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September 2017
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South Africa
Gordon's Bay

The Philippines
**Southeast
Bohol**

Norway
Lofoten

Forrest Galante
**Caution
with Crocs**

WWII Wreck
LST 349

Tech
Task Fixation

COZUMEL & RIVIERA MAYA

Mexico

DIRECTORY

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COVER PHOTO: *Diver in Cenote Ponderosa, Mexico*
Photo by Olga Torrey

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Diver in Cenote Ponderosa, Mexico. Photo by Olga Torrey.



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Stop the meanness

During processing of the photographs I have taken of sharks and other big pelagics, I have often noticed how many of the creatures carried scars from hooks, sometimes harpoons, and even gunshots and explosions. On my last trip to see the sharks off the Bahamas, there was a tiger shark with a huge dent, the size of half a basketball, behind its gill arch. I was told by the guide that this was the wound from a "bang-stick," which apparently was a kind of explosive device at the end of a long stick.

What sort of sick mind does this kind of thing to another living being?

Earlier this month, there was a public outcry in Florida following a video, which went viral on social media, showing some young men—beer cans in hand—dragging, at high speed behind a powerboat, a hapless shark while laughing about it. Other videos soon surfaced showing the same sort of deplorable behaviour by individuals who were shooting sharks with handguns.

We divers do not know—and probably never will—what goes through the minds of sharks and other creatures we encounter and enjoy on our adventures under the surface. But what we do know now—beyond a shadow of doubt—is that sharks

are highly intelligent and have physiological and behavioural responses, detectable as stress hormone levels and physiological markers, similar to our own when we experience stress, fear and anger. It is thus only reasonable to assume that they also have a similar experience of pain and fear.

Sharks have significant cognitive skills, and recent research, which we have recently referenced in this publication, even shows they have social structures. So who are we to torture them just for a perverse pleasure?

Marine mammals demonstrate traits of culture, as they pass on learned skills to younger generations, and appear to have a structured language, which we may one day be able to decode—at least, researchers seem to have made significant progress in this field in recent years. A tribe of chimpanzees has been observed performing rites (throwing stones into a hollow tree), which some scholars have interpreted as a kind of rudimentary religious behaviour. Granted, this interpretation could very well be a stretch; it remains a very contentious idea and a matter of much debate. But no matter the controversy, you get my point.

Until the day we all convert to veganism, or are able to live off

synthetic sustenance at some point in the future, we must slaughter other animals in order to eat. It has been this way since we hunted game with bows and flint-tipped arrows. We raise livestock, run fish farms and harvest the ocean so we can eat. I do not take issue with any of that, as long as the welfare of the animals is addressed in the process.

I do have an issue with meaninglessly inflicting pain on other creatures.

Some people are just depressingly ignorant, or woefully inadequately educated, and can perhaps be enlightened by having a discussion about it. Others are just beyond educational outreach and need to be reported to the authorities, without further hesitation. Some people need to go straight to jail.

In any case, whatever you do, for goodness sake, play it safe and stay well out of harm's way, as some people cannot be reasoned with. But please do stand up and raise your voice one way or the other, if you see cruelty committed to animals.

— Peter Symes,
Publisher and
Editor-in-Chief



News edited
by Peter Symes &
Catherine GS Lim

from the deep
NEWS

Archerfish are able to
discriminate between
human faces



Fish can tell human faces apart

Distinguishing between human faces is a surprisingly difficult task, but archerfish are nonetheless able to tell one human face from another, despite not having a neocortex—the most recently evolved part of the human brain, governing sensory perception and language—a team of scientists from Oxford and Australia's University of Queensland have demonstrated.

Archerfish, a tropical species best known for spitting pressurised water jets to shoot prey out of the air, were taught to spit at pictures of human faces displayed on a computer monitor suspended over their aquarium.

The researchers then tested whether the fish would recognise, and spit at, the familiar face among 44 new ones in exchange for a food reward. The fish got it right more than 80 percent of the time.

"We were pleasantly surprised at the speed at which the fish learnt as well as their high degree of accuracy," study co-author Cait Newport of the Oxford University's department of zoology, told *The Guardian*.

Fish present an interesting example as they can use colour patterns for recognition, which are additionally affected by changes in water quality and lighting. Because different wavelengths are attenuated unequally in water, some colours within a pattern are affected more than others.

Perhaps not so difficult after all?

It is possible that the perceived complexity of human facial recognition may simply be an anthropogenic point of view and in fact other animals must also perform similarly complex pattern discrimination tasks under highly demanding conditions. ■

SOURCE: SCIENTIFIC JOURNALS

How fish identify toxic prey



STEVE CLAY

Goniobranchus splendidus nudibranch's red spots vary across populations, but the yellow rim is present in all individuals.

Study sheds light into how nudibranches warn predators that they contain toxic defences.

Predators swiftly learn that brightly coloured animals are usually poisonous or are vile to the taste—essentially that they are not to be eaten.

Based on this assumption, researchers from the University of Queensland thus theorised that there would be limited variation in the visual warning signals of prey animals, so potential predators would be immediately deterred upon seeing the prey animal's appearance. Their study provides more evidence of how variations in animal coloration can be maintained as it evolves at the same time.

Using the *Goniobranchus splendidus* in their study, they observed that the nudibranch displays a consistent yellow brim around a white body with red spots. It is found in the Southern Great Barrier Reef to New South Wales. The colour and pattern of the red spots vary significantly across populations, but the yellow rim is the common factor.

"Natural selection may act on parts of the colour pattern in very different ways, allowing for the yellow rim to be stable, but the red spots to be highly variable," said Dr Karen Cheney, of the School of Biological Sciences. "We showed that fish predators (triggerfish *Rhinecanthus aculeatus*) only pay attention to the yellow border of the colour pattern when learning avoidance of the signal and they pay little attention to the red spots," she added. ■ SOURCE: PROCEEDINGS OF THE ROYAL SOCIETY B

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Noise pollution stresses and confuses fish

Researchers have demonstrated that the noise from motorboats has an impact on the behavior of cleaner fish.

In a study published in *Scientific Reports*, researchers from the United Kingdom, United States and France observed bluestreak cleaner wrasse at 24 cleaning stations and discovered that the noise from motorboats affected the behavior of both the cleaners and their "clients."

At 17 of the cleaning stations, in the presence of motorboat noise, the cleaner fish were more likely to nibble at their client's protective mucous layer rather than clean off parasites.

According to lead author Dr Sophie Nedelec from the University of Exeter, "Cleaners were biting their clients during boat noise and, instead of leaving or retaliating, the clients let the process go on for longer than normal."

She added that such behavior suggested cognitive impairment in either one or both parties.

"One explanation is the clients are distracted by boat noise and cleaners are taking advantage of this to cheat on their clients," said Dr Suzanne Mills, of École Pratique des Hautes Études (EPHE) and Centre de Recherches Insulaires et Observatoire de l'Environnement (CRIOBE).

Such a change in behavior may have an impact on the resilience of coral reef. Without the effective removal of parasites by cleaner fishes, the coral reef fish health, abundance and diversity may be adversely affected.

The study, which involved researchers from the United States, United Kingdom and France, highlights the need to control man-made noise in protected habitats. "We are now considering acoustic quiet zones and corridors, and exploring how engine and propeller development can reduce the impact of this globally prevalent pollutant," said Dr Steve Simpson, from the University of Exeter. ■

SOURCE: UNIVERSITY OF EXETER

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Erh... perhaps not quite in this fashion



GRAPHIC: PETER SYMES / PHOTO SOURCE: PIXABAY

Goldfish make alcohol to survive harsh winters

Every winter, the goldfish and crucian carp survive the winter at the bottom of ice-covered lakes in water devoid of oxygen. How do they do this?

Scientists from the Universities of Oslo and Liverpool have discovered their secret. Simply put, the fish produces alcohol in its body.

In zero-oxygen environments, the body switches to anaerobic respiration, a process in which carbohydrates are converted into energy. This process can only be sustained for a short time, as in the case of human sprinters. After that, lactic acid accumulates in the body, and too much of it is harmful to the body.

The fish can avoid this because they have two—not one—sets of proteins

used to channel the carbohydrates to the mitochondria, where energy is produced. Although one of the sets appear to be similar to that of other species, the other set of proteins appears to be a mutation that prompts the fish's body to release only ethanol—not lactic acid—through fermentation.

"During their time in oxygen-free water in ice-covered ponds, which can last for several months in their northern European habitat, blood alcohol concentrations in crucian carp can reach more than 50mg per 100 millilitres, which is above the drink drive limit in these countries," said Dr Michael Berenbrink, an evolutionary physiologist at the University of Liverpool.

"However, this is still a much better situation than filling up with lactic acid, which is the metabolic end product for other vertebrates, including humans,

when devoid of oxygen," he added.

After sequencing the animal's DNA, the researchers discovered that the evolution of the two sets of proteins took place eight million years ago, in a species that was the common ancestor of the goldfish and crucian carp.

Lead author, Dr Cathrine Elisabeth Fagernes, from the University of Oslo, elaborated: "The ethanol production allows the crucian carp to be the only fish species surviving and exploiting these harsh environments, thereby avoiding competition and escaping predation by other fish species with which they normally interact in better oxygenated waters."

It was thus not surprising that the goldfish, as the crucian carp's cousin, is one of the most resilient pets around, she added. ■ SOURCE: EUREKALERT

Coral gardening proves beneficial to Caribbean reefs

Efforts in the restoration of Caribbean staghorn corals in Florida and Puerto Rico have proved successful, reports a new study published in *Coral Reefs* journal.

Since the 1980s, staghorn coral (*Acropora cervicornis*) populations in the Caribbean have declined by as much as 90 percent. This coral species was listed as "threatened" under the US Endangered Species Act in 2006 in an attempt to conserve and protect it.

Researchers have been engaging in "coral gardening", in which coral populations are restored through the planting of laboratory-raised fragments on degraded reefs. Based on the data collected over the initial two years, their

efforts are having a positive impact on the Caribbean reefs.

Effective method

"Our study showed that current restoration methods are very effective," said lead author coral biologist, Stephanie Schopmeyer, from the University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science.

The study also showed that despite having tissue removed (to propagate new coral in the laboratory), donor colonies do not suffer excess damage.

Describing coral restoration programs as essential to coral conservation, co-author Diego Lirman, UM Rosenstiel School professor of marine biology and ecology, said, "Our findings provide the necessary scientific benchmarks to evaluate restoration progress moving forward." ■

SOURCE: UNIVERSITY OF MIAMI



SCOTT BENNETT

(File photo) Staghorn corals propagated within underwater coral nurseries so as to provide a sustainable source of corals for use in restoration efforts



Diver on LST 349
at Punta Papa
on Ponza Island

Text and photos
by Carlo Ravenna

The sinking of USS LST 349, which was heading to Naples from Anzio, Italy, occurred in February 1944. It happened during a severe storm, in which turbulent seas pushed the ship against the cliffs at Punta Papa on Ponza Island. Even though the people of Ponza made a great effort in the rescue operations, the death toll was heavy.



WWII Wreck

LST 349

At Ponza, Italy



The tank landing ship (also called LST or Landing Ship, Tank) used by the United States during WWII, had a flat bottom, a length of about 97m and a width of around 15m. The LST 349 was launched in Virginia on

7 February 1943 and was built, based on a revision of a British model, for logistical support of military operations in the Second World War for embarking and disembarking troops, military vehicles and supplies

on coastal landings without harbor docks or piers.

On its last voyage, the fury of the sea tore the ship into two parts, which sank to the sandy sea floor in an upright position. Today, the

bow of the ship rests at 26m, below Punta Papa, facing the northwest. The stern is located inside the cove, about 400m from the bow, and rests in a north-south orientation.

wreck
rap



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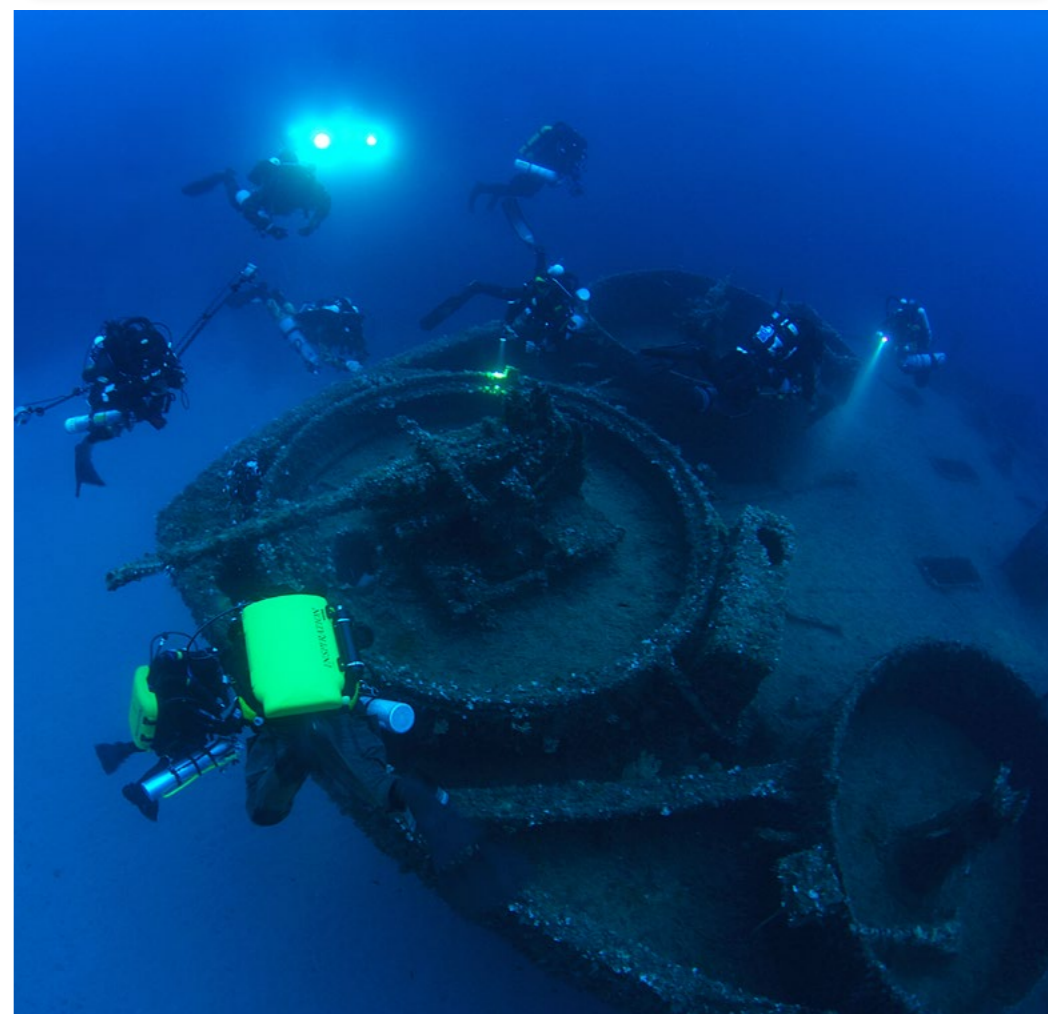
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Diver at stern of the wreck of *LST 349*, located off Punta Papa on Ponza Island, Italy

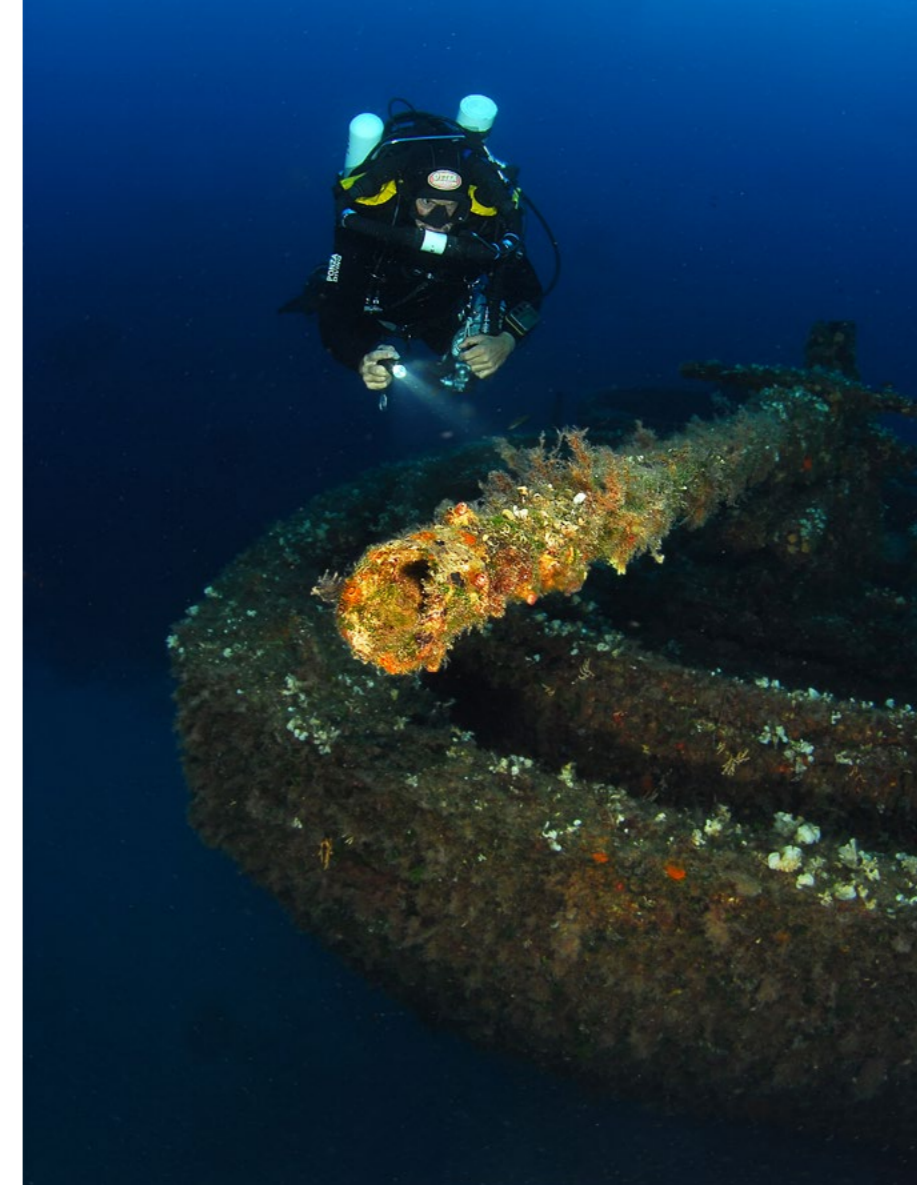
Diving the wreck

To explore the ship in detail, it takes at least two dives: one on the bow and one on the stern. The front section, most frequented by divers, is certainly the best part of the wreck. One just has to descend a few meters to get an overview of the wreck and see, in crystal clear water, the two machine guns and the cannons of the ship. The winch chain and other structures on the wreck are still in a good state of preservation.

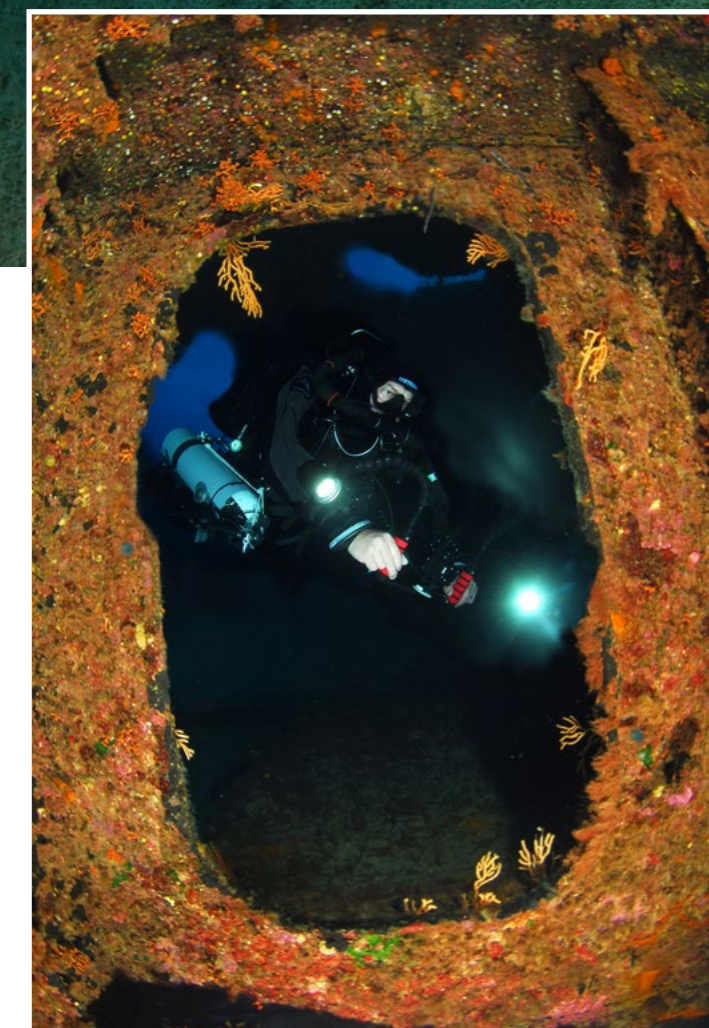
However, the tailgate is no longer in place, which, when lowered, allowed the landing of soldiers and vehicles on the beach, so it is recommended that divers descend to the bottom to explore the garage first, finding entrances to different cargo holds along the way, meter after meter.

The walls of *LST 349* are completely covered with a thick colony of yellow gorgonians, which benefit from the nutrient-rich current that is often channeled inside the wreck. Among the





THIS PAGE:
Scenes from
the wreck of LST
349, the stern of
which rests at
20m off Punta
Papa on Ponza
Island, Italy;
Diver at gun on
deck of LST 349
(left)



various fishes at the wreck site, you can easily find curious groupers that will follow the movements of divers.

Tips for photographers

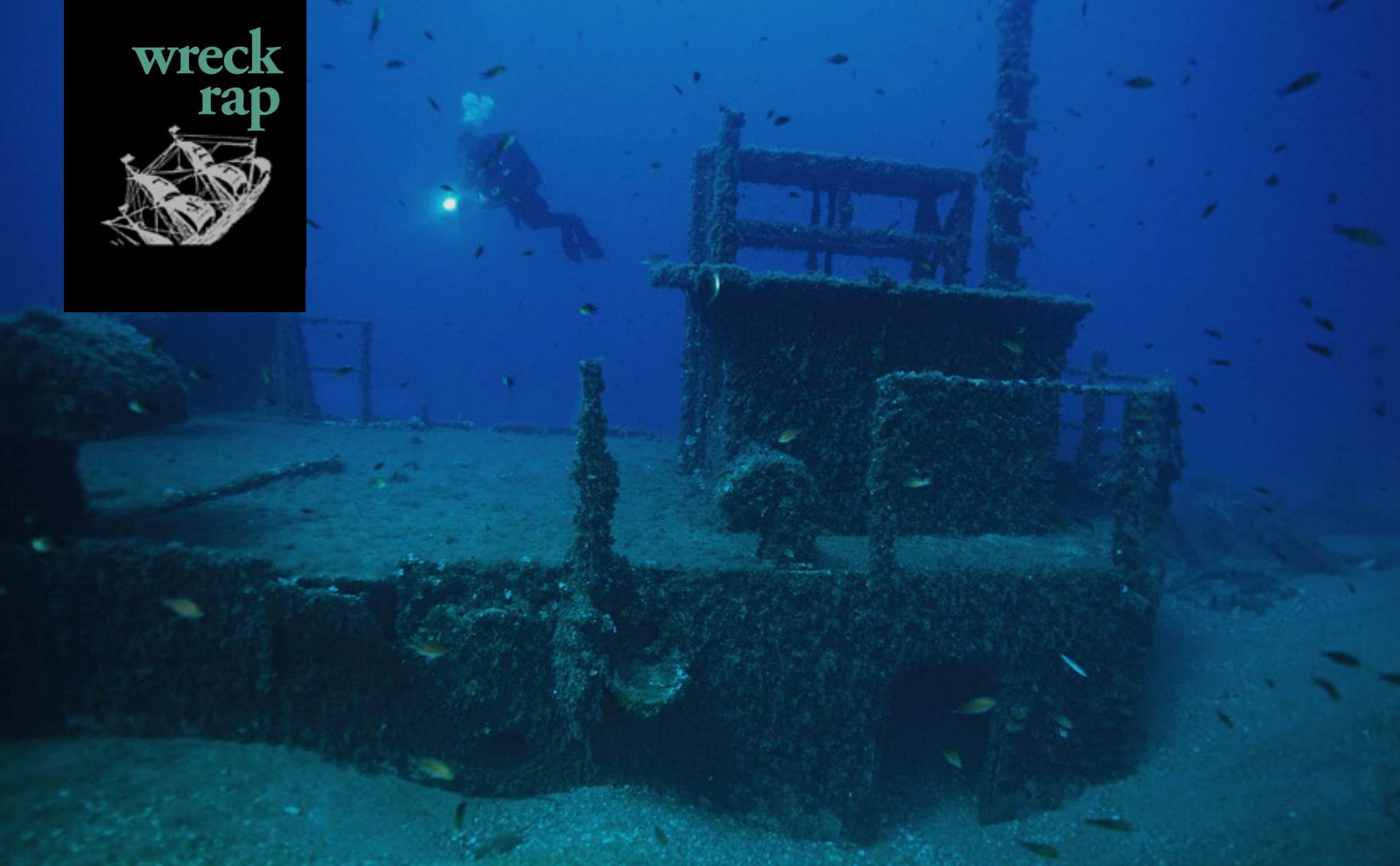
To get beautiful photographs of the wreck, it is recommended that underwater photographers reverse their visit and start from the bridge. Otherwise, bubbles expelled by other divers in the group will pass through the many cracks of the hull on their way to the surface, spoiling most of the shots.

On the return ascent, given the proximity of the dive boat to Punta Papa, it might be better to keep the cliff on one's left-hand side until 12m, where you will reach a beautiful cavern with various openings through which light is filtered. The stern rests at 20m, on a white, sandy sea floor,

which makes the underwater environment very bright. Here, one will find a control cabin, machine rooms, a piece of a propeller blade, wheel and engines. Finally, divers ascend along the cliff wall, at the end of this multi-level dive. ■

Carlo Ravenna is an Italian underwater photographer based in Rome, who has been diving for over 25 years. A love of nature and imagery led Ravenna, a former architect, into a career in nature photography and shooting for television. He is the author of several Italian underwater guide books, including Mediterraneo Vita Sommersa (published by Calderini), Ventotene sott'acqua and Il Giglio sott'acqua (published by Guastadisegni). For more information, please visit: CarloRavenna.it.





WWII SIGNAL CORPS PHOTOGRAPH COLLECTION / WIKIMEDIA COMMONS / PUBLIC DOMAIN

Historical photo taken in 1944 during WWII showing the tanks of an armored regiment disembarking from an LST in the harbor of Anzio, Italy, as reinforcements to the US armed forces on the beachhead

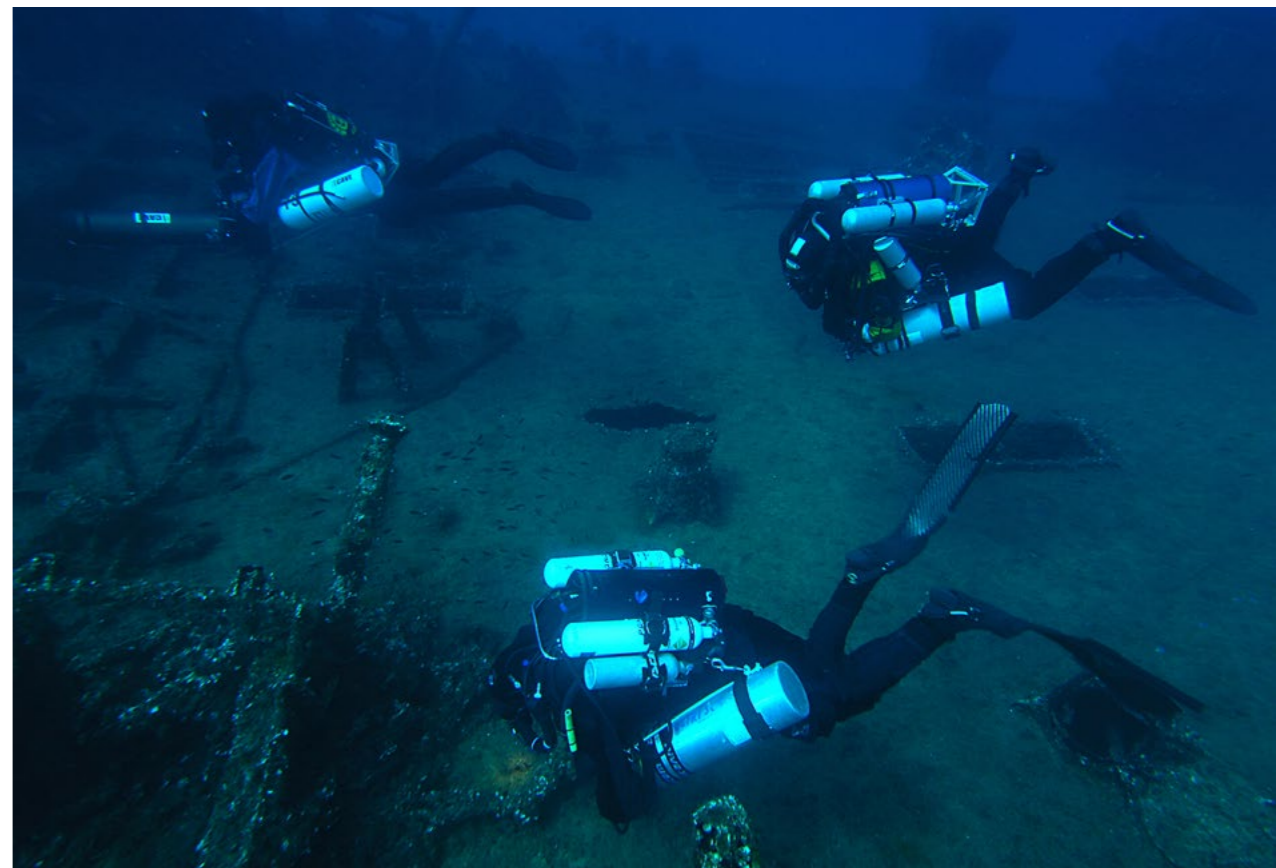
WWII HISTORY OF LSTs

The LST (also known as “landing ship, tank” or “tank landing ship”) was integral to the fighting forces during World War II, transporting tanks, cargo and troops directly to the battlefield. They were unique in that their flat keels allowed the ships to remain upright after beaching, without the need for docks or piers. Their twin propellers and rudders were specially protected from grounding.

The ship saw its combat debut in the Solomon Islands in June 1943, and also served in the Pacific War and the European Theatre. When on a mission in the battlefield, upon reaching its destination, a large door would open up onto dry land and a ramp would be deployed, facilitating the unloading of the troops, cargo and vehicles.

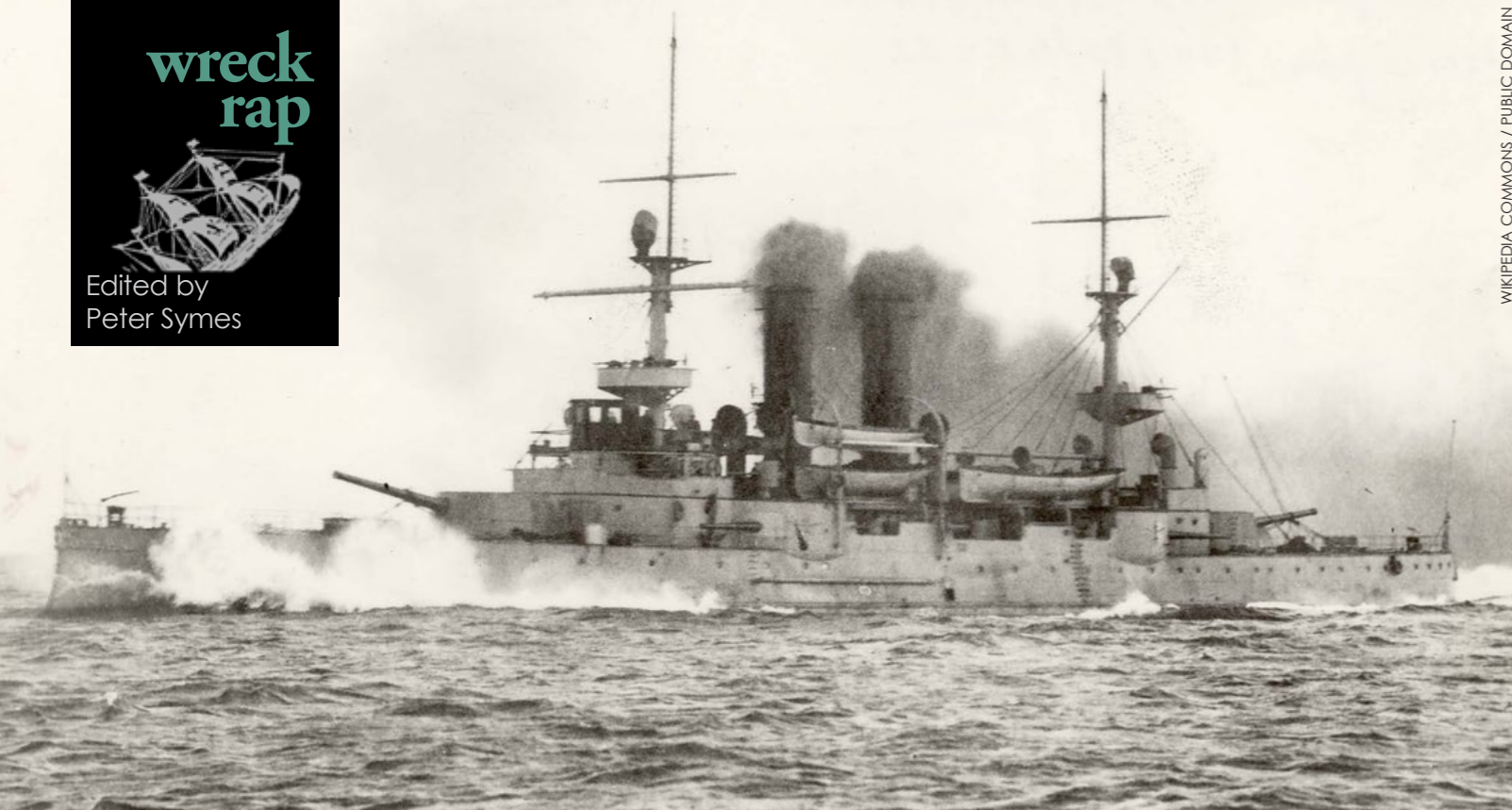
The LSTs proved to be versatile. Some were converted to become landing craft repair ships and hospital ships, while others were fitted with flight decks to launch small observation aircraft.

After World War II, many LSTs were demilitarized and converted into ferries, small freighters and dredges, while others were used in training or as target practice. ■



THIS PAGE: Scenes from the wreck of LST 349, located at Punta Papa on Ponza, Italy



Battleship *Norge* seen from port side

Legendary Norwegian WWII warship and war grave looted by divers

HNoMS *Norge* was a coastal defense ship in the Royal Norwegian Navy that was torpedoed and sunk by German destroyers in Narvik Harbor during the attack on Norway on 9 April 1940. Today, the sunken warship, which is considered part of the Norway's cultural heritage, is being subjected to plundering.

The Eidsvold class was a class of coastal defense ships, two of which were built for the Royal Norwegian Navy in 1899. The class consisted of two ships, HNoMS *Eidsvold* and HNoMS *Norge*. Locally, they were referred to as

panserskip. The Eidsvold class was armored to withstand battle with ships of a similar class, but the underwater armor and internal partitioning were not designed to withstand torpedo hits, which caused both ships' demise.

The remains of *Norge* rest at a depth of about 20m (66ft), in the middle of Narvik Harbor. Partly salvaged in situ, it is considered a war memorial and diving on or near the wreck was banned between 1999 and 2014. Shortly after the ban was lifted in order to attract more divers, artifacts started disappearing from the wreck, the NRK (the Norwegian Broadcasting Corporation) reported in August.

Ban

Officials from Nordland county told NRK that, among other artifacts, the engine order telegraph

and speaking tube have been removed from the wreck. In consultation with the Tromsø Museum, which is the administrative authority for the wreck, Narvik Municipality and Riksantikvaren (Norway's Directorate for Cultural Heritage), the county will now meet to discuss how they can prevent further looting and destruction of the shipwreck.

Sinking of *Norge*

The German attack on Norway came as a surprise, and the forces in Narvik were quite unprepared for the attack. In the morning mist, the armored warship *Eidsvold*—the sistership to *Norge*, which was anchored outside Framnesodden—discovered that foreign naval vessels were on their way to Narvik's harbor. Even being a 40-year-old warship at the time,

the armament of the *Eidsvold* was a big threat to the much smaller German destroyer, *Wilhelm Heidkamp*, which stopped a few ship's lengths away.

Asked to surrender

It must have seemed very strange for the commander of the *Eidsvold* to be requested to surrender to a German destroyer deep into a Norwegian fjord. As the *Eidsvold* prepared to open fire, the *Wilhelm Heidkamp* fired torpedoes, which sank the *Eidsvold* in just a few seconds. The German ships could, thereafter, sail into the harbor basin, partly hidden in a strong bliz-

zard. On board the *Norge*, it was clear that something was amiss. The ship then slipped its moorings. When the foreign warships were discovered in the harbor, the *Norge* immediately opened fire. Again, it went terribly wrong for the pride of the Norwegian navy. *Norge* was hit by a torpedo from the German destroyer *Anton Schmitt* and capsized, sinking in just two minutes.

Total chaos

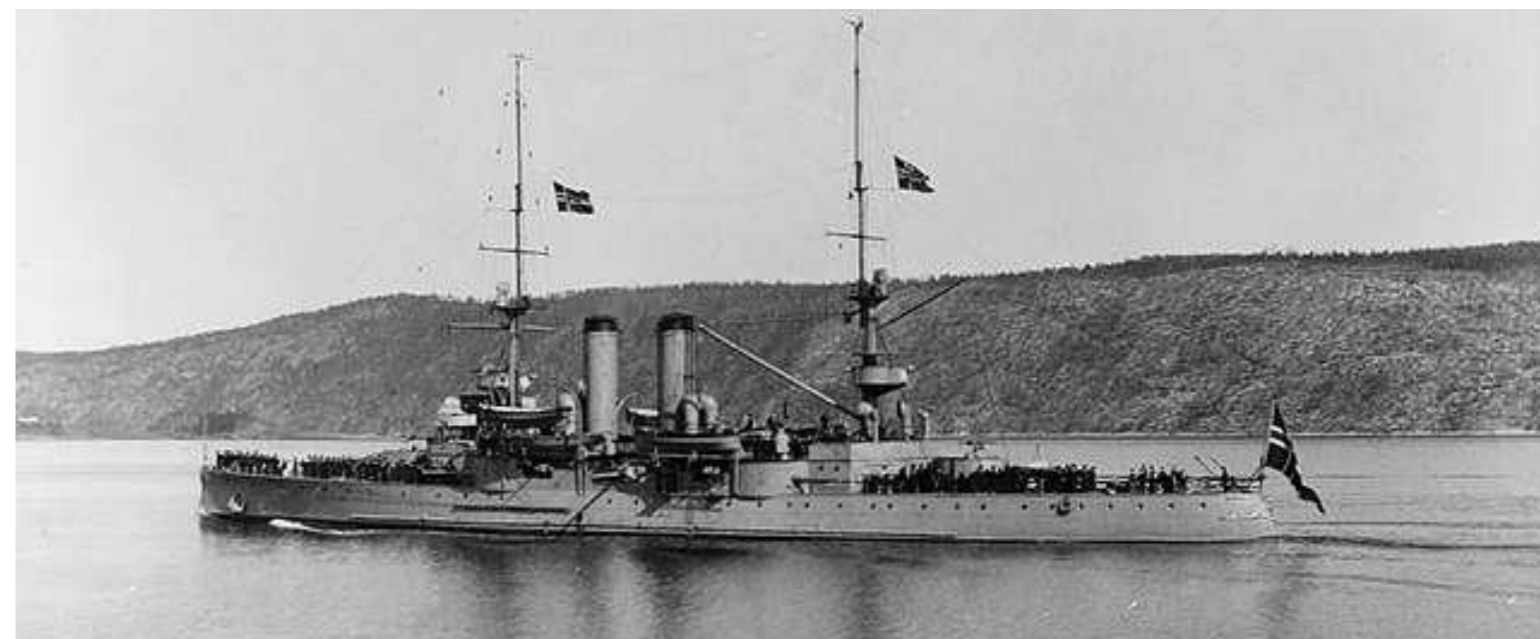
Out in the harbor basin, all was total chaos. The merchant ships launched lifeboats into the water, and thereby rescued a number of

survivors from *Eidsvold* and *Norge*. The captain of the German iron-ore cargo ship *Bockenheim* thought that it was British forces that were attacking, as three torpedoes hit the ship. He therefore ordered the ship to be beached and blown up. In the space of just a short time, Narvik Harbor was under German control. All the merchant ships that weren't German were immediately put under German command, and the guns on the British cargo ships were demounted, to be used as land-based guns. ■

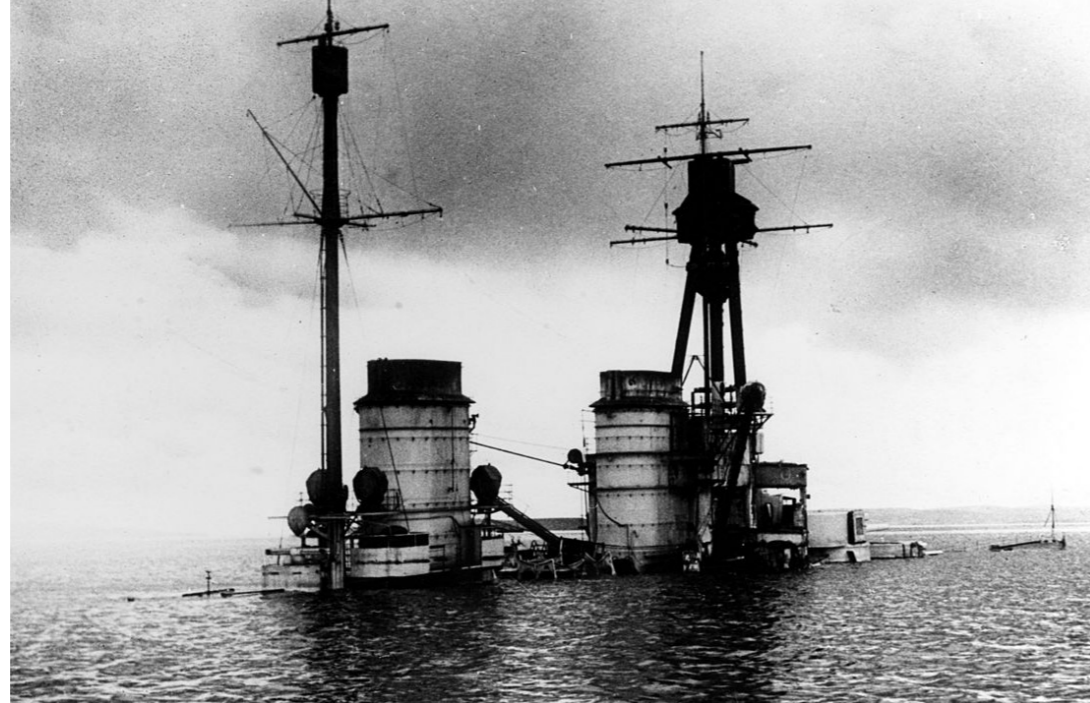
SOURCE: NORWEGIAN BROADCASTING CORPORATION (NRK)



WIKIPEDIA COMMONS / PUBLIC DOMAIN

Historical photo of HNoMS *Norge*

ANDERS BEER WILSE / WIKIPEDIA COMMONS / PUBLIC DOMAIN



Scuttling of the German Fleet at Scapa Flow—the upperworks of the German battlecruiser SMS *Hindenburg* above the water at Scapa Flow.

IMPERIAL WAR MUSEUM / PUBLIC DOMAIN

WWI warships at the bottom of Scapa Flow being mapped

Shipwrecks of the WWI German High Seas Fleet and the Scapa Flow war graves of HMS *Hampshire*, HMS *Vanguard* and HMS *Royal Oak*, which are located in a body of water sheltered by five of the Orkney Islands, are being surveyed.

Using a suite of geophysical equipment, ROV and diver survey to collect data that will accurately record the wrecks as they sit on the sea floor today, Orkney Research Center for Archaeology is conducting surveys in the area to map 10 naval shipwrecks at the bottom of Scapa Flow, the main base of the British Grand Fleet since World War I. The data collected will be used to continue to monitor, protect, conserve and promote these impressive shipwrecks.

Scuttling

The High Seas Fleet was the battle fleet of the German Imperial Navy in World War I. Following the signing

of the Armistice on 11 November 1918 at Compiègne, France, which effectively ended World War I, the surface fleet was to sail to the Firth of Forth and surrender to British admiral David Beatty. They would then be led to Scapa Flow and interned, pending the outcome of the peace negotiations. On 21 June 1919, Rear Admiral Ludwig von Reuter gave the order to scuttle the 74 ships of the High Seas Fleet located in Scapa Flow to prevent the ships from being seized under the Treaty of Versailles.

Not all salvaged

Nearly 52 wrecks were salvaged—only seven of the vessels, and some parts of others, remain underwater. The British Admiralty wrote off the sunken ships as complete losses and sold the rights to entrepreneur Ernest Cox for GB£250. He spent the next year recovering almost all of the smaller destroyers. Most of the steel was sold as scrap. One use, which could not have been predicted in 1919, was late 20th century precision scientific instruments, including those used in satellites.

The British ships in the study include the HMS *Vanguard* and HMS *Hampshire*, which sank during World War I, and HMS *Royal Oak*, which sank during World War II. The project has brought together universities, commercial companies and government bodies, including Historic Environment Scotland, Marine Scotland, Ulster University, Heriot-Watt University, University of Dundee and private company Seatronics.

Andrew Fulton, from Historic Environment Scotland, said, "We are pleased to see this next stage of survey work on the underwater wartime remains of Scapa Flow. The results will help update existing records of the wrecks, guide their management and contribute to the commemoration of momentous events in wartime history."

It is planned that this project will contribute to the centenary commemoration of the scuttling of the German High Seas Fleet in 2019. ■ SOURCE: ORKNEY RESEARCH CENTRE FOR ARCHAEOLOGY

Long lost WWII warship USS *Indianapolis* located

The USS *Indianapolis* was destroyed on 30 July 1945 when, somewhere in the Philippine Sea between Guam and Leyte, it was hit by a torpedo from a Japanese submarine. On 18 August 2017, a search team financed by Paul Allen located the wreckage of the sunken cruiser in the Philippine Sea lying at a depth of approximately 5,500m (18,000ft).

The *Indianapolis* sank in 15 minutes on 30 July 1945, in the final days of World War II. The ship was on its way to the Philippines when torpedoes from a Japanese submarine struck the ship. Of the 1,196 men on board, just 316 were rescued—the largest loss of life at sea

in the history of the US Navy. Nearly 300 people went down with the ship, and of the 900 who abandoned ship, only 317 would survive after four to five days in the water suffering from exposure, dehydration, drowning and shark attacks. It took the Navy four days to realize that the vessel was missing.

Location a mystery

The ship's rapid sinking and the lack of a distress call meant the ship's location had long been a mystery. The shipwreck's location had eluded researchers for decades. The coordinates keyed out in an SOS signal were forgotten by surviving radio operators and were not received by Navy ships or shore stations, the Navy command said. The ship's mission records and logs were lost in the wreck.

Researchers got a break last year, however, when Richard Hulver, a historian with the Naval History and Heritage

Command, identified a naval landing craft that had recorded a sighting of the *Indianapolis* hours before it was sunk. The position was west of where it was presumed to be lying. The search team was able to develop a new estimated position, although it still covered 600 square miles of open ocean.

Microsoft co-founder Paul Allen, whose crew discovered the vessel on 18 August, called the shipwreck a "significant discovery", considering the depth of the water.

Delivered first A-bomb

The ship is well-known for its final, secret mission. The *Indianapolis* had just completed a top-secret mission to deliver components of the atomic bomb "Little Boy" as well as enriched uranium fuel for its nuclear reaction to the island of Tinian. The bomb was later dropped on the Japanese city of Hiroshima. ■



US NAVY / PUBLIC DOMAIN

US Navy heavy cruiser USS *Indianapolis* (CA-35) underway, 27 September 1939

*To be able to honor the brave men of the USS *Indianapolis* and their families through the discovery of a ship that played such a significant role in ending World War II is truly humbling.*
— Paul Allen



Edited by
Peter Symes



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Can airlines be trusted with your biometric data?

US officials acknowledge that the biometric information collected for airport screening could potentially be used by airlines for other purposes.

The US Department of Homeland Security (DHS) and US Customs and Border Protection (CBP) has just issued an update of its Privacy Impact Assessment (PIA) to provide the public with notice regarding CBP's plans to use personally identifiable information (PII) collected by airlines and airport authorities, and CBP's use of facial matching technology in a cloud environment.

The CBP is continuing to develop and expand its biometric entry/exit system for international flights at airports throughout the United States. CBP is partnering with commercial air carriers

and airport authorities that will capture facial images of travelers as part of their business processes, and then send those photographs to CBP for use in the Traveler Verification Service (TVS).

These images include photographs captured by CBP during the entry inspection, photographs from US passports and US visas, and photographs from other DHS encounters. As boarding begins, each traveler approaches the departure gate to present a boarding pass and stands for a photo in front of a CBP-owned camera, which is connected to the cloud via a secure, encrypted connection.

CBP will match the images against previously captured photos by using a cloud environment.

Partnering with airlines

By partnering with stakeholders on a

voluntary basis and using biometric technologies, CBP is facilitating a large-scale transformation of air travel that will make air travel:

1. more secure, by providing increased certainty as to the identity of airline travelers at multiple points in the travel process;
2. more predictable, by establishing a clear, easily-understood boarding process; and
3. able to build additional integrity to the immigration system by better identifying which foreign nationals are violating the terms of their admission to the United States, and by providing the capability for immediate action when that occurs.

Can the airlines resist the temptation?

The CBP acknowledged the risk: "There is a risk that approved partners will use biometric images collected under the [service] for a purpose other than identity verification." Because it is a partner program, there is "a risk that commercial air carriers will use the photographs for purposes beyond departure verification," the CBP statement said, because "commercial air carriers are not collecting photographs on CBP's behalf or under CBP authorities."

CBP only keeps the photos on file for 14 days, but airlines are free to keep photos and biometric information on file as needed for business purposes. The biographical information itself is kept by CBP for 15 years for US citizens and 75 years for foreign travelers. ■
SOURCE: US DEPT OF HOMELAND SECURITY (DHS)

Raja Ampat

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KLASINA RUMBOKWAN





Pulau Rawa is one of the beautiful islands in the Sultan Iskandar Marine Park

Approval needed before diving in Sultan Iskandar Marine Park, Sultan of Johor decrees

Scuba divers must obtain prior approval and register themselves at the Mersing District Council before taking part in diving activities at Sultan Iskandar Marine Park and are required to have proper insurance coverage.

The Sultan of Johor Sultan Ibrahim Sultan Iskandar issued the decree on 7 August 2017, after launching the Coral Restoration Program and signing the Malaysia Book of Records' (MBOR) plaque for the Largest 1Malaysia Simultaneous Coral Reef Plantation Program in Pulau Tinggi, in southern peninsula Malaysia, the *New Straits Times* reported.

The Sultan said this was not only to en-

sure their safety, but also to protect the beautiful coral reefs in the marine park. He also said divers should also make an effort to protect the marine life and rich coral reefs in the park. "Much of the corals have been damaged due to boats anchoring improperly and flouting the regulations," he said.

Funds to protect the marine environment

To be imposed by the Johor National Park Corporation (PTNJ), the money collected from visitors would be used to maintain, protect and conserve the ma-

rine life in the areas, state tourism executive councilor Datuk Tee Siew Kiong said.

He said the fees would also help the corporation to finance its programs, including educational and research-related activities to educate the public on taking care of the marine environment.

Mersing Islands consists of six clusters, namely: Aur, Tinggi, Pemanggil, Besar, Rawa and Sibul. It covers an area of more than 8,000 hectares, inclusive of 13 islands.

Besides National Parks, all these islands are also being gazetted as Marine Parks.

■ SOURCE: NEW STRAITS TIMES

Divers who are heading to the Sultan Iskandar Marine Park must register themselves at the Mersing District Council. You must not simply come from Singapore or anywhere else and go diving here.

— Sultan Ibrahim

NICK SHALLCROSS



DeepFlight Submarine excursions starting soon in the Maldives

Local water sports equipment supplier Ocean Group and US-based underwater flight equipment manufacturer DeepFlight Adventures to launch the DeepFlight Super Falcon 3S submarine in the Maldives.

360-degree view

A trained pilot will treat two guests to an underwater excursion in the DeepFlight Super Falcon 3S, each seated comfortably in individual cockpits. Through the acrylic canopies, guests will be able to get

a 360-degree view of the ocean from their individual cockpits. The submarine is also

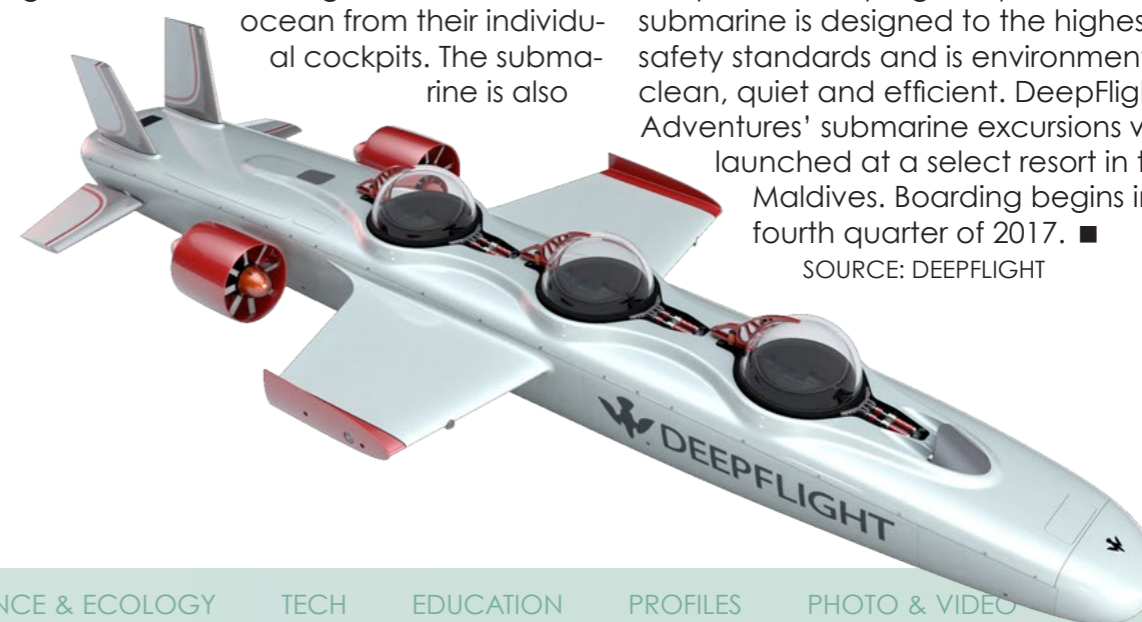
equipped with integrated video-capturing ability, enabling guests to relive their experiences after the dive.

Adam Wright, Managing Director of DeepFlight Adventures, said his company was delighted to be working with Ocean Group to bring underwater submarine excursions to the Maldives. "We believe DeepFlight Adventures offers a great opportunity for hotels to differentiate their properties by offering their guests the ability to access the beautiful underwater world right from the resorts," he said.

Service to begin end of 2017

The piloted DeepFlight Super Falcon 3S submarine is designed to the highest safety standards and is environmentally clean, quiet and efficient. DeepFlight Adventures' submarine excursions will be launched at a select resort in the Maldives. Boarding begins in the fourth quarter of 2017. ■

SOURCE: DEEPFLIGHT





Mexico's
**Cozumel Island
& Riviera Maya**
Caribbean Reefs & Mysterious Cenotes

Text and photos by
Larry Cohen and Olga Torrey



OLGA TORREY

The road in Punta Sur Eco Beach Park on Cozumel Island separates Laguna Colombia from the ocean; Sponge by a canyon (right) and diver in swim-through at Palancar Gardens (previous page); Blue tang at night on Punta Dalila reef (lower right inset)

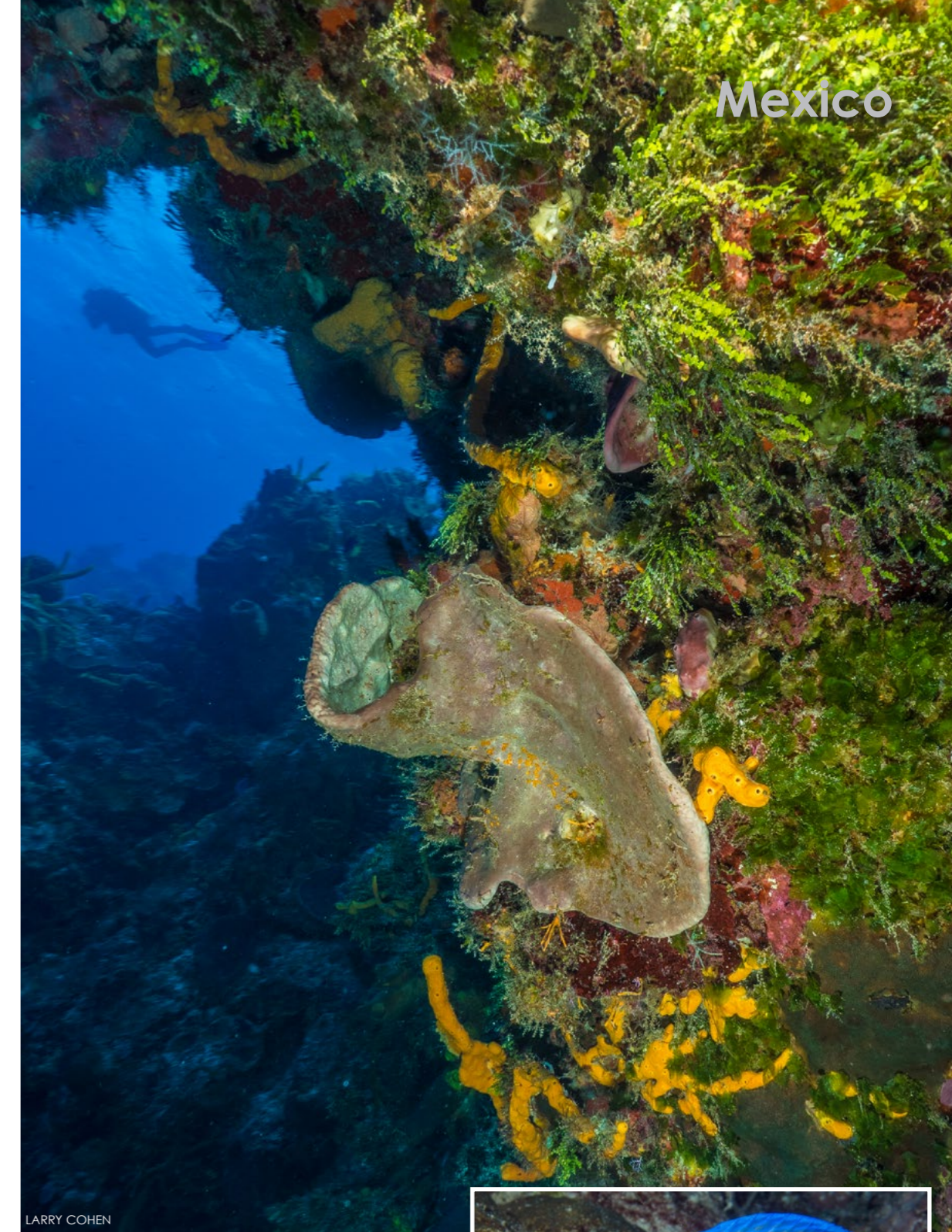


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Sponge at Palancar Caves

Mexico has much to offer the traveling diver. The Yucatán Peninsula and Cozumel Island are close to each other and are a perfect combination for a dive trip. While Cozumel has the largest reef in the northern hemisphere, the Yucatán Peninsula has some of the best cavern and cave diving in the world, many of which are found in the Riviera Maya district located on the coast.

To explore both the mainland and the island, you can fly into Cancun. From there, it is a 65km (41mi) drive to Playa del Carmen. From here, you can take a 45-minute ferry over to Cozumel. At the ferry station near the bus and taxi stop, there are people with wheeled carts to help you transport your bags to and from the boat. The ferries run every hour, and it is an easy trip. There are plenty of cabs both in Playa del Carmen and Cozumel to get you to your hotel. If you are just diving Cozumel, there is an international airport on the island.



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The island

Cozumel, Mexico's largest Caribbean island, is on the other side of the Yucatán Channel, opposite Playa del Carmen. The Mayan people called the island "Ah Cuzamil Peten", which means "the island of swallows".

There are several Mayan ruins in Cozumel. El Caracol ("the snail") is a small ruin located in the Punta Sur Eco Beach Park. This structure was dedicat-



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Diver in swim-through at Palancar Caves

ed to the moon goddess, Ixchel. Built between 1200 and 1400 AD, it is believed the building was used as an "alarm" for approaching hurricanes. El Caracol acted as a whistle when strong winds funneled through. The sound would warn the people to prepare for bad weather. It is also believed that the building functioned as a lighthouse or beacon used to send signals to the mainland. Some say these are just legends, and the building was a temple.

Also in the park is the Faro Celerain Lighthouse, with its charming nautical museum, and Laguna Colombia. Visitors can take a boat

ride through the lagoon to observe birds and crocodiles. Many of the mangrove trees were destroyed in 2013 during Hurricanes Ingrid and Manuel, with winds up to 140km/h (87mph). They are now on their way to being restored.

Diving Cozumel

Cozumel was named by Jacques Cousteau as one of the top 10 dive spots in the world back in 1961. Most of the diving takes place in the Cozumel Reefs National Marine Park. This protected area was created in 1996. The park is home to some 26 types of corals, with more than 100 subspecies. More than 500



Whitespotted filefish at Palancar Caves





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Toadfish hides in a hole on Cedral Wall



Nurse shark and large moray eel found under an overhang on Cedral Wall; Queen angelfish at night on Punta Dalila reef (right)

fish species live in the park.

Many of the dive sites are walls swept with currents that can be strong. There is drift diving here, and at times, it is difficult to stop and "smell the sponges". If you happen to be here on a full moon, the current can be even stronger. On the walls, it is possible to get to a sheltered area out of the current. On the flat reefs, divers are exposed, and it can be challenging to get out of the current to take photographs. Many photo opportunities can be missed as one drifts with the current, as a variety of marine life effortlessly swims into the current.

Dive sites

Cozumel has many different dive sites. Here are a few of the most popular ones:

Palancar Caves is a site with nice tunnel formations. This site starts on a sandbank in 12.19m (40ft) of water and is 27.43m (90ft) at the deepest. There is a steep drop-off where one may find sea turtles and nurse sharks.



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Palancar Gardens starts on a sandy patch inside the drop-off at 6m (20ft). You can then make your way through one of the canyons



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Lionfish hanging out on the wall at Punta Sur Cathedral



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Octopus at night on Punta Dalila reef; Diver at drop-off at Palancar Gardens (top left)

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School of blue-striped grunts on Paso Del Cedral reef (above)

to around 15m (50ft) down to about 21m (70ft). There are many cuts and channels to navigate through. If you look with an attentive eye, you can find the splendid toadfish. This species is endemic to Cozumel.

Paso Del Cedral is a flat reef with a few swim-throughs. Here, one can observe barracuda, lobsters, moray eels, grunts, and French and queen angelfish. The site is around 15m (50ft) to 18m (60ft) deep.

Cedral Wall has some dazzling coral tunnels and mounds with numerous overhangs. One small overhang had a nurse shark and large moray eel. These two looked like best buddies and one could



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only guess about their relationship. Large snappers, turtles, triggerfish and spotted eagle rays could be seen swimming into the very strong current.

Punta Sur Cathedral is an impressive site with many swim-throughs. It starts at 18m

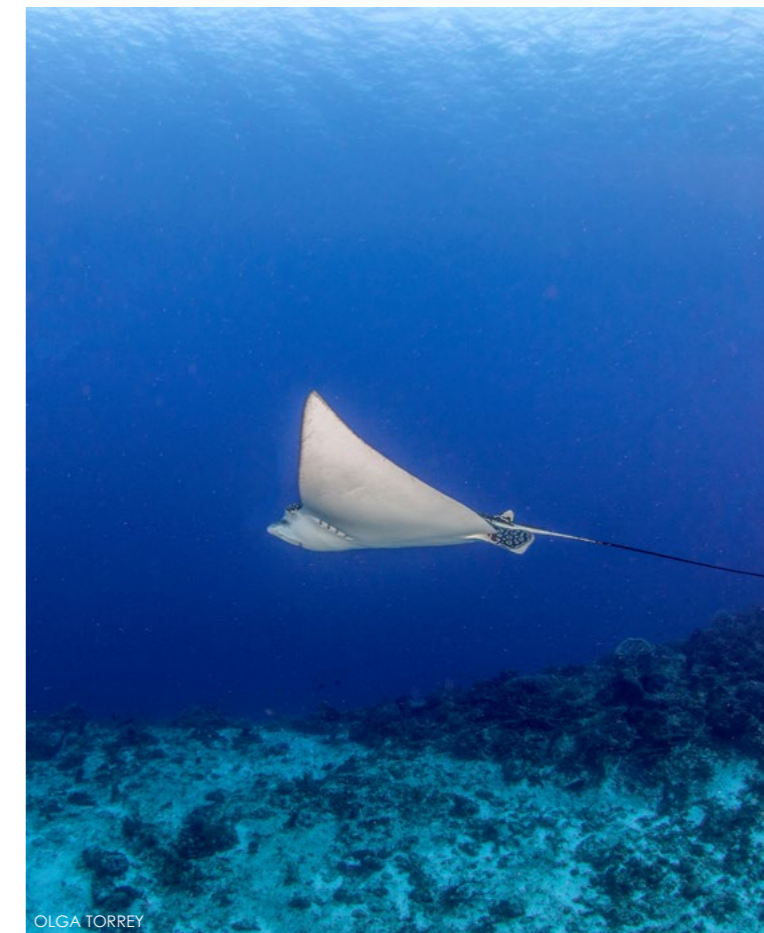
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Spotted eagle ray on Cedral Wall (above); Barracuda on the Paso Del Cedral reef (center)



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School of school-master snappers on Palancar Reef (above); Lots of the deep-water gorgonians at La Francesa (right)



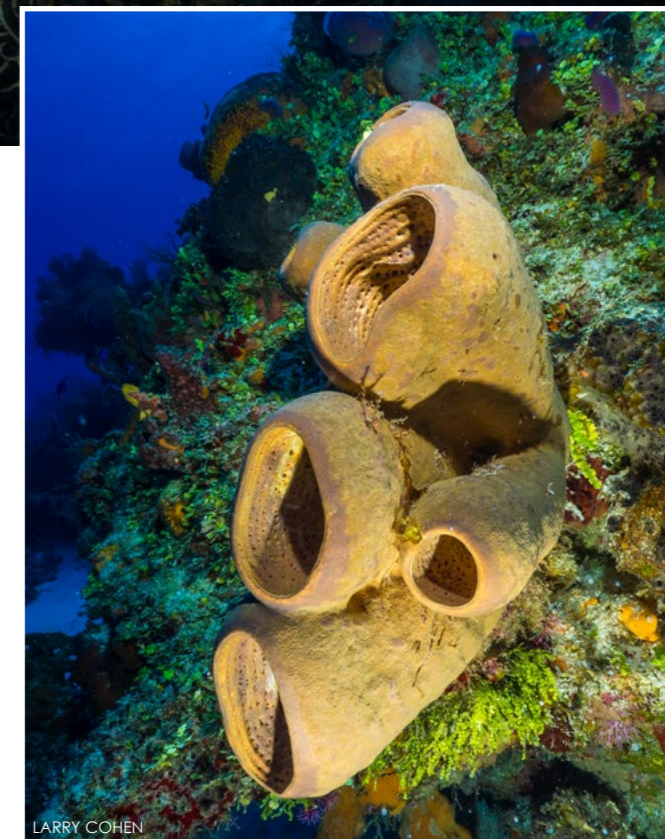
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(60ft), then a narrow tunnel takes you to 24m (80ft). The wall drops at a 45-degree angle down to around 40m (130ft). The chamber known as Little Cathedral has many large sponges.

Santa Rosa Reef is one of Cozumel's signature dives. You start on a flat reef, then go through a tunnel to a steep wall. The coral is rocky, with large outcrops that are 10m (33ft) to 12m (40ft) tall. This is a good location to find sea turtles, barracuda and grunts.

Punta Dalila is a great site for a night dive. In only 12m (40ft) to 18m (60ft) of water, one can find octopi, lobsters, crabs and moray eels. Here, it is important to keep track of your dive buddy as the current can be strong.

Felipe Xicotencatl C-53 is an artificial reef with a history. Originally a US Navy minesweeper named USS *Scuffle*, this ship served during WWII in the Pacific. She participated in the pre-invasion sweep of Manila Bay in prepa-



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Hawksbill sea turtle with French angelfish on Cedral Wall; Giant hermit crab at night on Punta Dalila reef (center); Large sponge at drop-off of Punta Sur Cathedral (far right)



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ration for landings at Mariveles and Corregidor. The USS *Scuffle* received five battle stars for her WWII service.

In October 1962, the ship was sold to the Mexican Navy and renamed ARM *DM-05*. In 1994, she was renamed again as ARM *General Felipe Xicoténcatl (C-53)*. Her time in the Mexican Navy was spent patrolling the Gulf of Mexico and the Mexican Caribbean Sea

for illegal arms and drugs. The ship also performed many rescue missions.

The C-53 was decommissioned and donated to the Cozumel underwater park. She was sunk in 1999 in 25m (82ft) of water just off shore from Chankanaab Park. The ship is 56.3m (154ft) long with a 10.10m (33ft) beam and is 12m (40ft) high.

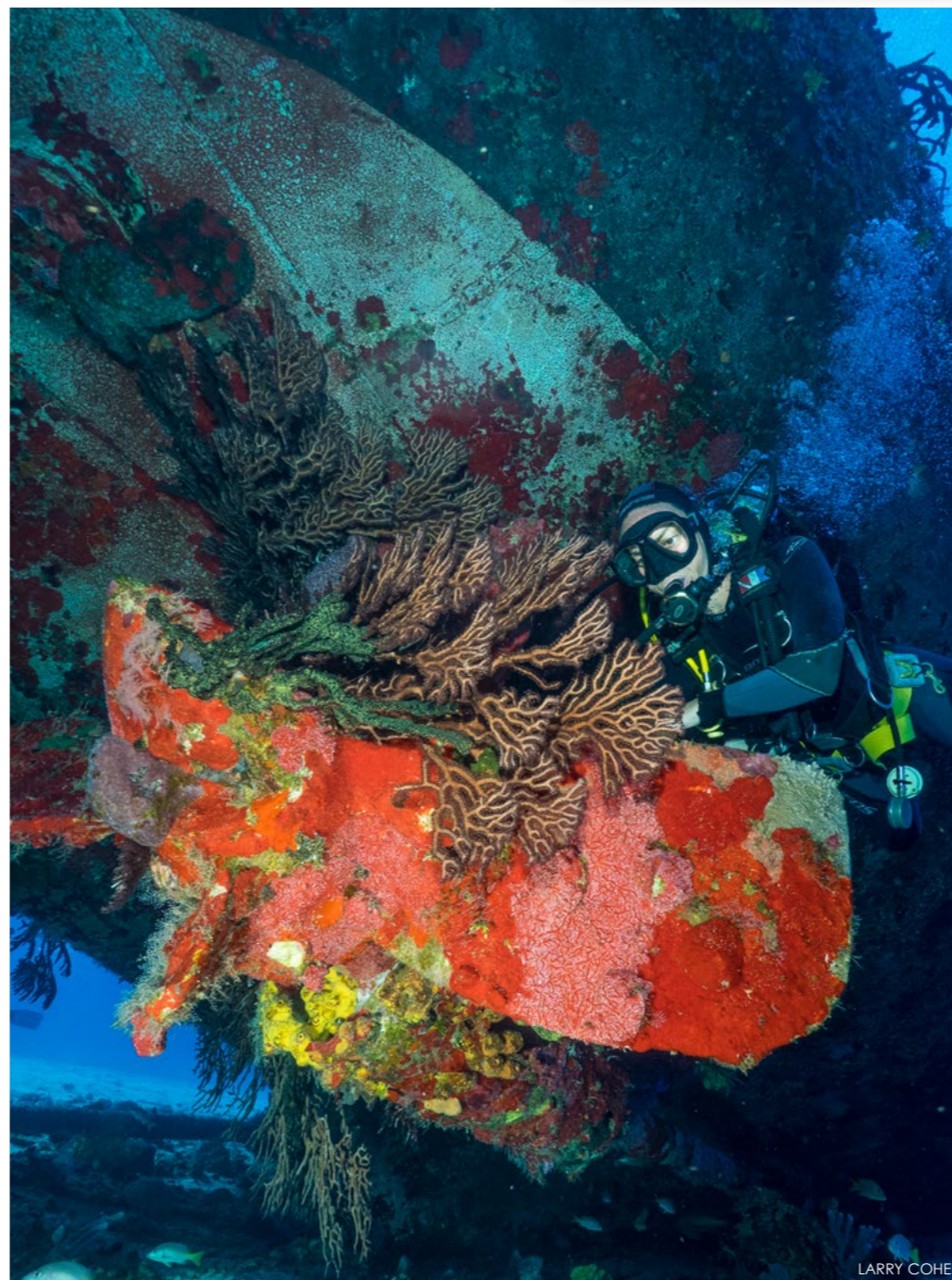
Currents can be very strong. The



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LEFT TO RIGHT: Diver exploring wreck of the *Felipe Xicoténcatl C-53*; Detail of the stern deck on C-53; Diver with gorgonians and sponges growing on C-53's propeller; Diver at stern of C-53; Barracuda hovers over the deck on *Felipe Xicoténcatl C-53*

ship sits intact and upright. In the stern, one can still see the propeller in the sand, now covered with marine growth. The deck still has machinery and some cabins that divers can penetrate and explore. Barracuda and other marine life now call this shipwreck home.



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Diver in Cenote Ponderosa (left)—millions of years ago, this area was a reef under ocean water; Woodpecker and western kingbird found in Riviera Maya (above)



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White-nosed coati (above); Iguana (above right); Mayan ruins at Tulum, which in ancient times was an important location for land and sea routes (top right)



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Tree shadows and green algae cover Cenote Kukulcan

Riviera Maya

While Cozumel Island is one of the top dive destinations in the world—with its rich, colorful reefs, walls, wreck and drop-offs—when traveling there, you should not forget about the underwater wonders to be found on the mainland along the Riviera Maya, a district that hugs the Caribbean coastline in the state of Quintana Roo.

In the north, the Riviera starts at Puerto Morelos and ends in Punta Allen. This is now a hot tourist district, but what interests many divers is underground.

This area of the Yucatán Peninsula is a

porous limestone platform. Millions of years ago, this area was a reef under ocean water. During the last Ice Age, the ocean level dropped, exposing the reef to air. The coral died, and jungle grew over the mile-thick limestone platform created by the dead coral.

Cave systems were formed by the gradual dissolving of the highly porous coral limestone. These caves are called “solution” caves because they were formed by acidic rainfall dissolving the alkaline limestone. During this time, these caves were not filled with water. As a result, formations such as stalac-

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Mexico



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THIS PAGE: Underwater stalactites are frozen in time in Cenote Ponderosa

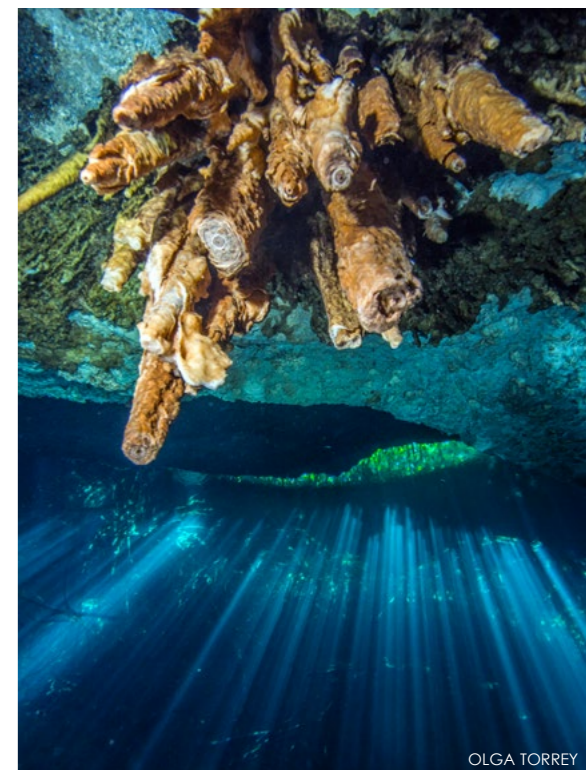
tites (which hang from the cave's ceiling) and stalagmites (which extend upwards from the cavern floor) formed. Sometimes, they joined together to create columns. When the Ice Age ended 18,000 years ago, the climate of the planet warmed up, and the caves flooded as sea levels rose.

Riviera Maya does not have any fresh water at the surface, but the area's caves—Ox Bel Ha, Sac Aktun and Dos Ojos—are three of the longest underground freshwater systems in the world. The cave formations are frozen in time, since they cannot form underwater. These stalactites and stalagmites are a spectacular sight to see.

Cenotes

When a cave ceiling collapses, a cenote is formed. The word "cenote" is derived from the Mayan word "ts'onot," which means "sacred well." Cenotes were the only source of fresh water for the Mayan people and they considered them sacred. The Mayans considered cenotes to be an entrance to the "underworld" or "Xibalba," where their gods lived and the human spirit resided after death.

When diving here, it does feel as if you are in a different world. Diving in a cave zone where no light exists requires special training, and the cenotes are in the cavern



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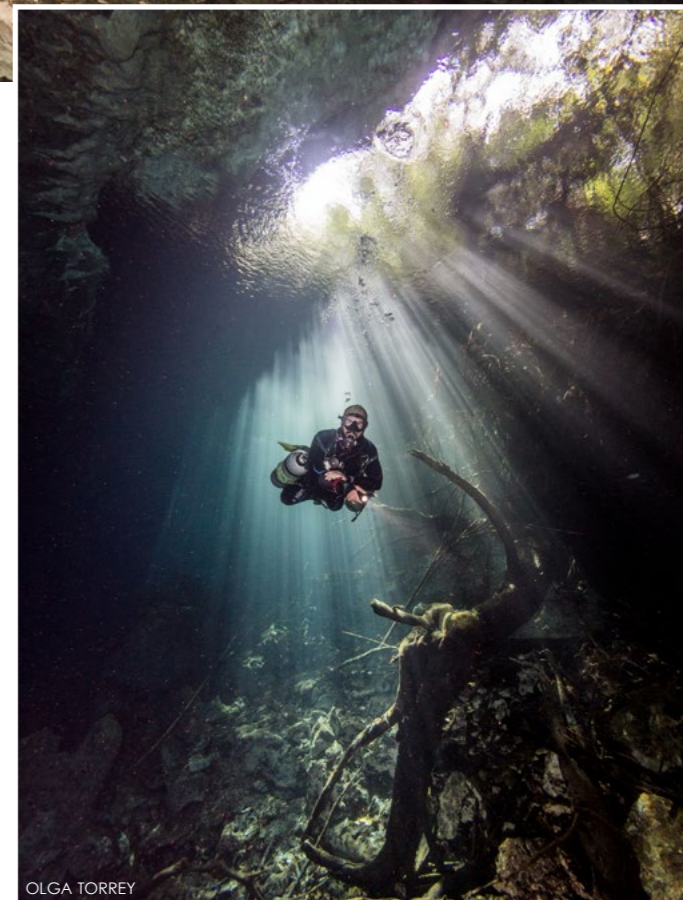
Mayan people considered cenotes sacred—One can see why in Ponderosa

zone. Taking a cavern course is a good idea, but these areas could be dived by all open water divers if accompanied by a properly-trained guide with an official cenote guide certification.

The visibility can be over 30m (100ft), and the water temperature is around 22-24°C (72-75°F) all year round. Besides the formations in the cenotes, another interesting phenomenon one can observe is the light. Natural sunlight filters around and through the porous ceiling, creating a magnificent light show. Rays of streaming light slice through the water, and different shapes are formed between the shadows and highlights. The effect chang-

es, depending on how cloudy it is, the time of day and time of year.

Cenote Ponderosa. The entrance to Cenote Ponderosa is vast. The permanent gold cavern line begins a little distance in, so you, or your guide, must run a primary reel from open water to the start of the permanent gold line. A very large tunnel leads from Ponderosa over to Corral Cenote. Once you reach Corral Cenote, the cavern line follows the edge, giving you a great view of both the cavern below and jungle above. On a sunny morning, the light show is very impressive, with light streaming into the cavern.



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THIS PAGE: Diver in Cenote Ponderosa—Solution caves are formed by the gradual dissolving of coral limestone





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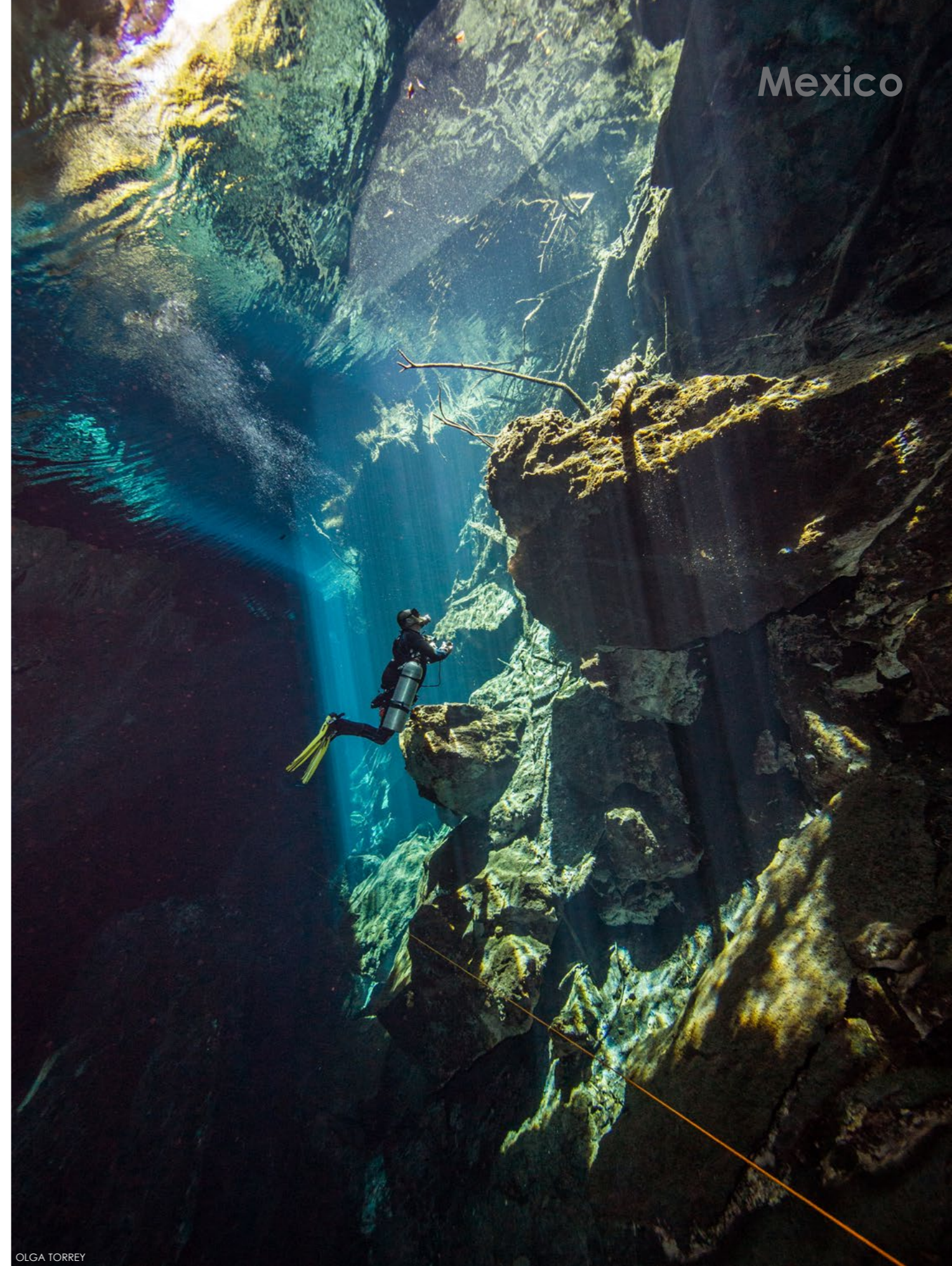
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Moving from cavern zone to the cave requires special training at Chac Mool

Cenote Chac Mool. Chac Mool is lined by tree trunks and branches that reach into the water. On a sunny day, it looks like a laser show, the way the light enters the water. The light and shadows form distinct patterns on the submerged rocks. In several areas, one will encounter a strong and defined halocline. A halocline occurs when fresh water from an underground stream and saltwater seeping in from the ocean mixes. Saltwater is denser than fresh water; when they mix, one experiences an optical illusion in

which everything looks blurry. I felt as if I was underwater without a mask. Swimming through a halocline is fun but can be disorienting.

Cenote Kukulkan. Cenote Kukulkan is part of the Chac Mool System. Divers can enter through an entrance down a set of steps, or one could do a short cave dive from Chac Mool to Kukulkan. At times, the open water area is covered with a green algae bloom. One can see the shadows from the trees of the jungle from underneath.



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THIS PAGE: Diver in Cenote Chac Mool. On a sunny day, it looks like a laser light show in this cenote.



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Divers return to the dive boat at Shark Point (top left); School of sailors choice fish and French grunts on Jardines Reef (above); Stoplight parrotfish on Sabalos Reef (left)

Ocean diving

Besides diving underground, Riviera Maya, which sits on the Caribbean coast, does offer ocean dives worth doing. Depending on the time of year, one can see whale sharks, sailfish and bull sharks.

Whale sharks. The whale shark season is from June to September. Boats leave from Cancun and head to Contoy Island where the whale sharks come to feed on plankton. Snorkeling with the largest fish in the world is a humbling experience.

Sailfish. Sailfish season is December through March. The boats for sailfish tours also leave from Cancun and head to Contoy Island. The sailfish are here to feed on Brazilian sardines, which form into a bait ball.

First, look for the frigate birds feeding on the sardines from the surface. Once you spot them, it is time to grab your snorkeling gear and hit the water.

The sailfish use their sword-like bill to stun the sardines and feed on them. They do not use their bill to spear their prey. These fish can be as large as 3m (9.8ft) in length, and weigh up to 90kg (200lb). They typically swim at 36 km/h (22 mph) but can go as fast as 110km/h (68 mph). They are the fastest fish in the world. Snorkeling with them, as they reduce a huge bait ball



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Whitespotted filefish on Sabalos Reef

Sailfish use their sword-like bill to stun the sardines



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down to one fish (and then no fish), is an astounding event.

While in the open ocean, it is possible to encounter manta rays, whale sharks and

dolphins, but this is not an aquarium. It is also possible to spend a very long day on the boat and see only water.



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Pregnant bull shark migrates to shallow water to give birth (above); Porkfish with sailors choice and French grunts on Sabalos Reef (top left); Sailfish feeding on Brazilian sardines (left)

Sharks. From November to March every year, a group of pregnant bull sharks migrate to the shallow waters off Playa del Carmen. They come here to give birth. It is believed that the sharks are attracted to the water's lower salinity, caused by the underground fresh water feeding into the ocean.

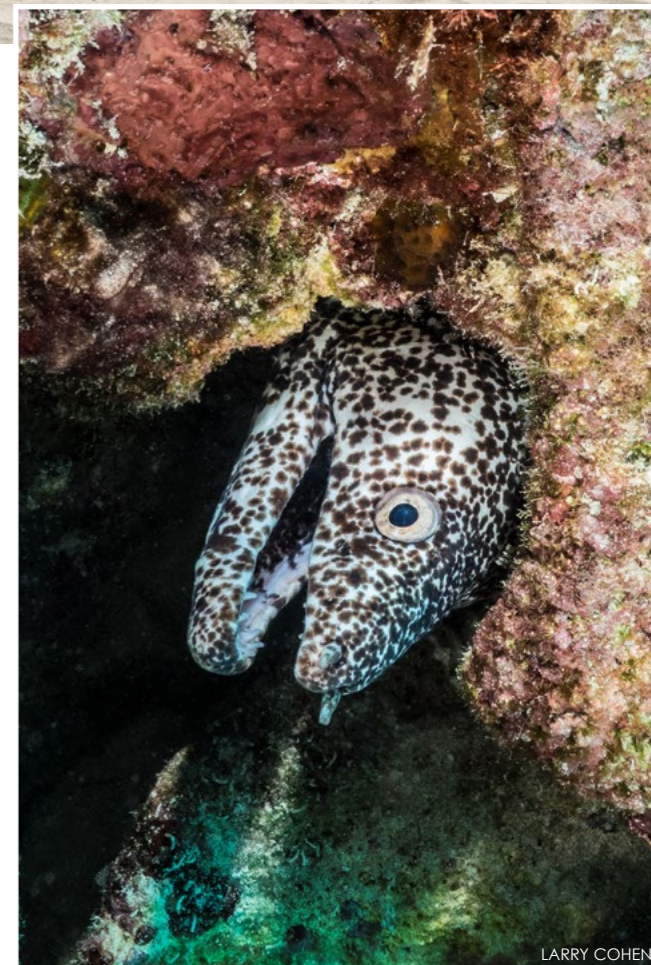
The site known as Shark Point has a sandy bottom. Since these are pelagic fish, it is difficult for scientists to acquire data. Since 2010, the nonprofit organization, Saving Our Sharks, has been gathering data and identifying the different sharks that visit Playa del Carmen. Twenty-five individuals have been identified. Besides the bull sharks, remoras and other marine life can be observed.

Diverse marine life. There are many patch reefs off Playa del Carmen including Jardines and Sabalos. These reefs might not be as lush as the reefs and walls

off Cozumel, but they are teeming with life. Large schools of grunts, porkfish and tangs can be observed. Different species of parrotfish and moray eels can be seen in the crevices. Skates can be seen in the sandy areas between the reef patches. The current at top of these reefs could be strong. It is possible to stay low and out of the current.

Dive center and hotel

Pro Dive International is a PADI Five Star Dive facility and Career Development Center. It runs the scuba concessions in several resorts in Cozumel, Playa del Carmen and the Dominican Republic. Their gear is in superior condition, nitrox is free and the staff is very supportive. In Cozumel, the center is set up for recreational diving and training, and advanced specialty courses are offered. Dive boats get divers to the dive sites fast due to their close proximity and the boats' speed. The



LARRY COHEN

Spotted moray eel on Jardines Reef



OLGA TORREY



OLGA TORREY

At Allegro Playacar, guests can enjoy relaxing at the pool or parasailing (left), and delicious meals (above).

to the dive shop and there is a special diver lounge named after the Santa Rosa Reef. Twice a day, at no additional charge, they offer non-certified guests a chance to try out scuba diving in the pool. If guests want to



OLGA TORREY

dive guides help you enjoy your dive experience whether you are a rookie or experienced diver. Pro Dive can arrange excursions to Playa del Carmen for bull shark diving, whale sharks, sailfish run and cenotes.

Allegro is one of the resorts in Cozumel and Playa del Carmen from which Pro Dive operates. In Cozumel, the sprawling grounds include five different pools, one of which is an aquatic park for children, and a hot tub area for adults. On the premises are five restaurants, five bars, spa, tennis and basketball courts and an outdoor theater. There are small bungalow-style buildings, each containing four-guest accommodations for a total of 305 rooms. The resort's all-inclusive program includes three meals, all drinks and sits conveniently in front of Playa San Francisco, one of Coz-

umel's most beautiful beaches. Besides diving, other water sports offered include windsurfing, bodyboarding, sailing, snorkeling, fishing and kayaking.

This hotel takes scuba diving seriously and strives to meet the needs of traveling divers. Allegro and Pro Dive offer the VIP Ultimate Dive Experience package, which includes a one-tank dive every day and many other benefits. There is a discount for additional dives. The other convenience is that the rooms are close

proceed further, they can get certified on the premises. The all-inclusive Allegro Playacar Resort is located inside the gated community of Playacar. The resort sits on a fine, white sandy beach. Besides diving, beach volleyball, windsurfing and other water sports are offered. This is a convenient base from which to visit the Mayan archaeological sites, as well as oceanic and cenote dive sites. Unlimited meals, snacks and beverages are available at the resort's three restau-

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rants and five bars. After a day of exploring, this is a welcoming way to relax.

Pro Dive International has a small check-in point at the coveted Allegro Playacar all-inclusive resort. Dive operations take place at its larger facility next door, at the luxury four diamond-rated Royal Hideaway Hotel.

The shop is right on the beach. Boats pull up to the surf zone for the reef and bull shark dives. At this location, if requested, Pro Dive provides double tanks and singles with left and right valves for side-mount. Nitrox is free and all ocean guides are fully qualified PADI Master Scuba Diver Trainers. The cavern guides are also at PADI MSDT level, and are fully certified full cave divers, with an official cenote guide certification.

Cavern training and full cave courses are offered as well, by highly qualified and experienced full cave diving instructors. Pro



The beach front of Pro Dive at Royal Hideaway Hotel

OLGA TORREY



LARRY COHEN



OLGA TORREY

Tulum is the only Mayan archaeological site located by the sea (left and above); The population at Tulum was estimated to have been between 1,000 and 1,600



OLGA TORREY

Detail of Mayan archaeological site in Tulum



NASA



Location of Cozumel Island and Riviera Maya in Quintana Roo, Mexico

Dive offers cave tours to divers that are cave certified. Pro Dive has comfortable trucks to take divers to the cenotes. The staff can also arrange for vans to take you to Cancun for sailfish or whale shark expeditions. Trips to Cozumel are also offered at this location.

Mayan ruins

A visit to the Riviera Maya would not be complete without seeing one of the major Mayan archaeological sites. Tulum is the only ruin that is on the Caribbean Sea. It was previously known as Zama, meaning the "City of Dawn". The current name "Tulum" means "fence" or "trench" in Mayan. This is one of the few Mayan cities pro-

ected by a wall.

Between the 13th and 15th centuries, vanishing only 70 years after the Spanish army started conquering today's Mexico, Tulum was a major trading center for the Mayan people. This was an important location for both land and sea routes. The population is estimated to have been between 1,000 and 1,600.

The *Daily Mail* reported that, nowadays, two million tourists visit Tulum each year—sometimes as many as 2,000 per day. This is more people than the estimated local population. As crowded as it can get, Tulum is still worth visiting. You will get a glimpse into the lives of the Mayan people who depend-

ed on the cenotes in which we now dive.

The ruin is enclosed with a limestone wall on three sides. It is 7m (23ft) thick, and varies between 3m (10ft) and 5m (16ft) in height. Visitors enter through one of five doorways and see some spectacular ancient buildings. Castillo (castle) is the most dramatic. It is perched on the edge of a 12m (39ft) limestone cliff. Below is a beautiful white sandy beach on the Caribbean Sea. Besides the ruins, one is almost guaranteed to encounter iguanas, white-nosed coati and other wildlife.

For the curious traveling diver, the coasts of Mexico offer a variety of dive experiences, history and culture. The sun, blue sky, new friends and well-known hospitality of Mexico will create a superb trip experience. Both the Riviera Maya and Cozumel will entice you to come back for more. ■

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 Liquidimagesuw.com/olga.

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Norway's Lofoten

— *Wrecks, Reefs & Culinary Delights*

Text and photos by Christian Skauge





Enjoy spectacular scenery at Haukland in the Lofoten Archipelago

Lofoten in northern Norway is renowned for spectacular scenery and stunning natural beauty—and it doesn't stop at the surface! Clear water, huge kelp forests with lots of marine life, great wreck diving and anemone-covered walls which rival any tropical coral reef... What more could you ask for?

Lofoten is one of those annoying places where you can

get in the water pretty much anywhere and still have a good dive. This makes it more important than ever to have good, local support, because good isn't good enough up here—you want to get to the really amazing and spectacular dive spots!

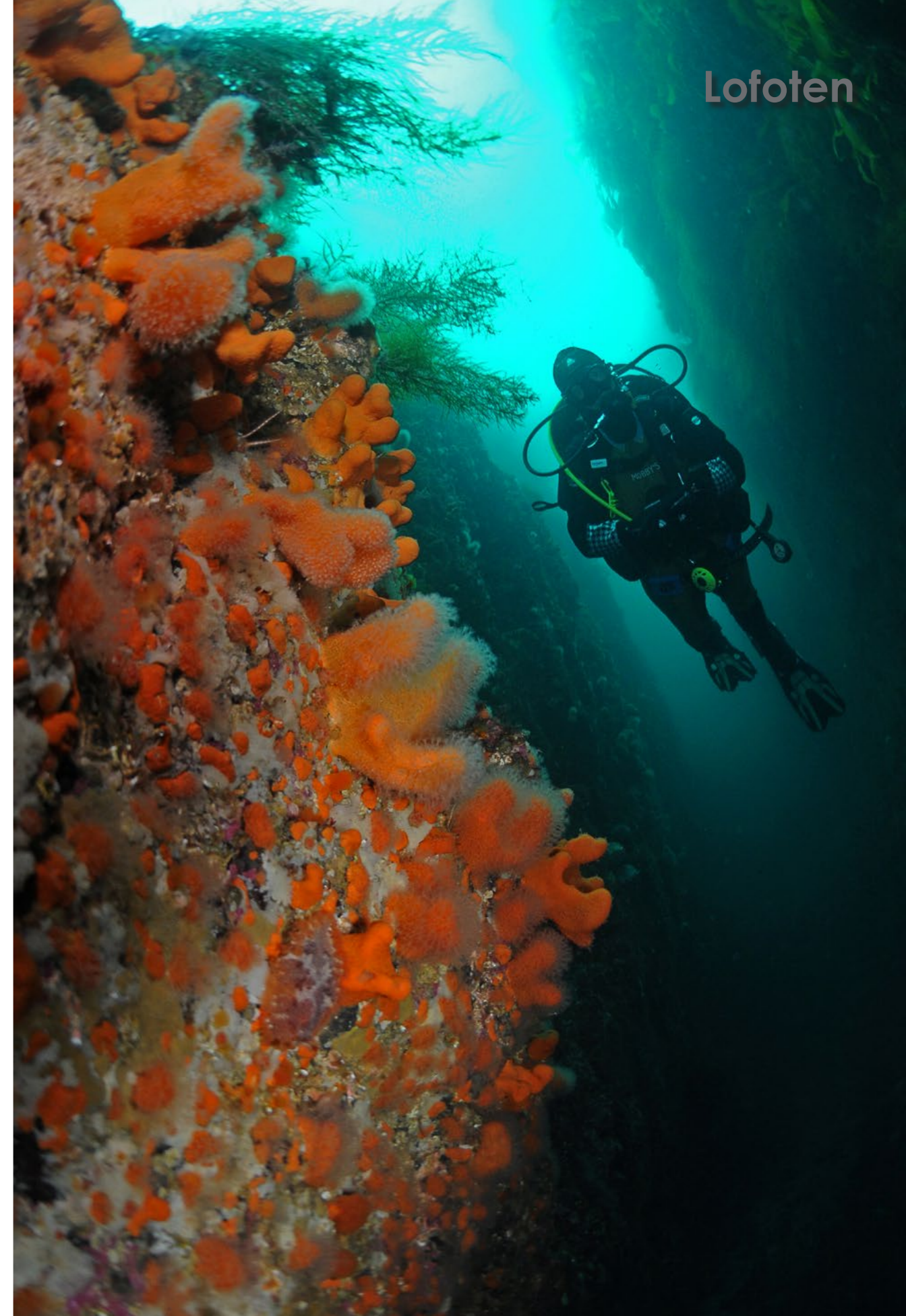
Nobody in Lofoten offers a better dive package than Lofoten Diving in the small township of Ballstad. Owners Daniel and Ada know the area like the back of their hands, and Daniel guides the fast RIB dive boat to GPS locations that offer truly great diving—all with a steady hand and a friendly smile.



A perfect starting point

Ballstad is located, pretty much, smack in the middle of the Lofoten Islands, northwest of Bodø in northern Norway.

The small township offers a perfect starting point to the many attractions within easy reach of Lofoten, including the dive sites Lofoten Div-



Diver at wall covered in soft corals at Nusfjord in Lofoten (above and previous page)
The picturesque village of Ballstad, located in the middle of the Lofoten Islands (left)



Lush kelp forests can be found at many dive sites along the Lofoten Archipelago



Lofoten

Diver swims over kelp forest at Ballstad, Lofoten (left); Brightly colored anemones and dead man's fingers can be found along the walls of the deep canyons at Ballstad (below); Divers enter the water from a dive RIB (center)

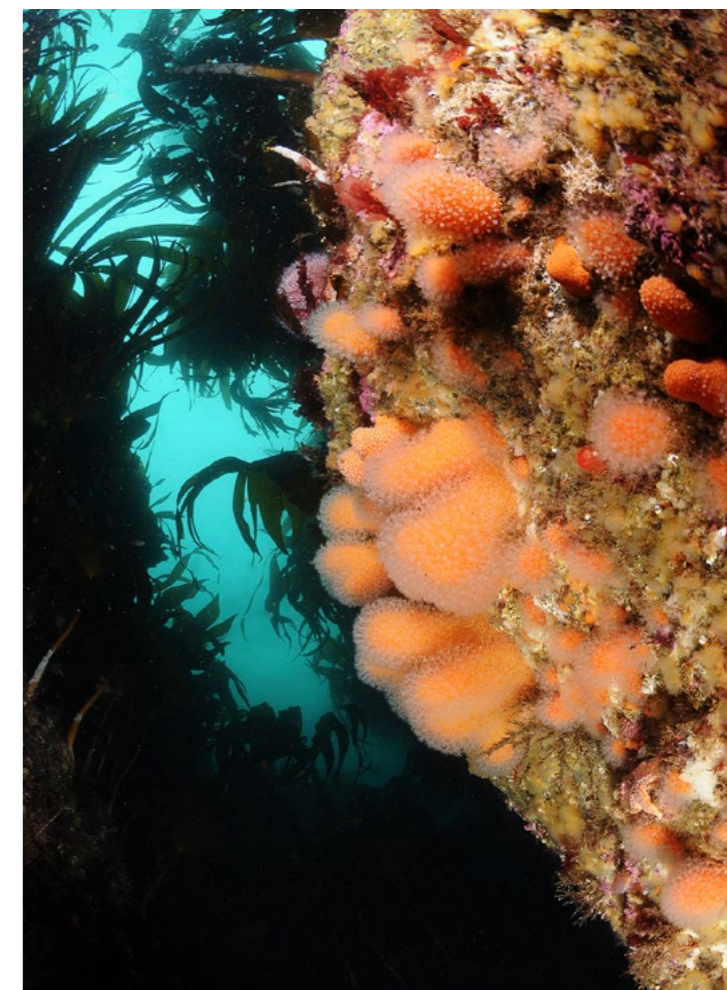


southwest of Ballstad known for its deep canyons and spectacular walls covered in dead man's fingers (*Codium fragile*) and anemones. En route, we marveled at the tall, snow-covered mountains, creating a perfect contrast to the vivid green coastline, which had ragged cliffs separated by patches of sandy beaches so white you would think you were in the Indian Ocean. It's not hard to imagine why tourists are so attracted to this part of Norway!

With this beautiful backdrop, we got ready for our dive and rolled backwards out of the RIB and into the cool, clear waters of Lofoten—ready for the natural wonders beyond the surface.

Grand Canyon

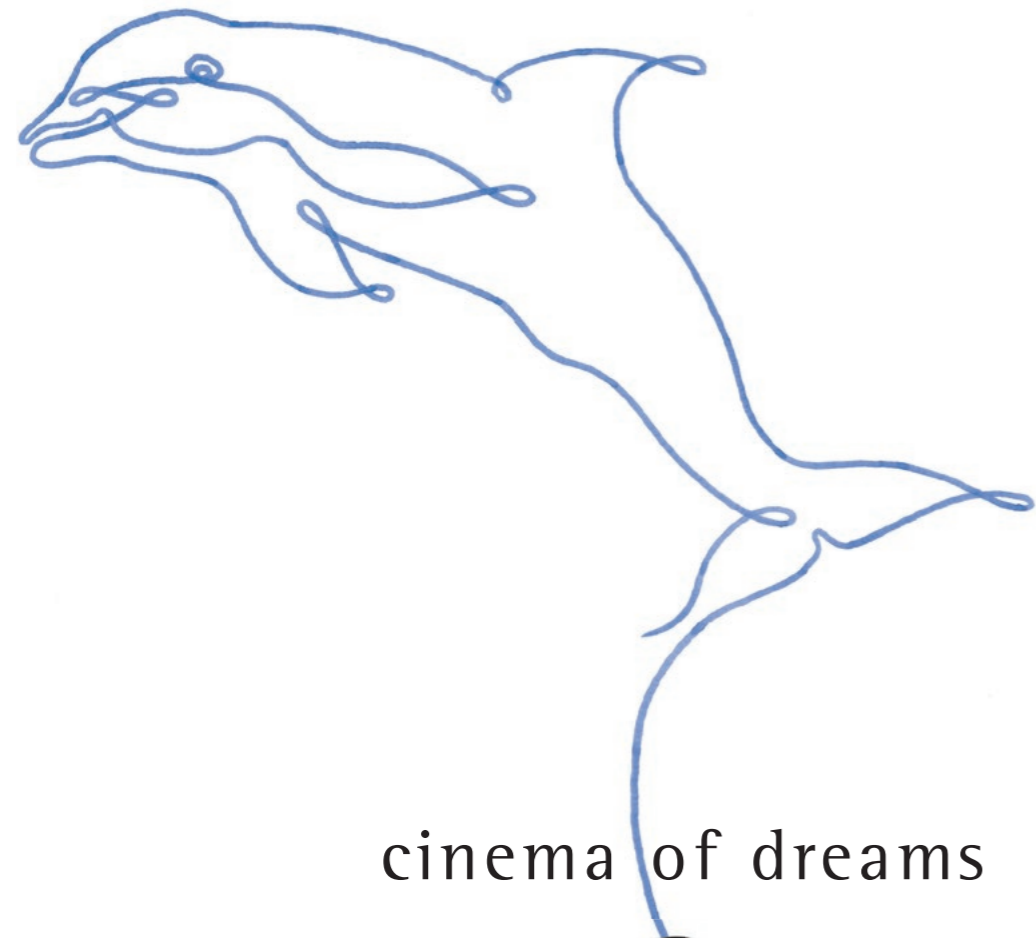
Since we were diving in mid-June, the kelp forest was fresh, green and did not have too much stuff growing in it. We had a slow swim over the top of this giant salad buffet before we found the canyon we were looking for on our right. Between two vertical rock faces covered in dead men's fingers,



ing recommends you visit, ranging from Reine and Nusfjord in the west to Svolvær and Raftsundet in the east. In addition, they visit several spots in the narrow sounds going north to Vesterålen, plus a handful of great wreck dives.

To start, we set a course for an area

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Lofoten

White sandy beaches and beautiful scenery at Uttakleiv; Quaint harbor town at Nusfjord (right)

the colors were intense; and when we continued into the gorge, we saw colorful lumpfish, well-camouflaged sculpins, huge coral nudibranchs and schools of tiny pollock hovering in the slight current.

At the bottom of the canyon, we arrived at a shelf covered in huge kelp. After relishing the sunlight—which, incredibly, reached us at 20-plus meters—we returned, heading back up the canyon. Lovely! Photo opportunities queued up, and I realized I already had a backlog of images, even before getting in front of the computer screen. Wherever we turned, there were vivid reminders of how colorful and fresh diving in Norway can be.

World-class beaches

The beaches of Lofoten are truly fantastic, and worth the trip all by themselves. The brilliant white sand is made up of the remains of trillions



of scallops, mussels, snails and sea urchins—their shells crushed to tiny bits by the ever-moving sea. The turquoise color of the water makes you think you are in the Maldives or at a tropical island in the Pacific—it is hard to grasp that you are well above the Arctic Circle in the North Atlantic.

Anyone visiting Lofoten should allocate at least one day for sight-

seeing and hiking—to enjoy the breathtaking natural scenery, the beautiful harbors of Reine and Nusfjord, the local seafood and the omnipresent seagulls. The most beautiful beaches are found at Haukland, Ramberg and Uttakleiv, which are all easily reached by car. Don't be surprised if you encounter dudes or dudettes with surfboards or backpackers camping out on





THIS PAGE: Scenes from the wreck of the MV *Hadsel* at Reine

the beach—they have long since discovered this natural paradise of the north.

Great wreck diving

Divers are picky tourists, and often have a very specific idea of what they want to see underwater. Our diving colleagues from Belgium were passionate wreck divers, and when they suggested we go to the nearby municipality of Reine to experience some serious rust, we certainly did not resist. Day trip! We were all stoked to see the wreck of the coastal passenger liner *Hadsel*, and get a fabulous RIB ride along the jagged coastline of Lofoten known as the Lofoten Wall.

MV Hadsel was on her way to Bodø with mail and pas-

sengers when she was caught in a strong current and foundered near Reine in January 1958. Water gushed in through a huge hole in the engine room, and the 20 passengers and 26 crew got into the lifeboats to save themselves. It must have been a riveting experience to witness the 220ft vessel slide off the skerry and sink below the surface of the wintry sea, less than an hour after she ran aground.

With this drama in mind, we slowly descended along the anchor line. When the beautifully preserved wreck materialized out of the darkness below, we knew we had hit gold. This was surely one of the most beautiful wrecks along the Norwegian coastline!

Hadsel is standing almost

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THIS PAGE: Scenes from the 71m long wreck of the MV *Guðrun Gísladóttir* located west of Ballstad; Diver on the *Hadsel* wreck (far left)



upright on a flat, sandy bottom at around 40m depth, with a 45-degree list to port. The wreck is full of interesting details, which we shared with both dive buddies and thousands of transparent comb jellyfish that had decided this was a good spot to congregate. The foremast was still standing upright. On deck, we found

an old radio receiver, and the superstructure amidships and aft offered plenty of opportunities for exciting penetrations. As a photo opportunity, *Hadsel* was simply top-notch, and my only regret was diving on air, which gave me a shorter bottom time than I would have wished.

More rust

Hadsel is not the only wreck on offer. Just west of Ballstad lies the 71m long MV *Guðrun Gísladóttir*, an Icelandic trawler that went down in 2002. She's in even better condition than *Hadsel*, and offers a truly great wreck dive at a depth of 27-40m. We had a little current on this dive, but the experience was still great.

Lofoten Diving also offers trips to the wrecks of SS *Ramø*, SS *Hamburg*, the unique German minesweeper mothership MRS-25, MV *Karlshorst* and the relatively shallow and easy MV *Siw-Aina* in Svolvær. All of them are within easy reach with the fast RIB from Ballstad, and rust addicts will certainly find that there is more than enough to keep them occupied in this area.



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Incredible anemone wall

The most beautiful and impressive dive site we got to experience on our Lofoten trip was dubbed the worst nickname among the guests, but not because it was bad in any way. "Shit Wall" was a steep rock face, just across from the picturesque harbor in Nusfjord, on which hundreds of cormorants had made their home.

Because of their guano, the water below was filled with nutrients, much appreciated

by the thousands of pretty and immensely colorful Dahlia anemones. They had formed a dense carpet on the wall, from around half a meter below the surface to almost 20m depth, and the staggering kaleidoscope of colors rivaled any tropical coral reef I have ever seen. You will find it impossible not to make the comparison when you see it for yourself.

We started a little too deep on the south end of the wall and it took us a little swim be-

fore we got to the most beautiful part of the wall, which is in shallow water, toward Nusfjord Harbor. If you want to maximize the time in this area, it is a good idea to start shallow at the

north end of the wall. This is a perfect second (or even third) dive of the day, because you really don't need any depth at all to have the best and most colorful view in the world.

THIS PAGE:
Anemone wall
at Nusfjord
Harbor



CLOCKWISE FROM TOP LEFT: Quaint lodgings at Villa Ballstad; Glass art of Lofoten; Diver collects scallops at Nusfjord for dinner; Racks of drying fish caught locally; Lofoten metal art after the Viking style; Sign for renowned restaurant, Krambua, at Hamnøy in Reine; Local brew enjoyed in Lofoten; Dining room at Villa Ballstad



Culinary delights

On the other side of the sound in Nusfjord, we found some scallop banks and collected enough scallops for a delicious appetizer. The main course for our hearty bacalao we bought at Anita's Seafood at Sakrisøy on the way back home—they have an impressive array of both fresh and cured seafood, just like what you would expect to find in Lofoten. After all, this is the heartland of Norwegian seafood, and there is nothing lacking in their treasure

trove. The fresh delicious fodder was devoured in the spacious and elegant dining room at Villa Ballstad, and praise was generously handed out afterwards.

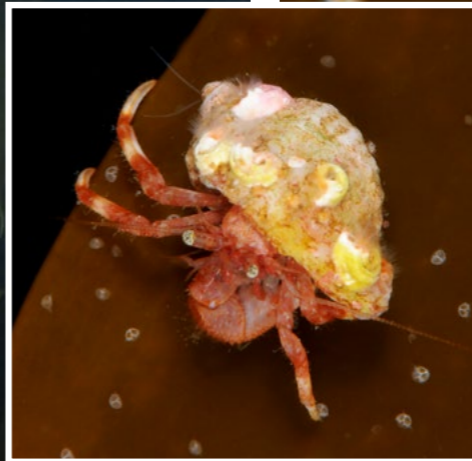
Culinary delights are a big part of the Lofoten experience, and being so close to fresh commodities is both inspiring and mouth-watering. You can catch or collect a lot of it yourself, or just stop by one of the local fishmongers—the seafood is equally fresh and delicious either way.

Lofoten also offers a selection of restaurants, some of which are very high class. We gorged on grilled monkfish and fish soup at master chef Mikael Björkman's renowned restaurant, Krambua, at Hamnøy in Reine. The Swede opened the doors



for us even though we were a bit early and served us an unforgettable dinner, entirely made from local catch and produce. Delicious—and absolutely perfect after a day of exciting diving.

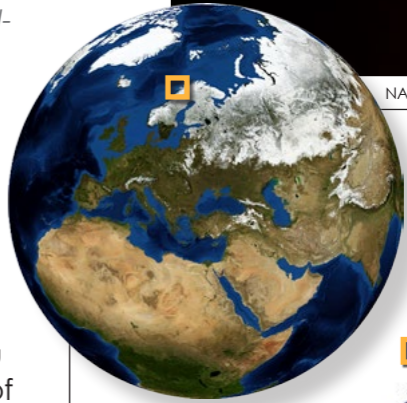




In Lofoten, kelp forests (far left), such as the one just outside Ballstad Harbor, are home to lots of hermit crabs (left) and nudibranchs, such as *Polycera quad-*



rilineata (above) and *Facelina auriculata* (right and lower left)



Location of Lofoten, Norway, on map of Europe



Shiny nudibranchs

For those who are into tiny critters, Lofoten also has a lot to offer—it's not all about big wrecks, drift dives and huge kelp forests here. We did some great macro dives just outside Ballstad Harbor, in an area with lots of tiny islets and skerries. Depending on the weather, you can dive pretty much anywhere, and among kelp forest and sandy patches, you will find an extensive array of colorful critters.

Beneath the canopy, the kelp forest is full of colorful amphipods, hermit crabs, nudibranchs and even the rare friendly blade shrimp, which we found on the sandy bottom at just 12 meters' depth. This splendid red critter is not really

very rare in Norway, but is usually found seeking shelter below big pink anemones at depths of 30-plus meters—in Lofoten, they seemed to enjoy shallower water and had no problems putting up with strobes and indiscreet photographers.

The nudibranchs were incredibly numerous, and the beautiful purple *Facelina auriculata* was especially prominent and in big numbers. They were everywhere on the kelp! This species is quite common along the Irish and British west coasts, but in southern Norway, they are more rarely seen. Not so in Lofoten! Yours truly (who has a certain passion for these "ocean butterflies") was astonished to see that the kelp was so fresh that I could photograph a mirror image of the bril-

liantly colored nudibranchs on the kelp surface. Unique—I've never even heard about this!

Experience Lofoten

Lofoten is a safe bet when you are thinking about going to Norway for a dive holiday. Not only is it great underwater, but the natural beauty in general will take your breath away. Add to this a very competent and knowledgeable dive resort, cool digs and great food—and you will have a perfect time! In terms of diving, there is nothing amiss in Lofoten. You will be able to enjoy wrecks, walls, kelp forests and critter diving, almost regardless of your certification.

Some of the wrecks (of course, the best-preserved ones) are a bit deeper and

require more experience—but no matter what your level is, you will be very well taken care of and will be almost guaranteed a great experience. Lofoten Diving also offers courses should you want to enhance your level of expertise, and their snorkeling trips and Discover Scuba try-out dives are also popular among visiting tourists. ■

Christian Skauge is an award-winning underwater photographer based in Oslo, Norway, and is the owner and editor of the Norwegian dive magazine, Dykking. He is particularly interested in photographing macro life, but also enjoys wide-angle wreck photography. For more information, please visit: Scubapixel.com.



South Africa's
Gordon's Bay
Vibrant Diving & Diversity

Text and photos by Kate Jonker
Aerial photography by Derick Burger



DERICK BURGER

Aerial view of the village of Gordon's Bay, located on False Bay, just a 50-minute drive from Cape Town
 PREVIOUS PAGE: Beautiful pink noble coral and elegant feather star at Noble Reef

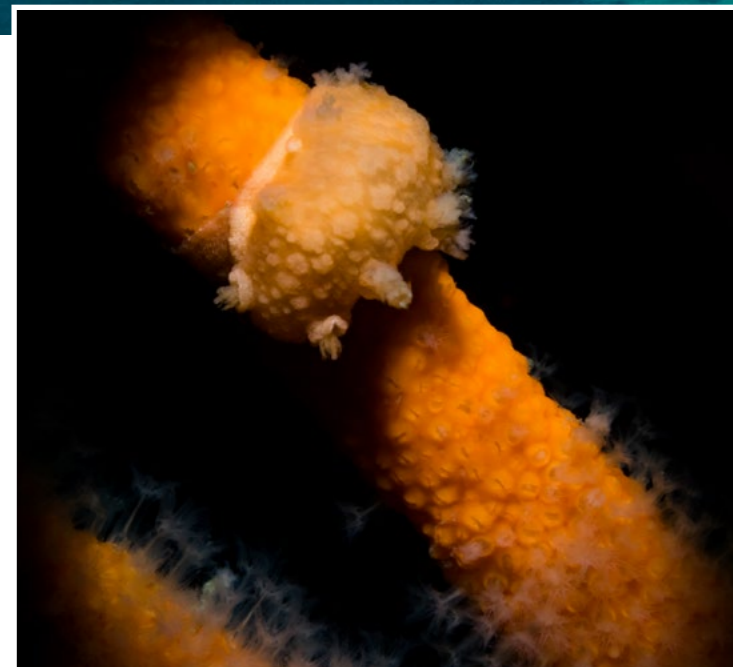
Gordon's Bay is a sleepy seaside village in South Africa, nestled in the northeastern corner of False Bay, where the majestic Hottentots Holland mountain range dips its toes into the ocean. A quick 50-minute drive from Cape Town, Gordon's Bay is surrounded by mountains and natural vegetation and the vibrant beauty of the countryside is mirrored beneath the waves.

Most of the dive sites run parallel to the rugged coastline that stretches along the eastern coast of False Bay. The many dive sites offer something for every diver—from shallow reefs and kelp forests to deeper, craggy reefs with incredible topography.

Fed by nutrient-rich waters, the marine life flourishes in Gordon's Bay and dive sites are densely covered with colourful soft corals in pinks, oranges, greens and purples. Sinuous, palmate and whip fans sway gently in the ever-changing tide, and yellow, pink, purple and orange sponges adorn the rocks. Vibrant starfish, anemones, feather stars and sea urchins add to the riot of colours, and beautiful pink and orange



Klipfish on reef at Steenbras Deep



Whip fan nudibranch on sea fan at Pinnacle



noble corals can be found proudly standing guard on the deeper reefs.

This base of vibrant life provides a safe and thriving habitat for the multitude of vertebrates and invertebrates that inhabit the reef. From colourful nudibranchs in all shapes and sizes, to crazily decorated spider crabs, hard-to-spot cuttlefish and octopus with their ever-changing textures and colours to small catsharks and reef fish—there is so much to

see. Gordon's Bay is a haven for macro photographers, and the variety and number of nudibranchs on any one dive is astounding. Larger visitors to the reefs include huge short-tail stingrays,

sevendill cow sharks and spotted gully sharks, Cape clawless otters, dolphins, Bryde's whales and many playful Cape fur seals, which often follow divers around underwater.

Gordon's Bay is the only town in South Africa that sports two working harbours—the quaint and rustic old harbour, which is home to South Africa's Naval Officer Training College and the Gordon's Bay NSRI; and the newer harbour at Harbour Island, where the dive boats launch from. Most dive sites are situated between 10 and 40 minutes from Harbour Island. As most of the reefs are close to shore, the scenery of the mountains and rugged coastline to and from the dive sites is breath-taking. Divers will often encounter dolphins,



seals and whales along the way, making the ride out to the dive sites almost as exciting as the dive itself.

Diving conditions

Cape Town diving is very seasonal and where you dive will depend on what time of year you visit. Sea conditions are affected by the prevailing winds. The south-easterly wind blows from October to May, clearing the water



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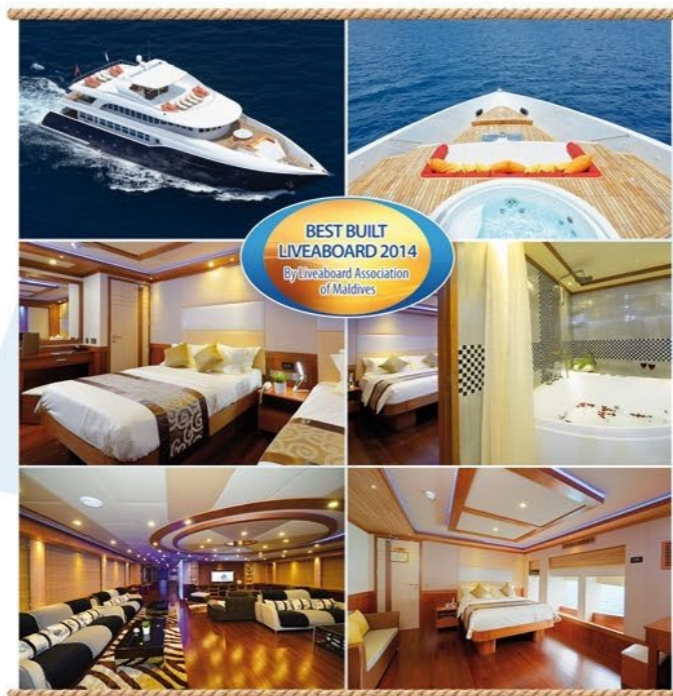


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Gordon's Bay



Two-eyed blenny hides in a crack at Stone Dog

along the Gordon's Bay side of False Bay, bringing great diving conditions. From June to September, the north-westerly winds blow and diving in Gordon's Bay is not usually possible as conditions are too rough and the visibility drops. The best time to visit Gordon's Bay is therefore from October to May.

Water temperature in Gordon's Bay can change daily and is affected by the tides and the water coming into False Bay. Temperatures usually range between 15°C and 19°C in summer, with the odd drop to 13°C. Divers are advised to wear either a 5mm wetsuit and hooded chicken vest or a 7mm wetsuit with a hoodie. Many local divers also dive with semi-dry or drysuits. Gloves, a hoodie and booties are also a must in order to stay warm.

The diving is done from eight-metre-long rubber ducks, known as RIBs or zodiacs in other parts of the



Baby's toes cowrie on reef at Steenbras River Mouth



Divers ready to start their dive at Blousteen (above); Diver explores the reef at Steenbras Deep (top right); Dive boat leaves Harbour Island in Gordon's Bay (right)



Huge basket star at Drop Zone

world. The standard procedure is for divers to put their gear together on land and load it onto the boat, where the skipper will secure it to dive racks. Divers then don wetsuits and booties, and climb on board. Once at the dive site, the divers kit up for the dive, usually with the assistance of a dive guide or the skipper. When everyone is ready to enter the water, the skipper will slowly count, "One, two, three, go!" And the divers all roll backwards into the water at the same time on the word "go".

Divers can usually choose to dive with a dive guide or in buddy pairs, exploring the reefs at their own pace. This is an ideal arrangement for photographers who can take their time instead of rushing to keep up with the dive guide. At the end of the dive, divers deploy their surface marker buoy and the dive boat will come to pick them up. It is therefore important that all divers have their own deployable surface marker buoy with them on every dive.

Indigo Scuba is the only dive centre in Gordon's Bay. All their skippers, dive guides and instructors have been diving and exploring

the reefs in this area since the 1990s. They have an immense knowledge of the reefs, many of which they have discovered over the years. Visiting divers are also able to rent any dive gear they might need from Indigo Scuba, and as the owners are accomplished underwater photographers themselves, underwater photographers are well looked after.

Dive sites

As there is only one dive centre in Gordon's Bay, the dive sites are pristine and well preserved, giving divers an opportunity to experience unspoilt Cape Town diving at its very best.

Cow and Calf. From the road that winds its way along the rugged coastline, the two large rock outcrops of this dive site can be seen breaking the water close to shore. They look just like a mother whale and her calf,



giving this beautiful dive site its name.

On the cow and calf pinnacles, you will find palmate and flagellar sea fans, soft corals, feather stars and urchins. Living amongst them is a multitude of nudibranchs, including soft coral, black, gasflame and fiery nudibranchs and Cape dorids. Fish life includes rock suckers, klipfish of all shapes and sizes,



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Astute octopus at Steenbras River Mouth; Puffadder shyshark at Stone Dog (above); Rare protea doris at Cow and Calf (right); Fiery nudibranch at Pinnacle (lower left)



Cape triplefins and puffadder shyshark. Playful young Cape fur seals are often found here and love to follow divers as they explore the reef.

Stone Dog. Fantastic for macro photographers, this is home to the rare protea doris and one of the very few places that this elusive little nudibranch can be spotted. Small Chinese klipfish and blennies hide amongst the cracks and little puffadder shysharks can be seen patrolling the reef for food.

Pinnacle. Highlights of this dive site include the many sea fans covered with whip fan nudibranchs and spider crabs. Huge orange wall sponges host giraffe-spot nudibranchs and provide hiding places for juvenile fish.

The boulders farther away from shore are a grazing ground for red spotted doris, Cape doris and beautiful purple and yellow inkspot nudibranchs. Longsnout pipefish can be found waiting in and out of the sinuous sea fans and shy

doublesash butterflyfish with their unmistakable yellow and brown bands can also be seen flitting around the outer edges of the reef.

Noble Reef. The deepest dive site close to shore, Noble Reef is named after the vibrant pink and orange noble coral that grows on the deeper ridges here. This is the only true hard coral to be found in Cape waters.

Starting at a depth of 15m and dropping to depths of 24m on the sand, this colourful reef comprises steep-sided pinnacles and sloping ridges lush with marine life. Both orange and blue gasflame nudibranchs can be found here and beautiful basket stars are often seen with their arms unfurled as they catch morsels of food that drift by in the ebb of the ocean.

Steenbras River Mouth. This fascinating dive site is located where the Steenbras River meets the ocean. Close to the mouth of the river, the sea floor is a bed of round boulders which have been shaped by time, river



and ocean. Venturing away from the river mouth, the underwater topography changes to steep-sided ridges that run parallel to shore, with canyons and sandy stretches in between.

Huge overhangs provide a safe haven for sleeping pyjama sharks, larger reef fish and short-tail stingrays. Well-camouflaged rock suckers and octopus hide in plain sight on the reef, waiting to be spotted by eagle-eyed divers.

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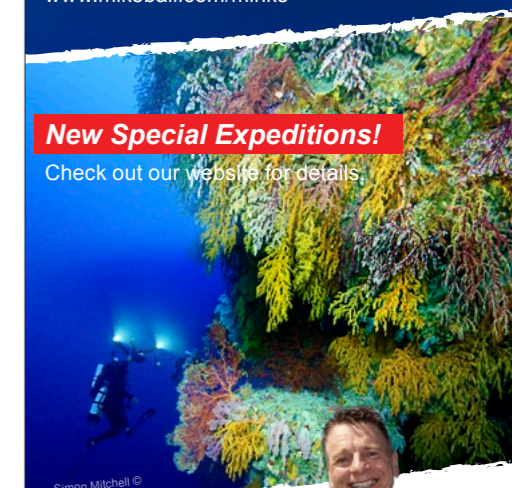
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Gordon's Bay



Jewel anemones at Steenbras Deep and common dolphins on the way to Blousteen

Blousteen. Located 40 minutes away from Harbour Island, towering cliffs and lush mountains provide a majestic backdrop. Playful seals and dolphins also supply endless entertainment en route to this vibrant dive site.

Starting at 7m and reaching 20m farther from the shore, this is a wonderful kelp forest dive. Blousteen is home to a variety of unusual nudibranchs such as *Catriona casha*, many fish as well as shysharks, spotted gully sharks, and sevengill cow sharks. Huge short-tail stingrays can be seen resting amongst the kelp and seals often pop down to visit the divers here.

Steenbras Deep. The topography of the Steenbras Deep reefs can only be

described as majestic, with ragged, steep sided pinnacles starting at 15m and plunging to 32m on the sand. The pinnacles are carpeted in yellow, orange and brown feather stars, delicate strawberry anemones, pink and orange noble coral, massive orange wall sponges, huge forests of sinuous and palmate sea fans and weirdly shaped grey sponges that resemble elephants' ears.

Large schools of silver fish swarm around the tops of the pinnacles, comical horned blennies grin out from cracks in the reef, huge bull klipfish stare superciliously at divers and cute little klipfish peer expectantly up at photographers. Nudibranch life is outstanding, with swarms of frilled



Tubular hydroid, flower of the ocean, at Blousteen

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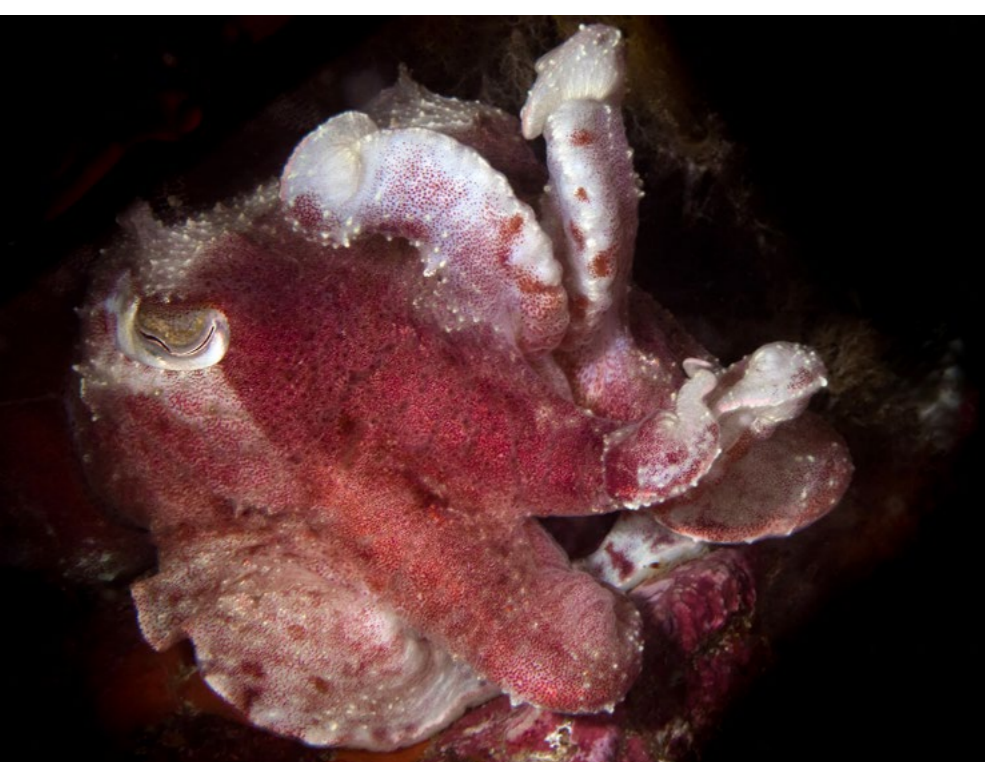
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Well-camouflaged cuttlefish at Steenbras Deep





Gordon's Bay

CLOCKWISE FROM LEFT: Sea fan at Steenbras Deep; Reef at Steenbras Deep; Silvertip nudibranch on yellow sponge at Drop Zone; Cuttlefish in defence position at Drop Zone

nudibranchs that congregate to breed and eat on the multi-coloured sea fans. Tiny candy, white-edged and purple lady nudibranchs are found atop the pinnacles and orange and blue gasflames the size of dinner plates can be seen chomping their way across the reefs.

Drop Zone. Drop Zone is quite a distance from Harbour Island and, like Steenbras Deep, can really only be dived in calm conditions due to the relatively long boat ride. This is a huge, dome-shaped reef that starts at 15m and gradually deepens to 25m and more. The reef is covered with craters, giving an impression that bombs could

have been dropped here (hence the name "Drop Zone").

Due to its distance from shore, the marine life is very different here. Game fish such as yellowtail amberjack and Cape salmon can be seen swimming by and eagle rays, leopard and pyjama catsharks are often encountered by divers. The smaller marine life is also incredibly diverse and includes sea spiders and interesting nudibranchs such as uniquely patterned variable

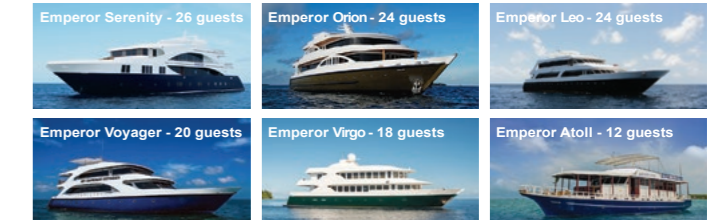


dorids, ghost nudibranchs and Mandela's nudibranchs. Cuttlefish and octopus are plentiful as are the beautiful basket stars

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that make their home on the reef's many sinuous sea fans.

Good to know

Gordon's Bay is Cape Town's hidden treasure. With its richly diverse, colourful marine life and incredible underwater topography, Gordon's Bay diving is very different to that offered along the western side of False Bay. It is a must-visit for underwater photographers, particularly macro photographers who enjoy critter hunting. Being easily accessible and within close proximity to Cape Town, Gordon's Bay should be on the itinerary of all divers visiting Cape Town.

Getting there. Gordon's Bay is a short 50-minute drive from the centre of Cape Town, straight down the main highway, the N2.

Accommodation. Lodging in Gordon's Bay is plenti-

CLOCKWISE FROM TOP LEFT: Bryde's whale comes to inspect the dive boat at Drop Zone; Inkspot nudibranch at Cow and Calf; Basket star reaches its arm out to catch prey as it floats by; Hotlips spider crab on a palmate sea fan

A Cape clawless otter visits the dive boat



CLOCKWISE FROM LEFT: Sevengill cow shark at Blousteen; Gasflame nudibranch at Noble Reef; Nearby Waterkloof winery has beautiful views overlooking Gordon's Bay; Divers enjoy the breathtaking scenery on the ride back from Blousteen; Root mouth jellyfish at Stone Dog

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Gordon's Bay



vegan, vegetarian and everything in between. There are a number of restaurants at both harbours where guests can sit outside, enjoy beautiful ocean views and watch the world go by. Many of the restaurants are family friendly and there is a local Spur on the Gordon's Bay beach front that has a special games area for children.

Topside activities. Gordon's Bay is easily accessible and centrally located for visits to the magnificent Cape Winelands, surrounding sparkling white beaches and the beautiful nature reserves and hiking trails close by.

There are many activities to keep non-divers and families entertained. The sandy main beach in Gordon's Bay is very shallow and wave-free, providing safe swimming and paddling for small children. The neighbouring seaside village of Strand is 10 minutes away and has a beautiful long, sandy beach with great waves for surfers of all levels. Other water sports on offer in Gordon's Bay include kayaking and standup paddleboarding, ocean safaris

ful and there is something to suit every budget. It is advisable to book accommodation in advance as Gordon's Bay is a popular holiday destination during the months of October to May.

Eating out. The many restaurants in Gordon's Bay offer a wide variety of cuisine—from pizzas, pasta, steaks, burgers, seafood, sushi,

and sunset cruises.

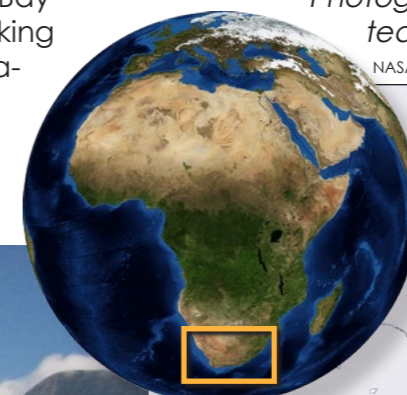
Those wishing to get away from the beach can explore the many local nature reserves, visit Monkey Town or the Cheetah Outreach. With the Stellenbosch wine route a mere 20 minutes away, wine enthusiasts will be spoilt for choice. Most of the wineries have their own restaurants, many of which offer world-class cuisine and

breath-taking views over False Bay and the Cape winelands.

Visitors who enjoy shopping can spend time browsing the "touristy" shops along the Gordon's Bay beach front and those looking for some proper retail therapy can pop into Somerset Mall, a short 15-minute drive from Gordon's Bay.

Kate Jonker is an underwater photographer and writer based in South Africa. A proud member of the British Society of Underwater Photographers, she teaches under-

water photography, is an SSI Dive Control Specialist and dive boat skipper, and leads dive trips across the globe. For more information, please visit: KateJonker.com.



Location of False Bay, and the village of Gordon's Bay, on map of South Africa

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The Philippines'
Southeast Bohol

Text and photos by Matthew Meier

— *Diverse Diving at Anda*



An aggregation of threadfin anthias and chromis swimming around a large colony of black sun corals



A tiny blue-ringed octopus displays a warning to predators that it is venomous; Pink anemonefish in anemone (right). PREVIOUS PAGE: A detailed view of a purple and green tubeworm

Tap, tap, tap! Our dive guide was rapping on his tank with such enthusiasm that I knew he had found something truly special. I had been searching in the muck for over an hour in hopes of finding octopus, but so far, had come up empty. As I swam over to where he was hovering, you could see the broad smile on his face as he pointed to his slate. Two words were all that was needed for me to know that he had located the holy grail of cephalopods: “blue ring!”

I had never seen a blue-ringed octopus before, and as I tried to control my excitement and ready my camera, the guide pointed with his reef stick at a lump in the sand. The octopus blended so well with the substrate that I was certain I would have never found it on my own, and probably had unknowingly swum over it several times. Plus, it was tiny—only two to three inches in length—posing the question: How does such a small creature pack such a lethal punch?

As I got down to its level and came in close with the camera, it flashed a warning of its famous blue rings. Now, it was easy to spot and even more magical to see in person. With finding and photographing one of the critters on my bucket list, I already considered this trip a huge success, but the blue-





Workers (above) cultivating the harvest in rice paddy fields; Wooden, outrigger style *banca* boats (far left) anchored just offshore, awaiting divers; A diver uses epoxy to affix broken coral to dead spots on the reef, as part of a coral restoration project on the house reef at Amun Ini Resort (left); Amun Ini Resort, viewed from the water (lower right)

ringed octopus was just the tip of the iceberg of all the cool creatures I would see this week.

About the island

The island of Bohol is the tenth largest in the Philippines and is located in the Visayan region of the country. The local residents primarily support themselves through agricultural rice farming; though similar to the rest of the Philippines, there is an increase in jobs in the service and tourism industries.

The town of Anda is situated in the southeastern corner of the island, sur-

rounded by tropical forest. Resorts in this area are off the beaten path and provide a tranquil, laid-back environment. Guests can fly into Manila or Cebu and transfer down to the town of Tagbilaran on the island's western shore, by either local flight or ferry. From there, the beautiful two-hour drive across Bohol passes through terraced rice fields and small villages along the southern coastal road.

Our driver met us with a private vehicle at the ferry terminal, along with our dive guide, who joined us for the ride to get acquainted. I spent the time admiring the scenery while discussing potential

photo subjects and lens choices with someone who had over 10 years of guiding and critter-finding experience in the Philippines. It proved to be an invaluable conversation and a much-appreciated personal touch at the start of our week of diving together.

Those familiar with the island of Bohol

most likely know it for Cabilao or Panglao off its western edge. The Anda area is somewhat new to the diving community, with most resorts there having been open for less than five years. The reefs in the area are pristine and several resorts, in coordination with local fishermen, have started establishing small marine reserves

to help keep them healthy and well-stocked with fish.

Amun Ini Beach Resort has even been working with local researchers on a coral restoration project in the reserve on their house reef. The researchers collect pieces of broken coral and use an epoxy to "glue" the corals back in place. By in-





Diving

Diving in the Philippines is typically done off an outrigger boat called a *banca*—a narrow-hulled vessel supported by large wooden stabilizers on either side. Often, a platform is built over the center hull to accommodate additional passengers and gear. The engines on these larger craft reside within the

center hull and frequently consist of old truck motors that have been modified so that the drive shaft now turns a propeller.

on either side of the platform. Depending on group size, some resorts also have smaller banca boats for four to six divers, or a speedboat for faster transport. Most dive sites in the Anda area are within two to 10 minutes of the resorts, and the house reefs straight offshore are well worth exploring. There will be plenty of time underwater, as four to five dives a day is the norm, including an optional night dive or dusk dive to try and observe mating mandarinfish.

The water was warm and clear during my visit in mid-September, with occasional light currents. I wore a 3mm full wetsuit to protect against stings and scrapes but did not necessarily need it for warmth. The calm dive conditions make the area perfect for divers of all skill levels, providing they have enough buoyancy control to stay off the reef.

creasing the volume of coral, the hope is that invertebrate and fish life will grow as well. The resort offers guests the unique opportunity to participate in the project by helping researchers reattach broken branches of coral back onto the reef.

center hull and frequently consist of old truck motors that have been modified so that the drive shaft now turns a propeller.

Divers enter the water with a giant stride or back roll off the bow and exit via stairs that are lowered



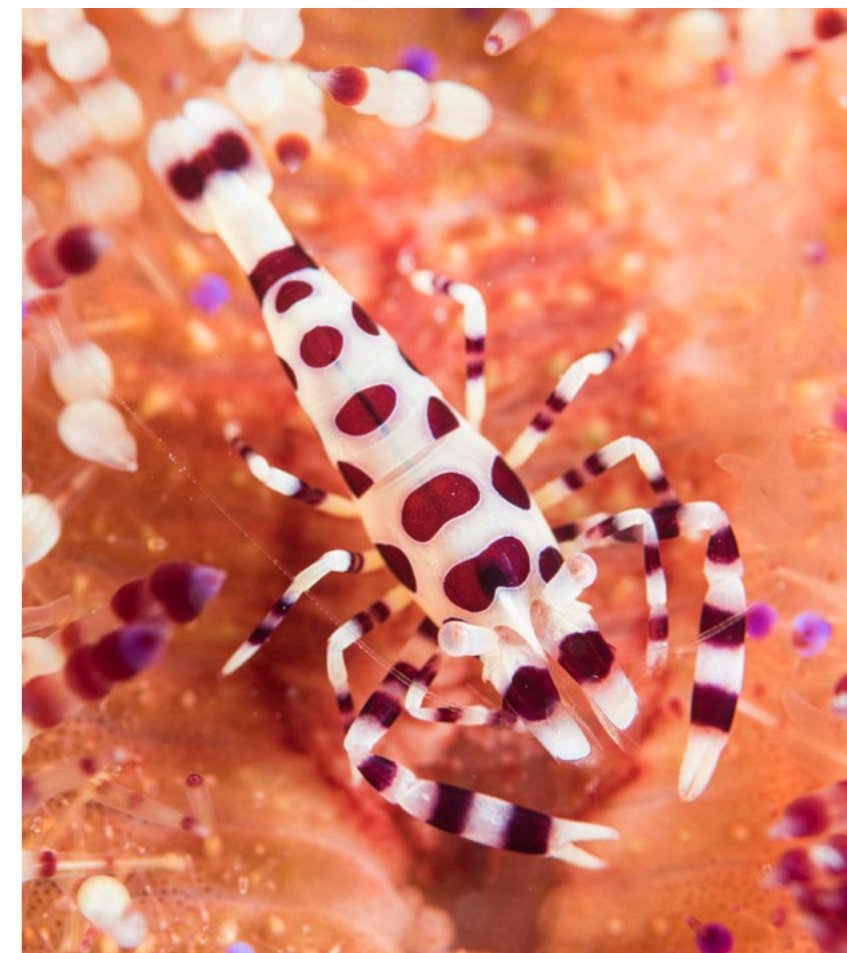
CLOCKWISE FROM LEFT: Pigmy seahorse camouflaged on a similarly-colored sea fan; Colorful coral bommie; A leopard anemone shrimp perfectly camouflaged against its host; Massive green sea turtle swimming over reef



TOP LEFT TO RIGHT: Spotted sea cucumber crab on sea cucumber; Mantis shrimp emerges from its burrow in the muck; Xenia soft coral crab blends in perfectly with its host; Zebra crab on fire urchin (left)

vertical walls, which are covered in sponges, sea fans, schools of reef fish and bommies of both hard and soft corals.

The wide range of life on the reef provides a multitude of photographic opportunities. On several occasions, I repeated a dive site named Coral Gardens because the spot had so much to offer and each journey along the reef proved unique. As an added bonus, at the end of each dive there, we were treated to nearly a dozen green sea turtles lounging among the shallow corals. On some of the dives, I set up my camera for super-macro to capture anemone shrimp and pigmy seahorses, while on others, I used a fisheye lens to photo-



Coleman shrimp living on a fire urchin

Diverse topography and marine life

The diversity of the diving in the area is impressive both in terms of topography and coral assortment, as well as in species density and va-

riety. Expansive hard coral gardens start in the shallow waters just offshore, and they are fun to explore whether you are utilizing a snorkel or a scuba tank. Beginning at 20 to 30 feet, the gardens transition to

Close-up of candy crab



A very small dragon shrimp (left) blends in with whip coral host; Spiny devilfish (above), also known as a demon stinger fish, moving across the coral rubble bottom; A wire coral crab blends in with its host (right)



(muck) diving. The substrate is light in color, which provides a nice contrast for some inhabitants while making others harder to locate and photograph. This is where we found the blue-ringed octopus, and where mimic, wonderpus and coconut octopus have also been seen, in addition to a wide assortment of frogfish at different times of the year.

A few of the species I saw living along the sandy bottom included flying gurnard fish, longhorn cowfish, devil scorpionfish, dragon sea moths,

mantis shrimp and Napoleon snake eels. Any foreign object sticking out of the sand, be it plant, animal or debris, soon becomes its own ecosystem, complete with critters that have adapted to blend in and/or imitate their host.

Some of the characters that

I photographed in this category included the sea cucumber crab, dragon shrimp, Xenia soft coral crab, wire coral crab, Coleman shrimp and zebra crab. To find these photographic gems, it is important to know—or perhaps equally as importantly, to have



Napoleon snake eel (above) poking its head out of its burrow in the muck; Helmut gurnard or flying gurnard moving across the coral rubble (top right)

graph sea fans, coral-scapes and of course the turtles. Anda also has large sandy areas with fantastic critter



Aggregation of reticulated dascyllus and threadfin anthias over hard corals (above); Colony of bubble coral (left)

a guide that knows—the environments in which they live. Otherwise, these animals are too well camouflaged and frequently too small to find simply by casually scanning the sea floor.

Surface interval activities

When a surface interval is required,

there are white sandy beaches to explore or lounge chairs next to the pool, if sunbathing is more to your liking. Perhaps you prefer to nap in a hammock suspended from a shade tree, while listening to the waves gently lap against the shoreline. Combine any of the above activities with a world-famous mango smoothie and you have a perfect afternoon.

The mangoes in the Philippines are incredibly sweet and tasty—perfect for a snack, a beverage or dipped in chocolate for des-

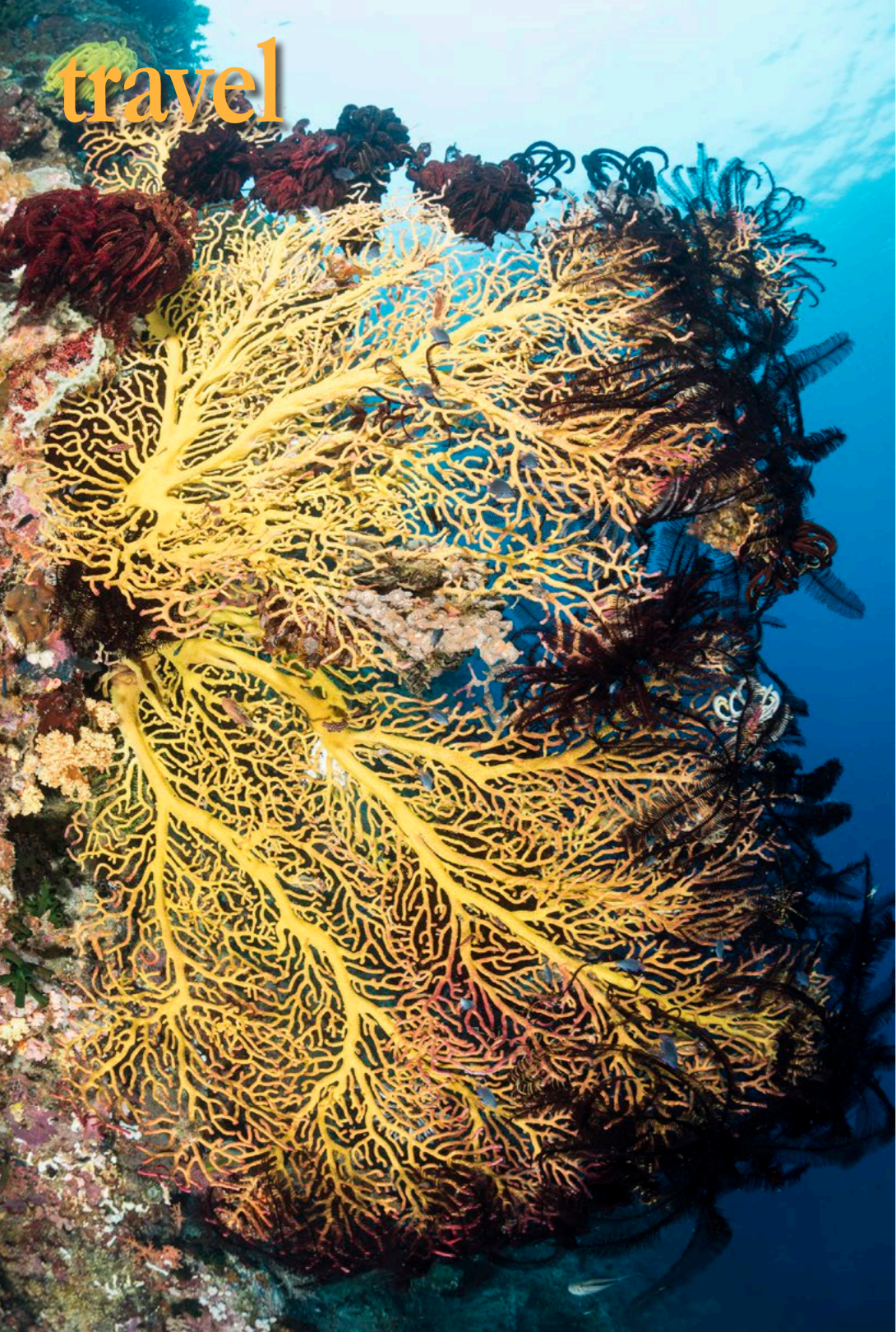
sert. Dried mangoes can even be brought home as gifts or for your own enjoyment while prolonging the holiday experience.

Spa services are available if you feel the need to rejuvenate or get a massage. For those that do not want to leave the water, possible surface activities include snorkeling, kayaking and paddle boarding. Resorts can arrange nearby biking and hiking trips or even a riverboat cruise, as well as a visit into town for some local culture.

My personal favorite involved a recliner on the beach, watching the night sky, as giant fruit bats flew overhead in silhouette. With a wingspan of up to four feet, the bats are an impressive sight, and the stars shine incredibly bright in this remote corner of the globe.



Diver over a colorful coral bommie (above); Longhorn cowfish swimming over the sandy bottom (top right)

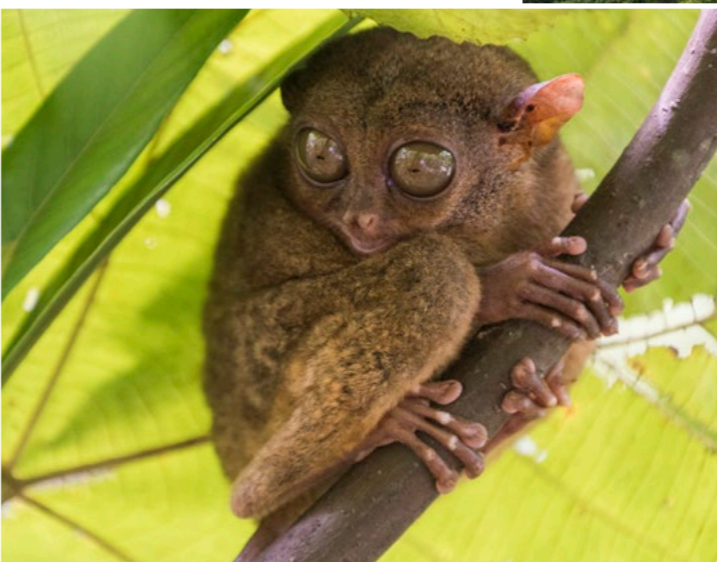


Large yellow sea fan rimmed with dark colored feather stars (left); The Chocolate Hills geological formation is unique to Bohol (right); Philippines tarsier (below), resting in the shade during the day, is one of the world's smallest primates.



out over 50 sq km (20 sq mi) and can be viewed from several vantage points. Our climb up the stairs to the observation deck was well worth the effort, as this topography can be seen only at a few places on earth.

Philippines tarsier sanctuary. Nearby to our Chocolate Hills overlook was a sanctuary for the Philippines tarsier, one of the world's smallest primates. These nocturnal creatures are carnivorous and have



Afterthoughts
The Anda area of Bohol is a dive destination to which I hope to return again and again. Nowhere else in the Philippines have I found such variety in the

huge eyes for hunting at night. During the day, they rest in the shade, holding onto branches with suction cup-like fingers and toes. Full-grown, the tarsier is no bigger than a man's fist and they are difficult to find in the foliage.

Docents watch over each animal, making sure guests do not hassle them with selfie sticks or flash photography. The sanctuary was established to help protect and preserve the tarsiers whose natural habitat is being lost to development and deforestation.

underwater landscape and critter concentration, all just steps off the beach. I thoroughly enjoyed the diving, the remote seclusion, the first-rate service and relaxing atmosphere, as well as the endlessly friendly Filipino hospitality. If you are contemplating a trip to the Philippines, the Anda area deserves serious consideration. I think you will be glad you made the trip.

And remember: "Always dive with a smile and love your guide!" ■

The author would like to thank Amun Ini Beach Resort and Spa (amunini.com) for their incredible generosity as the gracious host on this adventure; Philippines Tourism (experiencephilippines.org) and EVA Air (evaair.com) for their assistance with transportation and flights; and lastly, 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.

SOURCES: AMUNINI.COM, WIKIPEDIA.COM



Bohol Island on map of the Philippines

Topside excursions

Sadly, all journeys must come to an end. When it is time to head home, I recommend taking a scenic tour across the island's interior to view the Chocolate Hills and the endemic Philippines tarsier.

Chocolate Hills. The Chocolate Hills are a national geological

monument consisting of over 1,268 limestone and basalt domes ranging in height from 30 to 120m (98 to 390ft). The domes are covered only in grass (unlike the surrounding jungle), and the grass turns brown in the dry season, giving them the appearance of rows of chocolate kisses for which they are named. The hills are spread

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Edited by
Rosemary E. Lunn
& Peter Symes

Equipment

Mares Puck Pro+



Mares has given us the nod that it has some exciting plans for its computer line, and told us that it is worth having a chat with the company's representatives at the DEMA Show in November. It would seem that there will be a new algorithm in town, and the Mares Puck Pro+ has been specifically designed to be upgradable and to be able to run it. The Mares Puck Pro+ is aimed at the entry-level to intermediate diver. It is a two-gas computer, with nitrox (21%-99%) and gauge modes. According to Mares, the one-button controlled interface is intuitive. The logbook is capable of storing 35 hours of dive profiles and the coin cell battery can be changed by the diver. Mares.com

Dive Rite HP50 Light System

Modular lighting systems are good because (a) they cover so many aspects of diving; and (b) they grow with a diver's needs. From a compact, lightweight travel torch through to a device that can cope with a multi-hour technical dive. The latest version is from Dive Rite. Their HP50 easily converts from a handheld to an expedition canister and you can use the same light head with both! It has a useful depth rating of 152m (500ft) with the Cree XLamp XHP50.2 LED producing over 3,500 lumens and 100-hour burn time (low setting, expedition canister). The HP50 does not gobble up your luggage allowance either. It weighs in, ready to dive, at 0.65kg (1.4lbs) for the handheld model, or 1.87kg (4.1lbs) for the expedition canister. Divers can augment their systems with a choice of two canisters, a soft Goodman handle, a quick-release mount and a wired canister adaptor. DiveRite.com



NERD 2 Dive Computer



This unique dive computer from Shearwater Research features the world's first near-eye remote display, redesigned to boost reliability and flexibility, on a universal mount that works with most regulators and rebreather loops, allowing divers to secure the NERD 2 within their line of sight, so crucial dive information is available at a glance "as if you were looking at a 25 inch TV 12 feet away", according to the manufacturer. The compact design has an easy-to-navigate two-button interface with Bluetooth integration; an 18-hour rechargeable lithium ion battery; an Optional 3 Axis, tilt-compensated digital compass; AI functionality, displaying tank pressure in all modes; and a 1,000-hour dive log. Shearwater.com

O'Three Deepskin Tech Vest

O'Three—a Brit-based neoprene protection manufacturer—stated on its website that "unlike conventional lycra rash guards, our Deepskin tech vest offers a good degree of thermal insulation". It is probably down to the material. The Deepskin tech vest is made from 0.5mm high flex glide skin cell neoprene, which helps trap water around the torso, keeping the diver warmer. The vest benefits from a high "rolled lycra" finish at the neck, or mock turtleneck, and every seam is low-profile stitched. The unisex Deepskin tech vest can be dived on its own, thereby providing UV and sting protection to the wearer, or to augment additional thermal protection, by providing an extra layer and warmth. It comes in seven sizes—from extra small to triple extra large. Othree.co.uk



Fourth Element OceanPositive Swimwear

Fourth Element has unveiled its latest OceanPositive collection, introducing subtle imagery and new designs to fit a greater variety of body shapes. This collection's design theme echoes the fishing net from which the fabric is made. According



to the manufacturer, the four-way stretch premium Italian fabric, which is 78% Econyl recycled nylon and 22% Lycra Xtra Life, is chlorine- and salt-resistant, while providing UV protection (UPF 50+). The swimwear collection has no built-in clasps or ties, making it perfect to wear under a wetsuit or base layers. There are no clips to break, fall off or dig into skin, thus ensuring a comfy wear for the diver. The rash guards, swimwear, leggings and shorts are machine washable at 30°C (86°F). FourthElement.com



Let's talk about

Underwater Communications Systems

PIXABAY / PUBLIC DOMAIN



BECKY SCHOTT / PHOTO COURTESY OF OTS

Text by Michael Menduno

In 1977, a year after I got certified, Soundwave Systems launched the “Wetphone,” a voice-activated underwater communications device that promised to revolutionize sports diving, making it a “silent world” no more. I added it to my wish list along with a Waterglass At-Pac, the forerunner of modern-day wings, and an SAS drysuit. Soundwave filed for bankruptcy a few years later.

Today—nearly 40 years later—communication systems have become standard kit for commercial, military, law enforcement, public safety, aquarium and scientific divers and videographers, but they remain a niche product for recreational and technical divers. For many, the added complexity and cost of what is essentially an underwater walkie-talkie outweighs the benefits in the absence of a

mission-specific need. Others say they prefer to commune in silence. If you are wondering whether your next diving project could benefit from vox communication, it is useful to understand a little about the technology, its implementation and use.

Sounding off

There are two kinds of underwater communication systems: hardwire and wireless or “through-water” comms. Hardwire systems are essentially waterproof intercoms connecting the diver to the surface, and are used primarily for divers on an umbilical and “blackwater diving.” They are not designed for sport use. In contrast, through-water systems use ultrasound (typically 25-33kHz) to transmit and receive signals through water in the same way that walkie-talkies or mobile phones use radio waves. The density of water, which is 784 times greater than air, makes it an excellent conductor of sound energy—

a fact not lost on nature: many marine animals, especially cetaceans, use ultrasound to communicate and navigate. Conversely, with the exception of extremely low frequencies, radio waves do not propagate through water. Today through-water systems are called “half-duplex” (vs “full-duplex”) because only one person can talk at the same time on a given frequency while the receiver listens just like a walkie-talkie or push-to-talk CB radio.



OCEAN REEF GROUP

Ocean Reef M101A G divers underwater receive-only unit fits conventional mask straps and full-face mask models

History

Originally developed for the US Navy in the late '60s, early through-water comms and their spinoffs such as the Wetphone, used the circuitry found in AM radios to encode voice conversations (0.3-4kHz) on an ultrasound carrier. However, amplitude modulation

Divers communicate through comms systems attached to full-face masks



equipment



BECKY SCHOTT

(AM), which transmits three simultaneous signals—a carrier and two sidebands—suffered from poor intelligibility because the signals would get out of sync as they traveled through the water and were reflected off various surfaces. Also, divers had to remain nearly motionless in the water while talking; otherwise, voices sounded garbled.

None of this helped Wetphone's case. It was not until the mid-'80s that increasingly miniaturized electronics made it possible to use sophisticated single-sideband modulation, which transmits a single ultrasonic carrier signal to eliminate the reflection and multi-path problems of AM.

Single-sideband quickly became the de facto standard due to its near 100% intelligibility under good conditions.

Today, there are several primary vendors that build through-water comm systems: granddaddy Ocean Technology Systems (OTS) founded in 1984, DiveLink Underwater Communications and Ocean Reef Group. Products range from all-in-one, half-watt cigarette pack-sized sport transceivers that are powered by a 9v battery and mounted on the mask strap, to more powerful 5-watt walkie-talkie-sized units that can be attached to a diver's harness and include cabling for the mic and earpiece. Most units feature

Divers with OTS full-face mask

dual channels and are push-to-talk like a walkie-talkie, though some offer voice activation as an option. Their operational range varies from 150-1,500ft for sport units to more than half a mile for professional comms, depending on sea conditions and noise levels (special military units can transmit more than three miles). Vendors also sell receive-only units and a variety of surface stations for surface-to-diver communications.

Who was that masked man?

If you could just add comms without changing anything else, it is likely that many more sport divers would be talking the talk. Unfortunately, it is not that simple. In order to talk underwater, you need an air-filled space to speak into (and place a mic), and the mouth must be unencumbered. Early sport units like the Wetphone utilized a "mouth mask," essentially a rubber pocket attached to the second stage regulator and strapped over the mouth; however, they have proved to be largely unworkable. Instead, the community has standardized



OCEAN REEF GROUP

Ocean Reef Predator TDivers full-face mask

the full-face mask when using comms, which enables divers to breathe through their nose and mouth.

Full-face masks

Today, there are a variety of full-face masks on the market along with requisite training courses. Most masks feature a built-in oral nasal pocket to reduce CO₂ build-up, a built-in regulator, and a port to attach a comm system. In addition, the



PHOTO COURTESY OF KIRBY MORGAN

Divers with Kirby Morgan M-48 full-face masks

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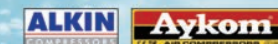


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majority circulates breathing gas across the faceplate to keep it from fogging.

Full-face masks offer divers a number of obvious advantages over scuba masks. They have a wider field of vision, they do not fog up, and they are warmer and more comfortable than a bite-mouth-piece. They also protect the diver's airways in the event he or she goes unconscious underwater, which is a big safety factor.

The disadvantages are subtler. Like any scuba mask, mask fit and obtaining a good seal is critical, especially since the full-face mask covers more of one's face. Equalization can be more difficult and so can mask clearing. With practice, gas consumption tends to be about the same with a full-face mask but goes up considerably when you are talking—good gas management skills are required.

In addition, bailout is a little trickier, particularly in cold-water. Divers have to remove their masks and regulators simultaneously to go on an alternative breathing source. Ironically, full-face masks present more challenges for technical divers. First, they complicate open-circuit



PHOTO COURTESY OF OTS



The Spectrum full face mask by OTS (above and left) has a soft nose for easy equalizing, and allows divers to use their own regulators.

The Full Monty of Underwater Communications

Listen up. Today, all through-water communications systems operate in “half duplex” mode similar to a walkie-talkie. The receiver is turned off when the user pushes the talk button so as not to saturate the receiver. Contrast this with your “landline” telephone, which operates in full duplex mode; both parties can talk at the same time. Mobile phones give the illusion of full duplex, but actually the transmitter and receiver operate on slightly different frequencies.

All that is about to change if QinetiQ North America,¹ has its way. Last month, the privately held, Massachusetts-based manufacturer, which produces some 200

other instead of relying on ineffective Time Division Multiple Access (TDMA) modulation, which assigns a specific time slot for each distinct communicator. For divers, it means they will no longer have to push to talk, and a network of divers can share the same frequency.

Simultaneous transmissions

Data transmission rates depend solely on the frequency and power of the underlying hardware. However, because a Dolphin-enabled point-to-point comm unit will be able to transmit and receive simultaneously—for example, transmitting data packets while receiving requests to resend specific missing packets, as part of its error correction protocols—throughput would show a 4x improvement, compared to half-duplex communications.

“I envision a group of eight divers that will all be able to communicate with each other at the same time, while the divemaster would be able to have private conversations with any specific diver and also get a read of diver’s gas supplies and their biometrics,” explained Greg Folts, QinetiQ’s Director of Business Development for Maritime Systems who is also a diver.

Other applications include creating “continuous” sonar versus discrete “pings” and listening, making it possible to reduce peak power requirements by 1000x or 30dB. The same goes for Fishfinders. It could also eliminate the under-the-boat blind spot in side-scan sonar. In addition, DOLPHIN can be used with radio frequency (RF) applications such as radar. The company plans to license its technology to interested manufacturers, i.e. “QinetiQ Inside.”

The company’s biggest challenge? “Our biggest problem is convincing people it is real,” said Folts, who is working to convince the military and others to rewrite their wireless comm specs. The company will be trialing DOLPHIN with the US Special Operations Command (SOCOM) in November. Keep your ears open for this space. ■

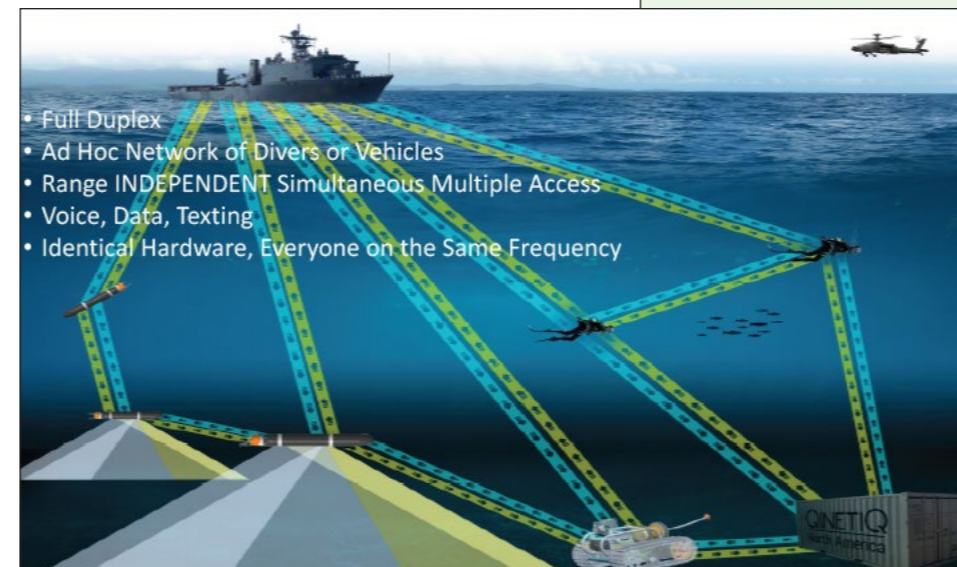


ILLUSTRATION COURTESY OF QINETIQ

gas switching: divers must use quick disconnects and/or a gas block to switch to their decompression gas or bailouts without removing their masks. Second, despite added airway safety, the use of a full-face mask with rebreathers is, at best, problematic for a number of reasons. Finally, comm gear is not inexpensive: A full-face mask with comm system can cost up to US\$1,000-2,000 per diver.

Some new and older masks are designed to address some of these issues. The new OTS Spectrum offers a soft oral nasal pocket, which makes equalization easier; divers can pinch their nose just like when wearing a scuba mask. In addition, it is designed to use divers’ existing second stage regulator, which reduces the cost. Similarly, the Kirby Morgan M48 Mod 1 Modular FFM has a removable oral nasal pocket that makes bailout and underwater gas switches easier. Company co-founder Bev Morgan began working on the design back in the early days of technical diving in response to the need to be able to make gas switches. Ocean Reef

also offers their Predator TDivers mask built for Team Blue Immersion founded by PADI Territory Director Jonas Samuelsson for a cold-water tech expedition. They also use it for their support divers.

In conclusion

Today, recreational and technical divers tend to use full-face masks and comms for mission-specific applications, and some say the uses are growing. Some examples are diving in cold or dirty water; outfitting support divers who need to be able to speak with the surface; use in very long decompressions or remote in-water recompression; and, of course, the occasional underwater wedding. They are also favored by gear geeks.

There is no doubt that being able to talk underwater adds a layer of safety, coordination and control that cannot be achieved otherwise. That is why they have become indispensable tools for working divers. But given their added complexity and cost, most sport divers are still content to rely on hand and light sig-

DOLPHIN Acoustic Communications and Sonar

nals to convey essential information, and do their talking after the dive. ■

Michael Menduno is an award-winning reporter and technologist based in California, USA, who has written about diving and diving technology for more than 25 years and coined the term “technical diving.” He was the founder and publisher of aquaCORPS: The Journal for Technical Diving (1990-1996), which helped usher technical diving into the mainstream of sports diving, and organized the first Tek, EUROtek and AsiaTek conferences, as well as Rebreather Forums 1 and 2.

partnership with Optimal Systems Laboratory, Inc. In addition, DOLPHIN creates a unique identification wrapper for each voice, making it possible to granularly manage communications. Until now, the problem was considered unsolvable.

QinetiQ’s technology will make it possible to create extensive undersea wireless networks for data and voice communications, solving numerous challenges for the military, commercial and even consumer users. The Navy, for example, will be able to operate swarms of autonomous underwater vehicles that will constantly communicate with each

¹ Note to tekkies: QinetiQ NA’s parent company, British-based QinetiQ Group Plc, developed the gaseous CO₂ sensor

Safety in Expedition Diving

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Expedition diving covers a broad range of environments, types of diving, and logistical needs. An expedition can be a single extremely challenging dive in a nearby cave, a weekend trip to the Andrea Doria, or a research project that takes diving in the Antarctic for months.

However you define your expedition it is important to recognize that once you begin planning it you have crossed out of the realm of normal recreational or technical and entered a world that requires serious oversight, preparation, and risk mitigation. Expedition diving does not have to be technical or extreme – a recreational diving trip to a destination like Truk Lagoon could put

you hours or days away from the nearest medical help and require expedition level preparations for medical treatment and evacuation. No matter what your adventure is, if the destination is remote or the diving is challenging, take the time to step back and examine how you'll need to respond if a real emergency occurs – it will take more preparation than you think.

Planning

You plan every dive, but diving in a remote location requires planning far beyond what you need to safely dive in a tourist destination. Incident management and risk mitigation aside, how will you keep your equipment functioning if your nearest dive shop is a two-day sail or a twelve-hour flight away? A single burst hose, failed regulator, or lost fin can put a halt to your diving plans if appropriate spares are not sourced. Diving in

remote locations means that you must anticipate equipment failures before they occur and bring both the supplies and the skills required to fix your equipment with you to the dive site. If your trip involves more than one diver, this

problem is multiplied and maintenance supplies and redundant equipment can begin to fill dive bags, hotel rooms, and vehicles. How you get the transportation over land, sea, and air you need to reach a site, the gas you need to dive, and shelter for you and your dive buddy will need to be arranged months or years ahead of time, and the logistics can be burdensome. Begin finding a safe source for diving gases, and safe and comfortable lodging for your expedition as early as possible – planning a trip two years in advance is not uncommon and makes it possible to verify the safety and effectiveness of your dive plan well in advance.

Support

Supporting expedition divers and mitigating the risks of extreme exposures can take a team of individuals. As divers push into extreme depths the gas supplies required can extend well past what they can individually carry, and they are put at increased risk of hypothermia oxygen toxicity, and DCI. These risks and logistical hurdles can only be effectively managed with a well-trained and attentive support team. While large expeditions may have support divers, dive tenders, and a medical support team on hand, a small charter boat may be all that you have access to. An attentive crew and a well thought out emergency plan, even with

a small vessel, can effectively mitigate many risks. Regardless of crew size, the ability to drop emergency gas to divers finishing decompression, or launch a skiff to retrieve a diver caught in a current can effectively increase the safety of both expedition divers and support personnel.

Emergency preparation

Dealing with the risks of divers doing long or deep dives always requires significant emergency planning, and this planning can be the most difficult part of making a dive expedition happen. Whether it is treating a seriously injured patient and evacuating them to qualified medical care, or dealing with the bumps and bruises of dive travel, almost all medical and emergency related issues become logistically and financially more difficult in a remote location. Portable hyperbaric chambers are available, as are travelling medical teams, but both come with their own operational difficulties, and costs.

For those of us without access to the type of funding and equipment needed to bring a hyperbaric team to a dive site, expedition planning means preparing for every possible contingency before a dive begins, to the best of our ability. Bringing adequate supplies of emergency oxygen to reach medical care, preparing boat crews to deal with divers caught in current or running out of gas while finishing decompression, and practicing injured or unconscious diver rescue scenarios are important steps you can take towards minimizing your risks. By preparing for the worst possible scenarios you not only shed light on the realistic risks of an expedition, but you increase the likelihood of a good outcome in any emergency.

For more information on dive safety, visit DAN.org. ■

For more information on the relationship between patent foramen ovale and diving, visit: DAN.org/Health.





opinion

Text by Simon Pridmore

— This is the second piece in a two-part article, adapted from a chapter in my book, *Scuba Professional: Insights into Sport Diver Training and Operations*. **Part one** was featured in the previous issue (#80).

At the end of my article in the previous issue, I referred to the fact that developing technologies, expanding markets and customers with different backgrounds and expectations have presented diver training agencies with challenges as well as opportunities. One major challenge has been to adapt training programmes to a changing world, while endeavouring to maintain the structures and paradigms that have been in place for over 50 years.

The solution, in some cases, has been to enable the training to be compressed into a shorter period of time. In the 1960s, a beginner's scuba diving course ran over several weeks, whereas, today, most people become certified divers in two to four very full days. Yet, the vol-



Scuba Confidential:

The Future of Scuba Diving

In a Flat World — Part II

ume of material that an instructor needs to cover in a beginner's course has not changed much at all over the last five decades.

Technology

Advances in technology have helped.

The theory element of the course used to mean spending days listening to an instructor talk. With the advent of "audio-visual learning," this turned into many hours sitting in a classroom watching videos, then listening to an instructor run through the high points. More recently,

the theory section of the course has mostly involved passing a few leisure hours, sitting at home or in a hotel room, running through a DVD on a laptop.

Today, someone who wants to learn to dive can study all the relevant theory online, via "e-learning" (the new "audio-

visual"), long before they show up at the dive centre. They can watch movies of people scuba diving and even study in advance detailed videos showing them how to perform key skills. If they are interested in a particular field of knowledge, they can study the topics well beyond

PETER SYMES & PIKABAY





opinion



PETER SYMES

the level that anyone ever taught in a scuba class for beginners in the old days. This means that new divers today can be much better prepared than their predecessors. It also means that during the course time, instructors can concentrate on the practical aspects of the sport, spending more time on water skills.

Changes in how people dive have helped too. In the 1960s, the dive travel industry was in its infancy and divers then, once certified, would usually go out and dive together on their own without professional supervision. Nowadays, this is unusual. Today, most new divers will go on to do all their diving with a dive centre or resort, paying professionals to guide them and help keep them safe. Or else, they will dive as part of a club activity, again under supervision.

There have been improvements in the reliability of the

equipment too. So, the reduced time that divers spend earning their certifications has not made scuba diving more dangerous. The statistics bear this out. (This does not mean that the current state of the dive industry is ideal. This is far from the case, as I describe elsewhere in my book, *Scuba Professional*.)

Content is king

The second major challenge that the agencies have faced involves the equalisation of access to knowledge and the ability to connect in a flat world. Training agencies are primarily booksellers. Their business is passing on knowledge in return for money. When e-learning was first mooted, all the agencies thought they needed to do was scan the student textbooks onto CDs to replace the books in student packs. "Great," they thought, "we no longer have to pay

for printing and shipping. Our costs will be reduced but we can still charge the same prices. We like this revolution."

That fantasy did not last long! The technology of e-learning moved fast, and today's sophisticated students expect high quality materials, especially if they have to pay for them. Any online content they pay for needs to be superior to the online content they can consume elsewhere, free of charge, or they will not perceive that it has value. Spending money just to be able to scroll down a greyscale PDF of the traditional diver manual and passively watch a dull "old world" video is not going to make them feel fulfilled. The content needs to be in their native language too, which is an increasing challenge as new nations and language groups come into the sport.

The agencies that understand and meet these expect-

tations are the ones that will survive in the flat world. Those that do not raise their game will find themselves competing with and being overtaken by technologically savvy new training agencies, possibly from new scuba diving nations that are not saddled with the baggage of previous eras.

One incidental but important issue that the industry is wrestling with, is how the fees that a student pays for signing up online to learn to dive can be shared fairly between the

agency and the dive centre or instructor that does the practical teaching. The present solution of requiring each student to name the dive centre they will do the practical sessions with when they sign up online with the agency is clumsy. It presents an obstacle to the customer and thus interferes with the selling process. It is also a potential point of conflict between the agency and its sales force (the dive centres and instructors). The agencies that find the most elegant

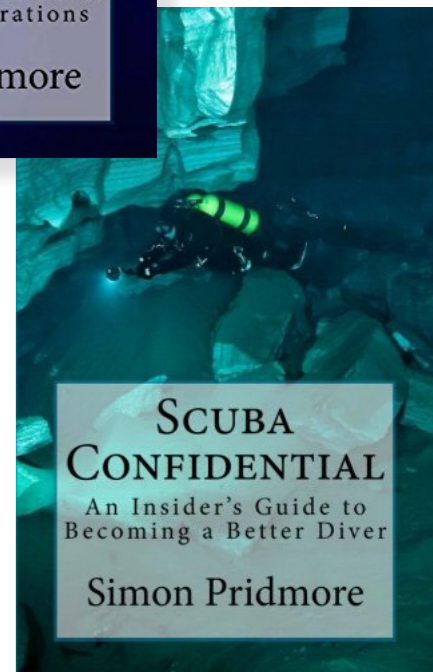
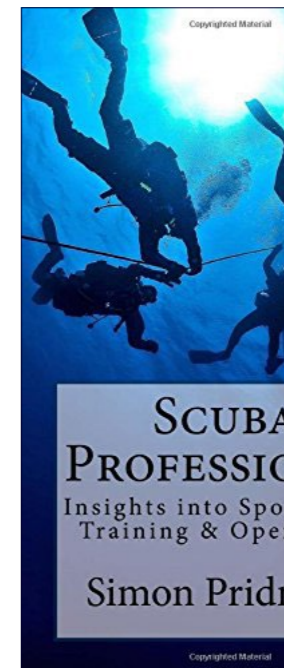
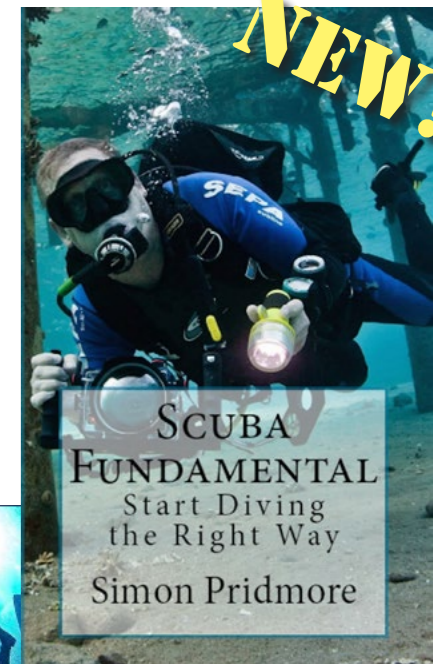


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opinion

Flat World

solution to this dilemma will be the future market leaders.

Local heroes

As scuba diving spreads to new markets, opportunities tend to arise for instructors and instructor trainers but, unless they have good local language skills, the opportunities do not last long. Typically the early adopters in the new nations are good English speakers and, once they have acquired the skills and knowledge, they then start up their own local networks. In 1998, I taught nitrox diving to a group of Koreans, led by a very enthusiastic instructor. A few weeks later, the instructor came back to take an Advanced Nitrox course and brought with him a printed and bound copy of the Nitrox Diver manual in Korean. He now runs one of Korea's largest diver training agencies.

The transition happens more quickly in some countries than others. It costs several thousand dollars to become a dive instructor, wherever you do the course, and, in some countries, this cost, combined with the low salaries

earned by dive guides, holds back development of local instructors and allows expatriate instructors to keep their advantage and their jobs. Historically, this has happened in countries where there is a lot of dive tourism, like

Egypt or Indonesia, but where there are not many local divers.

However, as has happened recently in both places, once scuba diving takes off, local instructor networks start to blossom everywhere, and dive centres that have invested in local talent benefit accordingly. New stars eventually appear in the new markets too: role models for future generations of divers to follow.

Where next?

It is not difficult to predict that, if the Chinese economic wave continues to roll, China will become an increasingly significant force in scuba diving equipment production, and Chinese divers will come to dominate scuba diving tourism worldwide. If you have a scuba diving business and you do not start to think about how to attract the Chinese market very soon, you will find yourself behind the curve. By sheer force of numbers, Asian divers in general and Chinese divers, in particular, will come to influence the future direction of the scuba diving industry.

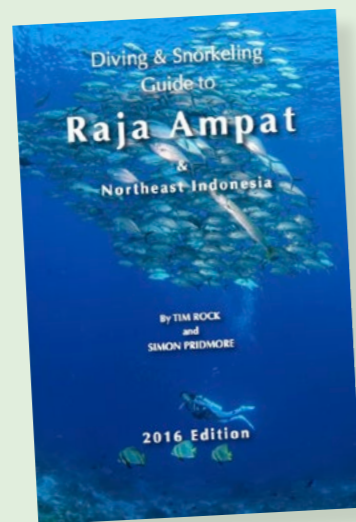
To identify where scuba diving will take off next, watch the business and finance media channels. Look at countries where a newly affluent urban middle class is developing, then watch and wait. Once people graduate to a lifestyle where they have time off and spare money, they rarely have "learn to scuba dive" as their top priority. It takes a while for confidence to develop and for the more basic needs such as health, food, comfort and travel to be taken care of. Then thoughts turn

to having more fun and that is where scuba diving comes in. Sometimes, it takes a second generation to rise. The Berlin Wall fell in 1989, yet the first major dive exhibition in Russia was not held until 2003.

Kenya, Peru and the Philippines are three of the fastest-growing economies in the world as I write this book. None currently has a significant domestic population of scuba divers, but all three countries have great diving off their shores. If, in 10 or 15 years' time, you find yourself sharing dive boats with groups from Kenya, Peru and the Philippines, you heard it here first! ■

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 and Operations and Scuba Fundamental: Start Diving the Right Way. He is also the co-author of the Diving and Snorkeling Guide to Bali and Raja Ampat and the Diving and Snorkeling Guide to Northeast Indonesia. This article is adapted from a chapter in Scuba Professional. For more information, please visit the author's website at: SimonPridmore.com.

New Dive Guide to Raja Ampat



As part of their series of 2016 Diving and Snorkeling Guides, authors Tim Rock and Simon Pridmore have produced a brand new guide to Raja Ampat and Northeast Indonesia.

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PETER SYMES





Forrest Galante with an American crocodile. A HECS aquatic ambassador, Galante is an American wildlife biologist raised in Zimbabwe, who participated in the Discovery Channel's reality series *Naked and Afraid*.

Text by Jordan K. Snyder
Photos by Mark Romanov

Former contestant on the Discovery Channel's reality series *Naked and Afraid*, wildlife biologist and HECS Aquatic Ambassador Forrest Galante has recently completed a wildlife documentary about diving with American crocodiles. The documentary film, *Dancing with Dragons*, is about setting out on a true photographic adventure, tracking down and studying the American crocodile with the aim to "expose some shocking truths about crocodiles' deadly reputation and challenge the thoughts that they are mindless killing machines."

Are large reptile dives the new adrenalin dive? With the explosion of big animal dives, such as shark and whale dives, one would think that alligators and crocodiles are the next big thing, but Galante is quick to caution people about the future of these dives.

While he may have gotten face to face with crocodiles without any incident, diving with any large reptile is not the future of diving just yet. Galante said that "crocodiles are far more instinctual and less predictable than sharks." It is a huge risk, even for professionals, to be in the water with any crocodylian, because

Caution with Crocs

— *A Discussion with Forrest Galante*





its "mood" can change instantly due to a number of variables, such as daily conditions or other animals in the area.

Growing up in Zimbabwe and watching Nile crocodiles attack large wildebeest, and even some of his family's safari staff, Galante learned quickly that if any crocodilian has an advantage, it will be taken, because they will always view people as prey. People must not overlook that they are extremely efficient killers, and it is very easy for them to switch directly into "predator mode".



Eco-tourism

Despite the caution advised by Galante and many other wildlife biologists, there is a growing industry in diving with alligators and crocodiles, one of which most notably is Banco Chinchorro in Mexico. Banco Chinchorro has a growing eco-tourism business offering dives with the American crocodile. It is the same species that Forrest's documentary film follows, which has no history of attacks of note on any tourists.

"I [am] ... a little surprised there has not been an incident yet, but ... the conditions are absolutely ideal for engagement [there]," said Galante. "That being said, I think it only takes a few people not paying attention, or rather acting in a manner that is not respectful enough, for there to be a big accident."

Safety

While crocodilians like the ones in Banco Chinchorro might be habituated to humans, this



© Mark Romanov



THIS PAGE: Galante maintains a healthy sense of caution and distance when photographing crocodiles.

does not mean that they are incapable of injuring a tourist. Even Galante admits that he maintains a healthy sense of caution and distance entering the water with these apex predators as a means of assessing the situation; this may not be the same approach taken by the average diver.

This is a new diving endeavor, and it may take some time to find a safe way to enjoy these amazing predators in the water, such as possibly "diving in a cage from a boat or platform." A barrier between the animal and diver would ensure safety on both sides.

Galante does believe that, in the future, there could be an eco-tourism industry built around crocodiles and alligators. But, in the meantime, it is not recommended that people attempt any of these types of dives, to avoid the likelihood of injury. Galante does recommend that everyone should enjoy these modern dinosaurs, but from a safe distance.

A special wetsuit

As an ambassador of HECS Aquatic, Galante has proudly used HECS wetsuits for conservation efforts and spearfishing. What makes a HECS wetsuit different from other wetsuits is its technology, which is based on the Faraday cage. This helps to enhance a diver's experience in getting closer to marine life by keeping all the electrical signals emitted by the human body within the suit.

Galante used a HECS wetsuit with a specially-created crocodile scaled pattern, based on the assumption that it might make the crocodiles more comfortable. "The theory was by looking like a crocodile and acting like a crocodile, we might actually be a little bit safer and be able to get closer to the crocodiles," said Galante. "There is no current scientific data to suggest crocodiles can detect electrical signals, you just never know, as this is an area of science that is very unexplored. By wearing suits that block the

body's electrical current and mimicked the animals' scaly patterns, we hoped to capture the reptile's natural behavior in a more unaltered state."

On the horizon

Currently, *Dancing with Dragons* is being submitted to roughly 50 film festivals. In the meantime, Galante does have another independent wildlife film in the works featuring cold weather animals. Keep an eye on his social media pages, because Galante is always performing exciting tests with the HECS technology on different animals around the world. ■

Thanks go to Forrest Galante and Mark Romanov for their time and contributions to this article. For more updates and pictures of Forrest Galante's latest adventures, go to: ForrestGalante.com or follow him on [Instagram @forrest.galante](https://www.instagram.com/forrest.galante). For more information on HECS wetsuits and technology, please visit: HECSAquatic.com.

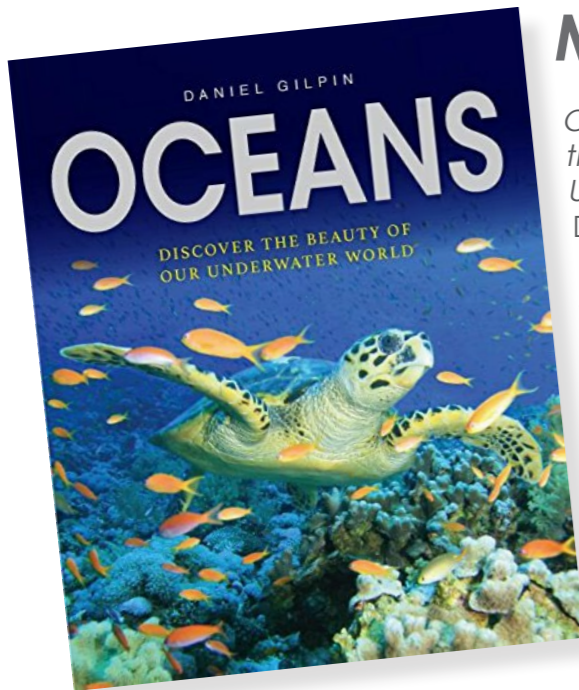


Jordan Snyder is a law student in South Florida with a background in biology. He is also a freelance journalist focusing on pressing environmental and conservation issues as well as an amateur wildlife

photographer. For more information on his previous articles and photography, please visit: <https://jksnyder1.wixsite.com/thereefdonkey>.



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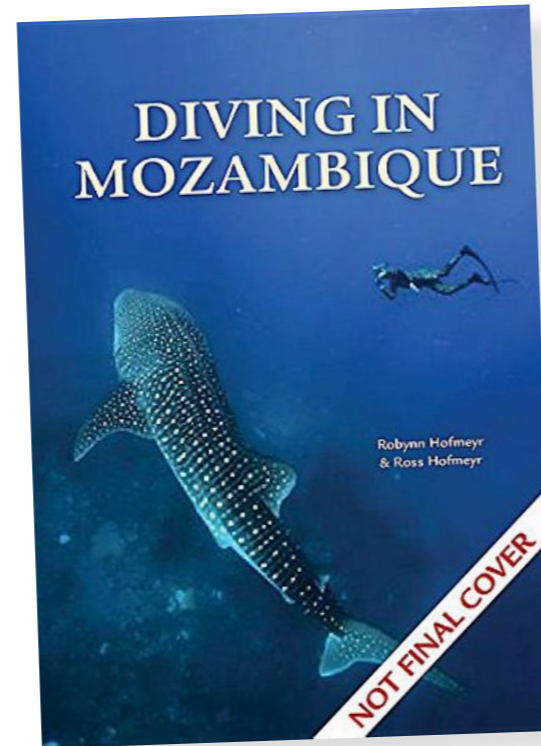
Marine life

Oceans: Discover the Beauty of Our Underwater World, by Daniel Gilpin.

More than 70 percent of our planet is covered by the oceans. This realm remains an unknown alien environment for many of us. Even as divers, we can never hope to be privy to all its secrets. In this book, author Daniel Gillian takes

readers on a journey beneath the surface, to explore the breathtaking beauty that lies within this underwater world, and even drops in on some of its most bizarre inhabitants.

Hardcover: 256 pages
Publisher: Parragon
Date: 5 September 2017
ISBN-10: 1474893171
ISBN-13: 978-1474893176

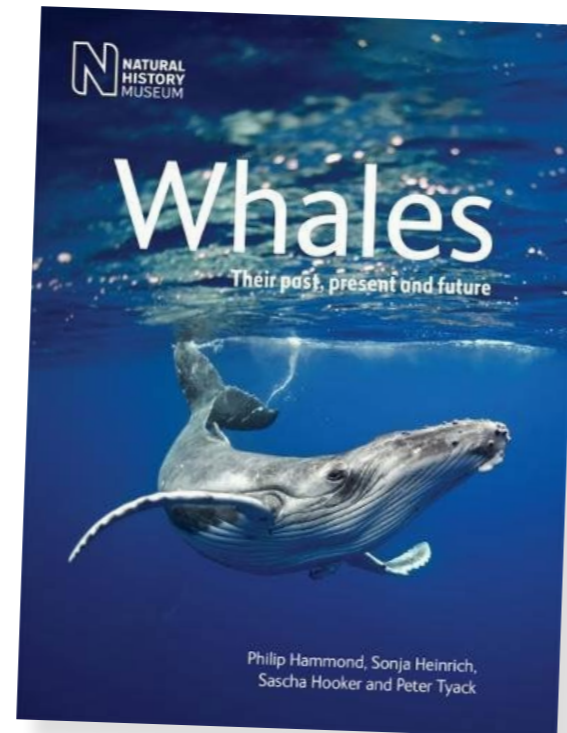


Mozambique

Scuba Diving in Mozambique, by Ross Hofmeyr and Robynn Hofmeyr.

Ever thought about diving in Mozambique? Though not a typical destination for most divers, Mozambique is recognized as one of the top dive destinations in the world. The dive resorts in this guide are categorized geographically, based on four provinces. Information covered include safety, boats, length of dive times, weather, equipment, nitrox availability, weather, accommodation, etc.

Paperback: 160 pages
Publisher: Struik Nature
Date: 1 August 2017
ISBN-10: 1775845257
ISBN-13: 978-1775845256

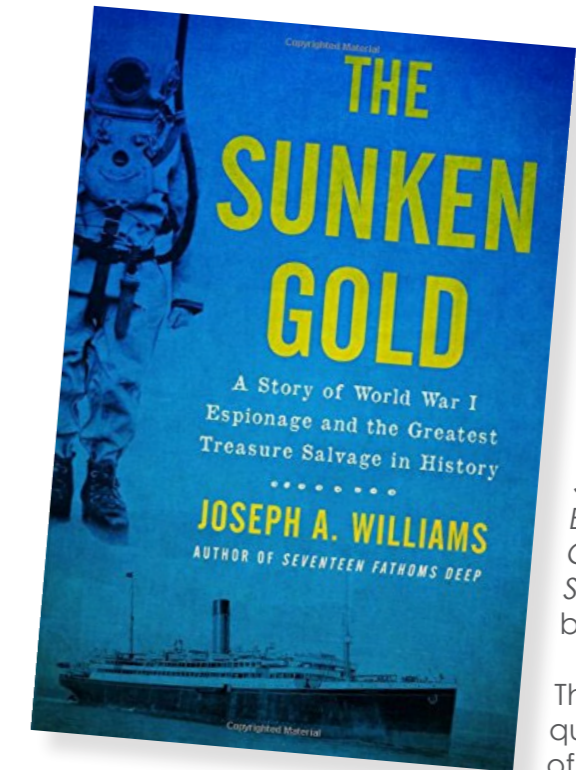


Whales

Whales: Their past, present and future, by Philip Hammond, Sonja Heinrich, Sascha Hooker and Peter Tyack.

As the world's largest living mammals, it is no wonder that humans have been fascinated by them. The authors draw on the latest research to tell of the whales' evolution from the terrestrial to marine realm, as well as their life cycle, diversity and the ecosystems that they are a part of in both life and death. Alongside spectacular photographs, the book also examines how our relationship with whales have evolved through time.

Paperback: 144 pages
Publisher: Natural History Museum UK
Date: 13 July 2017
ISBN-10: 0565094122
ISBN-13: 978-0565094126



WWI Shipwreck

The Sunken Gold: A Story of World War I Espionage and the Greatest Treasure Salvage in History, by Joseph A. Williams.

This book is about the quest to salvage 44 tons of gold bullion that sank off the coast of Ireland

when the ship carrying it struck two German mines. This proved to be challenging, as this took place in 1917, and the world was in the grip of World War I. The salvage had to be done in secret. Alas, it was called off when the person in charge of the operation, Lieutenant Commander Guybon Damant, was reassigned. After the war, Damant was determined to salvage the ship—and struggled for five more years. Beyond the recovery of the gold bullion, this book also tells a story of human persistence, courage and patriotism.

Hardcover: 352 pages
Publisher: Chicago Review Press
Date: 1 September 2017
ISBN-10: 1613737580
ISBN-13: 978-1613737583

marine mammals



A bull sea lion swims above, forming a distinct silhouette (right); A young sea lion swims close to the camera dome port (below)

Text and photos by Brent Durand

Keep an eye out for these behavior cues to make sure you are in place for the best interactions on your next sea lion dive.



The Excitement of **Sea Lion Dives**



Diving with sea lions is the ocean equivalent to playing with a friendly dog at the park. These pinnipeds are either full of energy... or lazily dozing off in the sun. They will bark, swim around in speedy arcs, play with toys, and even perform acrobatic moves that make you think

it's a private show. If you have dived with sea lions, then you know what I mean!

Sea lions have wide-ranging habitats, including both temperate and cold water regions such as Mexico's iconic Isla Los Islotes, the Galapagos Islands, California,

Vancouver Island, New Zealand and Australia. Like all marine mammals, sea lions have complex social structures and behaviors. Learning about these aspects of their lives will help you to have the best possible dive with them, by putting yourself in the right position for the

best interactions. As an underwater photographer, this is what I look for on every sea lion dive.

Social animals

Sea lions are extremely social animals, which is why you hear them barking as soon as the dive boat





THIS PAGE: Scenes from sea lion dives at Los Islotes, Mexico; A young female sea lions floats calmly on the surface (above); Two young sea lions play in the clear waters of Los Islotes (left)

approaches the colony. For big animal divers who often chase elusive and shy subjects, this is a very rewarding way to start a dive. Often, the young sea lions will jump into the water in anticipation of playing with divers and their fun bubble streams.

Within the larger colony, sea lions form many different subgroups. Dominant males will take charge of a harem of females, protecting them, and their territory, from other males. Being the boss is a tough job, however, and these harems do shift as the males become tired from the constant work and lack of time to go hunting and stay strong. The

fight between males can be very aggressive and violent, often leaving battle scars.

Alpha males

As scuba divers—and this is important to know—the alpha male will be keeping an eye on you in the water. He will often swim by divers just so that they are aware of his presence and know that his territory is close by. The bull sea lion will also warn advancing divers of their intrusion—first, by indirect swim passes. If divers proceed farther, the bull will start making more direct approaches, barking and blowing bubbles. This is

definitely the “go-no-farther” point of a dive, and I have not seen anyone careless enough to approach farther than this point. And that is because the females and the pups are the main attraction at a sea lion colony!

Females and pups

Female sea lions and pups will also form subgroups in the colony. Mature females are often very relaxed, floating on the water and oftentimes are found warming up (thermo-regulating) by floating with one fin sunning above the surface. These reposing mammals will often let a calm diver slowly approach to



THIS PAGE: Scenes from diving with sea lions at Los Islotes, Mexico

get excited if you show excitement as a diver. Many sea lion divers carry little toys to entertain the pups, as pups cannot resist coming in to investigate and mouth the colorful object. A classic scene is watching one or

even three sea lions nibble and tug on your fins as you try not to giggle through the regulator. The excitement of diving with these sea lions pups is what keeps divers coming back for the experience again and again. These subtle cues will help you to spot the most appealing sea lions to visit even before you jump into the water, and that's important, because once you join these pinnipeds, you won't want to leave the water! ■ *Brent Durand is a digital media content producer and publisher. His work covers adventure, from the snow to the oceans and the marine life we find there. His photography has been published in print worldwide, in advertising and across the web in a variety of outdoor industries. He has a reputation for writing insightful yet simple camera gear reviews and speaks regularly on photography technique, dive adventures and trends in the photo industry. He has led underwater photo workshops in the Bahamas, California, Indonesia, Mexico, the Philippines and Sri Lanka, and has a popular monthly newsletter full of photo tips and tricks. He is also a dedicated brand ambassador for BARE Sports, Stahlsac and Kraken Sports. For more information, visit: BrentDurand.com.*

spend quality time floating together, either enjoying the moment or shooting a few photos.

The pups gather in groups of similar ages and will steal the show at any sea lion colony. At ages of a few months to two years, these pups love to play. They will chase each other at top speed in the water, drawing lines and arcs that even breach the surface. The pups will wrestle with one another in much the same fashion as young (land) dogs do, and will often

even three sea lions nibble and tug on your fins as you try not to giggle through the regulator. The excitement of diving with these sea lions pups is what keeps divers coming back for the experience again and again.

These subtle cues will help you to spot the most appealing sea lions to visit even before you jump into the water, and that's important, because once you join these pinnipeds, you won't want to leave the water! ■ *Brent Durand is a digital media con-*



A sea lion floats just under the surface at the iconic Los Islotes sea lion colony in Mexico





PIXABAY / PUBLIC DOMAIN

The killer whale or orca (*Orcinus orca*) is a toothed whale belonging to the oceanic dolphin family, of which it is the largest member.

Scottish whale-watching network receives big grant

The Scottish government has awarded a grant of nearly GB£200,000 to the Hebridean Whale and Dolphin Trust to create a network of whale-watching sites around Scotland's western coast.

Hebridean Whale and Dolphin Trust (HWDT) is a marine conservation charity that takes action through a unique programme of community-based research and education. This two-pronged approach ignites strong local stewardship and supports meaningful change for the conservation of Hebridean cetaceans and marine life.

Prime whale-watching destination

It is hoped that funding will help the organization create the Hebridean Whale Trail, a developing network of 25 fantastic whale-watching and whale heritage sites across the western coast of Scotland, where the creatures are attracted by mineral-rich waters warmed by the Gulf Stream, and to further promote the area as one of Europe's best whale-watching destinations. Of the world's 83 species of whales, dolphins and porpoises, 24 species have been recorded in the waters off the western coast of Scotland in recent years.

As well as the grant to HWDT, Dumfries and Galloway Council has been awarded GB£300,000 to create 64 miles of coastal paths at the Rhins peninsula. ■
SOURCE: HEBRIDEAN WHALE AND DOLPHIN TRUST

Ocean-focused groups to receive US\$2 million

The Pacific Life Foundation will donate US\$2 million to four national marine mammal and ocean-focused nonprofit agencies. Ocean Conservancy, Oceana, The Nature Conservancy and World Wildlife Fund will each receive a commitment of \$500,000 distributed over a five-year period, with the first payment in 2017.

On Tuesday, 22 August 2017, the Pacific Life Foundation announced a US\$2 million grant to four national marine mammal and ocean-focused nonprofit agencies. Ocean Conservancy, Oceana, The Nature Conservancy and World Wildlife Fund will each receive a commitment of \$500,000 distributed over a five-year period, with the first payment in 2017.

"For over two decades, the Pacific Life Foundation has advocated for the conservation and research of marine mammals and to improve the health of our oceans," said Tennyson Oyler, president of the Pacific Life Foundation. "The humpback whale is at the heart of the Pacific Life brand and we feel it's critical to support these agencies in their work to protect ocean health and marine mammal life."

Funding from the Pacific Life Foundation will support:

- Ocean Conservancy's critical work to protect marine mammals from the harmful impacts of trash and keep the ocean healthy. Funding will directly support the recruitment of one million volunteers for participation in Coastal Cleanup Day; expansion of media relations efforts to raise greater awareness of ocean trash, removal and prevention; engagement of Trash Free Seas Alliance members to support emerging initiatives aimed at solving the complex issues around preventing ocean trash; and education of

the Clean Swell app to grow the non-profit's marine debris data.

- Oceana's efforts to promote science-based fishery management measures in US fisheries that will reduce bycatch of marine mammals and other animals; protect and restore small-fish populations at the base of the food web that supports marine mammals, larger fish and seabirds; protect from destructive bottom trawling of more than 100,000 square miles of important underwater habitat off the West Coast; save endangered sea turtles from being killed in shrimp trawl nets in the Southeast Shrimp Trawl Fishery; persuade the US Congress to protect sharks by passing a national ban on the sale or possession of shark fins; and save marine mammals such as whales, orcas and dolphins by defending the Marine Mammal Protection Act.

- The Nature Conservancy's focus to reinvent ocean information systems in California by transforming slow, outdated systems into a model of ocean infor-

mation management built on real-time data streams that provide continuous signals of ocean health; and development of a new suite of tools that capture and share high-quality, real-time information for adaptive and effective decision making, which can be shared with ocean managers and fishing interests around the country and world.

- World Wildlife Fund's efforts to reduce the devastating impacts of bycatch by working with both fisheries and policymakers, including leveraging the Marine Mammal Protection Act import rules and help develop and promote new technologies such as gillnet lights that help curb fisheries' bycatch and save marine species.

Since 1992, the Pacific Life Foundation has provided more than \$14 million in grants that have directly supported healthy oceans and the conservation of marine mammals. ■

SOURCE: PACIFIC LIFE FOUNDATION



PIXABAY / PUBLIC DOMAIN

Humpback whale taking a peek

marine mammals



Canada orders vessels to slow down to prevent whale deaths

Large vessels are ordered to slow down in the Gulf of St. Lawrence, as the Canadian government tries to protect right whales which frequent the waters.

In a new bid to protect endangered right whales, the Canadian federal government is ordering large vessels to slow down in the Gulf of St. Lawrence. Ships larger than 20m traveling the Gulf of St. Lawrence from Quebec's North Shore to the waters around northern Prince Edward Island are now subject to a temporary speed limit of 10 knots. The speed limit is meant to reduce the frequency and fatality of ship strikes. At least 13 right whales have died in the Gulf of St. Lawrence since early June, some after colliding with ships.

"These are reasonable measures to accomplish something

very important," said Transport Minister Marc Garneau. "I think that Canadians and the shipping industry and the fishing industry recognize that this is something most unusual and we need to take measures."

The measure will be enforced by Transport Canada and the Canadian Coast Guard. Ships not complying will be subject to a financial penalty of up to CA\$25,000. Smaller ships are being asked to voluntarily abide by the speed limit, which will remain in place until the whales have migrated from the areas of the gulf that pose the most concern.

Conservation efforts embraced

The measure was designed in consultation with the fishing and shipping industries, which for the most part, have embraced the conservation effort. "We do realize that there is some impact, but

I think the marine industry also recognizes that we are trying to achieve something extremely important," added Garneau.

The Fisheries Department has already taken steps to prevent further deaths, including operating surveillance flights, shortening the snow crab season and asking fishermen to report whale sightings. World Wildlife Fund Canada called the speed restriction a "good start," but said making the measure permanent is one of many steps Ottawa must take to reverse the species' decline.

It is believed that 80 to 100 right whales are currently in the gulf but will migrate south during the fall. Primary threats include ship collisions, fishing gear entanglement and underwater noise. Latest estimates believe only around 500 individuals remain in the wild. ■ SOURCE: GLOBAL NEWS

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Photo by Alvanir Oliveira





The Little Ripper drone manufactured by WestPac will help identify sharks from dolphins in Australia

Australia launches shark-detecting drones to protect beaches

The Little Ripper drones use artificial intelligence to distinguish sharks from dolphins and surfers in real time.

The battery-powered drones will provide a live-video feed to shark-spotting software to identify sharks in real time and with more accuracy than the human eye. Thanks to an onboard megaphone, the drone can also warn swimmers about what is lurking in the water before they have even seen the threat.

Artificial intelligence

Using a world-first algorithm, developed using artificial intelligence and deep neural networks, SharkSpotter is able to distinguish sharks from dolphins, rays and other marine animals, and even surfers. Studies have shown that people have a 20 to 30 percent accuracy rate when interpreting data from aerial images to detect shark activity. Detection software can

boost that rate to 90 percent, said Dr Nabin Sharma, a research associate at the University of Technology Sydney's School of Software.

Dubbed the "Little Ripper," the Australian drone, manufactured by WestPac, is designed to withstand powerful crosswinds and will be far more agile than standard, similar-sized consumer drones. Furthermore, it can fly without charge for up to two and a half hours.

With a lack of evidence for the more controversial approach of shark culling, it is good to see innovative techniques that can replace drum line traps and other tortuous methods being tested, in a bid to reduce human-shark conflicts. If the project continues to be successful, then the Australian government has promised to shell out another AU\$12 million to buy another 40 drones for beaches up and down the eastern coast.

Deployed from September

This new drone follows the New South Wales government's 2015 shark-tracking initiative. Trials have already taken place with drones exclusively designed to track sharks' movements through the water; there are even plans to tag sharks with trackers so coast guards will know where they are 24/7. The drones will commence regular patrols along beaches in New South Wales and Queensland on Australia's eastern coast from September, for the start of the Surf Life Saving patrol season. ■ SOURCE: CNET



Little Ripper drone by Westpac

More than 250,000 sign petition to charge men who tortured shark



PIXABAY / PUBLIC DOMAIN

The organizers of an online petition, which calls on Florida law enforcement to arrest and charge the men shown in a video dragging a shark behind their boat at high speed, said they delivered more than 250,000 signatures to the Manatee County Administration Building Monday morning, the *Miami Herald* reports.

A Change.org petition calling for charges against a group of Gulf Coast men who recorded themselves dragging a battered shark behind a speeding boat has collected more than a quarter-million signatures. The petition calls for the men to get jail time, serve 1,000 hours of community service and have their fishing licenses permanently revoked.

"Is the shark dead yet?"

The video, posted on social media by local guide Mark the Shark Quartiano on 24 July after the makers messaged it to him on Instagram, shows three men laughing and pointing as the shark flops in the boat's wake being dragged at high speed. One man asks if the shark is dead yet. The video sparked online outrage when it was posted to Facebook and prompted an investigation by the Florida Fish and Wildlife Conservation.

It also prompted a local activist group, called Stand Up Bark Back, to start the petition calling for those involved in the shark-dragging incident to be punished. It also asks Florida lawmakers to "pass a bill making this kind of animal torture a second-degree felony" and asks that "punishment should consist of jail time in addition

to community service," according to a post on GrindTV.com.

Call for legislation

The Florida Wildlife Federation (FWF)—the state equivalent of the nonprofit National Wildlife Federation, with its six million members—has joined the debate over the men shown in a video dragging a shark behind their boat at high speed. The FWF says it has lobbied legislators for years to increase penalties and make them mandatory. ■ SOURCE: MIAMI HERALD

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Text by Matt Jevon
Photos by Andrey Bizyukin

When divers on a technical dive become task-fixated, critical cues that warn them that their broader attention is needed can be missed. Psychologist and technical diver Matt Jevon discusses the effects and dangers of flow and task fixation in diving.

Recently, while working my day job, I was at Heathrow Airport in London for three days to work with a group of very talented executives who ran a successful multinational company. My role was to enhance conversations, guide and challenge participants on strategy development and to get the board of directors working as a cohesive team on issues that challenged both themselves and the company.

One particular issue in the company had recently occupied the attention of the executives. Interestingly, it impacted heavily on the strategy discussions, introducing a bias in the importance on one

particular element. As a result, we set up a short team exercise, which was a simple task in appearance, but was actually difficult in practice, and challenged the team to solve it. Off they went.

Now, this team had a good balance

of thinking styles and approaches. Ten minutes of discussion and experimentation ought to have revealed the answer, and in fact, they did exactly that later in the day. However, immediately on being challenged with the task, the team

fell into a common trap, which catches many divers and dive teams as well: task fixation.

Because the answer appeared simple, the group failed to plan and failed to communicate, so the first attempt failed.

This brought a realisation that there was a more significant challenge here. Communication improved dramatically, and the team was cooperating now, but still not being cohesive. A couple of team members came up with a couple of ideas,



The Dangers of **Task Fixation** *& How to Prevent It*

ANDREY BIZYUKIN





ANDREY BIZYUKIN



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good ideas, and the team went for them, without challenge!

This is not the way a high performance team operates. It should use the skills and approaches of each member to challenge and deconstruct ideas, so that by the time the implementation is due, the expertise of the group has ensured that the most likely solution is achieved.

Dive team skills

In diving, we need to think carefully about the composition and skills of our dive team. (A future article here, for sure.) Once we have a cohesive team, then that team needs to plan for every conceivable eventuality. Rehearse the plans, practise the skills and communications, and then, if the pre-conceived incident occurs, roll out the response.

This process relies upon recognition of the cues that reveal a situation is emerging, which can be easily missed, if we over-

fixate on a task. It is not too complex to solve, though—it is just a question of developing some scanning techniques.

Where task fixation becomes really problematic is when we do not recognise the need to adjust and change on the fly. The critical cues that warn us our broader attention is needed can be missed.

For example, cell readings start to adjust at different rates to depth changes. Bubbles start moving sideways, signalling a current picking up. We miss a backup computer failure.

Narrowing of focus

I was reading some of technical diver Bernie Chowdhury's accounts of dives on the wreck of the *Andrea Doria*. The times he and other very experienced wreck divers had incidents were all down to narrowing of focus, usually on the collection of artefacts—pushing penetrations to find the first-class crockery. One incident on recov-



ANDREY BIZYUKIN



ANDREY BIZYUKIN

tion into a task, we can easily fall into the concept of flow, where time ceases to have meaning. For example, how many times have you done something (driven home, finished a project) that you think would take a few minutes, but all of a sudden, it is two hours later.

Flow, if you are in a safe environment, is awesome. If you are executing skills, it is tremendous. But if you are in a fluid, changing and hazardous environment, flow can be a killer. Never be surprised when you check your computer for run-time.

The next time your teammate pulls on your fin or flashes you a light, don't forget to thank them for ensuring you stay aware—they are making sure you stay alive.

Dive smart, dive aware, dive safe. ■

A native of the Republic of Ireland, Matt Jevon, MSc., is an experienced and passionate open and closed circuit 100m trimix diver and full cave diver. Whether using backmount, sidemount or his favourite JJ-CCR rebreather, Jevon believes technical diving is all about being safe, having an awesome dive and enjoying experiences few people share. Jevon holds instructor qualifications from TDI, PADI TECREC and IANTD, and partly owns South West Tech—a TDI dive centre in Ireland. Jevon is also an approved JJ-CCR instructor and dealer. In addition, he is a sports psychologist, senior rugby coach and works in strategy and private equity. For more information, please visit: Swf.ie and Mattjevon.com.

ering plates resulted in an exit being lost due to silt stirred up by bagging the china.

As we sit here now, it is easy to realise that, of course, this would have happened. But it is a very different thing when one sits at 60m plus, in a small locker, inside a deep wreck, where the plates are piled high.

In this situation, one needs to concentrate to do well, so fixing on a task is good, to ensure its efficient and timely execution. But this requires a diver to place trust in his or her teammates.

So, the team needs to take up the scanning, looking for cues as to what the environment will throw at one next. If one does not have the team, then one needs to take personal responsibility for adopting a consistent scanning strategy.

Checklist

It needs to be relevant, so re-

hearse it. Make a list, pop it in the wet notes... what do you need to check on the dive? Gas, time depth, pO₂ for sure. Navigation, current, temperature, guideline integrity, overhead safety—it's pretty easy. What else is there, though? Awareness of other divers—all good.

The simplest and easiest check, though, is to ask oneself:

- How long have I been doing what I am doing?
- Is it part of the plan?
- Have I been aware of the passage of time and is that relevant to the depth I am at?

This is simply the fastest way of checking to see if you are task-fixated.

Flow can be a killer

When we invest our concentra-



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photo & video

Pair of mating blue-ringed octopuses. This species of octopus is what I term "nomadic" by nature. They are constantly on the move, making them difficult to find on a regular basis, unlike other octopuses. Occasionally, you might happen across a subject, not realizing you might have disturbed or interrupted something. But once the action starts, the subjects rarely stop what they are doing and do not seem to mind being photographed while doing it.

Text and photos by Mike Bartick

Recently, while visiting a photo exhibit, I overheard those familiar magic words, "Wow! Lucky shot!" coming from a couple standing next to me. This immediately caused me to fade away, drifting into my dream state, while contemplating that statement.

Luck and chance encounters play heavily into our underwater encounters, especially as new divers. As we continue to dive, we also continue to gain experience and knowledge about our new oceanic surroundings, becoming more comfortable and curious. Soon thereafter, a thirst for knowledge suddenly develops, becoming very hard to quench. This wonderful lifelong journey of

discovery upon which we embark is furthered when we acquire a camera; and from that moment on, some of us never look back.

The importance of preparation can-

not be stressed enough for photography, whether it is on land or at sea. Reliance upon luck is a poor strategy to depend on and preparing yourself for that special animal encounter is paramount if

you absolutely, positively have to get the shot. The more we rely on the preparation portion of the margins, the more luck margin begins to dwindle, and when that chance encounter does happen, you will

be at the ready.

"Luck" is defined as "success or failure brought on by chance". Perhaps this is true, but I like to think of luck as the uncontrollable element that bonds the



Best Behavior

— *Tips for Capturing Critters in Action*





photo &
video



Bryozoan goby (*Sueviota bryozophila*) have only been described in Indonesia so far. They occur in the delicate, lacy, white bryozoan that cling to rocks or sprout from the sand. Even the smallest of these clumps can have the gobies in them, along with shrimp and even a crab—sometimes all of them sharing the same little bryozoan. The gobies pair up and spend their entire life cycles in the bryozoan, feeding on anything that drifts into its tiny domain. Their eggs can also be seen by searching the different clumps carefully with a light or by watching the paired gobies' movements.

The black, bearded goby, or dark coral goby (*Paragobiodon melanosomus*) pictured below, like other coral gobies in the class—yellow, red-headed, black-finned, etc.—are monogamous once paired. They rarely leave their partners' presences. They are found in the acropora coral heads and populate quickly, laying and tending to their eggs regularly. Setting up for these types of shots requires patience and care not to damage the delicate habitat of the subject.



actions of research, preparation and determination for that special encounter. The more we rely upon preparation, the less we need to rely upon luck.

Shooting animal behavior is the combination of all of the actions listed above, and action is what this entire article is about. Shooting the action is, of course, the end goal, and the culmination of events. Knowing your subject and its various behaviors ahead of the shoot will better prepare

you for that special moment.

It has been said many times before that if you want to see something special, go to the place where you will find them. This simple golden rule can be applied to locations and habitats alike, depending on how zoomed-in you are on your quest for success.

I am a huge fan of using metaphors: Imagine flying over a desert searching for animal life. Where is the first place you would go? A watering hole,

of course. Or a place where there is a food source upon which our subjects can feed or hunt—a place that is rich in resources for our targeted subject. This can be as big as an open ocean, or as small as a bryozoan or a sponge, taking into consideration the obvious, that habitats vary for different subjects. Once your subject has been located, try to refrain from eminent elation. You will now need to get the shot and keep it safe to show others—

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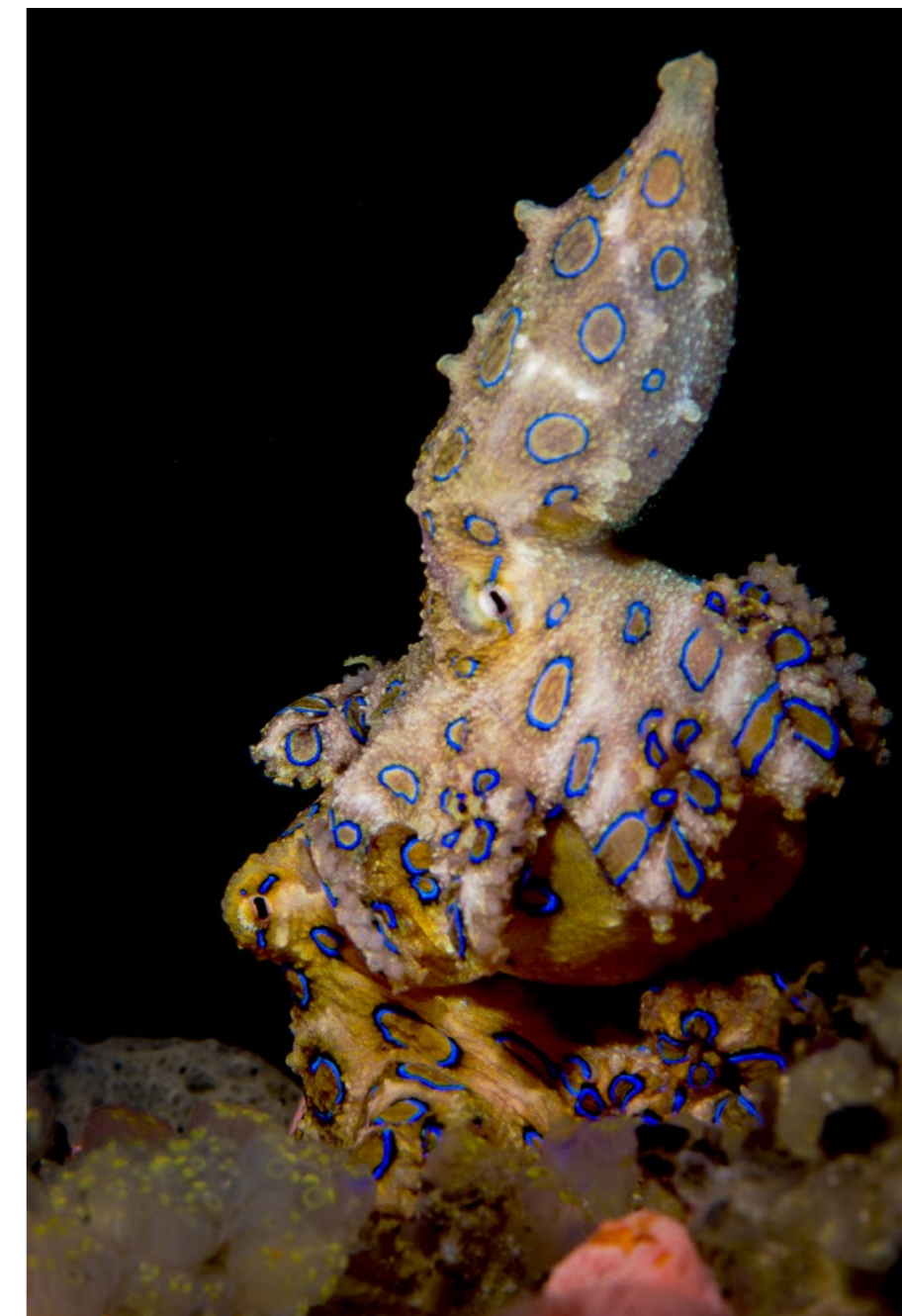


At sundown, crabs and squat lobster make great target subjects for a couple of different reasons, like the chance to capture molting and the hatching of their clutches of eggs. The action is fast and over in an instant, so be ready. I have missed many opportunities. By learning the behavior, I was finally able to capture the images. Crabs and squat lobsters will perch themselves in the open and are defenseless for just a few seconds before they release their eggs or molt. Knowing behaviors ahead of time will alert you to what is about to happen, so stand by.

When targeting a specific subject, such as the purple fire goby (*Nemateleotris decora*), learning about its unique habitat will help you to prepare for the hunt. Find out whether your chosen subject is located in specific places around the world, on a reef, sandy slope, estuary or at certain depths. The elusive fire goby in this image (left) required special preparation, as it lives below the 50m mark in the Anilao area, Philippines. Using a marine life identification book and discussing the subject with your local guides will also clue you in to what secret subjects might be found in the area. A local guide's intimate knowledge can be called upon for many reasons, such as finding out about currents, best times to dive for a subject, and of course, locations.

otherwise, it never happened.

Skill set and mastery over your camera system and dive skills both come into play once you are at the right spot and your subject has been located. At this point, many of us slip into a world of silence, with our eyes never leaving the viewfinder. Let's take a look at the things I refer to as my pillars of success for shooting behavior.



Pair of mating blue-ringed octopuses



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Pillars of success for shooting behavior

Research. Doing some investigative work will help to clue you in on your targeted subject. Where does it live? How does it feed? How does it reproduce? Is it a mouth-brooder or does it lay eggs? When is it the best time of year to see them? These questions should be asked prior to embarking, and can also be asked in a reverse fashion after planning a trip.

Preparation. Preparing for a shot can begin hours, months or even years prior to setting out. Be sure you have the right gear to accomplish the task. Consider the ramifications and expense of traveling to a location, diving for days and finally finding that special subject—only to realize that you do not have the right lens, strobe or gear. Even physical training might be needed if your next adventure includes currents or keeping up with large animals. Preparation should not be overlooked, and you can never be over-prepared.

Settings and lighting. "Lights, camera, action!"—another simple set of words that string together easily and remind us of the shooting aspect, prior to engaging our subject.

Lights. Be sure your strobes are placed in the right position and set on the correct power settings. Take into consideration strobe position, distance from your subject and water quality.

Camera. Technical settings must be accurate and are vital, as you might never have a chance to recreate your



photo & video



Surprise! While photographing a small crab living in an anemone, the arms of the anemone snatched a passing fish right out of the water column and sucked it in.

I had no idea this was going to happen, but when it did, I adjusted and fired away. Sometimes, a subject will surprise you, so stay tuned.

Many subjects will enlarge themselves to appear bigger, in an attempt to thwart off predation, or become highly defensive when they are tending to their eggs. The striped fang blenny (*Meiacanthus grammistes*) also possesses venom that stuns its prey momentarily to confuse and prevent escape. Oftentimes, a pair will tend to their brood of eggs and work as a team, one protects while the other hunts or draws attention away from its nesting mate. When the nest is discovered, the tending mate will become extra agitated, occasionally flashing its teeth. This happens very quickly, so observation or several dives might be required to capture the right image with the desired technical quality.



ocean realm, and carries that survival instinct into its adulthood. Marine animals do not have any regard for their size, and can behave surprisingly timid or aggressive.

Jump settings. Jump settings for shooting behavior, or having a baseline, will help establish a foundation to which you can return, should things get out of control. If the technical settings are not correct, you have

Capturing the interaction between animal and animal, or diver and animal (above), is also a great way to insinuate your viewer's, or a diver's, connection to the subject in the image. Using a macro lens or wide angle lens, these types of connections can be made under many different types of circumstances and photographed with a variety of lenses. Macro with a model is fun and adds an unusual twist to a portfolio filled with single subject portraits.

opportunity. My mentor harped on me about this and would scold me for "missing a chance of a lifetime". Learning from one's own mistakes is a human trait, but learning from others' mistakes can help you immensely.

Action. "Wait for it, wait for it..."—now that you have finally found your subject, prepare yourself. Test fire on something with the same color values, make any adjustments to your aperture and work it in. Getting close to your subject will give you a better strobe saturation and colorful, sharp images. Keep your eye in the viewfinder and don't ever look away. Let your subject relax and behave naturally, not out of fear. Remember that everything starts out small in the



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Juvenile fish oftentimes look much prettier and much different from their adult selves. The juvenile emperor angelfish (*Pomacanthus imperator*) is a beautiful testament to this fact, although photographing them is another story. Shooting moving fish can be extremely difficult and will test your patience, dive skills and mastery over your camera system. Flasher wrasse, antheas, and many of the colorful reef fish we might encounter make very colorful images. Shooting fish is actually much harder than one would think, as they are always on the move. Occasionally, fish will halt abruptly to flash or display themselves, and it is at that moment we will have a window of opportunity.



Behavior

Yawning and luring frogfish. What article would be complete without a yawning or luring frogfish? Agitation, stress or boredom—no one really knows why a frogfish yawns. The truth is, everyone is doing it. Lions to lionfish, this type of behavior is not unusual but still makes a great image. What the frogfish possesses, though, might surprise anyone. A frogfish is a true lie-in-wait predator that uses ambush tactics to overwhelm their prey and devour them in an instant. Sophisticated in many ways, they hunt without moving, attract prey without burning energy, and use chemical and visual stimulus to do so. Hairy frogfish are also highly photogenic, so give them a little time and you will see something fun.

missed the shot anyway. So, re-center yourself and begin again. Resetting yourself back to your baseline also helps when moving across the sand or from one subject to the next. Oftentimes, something will occur without any warning. Shooting from the hip, at this point, might be the only chance we have to capture an image, so anticipate the unexpected to close the gap on luck once again.

Jump settings for behavior are always different and dependent on what it is you are after. For instance, trying to capture spawning manderinfish might require a

higher ISO setting so that you can use a lower strobe power for faster strobe recycle time. The action can be lightning fast at times and may require rapid shooting. Setting up to shoot super-macro will require different settings, and big animal stuff will again present another choice of settings. There are no perfect settings for any situation, but having that baseline, which you can return to, helps to understand your starting point and builds an intuitive mastery over your tools, the lights, the camera and the action.

Our intended subject, once relaxed, will begin to do its thing.

When this happens, you know you are in for something really special. Many times, I have missed the initial attempt but quickly learned what the signals were. This information carried with me, and the next time I saw the signal, I could prepare myself for the show. Set the camera settings, strobe power and angle, approach slowly and relax.

To close the gap on luck, plan and prepare to capture images of animal behavior well before you jump in to shoot. Be sure the right tool is being used and the settings are correct. Observation is an overlooked tool that will serve

you well in this arena too, so be ready for that chance encounter and say goodbye to luck.

Remember to always have fun! ■

Mike Bartick is a widely published underwater photographer and dive writer based in Anilao, Philippines. A small animal expert, he leads groups of photographers into Asia's underwater realm to seek out that special critter. For more information, visit: Saltwaterphoto.com.





Many photographers, such as Emmy award-winning underwater videographer Becky Kagan Schott (seen here with stellar sea lions in British Columbia), are now using the Sony RX100V camera with a Fantasea FRX100V underwater housing in place of, or as a back up to, their large camera systems because of the quality and compact size of this system.

Text by Larry Cohen
Photos by Ran Mor, Howard Rosenstein, Trisha Stovel, Deyvi Urrutia Vanegas and Ron Watkins

Serious underwater photographers travel with large cameras in huge housings. They also need different lenses, ports, lighting and other accessories. As housings for small point-and-shoot cameras became accessible, underwater photography became very popular. In the past, these cameras had many limitations. Small sensor size and slow auto-focus were drawbacks. Most of these cameras only featured auto exposure control, with no RAW file capture, which is not ideal for shooting underwater. Today, there is now a number of advanced point-and-shoot cameras with specs that allow them to be used for serious underwater photography. Of these new models, the Sony RX100 V is one of the best.



Review:

The Sony RX100 V Underwater

TRISHA STOVEL

This compact camera is only 4.0 x 2.3 x 1.6 inches and weighs 10.55oz. The camera has a large 1-inch CMOS sensor that produces a huge 20.1-megapixel image. Because of the processor, image quality is outstanding and low light performance is excellent, with low noise levels. The cam-

era produces images that are very close, and often comparable, to ones produced by a camera with an APS-C size sensor. Besides quality stills, the camera captures 4K video and 4K slow motion.

The fast hybrid auto-focus system has 315 focus points. The camera has a built-

in Carl Zeiss Vario-Sonnar 8.8-25.7mm lens, which has a 35mm equivalent of 24-70mm. The lens has a fast f/1.8 (W) - 2.8 (T) aperture. The camera also has manual exposure control in both video and still modes.

Housing

This extraordinary camera is of no use to divers unless a quality housing exists. There are a number of companies that construct housings for this camera, including Sony. It is important that a housing manufacturer understands the needs



photo & video

Amanda Cotton
using Fantasea
Line FRX100

of underwater image-makers. Fantasea Line's founder, Howard Rosenstein, has been involved in underwater photography for a lifetime. As owner of one of the first diving and liveaboard scuba operations in the Red Sea, he was renowned underwater photographer David Doubilet's guide for his first *National Geographic* article. Howard is also a member of the Scuba Diving Hall of Fame and an accomplished underwater image-maker himself.



RON WATKINS



HOWARD ROSENSTEIN / FANTASEA

For the above reasons, it is no surprise that the Fantasea Line FRX100 V Underwater Housing is a gem of a housing with a reasonable price tag. This compact, yet



HOWARD ROSENSTEIN / FANTASEA

Fantasea AOI UCL-05LF Macro lens was used to photograph this fairy basslet (above)

sturdy housing is rated to 60m (200ft) and allows access to all essential camera controls. Since Sony did not change the size or control positions, this housing is compatible with the RX100 III, IV and V cameras. To get the best underwater images, the housing allows access to "wet" wide-angle and macro lens accessories. It also allows use of dual strobes or video lights or a combination of the two. The bottom of the housing has three quarter-inch to 20-inch sockets. It is best to use a tray that uses two of these sockets, so it does not twist. The housing even has a moisture alarm with flashing red light. This is unusual for a housing in this price range.

Because of the quality of this system and compact size, many photographers are now using it in place of their large camera systems, or as



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Spinyhead blenny captured with Fantasea UCL-05LF macro lens



Over/under photos (right) are not easy to achieve with a compact camera system. This sea grass in the mangroves scene was captured using the UWL-09 wide-angle lens; Caribbean reef shark (below) at Gardens of the Queen, Cuba; Close-up of batwing coral crab during night dive in Gardens of the Queen, Cuba (lower left)



small subjects, we need to increase magnification with a diopter or macro lens. When shooting with interchangeable

and Elisabeth Lauwreys. Captain Wayne Hason of the Aggressor fleet offers this housing to all guests to try out for free.

Lenses

This system has some practical advantages over a large camera rig. Even very clear water has particles in it. So, the first rule of underwater photography is: When you think you are too close to the subject, get closer! In order to be close and

able lens cameras, we have to decide what lens to use before diving.

Image-makers do research on the dive site before deciding to use a wide-angle, fisheye or macro lens. Even with the best research, you usually see the whale shark when the macro lens is attached and the rare nudibranch when using a fisheye lens! With a compact camera system, you use wide-angle and macro conversion wet lenses on the outside of the housing port. With this system, you could change lenses underwater. Now you can capture whale sharks and nudibranchs on the same dive.

A smaller camera means a smaller housing. The Fantasea Line FRX100 V dimensions are only 15.5 x 14.5 x 12cm (6.1 x 5.7 x 4.7"). Conversion wet lenses



Queen angelfish at Gardens of the Queen

a back-up. This includes Emmy award-winning underwater videographer Becky Kagan Schott. Other noted photographers include Amos Nachoum, Amanda Cotton, Chase Darnell, Christian Petron

fit a sizeable subject in the frame, ultra wide-angle lenses are required. The RX100 V has a zoom lens that is 24mm at the widest point. For large subjects, we have to add a wide-angle conversion lens. For



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DEYVI URRUTIA VANEGAS

Chase Darnell using Fantasea Line FRX100 V (left); The RX100 V's fast response helped to capture this giant hogfish at a cleaning station (below)

Sony RX 100 V



RAN MOR / RANMORPHOTO.COM

are smaller and lighter than DSLR lenses and the ports required to use them underwater. Traveling with a compact housing will pack-up smaller than a DSLR rig. With airlines increasing luggage restrictions, this reduces cost.

Wet lenses. The conversion lens used on the outside of the housing needs to be a high-end optic. Fantasea Line and AOI have teamed up to produce a premium line of wet lenses. The UWL-09F wide-angle has five multi-layered precision optic quality elements organized in five groups. This provides edge-to-edge sharpness. Everything underwater appears 25 percent larger and closer to our eyes and camera lens. Using a dome port corrects this size distortion. The UWL-09F has a built-in dome so the lens has an extremely wide 140-degree angle of view. The lens allows the camera to focus very close, and stays in focus even when the camera's lens is in the wide-angle or

telephoto position. A subject sitting on the dome will be sharp. Besides capturing large subjects, this lens allows image-makers to produce wide-angle close-ups and over/under images. In the past, only interchangeable lens rigs would be able to capture these kinds of images.

Macro lenses. Fantasea and AOI also produce three macro lenses. The UCL-05LF and UCL-06LF have +6 and +12 diopter values respectively. The UCL-09F is for super-macro lens, and has a +12.5 diopter value. All these lenses have optical glass elements and anti-reflective multilayer coatings. These lenses allow you to capture sharp close-up images equal to shooting with a dedicated macro lens.

All of the Fantasea/AOI lenses have 67mm threads. The FRX100 V lens port also has 67mm threads, so these lenses can be attached directly. This is an improvement over the FRX100 IV housing. This housing

had a lens port with 55mm filter threads. Lenses with a 67mm thread can still be used with the included step-up ring. The UCL-05LF and UCL-09F macro lenses also have 67mm filter threads on the front. This allows you to stack extra diopters for even greater magnification.

In conclusion, the serious underwater imager can now create quality stills and videos without transporting huge housing systems. The Sony RX100 V with the Fantasea Line FRX100 IV housing produces breathtaking results as is, but you can increase image range and quality when paired with the correct wet lenses and lights. ■

Larry Cohen is a well-traveled and published underwater photographer and camera gear expert based in New York City, USA. He offers underwater photography courses and presentations to dive shops, clubs and events. For more information, visit: Liquidimagesuw.com.



RAN MOR / RANMORPHOTO.COM

This great barracuda was photographed from only centimeters away, using the UWL-09 wide-angle lens



Shayna Leib



P O R T F O L I O





Maquette, (2011) by Shayna Leib. Glass and steel, 14 x 6 x 3 inches. Leib said that the piece "was inspired by my dives in caverns and around walls where coral is often hard to see. I am a curious and very slow diver, and it always gets me into trouble. Finding things that others pass by is my way of diving, and one that often gets me scolded by the divemaster as they look over my shoulder into my camera and say incredulously, 'Where did you see that?!'" Photo by Eric Tadsen.

PREVIOUS PAGE: *Biochroma VI*, (2014) by Shayna Leib. Glass and resin, 52 x 22 x 7 inches. The artist said of the work, "I often get asked why I like creating modular pieces, as in the format of the *Biochromes*. When I'm diving, I almost always have my camera for research, and I see the world within the parameters of the lens. I am always looking through that lens, and these pieces reflect what I see, one snapshot at a time." Photo by Eric Tadsen.

Text edited by Gunild Symes
All artwork by Shayna Leib
Photos by Jim Gill, Eric Tadsen
and Jaime Young

An avid diver since 2009, American artist Shayna Leib creates stunning glass sculptures that capture the dynamic movement and sublime beauty of wind and wave action upon water and reef life. X-Ray Mag interviewed the artist to find out more about her artwork and perspectives.

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

SL: I studied many things in college. My Bachelor of Arts degree is in philosophy and I have minors in existentialist literature, art (glass) and music [at the California Polytechnic State University]. They all played a role in my life, with music and art balancing out the headier subjects. The world is hundreds of years past the Renaissance and having a place for people who want to study all those things. I decided to move forward with graduate studies [at the University of Wisconsin-Madison] in something I really loved, which was glass, and figure the rest out later. It was a surprise to me that I could make a name for myself and a living at being an artist. They say you can't do that.



Azores, (2009) by Shayna Leib. Glass and resin, 20 x 24 x 6 inches. The work is inspired by the "high eddy kinetic energy" of the Azores Current found south of the Azores Archipelago off the coast of Portugal. It is part of the subtropical North Atlantic gyre and feeds into the Canary Current and the North Equatorial Current, said Leib. Photo by Jaime Young.

X-RAY MAG: Why themes of oceans, waves and marine flora and fauna? How did you come to these themes and how did you develop your style of glass sculpture?

SL: The *Wind & Water* series first started out as a series that studied motion and patterns of flow. As time passed, I found myself looking more and more to sea life for inspiration. I'm a water baby, and growing up on the Central Coast of California really nurtured my relationship with the sea. Once I became a diver, it really

cemented the direction of my work. I still have a love for depicting patterns of flow through the simplicity of a monochromatic piece, but I tend to enjoy creating smaller snapshots of ocean life more.

X-RAY MAG: What is your artistic method or creative process? How do you create your artworks?

SL: My art undergoes three main stages from beginning to end. The first part consists of the hot process. I melt clear glass

LEFT: *Laminaria*, (2010) by Shayna Leib. Glass and steel, 38 x 24 x 19 inches. The work is inspired by a genus of 31 species of algae (*Phaeophyceae*), all of which share the common name of "kelp." Photo by Eric Tadsen.



ABOVE: *Six Species*, (2011) by Shayna Leib. Glass and resin, 50 x 14 x 8 inches. The six aquatic species portrayed in the work include (from left to right): polyp anemone, hard coral, sea fan, soft coral, nudibranch and sea grass. Photo by Eric Tadsen.

The second stage is what I call the "warm" stage and consists of taking all the cane and bringing it up to around 1,200°F so it slumps over curved molds. These are then cut into tens of thousands of individual pieces, which are sorted according to size and color.

The final stage is the assembly, where all the parts are placed one by one into a canvas to elicit movement and flow. It is a very lengthy process from start to finish.

X-RAY MAG: How did you become a diver and how has this influenced your art? In your relationship with the under-

water realm, where have you had your favorite experiences?

SL: I became a diver about seven years ago in order to research the creatures that inspire my work, like invertebrates and corals. Pictures can convey a lot of things, but they are never a substitute for experiencing the real thing.

I have to be cliché and say that there is something different and unique about each dive. I'm just happy when I'm in water.

Some dives are ambient and beautiful, like the caverns in Florida or the slopes of Cabo. Some have the most awesome corals, like the Caribbean or Maldives.



Detail of *Malvinas*, (2008) by Shayna Leib. Glass, 42 x 12 x 7 inches. Photo by Jaime Young.

until it is molten at around 2,100°F and use colorants made from rare earth minerals and metals such as cadmium, gold, cobalt, manganese and selenium. One of my staple items is "cane," which are long glass rods that I make by hand. I can make around 45 feet

of it every 20 minutes, depending on what colors I use. Some of my larger wall pieces made entirely of cane can use three-fourths of a mile of it. Other hot processes include hot sculpting and glass blowing to create different shapes and effects.



Oyashio, (2007) by Shayna Leib. Glass, 32 x 13 x 5 inches. The piece is inspired by the southward flowing current off the eastern shore of Japan, which collides with the Kuroshio Current. Photo by Jaime Young.

My memorable experiences include swimming with a pack of dolphins in Maui, going way too deep in Croatia, bumping into a giant sea turtle in near darkness on a night dive, seeing my first gorgonian, freezing in the most beautiful underwater forest in Catalina, getting stung in the face by a man o' war jellyfish, getting stung by fire coral, getting stung by electric coral, watching bubbles part duckweed on the surface of a cavern in Florida—that time I got left behind because I was too busy photographing stuff, and the other time I got left behind and in trouble for being too busy photographing stuff.

My best dives are with other photographers, where I can take my time appreciating things. People are in such a hurry looking at fish that they don't notice the more amazing life forms, and I get tired of being left behind because I'm absorbed in something beautiful. I usually surface having pictures of the most amazing things that everyone missed while they were looking at fish.

X-RAY MAG: What are your thoughts on conservation of sea and freshwater environments and how does your artwork relate to these issues?

SL: Like every diver I know, I'm heartbroken about the state of the ocean and land. People don't gravitate toward diving that aren't already in love with the natural world. I have yet to see a coal plant employee on one of the dive boats.

From the mercury dumping in the '50s in Minamata Bay [Japan] to the floating islands of

plastic, and now the cesium and strontium, oil spills and overfishing—mankind just can't seem to get to a place of respect for nature or learn from its mistakes. We are a tiny speck on the timeline of the Earth, and our impact is irreversibly enormous as its most detrimental, selfish species. Everyone has a legacy they leave. It's up to each individual whether or

not to take from the planet, and it bears each person's weight—or to give to it and help its health.

I wouldn't put myself in the same class as artists directly addressing environmental issues with their art, as mine is merely an appreciation of the natural world. If that appreciation is felt by others, then I am humbled and grateful.

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

SL: I leave this up to the viewer. Viewing art is personal and I don't want to force anything on my audience. Only they know what they walk away with.



Morro Sway, (2008) by Shayna Leib. Glass, 32 x 32 x 16 inches. Photo by Jaime Young.

Shayna Leib





Eddy, (2007) by Shayna Leib. Glass and steel, 38 x 20 x 34 inches. Photo by Jaime Young.

Shayna Leib



Stiniva I, (2011) by Shayna Leib. Glass, 19 x 30 x 8 inches. The work is inspired by the blue, green and white colors of the waters around the island of Vis in Croatia. Photo by Jim Gill.

X-RAY MAG: Why art? Why is it important and what are the challenges and/or benefits of being an artist in the world today?

SL: Artists see and experience the world differently. And with their work, they lend the audience their eyes. I can think of nothing more important in the world than expanding one's reality and seeing things from another perspective. I believe violence and rigid thinking stem from an inability to understand something, whether it's another human, an animal or an environment. My perspective focuses on the sea and the creatures in it. It comes from a vantage point of beauty, curiosity and wonder. Glass is a perfect medium to evoke the fragility of life forms.

X-RAY MAG: How do people respond to your works?

SL: I don't often get to see people react to my work, but when I do, it's interesting. Most people really want to touch it. That's their first instinct. Especially people that aren't from America and perhaps didn't grow up with the fear of glass instilled in them. It's an honest response, coming from a place of curiosity.

Collectors often have a different response to my work than the average viewer. I'm interested more in the average viewer. And to be honest, I actually tend to prefer watching other artists view my work. They grasp things I was sure would go unnoticed.

X-RAY MAG: What are your upcoming

projects, art courses or events?

SL: I am really excited to have some time off. I've been working on a new series that depicts glass desserts called "Patisserie," and I've been having fun with that in-between large projects. It is taking me back to the pure joy of creating objects without having to invest months into them.

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

SL: My earlier works all have bits of cat hair in them [wink]. ■

For more information or to purchase or commission artworks, please visit the artist's website at: ShaynaLeib.com.