



GLOBAL EDITION
Sep / Oct 2020
Number 100

Tech
Wookey Hole

Indonesia
Lembah Strait

California
Channel Islands

Japan
Miyakojima

UW Photo
Retouching

Contributors' Picks
My Favorite Unusual Critter

I N D O N E S I A

Banda Sea

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X-RAY MAG is published by AquaScope Media ApS
Copenhagen, Denmark

www.xray-mag.com

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COVER PHOTO: *Detail of bull kelp, Channel Islands, California, USA*
by Frankie Grant (frankiegrant.com)

contents

Candy crab on soft coral, Lembeh Strait, Indonesia. Photo by Claudia Weber-Gebert.



12
INDONESIA'S
BANDA SEA
BY MATTHEW MEIER

58
JAPAN'S
MIYAKOJIMA
BY MARTIN VOELLER

columns...

68
SCUBA CONFIDENTIAL:
DEFENSIVE DIVING, PART I
BY SIMON PRIDMORE

26
MY FAVORITE
UNUSUAL CRITTER DIVE
CONTRIBUTORS' PICKS

74
DIVING THEN & NOW:
THE WOKEY HOLE CAVES
BY NIKOLOA VALTOSOVA

84
UW PHOTO:
RETOUCHING
BY RICO BESSERDICH

41
CALIFORNIA'S
CHANNEL ISLANDS
BY FRANKIE GRANT

78
POOL DIVING
ADVENTURE
BY LARRY COHEN

92
PORTFOLIO:
JOHN LAUTERMILCH
EDITED BY G. SYMES

48
INDONESIA'S
LEMBEH STRAIT
BY C. WEBER-GEBERT

82
ART INSPIRED BY
UNDERWATER IMAGES
BY OLGA TORREY

plus...
EDITORIAL 3
NEWS 4
WRECK RAP 6
TRAVEL NEWS 11
EQUIPMENT NEWS 67
BOOKS & MEDIA 71
MARINE MAMMALS 72
PHOTO NEWS 91

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Putting things into perspective

Blimey, we made it to our 100th issue. How did that happen? How did we make it here? Looking back over the past 17 years of the magazine, from the publication of our first issue to today, certainly puts many things into perspective—and what a journey it has been!

Thinking back to the early '00s, I recall how the Internet (and everything digital) was thought of by many in the dive industry as just another new fad, with a few practical uses such as email and some basic websites. Not many believed in a digital publication like ours, but we had a vision, which we pursued. We published the first issue before most of the present-day social media giants were even founded, and many years before they got to play a significant role in the media landscape.

The rest is history... but not quite. Surely, we have seen some ups and downs in the dive community. Crises have come and

gone; adversity has been faced and overcome.

Presently, the global dive community and industry is facing—without comparison—its biggest challenge yet, as the pandemic is forcing many operators to mothball or cease operations.

Last year, several of the business associates and industry colleagues with whom we have had dealings and built a personal relationship, over many years of attending countless dive shows and other events, began expressing that they looked forward to celebrating our 100th issue with us.

But I don't feel like celebrating. Not right now, at any rate—but perhaps later, once we hopefully get on the other side of the pandemic and dive operations can be revived.

The dive industry is not predominantly made up of big and well-capitalised brands—which we mostly find among equipment

manufacturers—but many smaller entities, managed by good, hardworking people, who now see their livelihoods and savings threatened. Many of these people we have got to know well and have made friendships with, some of which have lasted several decades.

The crisis and economic downturn is surely affecting us in dive media too, as there are probably not many in this industry who are left unscathed. But we will be all right.

My thoughts and concerns mostly go out to all those dive industry colleagues and associates who are now having a real fight on their hands to keep their operations together and make it through the pandemic.

A big thanks therefore goes out to all of you who have supported the dive operators by booking with them next season.

— Peter Symes
Publisher & Editor-in-Chief



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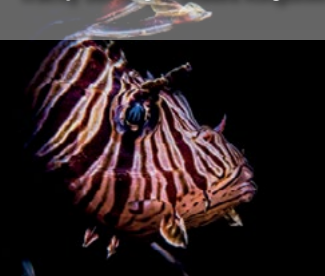
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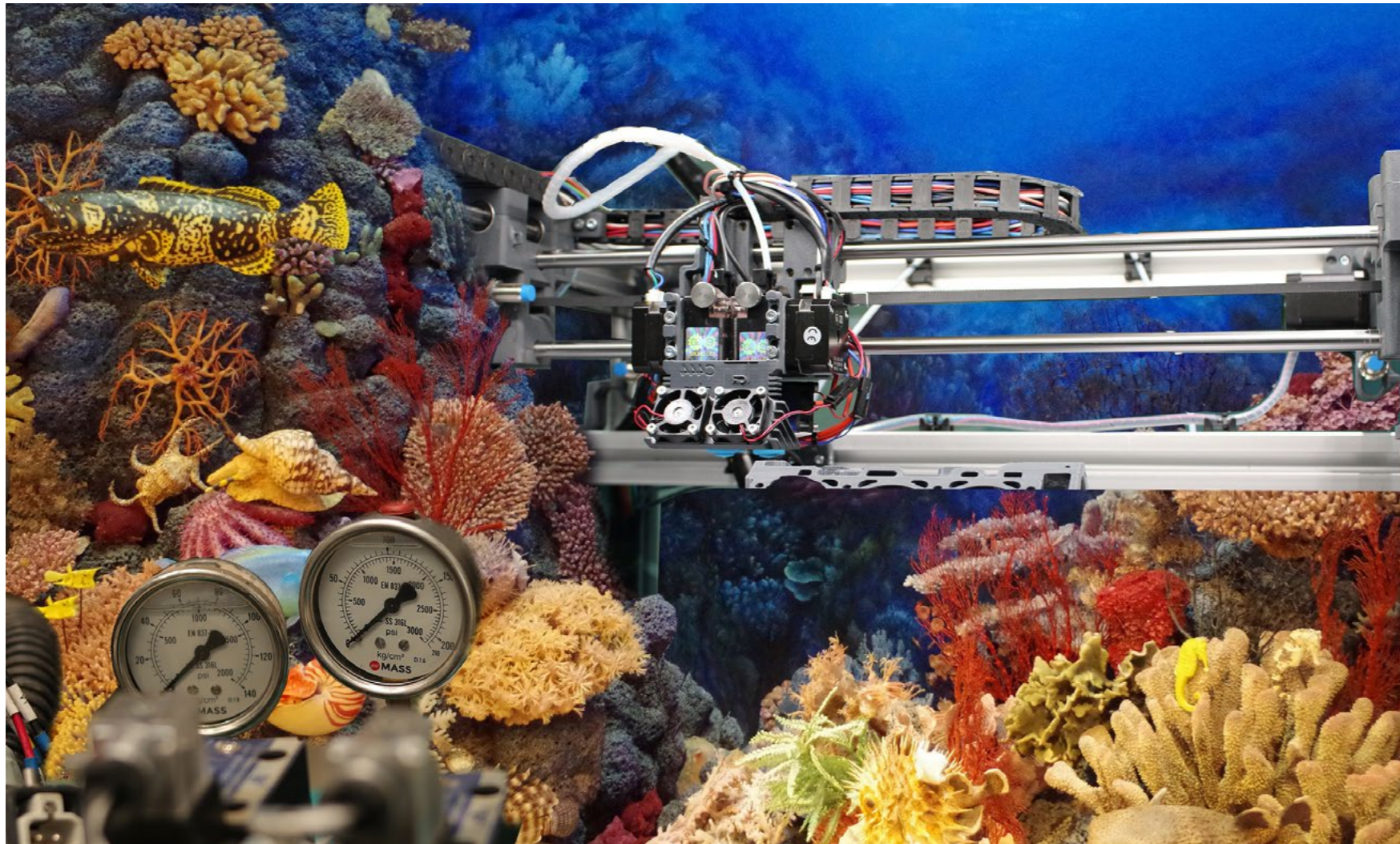
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Edited by
Peter Symes

from the deep NEWS



What if coral production could be automated? (Photo-illustration by Peter Symes, compiled with public domain images from Pixabay)

Can coral reefs be manufactured?

Researchers are developing a solution for dying reefs by using robotics and manufacturing techniques to help grow a million new corals each year.

Science is now so progressed that we are able to grow several types of human organs (or at least important components of them) and tissue engineered transplants have been a reality for a decade already. So, why not give 3D printing of corals a try?

Enter Coral Maker, a collaboration between the California Academy of Sciences and Autodesk. The group's goal is to use coral science and manufacturing technology to produce one million live corals per year by automating the coral production process,

more effectively restoring the ocean's declining coral population.

One of the main problems, or bottlenecks rather, with current restoration methods, such as coral gardening involving coral nurseries producing corals for reef restorations, is that the process is laborious, time consuming and is difficult to scale. Another bottleneck is slow coral growth rate.

To address these scaling issues, the Coral Maker team is combining science, manufacturing technology and traditional manufacturing techniques to mass produce live corals for reef restoration.

Press "print"

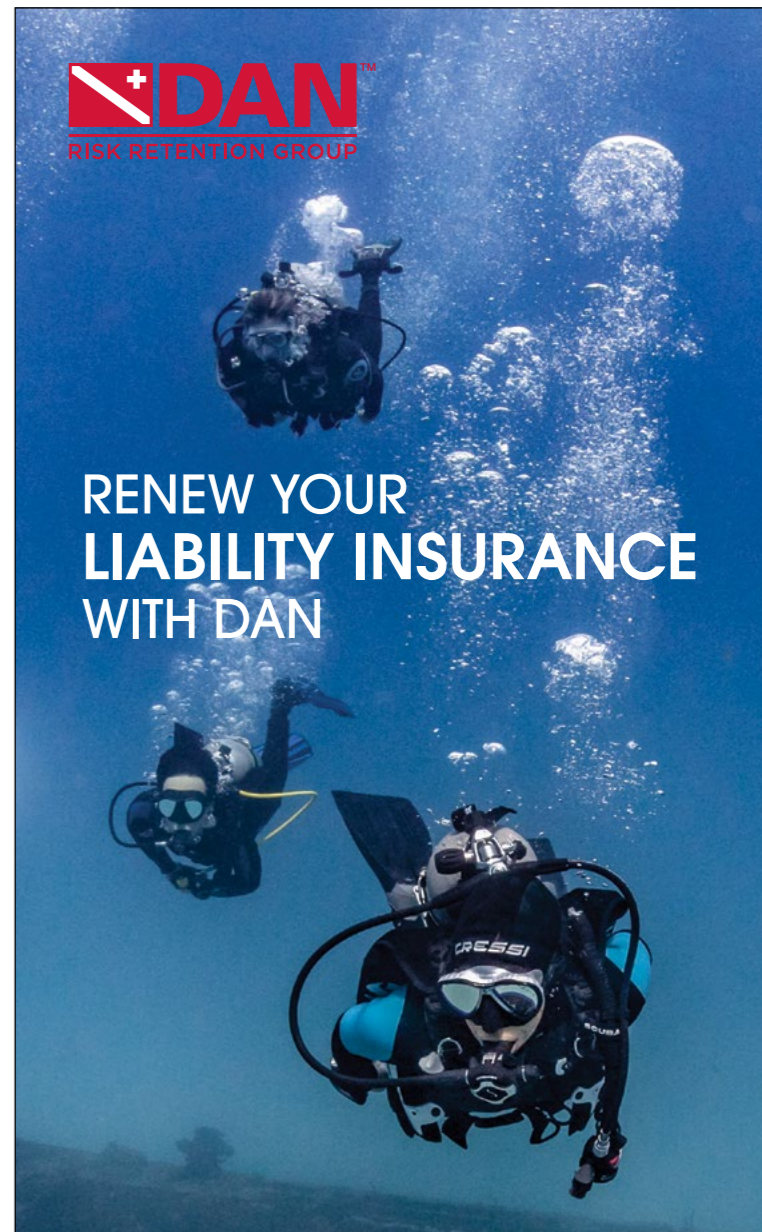
The team's idea is to design and mass-produce pre-made coral skeletons, with a dome-shaped base composed of stone material similar to corals' natural calcium carbonate skeletons. These skeletons are designed with built-in fittings for easy or automated seeding with live coral material. The coral "seeds" will then recolonize the pre-made skeleton with live material, achieving adult, habitat-forming size over months instead of years.

The seeding process, which is currently a repetitive, manual task, can be automated by using a robotic arm, which inserts seed plugs with live coral fragments into the skeleton.

As the coral does not need to calcify its skeleton from scratch, the time to reach adult size is reduced from three to 10 years to about six to 18 months.

By the end of 2020, Coral Maker is intending to deploy prototypes with real coral fragments into the ocean, collect data and make improvements to the design. Though the pandemic has shut down the prototyping facility, researchers are using home 3D printers to keep the plan on track. ■

SOURCE: CORAL MAKER



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Fish assemblage seen in another bioreserve, Cabo Pulmo, which saw an increase in total biomass of more than 400 percent after it became a reserve (right); Islas Marías Biosphere Reserve is located off the Pacific Coast of Mexico (lower right).



Former Mexican prison islands turned into nature reserve boast enormous biodiversity

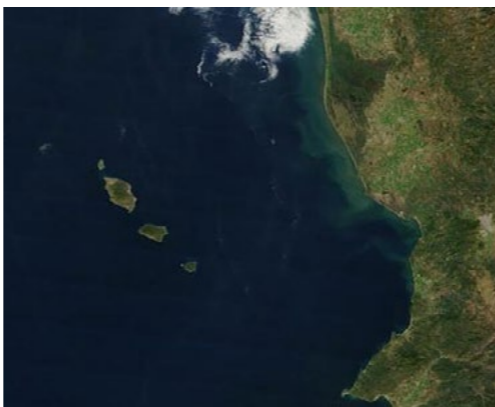
The Islas Marías Biosphere Reserve is made up of four islands—Isla Madre, María Magdalena, María Cleofas, and the San Juanito Islet—located 112km from the Pacific Coast of the Mexican mainland. The archipelago encompasses a ample variety of ecosystems with a great wealth of species of biological, economic, scientific and cultural relevance.

The islands were used as a penal colony until 18 February 2019 when President Andres Manuel Lopez Obrador ordered the closure of the

federal prison, which was established on Maria Madre Island in 1905. During this period, the islands were a strict no-go zone guarded by the Mexican Navy. Now biologists are discovering that the tiny archipelago, which was designated a Unesco Biosphere Reserve in 2010, is also home to a vast array of marine life.

The marine environment is highly productive, reflected in the great diversity of organisms to be found, such as coral reefs, reef fish, sharks, rays, turtles and marine mammals. Also, because of its location, the islands are part of the migration route of the humpback whale, gray whale, killer whale, sea lions and dolphins. Furthermore, the reserve is an important refuge, nesting and feeding site for large colonies of sea birds. The area also encompasses an ample variety of ecosystems: coastline, reefs, mangroves, and low and medium jungle—all of which harbour the genetic heritage of humanity.

Researchers have identified 21 species of sharks, 10 different rays, three species of

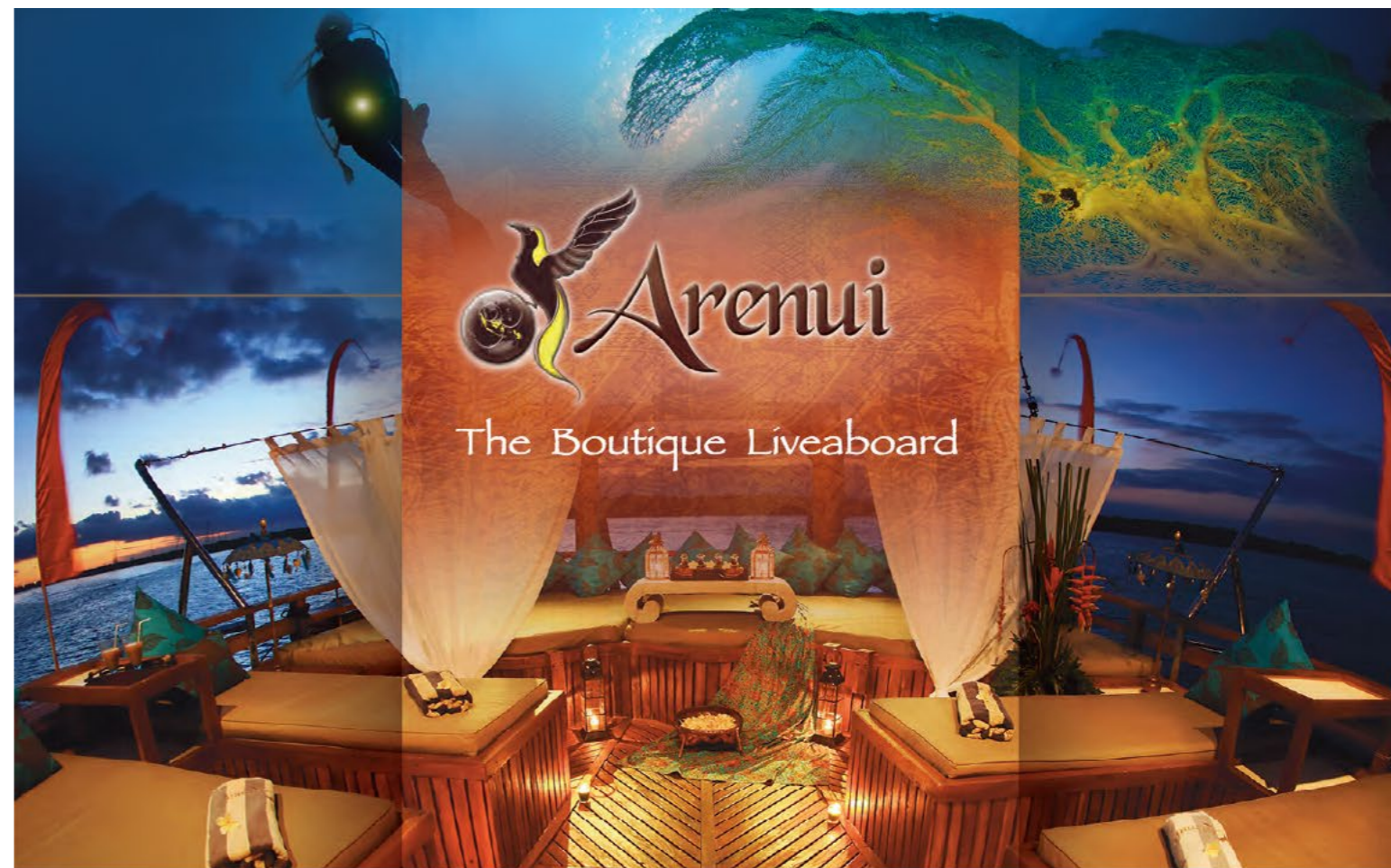


sea turtles and healthy coral reefs bursting with life. The endangered whale shark swims in the waters off the Marías, as do 114 species of commercial fish, such as sardines, tuna and red snapper. On land, the yellow-headed parrot, red cardinal, rabbits and raccoons thrive amidst six different ecosystems, Jorge Castrejón, director of the Islas Marías Biosphere Reserve, told *Mexico News Daily*. Fifty-four species of land and marine fauna are protected under some risk category and of these, 19 are endemic.

An upcoming dive destination? The four-island archipelago was being considered a potential tourist resort. Nevertheless, for now, that idea has been shelved because massive visiting would be a threat to the islands' fragile environment. Whether the protection schemes in place could possibly allow dive boats to pay visits to its surrounding reefs is not known to us at this point. Neither do we know whether some operators would consider these islands a potential new destination worth trying. ■ SOURCES: MEXICO NEWS DAILY, UNESCO



File photo from another bioreserve, Hierro Island



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Diver at anchor windlass, in a view towards the bow, on a 17th century Dutch Fluit recently discovered in the Gulf of Finland

From the 13th century, the Hanseatic League controlled the trade, but during the 17th century, the very efficient merchant navy of the Dutch Republic gained control. The importance of the trade gained further significance after the Russian Czar Peter the Great founded his new capital of St. Petersburg at the estuary of Neva River, at the Eastern end of the Gulf of Finland.

During this period, one type of ship stood out, playing a significant role in this trade: the Dutch "Fluit" ship—a three-masted ship with a very capacious hull design. It was not armed and was able to carry a very large cargo load for its time. In addition, the Fluit ship utilized a very novel and advanced type of rigging, with cleverly designed pulley and tackle systems for hoisting the yards and sails and controlling them. These advanced technical features required a much smaller crew than earlier ship types, making the trade more profitable.

Another characteristic of Fluit ships was that the entire crew lived "abaft of the main mast." The ship's master, mates, bosun, cook and all the ranks, occupied the same space between decks, and ate at the same table. This was very unusual in the contemporary society of the time, let alone in the highly hierarchical maritime world.

The Fluit ships were dominant in Baltic trade between the late 16th to mid-18th centuries. However, very few of these once common ships have survived, even as wrecks.

Therefore, it was to the expedition's great surprise when descending on a wreck at 85m depth, expecting to

Surprise discovery of a Dutch 17th century merchantman in the Gulf of Finland

Expecting to document some supposedly First or Second World War wrecks at the mouth of the Gulf of Finland, the experienced divers from Badewanne Diving Team instead descended on one of the biggest surprises of their long careers: an almost completely intact Dutch Fluit.

During the Middle Ages, trade in the Baltic Sea became increasingly important for the navies of Holland and England, which needed vast supplies of wood, tar and hemp—all of which were produced around the Baltic.

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Anchor windlass on the bow, in a view from the starboard side (above); Port side hull view of the stern of the wreck, with decorated stern cabin window holes visible (top left); Stern of the wreck (top right)

see an early WWI minesweeper or a schooner sunk during WWII, the group realized that they were looking at an almost completely preserved Dutch Fluit ship!

She rests on an even keel on the seabed, with most of her rigging scattered around her. There is only slight damage from a pelagic trawl. The trawl seems to have swept her from the bow towards the aft, dislocating the stem, somewhat damaging the poop deck and the topmost part of the typical Fluit transom. Apart from these damages, the wreck is intact, holds are full and all the side planking is firmly in place. Even the damaged parts and components of the transom decorations, such as the

“Hoekmen,” or the “Strongmen,” may be found on the bottom, behind the stern. Luckily, only very small bits of the trawl netting remain on the wreck.

There are only very few locations around the world, one of which is the Baltic Sea, where wooden wrecks can survive for centuries, without being destroyed by chemical, biochemical and biological decaying processes.

Thanks to low salinity, darkness and very low temperatures all year round, these destructive processes are very slow in the Baltic. Perhaps most importantly, wood-boring organisms such as shipworm, which is really a mussel, cannot live in such an

environment. Even in temperate seas, wooden wrecks tend to be broken down in a matter of a few decades, unless buried in sediment.

This find, an almost intact and complete Dutch Fluit ship—the Queen of the Baltic trade almost 400 years ago—is a good example of the importance of the Baltic Sea, and especially the Gulf of Finland, as a special cellar of the sea.

Only here can an environment be found that preserves these kinds of wrecks, plentiful in this area, which was a very important trade route and battleground for many wars over the centuries. Furthermore, all

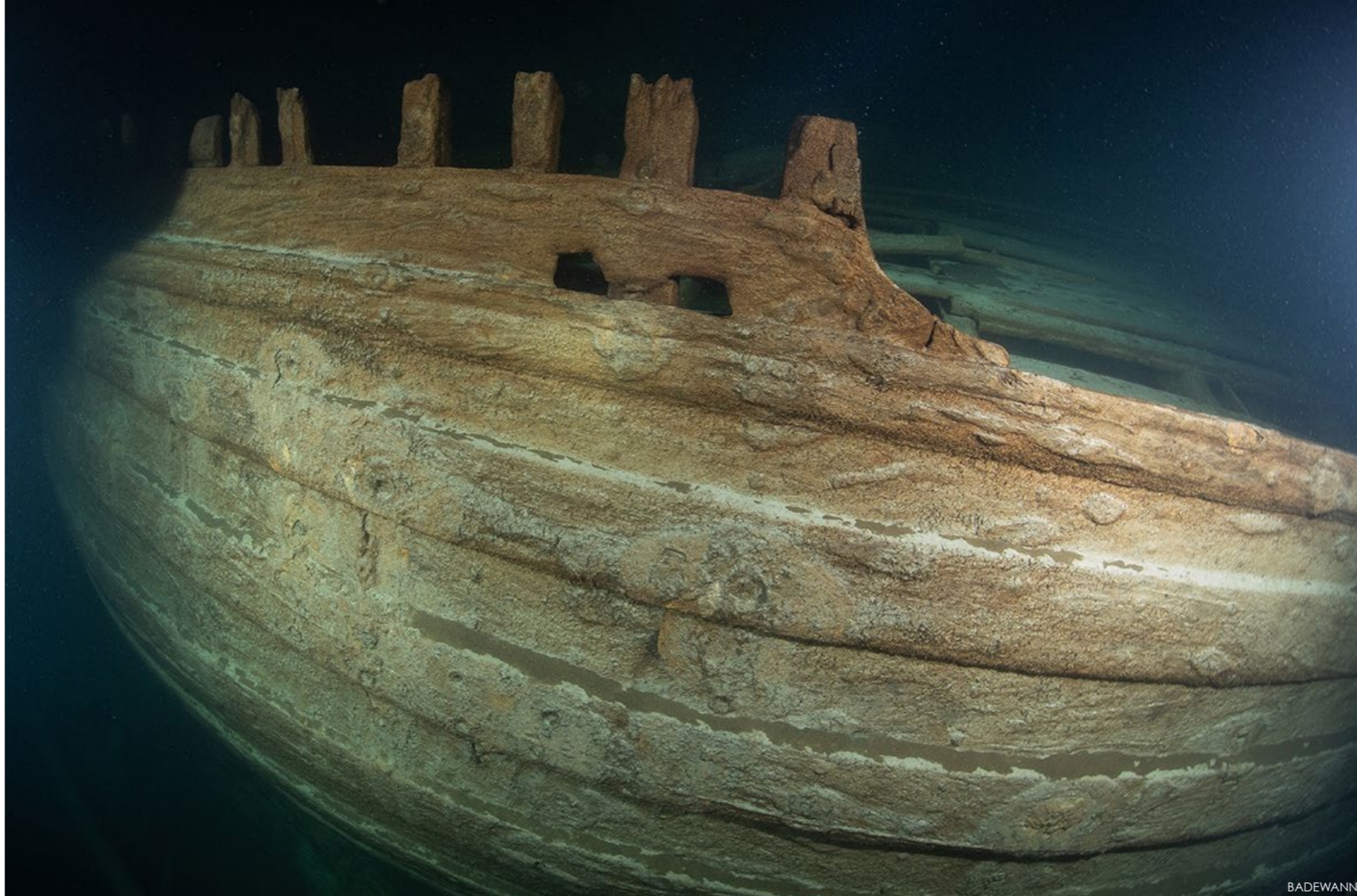


Port side hull near bow (right); Diver inspects a bollard with pulley wheels. There is also a pump pipe on the right (below).

of these wrecks are within the reach of divers, thanks to modern technical diving methods!

The Badewanne team will continue documenting and investigating this significant wreck in co-operation with the Finnish Heritage Agency of Antiquities and other partners, including Associate Professor Dr Niklas Eriksson, Maritime Archaeologist at the University of Stockholm in Sweden.

"The wreck reveals many of the characteristics of the fluit but also some unique features, not least the construction of the stern," said Eriksson. "It might be that this is an early example of the design. The wreck thus offers a unique opportunity to investigate the



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development of a ship type that sailed all over the world and became the tool that laid the foundation for early modern globalization."

Badewanne Diving Team is a voluntary group of divers specialising in documenting First and Second World War wrecks in the Gulf of Finland. This work has resulted in several documentaries, books and newspaper articles, including the *National Geographic* documentary "Sunken Nazi Sub." During recent years, the Badewanne Diving Team has also been increasingly involved in research of environmental threats to shipwrecks. Of these, the most significant are fuel oils remaining in the wrecks, and derelict fishing gear accumulated on them. The Badewanne Diving Team works in co-operation with civil and military author-

ities of Finland and Estonia. Although the Badewanne Diving Team is a Finnish organization, the divers in the team represent many nationalities. ■

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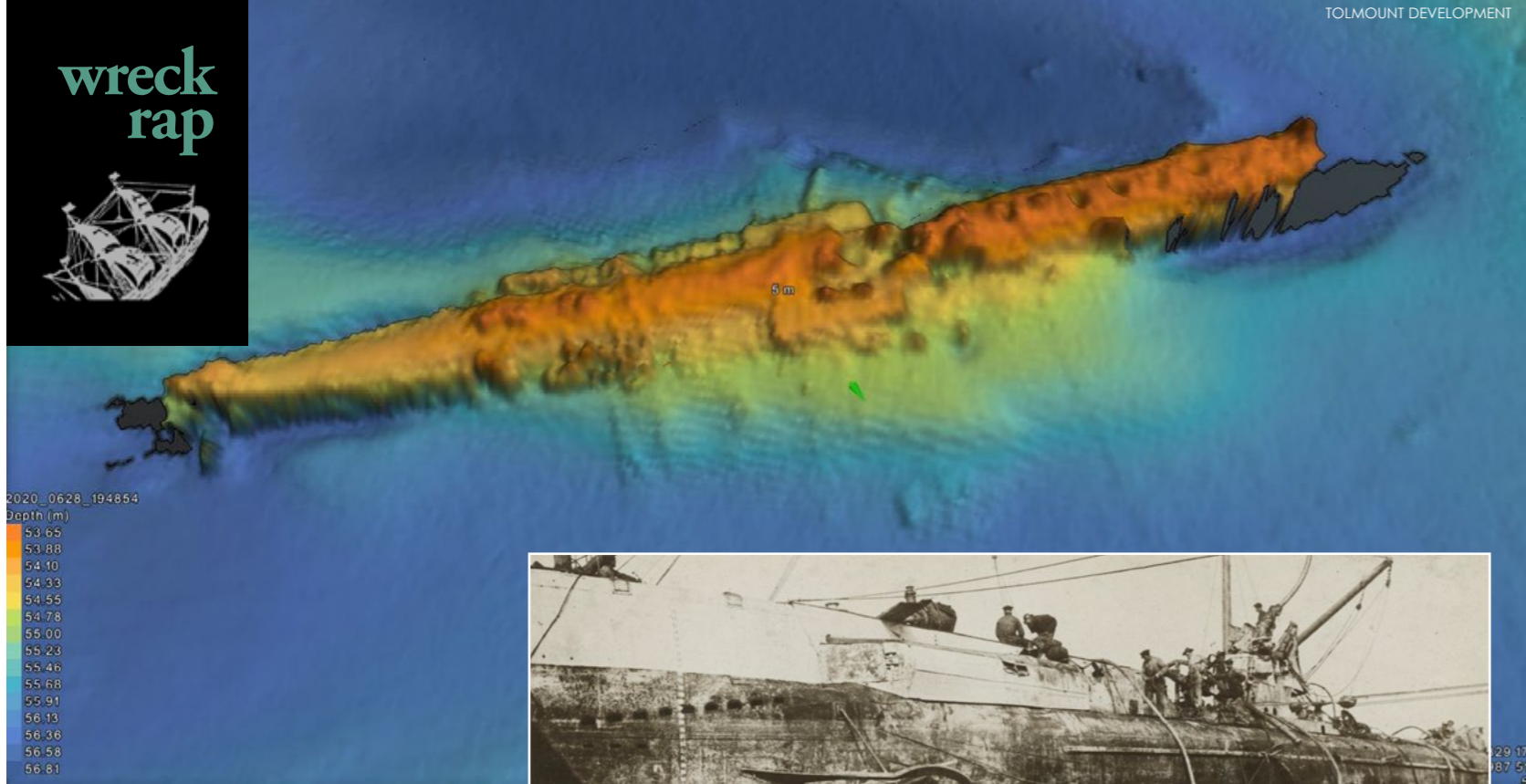
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Sophisticated scanning techniques and deep-sea video footage have revealed a large hole in the boat's hull—caused by an attacking British naval vessel.

A photograph of UC-47's sister ship, UC-44

US NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

German U-boat from WWI surveyed

During the summer of 2020, the German submarine UC-47, which was sunk by a Royal Navy patrol off the Yorkshire coast during WWI, has been surveyed for the first time. The wreck was investigated in conjunction with the laying of a new pipeline in the North Sea, some 20 nautical miles off the coast of Yorkshire, England.

Today, the vessel is only marked on the navigation charts as a shipwreck, and

until now, very little was known of the submarine's condition.

Using state-of-the-art robotics and high-resolution geophysical equipment, the wreck, which lies 50m below the surface, was mapped and inspected in unprecedented detail, showing an astonishing level of preservation.

From the archaeological survey of the site, it is clear that the wreck has been well preserved. The remains of the main hull, which is intact along its length, are visible above the seabed, and the damage she suffered during her sinking is clear to see. A large hole on the port side of the hull is indicative of an explosion. Scattered around the wreck site are components of the vessel, including one of

the torpedo tubes.

UC-47 was credited with sinking more than 50 vessels in her year-long career, and within the German Imperial Navy, had a reputation as a lucky vessel. But on 18 November 1917, her luck ran out when the Royal Navy patrol boat HMS P-57 surprised her on the surface—ramming and then depth-charging the U-boat. The submarine went down with all hands and has rested on the seabed ever since.

The day after her loss, UC-47 is reputed to have been visited by Royal Navy divers who retrieved valuable intelligence, including code books and charts. ■ SOURCE: UNIVERSITY OF SOUTHAMPTON



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CITY OF VANCOUVER ARCHIVES

Karlsruhe was a light cruiser that participated in Operation Weserübung, the German invasion of Norway in 1940.

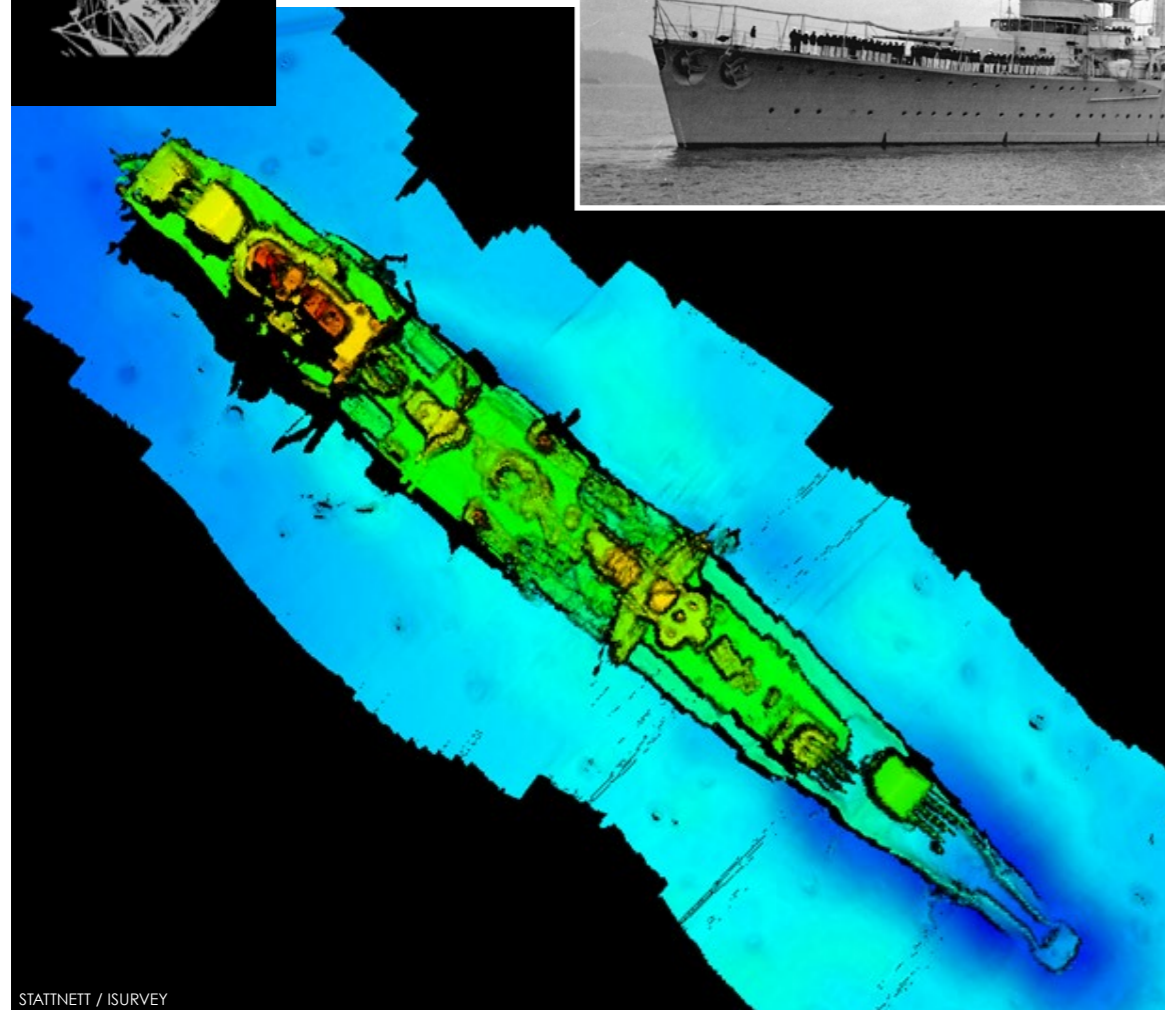
Operated Vehicle) and multibeam echo sounders.

"When the ROV results showed us a ship that was torpedoed, we realized it was from the war," said Hobberstad. "As the cannons became visible on the screen, we understood it was a huge warship. We were very excited and surprised that the wreck was so big."

Scuttled

Karlsruhe was a light cruiser that participated in Operation Weserübung, the invasion of Norway in 1940. She was not quite ready for combat operations, so she was used as a troop transport for the attack on Kristiansand. As *Karlsruhe* entered the fjord outside the harbour of Kristiansand, she came under heavy fire from the Norwegian coastal guns at Odderøya Fortress. The cruiser turned in the fjord to bring her full broadside into action; the artillery duel lasted for about two hours before heavy fog again covered the port, forcing both sides to cease fire. The Norwegians surrendered an hour later, and the German ships landed troops at Kristiansand.

While returning to Germany, she was attacked by the British submarine HMS *Truant*, which was positioned outside the fjord; two torpedoes hit the ship and caused significant damage. Unable to return to port, *Karlsruhe* was subsequently scuttled by one of the escorting torpedo boats. ■ SOURCE: STATNETT



STATNETT / ISURVEY

Scan of the *Karlsruhe* on the seabed, produced by multi-beam echosounder

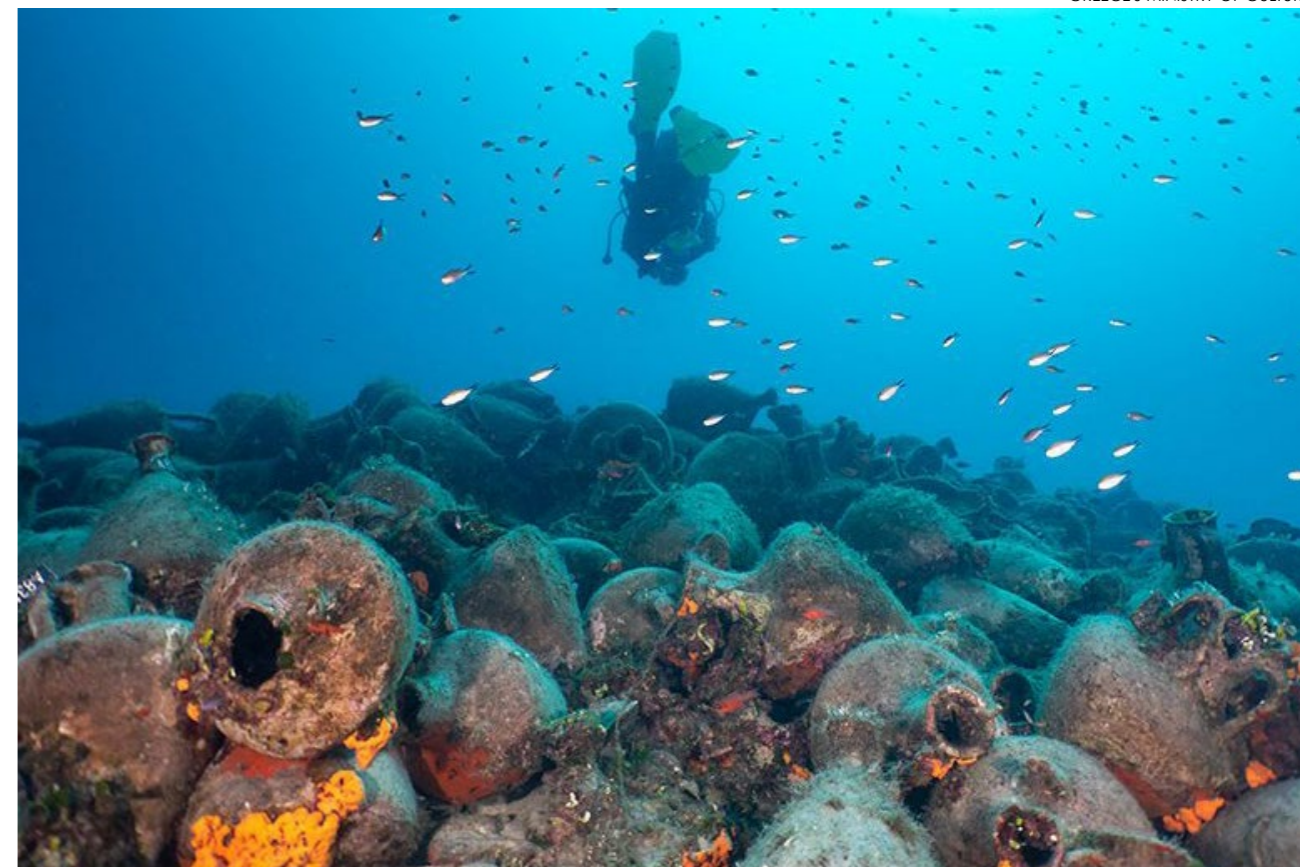
German WWII cruiser found between Norway and Denmark

The wreck of German cruiser *Karlsruhe*, the warship that led the attack on Kristiansand during the invasion of Norway on 9 April 1940, has been found at a depth of 490m.

The astounding discovery of the lost *Karlsruhe* cruiser was made by Statnett, the Norwegian state-owned power grid operator. Signs of wreckage were first detected three years ago during inspection work, some 13 nautical miles from Kristiansand in southern Norway, when sonar detected a shipwreck only

15m from an undersea power cable between Norway and Denmark.

This summer, Statnett's senior project engineer Ole Petter Hobberstad got the chance to find out more about the mysterious wreck, which was investigated by ROV (Remotely



GREECE'S MINISTRY OF CULTURE

The Peristera wreck lies at a depth of 21m to 28m, near the coast of the island of Peristera, and contains 3,000 to 4,000 amphorae.

Greece opens first underwater museum for divers

An ancient Greek shipwreck, which sank in 425 BC, has been opened up for tourists to explore in the Aegean Sea.

In a bid to boost tourism in the wake of the COVID-19 pandemic, Greece is now allowing divers access to one of its most remarkable and significant shipwrecks.

The Peristera wreck, which archaeologists believe was a large Athenian cargo vessel carrying thousands of amphora's filled with wine, sank in the Aegean Sea around 500 BC. The exposed parts of the wooden Peristera wreck have long rotted away, but the remaining cargo present a fascinating seascape for divers.

The impressive number of amphorae, the excellent condition of the wreck at a depth of 21 to 28m, the beauty of the exotic waters and the area's rich seabed—located within the protected area of the National Marine Park Alonissos in Northern Sporades—make the ancient shipwreck of Peristera a unique attraction.

Recreational scuba divers and freedivers will be able to visit the site, found at the bottom of the islet of Peristera in Alonissos, until Friday, 2 October 2020. The pilot operation of the Peristera shipwreck as a marine archaeological site open to the public in the summer of 2020 is the result of the cooperation between the Ephorate of Marine Antiquities of the Ministry of Culture and Sports, the Region of Thessaly and the Municipality of Alonissos.

Alonissos is the easternmost area of the Sporades island complex, in the northwest Aegean, and the greenest of the four. The island is also famous for its national marine park—a nature reserve for many terrestrial and marine species such as the Mediterranean monk seal (*Monachus monachus*). ■ SOURCE: GREECE'S MINISTRY OF CULTURE

Edited by
Scott Bennett

Dive travel in the time of coronavirus

Many dive operators are idling as customers are not travelling.

With borders reopening and travel following tentatively, keeping on top of the latest developments can be a full-time job. No sooner does one restriction ease than another seems to be implemented, a situation troubling for holidaymakers chomping at the bit.

In the United Kingdom, for example, countries once on the safe list have now been placed back on the no-go list. A very real possibility is travelling to a “safe” country and discovering a two-week quarantine has been suddenly implemented on your return home.

Fear factor

With daily reports of deaths and infections spreading about like sports statistics, fear of travelling is very understandable as air travel was how the virus spread worldwide in the first place. A healthy sense of respect and responsible behaviour is paramount to keeping the virus at bay. As long as we heed the advice and

take appropriate precautions, we need not be overly afraid. On the other hand, believing it is blown out of proportion—or an outright hoax—may lead to irresponsible behaviour, as witnessed repeatedly in the United States. Ultimately, the goal is to keep everyone safe during the resumption of travel.

But how can tour operators (and specifically, dive operators) adapt and thrive during the current situation?

The fact is the world cannot stay shut down indefinitely. Life must go on. Be it for business, pleasure or family issues, people want and need to travel. The current restrictions and procedures, although absolutely necessary, do not exactly make the prospect of long-distance travel enticing. Despite the uncertainty, a glimmer of hope is creeping over the horizon.

Planes should be of the least worry

According to a recent CNN report, experts, who refer to the few documented cases of in-flight transmission, say that the risk of contracting COVID-19 aboard a flight is actually quite low. If proven

true, the perceived risk of getting on an airplane could be unfounded. In one instance on 31 March, 328 passengers and crew members on a flight from the United States to Taiwan were tested for coronavirus after 12 symptomatic passengers were identified. Ultimately, all other passengers and crew members tested negative.

One reason for the apparent low level of risk is that air is replaced with new, fresh air every two to three minutes in modern aircraft cabins. Most aircraft have air filters that trap 99.99 percent of particles. With protocols like mandatory face masks or shields, temperature screenings, intensive cabin cleaning and limited cabin movement implemented during flights, flying is not particularly unsafe, just uncomfortable. Going through airports has also become a bit more of a hassle and inconvenience.

The dive industry will have to look towards the general travel industry for solutions. Airlines, international hotel chains and cruise liners possess deeper pockets, more manpower and have much more at stake.

Test schemes

A solution gaining momentum is for travellers to present a negative COVID PCR (polymerase chain reaction) test taken within a 10-day period prior to departure as well as another test taken upon arrival at their destination. If results are negative under these circumstances, overseas travel should not be an issue, especially if it is to a country that does not have an enforced quarantine-on-arrival policy.

New rapid COVID-19 test centres in the airports themselves, with results delivered in hours or even as fast as 90 minutes, could also possibly replace quarantine requirements and ease travel. A two-test model, which has been used successfully in Iceland, involves a first test taken upon arrival and a confirmatory test a few days later.

On location

With regards to dive operators and liveboards, increased sanitising of equipment and facilities, combined with social distancing practices, should allow for both a safe and fun diving experience.

Doing away with quarantine

Frankly, the biggest travel deterrent seems to not be travel itself, but the prospect of a two-week enforced quarantine upon returning home. According to Quash Quarantine spokesperson Paul Charles, “If we are going to learn to live with COVID, there have to be alternatives to quarantine. Quarantine measures are extremely destructive to the economy because you quarantine the vast majority of people that are perfectly healthy, affecting productivity and scarring the economy. The alternative has to be testing.”

But in our world of polarised media reports and personal viewpoints, the answer is not going to extremes. Instead, listen to and follow sound advice from those in the know. As long as safety and common sense are utilised, travel should not be out of bounds. The resorts and liveboards need our support. ■

SOURCE: CNN, JAMA NETWORK OPEN

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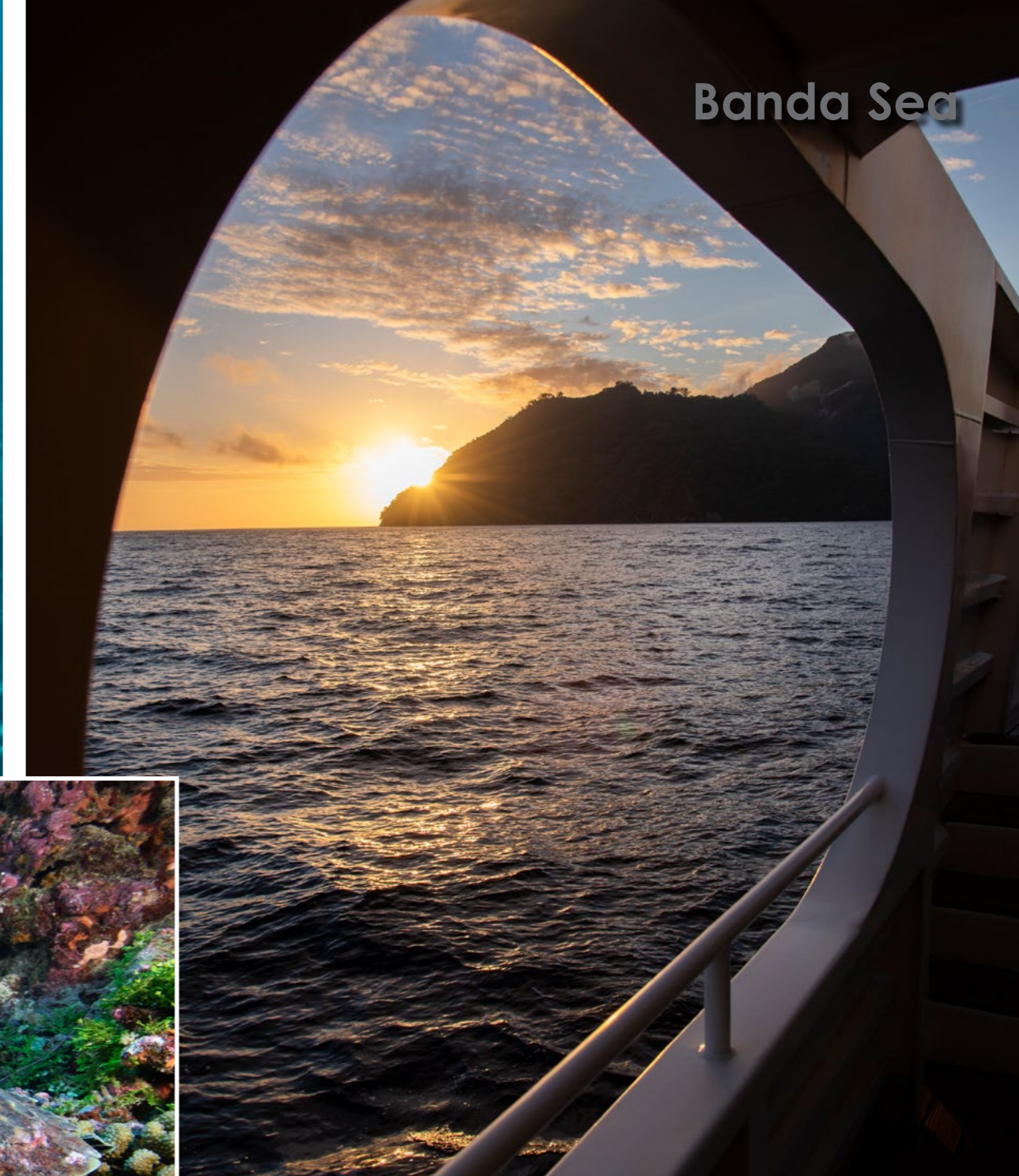




Banda Sea

— *Diving the Spice Islands of Indonesia*

Text and photos by Matthew Meier



Banda Sea

Scalloped hammerhead shark swimming over a hard coral reefscape (above) and hawksbill sea turtle lifting its head while feeding on a sponge (right) at Suanggi Island; Sunrise from behind Serua Island, through a window on the deck of the *Solitude Adventurer* liveaboard (far right); Diver with large sea fan, Hole in the Wall, Hatta Island (previous page)

Five minutes into my first dive in the Banda Sea, I came face-to-face with a scalloped hammerhead shark, gliding effortlessly in its underwater realm as it emerged from the depths to investigate the alien visitors descending from above. A second hammerhead swam past a moment later but was less bold in its approach and quickly disappeared back into the abyss. I had come to this remote corner of the globe after hearing stories of schooling hammerhead sharks, abundant sea snakes, magnificent coral formations, huge sponges and the possibility of observing other pelagic migrants such as manta rays, false killer whales, leatherback sea turtles and the pygmy blue whale. My efforts would not go unrewarded.



The Banda Sea is a region within the Indonesian archipelago, located in Southeast Asia, between the Indian and Pacific Oceans. It is situated south of the Maluku Islands, east of

the island of Sulawesi and north of Timor Island. This secluded body of water contains dozens of volcanic islands in an area covering over 180,000 sq mi (470,000 sq km).

Dutch eventually acquired all of Indonesia and governed the nation until the end of World War II, when the Indonesian people were ultimately granted their independence. To this

The Banda Islands, also known as the Spice Islands, helped put the area on the map in the early 1600s when the Dutch East India Company took control of the trade routes for native spices such as nutmeg, pepper and cloves. The

day, many of the islands in the Banda Sea remain uninhabited and most are separated by large expanses of open ocean. Of the 267 million people living in Indonesia (making it the world's largest island nation), only about 19,000 reside within the Banda Islands.

Getting there

Our eight-day voyage began and ended in Ambon, which is the capital city of the Maluku province at the northern end of the Banda Sea. Daily local flights exist from several desti-



CLOCKWISE FROM TOP LEFT: At Ambon, a pair of white-eyed moray eels poking their heads out from beneath a ledge, a yellow and red shortfin lionfish, a pale yellow leaf scorpionfish resting on the reef, an ornate ghost pipefish camouflaged against a patch of sea grass, and a mating pair of solar-powered *Phyllodesmium nudibranchs* perched on a sponge



Suanggi Island

After dinner, we departed Ambon's harbor and made an overnight crossing to Suanggi Island, arriving in time for an early morning dive at a site called Jackpot. Home to deep-water

pinnacles covered in large coral formations and huge pink barrel sponges, as well as the aforementioned curious hammerheads, this was our first taste of what the Banda Sea had to offer. Our second immersion of the



nations within Indonesia, including Bali, Jakarta, Makassar and Manado. Upon arrival, my dive partner and I transferred to our liveboard dive boat anchored in the bay, as it is the only way to access this out-of-the-way destination. The *Solitude Adventurer*, a recently renovated, spacious and stable 118ft (36m) long aluminum catamaran, would be our home for the next week.

Ambon is famous in and of itself as one of the top macro and

muck diving destinations on the planet. Divers will often visit for a week or more to experience as many of the weird and wonderful critters that exist here as possible. Our travel plan only allotted time for two check-out dives with which to dial in our

buoyancy, knock off the rust and work on photographing those spectacular macro subjects. I had grand illusions of finding the endemic and rare psychedelic



a painted frogfish and a pair of white-eyed moray eels—quite the impressive array of species, and not a bad consolation prize, especially for check-out dives.



Mixture of hard and soft corals creating an “underwater cityscape” (above) and brown booby bird (right) at Manuk Island

morning was on a nearby wall at a site called Ping Pong. We encountered several hawksbill sea turtles cruising over the coral formations, had our first of many sightings of an olive sea snake, an elusive bumphead wrasse made a brief appearance and there were plenty of massive sponges, some too large to effectively photograph properly without my fisheye lens.

During our surface interval, the boat motored to nearby Run Island where we made two exploratory dives in the afternoon. Sea conditions prevented us from accessing the normal dive sites around the island, so we anchored in a more protected area and dived sloping walls inundated with hard coral formations and schooling fusiliers,

mammoth sea fans, more impressive sponges and several sea turtles.

Manuk Island

We awoke at Manuk Island the next morning a little later than expected because rough seas dictated a slower-than-usual passage, as we departed the Banda Islands for the Forgotten Islands. The wind and waves that had picked up overnight were also contributing to choppy sea conditions around Manuk that were not conducive to responsibly launch divers in small inflatable boats. The catamaran was capable of cutting through the swell to get to the premier dive sites, but boarding the skiffs from alongside the



mother ship was not advisable and nor could the RHIBs navigate safely through the waves to get around the island themselves.

Similar to the previous afternoon, we wisely elected to anchor on the leeward side of the island and spent the day diving a site called Coconut Corner. The visibility was not ideal due to the turbulent seas, but this site boasted some of the largest hard coral formations I had seen to date in my nearly 30 years of diving experience. Amazing

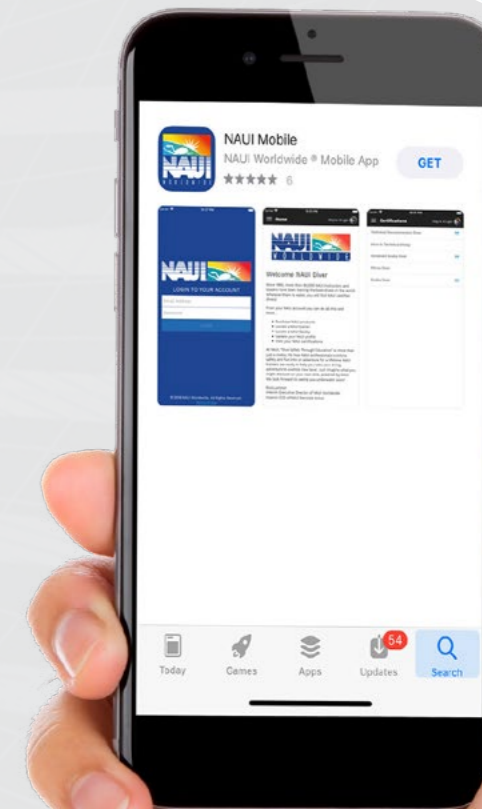


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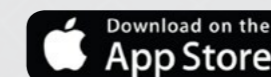
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At Manuk Island, large sponges and orange soft corals decorate the reef (left), an olive sea snake swims over the hard coral reef (below), a diver hovers over a massive aggregation of *Acropora* sp. plate corals (bottom right) and an aerial view captures the moment scuba divers back-roll off an inflatable RHIB into the water (lower left)



coral bommies covered in plate and staghorn corals, interlaced with sea fans, leather corals and both green and purple elephant ear sponges.

Manuk Island is also famously known for its considerable number of olive sea snakes and we saw copious amounts on every dive, along with a few banded sea kraits thrown in for good measure. Both species breathe air and each trip to the surface for oxygen puts them at risk of predation, so it should not be surprising that the snakes use every bit of cover they can find to conceal themselves when venturing out in the open. Perhaps also exploiting the body heat we humans emit, divers are often startled as



snakes emerge from under an arm or between a pair of legs while traveling to and from the surface or simply while inspecting their new neighbors. We made three dives at this site throughout the day

and spotted both hawk-bill and green sea turtles, a small school of bluefin trevally, numerous jacks and triggerfish hunting on the reef and a colorful, juvenile rockmover wrasse in constant motion, doing



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its best to stay hidden and avoid being photographed.

Forgotten Islands

Departing Manuk, we headed southwest toward the Forgotten Islands of Serua and Kekah for another overnight transit. The wind and waves gradually subsided throughout the evening, allowing for faster cruising speeds and a much more restful night's sleep.

Serua is a relatively large island with multiple volcanic cinder cones, one of which is still belching steam. Kekah, located just adjacent, is so minuscule it barely appears on the map. The *Adventurer* anchored in a small protected cove behind Kekah Island and we proceeded to make four dives at

a site called Kekah's Corner. The topography beneath the waves consisted of a sloping wall of corals with occasional barrel sponges and a shallow coral garden at the top of the reef. Water temperatures were a few degrees cooler than earlier in the trip and several degrees cooler below the thermocline that materialized between 60-90 ft (18-27m). There was also a steady, nutrient-rich current that turned most dives into a pleasant, albeit hazy, drift.

Scalloped hammerheads

The main attraction at Kekah's Corner this time of year is the consistent presence of scalloped hammerhead sharks. They were seen at depth, often below the thermocline, in large schools

or walls of sharks, and at other times, appeared alone or in small groups, cruising along the wall or navigating the shallows. As it had seemingly been throughout our trip, the visibility was not ideal, and on this particular day, the topside overcast conditions contributed to a very dark underwater environment for photography.

We saw hammerheads on every dive, but as luck would have it, I was either not able to get close enough to capture them or did not see them until they were already past me. On one dive, I spent the first 45 minutes staring off into the blue, waiting in vain for the sharks to appear, and then was sadly oblivious to a hammerhead swimming by only a few feet away, when I had finally let a hawksbill sea turtle distract





At Serua Island, a large school of scalloped hammerhead sharks swim in murky deep water along the sheer reef wall (above), a yellow-lipped sea snake hunts for food on the coral reef (top right), a large cuttlefish swims over soft and hard corals (right), and a large black-spotted moray eel, also known as a honeycomb or leopard moray, peeks out of its den (left).



me for a photo.

Fortunately, we had the flexibility of an extra day on our itinerary and a group decision was easily made to stay for added time with the hammerheads. The

next morning, I photographed a spectacular sunrise as it sprung up from behind Serua Island. Over time, the sky transitioned into a beautiful, sunny blue with intermittent puffy, white clouds. The colors

of the reef expanded dramatically with the addition of sunlight, and it seemed we were diving an entirely different site as we relished four more chances to swim with the sharks. Descending for our first dive, I noticed that the hazy visibility had somewhat improved overnight but would still be presenting challenges—most notably, the inability to see the hammerheads coming from far off, contrasted with the need to be in their immediate vicinity for clear photos. Wanting to take advantage of the gorgeous sunlight, I attempted to reshoot several reef

scenes I had captured the day before, all the while keeping one eye in the blue for the hammerheads.

We came across the same distracting sea turtle from the day before and discovered a sizable broadclub cuttlefish

hovering in the shallows. I photographed several sea snakes throughout the day and a massive honeycomb eel, poorly hidden under a small coral head.

On one dive, the current swept us farther than normal down the reef and we



Diver with mushroom leather corals, a purple sea fan and orange soft corals on the reef at Hatta Island (above); Aerial view of the massive submerged coral reef at Karang Hatta (top right); Large colony of mushroom leather corals growing near the surface, with Snell's window overhead (right); Octopus blowing sand as it emerges from a crevice in the coral reef (left)



saw the heart-wrenching destruction that dynamite fishing had inflicted on the environment. Healthy, vibrant corals were reduced to a field of broken rubble that would take years, if not decades, to rebuild—an entire mini-ecosystem destroyed in the short-sighted goal of the few fish that floated to the surface after the explosion. According to the Kekah's village chief, the devastation was caused by a desperate act of struggling fishermen

from a distant neighboring island.

Hammerheads were again witnessed on every dive, and I personally saw them on three of four but regrettably, I never managed to get close enough for a publishable photograph.

Hatta Island

The boat pulled anchor soon after our last dive, and we start-

ed a 12-hour crossing back to the Banda Islands. Favorable tail winds and calmer seas made for a smooth ride up to the shallow, submerged reef called Karang Hatta. Just south of Hatta Island,

this colossal crescent-shaped reef system is exposed at low tide and features colorful coral walls with schooling jacks and fusilier fish, immense elephant ear sponges and huge sea fans.



Banda Sea



Diver in silhouette with pink barrel sponges growing on the side of a sheer wall at Banda Neira Island (above); Local children paddle a canoe (left).

branching corals.

After two dives, we transitioned up to Hatta Island and made our third dive of the day at a site called Goa Hatta. Also known as Hole in the Wall, this dive begins with a vertical descent through a gap in the reef, which opens up to a wall covered in large sea

her silhouetted in the hole while framing a large sea fan in the foreground. Our dive guide, Eme, was instrumental in preparing us in advance for what to expect and after several attempts, with numerous hand signal adjustments, I was very excited with the results (see title page).

Banda Neira Island

Departing Hatta, we made the short trek up to Banda Neira Island where we anchored in the protected harbor for the night. Our last dive of the day was at twilight on the other side of the anchorage in anticipation of observing mating mandarinfish. Hovering



Aggregation of butterflyfish and triggerfish on colorful coral reef at Banda Neira Island (above); Aerial view of the eastern edge of Banda Island with its volcano visible in the background (top right)

I saw several moray eels, an octopus out hunting in the daylight, plentiful reef fish and a cute baby whitetip reef shark swimming amongst the

fans, barrel sponges, black sun corals and colonies of leather corals. I spent a good bit of time working with my dive buddy and underwater model to get





At Banda Neira Island, a diver hovers over a huge hard coral bommie at Lava Flow dive site (above) where a colorful reef can be found (right), a pair of big pink barrel sponges grow near the base of a sheer wall (top right), and a large yellow-green map pufferfish swims amongst an aggregation of redtooth triggerfish and pyramid butterflyfish (left).



near the edge of a field of stag-horn corals, we witnessed several males displaying and posturing for the females in hopes of pairing off for a frantic rush up into the water column to release eggs and sperm.

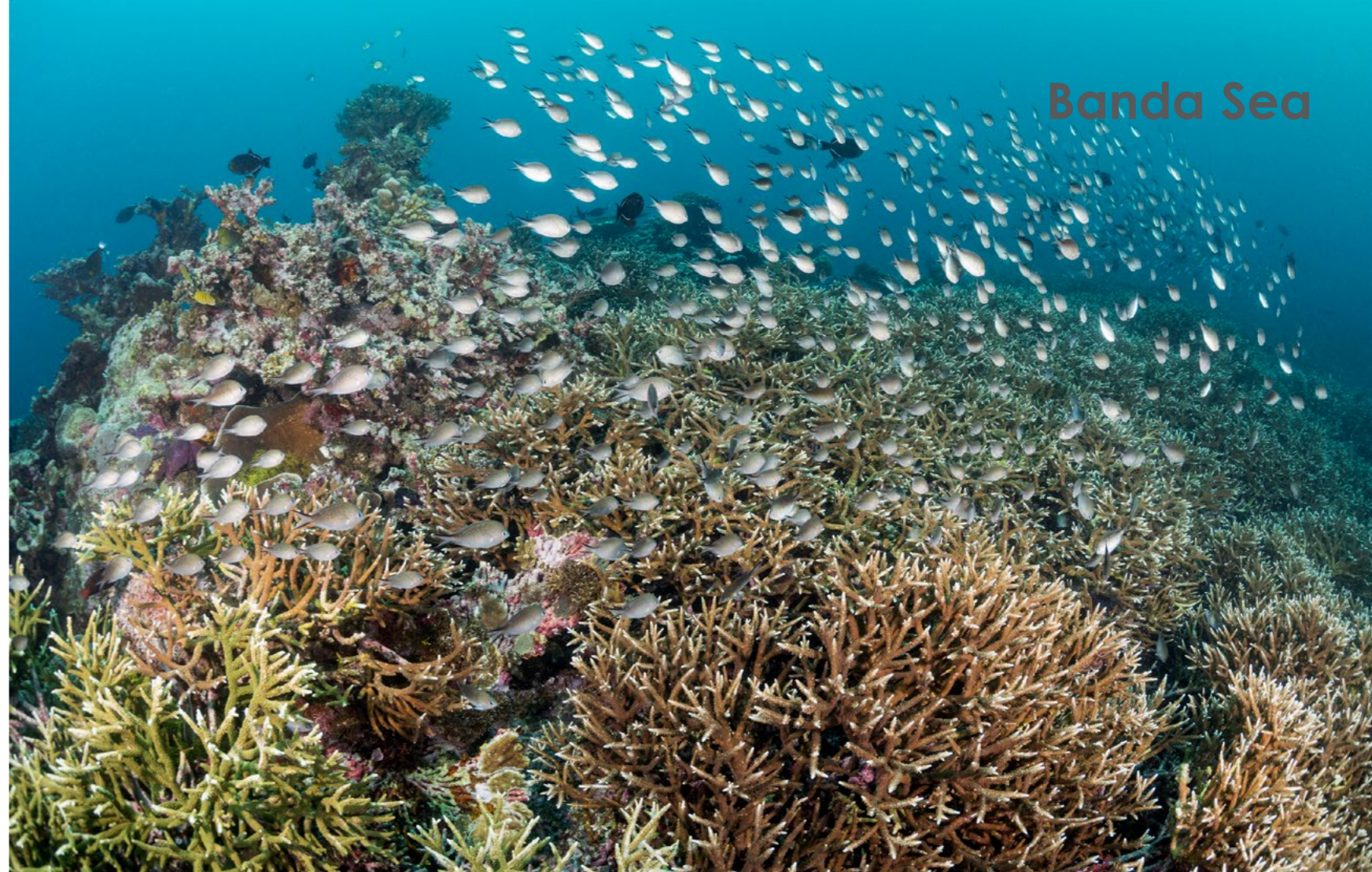
Mandarinfish complete this ritual every night at dusk, though divers do not always get to see the entire mating behavior.

The next morning, after our second night at anchor, we shifted

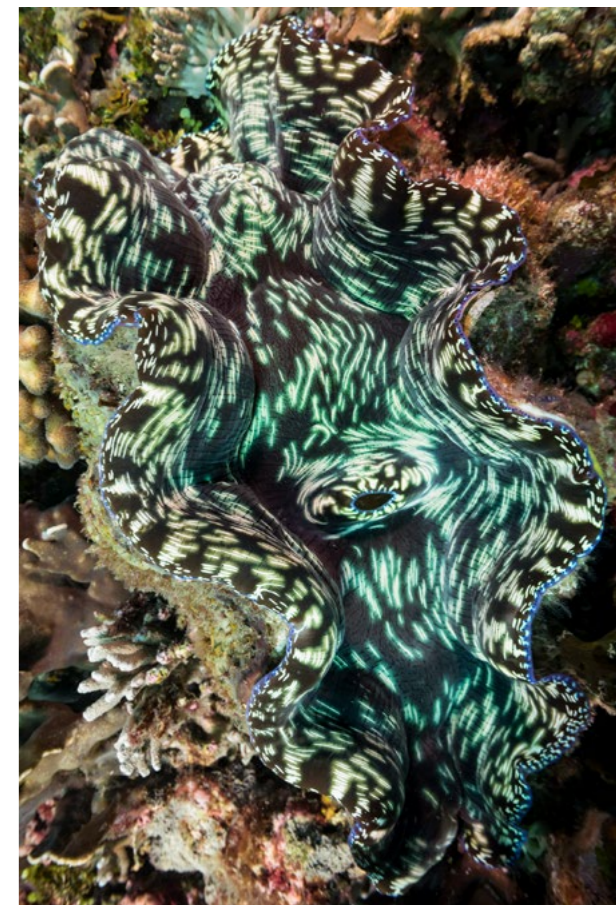
to the far eastern edge of the island to dive a spot called Pohon Miring. Dropping into the water near a handful of local fishermen in wooden canoes, we descended down a wall with massive elephant ear and barrel sponges to find a swim-through at 80ft (24m), which was lined with colorful sea fans. The current picked up as we rounded the next corner, accelerating the remainder of the dive, and we finished our safety stop secured by reef hooks in a coral garden at the



School of yellowtail fusilier fish swim above a colorful coral reef and a large, pink barrel sponge (above) at Banda Neira Island where one can see the lava flow from an eruption in 1988, extending from the top of the volcanic cinder cone into the ocean (top left).



School of ternate chromis fish swimming over a field of staghorn corals at Banda Neira Island (above); A green and black giant clam at Serua Island (right)



top of the wall.

A short distance away sits an off-shore exposed rock that was to be our second dive of the day. Known as Batu Kapal, or Ship Rock, this site has multiple underwater pinnacles, which are covered in aggregations of reef fish, sea fans, sponges, orange soft corals and large colonies of black sun corals. Following the dive, the liveboard anchored back in the harbor at Banda Neira, and we used the skiffs to access our last dive of the day.

A volcanic eruption in 1988 decimated the existing reef, as molten lava ran from the top of the cinder cone all the way down to the shoreline and into the ocean. Since that time, at a dive site now called Lava Flow, the corals have repopulated, flourished and exploded into one of

the most impressive hard coralscapes I have ever seen. We were informed that scientists are in fact studying this reef to try and discover the keys to its mind-blowing recovery in hopes of replicating the formula at other reef systems across the globe. There were immense fields of staghorn corals, incredible plate coral formations, colorful expanses of lettuce corals, large pink barrel sponges and schools of chromis swimming amongst it all.

Topside excursion

After a quick shower and rinse of the dive gear, we boarded the skiffs to transfer across the harbor for a land tour of Banda Neira. Once on land, we were met by a local tour guide who took us to a museum filled with artifacts, paintings and histori-



Panoramic aerial view of Bobooi Island off the southern tip of Saparua and the surrounding shallow coral reefs (above); Aggregation of anthias and chromis fish swimming above a hard coral reef at Nusa Laut Island (left)



cal drawings depicting life in the Banda Islands during the time of the early Dutch settlement. Sadly, the treatment of the locals was not always kind, similar to the history of other invading nations around the globe. One painting in the museum actually depicted barbaric public beheadings and dismemberments of the natives at the hands of mercenary Samurai warriors as a means to maintain power and control.

The tour continued through town and up into the hills where we witnessed the local farming of almonds, nutmeg and cloves. At the top of the hill, we came upon Fort Belgica, which was built by the Dutch in 1611 to protect their colony and also serve as a jail. The pentagon-shaped brick fortress is fully surrounded

by an additional barrier wall, which has defensible columns at each of the five corners. The fort now serves as a tourist attraction and is largely empty except for a handful of bats roosting in the sleeping quarters. On our way back through town, we shopped for spices, dried fish, fruits and pastries at various market stalls before returning to the live-aboard for an elaborate BBQ dinner of grilled chicken, pork and shrimp served on the upper deck under the stars.

Nusa Laut Island

One more overnight crossing followed, as we pulled anchor after dinner to continue the trek north back towards Ambon. Our last day of diving began in the early morning hours at Nusa Laut

Island. We dropped in at a site called Ameth to a stunning wall of corals that transitioned into a coral garden on the white sandy bottom, all of which was teeming with schools of chromis and fusiliers. The mild current was just strong enough to make for a pleasant drift dive and keep all of the reef fish swimming in unison above the corals.

Bobooi Island

A short ride later, we arrived at Bobooi Island to complete our final dive just offshore on a small, shallow coral outcropping known as Pombobooi. The site boasted similar coral structures and reef fish to our morning dive, though I was more impressed with the panoramic aerial view of the island I captured with



Olive sea snake (left) and aggregation of leopard anemones living on the skeleton of a sea fan (far left) at Serua Island

my drone.

The remainder of the afternoon was spent motoring to Ambon's harbor, where once anchored, we enjoyed a spectacular steak dinner with the guests and crew on our last night together. The evening was spent sharing stories and packing gear in preparation for the next morning's departure.

Afterthoughts

Time always goes too quickly on these adventures, and eight days disappeared into the rearview mirror far faster than seemed possible. It was an absolute privilege to have the opportunity to dive in this remote and unspoiled place, and I was very thankful to become acquainted with all the highlights of the Banda Sea, even if Mother Nature did not always provide optimal photographic opportunities—so goes the cruel irony of divers' quests for pelagic creatures and the prospect of perfect conditions with plentiful interactions that keeps us coming back. In a perfect example of the "you-should-have-been-here-last-week" scenario,

the group that came on board immediately after us jumped into clear waters with a manta ray, false killer whales and hammerhead sharks on their very first dive!

The Banda Sea is a spectacular place to explore, and I hope you get the opportunity to experience it for yourself. I am very much looking forward to a return visit. The pygmy blue whales and leatherback sea turtles are still out there waiting for us. ■

The author would like to thank Solitude Liveaboards and Resorts (Solitude.world) for hosting this excursion and the crew of the Solitude Adventurer for taking such good care of us. Thanks also go to Scubapro (scubapro.com) and Blue Abyss Photo (blueabyssphoto.com) for their assistance with underwater dive and photo gear.

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



Large pink barrel sponge, elephant ear sponge and orange soft corals contrast with the bright green black sun corals at Serua Island.

fact file

Indonesia



SOURCES: US CIA WORLD FACTBOOK, CDC.GOV, STATE.TRAVEL.US, WIKIPEDIA.ORG, XE.COM

History Indonesia had been inhabited for thousands of years prior to traders from Portugal arriving in the 1500s hoping to monopolize the spice trade of nutmeg, cloves and pepper from the Banda Islands. Their efforts proved unsuccessful as more merchants from the Netherlands and Britain joined the trade routes, before ultimately, the Dutch East India Company took control in the early 1600s. The Dutch regulated the spice trade and slowly extended their grip over all of Indonesia in the following centuries. During WWII, the Japanese forcibly gained control of the archipelago and after the war, on 17 August 1945, the Indonesian people proclaimed their independence, which was not formally recognized by the Dutch until December 1949. Government: Republic. Capital: Jakarta.

Geography The Indonesian archipelago is comprised of over 17,000 islands in Southeast Asia between the Indian Ocean and the Pacific Ocean. Located within the archipelago, the Banda Sea is situated south of the Maluku Islands, and southeast of the island of Sulawesi. It contains dozens of volcanic islands, many of which are uninhabited and extremely remote, occupying a total area of 180,000 sq mi (470,000 sq km). The Banda Sea is

only accessible by liveboard dive boat, whose season is typically during the months of September and October, though boats will travel through the area at other times of the year. Coastline: 54,716km.

Climate The climate is tropical year-round with a rainy season from December to March and a dry season from July to September, though rain can fall any time of year. Air temperatures range from 22 to 33°C (72 to 90°F) and water temperatures range from 25 to 29°C (77 to 84°F). A 3mm or 5mm wetsuit is recommended depending on the season, as is a hooded vest.

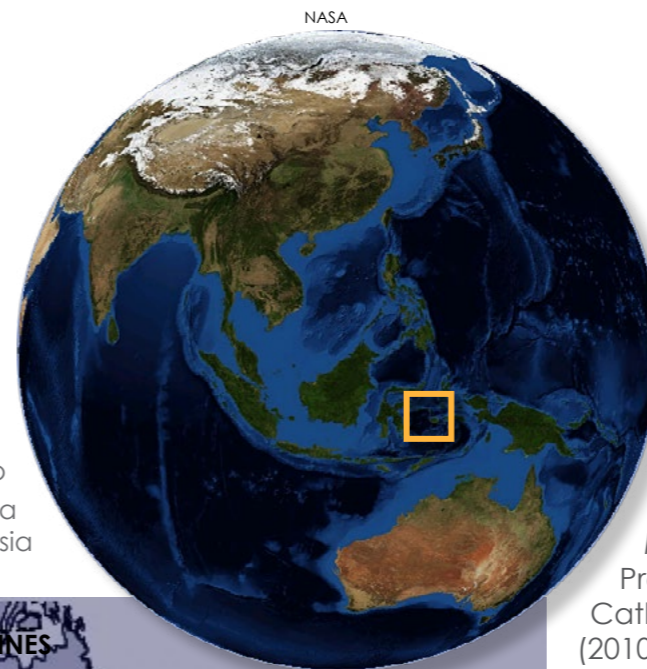
Environmental issues Challenges include heavy smog caused by wildfires associated with large-scale deforestation, which is often illegal; overfishing and exploitation of marine resources; and water pollution from industrial waste and sewage. Air pollution, traffic and management of garbage, water and

wastewater are challenges in rapidly growing urban areas.

Economy Tourism dollars from scuba diving, along with fishing and spice sales, account for the majority of income generated in the Banda islands. Also known as the Spice Islands, they once were the sole producers of the spices nutmeg and mace. Indonesia is Southeast Asia's largest economy. Challenges the country continues to face include poverty and unemployment, an infrastructure that is inadequate, corruption, complicated regulations and unequal resource distribution amongst its regions.

Currency Indonesian Rupiah (IDR). Credit cards are accepted on board and at larger hotels and resorts, but ATMs and banks are difficult to find outside of major cities. Exchange rates: 1USD=14.55IDR; 1EUR=17.14IDR; 1GBP=18.77IDR; 1AUD=10.40IDR; 1SGD=10.57IDR

Population 267,026,366 (July 2020 est.), making Indonesia the fourth largest country in the world. With a populace of only 18,544 (2010 Census), the Banda Islands accounts for a very small portion of that population. Ethnic groups: Javanese 40.1%, Sundanese 15.5%, Malay 3.7%, Batak 3.6%, Madurese 3%, Betawi 2.9%,



RIGHT: Location of Banda Sea on global map

BELOW: Location of Banda Sea on map of Indonesia



Minangkabau 2.7%, Buginese 2.7%, Bantenese 2%, Banjarese 1.7%, Balinese 1.7%, Acehnese 1.4%, Dayak 1.4%, Sasak 1.3%, Chinese 1.2% (2010 est). Religions: Muslim 87.2%, Protestant 7%, Roman Catholic 2.9%, Hindu 1.7% (2010 est). Note: Indonesia is the country with the largest population of Muslims in the world. Visitors are encouraged to respect local traditions and dress modestly. Internet users: 65,525,226 or 25.4% (July 2016 est.)

Language The official language is Bahasa Indonesia, though English, Dutch and over 700 local dialects are also spoken. English is generally spoken in tourist areas.

Voltage Electricity is 220 Volts/50 Hz and the plugs have two prongs, identical to the EU. Many resorts and liveaboards have installed universal sockets, so inquire as to whether an adaptor is needed.

Cuisine The food on board the liveaboard is a mixture of traditional Indonesian fare, Asian and international cuisine that can be tailored to meet any dietary constraints. The meals are frequent, delicious and the portions plentiful.

Tipping Tipping is expected on liveaboard dive boats and each establishment has their own guidelines and suggestions. A tip of 10 to 15 percent of the value

of your trip is generally recommended.

Health Please check with your state department or local embassy for the latest travel restrictions due to the coronavirus pandemic. There is a high degree of risk for food or waterborne diseases such as bacterial diarrhoea, hepatitis A and E, and typhoid fever, as well as vectorborne diseases such as chikungunya, dengue fever and malaria. Check with the WHO or your dive operator for prophylaxis recommendations and required vaccines. Bring insect repellents containing DEET. International Certificate of Vaccination required for yellow fever if arriving from an infected area within five days.

Hyperbaric chamber The nearest chamber to the Banda Sea is in Makassar or Manado. Both are located on the island of Sulawesi and would require an evacuation by sea or air. Makassar: Rumah Sakit Umum Wahidin Sudirohusodo Tel: +62 0411 (584677) or 584675 Manado: Malalayang Hospital Tel: +62 0811 430913

Travel/Visa/Security Please check with your state department for the latest travel advisories and restrictions due to the coronavirus pandemic. A passport is required for entry into Indonesia and must be valid for at least six months past your departure date. For visiting foreigners, a visa and health certificate may be required. Visa-on-arrival services may be suspended.

Websites Indonesia Travel indonesia.travel/gb/en/home

My Favorite Unusual Critter Dive

— *Contributors' Picks from Around the World*

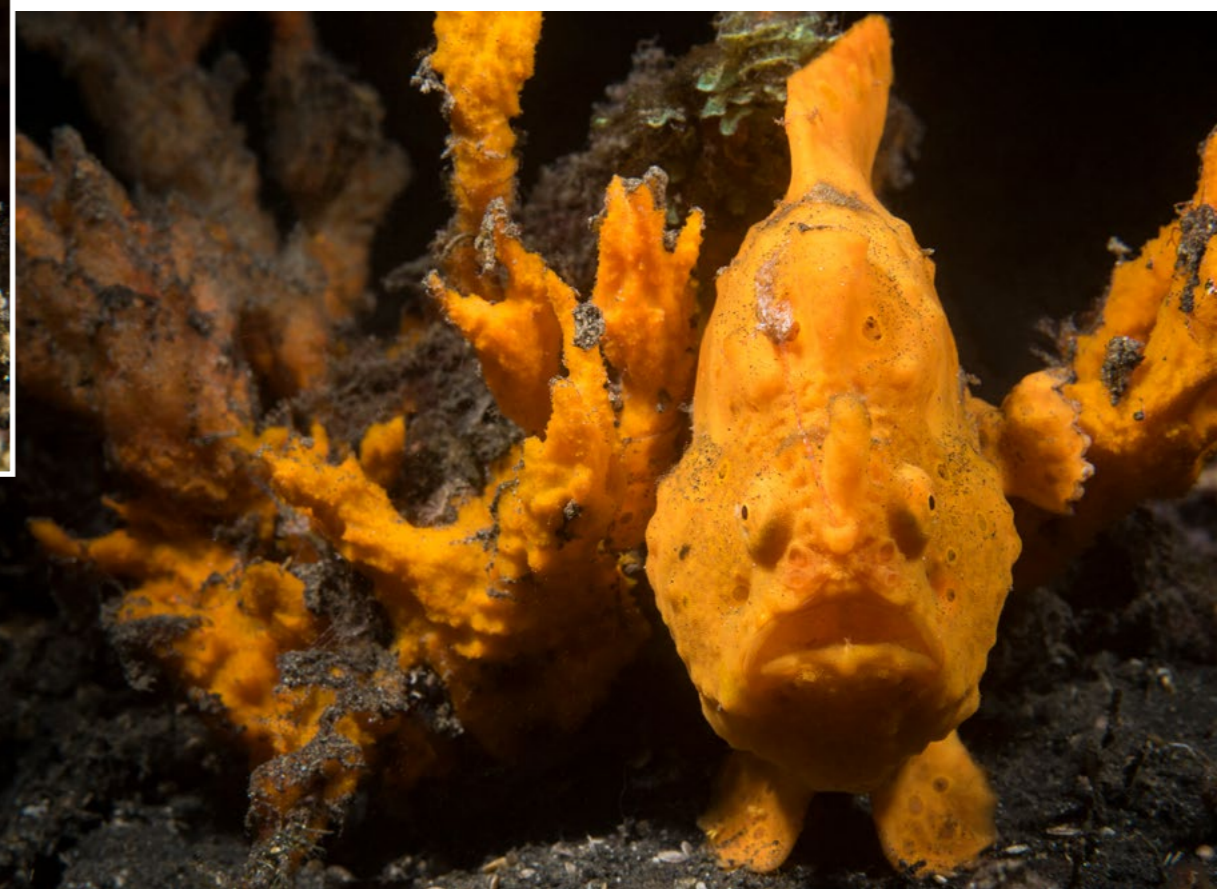
Text and photos by Scott Bennett, Andrey Bizyukin, Larry Cohen, Brent Durand, Frankie Grant, Vladimir Gudzev, Jennifer Idol, Kate Jonker, Matthew Meier, Brandi Mueller, Roman Shmakov, Don Silcock, Olga Torrey, Beth Watson and Andrey Zamyatin

We asked our contributors what their favorite unusual critter dive was and they answered with stories and photos of weird and wonderful creatures, big and small, giving first-hand accounts of their often bizarre behaviors under the waves. *X-Ray Mag* contributors reveal the strange, rare or other-worldly yet endearing denizens of the underwater realm—from the topical paradise of Indonesia and the Philippines to the temperate waters off California, British Columbia, South Africa and South Australia, to the frigid waters of the Barents and East seas off Russia—where they captured images of their favorite critters.





A black-colored giant frogfish on a large pink sponge, Verde Island, Philippines. Exposure: ISO 200, f/7.1, 1/250s (left); A tiny clown frogfish is a juvenile version of a warty frogfish, Lembeh Strait, Indonesia. Exposure: ISO 200, f/29, 1/125s (right)



An orange painted frogfish camouflaged on an orange sponge, Lembeh Strait, Indonesia. Exposure: ISO 200, f/18, 1/250s (right); A juvenile painted frogfish using its angler lure, Dumaguete, Philippines. Exposure: ISO 100, f/11, 1/125s (top center); A portrait of an orange hairy frogfish, Lembeh Strait, Indonesia. Exposure: ISO 200, f/22, 1/125s (top right);

A pink hairy frogfish walking across the black sandy muck, Lembeh Strait, Indonesia. Exposure: ISO 200, f/18, 1/125s (previous page). All photos were captured with a Nikon D810 camera and a Nikon 105mm macro lens in a Subal housing with two Sea&Sea YS-250 strobes and homemade snoots, except for the giant frogfish, which was shot with a Sigma 15mm fisheye lens.

Frogfish

Text and photos by Matthew Meier

One of my favorite critters is the frogfish. Part of the anglerfish family, these lay-in-wait, ambush predators come in a variety of colors, textures and patterns, all designed to help them blend into their environment. The camouflage helps frogfish elude predators and also hide while attracting prey with the use of their lures. When a target is within striking distance, they open their mouths and fully engulf their meals, which can be up to twice their own size, in

as little as six milliseconds. The assault is so rapid that it is difficult to see without the aid of slow-motion cameras. Tiny frogfish that can be found on the reef can be smaller than a pinky fingernail, while the giant frogfish is as large as a soccer ball when fully grown. I am fascinated with the hairy frogfish, also known as the striated frogfish, and am compelled to take photos whenever I am lucky enough to find one. Thanks go to Atlantis Dive Resorts and Liveaboards (atlantishotel.com) and Solitude Liveaboards and Resorts (solitude.world) for hosting these photo adventures. Please visit: MatthewMeierPhoto.com





Harlequin shrimp on hard coral. Exposure: ISO 125, f/29, 1/50s (above); Harlequin shrimp feeding on starfish. Exposure: ISO 125, f/25, 1/50s (right); Harlequin shrimp work in pairs to flip over starfish so they can feed on its tube feet and soft tissues. Exposure: ISO 100, f/29, 1/125s (far right). Camera gear used for all images, which were taken at Seraya Secrets dive site in Tulamben, Bali, Indonesia: Nikon D200 camera, Nikon 105mm macro lens, Hugyfot housing, two Ikelite D125 strobes

Harlequin Shrimp

Text and photos by Scott Bennett

To the uninitiated, it is difficult to comprehend what you are even looking at. Brandishing paddle-shaped claws and a cream-coloured body patterned with red, purple, orange and blue spots, harlequin shrimp must be one of the most photographic critters in the sea. Reaching about 5cm in length, harlequin shrimp reside throughout the tropical Indo-Pacific. Despite their compact size, they have

few natural predators, likely due to toxins present in their bodies. Bright colouration is usually a warning to predators, so the harlequin shrimp is a neon billboard! (Wikimedia)

Its benign appearance masks a grisly character. Living in pairs, harlequin shrimp feed exclusively on sea stars, including the notorious crown-of thorns starfish. Upon detecting the scent of their prey, they work together to flip the starfish on its back, consuming the tube feet and the soft tissues. If unable to right itself, the starfish will then face the prospect of being eaten alive for a

period up to two weeks. (Wikimedia)

I saw my first harlequin shrimp at the Seraya Secrets dive site on Bali's east coast. Swimming along the black volcanic substrate, the impossibly gaudy colouration stood out like a sore thumb. A pair of harlequin shrimp had captured a starfish and were in the process of severing an arm. Utterly preoccupied, they took no notice of my camera, allowing me to fire off a number of images. I was thrilled. The starfish? Not so much. Please visit: xray-mag.com/contributors/ScottBennett





Diving guillemot seabirds, Barents Sea, Russia. Exposure: ISO 400, f/3.5 to f/9.0, 200 to 250s. Camera gear: Canon 5D Mark III camera, Canon 15mm fisheye lens, Subal housing, Inon 240 strobes with TTL converter by UW Technics

Diving Guillemots

Text and photos by Andrey Bizyukin

Land, sea and air—the three domains on Earth. Are all three realms accessed only by special forces SEAL teams or curious, playful seals? No, as it turns out, there are other creatures on our planet that also claim access to all three domains. Intelligent, inquisitive, omnipresent, merciless hunters and far more agile, they are the diving birds. I have travelled the world in search of places where I could observe and photograph these seabirds in their natural habitat. After trips to South Africa, Antarctica and the Galapagos Islands, I finally found that Kuvshin (Jug) Island in the Kandalaksha Nature Reserve, located in the Barents Sea of Russia, was the best and most affordable place to successfully photograph diving birds. In summertime, guillemots and puffins migrate to their nesting places in the Russian North. When their chicks hatch, adult birds begin

to hunt for food for them, flying over land and sea and diving under the water. They will dive to depths up to 30m in search of fish. I participated in a few dive trips over several years to find the right time, weather and conditions to which the birds were accustomed, and which offered a chance to observe and photograph them. The seabirds usually avoided divers, but curiosity often took over and they would quietly begin to watch divers from behind. Underwater, the birds were super-fast, their movements lightning quick. Their dives lasted only a few seconds, during which time they flashed in front of the camera and then disappeared again into the dark depths, leaving you in the empty sea for a long time, waiting and hoping for another encounter. To get lucky shots, I had to do several 1.5- to 2-hour dives in icy waters of 4°C. I used a TTL converter by UW Technics, which really helped a lot. Thanks to this device, most of the images captured were of good quality and had the right exposure. Visit: xray-mag.com/contributors/AndreyBizyukin

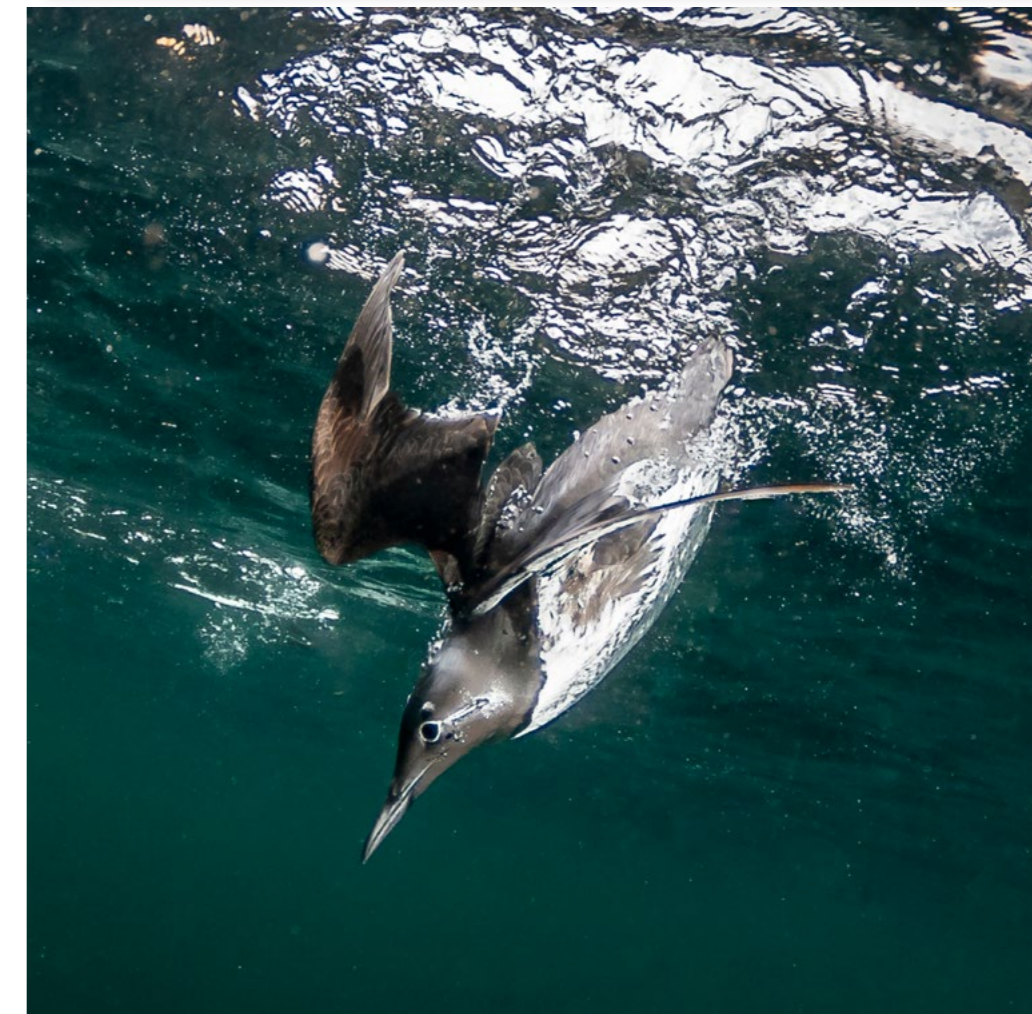
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© Larry Cohen. Left: Exposure: ISO 400, f/9.0, 1/250s (above). Right: Exposure: ISO 400, f/11.0, 1/250s (right).

Male wolf eel with his female mate in the den (wolf eels mate for life), British Columbia, Canada

Wolf Eel

Text and photos by Larry Cohen

Divers in the North American Pacific Northwest consider wolf eels to be very common. But as a diver from the US Northeast, they had been on my bucket list for many years. In 2013, my desire to photograph and interact with these animals came true in British Columbia, Canada. All the walls underwater there teemed with life. This was where I spotted my first wolf eel. These creatures have a face only a mother could love. Wolf eels mate for life. They can grow up to 2.4m (7ft 10in) in length and weigh as much as 18.4kg (41lb). Wolf eels differ from true eels in that they have

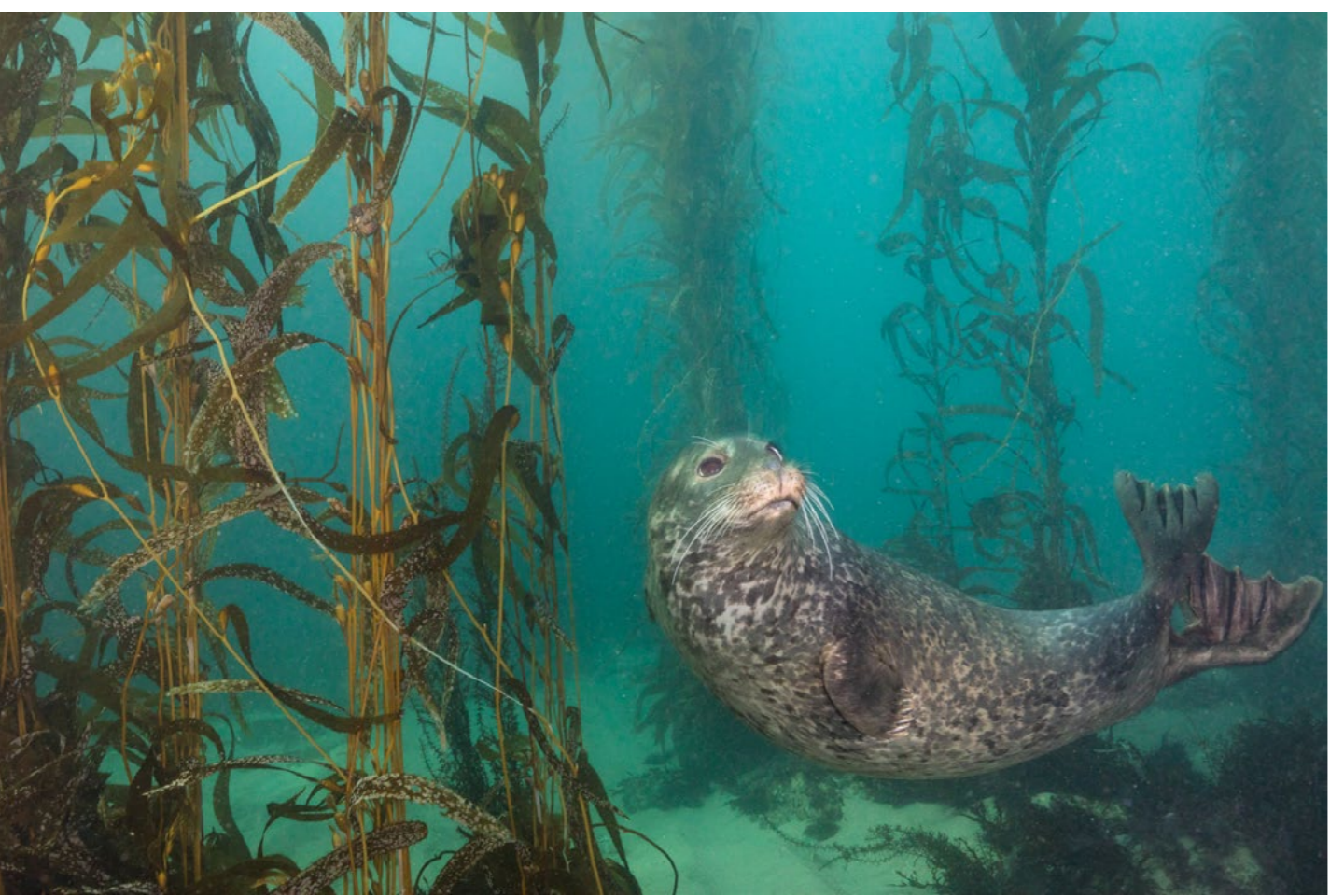
paired gill slits and pectoral fins (Wikipedia).

Beauty is in the eye of the beholder, and these gentle fish have a charming personality. They feed on invertebrates with hard shells, including sea urchins, mussels and clams. Wolf eels are able to crush through the shells with their strong jaws. Not aware of this fact, my dive partner Olga Torrey and I opened and fed sea urchins to our new wolf eel friend. But our new buddy gently grabbed the sea urchins from our hands. It chomped through the hard shell and spines with its powerful jaws. At that time, I was shooting with the Olympus E-620 DSLR in the Olympus PT-E06 housing. The lens was the Olympus 7-14mm four-thirds lens and I used two Olympus UFL-02 strobes for lighting. Visit: liquidimagesuw.com



Dive partner Olga Torrey feeding a sea urchin to our new wolf eel friend (above)

Wolf eel using his strong jaws to crush a sea urchin (left)



California Harbor Seal

Text and photos by Brent Durand

California harbor seals (*Phoca vitulina*) never cease to capture my full attention. Many of my saltwater friends can recount magical interactions with these shy pinnipeds; however, I rarely seem to have that luck. I usually see a flutter or a shadow in the distance and know it is a seal, based on its movements—then, nothing more. But one day in Malibu, that all changed. I found myself spending an hour freediving with a curious but shy seal, which I had seen around the reef in recent weeks. I ran to the car, switched to scuba, grabbed my camera, and finally, the seal came up to play, like a timid puppy. It nibbled on my fins, inspected what I pretended to find very interesting, and just had a great time. It followed me to shore, once I had to go, but then became shy when I swam out with my next tank. I welcome all seals to join me on any dive! Visit: tutorials.brentdurand.com



Playful harbor seal nips at the author's fin

THIS PAGE: Harbor seal (*Phoca vitulina*), Malibu, California, USA. Exposure: ISO 1250, f/14, 1/100s. Camera gear: Canon EOS 5D Mark IV camera, Canon 16-35mm f/4L lens, Sea&Sea housing, Sea&Sea YS-D1 and YS-D2 strobes



Garibaldi fish (*Hypsypops rubicundus*) guards its brood of eggs on a heart-shaped rock, Islas Coronados, Baja California Norte, Mexico. Exposure: ISO 125, f/8, 1/125s. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, dual YS-D2 strobes

Angelshark and Garibaldi

Text and photos by Frankie Grant

A couple of my favorite unusual critter dives took place off the coasts of the US state of California and the Mexican state of Baja California.

La Jolla Shores is quite famous in Southern California for its remarkable night shore dives and unique wildlife encounters. One such creature, the Pacific angel shark, can be seen here resting on the sand. They will bury

themselves into the sand, perfectly camouflaged, and hunt fish under the cover of darkness.

When people think of the Coronado Islands in Mexico, the sea lion rookery is usually the highlight. But, tucked amongst the rocks is a thriving ecosystem, including sheephead, kelp bass and Garibaldi fish. The Garibaldi, pictured above, is guarding its nest under a rock ledge. One can see several bite marks where other fish have preyed upon the eggs. It is quite intriguing, though, how the rock on which the nest was laid had a bit of a heart shape. Visit: frankiegrant.com



Angel shark (*Squatina californica*), La Jolla Shores, San Diego, California, USA. Exposure: ISO 400, f/11, 1/200s. Gear: Canon EOS 7D Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, dual YS-D2 strobes

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American paddlefish (*Polyodon spathula*) filter-feed with their mouths open. Exposure: ISO 400, 26mm, f/7.1, 1/250s. Camera gear: Nikon D5 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes (above)

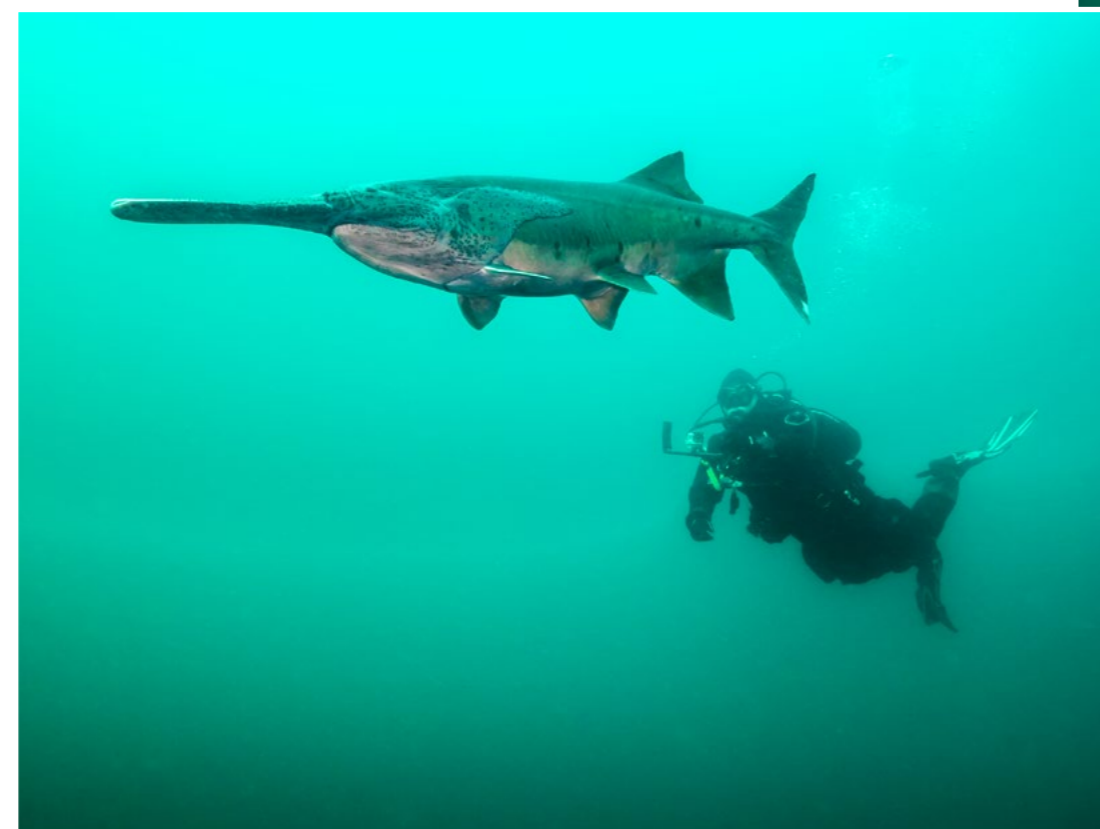


American Paddlefish

Text and photos by Jennifer Idol

I first learned of the American paddlefish (*Polyodon spathula*) during my 50-state journey, diving in each state of the Union [Ed. – see the author's book, *An American Immersion*]. Listed as a vulnerable species, they are the last of their kind. The Chinese paddlefish was declared extinct last year, leaving this prehistoric wonder as the only living relative. This living fossil dates back to the Early Cretaceous and is closely related to sturgeon, another primitive fish. Once

prolific, these fish are hunted for their unique shape and roe. They were extinguished from their original northeastern habitats in the United States. They live in rivers and are supported as a species by hatcheries. Since a current is required for them to reproduce, damming of rivers has further reduced their population. Similar to basking sharks, these fish are filter feeders and can be seen swimming through murky water filtering zooplankton. I return annually to lead a trip at Loch Low-Minn quarry lake in Athens, Tennessee, to share the experience of encounters with others. Please visit: uwDesigner.com



A diver swims up to photograph a large paddlefish. Exposure: ISO 400, 19mm, f/5.6, 1/160s. Camera gear: Nikon D5 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes (above); The rostrum, or snout, helps paddlefish locate zooplankton so they can filter-feed. Exposure: ISO 400, 35mm, f/6.3, 1/200s. Camera gear: Nikon D610 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes (right)



The silhouette of a paddlefish is unique due to its snout and reminiscent of sharks. Exposure: ISO 800, 24mm, f/7.1, 1/200s. Camera gear: Nikon D610 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes

A diver swims up to photograph a large paddlefish. Exposure: ISO 400, 19mm, f/5.6, 1/160s. Camera gear: Nikon D5 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes (above); The rostrum, or snout, helps paddlefish locate zooplankton so they can filter-feed. Exposure: ISO 400, 35mm, f/6.3, 1/200s. Camera gear: Nikon D610 camera, Nikkor 16-35mm lens, Nauticam housing, Inon Z240 strobes (right)

feature

A profile view of the rare Acoel flatworm at Steenbras Deep in Gordon's Bay, Cape Town, South Africa, with eye spots and what looks like a nose and mouth, reminding me of "Casper the Friendly Ghost" from childhood cartoons. Exposure: ISO 320, f/18, 1/250s. Camera gear: Canon EOS 7D Mark II camera, Canon 60mm macro lens with +15 diopter from Fantasea Line, Sea&Sea housing, two Sea&Sea YS-D1 strobes (right)

The incredibly rare and seldom-seen Mandela's nudibranch (*Mandelia mirocornata*) at Steenbras Deep. Exposure: ISO 320, f/18, 1/250s. Camera gear: Canon EOS 7D Mark II camera, Canon 60mm macro lens, Sea&Sea housing, two Sea&Sea YS-D1 strobes (below)



Rare Flatworm and Nudibranch

Text and photos by Kate Jonker

Named for its distance from the land rather than for being particularly deep, Steenbras Deep is a vast reef, running parallel to the eastern coast of False Bay, South Africa. Life here is extraordinary and rare critters abound—from crazy, grey elephant-ear-like sponges and seldom-seen Mandela's nudibranchs (*Mandelia mirocornata*), to weird smooth horsefish (*Congiopodus torvus*) and snakehead toadfish (*Batrachthys apiatus*).

One of the most fascinating and unusual critters you will find is a tiny, white, undescribed species that can morph into various shapes—reminding me of a 4mm-long "Casper the Friendly Ghost" from my childhood comic books. Although referred to as an Acoel flatworm, this species has local marine biologists stumped as it does not have a stomach and verdict is still out as to what it is. Steenbras Deep is an exciting dive as one never knows what rare and unique critters one will encounter—but one thing is certain, you can expect the unexpected! Visit: katejonker.com

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Tongue-eating louse, Lembeh Strait, North Sulawesi, Indonesia. Exposure: ISO 200, f/20, 1/200s. Camera gear: Nikon D850, 105mm lens, Ikelite housing, dual Ikelite DS161 strobes (above)

Tongue-Eating Louse

Text and photos by Brandi Mueller

Like something out of a horror movie, the tongue-eating louse is an underwater creature out of a nightmare. These parasitic isopods access the fish through the gills and attach to its tongue, slowly digesting it until the isopod basically becomes the fish's tongue. These isopods can be found in many places around the world, but nowhere else in my dive travels have I found them to be so prolific, and also a bit specific, as in Indonesia. Many clownfish and anemone fish in Indonesia's Lembeh Strait seem to be suffering from these parasites. Often, they open their mouths and we can see two tiny eyes looking back at us. Ouch! Not all isopods take over tongues though; this long-nose hawkfish (right) in Raja Ampat, Indonesia, has one living on the outside of its body. Visit: brandiunderwater.com



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Parasitic isopod, Raja Ampat, Indonesia. Exposure: ISO 250, f/18, 1/200s. Camera gear: Nikon D850, 105mm lens, Ikelite housing, dual Ikelite DS161 strobes (below)



Diver with rare blue king crab in attack position, Barents Sea near Teriberka, Russia. Camera gear: Canon 5D Mark II camera, Canon 15mm fisheye lens, Subal housing, Inon 240 strobes in manual mode. Exposure: ISO 100, f/6.3, 1/160s.

Very Rare Blue King Crab

Text and photo by Roman Shmakov

On a recent trip in early summer, my dive partner and I traveled along the eastern coast of the Barents Sea. The Gulf Stream cools down and ends at this point; hence, underwater life here is even richer and more diverse than in Norway. In the open sea, just opposite the local village of Teriberka, we descended down to a depth of 15m in cold clear water with a temperature of 4°C. We found a large company of king crabs waiting for us at the bottom.

Once upon a time, biologists had

brought these crabs here from the Pacific Ocean and now they have completely taken root. King crabs are very active at this time of the year. They protect their territories on the seabed and attack each other and even curious divers. For some reason, I spotted one very large crab of blue color and decided to photograph it close-up. The crab took on a terrifying pose and came at me, fearlessly, threatening me with its huge claws—maybe because it saw its reflection in the dome port of my camera and mistook it for another male.

At the time, I was afraid it might cling to me and bite off my regulator hose or flash cables, but my dive buddy understood what was

going on and tried to distract the crab, and at the same time, illuminate it with a red light. This was how the shot of the attacking crab came about.

Later, I learned that I had, in fact, taken a unique photo of a very rare blue crab (*Paralithodes platypus*), which usually live at a depth of 100 to 300m, can reach 5kg in weight and live up to 25 years. Marine biologists told me that it was a real achievement to meet and photograph such a unique creature underwater in its natural habitat.

Guest contributor Roman Shmakov is an avid diver and underwater photographer based in Moscow, Russia.

Giant Pacific Octopus

Text and photos by Vladimir Gudzev

On one particular dive off the Russian coast on the northern end of the East Sea (also known as the Sea of Japan), in the vicinity of Ore Pier, my dive partner and I searched the sandy sea bottom dotted with rocks at a depth of 22m, with a specific purpose—we were hoping to meet octopuses. In this place, two varieties of octopus were usually found: the giant Pacific octopus (*Enteroctopus dofleini*) and the sandy octopus (*Octopus conispadi-ceus*). Giant Pacific octopuses can grow up to 5m in length and up to 60kg in weight, but this is rare. They usually reach around 20kg. In contrast, the sandy octopus is small, weighing usually about 4kg.

Octopuses can be found at a depth of about 20m, where the water is cold (6-10°C). On this dive, which took place in September, water temperatures at the surface were 17-20°C. As we searched the sea bottom, we acci-

dentally scared a large octopus, apparently a giant Pacific octopus. There was a dignity and elegance in its behavior as it displayed its abilities in mimicry, moving, swimming, taking threatening postures and releasing ink. And then, it disappeared into the crevices of the rocks. We were lucky to capture a shot of it.

Vladimir Gudzev is an avid diver and underwater photographer based in Moscow, Russia.



Diver with giant Pacific octopus, East Sea, Russia. Exposure: ISO 200, f/5, 1/80s. Camera gear: Olympus E-410 SLR camera, Olympus M.Zuiko digital ED 8mm f/1.8 fisheye lens, Olympus housing, Olympus strobe in PFL-01 underwater protective case.



THIS PAGE: Australian giant cuttlefish cuddling. Exposure: ISO 250, f/11, 1/250s. Camera gear: Nikon D500 camera, 8-15mm lens, Nauticam housing and dual OneUW 160X strobes

Australian cuttlefish gather to mate. Last year, I went back again to fulfill a promise made during the Sardine Run in South Africa to my great Italian diving buddy Filippo Borghi (instagram.com/filippoborghi5) that I would show him what I consider to be the finest that Australia has to offer underwater. It was the best trip ever and it is now obvious to me that in terms of getting close to incredible animals during a special moment in time (for them), it is my favorite unusual critter dive! Space does not allow for why so many cuttlefish gather and what exactly is going on, besides the basic theme of "it's sex at its most rampant," but trust me, it is an incredible spectacle to observe. There is a full explanation, together with some of my best images, available on this link to my website: **The Australian Giant Cuttlefish.**

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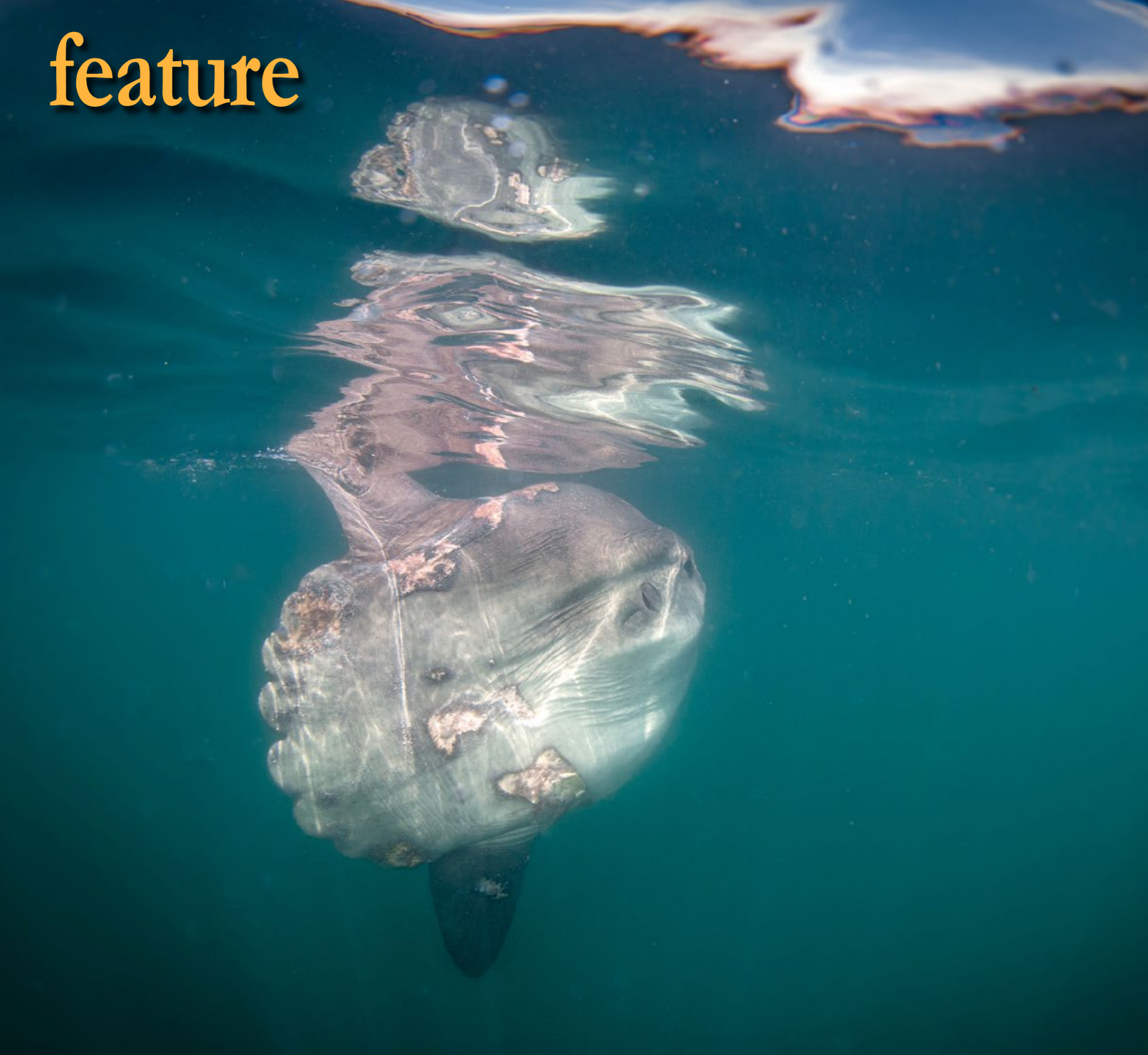



Australian Giant Cuttlefish

Text and photos by Don Silcock

"What's your favorite unusual critter dive?" Sometimes, it takes a really obvious question to make you realize just how good your own backyard is. About six years ago, I got the "big animal" bug and started to travel great

distances to experience and photograph some of the incredible aggregations that occur each year around the world. Those journeys took me to the Bahamas (three times), both coasts of Mexico, the Azores, South Africa (three times), Tonga (twice) and Japan (twice) as I sought to capture what happened at those special and quite unique events. I also returned to Whyalla in South Australia, where each year tens of thousands of giant



Ocean Sunfish (*Mola mola*)

Text and photos by Olga Torrey

Our goal, while snorkeling off Montauk, New York, USA, was to photograph blue sharks. This trip turned into a once-in-a-lifetime experience. A curious adult blue shark stayed with us for three hours, to our delight.

We were all back on the boat, getting ready to head back to the shore, when, suddenly, an ocean sunfish (*Mola mola*) appeared on the stern side of our boat. My friend Sandra and I jumped back in the water. This fish is native to temperate waters around the world (Wikipedia), and I knew they existed in the

waters of the Northeast. I had always wanted to photograph one, and here was my chance.

Ocean sunfish are one of the heaviest known bony fishes in the world. Adults typically weigh up to 1,000kg, or 2,205lb (Wikipedia). The one I encountered, was a small juvenile, but still impressive. It is hard to believe that a fish this flat could weigh so much. The magnificent creature stayed with us for only a few minutes. This did give me enough time though to take photographs with my Olympus OM-D E-M5 camera in a Nauticam housing. I used the Panasonic Lumix G fisheye 8mm f/3.5 lens and Sea&Sea YS-D1 strobes for lighting. Please visit: fitimage.nyc

Critter Dives

Using bait to attract blue sharks for photography, Montauk, New York, USA (left)

Juvenile ocean sunfish (*Mola mola*) in the waters off Montauk (far left)

Technical diver Sandra Clopp snorkeling and photographing the ocean sunfish (below)





A blackfin snake eel (*Ophichthus altipennis*) emerges from the sea floor to be cleaned by the shrimp (*Periclimenes magnificus*). Exposure: ISO 160, f/18, 1/160s. Camera gear: Canon EOS 5D Mark III camera, Canon 100mm 2.8 lens, Nauticam housing, Ikelite DS125 strobe, Retra LSD

A blue-ringed octopus (*Hapalochlaena*) holds on to and stretches out along the rocky substrate. Exposure: ISO 160, f/16, 1/160s. Camera gear: Canon EOS 5D Mark III camera, Canon 100mm 2.8 lens, Nauticam housing, Ikelite DS125 strobe, Retra LSD



Eels and Octopuses

Text and photos by Beth Watson

The Nudi Falls dive site in Lembeh Strait, Indonesia, is amazingly diverse and one of my favorite dives for macro critters. There is a short mini-wall in the shallows, which is home to a wide variety of marine life. A rocky reef and sandy slope extend out from the wall, providing a plethora of exotic, weird and wild critters to photograph. There is a beautiful soft coral garden, beginning at around 20m, which extends into deeper water. The area is a hotspot for rich marine life and biodiversity. Nudi Falls can be dived time after time, and it never gets tiresome. Divers will be awed and astounded by the life found on each and every dive. It's a mystery—you never know what will pop up! Please visit: bethwatsonimages.com



Wunderpus octopus (*Wunderpus photogenicus*) strolls along the ocean floor in Lembeh, Indonesia. Exposure: ISO 160, f/20, 1/100s. Camera gear: Canon EOS 5D Mark III camera, Canon 100mm 2.8 lens, Nauticam housing, Ikelite DS125 strobe, Retra LSD



THIS PAGE: Lemon sharks during a feeding frenzy on a shark dive at Tiger Beach in the Bahamas. Exposure: ISO 200, f/8.0, 1/60s. Camera gear: Sony NEX 7 camera with a composite fisheye lens, Nauticam housing, two Inon Z240 strobes.



Lemon Sharks

Text and photos by Andrey Zamiatin

Tiger Beach, located in the Bahamas, is well-known for offering unique opportunities for shark photography in natural conditions without cages. The *Dolphin Dream*, which departs from West Palm Beach, provides keen underwater photographers a chance to take photos of lemon sharks. The photo shoot in which I participated took place during a feeding frenzy, when sharks were fed grouper fish heads, right next to us divers. Special care and detailed instruction were required to do the dive.

These yellow-skinned beauties live in the warm waters of the Caribbean Sea, not far from the Gulf of Mexico and the Bahamas archipelago, sometimes moving on to the Atlantic Ocean. The short-winged, sharp-toothed shark got its name from the light brown color of its huge 3m-long body, which helps it to disguise itself on sandbanks.

Lemon sharks have interesting character traits. They also have good memories. By the way, it is the lemon shark that has the highest intelligence among the various shark species. Indeed, it is a species that can seem very vengeful. There is a well-known case that occurred on the reefs, in which a lemon shark, after a skirmish with a

Caribbean shark, furiously attacked all the reef sharks swimming in their usual territories. In principle, the lone short-winged lemon shark quite simply provoked an attack. A lemon shark will attack—not interfere, but attack—other sharks. That is why these sharp-toothed predators can claim their rightful place on the list of formidable sharks. However, lemon sharks are a threatened species due to overfishing and predation. There is, unfortunately, high demand for their skin, fins and meat.

Guest contributor Andrey Zamiatin is an avid diver and underwater photographer based in Moscow, Russia. Visit: zamiatin.com



California's
Channel Islands

— Kelp Diving on the US West Coast

Text and photos by Frankie Grant



Due to their unique position relative to the eastern Pacific current, or the California Current, the Channel Islands off California's coast receive an ideal amount of nutrients and water circulation for optimum growth of California giant kelp. This colonial algae forms forests over the rocky reefs and walls surrounding the islands, and act as one of the world's most productive marine ecosystems. Eight islands and numerous off-shore seamounts comprise this island chain, which is for the most part uninhabited and full of unique anchorages and protected coves for divers to explore.

After a smooth night crossing from San Diego, I awoke to the sound of a freed anchor and the gentle tug as it sat firm in the sand. I rose to the deck, eyes wide once the morning's coffee was prepared, to an almost glass-like sea near the southern tip of San Clemente Island. Cloudy skies presented a grayness over the ocean, but it was no indication of the vibrance and solitude I would soon find beneath the waves.

I sometimes say in jest, SoCal shore divers spend most of the year testing, breaking or losing their new gear with the goal of joining at least one five-day trip out to the Channel Islands. And with good reason; enthusiastic divers can find whatever experiences they are looking for in this area. From beginner up through the ranks, the possibilities are quite endless. Walls lined with kelp, seagrass beds, rocky reefs, canyons, pinnacles, caves, rookeries, wrecks, sandy flats—the list continues with all



Bat star at Santa Cruz Island (above); School of señoritas, a species of cleaner wrasse, in the kelp forest at San Clemente Island (top right); Forest of California giant kelp at Santa Barbara Island (previous page)

Detail of giant California kelp at Santa Barbara Island in California's Channel Islands



California sea lion at Santa Barbara Island (above); California sheep-head with red gorgonian at Santa Barbara Island (right inset)

the possible locations one can explore underwater.

During late summer, visibility can even reach 100ft (30m) at some dive sites, as blue water flowing unobstructed across the Pacific finally meets land. The kelp forest can be viewed as being similar to a rainforest, as distinct zones emerge while moving up or down through the water column. The canopy, understory and floor of the kelp forest all come with their own cast of creatures and characteristics.

Established in 1980, the Channel Islands National Park is comprised of 390 sq mi of protected marine and terrestrial habitat, and are made up of two unique island groups. The Santa Catalina group to the south includes Santa Barbara,

San Nicolas, Santa Catalina and San Clemente islands. The Northern Islands are composed of Santa Cruz, Anacapa, San Miguel and Santa Rosa islands.

Archaeologists have traced the history of this archipelago as far back as 7500 BP when the Northern Islands were settled by maritime Paleo-Indian peoples. Today, these islands stretch 150mi (240km) along the southern Pacific coast and are largely pristine.

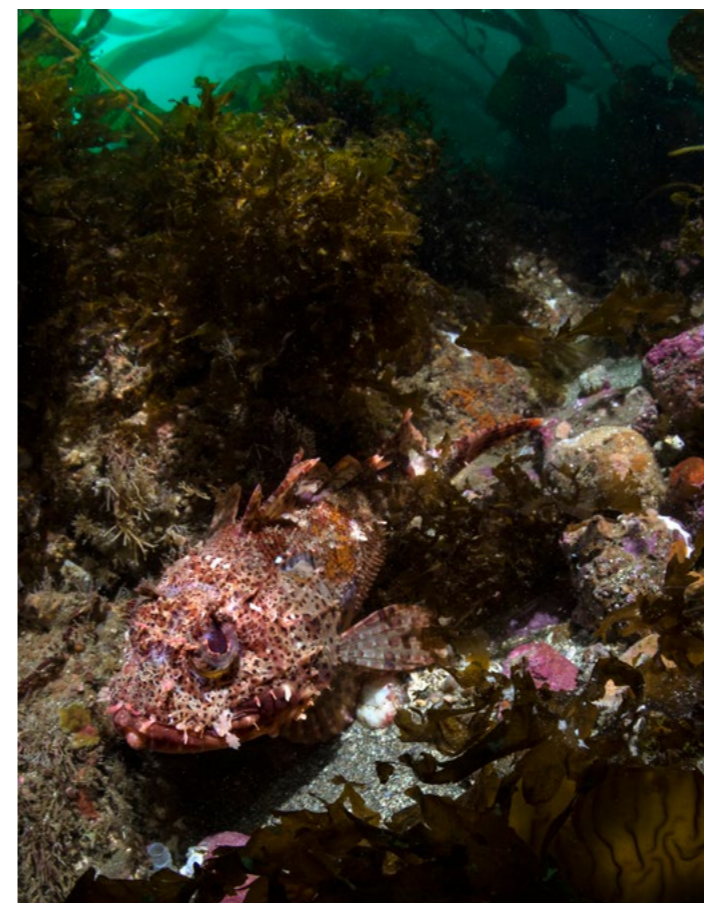
Getting out there

Located a mere 22mi (35km) from the shore, Santa Catalina, which is the only island with permanent residents, boasts year-round scuba diving, seeing huge spikes during the busy summer season.

Portrait of a California golden gorgonian in a kelp forest at San Clemente Island



Bat star at Santa Cruz Island (above)



Well-camouflaged scorpionfish at Santa Cruz Island (above); Southern sea palm at San Clemente Island (top right); Red gorgonian at Santa Barbara Island (top left)

Apart from Catalina, the Channel Islands are too far a journey for the business-oriented day boat, which puts them comfortably in the range of multiday liveaboard vessels, seeking only the best sites the islands have to offer. Several vessels run multiday trips departing from San Diego, San Pedro, Long Beach, Santa Barbara and Ventura.

For vessels departing from San Diego Harbor, it only takes about six hours to reach San Clemente, although a slower

crossing lends itself to a more comfortable sleep schedule and puts divers at the dive site just as the sun rises.

Diving

We are now back to our anchorage at the southern end of San Clemente Island, a little more than 70mi (112.5km) northwest of our departure point at San Diego Harbor. At the southern end of San Clemente, divers will find well-protected walls lined with kelp, hosting a full range of species,

ranging from a 7ft (2m) black seabass down to the Porter's chromodorid, measuring 1.33in (34mm) at most.

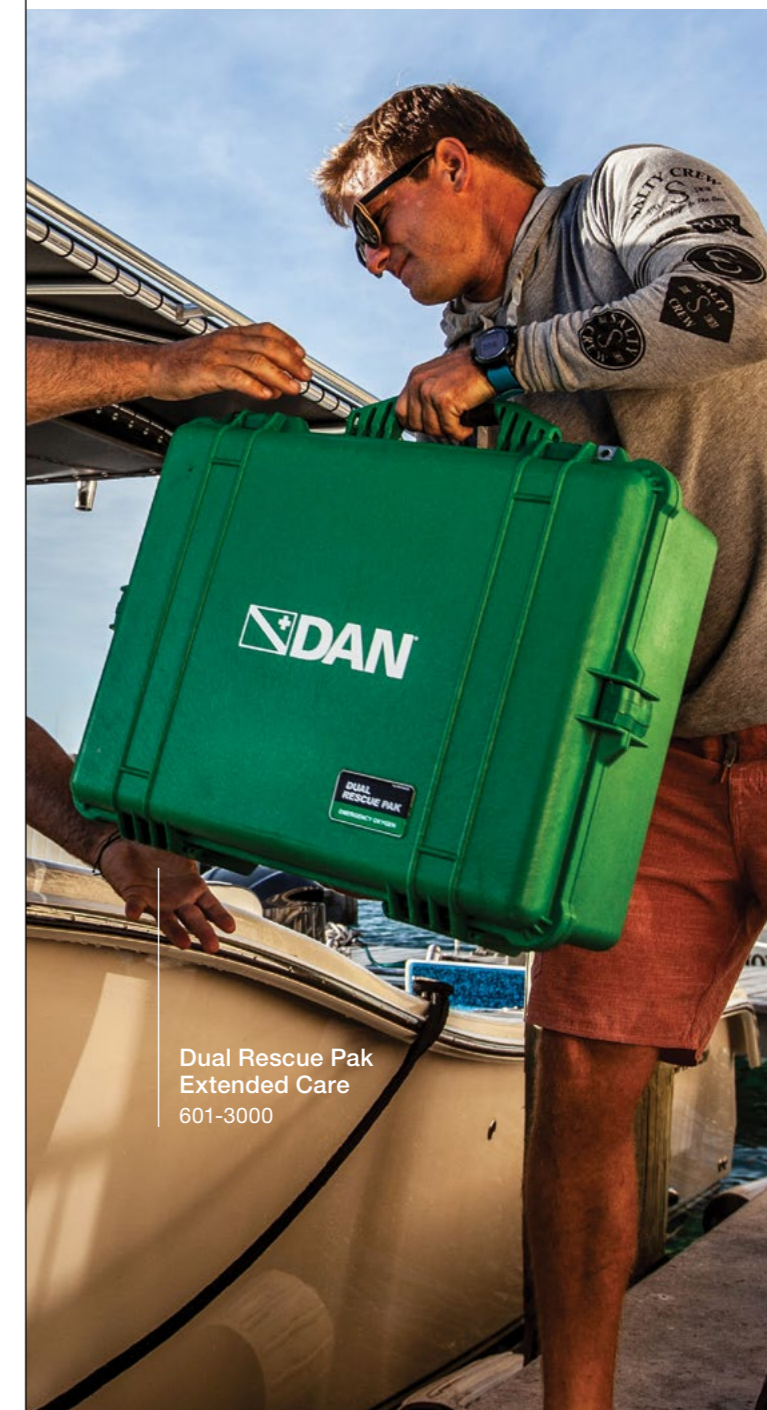
Pyramid Cove. I geared up for our morning dive at Pyramid Cove. Glancing over the side of the vessel, I was immediately hypnotized by the view from the top of a kelp stalk down to the rocks maybe 70ft (21m) below. Upon further inspection dur-



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ing my dive, the wall of kelp was constantly buzzing with schools of blacksmiths, señoritas and jack mackerel all looking for their morning meal.

Swiss Cheese. Our next dive was a seldom-visited site known as Swiss Cheese, dubbed so for a large rock outcropping dotted by the many swim-throughs crossing its interior and exiting every rock

face except the bottom. I spent half of the dive waiting in the adjacent kelp patch until most of the divers had lost interest in the uninviting tunnels. It was then I could fully examine how intricate

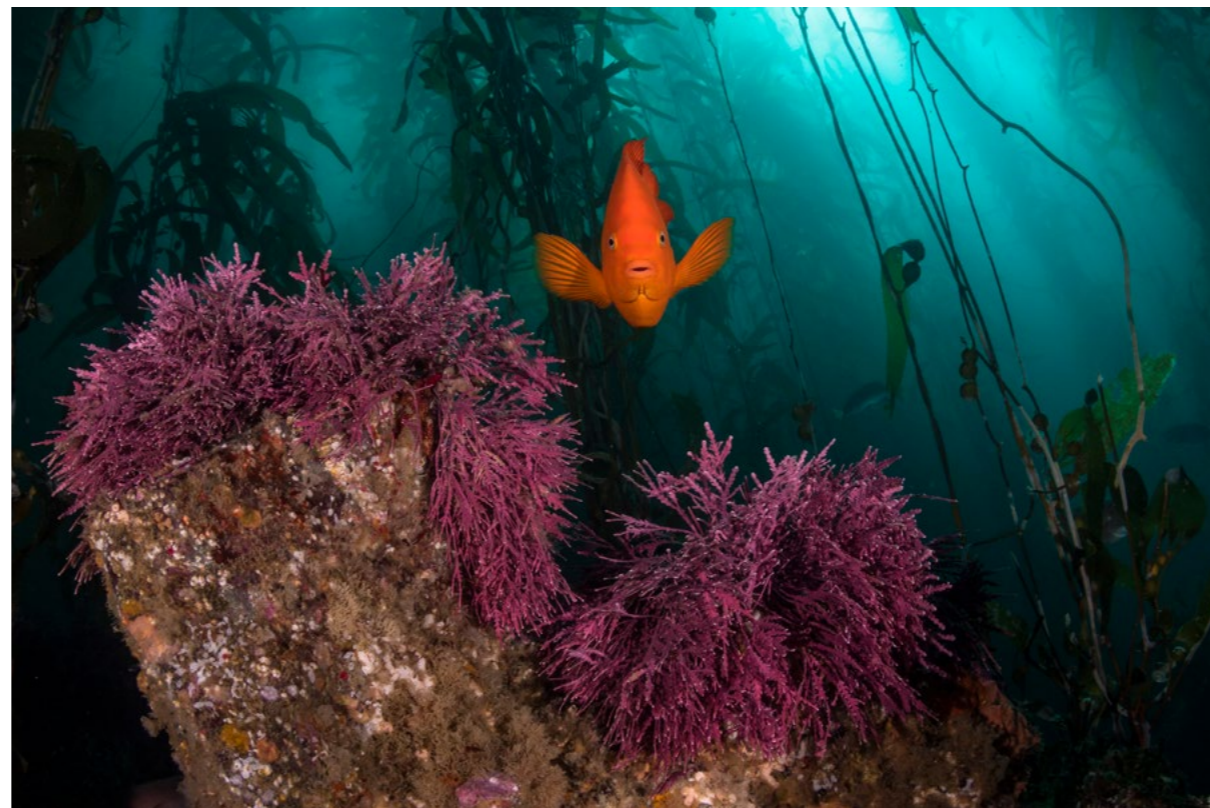
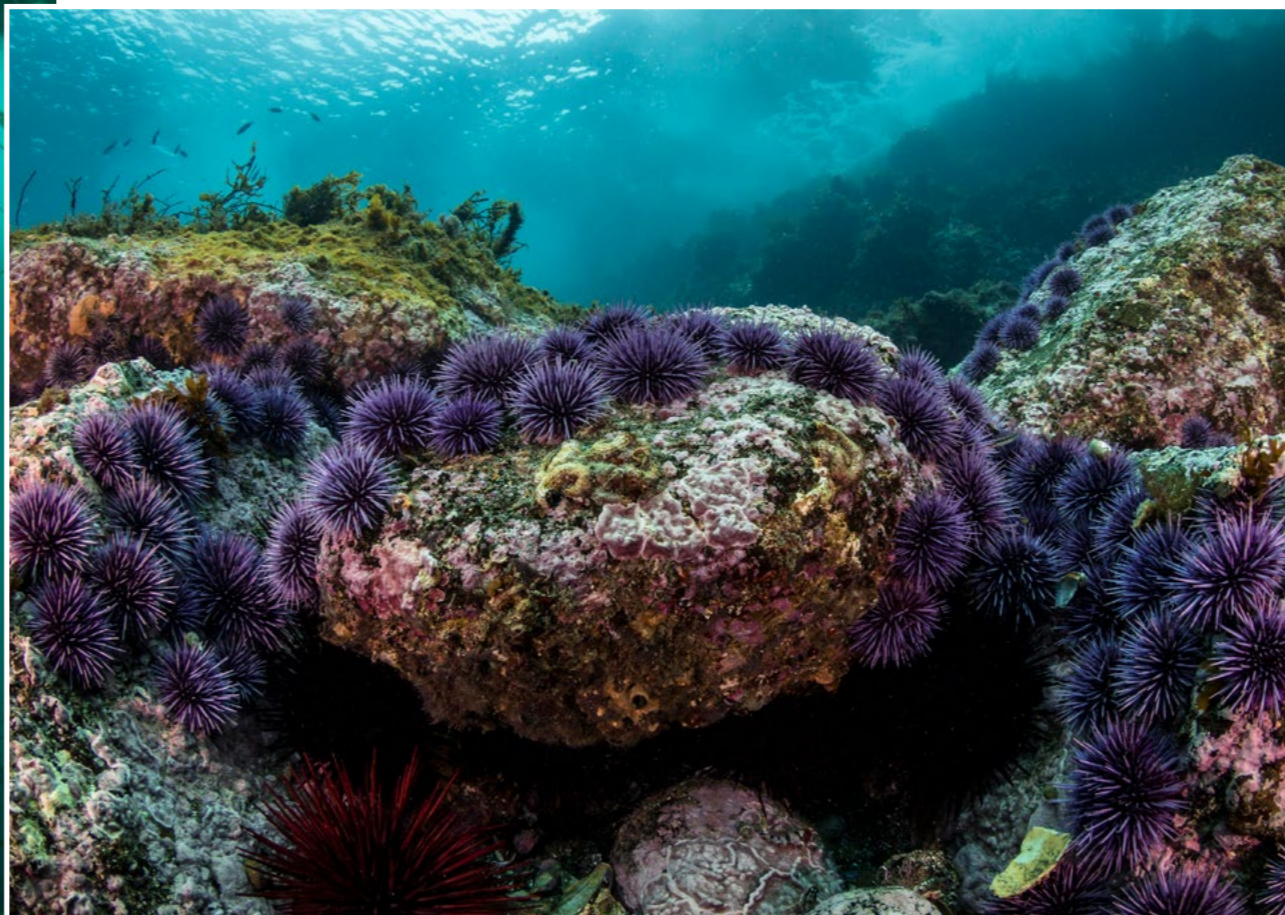
the tunnels were; I found myself in awe of the countless crevices filled with more lobsters than one could count.

Santa Catalina Island. North

to land, Catalina boasts some of the richest kelp forest and largest populations of the endangered black seabass. Although Avalon dive sites are easily accessible to the local shore diver, many excit-

ing dive sites can be explored by boat, such as the famed Farnsworth Banks. The island is surrounded by plunging walls and deep drop-offs, most of which are lined with California giant kelp. At the southern end of the island, in Avalon, shore divers consistently flock to Casino Point, known for its easy logistics and entry. This is one of the most commonly dived shore sites in the entire Channel Islands National Park.

St Nicolas Island. St Nicolas Island's remoteness and weather-dependency make it a rare treat for divers, but lucky guests will enjoy some of the most pristine kelp forests in all the Channel Islands, including schooling fishes, torpedo rays, oversized lobsters,









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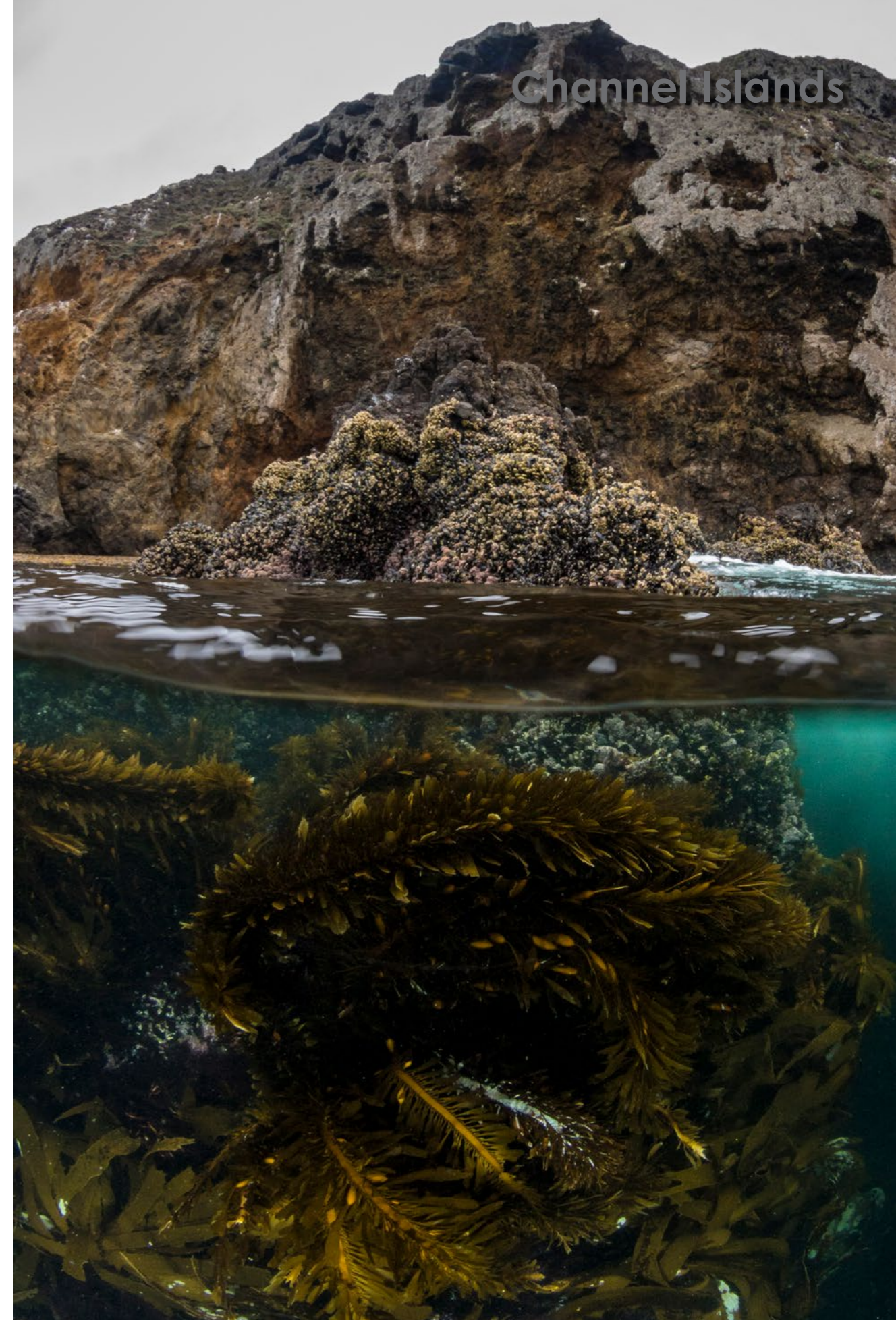




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California sheephead and golden gorgonian at San Clemente Island (far left); Purple sea urchins at Urchin Barren dive site off Santa Barbara Island (top center); Garibaldi fish and coralline algae on rocky reef at Santa Barbara Island (left)





Channel Islands

and occasionally, even tope sharks and harbor seals.

Santa Barbara Island. Popular in both diving and birding circles, Santa Barbara Island is also home to the largest breeding colony for Scripps's murrelet, a threatened seabird species. Since this habitat has been designated of critical importance, the establishment of a state marine reserve has boosted local populations to incredible levels. The southern side of the island, including Sutil Rock, is composed of rocky reef kelp forests filled with seabass, kelp bass, harbor seals, sea lions, Garibaldi fish and the usual suspects—all going about their day within the protective strands of California giant kelp. The best kept dive secret on this small island is definitely Sutil Rock, where divers will find

a dense, shallow kelp forest abutted by a large rock exiting the water on one side and a channel on the other. Keep your eyes open as literally any creature documented in the kelp forest could potentially make an appearance.

Marine life

The migratory nature of many marine mammals off the coast of California lends to the abundance and sightings of cetaceans and pinnipeds throughout the Channel Islands, as the numerous protected bays act as safe harbors for humpbacks making their annual migration as well as hunting grounds for California sea lions living on the coast and venturing far from home to supply vital nourishment to their young.

Throughout the islands, the uneven

rocky structure creates plenty of attachment sites not accessible to giant kelp. These areas are normally filled in by red and golden gorgonian colonies filtering the water for nutrients. California sheephead (*Semicossyphus pulcher*) act as a regulator of the kelp forest, by destroying the very thing which destroys the kelp: purple sea urchins. Their unique mouths allow them to crush prey, such as urchins and bivalves, effortlessly.

In recent years, the islands have come under attack from the purple sea urchins, crippling entire areas of once-productive reefs, turning them into urchin barrens, devoid of life or kelp. Marine protected areas such as the Channel Islands National Park serve to restore balance to this fragile ecosystem through many different projects, including urchin

Over-under shot of feather boa kelp at Anacapa Island (above); A bright orange Garibaldi fish and crimson-colored California sheephead with red gorgonian at Santa Barbara Island (top left)





Diver with pair of Spanish shawls, which have just mated, at Santa Cruz Island

CHANNEL ISLANDS FAST FACTS

WATER TEMPERATURE: 65-70°F (18-21°C) in summer; 50-52°F (10-11°C) in winter

EXPOSURE PROTECTION: 7mm wetsuit with hood, or drysuit

VISIBILITY: 60 to 100ft (18-30m) in summer and fall; 40 to 60ft (12-18m) in winter and spring

MUST-DIVE SITES: Swiss Cheese, Inside Boiler, Pyramid Head, Farnsworth Bank, Sutil Rock, Cortes Banks, Little Flower

WHEN TO GO: July to November. The Channel Islands are only accessible via boat. Make sure to check current closures from the US Navy.

PRO TIP: Always have a snorkel handy. Even if you do not prefer to wear one while diving, the opportunity to hop in the water with a unique marine animal is always around the corner. Think whales, ocean sunfish (*Mola mola*), dolphins, baitballs and blue sharks. ■

Drifting pyrosome at Santa Clemente Island (left); Harbor seal playing hide-and-seek in the kelp forest at Santa Cruz Island (left center)

removal and no-take zones.

One creature seldom overlooked is the Garibaldi damselfish (*Hypsypops rubicundus*). With its orange skin and bold nature, this territorial fish makes its presence known and seemingly spends its entire day arguing with its neighbors. Nonetheless, it is great to see them in such numbers.

Ecology and topography

Kelp fronds move with the surge as sunbeams slowly shine through the empty spaces in the canopy, creating something of a swaying underwater cathedral, complete with patrons going about their day. These are the sights that await a diver on an average day in a Channel Island's kelp forest, and their memory is not soon forgotten.

While eastern Pacific kelp forests range from Alaska south to Baja, those hidden among the Channel Islands are a benchmark for this diverse, yet threat-

ened, ecosystem. California giant kelp will range from the water's surface all the way down to depths of over 100ft on the rocky ocean floor. These thick communities of kelp strands act to insulate interior island reefs from the heavier storm surge, creating "mangrove-like" marine zones ideal for juvenile fish and invertebrates. These islands receive cold water currents from the north as well as warm water currents from the south, thus creating a proverbial mixing bowl of ideal conditions for high abundance and species diversity.

In years when the tides are right, giant kelp (*Macrocystis pyrifera*) can grow at a rate of two feet (70cm) per day, breaking the surface at high tide. Although this may look like a plant in the photos,

giant kelp is not a plant at all. It is actually a type of algae belonging to the kingdom Chromista. Most Chromists are single-celled and too small to see with the naked eye, but giant kelp grows to become the largest algae on the planet, reaching over 150ft (45m) long in one growing season.

times, thus increasing one's stress levels. I believe kelp forests are a place to find serenity and truly observe the ocean realm around us. All that is left for you to do is to find a suitable vessel and climb aboard. Kelp forests of every type and character await you on a trip to California's Channel Islands. ■

Afterthoughts

Although conditions here may be challenging, every adventure to the Channel Islands leaves one wanting more and/or revisiting the novel encounters from the last trip. One must go into each dive being flexible in mind, as conditions may change, the wildlife may not be cooperative or there may be a combination of factors which work against us at

Special thanks go to Truth Aquatics, Horizon Charters and California State Parks.

Frankie Grant is an award-winning American marine photojournalist and PADI scuba instructor who enjoys nothing more than sharing his passion and knowledge of the ocean with his students and peers. Based in San Diego, California, Grant conducts dive expeditions and imaging workshops both locally and abroad. You can see more of his work on his website at: frankiegrant.com, or on Instagram @oceans.wild.

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Indonesia's
Lembeh Strait

— *Relax & Enjoy Muck Diving & More*

Text and photos by Claudia Weber-Gebert
Blackwater photos and captions by Yos Amerta



Lembeh Strait

For underwater photographers, when we talk about Lembeh Strait in Indonesia, lots of macro subjects and small critters come to mind. “Muck diving,” which involves diving in muddy areas where lots of small animals can be found, is actually the main business of the local resorts and dive centres. But as you will find out in this article, there are lots of other things to see here too.

Biodiverse reefs and drop-offs

The beautiful coral reefs in the northern end of Lembeh Strait are lesser known. They are composed of flat coral gardens with dense populations of all kinds of corals and sponges but also beautifully overgrown drop-offs with large coral fans. Shoals of fish pass between the coral gardens—a fantastically beautiful scene. Here, there is a guarantee of getting beautiful underwater landscape shots.

Since these places are not as well known and so are less visited, the corals are still completely intact and host a large biodiversity. Of course, macro subjects can also be found in this coral landscape, but it is



School of blacklip butterflyfish on reef (top left); Harlequin shrimp on sponge (top right); Feather star crinoid, soft coral and sponges on reef (above); *Janolus* sp. 2 nudibranch (left). PREVIOUS PAGE Bright pink *Rhinopias* scorpionfish





Blackwater dives take place at 5m to 30m in the middle of the bay, away from the reef, where depths reach about 100m deep. Bonfire dives take place at shallower depths, on the sandy sea bottom or on the reef. Very bright lights, suspended in the water column, are attached to a down line at various depths. The light attracts plankton and other critters rarely seen in their larval stages. Blackwater and bonfire dives can be done anytime, but the most abundant dives occur up to four days before or four days after a new moon.



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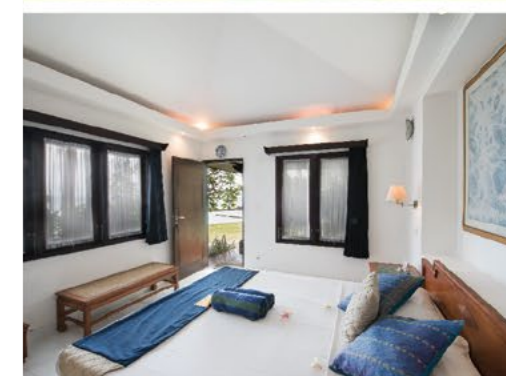
more worthwhile putting a wide-angle lens on one's camera and capturing images of the beautiful coral scenery. During topside intervals between dives, one can observe black monkeys jumping back and forth in the trees and hear them calling. They feed on the fruits of the trees perched on the high cliffs, towering over the sea. Impressive.

Blackwater photography Particularly noteworthy are the popular "blackwater dives" for underwater photographers offered by the local

dive centres. I participated in the blackwater dive at YOS Dive Lembeh Eco Beach Resort, where I stayed during my trip to Lembeh. These dives take place in the evenings after sunset. First comes the briefing, then the boat leaves for the dive. A 30m-long rope is attached to the underside

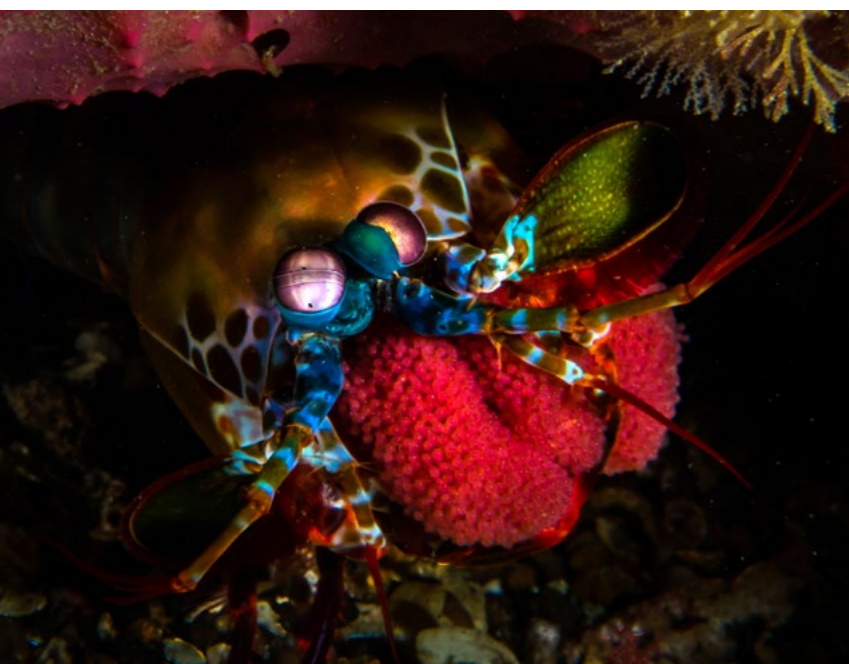
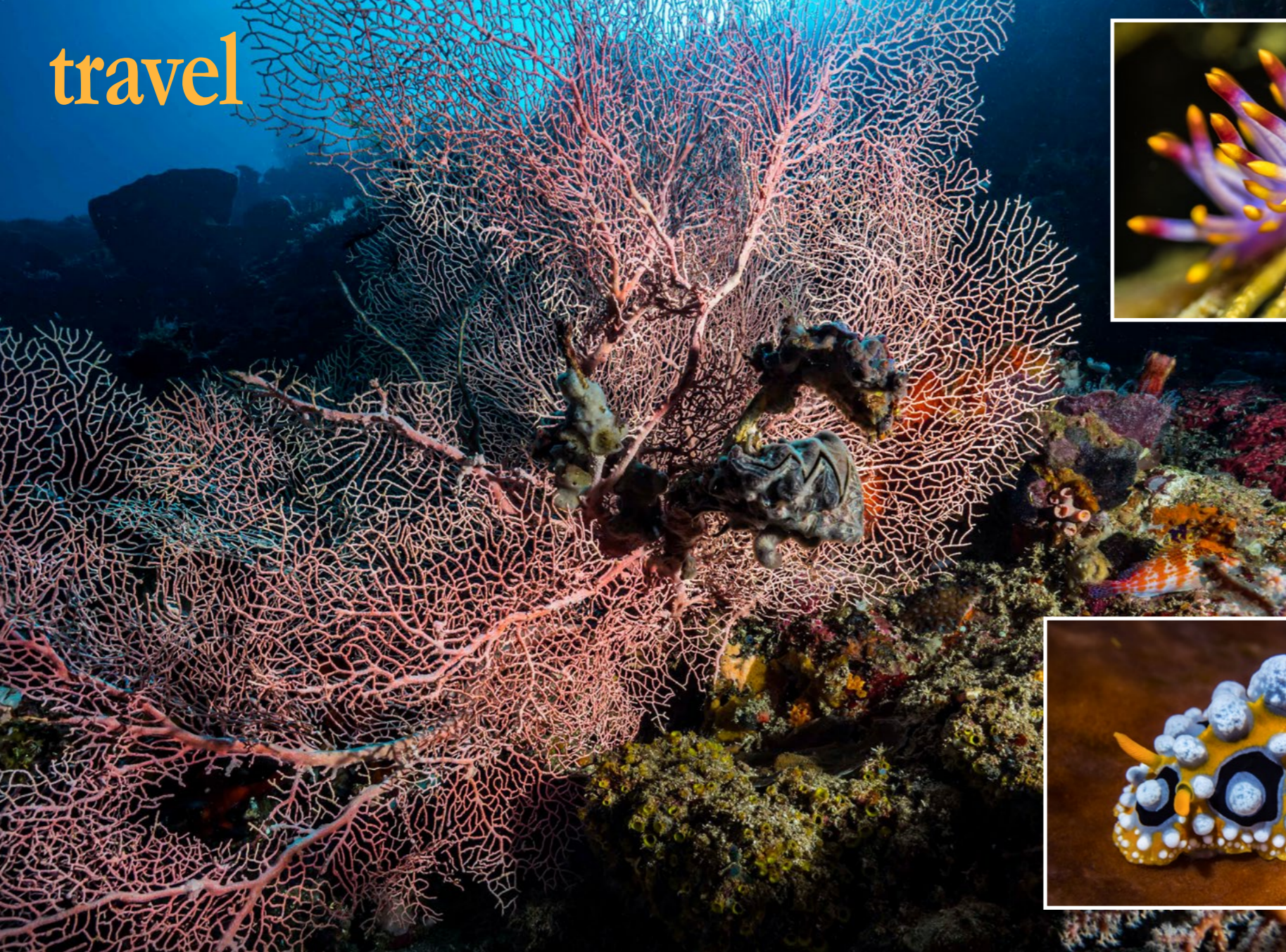
of the boat, and there is a small lamp attached to the rope every five metres. One dive guide is responsible for a maximum of two underwater photographers. In the water, the cone-shaped light beams from each lamp reveal the biomass welling up from the depths at night. Presented here are blackwater photos by Yos Amerta, owner of the resort, who has been photographing these creatures for many years. They feature larvae of all kinds, juvenile fish, jellyfish, baby octopuses—everything

you cannot see during the day or in daylight. Yos and all the resort's dive guides are true professionals in this domain and are happy to pass on their knowledge of blackwater photography, so even an inexperienced underwater photographer will quickly get good results.



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The largest migration on earth takes place every night in the oceans where the zooplankton migrates vertically up from the deep to feed. This creates a whole new world for underwater photographers looking for something new and unique.



Large sea fan on reef (above); *Flabellina nudibranch* (top center); *Phyllidia ocellata* nudibranch (center inset); Flamboyant cuttlefish (top right); Mimic octopus (lower right); Peacock shrimp with brood of eggs (left)

Diving

The resort has its own dive centre, which offers guests three to four dives per day. All the dive guides are certified dive instructors and underwater photographers, and are always available for advice and activities. Dive boats depart from the resort's own jetty directly on the beach.

One great thing about this resort is that guests had only to get themselves on board; everything else was transported onto the dive boat for them. Staff carried the guests' dive

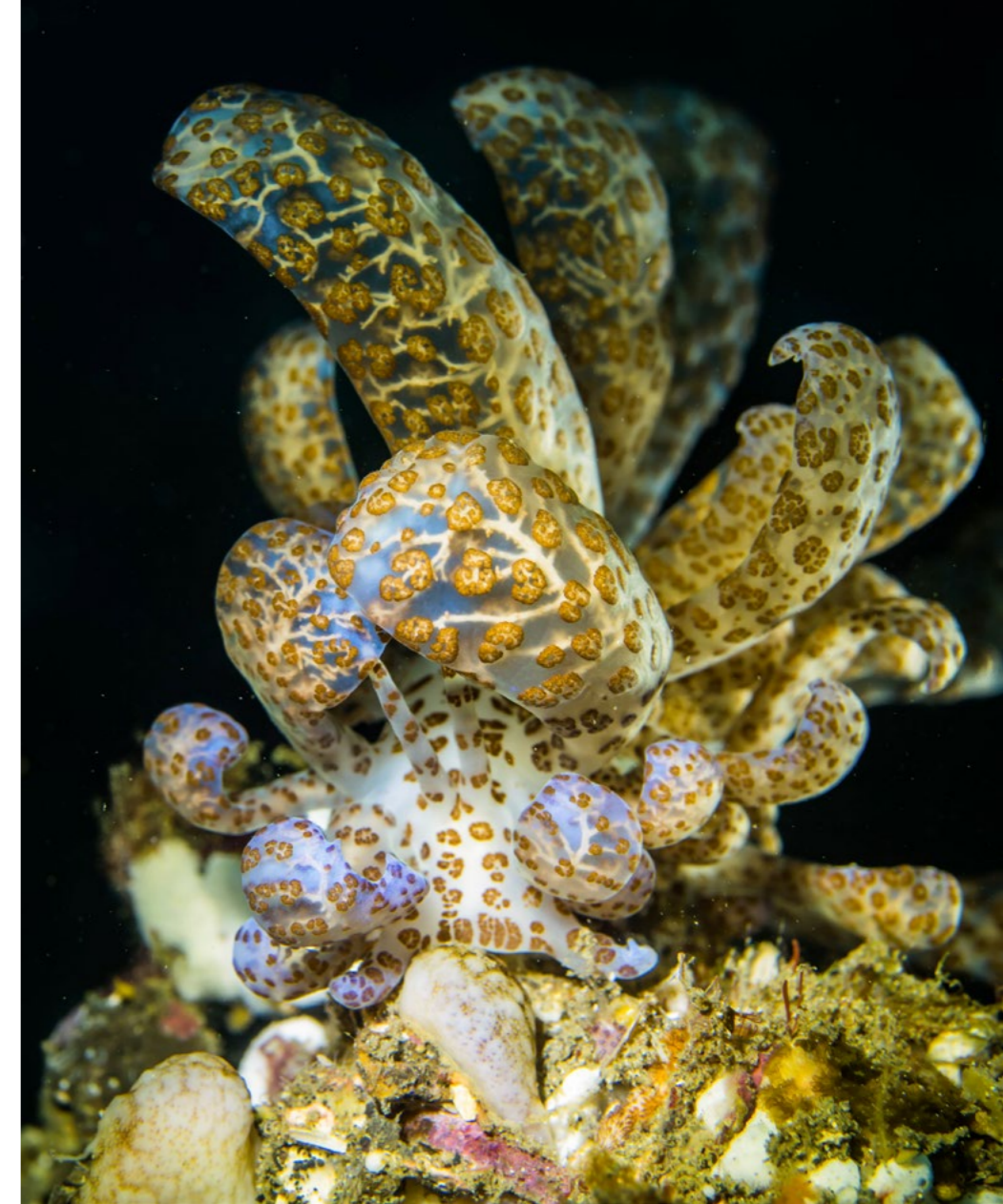
equipment and camera equipment onto the dive boat, as well as assembled BCDs with regulators and air tanks. It was easy diving at its best!

Here, only a thin wetsuit was required for diving, as the water temperature was around 27-30°C, and divers could dive until their tanks were empty. There were no time restrictions.

The dive guides were trained to find the tiniest creatures underwater

and to point them out to underwater photographers. So, good photos could be pre-programmed. They also knew which critters could be found

at which dive site. Most dives were "muck dives," so this involved diving down to the dark sand and sediment for which Lembeh is famous.



Ornate ghost pipefish (top left); Clown frogfish (top center); *Phyllodesmium longicirrum* nudibranch (top right); *Thecacera* sp nudibranch (above); Blue-ringed octopus (left)



Juvenile banggai cardinalfish (above); Allied cowrie (bottom left)

There was a multitude of different tiny underwater creatures to find on these dives. Critters were everywhere, if you could find them yourself. If not, the experienced eyes of the dive guides did not miss anything. In algae, on sponges, in soft corals and on anemones—there was something to be

found everywhere. Even if you were diving with a small group of divers, there was so much to see that there was enough for everyone to discover. So, as a photographer, it did not get annoying to be with a group, while taking photos.

After every dive, each diver was first given a small hot towel

to wash the saltwater off one's face, and then a hot drink—either tea or ginger water—was offered to warm oneself from within. Although the water temperature in the strait was around 30°C, it would often feel a bit colder than that after diving for more than an hour.

Once back at the resort's





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Through the resort's "trash hero" initiative, local kids help with beach clean-ups, learn how garbage is not only ugly but unhealthy, and are rewarded with cookies and juice.

jetty, everything was again easy for guests. The boat crew and dive guides took care of all that was necessary following the dive trip. At the dive centre, suits were rinsed out and hung up. And since the dive guides had everything else under control, guests could simply relax and enjoy themselves. At the resort, underwater camera housings were rinsed off and placed on a spacious shelf. There was also compressed air ready for drying cameras. Everything needed to prepare one's camera gear for the next dive was available, and there were enough power outlets to charge all our batteries.

Garbage, plastic and microplastic pollution
In addition to great biodiversity, Lembeh Strait is also well known for the presence of garbage, both above and below the water's surface—a problem of which many locals are now aware. However, a lot of trash is also being washed into the strait from the open sea, blown in by winds from the north and south. No matter how the wind blows, floating garbage patches always end up in the narrow channel between North Sulawesi and Lembeh Island. As often as possible, a lot of garbage is fished out and disposed of. With the help of local village children and neighbouring residents, a daily

beach clean-up takes place at the resort. After the activity, the children are rewarded with cookies and juice. Thus, in this fun and friendly way, they learn that the garbage in the water is not only ugly, it is also unhealthy. So, the "trash hero" initiative becomes a motivation for these children. Divers can, of course, also help to remove the garbage found underwater, which is not visible to the majority of the population. But be mindful. Always look carefully first before removing an object, because a lot of these items, which have been lying on the sea floor for a long time, have become homes to sea dwellers. Plastic bottles, cups and plastic lids may have become both protec-



Check first, before removing trash, as it may be home to a small fish or blenny!

like this. On the contrary, one can see that people live off fishing here, and one can count on one hand how many plastic items (and perhaps microplastics) end up

tion and homes for many small fish, octopuses and other small animals.

Despite the garbage one may come across in the area, diving in Lembah Strait still has its charm. Nature shows us that it does not give up; it tries to cope with the man-made problem. But that does not mean that we should go on

in the food chain, and in the fish that people eat. But the long-term effects of this garbage cannot be estimated in this way.

One also has to admit that a large amount of garbage in Indonesia is transported from Europe and is not properly processed and disposed of, and so

it finally ends up in the sea. So, please do not scold the people of Indonesia; rather, strive first to produce less plastic waste in Europe and other regions!

Lodgings

There are wonderful, beautiful resorts in the area to enjoy, such as the small yet friendly and cosy YOS Dive Lembah Eco Beach Resort where I stayed. The owner and manager Yos had studied architecture in Germany and designed the resort himself, as well as another resort in Bali. The architectural style of the resort combines modern, clean shapes with a touch of Balinese flair. Made from only natural materials, it was bright and beautiful, without a lot of frills. A real wellness oasis, it was easy to feel good here.

Nestled in a small community



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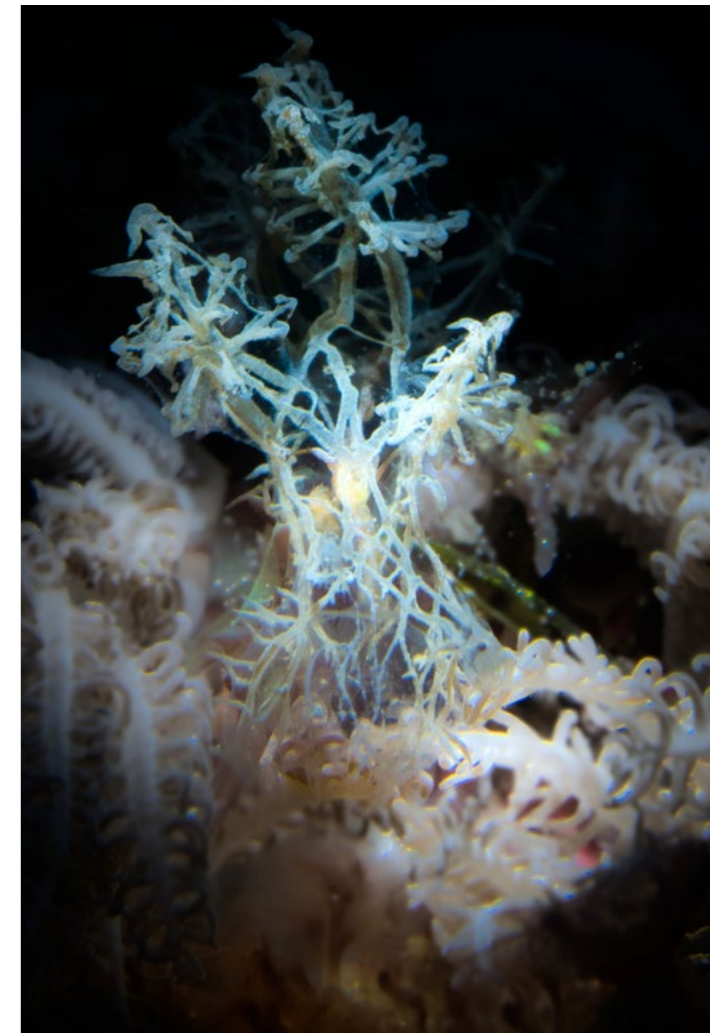
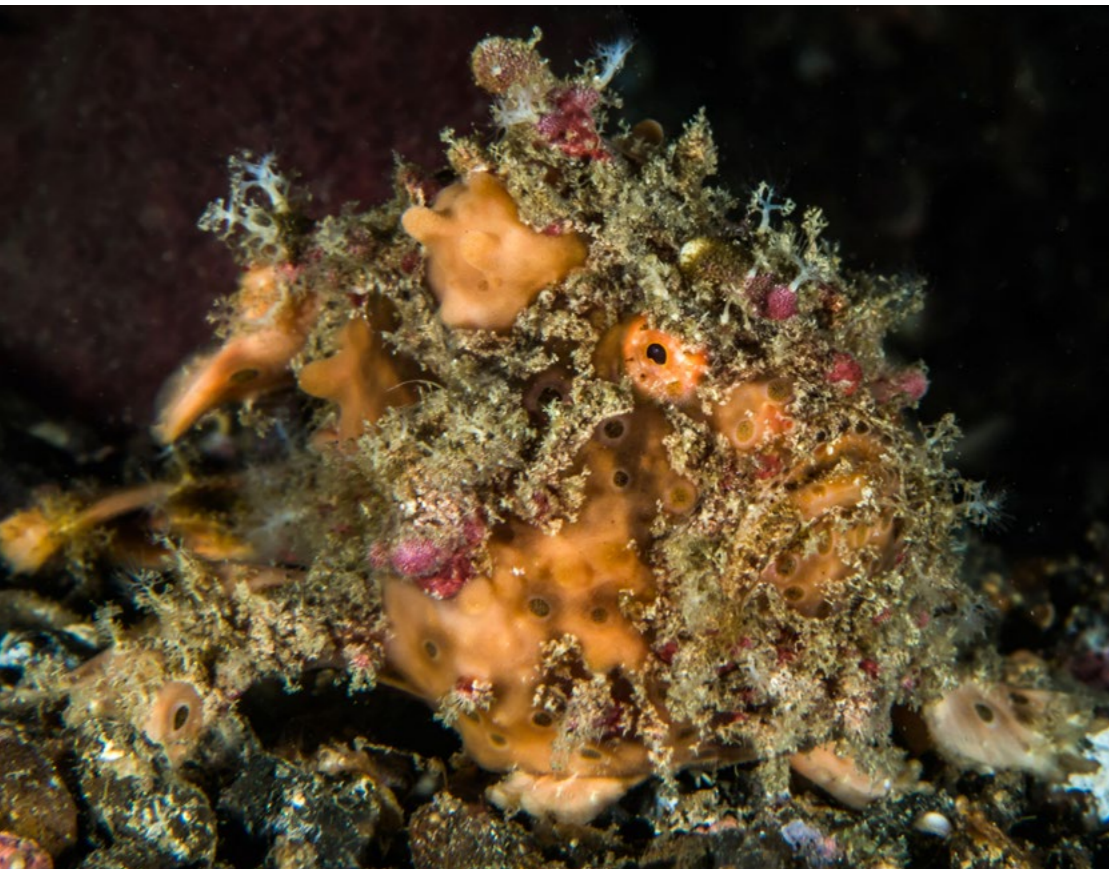
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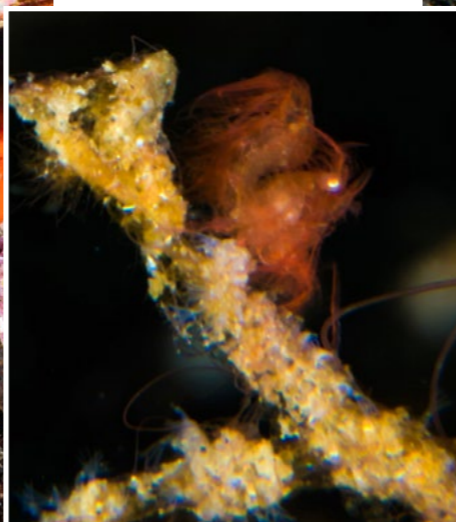
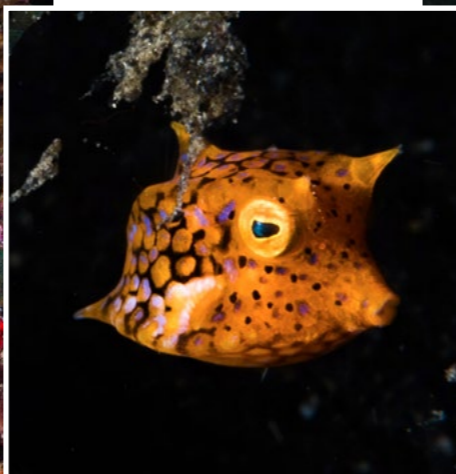
CLOCKWISE FROM TOP LEFT: Black hairy frogfish; Emperor shrimp on *Chromodoris splendida* nudibranch; Whip coral shrimp on whip coral (center); *Janolus* sp. 2 nudibranch (top right); *Glossodoris cincta* nudibranch; Candy crab (right); Warty frogfish (above)

near Bitung, the resort was located right on the beach, next to the houses of local fishermen. It could host up to 22 guests. Although it did not cover a large area, its guest rooms, with their high ceilings, were really spacious. Bright colours

and natural surfaces provided a unique character that was reflected throughout the resort.

Some rooms had a balcony directly facing the beach, so the rising sun awoke guests when its first rays crested over the offshore island of Lembeh. The remaining guest rooms were situated adjacent to a garden area and were just as bright and welcoming. In every guest room, there was plenty of storage space and many sockets available for recharging camera equipment and batteries—simply a dream for underwater photographers. Indeed, my comfortable, large four-poster bed also invited dreams and restful sleep.

Rare ghost phantom nudibranch, *Melibe colemani*



Tambja morosa nudibranch (above); Pair of *Nembrotha lineolata* nudibranchs (left)

TOP LEFT TO RIGHT: Branching coral; Juvenile cowfish; Hairy shrimp; Veined octopus
CENTER LEFT TO RIGHT: Cuttlefish; *Chromodoris annae* nudibranch; *Flabellina exoptata* nudibranch; *Ceratosoma tenue* nudibranch; Robust ghost pipefish

All-inclusive meals could be enjoyed in the open-air restaurant terrace, which had a sea view and was shaded by a palm-thatched bamboo roof. The cuisine was Indonesian—but less spicy than usual—and really very, very tasty! Everything was freshly prepared by local cooks within the resort's small kitchen. They happily catered to individual requests, including those from guests

with food intolerances or allergies. Vegetarian cuisine was also available upon request.

Breakfast, lunch and dinner were served daily, but one could also order a snack between meals, which was then freshly prepared and served. Drinks were also available at any time. Fruit juices, which were served freshly squeezed, were particularly recommended, and

water and tea were always available with self-service.

What's more, anyone celebrating a birthday would be surprised with a cake in the evening. But these celebrations normally did not last too long, because the next morning, there would be diving again, and everyone wanted to be fit for it. The resort staff, who were nice



Lembeh Strait



Flagtail shrimp goby (above); Juvenile harlequin sweetlips (right)



people from the village, seemed to meet almost every wish just by reading our eyes. Warm Indonesian hospitality was reflected throughout the entire resort.

Afterthoughts

It's definitely worth the trip! Here, one

Blacklip butterflyfish, crinoids, sponges, sea squirts and squirrelfish on reef (above)

can hardly expect to feel better or more at ease. Single divers can quickly make friends here, as in the evenings, one can enjoy pleasant chats with other international guests. For this, speaking English is an advantage.

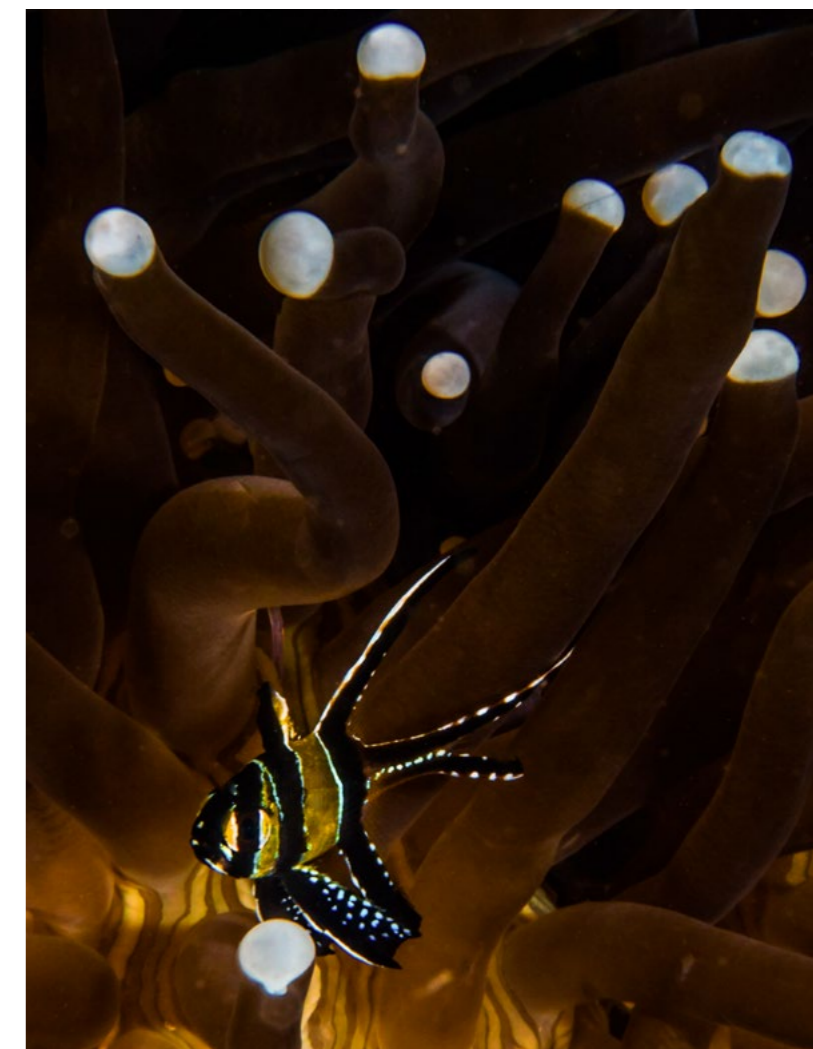
As for getting to Lembeh, flight connections can be made via Singapore or Jakarta. From either of these hubs, one can fly with Garuda Air or Batik Air to Manado in North Sulawesi. Individual pick-up and transfer service from and to Manado Airport is provided by the resort. ■

For more impressions, have a look at this [video >>>](#)

Claudia Weber-Gebert is an advanced diver, underwater photographer and dive writer based in Germany.



Tiny juvenile painted frogfish (above); Halgerda batangas nudibranch (center inset)



Juvenile banggai cardinalfish in anemone (above); Common octopus (top right)





Japan's
Miyakojima
Vast & Vibrant Coral Reefs & Marine Life

Text and photos
by Martin Voeller



Pristine beach of 17 End on Miyako Island in Okinawa prefecture of Japan (above); *Chromodoris nudibranch* (right). PREVIOUS PAGE: Coral reef of Yabiji

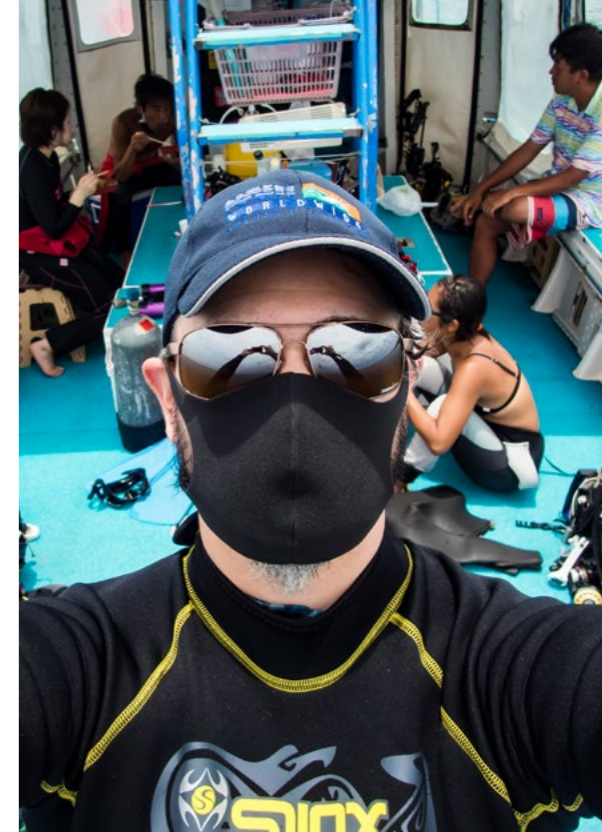
Year 2020. The coronavirus pandemic has confronted the world with an unprecedented situation. Many countries went into lockdown, and as a result, many people were forced to stay indoors, including myself in Japan. Although Japan never went into an official “lock-down”—it instead went into a so-called state of emergency—I could not wait to get out of the Tokyo metropolis as soon as restrictions were lifted.

I had stayed indoors for far too long—three months—and my body was craving the ocean as it never had before. As traveling to countries outside of Japan was not possible due to the pandemic, I decided to take on an excursion to the warmest place possible within Japan: the Okinawa Islands. However, there are many islands that comprise Okinawa, and given the grim situation that I had been in, I had to choose the island that most represented the opposite of it: the tropical paradise of Miyakojima, or Miyako Island.

Miyako Island lies 300km south of Okinawa Main Island and is the fourth largest island in Okinawa prefecture. The island is easily accessible from Tokyo—just



Shigira beach—corals are flourishing just a few steps away from the beach.



Pristine beach of Imugya Marine Garden, Miyako Island (above); A food court, with tables spaced apart for social distancing, is usually crowded during evening hours, but is almost empty now (left).

mode of transport.

Strolling through the rural, empty streets on the island, you will also come across many lion-like statues of mythical creatures called “shisa,” which are often placed around homes to ward off evil spirits. They are available in many souvenir shops as well. The island has its own unique cuisine, too; goya or luffa champuru (stir fry dish), Miyako soba (buckwheat flour noodles), and Miyako beef steak are some of the most famous dishes originating from the island.

The beaches are breathtaking. The island is known to host the best beaches in all of Japan. The white, sandy beaches and azure sparkling waters of Miyako Island will make you feel like you are in a tropical paradise. Most beaches on islands of Okinawa are often watched by lifeguards, and the waters have boundaries in which you are limited, where



Pristine beach of Imugya Marine Garden, Miyako Island (above); View overlooking Shigira Resort (top center); Since the COVID-19 outbreak, it has become mandatory for all guests to wear masks, even while on a dive boat (top right).

a three-hour direct flight. The island of over 50,000 people is easily accessible from Tokyo—just a three-hour direct flight.

It is home to sugarcane cultivation, and away from the beaches, you will mostly see land covered by sugarcane fields. One can even rent a scooter that runs on biofuel made from sugarcane, which can be an efficient





Pristine beach of Imugya Marine Garden, Miyako Island (above); Crab on a beach—a very common sight (below)

you can enjoy water sports, etc. This is not the case with Miyako Island—you are free to enjoy the boundless beaches without restrictions from lifeguards. And with so many pristine beaches from which to choose, you will be asking yourself where to even begin when you land on the island.

Coral reefs

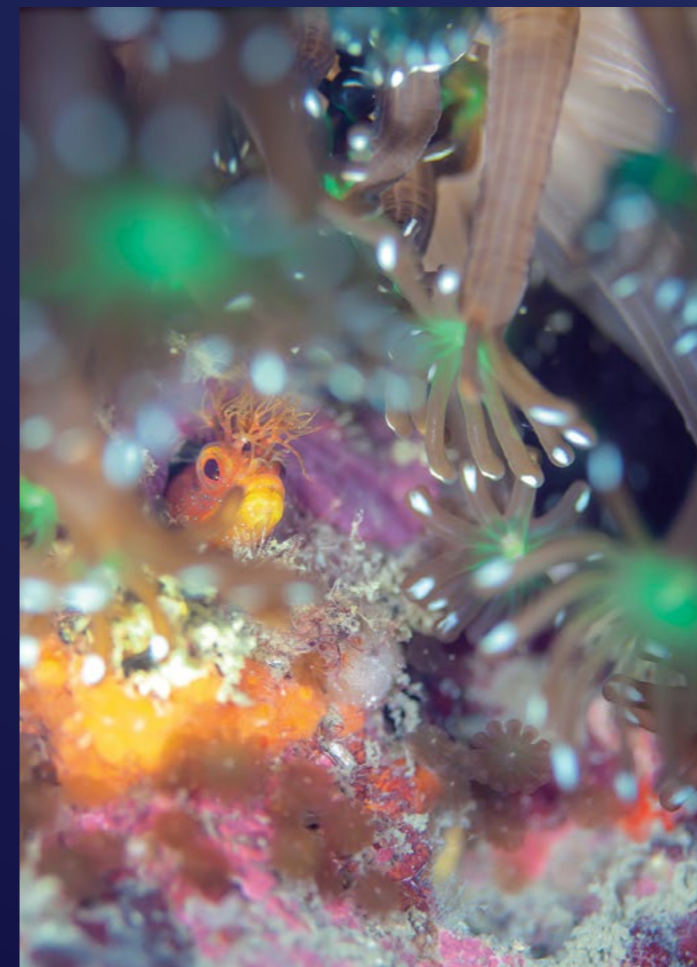
One of biggest attractions of Miyako Island are the beautiful, vibrant coral reefs. Yabiji is an area located in the northern seas of Miyako Island, and it has the largest nationwide coral reefs in all of Japan—it stretches over 25km! The water depth at this site is quite shallow, and during low tide, the seabeds are exposed and can be seen from above. Because of this

particular sight, Yabiji has been called the “Illusory Island.”

Not only divers but also snorkelers can fully enjoy swimming in this area, as reefs and marine life are much closer in proximity. Hard corals here are lush, abundant, colorful and gigantic. Among the coral reefs, you can expect to see large table coral, hump coral and stag-horn coral—just to name a few.

As for marine life, you can expect to see countless schools of anthias, hovering freely over the coral reefs,

as well as various types of blue damselfish, swimming and dwelling inside the countless corals. Clownfish darting in and out of sea anemones are a common sight, and you may encounter sea turtles taking a nice snooze among the reefs as well.



Japan Underwater Photo Contest 2020

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<https://www.japan.travel/diving/en/>





Miyakojima



Large colony of lettuce coral (above); Blue damselfish among staghorn coral (top left); Black-lipped butterflyfish, anthias and sea fan on reef (bottom left); Sea turtles are commonly seen (left).

many corals were bleached and perished.

I have read many times in reports that about 70 percent of the reefs in Yabiji have been impacted. I tried to reconfirm this figure with my dive operator, and many dive operators are recently challenging it. Areas which previously did not have any stretches of corals are now starting to thrive, and it is now being speculated that only 70 percent of “known” corals have been destroyed; there

However, not everything is hunky dory here. As with many coral reefs around the world, the reefs of Yabiji have suffered. Especially during the harsh El Nino of 2016,

seem to be other “unknown” areas in which corals are thriving and have not been impacted.

Again, the reefs here are vast, which may explain the above rea-

son. Indeed, Yabiji consists of eight large coral reefs and the small clusters of coral reefs that surround them. “Yabiji” actually means “eight reefs on top of each other” in the local language.

Underwater topography

Another underwater feature of Miyako Island is the unique topography. It is an exact opposite of the lush coral reefs I mentioned above, comprising underwater arches, tunnels and caves formed over eons of time via seismic and volcanic activities.

Miyako Island is composed entirely of coral limestone, which can be eroded easily by rainwater, seawater, currents and waves. Some tunnels and arches can be as deep at 50 to 70m,



Coral reef of Yabiji (above); Miyako Island abounds with macro subjects, like this *Phyllidia varicosa* nudibranch photographed with a snoot (left).

mountains and rivers. Nothing flows into the ocean from land to stir up the visibility. Thus, one can often enjoy the ethereal effects created by direct sunlight penetrating sunbeams into

and the inner areas can be pitch dark. And because of the low energy of the seawater in such areas, the sediment along the sea bottom is not hard and rocky—instead, it is very fine.

Visibility is almost always clear and excellent as the island lacks

these caves and tunnels, and one such site is called Satan's Palace. This dive site name is derived from its complicated terrain, which includes a large vertical hole called a "palace," found after one swims and meanders through many narrow and dark arches. The



Sea fans on reef under the dive boat (above); Pair of *Chromodoris* nudibranchs (left)



Cenote of Miyako Island? This is a giant pond called Tori-Ike, now connected to the ocean via a tunnel, allowing divers to explore (above); Diver at a dive point called Satan's Palace (left)

cathedral-like light that penetrates from above is mind-blowing.

At a symbolic cave dive site called Tori-ike, there are two large ponds linked to the sea by a cave with a diameter of 10m, and the water level of both pools varies with the tide. It is considered to have been formed from limestone caves, which admitted the sea over many years.

When the ponds are viewed from above, they closely resemble the cenote sink-holes of the Yucatan Peninsula in Mexico. Legend has it that a fisherman hooked a spirit out of the sea, and as punishment, a tsunami was sent, so the fisherman's house caved in, forming a pool. Because there is freshwater in the upper layer and saltwater in the bottom layer, many layers of color

can be observed, as well as a chemocline phenomenon.

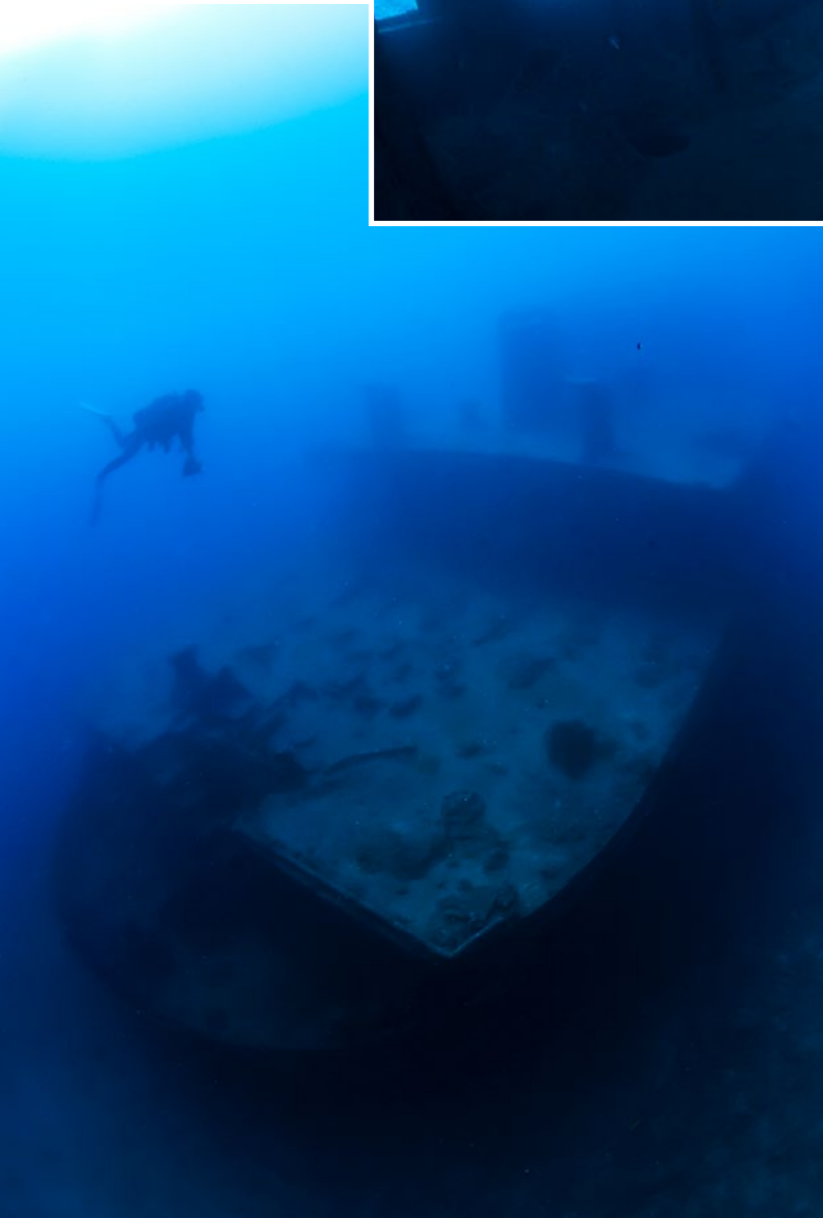
Wreck site

Another dive site of interest here is the Irabu shipwreck. Miyako Island is surrounded by several smaller islands, and one of the surrounding islands is called Irabu Island. In order to carry people between these Miyako and Irabu islands, a car ferry was used in the past for transportation. In 2015, Japan's longest toll-free bridge of 3,540m was completed, making the 40m-long car ferry no longer necessary. It was then sunk, creating a new dive site on the island.

Most divers may think wreck sites are deep and dangerous, but this particular shipwreck is not deep; it is a maximum of

Diver swims inside a cenote-looking pond called Tori-ike.

Diving inside the Irabu shipwreck can be very eerie (right); Overview of Irabu shipwreck (far right); Diver on Irabu shipwreck (below)



Large schools of luminous cardinalfish are often hiding inside the Irabu shipwreck (above).



18m deep, and there is hardly any current. Once you enter the shipwreck, it is eerie and haunting. It almost feels as if you are inside a ghost shipwreck frozen in time. On the other hand, when the sunlight shines through the openings of the ship, it feels as if you have been abducted by a U.F.O.

But once you turn your video lights on, you will soon notice that the wreck is teeming with

life. Dusky batfish and longfin batfish are seen gently swimming around. Large schools of luminous cardinalfish or pigmy sweepers will be hiding in corners of the ship, and when lit with your lights, they shine and create luminous reflections. As you exit the ship, you will be greeted by numerous anthias swimming over the corals, which have been growing on the shipwreck for the past five years.



Colony of hard corals on reef at Miyako Island (above); Beautiful anthias can be found among the many corals (center inset).

Afterthoughts

Visiting and diving in Miyako Island was exactly what I needed—stress-relieving, abundant nature. Here, you can expect to experience clear and pristine ocean, untouched and lush greenery, and rich fauna and flora.

The summer in Miyako Island is long, and one can easily enjoy warm months from April until October. Temperatures will rise over 30°C, but the steady, light breeze from the sea regulates the heat quite well. The typhoon season arrives in August and September, which should be avoided. January and February are the coldest months, with the mercury reaching around 18°C, making Miyako Island a popular destination even during the winter. Moreover, ocean conditions tend to be calmer, with better visibility during the

winter months.

There is so much diversity underwater at Miyako Island. From massive and lush coral reefs to underwater tunnels and caves, you get to explore the best of both worlds. Dive sites are filled with macro life as well, and if you visit the island during the right season, you may also be lucky enough to see big animals such as manta rays.

I had brought both of my wide-angle and macro rigs with me this time, as I did not want to miss out on any opportunity. Just my underwater camera rig alone weighed over 40kg, but I think I made the correct choice. ■

Japan National Tourism Organization (JNTO) has launched a site called "Japan Diving" to welcome divers from all over the world. You can choose from a menu

of over 170 dive locations in Japan. For further information about diving in Japan via JNTO, please visit: japan.travel/diving/en/.

Martin Voeller is an avid diver and underwater photographer based in Tokyo, Japan. Diving since 2011, he is a certified NAUI Divemaster and serves as a dive guide in the Kanto area. Having dived from the southernmost tip of Japan (Okinawa) to the northern tip (Hokkaido) and much more in between, he enjoys the variety of diving that Japan offers, ranging from tropical to cold water. He continues to explore Japan's diverse undersea formations and topography, and his mission is to share this with the rest of the world. See more of his underwater images at: poseidonphotos.com.

Coral reef of Yabiji (above); Green sea turtles are a common sight (top right).



POINT & CLICK
ON BOLD LINKS



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Edited by
Rosemary E. Lunn
and Peter Symes

Equipment

Quick physiology lesson

When you get cold, your blood vessels constrict to help mitigate heat loss. As a result, your extremities, such as your hands, get cold. One way you can dive longer in cold water is to use a heated device, provided you dive it in a thoughtful manner. You need to be able to turn the device on or off, and change the temperate setting during the dive. This is something Thermalution understands, because the company has launched heated gloves that you can individually control “on the fly.” This fully waterproof system can be dived with wet or dry gloves, and in conjunction with or without a Thermalution heated vest. The thin, heated gloves have three heat settings (low, medium, high) and four generous sizes (small, medium, large, XL). They have a depth-rating of 100m (328ft). Apparently, the military, sky divers and security personnel are already interested in these gloves. Thermalution-heated-gloves.co.uk



#SaveTheSeas #WearANet

Unlike some “environmental bracelets,” Bracenet is an ethically sourced bracelet that does pay it forward. Each Bracenet has traceability as to what the bracelet is made from. And, of equal importance, 10 percent of each Bracenet sale goes to Healthy Seas to fund future ghost diving removal projects. The balance of the money covers, among other things, the shipping of the raw ghost fishing gear to the manufacturing base. Bracenet has announced it is making just 750 limited edition “Galapagos” bracelets. No two pieces of ghost net are the same; hence, every product is unique. What they do have in common is that €2 from each Bracenet will be donated to the Charles Darwin Foundation. The green and blue net reflect the Galapagos flag, and the silver stainless steel tag features an engraved manta ray. The Bracenet is secured on your wrist with an engraved magnetic stainless steel clasp in matt blue. Bracenet.net



OceanPositive Face Mask

A number of companies have launched COVID-19 face masks—the latest being Fourth Element. The award-winning Cornish manufacturer has used Econyl fabric. This is a “grave-to-cradle” material made from recovered fishing gear, which has been processed and regenerated into nylon. The OceanPositive mask is secured to your head via a double cord and knotted at the back of the head. This helps avoid discomfort on the ears. However, if you want to secure it in this manner, the mask can be easily converted to ear loops. Each mask comes with three PM 2.5 filters—these have five layers of infiltration, including an activated carbon core. Once worn, you can wash the mask at 30°C (86°F), using your normal laundry detergent. FourthElement.com



Peregrine

Shearwater Research has a solid reputation for creating intuitive technical dive computers. It is therefore no surprise that its inaugural recreational computer has been designed so that it does not intimidate new divers—you can dive it on air or EANx up to 40%. The Canadian manufacturer states “the Peregrine is best suited for air and nitrox divers that want a great screen, at an exceptional value, with a simplified feature set.” Simple does not mean it is not unsophisticated. The Peregrine has two further modes. The ability to dive three “switch-on-the-fly” nitrox gases (up to 100%), and Gauge Mode. This ensures that if divers then choose to technical dive in the future, they can use the Peregrine as a back-up bottom timer. Other features include a vibrating alarm, full colour LCD screen and wireless charging and data transfer. Shearwater.com



i470TC

The watch-style i470TC dive computer from Aqua Lung is equipped with Bluetooth communication and wireless air integration. It has four operating modes—Air, Nitrox, Gauge (with run timer), and Freedive—and is capable of switching between up to three nitrox mixes with three Transmitters Mixes up to 100% oxygen with no restrictions. Deep stops with a countdown timer can be selected. The settings, log and profile data can be accessed using Aqua Lung’s free Diverlog+ app on computer or mobile device. Aqualung.com





Text by Simon Pridmore

— The Scuba Confidential column in this issue is adapted from a chapter in Simon's book *Scuba Exceptional – Become the Best Diver You Can Be*.

When we learn to scuba dive, we are given a little knowledge and taught some basic skills. We take a theory test and demonstrate that we can perform the skills and that's it, we get a licence.

Subsequently, as we do more diving, we gradually improve our skills and we experience various problems. By achieving mastery of the skills and dealing with the issues we encounter, we acquire the ability to anticipate problems and to avoid or manage dangerous situations.

As you might recognise, this is similar to the process of learning to drive a car. In diving as in driving, however, what guarantee is there that experience will teach

you everything you need to know?

You regularly encounter drivers on the road and fellow divers on the dive boat who, despite being licensed, and even quite experienced, seem to have poor skills and inadequate knowledge,

to the extent that they present a potential danger to themselves and others. You too may secretly be aware that your own skills are not as sharp as they could be.

In the motoring world, to develop safer and more skilled drivers, there are training courses in some-

thing they call defensive driving. You can choose to take a defensive driving course, or you can be required to take one as part of a traffic court sentence.

The concept was first introduced in the United States in the 1960s. The Safe Practices for

Motor Vehicle Operations manual defines defensive driving as "driving to save lives, time, and money, in spite of the conditions around you and the actions of others." Among other things, drivers learn how to anticipate and assess dangerous situations and

make well-informed decisions. As well as being shown how to drive sensibly and safely, they are taught useful things like how to use less fuel and save on vehicle wear and tear. They are also given guidelines on being courteous to other road users.

Defensive Diving *Part I*

ILLUSTRATION: COMPILED WITH PUBLIC DOMAIN IMAGES FROM PIXABAY





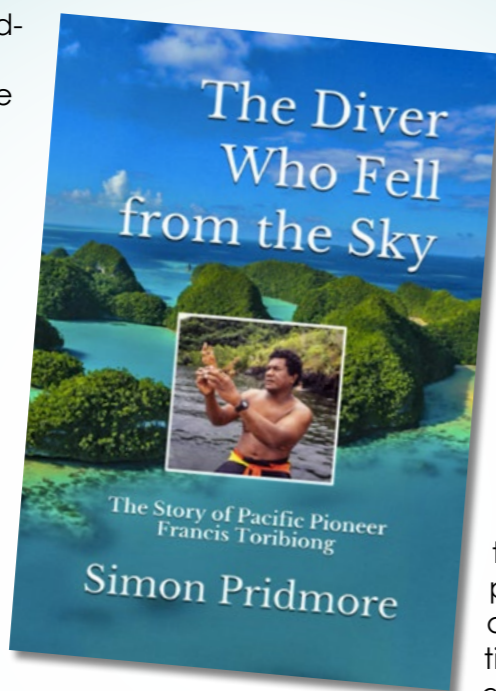
In scuba diving, the closest we come to a defensive driving course is Rescue Diver or the equivalent, but this is usually more about emergency responses than personal skills and awareness development. Some aspects of Divemaster training certainly match the concept of

defensive diving, but this is a professional course. Not many divers actually get that far in their further education.

In this short series of articles, I will describe strategies that I see as intrinsic to the defensive diving concept. I should make it clear that when I use the word

A New Book from 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.



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 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

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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PIXABAY / PUBLIC DOMAIN

“defensive” in a diving context, I am copying the example of the motoring world, where “defensive” means safe, careful, conservative and thoughtful. In other contexts, the word “defensive” can mean negative, fearful or resistant to change (not traits to be encouraged in scuba divers at all).

Defensive Strategy 1: View your computer with scepticism

Your dive computer is a useful tool, but it is a battery-operated device with only one or two O-rings protecting its complex electronics from the high-pressure water that is always trying to get in and fry them. At some point, every dive computer fails; the likelihood is that it will fail while it is being used and Murphy's Law of Scuba Diving dictates that this will happen at the worst possible time.

This should give you ample incentive to

keep looking at your computer regularly during every dive. If you do this and one day you experience the sinking feeling of glancing at your computer and seeing that the screen has gone completely dark, you will still be able to remember your depth and time from when you last looked at it a couple of minutes earlier. This will give you confidence and help you manage a safe ascent.

You do not want to suddenly notice that your computer has gone blank when you have not paid any attention to it since the beginning of the dive. Now, you do not know how deep you are, how deep you have been, nor how long you have been down. All you can do is guess at your decompression status as you make your ascent.

Or your dive computer may only partially fail and start giving you incorrect data, which can actually be worse. Here

are two short stories that show how dive computers can go wrong in ways you may not have imagined.

The computer that surfaces on its own

Sandra's computer seemed to be working fine during a long dive on a deep reef wall, until she ascended at the end of the dive. She noticed that the depth it was showing seemed to be shallower than she thought she was. Sure enough, as she went up, the depth counted down to zero and the computer switched to surface mode. As far as it was concerned, the dive was over. However, Sandra was still several metres underwater. Luckily, she had a teammate close by who had done more or less the same dive. She swam over, asked to see his computer and saw that it was reading 6m. Sandra thought fast and





opinion



SCOTT / FLICKR / CC BY-SA 2.0

concluded that it was likely that the computer had been reading 6m shallower throughout the dive. Therefore, she had no idea if she had gone into deco or not.

Her teammate had not accumulated any required decompression, which gave her some reassurance. Just to be certain, she did an extended safety stop and then went up. She assumed the computer problem might be related to a low battery, so she changed the battery out and dived with it again, this time taking along a backup computer for insurance. The same thing happened again. She checked that the pinhole leading to the depth transducer was not blocked and continued to dive with both computers over the next few days. After about a dozen dives, the malfunctioning computer went back

to normal. Sandra still has no idea what caused the temporary malfunction.

The computer that punishes you

Burt was a divemaster in Guam and had been diving with his group on a shipwreck. As he ascended, he passed a diver from another group, who was hanging onto the shot line. The diver signalled that he needed help and showed Burt his computer, which was telling him he had an hour of decompression to complete. The diver's gauge showed he did not have enough air for anything like another hour. Burt noted the dive time elapsed on the diver's computer and took out his backup decompression tables. He assumed the diver was on a repetitive dive and looked at the required stops for a dive at the maximum depth of

the site for the total time the diver had been in the water so far.

Even within these parameters, the table required much less decompression than what the diver's computer was showing. Burt wrote, "Do This, Don't Worry" on a slate and then listed the decompression stops and times given by the table. He watched the diver until he had safely ascended and was back on the boat.

When the diver later sought him out to thank him, Burt refrained from giving him a hard time about going into decompression when he evidently did not really understand what he was doing. Instead, he diplomatically explained that many dive computers are not designed for dives with decompression stops and often penalise divers unnecessarily heavily if they go into

deco, particularly on a second or third dive of the day.

Know what you are looking at

What can a defensive diver do to guard against computer failure?

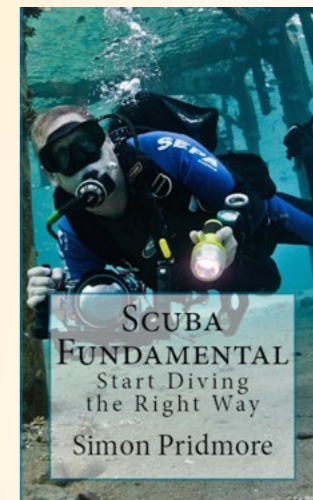
1. Have a look at some of the standard decompression tables that divers used to deploy before computers came along (and that most technical divers still use). Notice the typical no-decompression limits that apply at various depths and observe how decompression stop requirements increase in terms of time and depth, the longer you stray beyond no-decompression stop limits.
2. When upgrading to a new computer, keep the old one and continue diving with it as a backup, tucked away in a zippered pocket, in case the nice shiny new computer starts misbehaving and a second opinion is required.
3. And finally, if you are going to do planned decompression diving, buy a computer that is specifically designed for the purpose.

In the next issue, I will outline a few more defensive diving strategies. ■

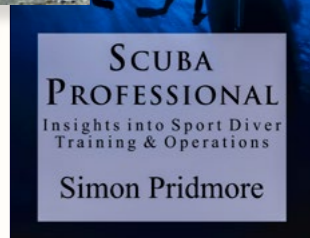
Simon Pridmore is the author of the international bestsellers Scuba Confidential: An Insider's Guide to Becoming a Better Diver, Scuba Professional: Insights into Sport Diver Training & Operations and Scuba Fundamental: Start Diving the Right Way. He is also the co-author of the Diving & Snorkeling Guide to Bali and the Diving & Snorkeling Guide to Raja Ampat & Northeast Indonesia. His recently published books include Scuba Exceptional: Become the Best Diver You Can Be, Scuba Physiological: Think You Know All About Scuba Medicine? Think Again! and the Dining with Divers series of cookbooks. For more information, see his website at: SimonPridmore.com.

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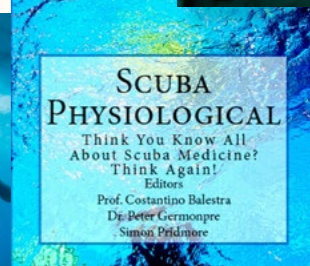
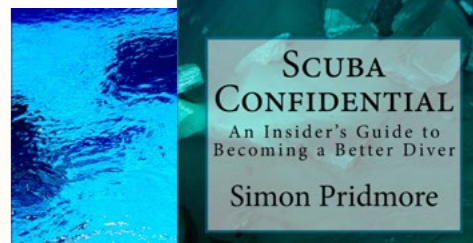
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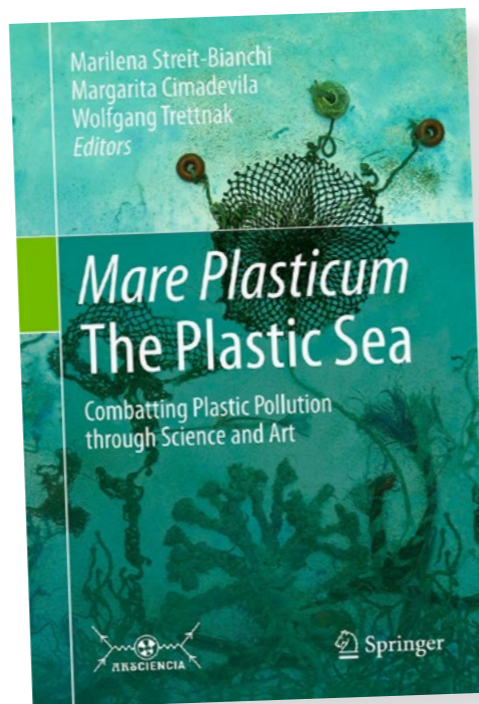
Shipwreck

The Tsarina's Lost Treasure: Catherine the Great, a Golden Age Masterpiece, and a Legendary Shipwreck, by Gerald Easter and Mara Vorhees

In 1771, the *Vrouw Maria*, a merchant ship from Amsterdam, crashed off the Finnish coast while it was delivering Dutch paintings to Catherine the Great, Empress of

Russia. *The Nursery*, an oak-paneled triptych by Dutch painter Gerrit Dou, was one of the treasures lost. In 1999, the wreck was found, upright and perfectly preserved on the seafloor. This book recounts the *Vrouw Maria's* loss and discovery—piecing together the rise and fall of the artist whose masterpiece was the jewel of the wreckage.

Hardcover: 400 pages
Publisher: Pegasus Books
Date: 1 September 2020
ISBN-10: 1643135562
ISBN-13: 978-1643135564

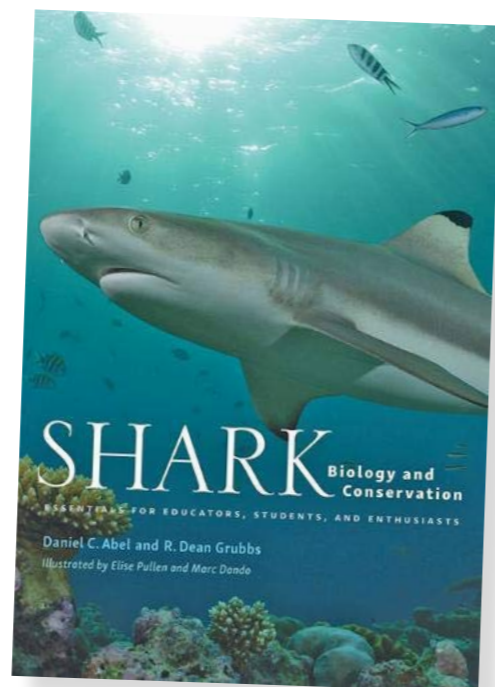


Pollution Solutions

Mare Plasticum – The Plastic Sea: Combatting Plastic Pollution Through Science and Art, by Marilena Streit-Bianchi, Margarita Cimadevila and Wolfgang Trettnak

This book explores the menace plastics pose to marine environments and organisms. It starts with beach litter on Galicia's beaches and culminates with a disturbing vision of the future. It also examines the impacts of plastics and microplastics, the new marine ecosystem (aka the "plastisphere"), and the status of the oceans today. Historical developments, sustainable solutions and protective measures are also explored, as well as the role played by rivers and the problems related to microplastics in soils.

Hardcover: 267 pages
Publisher: Springer
Date: 24 July 2020
ISBN-10: 3030389448
ISBN-13: 978-3030389444

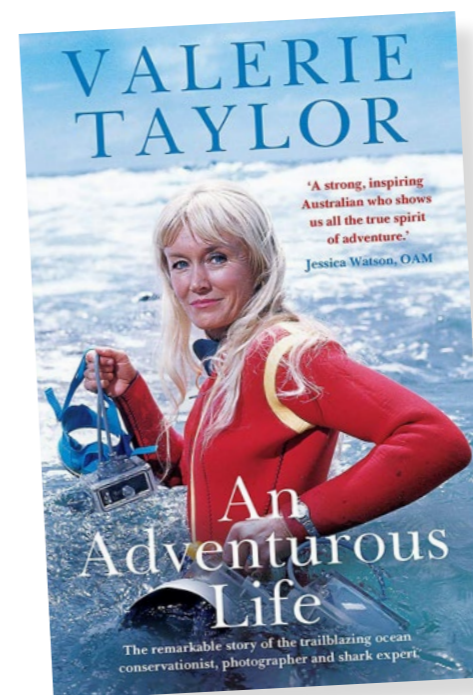


Sharks

Shark Biology and Conservation: Essentials for Educators, Students, and Enthusiasts, by Daniel C. Abel and R. Dean Grubbs

This book presents an overview of the diversity, evolution, ecology, behaviour, physiology, anatomy and conservation of sharks. It also covers emerging and traditional techniques for classifying sharks, and draws on the emerging and latest breakthroughs in the field. Among other things, the book also discusses which shark conservation techniques work and which do not, and comments on the use and misuse of science in the study of sharks. Contains more than 250 colour illustrations and photographs.

Hardcover: 448 pages
Publisher: Johns Hopkins University Press
Date: 25 August 2020
ISBN-10: 1421438364
ISBN-13: 978-1421438368



Dive Pioneer

Valerie Taylor: An Adventurous Life, by Valerie Taylor and Ben Mckelvey

This book tells the story of the life of marine conservationist, filmmaker, photographer and shark expert Valerie Taylor, from her childhood in New Zealand, all the way to the present. Her affinity for the ocean is evident throughout the pages. The book also recounts how her real adventures started when she met her husband Ron Taylor in the 1950s. Together, they filmed and photographed their experiences around the world for the media, making many documentaries while fighting in their own way to protect the underwater world and its inhabitants.

Paperback: 336 pages
Publisher: Hachette Australia
Date: 27 August 2020
ISBN-10: 0733641725
ISBN-13: 978-0733641725

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NOAA FISHERIES

The fin whale, also known as the finback whale, is the second-largest species on Earth after the blue whale.

Whales expand their distribution

Changes in distribution for five of the six baleen whale species mirrors known shifts in distribution for other species attributed to climate and the impacts of ocean warming.

Four of the six baleen whale species found in the western North Atlantic Ocean (humpback, sei, fin and blue) have changed their distribution patterns in the past decade.

Using 281 passive acoustic recorders moored to the sea floor from the Caribbean Sea to Greenland, re-

searchers from the United States and Canada monitored the movements of the whales from 2004 to 2014. The findings of their study was published in the *Global Change Biology* journal.

"All four whale species were present in waters from the southeast US to Greenland, with humpbacks also present in the Caribbean Sea," said lead author Genevieve Davis, a senior acoustician at the Northeast Fisheries Science Centre in Woods Hole, Massachusetts. "These four species were detected throughout all the regions in the winter, suggesting that baleen whales are widely distributed during these months."

The data from the recordings was divided into two time frames—2004 to 2010 and 2011 to 2014—reflecting the timing of climatic shifts in the Gulf of Maine and distribution changes by many species in the western North Atlantic Ocean.

Davis concluded that "a decade of acoustic observations have shown important changes over the range of baleen whales and identified new habitats that will require further protection from human-induced threats like fixed fishing gear, shipping, and noise pollution." ■
SOURCE: NOAA NORTHEAST FISHERIES SCIENCE CENTRE



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Pod of belugas playing in the cool productive waters of the Novaya Zemlya archipelago and Franz Josef Land, Russia

Beluga whales form extensive social networks

Not only do beluga whales regularly interact with close kin, they also frequently associate with more distantly related and unrelated individuals, a new study finds.

Belugas are gregarious, highly sociable and they regularly form small groups, or pods, which may contain between two and 25 individuals, with an average of 10 members. Pods tend to be unstable, meaning individuals tend to move from pod to pod. Their behaviour, which include sophisticated vocal repertoires, suggest that this marine mammal lives in complex societies. It has long been thought belugas formed

social bonds around females that primarily comprise closely related individuals from the same maternal lineage, but this hypothesis has never been documented. A new study, led by Florida Atlantic University's Harbour Branch Oceanographic Institute came up with several unexpected findings.

Belugas likely form multi-scale societies from mother-calf dyads to entire communities. Beluga whales exhibit a wide range of grouping patterns from small groups of two to 10 individuals to large herds of 2,000 or more, from apparently single sex and age-class pods to mixed-age and sex groupings, and from brief associations to multiyear affiliations.

Given their long life span of approximately 70 years and a ten-

dency to remain within their natal community, these findings reveal that beluga whales may form long-term affiliations with unrelated as well as related individuals.

From these perspectives, beluga communities have similarities to human societies where social networks, support structures, cooperation and cultures involve interactions between kin and non-kin.

A bit like people

Unlike killer and pilot whales, and like some human societies, beluga whales do not solely or even primarily interact and associate with close kin, explains Greg O'Corry-Crowe, Ph.D., lead author of the study. ■ SOURCE: HARBOUR BRANCH OCEANOGRAPHIC INSTITUTE AT FLORIDA ATLANTIC UNIVERSITY

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The expedition team members conduct pre-dive checks in Wookey Hole Cave.

Text by Nikola Valtosova
Photos by Lee Callaghan

Cave diving has progressed by leaps and bounds since its origins back in 1935. However, how many of us today really know what it was like to don a hard-hat suit, connect a surface-supplied, hand-pumped umbilical cord and literally walk along the cave floor in pitch black waters? The beginnings of cave diving can be traced to the Wookey Hole Caves in England. And 85 years later, divers like Ireland's Matt Jevon are still doing their part to discover this cavern's full potential.

How cave diving came to be

Cave diving was in its infancy during the 1930s. In the beginning, explorers did not look at cave diving as a form of sport or a diving method. Rather, it was more of a means to reach a specific end while dry caving. Particularly in the United Kingdom, dry caving dates back

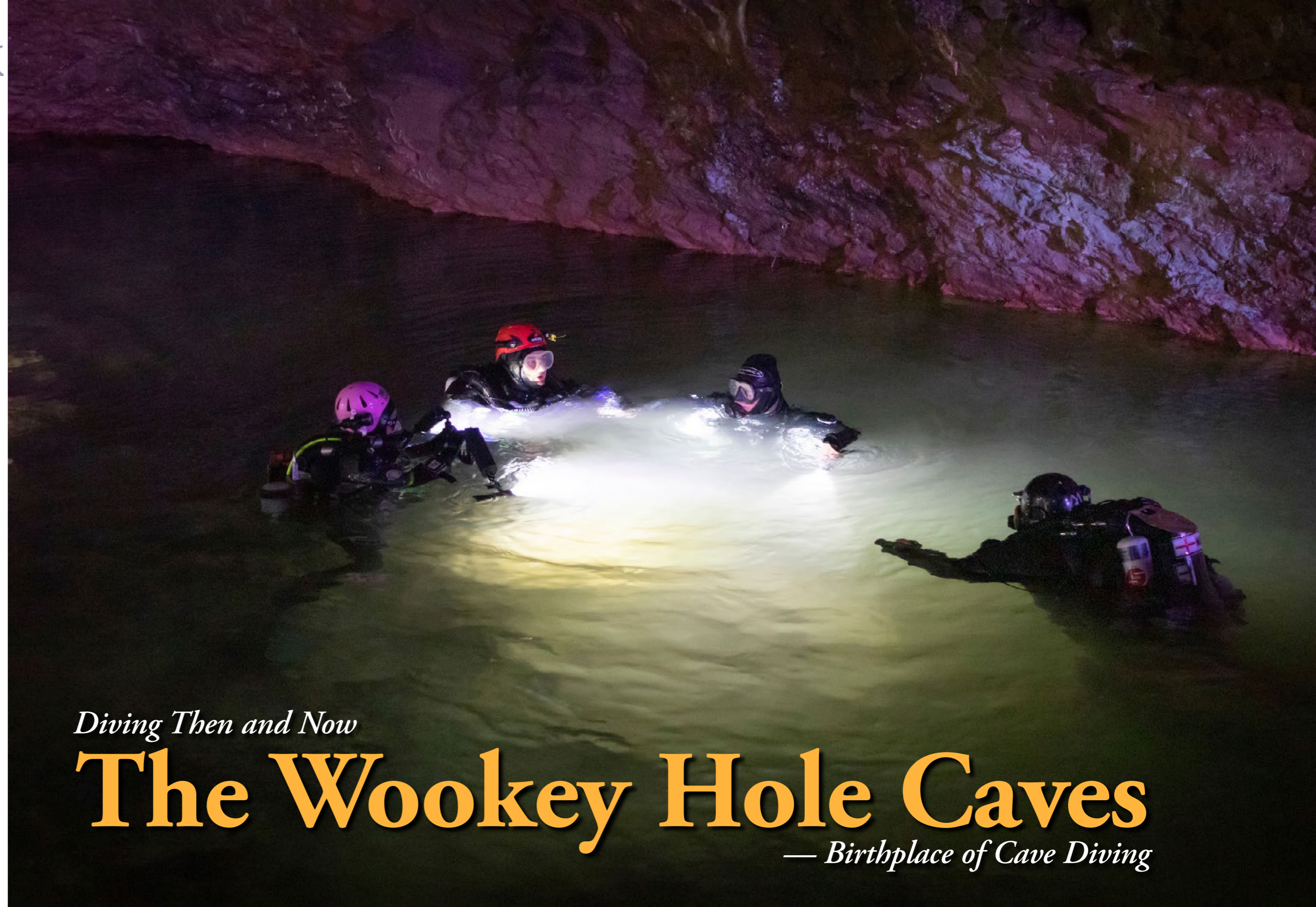
hundreds of years, yet the water-filled sections of many caves kept explorers from making progress. In the case of the Wookey Hole Caves, the original dive crew's goal was simply to get through the cave, bypass the water and reach

the next dry section. Thus, cave diving was born as a technique used to further cave expeditions, and has since transformed into both an activity and exploration tool in its own right.

The first in the water

The first divers to take the plunge on 14 July 1935 were Graham Balcombe and Penelope Powell (who was affectionately known as "Mossy"). It is worth noting that Powell was the only female diver on the

team, and today, is considered one of diving's unsung pioneers. If you do some further research on her, you can read her story and learn of her tremendous contributions (To find out more about Powell, read the **article**, *CDG Cave*



Diving Then and Now

The Wookey Hole Caves

— *Birthplace of Cave Diving*





Penelope Powell and Graham Balcombe kitted up in Wookey Hole Cave for the first ever cave dive in 1935



MENDIP CAVE REGISTRY & ARCHIVECAVE DIVING GROUP

A memorial plaque at Wookey Hole Cave commemorates the first cave dive ever done, which was accomplished by Graham Balcombe and Penelope Powell in 1935 (right).

Historical photo of expedition team members assisting with the hard hat gear used for the first ever cave dive (below)



Wookey Hole

Exploration—Beginnings, or the book, *The Log of the Wookey Hole Exploration Expedition: 1935*). Unfortunately, she has been left out of several surface-level records, including the Wookey Hole Caves Wikipedia page (which states that fellow crew member Jack Sheppard, not Powell, made the first dive with Balcombe).

Powell and Balcombe's first dive had them wearing the standard diving equipment at the time, which included brass helmets, chest plates, canvas suits and lead boots. They had to walk on their hands and knees along the cave floor in

near-zero visibility, dragging their breathing hoses and lifelines behind them as the unsettled silt flew all around. Luckily, details about the equipment they wore was well documented and we have a

was properly sealed.

With the goal of further exploring the Wookey Hole Caves in mind, the divers set up a base in the Third Chamber and eventu-



MENDIP CAVE REGISTRY & ARCHIVECAVE DIVING GROUP

ally made their way past the previously discovered Fourth Chamber to the Fifth, Sixth and Seventh Chambers. They were unable to go any farther as their base-fed air lines and weighted equipment restricted them from traveling more than 61m.

Fast forward to today

Cave diving originated that mid-summer day with Powell

and Balcombe. Since then, thousands of tourists—and very few divers—have traveled to Wookey Hole in hopes of discovering more than their predecessors and pushing the boundaries of technical cave diving. One such diver is Matt Jevon, an English-born Irish resident, and open and closed circuit technical and cave instructor. He has experience with both back and side-mounts and champions the CCR Liberty Sidemount.

Jevon had the opportunity to dive Wookey Hole Caves in 2019, working

hand-in-hand with extreme painter, Philip Gray. Even though he began his career as an Irish Navy Diver, Gray is not your typical technical diver. His passion and love for adventure is reflected in his artwork; he goes to extraordinary heights and depths to achieve his artistic ambitions (see philipgray.com).

The goal of Jevon's and Gray's dive was to enter into the same area as Powell and Balcombe and create two underwater oil paintings to commemorate the amazing feat accomplished there. In Jevon's words, "The paintings were meant to celebrate the anniversary of the world's first cave dive." Gray's work has now gone on to be featured as a permanent installment in the Wookey Hole Cave Diving Museum, which is dedicated to the monumental 1935 dive and the evolution of cave diving (see the project's YouTube [video](#)).

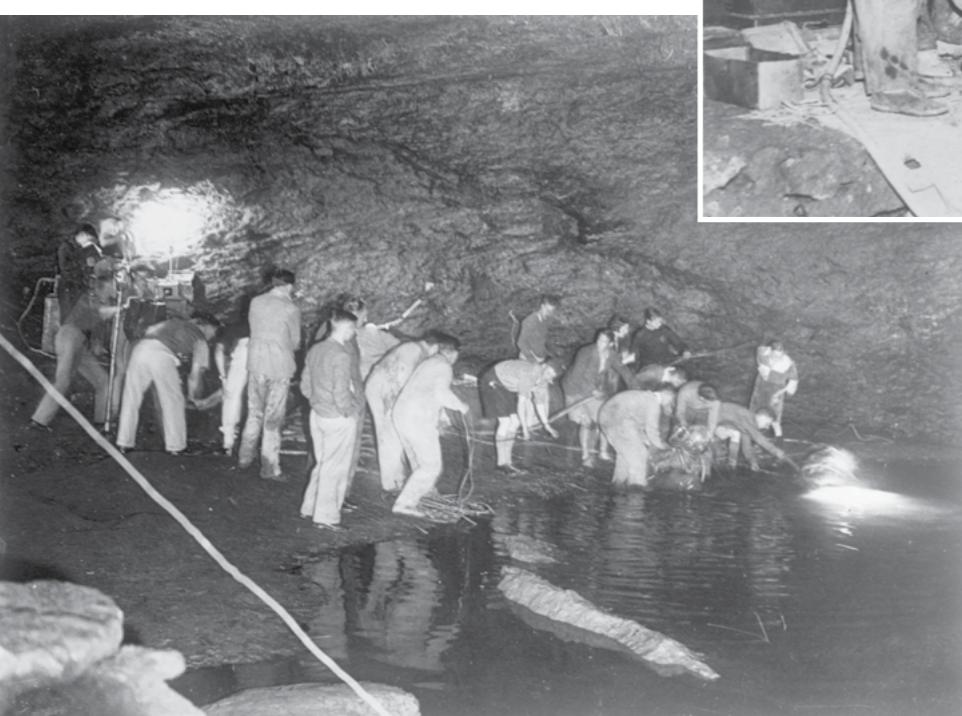
Times have changed

Now, as you can imagine, the experiences of Jevon and his team versus those

nearly 100 years prior differ in many ways. First, there is the gear. Even though their project was meant to commemorate the original Wookey Hole cave dives, Jevon did not wear weighted boots or a brass helmet. Instead, he ran a rebreather, and each team member's equipment included a main light, navigational marker kit, helmet, open circuit gas, two computers, a compass and much more.

Visibility is another factor that differentiates the two dives. Powell and Balcombe were forced to work in a near-zero-visibility environment, literally kicking up silt with every step they took. Jevon and his crew, on the other hand, did everything in their power to keep the silt on the cave floor as Gray needed to see as much of the caves as he could to paint. Additionally, each diver's main light and mandatory two back-up lights (plus the video/photography lights) allowed for a completely different scene of the cave's chambers than what the 1935 divers likely experienced.

Jevon went on to describe the pre-



MENDIP CAVE REGISTRY & ARCHIVECAVE DIVING GROUP

Team members assist Powell and Balcombe in 1935 cave dive



Gear for the set-up dive stands ready at the dive base inside Wookey Hole Cave (left); Tubes of paint are laid out on the cave floor, awaiting the artist's canvas (above); Artist Philip Gray with one of his paintings created in the cave (right); Team member sets up the artist's easel with canvas (lower left)

Wookey Hole



procedures were very much at the forefront."

Of course, safety also played a factor once in the water. Jevon and his team carefully calculated their run times based on safety reserves, with the safety divers ensuring these time limits were kept. Jevon explained, "We planned on one-sixteenth

gas reserves for bailout and exit, whereas normal practice would have been one-third. We regarded Philip as a diver until he began painting. It was then that all his dive equipment functions were monitored by a safety diver, and it was the safety divers who called to end the session whether or not the painting was finished."

the library, learning more about the Wookey Hole cave dives of the '30s, Jevon and his crew took a day to both survey the cave and set up the dives that would take place over the course of the next four days.

There were, however, a number of complications they first needed to overcome. In Jevon's words, "The main challenges were establishing a painting base over the silt. Our solution was to lay down a tarpaulin with weights, which we could then use to set up the easel. We also made sure the exit line could be easily maintained by all divers, and paid extra attention to lighting and filming within the limited space." Once everything was in place, the actual painting sessions could begin.

With planning taking up the first day, the second day was spent in the water painting. The crew

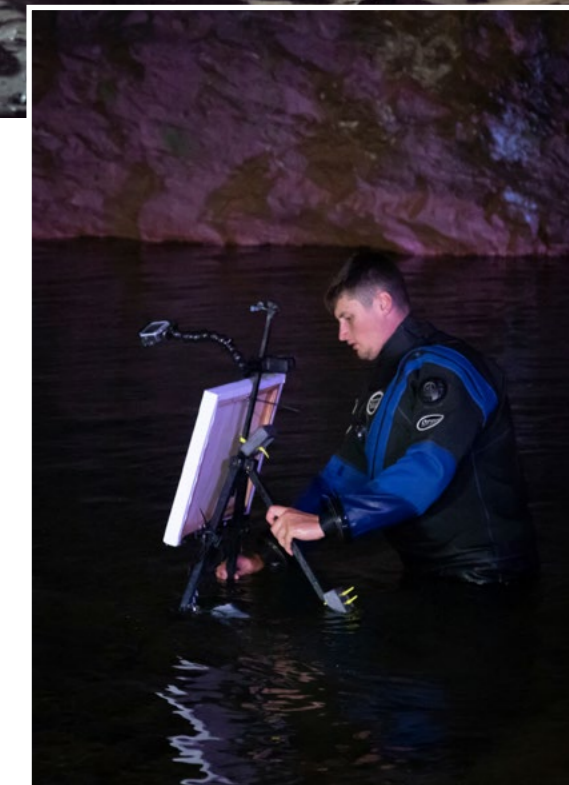
then moved the painting site and the process was continued for Gray's second piece. With the work finished, the final day was dedicated to cleanup, where everyone did their best to leave the caves as they found them. In contrast, Powell and Balcombe did not even attempt donning their gear in the caves until they had performed a practice run in the Minories pond, which sits in the hills above Wookey Hole.

"Safety first" —past and present

There is, however, one key aspect of both dives that remained the same: safety. The original expedition invented the standard for cave diving safety at the time. They focused on open-water training, kit testing, and learned to manage as they went. Other measures included training held

at the pools of Priddy Mineries, which were used as a "base camp," and the implementation of scrupulous log keeping, good lighting and line laying, to mention a few.

Today, cave divers follow the *Basic Cave Diving: A Blueprint for Survival*, developed by Sheck Exley and based on analysis following a high occurrence of cave diver fatalities in the 1960s and '70s. Being meticulous about keeping a continuous line to exit, ensuring backup equipment, gas management and reserves, safe navigation and teamwork are some of the safety points. In turn, Jevon can attest to how seriously they took safety, "In the briefings, we placed a lot of emphasis on 'what-ifs' over and above accepted cave diving practices. The cave is not too small but very silty. So 'lost line, lost diver'



dive work that went into their project. He said, "We visited the site and were privileged to be granted access to the Library of the UK Cave Diving Group to do our research." After spending time at

Philip Gray and Matt Jevon lead Michael Thomas and Robert Thomas into the cave for a painting dive (right); Gray and Jevon with the dive team and finished painting (far right)



Wookey Hole



When speaking of their gear, Jevon went on to say, "We actually omitted main reels and jump spools (not safety spools) as there would be no circumstance when they would be needed on the dives. Extra gas was the main change that we either carried or staged in additional cylinders." As the team was running CCRs, the extra gas Jevon spoke of was in terms of the amount of bailout they would normally carry.

Recognizing those who paved the way

So much has changed since the prewar cave expeditions of Powell, Balcombe and their team. Equipment, underwater conditions, visibility and common procedures are a few to note. Even the very purpose of cave diving as a technique has evolved from a means of furthering dry-cave expeditions into the exploration and pleasure diving of fully flooded caves.

Yet, these early divers were the first to do anything like this, and from that time on, a snowball effect of new discoveries and revelations had begun. It is thanks to their pioneering efforts, dedication and passion that Jevon (or any of us, for that matter) are even able to do what we love. Not only was cave diving born that

day on 14 July 1935, but the everyday practices we use as divers, such as the team approach, use of guidelines and drive to push the boundaries of diving, were put in place by the original Wookey Hole cave divers. We owe so much to them, and the least we can do is learn about those who have dived before us. Just as Jevon said, "Researching and understanding the history of where and how you're diving is paramount." We stand on the shoulders of giants—an expression loosely attributed to Isaac Newton (1675), and possibly even earlier to Bernard of Chartres (12th century). ■

Nikola Valtosova is a dive and travel writer, and project manager based in Prague.



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Two paintings created by Philip Gray during painting dives in the cave





OLGA TORREY

Text by Larry Cohen
Photos by Larry Cohen
and Olga Torrey

The Northeast US dive season usually starts with divers dusting off the cobwebs at Dutch Springs in Bethlehem, Pennsylvania. This year, the season started in the middle of a pandemic. Dutch Springs did not open in April, as it does most years. If you are a technical diver that is drying out, what is one to do? In our case, we took our drysuits, rebreathers, camera housings and sidemount rigs to our friend Gregory Borodiansky's pool.

OLGA TORREY

Olga Torrey's underwater model, Yana Borodiansky, dressed appropriately for 32°C (90°F) water in the pool (above); Snell's window photo of Larry Cohen with new Aquatica housing (top right)

Pool Diving Adventure





LARRY COHEN



LARRY COHEN

Gregory Borodiansky checks the work of breathing while on his back with a chest-mounted rebreather unit he designed and built off-season (above); Olga gets ready to shoot a surface marker buoy, or SMB (right); Snell's window photo of Olga (top right)

Gregory is a technical diving instructor and teaches a number of different rebreathers. Living in Staten Island, he has a 2m (7ft) deep, heated pool in his backyard. This was the only place for us to get wet! My dive buddy, Olga Torrey, and I had some new or recently repaired gear that needed to get wet

and checked out. Olga had a new drysuit from DUI, ordered at DEMA, and a new Hollis Katana 2 sidemount harness that needed to be adjusted. I had a new zipper and leaks fixed in my drysuit.

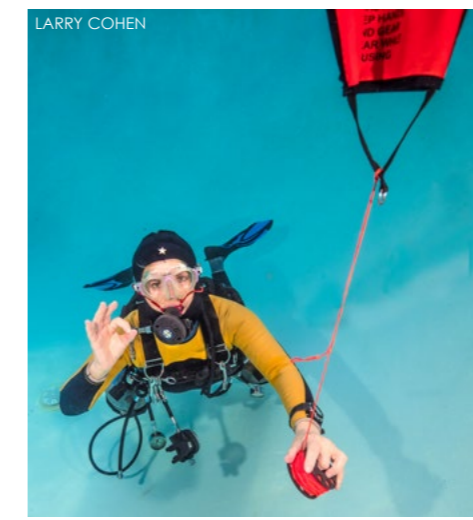
In addition, I needed to test my new Aquatica housing, for the Olympus OM-D E-M1 Mark II camera, and a Shearwater

NERD2 computer. The new gear and repairs were required to prepare for local diving as well as trips to Newfoundland, British Columbia, Philippines and Fiji. But all the trips were postponed, as the world learned to deal with the new normal. Trying to be optimistic, we decided to dive in the pool. This would be a different



Pool Diving

Olga working on her trim with new Hollis sidemount harness (left); Front view of the compact chest-mounted rebreather designed and built by Gregory (below); Snell's window photo of Gregory with chest-mounted Lungfish rebreather (bottom right); Successful deployment of the SMB (center); Larry with new Aquatica housing (far left)



kind of diving adventure!
 The pool was heated to 32°C (90°F). We were dressed in our drysuits, so we could check them for leaks. It was hard to tell if the dampness was coming from outside or inside! In the pool, Gregory was able to get Olga's sidemount harness adjusted and ready for open water. Olga practiced using a spool and deploying a SMB. This is an important skill to practice at the beginning of the season. Due to possible entanglement risk, do

not practice this skill unless properly trained.
Photography
 It was a challenge, using a housing on a sunny day, in very clear pool water. In open water, we use the camera's LCD screen for composition. On a bright day, we had to use the viewfinder. I was able to adjust the near-eye remote display (NERD) computer, so it was not an obstruction to look through the camera's viewfinder.

In the bright light, we had to use a low ISO, fast shutter speed and stop down the aperture, in order to balance the ambient light with our strobes.
 Experimenting with different techniques, we were able to use Snell's window. This is a phenomenon by which an underwater viewer sees everything above the surface through a cone of light. This phenomenon is caused by the refraction of light entering the water (Wikipedia). In the pool, we

OLGA TORREY
 Yana practicing yoga in the pool



Pool Diving



Gregory checks the work of breathing on his rebreather while on his back (above); Snell's window photo of Yana (left); Yana swimming on the surface (far left); Olga putting air in the SMB (bottom left)

Gregory Borodiansky can be reached at info@scubatron.com.

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.

LARRY COHEN

OLGA TORREY

OLGA TORREY

were able to take advantage of this to create interesting images.

Yana Borodiansky was appropriately dressed for the 32°C (90°F) water to model for Olga. Working close to the surface, Olga photographed Yana swimming, to capture her reflection using the Snell's window technique.

Rebreather check

Gregory used his pool to check the operation of several different rebreathers, and to test the new chest-mount unit he designed and built off-season. This compact unit weighs only 5.44kg (12lbs) and holds 2.27kg (5lbs) of sorb.

Oxygen is injected with a KISS valve, and the oxygen tank could be mounted either under the rebreather or on the diver's butt under the harness. The dil and bailout tank is sidemounted. Since the counter lungs are in front, near the diver's lungs, the work of breathing is excellent even when the diver is upside down. This tiny rebreather is perfect for recreational dives by itself or as a bailout rebreather along with a main back or sidemounted unit.

Between the three of us, we used US\$30,000.00 worth of gear to dive in 2m (7ft) of water! It was worth every

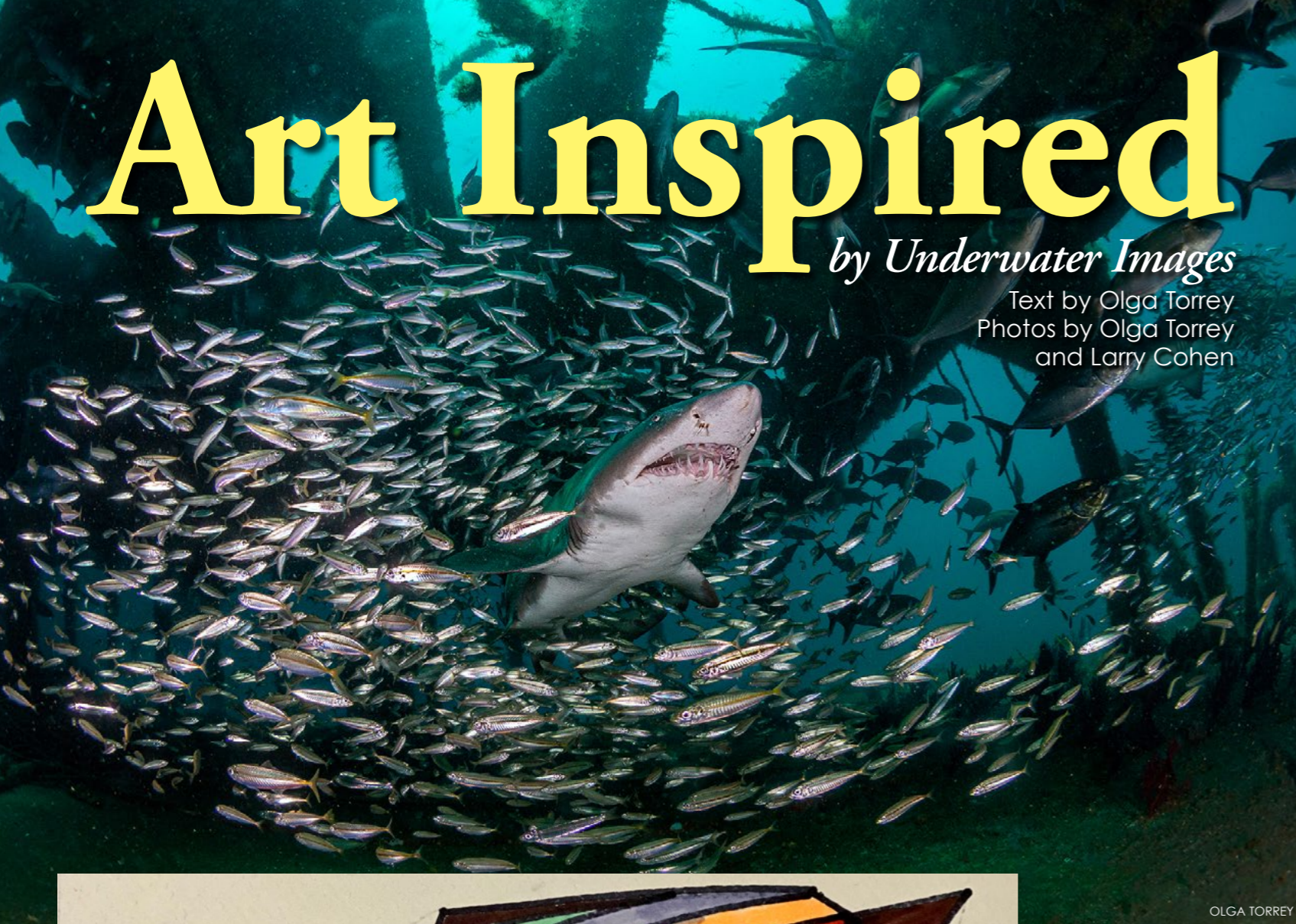
penny! But now that Dutch Springs is open again, we are taking our gear deeper. Soon, we will be doing boat dives up and down the East Coast. We are so looking forward to traveling internationally again. ■



Art Inspired

by *Underwater Images*

Text by Olga Torrey
Photos by Olga Torrey
and Larry Cohen



OLGA TORREY



OLGA TORREY

Underwater photographer and regular contributor Olga Torrey talks about how fine art and photography can influence each other, as she illustrates in her recent works undertaken in the *X-Ray Mag Photo Challenge*, which asks participants, who are homebound during the coronavirus lockdown, to recreate an underwater image they have taken with objects found around the home or things they can photograph from their windows. Torrey took the challenge to a whole new level by creating original art drawings and paintings inspired by underwater images.



OLGA TORREY

Sand tiger shark in *Aeolus* shipwreck in North Carolina in photo (top left) and in abstract drawing (above) by Olga Torrey; Silvertip shark in photo by Larry Cohen (right) and in an abstract drawing by Olga Torrey (above)

As a lifetime member of the Art Student League in New York City, I have studied both realistic and abstract painting. I often use my art training to help my photography, both above and below the water's surface. And when I create a realistic painting, I may use a live model or a photo as a reference. In my abstract work, the inspiration comes from within my soul. A feeling or the rhythm of a jazz song might inspire my work.

Recently, I undertook the challenge of turning a few underwater photographs into abstract pieces of art. I had always liked the curved lines in the silvertip shark

photo taken by my dive partner, Larry Cohen, so I decided to draw the head of a shark and to create curves similar to those in the photograph. I used the same technique to draw the sand tiger shark in the photograph I took inside the *Aeolus* shipwreck in the US state of North Carolina.

Using my photograph of two nudibranchs, I decided on a totally abstract design. I let the lines of the nudibranchs be the inspiration of the shapes joining together, which modified their true colors to work in my marker painting.

I took a more realistic approach to the drawing based on my photo-



LARRY COHEN





OLGA TORREY



OLGA TORREY



OLGA TORREY

Two nudibranchs in photo (above) and abstract marker painting (left) by Olga Torrey; Anemonefish and anemone tentacles in photo (right) and in a two-dimensional graphic representation (top right) by Olga Torrey

graph of an anemonefish. You can recognize the shapes of the anemonefish and the tentacles of an anemone. I wanted to flatten them to make them two-dimensional in order to turn them into a graphic version of the photograph.

With the art school that I used to go to being shut down due to the pandemic, I have not made any drawings in a long time. I found it challenging to start this project. Once I started, I remembered how much I enjoy drawing, and I am planning on doing more. ■

If you want to try your hand at recreating an underwater

image in an original drawing or painting, or with found objects, by taking the X-Ray Mag Photo Challenge, post and share your work on Twitter at [#xraymag-photochallenge](https://twitter.com/xraymag-photochallenge). For tips, go to xray-mag.com/content/take-x-ray-mag-photo-challenge.

Olga Torrey and Larry Cohen 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, please visit: fitimage.nyc and liquidimagesuw.com.



OLGA TORREY



Image 5. Final version of the tutorial image after advanced retouching in Photoshop

Text and photos
by Rico Besserlich

It should not happen but sometimes it does anyway: those annoying little white dots in our underwater images, which detract from the overall impression of the photograph. Known as backscatter, these dots appear when small particles in the water reflect the light from a strobe. The more directly the strobe light hits a subject, the higher the risk of backscatter. That is why a strobe should not be pointed straight at a subject. Indirect lighting (by angling your strobes slightly outwards or inwards but never directly toward the subject) is the main “trick” to minimise or even prevent backscatter.

Not much can be done with an underwater image that is covered with “white snow,” but to get rid of a few backscatter dots is no big deal. How many “dots” you are willing to remove is up to you, but it also depends on the image as well as how much labour you are willing to invest in postproduction.



Photo Retouching *of Underwater Images*

Just keep in mind that hours spent with the camera underwater are way more fun than hours spent in front of a computer.

Basic retouching in Adobe Camera Raw and Lightroom

For this tutorial, I have found an image (from the Red Sea in Egypt) of a shrimp

on soft coral (see Image 1 on next page). I adjusted the white balance, made a few very subtle exposure corrections and a slight curve alteration

for the contrast. This image looks okay to me so far, but there are several backscatter dots, which were caused by my not-very-cleverly-positioned strobe



Image 1. (left) For this tutorial, we will use this photo of a shrimp on soft coral taken in the Red Sea, Egypt. Image 2. (above) Problem zones can be identified (red circles) by zooming into an area of the tutorial image.

First, I will show you how to do it in ACR and Lightroom.

How to fix a few backscatter dots in ACR:

1. Open your image in ACR. (See Screenshot 1)
2. Zoom into the image to locate the "trouble zones."
3. Select the Spot Removal Tool (the eighth icon in the toolbar at the top, or shortcut "B" on your keyboard).
4. Make sure that the tool is set to "Heal" and the opacity is set at 100%.
5. Locate a backscatter dot and set the radius of the Spot Removal Tool to a size in which its circle is just a bit larger than the backscatter dot you want to remove.
6. Click on the backscatter dot. You can now see two circle-shaped areas: The red one is

light. See Image 2 for a zoomed-in view of the tutorial image with a few of those little troublemakers circled in red.

It is crucial to always zoom in to 100% magnification when post-processing your photographs, checking for fine details, working with full concentration and accepting nothing less than the best as a result. In this example photo, I find it acceptable to spend a little time (this is a five- to ten-minute job in postproduction) to get rid of those backscatter dots, especially because the backscatter is in the image's background and does not cover the main subject (the shrimp).

For such a task, I personally prefer to use Photoshop, but a small amount of backscatter can be fixed with Adobe Camera Raw (ACR) or Lightroom as well.

Advanced techniques and usage of tools in Photoshop will follow afterwards.

For both Photoshop and Lightroom, there are ready-made filters, plug-ins and "action scripts" available that pretend to fix such backscatter problems automatically. But most of these "automatic" functions employ blur filters, which—upon first impression—indeed eliminate the disturbing dots, but at the cost of losing important image details. That is why my personal choice is to do such fixes the "manual" way, trying to keep as much image details and digital information as possible. An image with a terrifying amount of backscatter in it is an image that I would throw into the bin and try to do better the next time—with my camera, that is, not with Photoshop.

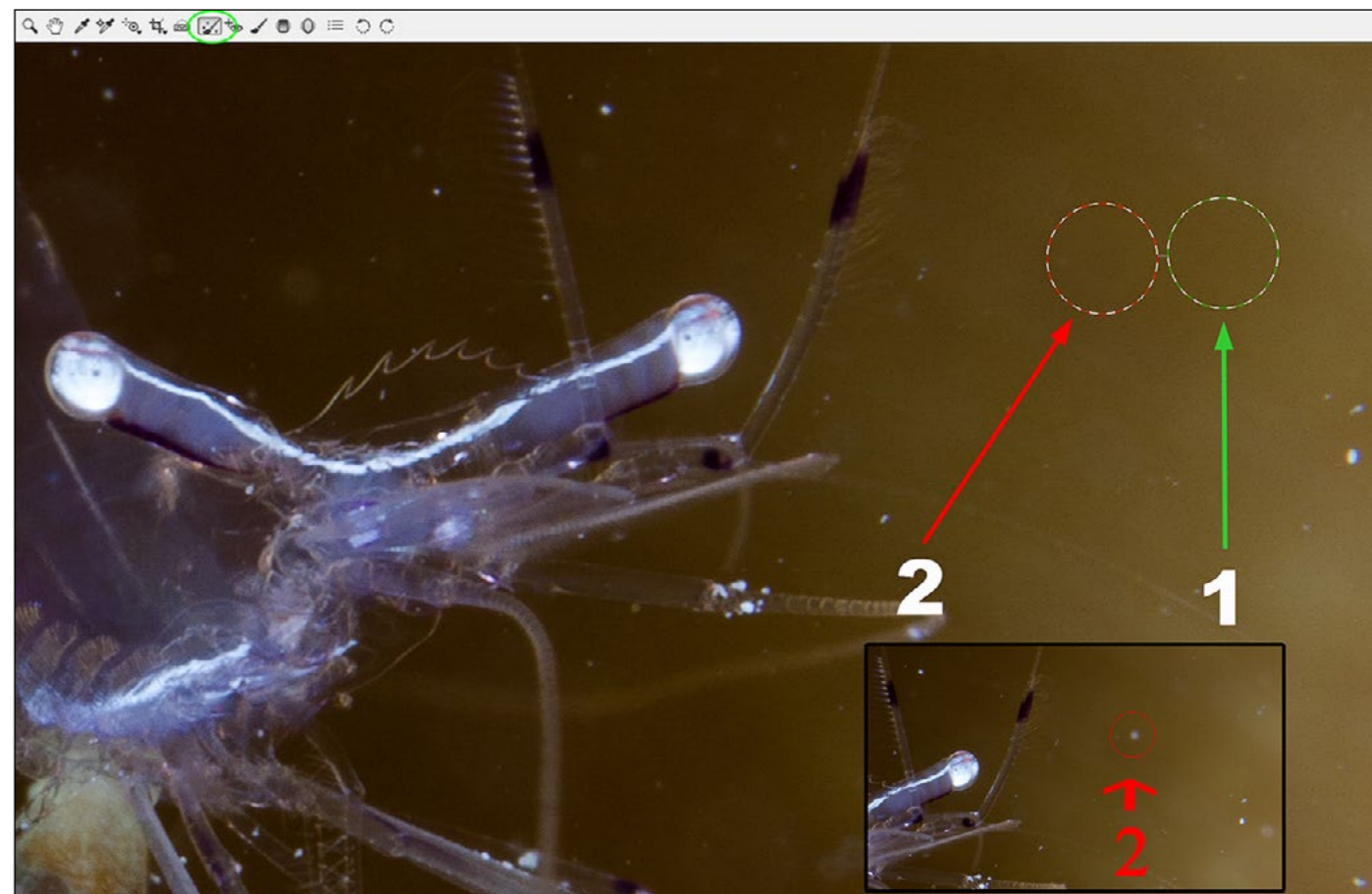
Retouching

the area that will be fixed (the target) and the green one is the area where ACR takes the information of an area with "correct" information (with no backscatter), which will be used to erase the backscatter (the source). You can move the green circle with your mouse until you are satisfied with the result.

Red circle: This is the area of the image that you want to fix. It is already fixed; check the inset square to see how it looked before.

Green circle: From this image area, a sample will be taken to repair the "trouble zone."

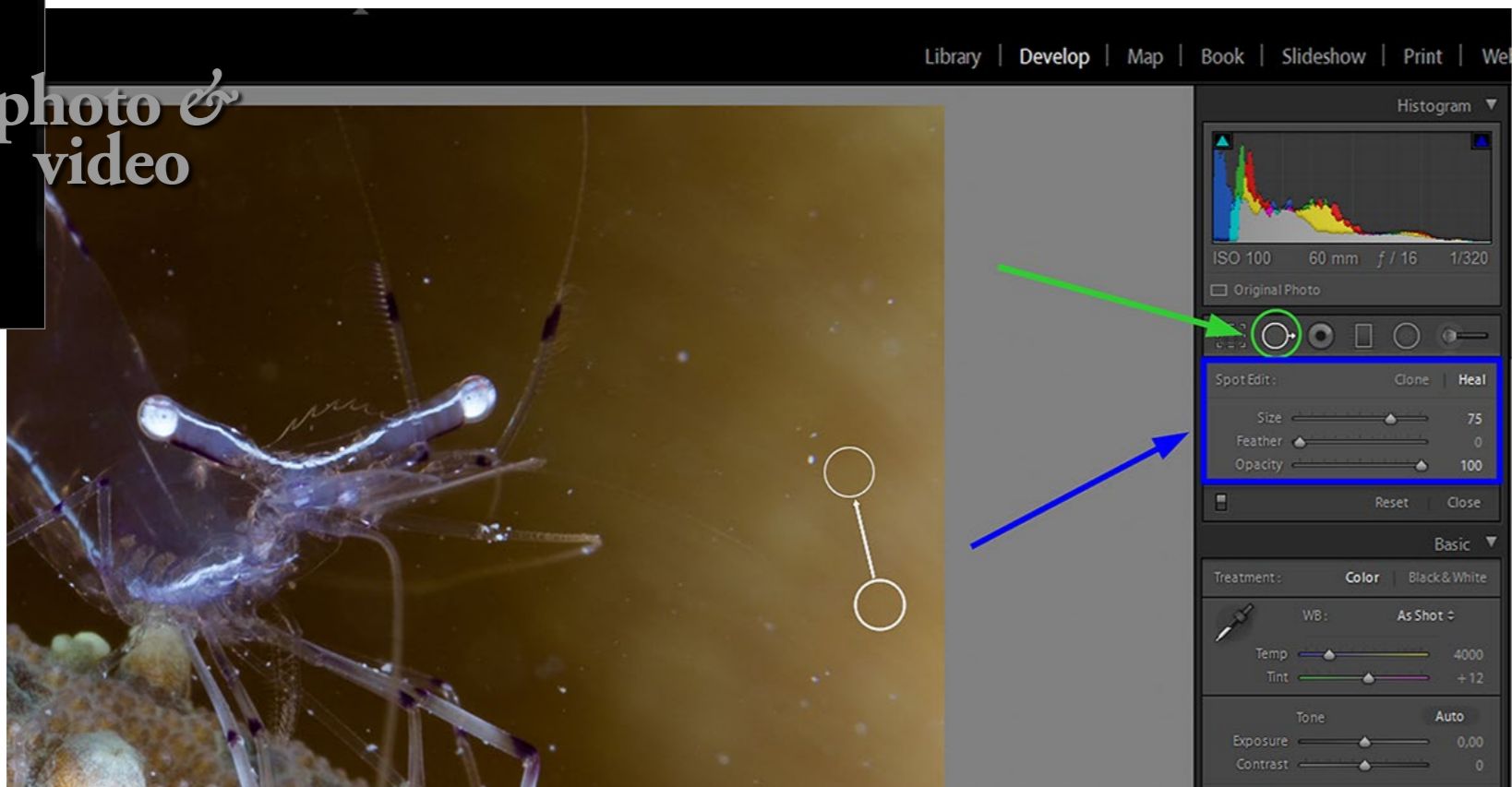
Not only should you choose a "healthy" area—one with no backscatter—but also one that has the same colour information as your target. Choosing, for example, a blue area to fix a backscatter dot in a



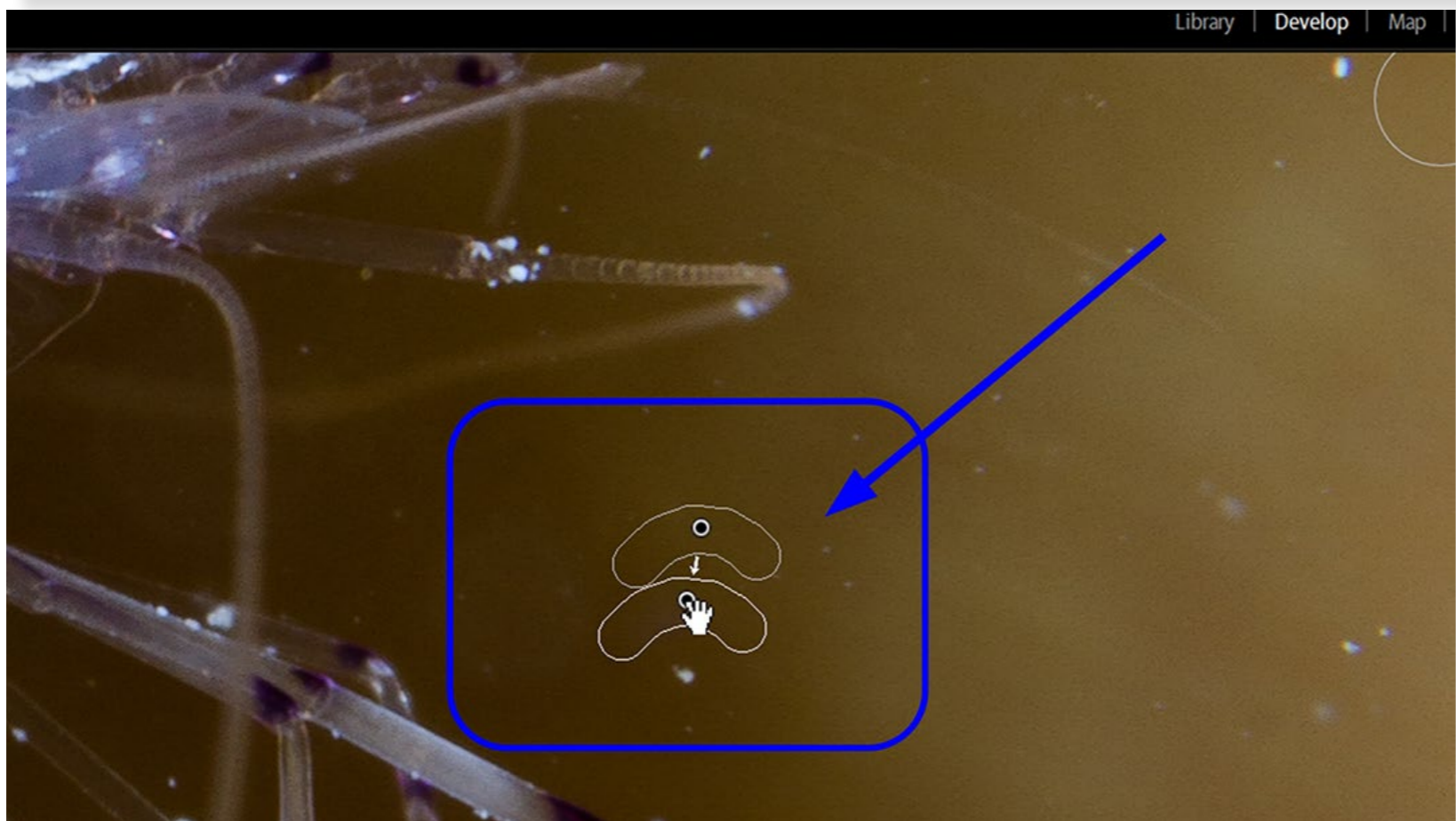
Screenshot 1. Using ACR's Spot Removal Tool (the eighth icon, shown circled in green, in top-left toolbar)



Screenshot 2. In Lightroom, the Spot Removal Tool is located in the Develop panel on the right



Screenshot 3. Newer versions of Lightroom and Photoshop allow you to use different shapes of the Spot Removal Tool



yellow area would result in a blue dot in place of the backscatter dot.
TIP: Always work in 100% magnification. You can easily switch between the Spot Removal Tool (B) and the Hand Tool

(H) for moving around in your image in higher magnification.
In Lightroom, the technique works in similar ways. The Spot Removal Tool is located in the "Develop" panel on the

right and can be activated with the keyboard shortcut "Q" (see Screenshot 2). Please note that newer versions of Adobe Lightroom and Adobe Photoshop do not limit you to circle-shaped spot



Image 3. The final version of the tutorial image after retouching in ACR

removal tools anymore. You can now "paint" freely with the Spot Removal Tool to "heal" areas with different shapes (see Screenshot 3).
After ten minutes of work, we have fixed the backscatter! (See Image 3)

Advanced retouching in Adobe Photoshop
While ACR and Lightroom provide basic tools for getting rid of a few backscatter dots and other smaller distracting elements in our underwater images,



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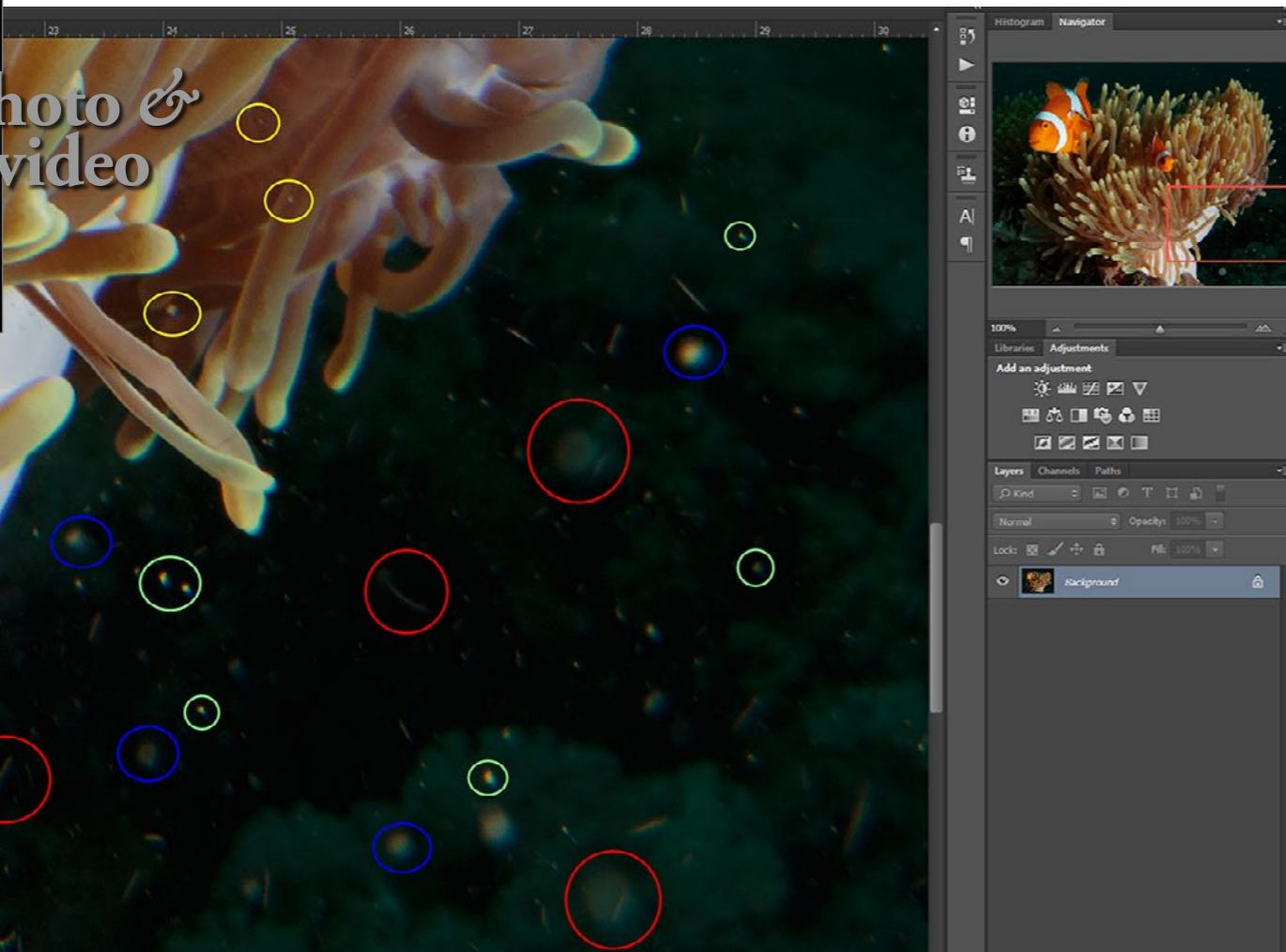
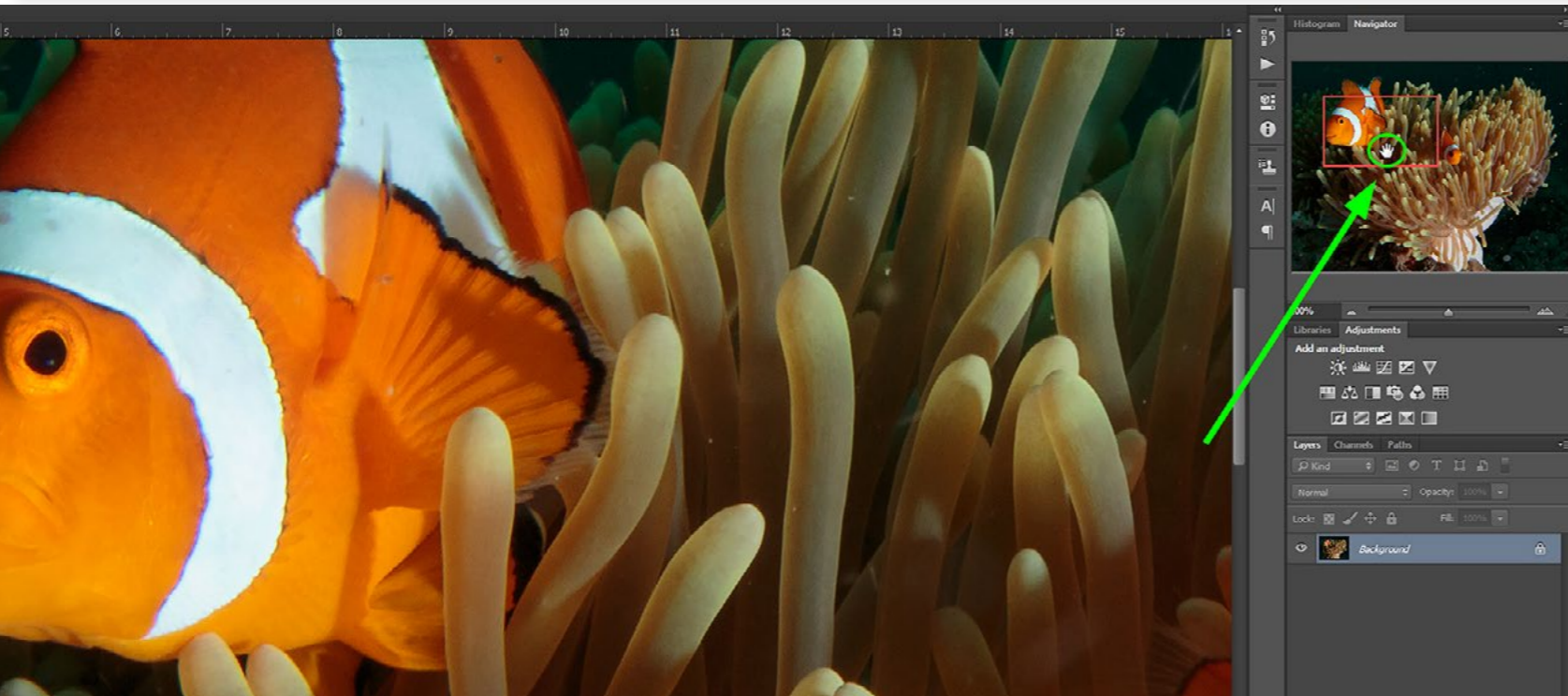


Image 4. (above) For advanced retouching in Photoshop, let's use this tutorial image of anemonefish taken in Anilao, Philippines; Screenshot 4 (top left) and Screenshot 4a (lower left) show zoomed-in views of the tutorial image with green, blue, red and yellow circles identifying different problem areas and issues



certainly wipe out lots of image details too. Therefore, I always recommend doing it manually, to keep as much of the original image details as possible.

Now, let's begin with an image of an anemonefish (from Anilao in the Philippines). (See Image 4)

As we can see on first viewing, quite a lot of backscatter detracts from the image. But there are a few other issues as well, including dirt, particles and a few flares, probably caused by dirt or small air bubbles on the front glass of the camera housing's port.

To view those little troublemakers, we need to zoom into 100% magnification. I usually use Photoshop's Navigator screen (at the top right) for this. The red rectangle marks the visible area, and you can drag it around with your mouse, carefully observing all the areas of the image in 100% magnification. This is the moment of truth. (See Screenshot 4 and 4a)

Having done that, I grabbed a few areas of the image, marking different issues with different colours (see Screenshot 4, and Screenshot 5 on the next page):

Green: This has very small dots in a neutral area, which are

easily removed with the Spot Removal Tool.

Blue: This has larger areas of backscatter—usually a case for the Healing Brush Tool.

Red: This has larger flares or dirt, mostly in neutral areas. Here, lots can be fixed with Photoshop's new Patch Tool. Or with the "special weapon" of newer Photoshop versions, which I will introduce in a bit.

Yellow: This has backscatter or other small distracting elements that are on the main subject (the anemonefish) itself or very near to it. For the most part, the Healing Brush Tool works well here.

sometimes there are cases that require finer and more precise tools. Such tools are found in Adobe Photoshop.

A few notes before we get

started: There are automated functions and ready-made "actions" in Photoshop that promise to "automate" specific steps in editing, such

as backscatter removal. The problem here is that all these functions use blur filters, which may indeed wipe out backscatter, but they will most

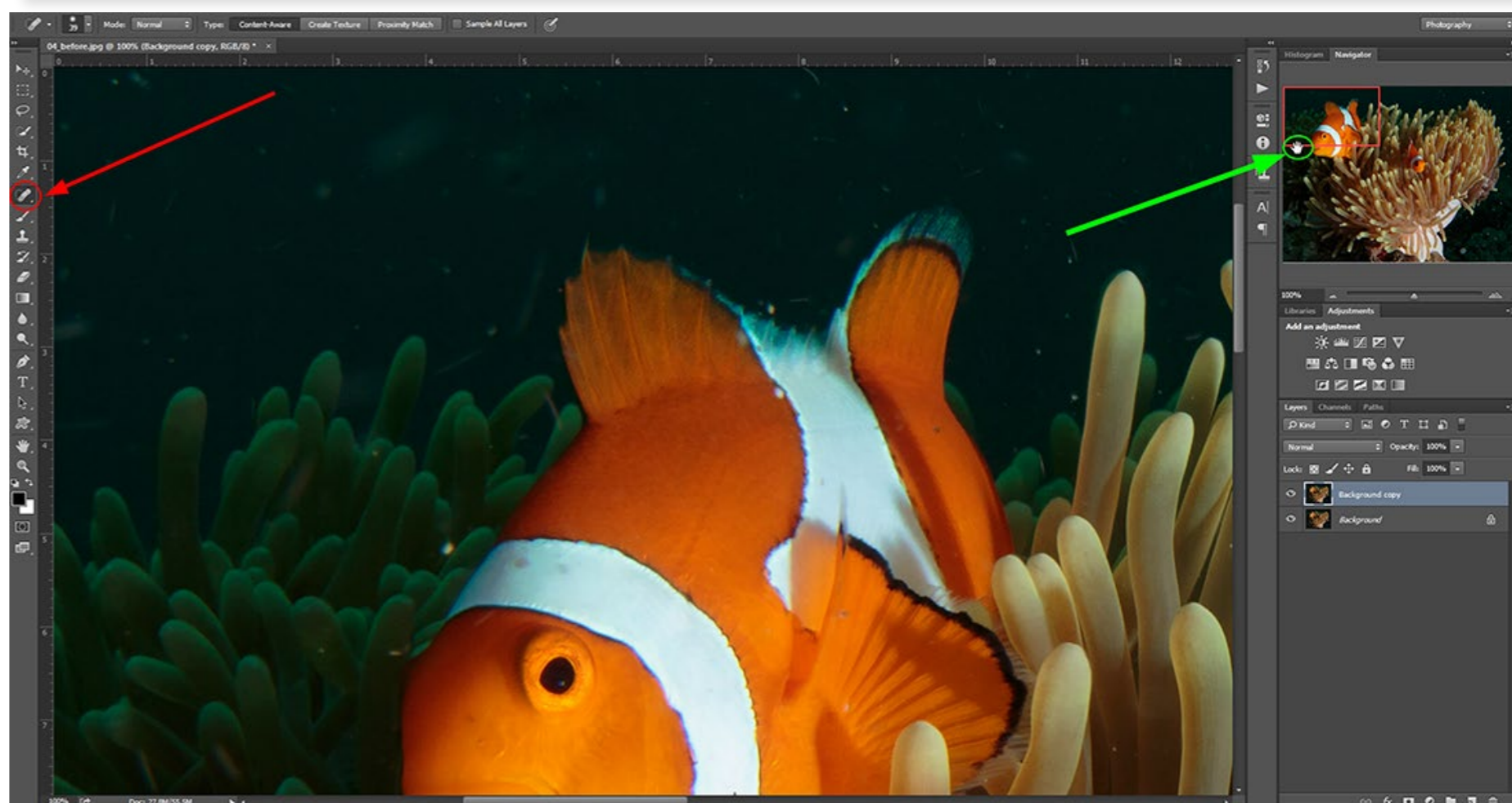
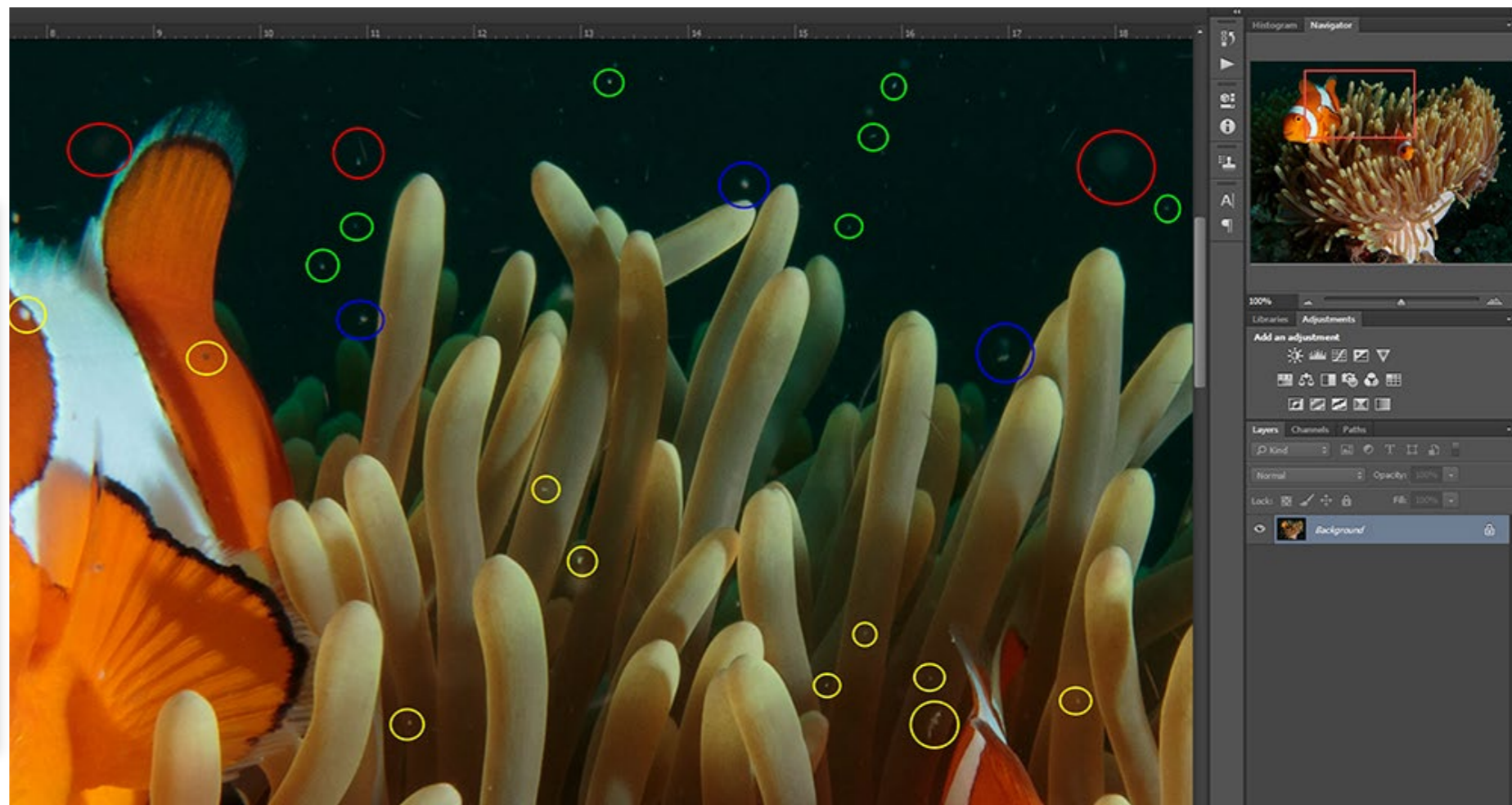
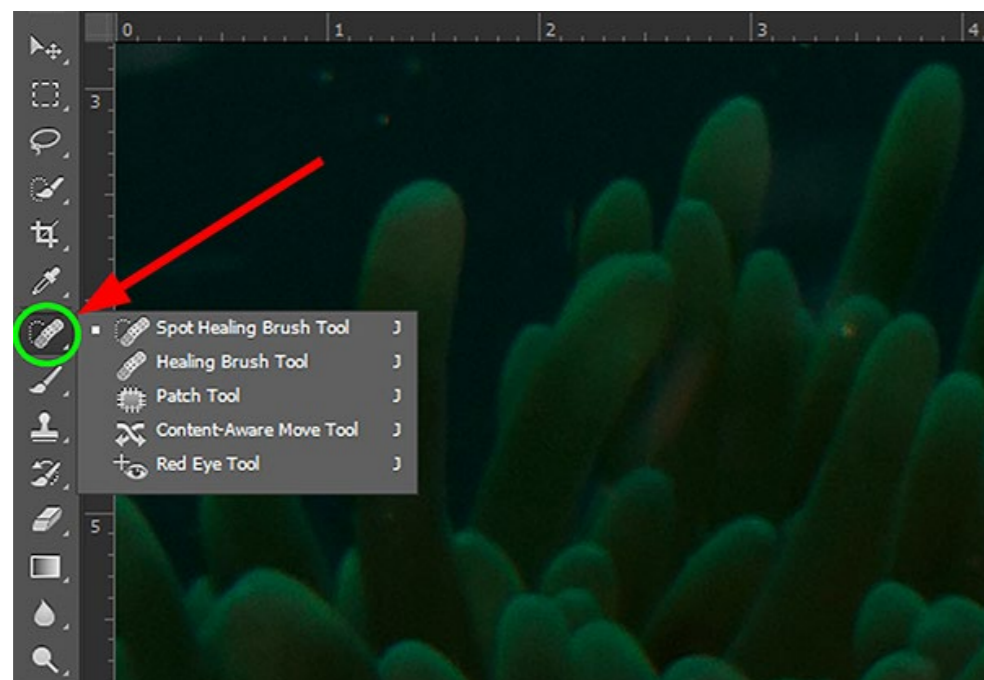




Screenshot 5. (right) shows a zoomed-in view of the tutorial image with green, blue, red and yellow circles identifying different problem areas and issues.

Screenshot 6. (bottom right) shows the Healing Brush Tool (circled in red), which is the seventh icon on the left-side toolbar.

Screenshot 7. Our start screen shows the drop-down menu of the Healing Brush Tool (circled in green). It is the seventh icon on the left-side toolbar.



Photoshop comes with several cool tools that help us fix these types of problems. The classics, and actually the tools of choice in 99% of all cases, are the Spot Removal Tool, the Healing Brush Tool and the Patch Tool. You can access them with the seventh icon in Photoshop's toolbar on the left side. (See Screenshot 6).

A classic "starting position" for working with those tools would be to have a 100% magnification of your image, a copy of your background layer and the Navigator window (top right) activated. Always work in 100% magnification and move the red rectangle on the Navigator screen to edit each visible area step by step. See Screenshot 7 for our start screen.

The functions of the tools

1. Spot Removal Tool

This tool removes spots by sampling surrounding areas. Once you have clicked on a small spot you want to remove, check that the tool size is just slightly larger than the spot, using the right-mouse-click menu. Then the tool basically determines a "problem" zone and looks around for a "healthy" zone nearby for sampling.

It works well for removing small dots and backscatter in neutral areas, but

only if a "healthy area" with similar colour information is nearby. You cannot select the area from which this tool takes the sample. But in this example, it works well with my green-marked areas.

2. Healing Brush Tool

Same concept but with one big difference: You have the ability to choose the "healthy" area to sample by holding the ALT key on your keyboard, clicking on an area from which to take the "correct" information, and then clicking on the area you want to fix. This tool works well for areas with lots of different colour information or variation, such as the yellow- and blue-marked trouble zones.

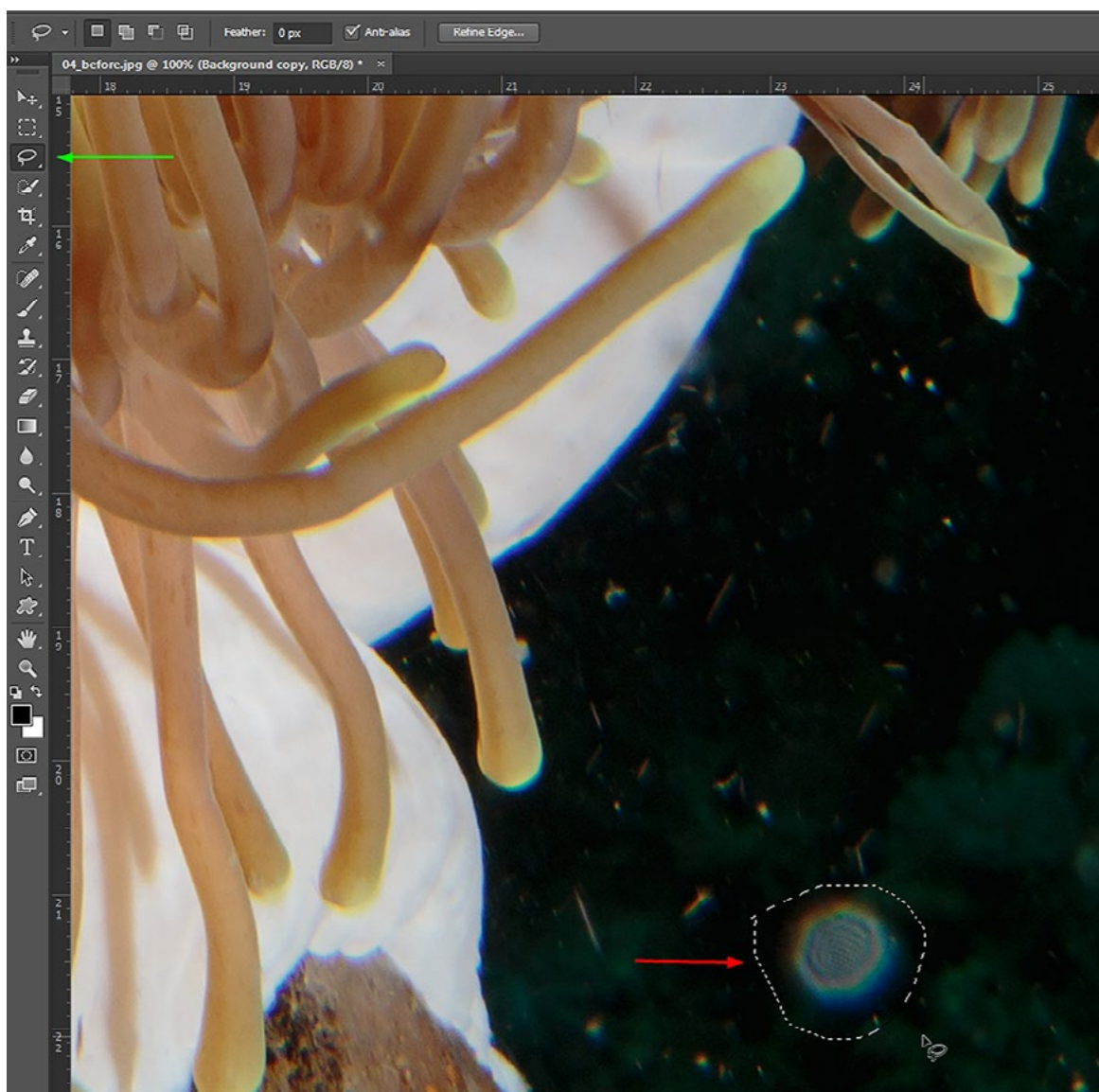
3. Patch Tool

With this tool, you can select a larger "problem zone" in your image, then just move the selection to a "healthy" zone and Photoshop does the rest (TIP: Do not forget to hit Deselect after the fix). It works very well; however, larger zones to be fixed (e.g. an area of your image with lots of larger backscatter dots or flares in it) require the existence of larger "healthy" zones to be sampled—with similar colour, of course. Otherwise, you would just



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Screenshot 8. (below) Use the Lasso Tool, which is the third icon on the left-side toolbar, to select the part of the image you want to go away



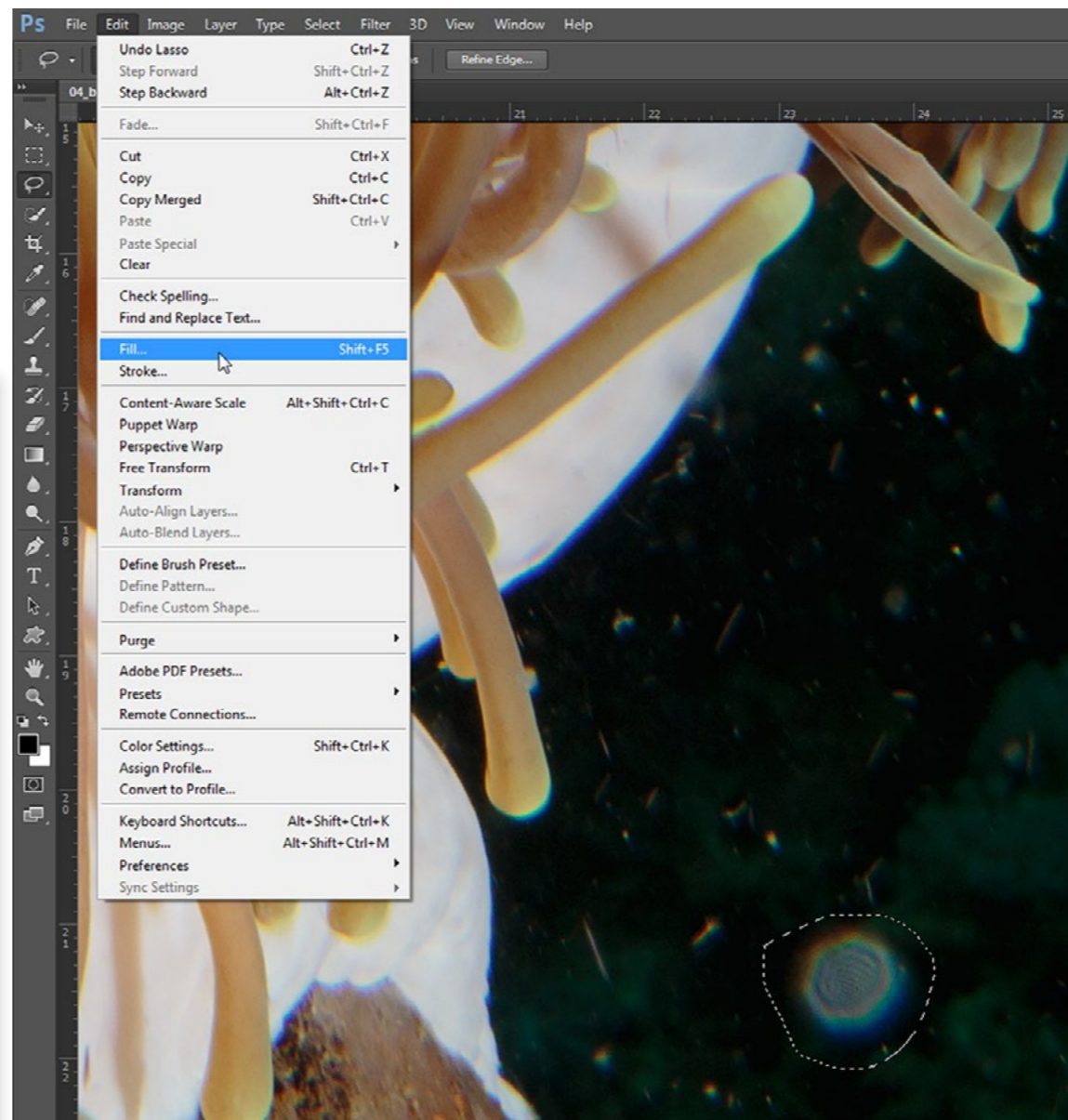
resample your own mistakes!

The Patch Tool works well for larger “troublemakers,” such as dirt (on the port) or flares. See the red-marked areas in the tutorial picture.

This is why I recommend starting with the “small” and working up to the “big.” First, fix the smallest backscatter dots (green), then the mid-sized ones—those that are on or near the subject (blue and yellow)—and lastly, the big nasty ones (red).

Content-Aware Fill

In newer versions of Adobe Photoshop (in all “CC” editions), another quite impressive tool is hiding in the menus—a real weapon that works just perfectly for the “big nasty guys” such as large lens flares and large dirt particles. It is so powerful, it even can erase a scuba diver, or any other “unwanted” object, out of your image and no one would ever know it had been there. But that would be a very



Screenshot 9. (above) In the upper menu of Adobe Photoshop, click on Edit, and then Fill, in the drop-down menu.

serious image manipulation (don't get caught!) so I prefer to introduce this tool and its use for only classic and “honourable” retouching purposes.

The Content-Aware Fill Tool replaces any area you select with content that can be found around or near the selected area. It works extremely well with “larger troublemakers.”

How to use it, in brief:

1. Use the Lasso Tool (the third icon in the left-side toolbar) and roughly draw a selection around the part of the image you want to go away (in my example, a nasty flare). (See Screenshot 8)

2. In the upper menu of Photoshop, go to Edit > Fill. (See Screenshot 9)

3. In the pop-up menu, make sure that “Content-Aware” is selected in that drop-down menu, the checkbox for “Color Adaptation” is checked, “Mode” is set to “Normal,” and “Opacity” is set to 100%. (You do not have to do that every time. Photoshop will remember your settings). If all of that is checked and done, hit “OK”—and see the nasty flare not only disappear before your very eyes but even get replaced with content that exactly matches the area around it. The Content-Aware Fill Tool is far superior to the classic Clone

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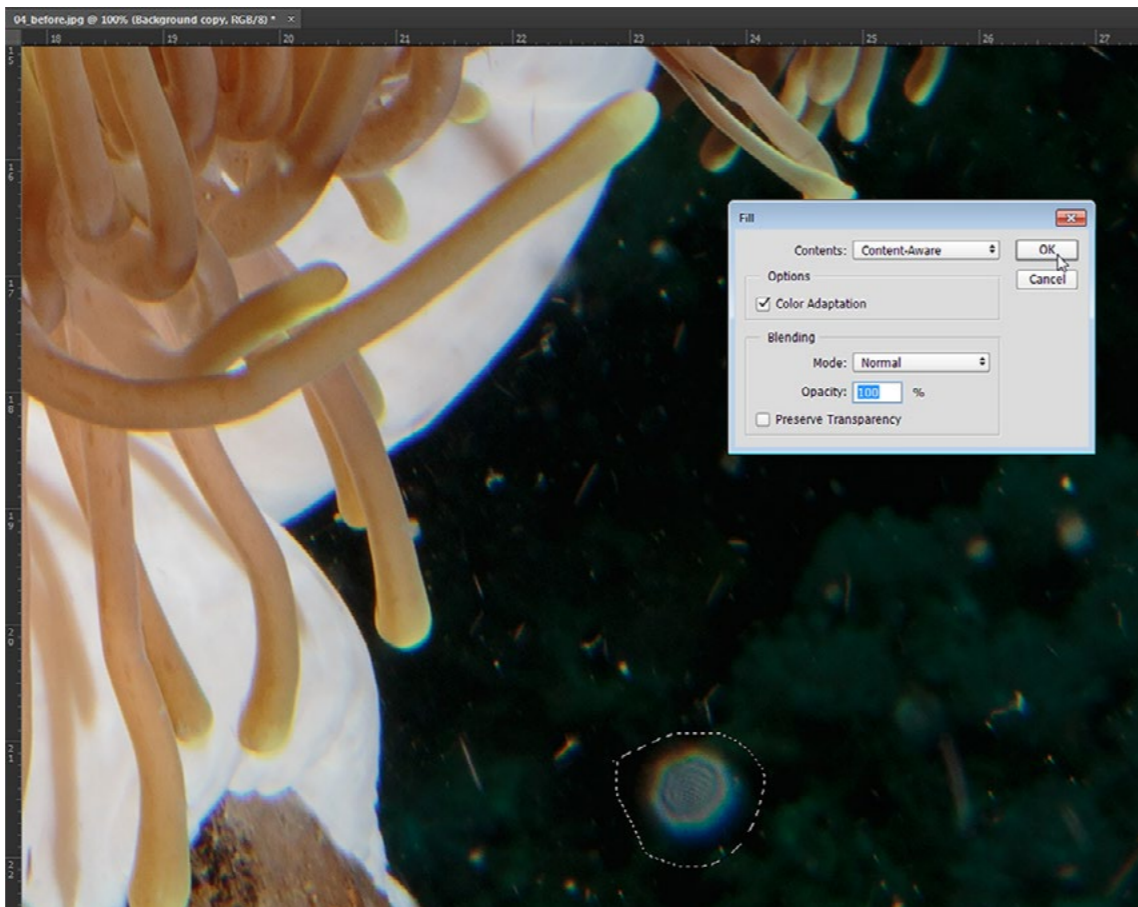


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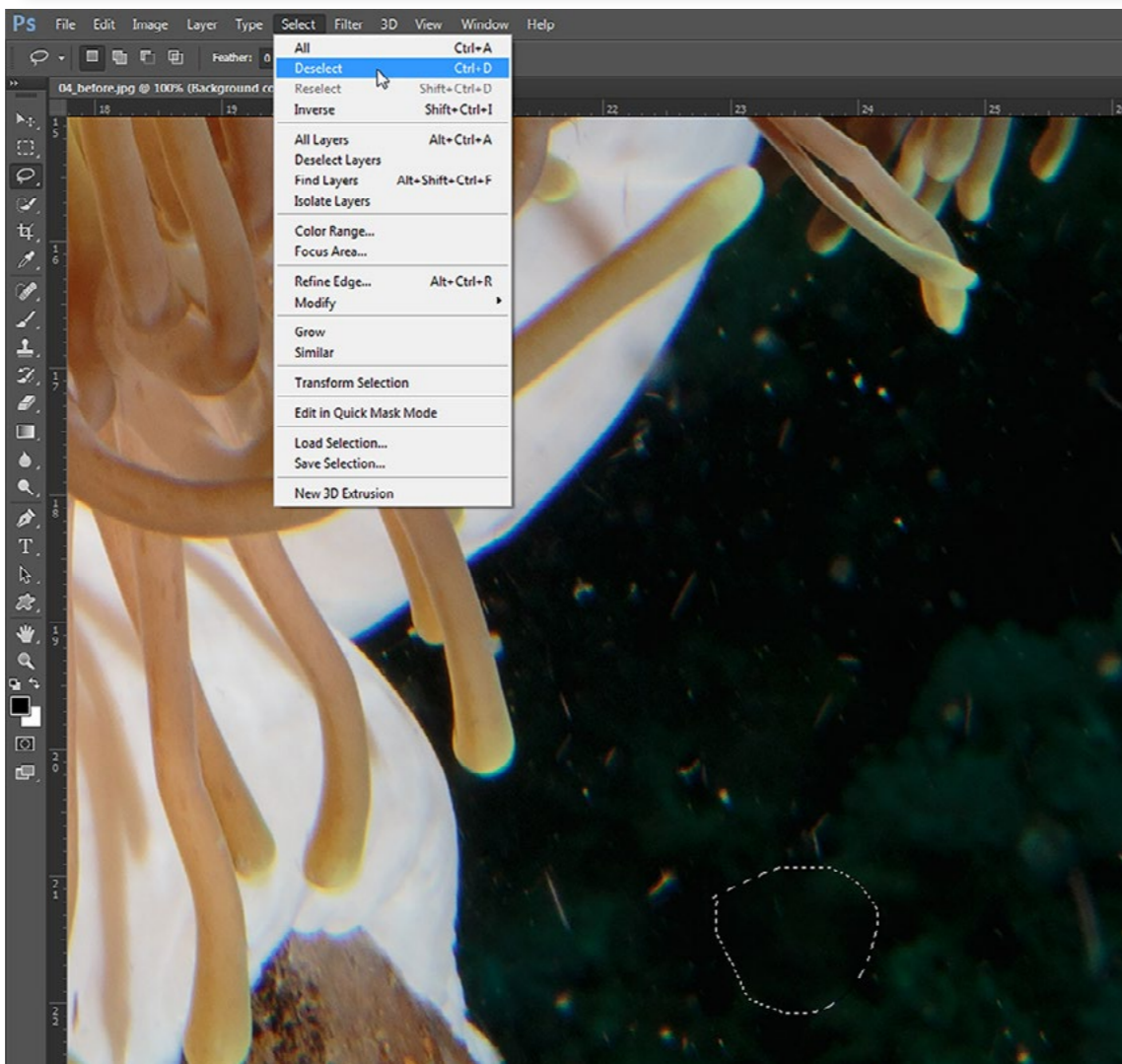
photo & video

Screenshot 10. In the pop-up menu, make sure that "Content Aware" is selected in that drop-down menu, the checkbox for "Color Adaptation" is checked, "Mode" is set to "Normal," and "Opacity" is set to 100%.



Stamp Tool of Photoshop, as the Clone Stamp Tool always slightly softens "cloned" areas while the Content-Aware Fill tool does not. This tool is very, very clever, and it is worth those few extra steps you have to do when using it. (See Screenshot 10)

4. You may now search for more "nasty big things" upon which to use this tool. When done, click Deselect in the Select drop-down menu (keyboard shortcut: CTRL+D). (See Screenshot 11)

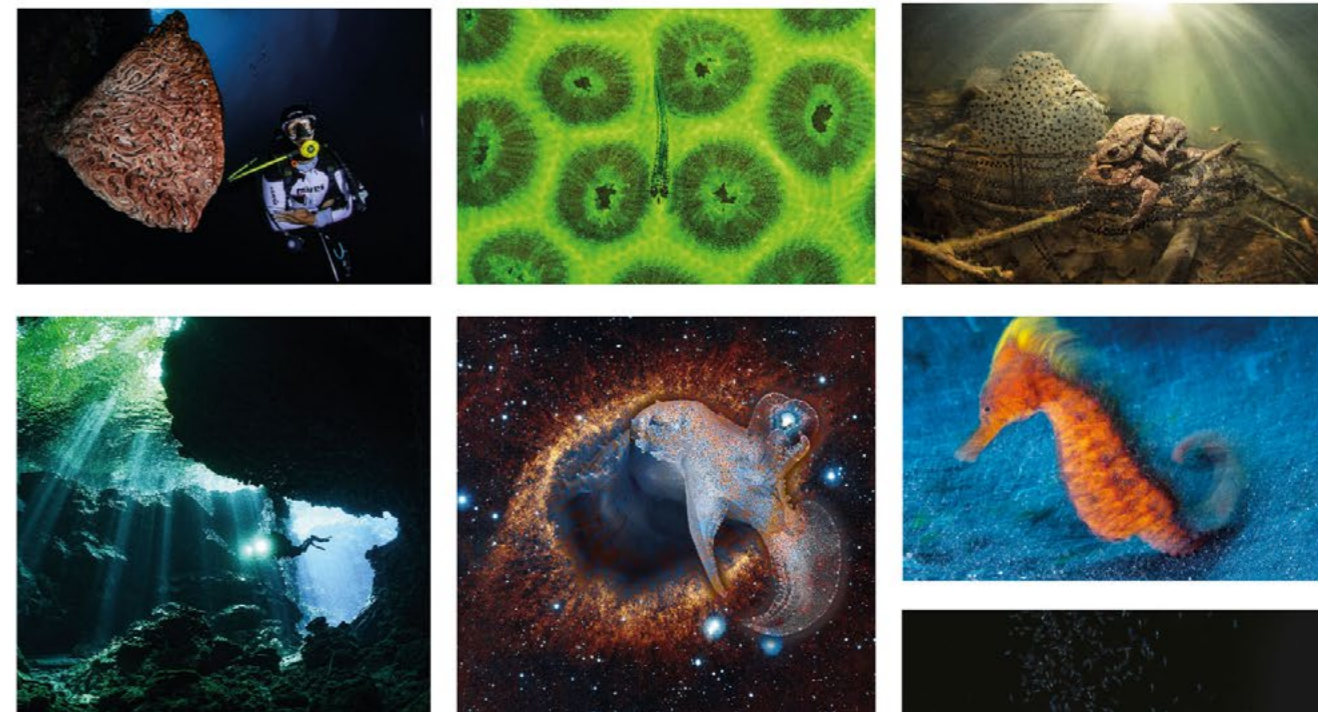


Afterthoughts

There is no need to be scared of Photoshop. Think of it as a workshop in which you store your tools, or perhaps think of it as your kitchen. Once you can recall where the screwdriver, saw, hammer, spoon or beer glass are stored, you can use them right away. Photoshop is no different. The key is to know which tool can fix which "problem." (See Image 5 on the first page of article for the final retouched version). Happy retouching! ■

Rico Besserdich is a widely published German photographer, journalist and artist based in Turkey. Visit: Maviphoto.com. See his latest book at: Songofsilence.com.

Screenshot 11. When finished, click Deselect in the Select drop-down menu



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Isotta dive mask

The Isotta transparent dive mask has been specifically designed for photo shoots with underwater models. It features a large, retro-style, single-lens design, which makes it easier for underwater photographers to get enhanced or highlighted eyes and facial features of underwater models.

isotecnic.it

Isotta RED64

The new RED64 strobe made by Italian manufacturer Isotta comes with a design, shielded electronics and microprocessor that are upgradable. It is also neutrally buoyant in water and depth-rated to 100m. The strobe features a Xenon toroidal lamp, which provides a wide and homogenous spread of light with no hot spot and a color temperature of 5300K. The Isotta RED64 features a guide number of GN22 in water (at a distance of 1m, 100 ISO) and a beam angle of 130 degrees, without a diffuser. The strobe has a two-color focus light (white and red, switchable). The RED64 is powered by eight Ni-MH AA-size rechargeable batteries, which are stored in a compartment, sealed and separated from the strobe's electronics. Strobe controls are visible from every angle. A multi-color LED indicates mode of operation, strobe readiness and battery status. The strobe can be controlled both automatically and manually; RED64 can be operated with an optical fiber cable, working in TTL mode and in Manual mode as well. Alternatively, it can be used with sync cables through a S6 bulk-head, or Nikonos V, or in slave mode. isotecnic.it



SeaLife close-up & macro lenses for Micro 3.0 camera

SeaLife has introduced a new close-up lens for its new Micro 3.0 cameras, including the new ReefMaster RM-4K and its previous generations. The new lens allows one to capture close-up images and video from 6 to 24 inches (15cm to 60cm). The +10 diopter wet lens attaches quickly and easily on land or underwater. The lens features a single optical glass element that is anti-reflection (AR) coated. The lens frame mount is constructed of a durable rubber material that protects the optical glass lens. The lens also includes a safety lanyard to prevent accidental loss. For closer focusing, SeaLife offers its two-element super macro lens, which shoots as close as 3.5in (depending on camera model), with a lesser depth of field of approximately 7in (9-18cm). sealife-cameras.com

Fujifilm FinePix XP140

The Fujifilm FinePix XP140 is a rugged digital camera, which is waterproofed to 25m (82ft). Its 16.4MP CMOS sensor enables still shots in JPG, UHD 4K (15fps) video recording (30fps in HD mode), and ISO 100-12800 sensitivity range. The camera is equipped with a (non-changeable) Fujinon 5x optical zoom lens, which covers a 28-140mm equivalent focal length range, and sensor-shift image stabilization. The XP140 comes with a 3in 920k-dot LCD monitor for composition and image review. All of the essential camera controls are placed on the right-hand side for one-handed control. Bluetooth and Wi-Fi functionality connects the camera to mobile devices, laptop or PC, for transfer of images or video, along with geotagging and time sync data. It features several scene modes, including two underwater modes. Other features are in-camera 360-degree panorama still, time-lapse, scene detector (Scene Recognition) mode, and double exposure. fujifilm.com



Wacom Intuos Pro digital graphical tablet

The Intuos Pro Creative Pen Tablet from Wacom is a graphical tablet that can make a noticeable difference in the postproduction workflow of underwater images. The Intuos Pro connects to your computer (PC or Mac) via USB or Bluetooth and is, after driver installation, ready to use and compatible with Adobe Photoshop, Lightroom, and various other image editing software. It has customizable ExpressKeys that can be assigned to specific functions or shortcuts in Photoshop, for example, and comes with the Wacom Pro Pen 2, which has 8,192 levels of pressure sensitivity, thus making advanced retouching and editing of underwater images a new and better experience. When combined with the separately sold Paper Clip, Finetip Pen, and paper, the Intuos Pro becomes the Intuos Pro Paper Edition, allowing the user to sketch on paper and store the work without having to be online or connected to a computer. It is useful for preparing shoots or for teaching online. The Intuos Pro is available in three different sizes: Small 269 x 170 x 8mm (10.6 x 6.7 x 0.3in), Medium 338 x 219 x 8mm (13.2 x 8.5 x 0.3in), and Large 430 x 287 x 8mm (16.8 x 11.2 x 0.3in). wacom.com



John Lautermilch



P O R T F O L I O

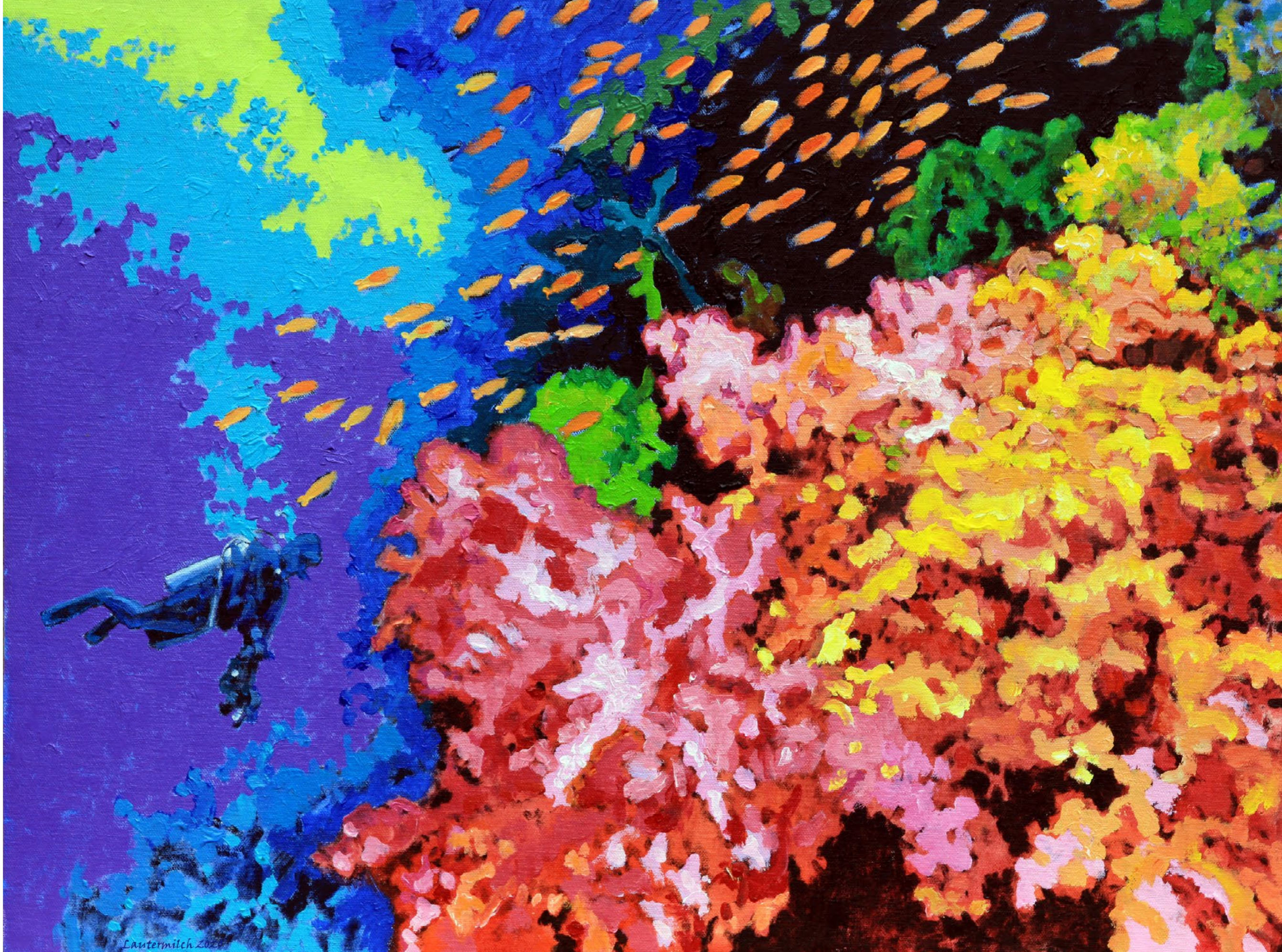
portfolio

Edited by G. Symes
All artwork by and photos
courtesy of John Lautermilch

John Lautermilch, an award-winning American artist from Saint Louis, Missouri, and graduate of the Washington University School of Fine Arts, has created paintings for 60 years, which have been shown in numerous solo exhibitions and include commissions for individual collectors and institutions. Among his plethora of paintings of the natural world are artworks featuring vivid and dynamic underwater scenes with divers and coral reefs. *X-Ray Mag* interviewed the artist to learn more about his creative process and perspectives.

X-RAY MAG: Tell us about yourself, your background and how you became an artist.

JL: I knew I wanted to be an artist from the time I was five years old. I was in love with the visual



Lost World, by John Lautermilch. Oil on canvas panel, 18 x 24in (45.7 x 61cm). PREVIOUS PAGE: *Spotlight on Creation*, by John Lautermilch. Oil on canvas, 30 x 40in (76.2 x 101.6cm)





Lautermilch

The Flow of Creation,
by John Lautermilch.
Oil on stretched
canvas, 36 x 48in
(91.5 x 122cm)

world, but I also enjoyed the compliments my drawings elicited from my parents and others. And so I continued to draw and paint throughout my childhood. I eventually went to a prominent university in the city of Saint Louis and studied art exclusively. My hope was to make a living as a non-commercial artist, but it was not meant to be. Therefore, I was compelled to take jobs in the commercial world, creating artwork for shoe advertisements, corporate publications, and children's books with religious themes. But I am now retired, so I have all the time in the world to paint only what I want, without needing to make a living from my artwork.

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?

JL: I have always been interested in the beauty of the natural world, no matter where that beauty happens to be found. And there is of course plenty of it to be found in the ocean. In many ways, the beauty underwater is more

LAUTERMILCH
2011





Swimming with the Dolphins, by John Lautermilch. Oil on stretched canvas, 36 x 48in (91.5 x 122cm)

John Lautermilch

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

JL: I am deeply worried about the future of our oceans. It is clear that our current path is not sustainable. I think the more people are exposed to the endless beauty of the underwater world, the more likely they are to cherish it and want to preserve it.

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

JL: I mostly want viewers to simply derive pleasure from my artwork. But if it also inspires them to be more environmentally conscious, that would be extremely gratifying.

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?

JL: Perhaps the biggest challenge of being an artist in today's world is competing for attention with the endless stream of videos, articles, music, social media posts, etc., that nearly everyone now has access to. To break through all of that requires not only great talent but also healthy self-promotion on every possible platform.

exotic and otherworldly than the beauty we experience in our everyday lives on land. Observing the aquatic world is akin to visiting another planet. The colors are breathtaking.

X-RAY MAG: Who or what has inspired you and your artwork and why? Which mentors, artists, art styles or movements have influenced your artistic vision, creative process and development of your artwork?

JL: Though I have dabbled in many different styles over the decades, I am mostly a traditionalist, in both technique and

subject matter. I mostly paint the natural world in a realistic and impressionistic vein. And my favorite artists did as well: Rembrandt, Vermeer and Monet.

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

JL: I am inspired to paint whenever I encounter beauty, whether I am fortunate enough to witness that beauty firsthand or only in photos and videos. Once I decide on the subject matter, I collect relevant photos of it. I then draw an outline of what I want to paint, sometimes going through

multiple drafts. Once the outline is satisfactory, I begin painting, laying down the background colors first. My preferred mediums are acrylic and oil paints.

X-RAY MAG: What is your relationship to the underwater world and coral reefs? Are you a scuba diver or a snorkeler and how have your experiences underwater influenced your art?

JL: Unfortunately, I have never been scuba diving and have only been snorkeling once. Therefore, my underwater paintings are inspired by the photos and videos of others.



Playing with the Sea Turtles, by John Lautermilch. Oil on canvas, 30 x 40in (76.2 x 101.6cm)





Lautermilch

In Search of The Creator,
by John Lautermilch.
Oil on canvas, 36 x 48in
(91.5 x 122cm)

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

JL: Generally speaking, people respond positively to the artwork. The natural world is of interest to everyone. The most memorable reaction was a woman who was so moved by a painting of water lilies that she began crying while viewing it.

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

JL: At my overly ripe age of 81, I do not do many events anymore. Normally, I put on an annual exhibit of my recent paintings at a nearby gallery. However, I will not be able to do so this year because of the coronavirus.

X-RAY MAG: Lastly, is there anything else you would like to tell our readers about yourself and your artwork?

JL: Only this: I hope they like it. ■

For more information or to buy originals and prints, please visit the artist's websites at: artpal.com/jlart#i9 or fineartamerica.com/profiles/john-lautermilch.

