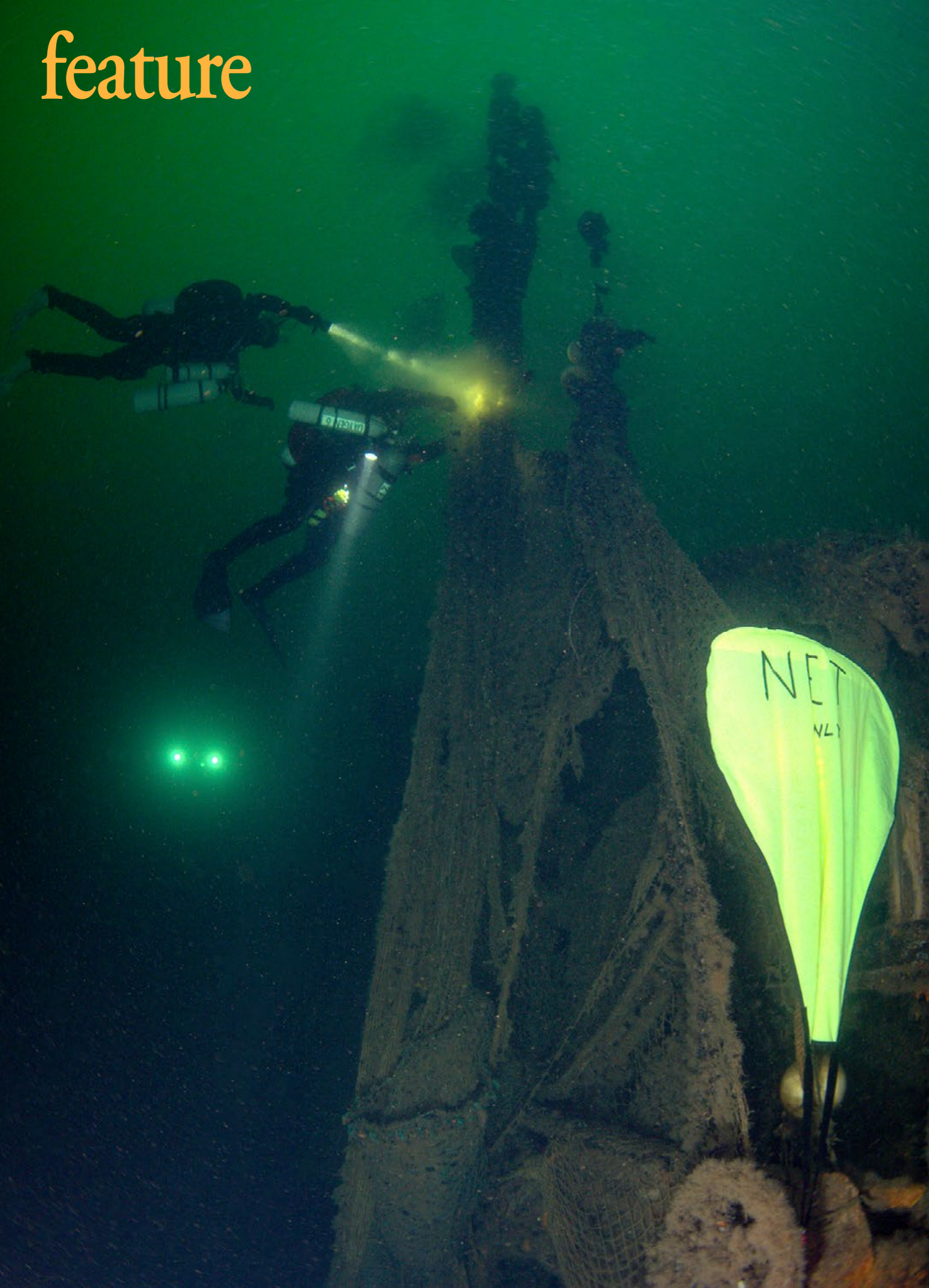
Local Dive Shops are the backbone of our sport. They are the gateway to training, the place where you meet dive buddies, get your tanks filled, book dive vacations, and of course purchase new dive gear. Being a small family run business ourselves, we understand that dive shops need your support now more than ever. We encourage you to support them any way you can to help keep our beloved sport growing.

SUPPORT YOUR LOCAL DIVE SHOPS



*Safe Diving,
Team Dive Rite*





Heavy nets from the wreck of the *Flying Dutchman* are hauled onto the expedition vessel (right).

problem, using photos and videos that documented the extent of it. However, we quickly realised that this was not enough. And so, we founded the BSHRP.

One of our goals is to search for, identify and document wrecks that are deeper than 40m. In addition to the condition of the wreck and the artefacts present, this documentation also includes an

inventory of the ghost nets that we find on the wreck.

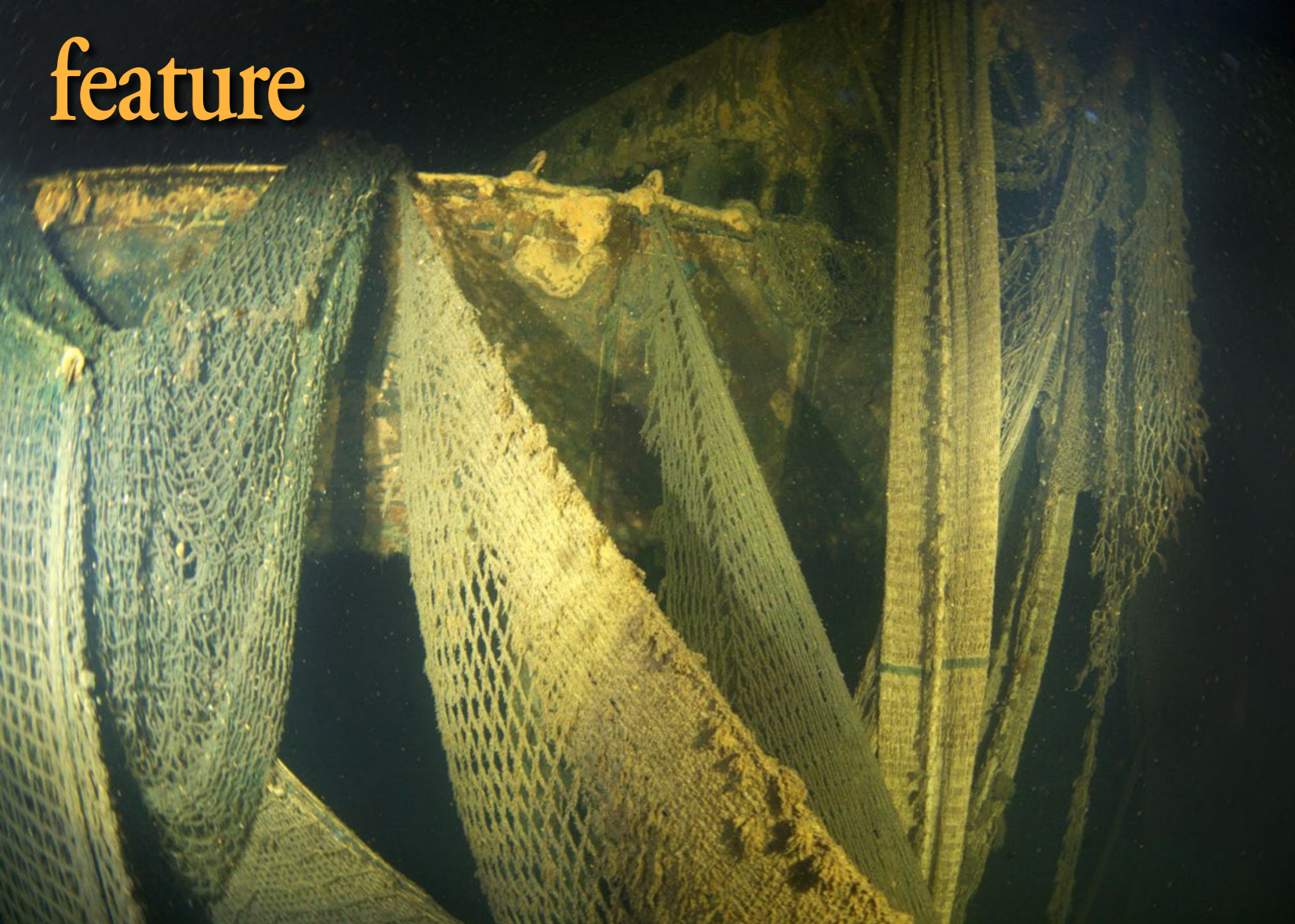
We cooperate with the archaeological department of the University of Klaipeda, the Lithuanian Sea Museum, various government ministries and the Estonian Heritage Board. Under strict controls, and with the requirement of not damaging the wrecks—some of which are more

Ghost Nets



Nets at the stern of *Edith Bosselmann* in Lithuania floated more than 20m above the wreck (above).

Diver attaches lift bags to nets to lift them off the *Flying Dutchman* near Rügen (above)



Several fishing nets draped across the wreck of the *Elbing IX* (above)

than a hundred years old—we are allowed to salvage ghost nets from the wrecks.

Elbing IX

The goal of our project in 2018 and 2019 was to free the wreck of the freighter *Elbing IX*, which sank in 1914, from ghost nets. The wreck is 80m long and lies at a depth of 50m. It was wrapped in nets from bow to stern. Some of the nets still had floating buoys, which ensured that the nets did not lie on the wreck but floated up to 20m above the wreck. This was an extremely dangerous situation for all sea creatures and especially us divers. The treacherous conditions under which

we had to work on the wreck required the use of only very experienced divers.

On each dive, we documented our work on the wreck, locating and checking the nets to be recovered next. One team member took care of the safety of the divers underwater. The recovery of the nets at the surface also had to be documented. Reports for the media and our collaborating partners also had to be written.


Project success

The successful implementation of our goals is only made possible with a strong team and reliable partners. Due to the





It is hard work to pull the wet and dirty nets onto the expedition boat.

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Ghost nets caught on the wreck of the *Elbing IX* (above); Divers work together to clear the *Elbing IX* of ghost nets (top centre); The result is always just a drop in the bucket, but we are always proud and happy to see it (top right); Surface marker buoys mark the location of ghost nets in Lithuania (far right); Lift bags hold the net, which is still attached to the *Edith Bosselmann* wreck (right)



challenging nature of the work, we must require the highest performance level of both the divers who help us and our equipment. We are particularly grateful to Bauer Compressors for their many years of support. We must be able to rely on a working compressor and clean air to ensure the safety of our dives.

In addition to the factors that we can partially control, such as the selection of divers and equipment, there are many things over which we have no control, upon which the success of our project depends very much. Weather, the Covid-19

pandemic, and the willingness of experienced divers to support us for the duration of our projects, are three good examples of this.

Challenges

For our six-week project in 2019, we lost two weeks, which were cancelled on short notice, due to bad weather conditions. Then another week was cancelled, when I found myself alone on the ship, as no one had

announced the trip. In the remaining three weeks, we managed to reach our goal for 2019 to free the *Elbing IX* from several tons of plastic waste in the form of ghost nets.

In the two pandemic years of 2020 and 2021, the implementation of the project proved no easier. Travel restrictions, quarantine rules and additional

challenges repeatedly put a damper on our plans. Nevertheless, in these two years, we were able to almost completely clear two wrecks, located off the Lithuanian coast, of the lost fishing nets trapped on them.

Since 2021, we have also been active in the German Baltic Sea, off the island of Rügen. In May and

October, we salvaged nets from the wreck of the *Flying Dutchman*. More than 3.5 tons of nets were removed from the wreck. The *Flying Dutchman* is now completely clear of nets. But there is still a lot to do here. So, our work at Rügen continues, and we were able to gain Greenpeace as a collaborating partner. Greenpeace



Ghost Nets

Old nets, cleaned for a new use and then reused in new products, depending on the material (above); Four tons of ghost nets were removed from the *Flying Dutchman* wreck (left), located off the island of Rügen in Germany, where there are over 1,500 wrecks, most of which are trapped in old nets; An air compressor provided by Bauer Compressors is a very important piece of equipment keeping our dives safe (right).



will support us with an experienced dive group.

Lithuania

In Lithuania, we work on very old wrecks, which means we must depend on permits from local authorities and cooperation with the university and the

Lithuanian Sea Museum. Some of these partners approached us with great scepticism in the beginning. They saw divers as a greater threat to the wrecks than the ghost nets were. Indeed, divers were equated with looting and destruction. But through our work and many discussions with these partners,

we are well on the way to changing this mindset. Hence, another goal of our BSHRP is to protect the wrecks from looting and destruction.

We are often asked: “Why Lithuania?” and “Why keep to the eastern Baltic Sea?” The answers are simple. We chose Lithuania because in this region, it was the first time we had been confronted with the problem of ghost nets on such a large scale and nobody wanted to do anything about it. As to keeping to the eastern Baltic Sea (i.e., Lithuania and Rügen), it is because sustainability is important to us. This is only possible if one is persistent and keeps talking and informing people about the problem.

Funding

The BSNHPA provides some of the financial support for the projects' ship charters, special equipment and transport of the nets to processing companies. We finance most of our work out of our own pockets. Anyone who would like to help with operations can do so by becoming a member of the BSNHPA or by making a donation to the association. We also need divers at all training levels and non-divers who can actively support us during the project weeks. ■

See the **videos >>>**

For more information, visit the website of the Baltic Sea Heritage Rescue

Project at: bshrp.org, or email: mail@bsnhpa.org.

Sabine Kerkau is a German technical diver, dive writer and underwater photographer based in Switzerland. Kerkau was inducted in the Women Divers Hall of Fame in 2019. For more information, visit: facebook.com/SabineKerkaureatherdiving

My Favorite UW Pix

Angling Up

Contributors' Picks



Text and photos by John A. Ares, Scott Bennett, Sheryl Checkman, Larry Cohen, Anita George-Ares, Kate Jonker, Matthew Meier, Brandi Mueller, Gary Rose, Michael Rothschild, Peter Symes and Olga Torrey

We asked our contributors what their favorite underwater photos taken with their camera angled upward were, and they returned with a variety of subjects captured while looking up... from delicate macro marine life to floating jellyfish, from majestic manta rays to divers and even birds. *X-Ray Mag* contributors share their favorite images from the tropical waters of French Polynesia, Fiji, the Solomon Islands, Chuuk, Papua New Guinea, Palau, the Philippines, Indonesia, the Maldives, Saba, St Croix, Cuba, Cayman Islands, Honduras, Mexico, and the Egyptian Red Sea to the subtropical and temperate waters of South Africa, Newfoundland in Canada, the US East Coast and Alaska.

A sand tiger shark swims inside the *Aeolus* shipwreck in North Carolina, USA (right). Gear: Olympus OM-D E-M5 camera, Panasonic 7-14mm lens, Nauticam housing, dual Sea&Sea strobes. Exposure: ISO 400, f/11, 1/40s

KISS rebreather diver Larry Cohen on *Papoose* wreck in North Carolina, USA (below). Gear: Olympus OM-D E-M5 camera, Panasonic 7-14mm lens, Nauticam housing, dual Sea&Sea strobes. Exposure: ISO 250, f/5.6, 1/30s

Giant Pacific manta ray in Revillagigedo Islands (Socorro), Mexico (previous page). Gear: Olympus OM-D E-M5 camera, Nauticam housing, Panasonic 7-14mm lens, dual Sea&Sea strobes. Exposure: ISO 500, f/10, 1/125s



Diver wearing a Kirby Morgan 37 helmet exits the water at Dutch Springs, Bethlehem, Pennsylvania USA (above). Gear: Olympus OM-D E-M5 camera, Panasonic 8mm fisheye lens, Nauticam housing, dual Sea&Sea strobes. Exposure: ISO 250, f/8, 1/200s



Depth, Strength and Power

Text and photos by Olga Torrey

One tip in photography is positioning the camera at an angle to achieve the desired composition. This is especially true when shooting underwater. Shooting at a low angle and looking up at the subject creates a sense of depth, strength and power.

I used this technique when capturing a diver wearing a Kirby Morgan 37 helmet as he emerged from the cold green waters of Dutch Springs in Pennsylvania, USA, into the sunny and warm weather at the surface. First, I followed the diver underwater, taking pictures at different angles by swimming over the subject, getting in front of or next to the diver. Then, I shot with a fisheye lens, using the water line across the frame to create this over-under photo. As the diver climbed up

the stairs, I took the image at a low angle, emphasizing the gear.

I saw my first giant Pacific manta ray in Socorro, Mexico. The beauty and grace of this animal took my breath away. I could not take my eyes away from this large fish gliding effortlessly, looking like a cosmic creature from another planet. I angled my camera up under the manta passing over me to show its impressive wingspan and the pattern on the animal's lower body. At this angle, I could also see two large remoras hitchhiking for a ride.

The *Papoose* was a tanker that sank off North Carolina, USA. It is an impressively large wreck and has many places to explore. The German submarine U-124 torpedoed the vessel during World War II. The tanker is now upside down on the ocean floor. I positioned my camera to show the wreck and the vast space of open water. My dive buddy, Larry Cohen, swam over the

top edge, through the opening that faced my angled-up camera. The upward camera position and the diver shows the scale and how impressive the vessel is.

The cargo ship *Aeolus* was part of an artificial reef program in North Carolina. The vessel was broken into three sections, and some are resting at an upright angle, making this site an excellent multilevel dive. Sand tiger sharks are frequently seen here, so this is an exciting place to visit. On the dive, I pointed my camera up and waited for a shark to swim underneath the circular-shaped hatch. This space became the negative space around the shark's torpedo-like body. This composition shows the texture of the wreck's interior, with the ambient light coming through the ceiling, as well as the sand tiger shark's magnificent power. Visit: fitimage.nyc



Angling Up

Diver in Leru Cut, Russell Islands, Solomon Islands (left). Gear: Canon EOS Rebel T1i camera, Sigma EF-S 11-18mm f/3.5 lens, Ikelite housing, twin Ikelite DS161 strobes. Exposure: ISO 400, f/4.5, 1/60s; Jellyfish and diver, Jellyfish Lake, Palau (above). Gear: Canon F-1 camera, Canon FD 20mm lens, Ikelite housing, available light. Exposure: ISO 400, f/8, 1/125s; Bull sharks, Beqa Lagoon, Fiji (top right). Gear: Canon EOS Rebel SL1 camera, Canon EF-S 10-18mm f/4.5-5.6 IS STM lens, Ikelite housing, twin Ikelite DS161 strobes. Exposure: ISO 400, f/11, 1/60s

Overhead Views

Text and photos by John A. Ares

Many thousands of stingless jellyfish commute back and forth each day at the surface of Jellyfish Lake in Palau, as they follow the sun. Being translucent, the jellyfish benefit from being photographed from below. While freediving, I descended to about 10ft and shot upward through the jellyfish layer toward my dive buddy.

In a few places around the world, it is traditional to dump waste from

fish processing back into the ocean. At Beqa Lagoon in Fiji, this has been occurring for over a hundred years, attracting many species of sharks. In a dive that can be best described as “controlled chaos,” I saw eight or nine bull sharks literally dumpster-diving into a patch of garbage containing fish parts. The action was compelling. Divers called wranglers swam behind the underwater photographers to push away any sharks that got too curious, using long poles called “shepherd’s crooks.”

Leru Cut is a unique long and narrow cavern in the Solomon Islands. It is

maybe 10ft wide. One enters the cavern near the bottom, at around 40ft or so, and exits at around 20ft, coming out on a spectacular wall. The blue glow of the surface was captivating when I was there, so placing a diver overhead was a natural choice.

It seems as if everything on the coral reefs in Papua New Guinea is red. In a tunnel at the Witu Islands, I found a sea fan that was typically red, adding a splash of color. Having the diver entering the frame while I was looking up through the hole in the reef made for a good composition. Visit: JohnAres.com



Tunnel, Witu Islands, Papua New Guinea. Gear: Canon F-1 camera, Canon FD 20mm lens, Ikelite housing, single Ikelite DS125 strobe. Exposure: ISO 400, f/5.6, 1/60s



feature

Chevron manta, Socorro, Mexico (right).
Gear: Nikon D850 camera, Nikon 16-35mm lens at 16mm, Seacam housing, two Inon Z-330 strobes. Exposure: ISO 320, f/10, 1/100s

Hawksbill sea turtle, Jayne's Gully, Fathers Reef, New Britain, Papua New Guinea (centre). Gear: Nikon D200 camera, Nikon 10.5mm lens, Hugyfot housing, two Ikelite DS125 strobes. Exposure: ISO 125, f/11, 1/100s

Whip corals and barracudas, Fathers Reefs, New Britain, Papua New Guinea (far right). Gear: Nikon D200 camera, Nikon 10.5mm lens, Hugyfot housing, two Ikelite DS125 strobes. Exposure: ISO 125, f/11, 1/80s



Waiting for the Right Moment

Text and photos by Scott Bennett

When it comes to wide-angle reef photography, Papua New Guinea's Kimbe Bay has few equals. In the Witu Islands, I encountered several hawksbill sea turtles grazing on a seamount. Suddenly, one headed to the surface for a gulp of air. On its descent, I positioned myself directly beneath, until the turtle was less than a metre from my dome port. Two strobes illuminated its belly, with my fisheye lens capturing both the turtle and the sunburst above it.

At another site in the Fathers Reefs, some whip corals proved especially photogenic, their vivid red contrasting sharply with the clear, blue water. With the sun clearly visible, I manoeuvred until it was positioned directly above the whip coral. Aiming upwards, I waited until a school of chevron barracuda moved into the frame. Exposure was set using ambient light, while two strobes set at half



power illuminated the coral without overexposing it.

Mexico's remote Socorro Islands are a mecca for big-animal encounters, with giant mantas the star attractions; during a recent liveaboard trip, I encountered multiple individuals on virtually every dive. At Cabo Pearce, I was positioned near a drop-off when one materialised out of the blue,

swimming directly towards me. At the last minute, it veered off, banking like the world's most graceful fighter jet. Two strobes set at half power brightened its belly.

Having done the majority of my dives in tropical reefs, visiting Cape Town in South Africa and its temperate seas proved a revelation, with its kelp forests illuminating a wealth of photo

possibilities. During the summer, photography proved challenging, with limited visibility hampering attempts to capture the kelp's full extent. At the end of one dive, I looked up to see clear water, with the kelp fully visible, ascending to the surface. As I framed the image, some passing fish completed the composition. Please visit: xray-mag.com/Contributors/Scott-Bennett

Angling Up



Kelp forest, South Africa. Gear: Nikon D100 camera, Nikon 16-35mm lens at 20mm, Seacam housing, two Ikelite D160 strobes. Exposure: ISO 320, f/10, 1/125s



feature

Sea turtle, Tent Wall, Saba (right).
Gear: Olympus OMD EM5 Mark II camera, Olympus M.8mm f/1.8 fisheye lens, Olympus PT-EP13 housing, Sea&Sea YS-D1 strobes.
Exposure: ISO 200, f/8, 1/250s

Reef shark, Cara-a-Cara (Marco's Place), Roatan, Honduras (below).
Gear: Olympus OMD EM5 Mark II camera, Olympus M.9-18mm f/4.0-5.6 lens at 9mm, Olympus PT-EP13 housing, Sea&Sea YS-D1 strobes.
Exposure: ISO 200, f/8, 1/100s



Sea turtle with sun rays, Marilyn's Cut, Little Cayman, Cayman Islands (right).
Gear: Olympus OMD EM5 Mark II camera, Olympus M.9-18mm f/4.0-5.6 lens at 9mm, Olympus PT-EP13 housing, Sea&Sea YS-D1 strobe. Exposure: ISO 200, f/8, 1/200s

and in front of me. However, I am leaving out one very important direction—up. When I adjust my gaze upward, I am often

rewarded with a more dramatic photo. When I went on a shark dive at Cara-a-Cara (Marco's Place) in Roatan, I knew the sharks would be swimming above us, so I concentrated on focusing my camera up, as the sharks swam overhead. I was able to capture the shot of a reef shark, swimming with a fishing line and hook dangling from its mouth, and its white underside illuminated by my strobe.



Angling Up

Diving at Tent Wall off the Caribbean island of Saba, I saw a sea turtle swimming towards me. I waited until it swam right over me and was able to capture a unique perspective of the turtle with a Snell's window (an effect caused by the refraction of light entering the water) and a diver behind it.

In Little Cayman, at Marilyn's Cut, I captured an image of a sea turtle swimming up toward the light, against the vertical beams of light filtering down from the surface.

In Palau, I snorkeled at Jellyfish Lake and could not resist photographing a jellyfish, while looking straight up. The water was so clear that the jellyfish looked as if it was floating in the sky! Visit: [instagram.com/sherylcheckman](https://www.instagram.com/sherylcheckman)



Jellyfish at Jellyfish Lake, Palau. Gear: Olympus OMD EM5 Mark II camera, Olympus M.9-18mm f/4.0-5.6 lens at 9mm, Olympus PT-EP13 housing. Exposure: ISO 200, f/11, 1/4000s

The Dramatic Direction

Text and photos by Sheryl Checkman

It is really easy when diving to focus on what is right in front of me. If I am diving on a wall, I will look for creatures inhabiting the nooks and crannies, and then occasionally look out into the blue to see what might show up. Diving on a reef, I will look left, right



Conch shell and goliath grouper in Gardens of the Queen, Cuba (below). Gear: Olympus E-620 camera, Olympus 7-14mm lens, Olympus housing, Sea&Sea YS-01 strobes. Exposure: ISO 100, f/5, 1/180s;



Larger Than Life

Text and photos by Larry Cohen

One of the rules of underwater photography is to shoot upward. Of course, rules are made to be broken, but taking a photo from a low angle does make subjects look majestic and larger than life. Also, when

When diving in the Gardens of the Queen in Cuba, I saw a conch shell on a wall that looked interesting. So, I got under the shell to get the lush marine growth and blue water in the background. Luckily, as I framed the image, a goliath grouper entered the frame at the same angle as the wall. Sometimes, the perfect composition is a matter of luck!



Olga Torrey and giant metridium anemones offshore in the US state of Alaska (above). Gear: Olympus E-620 camera, Olympus 7-14mm lens, Olympus housing, Sea&Sea YS-01 strobes. Exposure: ISO 200, f/5.6, 1/80s

taking pictures underwater, it is easier to use the water as the background when shooting at an upward angle.

While diving in Alaska, my dive buddy, Olga Torrey, and I were on a wall decorated with giant metridium anemones. I got low on the wall to make these spectacular anemones more majestic. Olga got close to the wall for scale, so the viewer could see how giant these anemones were compared to a diver. I also exposed the ambient light to get an emerald green background.

Diving off the Bay of Pigs area in Cuba, we explored some heavily decorated walls. In this image, I get underneath a yellow sponge. I also asked our dive guide to hover next to the wall and look at the sponge. Visit: liquidimagesuw.com

Angling Up

Decorated wall off-shore of the Bay of Pigs area in Cuba (below). Gear: Olympus OM-D E-M1 camera, Olympus 9-18mm fisheye lens, Aquatica housing, Sea&Sea YS-D1 strobes. Exposure: ISO 200, f/5.6, 1/125s

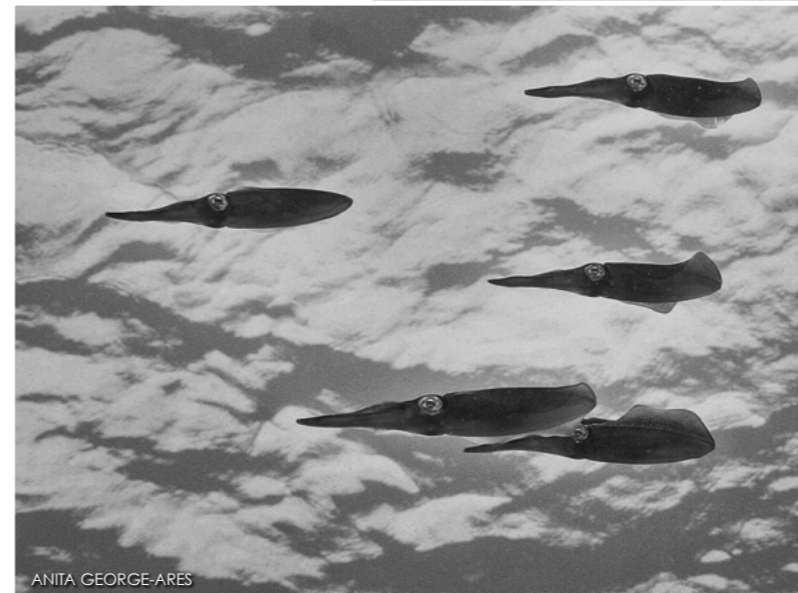




Humpback whale and calf, Moorea, French Polynesia (right). Gear: Canon EOS Rebel SL1 camera, Canon EF-S 10-18mm f4.5-5.6 IS STM lens, Ikelite housing, ambient light. Exposure: ISO 1600, f/22, 1/200s

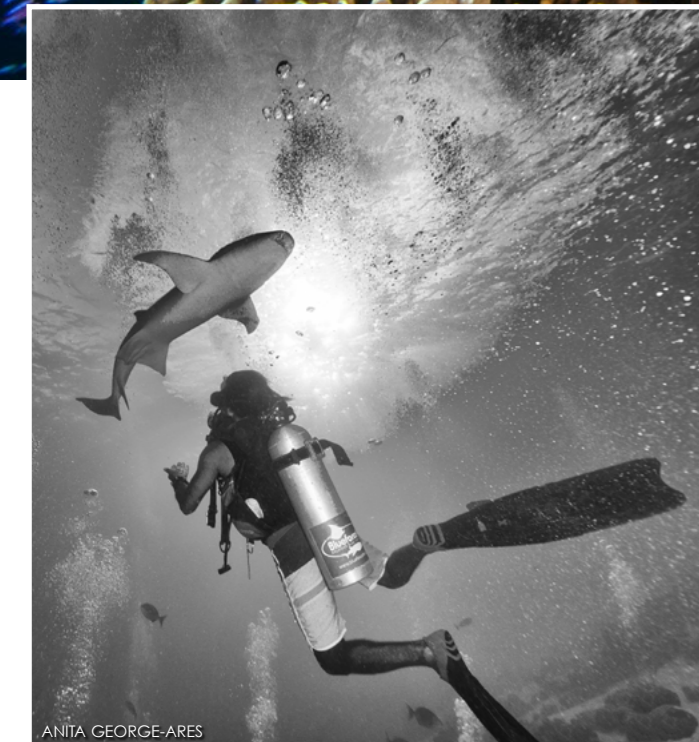


ANITA GEORGE-ARES



ANITA GEORGE-ARES

Rain seascape, Sumilon Island, Philippines (above). Gear: Canon EOS Digital Rebel XTi camera, Canon EF-S 10-22mm f/3.5-4.5 USM lens, Ikelite housing, two Ikelite DS161 strobes. Exposure: ISO 400, f/11, 1/200s; Squid at Bahura South, Dauin coast, Philippines (center). Gear: Canon EOS Digital Rebel XTi camera, Canon EF-S 60mm f/2.8 macro USM lens, Ikelite housing, two Ikelite DS161 strobes. Exposure: ISO 400, f/11, 1/200s; Diver and tawny nurse shark, Alimatha Island, Maldives (left). Gear: Canon EOS Rebel SL1 camera, Canon EF-S 10-18mm f4.5-5.6 IS STM lens, Ikelite housing, two Ikelite DS161 strobes. Exposure: ISO 200, f/8, 1/100s



ANITA GEORGE-ARES

Beyond Surreal

Text and photos by Anita George-Ares

Alimatha Island in the Maldives has a large population of tawny nurse sharks. I converted the image of a diver ascending towards a nurse shark

into black and white, as I liked the increased contrast.

At Bahura South dive site off the Dauin coast in the Philippines, the dive guide saw a small school of squid near the surface and drew my attention to it. I cropped the image significantly and converted it to black and white to improve the contrast. The wide ripples on the water's surface remind me of clouds. Squid flying below the clouds would be a subject worthy of the surrealist artist Magritte.

During my first dive at Sumilon Island in the Philippines, I took a photo of the reef, shooting up towards the sun. I chose the

image of the school of fusiliers as I liked the feeling of movement created by the fish flowing over the coral head. During the second dive, it suddenly got very dark underwater. I looked up and saw that it was raining hard at the surface. The falling rain created an interesting, pebbled texture on the water's surface.

I like the diagonal composition in the image of the humpback whale mother and her calf, ascending to the surface. Converting the image to black and white improved the appearance of the penetrating light rays. Please visit: [facebook.com/profile.php?id=100016947967639](https://www.facebook.com/profile.php?id=100016947967639)



ANITA GEORGE-ARES

Sun seascape, Sumilon Island, Philippines. Gear: Canon EOS Digital Rebel XTi camera, Canon EF-S 10-22mm f/3.5-4.5 USM lens, Ikelite housing, two Ikelite DS161 strobes. Exposure: ISO 400, f/11, 1/200s



Remember to look for divers passing overhead, when angling your camera up (above). Wait for them to swim into position, then take the shot. Gear: Nikon D850 camera, Nikon 8-15mm circular fisheye lens, Isotta housing, two Supe D-Max strobes. Exposure: ISO 400, f/16, 1/100s; A blue shark swims overhead, 40 nautical miles off Cape Point, South Africa (below). Gear: Canon 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea MDX housing, two Inon Z-240 strobes. Exposure: ISO 320, f/8, 1/200s

Shooting upwards, under yellow soft corals in the Red Sea, Egypt. The sea surface adds depth and texture (above). Gear: Canon 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea MDX housing, two Inon Z-240 strobes. Exposure: ISO 320, f/10, 1/250s; A boat on the surface adds depth of field (right). Gear: Canon 7D Mark II camera, Tokina 10-17mm fisheye, Sea&Sea MDX housing, two Inon Z-240 strobes. Exposure: ISO 320, f/11, 1/125s



Look Up for Luck

Text and photos by Kate Jonker

How often do you look upwards when you are diving? Probably not as often as you should! Imagine how many of the larger marine animals you have missed!

I, for one, am guilty of not looking up enough. I have had sharks, whales and rays swim right over me, and only known about it when, after the dive, my dive buddies asked me if I saw the ray that almost hit me on the head, or the zebra shark that I had always want to see whilst I was photographing the *Bornella anguilla* nudibranch, which I had

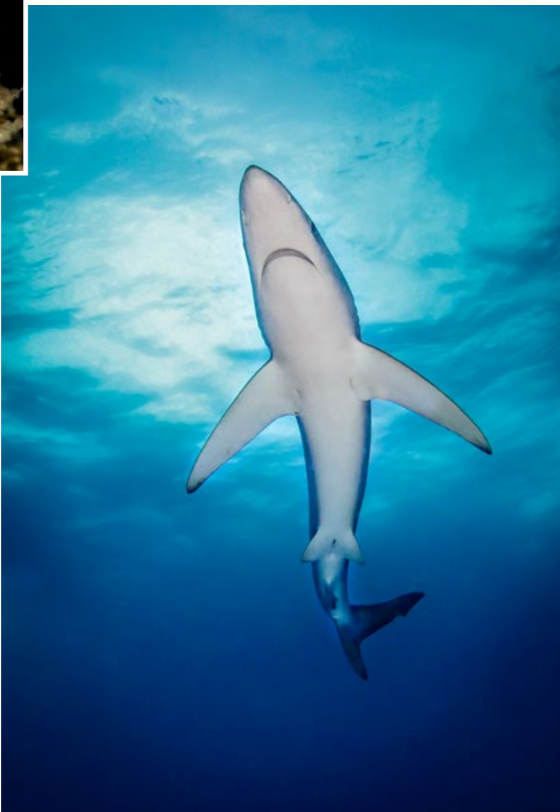
also always wanted to see.

As an underwater photographer, looking up and shooting upwards can result in beautiful photos. For macro photography, angling your camera upwards at a subject positioned on top of a coral or rock can create beautiful black backgrounds, as there is nothing to reflect your strobe's light back at you.

Looking upward really comes into its own with wide-angle underwater photography. You can capture the beautiful circle of Snell's window, create silhouettes of marine animals or

divers when shooting into the sun, photograph corals and reefs with the texture of the ocean in the background and add beautiful gradients to your water column when shooting at depth towards the sun.

By having a "look-up" mindset whilst diving, especially when taking wide-angle images, you are more likely to capture (and not miss!) the whale shark, dolphin, ray or shark passing overhead, and come back with images that have added depth and a uniqueness to them. Visit: katejonker.com



White-edged nudibranch, *Flabellina capensis* (above). Photographing a well-positioned nudibranch, with just the water column behind it, can give you a beautiful black background and make your subject pop. Gear: Canon 7D Mark II camera, Canon 100mm macro lens, Sea&Sea MDX housing, two Inon Z-240 strobes. Exposure: ISO 160, f/4.5, 1/250s



Coconut octopus walking across the black muck bottom (top left). Exposure: ISO 200, f/18, 1/125s; Decorator crab adorned with white soft corals (top right). Exposure: ISO 200, f/29, 1/125s; Orange hairy frogfish on the sandy bottom (right). Exposure: ISO 200, f/22, 1/125s. All images were produced in Lembeh Strait, Indonesia, at **Solitude Lembeh Resort**, using a Nikon D810 camera, Nikon 105mm macro lens, Subal housing, two Sea&Sea YS-250 strobes with snoots.

Elevating the Subject

Text and photos by Matthew Meier

As an underwater photographer, there are a few universal lessons that are engrained from the beginning. One is to get close and then get closer, and the other is to get low and shoot up. Pointing the camera up situates the subject in an elevated position and allows the audience to perceive it as being distinguished. Similar to a lecturer or religious leader speaking from a stage or pulpit, we look up

to them as an authoritative figure.

When photographing animals, especially those living near the ocean floor or amongst a busy background, shooting up also helps to eliminate distracting elements behind the subject. In the case of the examples shown here, I also employed the use of snoots over my strobes to restrict the light from going beyond my subject, and by using a fast shutter speed, low ISO and a large aperture, I was able to create a black background to further isolate and highlight each critter. Visit: **MatthewMeierPhoto.com**



Taylor's garden eel emerging from its burrow in the sand. Exposure: ISO 200, f/22, 1/125s





Enchanted Forest. Gear: Nikon D850 camera, 8-15mm fisheye lens, Ikelite housing, dual Ikelite DS161 strobes. Exposure: ISO 500, f/14, 1/200s



Sky Bubble (above). Gear: Nikon D850 camera, 8-15mm fisheye lens, Ikelite housing, natural light. Exposure: ISO 1250, f/22, 1/320s; Looking Down (right). Gear: Nikon D850 camera, 8-15mm fisheye lens, Ikelite housing, dual Ikelite DS161 strobes. Exposure: ISO 320, f/14, 1/250s

A Different Perspective

Text and photos by Brandi Mueller

Getting below and shooting up at your subject is one of the most popular rules of underwater photography, and for good reason. I love “angling up” to capture a different perspective than what we usually see when looking down on the reef. I also really like seeing the undersides of things we often are not used to viewing from below.

The effect of Snell's window often creates the most interesting shots, when looking to the surface, as if one is observing the topside world through a drop of water or a bubble. When sunbeams shine down into the water, the rays of light



can be fun to try to capture—even more so, if they are shining on pink lily pads, which appear to grow like trees in an enchanted forest, with real trees visible beyond the water. And it is not every day that you look up to see a swimming bird peering down at you. Visit: brandiunderwater.com



feature

Photo 1 (below). Pregnant female tiger shark. Exposure: ISO 100, f/11, 1/200s

Photo 2 (right). Soaring silky shark. Exposure: ISO 200, f/14, 1/125s

Photo 3 (bottom right). Multiple hooks in silky shark. Exposure: ISO 320, f/8, 1/100s

Photo 4 (top far right). Contemplation: lemon-shark sharknado. Exposure: ISO 100, f/14, 1/125s



When Things Are Looking Up

Text and photos by Gary Rose, MD

As divers, we are almost always looking forward and slightly down, or more comfortably just looking down. We are taught to be as close to the prone position as possible to improve buoyancy control, to decrease drag, and to see where we are going. Even our equipment increases our tendency to look down—the buoyancy compensator, holding the tank on our back with the top of the first stage of the regulator sitting high enough to prevent full neck extension. I know, some of you will say, “set up your tank lower,” to improve neck extension. My response is, “In that case, you will have a tank bottom hitting the back of your thighs with each kick.”

Having made my point, I encourage you to make a practice of looking up during your dives. There is so much that goes on, above, that you are missing. Either learn to be more proficient in extending your neck or assume a vertical position (without disturbing the reef or sea floor) and look up. I have seen sailfish

glide by on the surface. I have witnessed schools of scalloped hammerhead sharks above me in the Gulf Stream. I could not believe it, but last year, I saw a 5ft *Mola mola* (sunfish) hanging 20ft above my head.

I would not have seen the beautiful and very pregnant tiger shark in Photo 1, had I not looked up. I also would not have seen the reef sharks and beautiful lighting. I was in 60ft of water when I photographed the gorgeous silky shark in Photo 2, soaring right over me. Shooting up with a wide-angle lens captured the moment perfectly. Unfortunately, we sometimes witness the harm that others impose upon magnificent apex predators—in this case, stainless steel hooks impaling a silky shark in Photo 3.

By not using strobes, while shooting up, you can capture beautiful silhou-



ettes, which are very effective in evoking strong emotions in the viewer. Feel the passion of the lone diver in Photo 4, gazing at a “sharknado” of lemon sharks.

Explore your surroundings. Appreciate the natural beauty. Remember to look up. Visit: garyrosephotos.com

All photos were taken with a Nikon D500 camera, Tokina 10-17mm lens at 10mm, Nauticam housing, and Inon Z330 strobes.





Photo 1 (above). Freediver on Vandenberg wreck, Key West, Florida, USA. Gear: Canon EOS 7D camera, Tokina 10-17 fisheye lens at 10mm, Nauticam housing, dual Inon Z-240 strobes. Exposure: ISO 125, f/10, 1/250s



Photo 2. Diver at a safety stop, St Croix, US Virgin Islands. Gear: Canon EOS 7D camera, Tokina 10-17 fisheye lens at 10mm, Nauticam housing, dual Inon Z-240 strobes. Exposure: ISO 160, f/9, 1/250s

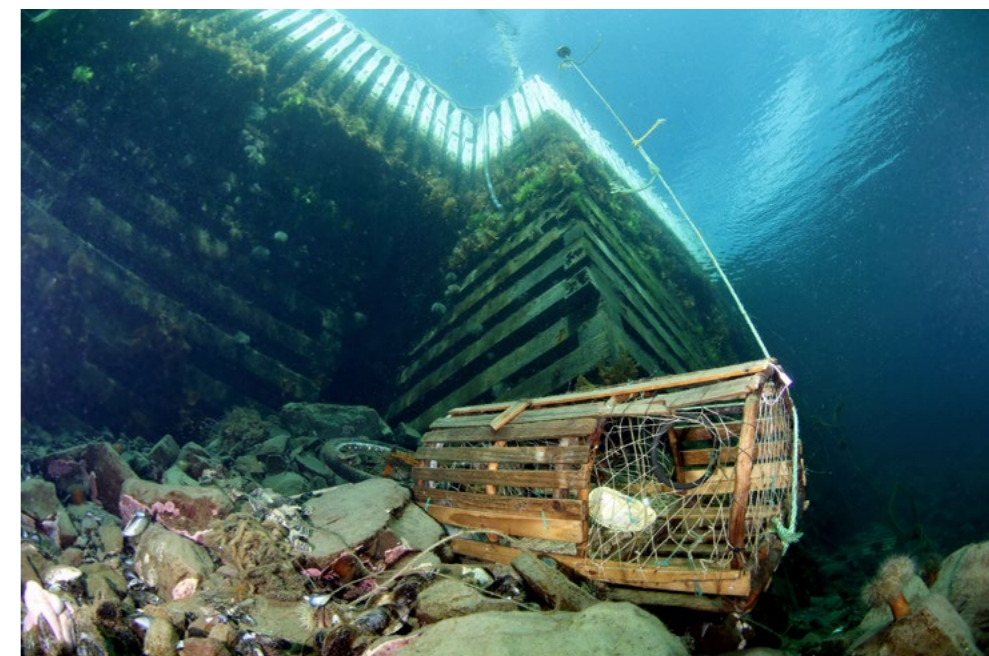


Photo 4. Dildo Harbor, Newfoundland, Canada. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens at 10mm, Nauticam housing, dual Inon Z-330 strobes. Exposure: ISO 250, f/11, 1/200s



Photo 3. Deco bottle, Chuuk (Truk) Lagoon, Micronesia. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens at 10mm, Nauticam housing, dual Inon Z-240 strobes. Exposure: ISO 250, f/11, 1/320s

The Surface Beckons

Text & photos by Michael Rothschild, MD

As much as divers love being underwater, we are air-breathing mammals. No matter how skilled, trained and technically equipped we may be, sooner or later, the surface beckons. It is at the back of our minds as we start our dive, but as time goes on, as tank pressure drops and as nitrogen accumulates, the drive to pierce that shining ceiling becomes stronger and stronger, until it can be resisted no more. So, it seems natural that the surface is the subject of many of my favorite photographs. All of these images—like most shot at this

angle—incorporate Snell's window to frame the subject.

The first image (Photo 1) is of my dive buddy on a surface interval. I love her expression and her hand gesture. I also like the balance of the strobe on her face against the sunball, with a few moon jellies to break up the green backdrop.

The second image (Photo 2) is of a divemaster at the end of a safety stop. Both his smile and his body language suggest the joy of diving. And like the first image, it is driven by a diver's face with no regulator to hide that grin.

The third image (Photo 3) is of a tank of oxygen suspended from a dive boat at Chuuk (Truk) Lagoon in Micronesia.

The lines in this photo are strong elements, radiating outwards from the sunball along with the rays of light, including the equipment lines, ladder and anchor line. You can imagine what a welcome sight this is to a diver running low on deco gas.

The fourth image (Photo 4) is of "the prettiest junkyard in the world"—the harbor of the town of Dildo, in Newfoundland, Canada. The waters

here are stunningly clear, letting one to easily see the thousands of bottles and other debris that cover the floor of this cove. Visit: dive.rothschilddesign.com

Humans, SS *Thistlegorm* wreck, Egyptian Red Sea (below). Gear: Minolta Dynax 700si camera, Minolta 16mm fisheye lens, Seacam housing, no strobes. Exposure: ISO 800, f/8, 1/30s. Shot on Agfa Scala black-and-white slide film.



Tiger shark, Tiger Beach, Bahamas (above). Gear: Sony Alpha A850 camera, Minolta 16mm fisheye lens, BS Kinetics housing, two Inon Z-240 strobes. Exposure: ISO 400, f/13, 1/80s

Opposites

Text and photos by Peter Symes

These two images are opposites. One is black and white, and the other is in colour; one depicts a wreck versus marine life in the other; and one is vertical in dimension versus horizontal in the other. One is shot on film and the other is digital. But perhaps more significantly, one is largely planned beforehand, while the other was a chance occurrence.

The image of the wreck, which some may recognise as the *Thistlegorm* in the Red Sea, I envisaged beforehand. I descended some minutes ahead of the main group of divers and got as low as I could on the seabed, behind the twisted-off stern with the iconic cannon. I laid on my side and rested the side of the camera on the sand, angling its upwards while trying to frame the image. As the divers came down, I shot off a series, in quick succession. This was shot on film and scanned, so the

dynamic range is not up to what present-day digital cameras are capable of, but the graininess gives it some sort of old-school press-photo quality.

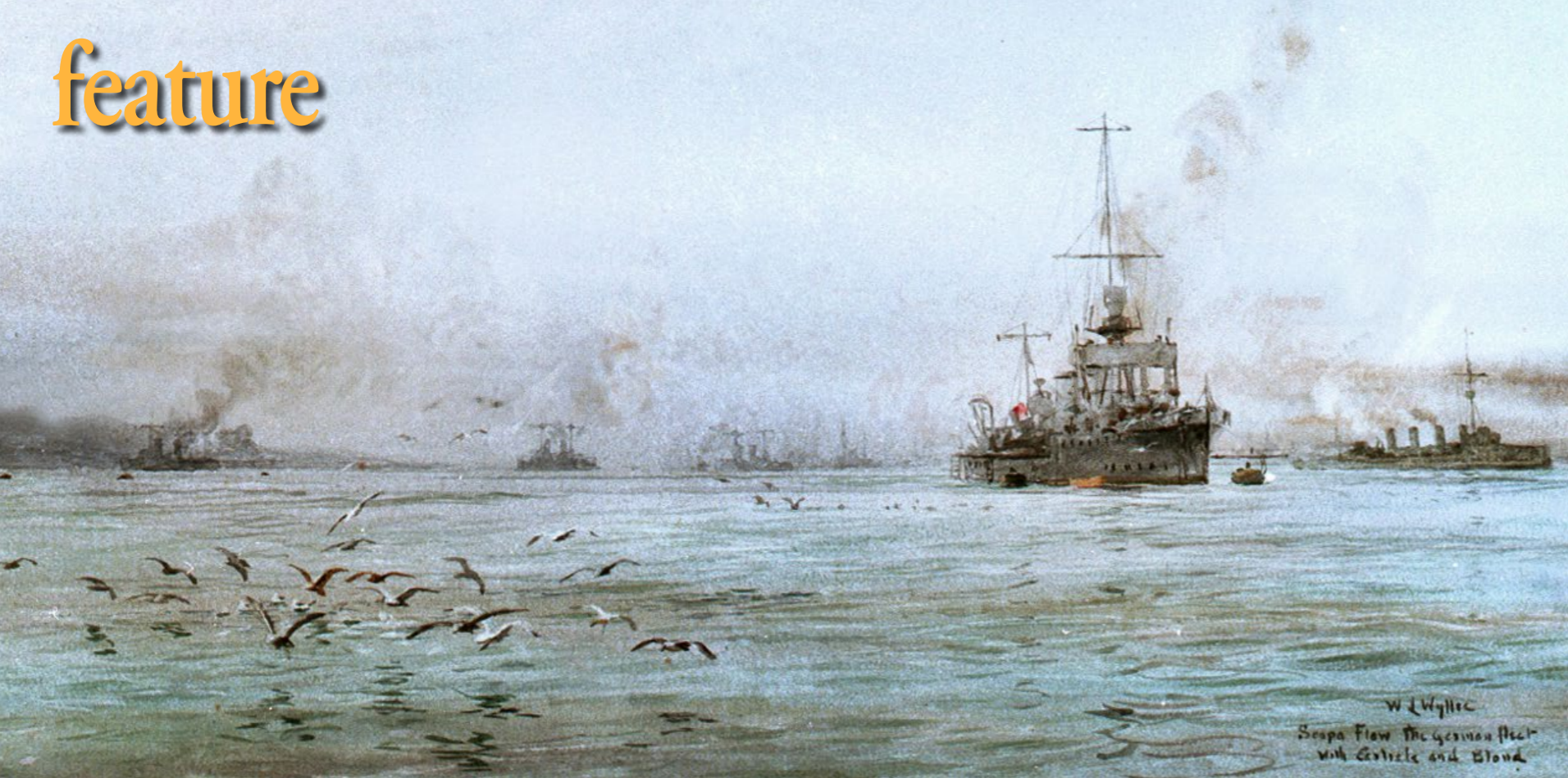
The tiger shark, on the other hand, pretty much framed itself, as I was underneath it. That a big predator takes up guard right between you and safety, and where you want to go, can be a tad intimidating, but I think I was mostly in awe of it. On a semi-silly thought: Does being pinned to the seabed by a shark constitute an overhead environment?

Visualising Scapa Flow Wrecks

— *Multibeam Sonar & 3D Photogrammetry*

Text by Rosemary E. Lunn. 3D Photogrammetry images
by Chris Rowland and Kari Hyttinen of 3DVisLab





Historical photo from 1918 showing the Royal Navy light cruiser HMS Cardiff leading the battle cruisers of the German High Seas Fleet into the Firth of Forth

Painting from 1918 of the interned German High Seas Fleet at Scapa Flow, with HMS Carlisle and Blonde, by British artist William Lionel Wyllie (above); The mast of the Kronprinz Wilhelm wreck, rendered in 3D photogrammetry by professors Chris Rowland and Kari Hyttinen of 3DVisLab at the University of Dundee in Scotland, United Kingdom (previous page)

Scapa Flow, located in the Orkney Islands of Scotland in the United Kingdom, is the site of the scuttling of the High Seas Fleet of the Imperial German Navy in June 1919 at the end of World War I. While many of the wrecks were salvaged following the war, the remaining wrecks have become popular dive sites. In recent times, efforts to learn more about these wrecks through multibeam sonar survey and 3D photogrammetry have taken place. Rosemary E. Lunn interviewed key figures involved in these developments to gain further insight.

“It takes years to get to know the German shipwrecks properly, to become familiar with these amazing shipwrecks, and to understand the sense of history that still pervades Scapa Flow both beneath and above the waves.”

— Rod Macdonald, author of *Dive Scapa Flow*, published by Whittles Publishing

Wreck knowledge

Shipwreck expert and explorer Rod Macdonald certainly has a point. But I would also argue that today’s visiting divers have an array of resources at their fingertips, which neither Rod nor I had when we first dived Scapa Flow, and these include very detailed three-dimensional images of the interned squadron.

In fact, these images have certainly

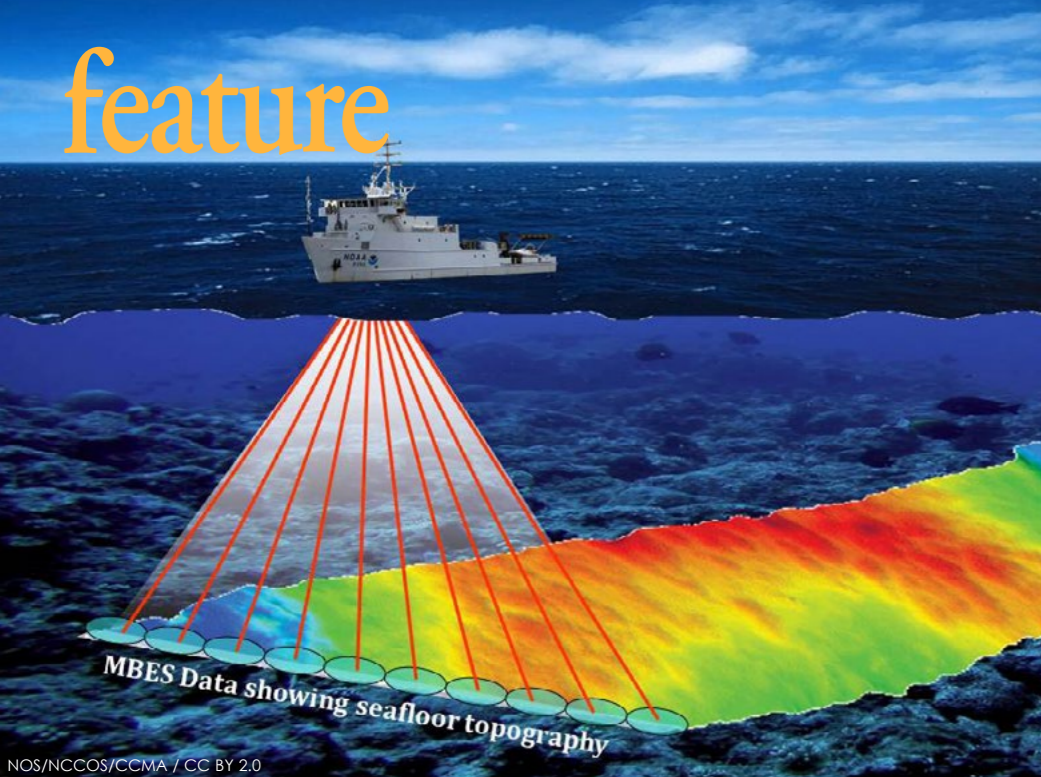
changed my diving for the better. It had been a revelation to dive the German wrecks on my last trip there because I was getting significantly more out of my diving than on previous visits, simply because I had a better understanding of these massive ships (e.g., where to spot the brass bridge or find the signalling iris or lamp, turbine blades, etc).

When I mentioned this to expedition closed-circuit rebreather (CCR) diver Sally Cartwright, she agreed, and echoed my first experience of the wrecks back in 1996. “When I first dived Scapa, I had not got a clue as to where I was going and what I was looking at. You could find yourself swimming along a steel wall the size of a 12-storey block of flats—and, whilst you were in awe of the size of the wrecks, you did not exactly get a lot out of the dive.”

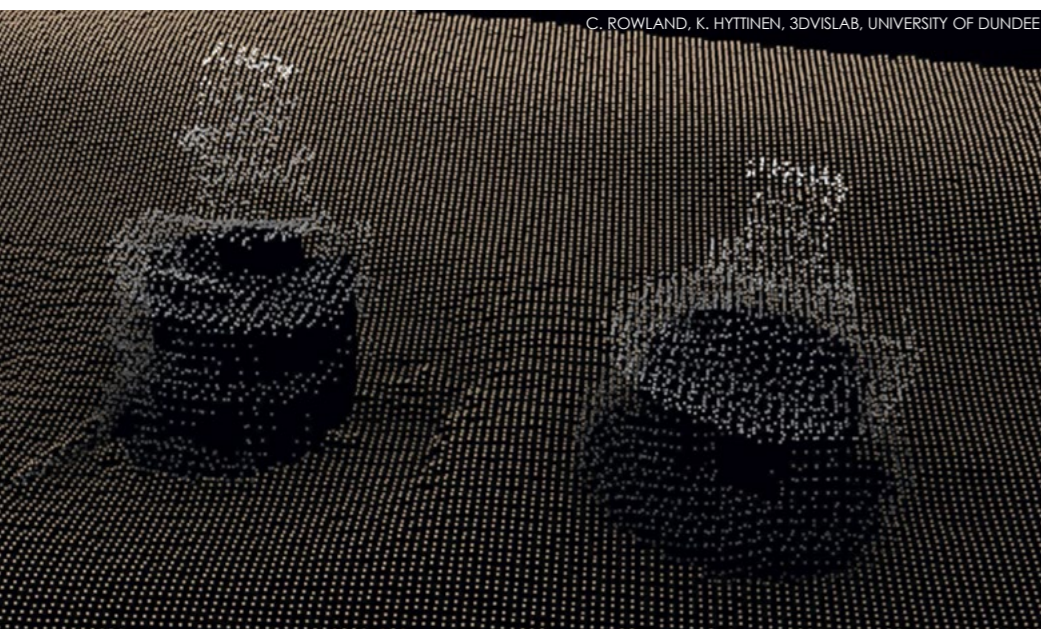
In the main, it is down to the dive boat skippers utilising the superb work



Map of the World War I German fleet's internment at Scapa Flow, including SMS Bayern, SMS Brummer, SMS Cöln, SMS Derfflinger, MS Dresden, SMS Karlsruhe, SMS König, SMS Kronprinz Wilhelm and SMS Markgraf, among others



NOS/NCCOS/CCMA / CC BY 2.0

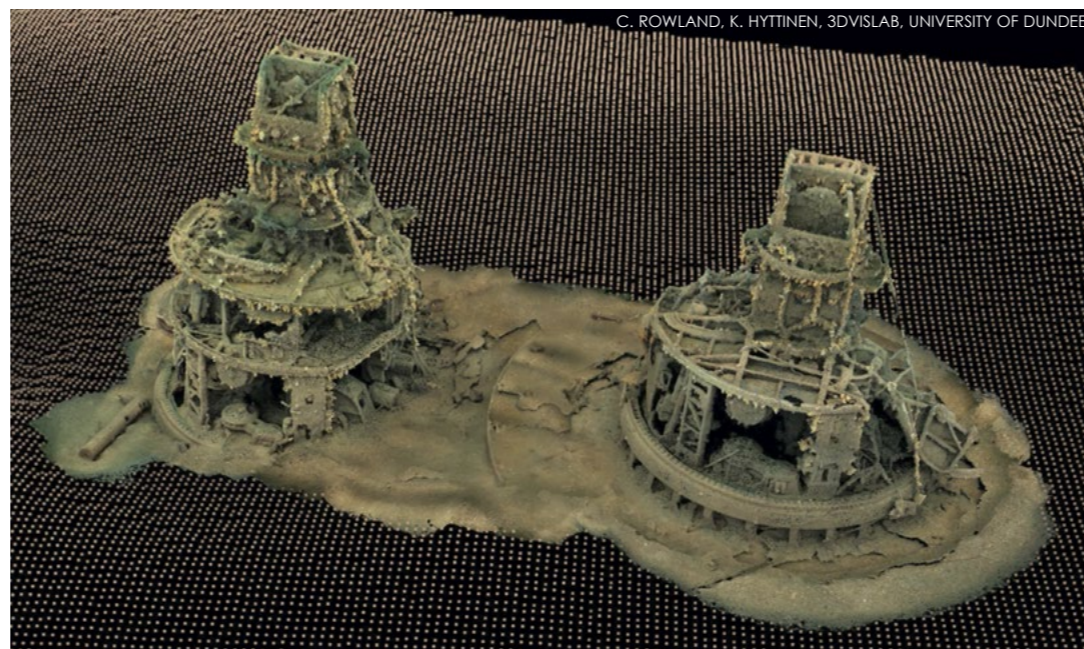


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Historical photo of SMS Bayern (left), which was raised after WWI, but remnants were left on the seafloor.

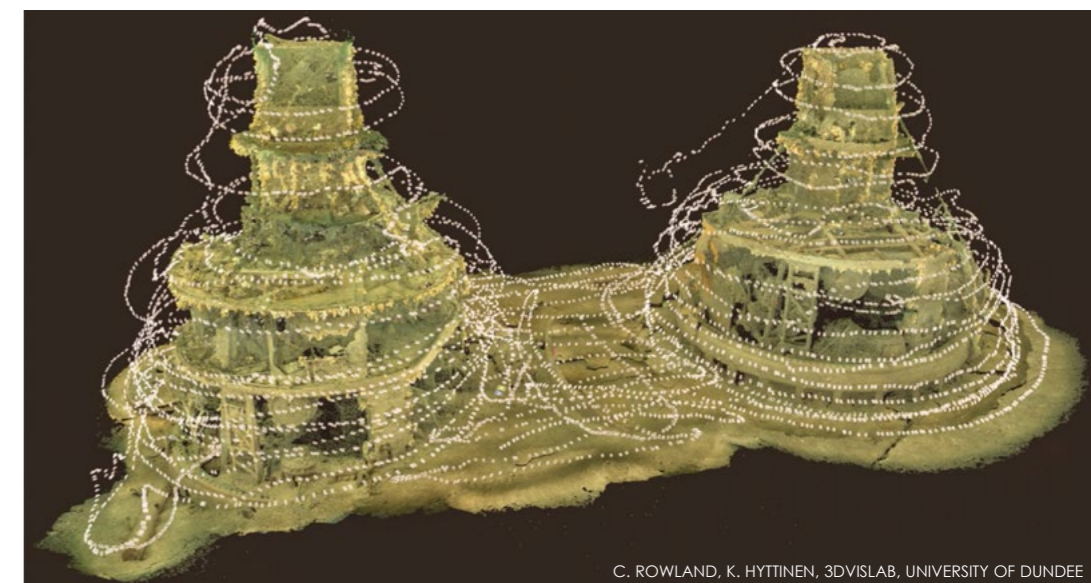


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Artist's conception of multibeam sonar (top left); Multibeam sonar imaging of SMS Bayern remains (left); 3D photogrammetry applied to multibeam imaging of the Bayern remains (above); The many data points where underwater photos were taken of the Bayern remains (right); Professors Chris Rowland and Kari Hyttinen of 3DVisLab photographing a wreck for photogrammetry (top right)



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Scapa Flow

done by a bunch of ardent academics and talented dive professionals (i.e., technical diver Emily Turton's presentations at EUROTEK.2018 were a masterclass in how to deliver a dive brief). The reference points are far more obvious, and they certainly help you orientate where you are, what you can expect to see in the vicinity, and in which direction you should swim.

We are fortunate that the researchers have now collected over two decades of data—recording baseline and monitoring information on this submerged heritage

resource—and then generously shared the extent and condition of these historic assets with the recreational diving community.

Research projects

It all started in 1986, when the Archaeological Diving Unit (ADU) was formed at the University of St Andrews. At the time, two key members of the team—Martin Dean and Mark Lawrence—had 20 years of experience in geophysical surveying and side-scan sonar systems. Jump forward to 12 June 2001, and ADU's

dive support and survey vessel was used as a platform for a seven-day, fact-finding survey on the seven German warships. The highest quality images were taken, using state-of-the-art marine survey techniques based on multibeam sonar.

“We are getting some truly wonderful images of the wrecks in a far greater resolution than anything we have seen before. We can see the ships lying on their sides, and how

much damage has been caused over the years [because of and as a result of the salvage].”

— Mark Lawrence, Archaeological Diving Unit at the University of St Andrews

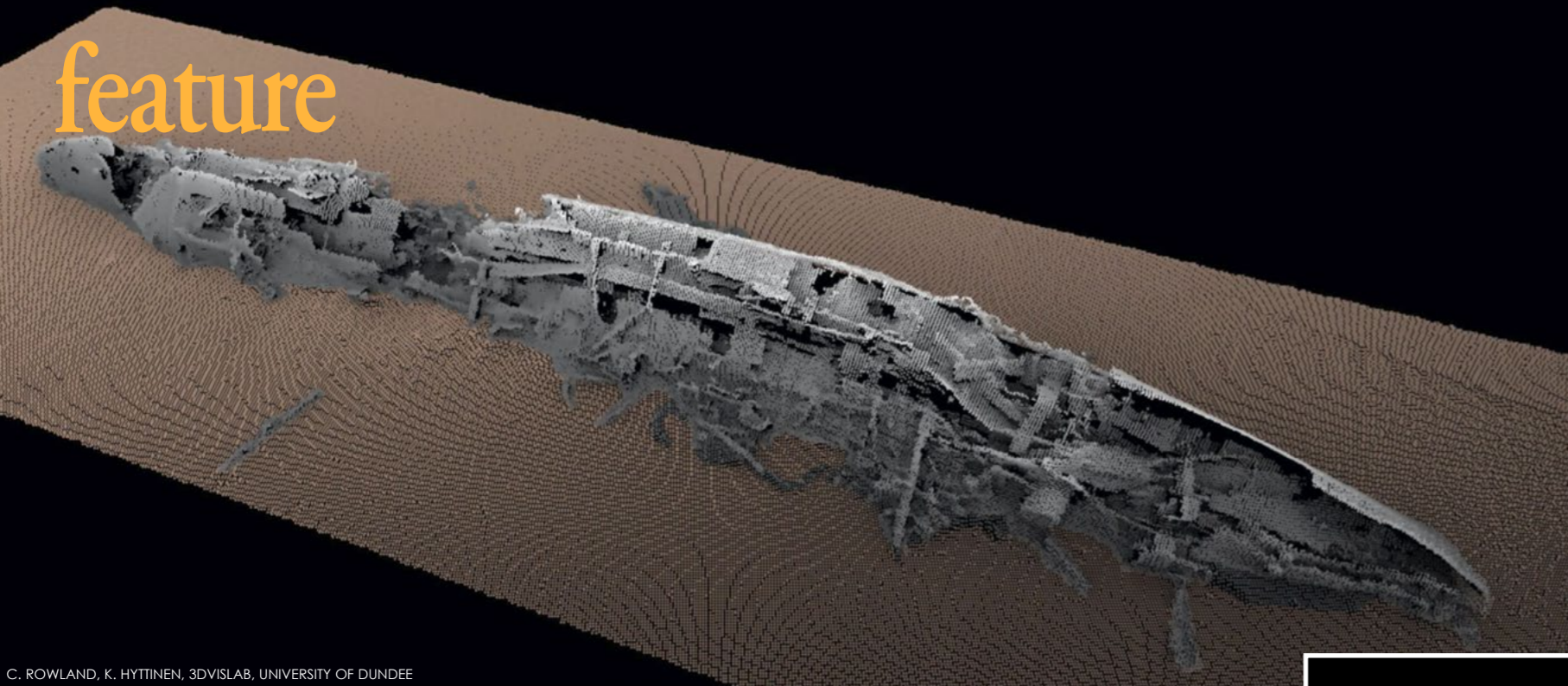
This project revealed the potential of multibeam sonar as an effective method for accurately and rapidly surveying shipwrecks without involving dive personnel.

Two years later, in 2003, a new diver visited Scapa Flow. His name was Chris Rowland, and he was an aca-

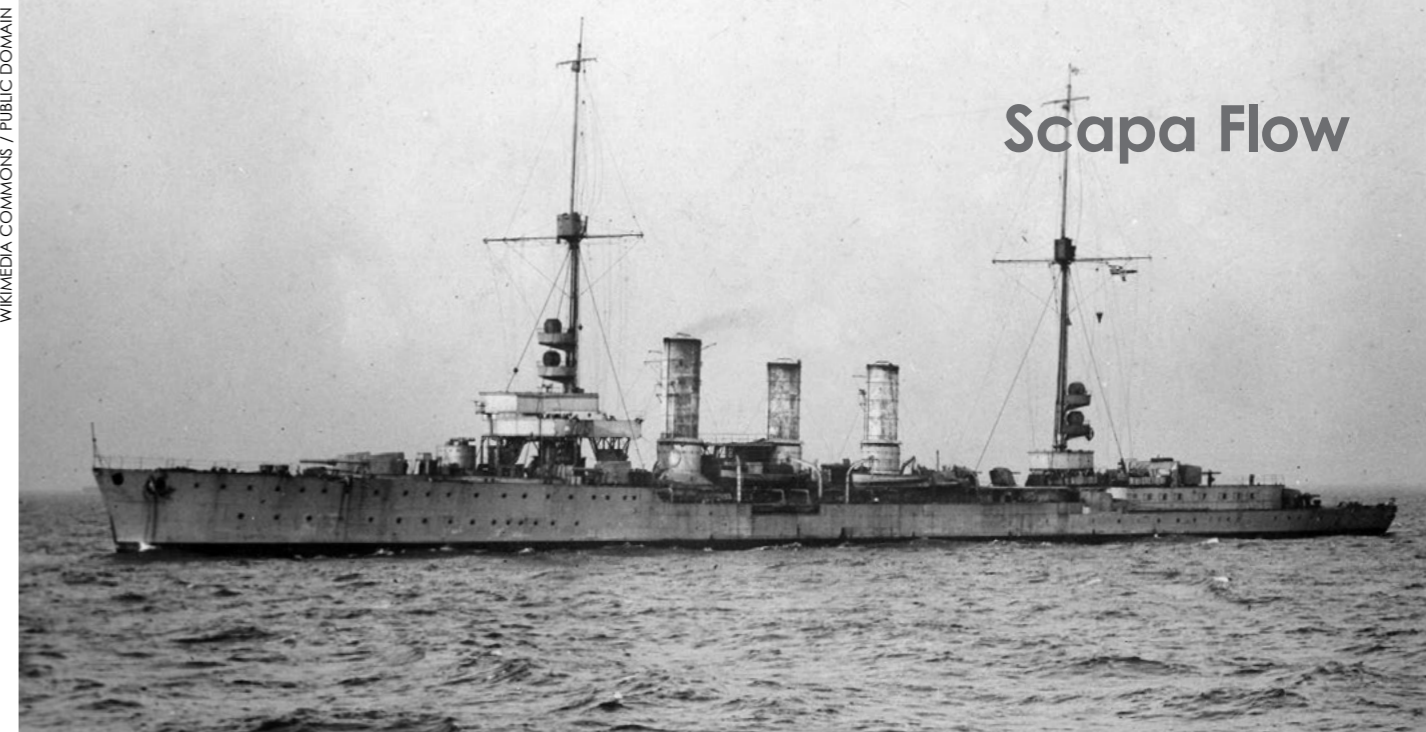
demical researcher from the University of Dundee in the United Kingdom, specialising in 3D animation, design and fine art.

“I fell in love with Scapa Flow, and I have been up here at least once a year since then.”

— Chris Rowland, University of Dundee
By 2006, Rowland was a professor and the director of the 3D Visualisation Research Laboratory at the University of Dundee. He was also back in Scapa Flow, this time at the behest of



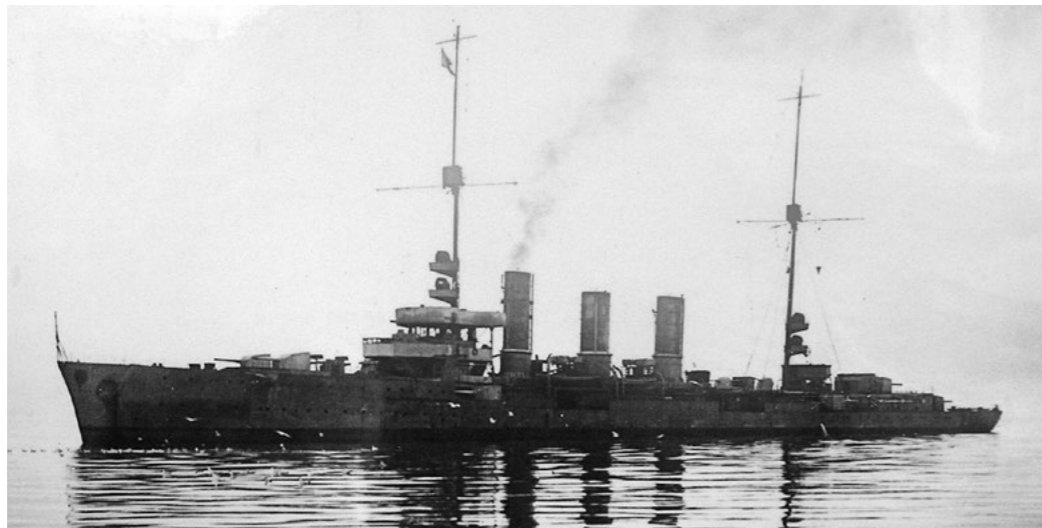
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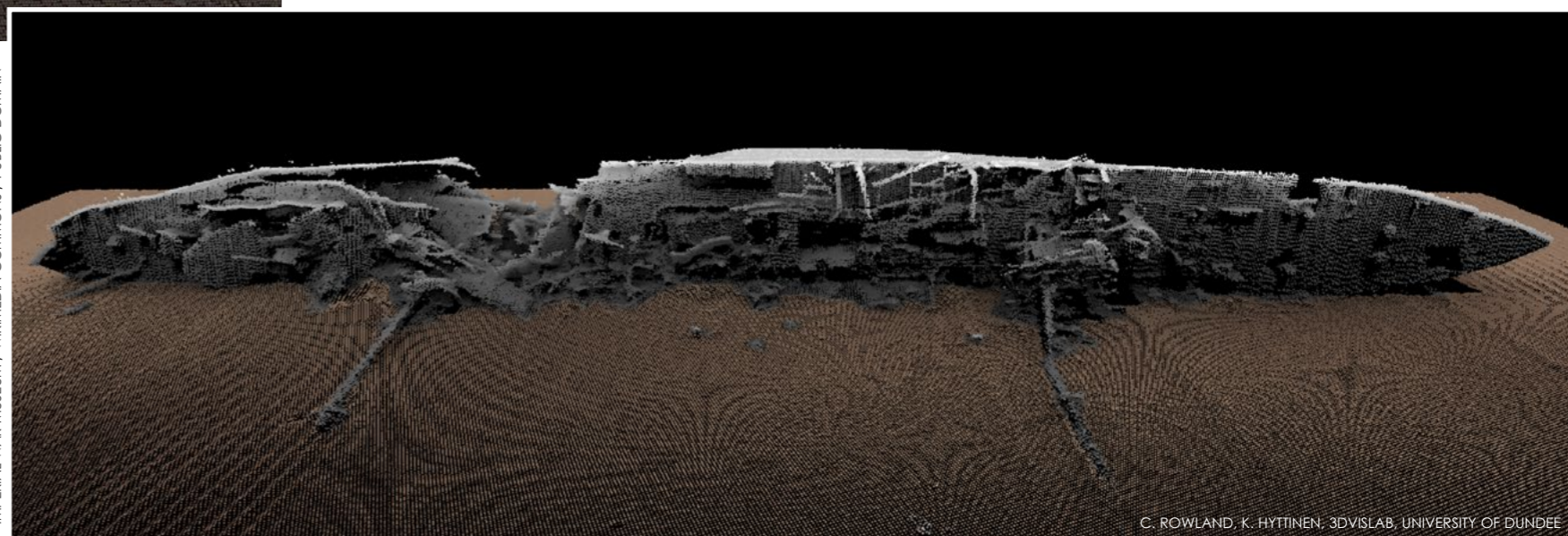
Scapa Flow

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Historical photo (top right) and 3D photogrammetry of German light cruiser SMS Karlsruhe (above); Historical photo (right) and 3D photogrammetry (far right) of SMS Dresden



IMPERIAL WAR MUSEUM / WIKIMEDIA COMMONS / PUBLIC DOMAIN



C. ROWLAND, K. HYTINEN, 3DVISLAB, UNIVERSITY OF DUNDEE

the Ministry of Defence to conduct a multibeam sonar survey of the WWI German Fleet, working alongside the St Andrews' academics.

This would prove to be a unique, powerful collaboration. When you amalgamate Dean and Lawrence's survey data collection methods with Rowland's novel visualisation skills, the result is *WreckSight*. It is a pioneering technique that captures and shows high-resolution, 3D multibeam data. In a nutshell, the software provides you with very detailed still and three-dimensional moving images of these historic and environmentally significant shipwrecks.

This was an exciting time for the academics—the improved results turned heads in the private sector. The oil, gas and wind-farm industries were hungry for better information, because the team's accurate surveys assisted with critical decision-making during salvage, wreck removal and environmental clean-up operations. As a result, the academics were commissioned to work on some interesting projects, and these included the *Costa Concordia* (i.e., visualisation of the wreck to aid the recovery of the ship) and *Deepwater Horizon* (i.e., visualisation to help investigate the cause of the disaster).

“If you can see it, you can understand it, and you can plan conservation for the future.”

— Chris Rowland, University of Dundee

Imaging advancements

Imaging technology continues to change, and one of the more interesting developments on the wreck-survey front has been 3D photogrammetry (where one extracts a three-dimensional image from two-dimensional data). The level of detail that you get via photogrammetry is far beyond the current capability of multibeam sonar.

I asked photogrammetry educator John Kendall to describe the process in plain English. He responded: “Take lots of photos that overlap, then use a clever piece of software to turn them into a digital 3D model. Prepare to swear lots during the process, and you will warm up a small town with the heat generated from your laptop, because this takes a massive amount of computing power.”

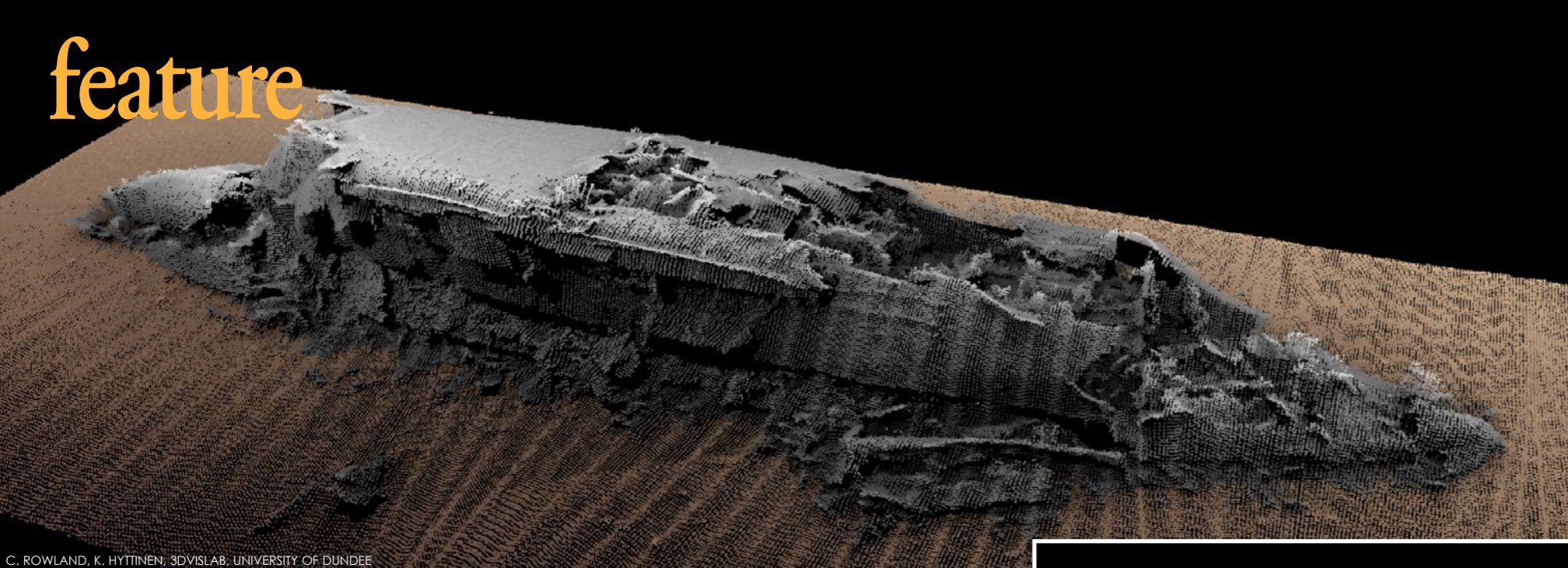
The photographic process requires precise planning and execution so that each high-resolution image systematically overlaps another in the correct sequence. You also need a lot of light, several thousand lumens

worth, to provide enough illumination to capture the images in temperate water.

Thirdly, if you are working over a large distance, it is possible you will get data distortion; therefore, you have to mark key features with rulers. This works very nicely until you get friendly seals discovering a new toy and moving the rulers. The results are worth all the hard work though, because the amount of detail you get is extraordinary.

Photogrammetry survey

In 2016, CCR expedition diver Professor Kari Hyttinen of Finland was



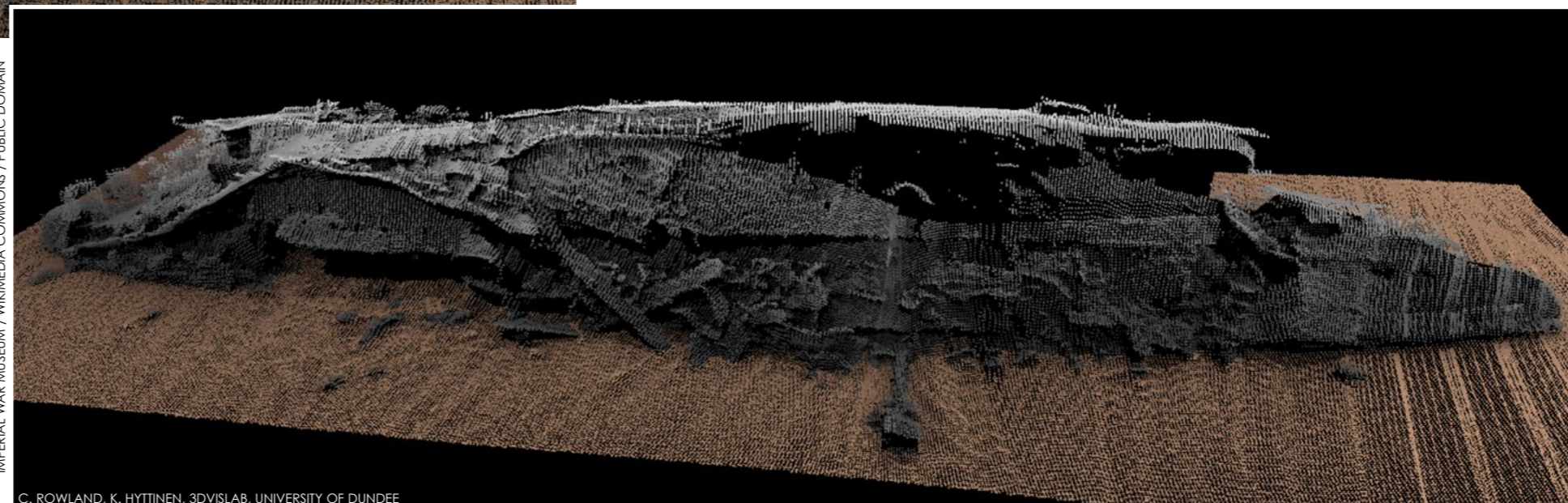
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BRITISH NAVAL INTELLIGENCE / WIKIMEDIA COMMONS / PUBLIC DOMAIN



Historical painting (top right) and 3D photogrammetry of SMS König (above); Historical photo (right) and 3D photogrammetry (far right) of SMS Kronprinz Wilhelm



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IMPERIAL WAR MUSEUM / WIKIMEDIA COMMONS / PUBLIC DOMAIN

invited to join Rowland to become part of the HMS Hampshire survey team because of his expertise in photogrammetry. As a result, the two academics are pushing the technology again, combining multibeam and 3D photogrammetry with extraordinary results. It is one heck of a task though, because you are looking at something like 23 million data points to create the total image.

I was fortunate enough to be shown the spotting top on the Kronprinz Wilhelm during my #Scapa100 trip during the centenary anniversary event at Scapa Flow in June 2019 (please see: xray-mag.com/content/scapa-100-centenary-

anniversary-event). It blew me away that one could see every nook, cranny, crevice and sea urchin.

I had just dived the wreck, “standing” inside it as though the ship still sailed, to get some sense of scale. I was not tall enough to look over the top edge of the spotting top. I could just about peek out of the observational slit. And there it was, right in front of my eyes on a computer screen—the observational slit on the rendered image.

It made me instantly think of the work done by marine artist Ken Marschall. He has a much-deserved reputation for rivet counting and then creating an exact painting of a ves-

sel. The spotting top image was easily on par with Marschall’s work.

Three-dimensional photogrammetry appears to be the perfect solution, but when I spoke to Hyttinen about his work, I learnt that this is not the case. One cannot use it to capture everything. If there is an object that moves, such as a flag flying from a wreck, the software algorithm just cannot cope. It either messes up the image or ignores the data. The best way to capture a dynamic image is by photography; hence, the team has also been working with two expedition CCR photographers, Marjo Tynkkynen and Kieran Hatton.

Summary

There is still much to learn about the iconic wrecks of Scapa Flow. Now, after data on baseline and monitoring information has been meticulously and systematically collected over the last 20 years, the extent and condition of the Scapa Flow wrecks has been generously shared with the recreational diving community. The latest technical developments in multibeam sonar survey and 3D photogrammetry are leading the way to better understanding and insights of these historic assets in this submerged heritage. For more information, see the video of Chris Rowland’s presentation on photogrammetry at: [youtube.com](https://www.youtube.com) ■

Based in the United Kingdom, assistant editor and UK representative Rosemary E. Lunn is a dive professional, writer, public relations and social media practitioner specialising in recreational and technical scuba and rebreather diving. In dive-event management, she organised the UK Diving Industry Trade Show twice, and Rebreather Forum 3, as well as co-founded and co-organised several EUROTEK conferences, and established TEK Dive USA and her own business, The Underwater Marketing Company. For more information, visit: rosemarylunn.wordpress.com.



Painting of Merlin,
the sea turtle, by Ila
France Porcher

Text, photos and illustrations
by Ila France Porcher

Sighting a sea turtle on a dive is always a pleasure. However, few know much about what they are like as animals. Being reptiles, it is assumed that they are essentially on automatic—emotionless and thoughtless. But we changed our minds about that when Merlin came. Ila France Porcher relays the tale of rehabilitating a young sea turtle when she lived in a remote area of Tahiti, at a time when turtles were often hunted for food.

Merlin came at sunrise, carried on the waves, a green sea turtle afloat and flailing. I carried him in from the sea and installed him in a deep blue basin where he steadily strove to dive down. But he could not. He floated high in the water so that all but the edge of his shell was above the surface and his respiratory rate was very fast—he took about one breath per minute. He was a rich amber colour with intricately patterned wings, head, and hind fins. His shell was nearly round and thirty-

nine centimetres in length. Suspecting that his buoyancy was the result of a respiratory infection, I began injections of antibiotics immediately.

He was calmer the next morning but still spent much of his time try-

ing to submerge. Whenever I put my hand near him, he moved his head to press against it.

Merlin's condition declined until he lay immobile on the surface. He did not swallow the small fish and vegeta-

bles I put into his mouth; I had to push them down his throat. His flesh lost its vitality, and his respiratory rate slowed to a breath every fifteen or twenty minutes. When taken daily to swim, there was no muscle response. His

head and fins hung motionless, and his mouth was slack. When his course of antibiotics was finished, mucous seeped from him and strands of it filled the water. I changed it often.

Weeks turned to months as he wait-

Merlin's Sentience

— *The Story of a Sea Turtle*

ILA FRANCE PORCHER





ILA FRANCE PORCHER



Sea Turtle

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The story of Merlin takes place in the French Polynesian island of Moorea (above); The drop-off on the reef wall (left), where Merlin (right) was afraid to go



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ed at death's door, and my husband, Franck, and I gave up hope that he would live. It seemed unbelievable that he could go on so long in such a lifeless state.

Return to life

But there came a day when

he began to move weakly. As he slowly returned to the world of the living, he began to hold his head up enough that his eyes were above the water's surface so he could watch us moving around the house.

We encouraged him to swim in the sea, hoping that exercise

would help to clear his lungs, and put him in an inflatable pool on the deck. He circled it slowly, looking around. I held a shellfish under the surface and he waved one wing back and forth until he drifted near. Then he lunged upon it. But though he had it between his jaws, he was unable to manipulate it into his mouth. Even when I steadied him, he could not eat, in spite of multiple manoeuvres and thrashing about. He became so frustrated with his difficulties that I put it into his mouth as I had done when he was very sick. After that, he always relaxed his jaw so I could put his food in his mouth, and never did he bite.

Nourishment

Now that he was recovering, he required a surprising

amount of food, and keeping him supplied with shellfish was impossible. I began giving him tiny fish donated by a fisherman and took him daily looking for seaweeds that he might like. Once, as we drifted along, I opened his mouth to check that he had no rotting food inside. Looking right at me, he opened his mouth so that I could see in all the way to his stomach, and powerfully expelled a cloud of rotting fish into my face. I took it as a statement and never gave him those fish again.

Instead, I collected snails and other items from the rocks along the shore for him, and took frequent excursions to the reef to bring back quantities of a seaweed beloved by sea turtles. Occasionally, there were turtles grazing there and

some were very large, more than a metre in length. Their shells were elongated compared with Merlin's, which was nearly as round as a pie; clearly, he was a juvenile. His pool was decorated with

a variety of sea plants in an effort to discover more foods that he liked. He was still unable to dive, but floated lower in the water with his shell now half-submerged.

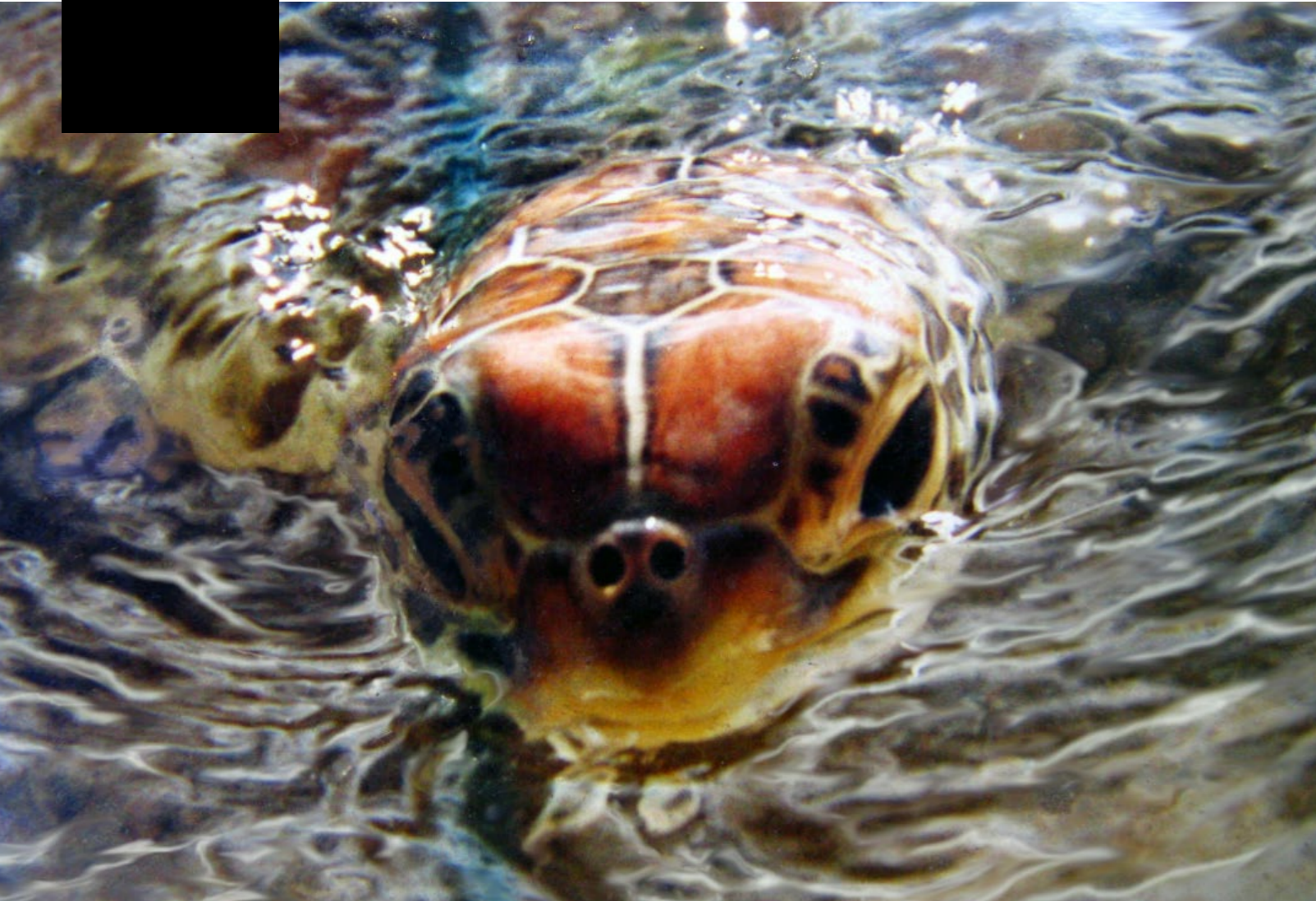


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Merlin, the young sea turtle, with flippers slack when he was very ill



The local reefs in Opunohu Bay of Moorea (right); Merlin, coming forward, looking above the surface, wanting constant attention (below)



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Sea Turtle

government holding facility at once and said that someone would come by later that day to pick him up.

After he had gone, I carried Merlin into the house and laid him on cushions, while filling his blue basin with seawater in a dark room at the back of the house. Then I locked the doors, pulled all the curtains, and sat down beside him with my latest drawing propped in front of me.

Merlin threw a violent fit to find himself back in his basin in the house, and splashed so much sea water around that it took the next twenty minutes to clean it up. Finally, he calmed down as I sat stroking him, alert and listening. I was terrified. Not being French, I

Craving attention

He wanted continuous attention and came to me whenever he saw me. Floating in his pool, he gazed up at the trees arching over him, the mountains and sky, and he watched anyone in view while scenting the air. It was a strange phenomenon, a marine reptile so exquisitely adapted to marine life, whose interests suddenly lay in the world above the surface.

I spent hours drawing the patterns of his scales, and for that, I needed a side view. But he would swim towards me and rest his chin on the edge of the

pool. I would stroke him, and give him a shellfish, but when I tried again for the side view, he turned with me. He wanted as much attention as he could get, and day after day I spent more time fussing with him than I did drawing him. Usually while he was occupied with his bit of food, I could draw him uninterrupted for a few moments, but not for long.

Once, my patience was wearing thin, and instead of getting him more shellfish, I gave him some lettuce that happened to be handy. He shook his head and spat it

out, then violently smacked his flippers on the surface several times and turned his back on me. Now, try as I might to get the side view, he kept his tail end turned exactly in my direction! It took him fifteen minutes to get over his fit of pique and drift back towards me again.

This unexpected incident suggested that he had ideas and preferences that very much mattered to him!

Trouble

One day, a stranger came by, saw Merlin, and went uninvited

to look at him. Two days later, he returned with another man, who claimed to be a government authority on sea turtles and demanded to see the one I had in custody. As we walked to Merlin's pool, I told the man his history, but he stated coldly that I had no right to keep him, snatched Merlin from the water, and roughly examined him. I said that my husband (who, I mentioned, spoke French without an accent), had called every branch of the government to ask for advice and help, but had failed to find anyone who could advise us about his care. (And being in a remote location, there was no access to the internet at the time, through which information such as this could be found). So, we had been obliged to treat the stricken reptile on our own.

Then, I asked him what a healthy turtle's respiratory rate should be, but he ignored the question. Anxious to learn, since he was the first sea turtle expert I had met, I asked again. He said it depended.

"But when a healthy animal is at rest," I asked, "how often does it breathe?" Again, he replied vaguely, and I realised that he did not know! He told me brusquely that the turtle would be transferred to a



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The author, face-to-face with Merlin, the young sea turtle





As he grew stronger, Merlin ventured farther away and was harder to find.

Sea Turtle

The official informed Franck that there was now a veterinarian charged with overseeing sea turtle cases, and she put Franck in touch with him. Not long after, the newspaper reported that all the sea turtles in that facility had died because of poor care.

Likely, the so-called turtle expert and his friend had planned to cook Merlin for dinner.

Merlin's recovery

We constructed an enclosure for Merlin on the fringe reef, and tried to get him used to it. But instead of exploring, he floated in the corner nearest the house in a cloud of fish, looking up at the house. He must have been lonely after so much attention close to us, in his pool.

But as time passed, he began exploring his enclosure and drifting in the middle, finning against the waves.

So I tied a coconut frond there for him to hold on to. Once, when high waters lifted him over his fence, he circled it, then swam to the beach.

At sunset, I carried him to the shallows and softly scrubbed him to keep algae from growing on his skin and shell. He had been sick for so long that in the tropical warmth it had become a problem. Merlin followed my movements with delicate touches of his wings and as I brushed his ventral shell, he clutched my hand for support. The delicate, curved bones in his hind fins shaped them like fingers so that it felt, each night, as if a small, human-like creature grasped my hand between his two, with cool, gentle fingers.

When the sea was too high, the waves too exhausting, or the sun too hot on his exposed shell, Merlin stayed in his pool where he was comfortable.

ILA FRANCE PORCHER

was uncertain if I had any human rights in the country, and was afraid that if I was caught breaking any laws, such as the one governing the touching of sea turtles, I could be deported.

On the other hand, while the rest of the world was working to save sea turtles from extinction, in Tahiti, the law tolerated people eating just as many as they wanted. They were very religious and believed that God had put sea turtles in the sea just for them to eat—even the very last one! But it was wrong to try to save one from death. I waited, trembling with anxiety, systematically drawing. The day darkened, and eventually I just looked out across the grey sea, comforting Merlin. When I was beginning to think that I had overreacted, a vehicle drove onto the lawn. I could hear it but dared not look.

There was a loud knock on the door, and in the subsequent silence, a man began yelling, "Allô!" Listening intently, I followed his progress around the house, imagining making a plea to a judge on Merlin's behalf. Only I knew his needs and it would endanger him, after all he had been through, to put him into a strange facility. Surely, I was in the right... Footsteps approached along the deck. Merlin's pool, decorated with seaweeds, sponges, and the seashell he liked to clutch, was empty, and the man paused there a long time. Then the footsteps retreated, the car door slammed, and finally the sound of the motor faded.

When Franck got home from work, he called the Department of the Sea and was told that they knew of no one who had been dispatched to take the turtle. The only sea turtle holding facility was on another island.



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Corals on the reefs of Moorea (above and left)

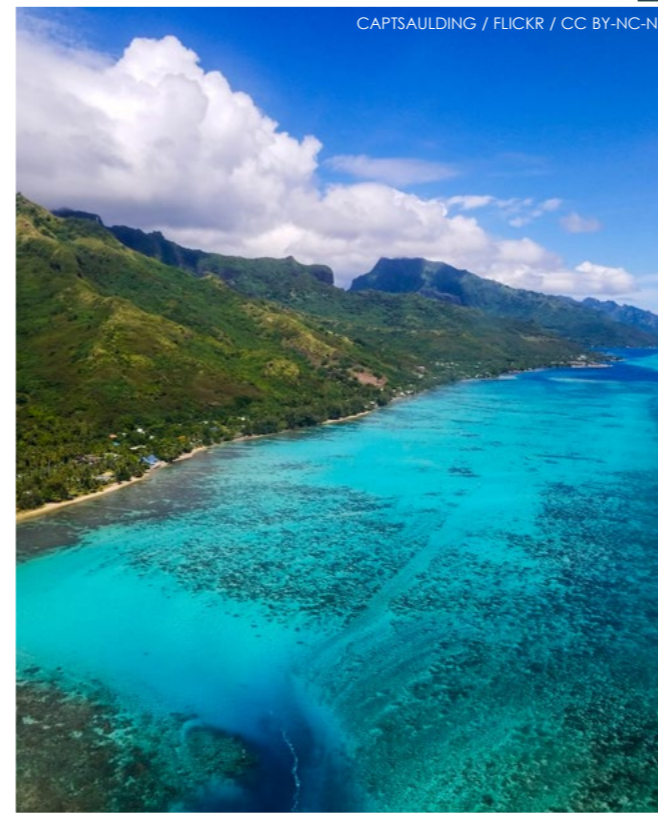


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CAPSAULDING / FLICKR / CC BY-NC-ND

Fringing reefs of Moorea (above and left); Merlin, swimming with the jackfish that accompanied him (right and bottom left)



Sea Turtle

ILA FRANCE PORCHER

His limbs were filling with muscle and daily he was becoming stronger and more alert. The bones of his wings extended like those of a bird, as he subtly altered their shape to push against the water. His move-

ments were graceful as the flow of water itself. But, while some days he floated lower than others, there had been little change in his buoyancy over the three months he had spent with us.

He wanted to eat almost continuously, and providing him with good food was increasingly problematic. He came with me when I searched for food for him, and when I saw something promising, I carried him down to the reef to see if it interested him. The outings stimulated him and gave him a chance to see his environment, but we discovered no new foods that way.

Pool time

Each evening, I cleaned his pool and changed his water so it would be the same temperature as the sea he had just left. The air was always colder than the sea, so his pool gradu-

ally cooled to the temperature of the air. His reptilian body acquired the temperature of his surroundings, and I felt he should not be subjected to a sudden temperature change. But I did not know what the best temperature was. One night, my back was too painful to carry the many bucketfuls of seawater to fill his pool, so Franck said he would do it when he got home.

But by the time he arrived, Merlin had waited an extra two hours, and it was dark. He was very upset and threw a tantrum, beating the surface of his pool with his wings as violently as he could, driving himself into the side, spinning wildly, and thrashing. But Franck had brought a bonito (an oceanic fish) for him, and when I held a piece of it in front of him, he grabbed it. Suddenly, he was thrilled and ate an astonishing number of pieces.

After that, I filled a large serving bowl with a mixture of cubed bonito, several crushed, boiled potatoes, cooked spinach, and lettuce, each morning. A second bowl was heaped with the

seaweeds he liked. Merlin consumed the contents of both each day.

Flying in the sea

One morning, when I carried him down to look at some seaweeds, for the first time, he flew along the sea floor, easily following its contours for several metres before slowly rising to the surface. He was too breathless to repeat the performance, but he had finally succeeded, if briefly, in achieving neutral buoyancy.

Hours later, the wind began to rage, and all night long, the atmosphere screamed. I awoke late in the morning, for no birds sang. Monstrous brown waves tore down the bay, wreckage covered the shore, and a thick layer of sand had been deposited far up under the house. Merlin was hiding at the bottom of his pool. His enclosure was gone, and the sea was far too wild to take him out. For several days, he had to stay in his pool while torrential rain fell and the wind howled. He returned to the surface

and remained afloat.

I took him out as soon as the sea calmed and found that he stayed in front of the house, so rebuilding the enclosure was unnecessary. When he wanted to eat, he came to the beach and if I did not appear immediately, he came clambering out of the water to find me.

So, I transferred the sketches I had done when he was ill onto a board prepared for something else, and started a painting of him right then and there, so I would not have to leave the deck from which I could watch over my precious sea turtle. From then on, he went into the sea each morning, and spent his days playing on the fringe reef.

A watchful animal

At times, he was able to submerge when we searched for his foods, and then he became a different animal. For the first time, I glimpsed the alert, watchful being he truly was. With his wings, he would stroke down to inves-



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A stonefish joined Merlin's community of fishes (right): Portrait painting of Merlin by Ila France Porcher (far right) Merlin's favorite shellfish, a red stripe trochus snail, *Trochus histrio*. Painting by Ila France Porcher (bottom right)

He would investigate a crevice in the coral, then when he began to rise, he would stroke again, moving on to look into another crevice. But it was never long before he returned to the surface.

Once, I took him with me when I dived down the wall at the drop-off, thinking that he would like the deep, dark water. But he panicked and swam up over the fringe reef and

back to the beach by himself.

Often, he played in the waves on the beach. At first, I rushed down to rescue him, gently putting him back beyond the breaking waves, only to see him come surfing up again a few waves later. It seemed that he liked to play where he could touch the bottom. He began surfing on the beach each evening while I prepared his pool for the night, sometimes clambering up towards me. He was always eager to return to his pool as night came.

The veterinarian comes

After a long delay, the government's official sea turtle veterinarian arrived. I extricated Merlin from his floating coconut frond with difficulty and carried him to the vet, who stood watching on the shore. He was very gentle and his examination was brief. As he set Merlin back in the sea, he told us that Merlin was the healthiest turtle he had seen in custody. Considering how ill he had been, it was the opposite of what he had expected.

We stood talking in the shallows and Merlin stayed nearby, often coming close to touch our legs, seeking attention. The vet was impressed with his freedom, his trusting behaviour, and the way he used the toys we

had tied up for him. He said he was glad to know that there were people able to care for these specialised marine reptiles and that he would keep us in mind in the future if a temporary home for a sea turtle was needed. He left Merlin's release up to us.

Merlin's character

Merlin began to explore more widely. He discovered an anchor

rope floating about fifteen metres (50 ft) up the shore and began going there to play. One day, I noticed a fisherman in an outrigger canoe cruising slowly past him, so after that, whenever I saw him playing there, I took him looking for food so that he would not make it a habit.

But Merlin did not like to accompany me when I searched for his seaweeds, and he became

increasingly adamant that I respect his wishes. Though he came passively in the beginning, he began experimenting with various escape strategies. He would swim along while I had my arm around him, but once I let go, he would whip his wing out of my reach and take evasive action with surprising rapidity. When he was especially irritated, he would smack my hand with his wing as I reached out to guide him in the proper direction.

Eventually, he began taking off for home as fast as he could when I dived down to pick some seaweed,

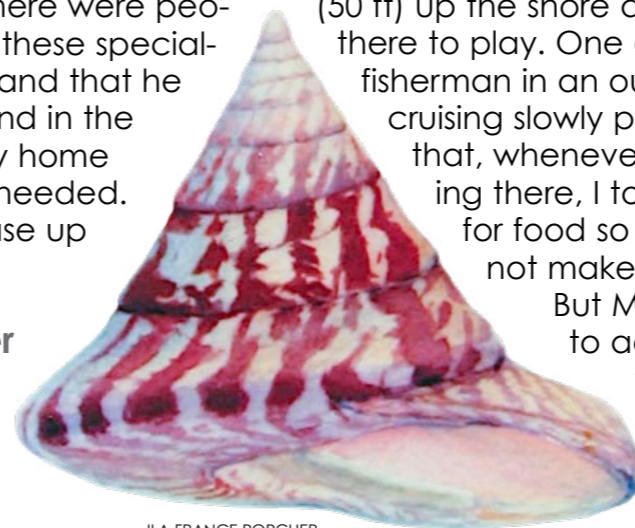


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Damselfish, such as this one, followed Merlin around.



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Merlin's community of fishes included jackfish (above) and ornate butterflyfish (left)

and I would have to speed after him and turn the protesting sea turtle around to

continue our search. He could be very hard to see since he was often able to swim

just beneath the concealing reflections of the surface.

Once, he vanished altogether and it was a long time before I saw him climbing up the beach in the distance. There was no doubt about his intentions; every time a wave touched his hind fins, he hoisted himself farther up the beach and eventually, like a little bulldozer, he struggled to the top, where he was partially hidden in shrubbery.

After that, I procured his seaweed by myself. Yet there were still times when we were swimming together that he suddenly flew home alone. No matter where we were, Merlin always knew where home was.



ILA FRANCE PORCHER

Opunohu Bay, where Merlin was rehabilitated and wild dolphins played (above). Painting by Ila France Porcher

One night, I was giving him a last feeding in his pool. He was a barely perceptible dark shape, and I fed him by feel, enjoying the delicate touch of his jaws against my fingers. Suddenly, he spun around and snapped something off the other side of the pool, which he began wildly shaking. It was a leaf that had fallen—he was remarkably sensitive to vibration. Yet, during the day, leaves frequently fell into his pool, and he paid no attention to them.

At night, if he was approached, or if a light came on, he would assume a protective position. He would tuck his wings tightly over the edges

of his shell, arch his neck so his face pointed downward, and extend his hind fins out from his body, fingers spread. Stroking him gently did not relax him.

Merlin's fish

One evening, I was carrying Merlin in for the night when the extraordinary face of a stonefish flashed past beneath us, just past the place where we came and went from the sea. It was a large one, with seaweed growing on it. It remained in the vicinity for several weeks, rarely moving, even when we went close to watch it.

Merlin's multispecies cloud of fish was always present

and partook of the scattering crumbs when he ate. Yet there was no greedy rush forward in spite of the hundreds of individuals; in deeper water, they filled the volume of a room. The most alert were small silver jackfish. They appeared around me as I put on my gear in the shallows and as I glided out, they surrounded me in formation, with the leaders a metre in front, escorting me to Merlin.

Some of them always came with me when I returned to the beach, a few taking the lead, while others swam companionably around me. They came too, when Merlin and I roamed together, but if he wandered too far away, they would not

Sea turtle in the open sea (right); A whitetip reef shark was part of Merlin's community of fishes (below)



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KEVIN C. CHARPENTIER / PEXELS

Sea Turtle

follow. When looking for him, scanning the water from the shore, I would often see them coming back, which told me the direction he had taken.

Those small animals seemed to form a community in which I was accepted and welcomed, something I had never known, in spite of the time I had spent observing terrestrial wildlife as a wildlife artist. The presence of the stonefish so close to our feeding area was unlikely to be a coincidence. It too was part of the community.

One day, Franck went to fetch Merlin in his kayak when he strayed too far. I was waiting on the beach with Merlin's fish, and they all went streaming out to meet the kayak when it was still ten metres (32 ft) away! When Merlin was placed back into the sea, they flashed around him like cascading silver coins. And as

he raised his wings and surged away, they took up their positions around him. As many as possible clustered against his ventral shell, likely for protection.

A striking incident illustrating the faculties of Merlin's fish occurred one day when I was walking on rocks lining the shore. His fish came streaming over and milled around in the water below me. They clearly recognised me from under the surface, though they had not seen me there before, and I looked very different fully dressed and standing on the rocks above, than I did when underwater. Those fish were remarkably intelligent.

Then, one morning when I looked out, Merlin had vanished... ■

Read the rest of Merlin's endearing and gripping tale in Part Two, filled with poignant

moments in tropical seas, insights into surprising reptilian intelligence and sentience, while facing the ever-present perils posed by hunters. Go to: xray-mag.com. Or buy the full ebook or paperback at: amazon.com.

Ethologist Ila France Porcher, author of *The Shark Sessions* and *The True Nature of Sharks*, conducted a seven-year study of a four-species reef shark community in Tahiti and has studied sharks in Florida with shark-encounter pioneer Jim Abernethy. Her observations, which are the first of their kind, have yielded valuable details about sharks' reproductive cycles, social biology, population structure, daily behaviour patterns, roaming tendencies and cognitive abilities. Visit: ilafranceporcher.wixsite.com/author.

Available Now in paperback or ebook

From author, ethologist, wildlife artist and rehabilitator Ila France Porcher

The lives of sea turtles in the context of a society that hunts them are revealed in vivid words in this account of what happened to four sea turtles in Tahiti. Their actions in different situations provide a revealing glimpse into their minds.

These exquisitely designed marine reptiles were able to plan ahead, cooperate against their own instinctive drives, and use deceptive strategies. They remembered abuse, took steps to try to avoid more suffering, and their behaviour was flexible according to the circumstances. Such evidence of their self awareness, and conscious approach to life, provides another reason to insist on their protection from extinction.

While the intelligent awareness and emotional nature of our pets is accepted increasingly in our society, a strong prejudice lingers against the idea that animals considered "cold" and "low," such as fish, amphibians and reptiles, could be sentient. This book shows how mistaken such an attitude really is.

MERLIN



The Mind of a SEA TURTLE

ILA FRANCE PORCHER

Available on
Amazon.com



Equipment

Edited by
Peter Symes &
Lelle Malmström



Mares SXS

The SXS 62X is the new, ultra-compact and light regulator from Mares. SXS is an acronym for "Second eXtra Small." It is indeed the Italian brand's smallest second stage. Mares states it is a good choice for any side configuration, because it only requires a few simple and easy operations to change the configuration from the right to the left side. The exhaust tube is positioned off to the side for better visibility. The corresponding 62X first stage has all of the Mares' innovative characteristics, the company writes, such as AST technology (Auto Sealing Technology) and DFC (Dynamic Flow Control) system, which guarantees constant, high airflow at any depth. [Mares.com](https://www.mares.com)

FE RF2

The latest freediving wetsuit from Fourth Element has been developed for freedivers who want to enjoy maximum freedom and ultimate warmth, the Cornwall-based company writes. Lined outer panels around the core, arms and legs provide durability, there is a Glideskin across the shoulders, and the hood maximises hydrodynamics. This hybrid freediving wetsuit offers cool and cold-water freedivers the freedom to explore their limits in comfort. The inner side of the suit has a smooth cell Metalite coating; this provides extra warmth retention and is more robust than traditional open cell. [Fourthelement.com](https://www.fourthelement.com)



Two-tones

Isn't it OK to single out a product simply because it looks cool or fun, or both? In any case, we plead guilty as charged when it comes to this funky mask, the two-tone Maxlux S from French manufacturer Beuchat, which is offered in two colour-combinations: Black and Yellow, and Black and Red. As with many of Beuchat's other masks, its design provides panoramic vision with a clearer view upwards and greater brightness. [Beuchat-diving.com](https://www.beuchat-diving.com)

Shearwater updates

Shearwater Research has updated its two flagship dive computers, the Perdix 2 and Petrel 3. Air integration is now standard for all Petrel 3 models with up to four Shearwater transmitters to customise a solution from open circuit to rebreather and bailout gas pressure monitoring. Safety is increased with a strong vibration alert system, and a user-changeable AA battery offers long dive times and ease of replacement. An all-new, easy-to-read, 2.6-inch AMOLED display is protected by a toughened aluminosilicate glass lens, titanium bezel, and piezo touch buttons, which have adjustable sensitivity. The Perdix 2 upgrades also include toughened aluminosilicate glass lens for greater impact resistance, a titanium bezel and buttons, and adjustable sensitivity for the buttons. Like the Petrel 3, the Perdix 2 also comes with strong vibration warning alerts. [Shearwater.com](https://www.shearwater.com)



APEKS recall

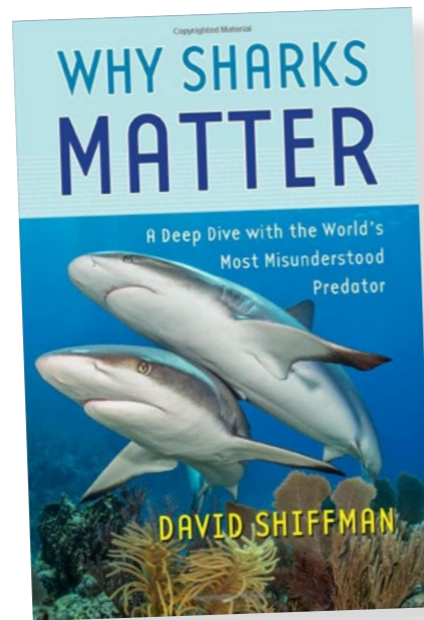
Aqualung Group is conducting a recall on a limited number of its Exotec BCDs. The recall concerns four models in which the BCD should have a longer pull cord. As a result, the BCD cannot be fully inflated, which could lead to a lack of buoyancy control. A list of serial numbers of affected devices and instructions for owners have been posted on [Apeksgiving.com](https://www.apeksgiving.com).



FE Halo now available

The Halo undersuit from Fourth Element is sort of old news. That is, we have already given it a good mention when it was presented at DEMA in 2019. However, global supply-chain issues, which have dogged most of the dive industry, kept pushing back the launch of it to the public. Finally, and in their own words, the Halo has now landed. [Fourthelement.com](https://www.fourthelement.com)

Edited by
Catherine GS Lim

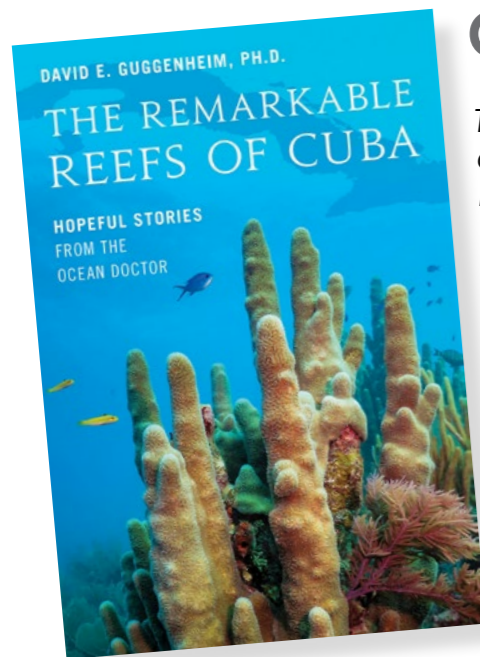


Sharks

Why Sharks Matter: A Deep Dive with the World's Most Misunderstood Predator, by David Shiffman

This book goes beyond encouraging readers to save sharks just because they are sentient beings with a right to live. The author explores how sharks are essential for healthy ocean ecosystems, and how much the world's coastal economies depend on them. He counters the popular misconceptions of sharks being man-eaters, and presents them as the elegant but imperiled ocean guardians they are. Readers will thus get to see sharks from a fresh perspective and come to realise that the sharks' survival on this planet is crucial to the survival of the human species.

Publisher: Johns Hopkins University Press
Date: 24 May 2022
Hardcover: 312 pages
ISBN-10: 1421443643
ISBN-13: 978-1421443645



Cuba

The Remarkable Reefs of Cuba: Hopeful Stories from the Ocean Doctor, by David E. Guggenheim

This book brings forth hope amid troubling stories of the general decline of Caribbean coral reefs since the '70s. While half of the Caribbean's reefs have been lost, the reefs in

the nearby waters of Cuba are thriving. This book examines how Cuba's history and environmental protections, as well as the collaboration of scientists from both Cuba and the United States, working together through political strife, manage to maintain the healthy and lush state of Cuba's coral reefs, thereby providing a beacon of hope for reefs in the rest of the world.

Publisher: Prometheus
Date: 15 August 2022
Hardcover: 264 pages
ISBN-10: 1633887804
ISBN-13: 978-1633887800



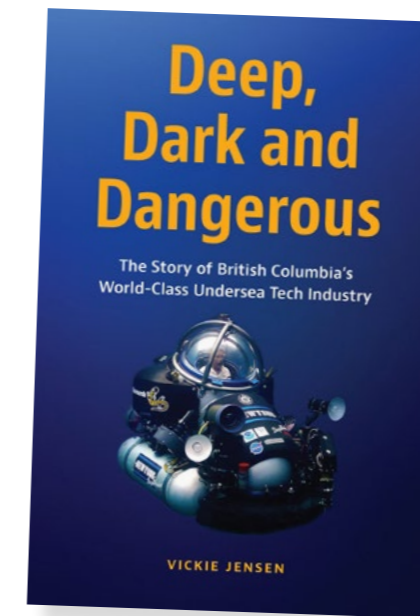
Wrecks

Shipwrecks of Lake Ontario: A Journey of Discovery, by Jim Kennard, with Roland Stevens and Roger Pawlowski

The New York State waters of Lake Ontario have long attracted shipwreck enthusiasts searching for sunken ships, using scuba equipment, simple depth finders, sophisticated side-scan sonar equipment, and even remotely operated vehicles. This book shares the

stories of these long-lost shipwrecks and the adventures of the underwater explorers who discovered them. All proceeds support the National Museum of the Great Lakes.

Publisher: National Museum of the Great Lakes
Date: 27 March 2019
Paperback: 208 pages
ISBN-13: 978-0940741027

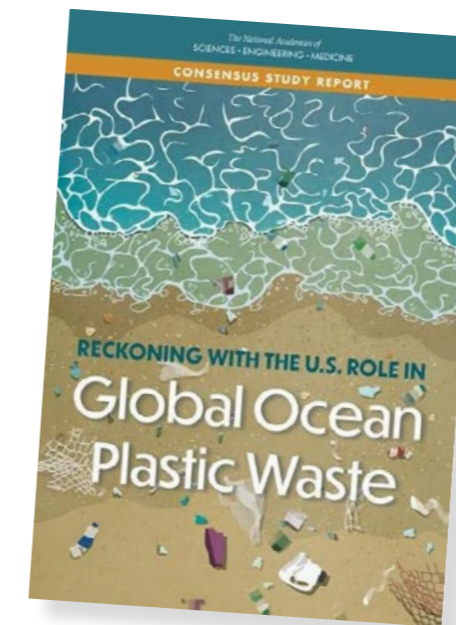


Submersibles

Deep, Dark and Dangerous: The Story of British Columbia's World-Class Undersea Tech Industry, by Vickie Jensen

In the early 1960s, two commercial hard-hat divers in Vancouver needed to use a submersible with robotic arms for deep-sea work. When they could not find one to buy, they decided to build their own. These humble beginnings form British Columbia's foundation as a hot spot for submarines, submersibles, Newtsuits, underwater robotics, Arctic sonar and other cutting-edge undersea technologies. The book traces the province's colourful history and climb to become a world leader in underwater tech, as well as its future as a front runner in the world of subsea technology innovation.

Publisher: Harbour Publishing
Date: 19 April 2022
Hardcover: 256 pages
ISBN-10: 1550179209
ISBN-13: 978-1550179200



Ocean Plastic

Reckoning with the US Role in Global Ocean Plastic Waste, by Medicine National Academies of Sciences, Engineering, Division on Earth and Life Studies, Ocean Studies Board, Committee on the United States Contributions to Global Ocean Plastic Waste

This book is a response to the Save Our Seas 2.0 Act that calls for a scientific synthesis of the United States' role in both contributing and responding to global ocean plastic waste. It calls for a national strategy by end-2022 to reduce the country's contribution to global ocean plastic waste at all stages of its life cycle. It also recommends a nationally-coordinated, expanded monitoring system to track plastic pollution, so as to better understand the scale and sources of plastic waste, establish priorities and measure progress.

Publisher: National Academies Press
Date: 29 April 2022
Paperback: 268 pages
ISBN-10: 0309458854
ISBN-13: 978-0309458856

Text by Simon Pridmore
Photo by Michael Rothschild

— This article is adapted from the chapter, “Situational Awareness and Developing Instincts,” in Simon Pridmore’s book *Scuba Exceptional: Becoming the Best Diver You Can Be*.

A term that has crept into discussions of scuba diving safety comparatively recently is “situational awareness,” a concept that originally arose in the field of aviation but has now been extended to a wide range of human activities, from medicine and motor-ing to personal security and law enforcement. Simon Pridmore offers insight and advice on safe diving and how to employ your scuba sixth sense.

Situational awareness involves being aware of elements in the environment around you, understanding what is happening in the moment and assessing what could happen. Somebody with a good sense of situational awareness might be described as having a “feel” or a “sixth sense” for how

situations, people and incidents will play out.

As an example, I often tell the story of a pair of experienced divers who watch powerlessly from a distance as a group of ascending divers drift

unknowingly into a patch of water where whirlpools on the surface are generating a downcurrent. The divers’ bubbles, travelling almost horizontally ahead of them as they drift, are being caught and catapulted

down into the depths and it is clear to the observing couple that the same fate will befall the divers if they do not take some form of evasive action.

The group remains unaware and is picked up and swept down into

the depths. Eventually, the downcurrent becomes weaker and relaxes its grip, allowing the divers to begin a new ascent out in blue water. They all survive the dive, nobody runs out of air or panics, but, back on the boat,

Developing a **Scuba Sixth Sense** *— The Importance of Situational Awareness*

MICHEAL ROTHSCHILD

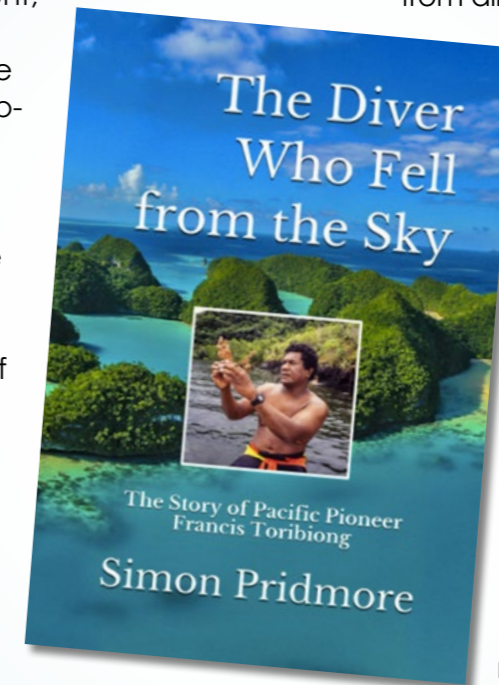




FRANCISCO DAVIDS / PEXELS

A Pioneer Story by Simon Pridmore

When his country needed him most, Palauan Francis Toribiong came along and helped the Pacific island nation find its place in the world and become an independent, forward-looking 20th century state. And he achieved this, improbably, via the sport of scuba diving. This is the inspiring tale of an absolutely unique life, written by Simon Pridmore and illustrated with images of the beautiful islands of Palau, above and below the water.



Toribiong was born poor, had no academic leanings and no talent for diplomacy. Yet he was driven to succeed by a combination of duty, faith, a deep-seated determination to do the right thing and an absolute refusal ever to compromise his values. And, as well as all that, he was Palau's first ever parachutist—known by islanders as “the Palauan who fell from the

sky.” In giving him this title, people were speaking both literally and figuratively.

Toribiong was so completely different from all of his contemporaries in terms of his demeanor, his ambitions and his vision, that it was as if he had come from outer space. Palau had never seen anybody quite like him and there was no historical precedent for what he did. He had no operations manual to consult and no examples to follow. He wrote his own life.

Toribiong was the first Palauan ever to seek and seize the international narrative. No Palauan, in any context or field, had previously thought to go out into the world and say: “This is Palau—what we have is wonderful. Come and see!” This is his astonishing story.

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they are all shocked and scared. They all agree that “it just came out of nowhere.”

In fact, of course, the situation did not come out of nowhere. It was there, but none of the divers saw it coming because they were not watching out for it.

The observers, however, were fully aware of the various elements in play: unaware divers, moving water, bubbles and downcurrent. They could see the situation clearly and could predict what was going to happen. They were exhibiting situational awareness. The divers who got into trouble were not.

Developing situational awareness

How do you develop situational awareness as a scuba diver?

When you first start to scuba dive, you do not pay much attention to what is going on around you during a dive because you are too busy just staying alive. You are trying to remember all the things you have been taught and all the advice you have been given. Even so, with every dive you do, you are unconsciously developing valuable experience.

Soon, you reach a point where you have mastered the essential skills and now have room in your mind to consider other things apart from your own

survival. The more you dive, the faster you should reach this point.

However, situational awareness will not then develop unaided. The group of divers in my story were not beginners but they showed no sign of being cognisant of their situation at all.

Building situational awareness takes work. Once you get to the stage where you are feeling more comfortable in the water, your fears have been replaced by wonder and confidence is seeping through your veins instead of adrenaline, resist the temptation to relax and switch your brain off.

Instead, always keep your mind on the dive. Concentrate at all times on

what is happening underwater. Avoid letting your thoughts drift away to other things that are unrelated to the specific dive that you are doing now. Instead, visualise yourself as an operational controller with a number of screens in front of you, which are displaying different aspects of the dive.

Cycling through multiple screens

One screen is showing your state of mind, a second is showing your gauges, a third screen is showing a movie of you as you swim along. Then, there are other screens that show the fish life on the reef, the route you are taking, the water conditions and the weather on

the surface. Still more screens are monitoring your fellow divers, showing their location, behaviour, breathing rate and finning style.

As you dive, keep your mind cycling through the screens. First, watch the fish swimming around you for a few minutes; then, check your gauges. Next, take note of a large rock you have just swum past. Will this make a good waypoint on the route back? Then, look around at your dive team. Is everyone still there? Is anyone lagging behind? Is anyone breathing faster than you would expect, given the conditions?

Then, give a little thought to your



PIA / PEXELS

own status. Make sure that your fins are not brushing against the seabed, and you are maintaining a nice, long, slow breathing rate. Are you okay? Are you thinking straight? Do you sense any narcosis? Then, go back to looking at the fish. Is that a moray eel poking its head out from under that stone? Maybe your buddy would like to take a photograph of it?

Eyeing the whole and its parts

And so on. You keep your mind on the dive as a whole by focussing your attention on specific aspects of it all the time. Of course, you do not have to create a sequence in your mind. Nor does any of this need to distract

from the fun of diving. The cycling through the screens is going on in the back of your mind.

Think of what you do when you drive a car. You keep an eye on your instruments, at the same time as you watch the road, at the same time as you pay attention to changing weather conditions. But you are still listening to the music on the sound system and chatting with your passengers. Maintaining situational awareness on a dive is a similar concept.

On different dives, you will find you give more attention to certain aspects of the dive than others. On the first dive in a new location, you will give more attention to your route

and the landmarks. If you are diving with an inexperienced team, you will spend more time making sure they are not in difficulty.

Then again, if you are with trusted, capable buddies at a site you know well, in easy conditions, most of your time can be devoted to watching the marine life in all its glory and enjoying being at one with the ocean. But you never take your eyes off the other screens completely. You never know when the gremlins of the sea might come and bite you.

Even when you are diving with guides or instructors, do not devolve your responsibility for situational awareness to them. Instead, add

NEW 4 in 1!

Simon Pridmore has released a new single-volume e-book, bringing together four books in his bestselling *Scuba* series:

- *Scuba Fundamental – Start Diving the Right Way*
- *Scuba Confidential – An Insider's Guide to Becoming a Better Diver*
- *Scuba Exceptional – Become the Best Diver You Can Be, and*
- *Scuba Professional – Insights into Sport Diver Training & Operations*

As Simon puts it, this is "a remastering and repackaging of the original albums rather than a greatest hits." Nothing is missing. *Scuba Compendium* gives e-book readers the advantage of being able to access all the knowledge contained in the four books in one place, making this a unique and easily searchable work of reference for divers at every level.

Simon has always promoted the idea of safer diving through the acquisition of knowledge, which is why he has chosen to release this highly accessible version. If you have read his work before, you will know that he provides divers with extremely useful advice and information, much

them to your battery of screens. After a while, you will find that switching off your situational awareness is not even an option. Your scuba sixth sense will have become ingrained. ■

Simon Pridmore is the author of the international bestsellers Scuba Fundamental: Start Diving the Right Way, Scuba Confidential: An Insider's Guide to Becoming a Better Diver, Scuba Exceptional: Become the Best Diver You Can Be, and Scuba Professional: Insights into Sport Diver



of it unavailable elsewhere; his points often illustrated by real life experiences and cautionary tales. He examines familiar issues from new angles, looks at the wider picture and borrows techniques and procedures from other areas of human activity.

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*Training & Operations, which are now available in a compendium. He is also the co-author of the Diving & Snorkeling Guide to Bali and the Diving & Snorkeling Guide to Raja Ampat & Northeast Indonesia. His recent published books include The Diver Who Fell From The Sky, Dive into Taiwan, Scuba Physiological: Think You Know All About Scuba Medicine? Think Again! and the Dining with Divers series of cookbooks. For more information, please see his website at: **SimonPridmore.com**.*

marine mammals

Text by Peter Symes

White sharks complicate population recovery for sea otters

Decades of conservation work have boosted sea otter populations from near extinction in many parts of the North Pacific, but the animals are now being killed by great white sharks.

Complex interactions and conflicts between protected populations may challenge the recovery of whole ecosystems. Several factors indicate that white sharks may be currently limiting the recovery of California sea otters.

Protected white sharks (*Carcharodon carcharias*) and pinnipeds have an established predator-prey relationship along the California coast.

White sharks are considered threatened by the IUCN Red List, and though they are protected at the state, federal and global levels,

their current status in the northeastern Pacific is debated.

Seals and sea lions are protected taxonomically under the Marine Mammal Protection Act ("MMPA") and many species are recovering from near-extinction in the early 20th century and now reoccupy the full extent of their historical range.

Meanwhile, sea otters have been slower to recover than pinnipeds and have reoccupied only 13 percent of their prior range. While decades of conservation work seem to have paid off and boosted sea otter populations in many parts of the North Pacific Ocean, many otters are now being killed by great white sharks.

Mistakes?

The sharks prefer blubbery, calorie-dense prey like seals. By contrast, sea otters insulate themselves with a thick fur coat and provide little com-

parative caloric value for feeding white sharks. So, any bites of furry sea otters are probably mistakes. At least a growing body of evidence indicates shark bites on otters are incidental and nonconsumptive i.e. the extensive occurrence of stranded sea otters that bear bite wounds from white sharks but have not (even partially) been consumed.

Even though white shark bites to otters therefore appear exploratory, they still cause a steep and related increase in sea otter mortality.

levels of recovery, with high population densities in some areas and threatened populations in others. Sea otters currently have stable populations in parts of Russia's eastern coast, Alaska, British Columbia, Washington and California, with reports of recolonizations in Mexico and Japan.

Population estimates made between 2004 and 2007 give a worldwide total of approximately 107,000 sea otters. ■

SEA OTTER POPULATION

The sea otter population is thought to have once been 150,000 to 300,000, stretching in an arc across the North Pacific from northern Japan to the central Baja California Peninsula in Mexico. The fur trade that began in the 1740s reduced the sea otter's numbers to an estimated 1,000 to 2,000 members in 13 colonies.

In about two-thirds of its former range, the species is at varying

Sea otters bounce back but fall prey to great white sharks



"MIKE" MICHAEL L. BAIRD / CC BY 2.0

When?

Sea otters were being bitten more frequently in the summer, around the time adult sharks come closer to shore before moving on to seal rookeries.

Why?

White shark population growth, and particularly increases in the proportion of juvenile white sharks, could be a factor. Reduced juvenile mortality due to the California gillnet ban of 1994 likely has resulted in stronger juvenile cohorts and as immature sharks have no social learning and are less experienced in distinguishing targets, juvenile white sharks may simply target the wrong surface prey. It may also simply be down to the population growth of white shark prey (pinnipeds, cetaceans), and a corresponding population increase in white sharks resulting in far more interactions. ■

SOURCE: ECOLOGY AND EVOLUTION

Update On Diving Medicine

**Socorro, Mexico:
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Gary Rose, MD, Tour Leader
Nautilus Belle Amie, Dive Operator

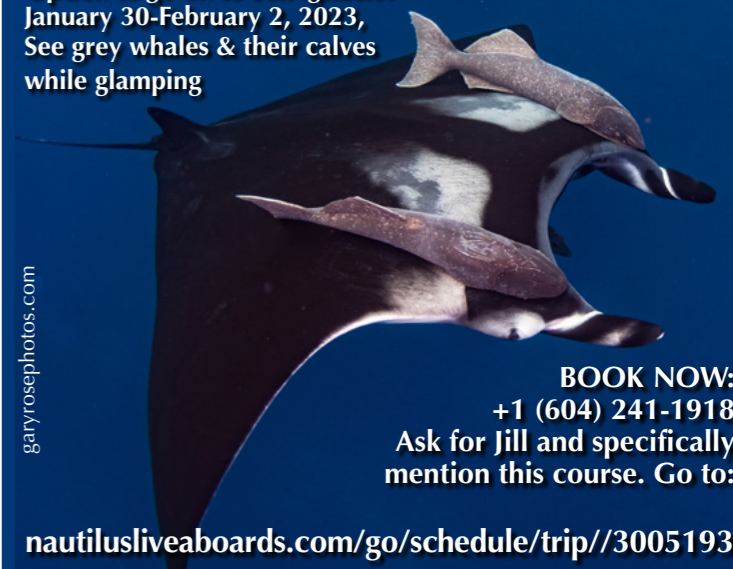
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marine mammals

Text by Peter Symes



Feeding aggregation of around 70 fin whales encountered during RV *Polarstern* expedition in 2018

Groups of fin whales spotted in Antarctic, suggesting recovery after whaling

Scientists have seen fin whales in massive numbers feeding near their ancestral hunting grounds of Elephant Island in the Antarctic.

Fin whales (*Balaenoptera physalus quoyi*) of the Southern Hemisphere were brought to near extinction by 20th-century industrial whaling. For decades, they had all but disappeared from previously highly frequented feeding grounds in Antarctic waters. Researchers estimate that by the time whaling was banned in the 1970s, over 700,000 fin whales

had been killed.

New surveys now confirm their return to ancestral feeding grounds, gathering at the Antarctic Peninsula in large aggregations to feed. All aggregations during two expeditions in 2018 and 2019 were recorded at the northern coast of Elephant Island.

A team of scientists led by University of Hamburg's Helena Herr spotted over 100 groups of southern fin whales during the two expeditions, the research states. The team has just published the results of an abundance survey and presented the first scientific documentation of large fin whale

feeding aggregations at Elephant Island, Antarctica, including the first-ever video documentation.

Recovering population

The researchers interpret high densities, re-establishment of historical behaviours and the return to ancestral feeding grounds as signs of a recovering population.

The recovery of fin whales in that area could thus restore ecosystem functions crucial for atmospheric carbon regulation in the world's most important ocean region for the uptake of anthropogenic CO₂. ■

SOURCE: SCIENTIFIC REPORTS

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Edited by Peter Symes



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The great hammerhead (*Sphyrna mokarran*) is the largest species of hammerhead shark.

Petition to protect great hammerhead sharks

The great hammerhead shark is categorized as “critically endangered” by the International Union for Conservation of Nature. That’s the designation just before “Extinct in the Wild.” The species is highly threatened with extinction.

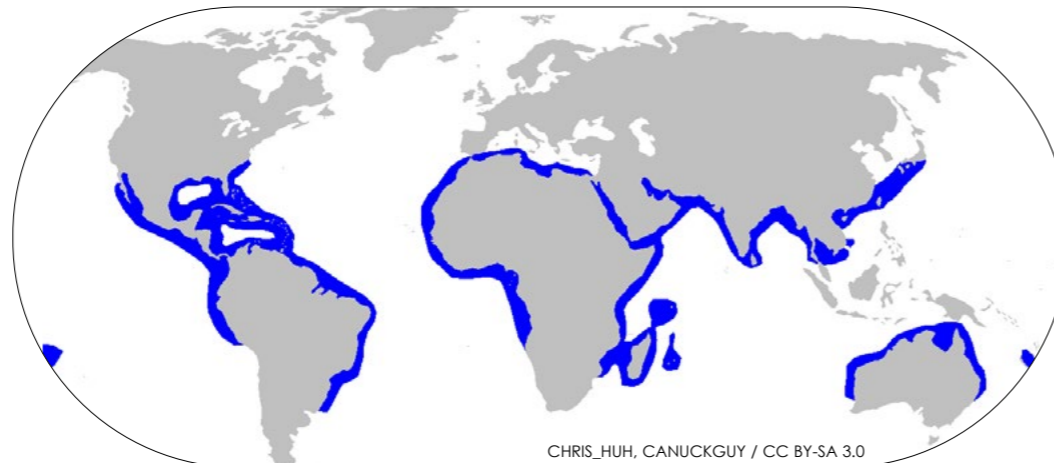
eral help,” said Emily Jeffers, an attorney with the Center for Biological Diversity. “They’re being slaughtered for their fins and killed in great numbers by gillnets and other fishing gear. With Endangered Species Act protections, we can ensure the next generation will see these amazing creatures in the wild.

Great hammerheads won’t be around much longer unless we act now.”

The great hammerhead inhabits tropical waters around the world, between the latitudes of 40°N and 37°S. ■ SOURCE: CENTER FOR BIOLOGICAL DIVERSITY

To that end, the Center for Biological Diversity has submitted a petition urging the National Marine Fisheries Service to protect the great hammerhead shark under the Endangered Species Act.

“Great hammerheads are magnificent, but these huge, iconic animals desperately need fed-



CHRIS_HUH, CANUCKGUY / CC BY-SA 3.0

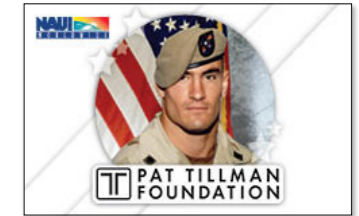
Distribution map of great hammerhead sharks

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HEAD OVER TO LEARN MORE



Gregory Borodiansky diving his Generic Breathing Machine (GBM), a front-mounted rebreather he invented (right); The most recent GBM configuration (center); Detail of the single button needle valve oxygen control block (bottom right)



The Generic Breathing Machine

— Front-Mounted Rebreather Innovation

Text by Larry Cohen
Photos by Larry Cohen,
Olga Torrey and Gregory
Borodiansky

Technical diving instructor and inventor Gregory Borodiansky is qualified to dive 20 different rebreathers. He is also a rebreather instructor on many units and a rebreather instructor trainer. Since Borodiansky has a background in electronic engineering and computer science, he took the features he liked on each unit and designed a front-mounted rebreather. Larry Cohen reports.

Borodiansky's philosophy is to make rebreather diving more like diving open circuit. Open circuit divers do not need to be trained on each brand of regulators, so if a diver is certified on any rebreather, they can

dive on Borodiansky's Generic Breathing Machine (GBM). The GBM does not have a solenoid to control the amount of oxygen injected into the loop. Instead, it has an adjustable needle valve that does not need to be calibrated with a regulator. Divers wear the rebreather on the front of their bodies. It is so tiny that the diver will not even notice it is there. It is like the pouch a kangaroo has for its baby.

The oxygen bottle can be

attached to the bottom of the rebreather or carried off-board. The diluent gas bottle is carried off-board. Because of the GBM's size and simple operation, it can be used as a backup rebreather for extremely deep or long dives.

Electronics
The electronics has an interesting design. There are two sensor modules.



GREGORY BORODIANSKY



OLGA TORREY

Diving Dutch Springs in Pennsylvania, USA. The GBM is extremely small.

an AK4 four-pin cable designed for marine electronics. It is possible to disconnect and change computers without causing a flood.

Borodiansky has been diving and improving the GBM for the past several years. He has been diving the GBM on wrecks as deep as 100m (330ft) and using it in caves.

Once he has the GBM certified by a training agency, it will be offered to the technical diving community. ■



LARRY COHEN

To light the cuttlefish correctly, my strobes were pulled in close to my housing.

Text and photos by Kate Jonker

One of the biggest challenges to using strobes in underwater photography is positioning. In this article, Kate Jonker offers six simple steps to better strobe positioning for wide-angle underwater photography.

The aim is to get you thinking about where you are putting your strobes and where the light is falling—and to encourage you to try it for yourself. Play around and see what works for you (and your subject)! It is the only way to learn.

I am going to assume you have two strobes, with two arms mounted onto two handles on either side of your housing and that you have a DSLR or mirrorless camera with a wide-angle lens behind a dome port, or a compact camera with a wide field of

view, and possibly even a wet wide-angle lens.

My go-to arm lengths are medium (21cm) attached to my handles, and then short (12cm), which attach to

the other end of my medium arms and my strobe.

These are my favourite steps to better wide-angle strobe positioning:

1. Keep your strobes well back

The single most important thing to remember is to keep the front of your strobes well back. This prevents “hot spots” caused by the light of your

strobes appearing in the top corners of your photo. It also helps to eliminate backscatter.

Keep the front of your strobes in line with (or slightly behind) the handles



Wide-Angle Lighting

— Six Simple Steps to Better Wide-Angle Strobe Positioning

Vertical shots are great in wide-angle underwater photography.

of your housing and point them straight forward. If there is lots of sediment in the water, turn them out ever so slightly (about 10 degrees outwards to the side).

2. Strobe power

I normally push up my strobe power quite a lot—sometimes to the maximum, especially if my subject is quite large and I must back off a bit to get it in the frame.

However, depending on your camera settings and the brightness (reflectiveness) of your subject, you might need to drop your strobe power to ensure you do not overexpose your subject. It is all about trial and error to see what strength of power works best with your subject.

If you find that you are getting a lot of backscatter in your photos, drop the strobe power a bit.

3. Strobe distance

Think about the beam of light that is coming out of your strobes. Where is it going to fall? It is cone-shaped and starts off narrow and gets wider, the farther away it travels from your strobes.

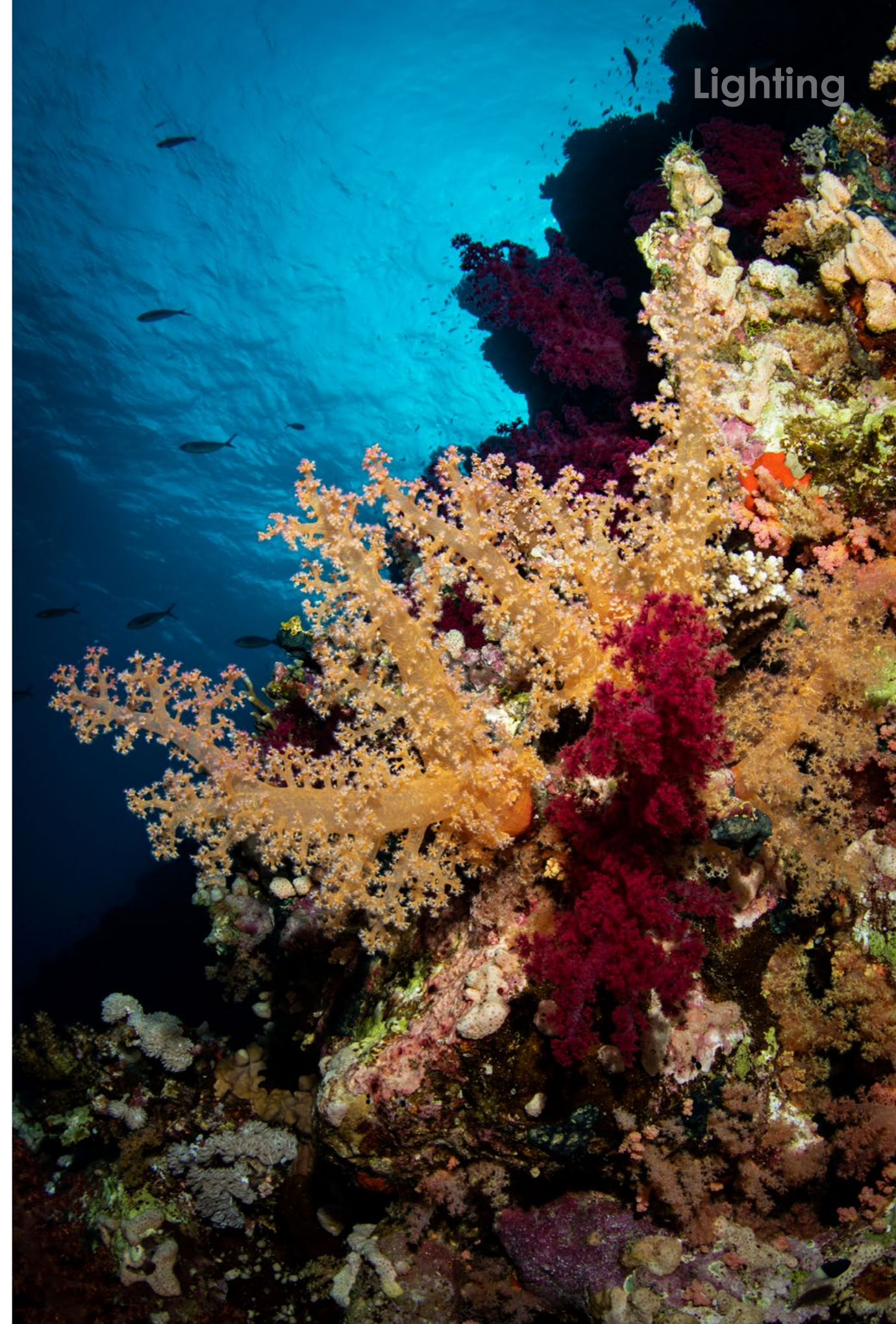
To light up your subject, you want to be sure that those beams meet in the middle, and only very slightly before where they hit your subject. If they do not meet, you will

have a dark area in the centre of your photo. If they overlap too far forward of your subject, you will light the particles in the water between your subject and your camera and the result will be backscatter.

The general rule here is the farther you are from your subject, the farther sideways (away from the handles) you need to move the strobes. In fact, the distance from your port to your subject should be equal to the distance your strobe



If you are unable to light the entire reef, focus on a subject and use the rest of the reef to add contrast and depth to the image.



I used long strobe arms to light this huge sea fan.

is from the centre point of your lens. When lighting huge reef scenes, I use longer arms (31cm) together with my medium arms (21cm) so that I can really push out my strobes.

4. Get close

The reason we use a wide-angle or fisheye lens is to get as close to our subject as possible to light it well. The closer you are to your subject, the better your lighting will be. If you are too far away, your beam will not reach your subject, no matter how much power you blast at it. If you are shooting a big reef or wreck, choose the most photogenic part and light that. You can always use the part that is unlit as a silhouette to add depth to your image.

5. Standard positioning

The standard positioning for wide-angle lighting is to have your strobes on either side of your housing in the 9 o'clock and 3 o'clock position. This is useful for most scenarios, smaller subjects, and divers. If you



find you are lighting too much of the reef or sea floor below your subject, lift your strobes higher to a 10 o'clock and 2 o'clock position.

6. Angle to your subject

For the best lighting, you need to hit your subject with enough light for it to be lit evenly throughout. The easi-

est way to do this is to choose a subject that is completely parallel to your camera. If you are taking the photo with your camera horizontal (land-

scape), you will easily light up the entire subject without having to adjust the power of either of your strobes.

Sadly, not many reefs are

as thoughtful as this, and you may find you will need to push down the power of your strobe closer to the reef or push up the power of your strobe that



Typical 9 o'clock and 3 o'clock strobe positioning



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is farther from the reef (do not push your strobe forward!).

Similarly, if you are taking a photo holding your camera vertically (portrait), keep the strobes at the 9 o'clock and 3 o'clock positioning but drop the power of your strobe now at the bottom so that it does not give an unnatural-looking upwards lighting effect.

Bonus Tip

Remember to keep reviewing your photos in your viewfinder. Zoom in to check either side of the screen for backscatter and reposition your strobes to help prevent this or adjust the strength of your strobes to get the right amount of light on your subject.

Underwater photography, and especially lighting, takes a lot of practice. It does get easier once you understand where and how the light falls, and the amount of strobe power you need to use. Persevere, and your hard work will be rewarded! ■

Kate Jonker is an underwater photographer and dive writer, underwater photography instructor, dive guide and dive boat skipper based in South Africa who leads dive trips across the globe. For more information regarding diving and underwater photography in Cape Town, divers are welcome to find her at: katejonker.com.



Strobes can really make the colours pop in underwater photography.



Ikelite housing for the OM System OM-1

Ikelite has released its housing for the OM System OM-1 Micro Four Thirds mirrorless camera. The housing is built around the company's Dry Lock Micro (DLM) port system and features an ABS-PC body in transparent back, an ergonomically designed shutter release (which can be optionally extended), and the option to add a TTL converter for automatic exposure when using compatible DS-series strobes. The OM-1 housing is depth-rated to 60m. It weighs 2.9 lbs (1,322g) with the dimensions of 7.5 x 5.75 x 5.875in (190 x 146 x 149mm). [Ikelite.com](http://ikelite.com)



Megadap ETZ21 Sony E-Mount to Nikon Z-Mount lens adapter

The newly released Megadap ETZ21 is an updated version of the ETZ11. Like its predecessor, the adapter supports both APS-C and full-frame Nikon Z mirrorless models, including the Z fc, Z50, Z5, Z6, Z7, Z6 II, Z7 II, and Z9. The adapter supports in-body image stabilisation, in-lens vibration reduction, aperture rings, real-time and face, eye and animal detection AF in all focus modes. The bayonet mount is now made of stainless steel (instead of aluminum). Like the ETZ11, the ETZ21 ships with a special clip-on cable for firmware updates via USB. Megadap.net



Panasonic GH6 firmware update

The update allows users to record ProRes RAW in DCI 4K at 120p as well as 5.7K at 60p via the Atomos Ninja V+. Underwater videographers who are shooting with anamorphic lenses get ProRes RAW 4:3 in 4.4K at up to 60p and 5.8K at up to 30p with the Ninja V+. The new firmware also adds support for internal ProRes 422 and ProRes 422 HQ recording in DCI 4K and Full HD at up to 60p, in addition to the current 5.7K options. The new firmware version 2.0 for the Lumix GH6 is available for free download at the Lumix Global website. Panasonic.com



Canon 15-30mm RF-mount ultra-wide lens

Canon has announced a new RF-mount ultra-wide zoom lens—the RF 15-30mm f/4.5-6.3 IS STM. The lens, being priced in the lower segment, complements the existing RF 14-35mm f/4L IS USM and RF 15-35mm f/2.8L IS USM, which are both pro-level lenses. The new lens weighs only 0.9lbs (390g). The 15-30mm lens uses a seven-blade aperture diaphragm and is constructed using 13 elements in 11 groups, including two ultra-low dispersion elements and an aspherical element. It has a minimum focusing distance of 11in (28cm) throughout the focal range when using AF; when using the manual focus at 15mm, it can focus as close as 5.1in (13cm). The lens features optical image stabilisation and has a 67mm front filter thread. The RF 15-30mm f/4.5-6.3 IS STM will be available in late August 2022. Canon.com

Nikon Z 30 mirrorless camera

Nikon has released its APS-C size/DX-format Nikon Z 30 mirrorless camera. The Z 30 features the smallest (128 x 74 x 60mm) and lightest (405g) body among the Nikon Z series models, as well as a vari-angle LCD monitor, a REC lamp for instant alert of recording, and up to 125 minutes of recording with the same EXPEED 6 image-processing engine used in the Nikon Z7. In addition, the Z 30 is designed for beginner-friendly video recording, featuring various presets, 4K UHD/30p video, and slow-motion video. It is equipped with a 20.9 MP APS-C sized sensor and the EXPEED 7 image-processing engine. It offers 4K at 30p without crop and full HD at 120p. All DX-format and FX-format NIKKOR Z lenses are available with the Z 30. Nikon.com



processing engine used in the Nikon Z7. In addition, the Z 30 is designed for beginner-friendly video recording, featuring various presets, 4K UHD/30p video, and slow-motion video. It is equipped with a 20.9 MP APS-C sized sensor and the EXPEED 7 image-processing engine. It offers 4K at 30p without crop and full HD at 120p. All DX-format and FX-format NIKKOR Z lenses are available with the Z 30. Nikon.com

The Making of an UW Video Lorenzo Moscia

— Videographer, Video Editor & Music Composer

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Looking at his body of work in image-making, Lorenzo Moscia appears to be what some might call a “triple-threat”—he is a photographer/videographer, composer and video editor. Not to mention, he is also a professional international photojournalist and investigative reporter (armed with a law degree), as well as a technical diver. *X-Ray Mag* interviewed Moscia to learn more about his recent video, *Underwater World*, his creative process and his perspectives.

Interview by G. Symes
Edited by Scott Bennett
Photos courtesy of Lorenzo Moscia
Screenshots courtesy of Lorenzo Moscia

X-RAY MAG: Please tell us about yourself and how you got into underwater videography.

LM: Creating videos has always been a passion of mine. I have memories of myself using a video camera at age 13, and cousins and friends were recruited to act for the camera. Afterwards, I enjoyed the editing process, using two VHS recorders. Music also came into my life around

that age. I used a keyboard to compose the soundtracks of those short videos. I was self-taught across the board. My parents enrolled me in piano lessons for a few months, but it did not produce the desired result of me entering the Conservatory of Music in Rome. I opted to study law, which was per-





Screenshots from Lorenzo Moscia's video *Underwater World* (left and below); Lorenzo Moscia (centre)

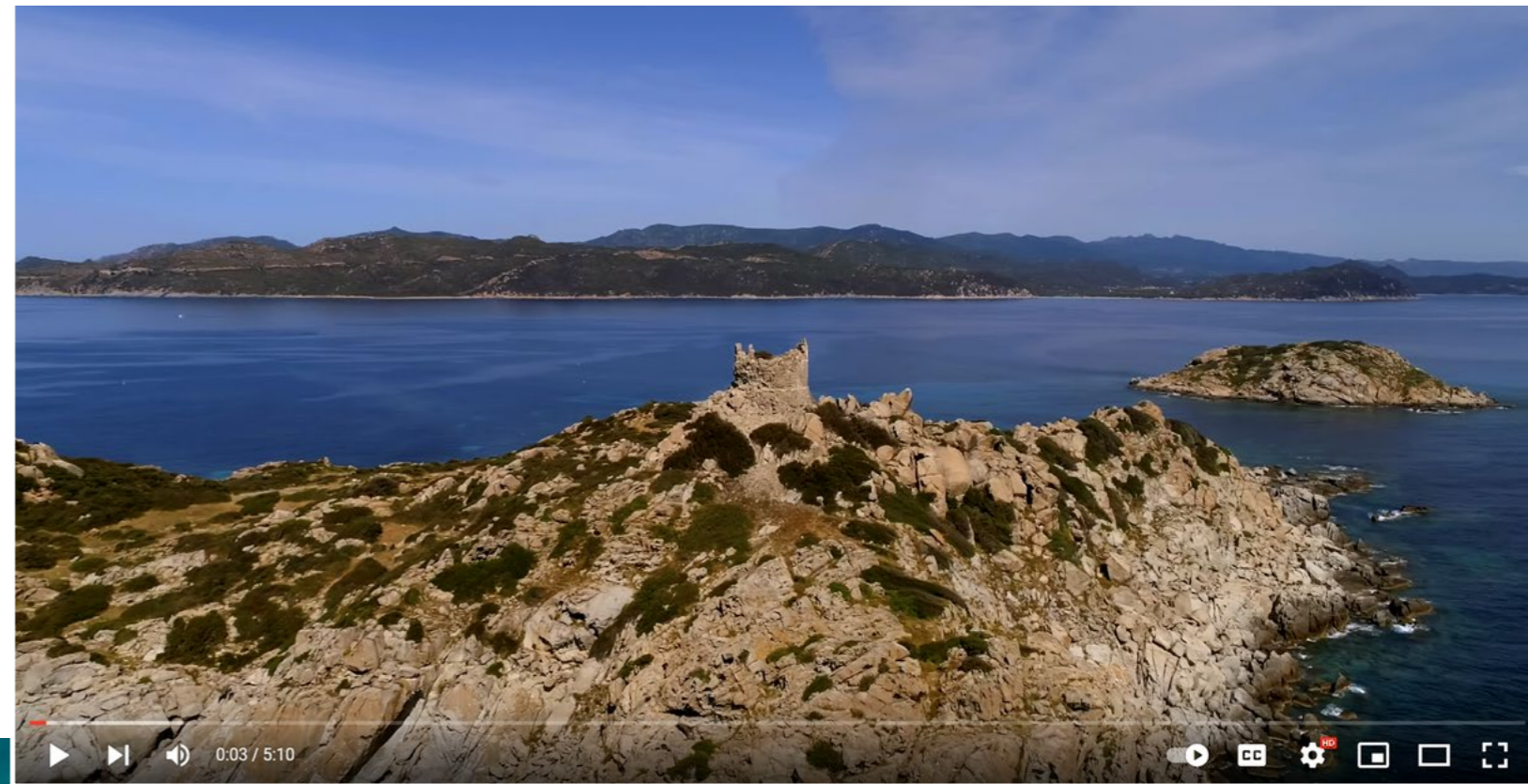


PHOTO COURTESY OF LORENZO MOSCIA

haps a choice more dictated by a series of exclusions rather than any real conviction. I got my degree and practised as a divorce lawyer for two years.

During a vacation in Chile, I discovered a passion for photography and stayed with a small local community on Easter Island for a few weeks. Upon returning to Rome, I discovered that only two of my photos were decently exposed, out of the twenty or so rolls of film I had taken. The photos then fell into the hands of a journalist friend, who suggested that I write an article and try to publish it. I was lucky and received my first payment after publication.

I decided to return to Easter Island to deepen my photographic reporting. The result was an exhibition in Santiago de Chile, financed by the Italian Embassy, as well as a book of photographs.

I decided to give up my profession as a divorce lawyer and stayed in Chile, where I

collaborated with international agencies and magazines, both Chilean and foreign, and specialised in long-term investigative assignments.

Rather than just following a news story, I was dedicated to exploring a specific social reality, using my photos to convey an intimate and somehow poetic story.

My work philosophy was to consider every social group as a kind of tribe—be it a platoon of the Chilean army stationed in Haiti during the civil war, a police patrol controlling the streets of Santiago de Chile, or a group of criminals running a favela in Rio de Janeiro, I must try to fit in and be accepted. Only then could I take out my camera and start shooting.

Diving started to enter my life while I was in Chile, obviously on Easter Island, but also while on assignments in the deep south of the country. Then, in a photo contest, I won a Nikonos 5, an underwater camera that I started using during a series

of dives in volcanic locations. It was exciting to be able to shoot underwater.

I used to go with a local expert diver who often worked with the police to find bodies in rivers and lakes. He had recovered a huge number of corpses and helped give a face and a burial to the *desaparecidos* after the end of Pinochet's military regime. He allowed me to use the tanks without a licence if I gave him the best shots.

very narrow field of view, which was inadequate for panoramic images. You had to focus manually, using the distance scale markings on the focus ring positioned on the front. The ISO was, of course, fixed, and I did not invest in a strobe; in short, techniques I was accustomed to using on land required a greater degree of effort underwater.

All of this discouraged me from going further into underwater photography. So, I sold the Nikonos 5, a decision I still regret to this day!

Nevertheless, diving always remained in the back of my mind for the next 13 to 15 years. When I came across a documentary or a book of underwater photography, I was always fascinated, leafing through it for hours.

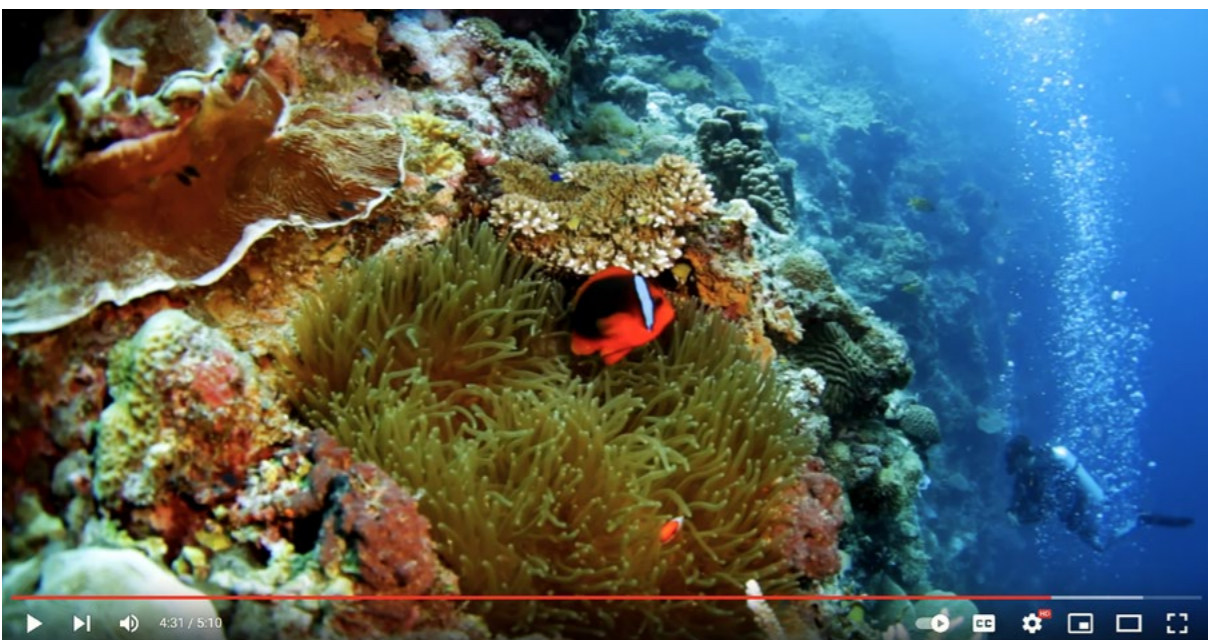
It was not until the summer of 2016, while working for Greenpeace on the Italian island of Pantelleria, contemplating the crystal-clear waters

while snorkelling, that I finally said to myself, "Enough!" I vowed to get serious about studying scuba diving, taking at least the first certification and starting to dive properly, as well as finding the best and most secure way to bring my camera underwater.

X-RAY MAG: *What equipment and gear do you use underwater?*

LM: My investment in diving has been slow, thoughtful, and preceded by careful analysis, but not without anxiety. With three children and the lack of a steady salary that comes with freelance photography, every penny counts.

My first housing for my Canon 6D camera was from an Italian company called NiMar. It was made of plexiglass, with a dome for the 16.35 f/2.8 lens. It was the most economical serious camera I could find on the market.



switch to an aluminium housing, as the buttons on the plexiglass case had disappointed me on numerous occasions, especially at depths over 30 metres. After exploring various alternatives, I decided on a Nauticam housing, considering that near my house in Rome was Pietro Cremonese, an excellent underwater photographer and Nauticam representative. This guaranteed me assistance and immediate maintenance as well as excellent access to buy and sell used equipment. Pietro is a great advisor and teacher who does not skimp on advice and tips for shooting underwater.

As one of my primary employers is Greenpeace, I also decided to invest in a camera body in order to deliver optimum footage.

The days when you could say that the camera is merely a tool, and all you need is your heart and head to take good pictures, are over. Please do not get me wrong; the eye and experience, the brain, the heart and intuition, are always the basis for good photography. However, there are cameras on the market that are

able to shoot 4 or 8k at 120 frames, are super-stabilised and possess a dynamic range that allows one to capture every detail and colour. Obviously, the camera is not the photographer, but a good camera certainly helps to deliver the best possible product to the client.

I have been very happy with my Canon 5D Mark IV camera and would not have switched to the R5 if it had not been for the considerable leap in technology and enhancement that the R5 offered. Now, I use an R5 with an 8-15mm 2.8 lens. This lens will very likely be replaced by my 16-35mm f/2.8 lens because, especially in shooting video, it is a great tool that helps one avoid the rounded lines in shots, which are typical with a fisheye lens. At 35mm, it is a good compromise, in which one may avoid having to mount a macro lens directly onto the camera.

I am not a big fan of macro, as it has never been part of my world as a topside photographer for over 20 years. Learning how to use it properly requires time for me, but

Screenshots of marine life scenes in Lorenzo Moscia's video *Underwater World* (top left, top right and left)



LORENZO MOSCIA
PHOTOGRAPHER
lorenzomoscia.com

In the summer of 2016, I got my Open Water certificate with a 60-year-old Italian instructor, who was described by the local diving community as a worthy representative of the "old school." Ettore loved to teach the hard way. While underwater, he would take off my mask without warning, close my tanks or rip off my regulator. On the other hand, his passion for the sea, his toughness and generosity will be

with me forever.

In September 2016, I was in California for an assignment and decided to fly to Hawaii where I could stay for free at a friend's house on the Big Island. Even though I had my dive certificate with me, I was not confident enough, but I did use the housing while snorkelling, just to get familiar with the controls.

In 2018, after getting the SSI Deep Diving certification, I decided to

photo & video



including some macro images in an assignment (reportage) with a lot of wide-angle shots helps to create variety in the final product.

I also have two lights with 15,000 lumens (the manufacturers say), which I use for both video and still photography. And I recently bought a Sea&Sea YS-D3 strobe.

Working with different NGOs (non-governmental organisations) around the world in the years before the coronavirus pandemic, I was able to take advantage of the opportunity to dive in the sea where my work would take me. I got to know the Andaman Sea in Thailand, and the reefs in the Philippines as well as Mexico.

In the Marshall Islands, I was able to appreciate the beauty of the Pacific Ocean, but without oxygen cylinders, as the American army at the military base in the area had exclusive use of air and gasses. However, snorkelling with the locals was incredible. During



these trips abroad, the mini dome port for my 8-15mm camera lens proved incredibly handy.

My dive equipment was also bought in small steps. I started with a Cressi Ice 7mm semi-dry suit, and a year later, I added my first BCD (stab jacket) from the Rome-based company called Ugly Fish, two Scubapro MK17 first stages and two Scubapro S620 Ti second stages. Recently, thanks to a twin 10-litre tank recently given to me by my brother-in-law,

I got another BCD with larger capacity from DiveSystem, a company based in Tuscany, and a wetsuit.

X-RAY MAG: You edit and produce your own videos. How did you become a video editor?

LM: I have always been passionate about video editing and filming. While I lived in Chile, I started working with Avid video editing software. I then switched to Final Cut, which I still use today, although I know that



DaVinci should be learnt, as it is more comprehensive. I do not consider myself a professional editor, but I am in the process of learning.

X-RAY MAG: What is your creative process in postproduction and what tools do you use?

LM: I am currently using Final Cut Pro X by Apple. Depending on the material and amount of time I have to edit, I follow different creative processes. For example, I found some tapes I had shot during my coverage of the war

in Libya in 2011. They were about ten hours long, and so I made a 45-minute montage that tells the story of those days—a sort of travel diary of the war.

I never write a script; the editing is done visually, by watching the clips and starting to build small stories that I then weave into a sequence, which I can only finally approve when I see the images again after letting them “rest” for a while.

For underwater videos, I try to take off with the music, to get away from any formula or sequence that I may have been following for too long; I want to try to innovate in my next releases. It starts with the trip by boat or dinghy, the preparation, some panoramic shots of the dive site and then the descent.

From a photographic point of view, I have always tried to focus on the group of divers who wander through an underwater landscape. Maybe it is a legacy of my passion for street photography, so let's say, I try to bring underwater street photography into

photo & video



my videos, where there is a lot of improvisation.

When I have specific requests, it is a different story. When I documented the “Mare Caldo” (Hot Sea Water) project for Greenpeace, I dived with marine biologists who set up and collected sea water temperature sensors, which would provide a graph of rising sea temperatures. In this case, I was focused on creating images that could convey the message of that action, as well as include images of divers unfurling a banner or sign containing a specific message. Depending on the client's requirements, I try to provide material that is either finished or may need to be edited a step further.

X-RAY MAG: Please tell us how you became a composer.

LM: Playing the piano has always been a fundamental

part of my life, as an escape valve from stress. After the failure of my classical studies as a pianist, I studied jazz for a couple of years, where the maniacal reading of sheet music was replaced by improvisation on a chord scale. It was paradise.

I started composing around the age of 12, and between the ages of 17 and 25, I played in various bands in Rome. With one band, we played all my own compositions and those of the singer's. It was a joy experiencing the creative process alone or together with the other band members. Over the years, I wrote various pieces both with and without lyrics, recorded with makeshift cassette players or sometimes even in recording studios.

X-RAY MAG: The soundtrack of your latest work is an original score you composed yourself. What was your inspiration?

What came first, the music or the imagery?

LM: The piece I composed for the video, “Underwater World,” came out of the blue, with a very simple chord progression. There is an alternation between minor and major chords, which is repeated until it leads to a progression of minor and diminished chords. My inspiration for this soundtrack came from the late '90s electronic music of Massive Attack and Thievery Corporation, who used piano with a hip-hop drum base, and chamber instruments.

For this project, I wanted to create a slightly chilled-out sound, but it turned out darker and more melancholic. That is why I added the video segments of plastic pollution in the sea. It was a choice dictated by the music, rather than by cold planning. The progression

of dramatic and sad chords, which come just before the midpoint of the video, recall the images that justify this heavy atmosphere.

My initial idea was to create a video that would take stock of my diving activities over the last few years—a kind of pres-

entation or showreel to say, “This is what I did, and what I saw.” But during the production of it, I realised that I wanted it to have a message testifying to the importance of the aquatic world and its beauty, which is impressed upon those who visit it. Some swim in it, like the

Italian team of divers and swimmers, while others use it as a means of survival, like the freedivers of the Marshall Islands.

The sea can also be a source of ruin and destruction, transforming itself, through no fault but our own, into a large garbage dump. It can then





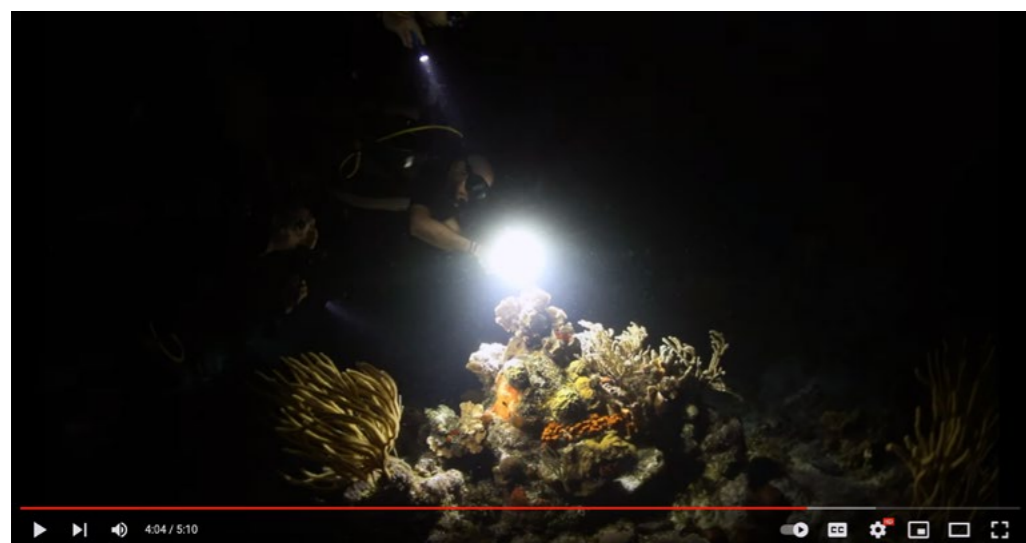
LORENZO MOSCIA



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Screenshots from Lorenzo Moscia's video, *Underwater World* (top left, centre and far left); Greenpeace's expedition vessel (above); Alonso Muñoz with Greenpeace (right)



take revenge on us, by returning our garbage with monstrous and deadly tsunamis, as I saw in the Philippines.

that we used for a few minutes will still be in the sea, slowly decaying and clogging up the lungs of a sea turtle.

Disposable plastic is a completely superfluous element that should be eliminated on a global level. I am not talking about eliminating plastic in its entirety, but we should start by eliminating single-use plastics, which are only used once before ending up in the sea and degrading into microplastics. When we are nothing but dust in the earth, that straw

I do not agree with blaming this situation entirely on consumers. For example, a well-known brewery has just started selling beer in 33cl plastic bottles. In doing this, the profit is considerably more, since the weight of a case of plastic beer bottles is one-fifth of that in glass. What is the point in making a single mother feel guilty when she buys dispos-

able plastic items in order to save money to celebrate her son's birthday when a multi-billion-dollar brewery sends cases of plastic bottles around the world?

X-RAY MAG: *What advice do you have for others who want to get into underwater videography?*

LM: I still consider myself an apprentice, so I can give good advice to those who want to enter this profession. First and foremost, you need to have the confidence to stay underwater. For video, stability is fundamental in creating smooth images that are comparable to those of a drone surveying the landscape from a mountain top.

For approaching fish, having a closed-circuit system that does not produce bubbles is a big step. Trying to tell a story is fascinating, but also very challenging. Returning to the same dive site is very useful. I think the next challenge for me is to be able to tell the story of wrecks even at great depths, which are still perfectly preserved today.

X-RAY MAG: *What is your next project, course or event?*

LM: I just finished the postproduction of a documentary, which has nothing to do with the sea. It is of the last interview with Gerry Conlon, which I had the honour of being able to make shortly before he died.

Gerry, whose story inspired the film *In the Name of the Father*, spent 15 years in prison for a crime he did not commit. Filming the whole documentary and editing it took over seven years, and now, we are close to showing it to the public.

In addition, I am studying for a second technical diving certificate to get down to 50 metres, using nitrox gas to ease decompression times on the way up. I must say that studying scuba diving and delving into the underwater world has saved me from guaranteed depression during the Covid-19 pandemic. ■

To see the video, go to: **youtube.com**. The video



LORENZO MOSCIA / GREENPEACE

"Underwater World" and this interview is dedicated to Lorenzo Moscia's dear friend, Alonso Muñoz, with whom he worked on the Greenpeace ship in 2017. Muñoz was a sailor and divemaster with whom the author shared his underwater photos. In honour of his memory, Moscia said, "His comments and criticism pushed me forward."

For more information, please visit: **lorenzomoscia.com**



Setsuo Hamanaka



P O R T F O L I O



Bigeyes, 65.2 x 90cm, oil on canvas (right) and *Blue and Yellow*, blue marlin and dolphinfish, 65 x 90cm, oil on canvas (previous page) by Setsuo Hamanaka

Interview edited by G. Symes and Catherine GS Lim
All artwork and photos by Setsuo Hamanaka

Self-taught Japanese artist Setsuo Hamanaka creates beautiful, detailed and dynamic paintings of aquatic life in a variety of settings from the open ocean and mangroves to freshwater ponds and cityscapes. *X-Ray Mag* interviewed the artist to learn more about his creative process and what inspires him about the underwater realm.

Born in Yokohama in the '50s, Setsuo Hamanaka started out as a news photographer for the local daily newspaper. When he eventually became a freelance photojournalist, he began drawing illustrations for publications and soon created illustrations on commission for books and magazines. He then gravitated toward drawing illustrations for nature books and some fishing magazines, where he worked as a journalist.

His interest in fish has been important in his career and as a hobby, taking him to many locations around Japan and the world, including Saipan, Australia, Indonesia, the Maldives, Italy, Spain and the US coasts. With his



accumulated experiences, he started to create oil paintings of marine life, featuring both saltwater fish and freshwater species as well as their habitats and seascapes. In addition to

his artwork, he has worked on conservation projects in the Galapagos Islands to reduce illegal fishing and overfishing and in Japan to revive eelgrass meadows in Tokyo Bay.



Field Work in the Eelgrass Meadow, 65 x 45cm, oil on canvas by Setsuo Hamanaka

Cradle, eelgrass, 41 x 65cm, oil on canvas by Setsuo Hamanaka



X-RAY MAG: *Why marine life and underwater themes? How did you come to these themes and how did you develop your style of painting?*

SH: I am a self-taught artist. I was interested in technical and science illustration when I was a student. My experience as a

press photographer gave me a good foundation for this type of illustration and nature art.

There is a lot of good fieldwork involved in working for fishing magazines. So, I learned ichthyology and was fascinated by the sea, fishes and their environment.

X-RAY MAG: *Who or what has inspired you and your artwork and why?*

SH: I learned a lot from the artworks of European and North American nature artists. Stanley Meltzoff, Al Barnes and Don Ray gave me motivation to paint underwater

images. I was fortunate to meet Don Ray at an IGFA [International Game Fish Association] art show in 2005 and saw some of his original paintings.

X-RAY MAG: *What is your artistic method or creative process?*



Dive, manta rays, 38 x 45.5cm, oil on canvas (left) and June, rockbass, Lake Hopatcong, New Jersey, 100 x 65cm, oil on canvas (below) by Setsuo Hamanaka

Setsuo Hamanaka

dramatic stories and circumstances. I also love shallow waters and wetlands as I do not need to use scuba equipment there.

“Amamo Revival Collaboration in Kanazawa-Hakkei, Tokyo Bay Area”—to study Tokyo Bay and help promote environmental education.

X-RAY MAG: What is the message or experience you want viewers of your artwork to have or understand?

X-RAY MAG: What are your thoughts on ocean conservation and coral reef management and how does your artwork relate to these issues?

SH: I was born in Yokohama and now live in Yokosuka. Both are port towns on Tokyo Bay. I saw extensive water pollution in the bay as a child and now am seeing its recovery. There were many *amamo* (eelgrass) meadows on the coast of Tokyo Bay before I was born. Eelgrass fields hold a rich marine environment. Many juvenile fishes, squid, clams and other small creatures depend on the eelgrass meadow as a cradle or nursery, shelter or habitat for life. But now, only a few small patches are left in the bay because of industrialization in the Tokyo area.

Water pollution has been reduced by sewer improvements. People now understand that we need healthy ecology in the bay. However, there are still many problems like hypoxic water masses (dead zones), extinction of species and poor catch yields in commercial fishing, etc.

At first, I was interested in painting tropical fishes and coral reefs; now I observe my own local waters. I joined a local nonprofit organization—

SH: My fieldwork involves fishing trips and conservation research. As I used to be a photographer, I take many pictures, not only for research reports but also for my own reference. Sometimes, I keep my catch to study the anatomy, and to eat.

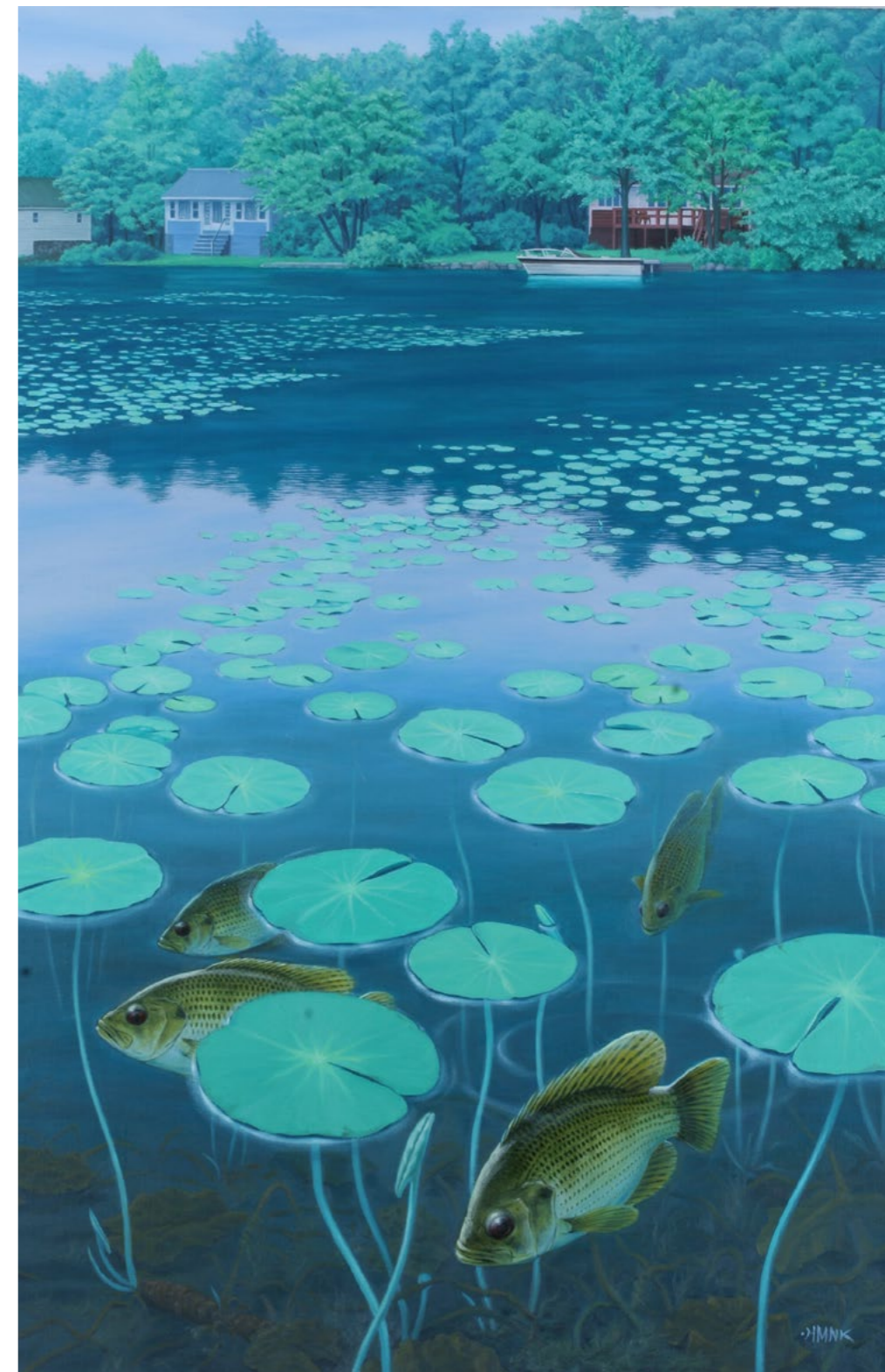
My medium is oil on canvas. I approach the creative process in an orthodox manner. I create many rough drawings in charcoal for the composition, small oil paintings for the color study, and then move on to a big canvas.

X-RAY MAG: What is your relationship to the underwater world and coral reefs? How have your experiences underwater influenced your art? In your relationship with reefs and the sea, where have you had your favorite experiences?

SH: I am not a scuba diver. Unfortunately, I have had a problem with my nose since childhood and cannot relieve ear pressure. Nonetheless, I visit many tropical seas and clear waters, not only to fish but also

as a fishing trip coordinator for television programs and as an ODA [official development assistance] expert.

I have seen and fished many species in their natural habitats, and met with local fishers. I have learned about the ecology of fish and their environment, and use this to inform my imagination and visualization of underwater images. You can watch footage from many underwater action cams these days. Still, an artist's imagination can create much better





Native and Aliens, black porgy and invasive species, 60 x 45cm, oil on canvas by Setsuo Hamanaka (below)

Setsuo Hamanaka



SH: From a small stream on a mountain to a big blue ocean, we are connected by water, my friends.

X-RAY MAG: What are the challenges or benefits of being an artist in the world today? Any thoughts or advice for aspiring artists in ocean arts?

SH: There are many ways to showcase your artwork these days. Besides exhibitions, you can also have your own website, blog or social media pages. But the most important thing for a nature artist is fieldwork. Whether it is scuba diving, fishing or conservation, get outside and feel the water to gain inspiration.

X-RAY MAG: How do people—adults and children—respond to your works?

SH: I had an exhibition at Tokyo Bay Festival, which was organized by the Ministry of Land, Infrastructure, Transport and Tourism some years ago. A father and a boy—maybe ten years old or so—stopped in front of

Mangrove Forest, barramundi, 100 x 65cm, oil on canvas by Setsuo Hamanaka





Yellow Frenzy, yellowtail, 34 x 41 cm, oil on canvas by Setsuo Hamanaka (left)

*Urban Life, suzuki (Japanese seabass, *Lateolabrax japonicus*) and sappa (*Herklotsichthys zunasi*)*, 65.2 x 50 cm, oil on canvas by Setsuo Hamanaka (right)

Streaks, African pompano, 27 x 41 cm, oil on canvas by Setsuo Hamanaka (below)



my artwork *Native and Aliens*. It was a painting of a native porgy in Tokyo Bay. The father began using hand gestures to teach his son how to fish a porgy. The boy was listening to his father with great interest and respect. It was a very lovely scene.

X-RAY MAG: *What are your upcoming projects, art courses or events?*

SH: Unfortunately, my art workshop had to be canceled because of Covid-19. So, no

events are planned right now. In the meantime, I am focusing on local subjects. I moved to Yokosuka six years ago. Yokosuka is located on the Miura Peninsula, with Tokyo Bay to the east and Sagami Bay to the west. There are many fishing villages on the peninsula and many people here work in inshore fishing and seaweed farming. I started to study them. Some have hard



days because of poor catch yields and global warming. But there are many interesting stories about the ecology, environment and traditional life here. ■

For more information or to purchase original artwork and limited edition prints, please visit the artist's website at: s-ham.com/index.html or artistsforconservation.org/artists/1356.