



GLOBAL EDITION
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Number 56

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Sea of Cortez

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Sidemount

Diving
Hardhat

Portugal
**Artificial
Reef**

Wide-Macro
**Fisheye
for Critters**

Portfolio
Sharon Brill



Profile
Mike Fletcher

Sport Rebreathers
**Opening Up
Closed Circuit**

INDONESIA'S
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COVER PHOTO: Juvenile dusky batfish, Lembeh Strait, Indonesia
Photo by Andrea & Antonella Ferrari

contents

Clark's anemonefish in anemone, Lembeh Strait, Indonesia. Photo by Andrea & Antonella Ferrari



10
HERMENEGILDO CAPELO
PORTUGAL
BY *BARB ROY*

54
PROFILE:
MIKE FLETCHER
BY *ROBERT OSBORNE*

columns...

62
DIVE FITNESS:
SEA LEGS
BY *GRETCHEN ASHTON*

22
LEMBEH STRAIT
BY *ANDREA & ANTONELLA FERRARI*

59
HEAVY METAL:
HARDHAT DIVING
BY *LARRY COHEN*

89
EVENTS:
INNERSPACE 2013
BY *ROSEMARY E LUNN*

31
FISHEYE FOR CRITTERS
BY *ANDREA & ANTONELLA FERRARI*

67
SEA OF CORTEZ
MEXICO
BY *MATTHEW MEIER*

92
UW PHOTO:
MIRRORLESS CAMERAS
BY *DON SILCOCK*

37
NORTH SULAWESI
INDONESIA
BY *KELLY LACLAIRE*

84
TECH TALK:
SIDEMOUNTS
BY *STEVE LEWIS*

99
PORTFOLIO:
SHARON BRILL
EDITED BY *GUNILD SYMES*

49
ECOLOGY:
BEYOND THE MUCK
BY *MIKE BARTICK*

87
OPENING UP
CLOSED CIRCUIT
BY *SIMON PRIDMORE*

plus...
EDITORIAL 3
NEWS 4
WRECK RAP 16
TRAVEL NEWS 19
EQUIPMENT NEWS 58
BOOKS & MEDIA 65
MARINE MAMMALS 77
TURTLE TALES 78
SHARK TALES 80
PHOTO NEWS 97

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Checklists rule!

Airline pilots and surgeons are some of the most highly trained and skilled professionals – as they should be since we entrust them with our lives. They are very smart people, have a lot of routine and undergo constant training. Yet, as most of us are aware in the case of pilots, they also stick to rigorous procedures aided by checklists.

The value of implementing and nurturing a safety-minded culture in preventing accidents and saving lives cannot be underestimated. In the airline industry, for example, it led to a year (2012) with no fatal accidents at all in commercial aviation.

The issue at hand is, of course, that regardless of how skilled and experienced we may become, we will always be prone to making mistakes, or forgetting something. It is human nature, it is as simple as that.

In the diving community, checklists are used mostly by technical divers, and it is an integral part of the training and procedures when diving rebreathers, where the level of technical complexity more

easily leads to human errors. But even during our basic open water courses, we are taught some acronym or jingle to help us memorize pre-dive routines and checks. On a more menial level, we use shopping lists to help us remember to get all the groceries the first time around in order to avoid having to go back to the store to pick up what we forgot. Lists and aides make us more efficient and less prone to making mistakes.

That goes for our ventures underwater, too.

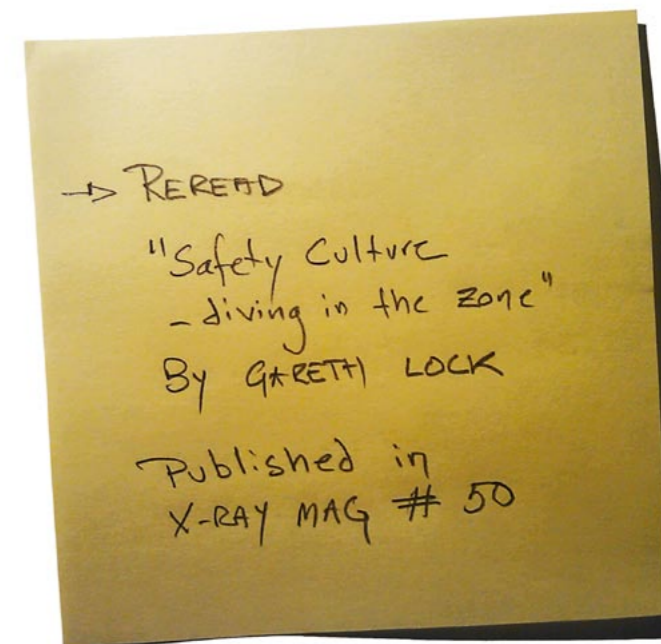
There has been much talk recently about how using checklists can make the difference between life and death, but the principles also apply on a smaller scale and can save each of us a lot of small mishaps and annoyances – it only takes a broken or missing o-ring to potentially flood your camera, short your dive computer or cause some other equipment

malfunction. The devil is often in the detail, and all the details can be hard to remember, which is where the checklists come in.

They not only make things safer but also easier and less stressful. Yes, I may take my sweet time rigging up both my camera gear and my rebreather, but what is the hurry?

In any case, these rituals also serve to get me grounded, focused and into the right mindset after which I feel ready and assured – but never complacent – everything is in order, making me enjoy my dive much more.

— Peter Symes





from the deep
NEWS

Despite the continued increase in atmospheric greenhouse gas concentrations, the annual-mean global temperature has not risen in the twenty-first century.

Is the Pacific Ocean pausing Global Warming?



PETER SYMES

A series of naturally occurring La Nina weather events in the Pacific in recent years seem to be responsible for the slowdown in the pace of global warming so far this century, a new study suggests.

In an article entitled, *Recent global-warming hiatus tied to equatorial Pacific surface cooling*, just published in the science journal *Nature*, a group of scientists affiliated with Scripps Institution of Oceanography in San Diego, California, has looked into why average surface temperatures seem to have plateaued since the 1990s even though the

decade also qualifies as the hottest on record. Rising concentrations of greenhouse gases in the atmosphere have not accelerated warming to new heights as rapidly as happened at the end of the 20th century.

Climate scientists have disagreed over the cause of the pause in fairly regular increases in temperatures seen before 1998. The slowdown

has raised hopes among some governments that it will be easier and cheaper to achieve long-term goals for limiting temperature rises to avert more heatwaves, droughts, floods and rising sea levels.

Natural variability

The current study finds that the current hiatus is part of natural climate variability, tied specifically to a La-Niña-like decadal cooling. Although similar decadal hiatus events may occur in the future, the multi-decadal warming trend is very likely to continue with

greenhouse gas increase.

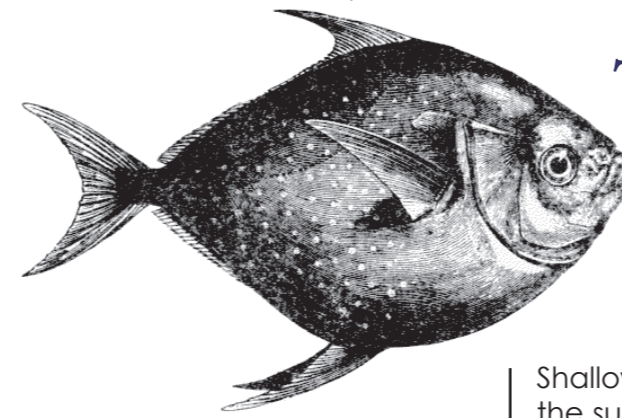
But it is clear that the cool Pacific pattern cannot persist forever to cancel out the extra heat trapped by rising CO₂ concentrations, climate scientist Shang-Ping Xie and senior author on the *Nature* journal study notes.

"Our results strongly confirm the role that (man-made) emissions are having on the climate. At one point over the long term, the effect we are seeing in the Pacific will stop. I'm confident the bigger increases in warming will resume." ■ SOURCE: NATURE

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The deeper the fish, the more mercury they accumulate

Shallower fish are safer to eat as, at the surface, photochemical reactions break down mercury, researchers have found. A new study by the University of Michigan and the University of Hawai'i at Manoa School of Ocean and Earth Science and Technology (SOEST) has combined direct observations of marine ecology and biogeochemistry to show a global picture of how mercury is acquired by ocean fish at different depths of the sea.

A common industrial toxin, mercury is transported through the atmosphere before it enters the ocean and the marine food web, accumulating in the flesh of ocean fish we eat. Scientists have found that this takes place at deeper depths, since organic mercury is broken down by photochemical reactions in well-lit waters at the surface.

Researchers used a highly sophisticated mass spectrometer to measure mercury levels in nine species of marine fish feeding at different depths. Study findings show that sunlight destroys up to 80 percent of mercury at shallow depths and that a significant amount of mercury is forming and entering the food web in deeper, oxygen-poor waters.

"The implication is that predictions for increased mercury in deeper water will result in higher levels in fish," said Joel Blum, professor of earth and environmental sciences at the University of Michigan and lead author of the study published in the journal *Nature Geoscience*. "If we're going to effectively reduce the mercury concentrations in open-ocean fish, we're going to have to reduce global emissions of mercury, including emissions from places like China and India." ■

SOURCE: EUREKALERT.ORG

Ailing California seagrass boosted by return of sea otters

A new study published in the journal *PNAS* finds that the return of sea otters to a U.S. central California coast estuary has improved the health of seagrass in the area. Seagrass in this region was thought to be headed for extinction. But researchers found that the sea otters triggered a chain reaction of activity which boosted the health of the seagrass in the area, which has been threatened by a massive increase in nutrient pollution from fertilizer run-off.

"This estuary is part of one of the most polluted systems in the entire world, but you can still get this healthy thriving habitat, and it's all because of the sea otters," said lead author of the study, Brent Hughes of the University of California. "It's almost like these sea otters are fighting the effects of poor water quality."

In the study, researchers analysed seagrass levels in the past five dec-

ades in the Elkhorn Slough area of Monterey Bay, mapping periods of growth and decline of the seagrass. Various changes were studied that could have affected the seagrass, and the only common factor that influenced seagrass was the number of sea otters in the area. The research suggests that the hunting of sea otters to near-extinction in the late 1800s early 1900s most likely made the situation worse, while the reintroduction of sea otters in this century is aiding the revival of seagrass populations, despite pollution from agricultural run-off.

The theory is that sea otters eat crabs, which eat small invertebrates, which eat a type of algae, which blooms with nutrient rich soil and grows on seagrass leaves, blocking sunlight and thus causing die-off of seagrass. To test this theory, scientists compared similar estuaries that had sea otters with

Seagrass signals

According to researchers, seagrass is important to the health of the oceans and fisheries, as it acts as a nursery for many species of fish and is an important CO₂ sink combatting the effects of climate change. Hughes said seagrass is "the canary in the coalmine" in regards to prediction of the levels of nutrient pollution in estuary waters.

"It's what we call a foundation species, like kelp forest, salt marsh or coral reef," said Hughes. "The major problem from a global perspective is that seagrass is declining worldwide. And one of the major drivers of this decline has been nutrient inputs from anthropogenic sources, via agriculture or urban runoff."

Sea otters have until recently been banned from moving along the coast to southern California because it was feared that the sea otters would have a negative impact on fisheries in the area. The research findings are particularly interesting in light of this lifting of the ban.

"That's important because there's a lot of these kind of degraded estuaries in southern California because of all the urban runoff from places like Los Angeles and San Diego," said Hughes. "Coastal managers will now have a better sense of what's going to happen when sea otters move into their systems. There's a huge potential benefit to sea otters returning to these estuaries, and into these seagrass beds that might be threatened." ■

SOURCE: BBC NEWS

those that didn't, running experiments in the lab and in the field. The experiments confirmed their hypothesis.

Female sea otter with her pup at Morro Rock, California



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Jennifer O'Neil



Tubbataha Reef

—The Crown Jewel of Philippines Diving

Text by Duane Silverstein and Ferdie Marcelo. Photos by Randy Wright and David Reubush

The word *tubbataha* is a combination of two Samal words, *tubba* and *taha*, which together mean “a long reef exposed at low tide.” But today the name Tubbataha is synonymous with a different definition—the best dive location in the Philippines. About 180 kilometers (110 miles) south of Palawan Island, Tubbataha is a coral reef in the Sulu Sea, Philippines, consisting of three distinct parts: the huge North and South Atolls and the smaller Jessie Beazley Reef. In 1981, it became the first national marine park in the Philippines under the leadership of then President Corazon Aquino, and in 1993, Tubbataha was declared a UNESCO World Heritage Site. Just last year, CNNgo.com named this 130,000 hectare site one of the world’s top ten dive spots.

I recently visited Tubbataha through my work as director of Seacology, a non-governmental organization (NGO) whose sole purpose is preserving the marine and terrestrial ecosystems of islands throughout the world. Seacology has 240 projects in 51 countries throughout the globe where deals are made to provide an island village something tangible it needs such as a school or fresh water delivery system in return for establishing a marine or forest reserve.

One such project is on the small island of Manamoc in the Philippines where we provided the requested solar energy system in return for support of a 267 acre marine protected area. This past April, I led a group of Seacology donors to the Philippines to see our project on



RANDY WRIGHT



USS *Guardian* aground on Tubbataha Reef in the Philippines

Manamoc and spend a week diving the reefs of Tubbataha.

I have visited the Philippines on many occasions and dived some of her magnificent reefs. But every time I mentioned where I had been I would get the same response: “The diving there is quite good but if you want

One of the reasons Tubbataha diving was supposed to be so good is its remoteness from human activity. There are no villages within 150 kilometers of Tubbataha, which means little pollution and little pressure from divers. The only way to dive Tubbataha is on a liveaboard dive boat, and due to potential rough seas caused by seasonal climate changes, Tubbataha can only be dived between early March and early June of each year.

Hippocampus denise seahorse

to see world-class diving you should go to Tubbataha.”

Ship groundings

As the time of our trip rapidly approached I could hardly contain my excitement about diving this isolated reef. However, just two months before our trip I received terrible news. The U.S. minesweeper USS *Guardian* ran aground on Tubbataha’s south atoll—2,345 square meters of the reef were damaged by this grounding, which the U.S. Navy’s own report attributed to a “lack of leadership”.

Everyone breathed a huge sigh of relief when on March 30 shortly before our trip to Tubbataha the last section of the USS *Guardian* was lifted off the South Reef by a crane. There was great sadness over the damage done to the reef, but this was ameliorated to a small extent

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Diver with large cuttlefish on reef



RANDY WRIGHT

by knowing that finally the boat was gone and could not do any more harm. Now we can once again think of our impending trip and perhaps even see for ourselves the extent of the damage done by this horrible accident.

Then the near impossible happened. Just one day before our flight from Manila to Puerto Princesa (the departure point for most liveaboards), another ship went aground on Tubbataha. How could this happen twice in such a short period of time particularly at a UNESCO World Heritage Site that is nowhere near a major shipping lane?

My first reaction upon reading this news was the same as that attributed to Philippine President Benigno Aquino III: "This must be some mistake. This can't be happening again!" Or in the oft-quoted words of famed U.S. baseball player Yogi Berra, "It's déjà vu all over again!"

This time the culprit was a Chinese fishing vessel, the F/V *Min Long Yu* (whose cargo, as I'll explain, was anything but fish). And this time, the damage was a lot worse. Nearly 4,000 square meters were destroyed, including some massive corals over 500 years old. As one official stated, "It bulldozed through vibrant coral reefs

leaving a highway of destruction in its wake."

Our trip, however, was still a go so later that same day we boarded the scuba liveaboard, the *Atlantis Azores*, which is a former Aggressor fleet ship that was recently renovated. The boat was in excellent shape, the hard-working crew was spectacular and the food was very good. The rooms below deck were on the small side and did not have windows or portholes, but the friendliness of the crew more than made up for these minor shortcomings.

During the course of the week a tank was accidentally dropped on my gear, and consequently, my regulator and flashlight were damaged. Though I was not pleased with this, I have dived enough to know that accidents will happen. The captain

and crew were extremely apologetic and took immediate responsibility. They lent me replacement gear at no cost and told me to take my damaged equipment to my favorite dive shop back in the States, and they paid the bill by credit card, no questions asked. I was impressed with the way they handled this mishap.

Diving Tubbataha

But how was the diving in Tubbataha? In a word, excellent. During the course of the week, I saw more sharks than I have in years, particularly in Jessie Beazley Reef. I also have not dived with this many turtles in a long while, and for the first time ever, saw a pair of mating turtles. The occasional napoleon wrasse, large tuna and large schools of jacks added to the enjoyment of the dives.

ENDLESS COLOUR

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ENDLESS POSSIBILITIES



MABUL ISLAND, SABAH



Reef shark resting in its hiding place on the reef

there are more in the Galapagos. Tubbataha has a lot of pygmy seahorses, but there are more in Raja Ampat. Tubbataha has good visibility, but you can find better viz in the Solomon Islands. Tubbataha has a lot of nudibranchs, but you can see more in other parts of the Philippines. However, when you add things up, Tubbataha is one of the best rounded dive sites in the world.

To me, the key to Tubbataha's beauty is its remoteness from human activity. Other reefs are

Except where there was old damage from blast fishing and, of course, the two recent groundings, the reef itself is in excellent shape. And Tubbataha has plenty of small creatures as well. I saw many pygmy seahorses, nudibranchs and various fingernail size crabs. There were many opportunities for night dives which ranged in interest from so-so to one dive where an octopus spent 30 minutes putting on so many poses for us that we nicknamed it "Zoolander".

I cannot give a personal assessment of the damage caused by either boat, as we were not allowed to dive the sites closest to where the USS *Guardian* went aground. This was allegedly so that the area could begin to recuperate, but I suspect the real motivation was to prevent divers from taking photos of the damaged reefs. Nor could we dive the area near the F/V *Min Long Yu*, as it was still aground when we were there. It has since been removed.

We did however pay a visit to the ranger station that sits less than two kilometers from the point where the *Min Long Yu* went aground. The rangers

told us that the ship was carrying 2,870 dead pangolins, an endangered scaly anteater found on Palawan Island. These were probably destined for the shelves of Chinese drugstores alongside rhino horns and remnants of other threatened species.

The rangers told us that the 'fishermen' on board the *Min Long Yu* offered them a bribe of US\$2,400 for their quick release. This proffer was refused, and the culprits are now in jail.

I have a theory as to why Tubbataha is not better known than it is amongst international dive circles. Tubbataha is an all around excellent dive site but it does not rate as the world's best in any one criterion. Tubbataha has a lot of sharks, but

too close to human settlements and are thus extremely vulnerable to over-extraction and degradation from pollution. That is unless the island community nearest the reef actively protects and conserves it. And this is precisely what is happening in Manamoc Island in the Philippines with the help of Seacology.



Pair of sea turtles mating

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Children welcome the delegation visiting the Seacology solar energy system in the village of Manamoc in the Philippines; Diver hovers over lush soft corals on reef (far right)



DAVID REUBUSH

Community action

One of the major problems besetting island communities like Manamoc is the lack of reliable electricity. Its generators depend on fossil fuel, which has to be imported to the island and is very susceptible to price increases. The very high cost of power makes it difficult for villages to provide efficient and effective services to the community. Moreover, the community's generators are usually turned on only at dusk and turned off at midnight. In the local high school, for instance, students and teachers had to shell out personal money to purchase gasoline for the sole generator within the school to power at least two of the six working computer units in their classroom.

In 2008, Seacology funded several solar power supply systems for the community health center, village hall, community training cum multi-purpose center, public high school, public elementary school and the pre-school center—all in exchange for their commitment to protect a nearby 108-hectare marine protected area (MPA). Our local partner, the Andres Soriano Foundation (ASF), has been reporting that the solar power systems are serving the community well, and that the MPA is being strictly enforced

as a no-take zone. Shortly after our visit to Tubbataha, a Seacology delegation visited

Manamoc to see for ourselves what is actually happening on the ground.

On our arrival we were met by dancing children, ASF staff and village officials who briefed us on the status of the MPA. Fish counts have tripled between 2008 and 2012. In 2008, there was only 25 percent hard coral cover, whereas now hard coral covers 50 percent of the reserve.

The villagers have organized their own fish warden group, which continuously patrols the MPA. Poachers, invariably other fisher folk originating from neighboring islands, are apprehended and fined. Through the fines collected, the villagers were eventually able to purchase a patrol boat exclusively for this purpose.

After the brief presentation at the beach, we were taken around the village where we saw the solar power systems at work, most notably at the health center where temperature sensitive medicine such as vaccines are now refrigerated, and the high school where students can now learn

and practice computer skills regardless of their families' ability to pay for fuel. This project is a good example of what can happen when a highly motivated village such as Manamoc works with a terrific local NGO such as ASF with the support of Seacology.

Our Seacology expedition to Tubbataha and Manamoc Island offers critical lessons in the management of the Earth's remaining wildlife resources. No spot on this planet is sufficiently isolated from potential damage done by humankind. A single ship grounding can instantly obliterate wide areas of coral for decades if not centuries to come. Wanton poaching for whatever purpose can drive a species to extinction. And a small island community taking responsibility for the protection of its marine resources can cause these areas to flourish, translating to increased bounty within nearby designated fishing areas. ■

Duane Silverstein is the executive director and Ferdie Marcelo is the Philippines Field Representative for Seacology an NGO whose sole purpose is preserving the marine and terrestrial ecosystems of islands throughout the world. For more information about Seacology, which has protected almost two million acres of island marine and terrestrial habitat, or to find out more about and Seacology's expeditions, visit Seacology.org

No spot on this planet is sufficiently isolated from potential damage done by humankind.

A single ship grounding can instantly obliterate wide areas of coral for decades if not centuries to come. Wanton poaching for whatever purpose can drive a species to extinction.

And a small island community taking responsibility for the protection of its marine resources can cause these areas to flourish, translating to increased bounty within nearby designated fishing areas.



RANDY WRIGHT



Text and photos by Barb Roy

If anyone was to notice me I probably looked pretty funny underwater, sticking half way out of a hole in the side of a fair-sized shipwreck. My fins kicking away to control my balance might make one think I was stuck or something. But I was by no means—only totally absorbed in what I was looking at. From the outside, this natural shipwreck appeared to be just another ordinary wooden cargo barge, mostly deteriorated and dull-looking after years of weathered exposure to the Atlantic Ocean. You might say nature's camouflage had done a great job blending it into its surroundings.



Portugal: Another Ship Down
Hermenegildo Capelo
— Adds to Unique Diving



Hermenegildo Capelo heading for new life as a reef

The sinking of the *Hermenegildo Capelo* on 15 June 2013

I too would have not given the *Batelao do Burgau* a second thought except for the fact I was searching for some form of color or marine creature to photograph when I came across a few tiny red anemones in the tattered opening of where a porthole once was. Previous experience hinted there might be more of these colorful critters within the covered section of the hull, so I peered into

a larger opening to investigate.

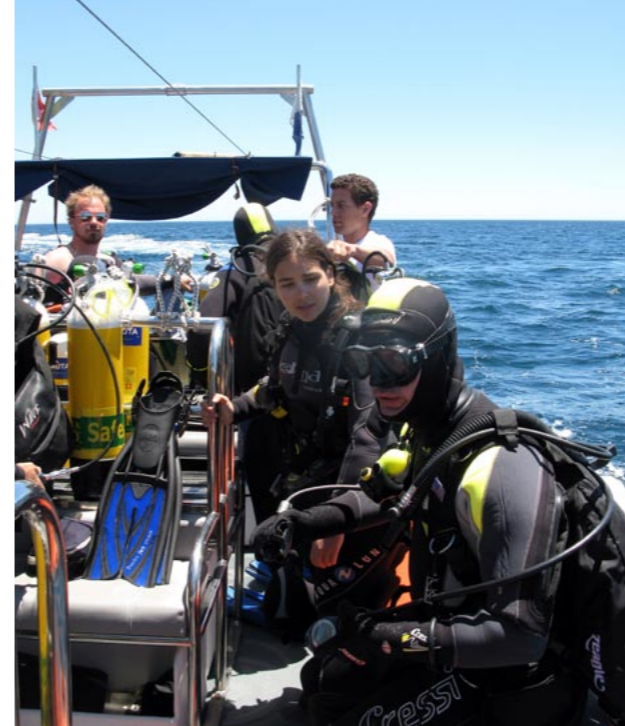
Whoa! To my delight, life was everywhere. The sun's shimmering rays of light trickled in through dozens of small holes in the top deck allowing vivid colors of orange, purple, yellow and red to emerge. A variety of jeweled anemones, gorgonians, sponges, and other invertebrate life seem to occupy every part of the remaining interior skeletal structure



wreck rap



Exterior (right) and interior (below) of the *Batelao do Burgau* wreck



Divers prepare to dive on the new wreck

in the Algarve region of southern Portugal when the first explosive charges rumbled through the 102-meter (335-foot) Ex-NRP *Hermenegildo Capelo*. Not long after, fiery pyrotechnics boomed from the bow, mid-ship and stern, sending giant fireballs into the air. Boat horns sounded from surrounding boats while equally loud cheers roared over the radio from on-lookers at a nearby resort on land. Silently the decommissioned Portuguese Naval frigate slipped beneath the surface in just over two minutes to begin its final mission of providing new habitat for future marine residents on a barren sandy ocean floor.

The *Hermenegildo Capelo* is the third and largest ship to be scuttled in the new marine park as part of the Ocean

Revival Project, a venture started and headed by local business owner, Luis Sa Couto, over five years ago.

"My intention for the project is to help transform the Algarve region into a world-class destination for diving, attracting divers from all over the world. The project is also meant to help increase the marine bio-diversity of life and preserve the memory and history of the ships in the park," said Sa Couto,

a diver since 1969.

In 2007, Sa Couto opened Subnauta, a PADI Five Star dive facility designed to offer local and visiting divers professional dive excursions off the coast of Portimao. This quaint, laidback community is already treasured by Europeans for its golden beaches and mild climate, so the addition of four ships will only add to Portimao's attraction.

along with small schools of hovering fish in mid water. It was like I was transported to another dive site.


Needless to say, it didn't take me long to maneuver my camera and strobes inside, but as tight as it was, I was extremely careful not to damage the structure or critters around the opening. Once finished collecting my shots, I paused to admire the beauty, wondering if this is what the inside of the steel ships they just put down in the new underwater park off Portimao, would one-day look like.

Ocean Revival Project

June 15, 2013 – It was a warm, clear afternoon along the peaceful coastline of Portimao



One of the first dive groups to dive the *Hermenegildo Capelo*; Subnauta dive boat (left)



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The *Hermenegildo Capelo* is prepared for divers (left); Chris Straub (right) of British Columbia, Canada, volunteers his time to set 17 Go Pro cameras on the ship before sinking to record the event

in a single day anywhere in the world. With three ships underwater in less than a year, Sa Couto is well on his way to meeting his goals.

In addition to the placing of these reefs of steel, a brand new hyperbaric chamber was provided to the hospital in Portimao by Sa Couto as part of the project. Medical professionals in the area have already begun utilizing the chamber's many useful applications as well as being prepared for any possible dive emergencies. Currently, an inland exhibit for the public is also underway, which will depict the history of these retired warships.

CARC

To assist in making this vision



a reality, Sa Couto and those behind the project enlisted the services of the Canadian Artificial Reef Consulting (CARC) group who has successfully scuttled over 23 ships in similar reef projects around the world.

"A project like this wouldn't be possible without the efforts of a lot of people," said Wes Roots, consultant and coordinator for CARC. "It usually takes about seven months to prepare one of these ships before sinking it. After the Navy turns over a decommissioned ship, it goes to Batista's Shipyard in Lisbon where it is thoroughly cleaned and prepared according to OSPAR Convention Rules. Sa Couto works with them on what to leave on the ships so each ship will be different, like leaving on the Gun Director or a radar unit.

"Scrap metal and any dangerous items are removed while still in Lisbon. Then it is brought down to Portimao where diver access holes are cut into the decks and hull, making it safe for divers to exit or enter the ship during a dive. After the holes are cut, the ship is brought to the Naval dock where Roy Gabriel, our explosives expert, and his son work with members of the PRT Navy EOD

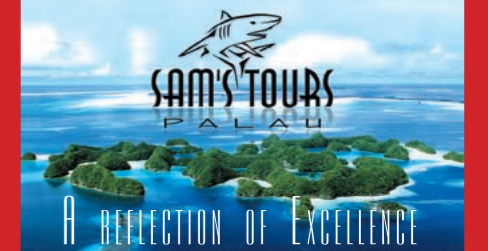
"We supply all diving gear for our boat charters," said Sa Couto, "because we understand about the airlines and traveling with heavy dive bags. We want divers to have a good experience when they come here."

Subnauta offers four dive boats of varying size which service not only the new park, but any of the natural historic wreck sites as well. In addition to shipwrecks, there are also several dozen nearby reefs to choose from.

On 30 October 2012, the first two vessels donated by the Portuguese Navy were placed in the park. The 85-meter (279-foot) Ex-NRP *Oliveira e Carmo*, a Corvette class ship, and the 44-meter (144-foot) Patrol Vessel Ex-NRP *Zambeze* offer two very different sites to explore. From what I could find, this was a record set for sinking two ships (prepared for diving) of this size



Portuguese Navy Clearance divers and the Canadian team



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Engine room of the *Hermenegildo Capelo*; Roy Gabriel Jr adjusts banner on the *Hermenegildo Capelo* (far right)



Divers to set the charges. ORICA Marine Services supplied the electronic detonation system and Alberto Braz acted as our liaison to coordinate everyone."

The last of the vessels to be scuttled will be the 64-meter (210-foot) Hydrographic ship Ex-NRP *Almeida de Carvalho*, scheduled to be scuttled in September of 2013. Not only has the project provided jobs for local residents in Lisbon and Portimao, the three ships underwater have already established a resident population of marine life and attracted curious divers

throughout Europe.

"After seeing how many different fish that now inhabit the corvette (*Oliveira e Carmo*) after only ten months," said Roy Gabriel Jr., part of CARC's demolition crew and an avid scuba diver, "I would expect that these ships will quickly become an amazing location for people who want to swim amongst large schools of fish. I expect that the frigate and eventually the hydrographic ship will populate as quickly. Once the word gets out, people will want to visit the park.



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I mean, what more could you ask for? Four decommissioned Portuguese Navy ships placed in one location and within ten minutes from the wharf, all under 35 meters of water."

Diving

My dive buddy, Roy Gabriel Jr., and I were able to dive on the *Hermenegildo Capelo* the day after it went down in June along with Wes Roots and his son Greg. Since Greg assisted in the prep work for this ship and the previous two, he was excited to check out the new wreck. Rebeca Sa Couto, daughter of Luis, and several other eager divers also joined the group.

Needless to say, it was another calm, sunny day when we rolled over the side of the rib. While descending I remember reading that the *Hermenegildo Capelo* had a crew compliment of 164 and was

the first ship in the Portuguese Navy to take on female crewmembers. It was retired in 2004 after 37 years of service.

Visibility was around 45 feet as we approached the ship, which was sitting upright with little to no noticeable damage. One of the first things Roy and I did was to straighten out the banners on the ship for a photo. Then it was off to the bridge for a photo in the captain's chair! A photo on the table in the Med-Bay and one on a bench on the side of the ship followed.

Being good on air has its advantages when exploring a ship of this size! Roy was like a kid wanting to visit all of his favorite places. However, as we darted about the ship engaging in various photo opts, I thought it all to be quite surreal; the idea of walking around on the ship the day before, and now seeing it underwater was indeed very cool.



Roy Gabriel Jr in captain's chair on the *Hermenegildo Capelo*



Anemones adorn part of the *Conhoneira Faro* wreck; Rebeca Sa Couto on bridge of *Oliveira e Carmo*; (far right)



The huge anchors tied to the deck on the bow looked even bigger underwater, and the gun barrel on the back-deck Director, too high for me to reach yesterday, was now at my fingertips. Similar memories were expressed back on the dive boat as everyone prepared for the next dive.

Oliveira e Carmo

The *Oliveira e Carmo* was our next adventure, but this time I went with Wes and Greg since Roy was flying home

soon. This was the first ship to be scuttled in the park and during a bad storm this past winter, was torn into two sections.

Lt Jaqueline Barroso, the Commander of the Portuguese EOD team helping the Canadians with the explosives, told me: "Yes it's true; the EX-NRP *Oliveira e Carmo* Corvette is now broken in two sections because of a winter storm. The smaller section, approximately 50ft, is the stern and is still in the original position. The biggest section—middle ship and bow—was dragged to the southeast approxi-



Greg Roots at bow of *Oliveira e Carmo*

mately 900ft from the original position. When I was on it in June, I dove on the section that was moved. The power of the ocean is amazing. The ship was torn into two parts like a sheet of paper!"

Talking with Barroso after the ship went down, he also explained how excited he was to have a park like this in Portugal.

"As a sailor and as a Navy Diving Officer, I'm really happy with this fantastic project," said Barroso. "After more than 40 years of duty in the Portuguese Navy, this is a wonderful and useful way to maintain these ships and keep them alive. Although they are on the bottom of the Atlantic Ocean they are still on a mission, not only as a Portuguese Naval Underwater Museum for all the divers to see but also for the environment to attract marine life to what would normally be a naked sandy underwater terrain."

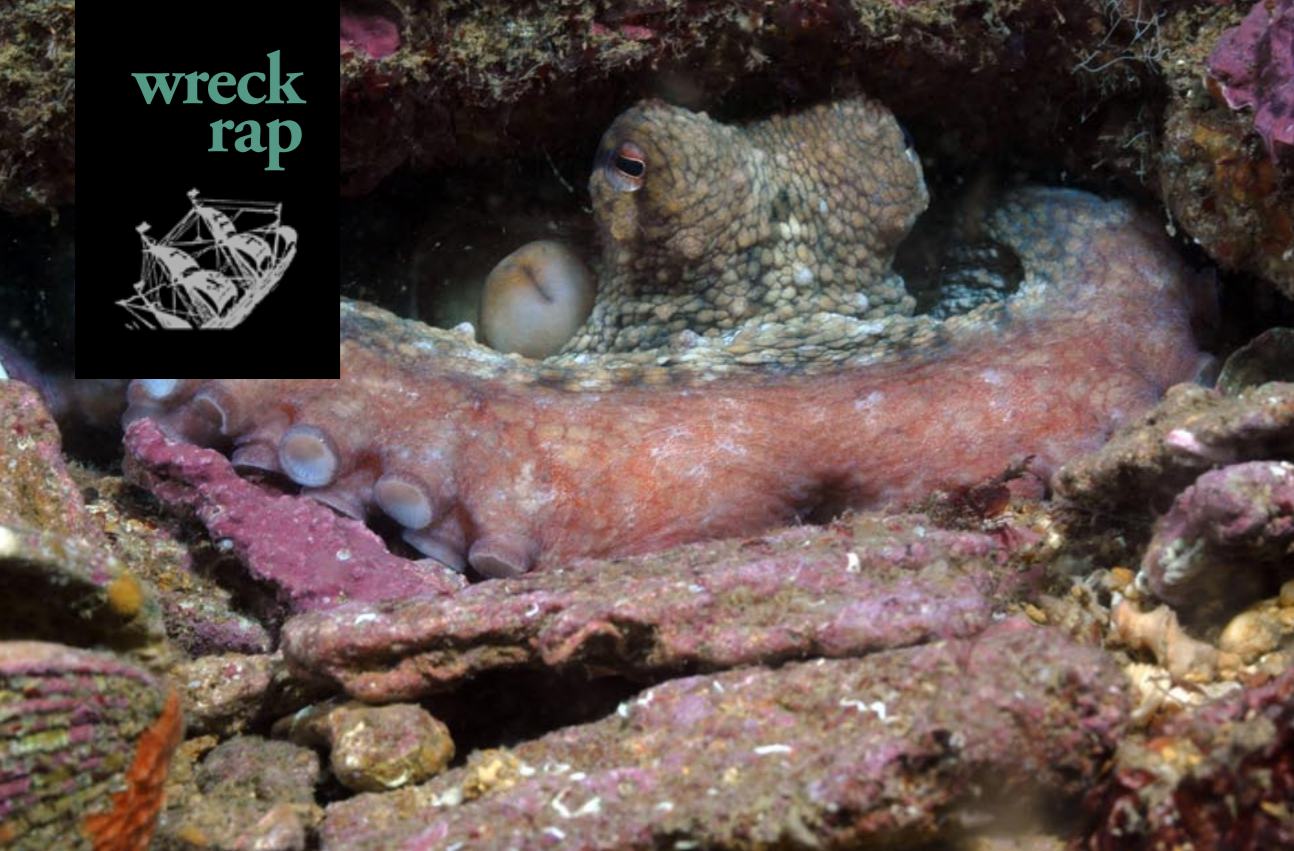
The three of us dropped onto the stern section of the *Oliveira* where we could check out the torn away hull first. It actually looked like a pretty clean separation. The hull had a few rough edges on the sides but appeared okay for entry into the different levels.

I followed the guys down the port side near the sand and watched as they examined several openings and looked into the engine room. The sand was built up like craters around most of the bottom openings, probably from surge action during the winter storms. With visibility around 60 feet, I could see a great deal of the openings, all of which looked clear.

Since the guys were occupied below, I peered into one of the top-deck access holes and found a small room filled with ambient light. Remembering what the

wooden cargo barge had looked like inside, covered in an array of life and color, I tried to imagine what the inside of this room might look like in five or ten years. Maybe there would be tiny red and purple anemones hiding within and small gorgonian sea fans growing on the hatch openings or on ridges where a wall was removed.

The ship's bridge was our next stop. With three divers inside visibility swiftly diminished. Once finished photographing both Wes and Greg at the wheel, I remained inside and waited for visibility to clear. This is when Rebeca entered with the grace of a lady and in much better control of her buoyancy. She swam over to the wheel where I proceeded to photograph her as well. I could tell by her wide eyes that she was as enchanted with the dive as I was.



CLOCKWISE FROM LEFT: Little octopus hiding on wreck of *Conhoneira Faro*; Jeweled anemones found on a dive at Jardim dos Nudibranquios; Meerkats taking it easy at the Lagos Zoo; Portimao boardwalk along the beach



Overall, the local diving offered a variety of different sites. The invertebrate life was colorful and the fish were plentiful on both the wrecks

Again, back on the boat we all had fun stories to tell. I'm sure the other divers felt as I did, wishing there was more time and air to visit all the wrecks right then! Alas, there is always tomorrow...

Historic wrecks

In addition to diving on three historic natural wrecks and on two of the three Naval ships in the park, I was able to explore a reef in the area. Perhaps my favorite site however, was on the *Canhoneira Faro* which translates to "Faro Gunboat," a steam-powered Portuguese Navy warship made of iron.

I would have to say, as a photographer I was delighted by the amount of marine life living on and hiding in what remained of the iron debris. Beautiful anemones seemed to be glowing blue color from their center while pink, lavender and red encrusting algae spotted protruding pieces of the ship. Orange and white gorgonians, tubeworms, small blennies, sculpins and sponges were everywhere.

One of the most interesting creatures was a small octopus, trying its best to build a wall of rocks and empty shells. When it saw me, or maybe it saw its reflection in my camera's dome port, it cautiously moved closer. I am used to



the giant octopus we have back home in British Columbia, the kind that will grab onto your camera and challenge you to a tug of war to get it back! No, this one was small, cute, and according to one of the dive masters, doesn't get much bigger. After a few minutes it went back to its construction, ignoring me altogether.

in the park and at the natural dive sites. I found the dive staff at Subnauta to be knowledgeable, friendly and all spoke English well.

Topside excursions

When not diving, I was able to easily walk around Portimao. The town

supported a nice variety of reasonably priced restaurants, all with exceptional wines. A boardwalk stretches along the beach from one end of town to the other, which I found nice for evening walks. Land-based and water tours are available, with most companies able to arrange transportation from your hotel or bed and breakfast.

A good place to spend a half day with the family or alone is at the Lagos Zoo. Here, I enjoyed seeing a wide selection of animals, birds, reptiles and flowers from around the world.



Afterthoughts

For a unique view of one of these ships sinking, check out the video, *17 Points of View*, at Oceanrevival.org. Greg Roots helped Canadian volunteer diver, Chris Straub, put up 17 Go-Pro cameras around the *Hermenegildo Capelo* before sinking. Viewers can see from different angles and locations on the ship, the water rushing in as the vessel sinks!

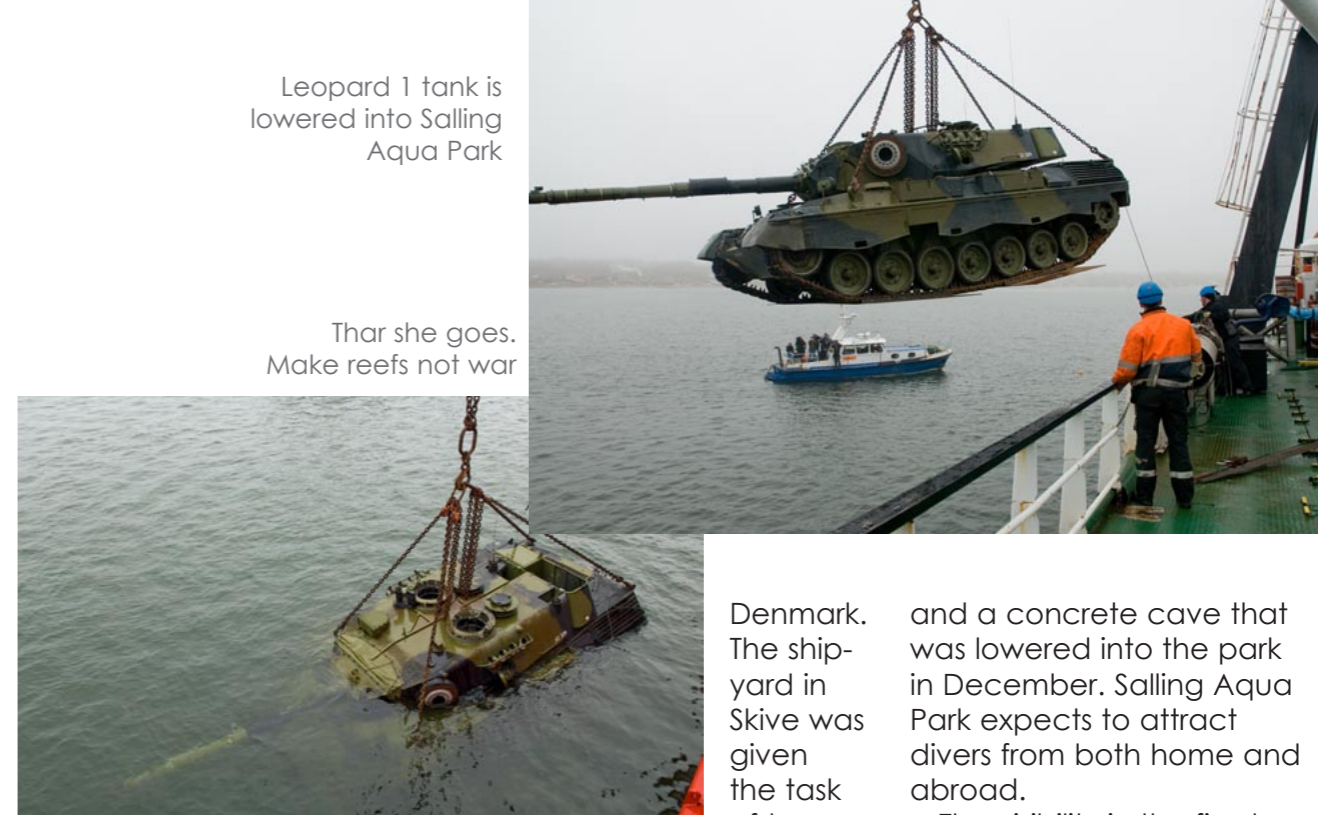
As with most ships of this size prepared and placed on the ocean floor for divers to enjoy and marine life to inhabit, it is wise to seek specialized training for overhead environments if you want to explore inside the ships. Because of their sheer size, it might also be more prudent to take a couple of dives to see it all.

Perhaps seeing the success of this project, as well as others before it, will be an encouragement for more countries around the world to brave projects such as this and sink their own reef of steel. ■

For more information, visit Ocean Revival Project at Oceanrevival.org; Subnauta at Subnauta.pt; Canadian Artificial Reef Consulting at Artificialreefs.net.



Swedish minesweeper M25 on its last journey to its final resting place in a Danish fjord



Leopard 1 tank is lowered into Salling Aqua Park

Thar she goes. Make reefs not war

Minesweeper and tank see new life as artificial reef in Denmark

Photos by Kim Meineche

This past March, the Swedish minesweeper M25 found its last resting place at a depth of 18 meters on the bottom of Limfjorden, in the Northwestern part of Denmark. According to observers, the old vessel sank and sat nicely on the bottom a few hundred meters off the coast of the

town of Glyngøre. "She stands the way she is supposed to, upright and resting on the keel, without a lean. We have, afterwards, also appointed ourselves the world champions in wreck lowering," said Jan H. Opstrup cheerily, as project leader for the Salling Aqua Park in



The former Swedish minesweeper M25 now rests at a depth of 18 meters and can be reached by swimming out from the beach.

A crab has now taken the Leopard tanks periscope into possession

Glyngøre.

Sport divers from the local area volunteered to help with the sinking of the minesweeper in the soon-to-be completed Salling Aqua Park next to Glyngøre. Many interested spectators from the surrounding communities came to see the sinking of the vessel despite the cold winter weather, which is typical this time of year in

72-year-old ship from the port of Skive to its final resting place near Glyngøre Harbour, where it was anchored to the bottom with four concrete blocks, which were sunk on the site in advance.

The minesweeper will be one of the main attractions in Salling Aqua Park, along with the Leopard 1 tank

Denmark. The shipyard in Skive was given the task of towing the

and a concrete cave that was lowered into the park in December. Salling Aqua Park expects to attract divers from both home and abroad.

The visibility in the fjord often leaves a lot to be desired but the proximity to the coast makes these new artificial reefs diveable straight off the beach which is definitively a bonus and the location within a fjord is not subject to wave action from the open seas. But do bring a torch local divers we have been recommended by local divers familiar with the site. ■ SOURCE: SKIVE FOLKEBLAD



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Confirmed: Lost 19th century wreck is U.S. Coast Survey steamer, NOAA says



USCS *Robert J. Walker's* unique paddlewheel flanges

The U.S. National Oceanic and Atmospheric Agency (NOAA) has identified a 153-year-old mystery wreck as the USCS *Robert J. Walker*, which was coming back home from a hydrographic survey mission in the decade before the Civil War when it met its demise in a collision at sea.

Twenty souls were lost on 21 June 1860 when the steamer that served the U.S. Coast Survey, which was a predecessor agency of the NOAA, was hit by a commercial schooner off the coast of New Jersey, sinking within just 30 minutes and marking the largest single loss of life in the Coast Survey history.

An important survey ship carrying 66 crew members, the USCS *Robert J. Walker* was responsible for charting the Gulf Coast and plotting the movement of the Gulf Stream along the U.S. eastern seaboard.

"Before this identification was made, the wreck was just an anonymous symbol on navigation charts," said the director of NOAA's Office of Coast Survey, Rear Admiral Gerd Glang. "Now, we can truly honor the 20 mem-

bers of the crew and their final resting place. It will mark a profound sacrifice by the men who served during a remarkable time in our history."

First discovered in the 70's Resting at 85ft, the *Walker* wreck site was first discovered by a commercial fisherman in the 1970s. Despite being regularly visited by divers, the wreck's identity has until now been a mystery.

Identification of the wreck was a collaborative process between public and private groups. Research in identifying the wreck was provided by New Jersey wreck divers; maritime archaeology student, Joyce Steinmetz, of East Carolina University; and Capt. Albert Theberge, a retired NOAA Corp captain and chief of reference for the NOAA Central

Library.

On-site clues were gathered by the NOAA Maritime Heritage diving team visiting the site on the NOAA Ship *Thomas Jefferson*, using multibeam and sidescan sonar systems. Identifying keys of the iron-hulled wreck included its layout and size as well as unique features such as its engines and rectangular portholes.

"The identification of *Walker* is a result of excellent collaboration with the local community," said director of maritime heritage for NOAA's Office of National Marine Sanctuaries, James P. Delgado. "We look forward to working with our local partners to share *Walker's* story with the public in a manner that both promotes educational dive tourism and protects this nationally significant wreck and gravesite." ■ SOURCE: NOAA

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NOAA OKEANOS EXPLORER

The two-masted ship may be 200 years old. Archaeologists have been able to recover some items like ceramics and bottles, including liquor bottles and an octant. Other items spotted among the wreckage are muskets, swords, cannons and clothing

Find three wrecks for the price of one

As marine archaeologists were examining a well-preserved shipwreck deep in the Gulf of Mexico, they also found two other sunken vessels that likely went down with it during an early 19th century storm.

The shipwreck appears to be an untouched, early 19th century, wooden-hulled, copper-clad vessel containing artillery and firearms.

The vessel's length is 84 feet and the most prominent feature of the site is the remains of the ship's hull covered with copper sheathing, which indicates a relative date of late 18th to early 19th century. The rake of the vessel at the stem and the stern suggest that it is potentially a clipper or shares attributes with this vessel type. While the hull might be the most prominent feature, the assemblage of material culture found on the shipwreck is extremely impressive and lends to the need for sampling and further study.

Little is known about the other ships, including the flag or flags they sailed under and the year they sank about 170 miles southeast of Galveston.

Although they weren't allowed to retrieve artifacts from the two new sites

under the terms of their agreement to examine the initial one, the researchers took thousands of photos and closely examined the wreckage of all three ships, which came to rest within five miles of one another.

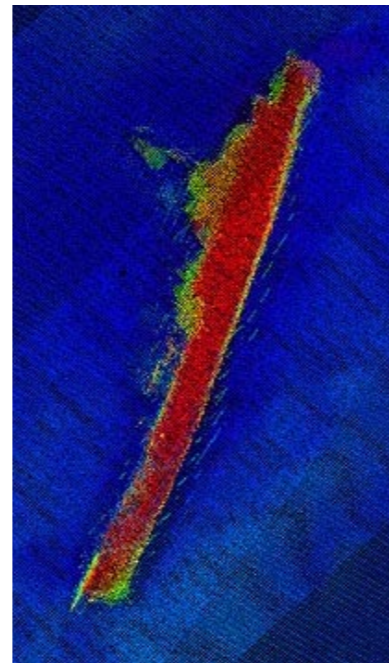
Two of the ships were carrying similar items, and researchers believe they may have been privateers, or armed ships that governments would hire, said Fritz Hanselmann from Texas State University in San Marcos' Meadows Center for Water and the Environment. The third vessel was loaded with hides and large bricks of tallow, suggesting that it may have been a prize seized by the privateers. ■ SOURCES: NOAA, TEXAS STATE UNIVERSITY

Royal Navy survey finds wrecks off Libyan Coast



(File photo) HMS Echo

HMS Echo used state-of-the-art sonar equipment to map the unseen wrecks, reefs and rocks of the Libyan coast and make navigation less hazardous. Significant discoveries included a number of uncharted wrecks in shipping lanes, which could have posed a danger to vessels.



In total, the ship's crew surveyed 46.8 square nautical miles, an area equal to that of just under 20,000 football pitches. All of the survey data will be shared with the Libyan Hydrographic Office in order for the area's charts to be updated.

In addition, specialists from the ship passed their expertise on to members of the Libyan Navy who spent several days on board. The sailors learned the

modern surveying methods including side-scan sonar, satellite positioning and electronic data collection to allow the Libyan Navy to take responsibility for mapping their waters in the future. The operation was the ship's second visit to Libya following a successful trip in 2012. Echo was launched at Appledore in Devon in 2002, and was designed to carry out a wide range of survey work, including support to submarine and amphibious operations, through the collection of oceanographic and bathymetric (analysis of the ocean, its salinity and sound profile) data. Echo left Devonport in the first week of 2011 on a two-year deployment to the Red Sea, the Gulf, the Indian Ocean, the Middle and Far East and returned to home waters at Devonport in August 2012. After spending two months in Falmouth for a revamp, the specialist survey ship spent the final weeks of last year putting would-be navigators through their paces in the waters off the southwest of England. ■ SOURCE: ROYAL NAVY

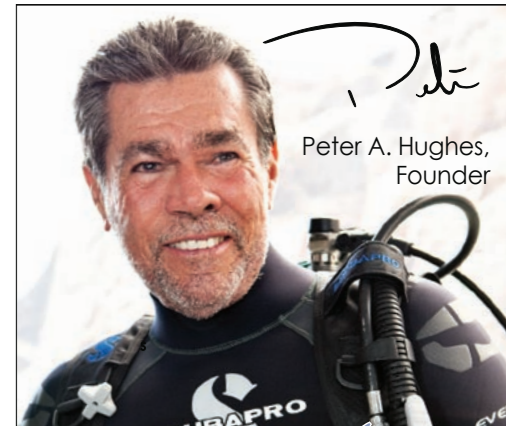
Turkish shipwreck survey in ancient Troy

An international team of archeologists sponsored by the Institute of Nautical Archaeology (INA) and the Honor Frost Foundation have been granted a permit to survey the waters around the ancient city of Troy (located in northwest Anatolia in Turkey), as well as the entrance to the Dardanelles (the

narrow strait in northwestern Turkey, which connects the Aegean Sea to the Sea of Marmara). The team will collaborate with Harun Özdaş, INA research associate from Dokuz Eylül University Marine Science and Technology Institute.

The researchers will focus on the trade routes that lead to the

entrance of the Dardanelles, formerly known as Hellespont. The team will conduct a systematic shipwreck survey of Gokceada and map WWI remains of the famous naval battles known as Gallipoli, or Dardanelles Campaign. ■ SOURCE: NAUTICALARCH.ORG



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Edited by Larry Cohen

Divers from the United States can now explore Cuba

The United States partially imposed an economic embargo on Cuba in the fall of 1960. After Cuba nationalized the properties of U.S. citizens and corporations, the embargo was strengthened in 1962. From that time forward, U.S. citizens could not visit Cuba for tourism. They also could not do business or spend money there.

Many U.S. citizens do travel to

Cuba by entering illegally from other countries. The U.S. Treasury Department's Office of Foreign Assets Control does issue licenses for U.S. citizens to visit Cuba for humanitarian, cultural, religious and a few other special reasons. Journalists and professional researchers can get a license for work that will be published.

It is also possible for educational

organizations to get a people-to-people license. The purpose of this is for U.S. citizens to have meaningful interactions with the Cuban people and communities. Now a people-to-people license has been issued that involves scuba diving.

Diving in Cuba

Ocean Doctor, a nonprofit organization founded in 2004 by Dr David E. Guggenheim, who has conducted research programs in Cuba for nearly 13 years, has been granted a people-to-people license to run educational programs in Cuba for U.S. citizens. Transportation from the United States will be handled by Marazul Charters, which works with a number of charter airlines that fly between the United States and Havana.

Avalon Cuban Diving Centers will be in charge of dive operations and all logistics in Cuba. Avalon is the only dive operation with a permit to operate in the national marine park, Los Jardines de la Reina (Gardens of the Queen).

Cuban reefs are rich with soft corals sponges (left); Southern stingray (right) and Atlantic goliath grouper (far right) can be seen on most dives



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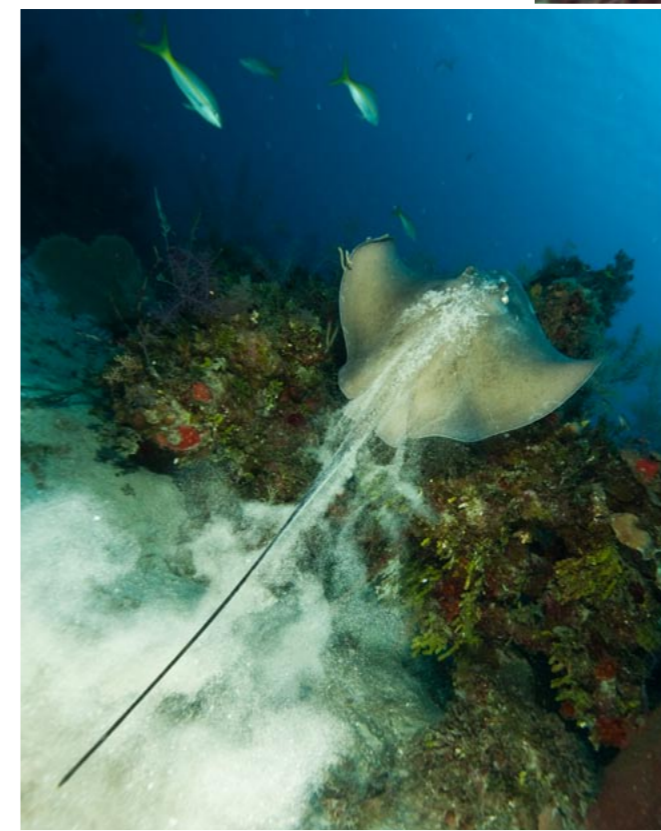
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National marine park

The tours are designed to educate U.S. citizens about conservation and ecotourism and how it affects the Cuban people and their communities. Participants will visit historic sites in and around Havana and will interact with Cuban scientists.

After leaving Havana, the group will travel south to visit and dive the national marine park. Christopher Columbus named the archipelago, which is located



in the park, in honor of Queen Isabel of Spain. The Cousteau crew visited the area in 1985 on the famous research vessel *Calypso*. It is also rumored that both Castro and Che fished and might have even dived these islands.

In 1996, the 837-square-mile area became a no-take reserve—the largest in the Caribbean—

and in 2010, was designated a national park. For several years, researchers from Ocean Doctor have been studying this area with the Cuban Center for the Study of Coastal Ecosystems and the University of Havana's Center for Marine Research.

Getting to the marine park is an adventure. The journey from Havana starts at 5:30AM with a five-hour charter bus ride to the small fishing village of Jucaro. At the marina, participants board one of Avalon's four liveaboard vessels or the water taxi for a





Caribbean reef sharks call Cuban reefs home

researchers studying how ecotourism is improving the environment and the lives of local people and their communities. Proceeds from this program will be used to fund additional research and conservation efforts in Cuba.

The program is scheduled to start in late September 2013. For more information, visit: OceanDoctor.org/Gardens.



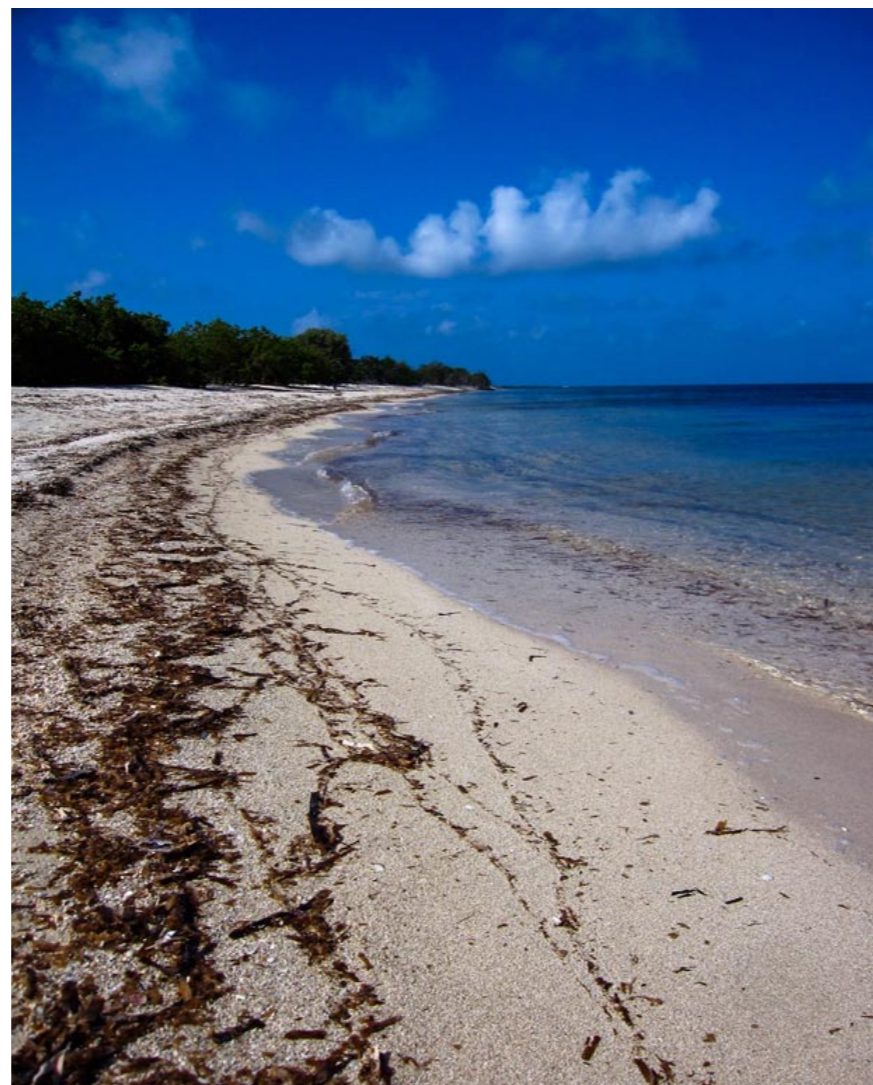
A unique educational program focused on conservation, ecotourism & diving in the heart of Cuba's spectacular Gardens of the Queen National Park



three-hour boat ride to Tortuga, a floating hotel.

The marine park has an exceptionally healthy marine ecosystem. Coral and fish populations are abundant. Fish populations include black grouper, tarpon, Cubera snapper and mahi-mahi. The critically endangered Nassau and Goliath grouper are found in large numbers. The area also harbors an abundant population of Caribbean reef and silky sharks. In the fall, whale sharks migrate through the area.

Travellers will visit coral reefs, mangroves and secluded beaches, but this is by no means a vacation. Divers will interact with local



Beautiful secluded beaches will be visited during the educational programs in Cuba; Christmas tree worms on reef (center left)

www.OceanDoctor.org/Gardens



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The diving community gains three deco chambers and loses one

The good news is that the Hyperbaric Unit at Gozo General Hospital (GGH) has reopened, and the deco chamber on the Mediterranean island is now oper-

ational and able to treat diving emergencies. The Maltese Ministry for Health is also planning to train two further doctors in hyperbaric medicine at the GGH.

High speed internet in planes next year

Would you like to be able to view streaming video such as Netflix while on board a plane, but the connection is too slow? Well, this could soon change, as the communications regulator Ofcom has proposed licensing a new satellite system called Earth Stations on Mobile Platforms (ESOMPs) which can deliver internet connections up to ten times faster than what is currently available to travellers on planes, trains and ships. ■

Mosquito repellent

A new wearable anti-mosquito patch has been developed, which will protect you from mosquitos for 48 hours. Called the Kite Patch, the stick-on can emit compounds that make it so mosquitos cannot detect carbon dioxide, and hence, cannot detect you. The patch developed by ieCrowd and Olfactor Laboratories is a major breakthrough in the fight against malaria, dengue fever and west Nile virus. ■



Meanwhile, quite some way from the Med, the Pacific Grove Hyperbaric chamber on the Monterey Peninsula, California, USA, has also reopened. The National Oceanic and Atmospheric Administration (NOAA) funded technical repairs; chamber volunteers, dive-community donors, city officials, the Monterey Bay Sanctuary Foundation and other marine research institutions also pitched in. The City of Pacific Grove, on the Monterey Peninsula, has provided medical treatment to injured divers with its hyperbaric chamber since 1966. The City of Pacific Grove provides for many of the chamber's operation needs, yet the facility needs continued fiscal support to offer

these important medical treatments.

We have also learned that St. Francis Hospital and Medical Center in Connecticut, USA, has purchased two hyperbaric chambers. While these are intended primarily for wound care, a press release states that treatments are also offered for decompression illness.

In the not-so-great news department, we have also learned that Bartlett Hospital in Juneau, in Southeast Alaska, has dismantled its compression chamber used for diving emergencies. Divers in Southeast Alaska requiring emergency treatment in a hyperbaric chamber will now have to go all the way to Anchorage or Seattle. ■

Helpful travel websites

Check out Knowdelay.com and Expertflyer.com.

Knowdelay helps travellers avoid flights in the United States with the greatest chance of delays due to weather. Although they do not claim to predict the weather, Knowdelay has created a formula using different weather models in order to gauge the impact of weather events, up to 100 miles away, on airport performance. With a red, yellow and green warning scheme, you can

see which flights have the most chance of experiencing delays.

ExpertFlyer was created to help travellers wade through all the airline flight information available when considering their next trip. While the site does not sell tickets, it can give travellers the best information on which flights they should take, what the fares are, where the best place to sit on the plane is and how to best utilize elite upgrades and frequent flyer miles—so travellers are thoroughly briefed on the options before they purchase tickets online or off. ■

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A large, brown, mottled cuttlefish is the central focus of the image, resting on a coral reef. The cuttlefish has a yellowish-green eye and a prominent, curled mantle. The reef is composed of various coral species, including a large, brown, branching coral on the left and a smaller, white, branching coral on the right. The background is dark, suggesting a deep-water environment.

Critter Central Lembeh Strait

Text and photos by
Andrea & Antonella Ferrari

— *Fantastic Muck Diving in Indonesia*



Large paddle-flap scorpionfish shows its unmistakable gargoyle-like profile

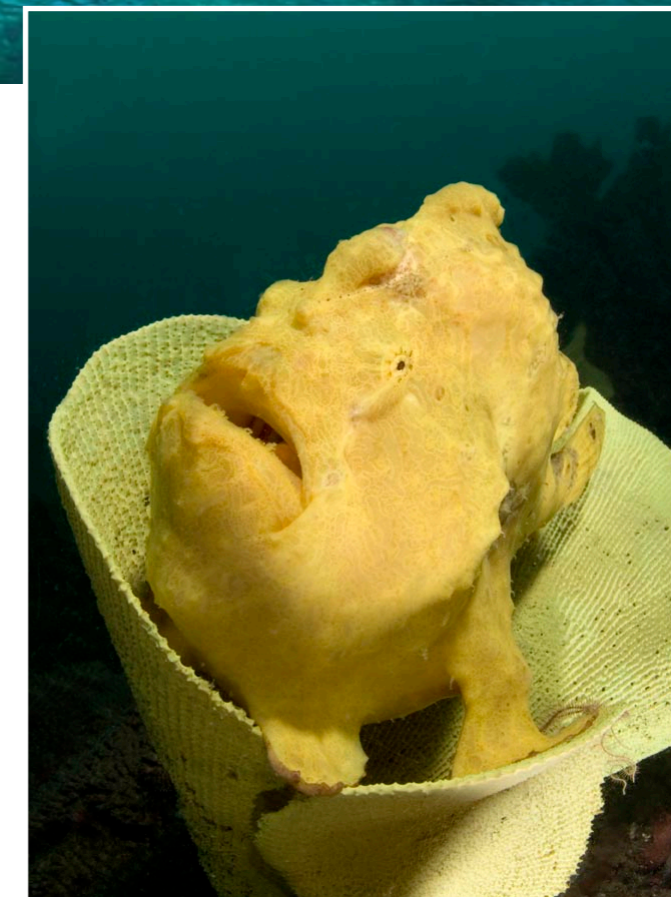


PREVIOUS PAGE: Cuttlefish in defensive posture. Kungkungan Bay Resort (above)

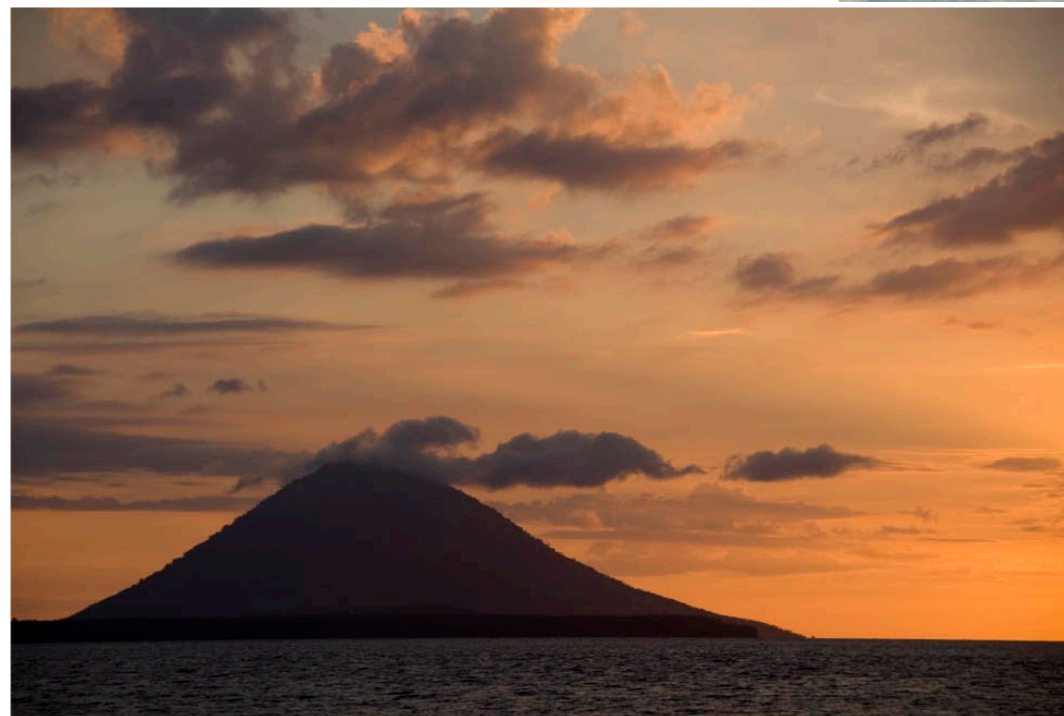
The world's full of triangles. There's the Love Triangle, the Golden Triangle, the Bermuda Triangle... and then of course, most relevant of all to us divers, there's the Macrolife Triangle, that blissful figure made up by the Malaysian islands of Lankayan and Kapalai and—at the northern tip of the Indonesian island of Sulawesi—the Strait of Lembeh. Everybody today knows about muck diving—the concept of looking for strange and grotesque macro critters in coral-poor areas with medium or downright bad viz—but not everybody knows this is where it all began, circa 15 years ago.

A young American diver and entrepreneur just happened to discover the then-unknown place—a sea channel less than 40 meters at its deepest and less than one mile at its widest, leading from the harbor town of Bitung to the open sea on the eastern coast of

Northern Sulawesi—at the same time falling in love with a plantation set in an idyllic little bay between a rugged, jungle-covered rocky slope at its back and the black volcanic sand beach on its front. Ditto, the legendary Kungkungan Bay Resort (KBR) was born!



Giant frogfish nestled in sponge



professional DSLR underwater photographers, a new price policy put in place has given KBR

covered in thick greenery, sea eagles soaring above and colorful local fishing boats passing by.

But it's the diving which makes Lembeh so unique. Being close to a very deep water area featuring daily cold-water upwellings, the sandy and silty sea bottoms of the Strait of Lembeh host an enormous variety of rare species, which are common here but almost unheard of everywhere else.

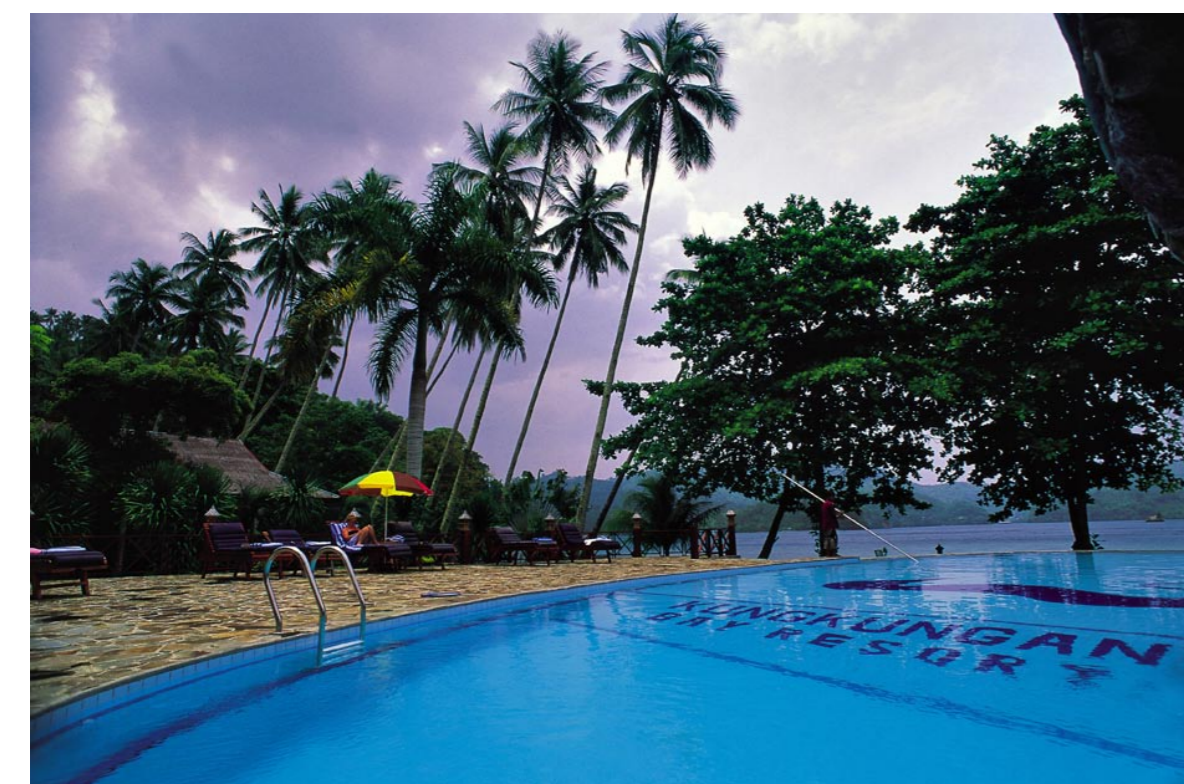
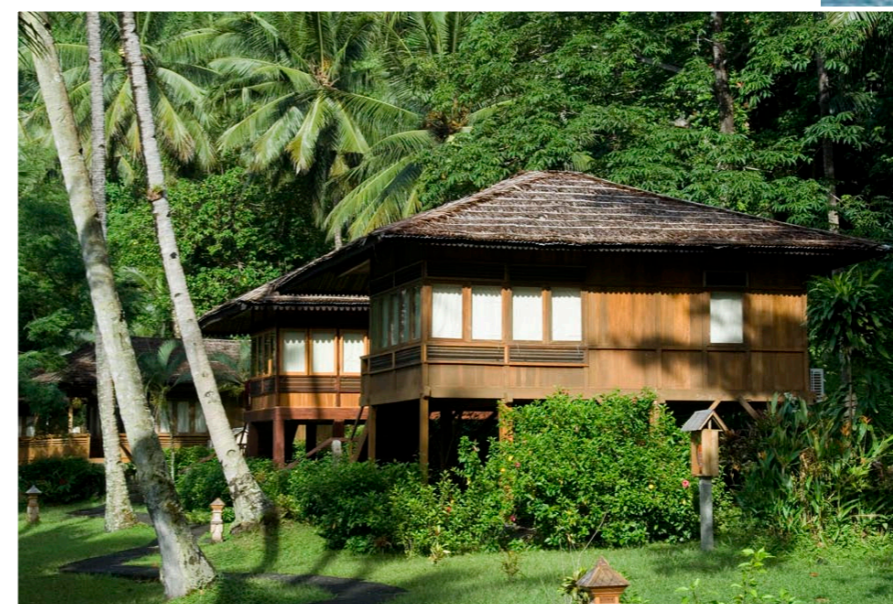
Even common species here come in dazzling and unique color phases, this fact being due both to the dark volcanic sand on which they live and some other undiscovered factor. The weird, the grotesque, the rare

a new lease of life. People are flocking to the place and its lovely bungalows by the sea, and a beautiful swimming pool has been added to the grounds.

With several more top level dive resorts now springing up close by and the Lembeh Strait soon to be declared a Marine National Park by the Indonesian authorities, the future of this very special dive destination seems at last truly assured.

A unique location

What is so special about the place? Well, everything. KBR, being the first dive resort, was able to pick the best location, and its setting is truly idyllic. The surrounding panorama above water is simply enchanting, with steep, rocky slopes



It soon became a famed destination all over the world for unusual, spectacular species, especially for those in the most affluent areas of the United States—but the catch was

in its very high price policy, which put it outside the range of common mortals.

Now, luckily for both the crowds of point-and-shoot users and the more

THIS PAGE: Scenes from Kungkungan Bay Resort



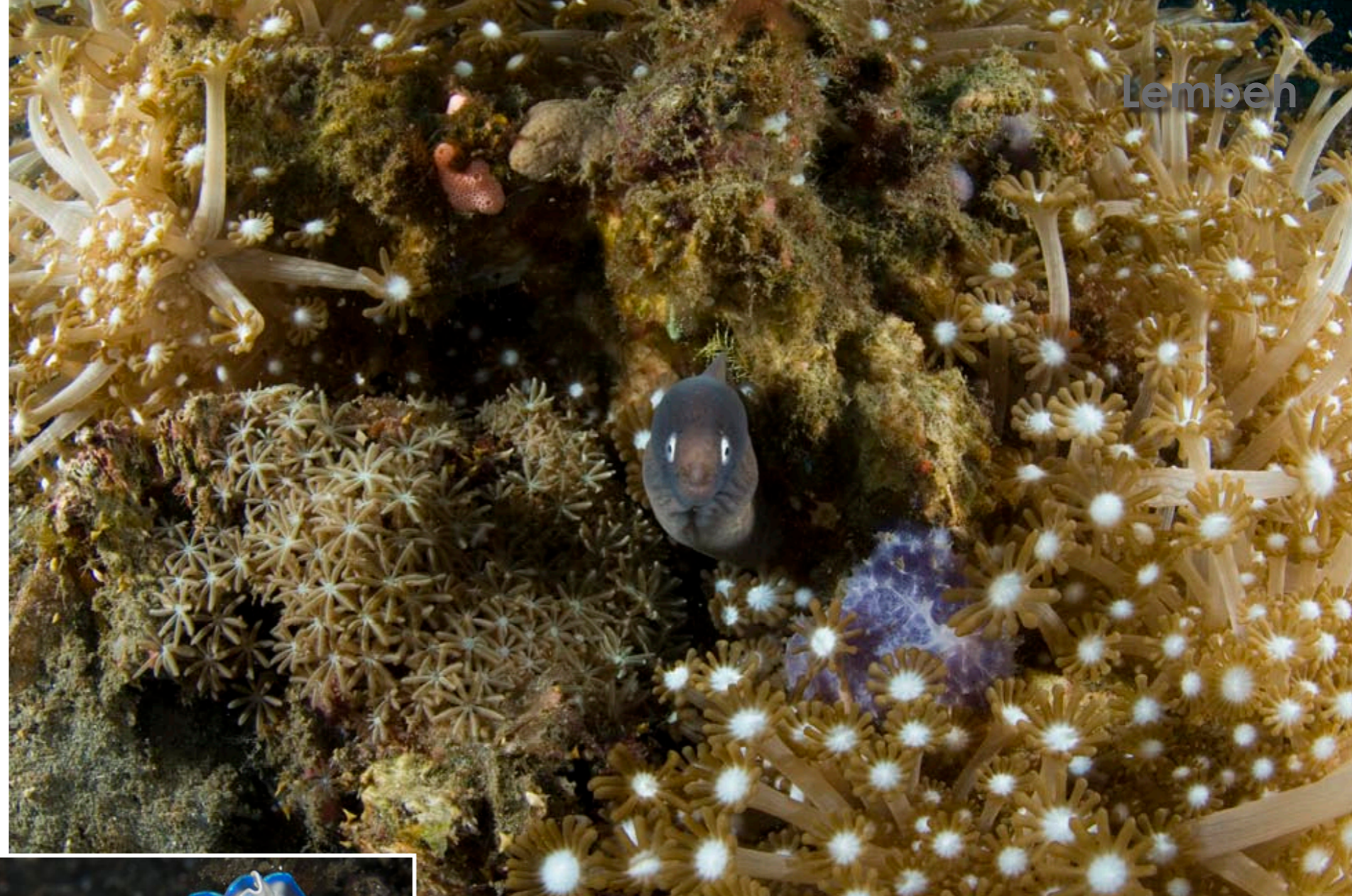


Lemon yellow leaffish (left); Moray eel peers out of its lair in the reef (right); A bubble shell sea snail prowling at night (center inset); Hairy frogfish on Lembeh's dark volcanic seabed (lower left)

and the downright absurd are a daily occurrence at its dive sites.

This is a destination where it's not uncommon to find holy grails like weedy and paddle-flap rhinopias, Ambon scorpionfish, mimic octopus and wonderpus, pygmy seahorses, blue-ring octopus, hairy octopus, flamboyant cuttlefish, boxer crab and tiny orange-rimmed baby batfish on a daily or weekly basis—it's a place where after a few days, it's easy to become so spoiled that you'll just give a passing glance and no more to uncommon species like painted and clown frogfish, thorny seahorse, cockatoo waspfish or mandarinfish.

But that is not all, as the Lembeh Strait, which has become so famous for its world-class muck diving, offers in fact first-rate coral reef dives on quite a few spots, such as Angel's Window or California Dreaming. We know. We've been able to photograph there



some very rare species of butterflyfish and wrasse we'd never seen anywhere else! In any case, and whatever you're looking for (well, except for

big sharks—but in fact we have seen large eagle rays there!) the Lembeh Strait offers unsurpassed photographic opportunities.

The diving is very, very easy—shallow water, no currents, unbelievably good and very experienced dive guides. Most dive sites are just a few minutes away by KBR's speedboats—and after



Angry devil scorpionfish in defensive display to intimidate intruders





Orange mantis shrimp hiding in volcanic substrate (above); Orang-utan crab (top center); Tiny coin-size wonderpus in display to intimidate intruders (right)



Halgerda nudibranch

night dives (something you do not want to miss here!) you'll always find a warm, dry towel and a mug of hot chocolate waiting for you back on the boat.

KBR and the other resorts normally offer three daily dives—two in the morning and one in the early afternoon, plus night dives and unlimited house reef diving. Groups are kept to a mini-

mum—no more than four divers for each guide (in some resorts no more than three), for maximum freedom and photo opportunities.

Given the tight dive schedules (and the longer than usual dives you'll be enjoying, even if the official limit is 45 minutes) being on time at dive boat departure time is of paramount importance for everybody, so be punctual.

One last recommendation: the fascinating array of Lembeh mari-

ne species requests some reading beforehand to be fully understood and appreciated, so be good and do your homework. There's plenty of great guidebooks out there to prepare you for this bit of underwater paradise!

A fragile ecosystem

The Lembeh Strait is an almost unique ecosystem, and as such it deserves all the protection we can give it. While most resorts

Lembeh



Richly populated reef garden with blue seastar



CLOCKWISE FROM LEFT: Giant frogfish; Zebra crab sitting well protected among the highly venomous spines of a fire urchin; Thorn-back cowfish; Snout of a blue ribbon eel



Strait one mostly dives in, well, garbage) it is a fact that the success of the place has led to an exponential increase in the numbers of resorts and consequentially visiting divers.

Some dive sites—especially the most famous ones—risk being overdived, provoking the disappearance of those same rare species people are coming to see. Declaring the area to be a National Park soon is very good news indeed, but at the same time it is imperative for all

the dive operators in the area to agree on common, strict rules: divers, especially photographers, must learn not to pester their dive guides with obsessive requests (which will lead to excessive disturbance of the environment to satisfy their gluttony) and a firm rotation on the most frequently visited dive sites like Hairball, Jahir or Nudi Falls must be enforced as soon as possible.

Lembeh is a fragile masterpiece, and none of us wants to see it broken to pieces by visiting, uneducated divers or overenthusiastic dive operators.



are today enforcing a strict no-gloves dive policy (something we actually do not agree with, as we believe fingertip

control can actually avoid damage by clumsy divers—it also seems a rather ridiculous request when in the Lembeh

Brilliant in Black.



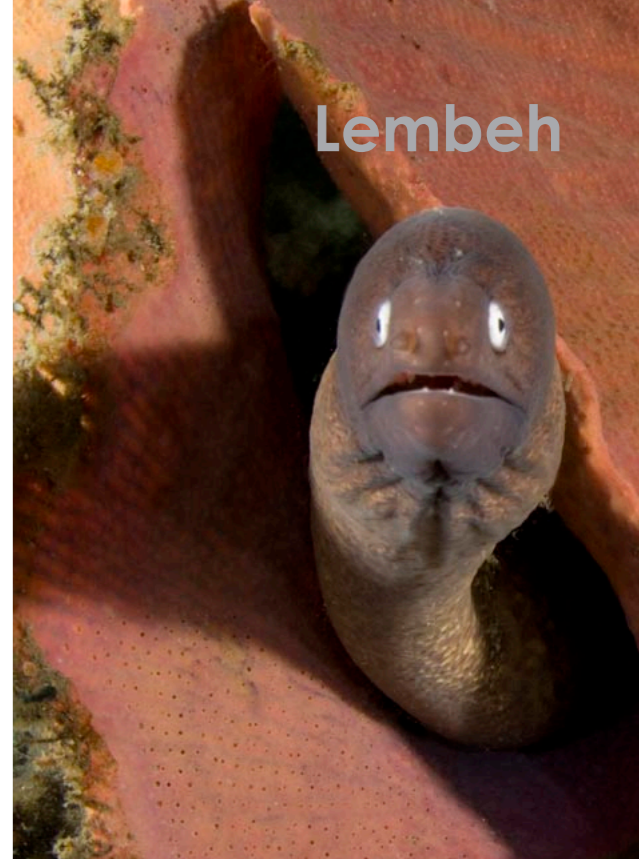
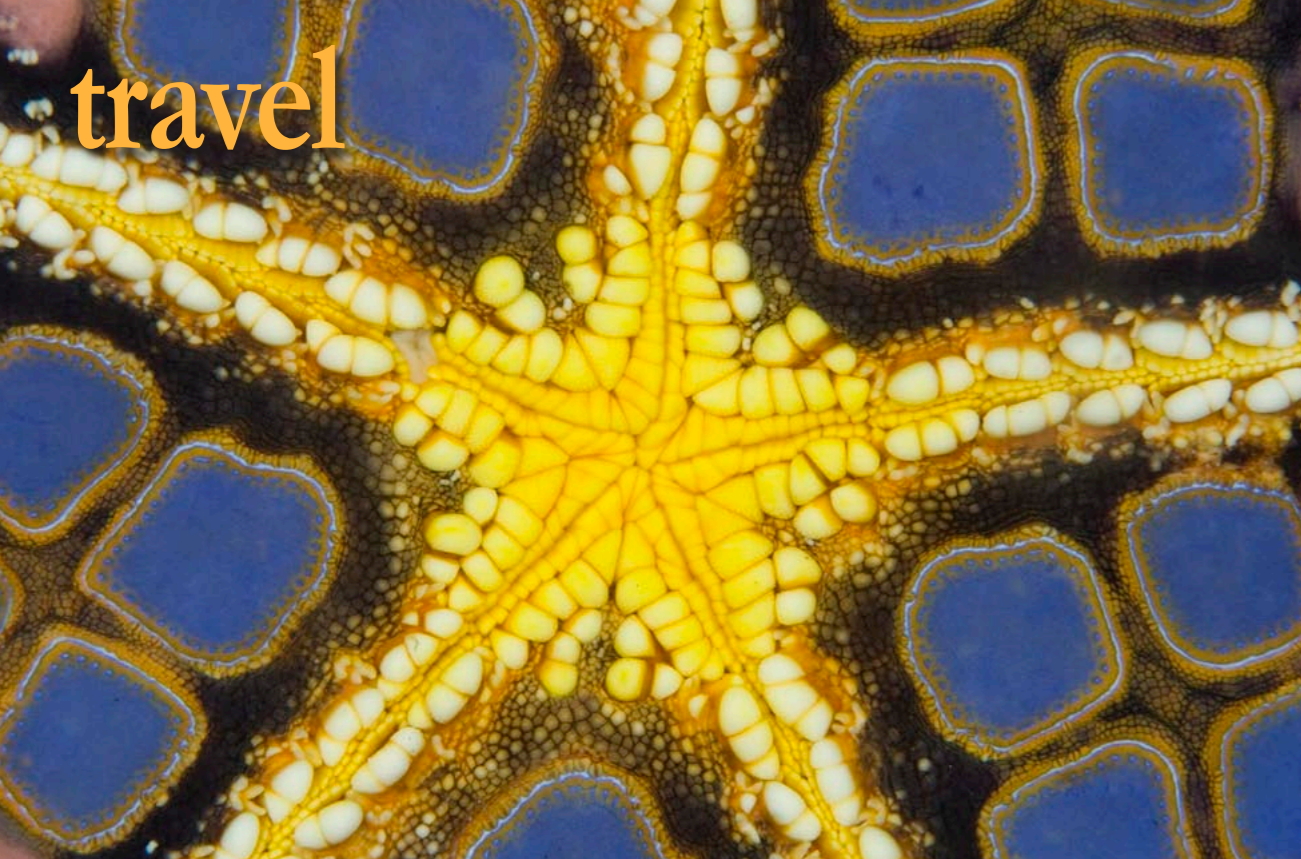
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Lembeh



Zebra batfish juvenile



General information

Kungkungan Bay Resort (www.kungkungan.com) and several other dive resorts on the Lembeh Strait can be easily reached with a couple of hours drive from Manado. Your travel operator will arrange everything from you.

One word of advice: water temperature in the Lembeh Strait is appreciably lower on average than the rest of Indonesia (think 24-27°C) so a 5mm wetsuit or a vest under a 3mm wetsuit will be handy. A full hood will also help in avoiding head- and neck-aches in the cold water.

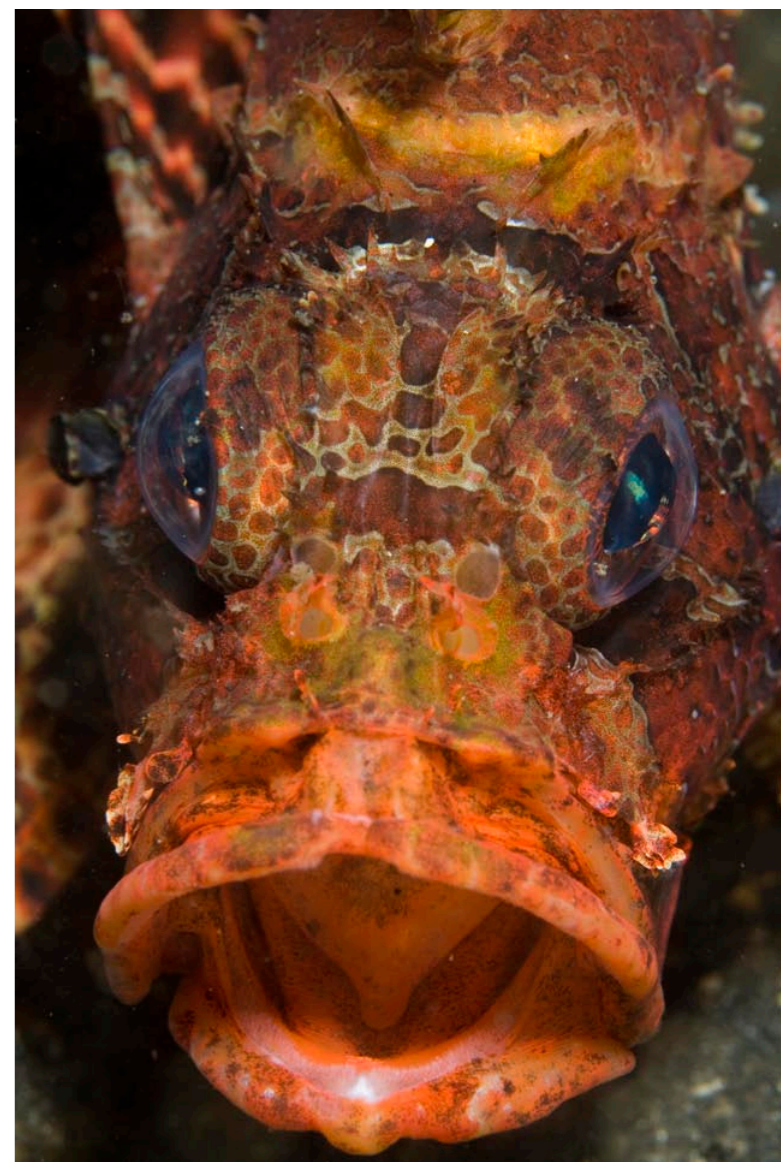
camera room by the dive center where shutterbugs can leave their equipment overnight to dry and re-load batteries. Power is on 24 hours a day; 220 and 110 volts are both available.

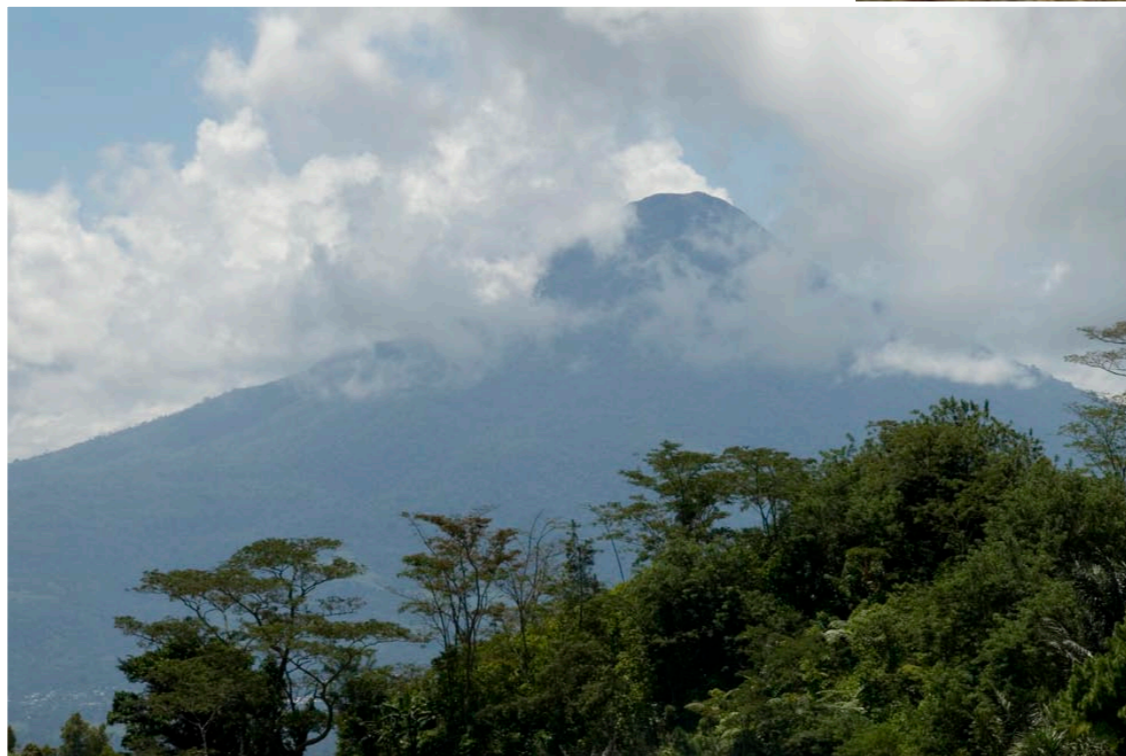
Dive guides—especially the younger guys—are generally eagle-eyed

CLOCKWISE FROM TOP LEFT: Close-up of the tiled bottom face of the pincushion seastar; Close-up of wonderpus in full display; The mad-doctor glare of a white-eyed moray eel; The ominous yawn of a small dwarf lionfish; The nocturnal Napoleon snake eel; Pair of cockatoo waspfish on dark volcanic substrate

and highly motivated, being very proud of working here. This is a place where a good tip is mandatory.

No visas are needed upon entry in Indonesia, but nationals of several western countries have to pay a hefty fee in Manado Sam Ratulangi Airport's immigration office both when entering and exiting the country.





THIS PAGE: Scenes from Tangkoko National Park including the highly social black or crested Sulawesi macaque (far left) and the strictly nocturnal Sulawesi tarsier (right)

Land excursions

Northern Sulawesi encompasses a large area of exceptional natural beauty, with breathtaking landscapes and unique fauna. Divers have the bad habit of seldom looking around when on holiday, but on this occasion, it would really be a pity not to engage in some hiking or car touring, especially since most dive resorts readily offer affordably-priced excursions with excellent English-speaking guides and

extremely comfortable transportation.

Two destinations the discriminating traveller cannot afford to miss while in the are Tangkoko National Park and the Minahasan highlands. The first can be reached by a one- or two- hour scenic drive from most resorts in the Lembeh Strait and then can easily be visited on foot.

The coastal lowland deciduous forest is the home of at least three large troops of the endemic and highly

sociable black or Sulawesi macaque (*Macaca nigra*) and the haunt of several family groups of the fascinating Sulawesi tarsier (*Tarsium spectrum*), the smallest primate in the world, which lives inside the hollow trunks of strangling figs and which can be reliably observed at several locations inside the park at twilight. Longer (from three to five hours) hikes in the forest will also result in sightings of shy but spectacular hornbills, reptiles and insects.



The second trip lasts all day and will take you to the cool and beautiful Minahasan highlands, rich in local culture and scenic landscapes. One of the highlights of the excursion is the midday visit to the colorful and noisy local market at Tomohon, which offers many interesting opportunities to photographers.

Just make sure to avoid the



Andrea and Antonella Ferrari are widely-published dive writers and underwater photographers based near Milan, Italy, who have authored several dive guides and books on dive travel. For more information, visit: Animamundimag.com



"meat" section of the market, where unaware visitors will be faced by the gruesome and heart-rending spectacle of desperately yelping dog puppies being slaughtered for the table, together with roadside stands offering kebabs of freshly grilled jungle rats and half-roasted, scorched fruit bats. Telling your guide in advance will guarantee you'll be spared most of these shocking sights if you—like us—would rather avoid facing them.

Besides the market, you'll also enjoy spectacular sights of rice paddies,

terraced cultivations and jade-green volcanic lakes. The local Minahasans inhabiting this verdant, fertile area are very active in farming, pottery making and wood-working. They are also quite good looking, exceptionally friendly and said by other Indonesians to be of Cambodian origin. ■



THIS PAGE: Scenes from the colorful local market at Tomohon

Painted frogfish
masquerades
as an orange
sponge

Fish-Eye for Critters

In the Lembeh Strait

Text and photos by
Andrea & Antonella Ferrari

The apparently contradictory choice of adding teleconverters to fish-eye lenses to obtain arresting “wide-macro” images has long been adopted by many rainforest and insect specialists—notably Frans Lanting, the grand master of them all—while several Japanese authors have pioneered its use in underwater photography since the last decade. This unusual combination allows an extremely close approach to small subjects, offering at the same time the opportunity to keep a large area of surrounding environment or background in the image frame, with little or no peripheral distortion and with the added bonus of an absolutely spectacular depth of field.

Simply put, this technique allows the photographer to obtain truly unique and very personal images, which deeply contextualize the subject in its natural habitat—something most macro lenses, such as the 60mm and the much-loved 105mm, rarely

permit in this age of reduced size digital sensors.

I had long been intrigued by this visionary technique since admiring many close-up and truly arresting rainforest reptile and insect images taken by Lanting more than 15 years ago. But the long years of work

undertaken to put together all the images necessary to publish our books, *A Diver's Guide to Underwater Malaysia Macrolife* and *A Diver's Guide to Reef Life*, had restricted us to documentary-style profile shots to be strictly used for identification purposes by other divers and photogra-

phers—a hugely enjoyable job, which, however, prevented us from experimenting with more creative options.

Having just completed our new book, *A Diver's Guide to the Art of Underwater Photography*, we recently decided to go back to the Lembeh Strait in Northern

Sulawesi, Indonesia—a favourite spot of ours for relaxing muck diving and interesting new or rare species. Making our base at the much-loved Kungkungan Bay Resort for the fourth time, I soon found myself strangely and strongly dissatisfied by my 105mm—a lens that for many years





The bright colors of the zebra lionfish (above) and the clownfish in anemone (top) stand out against the dark volcanic seabed of Lembeh Strait

past had become an object of cult for me. Macro portraits seemed, all of a sudden, to have lost visual power. Creative apathy had set in. Fiddling in frustration, I suddenly realized that going "wide-macro" could offer the solution to the impasse—even if by definition, this technique, as suggested by our friend Alex Mustard, might actually end up being severely restrictive in the choice of subjects and could also create a lot of backscatter problems in the notoriously murky depths of the Lembeh Strait.

Anyway, there seemed to be no real choice, so I set

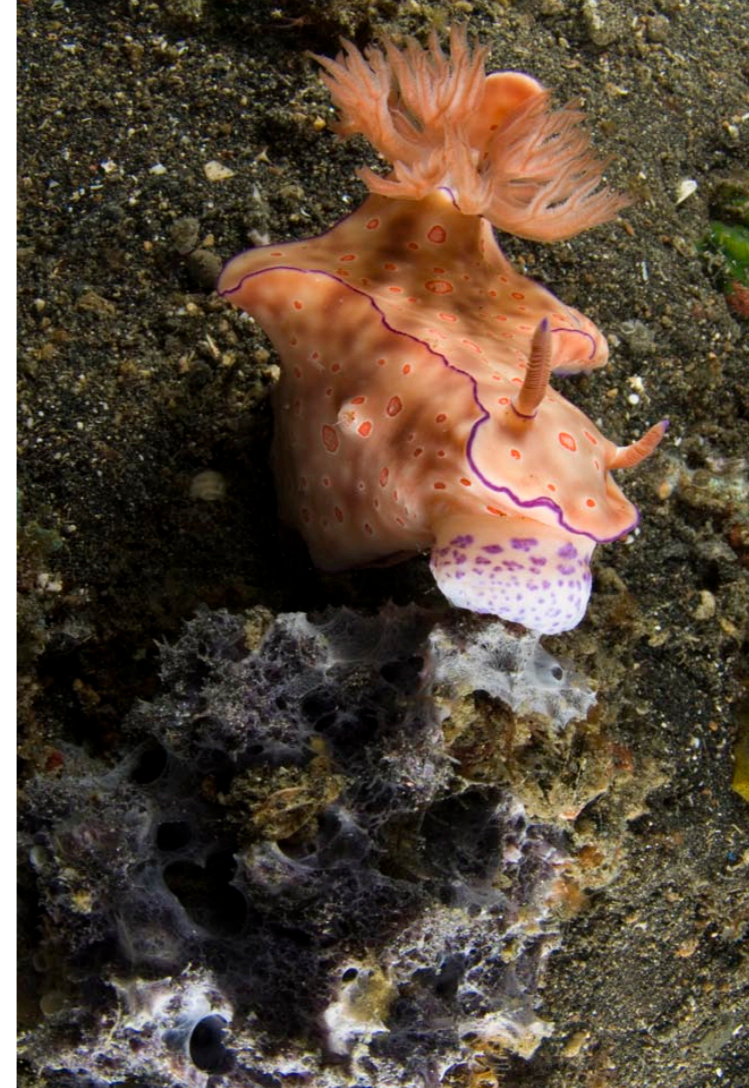
up my untried combo of the Nikon 10.5mm plus a 1.4 Kenko teleconverter and had it mounted on my D200 behind the smallish polycarbonate fish-eye dome of my Sea & Sea housing, which until now I had only been using with the 10.5mm alone or the 12-24mm zoom, in both cases with excellent results.

Intriguing results

Results were immediately intriguing. I have always been a strong supporter of the use of fish-eye lenses in shooting close-up images, but at the same time, I have also been regularly frustrated by the

Wide-Macro

Large *Ceratosoma trilobatum* nudibranch feeding on a sponge colony



strong peripheral distortion of the image created by the use of such extreme lenses.

With the new combination, I immediately found myself being able to get in physical contact with most subjects—actually brushing against cockatoo waspfish, devil scorpionfish, snake eels, frogfish and other critters—with the camera's dome, getting much closer than it had ever been possible in the past while using the 105mm flat port.

It was clear from the start that most species would not associate the approaching, reflective dome with an impending danger, and would



Paddle-flap scorpionfish



Strapweed filefish (above); Weedy scorpionfish (right) in its bright orange color phase is one of the most bizarre and sought after species of Lembeh—its richly ornamented livery makes it all but invisible among the coral rubble of the sea bottom; Napoleon snake eel (below) is a nocturnal predator

not perceive it as the gaping mouth of a looming predator as had always happened with the 105mm tubular port.

A slow and careful approach allows exceptional proximity to shy subjects. Now it became clear how rainforest photographers had obtained such spectacular images of tree frogs, gaping snakes and displaying praying mantises!

A few attempts immediately showed that to obtain the best results in lighting



and composition—particularly regarding later editorial use—required the subject to be strongly positioned off-center, as the usual rules suggest. This is easier said than done, however, at such short distances, and I suggest

photographers to focus on the subject's eye by half-pressing the shutter lever while it is in the center of the frame, and then to carefully recompose while keeping the shutter lever half pressed.

A slight peripheral distortion of the image becomes quite noticeable at

extremely short focusing distances, so framing becomes an enjoyable challenge—a few degrees above or under the horizontal will generate dramatic differences in the final composition.

Since most subjects in the Lembeh Strait are generally found lying camou-

flaged on the sandy, silty or rubble bottom and not on coral heads or walls as on a pristine reef elsewhere, one has to literally dig the lower third of the dome in the soft substrate to frame them more or less horizontally and not from above.

This is where a smallish polycarbonate



Porcelain crab and anemonefish on anemone (left); *Ceratosoma nudibranch* (below); White leaf-fish (bottom right); Yellow frogfish (bottom left)

Wide-Macro

next. I tried some creative experimenting here and there—holding the two Sea & Sea YS-120s close and in front, for example, as in normal macro photography, or above. But a few trial shots immediately revealed the presence of unwanted parasite reflections inside the dome (remember the

addition of the 1.4 teleconverter changes all the curvature ratios between the lens and the inner face of the dome) and an excess of backscatter “snowflaking” in the background.

I imagine the same problems—with possibly a slight reduction in the presence of unwanted



fish-eye or wide-angle dome wins hands down over a bigger and much more expensive glass one. There's little risk of scratching it while rubbing it against the coarse sand or even small sharp pieces of coral rubble, and even if this happens, the optical effects are quite negligible since small surface scratches can easily be erased later on (a glass dome would be ruined for good!).

This technique requires a delicate hand and some nerve, however, since sand ends up collecting

around the main o-ring grooves—a risky proposition. The remarkably short focusing distances involved also present the very real risk of actually bumping the dome into corals or rocks with serious risks of damage. So, I started closing in on the chosen subject while holding my left hand in front of the dome to protect it from car-crashing it somewhere unintended.

Lighting

Once the subject of composition had been mastered, lighting was

feature



Wide-Macro

Limited subjects?

But what about the subject limitations I had been warned about? Again, it soon became apparent there was no need to worry. If correctly and creatively used, the fish-eye lens plus teleconverter combination can successfully handle any stationary subject in the range size from a couple of inches to more than two feet in length, i.e. anything from a reasonably large nudibranch to a crocodile fish.

It gives its most striking results in the middle range obviously. You'll be able to get arresting

CLOCKWISE FROM ABOVE: Longnose hawkfish; Weedy scorpionfish; Crocodilefish resting on seabed; Cockatoo waspfish



backscatter—would present themselves in clear water, too. My conclusion and suggestion is to use both strobes in "wide-macro" as they would be in normal fish-eye photography—widely spread and positioned as far behind the actual dome as the length of the strobe arms would allow.

We are talking about an f2.8 10.5mm lens here, so there's plenty of ambient light coming in—even in the gloomy

waters of Lembeh—and while shooting at ISO 200 with a -0.3 or even -0.7 exposure compensation on my Sea & Sea TTL converter, I could get perfectly exposed images at f11, f16 or f18, ensuring razor-sharp focusing and exceptional depth of field in all images.

This is another wonderful side effect of the combo. One is shooting in macro mode without having to worry too much about losing sharpness and correct focus.





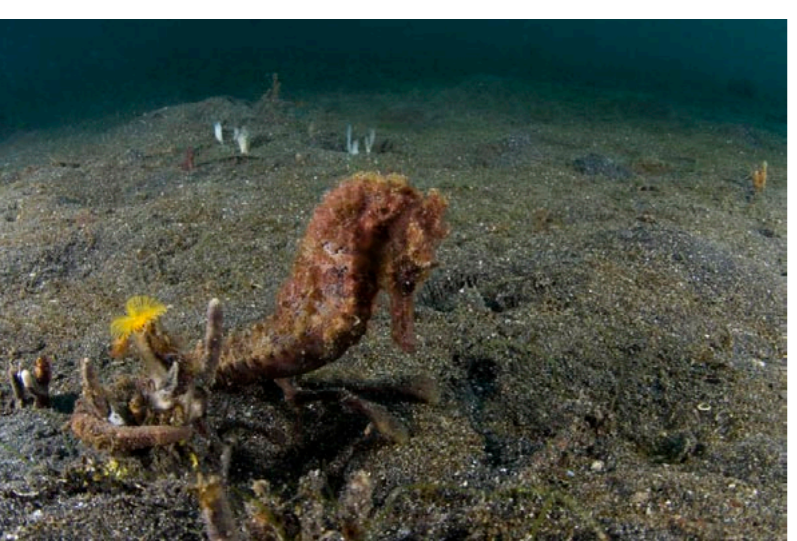
Porcelain crab on anemone (left); Lone seahorse hangs tenaciously to its perch in the endless, gloomy seabottom of Lembeh (lower left)

ful one has to combine the “macro frame of mind” (visually focusing on the main subject) with the “fish-eye one” (i.e. taking into consideration the background)—an interesting and engaging exercise in creative flexibility,

which will presumably lead to more compelling visual results and Doubilet-ish photographic results.

I can only imagine the striking images this solution could generate on colorful, brightly-

lit pristine coral reefs in clear blue water, and I am personally hooked. I cannot wait to try this wonderful and unsung technique on some weird rainforest creatures during our next trip to the tropics! ■



shots of frogfish, lionfish, scorpionfish, sea snakes and especially octopus including wonderpus and mimic, all spectacularly contextualized in a wide expanse of their natural habitat, which will stretch all the way in the background, mostly in focus and—if you have been doing your homework and using diffusers—softly, uniformly lit (remember to always keep diffusers on both your strobes, this is an absolute must in such close-up work with digital cameras!).

Stationary or semi-stationary subjects offer the best opportunities obviously, but I've got great results shooting small groupers or even fast-moving large wrasses with this technique. One is free to experiment given the broad latitude in the focused area.

Most importantly, however, to be truly success-

Burrfish and large leather coral on reef



Indonesia's North Sulawesi

—*Buyat Bay & Lembeh Strait*

Text by Kelly LaClaire. Photos by Kate Clark





Panorama of Buyat Bay. PREVIOUS PAGE: *Hypselodoris* sea slug at The End

—*X-Ray* dive team Kelly LaClaire and Kate Clark explore the waters of North Sulawesi, Indonesia, visiting the undiscovered and unspoiled reefs of Buyat Bay and enjoying muck diving in Lembeh Strait.

There are very few places in the world that remain unknown to the dive community. Let's face it, scuba enthusiasts are nothing if not resourceful when it comes to finding new and uncharted waters to dive in. But chances are excellent that when you read the title of this article you asked yourself, "Buyat Bay? Where the heck is that?"

That was exactly my reaction when I was first told about

this vibrant and breathtaking stretch of sea three hours south of the Lembeh Strait just off the Sulawesi mainland in Indonesia. Of course, like nearly every diver, I had heard of Lembeh and the wondrous creatures that call that famous sliver of water home, but Buyat Bay? Nope. That was a name I was totally unfamiliar with.

So, when *X-RAY MAG* was invited to dive in this still unspoiled and undiscovered part of the world, well, we jumped at the chance.

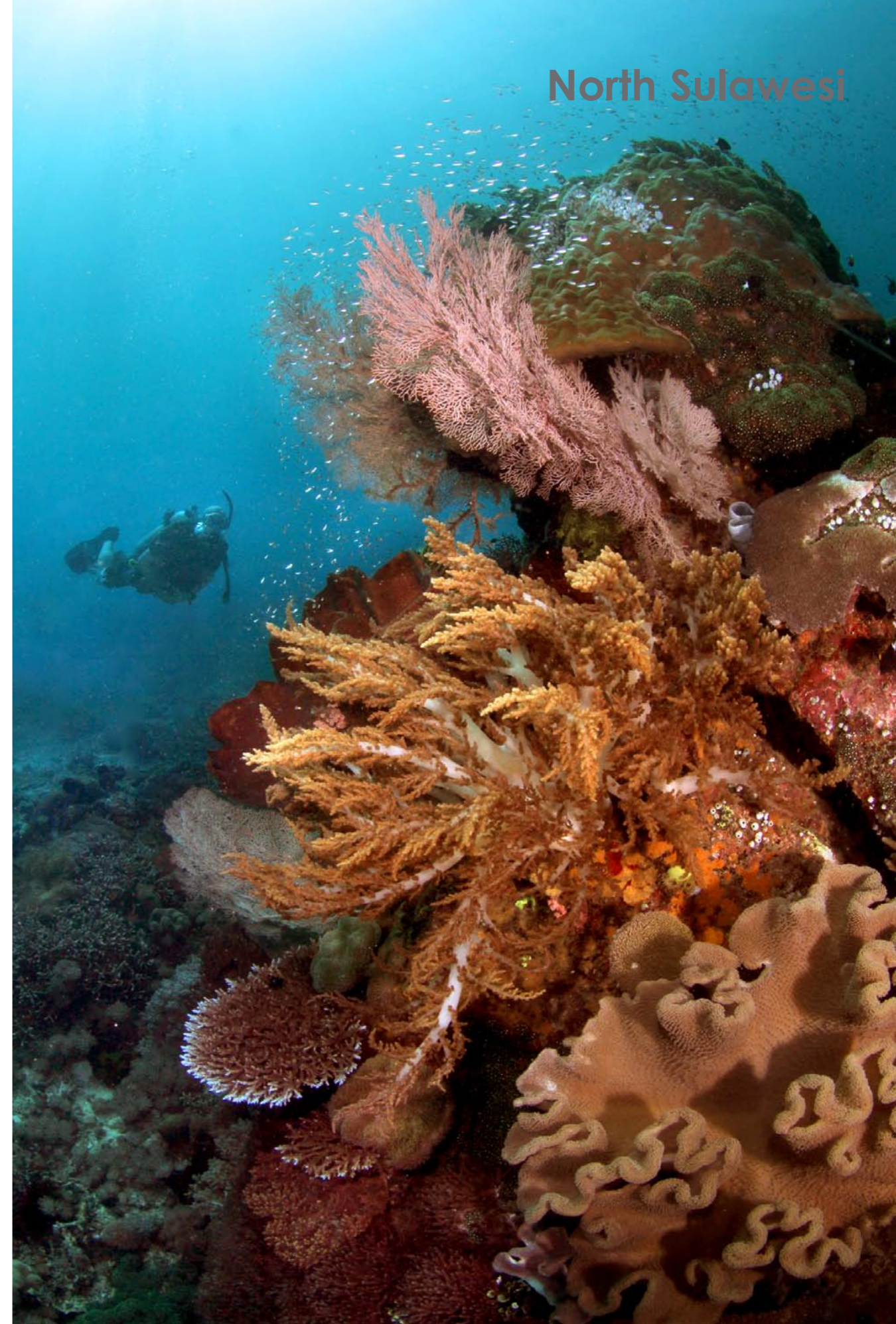
Endless coral

Kate, my cousin and photographer on this trip, was the first of our little group to roll off the dive boat, and as she was waiting for me to pass over her camera I saw her take a peek under the surface. "Oh my God!" she laughed, "Wait till you see this!"

The water was so clear in Buyat that it looked almost colorless through our masks, and as we drifted down, endless fields of staghorn coral



Purple soft corals at Pulau Rancun



Author, Kelly LaClaire, diving the coral gardens at Pulau Rancun



Glass sweepers at cleaning station, Pulau Tulang (above); Tricky-to-find tiny pigmy seahorse on muricella gorgonian (top center) can measure only 2cm; Banded pipefish at The End (right); Robe hem *Hypselodoris nudibranch* on green algae at The End (far right)

spread out below us, giving way to thriving meadows of dark green hard corals dotted with pink and yellow anemones. Colossal sea fans—deep purple and easily three meters across—scattered themselves across the rocky outcrops around the site. I'd never seen coral growth this prevalent or healthy. It was as if some master underwater gardener had sewn the purest and richest seeds in the most fertile seabeds on Earth and said, "Let there be coral!"

We levelled off a meter or two above the seafloor where a family of false

clownfish rushed at us, chomping and snapping at our masks, relentlessly defending their territory with heated vigor. Shifting schools of blue and yellow wrasse darted through our bubbles, while groups of triggerfish foraged for food and played tag below us.

Several moray eels were wavering sinusously back and forth in their rocky dens, and a blue-spotted stingray wriggled out of one of the rare sandy spots, giving us a menacing glance before quickly fluttering off. Kate put her first two fingers to her head and pulled an imaginary trigger

—"This is blowing my mind!"

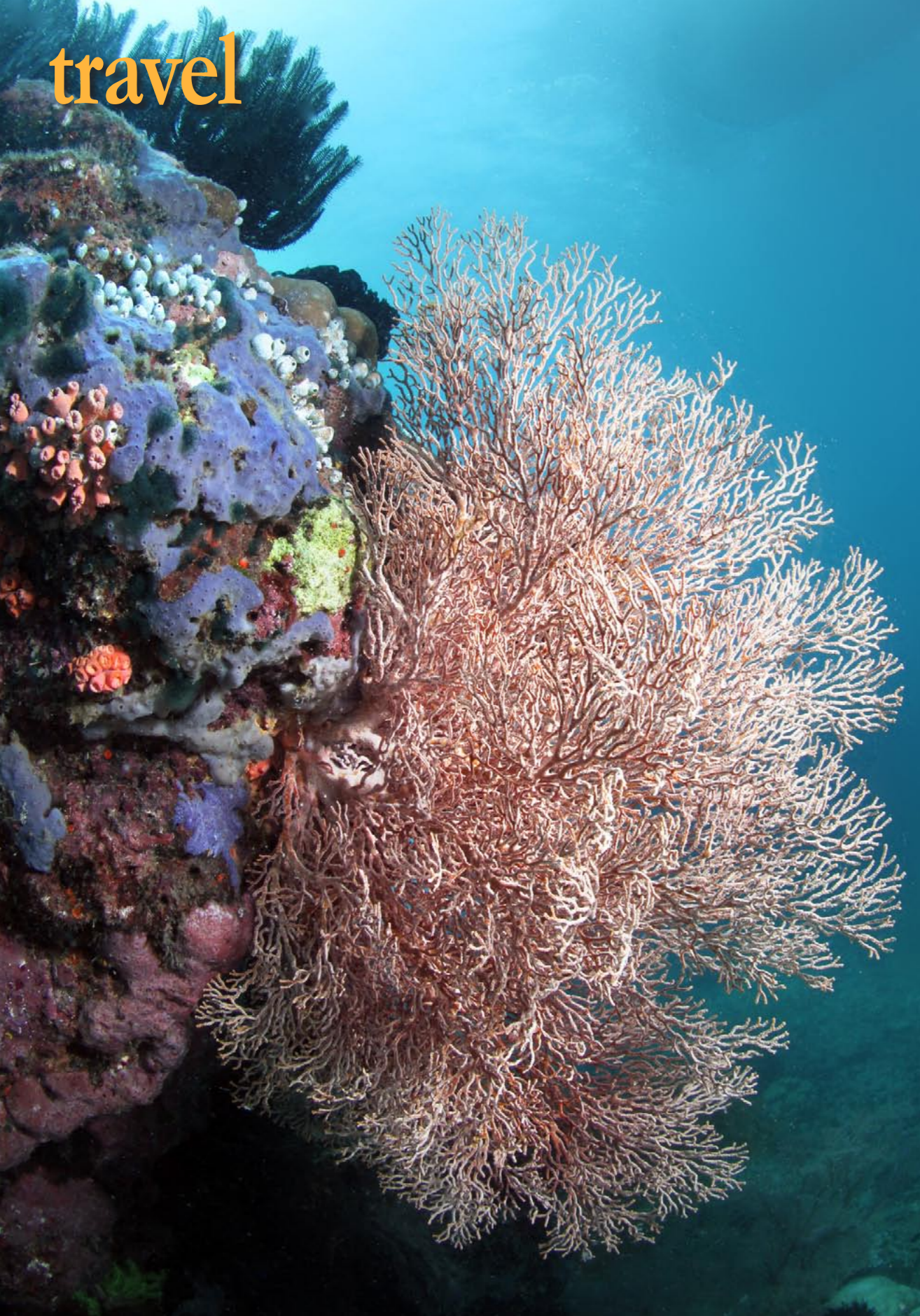
Our guide, one of several diving virtuosos from Critters at Lembeh dive center, shook a noise maker and pointed to a small pink mass of coral while flashing the "pygmy seahorse" sign. I got close, strained my eyes and shrugged, unable to see anything. He pulled out a long metal stick and pointed to a formless mass about the size of an apple seed. Still seeing nothing, I gave it up and swam off a bit, giving Kate the chance to capture it with her macro lens.

While she was setting up her shot, I

spotted a curious but timid cuttlefish a few meters away, and my body instantly responded with playful butterflies and lively, pulsing heart beats. I'd never seen a cuttlefish in the open ocean, but it

had been at the top of my bucket list for quite some time. He seemed to sense my excitement and obligingly began flashing colors like the world's most enthusiastic quick-change artist.





Kate moved in next to me, and I could hear her giggle behind her regulator. The timid cephalopod, unsure and wary,

turned a translucent white and raised two tentacles, but soon realized we were no threat and resumed showing off for the

camera after only a few moments.

Kate got a shot she was happy with and flashed me a wide grin I couldn't help but return. It was obvious we were both falling in love with Buyat.

Newmont Mining Camp

Our hosts, Miguel Ribeiro and Ana Fonseca, transplants from Portugal who manage Lembeh Resort to the north, joined us for our three-day stay at Buyat Bay and gave us a little history of our lodgings, as we headed to shore.

The area was originally an old mining camp for the Newmont Company that shut down operations in 2004. Now the small rustic cabins are used by Critters at Lembeh for short two- and three-day stays for customers who want a break from muck diving and the larger groups that fill the sites in the strait. We were the only boat in the area and the only guests on the trip, so we had the place all to ourselves.

The bungalows were small and aged but serviceable. Each came with a private bathroom and air conditioning but, honestly, this setting is not for everyone, and if a more refined, spacious resort is what you like when vacationing, then Buyat may not be the best choice. But if you're willing to rough it a bit—think sparse, summer camp living—then unspoiled water, endlessly rich coral and an open ocean devoid of tourists and other divers awaits you.

We spent the remainder of the evening getting to know the rest of our small group; three friends who belong to a dive club had gathered here to start an Asian diving tour of sorts, and they were just as excited as we were. Kate and I like them immediately, and we swapped cameras, *oohing*

Cuttlefish on reef (above); Pink gorgonian fan coral (left) and *Sarcophyton sp.* mushroom leather coral (top right) at Pulau Rancun



CLOCKWISE FROM LEFT: Community sack race; Kelly enters sack race; Fish farm harvest; Community bench at Buyat Bay; Girls playing together and piggyback race at community festival



swapping stories and culture over cold Bintang beer and exotic new foods is just about the best thing a person can do if they want to broaden their own viewpoint of the world—and I never tire of it.

New found fame

A yearly festival was taking place on the beach near the mining

camp. Local villagers were playing volleyball and soccer, while their children swam and splashed in the shallow waters of the bay. Kate and I wanted a few pictures, but we tried to keep our distance, cautious about intruding and becoming the bumbling, obnoxious tourists that make everyone cringe. Turns out, our fears were groundless.

As soon as we stepped on the beach, a crowd of people surrounded us as if we were members of a famous rock band. Nearly every person there wanted our picture, and mothers were passing us



their babies to pose with. Packs of teenagers shouted, "Hello!" and then ran off in fits of giggles. Little kids were hanging on our legs and asking us to swim with them. We spent an hour snapping photos, shaking hands and hugging total strangers who treated us like old friends come home from a long



journey.

Being a Caucasian male residing in the United States, I've never been a novelty or an object of any real interest, but suddenly our light skin was captivating and awe-inspiring. Dozens of

women were reaching out to touch Kate's blonde hair, and one older grandmother, who quite possibly had never seen a white girl before, actually began petting Kate's face and following her around wherever she went. It was surreal—no other word describes it.

The group insisted we participate in their piggy back contest (which we won) and the potato sack race (which we lost miserably) followed by more photos and quick touches on the back or shoulders from the villagers. We left in the highest of spirits, and I can't remember being

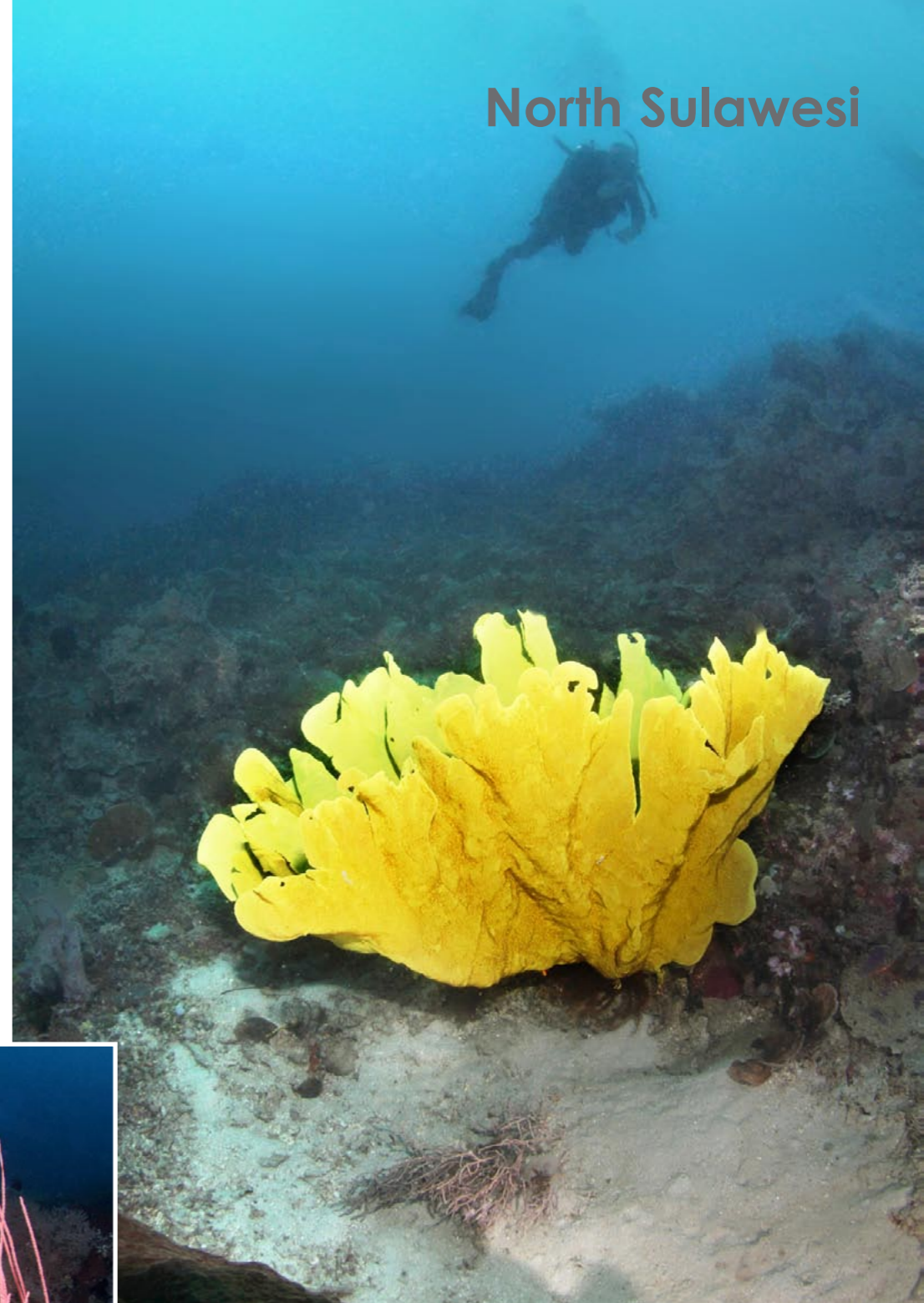
and *ahhing* over the images we saw on the various displays.

It's these moments that define the scuba experience for me, not just the diving alone. I know it sounds trite, but sitting down with folks from half a world away,





CLOCKWISE FROM LEFT: Coral garden with tomato anemonefish at Pulau Racun; Chamberlain's nudibranch, The End; Diver with yellow elephant ear sponge on reef at Pulau Haglow; Pink whip coral at Pulau Hogow



North Sulawesi

so cordially welcomed and warmly embraced by any group of people before or since.

Unfond farewell

The next morning, Kate and I climbed a few hundred stone stairs to a local temple before one last dive. Later that afternoon, we were heading to Lembeh Resort for three more days of muck diving in the strait. It was early, but the sun was

already high, and a light breeze rustled through the large banana groves covering the hillsides. The waters of the bay sparkled, and the dappled greens and blues of the reefs were calling to us. We enjoyed fresh eggs and local fish for breakfast and soon were headed out with our three new friends and gracious hosts.

Our boat twisted through the lush, deserted islands that dot the coastline until we reached a hid-

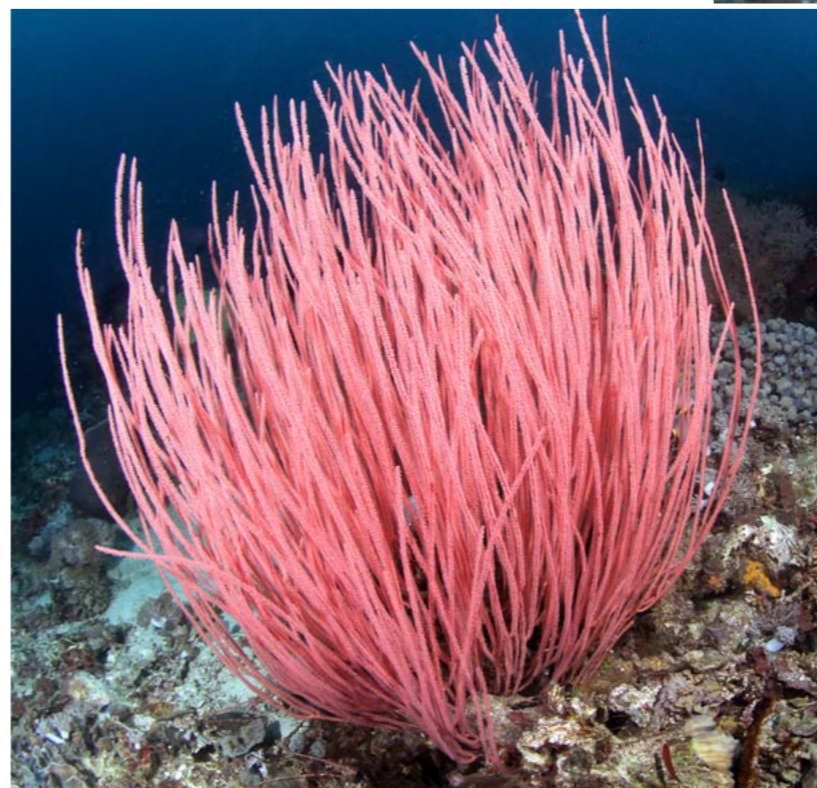
den cove where we shut off the motor and began gearing up. Under the surface, we descended into a maze of towering granite boulders covered in soft yellow and pink corals. Our guide pointed out a school of glass sweepers hiding in a rock fissure. The tiny, gleaming fish numbered in the thousands, and they pressed back into the small cave in one fluid motion.

We let the slight current take us through the giant rocks and found a large yellow-spotted moray eel peering at us from his home in a giant tube sponge. Kate tried to entice him out, but the grumpy eel was obviously in no mood for photos.

I looked down and saw a good-sized mantis shrimp peeking out of his sandy home. The colorful little guy didn't seem

to have any reservations about the camera and crawled out of his hole, posing and dancing energetically.

We scanned the deeper drop-offs around the site hoping to find a few white tip sharks, but we didn't see any. I had supposed that these remote waters would be full of sharks, but Indonesia,



it seems, has been stripped of many of their various shark species. Of course, like most Asian seas, they are fished relentlessly, and the toll is evident. In almost a dozen dives we didn't spot a single shark. My heart is still sad about that; ten years ago, these waters

were teeming with them. As we ascended, a large group of giant trevally swam by. They were big and confident—about a meter each—and they reminded me of a small town street gang arrogantly assessing their territory. They owned that area, and they knew it. They got close enough to give us a few dismissive glances, and then they headed to deeper waters; apparently we weren't





Divers and swirls of scroll coral on reef at Pulau Tulang (above); Wire coral with diver at Pink Point (left)



While we chatted and exchanged stories, I looked out across the bay and realized we only had a little while longer before our captain turned north and set sail for Lembeh Resort in the straight. Kate and I wanted to spend every last moment in the water, so we put on our snorkels and fins and rolled off the side for more.

An hour later, our time had come to an end, and our friends had to physically pull us out of the water. We grumbled and said a sad goodbye to the crystal waters and unblemished beaches. Three days wasn't enough, and I secretly wished our motor would seize, stranding us for another week or so.

Buyat captivated me and leaving was tough. I knew that just to the north some of the most exotic and rare creatures on Earth were waiting, but the remote and

unspoiled dive sites of Buyat Bay had mesmerized me, and I wanted to explore the rest of the area before moving on.

Kate patted my shoulder sympathetically and offered me more taffy. "Here," she smiled. "Maybe this will make you feel better." It did of course—candy always does.

But as we left the bay, I promised myself I'd come back at least once before my diving days were done. I knew that the memories of the dramatic corals and playful villagers would tug at me.

Moreover, my pride had been damaged, and I had a burning desire to redeem myself from the crushing defeat in the potato sack challenge.

Lembeh Resort

—*Indonesian splendor*

We drifted slowly into the natural cove of Lembeh Resort, our little

boat pushing into the fine black sand and towering palms lining the property. Several smiling faces waved to us, as the staff began gathering our gear, taking it to personalized lockers situated next to the boat landing. Kate and I tried carrying our own bags, but the staff would have none of it.

Ana and Miguel showed us to our five-star bungalow perched on a small cliff overlooking the property. The area was shaded by swaying palms and flowering bushes, and our bags were already placed on the large, covered deck. I sipped on a cocktail that had been set out for our arrival, as Kate gushed over the ceiling-less bathroom that would allow for late night soaks with a



Inside-outside bath (above) and view outside room (top) at Lembeh Resort



Lembeh Resort twin bed room

important enough to be concerned with.

Back on the boat, Ana and Miguel passed out fruit wedges, hard candy and taffy, as Kate and I laughed and shared pictures with the rest of our little dive group.



Decorator crab (left);
Pygmy cuttlefish on
coral at Nudi Falls
(right)

could hear Kate gasp through her regulator, as she smiled at me, flashing our hand signal for “Holy crap, that’s awesome!”

Anyone who knows me will tell you, I am a certified octopus lover. I find them intensely fascinating and wondrously intriguing. It’s hard to explain, but I somehow lose myself in their weirdly beautiful movements and the primeval intelligence that flashes in their eyes. Usually blue-rings are timid and hide once spotted, but this one was guarding a bundle of eggs under her arms and remained out in the open for several minutes.

This brief moment was all it took—I was hooked. Muck diving took hold of me and hasn’t let go since.

We kept on finning slowly, and now I was eagerly searching the



North Sulawesi

view of the stars and trees.

Lembeh Resort has been ranked as the best resort in North Sulawesi by *Trip Advisor*, and it was obvious why. I can’t recall more relaxing and inviting accommodations on any dive trip I have ever been on, and Kate, having spent the better part of two years living in Asia, was absolutely captivated as she sunk into her soft, puffy bed.

To muck dive or not to muck dive

—That’s not even a question
The next morning, we headed out early into the famous straight. I

I had never experienced muck diving before, and I wasn’t sure what to expect. Honestly, hunting around for infinitesimal creatures hiding in the sand didn’t sound all that attractive to me (I am much more of a mega-pelagic, giant killer shark kind of a guy). In fact, I was worried I might find myself bored with the whole affair rather quickly. Our first dive thoroughly disabused me of that idea.

Only ten meters down we hit the black sand bottom and within seconds our guide, with eyes like high powered microscopes, had spotted a blue-ringed octopus. I



Blue-ringed octopus



Flamboyant cuttlefish eggs



Coconut octopus (left); Mandarinfish at Bianca (above); Bald hairy frogfish (right)

sands for signs of movement. After only a few meters, I spied a long-armed octopus peeking out of his hole. "It's scuba Christmas!" I thought to myself, and our guide began brushing a thin metal pointer in the sand trying to coax the chary creature out.

A curious arm, thin and delicate, wiggled from the hole, followed by another. The arms grasped the pointer, and a light game of tug o' war ensued, as our guide pulled the octopus gently out of his hiding place. Obviously feeling exposed, the little guy puffed up in a show of aggression, his long arms contracted and thickened before shooting off backwards like a miniature rocket.

I spent the next hour wide-eyed and giggling. I know that sounds ridiculous, but I did; I felt like a child left overnight in an ice cream store. Everywhere we turned there were more absurdly fascinating and wonderfully bizarre creatures scurrying along the sand or hiding behind the few anemones and soft corals that grew out of the dark seabed.

When we surfaced, all I wanted was a fresh tank and another two hours to explore. The boat crew said that was fine, but they were required to feed us first.

A photographer's paradise

Critters at Lembeh, the dive center attached to Lembeh Resort, knows that nearly every diver coming to stay will be bringing a camera, and most of those will not be your average underwater point-and-shoot but seriously technical and seriously expensive equipment. For this reason, they provide visitors with an entire bungalow dedicated to you

and your camera.

Over 20 stations—all replete with charging racks, storage shelves, extra plug-ins and a work area—are prepared for any guest to use at anytime. Most divers left their gear disassembled overnight to dry, and every plug seemed to be full with some apparatus recharging for the next dive. Kate wasn't just impressed, she was downright flabbergasted at the extensive set-up.

The resort also boasts a photo center where high quality prints can be made, cameras and equipment can be rented, strobes can be borrowed, etc. And if something should go really wrong, a piece of your housing breaks for example, the dive center also has—get this—a 3D printer that can actually make custom pieces for your camera for any needed repairs!

Sascha Janson, a camera guru who runs the shop, gave us a close look at the remarkable printer and showed us how it worked. After only



Peacock mantis shrimp



Juvenile barramundi, House Reef



CLOCKWISE FROM LEFT: Golden spearing mantis shrimp; Bus stop chromodoris nudibranch; Critters At Lembeh dive shop; Orange painted frogfish at Bianca; Juvenile ghost pipefish at Goby-A-Crab



a few key strokes and quick set-up, he made a plastic octopus out of thin air. I still don't know how he did it, but believe me, it was the coolest thing I'd ever seen. He has made focus rings, housing buttons and a plethora of other camera parts for guests. Honestly,

it's a modern miracle out in the middle of the Indonesian jungle.

Janson also offers all kinds of photography and video courses, and I can't think of a better place to hone your craft than with the great folks at Lembeh Resort and Critters at Lembeh.

Muck madness

By the third day, I was a diver possessed. Muck diving had become my new passion, and I wanted more. The guides saw that I got it.

We were diving four times a day, and the critters kept coming out in droves to fuel my new



addiction. Cuttlefish became commonplace, as did mantis shrimp, candy crabs, seahorses, juvenile barramundi and hairy frogfish. Lembeh Strait, if you have never been, is a wonderland of the odd and astonishing.

Each dive revealed new and exciting creatures I hardly knew existed and more than a few I had never even heard of—eels of every size, color and shape, various scorpionfish and stonefish, Rhinopias, seamoths—fish so queer and peculiar I can't even begin to name them.

On our last dive of the afternoon,

Kate got a nice close encounter with a wonder puss, a creature she was dying to see. I just missed it, as I had—shocker—run out of air and was on the boat when it slipped out of its hole and showcased its long, banded arms and spotted mantle.

We ended the day, as one

does each night at Lembeh, in the refined but comfortable dining room, sipping top-shelf spirits and eating remarkably well prepared satays (and asking for second helpings of the unbelievable chocolate-avocado pudding) surrounded by excited conversation from the day's finds.



One group boasted that they had seen five flamboyant cuttlefish and seven octopi on one dive. We raised a glass and toasted their luck with laughter and good cheer.

Here again, I was reminded why I love traveling and diving as much as I do. I don't think any other activity brings so many people from around the world together in such a pleasing fashion. As we ate and talked about our underwater adventures, I could actually feel the life in each of the guests expand out and fill the

room with happiness and contentment. I know that comes across as a bit cheesy, possibly a trifle sappy and maudlin, but it also happens to be true. And if you haven't had that wave of joy after a day of diving wash over you in a while, I suggest you get out there and get back in your gear as soon as you can.

The water is waiting, and I'm quite sure you have earned it. ■

Editor Kelly LaClaire and underwater photographer Kate Clark are cousins based in Portland, Oregon, USA. They share a passion for worldwide travel, experiencing new peoples and cultures, as well as hacking one another's social media accounts.

CLOCKWISE FROM FAR LEFT: *Chromodoris magnifica* nudibranch; Candy crab on soft coral; Flying gurnard; Lembeh Resort restaurant; Yellow-edged moray eel in sponge; Cardinalfish in anemone

fact file



North Sulawesi, Indonesia



SOURCES: U.S. CIA WORLD FACTBOOK, NORTH-SULAWESI.ORG, D. SILCOCK

History Moslem merchants from Persia began visiting Indonesia in the 13th century and established trade links between this country and India and Persia. Along with trade, they propagated Islam among the Indonesian people, particularly along the coastal areas of Java. In 1511, the Portuguese arrived in search of spices after their conquest of the Islamic Empire of Malacca. They were followed by the Spaniards. Both began to propagate Christianity and were most successful in Minahasa/North Sulawesi and Maluku, also known as the Moluccas. However, it wasn't until the arrival of the Dutch in the early 17th century that Christianity became the predominant religion of North Sulawesi. From 1942 to 1945, Japan occupied Indonesia. Shortly before Japan's surrender in WWII, Indonesia declared its independence. However, it took four years of often brutal fighting, sporadic negotiations, and mediation by the United Nations before the Netherlands finally agreed in 1949 to transfer sovereignty. Strife continued in Indonesia's unstable parliamentary democracy until President Soekarno declared martial law in 1957. Soekarno was removed from power following a fruitless coup in 1965 by alleged Communist sympathizers.

President Suharto ruled Indonesia from 1966 until 1988. Suharto was toppled in 1998 following a round of riots, and in 1999, free and fair legislative elections took place. Indonesia is the world's third most populous democracy, Government: Republic. Capital: Jakarta.

Geography

Located in Southeastern Asia, Indonesia is an archipelago situated between the Indian and Pacific Oceans. Coastline: 54,716km. Terrain consists primarily of coastal lowlands, with interior mountains on larger islands.

Climate Tropical, hot and humid, with more moderate climate in the highlands. The water temperature is normally 28-29°C (84-86°F) year round, with an occasional "chilly" 27°C (82°F) spot. Most divers use 1mm neoprene suits. However, some people prefer 3mm.

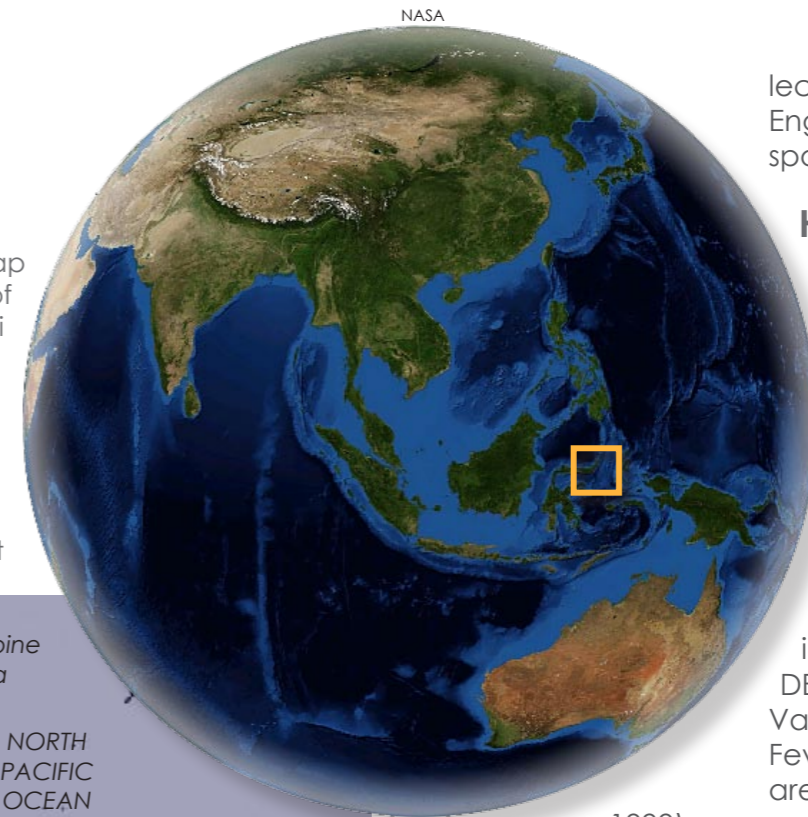
Environmental issues

Challenges include industrial

waste water pollution, sewage, urban air pollution, deforestation, smoke and haze due to forest fires. Logging—the rainforests within the combined West Papua/Papua New Guinea land mass are second in size only to those of the Amazon, making it 'the lungs of Asia'. In 2001, there were 57 forest concession-holders in operation around the country and untold other forest ventures operating illegally. Mining—tailings from copper, nickel, and gold mining are real threats.

Economy A vast polyglot nation, Indonesia has experienced modest economic growth

RIGHT: Global map with location of North Sulawesi
BELOW: Location of North Sulawesi on map of Indonesia
BOTTOM RIGHT: Lance blennie makes its home in a bottle at Lembeh Strait



1999) are widely accepted. ATM machines in tourist areas offer the best exchange rates, Travellers cheques are becoming quite difficult to use except at banks. Exchange rates: 1EUR=12,723IDR; 1USD= 9,737IDR; 1GBP=15,127IDR; 1AUD= 9,972IDR; 1SGD= 7,908IDR

Population 251,160,124 (July 2013 est.) Ethnic groups: Javanese 40.6%, Sundanese 15%, Madurese 3.3%, Minangkabau 2.7%, Betawi 2.4%, Bugis 2.4%, Banten 2%, Banjar 1.7% (2000 census). Religions: Muslim 86.1%, Protestant 5.7%, Roman Catholic 3%, Hindu 1.8% (2000 census). Note: Indonesia is the largest Muslim country in the world. Visitors are encouraged to respect local traditions and dress modestly. Internet users: 20 million (2009)

Language Bahasa Indonesian is the official language, plus English, Dutch and local dia-

lects are spoken. In tourist areas, English, Spanish and German are spoken.

Health There is a high degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A and E, and typhoid fever, as well as vectorborne diseases such as chikungunya, dengue fever and malaria. Check with WHO or your dive operator for prophylaxis recommendations. Larium is not effective. Bring insect repellents containing DEET. International Certificate of Vaccination required for Yellow Fever if arriving from infected area within five days.

Decompression chamber

Manado: Malalayang Hospital tel: +62 0811 430913
Makassar: Rumah Sakit Umum Wahidin Sudirohusodo tel: +62 0411 (584677) or 584675

Travel/Visa/Security

Passport valid for six months beyond intended stay is required. There is a Visa-On-Arrival for 35 countries including USA, UK, most European and Asian countries. It is US\$25 for a stay of up to 30 days. Although there is an active independence movement in Papua, tourists have not been impacted.

Web sites

Indonesia Travel
www.indonesia.travel/en





Edited by
Peter Symes

Beyond the Muck

Text and photos by Mike Bartick

Muck diving is a term used quite frequently these days that can be applied to either a dive site, a type of diving or even an entire region like Lembah Strait in Indonesia or Anilao in the Philippines. These areas of the Indo-Pacific have consistently ranked amongst the highest in terms of high coral counts, reef fish and of course the high impact Holy Grail of critters.

The intertidal and estuary zones typically associated with muck dives provide much more overall for the eco-system than what meets the eye. Nutrients flowing into the ocean current mix to create an amazing bio-mass of diversity that ranges from bull rush sea grass to bull sharks. However, the critters most encountered while muck diving are typically benthic bottom dwelling organisms. These critters as we call them have

evolved elaborate and eccentric life styles to survive on the substrate and are unlike the ocean roving pelagic fish above them in many ways.

Pelagic fish hunt long range, tend to be bi-colored, are fast and are more adept to following the fluctuating current and food source. Benthic critters, on the other hand, are forced to adapt to their environs on the bottom with limited movement and hunt close range. These critters use a combination of "Lie and wait" hunting and "ambush attacks", relying heavily on aggressive camouflage that mimics or matches their surroundings. The same current lines that feed the higher chain (food grade fish) also brings food and organisms for the lower chain animals that are sought out to photograph.

The more productive dive sights that support an overall abundance of biota are intertidal sand flats, fringing reefs and tidal sand banks formed in-part by fluctuating current lines. These currents carve and shape the substrate that often mix within the intertidal zones and create an underwater oasis for encrusting sea life.

In the shallows, fringing beds of sea-grass supports a mix of critters like ornate and common pipefish, flatfish, frogfish, urchins, crustaceans, opisthobranchs, vertebrate and invertebrate sea life.

In addition the sponge, sea squirts, tunicates, sea fans and soft corals that also thrive here provide both food and protection, creating a unique habitat for an abundance of unique sea life on the bottom.

Like the big animal Holy Grail, there also exists the small animal Holy Grail that survives in this intertidal benthic realm with names that are almost as dazzling as their appearance. Rhinopias, hairy frogfish, stargazers all sound like they belong in a superhero comic book, and some even have the abilities to match. The evolutionary process has been both rigid and creative with these compelling creatures forcing them to adapt or pay the ultimate price.

The solitary juvenile pinnate spadefish (*Platax pinnatus*) survives by its color and rapid movements. Living between rocks and small crevices, it mimics the colors of a venomous flatworm. Found exclusively in the Indo-Pacific, its midnight



Juvenile pinnate spadefish side view (above) and front view (inset) mimics a venomous flatworm



In the photo at left, the smaller male (left) and the larger female (right) hairy frogfish meet in courtship to mate; A stargazer lies in wait to ambush passing prey (right)



third and final step, as it ambushes its prey with its lightning fast gape strike, often consuming them in one gulp.

When frogfish are found together, it is generally a strong indication that mating will occur soon. The female is almost always the larger of the two, as she needs to be a bit larger than the male in order to produce the mass of eggs. The smaller *A. striatus* (male) pictured above was attracted to this lovely female a day earlier by an irresistible pheromone.

black and vibrant orange colors will fade to a drab silvery coloration, as it enters into the second phase of its lifecycle.

The *Antenarius striatus*, or hairy frogfish, are a highly sought after Holy Grail critter due in-part to their photogenic behaviors and for their unusual appearance.

The *A. striatus* is a bit more sophisticated than many other fish for using a special method to hunt. Impossible to swim and hunt the *A. striatus* is able to do so with very little movement on their part and is achieved by exciting their prey.

First the hairy frogfish will release a scent, which alerts nearby fish or shrimp down current that food is near. This excites their prey, and as they follow the scent closer, the frogfish switches to its second strategy, visual stimulation using its lure.

The frogfish now relying on its lure drops it out and waves it around. This excites the victim even more, not knowing that the algae or soft coral it sees is actually a hairy frogfish, cunning and powerful. As the fish moves in for its meal, the hairy frogfish unleashes the



The female *A. straitus* actually selects the right male in a natural process that could involve either eating or just ignoring the rejected suitor.

Nocturnal critters

Muck dive sites can get even more interesting at night with the cast of nocturnal critters. The exact same dive site will yield a whole new team of characters after the sun sets and provides for some better than sci-fi photo ops.

The white margined stargazer (*Uranoscopus sulphureus*) is perhaps the most macabre looking of all the critters. Its name is derived from its appearance, as its eyes are situated on the top of their heads appearing as if casting a never-ending gaze upon the night sky above. A venomous ambush predator, the positioning of its eyes are very useful,

as they bury themselves under the sand to hunt. When another benthic fish or smaller unsuspecting fish swims closely overhead, the stargazer springs from its burrow and engulfs the fish in a flash, then quickly buries itself again. In addition to being venomous, the stargazer can produce an electrical charge and conceals a lure in its mouth—talk about equipped!

The bobbit

No write up on muck diving would be complete without something about the elusive bobbit worms (*Eunice aphroditois*). These carnivorous polychaete worms are the things that nightmares are made of. Growing up to six feet in length and a diameter of three inches, these creepy critters play for keeps.

The bobbit's calcified jawbone, tentacle feelers and chemical receptors all work in unison to attract and kill their prey. Often seen bobbing up and down in the sand on night dives, bobbit worms are highly sensitive to light. Lunging and snapping at unsuspecting prey seems

Hairy frogfish hunting with lure



Babbit worm bobs up and down, snatching fish right out of the water column

The tiny commensal pandalid shrimp, *Miopandalus hardingi*

to be its technique of choice, often snatching fish right from the water column, slicing them in half or pulling them down, below the sand.

Super macro

Super macro techniques have gained popularity in the last several years, giving us a closer look at some of the very small yet decorative shrimp, and other interesting critters. Sometimes called the insects of the ocean, they all seem to bind dives together and keep a photographer's shutter snapping. The bazaar



Muck

Cephalopods

The docile blue-ringed octopus and flamboyant cuttlefish are both highly sought after. Holy Grail finds that can turn any dive into a free-for-all very quickly. Each of these amazing cephalopods has enough bacterial neurotoxin to kill dozens of fully grown men. Tetrodotoxin (TTX) is a powerful digestive byproduct transmitted through saliva from a blue-



Red hairy shrimp

horned shrimp is a prime example of the incredible tiny creatures to be found, but can pose many challenges when trying to photograph them.

A commensal or partner shrimp (*Miopandalus hardingi*) is associated with brown or green gorgonians and are easily overlooked.

The very small hairy shrimp are part of the broken back complex (*Phycocaris sp.*). They can be extremely compelling and difficult to photograph. They are normally associated with algae growth of the same coloration but can also be found on small rocky outcrops, near the algae.



Algae shrimp, *Phycocaris simulans*



ringed (*Hapalochlaena maculosa*) octopus' bite. The flamboyant cuttlefish, on the other hand, (*Metasepia pfefferi*) is also docile yet deadly and can inadvertently transmit the TTX just by touching its skin tissue. Although not as effective as the bite, scientists still limit contact and exposure to them, keeping it to a minimum.

Scorpionfish

A member of the scorpionfish family, the *Rhinopias frondosa* can create very large ripple effect topside, wherever one turns up, especially in small communities like Anilao. It's nearly the equivalent of a gold rush, as guests flood in from all over the world for a chance to photograph one of these amazing critters. An ambush gape strike predator, they will drag themselves along the bottom toppling forward then rolling back mimicking an injured fish. When a predatory fish from above sees the oppor-



Blue-ringed octopus (far left) and flamboyant cuttlefish (left) eating. Both carry poisonous neurotoxins; Veined octopus or coconut octopus, *Amphioctopus marginatus*, on eggs (center)

Nudibranchs

The frontal view of the *Nembrotha kubaryana* nudibranch reveals its intricate textures and details. Its favorite food source is tunicates and are considered common.

A special class is reserved for the ever colorful and slow moving nudibranch. These special little gems are a dynamic bunch made for underwater photographers. The color patterns and textures, shapes and details can be show-stopping. But it's not just their looks but the science behind them, too, that



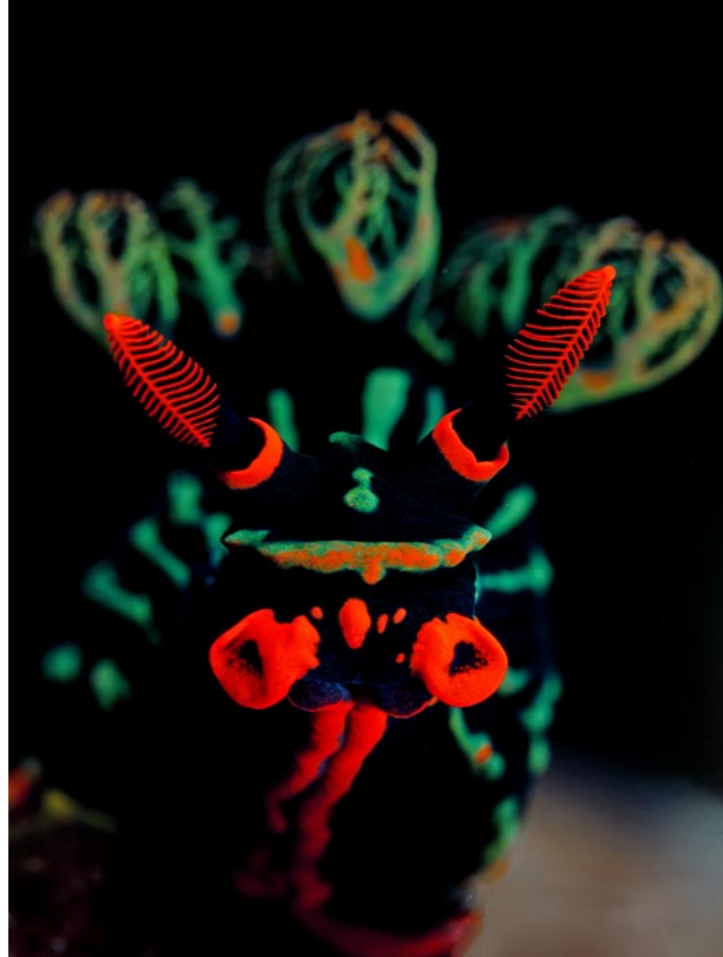
tunity of an easy meal below them, they swoop down to investigate. The *Rhinopias* unleashes its bucket mouth gape strike, inhaling the fish with haste, then trundling forward, it moves on.

is appealing. Terry Gosliner from the California Academy of Science calls them "the most diverse fauna on planet earth". I would have to conclude he's 100% spot on with that statement.



Muck

Rhinopias frondosa is a member of the scorpionfish family



Fish

The estuary batfish (*Haleutia sp.*) is truly a rare find amongst finds. The natural data on this fish just doesn't exist, unlike many of the other critters out there. It is believed to be a deep sea anglerfish. This one (shown above) was found in the shallows by my trusted assistant, Gladys, and later positively identified using the *Reef Creature ID* book. It was so cryptic and blended so well with the substrate that when I glanced away for a second, it was lost forever.

The spotted xenia pipefish (*Siokunichthys herrei*) is just one more amazing critter find from Anilao. Reliance on sharp guides nearly always pays off, time and time again. Experience has taught me not to be complacent and to always come when my guide waves me over. One of the advantages of working in the Indo-Pacific region is the opportunity to find and document rare creatures like these.

Beyond the Holy Grail are the oddities that only Mother Nature

allows us to see. I am often surprised at what is found while muck diving and quickly refer to the identification books afterwards. The sheer amount of opportunities of seeing something new or undiscovered is part of the main draw in muck diving.

Remember, research, hiring a professional guide and persistence pays off when hunting for that special critter. Communicate with your guide and the resort before your arrival and let them know what it is that you would like to see.

Now get out there and have an adventure! ■

A special thanks from the author goes to Crystal Blue Resort (www.divecbr.com). California native Mike Bartick is a widely published underwater photographer based in Anilao, Philippines. A small animal expert, he leads groups of photographers into Asia to seek out that special critter. For more information, visit: Saltwaterphoto.com



CLOCKWISE FROM TOP LEFT: Estuary batfish, *Haleutia sp.*; *Nembrotha kubaryana* nudibranch; Spotted xenia pipefish; *Hipseledoris sp.* nudibranch



Mike Fletcher, with underwater camera gear, came from modest beginnings to become a commercial diver making shipwreck discoveries that led to success in television productions including the series, *Dive Detectives*

Mike Fletcher

—*The Dive Detective in Depth*

Text by Robert Osborne
Photos courtesy of Mike Fletcher

Mike Fletcher is a scary guy. Not because he's violent or aggressive. Quite the contrary, when I meet him in person he turns out to be quite modest and charming. But when you listen to Mike talk about some of his dives, it's a terrifying experience.

I'm sitting in a coffee shop in Port Dover, Ontario, Canada, having lunch with someone I consider to be one of the pre-eminent figures in diving today. He's telling me about a salvage job he'd been recently hired to do in Collingwood, Ontario. In a voice that could be describing something as matter a fact as how to catch a bus to his house, he's talking about crawling in near zero visibility through the bowels of a ship that's settled on the bottom and filled with sediment. The maze of steel is filled with jagged shards of metal, anyone of which could tear his suit or his air hose and leave him dead within minutes.

I'm no commercial diver, but I know enough to understand that his margin of error in this situation is pretty low. I also know a little bit about what its like to try and wriggle through restrictions, and what he's describing is an extreme challenge by any stretch of the imagination. Either he does it right, or he's in a world of hurt. But for Fletcher, it's just another day at the office. It's an "office" that Fletcher never dreamed of occupying when he

grew up in Nanticoke, near Port Dover, Ontario.

Fletcher's roots do not scream world famous diver. In fact, his beginnings are very modest. He was born on a dairy farm on the shores of Lake Erie in 1955.

His family had been in the area since 1796 when they left Philadelphia as United Empire Loyalists.

Mike was the youngest of three children; he had an older brother and sister. The family was not what you would call

wealthy by any stretch of the imagination. In fact, Fletcher describes his upbringing as "poor".

Fletcher's parents worked the farm and drove school buses just to make ends meet. The family had little spare money,

and as result, the confines of his world were fairly narrow, according to Fletcher. He said, "My parents used to try and protect us from wishing for things. They didn't want us to be disappointed. My father used to always say 'hard work is for us.'"





Fletcher preps for a dive on the HMS *Repulse* and the HMS *Prince of Wales*

Bitten by the dive bug

Education didn't look like a way out for Fletcher. He said he wasn't a particularly good student, though he likes to say that as he got older, he got a little better. Nevertheless, Fletcher's world took a turn for the better when he was 13 years old in 1968. That was the year his father finally sold the family farm.

That simple action completely changed their lives. For a start they had some money. His father went out and brought 36 acres—an old Boy Scout camp—on the shores of Lake Erie. Suddenly, a life restricted to dairy farming wasn't the only option open to Fletcher.

Around the same time, Fletcher began watching a show on his grandmother's television called *Diver Dan*—a character who worked as a hard hat diver. Lloyd Bridges soon entered the picture with his TV series, *Sea Hunt*. And shortly after that, Jacques Cousteau began making under-

water films for *National Geographic*.

Mike developed a bug for all things diving. He was worried that he didn't have the grades to be a marine biologist. But at night, he used to lay awake listening to the sounds of the oil and gas rigs just off the coast and imagine the work the divers working on those rigs would have to do.

In the evenings and on weekends he would ride his bike down to the local docks and watch the hard hat divers working. The whole experience opened up a new series of possibilities for Fletcher. Suddenly, he knew one could make a living in this undersea world. Never one to wait around for an opportunity, Fletcher decided to take his diving career into his own hands.

He'd managed to save up \$360 picking cucumbers as a summer job. He told his father he was going to buy diving equipment with the money. Using a mail

order catalogue, he ordered a tank, a regulator and a back plate (he already had a mask and fins).

The gear finally arrived in October. Undeterred by the lateness of the season or the fact that he didn't have a clue how to use the equipment (other than having read a book or two), he went down to the local duck pond, geared up and jumped in. He sank to the bottom and stayed there until he'd breathed the tank dry, while his father paced anxiously back and

forth on the shore. And just like that, Mike Fletcher was a diver.

Commercial diving

Fletcher's transition to commercial diving was equally unorthodox. In 1975, Fletcher decided to quit high school and go to work full time in construction. He was hired as part of a crew building an oil refinery. It was an invaluable opportunity because he learned a number of critical construction skills such as welding and working with concrete. It also opened up an opportunity to get into the whole world of commercial diving.

It all began one day when the foreman was asking around about whether anyone knew a local diver who could help pump concrete—specifically to sandbag the concrete form underwater. Once again, Fletcher took the proverbial bull by the horns. He told the foreman he knew how to do that and just like that he

was hired as a commercial diver. That earned him an extra \$5 per day, and from then on, he was the company diver.

What were his credentials? He had none. In fact, Fletcher had yet to take even the most rudimentary of diving courses. But he likes to say that he had the best credentials of all. "If you want to find a good commercial diver, look for a smart farm boy," he said. From that point on, he started to promote himself as a commercial diver.

It didn't take long to get his next break in the world of diving. In 1977, his foreman, Len Byman, went to a diving operation that was working the gas drilling on Lake Erie and told them about Fletcher—told them they'd be crazy not to hire him. Byman must have been pretty persuasive because Place Gas and Oil hired him immediately. Fletcher was 22 years old when he started working for them full time as a commercial diver.

Now the work wasn't what you might think. Fletcher wasn't spending hours on the bottom hundreds of feet down. The deepest well was in 45 feet of water. Nonetheless, Fletcher decided it was time to polish his credentials. That same year, he went and took an introduction to scuba course. He'd already been working as a commercial diver for a year.

As the years passed, his commercial career became more complex—deeper and longer dives. Fletcher responded by obtaining more training and more certifications so that he could do the work safely. It wasn't an easy life, but the money was unbelievably good. In the 1990s, he could make up to \$500 a day. He worked throughout the 80's and 90's as a commercial diver.

The whole time he was working underwater, he was still out on the water on his days off exploring the wrecks of Lake



Mike Fletcher prepares to dive near Punta Arenas, Chile

Mike Fletcher with son, Warren, are the hosts and cameramen in the television series, *Dive Detectives*



The Fletchers investigate the seafloor



Fletcher

into granting him sole ownership—all this even though the ship was only a few miles from the Canadian coast and well within Canadian territorial water.

Fighting for *Atlantic*

Fletcher fought back. He took Mar Dive to court in Canada. Oddly, initially the Ontario government took a position against Fletcher in the fight. Rather than protest that Morgan was violating Canadian sovereignty and attempting to pillage the wreck, they charged Fletcher for being illegally on the wreck.

It took a few years for them to

Erie. With all that bottom time, he started finding wrecks. Nobody paid very much attention to what he was doing until 1983 when he found the wreck of the *Atlantic*. That discovery changed everything.

The *Atlantic*

The steamer *Atlantic* sank in Lake Erie after a collision with the propeller steamer *Ogdensburg* off of Long Point in August 1852. The ship sank with a cargo of \$36,000 in gold in the safe. Over 150 to 250 people drowned in the disaster.

Almost immediately after the sinking, American Express, the company that owned the gold, had a diver named Johnny Green go down and look at the wreck. He did not find the gold. So in 1854, Green went back again, and yet again, did not get the gold. He did, however, get the bends. That put him out of the diving business for a couple of years.

In the meantime, in 1855, a diver named Elliot Harrington went to the wreck, and he did find the gold. Story complete? Not quite. All kinds of rumors abounded about what might be on the wreck. One story had it that there was a submarine sitting on the deck. Allegedly,

a man named Laudner Philipo brought a submarine to the wreck in 1853 to recover the gold, and the sub sank.

But shortly after the gold was recovered, the location of the *Atlantic* was forgotten, and the ship disappeared into history for more than a hundred years, until one day, in 1983, when Mike Fletcher found it.

There were a number of reasons the *Atlantic* was a valuable property, even without the gold. It was a rare type of ship called a Palace Steamer. It was also still loaded with all the original affects of those on board the ship and all of the cargo and incidentals such a ship would carry. And what's more, they were all in relative pristine condition. So, the ship was of great interest to several groups.

Fletcher wanted it preserved with some of the artifacts brought up for a museum. But an American treasure hunter named Steve Morgan of Mar Dive in California had other ideas. He used a mooring that Fletcher had attached to the wreck to access the *Atlantic* and then tried to lay claim to it. He did it via a kind of legal slight of hand whereby he tried to resurrect the company that used to own the ship and then talked a California judge



Mike and Warren Fletcher head to the dive site of the 1854 steam yacht *Fox*, which sank off the coast of Greenland in 1912

profile

decide that Fletcher was actually trying to defend Canada's interests. Ultimately, they did side with Mike, and so did the courts.

They told Morgan the wreck wasn't his and that no judge in California had any jurisdiction to say differently in Canada. The *Atlantic* was left alone, and Fletcher turned over the artifacts he had already gathered to the Ontario government.

The controversy over the *Atlantic* garnered Fletcher national media attention. And there was one positive side benefit from all that publicity. It brought him to



Mike and Warren Fletcher in the dive tank on set

Fletcher

projects. All told, Fletcher estimates he's worked on nearly 100 episodes of underwater television.

And yet, despite the fame and fortune of working in television, Fletcher still likes to keep his hand in as a commercial diver. He said, "It keeps me sharp. Whether you're in a sewer or salvaging a ship, it's all training to make good TV."

Other than that, Fletcher spends time on his farm on the shores of Lake Erie. These days, he and his wife, Lorraine, are raising thoroughbred horses.

belt, he still loves to spend time underwater. He said that's still what it's all about. "More people need to embrace the joy of diving," said Fletcher. "I never stop being excited about doing things underwater."

And he still loves to make television. He's currently working on a project with a preliminary title, *The Wild Goose Files*. In this project, he is teamed up with the world famous treasure hunters, the Fisher family in Florida. It's a series about hunting for gold and making people's dreams come true—appropriate for a farm boy from Ontario who, against all the odds, managed to make his own underwater dreams come true. ■

Features editor Robert Osborne is an internationally published dive writer, television producer and reporter based in Toronto, Canada.



Mike Fletcher

the attention of John Davis, a producer at Eco Nova Productions in Halifax.

Making television

Davis approached Fletcher along with Clive Cussler in 2000 and asked him if he was interested in working on a show called, *The Sea Hunters*—not initially as a host, but as the expedition leader.

Fletcher accepted the job and was paid to make sure that all the diving would be handled in a safe manner. But ultimately, as the production got underway, Fletcher showed that he had much more value on the creative side of the show. He had story ideas—ideas about the writing and the directing of the show.

Ultimately, the producers decided that Mike and his son, Warren, were better used as hosts and camera-

men for the show.

The show was sold to the History Channel and National Geographic and lasted for five seasons. It was broadcast around the world, arguably one of the most successful dive series on television. It finally ended in 2005, but Fletcher's TV career was just beginning.

A second show was offered to him in 2008. History Television came to him again and asked him whether he was interested in doing *The Dive Detectives* produced by Yap Films in Toronto.

This was a more upscale dive show. It only ran for one season, but what a season it was. The Fletchers and their crew travelled around the world looking for lost Buddha's in the Mekong River, exploring Ghost Ships on the island of Saba and were even allowed to explore the famous 19th century ships, *Hamilton* and *Scourge*, on the bottom of Lake Ontario.

Fletcher also kept busy working on a multitude of other shows including a show called *Dream Wrecks* in which he was both a host and underwater cameraman. The series ran for 26 half hour episodes.

He's also worked on a number of single

The joy of diving

Through it all, though he's lost count of the thousands of dives he has under his



Mike and Warren Fletcher in action underwater



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POINT & CLICK
ON BOLD LINKS



Equipment



Edited by
Rosemary 'Roz' E. Lunn

Orange

Alpina is not well known in the diving world, however, they do have a history of manufacturing diving watches. The Extreme Diver 300 Orange is Alpina's latest creation (and sixth diving watch) and it comes in two versions. An automatic model powered by an AL-525 movement and a quartz-driven model with a AL-240 movement. Both watches are water resistant to 300 metres (984 feet). Features include a screw-in crown, a screw-down case back, a choice of a metal or rubber bracelet and a unidirectional rotating bezel. The bezel markers are luminous and both models feature an anti-reflective treated sapphire crystal.



Giotto

Unveiled at the 2012 DEMA Show, the Cressi Giotto wrist mounted air/nitrox computer has now come to market. This visually attractive, feature-rich, computer runs a new 'reduced gradient bubble model' RGBM algorithm, specifically designed by Cressi and Dr Bruce Wienke, for repetitive multi-day dives. The large screen displays data that is divided into easy-to-understand sections. A screen prompt tells you which mode you are in, as you navigate through the system, using the three buttons. The programme in two gas mixes up to 99% EANx. Other features include audible and visual alarms, user changeable battery, a deep stop option and gauge mode. The Cressi Giotto is rated to 150 metres (492 feet).

diver can

features include audible and visual alarms, user changeable battery, a deep stop option and gauge mode. The Cressi Giotto is rated to 150 metres (492 feet).

Finger spool

'Highly Optimized Gear' or HOG manufacture a small, low-profile finger spool in ABS plastic. It is ideal for stashing in a pocket or clipping off on a D-ring. The holes along the side can be used to lock a marine grade 316 stainless steel double ended bolt snap to the spool. Alternatively, the diver can make a small loop, sometimes known as a 'Jasper' loop, at the end of the line. This is then threaded through one of the holes and the bolt snap attached to the loop, to stop the spool unwinding. The 30-metre (100-foot) bright orange #24 line makes it easier for the eye to follow when diving in low visibility conditions. The line most commonly used for finger spools is #24 braided line, some people call this 'cave line', as opposed to 'wreck line'/#26.



Shot

FX Aqua Lung states that their Shot FX fins are an innovative design that helps provide a powerful, yet comfortable kick. The foot pocket has a customised inner sole designed to anchor the foot, preventing power from the boot moving laterally during the power stroke, resulting in maximum energy transmission.

The blade is shorter and softer, too, making it easier to kick, and performance has been enhanced by adding an elastic blade insert. Apparently, this creates a "spoon effect" that pushes more water with each down stroke. Aqua Lung has realised just how popular technical spring straps are proving, with fitted metal spring straps and a soft heel lug. This visually attractive fin is popular with both sexes, and is available in Twilight and Arctic White.

Xjoy 2

Suex has recently launched a recreational diver propulsion vehicle—the XJOY 2. Coming from a stable with a good pedigree for exploration equipment, this should be a good entry-level scooter. It has a useful 80m (260ft) rating and is lightweight (15kg), compact (63cm tall), and is powered by a NiMH battery. The XJOY 2 comes weighted/trimmed for neutral buoyancy 'out of the box' and has a burn time of around 60 minutes. Suex states the cruising speed is approximately 50 metres per minute when towing a single tank diver. In summary, the XJOY 2 is a nimble, maneuverable, lightweight, tough and economically priced DPV. And it looks like a lot of fun!



Heavy Metal

— *The Hardhat Diving Experience*

The Northeast Diving Equipment Group based in the U.S. state of New Jersey is an organization that allows the average sport diver to try hardhat diving. They have been around since 1993 but really started in 1987. Dave Sutton, an experienced commercial diver, was manager of Lakeland Divers, a dive shop in New Jersey. He purchased a Mark V hardhat rig and started offering a series of recreational hardhat courses. These courses were to familiarize divers with the gear. There was no formal certification.

Text by Larry Cohen
Photos by Olga Torrey

A number of Sutton's students, including Fred Barthes, John Melnick and Jim Boyd, purchased the surface supply gear and formed the Northeast Diving Equipment Group (NEDEG). Barthes is the remaining co-founder of this very active group.

Every Memorial Day and Labor Day weekend since 1988, NEDEG brings out all the heavy gear. They started doing this at Willow Springs Quarry in Pennsylvania and have continued the tradition at Dutch Springs since 2008. Dutch Springs in Pennsylvania is a Mecca for dive training.

At this event every certified diver has the opportunity to try various hardhat rigs. This is important to the dive community. The group's goal at these events is to show sport divers their roots. As Barthes said, "We must understand where we came from in order to move forward."

Vintage hardhat gear

At this event, one can dive historical and vintage gear, including the famous Mark V helmet. The U.S. Navy used this classic hardhat from 1916 till 1984. The "hat", as



Diver in Chinese TF3 12 bolt helmet drives sunken fire truck



Diver in Mark V helmet and diver in background in Mark XII helmet





Diver in Desco custom helmet exiting water (left); Miller Diving helmet (above) with umbilical; U.S. Navy Mark V boots (right) modified with red and green paint

it is called, saw its heyday during World War II. More Mark V rigs were manufactured and in use during that time.

Divers can also dive Russian and Chinese hardhats, along with a Custom "Scarponi" Helmet. All of these are based on the Mark V design. Vince Scarponi ordered a modified Mark V helmet in 2009. It has a commercial secondary exhaust valve and mounting blocks on the bonnet. The faceplates are oversized and made of Lexan.

These helmets are used with a constant volume suit. The rig has a breastplate to which the helmet is attached. The air flows through the helmet and suit. Barthes said, "It is like diving inside your BC."

Gas is supplied from the surface by an umbilical. The gas free-flows into the helmet via a diver-controlled valve and exits through a constant exhaust. This creates a large volume of gas in the suit and means one needs to add an enormous amount of

weight. This makes the suit hard to work in.

Two to three tenders are needed to dress the diver, and it takes up to half an hour to get the person in the water. The diver and suit will weigh around 400 pounds. If the diver falls over, it takes at least four people to help raise him or her up.

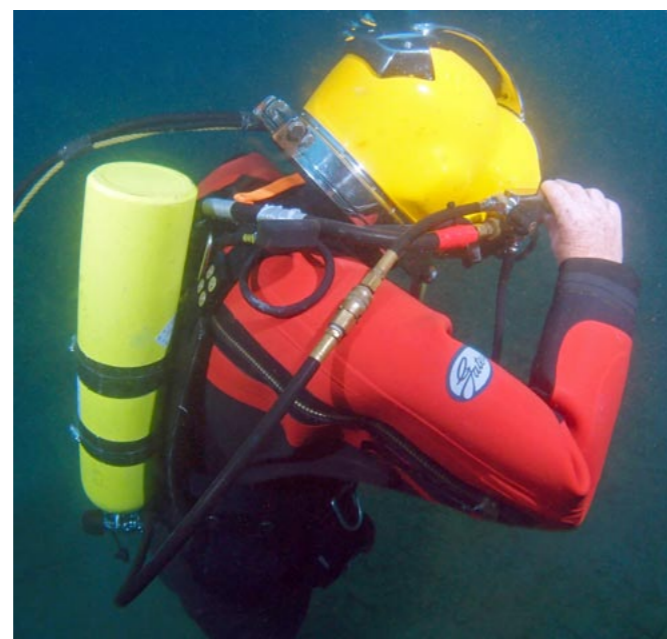
Modern hardhat gear

Divers can also try a variety of modern gear including a Kirby Morgan Superlite stainless steel 37, Aquadyne AH2, band masks and the Desco Pot hat. This equipment is still used by commercial divers.

The Desco Pot hat is used for hazmat work. The Pot hat and the Aquadyne AH2 are hardhats, but are much smaller than the older Mark V. Less weight is needed, and a diver could be dressed in five minutes or less with the help of one tender. They still use a free-flow gas supply from the surface and could be used with a constant volume suit with



LEFT TO RIGHT: Diver with Advanced 2000 air helmet; Diver in Miller diving helmet; Diver with Superlite 17 K helmet getting ready to enter the water



Diver in Superlite 77 SS helmet, holds the umbilical

CLOCKWISE FROM ABOVE: Diver in Superlite 17 K helmet from the back showing bailout; U.S. Navy's newer Mark XII helmet on left, which replaced the older Mark V on right; Diver in Chinese TF3 12 bolt helmet relaxing on the bottom; Diver walking on bottom of Dutch Springs in a Desco custom helmet

a breastplate or yoke.

With a yoke system, the helmet is screwed onto the yoke and held in place with a crotch strap. These helmets could also be used with a neck dam. With this system, the helmet seals onto the diver's neck, and the gas flows only in the helmet, not in the suit.

Neck dams are the way Kirby Morgan Superlite helmets are attached. When diving a Superlite, the gas is still surface supplied from an umbilical, but the hat has a demand regulator, just like open circuit scuba.

Instead of a constant free-flow, the regulator only delivers gas when the diver inhales. This uses less gas than a free-flow system and requires less weight.

A band mask looks like the front of a Superlite, but instead of a helmet, the back is neoprene. A redundant gas supply is always recommended. When diving a neck dam rig, a redundant gas supply is necessary.

All systems have redundant air supplies, and line pull signals are discussed in case the communication system goes down.

A unique experience

Diving a hardhat is a very different experience from scuba diving. Donning the heavy gear will make putting on scuba equipment seem like skinny-dipping. Neutral buoyancy is not the goal. With weighted boots you want to walk along on the bottom.

Since many of the helmets are attached to your suit, when you turn your head the helmet does not turn. Instead, you end up looking out a small side window. This feels very strange at first, but after a few minutes you get used to it. The next thing is the communication system.

It is very strange to hear the tender on the surface talking to you. At first, you start to wonder if you are narked and hearing voices. What is even stranger

is the fact that you can talk back, and the tender responds. At least you know you are not hearing voices.

Education and awareness

At present, the NEDEG's goal is to educate the public about surface supply diving today and in the past. They do presentations in schools, museums, dive clubs and even to the U.S. Coast Guard. They hold exhibits at the New Jersey Ocean Wreck Divers Flea Market, beach clean-ups and local fairs.

The group is involved with setting up a permanent exhibit at the New Jersey Maritime Museum in Beach Haven, New Jersey. This exciting project will be called the "Evolution of Diving". Vintage and historical dive gear will be on display, along with the newest technology including rebreathers. ■

For more information send an email to fpbarthes@yahoo.com



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

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

When shore diving, divers often have to overcome an obstacle course to get to their favorite dive spot. Beach access may be by stairs and always includes walking across grass, concrete, sand or rocks. Entries and exits are in varying surf conditions and divers regularly “kick out” or “turtle” for extended distances on the surface to conserve air before dropping down to dive. Boat diving brings agility challenges requiring divers to maneuver on decks and ladders on constantly rolling seas. Divers do all this under the weight of 50 to 70 pounds of scuba gear while wearing bulky and somewhat restrictive protective clothing. The diverse physical demands of scuba diving, and most notably, an efficient fin-kick, translate into power, strength and endurance.

Sports fitness regimes typically separate power, strength and endurance into off-season, pre-season and in-season programming. Scuba divers, however,

can develop their sea legs by combining power, strength and endurance into the same workout.

Time, tension and rest

To develop lower body fitness ideal for diving, exercises that combine the major muscles of the legs, hips and buttocks

must be performed with variations of time, tension and rest.

Striking the best balance of time, tension and rest is accomplished with sets,

repetitions, intervals and resistance. By changing the amount of weight lifted and the duration of both the exercise and rest period, different combinations of



Sea Legs

Power, Strength & Endurance for Diving



muscle fibers are recruited and different training goals are achieved. A set performed with the adequate (balanced) resistance and duration produces an oxygen deficit in the muscle cells causing fatigue or failure within a predetermined number of repetitions. As the resistance (weight lifted) increases, fewer repetitions are usually performed and rests between sets are longer. After a rest of from 30 seconds for foundational fitness to as much as three to five minutes for power athletes, oxygen has been restored and the muscles are able to perform again. The more sets performed, the greater the training demand.

Power

To develop power, perform exercises with as much weight as possible for four to ten repetitions for three to five sets with a rest period of one to three minutes. To elicit an adaptive response the last two repetitions should feel difficult to perform.

Strength

To develop strength, perform exercises with as much weight as possible for 12 to 15 repetitions for one to three sets with a rest period of 30 seconds to one minute. To elicit an adaptive response, the last three repetitions should feel difficult to perform.

Endurance

To develop endurance, perform exercises for 15 repetitions or more including intervals of one to three minutes one to three times with as much weight as possible and no rest period between exercises. To elicit an adaptive response, the last 15 seconds should feel difficult to perform.

The workout

Begin with a 10- to 20-minute warm-up

of aerobic exercise to prevent injury. Divers with more lean muscle mass benefit from a longer warm-up.

Finish the workout with an additional 10 to 20 minutes of aerobic exercise to prevent soreness. For fat loss, continue an additional 10 to 20 minutes.

Combining power, strength and endurance into the same exercise session may initially result in increased "delayed onset muscle soreness" (DOMS). DOMS, if it occurs, should peak and subside within 24 to 36 hours after the workout.

Work into the routine gradually and at an individual level. Stay well hydrated before, during and after the workout. As with any exercise program, as the workout gets easier continue to safely increase the resistance.

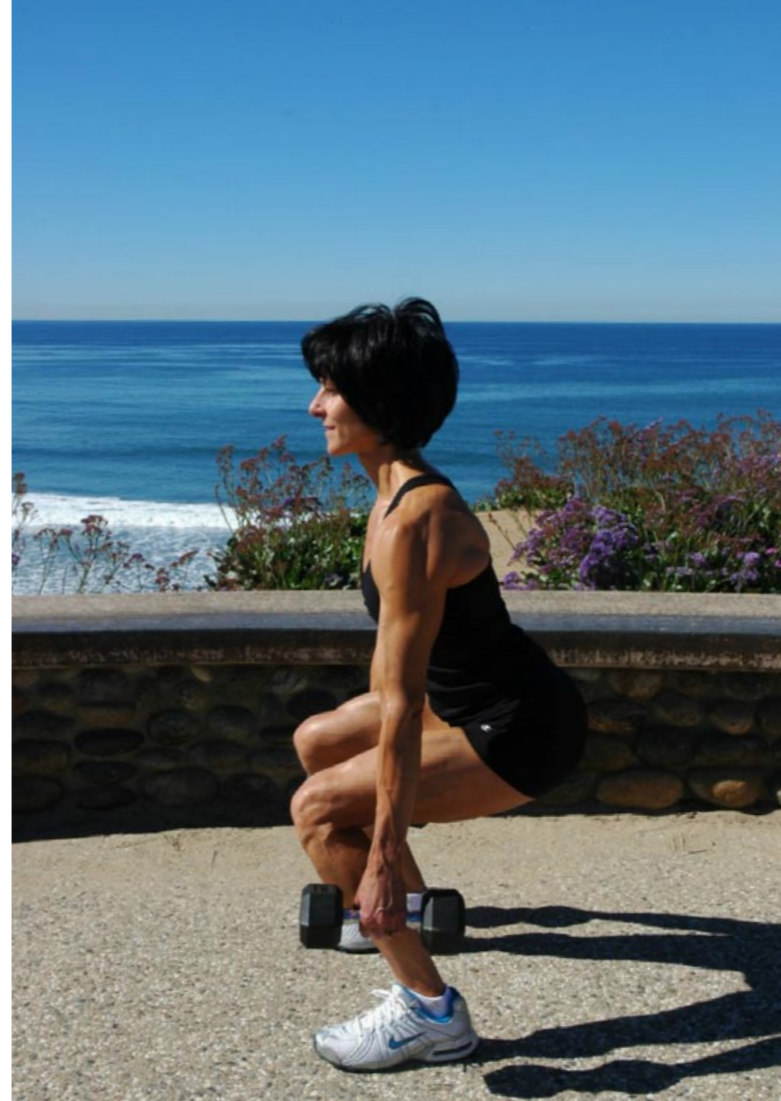
Beginner

To begin, perform each exercise for *power* one set, for *strength* one set, and for *endurance* one set, then repeat one to three times.

Advanced

For an ultimate workout, perform each exercise for the entire *power* sequence (five sets), then for the entire *strength* sequence (three sets), then for the entire *endurance* sequence (three sets) before moving on to the next exercise. Select three to five exercises.

Squat with dumbbells—starting position



Squat with dumbbells—seated position

Sea Legs

Be creative and safe. Select and perform only those exercises well-tolerated by individual fitness and mobility (i.e. use caution with any knee, back or musculoskeletal conditions).

Squat

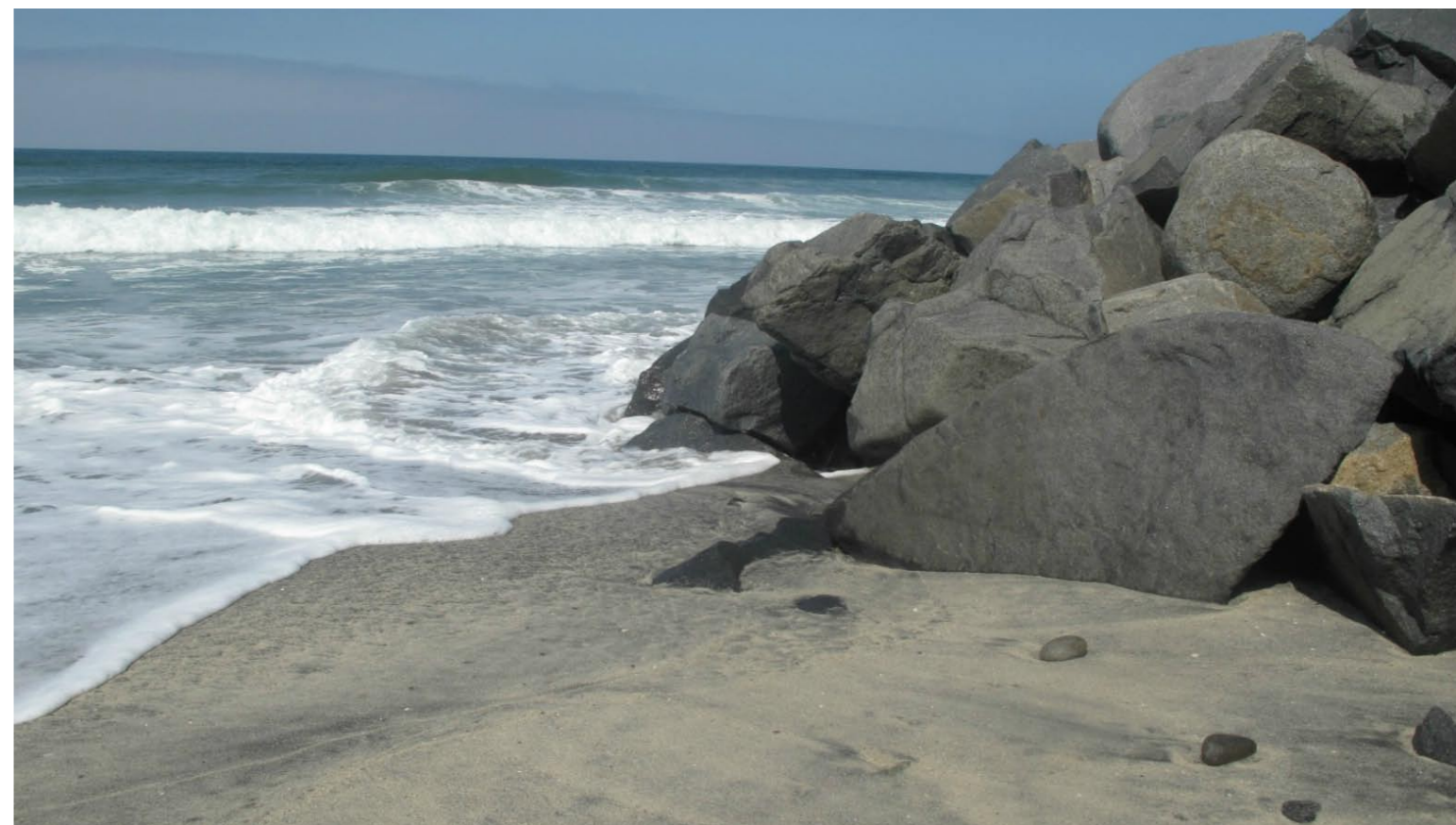
To perform the squat, hold dumbbells alongside the body, contract the abdominals, inhale deeply through the nose, and sit down and back as if reaching for a chair that is too far away. Bend the knee and hip joints until right angles are achieved at each joint and at the ankle. Knees should always be just above or behind the toes. The dumbbells may shift forward and the head may look

Options

The featured exercises are presented with dumbbells but may also be performed with barbells and plates or modular fitness machines.

Additional lower body exercises include, but are not limited to, the Leg Press, Smith Machine, Wall Sit, Leg Extension, Leg Curl, Dead Lift, Adduction, Abduction, and Calf Raise.

Equipment may be mixed and matched for additional variety. For example, a leg press is ideal for power exercises because greater weight can be used to perform the exercise. Cable stations may be well-suited to endurance sequences.



Divers often have to navigate a beach entry while schlepping 50 to 70 pounds of dive gear on their backs



Wide stance squat with dumb bell—seated position

up slightly to help maintain form.

To reverse the exercise, exhale through the mouth, contract the glutes (buttocks) and extend the knee and hip joints returning to the starting position.

Precaution: Do not lock-out the knees or look down.

Wide Stance Squat with Dumb Bell

Set up a wide stance as shown with one dumb bell in front of the hips and contract the abdominals. Make sure the hip joints are slightly rotated away from center so that the knees and toes are aligned when viewed down the length of each leg. Use the



same form as described for the Squat.

Precaution: Keep knees behind the toes. Do not lock-out the knees or look down.

Lying Leg Curl with Dumb Bell

The lying leg curl with a dumb bell is a challenging way to train the glutes and hamstrings. By squeezing the inner thighs together during the exercise, divers will also purposefully work the adductors (inner) and abductors (outer) thighs.

Stand the dumb bell on end on the floor or bench. Grasp it between the arches of the feet allowing the end of the dumb bell to rest on the bottom of the feet as shown. Contract the

abdominals and glutes to protect the low back during this movement. Keep the head aligned in neutral spine as much as possible. Inhale and extend the knee joints while lowering the weight as close to the floor as possible without dropping the weight or putting pressure on the knees. Exhale while flexing the knee joints and raising the weight toward the buttocks.

Precaution: Do not allow the front of the hips to lift off the bench or floor. If this happens, lower the weight until the exercise can be performed with safe and proper form. ■

Gretchen M. Ashton is registered with the Na-

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

Sea Legs



Lying leg curl with dumb bell—starting position



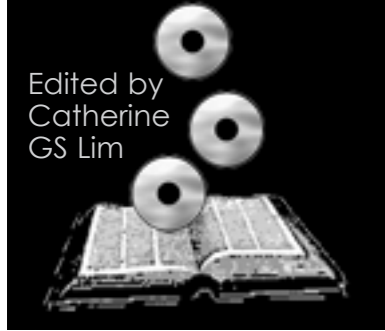
Lying leg curl with dumb bell—extended position



Wide stance squat with dumb bell—starting position



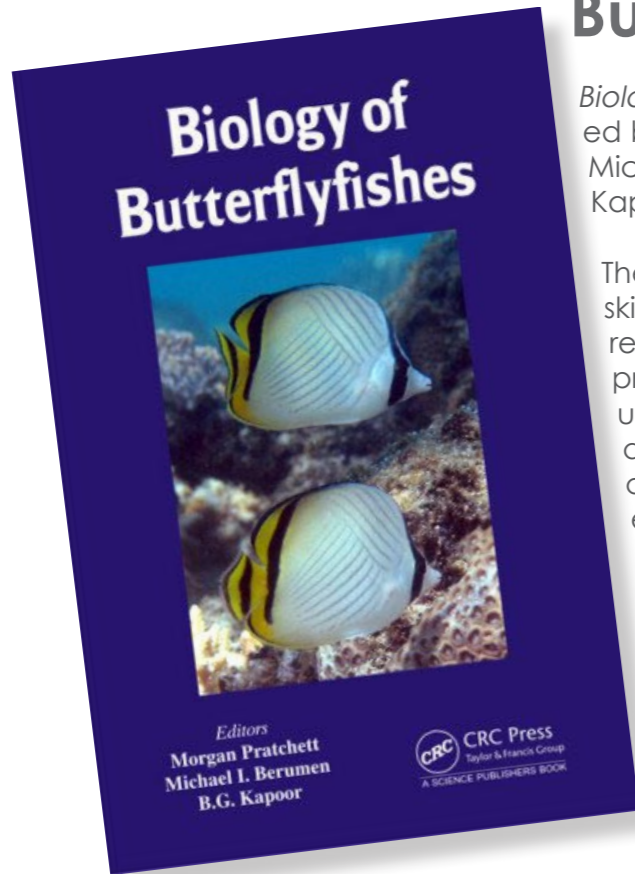
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Catherine
GS Lim



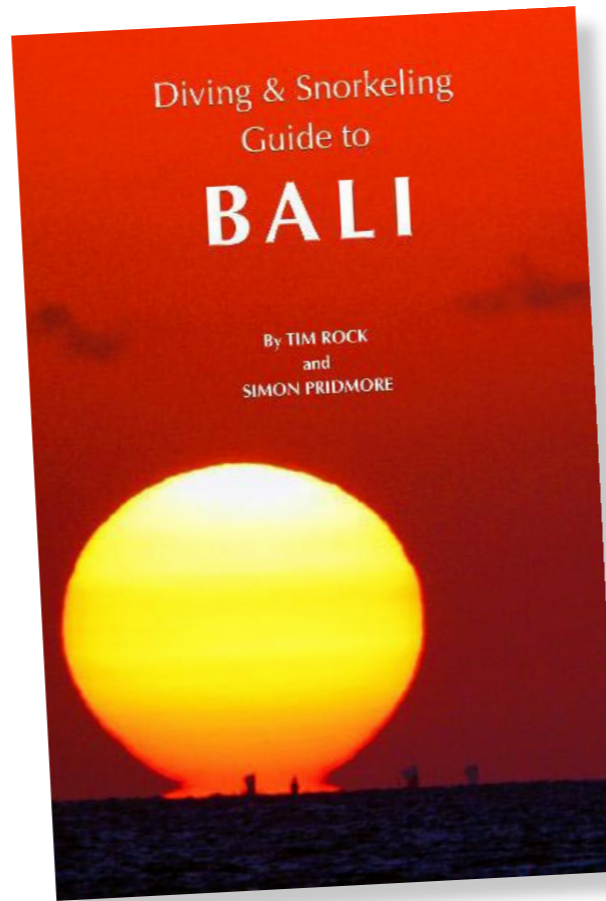
Butterflyfishes

Biology of Butterflyfishes, edited by Morgan S. Pratchett, Michael L. Berumen and B. G. Kapoor.

The butterflyfish that dart and skirt around the world's coral reefs are more than just a pretty complement to your undersea photos. Find out a little more about them—and then some—with this extensive 320-page book that covers their evolution, diversity, adaptations, behaviour and reproduction. Other topics include their role in the reef system, as well as the threats and challenges related to their conservation.



Hardcover: 320 pages
Publisher: CRC Press
Publication date: 7 Sep 2013
ISBN-10: 1466582898
ISBN-13: 978-1466582897

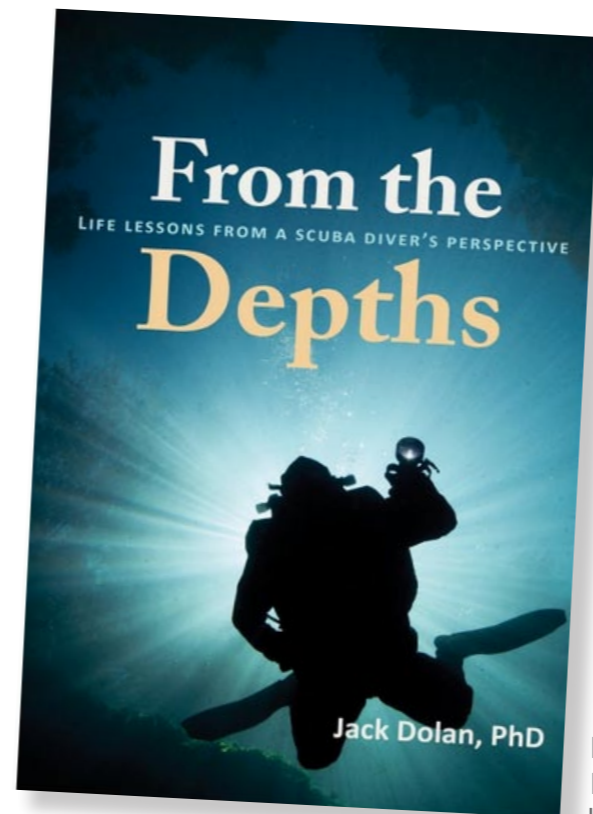


Diving Bali

Diving and Snorkeling Guide to Bali: Best Dive Sites Around Bali, by Tim Rock and Simon Pridmore.

Containing all the essential information ala a normal tourist guide, this book focuses primarily on the needs of the travellers bent on getting themselves wet in Bali. So, alongside tips on what to bring and wear, and how to get around, the bulk of the book shares information on 60 dive and snorkelling sites, site maps and dive safety tips for the region. You'll also find out about where and when to dive, as well as the colourful critters you can hope to spot while underwater.

Paperback: 108 pages
Publisher: CreateSpace Independent Publishing Platform
Publication date: 23 July 2013
ISBN-10: 1491056894
ISBN-13: 978-1491056899



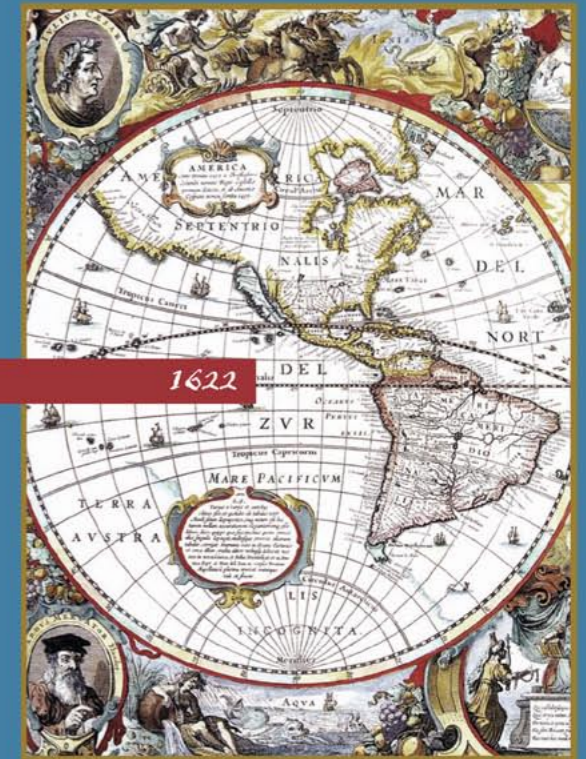
Scuba Life Lessons

From the Depths: Life Lessons from a Scuba Diver's Perspective, by Jack Dolan.

When Jack Dolan took up scuba diving lessons at the age of 56, he saw it as yet another aspiration to be realised. As the lessons progressed, he realised how similar scuba diving was to the adventure of life. He saw how the sport was filled with anxieties, doubts, questions and challenges, as well as fun, excitement and rewards. The more he learnt about the sport, the more he came to know himself. Written in a straightforward readable style, this book is an account of Dolan's introduction to the world of scuba diving, and the rediscovery of his own life.

Paperback: 186 pages
Publisher: Wheatmark Inc
Publication date: 15 Jun 2013
ISBN-10: 1604949503
ISBN-13: 978-1604949506

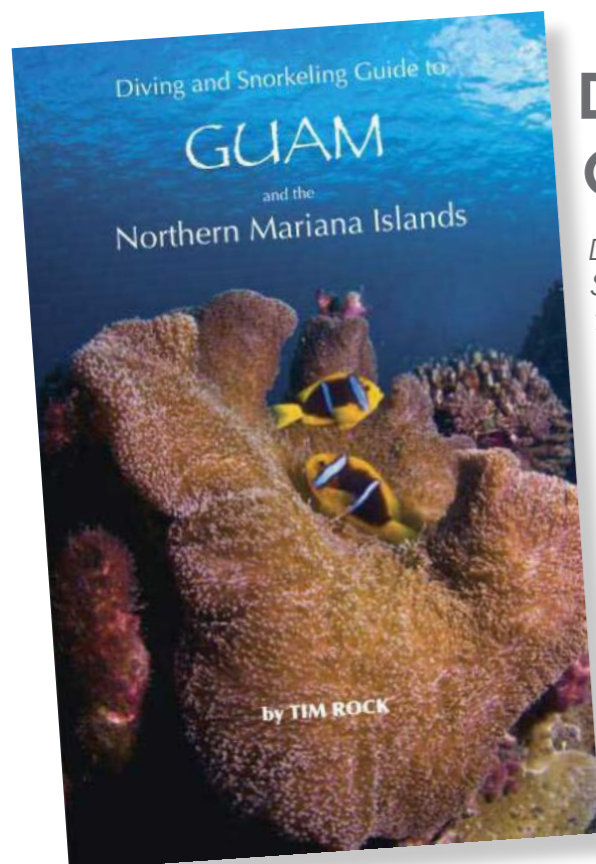
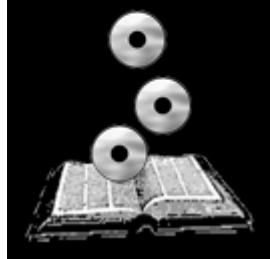
Treasure Coins of the *Nuestra Señora de Atocha* & the *Santa Margarita*



Carol Tedesco

In 40 succinct pages, *Treasure Coins of the Nuestra Señora de Atocha & the Santa Margarita* answers all the most frequently asked questions, including what the coins look like when first discovered, the meaning of the various markings, how they are cleaned, conserved and graded, what they were worth in the 17th century, and the most up-to-date information on the names and periods of office of the men who made them. Of particular interest to 1622 fleet coin enthusiasts is a section devoted to the exceedingly rare Old World minted coins discovered on the Atocha and the Santa Margarita.

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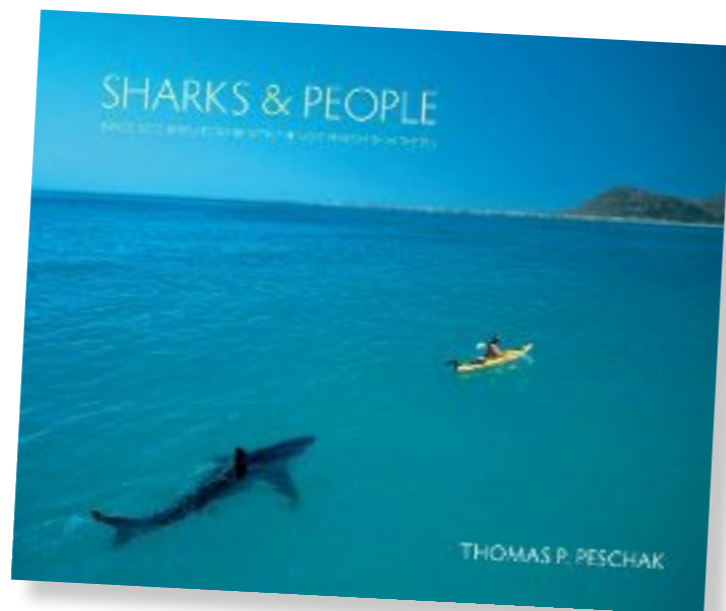
Diving Guam

Diving and Snorkeling Guide to Guam and the Northern Mariana Islands: Best Dive Sites on Guam and CNMI, by Tim Rock.

The island of Guam may sound like an exotic travel destination, but this is a place that divers should also pen into their wish list. This is because Guam and the Northern Mariana Islands are hard

coral kingdoms with around 400 coral species and over 900 fish species—as well as World War remnants—in the surrounding oceans. This book introduces readers to popular dive sites of the region, alongside useful information about the types of dives to be expected, the dominant marine life likely to be encountered and the necessary logistical information. Definitely a handy book to have, whether you are new to the region, or a seasoned diver in these parts.

Paperback: 108 pages
 Publisher: CreateSpace
 Independent Publishing Platform
 Publication date: 24 July 2013
 ISBN-10: 1491056479
 ISBN-13: 978-1491056479

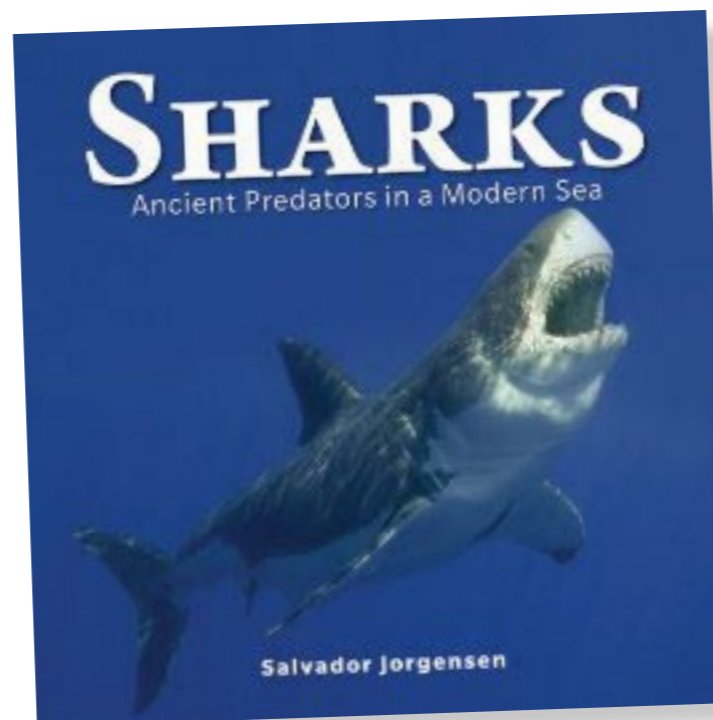


Sharks & People

Sharks and People: Exploring Our Relationship with the Most Feared Fish in the Sea, by Thomas P. Peschak.

Pick up this book and you're greeted on the cover with the now-famous photo of a great white shark behind a researcher in a yellow kayak. As a dramatic—and admittedly terrifying—introduction to the topic, the photo is just one of the many found in this book, which illustrates our relationships with sharks and describes the natural history of this apex predator (sharks, that is). In this book, award-winning photographer Thomas P. Peschak aims to illustrate the brute strength and unique attraction of sharks that have enthralled and inspired us through the centuries.

Hardcover: 256 pages
 Publisher: University Of Chicago Press
 Publication date: 7 October 2013
 ISBN-10: 022604789X
 ISBN-13: 978-0226047898



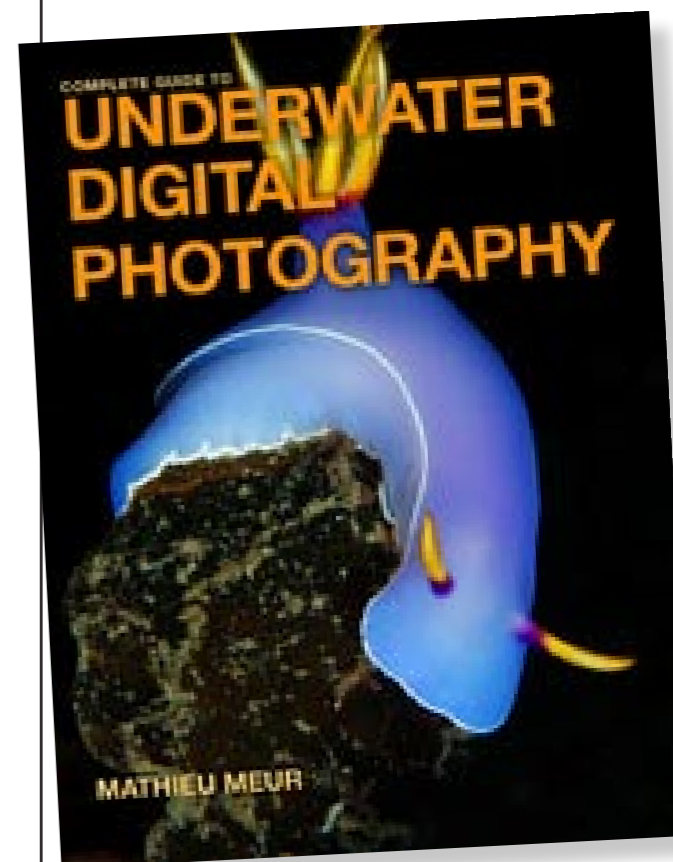
Ancient Predator

Sharks: Ancient Predators in a Modern Sea, by Salvador Jorgensen.

The body and senses of the shark have been honed through the centuries to create an impressive and efficient hunter. This book explores the latest scientific findings, newly observed behaviour and recent developments in our understanding of how they live—and thrive. Readers are also privy to recently discovered creatures from the Ocean Census research as well as photos of shark births and the latest discoveries of new species, making this book a must-have on any shark enthusiasts' bookshelf.

Hardcover: 256 pages
 Publisher: Firefly Books
 Publication date: 25 July 2013
 ISBN-10: 1770852336
 ISBN-13: 978-1770852334

New eBook



Underwater Digital Photography

Complete Guide to Underwater Digital Photography by Mathieu Meur.

Described as the first comprehensive, interactive electronic book of its kind on underwater digital photography in the iTunes Store, this ebook runs the gauntlet to cover all aspects of underwater photography. Topics include equipment, techniques, composition, lighting, post-production, and even tips on getting published and winning competitions. Targeted at both beginners and advanced photographers, this book contains over 350 pages and more than 500 images and illustrations.



Mexico's
Sea of Cortez
Text and photos by Matthew Meier — *Where the Wild Things Are*

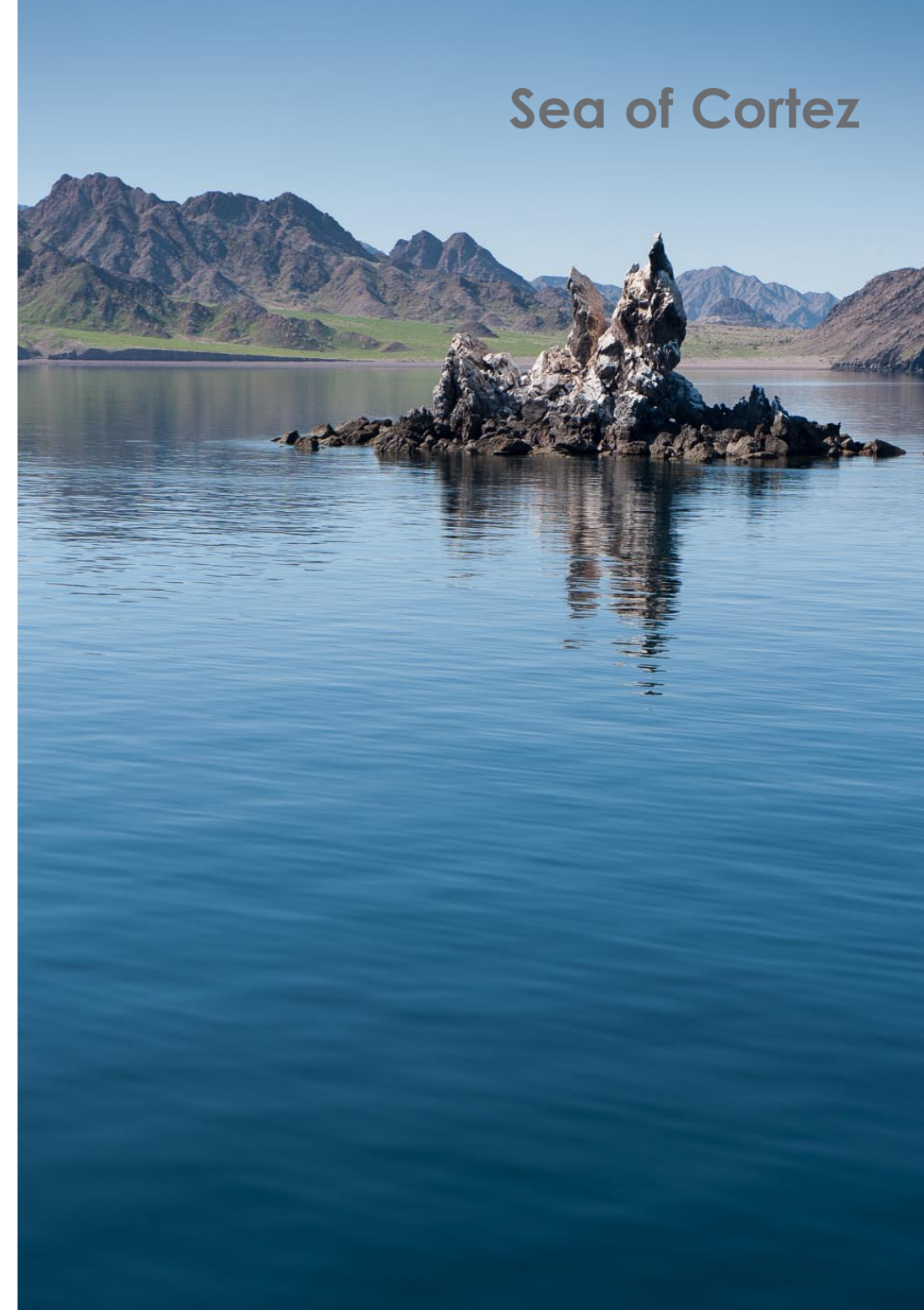


—Diving Mexico's Sea of Cortez, Midriff Islands and Baja California.

Whale shark, whale shark, whale shark! After several unsuccessful hours of searching the bay by small boat, these long-awaited words came as a welcome relief. Only a handful of us had heard the radio call after opting to stay behind and skip the last dive of the trip. The excited skiff driver making the transmission had just dropped off his divers when a 15- to 20-foot juvenile whale shark came up to investigate. An explosion of activity ensued as our remaining few frantically scrambled for snorkel gear and made last second camera checks before jumping into the now returning skiff in hopes of seeing the world's largest fish up close. For 16 magical minutes we were fortunate to have a very inquisitive youngster exhaust each of us in turn with its oversized version of follow the leader. The whale shark literally chased us in circles at the surface, as we passed the virtual baton, from one snorkeler to the next, in hopes of catching our breath before it came around again.



Head-on view of a juvenile whale shark just below the water's surface, Bahia de los Angeles (above); Panoramic view of Salsipuedes Island in late afternoon sunlight (top); Diver and yellow polyp black coral growing on rock wall at Andrea's Eagle off Angel Island. PREVIOUS PAGE: California sea lions circling each other at Ravijunco off San Pedro Martir Island



Sea of Cortez

CLOCKWISE FROM LEFT: Large fine spotted moray eel at Angel Island; Large organ pipe cactus in Sonoran Desert; Bullseye Stingray on sea floor at Andrea's Eagle, Angel Island; La Muela rock in Refugio Bay at the north end of Angel Island; Bluespotted jawfish at Los Cuervos, off Salsipuedes Island



this large, protected anchorage is also known as the Bay of the Angels and Bay of LA. The entrance to the bay is dotted with 16 separate islands and farther east, across the Canal de las Ballenas (Whales Channel), lays the southern portion of Isla Angel de la Guarda (Angel Island).

endemic to Baja California—is the world's largest cactus, growing as tall as 18m (60ft).

Angel Island

The second largest of the Midriff Islands, Angel Island is the northernmost landmass of the archipelago. This rugged, mountainous and uninhabited island is 69km (42.7mi) long, runs northwest to southeast, and contains no freshwater. The arid landscape supports various grasses, succulents and shrubs, along with a variety of birds and reptiles. The Angel Island speckled rattlesnake exists nowhere else, and the cardon cactus—nearly



Bahía de los Angeles

Whale sharks are commonly seen in this area from late July through September, and as this was the

first week of October—we were very lucky to have such an interaction. Located on the eastern shoreline of the Baja Peninsula,

Diving the Midriff Islands is accomplished by liveaboard dive boat. Trips typically run Saturday to Saturday from July through early October and include five and a half days of diving plus snorkeling opportunities with whale sharks and other pelagics when possible. Passengers are shuttled from the United States at Phoenix, Arizona's Sky Harbor International

Airport, through the Sonoran desert and the Organ Pipe Cactus National Monument, across the Mexican border and on to Puerto Penasco (Rocky Point), where guests board the boat for their overnight passage, traversing the Sea of Cortez.

We awoke that first morning to glassy sea conditions, while motoring into Refugio Bay, at the northern end of Angel Island.



Male orangethroat pike-blenny (left) displaying to attract a mate while in it's burrow off Angel Island; Aggregation (right) of juvenile blue-and-yellow chromis, scissortail chromis, Mexican hogfish and king angelfish swimming above the rocky reef at Andrea's Eagle, Angel Island; Angelfish swimming amongst yellow polyp black coral off Angel Island (below)

lions swam by for closer inspection. Lolo's Cove offered our first look at the endemic bullseye electric ray, and our guide pointed out a pair of seahorses that had taken up residence within the structure of an old lobster trap. A school of baitfish, corralled by circling barracuda, pro-



Sea of Cortez



Over the next two days we would explore several dive sites, rock outcroppings, bays and coves as the crew guided us down the western side of the island. Our first stop was La Muela (Molar Tooth) for a shallow check out dive. Here, we were treated to an array of bluespotted jawfish, living in burrows amid the rocky bottom, several species of stingrays and a fine spotted moray eel. Next came a drift dive along walls covered in gorgonians, hydroids and several schools of fish, all the while, dozens of curious California sea

and pelagics. Numerous colonies of California sea lions provide ample opportunities to dive and interact with these gregarious underwater acrobats. Whale sharks and sperm whales can be seen in the late summer and fall, along with pilot whales, dolphins, manta and mobula rays.

vided plenty of distraction on our safety stop.

The Sea of Cortez, or Gulf of California as it is also known, offers a varied mix of macro subjects, scenic rocky reefs

For those adventurous souls willing to jump into a cage at night, it is also possible to dive with humpoldt squid. Sadly, whether a product of climate change, over fishing or a simple change in their whereabouts, the squid have become increasingly hard to find.

Sharks are another species that are difficult to locate around the Midriff Islands, and unfortunately, mankind is very much to blame for their absence. From 1985-1995 over 200,000 sharks were killed by fishermen from camps in San Francisquito Bay, 50 miles south of Bahia de Los Angeles. Sadly, an equal amount of bycatch was also discarded in the process, and when it was over, the shark population was decimated. We were encouraged to see a couple of sharks swimming at the surface during our trip, and I hope that they make enough of a comeback to consistently be found underwater as well.

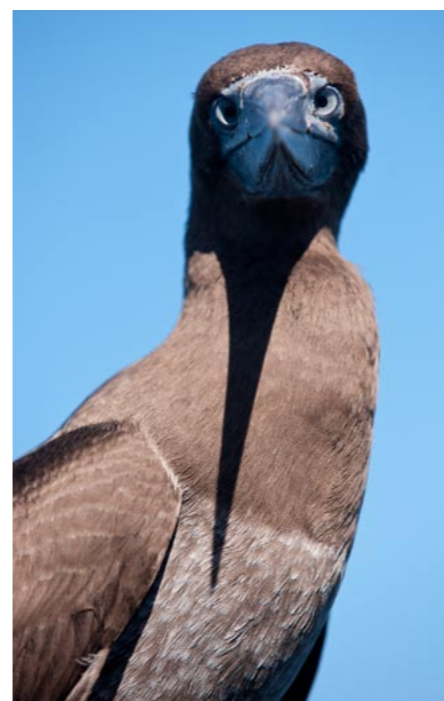


Fine spotted jawfish hiding in rubble burrow on sea floor off Angel Island



California sea lion (left) just below the surface at El Morro, San Pedro Martir Island; Raft of California sea lions (right) reflecting in the smooth surface of the water and diver (below) with playful California sea lions at Ravijunco, off San Pedro Martir Island

ders and abundant marine life. The crevices between the rocks allowed for plenty of hiding places for the various invertebrates and reef fish, while anemones,



Brown booby perched on boat

Andrea's Eagle. Our second day of the expedition began with two dives at Andrea's Eagle, one of my favorite sites—so named for the osprey (fish eagle) nest on the cliffs overhead. Underwater, this rocky pinnacle provided an equal breadth of amazing wide-angle and macro subjects. Male orangethroat pike-blennys were displaying for a mate in the shallows, while a fine spotted jawfish—its head

the size of a baseball—hid in a burrow in deeper water. Large aggregates of blue and yellow chromis, Mexican hogfish and king angelfish pulsated above the rocky reef and Cortez angelfish swam through forests of pristine yellow polyp black coral at depth.

El Aquario. After lunch we had two dives at El Aquario, a site with piles of large boul-

sponges, hydroids and gorgonians grew on the rocks themselves. A strong current came up for the night dive making macro photography all but impossible.

Diving the northern Sea of Cortez can be a bit of a challenge due to the varied conditions dive to dive, but that is also part of the adventure. Water temperature, visibility and current can change from one site to the next, between successive dives and occasionally during the dive itself.

Strong tidal currents produced by the lunar tides in the Pacific Ocean can create drift dive conditions and are especially robust during a full moon. These tidal currents also produce upwelling's that bring nutrients from the depths, which can affect visibility as well as temperature. Amongst the various dive sites, over the week of diving, we experienced a ten-degree difference in temperatures.

San Pedro Martir Island

Overnight, the boat moved south from Angel Island to the island of San Pedro Martir, and we were subsequently serenaded awake by hundreds of brown booby birds fishing for their breakfast.





CLOCKWISE FROM LEFT: Stone Scorpionfish, with dorsal fin raised, at Ravijunco, San Pedro Martir Island; Tube-dwelling anemone tentacles flowing with current; Pacific creolefish resting in a crevice on the rocky reef at night; Giant hawkfish hiding in a crevice on the rocky reef off San Pedro Martir Island



dens. Countless scorpionfish, in a multitude of colors, dotted the reef, along with several giant hawkfish, tube-dwelling anemones and panamic cushion stars. After dark we returned to Ravi Junco, scouring the large rock formations to find sleeping fish, moray eels and scavenging pinto spiny lobsters.



El Morro II and Sharenly. Two more amazing rock pinnacles were explored the following morning at El Morro II and Sharenly. Each was covered in gorgonians, hydroids, sponges, black coral and large schools of reef fish. When compared to some of my previ-

ous destinations like the Socorro Islands, Cocos or the Galapagos, I found the colors and reef life here much more vibrant. While each of these locations has similar underwater topography and fish species, only the Sea of Cortez had reefs with such vitality and beauty.



Ravi Junco and El Morro. The early morning was spent frolicking with sea lions at Ravi Junco as they swam circles around each other and us, often hovering above

unwitting divers, playing in their bubbles. From there we moved to a rocky pinnacle called El Morro, where a huge school of Pacific creolefish swam by to greet us,

followed closely by an aggregation of king angelfish and chromis, and then ultimately more sea lions joined us at our safety stop, posing for photos amidst the sun's rays.

El Arroyo. That afternoon we dove a site called El Arroyo where deep sand channels separate rock formations and black coral gar-



Panamic cushion star covered in hundreds of baby brittle stars





CLOCKWISE FROM LEFT: Large gorgonian sea fan and pink barrel sponges at Shareny off San Pedro Martir Island; Balloonfish hiding in rocky reef; Pinto spiny lobster hunting on the rocky reef at night at Ravijunco, San Pedro Martir Island; Pyramid sea star amongst pink barrel sponges with scissortail chromis swimming overhead at Shareny off San Pedro Martir Island



Sea of Cortez

the water as a form of thermoregulation. We found many of the usual fish suspects, as we dove two more pinacles covered with marine life. New additions from the first dive included several finescale triggerfish protecting their nests in the sand and a pair of seahorses was discovered on the last dive of the day.

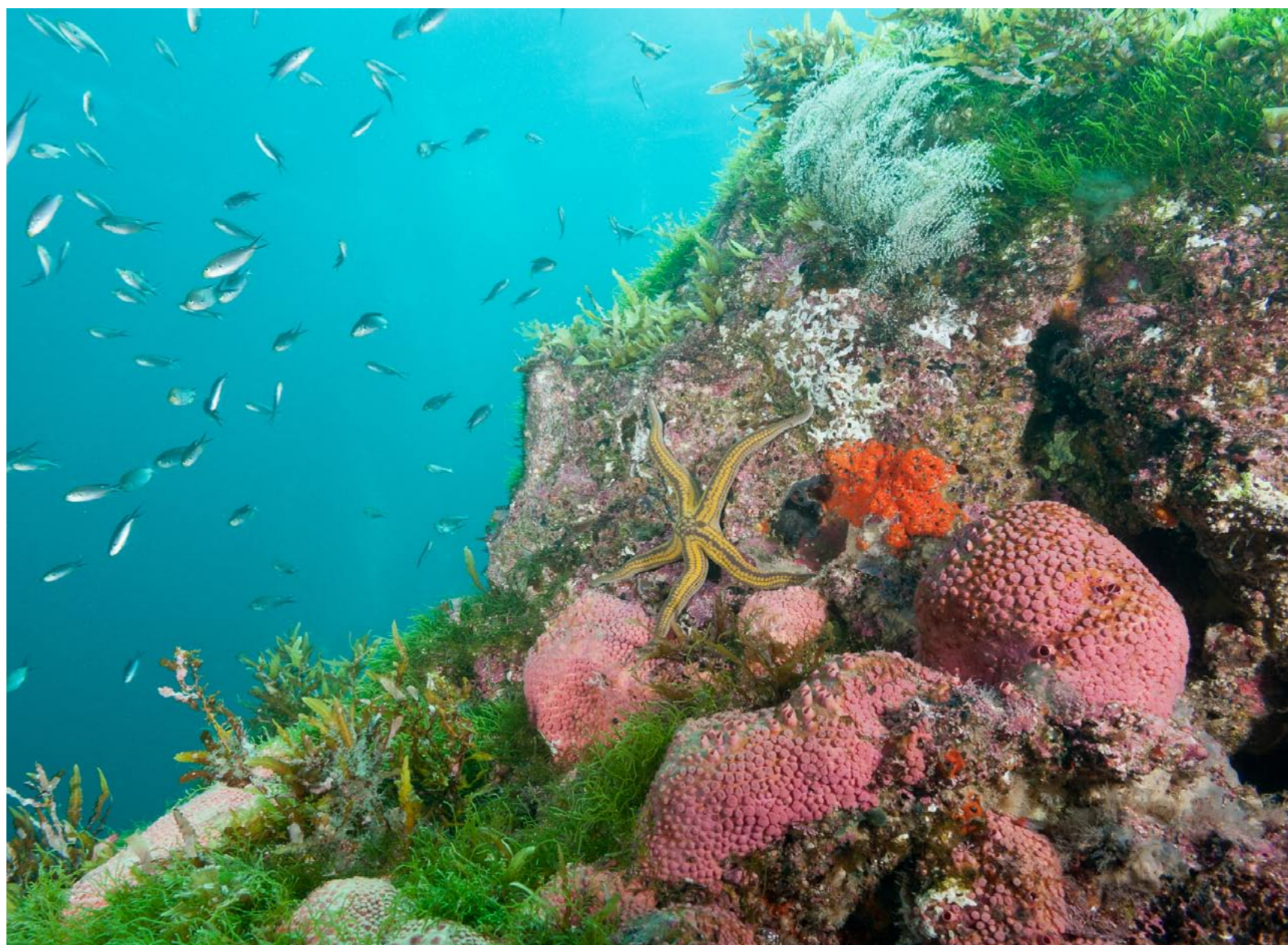
I skipped that last dive to hike and explore Salsipuedes Island and photograph the hundreds of brown pelicans lining its coastline. I also took advantage of being on dry land, using my tripod to create a panoramic image of the island itself and document several Sally Lightfoot crabs. At sunset, I was

Salsipuedes Island

The final full day of diving brought even larger numbers of sea lions, both floating in rafts on the surface and swim-

ming en mass underwater. The rafting behavior entails several sea lions floating together at the surface, often raising one or more of their flippers out of

fortunate to silhouette three pelicans on a rock outcropping against a beautiful orange sky reflected in the water's surface. While disappointed to have





Sea of Cortez



missed the seahorses, I was very pleased with my land excursion and topside shots.

The Midriff Islands are remote and isolated, the terrain rugged and the scenery dramatic. Spectacular sunrises are only outshined with brilliant starry nights and the complete lack of light pollution or any sign

of civilization. Ours was the only boat we saw for days, and our only companions on the water were the dolphins that played in our wake during transports.

It is hard to put into words the peace and tranquility that comes from being so removed from daily life. The sights and

Scissortail chromis (above) over pink and yellow barrel sponges at Shareny, San Pedro Martir Island; Raft of California sea lions (top) near Salsipuedes Island; California sea lion (top left) over rock wall covered with barrel sponges and stinging hydroids at La Pared, San Pedro Martir Island; Sea lions (left) swimming close to each other underwater at El Caballo, Salsipuedes Island





Images this page from Salsipuedes Island. CLOCKWISE FROM LEFT: Sally Lightfoot crab on rocky shoreline; Flock of brown pelicans taking flight; Three brown pelicans silhouette against an orange sunset sky

To see more of his work and to order photo prints, please visit: Matthewmeierphoto.com

SOURCES: WIKIPEDIA.ORG
ROCIODELMARLIVEABOARD.COM
SEAWATCH.ORG/SEA_OF_CORTES/SHARKS_DEATH_CAMPS.PHP



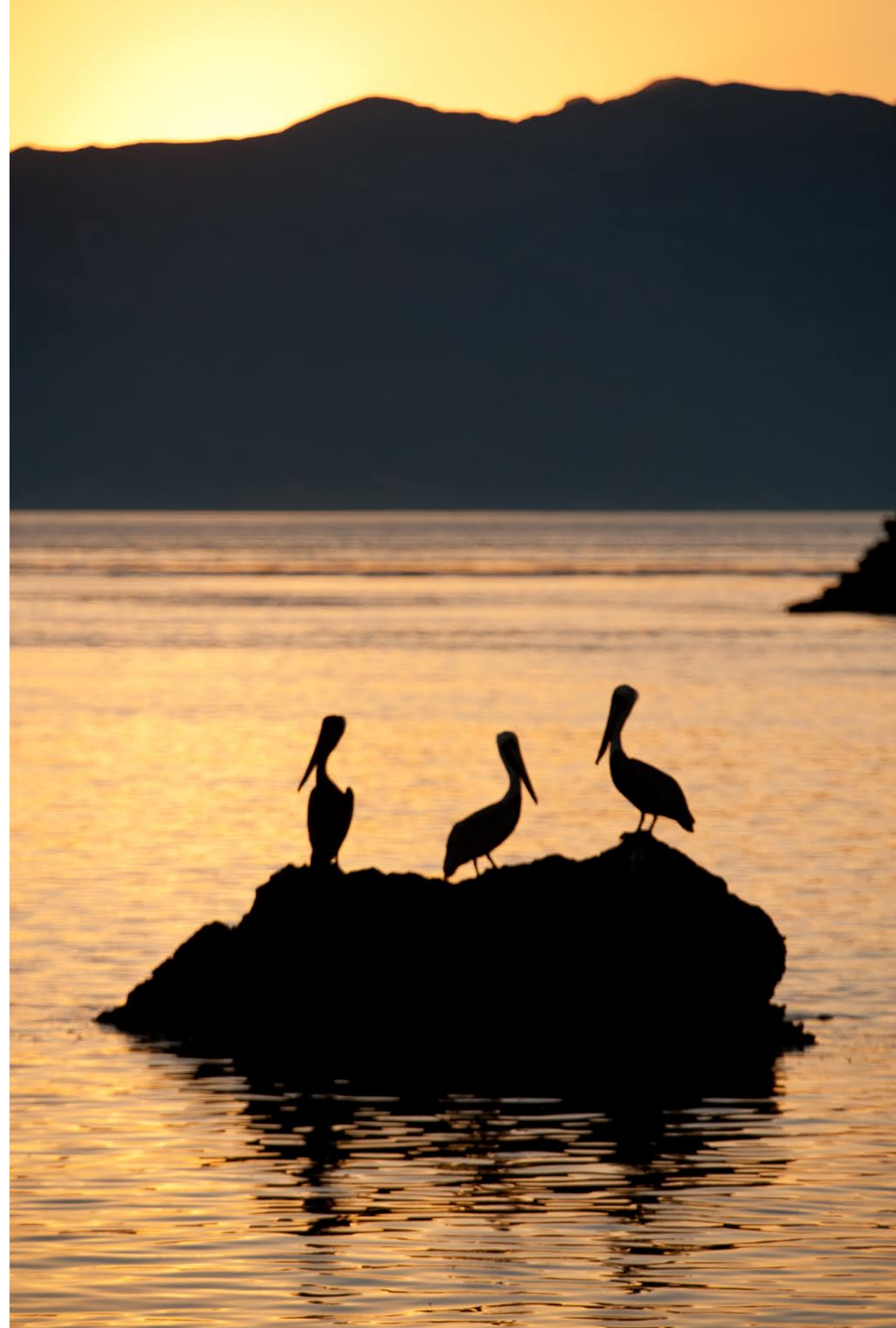
sounds of the Sea of Cortez will remain with me for quite some time, and I very much look forward to my next visit. ■

The author extends a special thanks to the management and crew of the Rocio Del Mar (Rociodelmarliveaboard.com) for hosting this adventure. The author also thanks Blue Abyss Photo (Blueabyssphoto.com) for assisting with underwater photo gear.

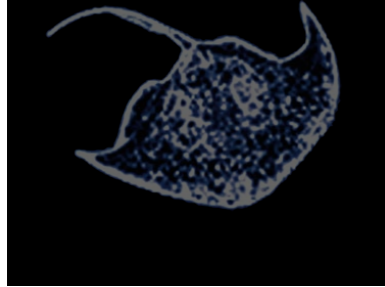
Matthew Meier is a professional underwater photographer and travel writer based in San Diego, California.



California sea lion barking while floating at the water's surface near San Pedro Martir Island, its flippers out of the water to regulate body temperature



fact file



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

Sea of Cortez, Mexico



History Mexico was home to the Maya and Aztec people, along with several other advanced Amerindian civilizations, before Spain conquered and colonized the country in the early 16th century. For three centuries, Mexico was administered as the Viceroyalty of New Spain before gaining its independence in the early 19th century. Mexico lost a large portion of its territory to the United States at the end of the Mexican American War of 1846 and nearly a tenth of their population during their Mexican Revolution from 1910-1929. The country stabilized in the 1930s and was controlled by the Partido Revolucionario Institucional (PRI) party until 2000.

Geography Mexico is landlocked between the United States and Guatemala in North America and bordered by the Caribbean Sea and the Gulf of Mexico to the east and the North Pacific Ocean to the west. The Sea of Cortez is located between the Baja California Peninsula, one of the longest peninsulas in the world, and mainland Mexico. The sea is 700 miles (1,126km) long and between 30 to 150 miles (48 to 241km) wide, with a mean depth of 2,684 feet (818m). It contains 37 islands, most of which are found on the peninsular side of the gulf. One of the largest is Isla Angel

de la Guarda (Angel Island). The Gulf of California is a UNEXSO World Heritage Site.

Climate The Northern Sea of Cortez has a dry and arid climate that is hot in the summer months from May to October and milder in winter from November to May. Air temperature can range from 80°F to 100°F in summer months and 60°F to 95°F in winter. Water temperature can range from 72°F to 85°F in summer and often fluctuates depending on currents. A 3mm to 5mm wetsuit is recommended for diving.

Economy Mexico has a free market economy containing a mixture of industry and agriculture. Their per capita income is one third that of the United States and roughly 50% of the population lives below the poverty line. Imports from the United States have increased from 7% to 12% since the implementation of the North American Free Trade

Agreement (NAFTA) in 1994 and more than 90% of Mexico's trade is under free trade agreements. In the recent global economic downturn, Mexico's GDP dropped 6.2% in 2009. It rebounded with positive growth of 5.6% in 2010 and slowed to roughly 4% in 2011 and 2012. A comprehensive labor reform was signed into law in November 2012 in hopes it would prioritize structural economic reforms and competitiveness.

Currency Mexican Peso (MXN) U.S. Dollars and international credit cards are widely accepted at tourist destinations. Exchange rates: 1EUR=16.77MXN; 1USD=12.65MXN; 1GBP=19.48MXN;

1AUD=11.70MXN; 1SGD=10MXN
Population Mexico has a population of 116,220,947 (July 2013 est.)—the majority of which are Roman Catholic. The capital, Mexico City, is the second largest urban agglomeration in the Western Hemisphere at 19,319 million. Conversely, the Midriff Islands in the Sea of Cortez are mostly uninhabited.

Language Spanish is the official language of Mexico, but there is still a small portion of the population that speaks indigenous and other regional languages. English is widely spoken in tourist areas.



RIGHT: Global map with location of Sea of Cortez
BELOW: Location of Gulf of California, or Sea of Cortez, on map of Mexico
LOWER RIGHT: Lizard triplefin camouflaged against the rocky reef at Los Cuervos off Salsipuedes Island



also be able to use your home country's. The roads are generally paved and in good condition, though not necessarily well marked.

Decompression chamber The nearest hyperbaric chamber is located on the mainland in Puerto Penasco (Rocky Point). There are no chamber facilities on the Midriff Islands.

Travel/Visa A passport is required for entry into Mexico. Visas are not required for U.S. citizens but may be necessary for travel from other countries. Phoenix, Arizona's Sky Harbor International Airport (PHX) is the most convenient for boarding a liveaboard boat to the northern Sea of Cortez. Shuttles run between Phoenix and Puerto Penasco (Rocky Point) where guests board the boat for their transit down to the Midriff Islands.

Voltage 110 volts, with U.S. standard 2- and 3-prong plugs are available on the liveaboard dive boats.

Cuisine Mexican cuisine has a mixture of indigenous and European influences, mainly Spanish. Native corn, beans and chili peppers are staples, to which are added beef, pork, chicken and seafood, dairy products, herbs and spices. The food is tied to local conditions and culture and varies greatly by region. Corn is the most common starch and is usually served as a tortilla.

The menu on the liveaboard boat includes a variety of local dishes, fresh fish, fruits and vegetables and American style breakfasts.

Tipping A 10-15% tip is customary for shuttle drivers, dive guides and boat crewmembers, as well as wait staff in restaurants.

Driving Vehicles travel on the right side of the road. An international driver's license is accepted for renting a car, and you may

ADDITIONAL SOURCES:
EN.WIKIPEDIA.ORG/WIKI/GULF_OF_CALIFORNIA
ROCIODELMARLIVEABOARD.COM/INDEX.HTML





Edited by Scott Bennett

Gangetic dolphin meat sold openly in India's Assam Province

Fish vendor discovered selling meat at roadside market. Local environmental groups outraged by slaughter.

The Gangetic river dolphin, India's national aquatic animal, is being slaughtered for its meat in the state of Assam. A fish vendor was discovered to be selling dolphin meat at a roadside market in Lezai-Kalakhowa in Assam's Dibrugarh district. A local woman photographed the vendor and informed wildlife activists of Nature's Beckon and Irab Kirab regarding the incident.

Following outrage by environmental groups, police registered a case and have initiated an enquiry. Initial findings revealed the dolphin was caught from the nearby Burhidehing River. Abdul Wakid, head of

the Gangetic Dolphin Research and Conservation Initiative called Aaranyak, stated the matter has been taken up with the forest department. Local residents claimed dolphin meat is often sold in the rural markets. The perpetrators, however, have yet to be apprehended.

"It is quite unfortunate. The present population of the Gangetic river dolphin in the rivers of Assam is about 400. The worldwide population is around 2,000. During summer, when the water level of the Brahmaputra rises, dolphins tend to migrate upstream to the tributaries and smaller rivers. This is the time they are caught by fishermen. Apart from the Brahmaputra, the species is found in its tributaries Kulsu and Subansiri," said Wakid.

The Gangetic river dolphin (*Platanista gangetica*) was declared the state aquatic animal by the Assam government in 2008. Anyone found killing or possessing any part of the animal can be imprisoned for one to six years and fined no less than Rs 6,000.

Highly endangered, the freshwater Gangetic dolphin, or Susu, grows to a maximum length of eight feet and weighs about 100kg. Residing in one of the world's most densely populated regions, the species is threatened due to habitat loss resulting from the creation of dams and irrigation projects. ■ SOURCE: TIMES OF INDIA



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Gangetic river dolphin (*Platanista gangetica*)



Beluga whale at the Vancouver Aquarium

Disturbing increase in St. Lawrence beluga deaths

Researchers concerned by increase in beluga calf mortality. World's southernmost beluga population under threat.

A disturbing increase in dead beluga whale calves washing up on the shores of the St. Lawrence River are concerning Quebec marine biologists. In 2012, researchers associated with Tadoussac-based marine mammal research group, the Groupe de recherche et d'éducation sur les mammifères marins (GREMM), discovered 17 dead beluga calves either drifting or washed a shore. According to GREMM's scientific director Robert Michaud, that's a record.

For years, the population was considered to be stable but Michaud worries it may now be on the decline. Based on data dating to the early 1980s, fewer than three dead baby belugas washed up on shore each summer.

"Since 2005, we've seen an increase in the mortality of calves [and] a new kind of mortality in females—a lot of females are dying in neonatal conditions, either just before, during or after giving birth," Michaud said. "For now, we have no simple explanation to account for [this increase]. We don't know either what will be the impact of this mortality on the recovery of this population," he added.

Researchers rely on data collected by Fisheries and Oceans Canada to monitor the beluga population via aerial surveys. However, cuts to the federal department's budget have left holes in the data. Before that, the surveys were conducted every three or four years, dating back to 1988. Researchers are still waiting for the analyses of data collected in 2009 and there have been no surveys since.

"When we are tracking a small endangered population, we want to be able to detect significant change in the population," Michaud said. "If something is going wrong with the population, we should be able to detect that rapidly. Not five, ten years afterwards."

Due to the closure of the DFO ecotoxicology lab, researchers will not have access to data from a program monitoring the impact of contaminants on the health of belugas. "What will be the impact on the beluga?" Michaud asked. "Unless we're able to monitor every component of the ecosystem, we won't be able to answer that."

Approximately 1,000 beluga whales reside in the St. Lawrence River near the mouth of the Saguenay River. The world's southernmost dwelling belugas are an isolated population, far from their nearest neighbours in northern Quebec. Nearly exterminated by the 1950s, they only became protected in the late 1970s. ■ SOURCE: CBC NEWS



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turtle tales



Edited by
Bonnie McKenna

Plastic ingestion on the rise

Around the world, endangered green sea turtles are swallowing more and more dangerous plastic, according to a recent study. The Australian study published in the journal *Conservation Biology* showed that ingestion of man-made debris by six of the world's seven species of sea turtles, all of them classified as vulnerable or endangered, has increased significantly since the 1980s.

"We found that for green sea turtles, the likelihood that a sea turtle has ingested debris

has nearly doubled in the last 25 years," said the study's lead author, Qamar Schuyler, from the University of Queensland. "Specifically for green turtles, it does appear that they are eating a lot more debris than they used to."

By reviewing scientific literature since 1985 on sea turtles ingesting rubbish in the sea, researchers found that the probability of a green sea turtle eating debris rose from 30 percent in 1985 to 50 percent in 2012. The amount

of refuse consumed by leatherback sea turtles has also increased since the first data was recorded over a century ago.

Plastic debris can kill animals that eat it by blocking their stomachs or puncturing their intestines, leading to starvation and death. Ingested plastics can also release toxins, which are inherent in the

plastic or absorbed while floating in the ocean, into an animal's system.

"The animal may not die of that right away but it may impact things like their reproductive cycle and that has longer-term consequences," said Schuyler.

Turtles that have eaten a lot of plastic were not always washing up on the shores of the most populated or polluted areas, according to the data. This means the sea turtles were eating debris from places farther away from where they were found, said Schuyler. She added that the finding suggested a global response was needed in order to combat the problem.

"What we really need to look at is a large scale movement to stop debris entering the oceans."

Data collected as far back as 1900 was examined in the research, which included the analysis of 37 studies published between the years of 1985 and 2012, and showed that turtles in all regions were ingesting debris, plastic being the most common. The researchers stated in the study, "Our results show clearly that debris ingestion by sea turtles is a global phenomenon of increasing magnitude." ■

SOURCE: PHYS.ORG



Feeding green sea turtle



Why do female loggerhead sea turtles always return to their place of birth?

Scientists are trying to understand why turtles return to their birthplace after long distance migrations. Using molecular tools from GEOMAR Helmholtz Center for Ocean Research it was found that males and females adopt different strategies: females are faithful to their place of birth, males are less selective and mate at multiple locations.

The *Royal Society B: Biological Sciences* hypothesizes that females from different places have different immune genes, suggesting that returning home is linked to advantages in parasite resistance.

To address the question, GEOMAR focused on the world's third largest nesting population of loggerhead sea turtles found in the Cape Verde archipelago. This archipelago is composed of numerous islands; here, the scientists collected tiny skin samples from turtles on four different islands for analysis. Using genetic tools they found that the female loggerheads not only return to Cape Verde to breed, but also

they show a remarkably accurate ability to return to reproduce at the place of their birth.

This behavior has some advantages: a certain region in the turtle's genome is responsible for fighting parasites and diseases, the so-called histocompatibility complex.

At the same time, always returning to the same area may

lead to mating with relatives. However, the study found that males counteract this inbreeding risk by being less selective in choosing their mating places.

The study suggests that it is important not to lose any of the nesting colonies, as each location provides important genetic adaptation for survival of the entire population. ■



Loggerhead sea turtle



How did the turtle get its hard shell?

For years, it has been a mystery, but researchers have made new findings that bring to light how the turtle's hard shell was formed.

Millions of years ago the sea turtle's unique shell evolved, and the key to unlocking the mystery lies with an ancient fossil of an extinct reptile in South Africa, researchers said. This fossil is helping to bridge a gap of 30 to 55 million years.

Called *Eunotosaurus africanus*, the ances-

tor of today's turtle is estimated to be about 260 million years old and has major differences to other fossil relatives recently discovered.

Although a hundred years have passed since *Eunotosaurus* was discovered, new research published in the journal *Current Biology* has just analysed anew the differences between it and other turtle fossils.

Skeleton of *Eunotosaurus*

Made up of about 50 bones, the turtle's

shell is formed by the fusing together of the ribs, shoulder bones and vertebrae. The formation of modern-day turtle shells can be seen in the developing embryo. First the ribs widen, then the vertebrae broaden, then an outer layer of skin grows on the edge of the shell.

"The turtle shell is a complex structure whose initial transformations started over 260 million years ago in the Permian period," said Dr Tyler Lyson of the Smithsonian Institution and Yale University and lead

author of the study. "The shell evolved over millions of years and was gradually modified into its present-day shape."

A 210-million-year-old turtle fossil was found with a fully developed shell. However, another fossil found in China (*Odontochelys semitestac*), which was 10 million years older, had a carapace that was not fully formed.

Lyson and colleagues have been helped by this fossil when comparing the modern turtle with its predecessor, *Eunotosaurus*,



PROJETO TAMAR BRÁZIL/MARINE PHOTOBANK

Millions of years ago, sea turtles evolved with a unique hard shell

which lacked the broad spines on its vertebrae that both today's turtle and *Odontochelys* have. Other features were missing such as intercostal muscles, or muscles that lie between ribs, as well as bony scales.

Protecting the turtle is the shell's main purpose, but it also helps a turtle survive underwater longer than other vertebrates because it stores magnesium and potassium. These elements help protect the turtle from lactic acid build up.

"*Eunotosaurus* is a good transitional fossil which bridges the morphological gap between turtles and other reptiles," Lyson said.

Researchers can now describe the development of the shell based on fossil evidence. The ribs broadened first, then the neural spines of the vertebrae widened, and then the skin on the outer side of the shell formed, all coming together to form today's turtle shell, according to Lyson.

"One of the direct consequences of forming a protective shell by broadening and locking their ribs is that turtles cannot use their ribs to breathe," said Lyson. "Instead turtles have developed a unique abdominal muscular sling that wraps around their lungs and organs to help them breathe."

The importance of the findings was highlighted by assistant professor Judith Cebra-Thomas of the department of biology at Millersville University in Pennsylvania, not one of the authors of the study.

"The turtle shell is considered an evolutionary novelty, which means that there are no closely analogous structures in related animals," said Cebra-Thomas. "That leads to the notion that such things cannot occur through normal evolutionary processes. But, when you examine it in detail, you can see the series of steps, each of them explainable through small changes that gradually add up to the novel structure." ■ SOURCE: BBC

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shark tales



Researchers take identification photos of a whale shark

Text by Georgina Wiersma
Photos by Peter Verhoog

Underwater photographer Peter Verhoog of the Dutch Shark Society is on a mission—a mission to save sharks. He wants to raise awareness for sharks and their fate among a wide audience. One of the ways to do this is to show people not only the beauty of sharks but also shark behaviour and their sometimes worldwide migration and feeding patterns.

Marine conservation is almost never a national matter; migratory species can cross many borders, and regulations have to span more than one nation to protect a species. The whale shark is a highly migratory and cosmopolitan tropical and warm temperate species. It is established that the whale shark occurs in an astonishing number of countries—124 countries worldwide.

This shark is the world's largest

fish, with a maximum recorded length of 16 meters and a mouth that can be 1.5m wide. Its life cycle is poorly understood. Populations appear to have been depleted by targeted harpoon fisheries in Southeast Asia and perhaps incidental capture in

other fisheries. Its flesh is eaten, but their fins are more valuable; in the markets in the Far East, one fin from a whale shark can sell for over US\$15,000, the total from one single shark can exceed US\$60,000. Its normally low abundance make this species vulner-

able to commercial fishing.

Why tracking?

Whale sharks have become a species listed as "vulnerable" on the IUCN Red List. Its life history is largely unknown. Tracking individual sharks is therefore a valuable

practice, being it by photo ID or tags.

In 2012, Peter Verhoog visited Djibouti, a true 'hotspot' for juvenile, predominantly male whale sharks. From mid October to February, plankton blooms develop in an enclosed bay near

Djibouti town called the Goubet al Kharab (Devil's Cauldron). This bay is visited by whale sharks year round, but the number of shark is much higher during the plankton bloom. This aggregation has been studied for a number of years, and confirms that whale sharks



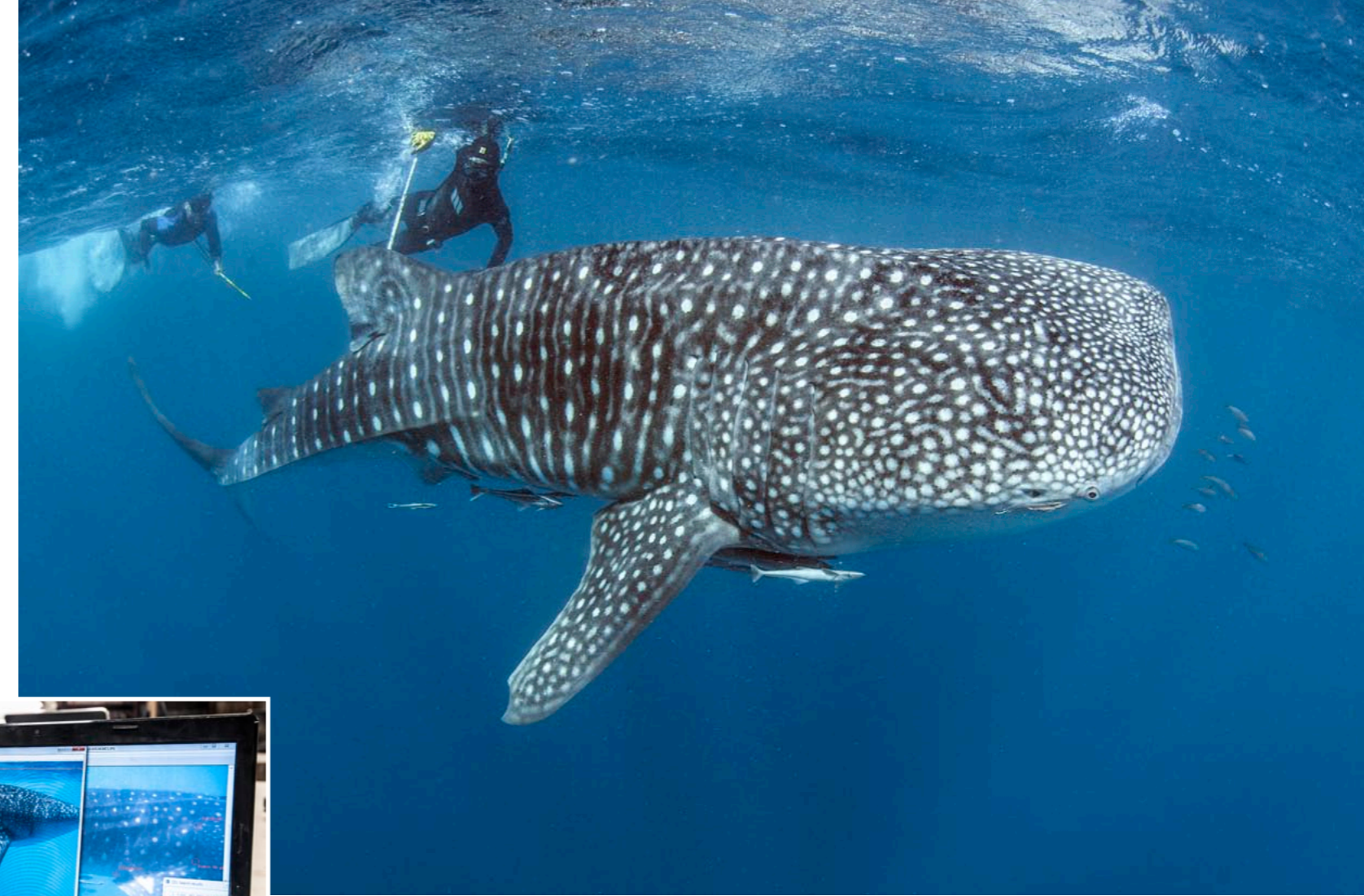
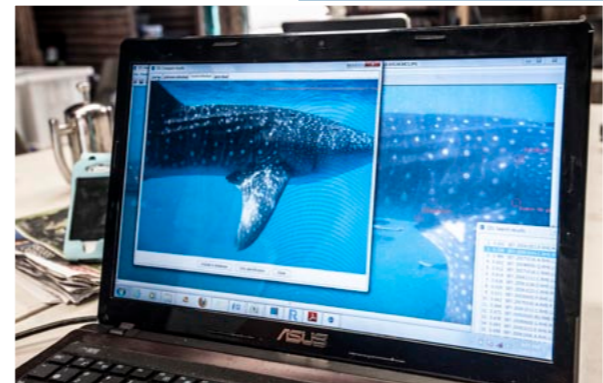
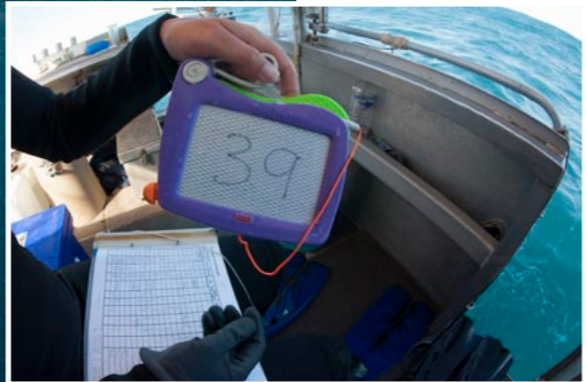
Gatherings of the Gentle Giants



shark tales



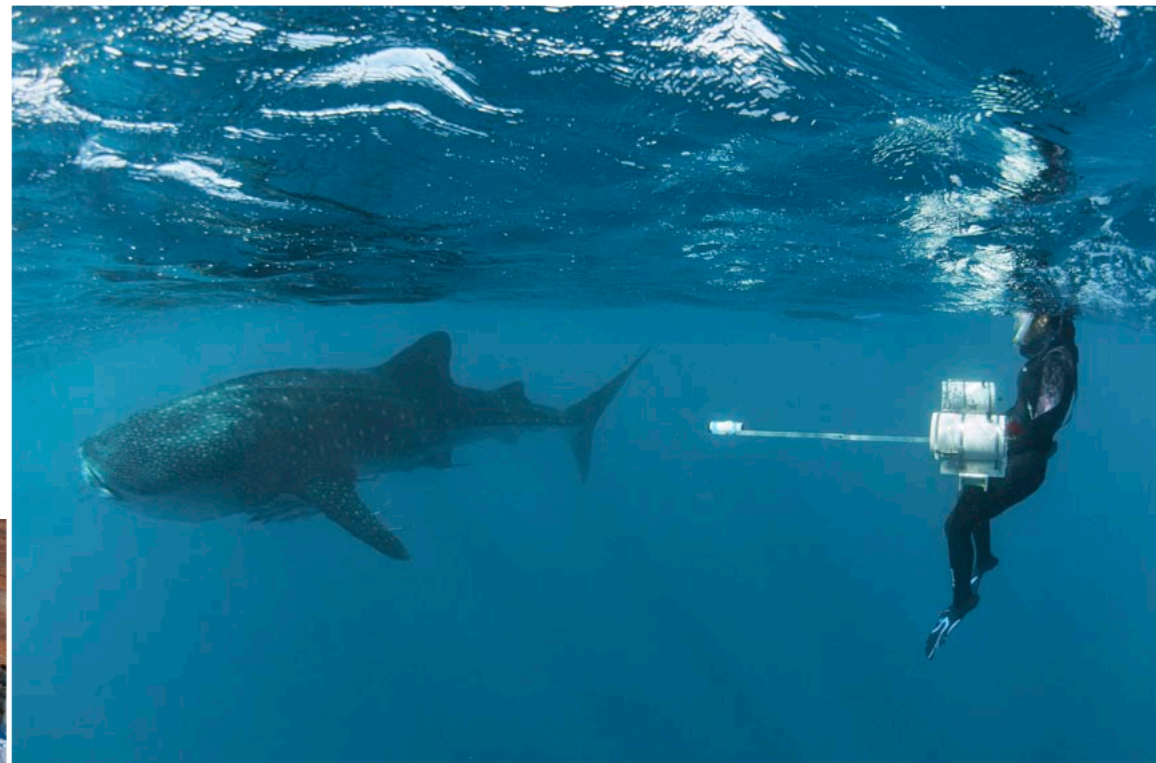
Collection of plankton (left); Researchers tag and sample whale shark (right); The number of each whale shark is photographed for each ID shot and sample taken (below left inset); Comparing ID photos on screen (below right inset)



the Marine Conservation Society of the Seychelles to identify sharks by taking photos of the spots on their left and right sides. These spots are like fingerprints, and every shark has a unique pattern that can be identified with special matching software. All other markings, like scars, are documented as well. It is also noted, which fish species accompanies the whale shark, as this gives an indication about the route they have taken—close to

reefs, or through the open ocean.

Conservation photography is different For a conservation photographer, it is just not 'done' to interfere with research. The latter is the most important part and main goal of any research expedition, and contrary to any 'tourist' expedition, the photographer



Researcher records whale shark length with special stereo measuring device (above); Scientists lower device at night to catch krill and process tissue samples for genetic research (left); PhD student Lara Marcus examines samples (far lower left); Fin identification photo (far left center);

aggregate in certain areas rich in nutrients to feed on seasonal aggregations of tropical krill and bait fishes. They just follow their food, and depending on the type of plankton, the numbers rise and fall.

A team of volunteers snorkels with the sharks, and supports the research team of



shark tales

Whale sharks feeding together (right);
 Researcher puts out a net to catch plankton (below);
 The whale shark's gaping mouth during feeding (lower left)



is the last in line to approach the animals. And you have to work incredibly fast, as the last person to approach an animal, you are very often confronted with just the tail.

It was an exciting trip, with large numbers of whale sharks—

391 in the first week, 319 in the second week and 370 in the third week. The research team also fished for plankton, took ID pictures and skin samples and tagged a number of sharks. Since 2010, the sharks are measured using laser photo-grammetry.



Verhoog documented all procedures, and all his pictures can be used freely by researchers, students and non-profit organizations.

Moving on to Australia

In April 2013, Verhoog joined doctor Mark Meekan of the Australian Institute of Marine Science on his yearly trip to Ningaloo Reef, another whale shark hot spot.

Adult whale sharks turn up at Ningaloo every year from about March through to the end of July.

But where do they go afterwards? Meekan is determined to find out. He has been attaching tracking devices and cameras to the whale sharks, which have revealed some startling facts.

During his research, a spotter plane searches for whale sharks, and informs the team about their location. Tag data has revealed that whale sharks seem to head out in different directions. Some go to Southeast Asia, others swim up north to Indonesian waters, and some head for the open ocean. During their journeys,

whale sharks can travel 30 kilometers a day and make deep dives to over 1,000 metres.

And one tag, attached at Christmas Island in 2008, was even collected at the home of a fisherman, who found it collecting turtle eggs on a beach and had taken back to the village. Thanks to Google Earth, an assistant of Mark Meekan paid him a visit and collected the tag. It was probably ripped off by a predator.



Of the two, whale sharks prefer the plankton on the right—it has more worms and is 'richer'





Since whale sharks are shallow swimmers, they are often hit by boats (above); A harpoon is used by a scientist to take a sample of the 10cm-thick skin (left)

And for a research expedition, failure is just not an option. There is no repetition possible; every shot must be perfect immediately, with good exposure and sharpness.

All pictures were made with available light and a shutter speed of at least 1/250 sec. This was necessary to avoid blurred photographs due to movement. Verhoog also made

a clip of Meekan tagging a whale shark.

And though this was not a luxury trip for the faint-hearted, it had one major advantage—the opportunity to work with whale sharks all week and contribute to marine conservation. For more information, visit Dutchsharksociety.org or [Facebook.com/dutchsharksociety](https://www.facebook.com/dutchsharksociety). ■



Whale sharks have gill slits, which filter the water

The AIMS research on whale sharks is collecting knowledge about the movements of sharks in the Indian Ocean after they visit well-known aggregation sites in Australian waters like Ningaloo Reef and Christmas Island.

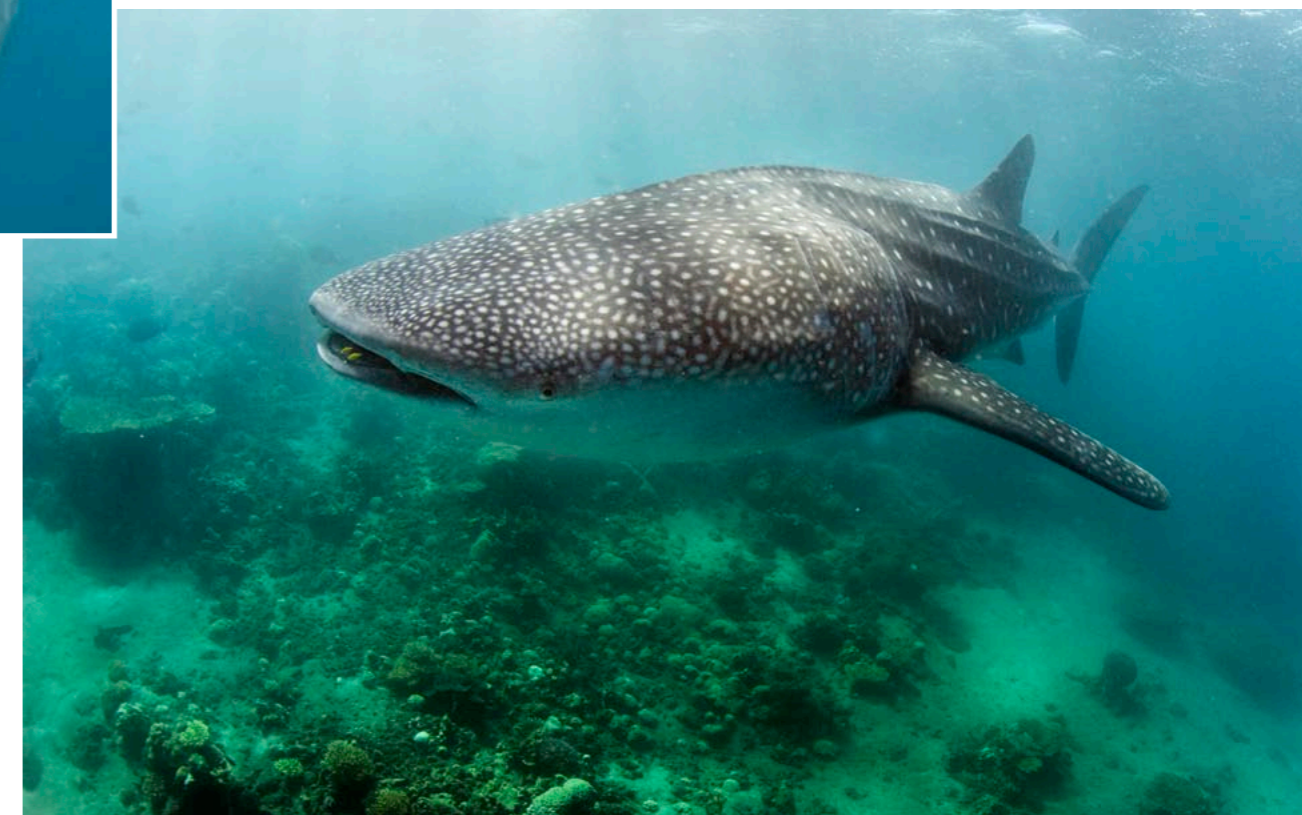
During the research trip Peter and the team slept in an old sheep barn infested with bats. The team went out daily, taking ID pictures, tagging sharks and fishing for plankton. Weather did not exactly cooperate; on most days, the waves were high, and the wind was strong. Some days, going out was impossible. But the sight

of the whale sharks and the good spirits of the AIMS team made it all worthwhile.

ID-ing again

One of Peter's tasks during this expedition was again to make ID pictures of as many sharks as possible and to make some underwater footage. To make sure that each picture, each second of footage and each tissue sample was from the same whale shark, there was a sign with a number for each shark, that was shot as well.

The food that whale sharks prefer, the plankton, can ruin many shots.



Whale sharks come to the shallows





Text by Steve Lewis
Photos by Ben Martinez

Have you ever had that odd experience when you hear a word you've never heard before—let's say "varietal"—or you've read a magazine article about a car you've never seen before—a Bugatti Veyron, for example—and you say to yourself, "Wow, that's unusual." Then in the following couple of weeks, you hear the word *varietal* used in every second conversation you have, or during your very next visit to the grocery store, you see two bloody Bugatti Veyrons parked side by side? A few of my mates tell me they sort of feel that way about sidemount divers lately.

Just a year or two ago, the appearance of a diver in sidemount kit was something to make a note of in your diary, or at least in your dive log, "Dear Diary, saw a couple of dudes at the quarry today dressed in the most peculiar rig."

But things have changed. It seems that sidemount has recently become *the* default kit configuration for a whole raft of divers—sport divers, technical divers, wreck divers, cave divers—well, at least here in North America. Why the last time I was diving my favorite dive site, there

were *only* sidemount divers in attendance—well, only sidemount open-circuit divers in attendance. The only divers in backmount were a couple of dudes wearing rebreathers, and come to think of it, they had their bailout bottles rigged for sidemount.

So, what gives? What happened to

that traditional North Florida Cave Diver's kit we all used to dive? You know, doubles, manifold, backplate and wing? Hogarthian, DIR, neo-Classical tech, whatever the heck it was called? Did it drop off the face of the earth?

Well, the simple answer is that it did not drop off anything, but a lot of divers

who used to stagger around with a set of twins on their back, have adopted, what a buddy of mine calls, "a gentler, friendlier way to dive doubles."

Why?

Some time back, a guy called Lamar Hires made a pretty astute observation

about divers who opted to use a sidemount configuration. He said they did it for one of two reasons. The first was mission specific. Sidemount was born in an overhead environment and the "mission specific" that Hires was talking about are those small, low passages in a cave or in a wreck that would be impassable in tra-



BEN MARTINEZ

Sidemount

— *It's everywhere but who's to blame?*





BEN MARTINEZ

ditional doubles. For these tight confines, sidemount really is the better option.

The second reason to wear primary cylinders at one's side is what Hires calls a "lifestyle choice", and for the majority of folks using sidemount, this seems to be why.

In essence, with two single cylinders, one has the option to carry them to the water one at a time. Even on a dive boat, it's possible to wear one and throw the other into the water on an equipment line and pick it up when its apparent weight has dropped by a few kilos.

Also, with a cylinder at each side, there's no special yoga posture or daily stretching exercise necessary to stay flexible enough to reach the hand wheels on your valves since they are not behind your head but right there where you can

reach *and* see them.

Both mission specific and lifestyle are perfectly valid reasons to switch, but neither is the primary reason that, when I dive open-circuit, you'll find me in sidemount. The fact is that I switched because in my overall assessment, this configuration is "safer."

Sidemount is safer

Let me explain the rationale behind my statement and the logic (and experience) that led me to that conclusion.

You'll recall that the first rule we teach new divers is DON'T HOLD YOUR BREATH and the simple extension to that piece of advice as soon as our dives get a little more advanced is: "And always have something appropriate to keep you breathing for the whole dive." All pretty

basic advice, correct.

But as basic as it sounds, it does speak to a couple of planning skills that careful and successful advanced divers use every dive: Gas Volume Management (RMV calculations, time over available volume, at least one third of starting volume as a reserve, dive planned on the gas volume carried by the team member with the "shortest" fill... you know, all that stuff); and using a mix that balances oxygen partial pressures and narcotic loading against inert gas uptake and decompression obligation (analysing and checking all gas mixes, clearly marking the maximum operating depth on each cylinder, verifying gas switches with team members, and all that stuff too).

The reality of these simple, basic aspects of gas management are essen-

tially no different regardless of whether a diver is wearing a set of twins or carrying sidemount. But there are a couple of other "skills" that make me believe that a sidemount configuration is safer than traditional backmount, and these are the skills used when preserving gas volume in the event of kit failure.

Line of sight

In the simplest possible terms, this boils down to the position of the cylinder valves, hand wheels and regulator first stages, and the various hoses supplying gas. They are where the diver can see them. There is nothing important behind the diver's head.

The major components of her life-support system are right where she can see them, identify the issue and react to it appropriately in the timeliest fashion possible. Having spent around 20 years teaching people how and watching them execute valve shutdowns while wearing traditional backmounted twins, there is no doubt in my mind which is easier to manage—which is safest.

There are arguments made about the perceived advantages of a modern isolation manifold when things go pear-shaped: most commonly that with a tank valve turned off, the gas in the effected cylinder is still available to the diver. No question, that is correct. However, when the correct protocols are followed, in the event of an incident that requires the diver to bailout and shut off a tank, the dive is over, finished, done and dusted. And when the correct gas volume protocols are followed, the volume of gas available to a sidemount diver with one side compromised, is more than sufficient to get them out of the water.

Sidemount

Gas switching

I guess, I should explain something about gas switching, too. Actually, I believe the fact that a sidemount diver switches second stages during her dive is another advantage that sidemount has over traditional backmount breathing the long hose. There's probably a whole 1,000 words on the potential scenarios where this would show itself, but the short form is that our sidemount diver knows both her second stages are working—she always knows.

The argument made by stuck-fast doubles divers that breathing the longhose and having it ready to donate it in the event of an emergency out-of-air (OOA) situation, is largely spurious. Firstly, how

many emergency OOA situations have *you* experienced when diving with advanced or technical divers? When gas management guidelines are followed, these situations are rare: extremely rare.

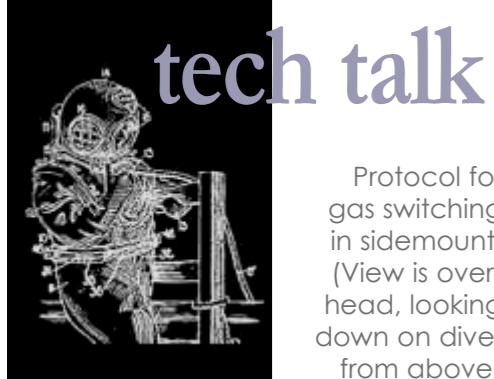
(If you are diving with classically trained open water divers who have been taught to believe that gas volume management includes a Controlled Emergency Swimming Ascent as a viable option, your mileage may vary, but a straw poll of all the folks in the head office of TDI

in Maine a few years ago turned up just how rare this type of situation is. Between us, we had in excess of 14,000 dives on doubles and in sidemount, and we could only cite one example of an emergency OOA.)

At any rate, let's get back to that protocol for switching between regulators and how well this technique helps to preserve a nice cushion of spare gas for a buddy in the event that something *does* go wrong.

There are several methods but the one I use and teach to folks who are team

Both mission specific and lifestyle are perfectly valid reasons to switch, but neither is the primary reason that, when I dive open-circuit, you'll find me in sidemount. The fact is that I switched because in my overall assessment, this configuration is "safer."



tech talk

Protocol for gas switching in sidemount. (View is overhead, looking down on diver from above)

diving is this. It requires only *three* regulator switches for the whole dive—well, at least until the decompression gas is reached.

The diver starts by breathing from the right-hand cylinder (the bottle at the diver's right side, which is usually fitted with a long hose) and ends with the diver breathing from the bottle at her left side.

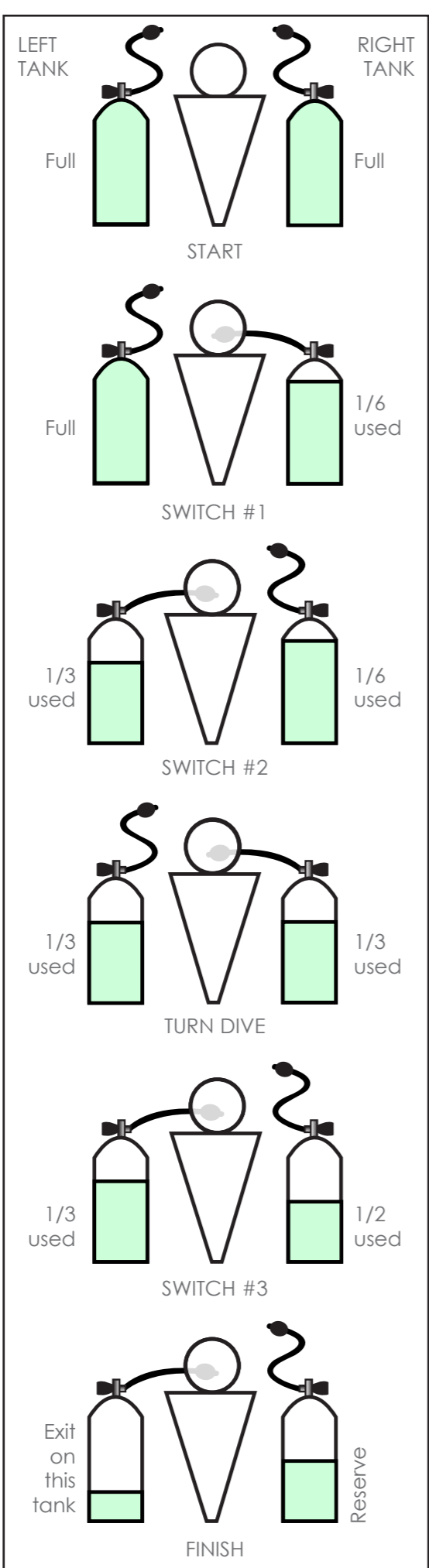
Okay. Take as given that the diver has worked out her gas volumes and knows how many bar represent thirds and how many bar represent one half of one of those thirds. To make this somewhat clearer, let's say that one third of our diver's available pressure is 60 bar, therefore, one sixth is 30 bar.

She begins her dive and breathes from her right cylinder until its pressure has dropped by 30 bar, and then she switches to her left cylinder.

She breathes from it until the pressure drops by 60 bar, and she switches back to her right tank. For the record, her left cylinder is now at thirds.

She breathes her right tank until its pressure has dropped by 30 bar, and at this point, she is at thirds in both tanks and signals to her buddies to turn the dive. However, she continues to breathe from that right-hand bottle until its pressure has dropped a further 30 bar. She is about to switch for the third and last time, but let's just recap a couple of things.

The bottle at her left side has two-thirds its starting pressure



Sidemount

(plus a small reserve if she is in an overhead). The one on her right, which she has just finished breathing from, contains one-half of its starting pressure (one-sixth plus one-third is three-sixths, which equals a half).

Okay, so our diver has switched for the last time and is breathing gas from her left cylinder, and she and her buddies are on their way home. The tank she is breathing from has sufficient gas to get her there. She will, at the end of the dive, should everything go according to Hoyle, have at least one-third of her starting volume preserved in her tanks. The only difference is that more of that contingency gas is contained in the cylinder to her right—the one with a long hose—the one she would share with her buddy if something hits the fan.

There are a bunch of reasons to dive sidemount, but for me, especially in a virtual or real overhead environment, the most important one is that from the perspective of gas management, I believe it is the safest option.

Thanks for your attention, folks! ■

Steve Lewis is an active technical diver and instructor based in North America. He is an author, blogger and workshop host with a special interest in diver education and the development of safe diving protocols. He first tried sidemount scuba as a young dry-caver in the United Kingdom, and now many decades later, carries a TDI sidemount cave instructor rating and is an open-water/overhead environment Sidemount Instructor for PSAI. So, you might say, he is as guilty as anyone for promoting sidemount diving! See Techdivertraining.org

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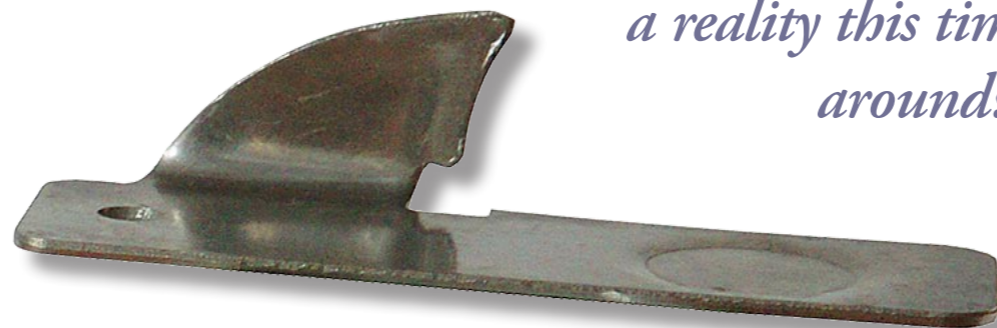
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Opening Up Closed Circuit

Is the sport rebreather dream a reality this time around?



The Lt. Lund II Oxygen-rebreather produced by Dräger in 1954 was developed for the military but also saw some civilian use.

Lt. Lund II
 Itapparat fra Drägerwerk 1954. Apparatet er blevet til i samarbejde med den norske søofficer Ove Lund, som var chef for den Norske Marines Føskermannsskole. Ove Lund omkom i 1956 under forsøgdykning med blandedingsgas. Apparatet er tidligere anvendt af blandedningsmandskorps.
 Foto af Fremadskorpset

It is a commercial holy grail: the dream of developing a product that will revolutionise the way that people interact with their world. The telephone; the automobile; the passenger jet; the vacuum cleaner; the telephone again (mobile this time); the list is endless. Today, scuba divers are being presented with machines that may revolutionise the way we dive – rebreathers.

If, at first, you don't succeed...

Rebreathers are not new: the concept dates back several centuries and they have been used by military and commercial divers for over a hundred years.

The notion of sport divers using rebreathers is not new either. In the 1960s Italian and American companies developed rebreathers for public sale but a series of accidents and training agency bans ensured that these experiments were short-lived and dissuaded others from attempting similar ventures for 25 years or so.

Then, in the mid-1990s rebreathers appeared in the market once again, their arrival

coinciding with the growth of technical diving, and this time they stayed. Technical divers eagerly adopted the new machines mainly because, although they were expensive to buy, they were much cheaper than open circuit equipment to use for deep dives on helium based gas mixtures.

However, the mainstream dive industry was cautious, as were recreational divers in general who saw no benefit in the models of rebreather that were then available and decided to stick with open circuit scuba.

...Try, try again

Which brings us to today. In the last two years, industry

acceptance of the idea of the general population of divers using rebreathers has grown considerably. PADI, the world's largest training agency, has given the concept its support and this has encouraged some of the mainstream equipment manufacturers to develop new units especially designed for "recreational" divers, (as opposed to "technical" divers.)

The first of these was the Poseidon Mk V1 Discovery but lately Hollis (Oceanic) has stepped into the ring with its Explorer unit. Other companies are watching developments carefully from the wings to see if these pioneering units will conquer the recreational market.

Key Questions

There are two key questions that divers are asking. The first question is: What is so different about these units that the mainstream diving com-

munity has abandoned its previous reservations concerning rebreathers?

The new models are compact and relatively light compared to the rebreathers that technical divers use. Having said that, they are still as heavy as open circuit scuba and current training procedures require you to carry a small open circuit set up too if you want to dive on a rebreather below 20m.

More



Text by Simon Pridmore
 Photos by Peter Symes



importantly, they have also been designed to reduce as far as possible the likelihood of the diver making the kind of errors that have led to rebreather accidents in the past. These rebreathers monitor themselves, know when they are functioning correctly or not and inform the diver immediately when there is a problem. The diver then deals with the problem according to his training.

The new models are also less expensive than technical rebreathers although, at around US\$5000, that does not mean they are cheap. International dealer networks are also in place to take care of maintenance requirements.

The second question divers are posing is: Why should I consider using a rebreather if I am not interested in getting into technical diving?

Rebreathers are incredibly quiet. The gas you breathe is warm and they give you much more dive time and no deco time than a single 12-litre cylinder of nitrox. The impact you make on your environment is also much reduced when you are not blowing clouds of exploding bubbles into the water with each breath.

Although it is difficult to assess how much differently marine life responds to you when you are on a rebreather, (after all, you are still a big strange animal in the water,) I can tell you



Hollis Explorer recreational rebreather

PRODUCT PHOTO COURTESY OF THE MANUFACTURER

that the only time I was ever approached by a wild dolphin underwater was when I was on closed circuit!

Are they for me?

If you are a relatively new diver looking for a smaller, lighter, simpler and more convenient alternative to standard scuba equipment then the current generation of rebreathers will not meet your needs. They are still more complex, awkward and more time-consuming to set up and use than standard scuba and, even if the unit is doing much of the monitoring itself, a diver still needs to be extremely attentive to what is going on.

Why should I consider using a rebreather if I am not interested in getting into technical diving?

If, however, you are a relatively experienced diver, have been intrigued by rebreathers in the past but were put off by the cost and complexity and concerned about their safety record, then now might be a good time to give the technology a try.

You will find that in return for a little extra tender loving care and attention, the equipment will give you a lot more freedom underwa-

ter in terms of time and gas supply. And, who knows, they may well turn out to be the genuine harbingers of a new diving revolution? Perhaps in much the same way that the Walkman presaged the iPod! ■

A former Hong Kong police officer and assistant political adviser to the governor of Hong Kong, Simon Pridmore has over the past 15 years been on the cutting edge of scuba diving in Europe, Asia and the United States. He pioneered mixed-gas deep diving in the late 1990s and

managed IANTD operations in Micronesia through Professional Sports Divers, his dive centre on Guam. Pridmore then moved to the United Kingdom to operate the IANTD U.K. franchise while serving as sales and marketing manager for VR Technology. Now living on Bali, Pridmore is currently the regional training director for IANTD in South East Asia. He continues to be widely published in dive and travel magazines and has written a new book, Scuba Confidential—An Insider's Guide to Becoming a Better Diver, soon to be released in 2013.



DIVE INTO THE POSSIBILITIES.
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Poseidon MKVI recreational rebreather

PRODUCT PHOTO COURTESY OF THE MANUFACTURER

Innerspace 2013 recap

—Bubbles, fluro night diving and other memories from Inner Space

Text and photos courtesy of Rosemary E Lunn

The fourth 'Red Sea Silence' week has recently wrapped up in Safaga, Egypt. I would not be at all surprised if this rebreather event probably came into being, partially because of the wild success of Divetech's Inner Space. Once seen, who can forget that iconic photo of a circle of rebreather divers? I remember just how much that image intrigued and excited me—"I want to be part of that." Though I must admit that I was somewhat astonished to realise it was taken a decade ago. Time has flown; Inner Space is ten years old.

Every year rebreather divers of note from all over the globe flock to Grand Cayman and Divetech, for a week-long gathering of the 'whose who of rebreather

diving'—manufacturers, training agencies, leading instructor trainers, personalities and divers.

Inner Space, the premier North American rebreather event, is the brainchild of Nancy Easterbrook. A grand dame and much respected industry stalwart who positively pushed the introduction of nitrox into the Cayman Islands when everyone else was uttering "voodoo gas". In more recent years, Easterbrook was the major power behind the sinking of the USS *Kittiwake*, project managing the entire process. It would seem Easterbrook has the Midas Touch. (I suspect her secret is a lot of hard work, appointing and empowering top-notch staff, investing money and resources where they are needed, much prior preparation and planning, coupled with pretty decent diving a few fin kicks away.)

I caught up with Easterbrook, as she checked final details and asked her how Inner Space started.

"I wanted to bring people together to learn what was happening with rebreathers, because I could see the technology was constantly evolving and getting better," said Easterbrook. "We attracted 19 divers in the first year who were keen to learn more and move the industry forward. The aim of Inner Space is to share

information, keep up with changes in the industry, and provide the ideal platform for people to meet like-minded divers and build relationships."

Like-minded

One like-minded diver who came to this year's Inner Space was Randy Thornton, owner of Dive Addicts in Utah and the power behind TEK Dive USA.2014 (www.tekdiveusa.com). I asked him why he considered Inner Space such a key event, because this was the fifth year he attended it.

"The technology is still fairly young," said Thornton. "We all are eager to interact and learn more from each other, and it is exciting to rub shoulders with newbies and old pros alike. I imagine rebreather divers are probably less than one percent of the diving population. But we are becoming a bigger piece of the pie all the time, hence the camaraderie in the rebreather community comes about because we are still relatively few in numbers."

Personally, I think diving as a

whole engenders positive camaraderie, and it is of a similar quality that is found within the armed forces and the medical communities. Diving has the power and ability to create friendships that bind as strong as hoops of steel, no matter where either party lives in the world. Perhaps it is because we experience such an extreme range of emotions, truly discover what we are capable of, and certain experiences and dives end up deeply seared into our souls. I vividly remember one such dive from Inner Space 2012.

Discovery

Part way through the week,

Warren Miller (North American sales manager for Fourth Element) and I quietly padded down the dock at Cobalt Coast to do an afternoon shore dive in the Caribbean Sea. Once submerged, we started gently bimbbling towards the North Wall when fellow Inner Space attendee Jean Anne Booth enthusiastically swam up to us.

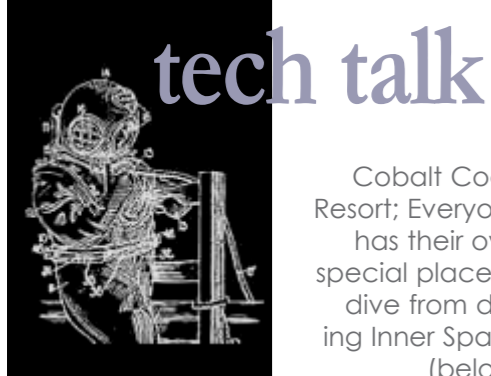
"Look," she signaled. "I'm ok," I replied. "No, LOOK!" She gestured wildly at the surrounding area. It took awhile, whilst I wondered what the heck it was, I wasn't seeing. I eventually spotted a squid. Then a pair, then 20, before suddenly realising we

were completely surrounded by a large school of hunting squid. Their translucent bodies glistened and glittered in the afternoon sunshine, reminiscent of an Essex disco.

I was entranced. Along with half a dozen other rebreather divers we just sat, watched and wondered for several minutes. We would never have seen something quite as dramatic as this on open circuit scuba.

It is therefore no surprise that as the divers arrive into resort greetings, chatter and big fish stories ebb and flow. I bump into Booth. "Do you remember that squid dive?" I asked, as I gave





Cobalt Coast Resort; Everyone has their own special place to dive from during Inner Space (below)



Cobalt Coast Resort

One of the reasons that a number of us swim at dawn during Inner Space is because of the resort setup. It is so easy that it would be rude not to, and in fact 'it is so easy' applies to everything here. All

Inner Space attendees stay onsite at Cobalt Coast. This resort has a mix of one and two bed-roomed en-suite rooms. Additional accommodation in the form of the Garden Cottages can be found a two-minute stroll away down a quiet lane. So if you need to, you can be from bed to breakfast, the dive centre or the private dock in about three minutes.

On land the divers naturally gravitate around two key areas. Firstly, there is the social heart of the resort—the bar and reception area. This part of Cobalt Coast is quite practical and used for many things. It is where you check in and check out. All the meals are served here, a set of cloakrooms are conveniently located a step away, and it is

the place at Cobalt Coast to sit to access the fast free WiFi.

Ari, the owner, sourced some high backed basket chairs that prove popular with many guests. The chairs are a great place to hide to check emails, make Skype calls or catch up with Facebook. During the day, you can eat at the bar, and if you are a solitary soul, you are soon welcomed to join a group, if you wish to be.

Dive center

The other key area is the Divetech dive centre and the big wide benches. I'd heard about these long benches years before I attended Inner Space from cave explorer and CCR instructor trainer Phil Short. He had remarked this event was one of the most enjoyable weeks of his year. I asked him why. Short simply said "smooth logistics". He would arrive in resort, unpack and put his wallet away. And then get on with teaching and diving because everything is covered in the Inner Space package, bar alcohol.

Everything? Yes, 'everything'. You arrive into resort to find your diving home for the week has been allocated. Every diver has their own special place labelled on one of the benches. When you are ready, you toddle up to the dive centre



two competitively trained swimmers, I feel a more precise statement should be 'Boot Camp Power Snorkeling'. However, once you get your head around it not being a gentle bumble, it is perversely quite pleasurable vigorously finning with the fellowship for a couple of miles at 5.30AM every morning.



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tech talk

The author underwater with Hollis rebreather; Freshwater hoses are pre-run along the benches, making breather care post-dive much simpler to manage (below)

window to collect your rebreather cylinders. It is pretty cool finding your tanks are labeled with your name and pre-filled with the requested correct mix, as indeed are your pre-rigged stage cylinders. All you need to do is analyse and label your gas, and screw a regulator or two in.

'Everything' also means things like gas fills, boat dives, night dives and all the consumables you need. Sorb, oxygen friendly lubri-

bility and dramatic drop-offs". 30 metre plus gin visibility is pretty much standard, and when that is coupled with the spectacular topography, the experience is exhilarating. Then throw in full tech capability for those that desire it, and the result is top drawer diving.

The effortlessness of being able to safely do interesting sub 100 metre fully supported expedition trimix diving is immensely appealing. It is little wonder that Inner

Space gets booked up so quickly.

Unique speakers

I've talked about the diving and the logistics. What else makes Inner Space special? Nancy Easterbrook asks certain industry luminaires to do short talks every evening. Mike Young, the new CEO of Kiss Rebreathers, entertained us with his stories of cave diving. I came away with the impression that he is the USA version of Rick Stanton. If it is a nasty

squalid small cave in the back end of beyond, Mike is your man to explore it. And then Dr Douglas Ebersole, an Interventional Cardiology doctor, educated us on cardiac concerns specific to diving. Ebersole is a fluid speaker, and I learn something new from him every time I hear him.

Diver safety

On a more serious note over the years Inner Space has positively contributed to diver safety. This is



the fourth year Dr Neal W Pollock and his team from Divers Alert Network have conducted extreme dive monitoring. This event is useful from both the divers (subjects) and the researchers point of view. Pollock gets access to at least 12 subjects pulling a plethora of profiles that fall way outside the normal recreational range.

The team looks for signs of decompression stress, (bubbles), by scanning the diver's heart using ultrasonic scanning technology—a transthoracic echocardiogram or TTE for short. They simply place a probe, similar to one used when doing ultrasound on pregnant women, on a specific area on the diver's thorax (chest wall) and the probe picks up the sound of the bubbles. The researcher and the subject are then able to observe a two dimensional scan of the heart. It is fascinating watching your heart and valves move on the monitor.

Each subject is scanned every 20 minutes for two hours post dive. I mentioned earlier that the divers find the research useful, too. There is often much discussion between

the divers and Pollock about what is seen on the screen. As a result, some of the subjects use these invaluable scanning sessions to play with the conservation factors on their computers.

As the week progresses the subjects tweak their conservation or gradient factors and see how it affects their bubbles scores. It is not only the divers who are interested in research Pollock is conducting. Shearwater Research, the manufacturer of the Predator and Petrel computer, has also been following the DAN study at Inner Space. As a result, the Petrel now comes preset with a gradient factor of 30 / 70.

Afterthoughts

All too soon the week was over. Thousands of litres of gas had been pumped and breathed whilst 1,320 lbs of sorb had dived. Inner Space closed out with a celebratory graduation ceremony on the Friday night. During the week over 800 dives had been done by the 70 attendees, with 10 divers successfully completing and passing a variety of diver / instruc-

tor / instructor trainer rebreather courses.

And what did I leave with apart from a pocketful of memories, a handful of dives and more friends? Something I did not expect at the start of the week—an understanding of why the Hollis Explorer has a valid place in the rebreather community.

I could not get a handle on it before, but having completed a user course on this unit I can now see the Explorer fulfilling the need of 'my first rebreather'. It is a good unit to learn rebreather discipline on, and get to grips with the three C's. Checks, concentration, cleaning. I also already knew it is never daft to carry bailout gas, but that was gently reaffirmed on a dive.

And I finally got to play with a Light and Motion Solar Nightsea torch. My first ever fluro night dive, and one that will be forever seared into my soul for all the right reasons. But that is a tale I will tell you another time.

For more information, visit: Divetech.com/files/Innerspace.htm ■



cant, etc. You are allowed to use as much sorb as you like. In reality, depending on the diving being done, we all change our sorb at the end of every day. No one abuses the system, nor do people try and push their scrubbers unnecessarily.

Diving

So what is the diving like? If you only gave me six words to describe Cayman diving, my response would be "stunning vis-



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Edited by Don Silcock

Group of frogfish photographed with Sigma 30mm lens

Text and photos by Don Silcock

—In this series of articles on the mirrorless cameras, we are exploring the overall potential of this new technology for underwater photography. In this article, the fifth in the series, we will take a close look at how the Olympus OMD-EM5 mirrorless camera performs underwater, but first a quick refresher on the story so far and why the OMD.

As I embarked on these articles I did so with quite a strong personal interest as I was looking at accomplishing two objectives. Firstly, I wanted to buy a set of equipment to take with me on some motorcycle trips I was planning, where space was of a premium, but I needed better performance than a high-end compact could offer. Secondly, I wanted to investigate the possibility of using a mirrorless camera as a small back-up rig to my main underwater one—a Nikon D800 in a Nauticam housing.

The D800 is an incredible piece of photographic equipment and is literally the best camera I have ever owned. But it is big and expensive, and so are the



Mirrorless Macro

— Close-up Underwater Photography with Mirrorless Cameras

lenses that are required to realize its full potential, which means that back-ups are a very costly exercise, and then it dawned on me that the cost of a second D800 body would provide enough working capital to consider a mirrorless rig as a back-up.

So, I began exploring the options and,

as detailed in the previous articles, while there is an ever increasing array of mirrorless cameras, when it comes to their suitability for underwater photography, and most importantly the ability to house them, the choices narrow down to two options—the Sony NEX mirrorless cameras and the Micro Four Thirds system from the

Panasonic and Olympus alliance.

I opted for the Micro Four Thirds technology because of one basic reason—lenses. Simply stated, there is a much better selection of glass available for the Four Thirds cameras than there is for the Sony NEX.

The Olympus OMD

At the time I started the acquisition of my system in January 2013, the choice of which Micro Four Thirds camera to use was a “no-brainer” and I went for the Olympus OMD-EM5 and have been very pleased with that decision ever since. When it was released in 2012 the OMD





photo & video



Scenic view over Bali (left);
Nauticam D800 and Olympus
OMD-EM5 (below)

Mirrorless Macro

for the OMD, I quickly realized that it was either the OEM housing from Olympus, or the Nauticam one, as there was literally nothing else available at that time.

Closer inspection of the functionality and, most importantly, the port options made the Nauticam the only choice.

The big advantage the Micro Four Thirds technology is the excellent selection of lenses available from Panasonic and Olympus, plus the third party manufacturers like Sigma who are joining the mirrorless party. To use some of those

lenses underwater, you need the necessary ports and Nauticam already had them.

Underwater at last!

I moved to Bali at the end of 2012 and wanted to establish a "local" site, which was both productive and handy to use, so I can quickly and effectively test new equipment and techniques in a known environment. I chose Secret Bay at Gilimanuk on the north-west tip of the island as that site, as I knew it pretty well



went straight to the top of Micro Four Thirds "charts" in terms of both functionality and desirability, and was still there in January.

The other potential contender was the Panasonic GX1, which I decided against because of the lack of a dedicated viewfinder. However, Panasonic just released the GX7, which seems a worthy competitor to the OMD and is well worth checking out.

There is no housing available as yet for the GX7, but you can be pretty sure that it will be supported by Nauticam who have an excellent record of quickly releasing new housings for popular cameras.

Olympus has really done a tremendous job with the OMD and being able to use it both above and below the water alongside the D800 has been a very interesting experience. I tend to think of the D800 as that red Ferrari I have lusted after—an absolutely amazing piece of engineering, but you have to know how to drive it, and you have to have the very best glass that Nikon produces to get the most out of that drive.

The OMD, on the other hand, is a bit like the Nissan Z370, in that it does amazing things in a really neat package, and while it looks a bit like a Porsche, it isn't

one and is nowhere near as expensive either!

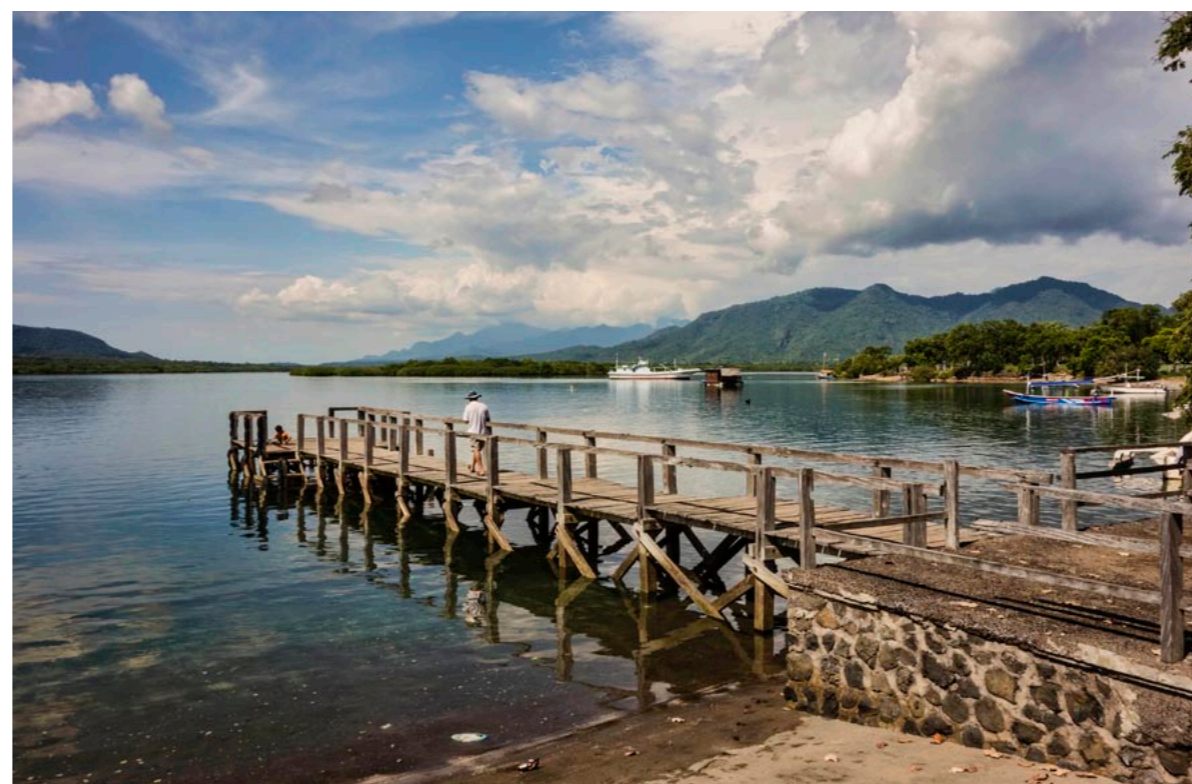
So, the real question is what do you really need? Hopefully, this article, and the ones to follow, will help you to answer that question.

My mirrorless rig

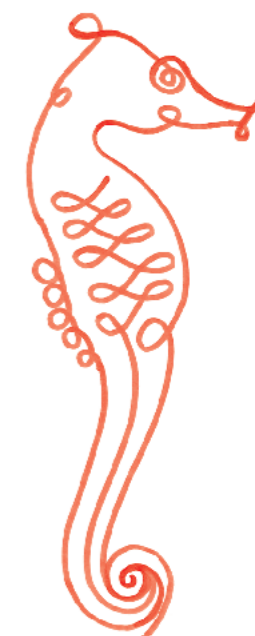
Just as the OMD was a "no-brainer" at the time I was buying, so was the selection of a housing, which rapidly boiled down to one option—Nauticam. Hong Kong based Nauticam seems to have come from nowhere over the last few years and now appears to be everywhere. They have done some really smart things to achieve that position, not least of which are the adaptors that allow you to use your existing ports on their housings—probably the biggest impediment to changing housings. Combine that with good overall functionality, a sharp price point, some good marketing and it starts to become clear how they have achieved that position.

After 18 years as a Subal user, I went for a Nauticam housing for my D800, simply because the housing was available at Reef Photo in Florida while I was in the USA, and the Subal I had previously ordered had not turned up yet.

When it came down to which housing



Secret Bay at Gilimanuk on the island of Bali



cinema of dreams



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photo & video



Nauticam OMD housing and 45 degree viewfinder

Strobes and lighting

Like most housings these days, the Nauticam OMD housing uses the camera's "internal" flash to trigger strobes through fiber-optic cables. However, to keep the camera small, Olympus did not provide an in-camera flash, opting instead for a small external unit that connects to the hot shoe and is provided along with the camera when first purchased.

Lesson #1 when preparing the OMD rig is to remember to mount the external flash

before putting the camera in the housing! Luckily I always test that the strobe is firing after assembling a housing, otherwise that seven-hour round trip to Secret Bay would have been a very long day the first time I used the camera.

I normally only use one Inon Z240 for macro photography, usually mounted above the port and angled up to edge light the subject and minimize backscatter. Using the fiber-optic cables with the Z240 allowed me to try

real macro ones, the Panasonic DG 45mm f2.8 and the Olympus 60mm f2.8, plus two "pseudo" ones that allow close focusing but are not 1:1—the Panasonic 20mm f1.7 and the Sigma EX DN 30mm f2.8.

The Panasonic 20mm and the Sigma were late additions after I realized that their close focusing capability would allow a different perspective on my new best friends in the frogfish colony, and I was pleasantly surprised at the results.

Mirrorless Macro

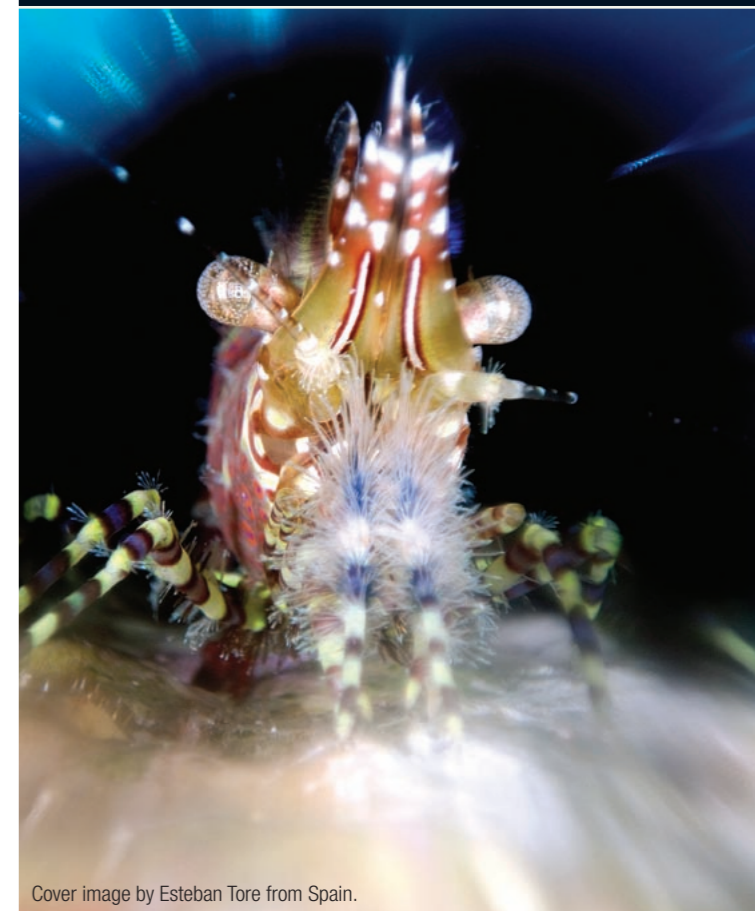
S-TTL for the first time, and overall, I was quite pleased with it, finding it quite accurate in general.

Viewfinder

Straight out of the box, the OMD and Nauticam housing gives you two options to compose your images—the camera's electronic viewfinder (EVF) and the LCD. Having learned the value of an additional magnifying viewfinder to augment the camera's one a long time ago, using the standard one was just a non-starter for me. Time is very limited underwater as it is, and so many things work against you at the best of times. So, performing contortions to see through that little hole is something I can do without—thank you very much.

I was, however, very interested in seeing how the LCD performed, but hedged my bets and forked out for a dedicated 45 degree Nauticam viewfinder and was very glad that I did, as I found the LCD difficult to use. Quite possibly, it was me. But, I really was not happy using it and much preferred the external viewfinder, particularly for vertical compositions. The downside though is that an external viewfinder

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from previous dive safaris around Bali, plus it is shore diving in a sheltered area and therefore quite safe for solo diving.

According to my map, it was only 95km from my new home on the south coast, but I subsequently learned that the road up the west coast of Bali is the route all the truckers from Java use after they get off the ferry at Gilimanuk, so a day's diving at Secret Bay came to involve a seven-hour round road trip!

Traffic aside, Secret Bay and its resident colony of frogfish provided the perfect location to try out my new equipment because once I got orientated, I could return to the same spot within an hour or two with a different lens for the same subject.

Macro lenses

I ended up checking out a total of four "macro" lenses at Secret Bay. Two



LEFT TO RIGHT: Olympus 60mm lens, Panasonic DG 45mm lens, Olympus OM-D camera, Sigma EX DN 30mm lens, Panasonic 20mm lens



Olympus OMD and Nauticam housing with standard macro port



Mirrorless Macro

I was very pleasantly surprised to find that both the Sigma 30mm and the Panasonic 20mm worked perfectly in the standard port, meaning that the 35mm equivalent of 40mm, 60mm, 90mm and 120mm prime lenses can be accommodated with one port and one extension ring!

Lens performance

Overall, I was pleased with the performance of all four lenses underwater, but particularly impressed with that of the Panasonic 45mm and the Olympus 60mm, which were both incredibly sharp. Both the Panasonic 20mm and Sigma 30mm performed well, with the 20mm having the edge on the 30mm, which is not really surprising given the Sigma's budget price tag.

That said, I would have no hesitation using the Sigma, and for a certain size of creatures, it is just perfect. It focuses down to just under 12 inches (300mm) and is a good choice as a "hunting" lens for sites where you don't know what to expect.

The Panasonic 20mm was excellent for larger subjects, and I was really glad I had it once I learned that the frogfish liked to cuddle up together when the cold incoming tide at Secret Bay made its presence felt.

The Panasonic 45mm is co-developed with Leica, so given its lineage and price tag, it should perform, and it certainly did!

I really liked the Olympus 60mm, but given that its equivalent to a 120mm lens in 35mm format, you obviously need some small things to focus on, particularly given the visibility at Secret Bay, which can be challenging at times. However, I just did not find that much small stuff so never really got the chance to nail a killer shot, but I have every confidence that the Olympus would perform superbly in those circumstances.

does add considerably to the overall size and weight of the complete rig.

Ports

Nauticam make a special line of small ports for their mirrorless housings, and

the "standard" flat port for the OMD is the one for the Panasonic 45mm macro lens. They also quickly provided a 20mm extension ring when Olympus released their 60mm macro lens so that the standard port can accommodate it.



Frogfish photographed with Olympus OMD camera with Panasonic 20mm lens



Frogfish taken with Olympus OMD with Panasonic 20mm lens



photo & video

Frogfish photographed with Olympus OMD camera with Panasonic 20mm lens



Conclusion

Having used SLR's and DSLR's exclusively for the last 18 years, getting my head around the OMD was a bit challenging at first, but the more I used it underwater, the more it replicated the positive experience I had with the

camera on the first bike trip I had taken it on.

The camera's autofocus is quick and responsive; Nauticam's external viewfinder provides a really nice, large and bright

canvas to work with; their housing is a nice size; and all the controls are pretty easy to use, if a bit cramped because of the minimal size of the housing.

The RAW images out of the OMD have a decent amount of "headroom" to pull out details from the shadows and highlights, provided you expose optimally, and the overall image quality is very good.

I still have a lot of testing to do with the camera and housing to see how it performs when used for super-macro and wide-angle, but my opinion at this point in time is that it will do very well with the former and reasonably with the latter—but time will tell.

Overall, I am very pleased with my "investment" and looking forward to the four weeks I have coming up in Raja Ampat in October-November when I will use the OMD exclusively for

macro and my D800 for wide-angle.

As they say... watch this space. But my general opinion at this point in time is that the mirrorless technology represents an excellent option for anybody getting into underwater photography for the first time. It also represents a very logical upgrade from a compact camera and an excellent option for a DSLR user looking to "rightsize" down from the big and bulky cameras and housings they have probably tired of carrying.

The mirrorless cameras do not have the incredible resolution of the latest DSLR's, particularly the full-frame ones like the Nikon D800, but do you really need that capability underwater?

My one reservation about the mirrorless technology at this point in time is their dynamic range and capability to do wide-angle underwater photography, but my four weeks in Raja Ampat should allow me to answer that question.

More to follow... ■

Don Silcock is a photo-journalist based in Bali, Indonesia, who specializes in underwater and travel photography. His articles and images can be seen on his websites Indopacificimages.com and Nomadicpixel.com



Seahorse, Olympus OMD with Panasonic 45mm lens



Frogfish taken with Olympus OMD with Panasonic 45mm lens





photo & video

Edited by Don Silcock

PRODUCT SHOTS COURTESY OF THE MANUFACTURERS



Garmin's VIRB Action Camera


Garmin, a major player in the GPS industry, has entered the action camera market with two new models—the VIRB and VIRB Elite. Both cameras feature 1080p video and image stabilized HD, plus a 1.4-inch built-in screen, 16MP stills and 3-hour HD recording battery life. The Elite version also features built-in wifi. Drawing on Garmin's extensive GPS knowledge, the Elite version can also capture and display heart rate, altitude, speed and other GPS related information. ■

Sony a3000 Mirrorless Camera

Sony has added a completely new camera to their mirrorless range with the release of the a3000. The new a3000 features a very DSLR-styled body that contains a 20.1MP APS-C size CMOS sensor, which is capable of 1080p video. It also sports



a mode dial that allows for manual, aperture, and shutter priority exposure modes as well as 15 different scene modes. With the built-in flash and hotshoe mounts, the a3000 will offer a variety of flash photography options. The a3000 is very aggressively priced at US\$400, complete with an 18-55 kit lens and offers a great entry point for photographers interested in the mirrorless cameras. ■



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Sony NEX-5T

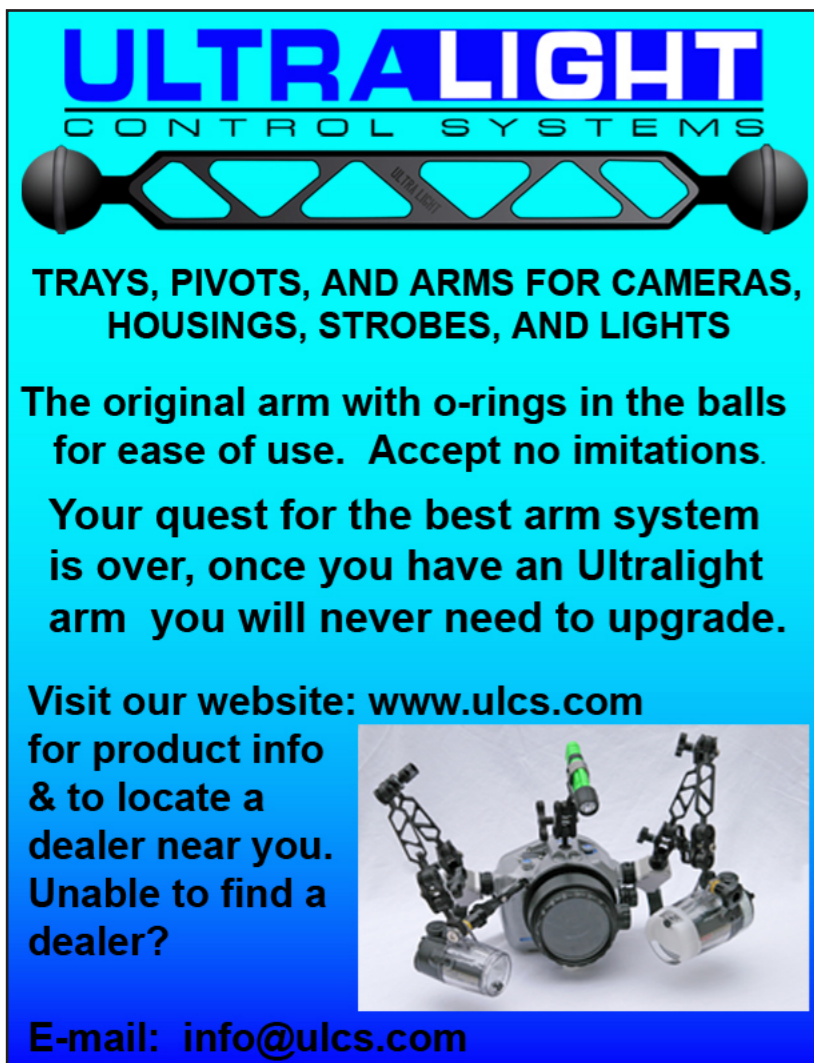
Sony has released the latest iteration of its popular NEX series of mirrorless cameras with announcement of the NEX-5T. Technically, the new 5T is very similar to its predecessor, the NEX-5R, and features a 16.1MP APS-C sensor, 3-inch 921K-dot tiltable touchscreen LCD, ISO range from 100-3200, hybrid autofocus that combines phase and contrast detection plus the ability to shoot 1080/60p video. Where



made the changes are the addition of new software-based functionality such as Near Field Communication (NFC) capability, which allows such things as "tap to transfer" videos and photos. While not particularly useful to underwater photographers, the key thing about the introduction of the 5T and the completely new a3000 is that Sony is continuing to invest strongly in its mirrorless camera range. ■

10Bar OMD Housing

Hong Kong based manufacturer 10Bar has released its housing for the highly regarded Olympus OMD E-M5 mirrorless camera. The 10bar housing is machined from a solid block of aluminum with an acrylic rear plate to view the OMD's LCD, and the housing features buttons and levers that provide access to all the important camera functions. 10Bar has also released flat ports for the popular Olympus 12-50mm zoom lens, the Olympus 60mm macro lens along with a port that allows the 14mm and 20mm prime lenses to be used. It has also released dome ports that can be used with the Panasonic 8mm fisheye and 7-14 rectilinear zoom, plus the Olympus 9-18mm zoom. Strobes firing is triggered by the built in fiber optic bulkheads and all seals are double o-rings. ■

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Panasonic GX7

Panasonic announced the release of its new micro 4/3 format mirrorless camera, the Lumix DMC-GX7. The GX7 is the successor to the well-thought of, but not hugely successful GX1, and is priced at US\$999—which places it head to head with the highly regarded Olympus OMD and shares the same micro 4/3 format. The GX7 features a new 16 megapixel Live MOS sensor with an ISO range of 125 to 25600, a new fast AF system and can record 1080P/60 video (1080P/50 in PAL countries) videos plus focus peaking to keep video sharp. The big news about the GX7 is the tiltable 2.764m dot high-speed refresh electronic view finder (EVF) at the far back left of the camera, which can rotate up to 90° plus a 3-inch 1.04m dot tiltable LCD display. ■



Canon EOS 70D DSLR

Canon released their new 70D mid-level DSLR camera for enthusiast photographers, which features a new APS-C 'Dual Pixel CMOS AF' 20.2MP sensor with enhanced low-light performance and a native ISO range of 100-12800. The new sensor splits every single pixel into two photodiodes for on-chip phase detection, promising vastly improved autofocus performance in live view and movie mode. Also boasting the 19-point AF module from the EOS 7D for viewfinder shooting, touchscreen control via its fully articulated 3-inch LCD, plus built-in Wi-Fi for image sharing and remote camera control from a smartphone or tablet. For video, the 70D will shoot 1080p full HD video up to 30 fps in either ALL-I or IPB codecs. The 70D is priced at US\$1,199 for the body only. ■



Recsea Sony RX100 MkII Housing

Japanese manufacturer Recsea has released their new housing for the Sony RX100 Mk II. Made from corrosion-resistant anodized aluminum alloy, key features of the WHS-RX100 housing are access to both the front and rear camera rings along with the capability to half-press the shutter release to obtain and lock the focus. ■



Canon updates popular G15 and S120 compact cameras

Canon has released updated versions of their popular and highly regarded G and S series compact cameras. The G Series is the top-of-the-range compact cameras that provide much of the functionality of a DSLR but with a built-in zoom lens. While the S Series is Canon's top-of-the-range "pocket-size" compact that is much smaller than the G Series, but retains a lot of the capability. Both series are highly regarded for their overall capability and image quality, but have many competitors, and the update is a clear sign that Canon is trying to stay ahead of the pack!

The new G Series camera is the G16, which replaces the G15 and adds built-in wifi and some minor improvements to shutter lag and autofocus speed. The G16 also retains the dual control dials that allow manual exposure control like an SLR and, contrary to the general trend, it retains its optical viewfinder.

The S120 replaces the S110 and is very similar to its predecessor apart from improvements to shutter lag and autofocus speed. It also gains a faster F1.8 maximum aperture improving low light performance. ■

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Sharon Brill



P O R T F O L I O



PREVIOUS PAGE: *Conch 24*,
by Sharon Brill. Porcelain
sculpture, 16x35x16cm

Sharon Brill

Text edited by Gunild Symes. Photos courtesy of Sharon Brill

Artist Sharon Brill captures the sensual nature of the sea and the dynamic energy of water in motion in her series of ceramic sculptures that play with the forms and structures found in reefs and mullosks. Originally from Israel, Brill worked as a graphic designer there for many years. After a decade in the digital realm, she felt a need to work with her hands again and reconnect with the tactile feel of natural materials, which she did while residing in the United States. Now back in her homeland of Israel, Brill talks to X-RAY MAG about her work and life by the sea.

X-RAY MAG: Tell us about your background and how you developed your artistic process in connection with themes of the sea or the underwater world.

SB: Ever since I can remember, the sea has been an integral part of my life. Born in Israel, in a northern coastal town by the sea, I often go to the beach for a swim or a stroll and take in its natural beauty. The composition of the light, the air, the water



Conch 22, by Sharon Brill. Porcelain sculpture, 15x10x14cm. RIGHT: *Conch 23*, by Sharon Brill. Porcelain sculpture, 15x10x9cm





LEFT: *Reef*, by Sharon Brill. Porcelain sculpture, 15x29x30cm

RIGHT: *Flow*, by Sharon Brill. Porcelain sculpture, 19x26x15cm

BELOW: *Core*, by Sharon Brill. Porcelain sculpture, 14x20x14cm



and the sand, the shapes, textures and colors, the softness and the intensity have always been a source of inspiration for the vision reflected in my work.

The sculptures I create in porcelain today are the result of an accident that happened to me in the past when I was working on another project. I was working for long hours on a new project that suddenly collapsed as I was working. Not following my normal habit of throwing the ruins away to the slurry bucket, I decided to put it off to the side covered in a plastic bag and place it on the shelf.

After few days, I opened the plastic bag and looked again at those ruins, and I was curious about what I saw there. So I began to turn it around, dig in, open the layers, and carve inside, and so

from this the whole series developed. At the end of this process when I looked at the first few works, they reminded me of the shells and parts of the reefs that are left on the sand after the tides that are so well known to me from my long walks on the beach everyday.

X-RAY MAG: What about the ocean and its creatures inspires you?

SB: My inspiration comes from many things that I absorb with all my senses: the changing light that creates different shades in the sand, water and vegetation, the unique textures and shapes of the reefs and shells, the sound and appearance of the waves that change by the day and hour, and the foam on the waves. By being on

the beach, swimming and strolling, I feel that my senses are all active and working together, which appears later in my works.

X-RAY MAG: What is your artistic mission or vision?

SB: My work is created out of an internal drive, as if emerging out of itself. What intrigues me is how I merge myself with the object, how I steep myself in the process to create spontaneously and intuitively, opening the layers, in search of what lies behind the overt, what is hidden within...

The concept of my works exists in the integration of two poles: aspiration for meticulous and restrained aesthetics on the one hand, and unrestricted spontaneous and intuitive search on the other.

X-RAY MAG: Are you a scuba diver or



Conch 25, by Sharon Brill
Porcelain sculpture
20x22.5x17.5cm

Sharon Brill

waves crashing on the rocks and the large view of the sea that stretches far beyond the horizon. I love swimming in the small lagoons those rocky hills create.

X-RAY MAG: Tell us about your ceramic sculptures. How are they made and how is your method unique?

SB: The artworks created are abstract organic sculptural

shapes. Their scale varies, and some can be held in your hand and observed from any angle. The lines and movement lead the eye around the shape, into it and all through it.

The forms are wheel thrown or slab-constructed, altered porcelain, fired to 1,260°C (2,332°F). The porcelain remains bare. The works are sanded with various grades of sandpaper, from rough to smooth, before and after being fired.

X-RAY MAG: How does your art work or artistic mission relate to conservation or environmental issues regarding our oceans and reefs?

SB: The sea is very close to my heart. It is, and will always be, a part of me. My work comes from inside me and is intuitive. The town I live in is rapidly growing in construction and population, which is threatening to reach and ruin the shore. However, the



Conch 14, by Sharon Brill. Porcelain sculpture, 10x15x12.5cm

if not, how do you interact with the underwater realm?

SB: I am not a scuba diver but I live in a small coastal town, and so I start my day, year round, by swimming in the sea and walking along the shore. Even when I meet

with family or friends, it is almost always on the beach. The sea is where I will always go when I need some peace of mind.

X-RAY MAG: What are your favorite locations and underwater subjects?

SB: The shore that I live by is my favorite place to go. I like its natural look, which is for now still safe from urbanization. I enjoy sitting on top of the sand dunes that face the sea or on the rocky hills that go into the sea itself. I look at the textures the wind creates in the sand or the



Conch 16, by Sharon Brill. Porcelain sculpture, 11x21x17.5cm

building hasn't reached the shore yet or harmed it, and I am full of hope that it will remain this way.

X-RAY MAG: Why art? Tell us why you think art is important?

SB: Art is a strong passion that comes from within me, is stronger than me and needs to be expressed. I cannot see myself doing anything else. It took me many years of searching (within the art field) until I found the exact place for me to express myself in the arts. It comes with many difficulties, frustrations and challenges, but art for me feels like

home. Sculpting in porcelain is my desire, and I feel glad and fortunate that this is what I do in my life.

X-RAY MAG: What are the challenges and benefits of being an artist today?

SB: As I said before, art is a passion and a certain need that cannot be held back unexpressed, though it's not realistic financially most of the time. Being a mother and raising two kids (16 and 11) is another challenge, trying to be committed both to my family and my art, yet it is a challenge I would never give up on.

Even though my inspiration comes from the sea, its elements and its textures, I always enjoy seeing how different people react differently to the sculptures and how each one of the sculptures reflects the viewer's own inner world in different ways. I think this is one of the greatest things about art! I always feel great satisfaction from the responses. ■

For more information and to view more of Sharon Brill's art works, you can find her on Facebook or go to her website at: www.sharonbrill.com



Conch 21, by Sharon Brill. Porcelain sculpture, 12.5x22.5x19cm