



GLOBAL EDITION
January 2012
Number 46

Diving with Dinosaurs
Nile Crocs of Botswana

U.S.A.

Alaska Adventure

Crustaceans
**Gladiators of
the Deep**

Philippines
**Jungle
Cave**

Unique Dive
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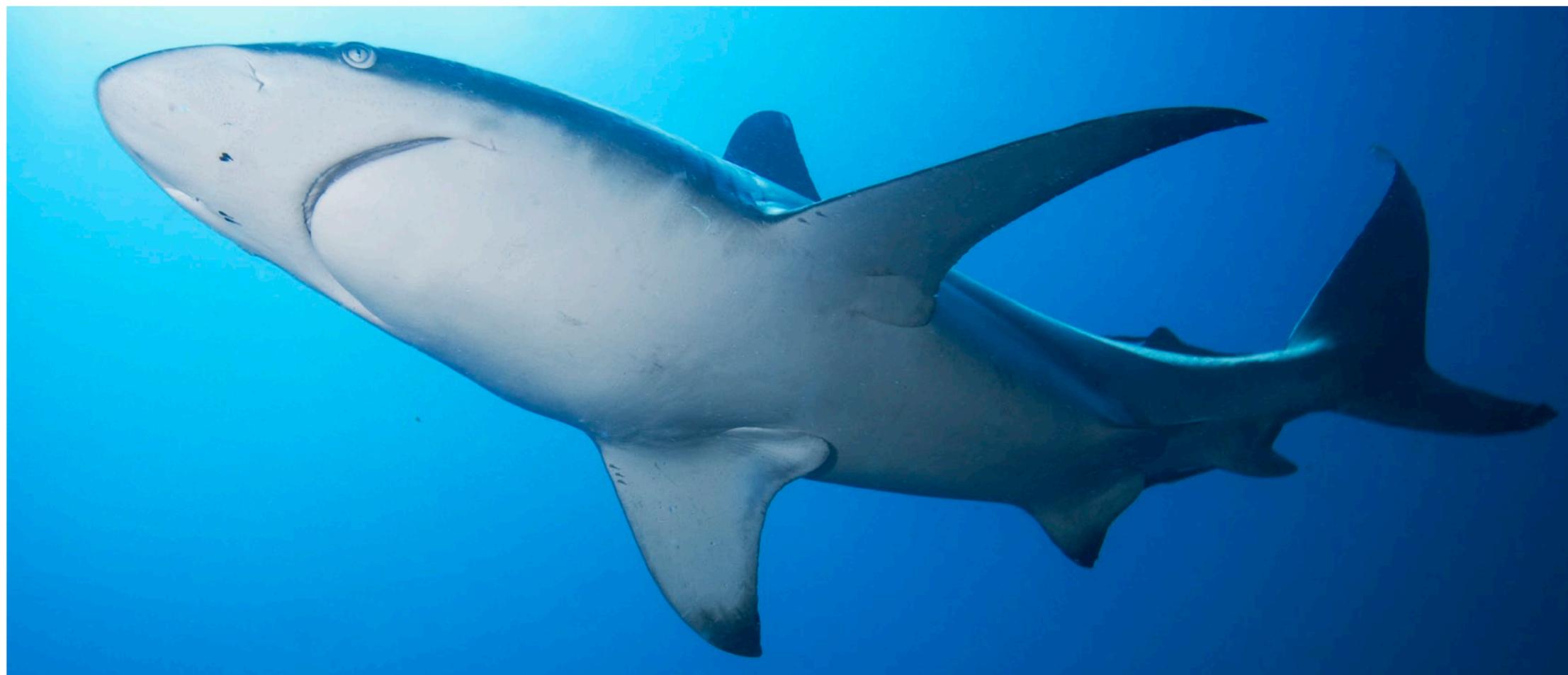
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COVER PHOTO: *Diver with Nile crocodile hiding in the Okavango River, Botswana*, photo by Amos Nachoum

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Blacktip shark, Protea Banks, South Africa. Photo by Scott Bennett



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This year, we commemorate the centennial of *Titanic's* sinking. One hundred years later, we are still drawn to this particular tragedy, even though there have since been far worse shipwrecks in terms of lives lost. While this particular one did indeed have all the elements of drama required for a Hollywood blockbuster, we are also drawn to shipwrecks for many other reasons.

They have often been called time capsules because, in many cases, artefacts are preserved better and for far longer in water than they would on land. Often the wrecks themselves appear frozen in time, and hence, offer glimpses into eras long past.

From wrecks we have learnt not only about the vessels themselves and how they were built but also about the daily lives of the seamen and about commodities traded.

The beauty of marine archaeology is that it is not just for well-funded scientists and institutions supplied with fancy high tech equipment for exploration. In countries with a rich maritime history to explore, many amateur archaeologists, or just curious recreational divers, have taken up an interest in finding and identifying shipwrecks along their local shores—sometimes working with local museums and experts in this regard. These days, recreational divers all over the world frequently dive some shipwreck or other, at home or on holiday trips.

Whether we go out to dive on a known wreck or accidentally stumble across some artefacts on the seabed, it is hard not to be intrigued, or to reflect upon, what happened or what these items are.

Thus, we can all be explorers or detectives. And that doesn't

just go with wrecks, marine archaeology and history. We also constantly see new creatures that are unfamiliar—perhaps not unknown to science, but certainly new to ourselves. I have been diving for a quarter of a century, and I do not recall ever coming up from a dive, even a shallow one along a not too exciting beach, in which I did not see something I had not noticed before.

Being divers, we do not have to venture deep into forests or wilderness, or explore some remote outback, in order to get new experiences, see something new or even have close encounters with wildlife.

Often, all it takes is a swim out from the beach.

— The X-RAY MAG Team



X-ray mag

News edited
by Peter Symes
& Catherine GS Lim

from the deep
NEWS



PETER SYMES

Fish flourish in Mexican marine reserve

The biomass in Cabo Pulmo National Park, a 27-square-mile reserve in the southern end of the Gulf of California, increased by 463 percent between 1999 and 2009.

Fish are flourishing in a Mexican marine reserve, offering a glimpse of what similar sanctuaries could do off the coast of California, said a scientist with the Scripps Institution of Oceanography.

The study, *Large Recover of Fish Biomass in a No-Take Marine Reserve*, employed a team of researchers who collected data in the reserve over the last ten years and documented changes to that data that led to the good news for the marine reserve.

That means that the area has recovered, including the large marine predators.

Octavio Aburto Oropeza, a postdoctoral researcher with the institution, studied Cabo Pulmo National Park—a 27-square-mile reserve in the southern end of the Gulf of California—where a “no-take” policy on fishing has allowed groupers, sharks and other top predators to grow bigger and more plentiful.

He found that the area's biomass increased almost five-fold in the ten years percent between 1999 and 2009. The biomass of top predators—such as large groupers, bull sharks, tiger sharks, and black-tipped and white-

tipped reef sharks—grew by 1,067 percent.

Reef areas within the reserve also developed a richer diversity of species during the study period, whereas reefs elsewhere in the gulf remained the same or declined.

Cabo Pulmo was dedicated as a marine preserve by the Mexican government in 1995. It encompasses 7,111 hectares of land and surrounding water. Its hard coral reef is home to more than 800 species of marine animals, including corals such as *Pocillopora verrucosa* and *Pocillopora capitata*, and marine invertebrate spe-

cies including the Wood's brown cone (*Conus brunneus*) and the prince cone (*C. princeps*).

There is also a healthy population of sharks, apex reef predators that are a sign a reef is doing well, according to the report.

The absolute increase in fish biomass within a decade is the largest measured in a marine reserve worldwide, and it is likely due to a combination of social (strong community leadership, social cohesion, effective enforcement) and ecological factors.

The recovery of fish biomass

has resulted in significant economic benefits, indicating that community-managed marine reserves are a viable solution to unsustainable coastal development and fisheries collapse in the Gulf of California and elsewhere. ■

Cabo Pulmo National Park is the only well enforced no-take area in the Gulf of California, Mexico, mostly because of widespread support from the local community.

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Goliath grouper makes a comeback

The once severely over-fished, Atlantic goliath grouper, a native species, is now making a comeback in the Atlantic Ocean and Gulf of Mexico around Florida.

Florida State University marine biologists have set out to understand the remarkable recovery of the Atlantic goliath grouper off of Florida's coasts. Everywhere else in the world, but Florida, the goliath grouper remains critically endangered.

The scientists will investigate predatory behaviors and migration patterns that could be contributing to population recovery. What they learn may guide future conservation and fishery management decisions on a wide range of specific issues.

The answers will be crucial to the Gulf of Mexico Fishery Management Council and the South Atlantic Fishery Management Council. They set policy on the management and conservation of the slow-moving, inquisitive giants, some of which grow to lengths of nine feet and weights of 400 to 800 pounds.

Protecting mangrove

Florida State University Coastal and Marine Laboratory scientist, Christopher C. Koenig, and marine ecologist, Felicia Coleman,

director of the FSU Coastal and Marine Laboratory, have studied goliath grouper life history and behavior for nearly 18 years and published a number of papers on the species' biology, ecology and population dynamics.

Their findings have demonstrated the importance of protecting mangrove habitat because of its critical value as nursery habitat for juvenile goliath grouper, whose nearshore survival rate affects the abundance of adults in the offshore environment. ■



Grouper may control invasive lionfish

The lionfish invasion of the Caribbean has spurred scientists to look for ways in controlling or diminishing the threat. The lionfish venomous spines don't make it attractive to other predators, except for maybe the grouper.

Controls of lionfish densities within its native range are poorly understood, but they have been recorded in the stomachs of large-bodied Caribbean groupers (*Epinephelus striatus* and *Myceteroperca tigris*). Whether grouper predation of lionfish is sufficient to act as a biocontrol of the invasive species is unknown, but pest biocontrol by predatory fishes has been reported in other ecosystems. The use of predatory fishes for controlling invasive species has been used in other ecosystems, but has not previously been described for coral reefs.

Groupers were surveyed along a chain of Bahamian reefs, including one of the region's most successful marine reserves, which support the top one percent of the Caribbean grouper biomass. The total amount of lionfish showed a multiple reduction in relation to the amounts

of groupers. While Caribbean grouper appear to be a biocontrol of invasive lionfish, the overexploitation of their populations by fishers, means that their median biomass on Caribbean reefs is an order of magnitude less than in the study. Thus, chronic overfishing will probably prevent natural biocontrol of lionfishes in the Caribbean.

Although the study doesn't give any clear answer to whether the grouper can be one solution to the lionfish problem, it could be a contributor. This also would give the grouper a higher status and offer more protection for the species. There remains much to learn about the scope for biocontrol of lionfish.

Further laboratory and field trials are needed to understand the size-dependency of the predator-prey relationship and the role that

small-bodied grouper and other fish may play, particularly in preying upon juvenile lionfish. The scientists also observed that lionfish appeared to remain closer to its hideouts at sites with high grouper densities, suggesting that grouper may both reduce lionfish densities and reduce the predation rates of lionfish in the area. ■



Parrotfish garden the reefs



Parrotfish fulfill a number of key roles on the reef. They remove sick and dead corals and clean areas for new corals to settle; they remove weedy growth; and they cart away literally tonnes of sand and sediment that would otherwise smother the corals.

Rates of bioerosion and coral predation are highly sensitive to human activity, whereas grazing and sediment removal are resilient to fishing. Using parrotfishes as an example, Australian researchers have shed light on how coral reef fish populations respond to escalating fishing pressure across the Indian and Pacific Oceans. Parrotfish are named for their dentition. Their numerous

teeth are arranged in a tightly packed mosaic on the external surface of the jaw bones, forming a parrot-like beak with which they rasp algae from coral and other rocky substrates. Their feeding activity can prevent algae from choking coral and

The bridled parrotfish (*Scarus frenatus*) is one of many small parrotfish species that graze the algal-covered reef surface. Unlike its larger relatives, this species can withstand some human fishing pressure. Through its grazing activity, it can buy time for reefs while we confront the coral reef crisis

Parrotfishes are the constant gardeners of the reef. They play a crucial role in keeping it healthy, suppressing weed, removing sediment and helping the corals to regrow after a setback."

Professor David Bellwood of the ARC Centre of Excellence for Coral Reef Studies and James Cook University

is important for the production and distribution of coral sands. After they digest the rock, they excrete it as sand. One parrotfish can produce 90kg of sand each year.

"Parrot fish fulfill a number of key roles on the reef. They remove sick and dead corals and clean areas for new corals to settle, they remove weedy growth, and they cart away literally tonnes of sand and sediment that would otherwise smother the corals," Professor David Bellwood

explained.

"But there are two sorts of parrot fish—the large ones that perform the main garbage removal task for the reef, and the much smaller ones that scrape away at the reef and keep it clean, healthy and free of weed. Both are being targeted by fishers, but the smaller parrotfish appear better able to withstand the pressure." ■

SOURCE: HUMAN ACTIVITY SELECTIVELY IMPACTS THE ECOSYSTEM ROLES OF PARROTFISHES ON CORAL REEFS BY DAVID R. BELLWOOD, ANDREW S. HOEY AND TERENCE P. HUGHES, APPEARS IN THE PROCEEDINGS OF THE ROYAL SOCIETY (BIOLOGICAL SCIENCES) 10.1098/RSPB.2011.1906.

Piranhas 'bark'

Scientists have discovered that the fearsome fish use sounds to communicate and to intimidate their rivals rather than attacking.

With animals, it's less expensive in terms of energy to make a lot of noise to impress the other guys, rather than fight," Eric Parmentier, from the University of Liege, Belgium, explained.

He has studied sound production and communication in a wide variety of fish species and already knew that red-bellied piranhas made sounds, but wanted to understand why. Many fish use noises to attract a mate, so the sounds are an important indicator that the fish are reproducing.

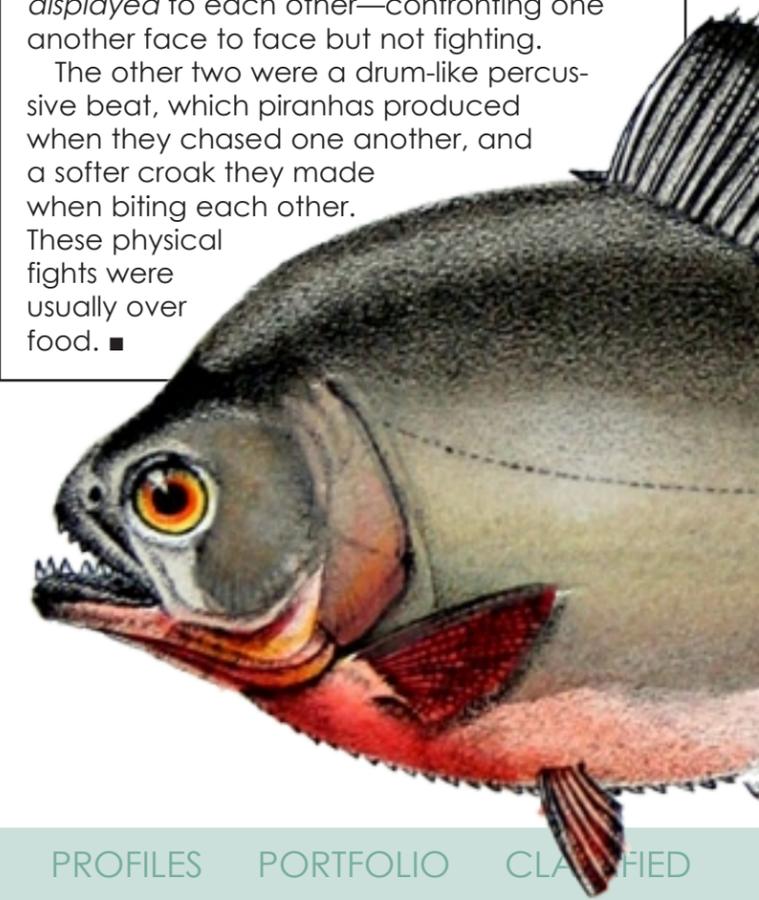
Piranhas, like many other "noisy" fish, produce sounds by vibrating their swim bladders—gas-filled organs in their bodies that help regulate their buoyancy.

Parmentier and his colleagues put a hydrophone—an underwater microphone—into a tank of piranhas in their lab and filmed the fish as they interacted.

They recorded three distinct sounds. The first was a bark that the fish produced when they displayed to each other—confronting one another face to face but not fighting.

The other two were a drum-like percussive beat, which piranhas produced when they chased one another, and a softer croak they made when biting each other.

These physical fights were usually over food. ■



News edited
by Scott Bennett

Tropical fish can adjust to warming oceans

As temperatures rise, many species will have to travel further from the Equator in order to compensate.

As global temperatures rise and the oceans heat up, a huge question is how fish that are adapted to one set of temperatures will survive the ecological upheaval. As fish require very precise temperatures to survive, they possess a far lesser margin for ecological error than their terrestrial counterparts. As temperatures rise, many species will have to travel further away from the Equator in order to compensate.

Scientists have debated whether many fish species will be able to migrate fast enough to keep pace with the changing water temperatures. A team of Australian scientists studying damselfish, a common coral reef resident, may have found an answer. According to lead researcher, Jennifer Donelson, "When we exposed damsel fish to water temperatures 1.5 degrees and 3 degrees above today's, there was a marked decline in their aerobic capacity as we'd expected. However, when we bred the fish for several generations at higher temperatures, we found that

the second generation offspring had almost completely adjusted to the higher temperatures. We were amazed—stunned. It shows that some species can adjust faster than the rate of climate change.

"When one generation of damselfish experiences high temperatures their whole life, the next generation is better able to cope with warmer water. We don't yet fully understand the mechanisms involved, but it doesn't seem to be simple Darwinian selection over a couple of generations. Instead, there has been a transmission

of information between the generations that enables damselfish to adjust to higher water temperatures," added Team leader Professor Philip Munday.

However, the heat-adjusted offspring evolved smaller than their parents, a possible trade-off for their ability to survive increasing heat. Exactly what drives this adaptation remains unclear, as it doesn't appear to be a case of natural selection. Even if the fish are able to withstand warming temperatures, it poses the question as to how their fragile coral reef habitat will fare. ■



Malaria and divers

A survey of anti-malarial medication use and its effects in recreational scuba divers has been launched as part of a research project.

Members of the dive community have been asked to participate in a research project on malaria medicine and diving. It is somewhat common knowledge amongst divers that not all medication is compatible with safe diving, and the purpose of this study is to show us the practices and experiences of scuba divers while visiting malaria areas. The results of this study can help us to learn more about and improve the safety of scuba divers in malaria areas.

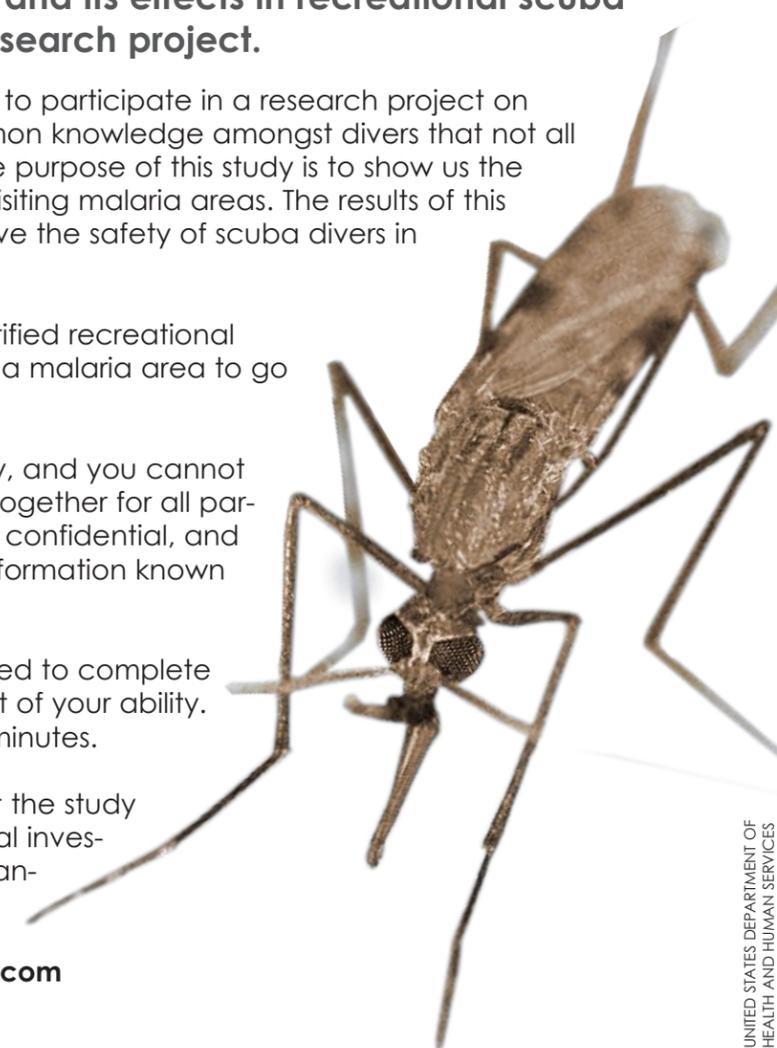
You may participate in this study if you are a certified recreational diver, 16 or more years old and you have visited a malaria area to go diving.

Participation in this study is completely voluntary, and you cannot be identified when the information is grouped together for all participants. All your information will be treated as confidential, and the study will not make any of your personal information known to someone else.

If you decide to join the study, you will be asked to complete a questionnaire (with 23 questions) to the best of your ability. This should take you approximately 15 to 20 minutes.

If you have any questions or concerns about the study you may contact Tanja Mandic, the principal investigator. This can be done by email: tanja.mandic@bimed.rs ■

Click here to do the survey on zoomerang.com



UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES

News edited
by Scott Bennett

Australian government plans world's largest marine reserve in the Coral Sea

If approved, reserve would encompass 989,842 sq km, more than one-and-a-half times the size of France. Coral Sea is one of the few places where ocean-going fish are found in great numbers.



Environment Minister Tony Burke stated the protected zone would encompass an area more than one-and-a-half times the size of France, with new fishing limits imposed and oil and gas exploration banned." There is no other part of Australia's territory where so much comes together—pristine oceans, magnificent coral, a military history, which has helped define us and now a clear proposal for permanent protection," he said. The proposal is subject to a 90-day consultation, but Burke said the Coral Sea's biodiversity was at the heart of the plan.

Ocean Elders

Lending key support is Ocean Elders, an independent group

of global ocean leaders whose members include Dr Sylvia Earle, Sir Richard Branson, Jean-Michel Cousteau, Ted Turner, Jackson Browne and others. Utilizing their collective influence and experience, they have joined forces to promote ocean conservation, pursue the protection of the ocean's habitat and wildlife, and preserve its ecosystems and biodiversity.

The group sent a letter to Australian Prime Minister Julia Gillard stating: "This provides your government with an opportunity to create the world's largest no-take marine reserve—one that extends from the Great Barrier Reef Marine Park to the limit of Australia's Exclusive Economic

Zone—and effectively protects the Coral Sea's spectacular marine life, including whales, turtles, sharks, tuna, billfish, and its critical habitats."

The Coral Sea is one of the few places where ocean-going fish are found in great numbers. "In the last 50 years, the world has lost 90 percent of these large ocean creatures due to overfishing," said Earle. "We need to do all we can to protect one of the world's last remaining refuges. That's why I support a fully protected marine park in the Coral Sea within Australia's waters. I call it a 'hope spot' for the oceans." Activists heralded the plan as a good start but indicated key reefs and spawning grounds

remain outside the protected area. Currently, the world's largest marine reserve is a 545,000-sq-km area (210,425 sq miles) established by the United Kingdom around the Chagos Islands in the Indian Ocean. ■

There is no other part of Australia's territory where so much comes together—pristine oceans, magnificent coral, a military history which has helped define us and now a clear proposal for permanent protection.

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News edited by
Catherine GS Lim

Baltic marine protected areas proposed

Oceana, the international marine conservation organisation, proposes nine new marine protected areas in the Baltic Sea. Crucial elements of the Baltic Sea's threatened marine biodiversity are completely unprotected.



OCEANA

The nine proposed areas include offshore waters and host habitats, communities and species that are not sufficiently covered by the current network of Marine Protected Areas. Some of the habitats documented by Oceana have not been described in the Baltic Sea before such as sponge aggregations and special types of coral gardens in the Kattegat and in the Sound.

Vulnerable communities

Also other communities living

muddy bottoms are poorly known. These habitats and communities are vulnerable to many human activities and in particular to bottom trawling, which according to Oceana's research is a direct threat to ecosystems. Their protection will fill some of the gaps identified in the current network of MPAs in the Baltic, Oceana writes in a press release.

Currently, 12 percent of the Baltic Sea is covered by MPAs. To safeguard biodiversity, a minimum

of 30 per cent of the Baltic Sea should be effectively protected. Fishing is only seldom restricted inside protected areas though fisheries, like trawling together with pollution, pose the most serious threats to biodiversity.

Many of these habitats can only recover with the immediate adoption of protective measures, which would benefit not only the benthic communities inside protected areas but also commercial fisheries with enhanced fish stocks. ■

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Waters surrounding Chile's Easter Island slated for marine sanctuary

NGOs, government and local communities to work together to protect ocean life. Proposal would create world's largest protected marine area by 2013.

A new project seeks to turn almost 400,000 square miles of the Pacific Ocean into a marine sanctuary around Chile's Easter Island. Spearheaded by the Pew Environmental Group, the proposal aims to create the world's largest protected marine area by 2013.

"These are areas where biodiversity is so rich that it has become a breeding ground. These centers generate sea life, and that feeds the other sectors with the ocean's currents, hence the importance of protecting them," said Ernesto Escobar, Pew representative in Chile.

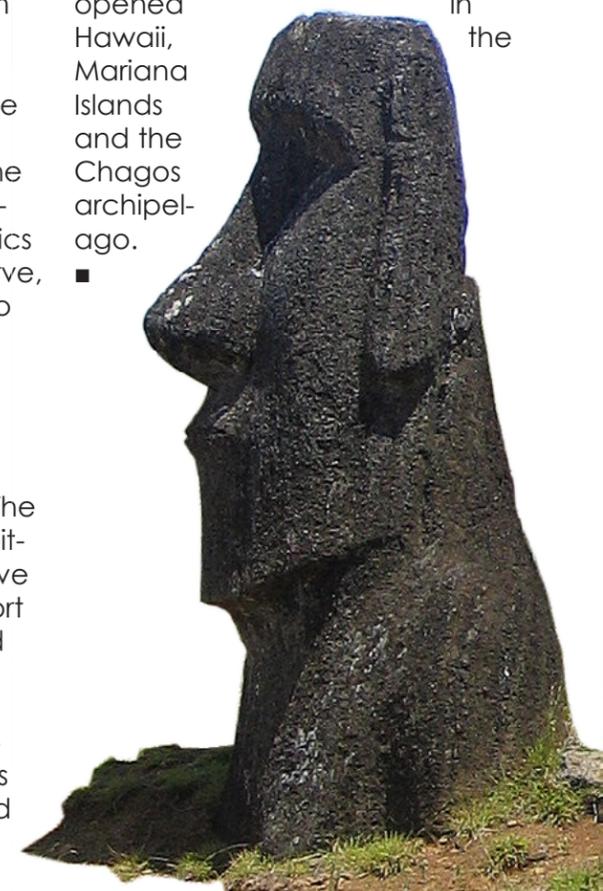
The Easter Island Development Committee (Codeipa) has already given its approval to the project, following measures reviewed by government earlier this year to help preserve the

island's natural resources. The next step will be approval from the island's indigenous Rapa Nui community. Escobar acknowledged the importance of the Rapa Nui community's involvement in the project. "The idea is that the Rapa Nui community define the characteristics that they want within the reserve, given their customs and links to the sea."

Satellite surveillance

PEW intends to protect and regulate the designated area through satellite surveillance. The satellites would monitor prohibited activities, including excessive fishing." We are designing a sort of Interpol for the sea," added Escobar. The sanctuary would be part of the Global Ocean Legacy, an endeavour to create 15 protected marine areas by 2022. Three of the proposed

reserves have already been opened in the Hawaii, Mariana Islands and the Chagos archipelago. ■



News edited by Scott Bennett

New Yeti crab species discovered near Costa Rica

Found near methane seeps, crab “farms” released fluid to derive energy for bacteria growing on its appendages. New species is only second member of Yeti crab family discovered to date.

A new crab species discovered in the Pacific Ocean near Costa Rica feeds off the bacteria on its claws fertilized by methane and sulfide released from the seafloor. Initially discovered in 2006 at a depth of 1,000 feet, *Kiwa puravida* is only the second member of the Yeti crab family discovered to date

appeared that they were providing food to the bacteria already growing on their claws,” Thurber said. “There isn’t sufficient food that deep that is derived from the sun’s energy, so vent and seep animals harness chemical energy released from the seafloor.”

Upon examining the bacteria on their claws, their genetic code was run through GenBank, an international database that includes thousands of species of bacteria. Results revealed it to be most similar to bacteria found on crabs and shrimp living near hydrothermal vents. “These bacteria are specialists and can be found on a variety of crustaceans—crabs, shrimp and barnacles—near seeps and vents,” he added. “But we hadn’t before seen that kind of ‘farming’ behavior in which the host waves its symbionts in seep fluid.”

Although symbiotic behavior is common in nature, few animals behave in quite the same way as *Kiwa puravida*. Some organisms, such as mussels and tubeworms, house symbionts that allow them to harness chemical energy. Others, such as barnacles, do not have

symbionts, instead waving their appendages to ensnare food drifting by. The new Yeti crab is the only one that combines both, utilizing symbionts on its appendages and waving its bacteria-laden appendages to capture chemical energy as food for themselves.

Lipid and isotope analyses revealed epibiotic bacteria to be the crabs’ primary food source, though it is theorized they obtain a small degree of sun-derived energy from dead plankton filtering down through the water column. Thurber believes the crabs harvest bacteria growing on their claws by using a specially adapted appendage to scrape the bacteria off their bodies and bring it to their mouths, and then continually waving their claws near methane seeps to boost the bacteria’s productivity.

Only one specimen of the original Yeti crab, *K. hirsuta*, discovered in 2005, has been collected and that was near a hydrothermal vent. About 30 to 40 *Kiwa puravida* specimens have been examined, with scientists believing them to exist at similar methane seeps.” Since this entire family of crabs wasn’t even discovered until 2005, there is a strong possibility other species are out there,” Thurber added.

Residing near methane seeps, new crab species “farm” released fluid to derive energy for the bacteria on its appendages. ■



ANDREW THURBER / OREGON STATE UNIVERSITY

according to Andrew Thurber, a post-doctoral researcher at Oregon State University that led the study.

“We watched the crabs wave their claws back and forth in fluid from a methane seep, and rather than trying to capture bacteria, it

Lloyd Godson is at it again



Australian marine scientist and aquanaut, Lloyd Godson, is partnering on a new project with Cees den Toom of Scuba Academie in the Netherlands. The project’s goal is to establish an underwater research facility, unique in the world, which will be used for education and outreach. The facility will be located in a freshwater lake area called, Vinkeveense Plassen, in The Netherlands.

To encourage children and young people to discover and explore and learn how to protect the underwater world and freshwater ecosystems, the

facility will serve as the international headquarters of Tik, a real-life underwater superhero, and his fishy sidekick, Bubbles. Inspired by the escapades of Tik and Bubbles, children will be encouraged to be proactive—to take action in order to make positive change in the world—to follow their dreams, to be philanthropic and to be compassionate stewards of our planet.

To be an environmentally friendly and completely autonomous unit energy-wise is a long-term goal of the project. Off-grid renewable and alter-

native energy systems will be used to achieve this goal.

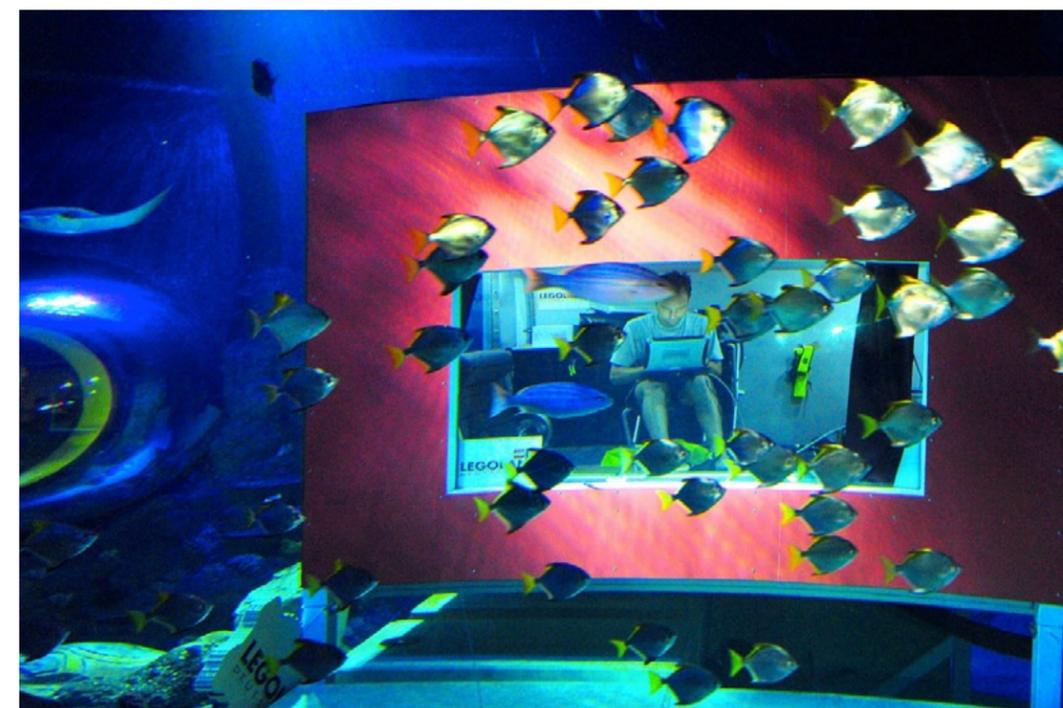
The project leader

Godson will lead the project. He has had a very active career including leading two Australian Geographic Society sponsored expeditions including the BioSUB Project and Life Amphibious.

In fact, Godson’s BioSUB Project won the Australian Geographic \$50,000 prize in the “Live your dream” Wildest Adventure Competition.

In the BioSUB Project, Godson lived for 12 days in the first-of-its-kind underwater habitat, which incorporated a plant-based life support system.

For more information, visit Lloyd Godson’s website (about.me/lloydgodson) and Scuba Academie in The Netherlands at (scuba-academie.nl) ■



IMAGES COURTESY OF LLOYD GODSON



NOAA

As one of very few taxa found exclusively in the deep sea, the xenophyophores are emblematic of what the deep sea offers.

They are fascinating giants that are highly adapted to extreme conditions but at the same time are very fragile and poorly studied.

Giant amoebas roam the abyss

Xenophyophores are the largest single-celled organisms found to date.

Mention amoeba, and one tends to imagine colourless microscopic organisms with irregular shapes. While this may be true for some amoeba, there is one species of amoeba that definitely does not fit into this category. That's the xenophyophores, which have been discovered living in the Mariana Trench.

It was during a July 2011 exploration that scientists from the Scripps Institution of Oceanography and the National Geographic Society found the marine protozoan

along the Sirena Deep section of the trench.

Found at 10,641m

Xenophyophores are the largest single-celled organisms found to date. Those in the Mariana Trench had been found 10,641 metres deep. The previous depth record was about 7,500 metres, held by xenophyophores in the New Hebrides Trench, in the southwest Pacific. Exclusively found in the deep ocean, xenophyophores can withstand the high pressure, low light and extreme cold of this

unique environment. They consume small particles of organic matter, with flexible extensions (pseudopods) that they use to wrap around and absorb the particles from the water.

Recently, studies have shown that xenophyophores can concentrate high levels of lead, uranium and mercury, indicating the possibility that these organisms could be resistant to large doses of heavy metals.

"As one of very few taxa found

exclusively in the deep sea, the xenophyophores are emblematic of what the deep sea offers. They are fascinating giants that are highly adapted to extreme conditions but at the same time are very fragile and poorly studied," said Lisa Levin, UCSD professor of biological oceanography and director of the Center for Marine Biodiversity and Conservation. For now, we have to be content with just photographic evidence of these organisms. Because of their location and the fact that they are well-adapted to the

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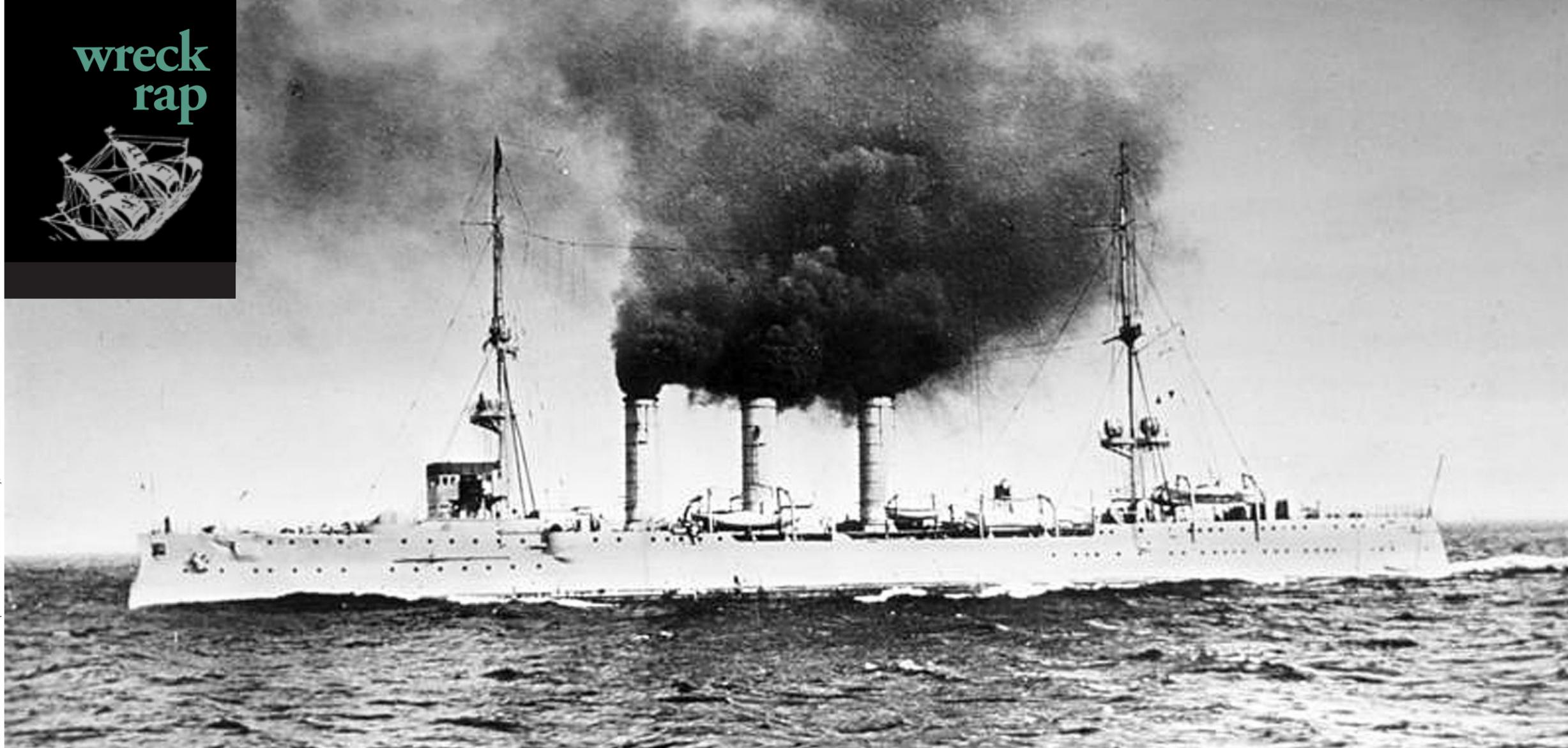
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The light cruiser *SMS Emden I*
at sea in 1910

The German WWI light cruiser *SMS Emden* was once one of the most famous German warships. Her wreck in the Australian Cocos Islands is still accessible.

Text by Roland Hanewald
Photos by Karen Willshaw

Diving the *Emden*

Commissioned on 1 April 1910, the *Emden* was eventually assigned to the East Asiatic cruiser squadron under Rear Admiral Graf von Spee, and stationed at Tsingtao at first. When war broke out, the squadron, aware of Japan's entry into the hostilities, left for the Eastern Pacific, detaching the *Emden* to conduct warfare of her own in the Indian Ocean. There, the cruiser proved its worth within just three months, sinking or capturing no less than 23 vessels and wreaking havoc to the harbors

of Madras and Penang. Still, her commanding officer, Capt. Karl von Müller, had achieved a reputation of utter chivalry in action and, respected and admired by friend and foe alike, was called a "gentleman of war"—a type of soldier that has since become extinct.

Assault on Cocos

The morning of 7 November 1914 had begun innocently enough for the men aboard, then prowling the central Indian Ocean in

quest of enemy tonnage. "There is a booby on the bridge," the duty officer reported to Hellmuth von Mücke, second in command, after a large bird had landed on the superstructure. "What's new about that?" the superior officer quipped back. "I've known that for years...!"

Dawn on November 9 saw the *Emden* creeping up on the Cocos Archipelago intent on destroying a radio and cable station located on Direction Island in the north-

east of the group of 27 islets. At six o'clock, a sleepy lookout on that island reported a strange vessel on the roadstead, which was at first taken for an Englishman but was soon identified as the enemy, which half of the Allied fleet was searching for in vain.

"*Emden* here!" a frantic radio call rang out. Minutes later, a landing party arrived on the beach of Direction. Von Müller could have shelled the station, but he refrained from doing so "because

civilians might be harmed". He was indeed a gentleman of war.

The English press later gave the following account of the dialogue between the German invaders and the station personnel: "One officer asked those of us standing on the jetty, 'Vere is de vireless eef you please?' and then, 'Vere is de house of de director?' The officer 'tanked' us 'very mudge', remarking, 'Ve haf had blenty troubles mit your vireless and gables'." No shot was fired. The adversaries engaged in friendly banter and the *Emden* men learned that, unbeknownst to them, they had been awarded the Iron Cross by their Kaiser. Finally, when the radio tower was blasted; the islanders asked for the favour of not letting it fall on their tennis court. Their request was readily granted. War is not always hell.

Turn of the tide

Meanwhile, however, the Australian cruiser, *Sydney*, which von Müller had deemed to be far away, had intercepted the emergency call and rushed to the scene, engaging the *Emden* in a duel on the high seas. In spite of scoring an initial direct hit, the diminutive German vessel, hopelessly outgunned and outmaneuvered by the vastly superior foe, was soon a burning hulk. Capt. von Müller decided to run the wreck on the coral reefs of North Keeling Island, a small atoll 13 nautical miles north of the main archipelago.

The *Sydney* continued to shell the defenseless derelict there, an act which resulted in a terrible bloodbath and which did not exactly endear Commodore J.C.T. Glossop, RN, with the British and Australian public after the tragedy became known shortly after.

wreck rap



All divers love to pose for a photo like this



Not only were the *Emden* men systematically gored by the enemy guns, trapped in the red-glowing hull, they also burned to death, while others drowned in the attempt to reach the nearby island through the pounding surf. Many of the wounded men reaching the shore were attacked by the huge seabirds of the island, which had gone berserk with the smell of blood and were no longer the friendly boobies observed two days earlier.

One hundred and thirty-four *Emden* men were killed in action, among them the ship's three Chinese laundrymen, who stoically continued their work at the height of the battle and died a silent heroes' death. Capt. von Müller survived

the slaughter and was taken aboard the *Sydney* with 66 wounded. He was later imprisoned on Malta. The Direction Island landing party sneaked out on the captured schooner, *Ayesha*, and eventually reached Sumatra, then Germany. Their leader, the valiant Capt. von Mücke,



was to command a river gunboat on the Euphrates for the rest of the war in the middle of the desert, which he, the model seaman, detested with a vengeance. *Sic transit gloria mundi.*

Not much left

The wreck of the *Emden* was thoroughly cannibalized by Cocos Islanders shortly after the battle, while some more substantial war trophies went to mainland Australia. A commercial Japanese enterprise broke up the rest in 1950, but the heavy stuff remained intact. During a tropical storm in October 1956 the carcass slid back into the sea and settled at eight meters, a ship's length from the beach.

Although this depth is next to nothing and can even easily be reached by snorkelers, general conditions over the wreck turn diving into a difficult job. The site is fully exposed to both the heavy ocean swells from the southwest and the rough seas of the trades from the southeast, either of which severely aggravates diving the wreck and lowers visibilities at times.

Dieter Gerhard and his Aussie partner Karen Willshaw, dive-tour operators on West Island (where the airport is), recommend the doldrum months from November through March for doing the *Emden*. Calms will then be frequent, although some rain is likely. Still, no iron-clad guarantee for a safe landing can even be given at any time. Dieter warns that prospective divers should be prepared for at least a two-week sojourn in the Cocos Islands, waiting for their chance to pound. Moreover, North

The vanquished "Emden", hard on the reef at North Keeling, 1914

The epic battle on has been commemorated on stamps, plus a map of the Cocos Archipelago and Keeling Island



Keeling is a strictly protected national park, only accessible with special permits of Parks Australia, which will be readily granted but may add a day or two, or more, to the time factor.

Yet, whether a dive on the *Emden* succeeds or not, the Cocos Islands, populated by some 60 Aussies and 650 Malays (on the isles of West and Home, the others are empty), offer enterprising underwater freaks one of the finest diving scenes worldwide. Protected in its entirety, truly off the beaten track and

with only few tourist infrastructures, the archipelago is virgin territory. A German travel magazine sometime back called the Cocos Islands "the Maldives, a hundred years ago", which hits the nail on the head.

A word of warning to divers who succeed in reaching the wreck site: The *Emden* wreck is a national monument and the removal of any wreckage, and be it as small as a little bolt, may result in a stiff fine as high as 50,000 ASD. ■





Lots going on in Sweden

2011 will go down in the history of maritime archaeology as incredible. Two intact warships discovered in Stockholm's archipelago and a medieval wreck and remains of a wharf were unearthed in the city center.



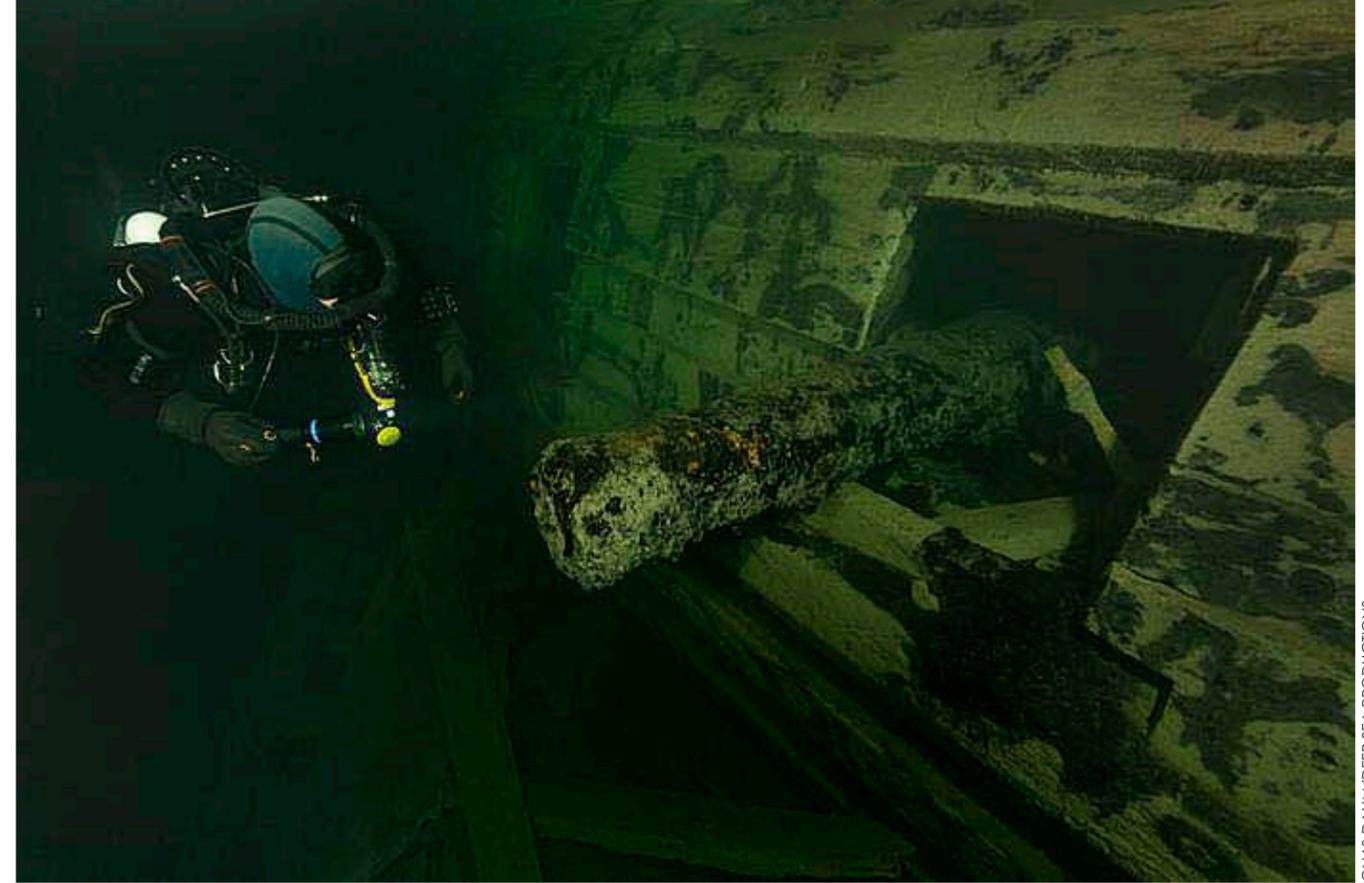
The Maritime Museum in Stockholm is excavating an area in the city center. In front of the Grand Hotel, the remains of a wreck that was sown together was found

Last summer, Deep Sea Productions, the Swedish underwater research team, first found a 25-meter (82-foot) wooden wreck it found off the island of Öland, which it believes is the famous warship *Svärdet* (The Sword). The 94-gun *Svärdet* was the Swedish Admiral Claes Ugglas' flagship. The ship was shot to pieces and set on fire by a Danish / Dutch fleet at the Battle of Öland's southern point in 1676. Six hundred seamen perished, including the admiral.

Then, during the same survey the team came across another intact 17th century warship, *Mars*, which was previously discovered by Ocean Discovery. Built in 1561 for the Swedish monarch, King Erik XIV, she was the largest ship in the Baltic Sea—approximately 70 meters long weighing about 1,000 tons. With more than 150 guns and cannon, she had more firepower than any warship before her. After an explosion on board, she went down in her first battle against a Danish fleet aided by ships from the German city of Lübeck.

These two vessels are the first two wooden ships ever discovered that were lost in battle and now rest on the bottom of the sea with important portions still intact; huge guns still pro-

Diver inspects a gun protruding from one of the gun-ports on the 17th century warship *Svärdet*



JONAS DAHM/DEEP SEA PRODUCTIONS

truding from the gun-ports; and remnants of epic naval battles that shaped European history.

The battle of Öland was a naval battle between an allied Dano-Norwegian-Dutch fleet and the Swedish Navy in the Baltic Sea off the east coast of the island of Öland on 1 June 1676. The battle was a part of the Scanian War (1675–79) that was fought for supremacy over the southern Baltic. Sweden was in urgent need of transferring reinforcements to its north German possessions while Denmark sought to ferry an army to Scania in southern Sweden to open up a front on Swedish soil.

Just as the battle began, the Swedish flagship, *Kronan*, foundered and sank with a loss of almost the entire crew, including the Admiral of the Realm and commander of the Swedish Navy, Lorentz Creutz.

Police charges filed

The chief attorney at the Swedish National Heritage board reported the discoverers of *Svärdet* to the police for keeping the location secret. The Swedish Historical Artifacts Act states

that finds must be reported to the authorities. Carl Douglas, who led the team who found *Svärdet* countered that the location was kept secret because there is, as yet, no way to protect the wreck from looters. And this secrecy is just the sticking point.

Meanwhile, nearby

When the eastern quayside of "Strömkajen" close to the posh Grand Hotel needed a long time coming renovation, some remarkable finds were made. First, a wreck that was sewn together came to light. And as the archeologists carefully worked through layer after layer, new insights to life in Stockholm through the centuries were revealed. On this location, an important naval ship wharf was active from 1560 and onward for around a century. It was here both the famous *Vasa* and the

recently discovered *Svärdet* was built. It is therefore quite possible that the wrecks were used as service vessels within the shipyard explained project manager, Jim Hansson, curator at the Maritime Museum.

Hansson sees a rewarding exploration ahead, but he feels the pressure. The city is breathing down his neck, eager to continue the renovation process. At the same time, excava-



A coin

tion is getting close to the spot they believe the rest of the wrecks are located. ■

MARIELE LARSSON



The U.S. Bureau of Ocean Energy Management estimates there are more than 2,100 historic shipwrecks in the Gulf of Mexico's federal waters

Ship from failed Mongol invasion found off Japan



WIKIPEDIA

Japanese samurai attacking a Mongol ship. Circa 1293, 13th century

The wreck of a ship thought to have taken part in a failed Mongol invasion of Japan has been found off the Japanese coast.

The vessel is the first of its kind to have been discovered relatively intact and dates from a series of attempts by Kublai Khan, emperor of the Yuan Dynasty, to subjugate Japan between 1274 and 1281. The 13th century attacks on Japan were a rare setback for the Mongols at the height of power.

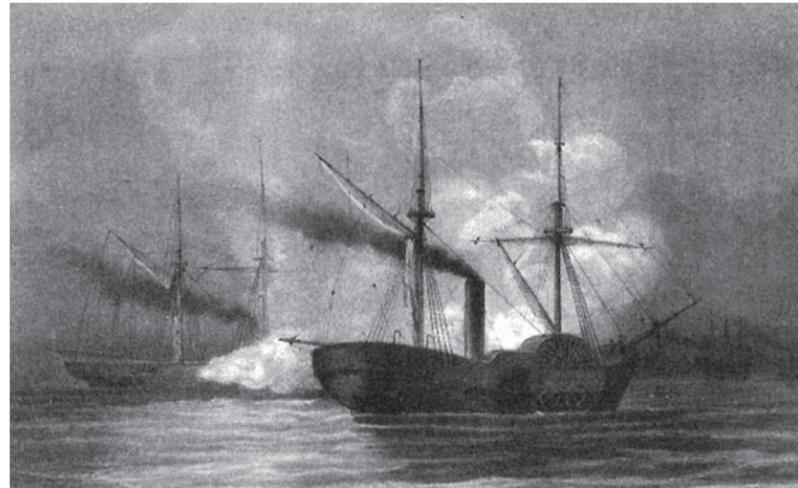
Historical records suggest that some 4,400 ships carrying 140,000 Mongol soldiers landed in Japan in 1281 and skirmished with samurai in northern Kyushu. But after returning to their boats, the fleet was struck by a devastating typhoon that put an end to the invasion plans—a storm known to all Japanese

as “kamizake”, meaning divine wind.

A team of researchers uncovered a 12-metre (36ft) section of keel buried in deep sand off Nagasaki prefecture. They said it was the first time such a large piece of hull had been recovered from the Mongol invasion fleets.

The warship was located with ultrasonic equipment about three feet beneath the seabed at a depth of 75 feet. The archeological team, from Okinawa's University of the Ryukus, had been carrying out a search of the waters around Takashima Island, in Nagasaki Prefecture, because the area had yielded other items from Mongol ships. ■

Historic shipwrecks in the Mexican Gulf protected



The first USS *Hatteras* was a heavy steamer purchased by the Union Navy at the beginning of the American Civil War. She sank in approximately 18m (60 ft) of water 32km (20 mi) off of Galveston, Texas, following an engagement with CSS *Alabama*

Updated guidelines protect historical sites on the bottom of the Gulf of Mexico.

New portions of the ocean floor have been added as likely locations for shipwrecks. Those designated blocks of ocean floor require surveys and archaeological reports prior to drilling.

U.S. Bureau of Ocean Energy Management Director Tommy Beaudreau said the update was prompted by “new information, recent discoveries and advances in

hydrographic survey technology”. Without first surveying blocks, oil-and-gas companies may disrupt historic sites without even realizing it.

The shipwrecks in the gulf date as far back as early Spanish explorers and as recently as 50 years ago. In 2001, the *U-166*, a famed World War II era German submarine, was found 140 miles from where it was thought to have sunk. ■

WWII wrecks off Hawaii charted

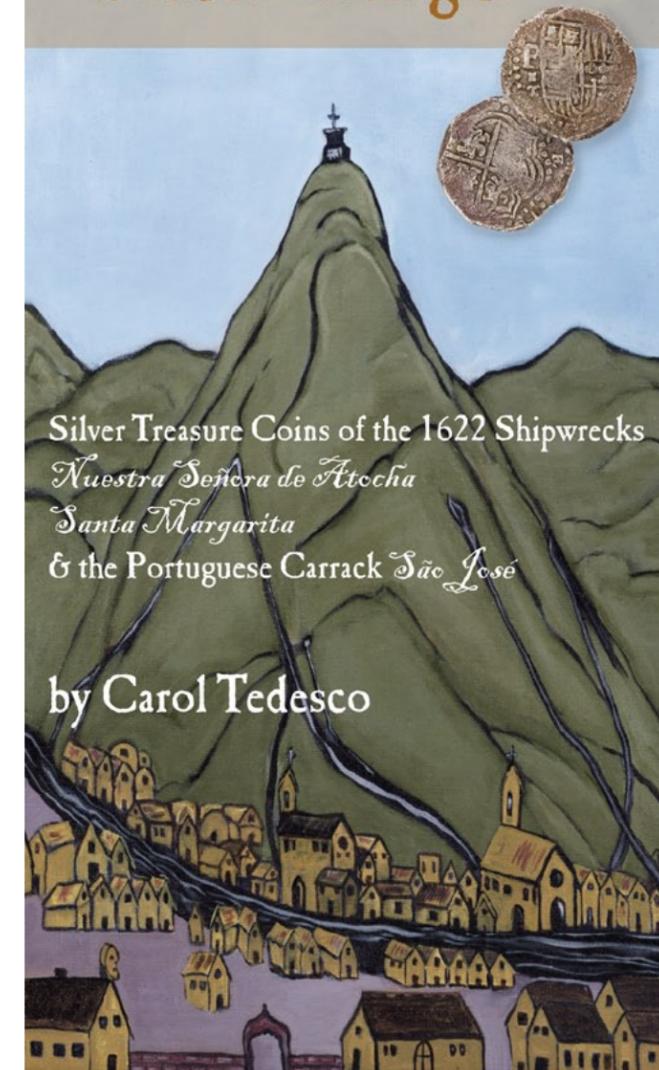


During WWII, numerous planes—such as the depicted Curtiss Helldiver—and landing craft, and occasionally the lives of young servicemen, were lost around the islands

The U.S. NOAA and the University of Hawaii's Marine Option Program have completed a survey of sunken World War II-era aircraft and shipwrecks along Maui's southern coast. This year the sites of six historic World War II wrecks have been uncovered and recorded for posterity. The survey

team produced scaled drawings and took photographs of six wreck sites, including a carrier-based dive bomber (SB2C-1C Helldiver); a carrier-based fighter plane (F6F Hellcat); and three amphibious assault vehicles (LVT-4 and LVTA-4s), two mounted with 75mm howitzers. ■

Pieces of Eight



Silver Treasure Coins of the 1622 Shipwrecks
Nuestra Señera de Atoccha
Santa Margarita
& the Portuguese Carrack *São José*

by Carol Tedesco

Fully illustrated with hundreds of finely detailed photographs, *Pieces of Eight* is more than just a reference book. Carol Tedesco not only explains the subtle nuances of the coins themselves, but places them in the context of their moment in history, explaining where they were coming from, where they were going and why.

To be released in 2010 by SeaStory Press, Key West Florida. To be on our availability e-mail alert list, please inquire at lostgalleons@aol.com.



South Africa announces first ever Shark Route



Oceans
Discovery team launches tours allowing visitors to meet local shark experts.

South Africa is not only home to a varied array of marine environments but also to some of the world's most diverse and abundant shark populations. With ecotourism burgeoning in the country, tourists will be able to experience up close and personal encounters with some of the Earth's last undersea apex predators.

Passionate about the well-being and future conservation of sharks, Oceans Discovery has launched the first ever shark route along the coasts of Southern Africa. A collaboration of divers, tour guides,

scientists, conservationists and shark professionals, the organization has created unique shark diving expeditions with an aim to introduce visitors to South Africa's shark species and the work being done to aid in their conservation.

Hosted by world-renowned shark experts who have moved to South Africa to conduct research, the Shark Route consists of three zones. Zone One runs from False Bay to Tsitsikamma, with stops in Gansbaai and Mossel Bay; Zone Two runs from Port Elizabeth to Durban with stops in Port St. Johns, Protea Banks and Umkomaas;

and Zone Three runs from Sudan to Tofu, with stops in Ponta, and Zavora. In these zones, guests will dive with great whites, mako sharks, blue sharks, shy sharks, ragged tooth sharks, bull sharks, tiger sharks, hound sharks, whale sharks, grey reef sharks, manta rays and the prehistoric seven-gill shark.

At each stop, clients will spend an evening with a local shark specialist. Evenings will consist of dinner followed by a brief presentation where the specialists will share their experiences, research and long-term conservation goals. ■

Maldives flip-flops on spas and massage ban

In an abrupt reversal of their previous decree, the Maldives government has overturned a decision to shut down all spas and health centres in resorts.

According to Maldives president Mohamed Nasheed, "We have lifted the ban and all the services will be available for tourists. We wanted to give confidence to tourists."

Spas and massage parlours were ordered to close in what appeared to be a political standoff. The hard-line opposition Adhaalat Party claimed that spas were being used for prostitution and accused President Mohammed Nasheed's government of compromising the principles of Islam.

The decree seemed certain to imperil the mainstay tourism sector, which accounts for 30 percent of the country's GDP. According to the country's tourism minister, the move immediately prompted a flurry of calls from the affected resorts, with many choosing to ignore the ban outright.

President Nasheed has asked the Supreme Court to decide whether operating spas is against the principles of Islam.

The island nation has of a population of 400,000. ■



YANN SAINT-YVES

Airlines & Airports

European Union passports set to include biometric fingerprints.

E.U. member states are set to issue passports with digital photos within 18 months and fingerprints within 36 months. Facial and fingerprint data will be stored on an embedded chip along with a digital copy of the bearer's photo. Personal details and biometric data will be held on national databases and on a E.U.-wide database of European Register for issued passports—the latter will be on the Schengen Information System (SIS II) and be accessible by law enforcement agencies. ■

Free Wi-Fi airports

With airports gouging travellers with exorbitant prices for virtually every service under the sun, it is a pleasant surprise to discover that some things are still actually free. With laptops now an integral part of travel, passengers can now find a list of worldwide airports offering free Wi-Fi at Wififreespot.com/airport.html ■

Facebook for 'Meet & Seat'

The gamble of who you sit beside on a flight can make travel either enjoyable or a nightmare. Recognizing that this ritual can make or break one's flight experience, KLM Royal Dutch Airlines is introducing 'Meet & Seat', a service allowing passengers to decide whom they sit beside based on their social media profiles. The service will be available to everybody and both passengers must be willing participants in order to choose your fellow passenger. However, those who enjoy putting on their headphones and enjoying a movie on their laptop—alone—can avoid the experiment altogether. ■



Dolphin sanctuary declared in the Red Sea



PETER SYMES

The Red Sea Governor has decreed the south western area of Fanous Reef in the Hurghada region a "safe zone" where all vessels, large and small, are banned from entering at this sensitive ecological hotspot.

With dozens of boats sailing the

Hurghada area every day, many concerns over the wild population of Indo-pacific dolphins (*Tursiops aduncus*) arose since consequences of boating and tourism at sea can range from oil pollution to, particularly bad for acoustic animals, noise; from unregulated dolphin watching and

swimming-with operation to bad practices eventually affecting the ecosystems.

The first step for the protection of this species has just been taken; the Red Sea Governor's Decree 379/2011 has established the south western area of Fanous Reef as a "safe zone".

The area is now closed for vessels but open for snorkelers and divers that can freely access it from the inner lagoon or the outer reef. Together with the decree, a suggested code of conduct is also being divulged; it means to provide information on the best practices to adopt when approaching wild dolphins on board a vessel or swimming with them. ■

SOURCE: HEPCA

Karnataka to make its first foray into diving



SCOTT BENNETT

Marine life experiences as colorful as Karnataka's culture awaits

The Indian state of Karnataka has announced the development of its very first scuba diving venture.

In conjunction with Jungle Lodges and Resorts, the Karnataka state government will establish its first scuba diving project in collaboration with the government of India.

The first scuba diving camp will be located at Netrani Island, Apsarakonda, in the Uttara Kannada district. Netrani Island is an uninhabited coral island approximately ten nautical miles from the Karnataka mainland teeming with a wide variety of marine life including colourful reef fish, whale sharks and orcas.

"We have identified land in Apsarakonda to set up the camp," said R. K. Singh, executive director (project and business development), JLR. "This

Semporna shark sanctuary petition

Sharks are being exterminated worldwide at an alarming rate, with a third of all shark species facing extinction and some, such as the hammerhead, have declined by up to 90 percent in the last 50 years. If current fishing trends and attitudes don't change quickly, the extinction of many species is assured in the coming years.

From Borneo and hammerhead sharks to the graceful whale shark, Malaysia's Sabah state is till one place where many species are still encountered on a daily basis. A petition has been created for the establishment of a Semporna Shark Sanctuary. People are being urged to sign this petition to not only preserve one of the world's most biodiverse marine ecosystems but also preserve the sea's apex predator for future generations while securing the future economy for the thousands of people who make a daily living from ecotourism in the area. ■

project will cater to the increasing demands of eco-tourists. It will help them gain more knowledge about marine life," he added.

The sea depth around Netrani Islands ranges from six to 40 meters with visibility ranging from 15 to 30 meters. The best time to visit Netrani Island for water sport activities is during the months of November to February. The monsoon season from June to September should be avoided as the sea becomes very rough during the rainy season. ■

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Worldwide Dive and Sail's S/Y Mandarin Siren lost to fire

During a recent trip to Raja Ampat in Indonesia, a fire broke out below decks of the S/Y Mandarin Siren while guests were on a morning dive. Although the fire's origin has yet to be fully determined, it is believed to have been caused by an electrical fault in the tumble dryer in the laundry room. Although the crew did everything possible to contain the blaze, the fire quickly spread to the engine room. As a result, the vessel was abandoned and subsequently lost. Fortunately, no one was hurt in the accident. ■



Diver explores
Aliwal reef

When it comes to marine diversity, South Africa certainly has the lion's share. Blessed with a lengthy coastline swept by warm and cold currents, the resulting array of marine habitats makes for spectacular diving in any season. For shark junkies, however, South Africa is nothing less than the promised land. While the Western Cape's cold waters are famous for its great white sharks, the country's subtropical environs are home to two of its premier shark dives—Aliwal Shoal and Protea Banks. With such underwater bad boys as tiger and bull sharks as the main attractions, I knew I was in for an experience like no other.

Text and photos
by Scott Bennett

Aliwal Shoal & Protea Banks **South Africa**

My journey to see some of South Africa's most impressive predators would begin above water in the world-famous Kruger National Park. Starting in neighbouring Mozambique, I took a plane to the capitol of Maputo where I would meet my driver to take me across the border.

Prior to my arrival, I was told that my driver, Bruno Liebi, would be a white guy with dreadlocks. I figured he probably wouldn't be too difficult to spot. An easygoing South African of Swiss descent, Bruno was waiting right outside the arrival hall. Greeting me warmly, we loaded

the car and headed for the border, negotiating Maputo's rush hour traffic in the process.

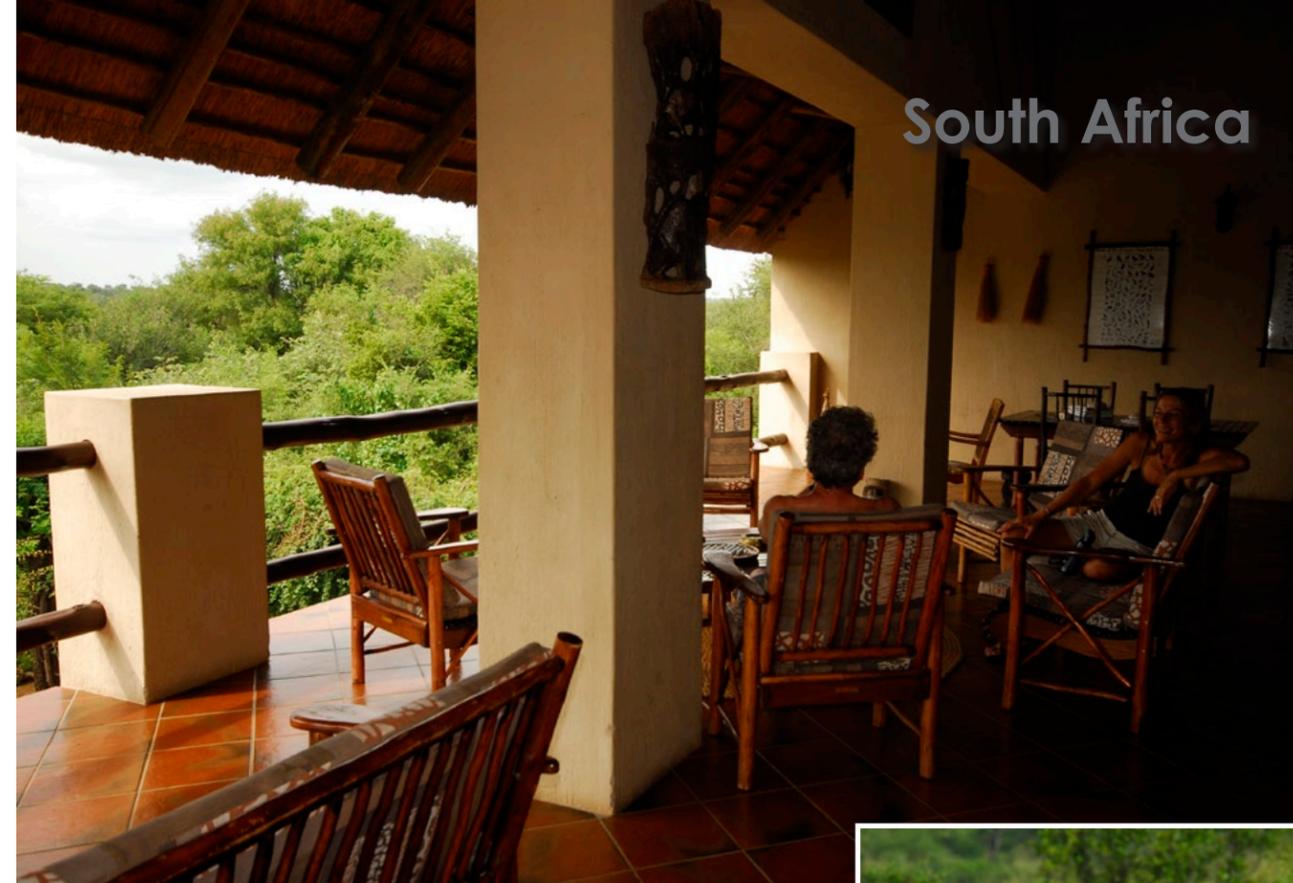
Twenty years ago, the border was tense and heavily fortified, as waves of Mozambican refugees, desperate to escape the violence in their home-

land, took tremendous risks to escape. If they managed to negotiate the heavily mined no-mans land encircled with barbed wire, there was a contingent of South African troops waiting on the other side. Beyond that lay the Kruger National Park where many succumbed

to marauding lions and leopards.

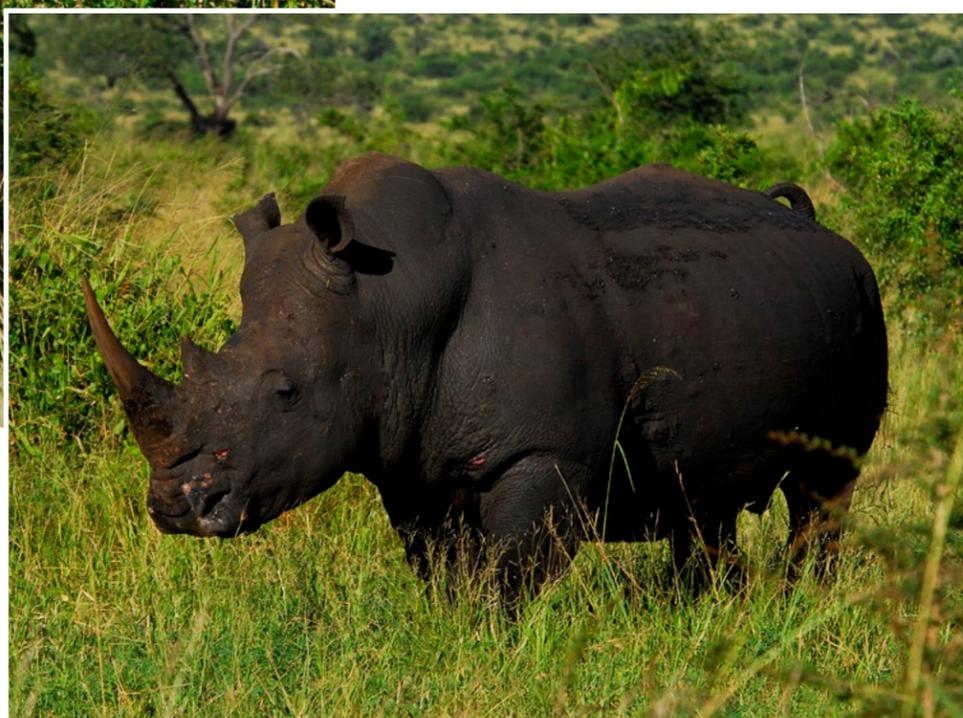
Today, that scenario is but a distant memory, replaced by scenes of vehicular chaos. Bruno recounted one instance where it was backed up 17km, resulting in an excruciating seven-hour wait. Arriving at 8:00PM on a Friday evening,





wife, Annette, the lodge overlooks the Kruger National Park and a 35-min drive from the Crocodile Bridge gate. Small and intimate with only five rooms, I felt like I was visiting friends for the weekend. For my first night, I was the sole guest. The

CLOCKWISE FROM FAR LEFT: Elephant; Cooking up breakfast in the bush; Bushwise Lounge view; Zebra in the tall grass; Brai—South African style barbeque; Endangered white rhino can be found in Kurger National Park



resort's game driver Werner joined me for dinner and we ate at the outside dining table. The main course was a traditional South African dish called Potjie. Translated as 'pot' in Afrikaans, it was a delicious lamb stew cooked in a huge earthenware pot. Washed down with an ice-cold Castle beer, it was just the ticket after a long day of travel. Even in my comfortable room, the African bush was never far away. Returning after dinner, I nearly squished a sizeable locust perched astride my bathroom door.

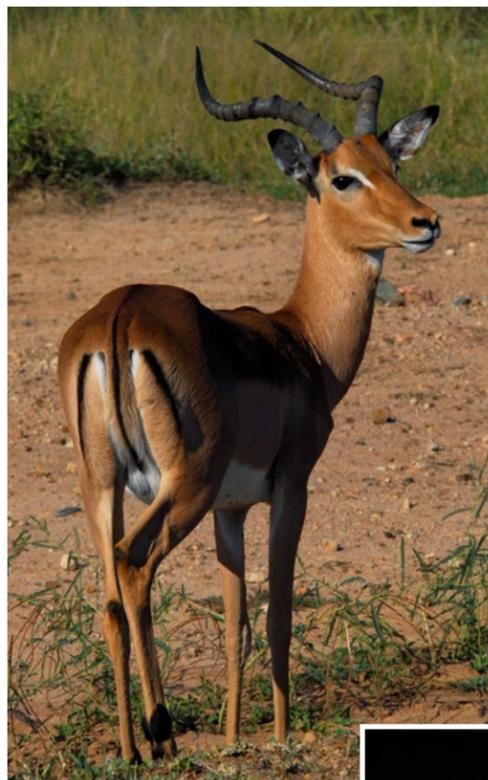
elephant, lion, leopard, rhino and buffalo—which received this title by being the five most dangerous species to hunt. For my first day in the park, I would be spoiled rotten, as I would have would have the safari vehicle all to myself. Photo bliss!

Established in 1898, Kruger is the flagship of South Africa's park system, covering two million hectares and home to an impressive array of species including 34 amphibians, 114 reptiles, 507 birds and 147 mammals. Among the latter are The Big Five—

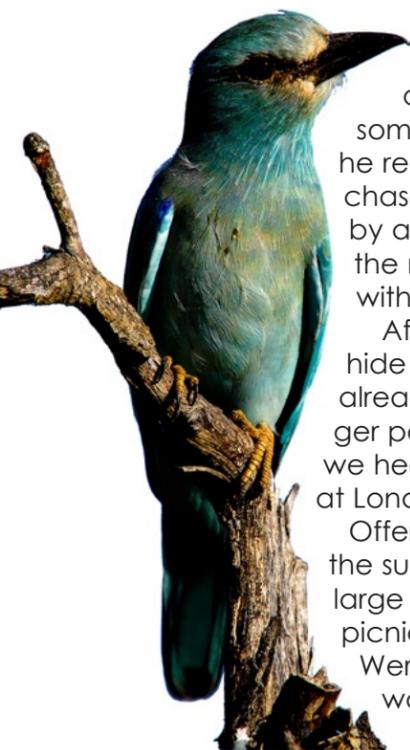
The wildlife parade commenced immediately; we spotted four white rhinos within the first 15 minutes. We soon added zebra, giraffe, impala, wildebeest and elephant to a rapidly expanding wildlife tally. Approaching one substantial tusker

we were in luck. Mozambiquan workers returning home for the weekend had yet to arrive, and we sailed through customs in 20 minutes flat.

My home for the next three nights was Bushwise Lodge, situated in Marloth Park, less than an hour's drive from the border. Run by transplanted Zimbabwean, Tim Van Coller, and his Afrikaans



CLOCKWISE FROM LEFT: Giraffe; Impala; Buffalo crossing a dirt road; Roaming blue wildebeest; Resting lion; European roller



beside the road, I asked Werner if he could shut off the engine while I took some shots. Politely refusing, he recounted the time he was chased backwards in a VW van by a charging elephant. From the moment on, I could live with the idling motor.

After stopping at a riverside hide to observe hippos, it was already mid-morning. With hunger pangs became persistent, we headed for the picnic area at Londolozi Dam for breakfast.

Offering expansive views over the surrounding countryside, a large covered pavilion housed picnic tables and barbecues.

Werner immediately got to work, whipping up a deli-

icious bush breakfast of bacon and eggs with all the trimmings. With the copious amounts of meat on display, I could already sense that South Africa was a dangerous place for vegetarians.

The remainder of the day was enthralling, with an impressive array of wildlife on display. An elephant carcass was mobbed by vultures and marabou storks as others waited their turn in nearby treetops. Despite a serious problem with poaching, white rhinos were especially abundant, counting 18 by day's end. A perfect day was capped by a dip in the lodge's infinity pool with a glass of Amarula liqueur in hand.

The next day's activities included a pair of totally different experiences—an early morning bushwalk and a sun-

set drive. For the former, an ungodly wake-up call of 3:30AM added a whole new dimension to the term 'bleary-eyed'. Stumbling out of bed, a jolt of coffee did little to rouse my stupor. Joining me for the walk was a Dutch couple who had arrived the previous evening.

Bushwalk

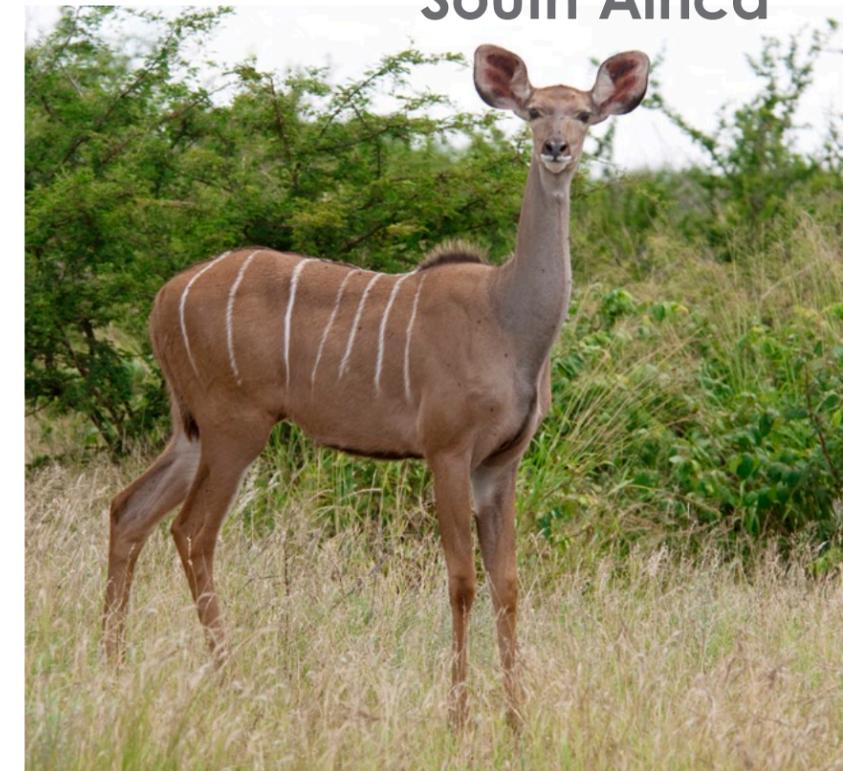
Arriving at the park office, a change of vehicles and guide was necessary, as protocol dictates park staff and vehicles must be utilized for both early morning and sunset excursions. Bidding Werner adieu, we met our guide Dingaan and his driver. Boasting an imposing six-foot frame with shaven head and broad grin, Dingaan soon

proved to be a treasure trove of information.

By 5:00AM, we were inside the park enroute to our embarkation point. I soon spotted what appeared to be a large tawny bag obstructing the road ahead. Only after stopping did I realize that the "bag" was an adolescent male lion! Despite being immature, the cat looked enormous at such close range. Although I had been assured

that animals don't recognize human shapes within a vehicle, for one brief moment the cat's striking golden eyes bore directly into mine. I couldn't help but wonder if he was regarding us as meals on wheels.

Arriving at the embarkation point, we were treated to a solemn briefing. With wildlife afoot that could perceive us as a buffet lunch, this would be no simple walk in the park. "When we



CLOCKWISE FROM FAR LEFT: Family of banded mongoose; Vultures; Female kudu; Red-necked francolin; Kingfisher; Yellow-billed hornbill; Enter-at-your-own-risk entrance sign

towards us in a comical cluster. Suddenly, one got spooked and the entire group bolted. Seconds later, they reappeared, only to repeat the entire procedure two more times.

After a day of rest at the lodge, it was back to the park for the sunset drive. As with the bushwalk, the park's guides would be leading the excursion. After a half hour of driving, we came across another safari vehicle parked off road in a clearing. Following suit, we approached the other vehicle to discover a trio of lions resting in the tall grass. It was hard to believe they were invisible from the road only metres away. Also hard to believe is what happened as we tried to back out. A loud bang announced an extremely untimely flat tire.

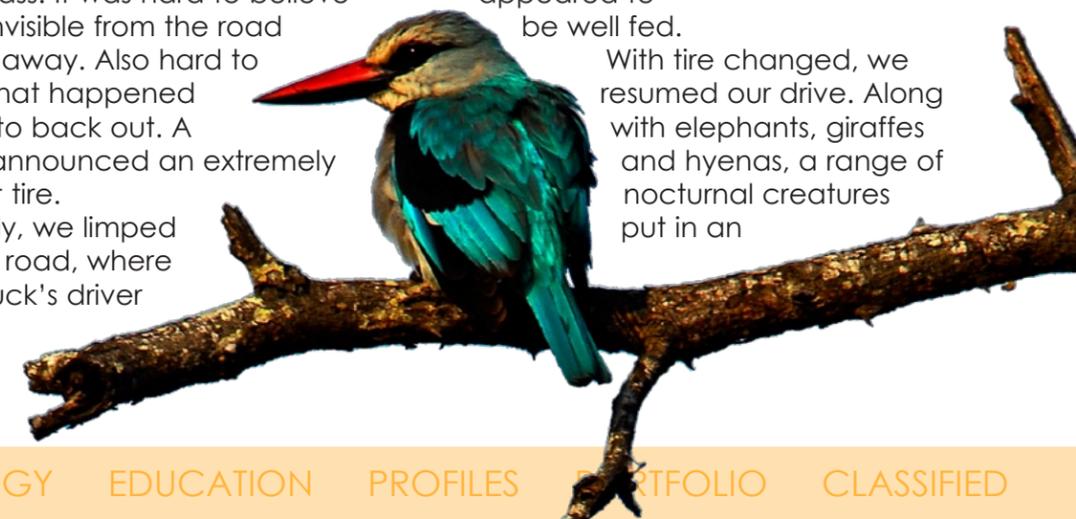
Fortunately, we limped back to the road, where the other truck's driver helped ours change the flat. Then,

to lighten the load, everyone had to get off. There was something decidedly surreal about standing on a darkened roadway with a trio of lions watching us intently. Fortunately, they



appeared to be well fed.

With tire changed, we resumed our drive. Along with elephants, giraffes and hyenas, a range of nocturnal creatures put in an



crouch, you crouch, if I tell you to stop, you stop. Most of all, no talking unless we say it is okay." With both guides brandishing rifles, we then set off on our two-hour hike.

Trudging through the waist-high grass offered a totally different perspective than from the comfort of a safari vehicle. Within minutes, apprehension turned to wonder. Here, we were on the animals' terms, with an overwhelming collage of sights, sounds and smells. Never knowing what was around the next bend added to the excitement.

Stopping frequently, Dingaana divulged

snippets of bush lore at each and every turn. He pointed out a sausage tree, whose sausage-like fruit hung down on long, ropey stems. A prized food source for animals and humans alike, we also learned to never park your car underneath one, as the 10kg fruit is capable of smashing through a windshield.

In the distance, giraffes eyed us warily while an elephant wallow had already been colonized by frogs and a turtle. Tottering on delicate feet, a trio of warthogs momentarily froze at our approach before bolting into the scrub—their tails raised comically like fluttering flagpoles.

After traversing a dry riverbed, we happened upon a rhino midden (latrine). Dung beetles seethed beneath the surface while additional dung at the periphery indicated the presence of other rhinos that had stopped by, kind of like the bush version of email.

With plenty of highlights during the

walk, two especially stood out. As a troop of baboons passed in a clearing ahead of us, a young male jumped atop the highest branch of a fallen tree, vigorously shaking it in defiance. "It's going to break," whispered Dingaana with a grin and right on cue, it snapped off, taking the hapless baboon with it.

Later, as we crouched to observe some rhinos sheltering under a grove of trees, a family of striped mongoose was perturbed to find us blocking their way. Squeaking and chirping, they skittered





South Africa

my gear, we set out for the town of Umkomaas, gateway to Aliwal Shoal. Driving on the N2 Freeway, the trip was fast, taking only 90 minutes.

Before long, we arrived at the Umkomaas Guest House, where I met up with owners Mick and Sue Clark, rambunctious Jack Russell terriers Jack and Robbie and Lulu the African grey parrot. Expats from the United Kingdom, their spacious home offered sublime views over the Indian Ocean.

For dinner, I headed to a local takeaway spot to sample a true Durban delicacy: Bunny chow. Although the name may conjure visions of a *Fatal Attraction* bunny-on-the-stove scenario, the reality is much more benign. A hollowed out loaf of bread stuffed with curry, it is a legacy of Durban's huge Indian population. In any case, it is enough to max out one's daily carb intake in one fell swoop. Tasty but messy!

Rising after sunrise the next

CLOCKWISE FROM LEFT: Elephant; Scene from Kruger National Park; Umkomaas Guest House; Bunny chow; Impala crossing

ery before stopping in Bruno's home-

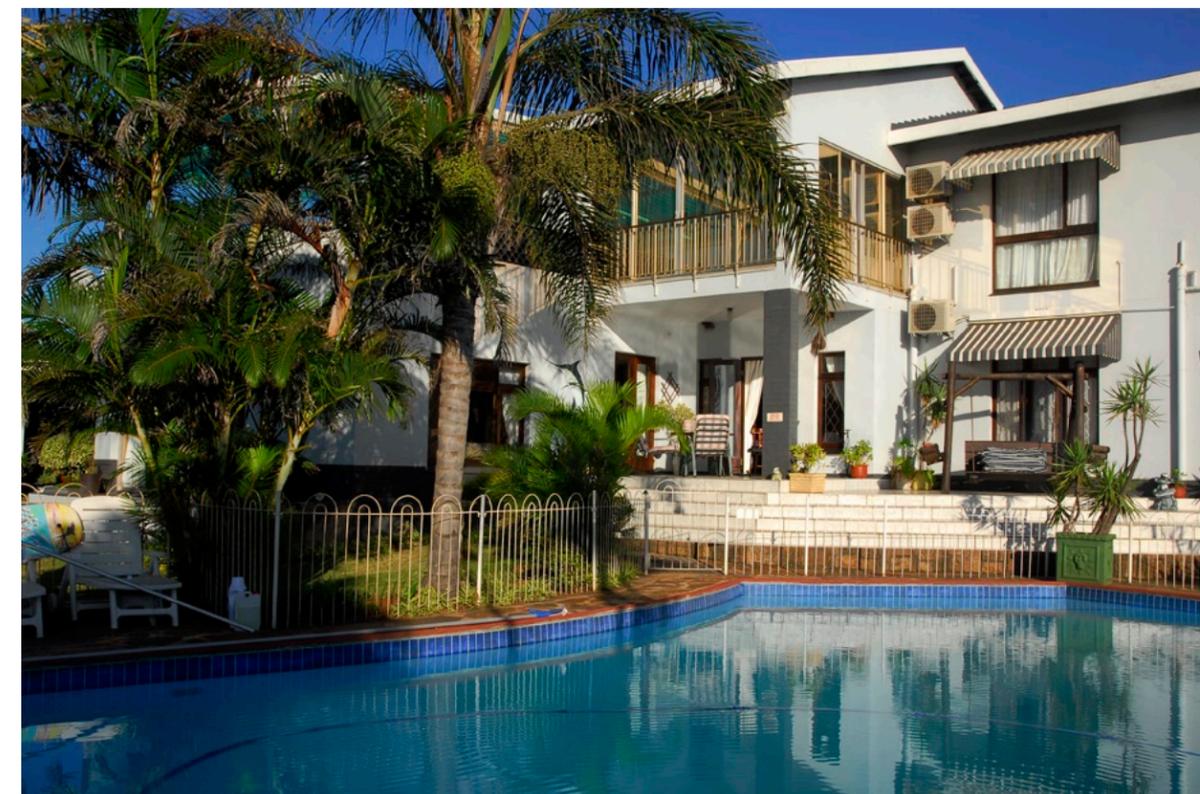
town of Nelspruit for breakfast. I decided to go whole hog (literally) for the farmer's breakfast, a meat fest of eggs, beans, bacon and Afrikaans sausage called Boerewors.

After Nelspruit, the land flattened out into endless expanses of farmland before entering the perimeter of Johannesburg's urban sprawl. Stopping for petrol, I glanced at a copy of the day's paper. Emblazoned on the front was a photo of a car that had

port, I bid Bruno farewell and headed for the domestic terminal to catch my South African Airways flight to Durban, situated on the south coast of KwaZulu-Natal province. With the dreaded spectre of excess baggage fees looming, I received a pleasant surprise at the check-in counter. After explaining I had a separate case of dive gear, they waived it though as sporting equipment with not so much as a rand in excess fees. South African Airways

rocks!

Situated 35 kilometres north of the city centre, Durban's King Shaka International Airport opened just prior to the start of the 2010 FIFA World Cup. After meeting my driver and loading



6:00AM. After having a coffee with Tim on the verandah, we set off on our five-hour drive to Johannesburg. We had some very

interesting conversations regarding today's South Africa compared to the Apartheid days and of the many challenges the nation faces in the new millennium. I also learned Bruno's wife was an African American from Seattle. He had some interesting anecdotes of mistaken assumptions whenever they arrive at U.S. immigration!

Enroute, we passed by some beautiful rugged mountain scen-

erupted by an angry bull elephant. I was eternally grateful that Werner always kept the motor running. Arriving at the air-

appearance including owls, porcupines, spotted genets and even a highly venomous puff adder.

My final day of game drives was just as exciting. Although I only saw four of the big five during my stay (lion, elephant, buffalo and rhino), the wealth of species more than made up for the absentee leopard.

The following morning, Bruno was waiting to meet me at





LEFT TO RIGHT: Blue Vision Divers; Aliwal reef scenes

morning, I could see from my window that the ocean looked reasonably calm. Fingers were crossed! During breakfast, Sue informed me Mick set out at 4:00AM to do some fishing from his jet ski. By the time I was picked up at 9:00AM, he had returned with a hefty catch, which I got to sample that evening for dinner.

Aliwal Shoal

Just before 9:00, I was picked up and driven to Blue Vision Dive Centre, where I met up with Carol and her son Ferdie, who manage and own the operation. Our dive guide was Tyler, an affable guy in his early twenties with wavy blonde hair who then gave our group of four divers a briefing about the area.

A fossilized sand dune, Aliwal Shoal was created approximately 80,000 years ago by a combination of ice age flooding and a shift in the continental plates. It received its name in 1849, when a ship named the *Aliwal* narrowly collided with the shoal while

enroute to Durban. Surprised by its absence on any charts, the ship's captain alerted the local papers to ensure others became aware of its existence. In the ensuing years, two ships have been sunk here: the *Nebo* and the *Produce*. Due to its unique position, Aliwal fosters a diverse milieu of marine life, from tropical reef fish and turtles to pelagics, rays, dolphins, and whales.

Diving in South Africa isn't exactly for the faint of heart. Sharks aside, just getting out to the dive sites provides a major adrenaline rush. As in Mozambique, transport to the dive sites was via rubber-duck, an inflatable boat brandishing a pair of powerful outboard engines.

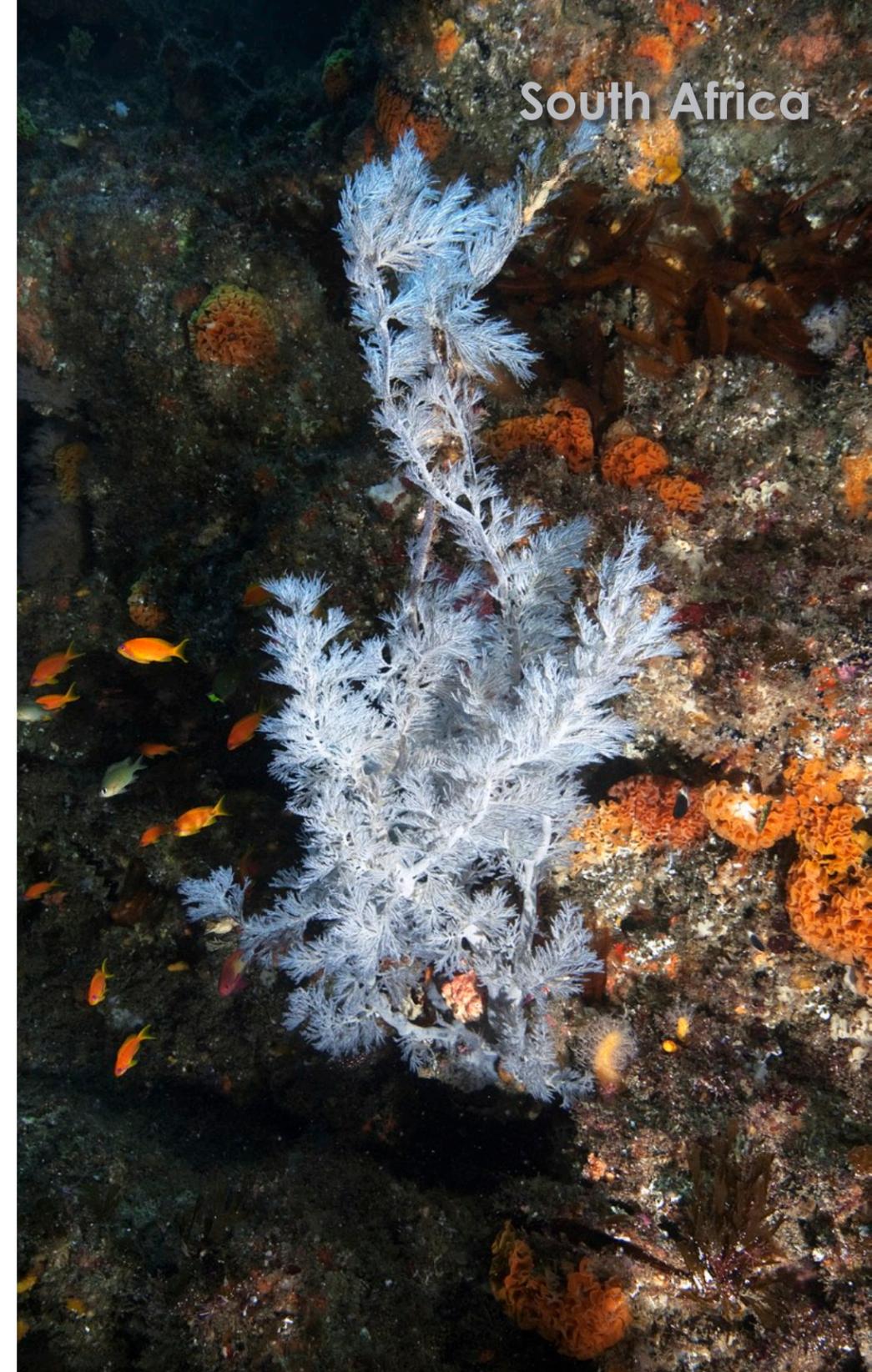
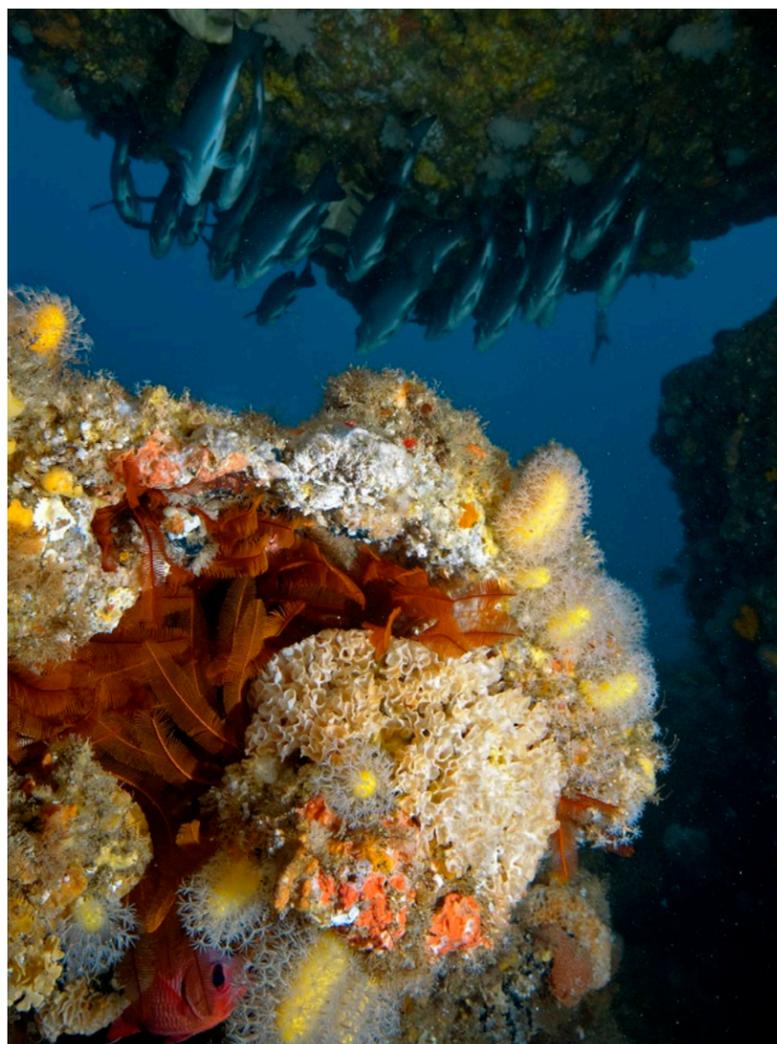
Able to take a beating in rough conditions, the durable 'duck' is the mainstay of the South African diving scene. Having gotten used to entry and beaching procedures in Mozambique, I figured there wouldn't be any surprises. Famous last words...

By briefing's end, all of our gear

had been placed in the duck perched atop a trailer hitched to a truck. Our group of four then hopped in the back of the truck for the short drive to the entry point. After stopping at the Marine Park office for the obligatory paperwork, we continued on beneath the railway viaduct spanning the mouth of the Mkhomazi River. A large number

of whales once used the estuary as a nursery, with the Zulus naming the river uMkhomazi, meaning the place of cow whales.

Stopping on a wide bank of exposed sand, we hopped off the truck while Tyler and the driver got everything prepared. Fortunately, we didn't have to wade too far



South Africa



Beaching Duck

into the water, as the ominous dorsal fins of bull sharks could be patrolling the middle of the river.

Before my arrival, I heard horror stories about Aliwal's launching conditions, which are reputed to be among the most treacher-

ous in all of South Africa. Visions of my camera or myself being hurled into rough seas had left me a tad anxious. Fortunately, Umkomaas is also home to some highly experienced skippers, and Tyler was no exception.



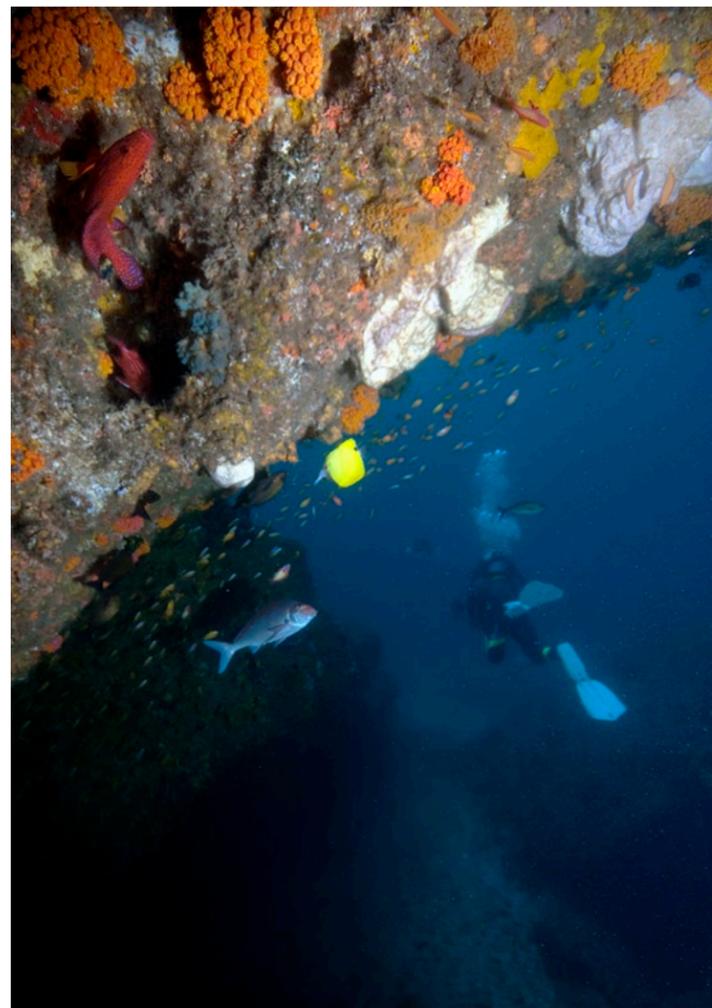


Easing the trailer to the waterline, the duck slid effortlessly into the river. Clambering aboard proved trouble-free, with no crashing surf to contend with. Unfortunately, *that* part was soon to follow. After passing beneath the railway viaduct into the estuary, the waves grew ominous with a profusion of whitecaps.

Tyler casually remarked that conditions didn't look that bad. The day before my arrival, exceptionally rough conditions flipped

over a boat from one of the other dive shops, injuring one of the passengers. That particular tidbit I could have done without.

Looking for an opening, Tyler made several attempts to get through. Finally, a break appeared and opening the outboards to full throttle, we roared ahead. Tightly grasping the side ropes with feet secured in the foot straps, I braced myself for a very bumpy ride. Fortunately, Tyler handled it with aplomb



THIS PAGE: Reef scenes from Cathedral
BELOW: Ragged-tooth shark

Cathedral. Our first site was Cathedral, a large cavern with a floor at 28m. During the winter months between June and August, it plays host to a large congregation of ragged tooth sharks during their breeding season. At that time up to 200 'raggies' can be observed here when colder water pushes up from the Agulhas Bank.

While the sharks were absent, there was plenty of life on view. We arrived to surprise a large blotched fantail ray resting on the cavern's sandy bottom.

flitted amongst rocky overhangs. With the temperature a chilly 21 degrees at the bottom, I was almost underdressed in my 3mm suit.

North Sands. Every underwater photographer has experienced at least one 'missed moment', that dreaded occurrence when the camera gods conspire to ruin that once-in-a-lifetime photo opportunity. Mine happened during our second dive at North Sands.

The dive certainly started promisingly. Plunging into clear, warm water with

20m+ visibility, we descended to an expanse of

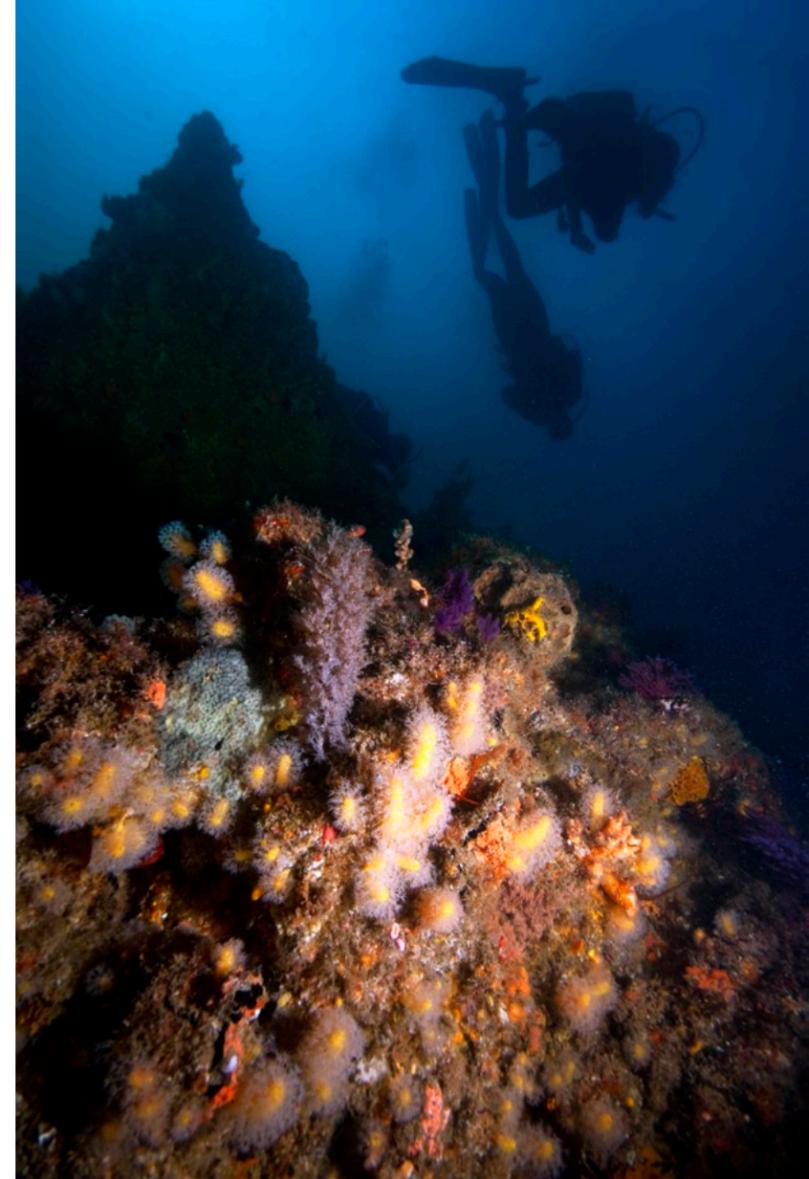
white sand hemmed in by rocky outcrops. Rummaging through the sand, Tyler produced a couple of ragged tooth shark teeth, which upon closer scrutiny, turned out to be everywhere.

With a slight current running, we then drifted across an undulating seascape buzzing with reef fish. Descending to 19m, a large overhang concealed a profusion of copper sweepers and squirrelfish. Stopping for a photo, my weight belt unexpectedly started to slide off. Placing my housing on the seabed, I re-adjusted



and after one good jolt, we were through and on our way to Aliwal Shoal.

A profusion of soft corals shrouded the walls as swarms of squirrelfish and anthias, locally called 'goldies',



my belt. Once secure, I retrieved my camera and finned after the others.

Descending further, the action increased exponentially. A massive marble ray cruised past reef followed by a hawksbill turtle. Moment's later, some frantic tank banging by Tyler heralded the arrival of something remarkable—a pod of bottlenose dolphins. Photographing furiously, the curious cetaceans passed within a few metres before veering off into the blue. Ecstatic at my good fortune, I checked my camera's viewfinder to ensure I nabbed the images. Success! If that wasn't enough, a school of barracudas arrived on the scene buzzed by a trio of oceanic blacktip sharks. Thank goodness for the nitrox.

Back at the dive shop, however,



my elation quickly turned to heartbreak. Nearly all of my photos were out of focus! It seems that when I put my housing down to re-adjust my weightbelt, the autofocus lever accidentally got bumped to manual, rendering all the subsequent images out of focus. To add insult to injury, a shifting tank had shattered my mask during the return trip. This clearly wasn't my day. Photo and gear mishaps aside, nothing could detract from a superlative pair of dives.

Down but not out, I eagerly anticipated the next day's dives. Now secure with Tyler's exemplary boating skills, our entry passed without a glitch, and we were on our way back to Aliwal Shoal. A return

previous day's outing. A hefty potato bass made an appearance along with a Zambezi (bull shark) and a whitetip.

Castle. As good as Cathedral was, our second dive at Castle was exceptional. Soft corals, barrel sponges and kelp enveloped the terrain along with a delirious array of reef fish. Tyler then drew my attention to a large, squat archway. Peering inside, I could discern a shark circling about. Suddenly, my eyes widened: it was a raggy!

Boasting protruding, needle-like teeth, the sinister grin belies a relaxed demeanor. After a few more circuits, the raggy exited, practically colliding with me in the

visit to The Cathedral proved to be much more photographically productive than the

process. It didn't even react when I accidentally kicked it with my fin. After taking some more shots, I turned to discover the raggy's toothy grin mere inches from my face. Fortunately, he merely wanted to retreat to his protective overhang. The raggy, however, turned out to be but a prelude to the afternoon's main event—the tiger shark dive.

Shark diving etiquette

Beforehand, Tyler gave us a comprehensive briefing. When it comes to shark dives, there definitely are a lot of *don'ts* involved. For starters, it was imperative to remain behind the dive guide and maintain buoyancy at all times. Moving up and down in the water column would attract unwanted attention, as would the motion of flipping one's hand back and forth, an action a shark could interpret

as a fish in distress. I was beginning to wonder if this was a good idea....

To attract the sharks, a discarded washing machine drum was loaded with a pungent brew of chopped up sardines and fish oil. Within moments of hurtling it overboard, a half dozen oceanic blacktip sharks crowded the surface. It was bizarre to think I would be doing a backward roll right into their midst. Soon the moment of truth arrived, and we all entered the water.

More than 30 sharks,



South Africa

LEFT TO RIGHT: Razorfish; Underwater photographer and swarm of blacktip sharks; Blacktip shark

all of them blacktips, instantly enveloped us. Despite the encircling melee, my apprehension vanished instantly. In fact, my first thought was, "Cool!"

Not one shark displayed an iota of aggressive behaviour; they were far more intrigued by the scent emanating from the bait drum. On a few occasions, I was even bumped, as they tried to avoid one another. With so many sharks bombarding us from all directions, photographing them proved to be a real challenge.

Thirty minutes into the dive, a dim silhouette materialized from the





CLOCKWISE FROM ABOVE: Nolangeni Lodge; Beached Duck; View of Shelly Beach at St. Michael's

Protea Banks

After collecting my gear and thanking my generous hosts, I headed back to the guesthouse to pack. My next destination was St. Michael's, an hour drive down the coast and gateway to Protea Banks. Unlike quieter Umkomaas, St. Michael's on Shelly Beach was a major holiday destination, with scores of hotels and guesthouses fringing the coastline.

gloom. The distinctive striped body was unmistakable. A tiger shark! Despite its bad boy reputation, it proved surprisingly timid, sticking to the periphery away from the frenzy of blacktips. Eventually, it came straight up to the drum and attempted to take a bite out of it. Even after an hour underwater, I didn't want it to end.

My accommodation, Nolangeni Lodge, was situated on a secluded, leafy street away from the beach's bustle. Run by Bev and her German husband, Herbert, their immaculate home commanded a prime location on a hilltop surrounded by tropical gardens. My tastefully appointed room, complete with sea-facing terrace commanded a beautiful view towards the ocean. Being

without my own vehicle was a bit problematic, so Bev ordered me a chicken Tikka pizza from a nearby restaurant called Debonair's. After dinner, I posted a few images from the on my Facebook page. "You're insane" was the general consensus.

At 6:30AM the next morning, I was picked up by Beulah Mauz, co-owner of African Dive Adventures. We soon arrived at Shelly Beach named after the millions of tiny shells that make up its beautiful expansive sweep. Waiting for us was Beulah's husband, Roland, an easygoing German with an infectious sense of humour. African Dive Adventures soon proved to be decidedly different dive operation.

In fact, they don't even have a shop. For the past decade, they have permanently rented a storeroom and compressor from the Shelly Beach Fishing Club. For the comfort of guests, some permanent thatched umbrellas have been erected right on the beach.

Situated some 8km offshore, Protea Banks' reef system is consistently rated as one of the world's best shark dives. With depths ranging up to 40m, we would be diving nitrox to maximize our bottom time. As safety is

paramount, Roland paid a visit to the harbourmaster's residence to give them everyone's name before we set out.

In marked contrast to Umkomaas' placid river entry, we set out right into the crashing surf. Once the duck was in the water, everyone then scrambled to turn it around. With only a few of us on the first dive, it was a challenge to rotate the craft in the rough conditions.

South Pinnacles. Our first dive would be at South Pinnacles, which is famed for its Zambezi sharks. During the dive brief, we were told we might run into a big potato bass roughly 2m in length. Name: Billy Bob Steinberg!

Descending through a strong surface current, we headed for the reef top at 32m. With his surface towline

acting like a sail, Kyle was propelled forward and the group had a struggle to keep up. Protea's undersea terrain proved different than Aliwal, with little in the way of soft corals. With his surface towline acting like a sail, Kyle was propelled forward and the group had a struggle to keep up.

Filtering nutrients from the strong currents, yellow barrel sponges peppered the sea floor as legions of blue triggerfish foraged the vicinity. The sponges, however, weren't the attraction—South Pinnacles immediately proved to be a mecca for all things big.

The current took us past an expansive sandy patch called Sand Shark Gully. Positioned at 40m, it is a favourite haunt of giant guitar sharks. A trio of spotted eagle rays glided



Two-meter-long potato bass named Billy Bob Steinberg



South Africa

examined the drum.

Later on, a second tiger appeared and came fairly close. It was also seriously big shark, measuring nearly 4m. Unfazed by our presence, its languid movement was sheer elegance. Approaching the drum, it gave one of the blacktips a deliberate bump to show it who was boss.

Seventy-seven minutes later, my tank was empty and memory card full. I

minutes.

Back on the duck, I just had to ask Roland about the grouper's unusual moniker. Originally nicknamed 'Billy Bob' by Kyle, the last name was added when Roland saw a news item on CNN featuring someone called Billy Bob Steinberg. Right away, their bass had a name!

Next up was the shark dive, with Zambezis the star attractions. As at Aliwal, a discarded washing machine drum was packed with chopped sardines and fish oil. Attached to a float, the contraption was heaved overboard along with copious amounts of fish oil and additional fishy bits. Kyle remained topside while Roland took control of the guiding duties.

Alas, only three sharks made an appearance—a pair of blacktips and a dusky. After 13 minutes, we called it quits to try a new location. With a total dive time of 13 minutes, there was plenty of air in my tank for round two.

Moving on to a new spot, Roland manned the boat while Kyle took to the water. At 23 degrees, it was nippy but instantly more productive. Along with the ubiquitous blacktips, a tiger shark showed up right at the start, only to vanish into the depths. In no time, a surfeit of oceanic blacktips arrived. Four Zambezi's made an appearance, but kept to the background as the smaller sharks

was also thoroughly chilled, a sensation not exactly synonymous with Africa. The day's diving was truly incredible, having spotted over 50 sharks of six different species!

For dinner, I walked down to a nearby German restaurant called Munchner Haus. After a week in South Africa, I finally had my chance to sample some wild game. In fact, with

WRECKS

Aliwal Shoal is also home to a pair of wrecks that can be explored by experienced divers. A 2000-ton wooden steamer, the *Nebo*, sank on her maiden voyage from Sunderland to Durban on 20 May 1884. It is theorized that the ship was incorrectly loaded and floundered in heavy seas. Positioned between depths of 19-25m, the stern remains reasonably intact, although the bow and midships are quite broken up. The propeller was damaged in the grounding, and the blade can still be observed in the Pinnacles area of the Shoal. The stern harbours a large assortment of fish and features a swim-through beneath the propeller. The boilers are still visible in the midships area as is the cargo of railway girders. A large debris field can be observed on the port side, with the cargo of railway line material making for a surreal sight on the sea floor.

A much more recent wreck is the *Produce*, situated between depths of 20-32m. A molasses carrier, it struck the northern part of Aliwal Shoal on 11 August 1974, breaking apart in three sections. They are the aft section, which is tilted onto one side, the broken up centre section and the front section. Today, the vessel is a refuge for a profusion of reef fish as well as a resident brindle bass, a massive grouper reaching three metres in length and tipping the scales at more than 500kg. Manta rays and game fish surround the wreck along with plenty of scorpionfish, lionfish and legions of goldies. ■



past along with several blotched fantail rays. A great hammerhead came by for a look and deeper down, we could discern a school of 15 scalloped hammerheads.

Halfway into the dive, Billy Bob showed up for an up close and personal encounter. Easily mea-

suring 2m in length, he definitely didn't have any shyness issues, coming right up to me for a look. Slowing in the current was a challenge, but I managed to fire off a few photos before heading off to catch up with the group. Include nine Zambezi sharks, and it all added up to a spellbinding 44

LEFT TO RIGHT: Diver and blacktip shark; Blacktip shark; Harbourmaster's house



CLOCKWISE FROM LEFT: Kyle prepares chum for shark dive; Zambezi or bull shark; Tiger shark; Zambezi with remora; Tiger shark mug shot

few exceptions, all game in the country is branded “venison”. The special for the day was kudu medallions in a mushroom and fresh green peppercorn sauce. Dessert was a white chocolate mousse with Amarula liqueur and fresh fruit. Sheer decadence!

The next day’s itinerary mirrored the first; a morning dive at South Pinnacles followed by a shark dive in the afternoon. Both yielded a few more surprises. At South Pinnacles, we were having our safety stop when Kyle gestured wildly to the blue. Just at the edge of vision was

a wall of dusky sharks accompanied by a few scalloped hammerheads. Back at the surface, Kyle said he counted at least 50.

Going into my final shark dive, I was a bit apprehensive. Despite the plethora of sharks, I had yet to photograph a Zambezi, and time was running out. During the ensuing hour, scores of blacktips and dusky approached, but no Zambezis. With air supply dwindling, I photographed every shark that passed within close range

“What an amazing dive”, enthused Kyle as we broke the surface. “Yes it was”, I replied. “It’s too bad there were no Zambezis.” Kyle looked at me incredulously. “What do you mean, there was a great big one right in front of you!” To put it mildly, I was stunned.

Back on shore, I excitedly

reviewed my images. As I scanned the last few images, a few sharks stood out in marked contrast from the blacktips. The massive, blunt heads were unmistakable—I got my Zambezis!

Before I knew it, my ten-day visit had drawn to a close. During my all-too-brief stay, I had encountered more sharks than I have in nearly 20 years of diving combined. Add an incredible array of sea life to the mix and South Africa adds up to a destination like no other. Next time, I might even look for some nudibranchs! ■

fact file

South Africa



SOURCES: US CIA WORLD FACT BOOK, SCUBADOC.COM

History In 1652, Dutch traders landed at the southern tip of modern day South Africa and founding the city of Cape Town, establishing a resupply station on the spice route between the Netherlands and the East. In 1806, many Dutch settlers (the Boers) travelled north to establish their own republics after the British seized the area of the Cape of Good Hope. In 1867 and 1886, the discovery of diamonds and gold encouraged wealth and immigration. This intensified the subjugation of the indigenous population. The years 1899-1902 saw the British defeat the Boers resistance during the Boer War; but, the British and the Afrikaners, as the Boers became known, governed together under the Union of South Africa. The National Party was voted into power in 1948 and instituted a policy of apartheid—the separate development of the races.

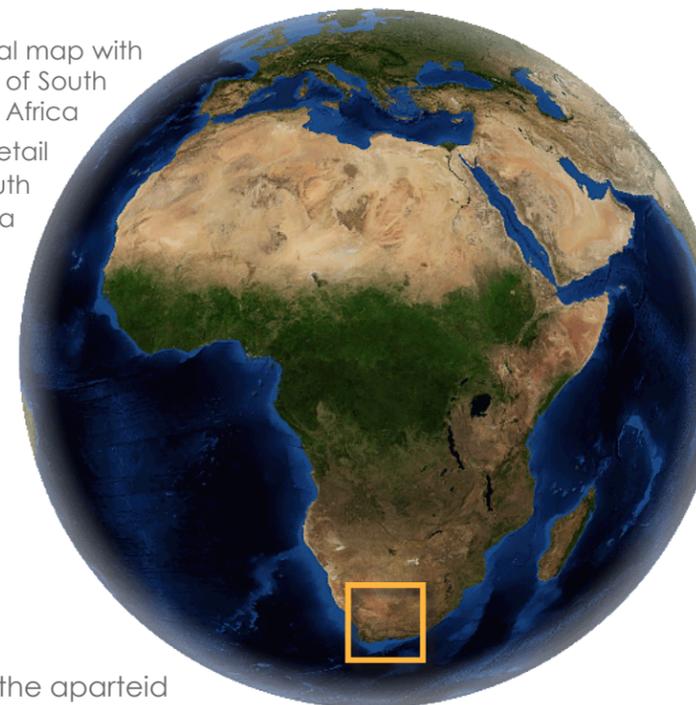
In 1994, the first multi-racial elections saw the end of apartheid and brought in black majority rule. Recent ANC infighting came to a head in September 2008 when President Thabo Mbeki resigned and was succeeded by party General-Secretary Kgalema Motlanthe as interim president. Jacob Zuma became president after the ANC won general elections in April 2009. In January 2011, South Africa assumed a nonpermanent seat on the U.N. Security Council for the 2011-12 term. Government: republic. Capital: Pretoria

Geography Southern Africa, is located at the southern tip of the continent of Africa. The country of Lesotho is completely surrounded by South Africa, which also almost completely surrounds Swaziland. Coastline: 2,798 km. Terrain: vast interior plateau surrounded by rugged hills and a thin coastal plain. Lowest point: Atlantic Ocean 0 m. Highest point: Njesuthi 3,408 m. Natural hazards: extended droughts. Environmental issues: extensive water conservation and control measures are

required due to the lack of important arterial rivers or lakes; water usage increases outpace supply; agricultural runoff and urban discharge cause pollution of rivers; acid rain due to air pollution; soil erosion; desertification. South Africa is party to: Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Seals, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Wetlands, Whaling.

Economy A middle-income, emerging market with a large supply of natural resources, South Africa has well-developed financial, legal, communications, energy, and transport sectors. Its stock exchange is the 17th largest in the world. Its modern infrastructure supports an efficient distribution of goods to major cities throughout the region. Although robust between 2004 to 2007, the economy slowed during the second half of 2007 due to an electricity crisis and the global financial crisis' impact on demand and commodity prices. The GDP fell nearly 2% in 2009, with high unemployment and outdated infrastructure constraining growth. Remnants of

RIGHT: Global map with location of South Africa
FAR RIGHT: Detail map of South Africa



the apartheid period include daunting economic problems, especially poverty, no economic empowerment among disadvantaged groups and public transportation shortages. The economic policy of the country is fiscally conservative but pragmatic. It focuses on controlling inflation, sustaining a budget surplus, and—as a means in increasing job growth and household income—employing state-owned enterprises to provide basic services to low-income areas. Natural resources: gold, chromium, antimony, coal, iron ore, manganese, nickel, phosphates, tin, uranium, gem diamonds, platinum, copper, vanadium, salt, natural gas. Agriculture: corn, wheat, sugarcane, fruits, vegetables; beef, poultry, mutton, wool, dairy products. Industries: mining (South Africa is the world's largest producer of gold, platinum, chromium), automobile assembly, metalworking, machinery, textiles, iron and steel, chemicals, fertilizer, foodstuffs, commercial ship repair.

Climate South Africa is mostly semiarid with sunny days and cool nights. There are subtropical areas

along the east coast.

Population 49,004,031 (July 2011 est.) This figure factors in the effects and mortality rate of AIDS which is ravaging the country's population. Ethnic groups: black African 79%, white 9.6%, mixed 8.9%, Indian/Asian 2.5% (2001 census). Religions Zion Christian 11.1%, Pentecostal/Charismatic 8.2%, Catholic 7.1%, Methodist 6.8%, Dutch Reformed 6.7%, Anglican 3.8%, Muslim 1.5%, other Christian 36% (2001 census), Internet users: 4.42 million (2009)

Currency Rand (ZAR). Exchange rates: 1EUR=10.36ZAR, 1USD=8.11ZAR, 1GBP=12.55ZAR, 1AUD=8.37ZAR, SGD=6.29ZAR

Language IsiZulu 23.8%, IsiXhosa 17.6%, Afrikaans 13.3%, Sepedi 9.4%, English 8.2%, Setswana 8.2%, Sesotho 7.9%, Xitsonga 4.4%, other languages: 7.2% (2001 census).

Health There is an intermediate degree of risk for food or waterborne diseases such as bacterial diarrhea, hepatitis A, and typhoid

fever. Vectorborne diseases include Crimean Congo hemorrhagic fever and malaria. Water contact diseases include schistosomiasis (2008).

Decompression Chambers

CAPE TOWN: National Hyperbarics Klienmont Hospital, Cape Town 24-Hour Hotline: Tel. 021-671-8655

DURBAN: St. Augustine's Hyperbaric Medicine Centre Hyperbaric and Woundcare Unit St. Augustine's Hospital 24-Hour Hotline: Tel. 031-268-5000 www.sahmc.co.za

JOHANNESBURG: The Hyperbaric Treatment Centre cc, East rand of Johannesburg, Tel. 011-914-2675 www.hyperbaric.co.za

Web sites
Expert-Tours
www.expert-tours.de
South Africa Tourism
www.southafrica.net



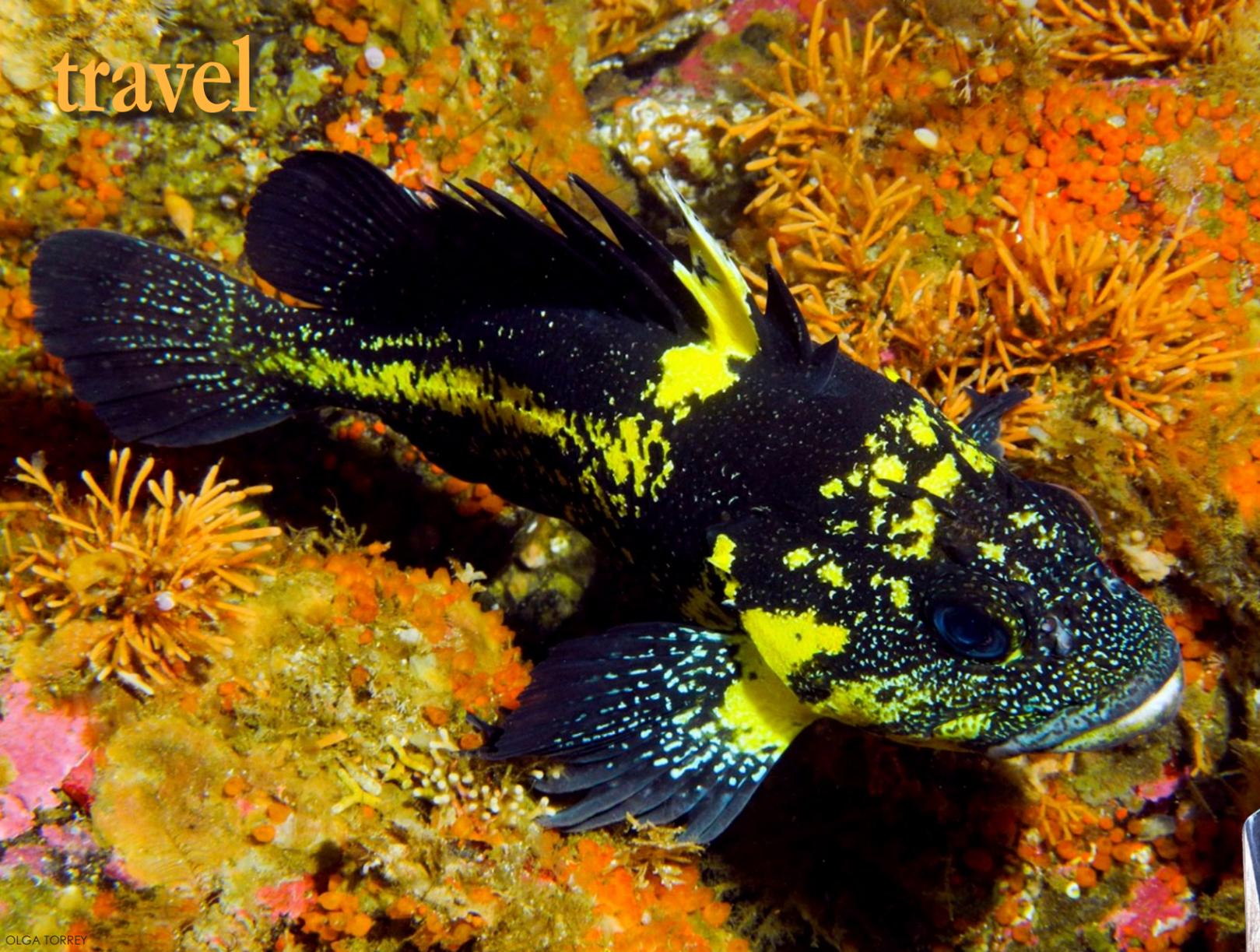
Marauding weaver finches



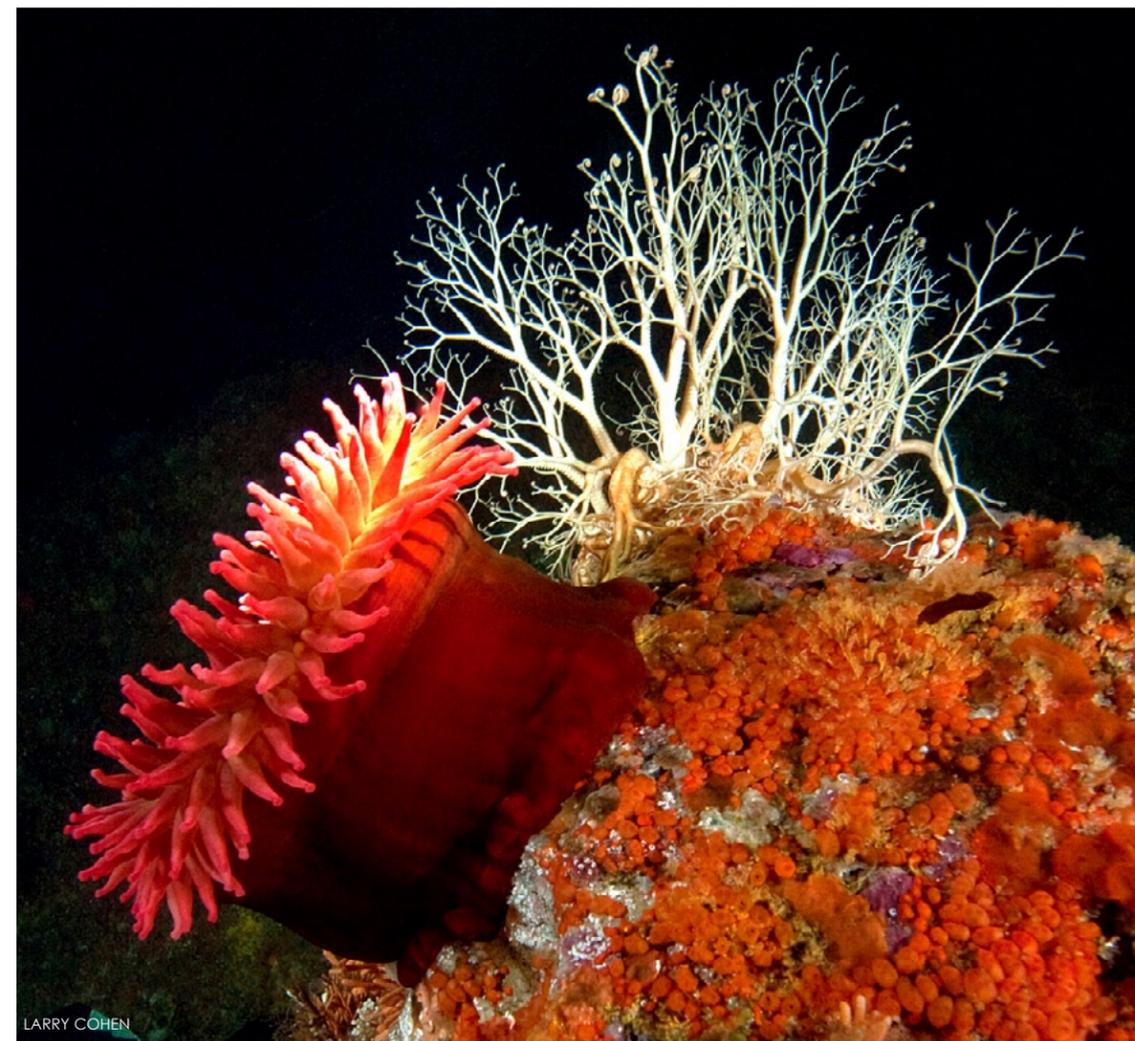
Juneau to Sitka Alaska

Text by Larry Cohen

Photos by Larry Cohen and Olga Torrey



Sitka National Historical Park, also known as Totem Park, has artwork decorated by Kiksadi Tlingit and Haida indigenous people



China rockfish at dive site near the Smudges. PREVIOUS PAGE: Magnificent view of the Mendenhall Glacier

A dive trip to the U.S. State of Alaska is a true adventure, both above and below the surface. The rich green waters of the Pacific Northwest are full of life and photographic opportunities. The liveaboard dive boat, *Nautilus Swell*, is a great way to experience Southeast Alaska. This 100-year-old refurbished tugboat is the perfect platform for cold-water exploration. The crew is well versed in dive procedures in this environment. The itinerary began with boarding the boat in Juneau, followed by a week of diving, and departing finally from Sitka.

Before embarking on the *Nautilus Swell*, there was a chance to spend a few days in Juneau. This town started as a gold-mining camp in 1880. When Alaska became the 49th state of the United States in 1959, Juneau became the capital.

One of the not-to-be missed experiences right in downtown Juneau was the Tramway up Mount Roberts. The Mount Roberts Tramway was about 3,087-feet long and rose to around 1,745 feet in elevation. On the way up, one got a view of the upper inside passage, where many cruise ships were docked. Upon reaching the top of Mount Roberts, the Timberline Bar & Grill was a nice place for dinner, before exploring some of the well-marked hiking trails.

There were interpretive signs describing many of the flowers, plants, trees, birds and animals, that one might see en route. Trails started in a sub-alpine eco-

Crimson anemone and basket star on the wall (above). The *Nautilus Swell* (top)



OLGA TORREY



LARRY COHEN



LARRY COHEN

Crew on aluminum skiff, *Indie*, checks out next dive site system. Within another 300 feet, there was a true alpine environment.

Some of the wildlife encountered included eagles, ravens, ptarmigan, grouse, marmots, Sitka black tail deer, red squirrels, mountain goats, black bears and porcupines. Along the trails were trees with totemic carvings depicting native legends.

Mendenhall Glacier was also an amazing place to explore in Juneau. Mendenhall was formed during the Little Ice Age, which began about 3,000 years ago. The climate and geography of this area allowed the glacier to survive, while others in North America have already disappeared. Mendenhall Glacier continues to provide researchers with new insights into past, present and future climatic conditions.

The Mendenhall Glacier flows for 12 miles down the Mendenhall Valley and terminates near the visitor center. The ice flows at an average rate of two feet per day, but at the same time, it is melt-

Mendenhall Glacier viewed from TEMSCO helicopter (above); Ice flowing down to the ice fields (left)
NEXT PAGE: Roberto Chavez kayaking just before the iceberg calved

travel

Alaska





LARRY COHEN



LARRY COHEN



LARRY COHEN



OLGA TORREY

CLOCKWISE FROM TOP LEFT: TEMSCO helicopter on Mendenhall Glacier; The contrast between icebergs and mountains is breathtaking; A 27-year-old bear feeds on salmon

ing at a slightly faster rate. When the ice melts, large pieces of ice break off the face of the glacier. This is known as *calving* and creates the icebergs floating in Mendenhall Lake. When the rate of melting is higher than the rate of flow, a

glacier recedes. The Mendenhall Glacier has been receding since the late 1700s and currently retreats at a rate of 25-30 feet per year.

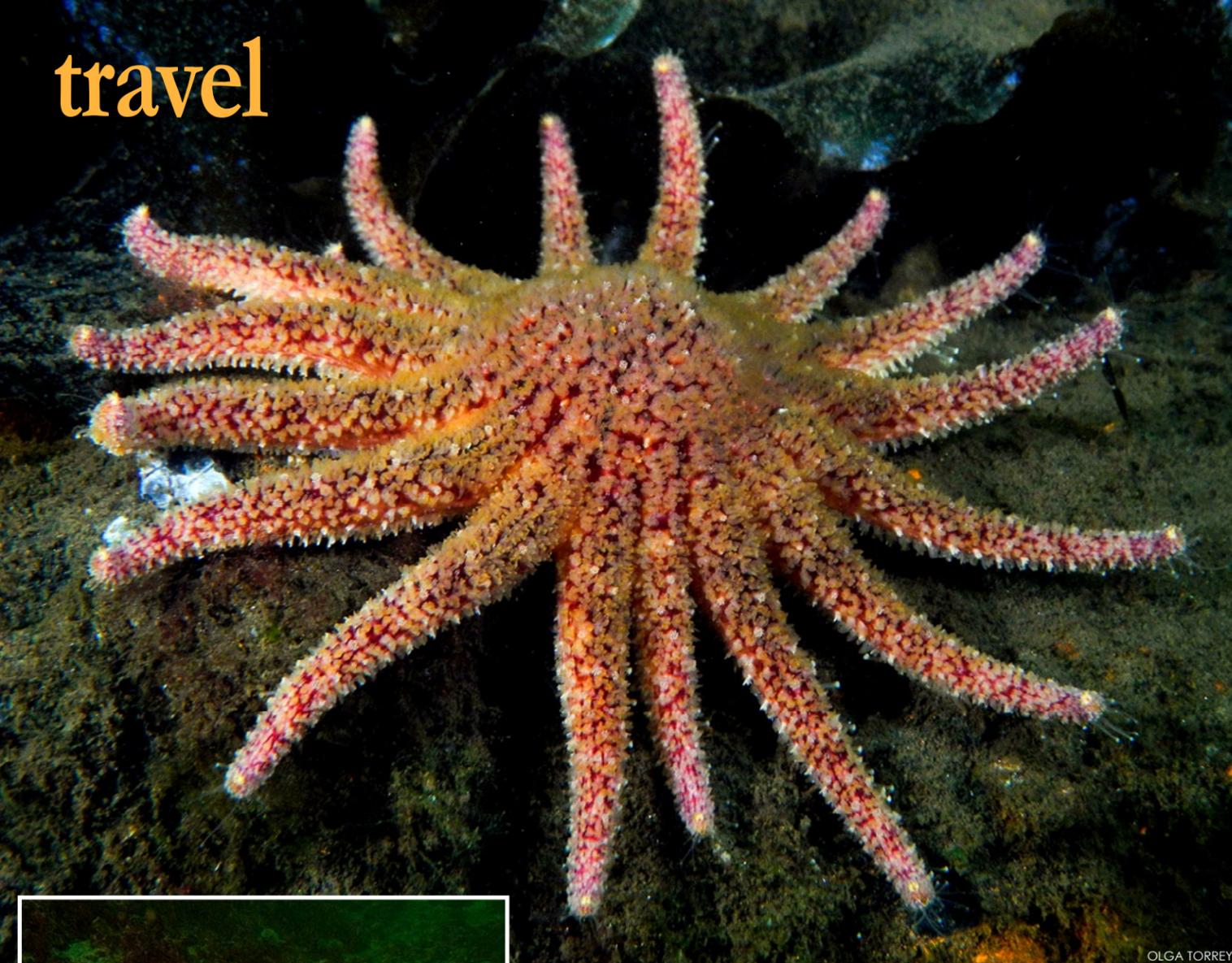
There are many hiking trails around the visitor center. Some of these short trails have viewing plat-

forms to see salmon and bears. Eagles are frequently seen in the area. Small mammals such as fox, coyote, porcupine, squirrel and snowshoe hare inhabit the valley floor. Several small herds of mountain goat can sometimes be seen

on the mountain peaks. The Trail of Time is an extremely pretty trail that is well worth visiting. Bears catching salmon in the stream can sometimes be observed.

Taking a helicopter to the top of the Mendenhall Glacier was a sce-

Icebergs floating in Mendenhall Lake



OLGA TORREY



OLGA TORREY



LARRY COHEN

Sunflower star at The Graveyard dive site

nic adventure. TEMSCO (an acronym for: Timber, Exploration, Mining, Survey, Cargo Operations) takes travellers on glacier tours. This company has been around since 1958. They used Hughes-500D choppers to get their passengers safely to the top of the glacier. Even when the weather was not very good, seeing the majestic mountain of ice was breathtaking.

After all these land-based adventures, it was time to go diving.

Diving

As the crew came to help my dive partner, Olga Torrey, and I load our dive gear, we were happy to see divemaster, Dan Dayneswood, who we knew from our *Nautilus Explorer* trip to the California Channel Islands. Also on board was chef, Enrique Aguilar, who we also knew from the *Nautilus Explorer*. So, even if the diving was



LARRY COHEN

Ling cod on the shipwreck, *State of California*; Dark dusky rockfish at dive site near the Smudges (top); Hermit crab hugging another hermit crab (right)



OLGA TORREY

Orange sea pen on Alaska reef





LARRY COHEN



LARRY COHEN

CLOCKWISE FROM FAR LEFT: Basket star at All You Can Eat Shrimp dive site; Shrimp sitting on limpet; Buffalo sculpin at All You Can Eat Shrimp dive site; Crab at The Graveyard dive site

whales breaching in the distance. We knew right then that this trip would be amazing. Most of the dive sites had walls blanketed with anemones, sea stars and other marine life.



LARRY COHEN

Sitka, we had some amazing experiences.

The *Nautilus Swell* was a beautiful old tugboat that was extremely comfortable. The rooms were a little small but well-designed with ample heat, which guests could control. All dive operations took place on the aluminum skiff named, *Indie*.

State of California wreck. Alaska also has many historic shipwrecks. We dove the wreck of the *State of California* located in Gambier Bay. This 300-foot ship sank on the 17 August 1913. She sat in 220 feet of water, but the bow came up to 85 feet. The morning we did the wreck, it was so dark, it seemed like a night dive. Still the wreck provided many photographic opportunities since it was home to so much marine life.

Many of these dive sites were only visited by the *Nautilus* crew. This was the first season for the *Nautilus Swell*, but the *Nautilus Explorer* has been taking divers to explore Alaska since 2000.

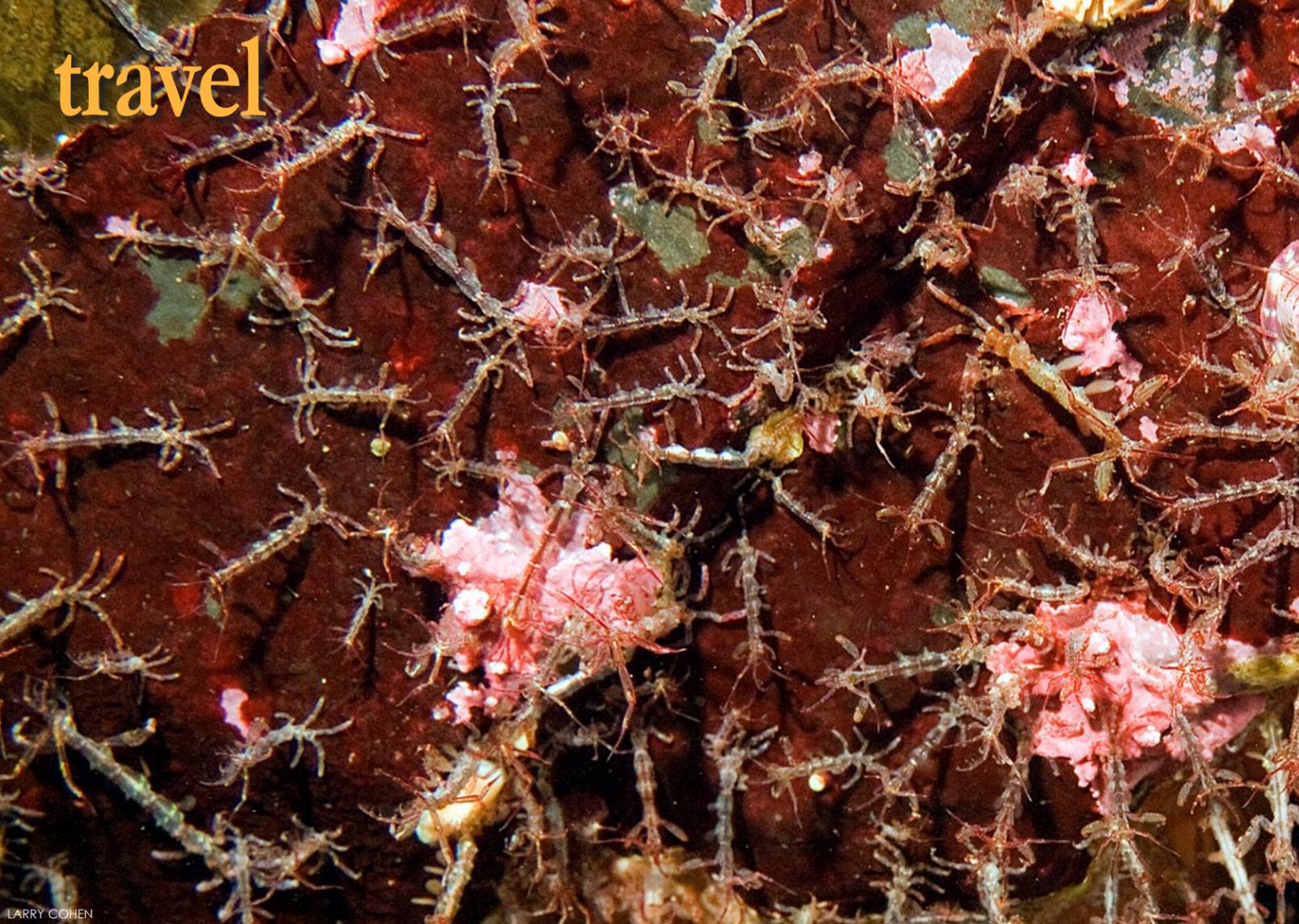
All You Can Eat Shrimp. New sites were always being explored, including All You Can Eat Shrimp, named for the thousands of tiny shrimp crawling over every inch.



OLGA TORREY

bad, we knew the food would be great! Well, in Alaska, bad diving just does not happen. As we headed south towards

As we departed Juneau, we got excited about seeing underwater Alaska. On the first morning, we saw humpback



LARRY COHEN



LARRY COHEN

If one stayed in one spot to allow the eyes to adjust to the scene, one would see a small area explode with life.

We were told that setting the cameras up with macro lenses was the only way to go. Well, while shooting some tiny sea stars, I saw some movement out of the corner of my eye. In the distance, there appeared to be a number of sea lions. They slowly got closer, and with macro lenses deployed, we now had four sea lion pups buzzing and playing with us. No images were captured, but that experience was burned into our minds' eyes.

Smudges. The jellyfish dive site called Smudges was a disappointment for us. This site was supposed to have thousands of jellyfish just like Jellyfish Lake in Palau. This was a case of *you-should-have-been-here-last-week*. We did see

and photograph a number of moon jellies but not in the numbers expected.

We then went to a nearby site filled with life including buffalo sculpins and other interesting fish. While photographing a China rockfish, my dive partner, Olga, had the unique experience of having a giant Pacific octopus come up between her legs and climb up her body. Another Alaska experience that went undocumented.

While near the Smudges, the crew got word of a pier thought to be worth exploring. Everyone on board got excited about being the first on this site. As we descended, the visibility kept getting worse. Under the pier, the bottom was dark, with thick black silt. When everyone surfaced, they declared this site to be spooky. So, it was named, The Graveyard. That being said, the site was filled with macro life. Tiny skel-



LARRY COHEN



LARRY COHEN

CLOCKWISE FROM TOP LEFT: In Alaska, even a one-inch square area is teeming with life; Mated pair of wolf eels are believed to mate for life; Orange sun star at All You Can Eat Shrimp dive site; Olga Torrey on the hunt to capture images of salmon



LARRY COHEN

Alaska

eton shrimp blanketed every inch. The site was also filled with crabs, anemones and sea stars.

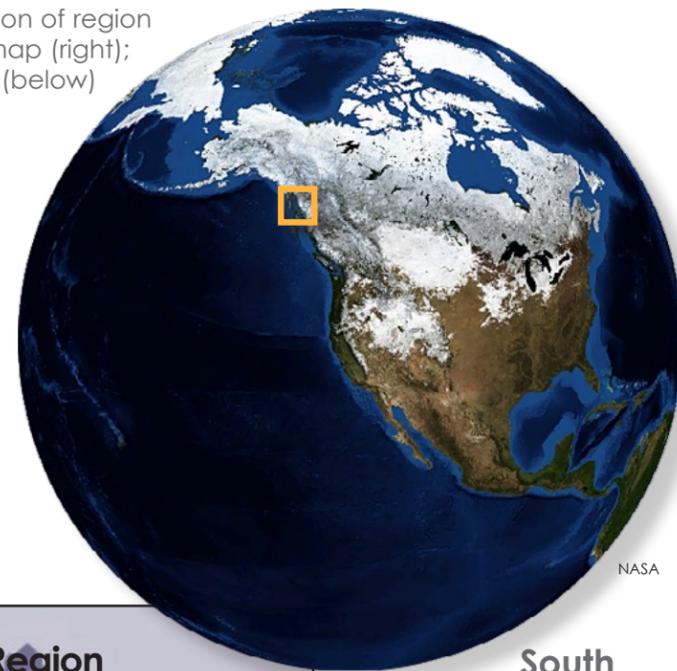
Snorkeling with salmon. Many of the adventures on the *Swell* did not involve scuba gear. Snorkeling with salmon was one of the highlights.

The first site we tried did not pan out. We saw very few salmon, so I used the time to photograph my dive partner in her OS drysuit. The yellow color of the water made an interesting background. Because of the mixture of salt and fresh water, a halocline was created. We had to be careful not to move around too much, or the water mixture would make our images appear out of focus.

The second site was much more productive. Taking a Zodiac upstream until it got very shallow, than it was time to jump in and swim. The water was two to five feet deep. The first thing we noticed were dead jellyfish. Drifting

into freshwater was not good for their health. All of a sudden the salmon appeared. There were hundreds of them. Some seemed to be at the end of their life cycles, but swimming and photographing the salmon was an experience that will remain in our memories forever.

Location of region on global map (right); Map of region (below)



NASA



South Sawyer Glacier

Another great non-dive adventure was the South Sawyer Glacier at Tracy Arm. Donning our drysuits to stay warm and dry on the surface, we took the aluminum skiff, *Indie*, up the passage to get up-

COUNTER-CLOCKWISE FROM ABOVE: The kelp patch turns into a magic forest of giant Metridium anemones below 60 feet; Olga follows a salmon upstream; Schools of Alaskan king salmon swimming up stream



LARRY COHEN



LARRY COHEN





LARRY COHEN



LARRY COHEN



LARRY COHEN

The South Sawyer Glacier in Tracy Arm (top left); Iceberg at the South Sawyer Glacier in Tracy Arm (above); Leather sea star, blood star and green urchins on an Alaska reef

close and personal with the icebergs of southeast Alaska. The icebergs were not as large as the ones I experienced in Newfoundland, but they were just as majestic. Being small, they were easy to climb. It was tons of fun to go slipping and sliding on an iceberg. It was also a great place to have cocktails, which were prepared in advanced on the *Swell*.

Some of us took out kayaks to navigate the ice fields. When Roberto Chavez paddled away from an ice-

berg, it calved—a giant chunk of ice landed just where the kayak was moments before.

The *Nautilus Swell* also visits the fishing village of Port Alexander. This was a booming town with a population of 4,000 before the Great Depression. Today, around 80 people call this place home. Exploring this village transported us back to a bygone era. **Vancouver Rock.** It was time to get back to diving. The next site was Vancouver Rock. This beautiful cold-



OLGA TORREY

Harbor seals check out the tourist



LARRY COHEN

Part of the trail leading to the Baranoff Island natural hot spring is built on a platform (left); Kelp crab at dive site near the Smudges (bottom left); Cruise ship docked in downtown Juneau (below)

forest of giant Metridium anemones. Because of the nutrient-rich waters, everything underwater in Alaska was huge. Some of these Metridium anemones were four feet tall. The size and large number of them were visually stunning.

Baranoff Island & Sitka

Before heading to Sitka, we spent time on Baranoff Island. A few of us jumped on *Indie* and did a tour of the bay. We saw a number of seals and sea lions sitting on the rocks. In the water, we saw sea otters. We then did a short hike to a natural hot spring, which sits right

next to a waterfall. While sitting in the hot water and listening to the rushing water, one had to wonder, "Does life get any better?"

Our last leg of the journey took us into the city of Sitka. Since we had an early morning flight, our cab driver gave us just a brief tour of the area. There was a strong Russian influence in the city. Sitka was the cultural and political hub of Russian America in the early 19th century. Sitting in the middle of town was St. Michael's Cathedral, an active Russian Orthodox church established in 1837.

The Kiksadi Tlingit native people have lived continuously in Sitka for over 50 centuries. We did a drive-by of Sitka National Historical Park, which is also known as Totem Park. Here, totems carved by both the Kiksadi Tlingit and Haida indigenous people can be seen along a pathway.

As we arrived at the airport and prepared to go back to the reality of New York, we knew we would miss Alaska. Thinking about all the adventure and beauty, returning to Alaska is definitely in our near future. ■

Alaska

GETTING THERE
Alaska Airlines has flights in and out of both Juneau and Sitka. In the United States, you can connect in Settle, Washington. www.alaskaair.com

DIVING
The Nautilus Swell is a 100-year-old refurbished tugboat. This live-aboard is the comfortable way to experience Alaska diving. The boat's itinerary includes both Alaska and British Columbia. www.nautiluswell.com

ACCOMMODATIONS IN JUNEAU
Extended Stay Deluxe Hotel in Juneau is comfortable and convenient. It is located across the street from the airport. They provide a shuttle bus to take you downtown. www.extendedstayhotels.com/hotels/juneau-shell-simmons-drive-esd.html

THINGS TO DO IN JUNEAU
TEMSCO helicopters provide charters, plus glacier and dog sled tours. They are located near the airport and Extended Stay Deluxe Hotel. temscoair.com

Mendenhall Glacier is worth a visit. There are many trails where you can observe this beautiful environment and the wildlife that call it home. The Visitor Center is a good place to get information and to warm up after hiking. www.fs.fed.us/r10/tongass/districts/mendenhall

Mount Roberts Tramway will take you up Mount Roberts around 1,745 feet. Enjoy the view from the tram and have dinner at the Timberline Bar & Grill. With the nature center, hiking trails and cultural attractions, there is plenty to do. www.goldbeltours.com/mount-roberts-tramway



OLGA TORREY

water reef started at 60 feet and gently sloped down to 90 feet. It seemed like there was a wolf eel in every crevice. This fish had a face only a mother could love.

The Kelp Patch. From here, we moved to The Kelp Patch, which is located just outside Warm Springs Bay on Baranoff Island. Below 60 feet, this rich kelp forest turned into a magic



LARRY COHEN



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POINT & CLICK ON BOLD LINKS



Equipment *in the news*



Edited by Peter Symes & Rosemary 'Roz' Lunn



OCS

You can tell that Oceanic has a passion for timing devices and computers. Their latest offering to hit the market—the OCS—is an elegant wristwatch dive computer. Oceanic states that it has an intuitive operating system. The OCS benefits from a Dual Algorithm® and an advanced digital compass. You can also programme it for three Nitrox mixes, and it's neatly packed in a strong, lightweight composite housing reinforced by a stainless steel case back and bezel. It's future proof, too, because operational improvements and new features can be installed via Firmware Auto-Update through the optional PC Interface kit. oceanicworldwide.com



warp1

At last year's Orlando DEMA we got a close look at the new Aquabionic warp1 fin from Cetatek. This Canadian-based manufacturer stated they were introducing the world's first water adapting responsive propulsion system for fins. When divers 'power up their legs' and kick harder, this patent pending technology apparently spreads and cups the fin blade in response to an increased load on the actuator joints. cetatek.com



Luminous idea

The SEE-ME delayed surface marker buoy from Custom Divers is a visual marker. What makes this different is that the diver can zip a torch / flashlight into a pocket and it illuminates the whole D-SMB. When a torch is fitted and switched on, the SEE-ME becomes completely luminous and is fully visible through 360 degrees, thereby giving superior visual sighting, especially after dusk.

Customdivers.com

Keldan Luna V

As with so many other fancy top-end brands, Keldan's coveted dive lights always seemed somewhat out of financial reach except for the well-off. Not any more. The new Luna 4 V is a smaller, more economical, yet still very powerful video light from the Swiss manufacturer. The battery pack is exchangeable, (a benefit of all Keldan lights) thus allowing quick battery changes within a few seconds. There are five selectable levels from 11 watt to 45 watt, resulting in a burn time of 45 to 180 minutes with the 5000K colour temperature matching that of daylight. Dry weight is a mere 0.7kg.

Keldanlights.com





f-LIGHT

The Manta f-LIGHT travel bag from Fourth Element is designed with travel in mind. Weighing in at less than 1kg but with a generous 115 litres (4 cu ft) it is one of the lightest dive bags on the market. By getting rid of the wheels of traditional bags, Fourth Element has managed to reduce the weight of the bag, freeing you to bring all the equipment you need for your adventure. Pair the Manta with the Remora travel bag, and you have a system meticulously designed from first principles for the travelling diver. fourthelement.com



Tea Tree oil

Earol Swim Tea Tree Oil delivers a metered dose of olive oil and tea tree oil into the outer ear finely coating the auditory canal creating a water resistant barrier. The oils have natural anti-fungal, anti-bacterial, anti-viral and anti-infection properties.

When combined with the pump action metered spray delivery system, it will help prevent the incidence of trapped water and swimmer's ear.

hlhealthcare.co.uk/earol-swim

The Legend lives on

Aqualung's new version of their classic Legend regulator is smaller and lighter. The new tough PVD finish will keep its good looks, too, as the pink gold is much harder and durable than traditional chrome plating. The Legend LUX second stage also features the Master Breathing System (MBS) which is a new, simple and effective way to adjust the breathing performance of your Legend LUX. The MBS controls two functions at one time. It controls the direction of air, which alters the venturi effect, as well as changes the opening effort. aqualung.com



Alu Trio

The Alu Trio's flattened, elliptical shape makes it a snug fit in a BC pocket. The light source is three LED's with a joint output of 780 lumen. The body is made from anodized aluminium alloy, and the magnetic sliding switch that is self-locking makes it easy to operated with one hand. It is powered by eight AA-batteries. The alu trio is depth rated to 300m. aqualung.com



Suunto D9tx

The D9tx now boasts trimix compatibility—allowing for switching between of up to eight gases—and the Suunto Technical RGBM algorithm, previously only found on Suunto HelO2 as well as a tilt-compensated 3D compass. Compact with a titanium bracelet, this new top model from Suunto is stylish enough to wear as an elegant time-piece, too. The wireless air integration is an optional extra. suunto.com





Dyron UV light

The Dyron 4200 Solaris UV light is for viewing and photographing fluorescence underwater. The light is supplied with a gel filter that can be cut and fitted to a mask, and also between a wet lens and the port of a housing. The 5W light has 16 LEDs, which emit a 120° beam with a maximum output of 4200 lumens and has a burn time of 30 to 50 minutes depending on power setting. Dyronstore.com



Explorer

The Hollis Explorer is a recreational rebreather. The unit is neither a fully closed nor a pure semi-closed system, but an intelligent hybrid that utilizes the best of both worlds. The Explorer uses a single gas; Nitrox, and is electronically controlled to achieve the optimal balance of PPO₂ and dive time that all breather divers desire. Hollis state the simple interface is easy to learn and straight-forward to dive hollisgear.com

OneSuit

Poseidon's retro-style new wetsuit line instantly transported us back to 1965 and the glamorous James Bond film, Thunderball. Sean Connery, clad in an iconic red wetsuit, battled with SPECTRE over two nuclear warheads.

James Bond always had the latest gadgetry so we think he'd be interested in Poseidon's comments. They state they've created 'a revolutionary suit made out of a material never seen in a wetsuit before'. The One-Suit Membrane is primarily intended for tropical waters. Sub tropical diving has not been overlooked, and there are additional garments (vest and shorts) to allow the diver to layer up and increase their thermal protection.

The cool-looking membrane (that gives this suit its unique look) also makes it easy to don and doff. Furthermore the membrane prevents the diver from getting over heated on the surface whilst protecting the diver from the marine environment just as efficiently as a neoprene suit. poseidon.com



Trim inflation pillow

Dive Rites' Trim Inflation Pillow is designed to solve the problem of 'heavy legs', which is especially prevalent for rebreather and sidemount divers. Providing 10lbs of lift, the Trim Inflation Pillow easily attaches under any buttplate-style system. A 12-inch inflator with 15-inch LP hose is mounted on the right side with an OPV on the left. However, these can be switched if desired. The Trim Inflation Pillow gives the diver flexibility to switch out tanks, change exposure protection or move from sidemount to rebreather units all of which affect trim and the amount of counterbuoyancy needed. diverite.com



Do you have to bring that iPad of yours along?

Despair not. UK-based Lomo Watersport have launched an iPad drybox; ideal for those who like to take their favourite tablet on a dive boat, sailing or anything environmentally hostile. Lomo state that these boxes can stand up to a fair amount of abuse, whilst protecting your iPad from bumps and knocks. Manufactured from ABS plastic, with chunky hinges, padded interior and a reinforced hinge, the IPAD drybox is watertight in most situations and can cope with being dropped into water. Priced at £29.99 it's available exclusively via Lomo's website Ewetsuits.com

Reviewing Atomic Aquatic's Cobalt Übercool

There is a first for everything, and as a case in point, I took Atomic Aquatic's Cobalt right out of the case and went diving with it without bothering reading the manual first. Under other circumstances, I would condemn such apparent reckless behaviour, but aside from also wearing my usual computer, I wanted to validate the claim that the interface was indeed so clear and intuitive that you could indeed just dive with it right out of the box.

And so it seems. Once in the water, it seemed pretty straight forward. The user interface is just like that of a cell phone, with four big navigational buttons and a logical, clear menu. Any modern human who is not a technophobe should feel at home straight away. The buttons are big enough to be easily operated with bulky

dry gloves. One push at the left button brings me back to the main menu. I scroll down and up through the options with ease using the up and down buttons and go into a menu by selecting it with the right button. The information architecture is well executed. My TV remote control works the same way.

Atomic Aquatic's Cobalt computer enticed me from the first glance with its Star Trek, fancy looking digital compass. The interface gets top marks for clarity and ease of use. As the images show, it is also easy to read in the dark.

In the settings menu, the user can enter up to three defined 'gas mixes'. As the only variable gas is oxygen, which can be set to 22-99%, the gas mixes in question are really just grades of nitrox. That makes it a computer that can be used in fairly advanced recreational diving, up to advanced nitrox, up to entry level decompression diving training. While it may be depth rated to 100m, therefore not a technical computer, it is clearly not designed for this segment in mind anyway. All that being said, it can still bring you fairly high up the skill ladder.



The interface is both easy to read and easy to use, even under challenging circumstances such as in the dark and cold

Once again, even with bulky drysuit gloves on, I had no troubles changing gas mixes in the water.

As the computer prioritizes the essentials first, as it should, it also comes across as a good companion for dive trips. Its 'Quick Disconnect' makes it fast and easy to connect and remove the computer when travelling or between dives. What I appreciate when I am out in some remote location doing many repetitive dives, and some of

them deep, is being able to go over my dive profiles and, where possible, keep an eye on the tissue loading.

It may be my neurotic side rearing its ugly head, but diving is about being safe. I can get a preview of the profile on the Cobalt. Needless to say, it does not get very detailed on the computer itself, yet it serves the job of giving one the general picture on the spot, including the No Fly time.

There are many good computers on the market, but the built-in compass on this unit is the deal-clincher. I always had compasses on my consoles but rarely used them for reasons I am not quite sure of—most likely because I had to take my eyes off my main instruments and mess around with a clunky mechanical bezel that tended to get stuck. On the Cobalt, by contrast, one can't help but keep an eye on it and start using it.

The build of the Cobalt seems quite sturdy, and when I first handled it, the unit felt a wee bit heavy. But with direct comparison to similar units, it is quite compact and is packed with features. The batteries are sealed inside the case but can be recharged by the user. The charger connects via a socket with wet contacts and can be charged either through the main outlet or USB. ■

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Diving With Dinosaurs

—*The Nile Crocs*
Okavango River, Botswana

Text and photos
by Amos Nachoum

My guide and I saw the croc on the surface, basking in the sun, laying on the papyrus grass. It was a Nile crocodile about five meters long and agitated by our invasion of its space. It moved lethargically and got into the water. We followed it, as it swam against the current. We drove the boat a hundred feet upstream, dived in and let the current carry us toward the beast. We saw it laying motionless on the gray soil of the riverbank. Its large head was under a broken tree trunk. I got myself ready to take its picture. Richard, my guide, was on one side, and I was on the opposite side. The



croc was between us. We were only at 5m depth, and the visibility was fair. Then—as if in slow motion—the croc went into reverse, climbed over the tree trunk and charged full speed toward my guide.





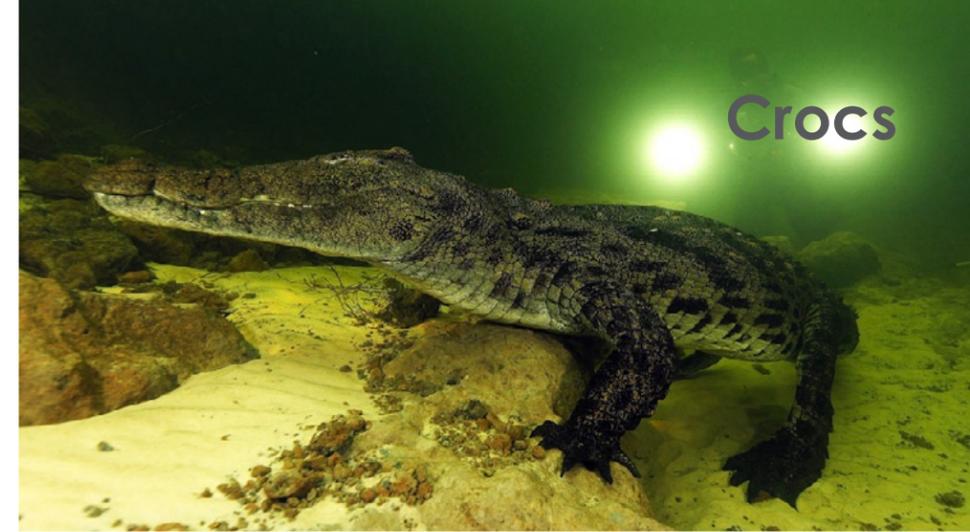
Richard saw the large croc rushing toward him. He raised his Hawaiian spear to defend himself. The croc pushed against the spear, pinning Richard against the river bed. The spear was bending, and sand was rising. The croc and Richard were swinging from left to right. Richard was holding his spear as hard as he could, swinging wildly from side to side. It looked almost like they were 'dancing'. More likely, they were locked in a struggle against each other and not letting go.

All this time, I had been following Richard underwater and was positioned behind him. I finned as hard as I could to get as close as possible to the action in order capture it with my super wide angle 14mm lens. But a thought was running through my mind, "Should I continue taking

Fourteen-foot croc lays on river bank amongst the reeds

CLOCKWISE FROM TOP LEFT: Team travels down the Okavango River seeking Nile crocodiles to photograph and film; Ready for diving; Getting into the water to meet the croc. PREVIOUS PAGE: Nile croc nicknamed, Scooby, shows off his powerful gaping jaws; Amos Nachoum (inset)





CLOCKWISE FROM LEFT: Rear view of a Nile croc; Croc inspecting underwater filmmaker, Brad Bestelink; Brad and croc in motion; Guide, Richard, with Hawaiian spear encounters croc in the Okavango River

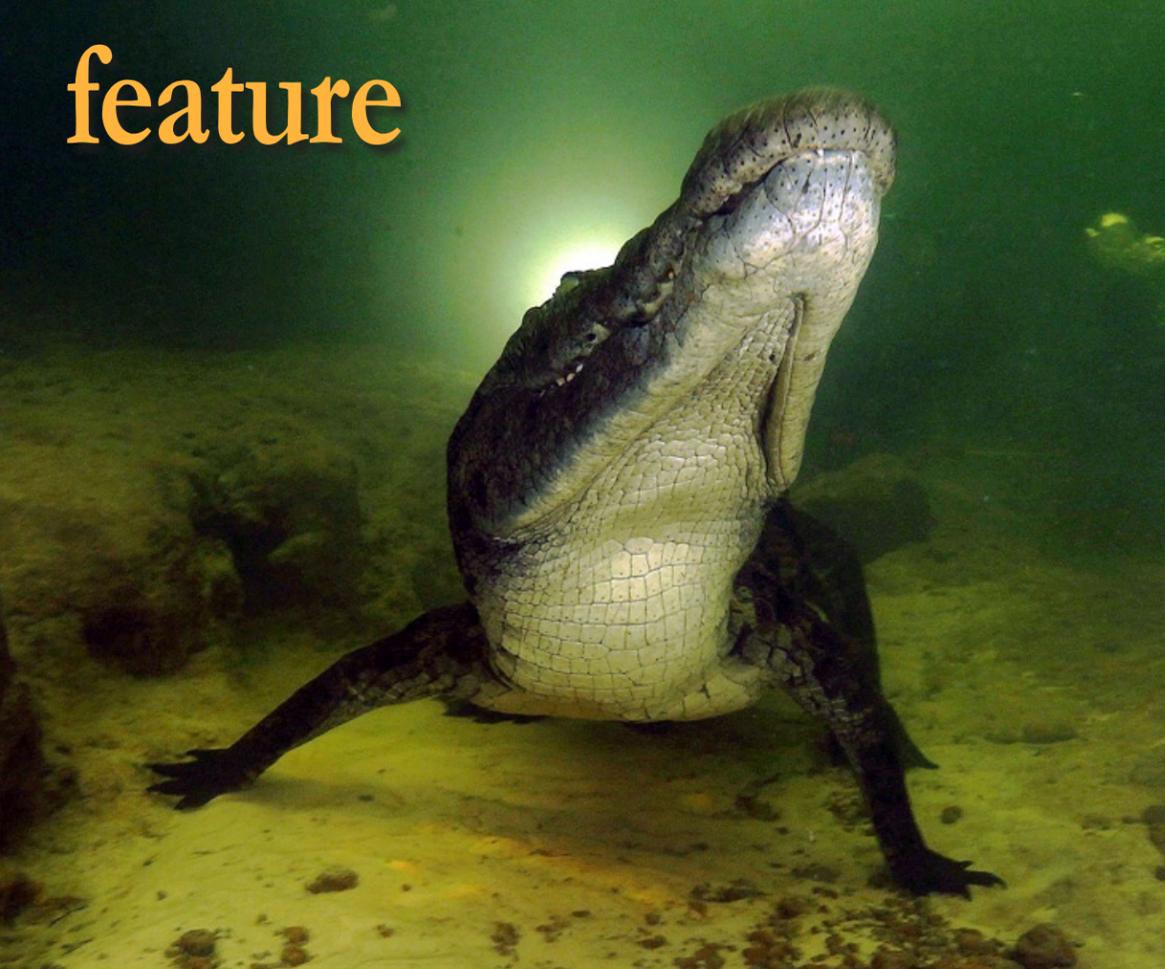
pictures, or shall I help Richard push this croc away?" Before I had to make this 'painful' decision and give up my camera, the croc let go and turned away, but not before it reached the surface and open its jaws wide, for one more fantastic photo opportunity to capture croc behavior.

Richard's head turned quickly, looking for me, and directed me to swim across to the other side of the river away from the croc. We started swimming just above the sandy

bottom of the river, pulling and helping each other to move against the current. It was hard work, but with the thought of the croc behind us, we found a new source of energy. We resolved that, under normal circumstances, we would likely abort the trip, but not this time.

We swam along the opposite bank of the river, presumably away from danger. Richard was ahead of me, moving leisurely down the current. I, for no apparent reason—just





CLOCKWISE FROM LEFT: Crocodile at the surface of the river; Backlit croc lifts head; Richard with spear encounters croc on the river bed; Amos' hand and croc's tail

my sixth sense—decided to look back. Even if I lost sight of Richard, I thought I would catch up with him. I turned my head back, and to my surprise,

two meters away from me, a dark figure filled my view, which could not be anything else but the croc coming toward us, and this time, from

my fins and myself about a meter from the bottom, and the croc was now under me. At that moment of advantage, I pushed my camera and my

behind. Now, I was in front of this wild animal, and I had no spear to defend myself, only my camera.

In a split-second decision, I raised

knees against the croc, pinning it against the bottom. Sensing the struggle behind him, Richard turned back to look for me. The croc, which was pinned under me, turned 90 degrees, and with all its power, pushed me over and ran out into the river current. Richard then led the way, rising to the river surface, signaled the boat, which maneuvered over our heads, and we both left the water speedily. It was enough *crocking* for one day.





PHOTO HIGHLIGHT: TIPS FOR WORKING IN MURKY WATER

Working in murky water immediately requires me to work only with a wide angle lens and to get very close to the subject. That means working with super wide angle lenses, and I'm talking about the Canon 14mm lens with 108-degree coverage and a 15mm fisheye lens with 176-degree coverage.

Since I was working along the bank of a river with lots of vegetation—which casts shadows over the croc—and I needed to highlight the color and texture of the crocodile's skin, I decided to work with strobes in order to highlight the shadows. However, due to sand particles in the water and the current, I had to avoid aiming the strobe light directly at the subject in order to avoid backscatter.

In this case, I decided to aim my strobes upwards toward the surface. Since we were always diving in shallow water, the light from my strobes reached the surface, which was only two or three feet above my head, and reflected back down onto the subject. However, I now had to closely monitor the results on my screen, adjusting the strobe output power, while at the same time modifying the ISO—both of which helped me to extend the range of the light reflected from the surface, since the light now had to travel much further than in the case where one aims directly at the subject, as one would usually be shooting underwater.

That being said, I was also mindful of my white balance and adjusted it according to the color of the water.

Last but not least, I do not suggest to anyone to attempt to dive any river full of crocodiles without an expert—a person who has done it before more than one or two times. If you do not understand crocodile behavior and have not dived the river location before, just don't do it.

Due to the inherent risk in diving at Okavango River, I escort only two divers for one week on this diving adventure, which is most unique in the book of diving safaris. The next expedition is in June 2012 at the Okavango Delta in Botswana. Contact Amos at: crocphoto@biganimals.com ■



The mighty jaws of the Nile crocodile (above). Expedition members saw crocs every day, four to five times per day, which were anywhere from seven to 12 feet long

Clearing the way for the boat (left)

Croc rising (top left)

Storytelling by the fire after an eventful day of *crock-ing*—the adventure of searching for and finding crocs in the Okavango River in Botswana with plenty of photo ops along the way (bottom left)

The Okavango River drops from its headwaters in Angola down the wide flat delta in Botswana and crosses Namibia's Caprivi Strip to finish its 1,100 kilometer journey to the Kalahari Desert. Yes, you read that right, the Okavango doesn't flow into the sea. Its fresh water flows into the Kalahari, fanning out during flood season to form the largest inland delta in sub-Saharan Africa. On this expedition, we saw crocs on

the river every day, four to five times per day, which were anywhere from seven to 12 feet long.

This first-of-a-kind extreme diving adventure is only suitable for two guests at a time. The next experience in the wild with Nile crocodiles is scheduled for 5-14 June 2012 in the Okavango Delta of Botswana. Contact Amos Nachoum at Biganimals.com or telephone: 415-923-9865 ■



Edited by Kelly LaClaire & Scott Bennett

ERIC CHENG



Are sperm whales cultural beings?

Differences in patterned clicks of sperm whale communication may lean towards culture rather than genetics. Findings could influence conservation efforts; instead of solely focusing on the animals' habitat, protection should also consider which dialect they use.

Researchers have discovered that differences in the patterned clicks of sperm whale communication may lean towards culture rather than genetics. A study published in *Behaviour Genetics* suggests that sperm whale groups are made up of individuals that use the same dialect, rather than those that come from a similar

area of the Pacific. The creatures hold a range of records: they're the deepest diving mammal, the largest toothed whale and have the biggest brain on Earth. However, they don't have the sharpest eyesight or sense of smell, so they communicate using codas. The sounds are very different than those of other marine

mammals like humpback whales, which sing haunting songs to each other, or dolphins, which whistle.

Clans

All sperm whales in a pod use the same small selection of patterned clicks. In the Pacific, sperm whales belong to one of five clans. Each

use a different dialect made up of a different handful of similar Morse code-like patterned clicks called codas. The clicks may be employed to communicate that they belong to a particular pod and to maintain social bonds. The whales create the sounds in the "big tub of oil at the front of their huge heads", explained Luke

Rendell from the University of St. Andrews. Along with air sacs in the whales' heads, the structure produces multiple pulses, just fractions of a second apart.

Cultural transmission

Rendell contemplated whether the difference between clans was down to genetics. "It's an obvious question to ask. What are the genetics of these populations? Are these dialects culturally transmitted or genetic?" To obtain an answer, Rendell and colleagues from the United States and Canada extracted DNA from the whales' sloughed skin to see if they could see any genetic differences between the clans. In total, DNA was analyzed from 194 sperm whales belonging to 30 different social groups from three of the vocal clans across the Pacific Ocean.

Once the dialects were biologically determined, it was surmised that those sharing the same dialect would have similar genes. Instead, they found that whales with different repertoires of codas are often genetically similar, suggesting that the genetic differences don't explain clan differences, and that dialects must be passed down through the generations. Not only do the clans possess different dialects, they also have different hunting patterns, parenting habits and reproductive rates.

"All the evidence for culture relies on methods of exclusion. It's very difficult to actually prove cultural transmission," stated Rendell. "But our finding isn't consistent with anything other

than cultural dialects." Sperm whale pods are made up of females—with a few young—and average around 12 individuals. Male sperm whales leave the pod when they're juveniles and join all-male pods for a few years, before beginning a solitary life roaming the oceans.

Findings from this research could help influence conservation efforts; instead of solely focusing on the animals' habitat, protection should also consider which dialect they use. "We hope our finding will get people thinking about conservation, and the idea that behaviour in marine mammals is culturally-determined," Rendell said. ■

Are these dialects culturally transmitted or genetic?

"Sometimes a deep breath is all you need to regroup and re-energize."
- Szilvia Gogh



Gogh Jewelry Design



Whales get the bends too

Whales and seals could suffer from the same decompression sickness experienced by human divers. Scientists at St. Andrews University find evidence of bubble formation in the bodies of cetaceans.

Until now, it has been contentious as to whether cetaceans could suffer from the disorientating sickness that can cause everything from skin rashes to death in extreme cases in humans, the university writes on its website. Their new study, published

While the bends is rare under normal circumstances, excessive human noise or disturbance may cause a marine mammal to change its diving behaviour in ways that result in serious illness or injury.

December 21, provides evidence of bubble formation in the bodies of beached

whales and seals that suggests the potential for decompression sickness, caused by the pressure experienced during deep sea diving.

The research also suggests that excessive human noise, such as exposure to military sonar, might cause disorientation in marine mammals, leading to them losing their natural defences and to succumb to the bends rather than avoid them.

Lead researcher Dr Sascha Hooker of the University of St. Andrews commented, "Decompression sickness, commonly known as 'the bends' is a serious problem for human divers, but the jury has been out as to whether marine mammals could get the bends or if it would be as serious for

them.

"Unfortunately the technology doesn't yet exist to measure what is going on physiologically inside a free-living whale during its descent to depths of over 1,000 metres.

Researchers began to question the conventional wisdom—that marine mammals have anatomical and physiological and behavioral adaptations to

avoid the bends—after examining beaked whales that had stranded on the Canary Islands in 2002. A necropsy of those animals turned up evidence of damage from gas bubbles.

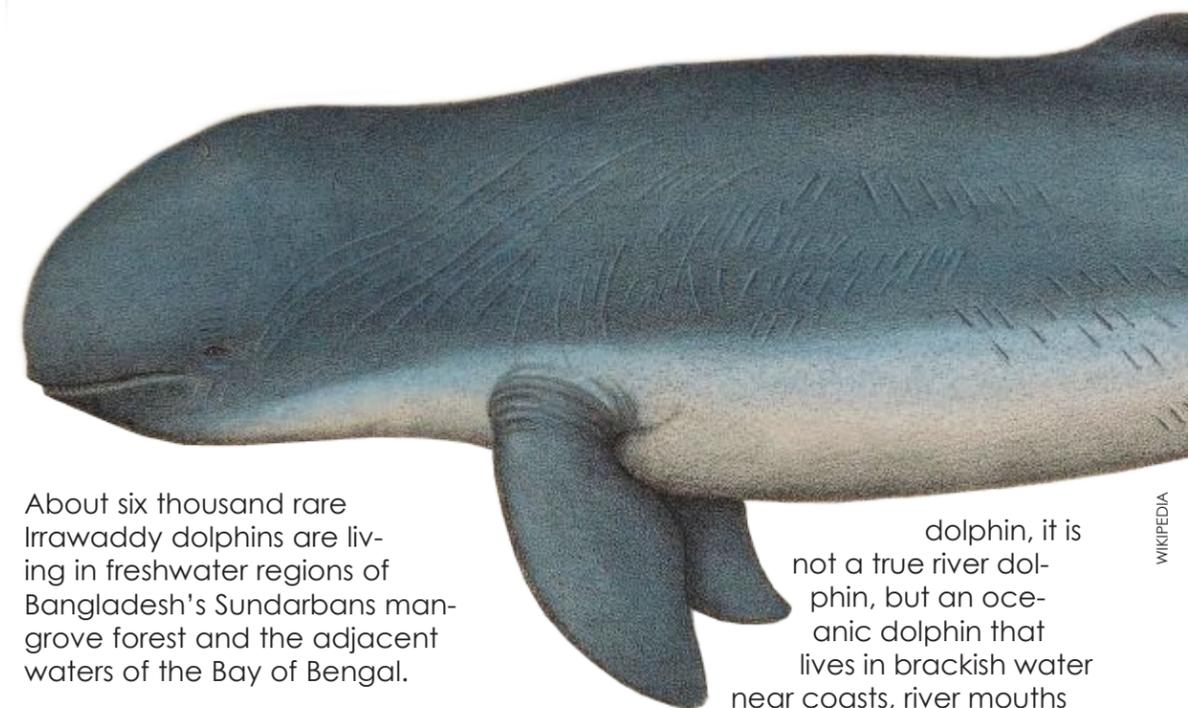
The animals had stranded after exposure to sonar from nearby naval exercises. This led scientists to think that diving marine mammals might deal with the presence of nitrogen bubbles more frequently than previously thought, and that the animals' response strategies might involve physiological trade-offs depending on situational variables. In other words, the animals likely manage their nitrogen load and probably have greater variation in their blood nitrogen levels than previously believed. ■



A spherical lesion found in a rib of a dead sperm whale that beached on Nantucket was likely caused by nitrogen bubbles

TOM KLEINDINST, WOODS HOLE OCEANOGRAPHIC INSTITUTION

Thousands of rare Irrawaddy dolphins are living in Bangladeshi waters



WIKIPEDIA

About six thousand rare Irrawaddy dolphins are living in freshwater regions of Bangladesh's Sundarbans mangrove forest and the adjacent waters of the Bay of Bengal.

Elsewhere, such as in the Mekong River where the critically endangered dolphin was once plentiful, the numbers were just down to 85, according to WWF research done in 2011. As calf survival was found to be very low, researchers concluded that the small population is declining and at a high risk of extinction.

Irrawaddy dolphins are similar to the beluga in appearance, though most closely related to the orca. Although sometimes called the Irrawaddy River

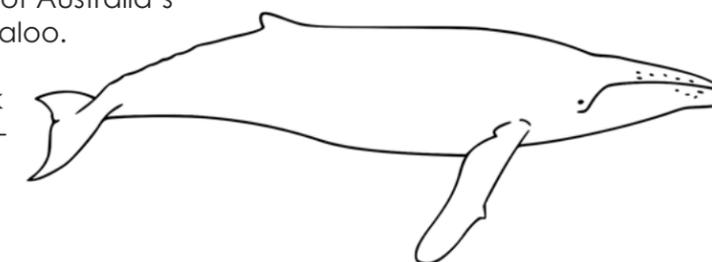
dolphin, it is not a true river dolphin, but an oceanic dolphin that lives in brackish water near coasts, river mouths and in estuaries. It has es-

tablished subpopulations in freshwater rivers, including the Ganges and the Mekong, as well as the Irrawaddy River from which it takes its name. Irrawaddy dolphins are more susceptible to human conflict than most other dolphins who live further out in the ocean. The majority of reported dolphin deaths in all sub-populations is due to accidental capture and drowning in gill nets and dragnets. Degradation of habitats is another main threat to Irrawaddy dolphins. ■

Migaloo, the white humpback, may have an albino offspring

A white humpback whale calf recently spotted off the coast of Queensland is thought to be the off-spring of Australia's famous white humpback, Migaloo.

However, Mark Read of the Great Barrier Reef Marine Park Authority, cautioned that without DNA information experts would be unable to link the calf to Migaloo. ■



PETER SYMES





Edited by
Kelly LaClaire

U.S. lawyers file lawsuit against Sea Shepherd on behalf of Japanese whalers

The Seattle, Washington, office of a Portland, Oregon, based law firm, Miller Nash, has filed a lawsuit against Paul Watson and Sea Shepherd on behalf of Japanese whalers accusing the anti-whaling activist group of harassment.

Since 1977 the Sea Shepherd Conservation Society (SSCS) has gained worldwide notoriety from their efforts to thwart illegal whaling across the globe, avowing in their mission statement:

"To end the destruction of habitat and slaughter of wildlife in the world's oceans in order to conserve and protect ecosystems and species. Sea Shepherd uses innovative direct-action tactics to investigate, document, and take action when necessary to expose and confront illegal activities on the high seas. By safeguarding the biodiversity of our delicately-balanced ocean ecosystems, Sea Shepherd works to ensure their survival for future generations."

Despite the huge financial setbacks of Japan's recent earthquakes, tsunamis and a devastating nuclear disaster, or perhaps because of those things, whalers were given several million dollars in governmental relief funds and are spending a portion of that money at Miller Nash in an attempt to get American courts to prohibit Sea Shepherd vessels from leaving port, essentially blocking the conservation group's efforts to prevent the Japanese hunts.

Japanese government

In a statement from the Institute of Cetacean Research (the organization that conducts the whaling program



Crew of Sea Shepherd throw rancid butter in bottles at whaling ship

under the authority of the Japanese government) and Kyodo Senpaku Kaisha (the owner of many of the whaling vessels) said:

"Kyodo Senpaku Kaisha and the Institute of Cetacean Research along with research vessels' masters filed a lawsuit against the Sea Shepherd Conservation Society (SSCS) and Paul Watson. The Institute of Cetacean Research and Kyodo Senpaku are seeking a court order in the U.S. District Court of Seattle, Washington, that prevents SSCS and its founder Paul Watson from engaging in activities at sea that could cause injuries to the crews and damage to the vessels. Japan's whale research program in the Antarctic (JARPA II) is a

legitimate program conducted since 2005/2006 under Special Permits granted by the government of Japan and is greatly contributing to the advancement of scientific knowledge of whale resources in the Antarctic. The activities perpetrated by SSCS and Paul Watson not only put at risk the safety of the research vessels at sea but are also affecting the scientific achievement of the JARPA II research program and therefore cannot be overlooked."

Sea Shepherd

Sea Shepherd, thus far, seems unconcerned about the litigation and plans to continue its efforts to curtail whaling activity.

"This seems like a frivolous lawsuit to me," said Captain Watson. "We have the images of the Japanese whalers destroying one of our ships, ramming our ships, running over our crew, firing upon us, throwing concussion grenades, deploying acoustical weapons, hitting us with water cannons and bamboo spears, and they are suing us because they are accusing us of violence towards them. We have not rammed them, and we have not caused a single injury, nor have we been charged with a crime or even reprimanded by anyone for our actions. We have cooperated with every inquiry. They have not. This is simply a case of using the courts to harass us. I don't believe they have a case, and I doubt a



Sea Shepherd Captain Paul Watson



Edited by
Kelly LaClaire



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MV Steve Irwin is part of the Sea Shepherd Conservation Society's fleet of vessels

U.S. court would take this seriously. Unlike Japan, the courts in the United States don't automatically do what the government demands that they do."

American law firm

What was concerning to Watson and Sea Shepherd was the fact that an American law firm had agreed to represent the legal actions of the Japanese. In an article posted on the Sea Shepherd website the group said:

"Sea Shepherd is surprised that an American law firm, with a reputation for supporting a no-kill

animal shelter, would represent a company that is illegally slaughtering defenseless whales inside the boundaries of a whale sanctuary. Miller Nash obviously has lawyers in their firm who care about the welfare of animals. They seem to be opposed to the killing of defenseless [cats and dogs], so it is a mystery as to why they would be willing to represent one of the cruelest and most barbaric animal slaughtering industries on the planet.

"An American law firm defending Japanese outlaw whalers from American whale defenders seems to be very un-American. It is most

certainly inhumane and disgracefully insensitive to the agonizing, cruel death inflicted upon these highly sensitive, intelligent, and socially complex, sentient victims of their ruthless clients. I urge our supporters and people around the world who love whales and who oppose whaling to politely contact the law firm of Miller Nash and ask them how they can justify this contradiction."

If you would like to contact Miller Nash, they can found at www.millernash.com. ■ SOURCES: SEATTLE POST INTELLIGENCER, ANIMALPLANET.COM, TAIPEI NEWS

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Edited by
Scott Bennett

Norway harpoons efforts to recognize whaling as threat to whales

Although a dying industry, whaling still poses a real threat to conservation, Latest blow to fight against whaling comes when Japan's whaling fleet is poised to set sail for Southern Ocean Sanctuary.

An intergovernmental conservation body representing more than 100 countries has failed to recognize whaling as a threat to whale conservation after objections from Norway—one of the three remaining countries that still kills whales for commercial reasons.

At the tenth meeting of the Conference of the Parties to the Convention on Migratory Species (CMS) in Bergen, Norway, party members agreed to a global programme of work addressing human-induced impacts on cetaceans, but withdrew whaling after Norway argued that the CMS was not the correct forum for this issue. This latest blow to the fight against whaling comes when Japan's whaling fleet is poised to set sail for the Southern Ocean Sanctuary to kill up to 935 minke whales and 50 endangered fin whales in defiance of global opposition and several international laws.

Patrick Ramage, the director of International Fund for Animal Welfare's (IFAW) Global Whale Programme, said: "Norway has harpooned efforts to have CMS recognize the very real threat posed to whales by

commercial whaling. While on one hand Norway committed to fight some important threats to whales through this forum, it has managed to kill any mention of whaling, which could and should have appeared in this important global resolution."

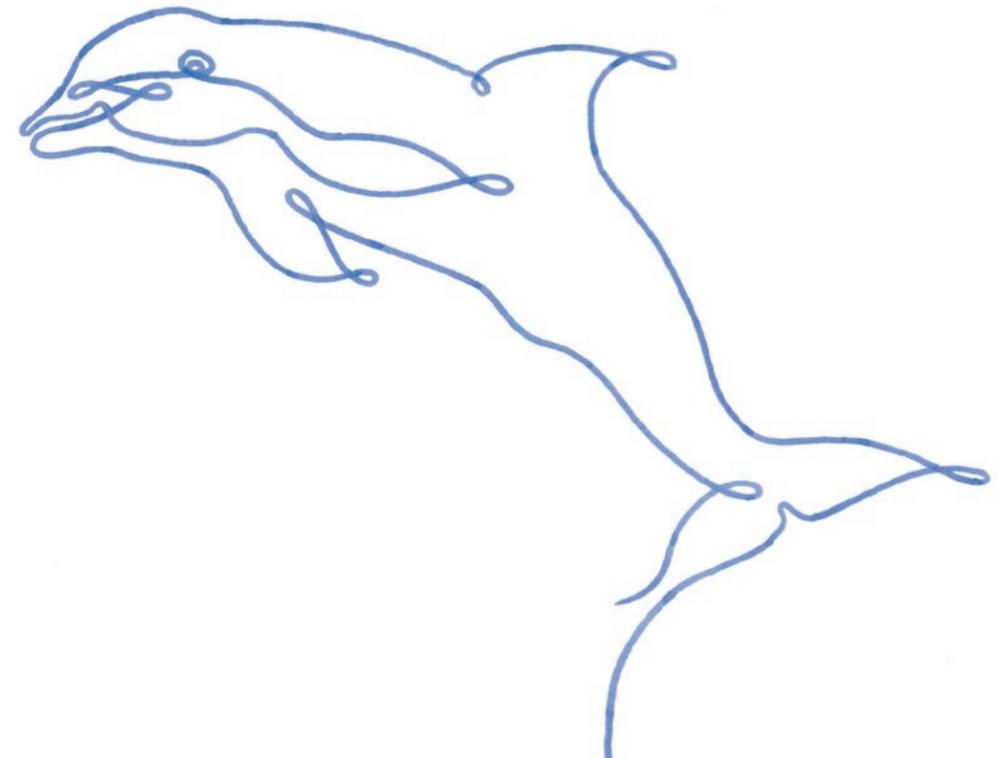
In a draft version of the resolution, commercial whaling was cited as one of the higher threats to whales, but was removed in the final version. "Whaling is a dying industry but one which poses a serious threat to whales at a time when they face more threats than ever before. IFAW is disappointed that an opportunity for this international

forum to recognize the threat of whaling was scuppered in this way," added Ramage.

IFAW opposes whaling because it is cruel and unnecessary, with footage of Japanese whaling analyzed by scientists showing whales can take more than half an hour to die. The organization promotes responsible whale watching as a humane and financially viable alternative to the cruelty of whaling. Despite this setback, the IFAW was pleased to see that other substantial threats, such as bycatch, pollution and feeding ground degradation, were included. ■



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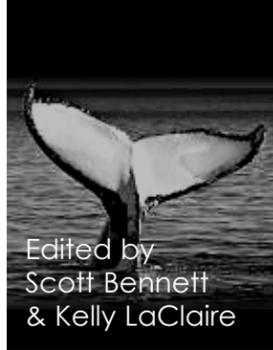


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Edited by
Scott Bennett
& Kelly LaClaire

Whales win, walrus lose in warmer Arctic

'New normal' means tourists and oil drilling. Loss of sea ice seriously affects polar bears and walrus, which utilize ice floes as hunting platforms.

In an annual assessment called the Arctic Report Card, specialists from 14 countries assessed the Arctic has moved into a warmer, greener "new normal" phase, meaning reduced habitat for polar bears and more access for development. In 2011, Arctic air temperatures were approximately 1.5°C higher than the baseline number for the previous 30 years, along with a dramatic decrease of sea ice and glacier mass.

With less bright ice to reflect sunlight, and more dark open water to absorb it, the Arctic's changed characteristics will probably feed on each other and accelerate.

"We've got a new normal," said Don Perovich, an expert on sea ice at the U.S. Army Corps of Engineers' Cold Regions Research and Engineering Laboratory in New Hampshire. "Whether it's a tipping point and it will never recover, who can say? But we have a new normal . . . that has implications not just for the ice but other components of the Arctic system."

Climate change effects
Released as U.N. climate talks

proceed in Durban, South Africa, the Arctic report found significant changes in atmospheric, sea ice and ocean conditions, and in landbased ice including glaciers, while marine and terrestrial ecosystems were also changed by the Arctic warming trend. The Arctic acts as Earth's "air conditioner" and also as a potent global weather-maker. The report found that even as the Arctic warmed, a shift in weather patterns sent cold Arctic air as far south as the United States and densely populated parts of northern Europe.

The Arctic's turning point came in 2006, when persistent weather patterns pushed out sea ice.

The following year, the Arctic ice extent, the area of the ocean covered by ice at summer's end, dropped to its lowest level ever. In 2011, Arctic sea ice reached its second-lowest extent. With less sea ice to clog potential shipping lanes, development in the Arctic is likely, said Monica Medina of the U.S. National

Oceanic and Atmospheric Administration. The Arctic "new normal" means oil and gas companies and tourists can begin to expect routine access to the area, according to report co-author, Jackie Richter-Menge, of the Cold Regions laboratory.

The New Normal

The new warmth means more tundra vegetation, with taller shrubs winning out over lower-lying moss and lichens which could affect caribou and reindeer. The loss of sea ice seriously affects polar bears and walrus, which utilize ice floes as hunting platforms. Whales were winners, especially those that migrate from temperate areas as they could remain in the Arctic for longer periods while the water remained open in the summer. Populations of tagged bowhead whales from Alaska and west Greenland were able to mingle in the Northwest Passage, which was blocked by ice until this century.

At the base of the marine food chain, biological productivity soared by 20 percent between 1998 and 2009 with more sunlight penetrating the increasingly open Arctic water. However, Arctic water also absorbs climate-warming carbon dioxide, which has made the Beaufort and Chukchi seas more acidic, which could erode the shells of some shellfish species. ■



Grad student hopes to study dolphins with backward fins

I know what you're thinking, because the first time I saw this picture, I thought the same thing. "That's Photoshopped, right?" Nope. That is an adult male eastern spinner dolphin, and yes, the fin is backwards.

But don't be alarmed. It's totally natural—at least for the adult males of this species. The females and juveniles have dorsal fins that look absolutely normal. At some point during the male's maturation, the fin changes aspects and begins to lean upward and finally ends up facing completely forward. Also unique to these spinners are the slightly upturned tail fins and the bulge just in front of the fluke.

"We've known about these dolphins for 50 years," said Matt Leslie, a graduate student at the Scripps Institution of oceanography, "but not a lot has been done to actually study why it's on backwards."

In an attempt to figure out why the eastern spinners have such strange characteristics, Leslie wants to build models of these unique dolphins and study them in a flow tank (basically a machine that works like a wind tunnel but with water). By look-

ing at how water streams around the models at different speeds, Leslie hopes to discover how the backward fin and upturned tail tips might affect the dolphins' swimming capabilities. He has a hunch it may give the spinners particular advantages in maneuverability and overall stability.

But it could far more basic than that. It is entirely possible that the anomaly is nothing more than a visual "turn on" to females, and that the males physical form changes with full maturation in attempt to appeal to possible mates.

To find out for sure, Leslie needs to perform a variety of tests and that calls for funding. Currently, this research isn't at the top of any large-scale funding agency's "donation list", so Leslie is appealing to ocean lovers, whale and dolphin enthusiasts and anyone who may be interested in helping solve the riddle of the eastern spinner dolphins with donations.

If you would like to see more pictures and video of these amazing dolphins, as well as Leslie's explanation of his project, log on to You Tube and type in Matt Leslie Dolphins. ■

SOURCE : SCIENTIFIC AMERICAN



WIKIPEDIA

—A matter of comfort Sidemount Workshop

Text by Olga Torrey
Photos by Larry Cohen

When I started scuba diving, I became aware of the limitations of an injured body. Every time I carried a scuba tank, the acute pain in my lower back and shoulders increased, and it took a long time for the pain to go away. I did not want to give up scuba diving, so I looked for a solution and found one—diving sidemount.

The best time of my life was when I competed in track and field as a teenager, in college and as a young adult. I continue to engage in sports today, including cross-country skiing, snowboarding, table tennis, basketball and many other sports. Injuries I sustained through sports stopped me from fully enjoying these activities. Since 1999, I have suffered from a back injury and have had both my shoulders operated on.

When a competitive athlete ages, he or she becomes more susceptible to injuries. Participating in sports requires one's full focus. The body becomes a machine that must properly function to produce the best results. Keeping the body healthy is extremely important, and the joy of victory over one's opponents comes with a price. If the individual push-

es the body to the limit, it could break. Physical injuries are the worst nightmare for any active person. One might embrace new challenges, but the body doesn't rebound as quickly. Minor injuries become a problem, and to continue an active lifestyle, one has to consider alternative techniques. I am one of those athletes.

Last year, I went to Dutch Springs, located in Bethlehem, Pennsylvania, USA, to practice diving and my photo-video skills. After finishing the dives, I expressed frustration about my pain loud enough for others to hear. Some moments later, Sean Martini—a scuba instructor from The Scuba Connection dive shop—suggested I take a sidemount class. Sean clearly explained the benefits of this gear configuration. He believed using sidemount could solve my issues. I had never even seen a diver in sidemount gear before, but I was willing to give it a try.

Dive Rite held a sidemount demo at Dutch Springs in the summer of 2010. My first step was to try it out in the water. Under the guidance of a scuba instructor, we did a 15-minute dive. Back at the surface, unclipping my tanks, I exited the water with just the harness. Finally, a dive without pain. I made the decision right on the spot to take a sidemount workshop.

The workshop

The following week, two of my curious scuba buddies joined me for the sidemount workshop given by The Scuba



Connection. Wayne, the business owner and an instructor, greeted us with a smile before starting the class. Manuals, pens and tank rigging parts were laid out around the table and the floor. When I saw so many unknown scuba parts, I doubted if I could remember them all and how to put them in order.

The workshop began with the history of sidemount. The configuration

was designed for extreme cave divers. Wearing tanks on their side, technical divers could penetrate tight passages too small for traditional back-mount rigs with multiple stage bottles. Other advantages include two separate sources of gas, with two independent regulators. One also has easy access to tank valves, in case of an emergency.

Sidemount allows for a greater range

of motion, comfort and vision. Buoyancy and a streamlined profile are easier to maintain. Entering and exiting the water without tanks is another advantage. Petite or aging divers can use different size cylinders.

I was already convinced that sidemount was for me. Eager to get into the water, I wanted to experience these benefits over my single tank back-mount





covered.

Wearing a drysuit, heavy undergarments and thick gloves that restricted movement, I had some difficulty clipping and unclipping the tanks and thought the clips were too small. The motion to perform this task made my shoulders ache.

When we took a break, I expressed my concern regarding the clips. I asked my instructor to replace the small clips with larger ones. Wayne explained why we needed the smaller clips to keep a low profile and streamline configuration. He said practicing would develop muscle memory, and this task would get easier. However, he agreed to temporarily substitute larger clips to

make it easier to attach the tanks.

Another issue came up with tanks unclipped and pushed ahead. To keep proper trim with steel tanks brought to the front, a diver must establish buoyancy. I did that, but I could not hold the cylinders for too long. The seven-pound negative tanks were too heavy for me to stay in proper trim. I realized more work had to be done in the gym.

We learned advanced finning techniques including frog, modified frog, flutter, modified flutter, helicopter turns and reverse kicking. I tried to mimic the instruc-

tor's techniques but realized more practice was needed. Other skills included deploying surface markers, ascending to a safety stop and maintaining proper trim. It was not an easy task to keep eye contact with my buddy and maintain neutral buoyancy while deploying a safety sausage.

Drills

The third day was as intense

as the previous days. Wayne outlined the day's plan on the blackboard. We worked on the system's attachment points adding other gear including lights, lift bags and reels. Gas management was explained in detail, and we performed valve shutdowns and air sharing while swimming.

The valve drill was a very tricky part of the workshop. I was instructed to swim to the sunken

configuration.

After history and theory, Wayne demonstrated tank rigging. He dressed and undressed a scuba tank, explaining step by step the proper attachment of straps, clips and bungees.

My practical scuba friend, Jeanne Chin, brought her camera to record every stage of how to do the tank rigging. It was very helpful for remembering how to rig the cylinders.

It was now our turn to rig the tanks. We practiced until it became familiar.

In the water

On the second day, we hit the water at Dutch Springs. The class began establishing proper buoyancy control, weighting and trim on the surface. When my buddies and I felt comfortable, we ventured out toward the training platforms at a depth of 30 feet.

I was overweighed. Wayne kept the Nomad weight plate on my harness with pockets facing out in case the weight needed to be readjusted. Finally, I established my buoyancy and focused on trim.

Easier said than done. My legs

pulled me down into a vertical position. Two steel tanks on my sides felt awkward. Wayne gently pulled my feet up and my shoulders down, this helped me get into proper trim. My body was tense, and it took some time to get used to this.

We learned how to route the hoses correctly and worked on valve drills. Images of rigging tanks from my dive buddy's camera were burned into my mind. Cylinder removal and replacement in different positions, unclipping the back of the cylinders and pushing them ahead was



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different environments and personal body types. Divers should be aware of their own needs when selecting equipment. I purchased a Dive Rite Nomad XT sidemount rig because the company has experience with technical dive gear.

The super-tough exterior is resistant to punctures and abrasions. The wing provides up to 50 pounds of lift, which

is perfect for the steel tanks I use.

The harness has a snug fit, which is essential. My instructor and I spent time adjusting the harness to the proportions of my body. I liked the padded shoulder and cross-chest straps for proper comfort and fit. Being a cold-water wreck diver, I appreciate that adjustments can be handled with thick gloves, and I enjoy the flexibility of the attachment points for all my loose gear.

When diving off boats, I use an equipment line. I clip off one tank in the water at the end of the dive. This way, I can climb up the ladder where a crew member removes my second tank. This is easier on my body.

Besides diving New York/New Jersey's wreck valley, I have travelled with my

sidemount gear to the Thousand Islands, Alaska and Bonaire. Outside of Florida's cave country and Mexico's Mayan Riviera, sidemount is not very common. One might expect resistance from dive operators who usually deal with single tank divers. Today, some recreational and technical training agencies offer sidemount courses, increasing the popularity of the configuration.

For the past year, I've met more sidemount divers. Sidemount was once a technique used only in the technical community, but now it's available to recreational divers. This makes it possible for divers of all levels to pursue their underwater passion. When I am asked why I chose this configuration I say, "Long dives, no pain." ■

Sikorsky H-37 helicopter using compass readings; then, penetrate the chopper through the back door; and finally, swim the full length of the helicopter. I was told to be ready for surprises.

When I swam in, I saw a flash card suddenly appear in front of my face. It read: "Cutting Tool". I pulled out a knife from my thigh pocket. "Backup Light", "Reel" and many other commands followed.

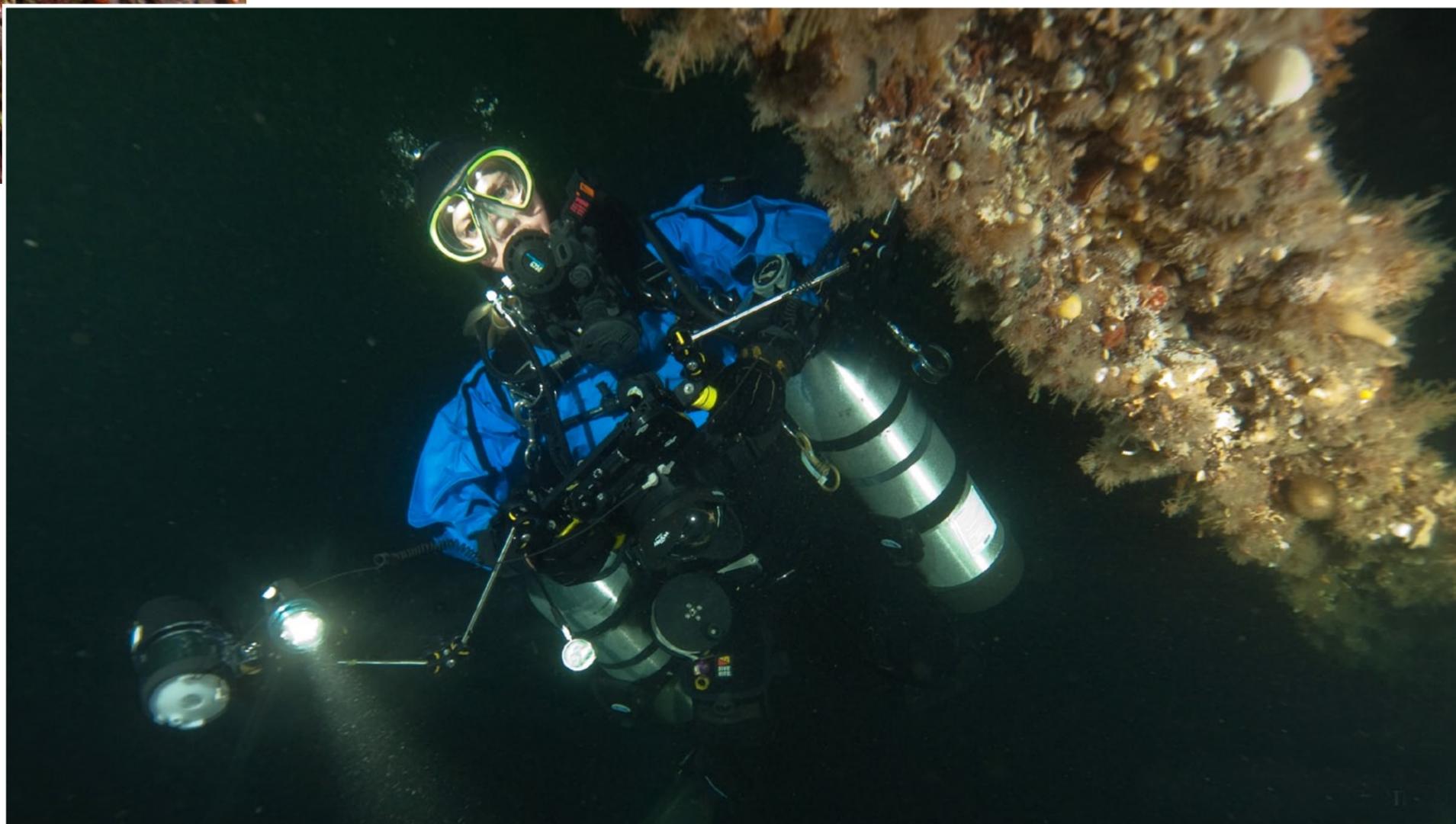
At some point, the instructor disappeared from my view. I relaxed, thinking I had finished my tasks for the day. Suddenly, a burst of bubbles erupted from my tank valve. Surprised and shocked, I realized I had a free-flow on my left tank. It took me a few seconds to evaluate the situation. I switched regulators, shut the tank valve and breathed from my right tank. Wayne had simulated the free-flow by sneaking behind my back.

Dealing with this kind of an emergency is much easier and safer with sidemount. You could see the valves and operate them without physical obstruction. This is not the case with back-mount.

We also practiced donning tanks while floating at the surface and handing them to a tender, or boat mate. After three days of training, it was time to demonstrate what we had learned. This time, I was more relaxed, knowing that I had a redundant gas supply and was more in control of my gear. This lowered my sac rate and allowed me to do longer dives. Because of this workshop, I am a better diver.

Rigs

The market offers a variety of sidemount rigs that meet the needs of



A White House for Anemonefish

Even if they offer a wonderful photographic occasion, sea anemones bleaching can be another signal of reef suffering due to water temperature increase.

Text and photos by Francesco Ricciardi

Coral bleaching is a natural phenomenon of zooxanthellae (the symbiotic algae necessary for the survival of many hard and soft corals) expulsion that some corals and anemones experience in presence of high temperatures, which induce the production of toxins by their symbiotic "allies". In this case, the enemy comes from inside and should be eliminated, thus, the animal eliminates the microalgae. Sadly famous is the massive coral bleaching induced by El Niño in the 90's, especially in the Indian Ocean. Other events of coral bleaching have been recorded worldwide, including the Great Barrier Reef and the Indo-Pacific area (Indonesia, Malaysia, Philippines). Some of these areas are showing signs of recovering, but the increasing temperatures remains a critical threat for every coral reef.

Recently, dive spots all around the Asian reefs presented a quite unusual incidence of sea anemones bleaching, due to the higher sea

temperatures recorded this year. Even though it's a great photo opportunity—of the primary sea anemone inhabitants, the clownfish (often called anemonefish) which with their bright colors make a wonderful color contrast to the white background of the bleached anemone—the shining white sea anemones are not a really good signal of coral reef health.

Even when there is not a massive coral bleaching event similar to that which occurred in many parts of the world, too many sea anemones bleaching in a given area are a warning signal that we should not underestimate, even if natural cycles of warmer waters can occur in some areas.

In Indonesia, in the North Sulawesi Area (Bunaken, Manado Coast, Lembeh Strait just to cite the most renewed areas!) the first signs of bleaching came from the magnificent sea anemone (*Heteractis magnifica*), which apparently is the

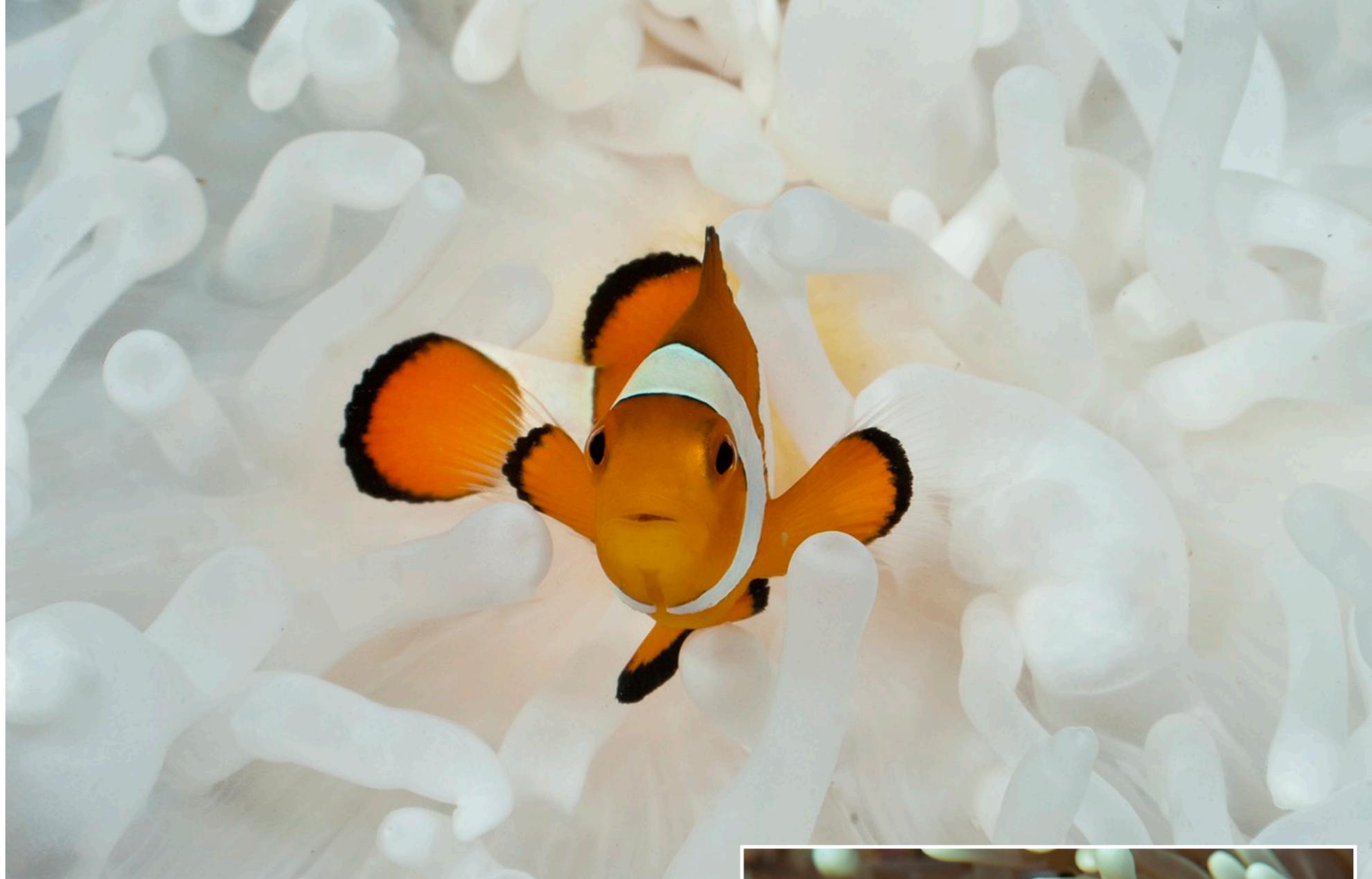
most sensitive species in the area. At the moment, other species such as *Heteractis crisper* and the bubble sea anemone, *Entacmaea quadricolor*, are showing signs of bleaching.

Anemone bleaching is not an instantaneous process; anemones start losing color slowly, passing from their natural color to a greenish-brownish one, before becoming something like a fluorescent green and finally completely white. In some occasions, especially at dive sites that I visit more commonly, it has been possible to monitor the color changes from the normal one

to the completely white phase.

Due to the importance of zooxanthellae in the sea anemone's physiology, the resistance without these microalgae is quite limited during this time; if they are not able to recover, bleached anemones start disappearing, especially if other conditions (light and food availability) are not optimal.

So, what about their inhabitants, the colorful anemonefish? Of course, a healthy anemone is necessary for their protection, and anemone bleaching can threaten the survival of some local populations. ■



Before and after (big image): the same magnificent sea anemone and his clownfish, the western anemonefish (*Amphiprion ocellaris*) photographed in November 2010 and February 2011. Fukui Point, Bunaken Island, North Sulawesi, Indonesia



Shark attacks

— facts & myths

Text and photos by
Andy Murch

Of the 465 or more species of sharks that are currently described, only a handful are regularly implicated in shark attacks.

The most commonly identified (or perhaps misidentified) sharks include the bull shark, white shark, tiger shark and various reef sharks. Historically sandtiger sharks (AKA grey nurse sharks in Australia, and ragged tooth sharks in Southern Africa) were held responsible for many attacks due to their menacing appearance.

Not guilty verdict

They have, more recently, been found 'not guilty' in the majority of cases, but the bad press that they initially received plus their docile nature when in contact with spear fishermen, left them wide open to exploitation, and their numbers have been seriously depleted. It is estimated that the schools once common off the east coast of Australia have dwindled to the point of pending extinction with somewhere around 300 individuals remaining.

In most attacks where the

shark escapes, it is difficult (if not impossible) to identify the exact species involved.

Identifying the culprit

One of the ways that shark attack investigators figure out who is the culprit in an attack is by the examination of teeth that are sometimes left at the scene having been torn

from the shark's jaw during the struggle or embedded in the victim's flesh or equipment. For example, teeth are sometimes lodged in surf boards during attacks on surfers. Another good way to identify individual shark species is by measuring the bite radius, the shape of the wound, and the clean or ragged cut of the teeth. For example, a tiger shark, which has an imposing set of cutting teeth capable of sheering through the shells of large sea turtles, would leave a cleanly severed bite out of its victim. Whereas, a sandtiger or Mako shark, which have dagger-like grasping teeth, would leave a ragged wound if trying to pull away a portion of flesh.



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Another good way to identify individual shark species is by measuring the bite radius, the shape of the wound, and the clean or ragged cut of the teeth. For example,

Subjectivity

It is often difficult for victims and observers to report objectively on their experiences due to the traumatic nature of the encounters. This combined with a general public's lack of knowledge of shark species leaves investigators lacking for accurate information.

Sometimes, geographic

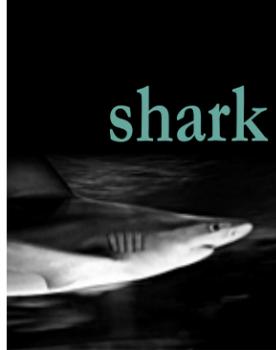
location is the best clue to identification. Some species inhabit areas where few other large sharks enter such as the freshwater range of bull sharks. Attacks occurring far up river are inevitably attributed to this species although in some areas, there are other fresh water sharks, which may be responsible such as the Ganges shark in the river systems of India.

Bull sharks are indeed one of the most gregarious of shark species and have been implicated in attacks as far reaching as New Jersey to South Africa, and the Zambezi River to Lake Nicaragua. In attacks off of the surfing beaches of California, white sharks are most commonly implicated.

Although other species inhabit this area (such as blue sharks), the white shark is responsible in the majority of cases, as its natural behavior and tendency to frequent surf zones lend to the likelihood of attack.

Hunger, curiosity or mistaken identity?

Attacks occur in many different ways. The majority of white shark attacks do not result in the death of the victim leaving researchers wondering why. Obviously, a large great white shark would have no trouble dispatching



a human if that was its intent, but in many cases, the shark bites the victim once and then leaves. There are many theories as to why white sharks do this.

One theory is that the shark is simply using its sensitive taste, touch and smell to attempt to identify the object in front of it. Unfortunately for the victim, this 'mouthing' can result in catastrophic injury. If the shark is indeed trying to ascertain the victim's content in order to decide whether it is worth eating, then its tendency to leave after the first experimental bite would imply that it finds human flesh either distasteful, or not fatty enough to waste precious energy trying to digest.

Hypothesis

Another hypothesis is that the

white shark is following its natural 'bite and bleed' instinct that it uses when tackling dangerous prey such as California sea lions. White sharks have repeatedly been documented to attack large seals explosively and then retire to a safe distance while the animal bleeds out. This strategy probably saves the shark from serious injury from the teeth and claws of the wounded prey. But, if this is the reason that humans are only bitten once and then abandoned, one wonders why the shark does not return before the individual is dragged from the water or manages to swim to safety.

Even if the extent of the injuries

There are probably a multitude of correct reasons why sharks bite depending on circumstance. What really goes on in a shark's brain may never be truly understood.

prove fatal, the body of the victim is rarely consumed by the shark although this does happen. A snorkeler was killed in the Abrolhos

Islands off the western seaboard of Australia in March 2005. The ferocity of the attack, which was witnessed by other swimmers, indicated that the shark was single-mindedly attempting to eat the victim and a cursory search for remains was almost immediately called off. At that time of year, transient white sharks arrive from South Africa having spent many weeks crossing the open ocean where food is in limited supply. It is suspected that the resulting hunger of these sharks is such that they are likely to attack and consume whatever is available upon their arrival off the Australian coast.

Turbid waters

Many attacks on swimmers occur in turbid water. This lends weight to the idea of mistaken identity i.e. the shark sees the moving light colored leg of the victim thrashing around in the surf and instinct kicks in. The shark expects a wounded fish and clamps down on the visible appendage only to find out that it is attached to a large struggling human. This mistaken identity scenario has also



Shark Attack

been attributed to attacks on surfers where the silhouette of the surfer on his/her board, when viewed from below, looks like the outline of a sea lion. In both of these instances, the shark, which generally has excellent vision, is made out to be somewhat less intelligent than it probably deserves.

Not food related

It may be that some shark bites are not food-related at all. How better for a curious shark to explore its environment than to chomp down on an interesting object. There are probably a multitude of correct reasons why sharks bite depending on circumstance. What really goes on in a shark's brain may never be truly understood.

Shark attack capital

In the summer of 2003, a 'feeding frenzy' occurred in Florida. At

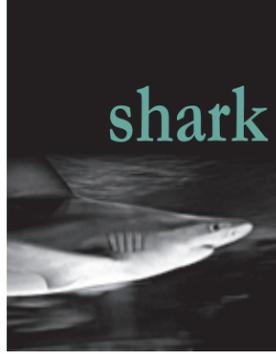
the same time, there were also a few shark attacks, some of which tragically ended in fatalities. The 'frenzy' was a product of the media that was blown completely out of proportion. The coverage resulted in serious repercussions in the shark world. Although the amount of attacks was no greater than previous years, the media starved for real news, worked the attacks until politically motivated officials called for a ban on shark feeding in state waters. The bill was passed, and the operators feeding nurse sharks around Boca Raton and other places suffered financially. Divers looking for their first shark interaction in the wild also suffered. The next year, the attacks continued.

Baiting

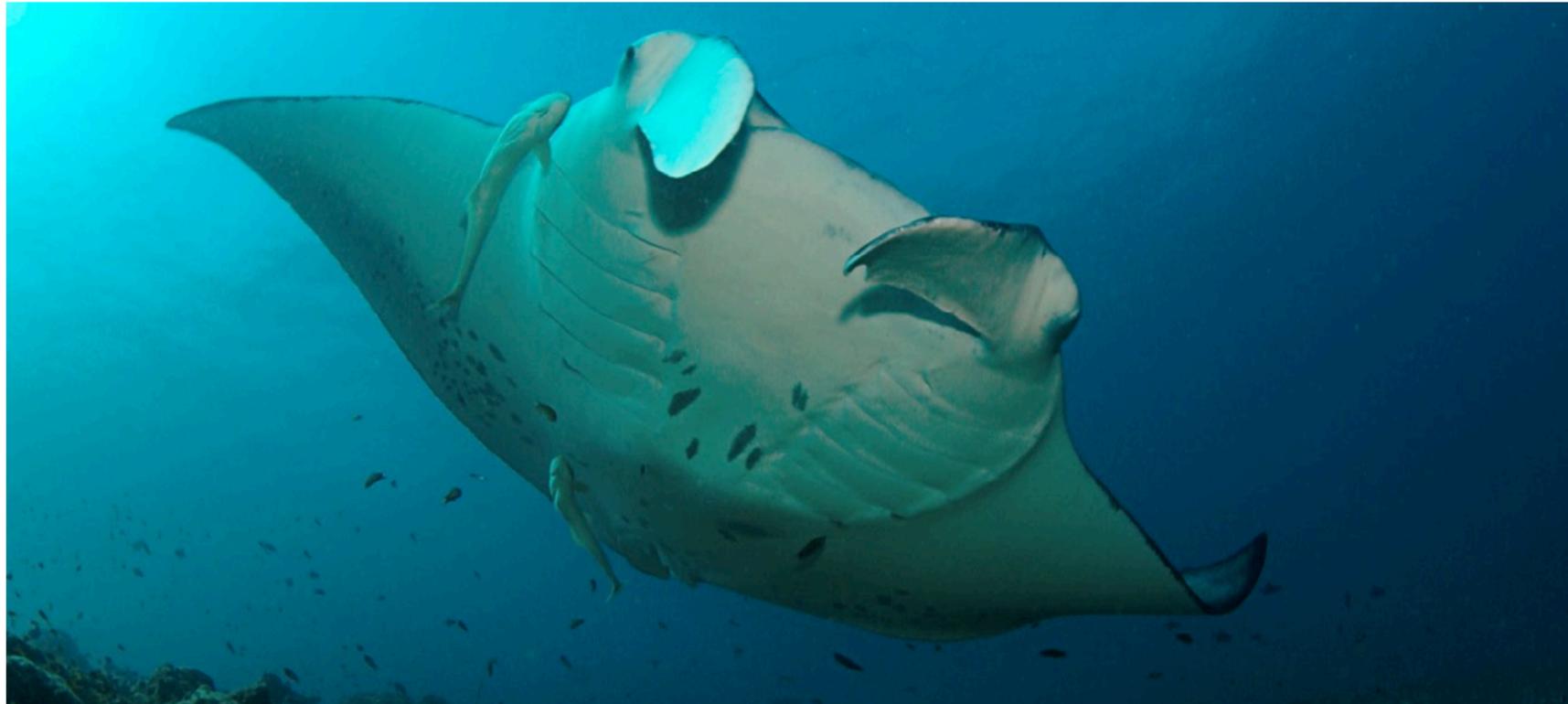
What is worth pointing out is that the fishing charters and pier fishers were still allowed to bait indiscriminately for sharks. The main beach attack grounds are surrounded by fishing piers where bait and fish scraps are tipped into the water mere yards from frolicking beachgoers. The nurse shark feeds took place way off shore and attracted sharks that have not been implicated in the Florida attacks, and even if they were, their dentition would result in minor wounds compared to the reef sharks that were being fished off the beaches. Presently, the dive operators negatively affected by the ban are lobbying for its removal, but with limited funds at their disposal, a return to shark diving in Florida is unlikely. ■

For more information on caring for a victim of shark attack, please visit: <http://elasmodiver.com/Shark%20Attacks.htm>





Mantas designated vulnerable species



MICHAEL AW

Giant and reef manta rays added to the Red List of Threatened Species by the International Union for Conservation of Nature (IUCN).

IUCN's Shark Specialist Group (SSG), a worldwide network of scientists based at Simon Fraser University (SFU) in British Columbia, Canada, and co-chaired by SFU biologist, Nick Dulvy, has declared manta rays 'vulnerable' with an elevated risk of extinction due to intense fishing and a growing scarcity of food.

The IUCN Shark Specialist Group has recently completed the Red List assessment of all 1,044 chondrichthyan (cartilaginous fishes

– Ed.) species. Manta ray populations have declined by as much as 80 percent in several regions over the last 75 years and by more than 30 percent worldwide.

Two species

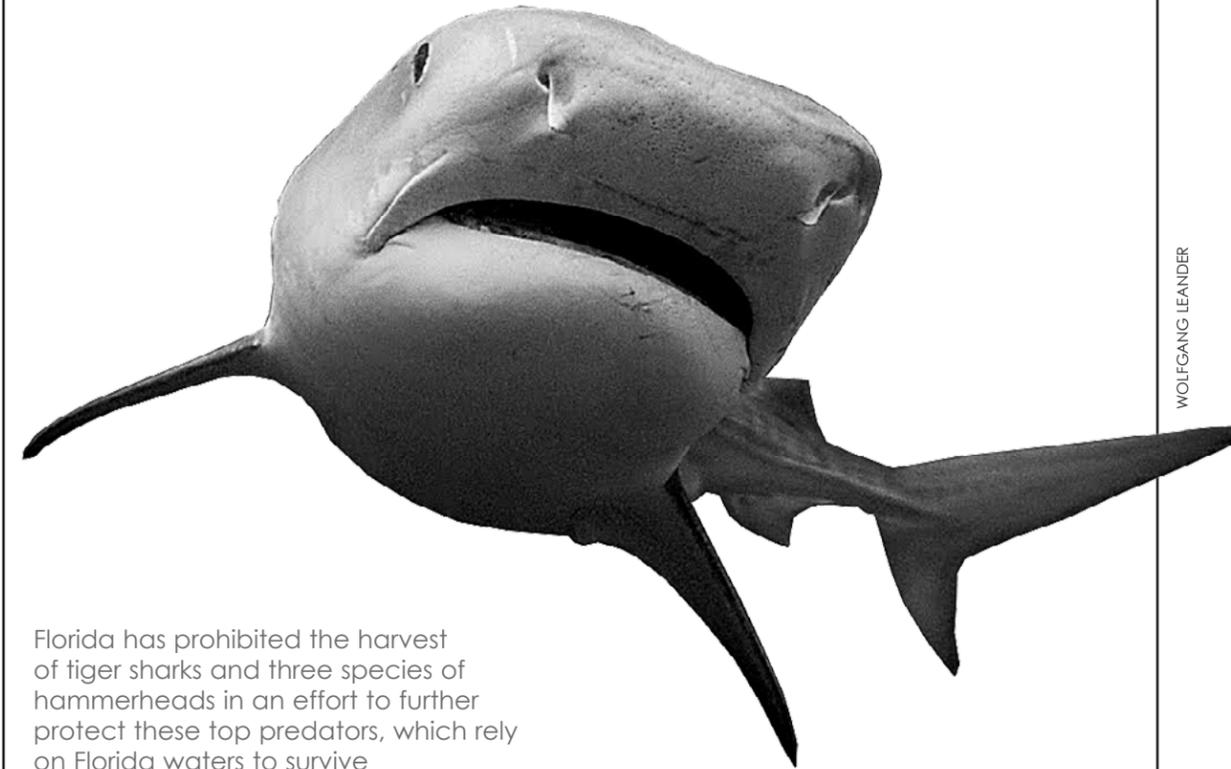
Comparisons of field observations recently revealed that there are actually two species of 'manta': the reef manta ray (*Manta alfredi*) and the giant manta ray (*Manta birostris*), both of which are now classified as vulnerable.

The Giant Manta Ray is the largest living ray, which can grow to more than seven meters across. Manta Ray products have a high value in international trade markets and targeted fisheries hunt them for their valuable gill rakers used in traditional Chinese medicine.

Monitoring and regulation of the exploitation and trade of both manta ray species is urgently needed, as well as protection of key habitats. ■

Swimming, diving and filming with manta rays are major eco-tourism activities generating US\$100 million annually worldwide.

Florida steps up protection of sharks



WOLFGANG LEANDER

Florida has prohibited the harvest of tiger sharks and three species of hammerheads in an effort to further protect these top predators, which rely on Florida waters to survive

The U.S. Florida Fish and Wildlife Conservation Commission (FWC) prohibits the commercial and recreational harvest of four shark species.

An estimated 800,000 sharks were killed by recreational fisherman off the Gulf coast and Atlantic waters between 2004 to 2008.

The new measures, which also prohibit the possession, sale and exchange of tiger sharks and great, scalloped and smooth hammerhead sharks harvested from state waters, became effective on 1 January 2012. These sharks can still be caught and released in state waters and can be taken in adjacent federal waters. The change got its start in 2010, after concerned citizens, shark researchers and shark anglers expressed their desires to the Commission to see increased protections for sharks.

Florida waters offer essential habitat

for young sharks, which is important for species such as the slow-to-reproduce tiger shark, which takes about 15 years to reach maturity.

Sharks have been strictly regulated in Florida since 1992, with a one-shark-per-person, two-sharks-per-vessel daily bag limit for all recreational and commercial harvesters and a ban on shark finning. Roughly two-dozen overfished, vulnerable or rare shark species are catch-and-release only in Florida waters.

The FWC is also working on an educational campaign highlighting fishing and handling techniques that increase the survival rate of sharks that are caught and released while ensuring the safety of the anglers targeting them. ■



“If it hybridizes with the common species it can effectively shift its range further south into cooler waters, so the effect of this hybridizing is a range expansion. It’s enabled a species restricted to the tropics to move into temperate waters.”

— Jess Morgan, University of Queensland

First observation of shark hybrids



UNIVERSITY OF QUEENSLAND PRESS RELEASE

This hybrid blacktip shark contains both common and Australian blacktip DNA

The newly discovered hybrid shark is a combination of Australian blacktip shark and its global counterpart, the common blacktip shark.

Scientists have found that sharks on Australia’s east coast display a mysterious tendency to interbreed, challenging several accepted scientific theories regarding shark behaviour. Researchers from

University of Queensland have discovered widespread hybridisation in the wild between two shark species commonly caught in Australia’s east coast shark fisheries—the Australian blacktip shark and the common

blacktip shark. Initial studies suggested the hybrid species was relatively robust, with a number of generations discovered across 57 specimens.

Some of these hybrids were first generation or what is technically referred to as “F1”. This means that one parent was a common blacktip and one was an Australian blacktip. Others were backcrossed (“B+”), which means that one parent was a common blacktip-Australian blacktip hybrid, and the other was a “purebreed” of one of those two species. According to the study’s lead author, Dr Jess Morgan of the University of Queensland, this means that these animals are reproductively viable. The hybridization and backcrossing has probably produced many more generations of mixes, but the existing genetic markers can’t distinguish how many generations past the second cross have occurred.

The two blacktip species are very closely related (termed sister species), and this is probably why their hybridization has been successful. The Australian blacktip is slightly smaller than its common cousin and can only

live in tropical waters, but its hybrid offspring have been found 2,000 kilometers (1,243 miles) down the coast, in cooler seas.

Reaction to climate change?

This has led to some speculation in the media that the Australian blacktip could be adapting to ensure its survival as sea temperatures change because of global warming. However, there is no evidence that supports the notion that the hybridisation is a reaction to climate change, and much of the debate displays an all-too-common lack of understanding of how evolution works.

Common blacktips have a much wider distribution and are found worldwide, including throughout the more restricted range of the Australian blacktip. The area where the ranges of two species capable of interbreeding overlap is called a “hybrid zone”. Scientists expect to see more hybrid zones as climate change

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SHARK DIVING AT SANDTIGER CENTRAL, MOREHEAD CITY, NORTH CAROLINA, USA

alters the ranges of numerous species.

Are they the only ones?

These animals may be the first hybrid sharks to be detected by scientists, but are likely not the world’s only hybrid sharks. Other closely related shark and ray species around the world may be doing the same thing; we just have not discovered it yet. Different shark species often have varied mating behaviors, which was thought to make such hybridization extremely unlikely. Though hybrids have long been known in many other groups of organisms, it’s just the first time that it has been observed in sharks.

It has also been hypothesized that the hybridisation is a reaction to overfishing, which has reduced the populations of both

“We do not believe that climate change triggered the hybridization event.”

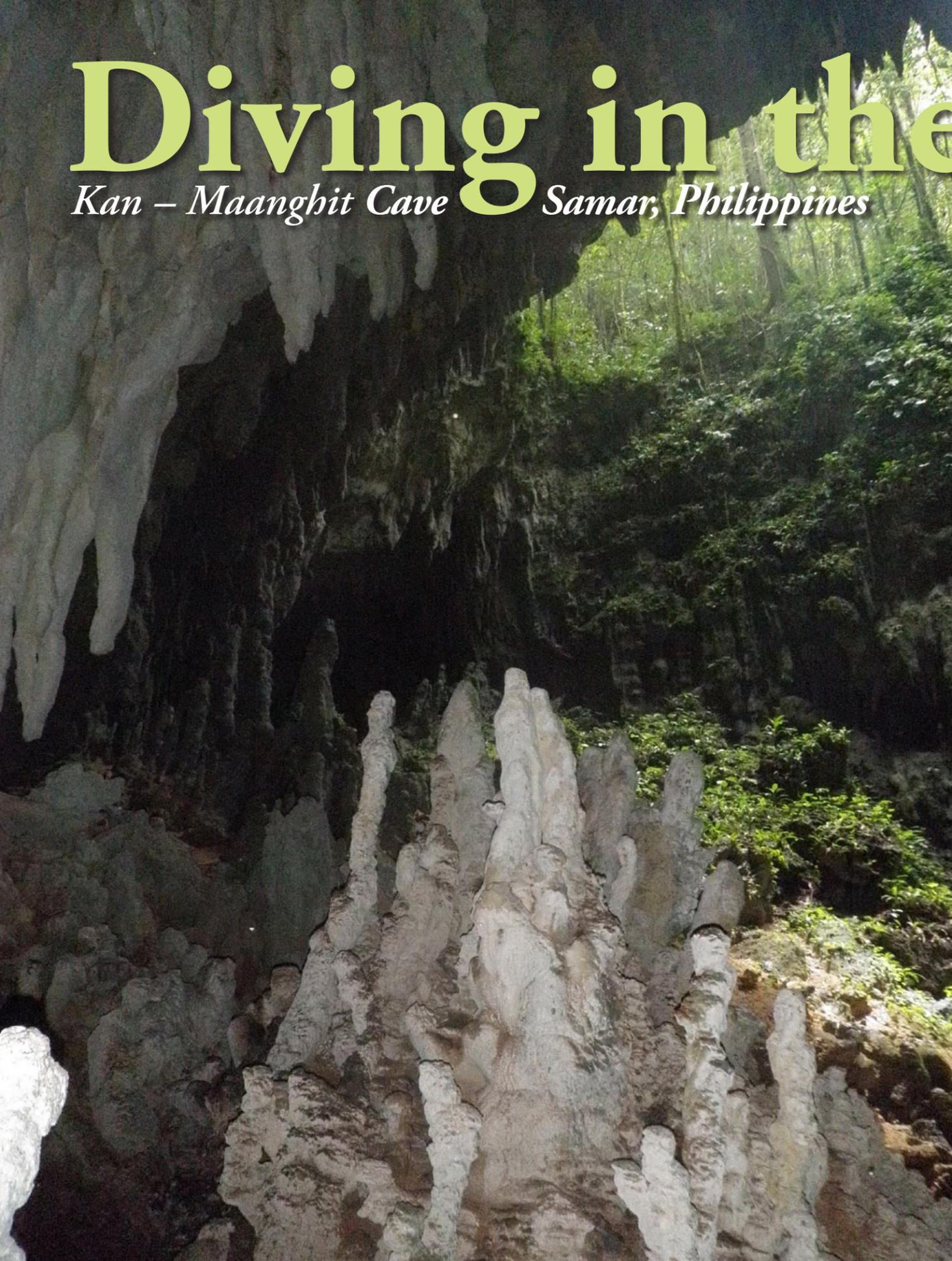
— Jess Morgan, University of Queensland

species. However, assessments suggest that they are relatively productive species and that populations are not at dangerously low levels. It should also be noted that sharks have long generation times, so the original hybridization detected in this study has to have been going on for at least several decades. That long ago, shark populations were much healthier than they are now. ■



Diving in the Jungle

Kan – Maanghit Cave Samar, Philippines



Text and photos by
Bruce Konefe

The island of Samar is located in the Eastern Visayas region of the Philippines. It is known for its serene living. The island has a beautiful coastline with beautiful rainforests and a rugged limestone terrain. As you travel through Samar, you will see many low level mountains with beautiful waterfalls and streams. The island of Samar does not have a distinct rainy or dry season, but if you would like to go, the months from April to July would be considered best.

This past August, our group of underwater cave explorers arrived in Samar to explore new cave systems and a system that we had discovered the previous year. As team leader, I met with divers, William Hudson and Thomas Bodis, and our local Philippino guide, Joni Bonifacio—owner of Trexplore in the capital city of Catbalogan in Samar.

Traveling one and a half hours by jeepney to nearby Barangay Campo Uno Paransas, our team of four met the owners of the three boats that would take us and our equipment up the Ulot River.

The boats were about four meters

long, powered by 10-hp Honda motors. The boats road so low over the water, that one could stick a hand over the side and into the water. It was quite amazing that we were able to fit a compressor, 18 dive tanks, three large dive equipment bags and a few other bags into the boats without sinking them. The ride up the Ulot River was a beautiful and exciting ride, which took 2.5 hours before arriving in the village of Barangay Salvation in eastern Samar.

The villagers told to us about a cave entrance that ran out of the mountains, which was just ten minutes up the stream. Upon arrival, we found a crack in the stone wall, but once we descended down to about 24 meters, it opened up wide

enough to get through.

The water was very cold (luckily, some of us wore drysuits) and also had a very strong current coming out of the cave. We pulled our selves down, squeezing through the large lime stone rock. The visability was quite good, and the passage widened a lot. However, it was a good thing that the team had decided to use sidemount equipment to get through some of the smaller holes.

We worked our way down to about 34m when we hit our rule of thirds and turned the dive. At 34m, the cave kept getting deeper, and the passageways got much larger. To explore the cave further, we would have needed trimix and nitrox to do the dive safely.



THIS PAGE: Scenes from Kan —
Maanghit Cave in Samar, Philippines





THIS PAGE: Villagers from Barangay Salvation look on as the dive team prepares equipment and packs the boats that will take them up the Ulot River toward the cave



There had been excellent visibility going in, but when the three of us turned around, the visibility decreased a lot. After a few meters of crawling our way out, the visibility cleared up. The problem we had to concentrate upon now was holding onto the large boulders so we would not get blown out and miss the decompression we had built up on the dive.

Once everybody was safe and sound back

on the boat, we headed back to the village where we started planning the next day's trip into the jungle.

Samar is really just starting to expand into cave diving activities. So, to acquire dive tanks, the team had to have them sent by minivan from the town of g1, which is five hours away from the local BFAR (Bureau of Fisheries and Aquatic Resources).

The village of Barangay Salvation is located

in a very remote area. The town has electricity for only about four hours each evening when there is enough fuel to run the generator. The people of Salvation were wonderful to us and let us stay in their own houses. They fed us some fabulous meals. On one special occasion, they served us *carrabo*, which was the most tasty meal of the trip.

The village is the local haunt of a Philippine military post, which has a lot of guys with



CLOCKWISE FROM LEFT: The crack leading to the Kan – Maanghit Cave; Riding the Ulot River to the dive site; Carrying dive equipment through the jungle; The dive team's camp near the cave

ies for us in the evening.

Our guide, Joni, organized a group of 18 porters from the village who helped carry all of our equipment into the jungle to Kan – Maanghit Cave. The journey to the cave took us about 2.5 hours, hiking

through fields, steams and jungles.

At the cave

As we walked through the waist-

deep water, there were thousands of bats swarming around. It was not unusual for the bats to fly right into us as we were walking.

We reached the place where we would dive, but not everybody had arrived yet. As we were waiting for the rest of the team, there was suddenly a lot of screaming, and porters were running in all directions. It turned out that the porters had come across a four-meter-long python snake.

For the next four days, we camped in the area in order to explore Kan – Maanghit Cave. Our plan for this trip was to extend the line we had previously laid last year. But, from the very first dive,

nothing went as we had planned.

During the past year, the water had risen so high that the people in the village had to move into the mountains. At the dive site, the flow of the water had strung the line all over the inside of the cave.

On the way to the cave, William and I made a small bet on whether the line would still be in the cave or not. I bet that the line was still there but almost wished it had been washed away. The line actually become a hazard while we were in the cave and really complicated the dives. We decided to repair the line as best as we could but then focus on exploring other parts of the cave.

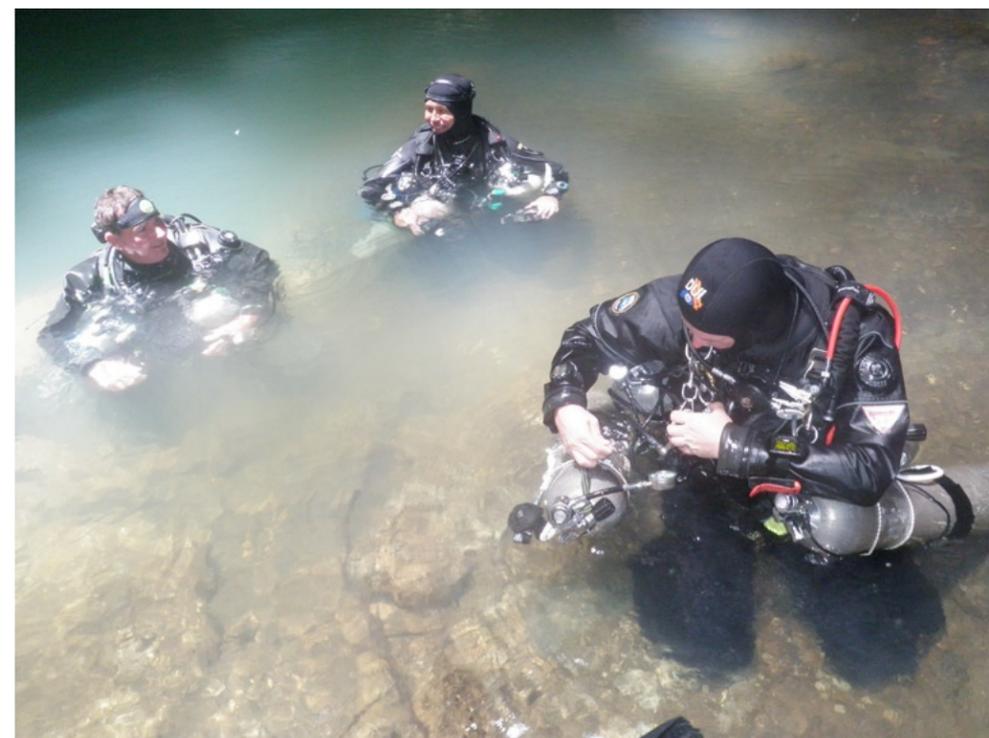




We explored the other side of the cave, and it turned out to be an awesome dive with a lot of stalactites and stalagmites. In one section, we were able to surface and see how beautiful the dry chamber was—a sight that took our breath away.

As we were getting ready to pack up the gear and start heading back to Barangay Salavation, the porters decided we had too much gear and that it was too heavy to carry out. We ended up having to hire more porters—a total of 28—a water buffalo and a small boat to get all the equipment back to the village.

After getting back to Catbalogan and getting some work done on our equipment, we headed off to Guiuan, which is located in the southeastern part of the Philippines. We had been there before and had had a lot of luck finding caves. On this trip, we went back to dive a cave we had found a couple years



THIS PAGE: Dive team prepares to dive Kan – Maanghit Cave as porters look on



THIS PAGE: Porters carry dive equipment back out of the cave and pack it onto a water buffalo for the return trip to the village



ago. We tried looking for this cave before, but instead we found two other caves to dive on the same path in the jungle. Because of the difficulty locating the other cave, we brought pictures of the cave and the porters, to show the porters what the cave looked like, in hopes that they could remember.

In order to reach this cave, we needed only six porters to carry the tanks and equipment. Once we found the cave, it was nothing but crystal clear water. Thomas and I spent an hour diving around the beautiful clear water. There were some other passageways we wanted to check out but our bottom time came to an end.

In our next adventure to Samar, there are three virgin caves that we plan to explore. Each year, we think it will be our last, but

we always manage to find new places to explore. Cave exploring is very expensive, especially when

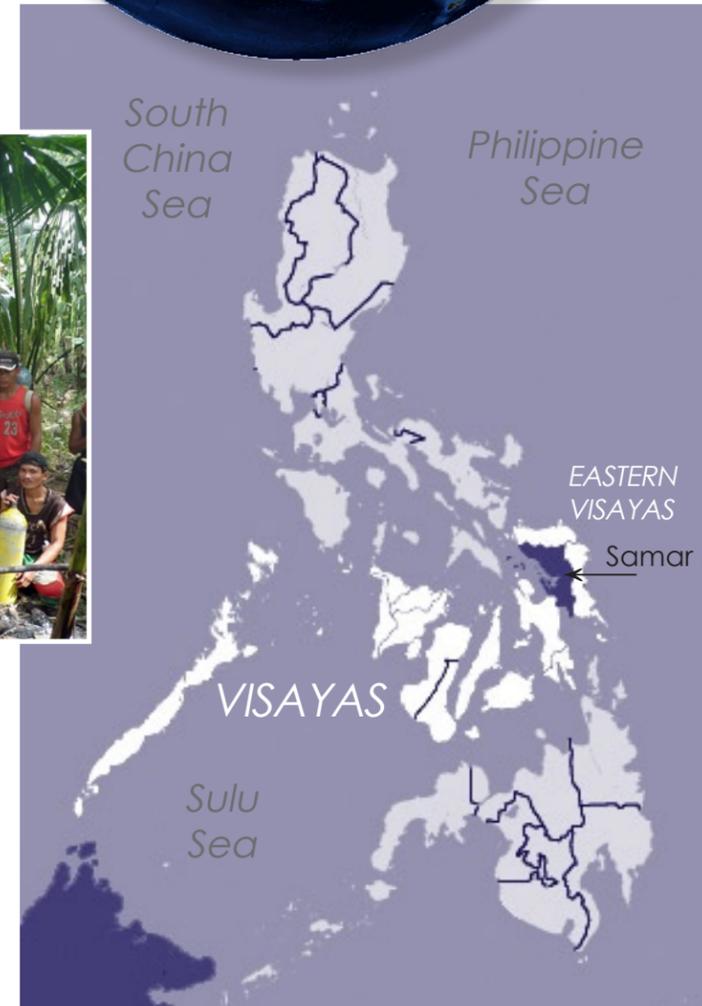
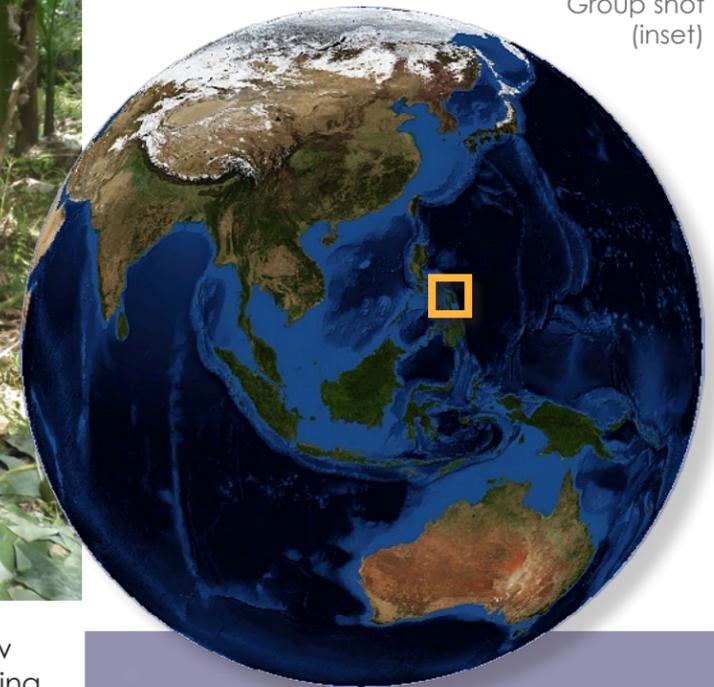


you are looking to find what no one else has explored before. ■

A special thanks to John Griffith of Ocean Management Systems, ANDI—American Nitrox Divers International and Cochran computers for their help and support of our expedition.

Jungle Cave

Location of region on global map (below); Location of Samar on map of the Philippines (bottom); Group shot (inset)



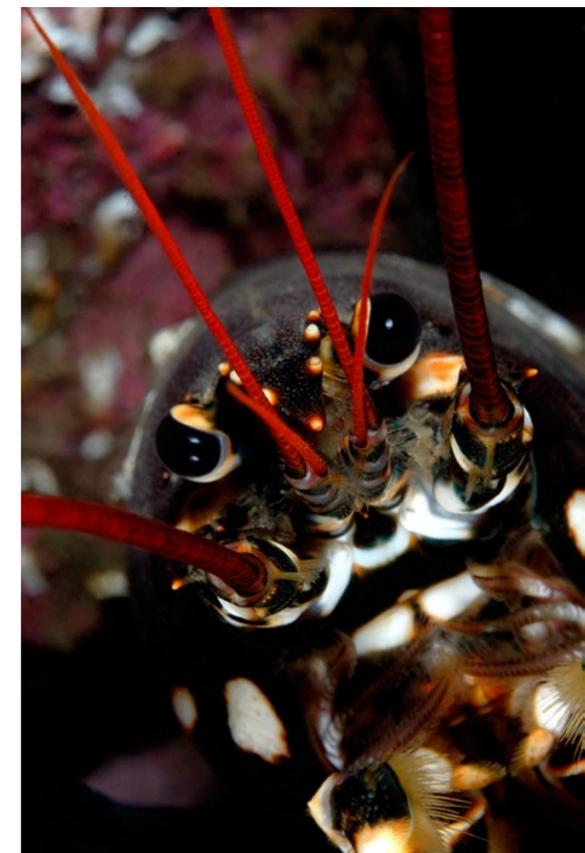
Gladiators of the Sea

Paralithodes camtschatica
(left)

Homarus gammarus
(below)

Text and photos
by Christian Skauge

As the night draws its blanket of darkness over the oceans, thousands of strange creatures begin to appear. Covered in spiky protrusions, an army of crustaceans begin their march towards domination.



The Crustacea is a large group of invertebrates belonging to the phylum, Arthropoda, an animal group which also includes the insects. Thanks to the tiny planktonic copepods, the crustaceans are probably the most numerous animal

group in the world, and with over 50,000 described species, they make a significant impression in terms of diversity, habitats and sheer numbers.

The crustaceans include many animals familiar to divers and can be encountered

in the oceans, in fresh water and even on land. Come with us into a creepy-crawly world of stone crabs, nut crabs, camouflage crabs, lobsters, hermit crabs, edible crabs, long-legged crabs, arrow crabs, spider crabs, squat lobsters, crayfish, shrimp

and sea spiders—and marvel at the wonderful world of the crustaceans.

Exoskeleton and compound eyes

The crustaceans differ from other animals in many ways, but one of the most out-





LEFT TO RIGHT: *Lithodes maja*; *Paralithodes camtschatica*; *Pagurus bernhardus*

are made up of repeating units, each of which functions as a separate visual receptor. This gives the crustaceans a composite image—a mosaic—a pattern of light and dark spots.

Interestingly, the same gene is responsible for producing eyes in both crustaceans and human beings—the process is just repeated over and over again. The compound eyes makes crustaceans apt to be active in dim light or darkness, and this is why night dives will leave you the best chance of spotting many of the species.

Despite sharing a com-

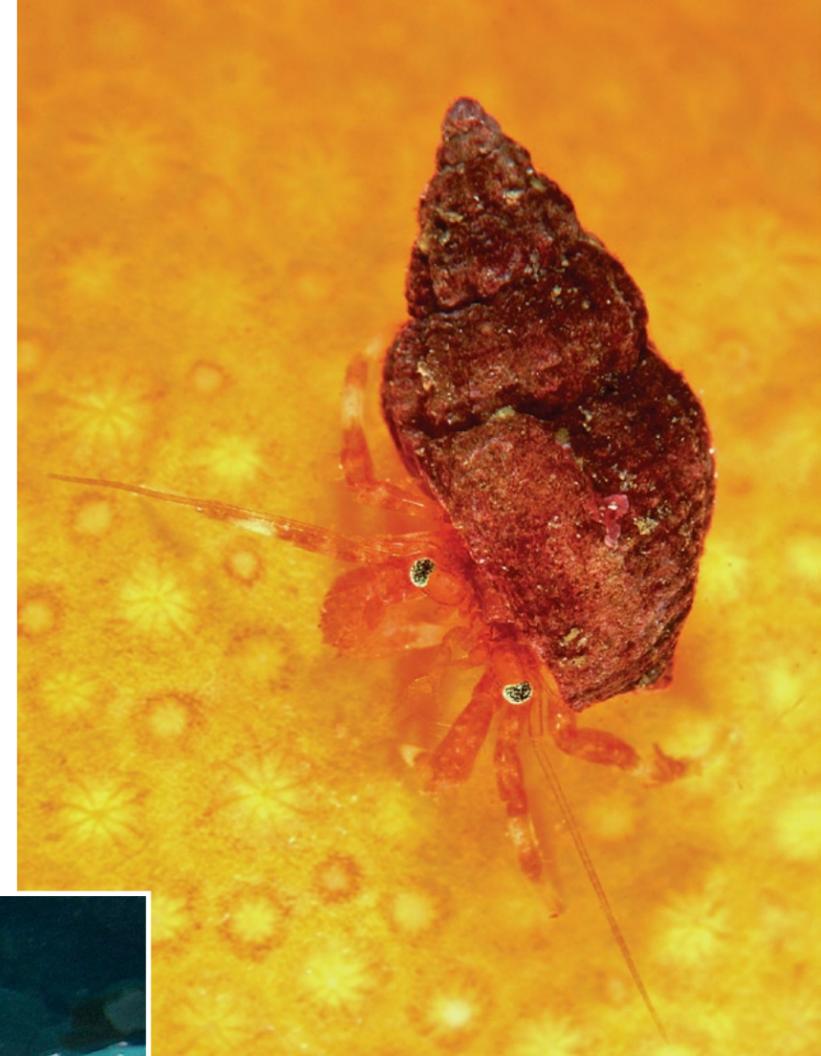
mon bodyplan, crustaceans come in an endless variety of shapes, sizes and even personalities. Some are extremely shy and will dart off to safety as soon as the torchlight comes anywhere near them, while others are inquisitive and have no problems interacting with divers. Between the smallest copepods and the giant Japanese spider crabs with a leg span of up to 12,5 feet there is literally a whole universe of different species.

Giant intruder

One of the true giants of the crustacean world, the

red king crab *Paralithodes camtschatica*, is a mighty sight. It can reach a leg span of more than five feet and the carapace can be as big as 11 inches. It is heavily targeted by fisheries, and the natural population in the North Pacific is in decline. In the Barents Sea, however, the population has exploded since Russian scientists released the crab outside of Murmansk in the late 60's.

The incredible increase is a major cause for concern among environmentalists and fishermen alike, as the crab devours more or less everything in its path. The king



crabs are spreading rapidly towards the south and northwest at a pace of more than 30 miles a year—and no one knows what they will end up calling home.

Mobile home

Speaking of homes, the clever hermit crab uses an empty sea snail shell for protection rather than having to cover its entire body with armour. But what seemed like a good idea at the time soon becomes a problem for this assiduous little crustacean. When the hermit crab grows, it will have to find a bigger shell—and this is not always as easy as it sounds.

Hermit crabs are extremely investigative, and will try on almost any empty shell when it is in need of a new one. Other hermits quickly pick up on this, sensing that there might be a new house on the market very soon. This can cause whole groups of hermits to move around on the bottom, one following another and constantly fighting and bickering over empty



standing features is the lack of an internal skeleton. Instead, they rely on a hard, outer shell, called an exoskeleton, to support them and, at the same time, providing excellent protection against predators.

The shell is made of calcium and a horny substance called chiton, and it is not continuous but made up of divided sections. The crustaceans have a number of jointed legs, two

pairs of antennae and often a pair of claws. Many of the species share the same bauplan of 20 body segments divided into a head, thorax and abdomen—as is the case with the Malacostracans, the largest of the six classes of crustaceans with over 25,000 species.

Another feature of the crustaceans (as well as the insects) are their unique compound eyes, so called because they



CLOCKWISE FROM BOTTOM LEFT: *Lebbeus polaris*; *Pagurus prideaux*; *Astacus astacus*; *Galathea nexa*

picking up whatever scraps are left over as the hermit feeds.

In return for the hospitality and generous spills—hermits are really messy when they eat!—the anemone will protect its host by flinging out

its beautiful, poisonous stinging threads if threatened or attacked. Many a predator has learned the hard way that this mouthful is better left alone, and the anemone hermit crabs enjoy relative safety thanks to their stinging partner.

shells. Sometimes the need can be so great that they will attack a fellow hermit and try to steal its mobile home.

Some hermits run into dire straits already when they are babies. Most sea snail shells are spirally coiled in a right-handed fashion, but a few species are wound the other way. If a hermit starts out with a left-handed shell, it will have to keep finding these oddities for the rest of its life, because the back part of the body is shaped to fit

and cannot be turned the other way—making househunting a much more difficult and laborious task.

In tropical waters, some hermits have shed the shell completely, so to speak, and instead live with their posterior parts well protected in abandoned tube-worm burrows. This prohibits them from moving around—but if the food supply is good, this does not seem to pose a big problem.

Symbiosis and chemical defence

Many crustaceans rely on chemical defence in addition to, or even instead of, a shell. Certain hermit crabs live in symbiosis with the anemone, *Adamsia palliata*, which completely covers their back-side. The mouth of the anemone is located on the hermit's underside,





Gladiators



The northern stone crab has a very spiky carapace, which in itself provides excellent protection, and combined with being of a certain size, it does not have to rely on anemones growing on its back. Still, there are times when even the most heavily armoured gladiator needs a little extra help. When it is time to moult, the stone crab often seeks protection under a large deeplet anemone.

Like all other crustaceans, it has to shed its exoskeleton in order to grow larger, something which occurs at regular intervals. During this transition, the crustaceans are

vulnerable, as the new carapace takes a while to harden. In soft times like these, the tentacles of a large anemone provide excellent protection—and in return, the soft-bodied actinian often grabs hold of the old, nutrient-rich carapace, which it devours with apparent pleasure.

The friendly blade shrimp

Spirontocaris lilljeborgii is another species very fond of stinging tentacles. Whole families, sometimes up to 20-30 members in different sizes, may shelter under large anemones, often deeper than 30 meters. As the name implies, these shrimp are very

curious and friendly, and divers may have several of them coming out from under the anemone to investigate and clean his or her hand after a few minutes of patience. Their brilliant colours make them look like exquisite, little gems, and they are favoured by many underwater photographers.

The difficulties of getting laid

Reproduction can be something of a challenge when your entire body is covered in armour. The time of moulting is the only time the crustaceans are able to mate, as they have internal fertilization

of the eggs. In order to “get laid”, the male has to wait for the female to shed her all-covering chastity belt. In order not to lose out on the opportunity, he will grab onto a suitable mate and hold onto her for days before the moulting occurs.

Exactly how the crustaceans know when this is going to happen is unclear, but it is suggested that enzymes that help to soften and loosen the exoskeleton seep out into the water. This scent might be picked up by the males, sensing an opportunity about to arise.

All kinds of crustaceans can be observed dragging a smaller

LEFT TO RIGHT: *Spirontocaris lilljeborgii*; *Ebalia tumefacta*; *Lithodes maja*



female along, holding her in a vice-like grip. After moulting and mating has occurred, the female will carry the eggs underneath her tail-flap until they hatch and the larvae drift off to start a new life somewhere else.

In this planktonic stage, the crustaceans are very vulnerable, and most of them will be eaten before they take to the bottom and develop proper protective armour. Even this early in life, many crustaceans know how to take advantage of protective stingers, and

often tiny larvae can be seen hitching a ride on top of small jellyfish or hydromedusae.

Making a swim for it

In spite of being well protected by full armour, many smaller crustaceans still face the imminent danger of being swallowed whole by a much larger predator. Their exoskeleton isn't of much use if the predator doesn't have to chew, and whole armadas of smaller crab, shrimp and hermits are devoured every night by mean cod and other



fish lurking in the darkness. Adopting the protection of stinging anemones may be a great help for some, but others have come up with equally efficient methods of getting out of harm's way.

The swimming crabs rely, as the name implies, on a quick dash to safety using its posterior legs on which the tips have developed into a flat, oar-like shape. When they wave the "oars" furiously back and forth in the water, they can reach impressive speeds and will very often disappear in a sudden blur of motion—escaping

both hungry fish and underwater photographers.

The art of camouflage

Other crustaceans, especially different kinds of spider crabs, have adopted even more elaborate ways of evading their predators—camouflage. They often have special spikes protruding from their carapaces allowing them to attach algae or sponges to their backs, and in terms of general cleanliness and personal hygiene, they look a total mess. Some of them will happily let almost anything





Gladiators

CLOCKWISE FROM LEFT: *Galathea strigosa*; *Eualus pusiclus*; *Nymphon gracile*; *Macropodia rostrata*; *Mysidium* sp; *Polybius pusilus*

grow on their shells, making them blend perfectly into the reef background. Being invisible is not such a bad idea. Whenever I encounter a camouflage crab, I cannot help thinking about how many I must have missed along the way.

Some shrimp species go even further when it comes to blending into the background. They don't use any decoration at all—they simply change their colour to match whatever they are sitting on. The chameleon shrimp, *Hippolyte varians*, can be found in almost any colour ranging from completely transparent, via

addition, these masters of concealment love to hide in between kelp and algae, making them very hard to spot.

The cardinal of the sea

The European lobster is another large crustacean, some individuals weighing as much as ten pounds. Unlike its American cousin (and most other crustaceans), this majestic animal is normally all black in colour, and is a very impressive sight. They tend to be very curious, and will readily check you out using their long,

green, yellow and red, to dark brown depending on its whereabouts. In

beautiful red and black antennae. Normally they are very gentle and seem almost intelligent—but the lobster is territorial and can be quite aggressive, even towards divers. When a large specimen comes running against you on the bottom with its claws fencing wildly above its head, it takes some nerve not to move instinctively out of the way.

Interestingly, the lobster has two different claws. One, normally the left, is slender and used for slicing and cutting, while the other is almost disproportionately

large and is made for crushing—and, trust me, a large lobster can crush pretty much anything it wants to.

Along the Norwegian coast, the lobster is consid-

ered an endangered species and is off limits for divers, whereas further south, they are abundant and not threatened at all. This has to do with temperature—they cannot reproduce if the water is too

cold, and years can pass between successful batches if the northern summers aren't warm enough.

Extensive illegal fishing makes it very hard for the lobster to sustain a viable population, and over the last few years, measures have been taken to protect them. Hopefully it is not too late—this magnificent creature is a great experience for any diver and underwater photographer.

The next time you hear talk about strange creatures with numerous legs, compound eyes, heavy armour, hefty claws and maybe even chemical defence mechanisms, you don't have to worry. The aliens are *not* coming—but the crustaceans certainly are! ■

Christian Skauge is an award-winning underwater photographer based in Oslo, Norway. www.scubapixel.com



Edited by
Bonnie McKenna

Loggerhead turtles take 45 years to grow up

Scientists from the University of Swansea have determined that it takes loggerhead sea turtles a long time to grow up and will not lay eggs until they are 45 years old. The estimate is based on decades of data.

The length of time until maturity means that the turtle population is “less resilient” than previously thought.

The longer the turtle takes to maturity, the more vulnerable to deliberate or accidental death—long before it has been able to reproduce itself through breeding.

Scientists made the age determination through a three-part trawl. To estimate the growth rate of hatchlings, the team took measurements of hatchlings at a nesting

site in Florida. Then they compared the results with the sizes of the same turtles when they drifted across the Atlantic to the Azores (approximately 450 days). The team then extrapolated their data from hundreds of measurements made by scientists who had captured, marked and recaptured individual loggerhead turtles.

The estimates reinforce the fact that sea turtles will take a very long time to recover from human caused population declines. ■

Green sea turtles hatched in Delaware

The hatchlings are from the first documented sea turtle nest in Delaware.

In mid-August a female green sea turtle came ashore, dug a nest and deposited 194 eggs. The nest was found by a Cape Henlopen park ranger during a routine beach patrol. The eggs were deposited in the high tide zone, an area vulnerable to high surf and waves. After getting permission from the U.S. Fish and Wildlife Service the nest was moved park rangers were afraid the

eggs would not hatch. Two storms deposited a lot of sand on top of the nest, then in October there was an unusual cold snap in the area. Temperatures dipped below 66°F (19°C).

The hatching of the eggs was delayed several weeks. The eggs have now been moved to the Pine Knoll Aquarium in North Carolina where scientists will keep the hatchlings until they are healthy enough to be released into the sea. ■

Jellyfish may be helping leatherback sea turtles

Massive blooms of jellyfish along the coast of Florida are a big source of food for leatherback sea turtles, but the bane of thousands of ocean swimmers who have felt the sting.

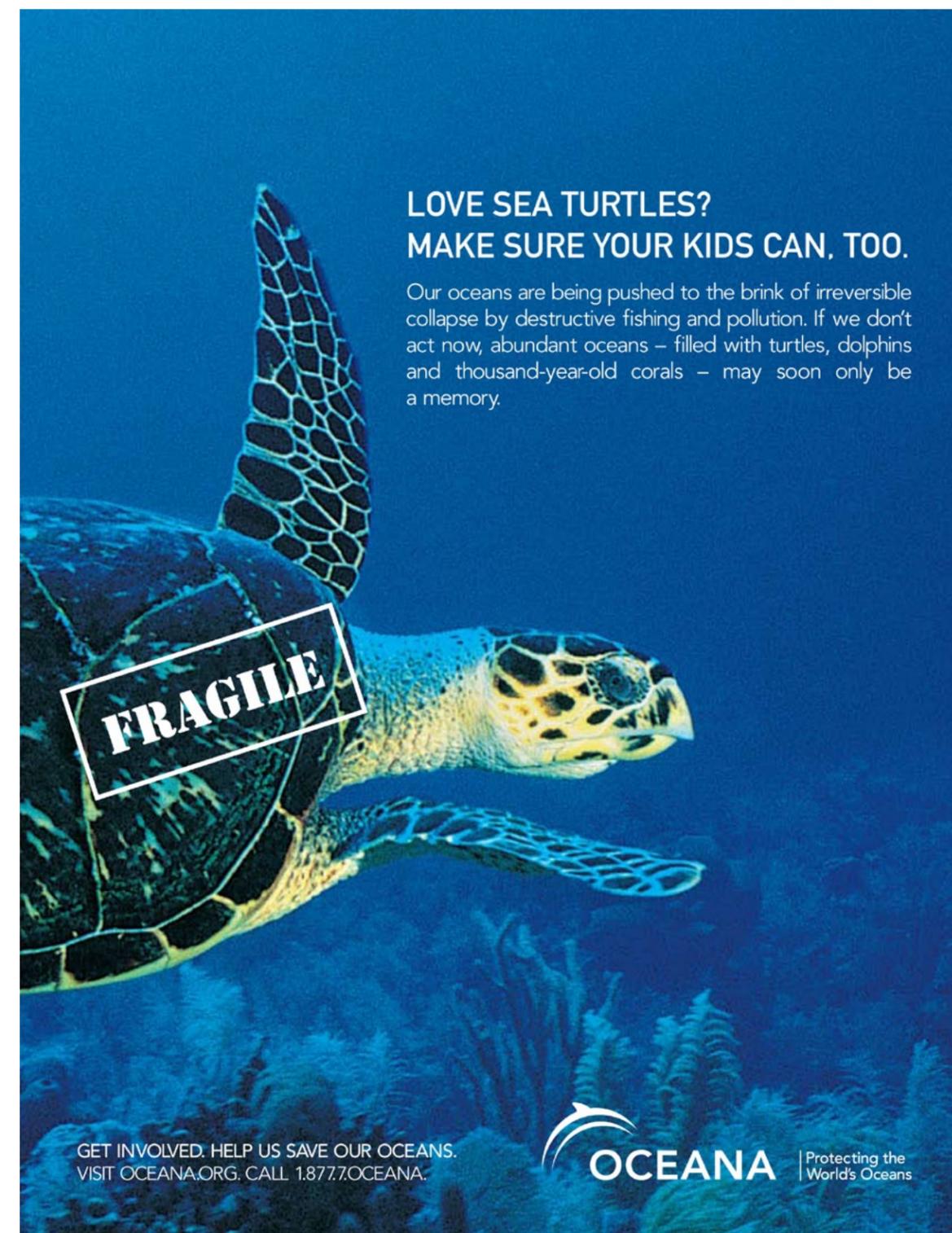
Leatherbacks are rare visitors to Florida, but over the past 20 years, the number of nests has increased. This year's count was 600 nests, one of the highest counts ever.

Jellyfish are the favorite food source for the leatherback. When jellyfish are abundant, females reproduce more often.

Although there is some evidence that the blooms are increasing, there is no historical data to compare.

The turtles are reaping the benefits from the jellyfish feasts because the females need to fatten up to reproduce.

A typical nest contains 100 or so eggs and turtles often nest two to three times a season—all of which takes a lot of energy. ■



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Egg release in Malaysia

Kuala Terengganu, Malaysia, fisheries department release approximately 66,000 turtle hatchlings into the sea this year. The hatchlings came from a total of 100,000 eggs that the fishery incubated.

The hatchling program was devel-

oped to ensure that the turtles of Terengganu do not become extinct.

The fisheries department also carried out a terrapin hatching program resulting in 1,590 baby terrapins being released into the wild. ■



Looking back two decades

Gary Gentile: Deep Wreck Diver

— aquaCORPS #3 DEEP, January, 1991

Text by Michael Menduno

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

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

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

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

USS Monitor

Quiet and self-directed, tending to keep to himself, Gentile gained notoriety through his protracted six-year battle with the U.S. Federal Government to dive the *USS Monitor*, a civil war ironclad, 16 miles off the coast of Cape Hatteras, North Carolina, which was

declared a National Marine Sanctuary in 1975. Recounts Gentile, “It's what I call bureaucratic territoriality. The people at NOAA who are working in the Marine Sanctuary Program feel they own the wreck. They don't want private sector encroachment. They look upon it as their wreck, and they view me—the public—as a trespasser.”

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

Gentile's court victory earlier this year and long-awaited-for permit to dive the *Monitor* was a professional and personal vindication. The verdict? NOAA's standards were deemed antiquated and failed to account for advances in diving technology and techniques.

Furthermore, the court found that Gentile and his colleagues were wrong-



ly and improperly classified as recreational divers.

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

His motivation?

"It's about freedom," explained Gentile, "a battle I've been fighting all my life. There will always be people who'll tell you, you shouldn't be doing this. It's dangerous. It can't be done. That's their problem."



USS *Monitor* in action with *CSS Virginia*, 9 March 1862. Aquarelle facsimile print of a painting by J.O. Davidson.

"I just want to live my life the way I want to and for me, that's what these dives are all about."

aquaCORPS: Gary, you've been on the cutting edge of wreck diving for 20 years, and you were one of the first people to dive the *Andrea Doria* back in '74. Did you take a lot of heat for your diving back then?

Gary Gentile (GG): All my diving career, the local people—the people in dive clubs—looked upon me as a madman. I've gotten back on the boat many times only to have people say to me, "What were you doing down there? Why were you just hanging on the anchor line?"

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

aquaCORPS: How did you get trained in decompression?

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

That's how I picked up most of my early experience in the water—the things I wasn't taught in courses. I studied their techniques and developed my own, just like everybody else does. Wreck diving tends to be an evolving sport; everybody who gets into it looks at what other people are doing and adds his own little improvements. I got into that as well. I was really fortunate to get into a group of expert divers.

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

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

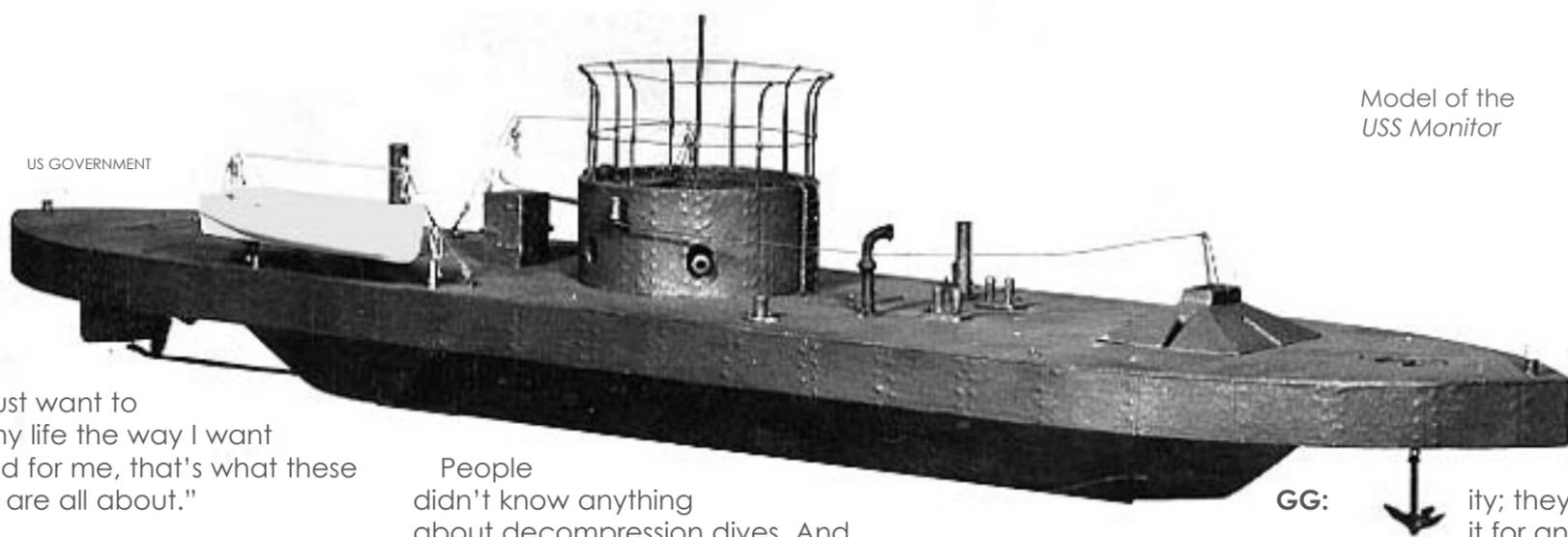
aquaCORPS: How many serious wreck divers are there?

GG: I'm finding, as I travel more that there are many thousands. For example, when I first travelled to the Great Lakes a couple of years ago, I discovered a whole new group of wreck divers I had never known existed. I was astonished at how many good deep wreck divers were there. And that's just one area. The same is true all around the country.

aquaCORPS: Communication has been a problem, then?

GG: A real problem. Most wreck divers are just doing their own thing. They're not seeking public-

Model of the USS *Monitor*



GG:



ity; they're not in it for an ego trip (some are, of course,

but most aren't). So, there's not a lot of publicity about it.

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

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

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

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

I picked up most of my early experience in the water—the things I wasn't taught in courses.

Ironclads

USS Monitor was the first ironclad warship commissioned by the United States Navy during the American Civil War.

She is most famous for her participation in the Battle of Hampton Roads on 9 March 1862, the first-ever battle fought between two ironclads. The *Monitor* fought the ironclad *CSS Virginia* (the former frigate *USS Merrimack*) of the Confederate States Navy.

SOURCE: WIKIPEDIA

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

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

But there may be another factor involved in the safety issue. By and large, wreck diving tends to be done in an uncontrolled environment. There are a lot of factors that can compromise safety. Storms can kick up very quickly at sea when divers are in the water; currents can come in when divers are decompressing. A lot of things can go wrong.

It's the changeable conditions that wreck diving necessarily encounters—being out there in the ocean or on a boat—that compromises safety. There are a lot of injuries just on the boat; Getting on, getting off—that kind of stuff. All in all, I think it's probably true that the safety record among cave divers is better. But it doesn't have so much to do with



the diving as it does with the conditions under which the diving is conducted.

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

GG: Number one is awareness. There are a lot of potential hazards in wreck diving that can be created simply by being unaware of them. For example, entan-

Andrea Doria

SS *Andrea Doria* was an ocean liner for the Italian Line (Società di navigazione Italia) home ported in Genoa, Italy, most famous for its sinking in 1956, when 46 people died. She had a gross register tonnage of 29,100 and a capacity of about 1,200 passengers and 500 crew. For a country attempting to rebuild its economy and reputation after World War II, *Andrea Doria* was an icon of Italian national pride. Of all Italy's ships at the time, *Andrea Doria* was the largest, fastest and supposedly safest. Launched on 16 June 1951, the ship undertook its maiden voyage on 14 January 1953.

On 25 July 1956, approaching the coast of Nantucket, Massachusetts, bound for New York City, *Andrea Doria* collided with the east-bound *MS Stockholm* of the Swedish American Line in what became one of history's most infamous maritime disasters. *Andrea Doria* was the last major transatlantic passenger vessel to sink before aircraft became the preferred method of travel.

Due to the luxurious appointments and initially good condition of the wreck, with the top of the wreck lying initially in 160 feet (50m) of water, *Andrea Doria* has been a frequent target of treasure divers. It is commonly referred to as the "Mount Everest of scuba diving".

SOURCE: WIKIPEDIA

Shallow wreck diving is essentially the same as reef diving in terms of the kind of expertise that's required

glement in monofilament—fishing nets—is a very serious problem for wreck divers.

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

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

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

aquaCORPS: Would you say most wreck divers are well equipped?

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



The *SS Andrea Doria* sinking after being struck by the *MS Stockholm* in 1956. Half of the ship's lifeboats are still onboard, a result of the severe list that developed after the ship was struck

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

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

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

GG: I can't claim to have developed all those techniques. I was part of the wreck diving community when those techniques were being developed. What I can claim credit for is setting them down in writing.

Some of the things I worked on myself, but it was an evolutionary process. To make a decompression reel, you'd look at what someone had said and say, "That's good, but I can add this and make it better." Then someone else would look at it and say, "Yes, but let's do it this way."

I saw the development occurring; I was in the middle of it. I remember one time trying to trace back to who actually developed the idea of making a decompression reel with the disks on the end to prevent the rope from coming out around the pins. No one knew.

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It had evolved; no one had any conscious awareness of who had done it. It was a group effort that was done incrementally.

aquaCORPS: Do you think recommended procedures and techniques will eventually evolve?

GG: Yes, I do. Most of the procedures in *Advanced Wreck Diving Guide* are now the lowest common denominator.

Equipment is important. That's something you learn only through experience. Get out there and do it; find out what equipment is necessary for decompression when an anchor lines breaks loose, for example.



We did it on air: 290 feet. I personally felt that it was pretty close to stretching the envelope.

That book is not the end result. It's a take-off point for the next generation, and I expect to see evolution coming from that. In fact, the sport is evolving already. Some of the things we're doing now, like using oxygen to add a safety margin in decompression—mostly for deep diving—or using nitrox decompression and custom tables for accelerated decompression times, are still being worked out.

aquaCORPS: How about mixed gas?

GG: I think mixed-gas diving is going to be the wave of the

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

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

GG: I've had a very curious thought about mixed gas. It's clearly the wave of the future, but for some people, I think it may also become an end in itself; becoming proficient in managing the technology. I see people wanting to do

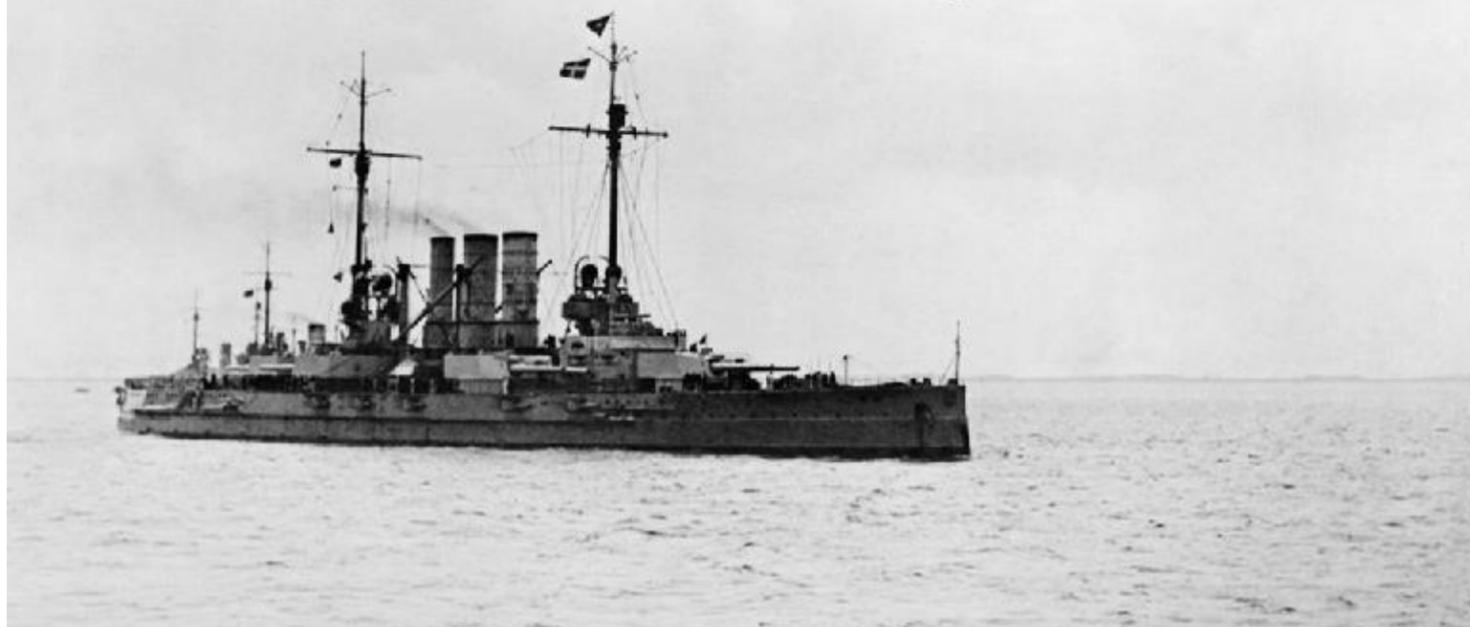
mixed-gas diving as much to do the dive as to see the wreck. They want to do something that other people haven't done. That's what the new frontier is all about—to do something that other people haven't done. That's exciting—a real challenge.

aquaCORPS: How about you?

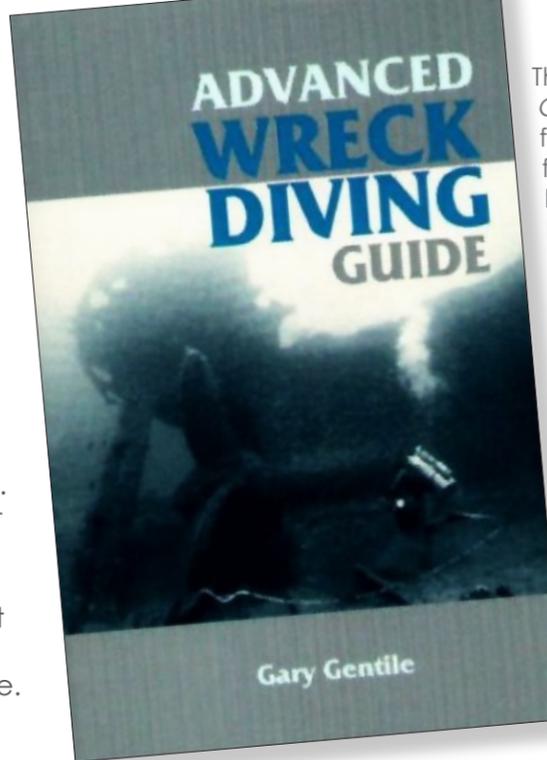
GG: Personally, I'm a wreck diver. My goals are to be able to use it to get to a wreck, not to gain the expertise in mixed-gas diving itself.

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

These days 200 is not



Ostfriesland in 1915 with German naval zeppeliner L31 overhead



The *Advanced Wreck Diving Guide* from 1988 was the first in a long string of books from Gary Gentile, which became classics and must-haves for any ambitious diver. He also published the first books on technical diving

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

We dove another battleship last year in Washington. That was 290 feet. It was sunk in 1924 as a Naval target.

aquaCORPS: You did it on air?

GG: Yep. We did it on air: 290 feet. I personally felt that it was pretty close to stretching the envelope. Beyond that, if you really want to accomplish something, you need to switch to mix. And that's my concern: accomplishing something. Not just getting there and saying you did it. But doing something when you get there. That's what we're planning for the *Ostfriesland*.

aquaCORPS: What do you hope to accomplish?

GG: For me, it's an historical event. I'm a researcher, and I've written about the *Ostfriesland* in my upcoming book, *Shipwrecks of Virginia*. I get a great deal of satisfaction out of doing research—concluding that, yes, a wreck is supposed to be in such-and-such a location, then going

Ostfriesland

SMS *Ostfriesland* ("His Majesty's Ship East Frisia") was the second vessel of the Helgoland class of battleships of the German Imperial Navy. She was launched on 30 September 1909 and was commissioned into the fleet on 1 August 1911. The ship was equipped with twelve 30.5-centimeter (12.0 in) guns in six twin turrets, and had a top speed of 21.2 knots (39.3 km/h; 24.4 mph).

Ostfriesland was assigned to the I Battle Squadron of the High Seas Fleet for the majority of her career, including World War I. Along with her three sister ships, Helgoland, Thüringen, and Oldenburg, *Ostfriesland* participated in all of the major fleet operations of World War I in the North Sea against the British Grand Fleet. This included the Battle of Jutland on 31 May – 1 June 1916, the largest naval battle of the war. The ship also saw action in the Baltic Sea against the Russian Navy. She was present during the unsuccessful first incursion into the Gulf of Riga in August 1915.

After the German collapse in November 1918, most of the High Seas Fleet was interned in Scapa Flow during the peace negotiations. The four Helgoland-class ships were allowed to remain in Germany, however, and were therefore spared the destruction of the fleet in Scapa Flow.

Ostfriesland and her sisters were eventually ceded to the victorious Allied powers as war reparations; *Ostfriesland* was transferred to the United States Navy. She was sunk during air power trials off the Virginia Capes in July 1921.

SOURCE: WIKIPEDIA



out there and verifying and identifying the wreck to prove that my research was valid. That's what'll give me the most satisfaction on the *Ostfriesland*—to actually relocate it from when it was lost in 1921.

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

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

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

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

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

GG: Eleven minutes. But the complication comes in that you're no longer self-contained. On air, you go down, come up, and decompress on your own air. But once you get into mixed gas diving, in order not to have to decompress for something like four hours or more, you've got to go into an accelerated decompression schedule that requires multiple gas switches during the ascent to several nitrox mixes, and finally O₂, based on custom tables.

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

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

The most difficult part was planning the mix, staging and decompression.

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

aquaCORPS: *What will your total decompression time be?*

GG: Two hours and 15 minutes.

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

GG: We did a two hour and 45 minute decompression on the *Monitor* (Ed. the *USS Monitor* dives were approximately 220 feet.) After a 25 minute bottom-time on air, we used computers and O₂ as a safety factor.

aquaCORPS: *There's some complicated logistics.*

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

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

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

aquaCORPS: *What are your personal diving goals over the next 12 months, Gary?*

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

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

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

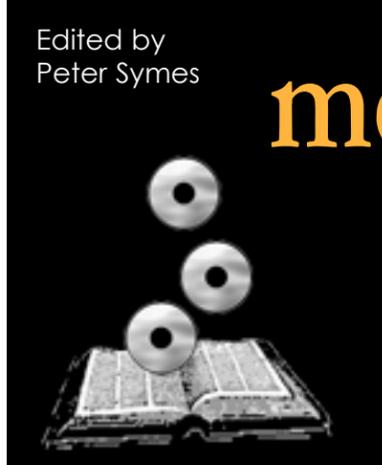
aquaCORPS: *From a practical point of view, how should people go about doing that?*

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

If I'd done it a half dozen times when it didn't count, when the real time came, it wouldn't have been so emotionally difficult to handle. That's why I think the first thing people can do is to take a course or read up on the literature that's available, so they can practice on their own.

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

You can always tell a pioneer from the arrows in his back



produces the stage for a number of number of environmental issues. As of fantasy—it goes with the genre—but the issues addressed are real. Also, there are interesting tidbits explained. An example of such a detail in a bigger story is the explanation of what tonic mobility in sharks is. As such, these comic books are good *infotainment* for the younger generations, in particular, but I am sure that among the many divers with gray hair hide many comic book collectors who would like these, too. IanChurchillsMarineman.com

Marineman

Superman, Batman, the Watchmen, the Green Lantern, Captain America—a whole string of classic comic book characters, many of which date back to an era before WWII, have in the latter years become familiar icons to new generations thanks to Hollywood blockbusters. Ian Churchill's MARINEMAN is something as rare and unique as a comic book about—well, perhaps not diving per se—but the marine environment. It incorporates classic style elements, conventions and old clichés from the early superheros, while also drawing on more contemporary masters and recent style. Our hero is Steve 'Marineman' Ocean, a handsome and very muscular hulk with supernatural powers such as being able to breathe underwater and swim at incredible speeds. He also happens to be a marine biologist, who presents and documentaries about the marine world. This sets storylines and adventures that evolve around a with other comic book heroes, there is a great deal

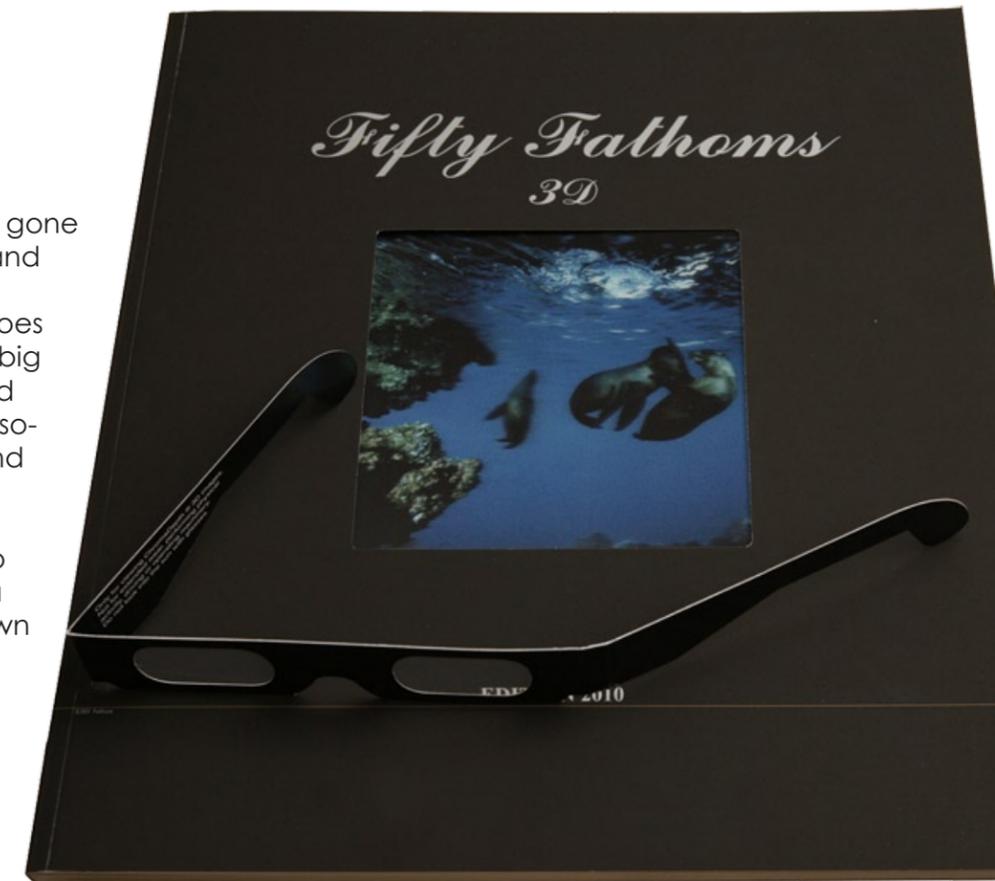


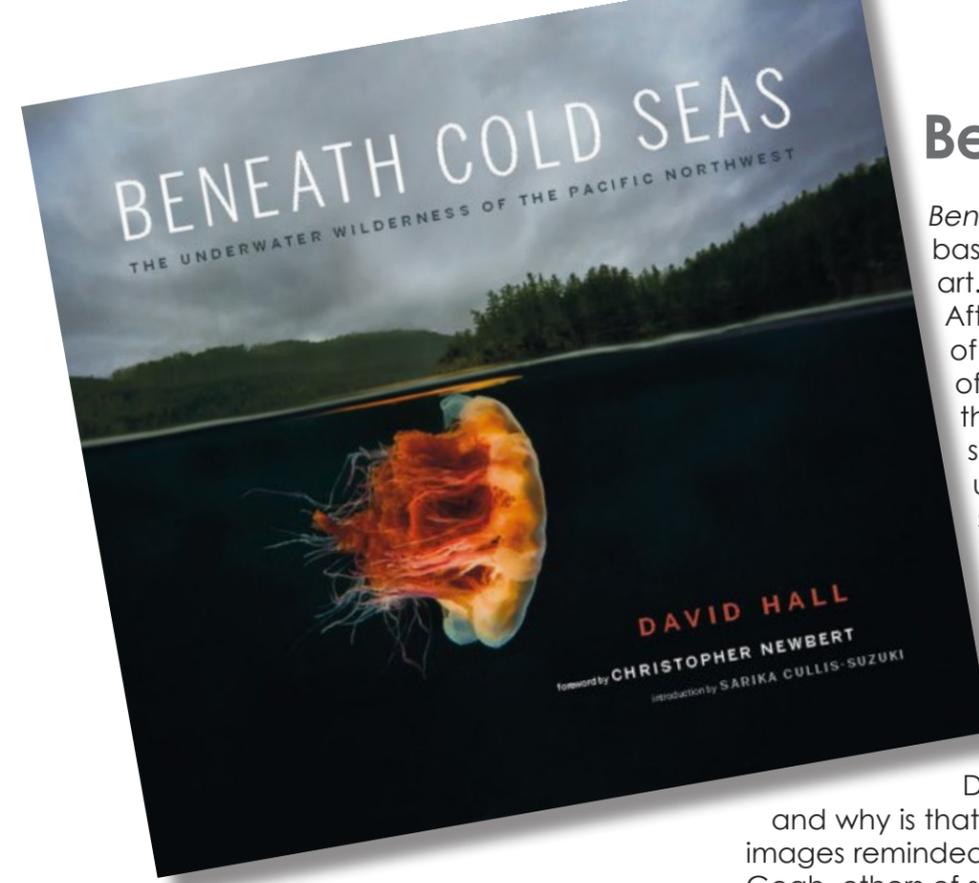
Hidden Sanctuary

Singaporean photographer, Imran Ahmad, is a commercial photographer who works in corporate and commercial photography, portraits, wildlife and underwater photography as well as photojournalism. As such, he knows his tools and techniques, which obviously free him up to do more creative things with composition and color. In this booklet, I am particularly drawn to his work with jellyfish and the abstract work with close ups of soft corals and structures like fish scales and urchin spikes. The images were shot at the Sipadan-Mabul resort where an artificial reef complex has been constructed on the sandy slopes adjacent to the resort. Escapeinc.com.sg

Fifty Fathoms 3D

In this day and age where everything's gone digital, paper has become expensive and coffee table books seem as rare as living dinosaurs, *Fifty Fathoms 3D* books goes straight against the main stream. It is a big and luxurious production, clearly printed with multiple inks—which increases the so-called colorspace allowing for more and deeper colors—on thick paper of that sort that makes the book softly squeak when you turn the pages. According to the information supplied, the paper is a "deckle-edged handmade paper known as *Büttenpapier*". I don't know exactly what that means, but it sounds about right. This limited edition, which has been edited by Dietmar Fuch who for many years was editor-in-chief for the leading German monthly, *Unterwasser*, features four of the grand masters of underwater photography—Kurt Amsler, who has supplied many features and a series on underwater photography for *X-Ray Mag*; Florida-based Stephen Frink; Reinhard Dirscherl and Chris Newbert. As for the 3-D effect, the book does come with a set of glasses. They are not colored, so they are probably polarising filters. The effect is there and fun to watch, but the images are also stunning without 3D. Edition-fifty-fathoms.com





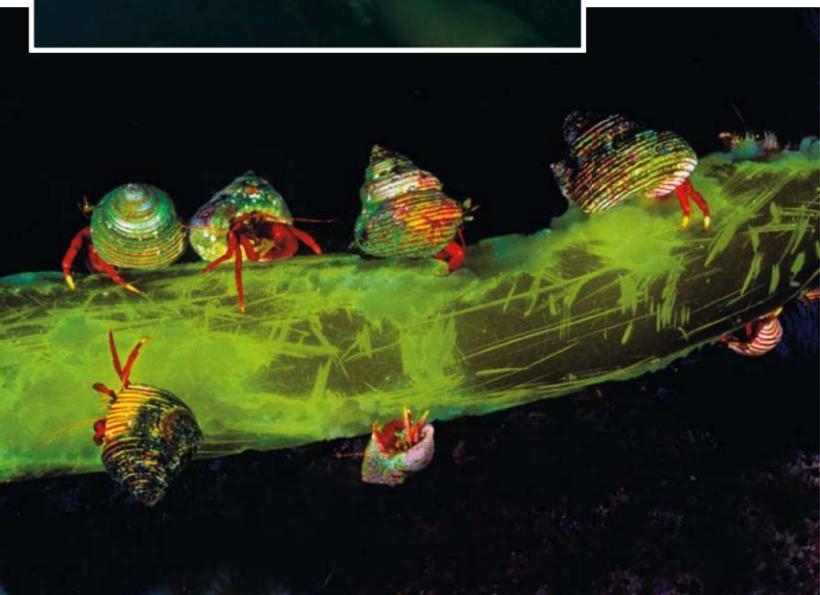
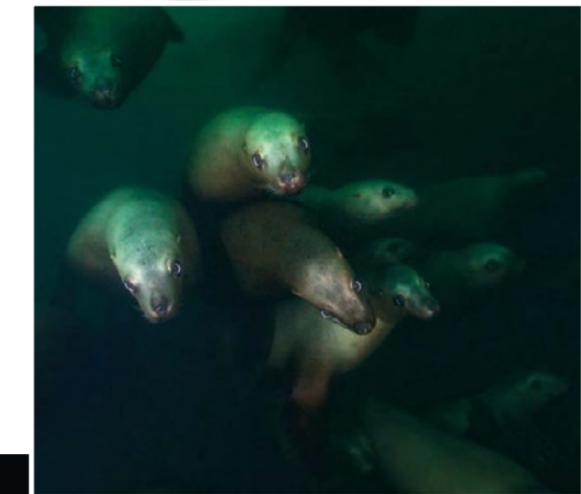
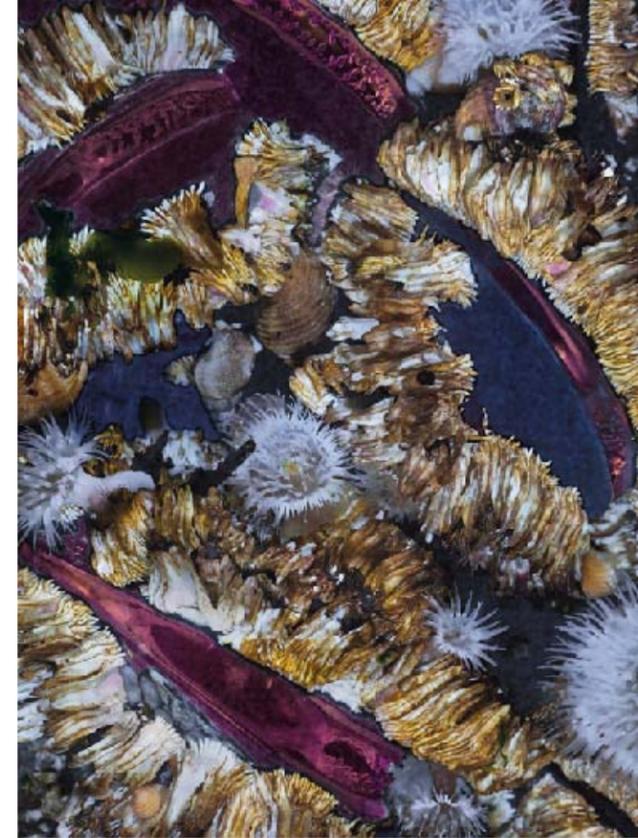
Beneath Cold Seas

Beneath Cold Seas by New York based David Hall is a rare piece of art. Or rather, it is full of them. After nearly two decades in this line of work, I have long since lost count of how many underwater images that have passed my lightbox, or screen, or how many books with underwater photography I have seen. In other words, it takes a lot to impress yours truly, but this book did. I had to browse through it three times in a row, right there on the expo floor when I was first handed a copy for review.

I hesitate not to say that David Hall is in a class of his own, and why is that? Leafing through his book, some images reminded me of the work of Vincent van Gogh, others of some of the great impressionists. Some of these images felt like paintings on canvas, not just photographs. Like no other photographer I am aware of, Hall has consistently managed to capture patterns, textures and colors and used all of these skillfully in compositions in such a tight and controlled manner, as if they were created on an easel.

Yet, these images are all naturalistic photos, which document how life below the surface can also look. The macro shots play with strong colors and patterns, while many of the over-and-under water shots have a surreal and almost dream-like quality to them, as if we were standing before a portal to another universe.

The image taken at dusk where the weird hooded nudibranchs are seen populating the illuminated kelp under the surface could have been an opening scene from an episode of *X-Files*. Others paint the archipelago in soft and romantic tones as would a Victorian painter depict the English countryside. I could go on, but I'd better let the samples depicted here do the rest of the telling. There are many more great images from whence they came—the compilation went through quite



some agony of choice. If you'd like to see more, you have to get this stunning book. Not only is the book just a pleasure to go through, but the images are also an inspiration and a challenge for all other underwater photographers to go out and do better. I certainly will. David Hall is an inspirational master who clearly hasn't yet gotten all the recognition that he deserves. Beneathcoldseas.com



photo &
video

Text and photos by Lawson Wood

Close-up or macro photography is a specialized form of underwater photography where the camera lens is positioned very close to a subject, or is able to zoom into the subject, to record a relatively large image in high magnification of the original subject. It is personally recommended that you start underwater photography with a macro system; this is because it is undoubtedly the easiest form of underwater photography. Frustrations common to many other types of photography are minimized, and very soon, you will be amazed by the sharp images and vibrant colours that only macro photography produces. What I learned very quickly, all those years ago, was that by concentrating on close-up and macro photography, you soon picked up the nuances of composition—and the smaller the subject, the more concentrated the field of view and more concentrated the compositional techniques required to frame the subject and expose it properly, whilst not stressing the creature or yourself!

Close-Up & Macro



Coleman's Shrimp (*Periclimenes colemani*), Tulamben, Bali, Indonesia. 60mm lens, ISO 100, Twin Sea & Sea YS110 flash, 1/125th second at F8





photo & video

The different perspective that macro photography gives, opens up a whole new world of tiny animals and plants not normally seen during average diving conditions. Your eyes get trained very quickly into finding creatures small enough to fit into the format you are using, and what were once boring dives on gravel beds or sandy bottoms or under jetties, now yield a wealth of life. *Muck diving* has now become a way of life for many of us and is discussed in the next issue. But remember that muck diving was invented in the Scottish Sea Lochs!

Benefits of macro photography

- Managed with any camera system
- A different perspective
- High magnification
- Maximum colour saturation
- Sharp focus
- Ease of learning and execution
- Can be done anywhere, under almost any conditions
- Easiest to use on night dives
- Greatest return for the least investment
- Least amount or chance of backscatter

Very quickly you can almost become an expert overnight, but the pursuit of underwater images is a life-long experience. You can achieve very good pictures very quickly and steadily improve your techniques as you learn more about composition. The great



LEFT: Whip coral shrimp (*Dasycaaris zanzibarica*) Lembeh Straits, North Sulawesi, Indonesia. 105mm lens, ISO 100, Twin Sea & Sea YS110 flash, 125th sec at F:16

surprising and breathtaking because of the revelation of exquisite detail and fine colour not normally seen to the naked eye.

Macro photography is also incredibly easy with a compact point-and-shoot camera. I use a Canon Power Shot S95 and combined in its specific waterproof housing also made by the camera manufacturers, the macro setting, combined with the zoom magnification allows me to use the camera's internal flash, which is strong enough to illuminate the subject without the additional

expense of more equipment. Look for the macro setting on your compact camera; this normally uses the 'flower' symbol.

Macro photography is the easiest of all to learn because invariably not only can you preset the aperture function, you can also set your camera for the closest magnification, particularly with compact cameras, which are able to utilize additional supplementary close-up lenses.

Compact cameras have great optics, and most actually have macro settings pre-built into their software. They also do not need external flash systems for this type of photography, as the camera's internal flash is more than adequate, but as already mentioned, only on the zoom setting, as the camera housing's structure may

thing about the Live View screen on all new underwater cameras is that you are able to learn and correct as you go. Remember that you are able to review your images immediately after, so you are still in the same place at the right time to allow you to correct the mistakes as you go. [Do not edit out or delete your mistakes immediately, rather look at them on a large screen and study where you go wrong and what you did to make it more pleasing to your critical eye].

The most striking aspect of macro photography is the high magnification. The subject to digital file ratio may be actual or twice life size, but when viewed on the screen as part of a digital 'slide show' presentation, the reproduction may be as much as 50 times life size. The richest and

most striking colours to be found in underwater photography are also found in macro photography. This benefit is due to two factors: strong flash illumination and very little colour filtration by the water. The distance between the lens and the camera subject may be between 3-20cm and the subject to flash distance of 35cm or less. This means that the light reflected back into the camera is virtually unaffected by the colour filtration effect of the water, and therefore, the purity of the colour is much higher and easily on a par with macro photography on land. In fact, I have been accused of taking some of my underwater macro subjects in an aquarium on land! The brightness of the flash will account for an aperture setting of between F16 - F32 allowing for the greatest

depth of field. The flash brings out all the highlights and tones not normally seen in other forms of underwater photography.

Macro photography also produces sharp focus. When dealing with a small aperture of F16 - F22 on a large Dslr (Digital Single Lens Reflex) with 12+ megapixels available in waterproof housings and illuminated by strong flash, the maximum depth of field can be obtained. The results are often



Black-striped blenny (*Escenius dentax*), Marsa Alam, Red Sea. 105mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/100th second at F:11

Macro





photo &
video

RIGHT: Eye of a zebra lionfish (*Dendrochirus zebra*) Sipadan Island, Borneo. 60mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/100th second at F:16



BELOW: Orange-sided goby (*Gobiosoma dilepsis*), Cayman Brac, Cayman Islands. 105mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/80th second at F:16



create a shadow where you least want it.

Most underwater photographers using housed Dslr's and ICL's (Interchangeable Camera Lens) opt for an auto-focus system built around the 55mm, 60mm, 90mm or 105mm macro lenses, which may also be fitted with a plus two or four dioptré. When using supplementary lenses on compact cameras, there is no need for readjustment or calculation of the distances involved. The hardest part is actually in finding the correct size of subject, or part of a subject, to fill the frame.

You only learn underwater photog-

raphy by taking tons of photographs, slowly learning your trade and being highly critical of your own work. This makes it a particularly appealing aspect of underwater photography in that it can be done almost anywhere and in any conditions. Standard and wide angle lens photography requires generally good light with very good to excellent underwater visibility, but macro can be executed in turbid waters with very bad visibility due to the close distance between the camera to subject.

A good rule of thumb is that you should never take photographs less than one fifth of the underwater visibility. So

if your subject, say, a diver, is one metre from your camera, you need five metres of underwater visibility. When working with macro photography, your subject to camera distance may be only 6cm away, in that instance you only need 30cm of visibility to produce acceptable results. When conditions get so bad that no other type of photography is available, you will always find photographers using macro.

Of all types and formats of underwater photography, macro is probably the least expensive, requiring minimal investment and very few accessories. The flash only needs to be small and compact and be able to bolt securely onto the camera. TTL is a nice option, but a manual flash on a limited budget will soon yield acceptable results.

What you have in a macro system is the chance to get the greatest possible return for the least investment. Of all the underwater lenses and systems available, you will achieve the sharpest and most colourful pictures and probably the greatest satisfaction in the shortest period of time.

The 105mm macro lens,

or its equivalent, will allow you to do life size reproduction of a small creature such as the orange-sided goby (left) and also include its habitat, which is a brain coral, in glorious Technicolor detail. Not only do you get the exquisite colour of the fish, you also get the additional depth of field in focus plus have an appreciation of the texture, shape and colour of the coral habitat.

More importantly, by using this type of telephoto or even a zoom lens on a compact camera, you are able to focus in on your chosen subject from a greater distance away. The plus side of all this is that you are able to control your buoyancy much better and keep away from the reef. You are also much further away from the subject, thus removing any stress to you or the subject, as it is not as aware about being stalked!

Sedentary subjects such as small gobies, shrimps, sea urchins, or static subjects such as corals, sponges, algae or anemones, make perfect macro subjects for you to train on. Macro photography is also undertaken 'on the fin' such as jellyfish floating by; pelagic shrimps or even 'swimming' Spanish dancers on night dives. All of your preparatory work concentrating on easy sedentary subjects will allow you the confidence to

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photo & video

tackle much more difficult macro subjects. Perfect buoyancy is essential in all aspects of your photography.

Good buoyancy is essential at all times for macro photography, particularly in the open water column or near fragile reef systems.

The equipment

Close-up lenses

These are single or double element supplementary lenses that also allow

RIGHT: Juvenile herring with lion's mane jellyfish, St. Abbs, Scotland. 60mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/100th second at F:16

LEFT: My wife, Lesley, photographing a moon jellyfish in the northern Red Sea. 60mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/100th second at F:16

glasses and are attached onto the front of the prime lens and use the water sandwiched between the prime lens and the supplementary lens as an additional element. The advantage that these lenses have is that they can be removed underwater and so give the added facility of being able to take photographs with several magnifying lens combinations if the need arises. Sea & Sea has a range of lenses that fit most of their cameras, and INON has lenses that will fit most CC's with their specific adapter.

Macro or micro lenses

Macro or micro lenses are available for Dslr and ICL systems in water-proof amphibious housings and are designed to focus much closer than standard lenses yet still be able to focus all the way out to infinity. Because these lenses are a compromise, they are designed to work better in close up than at infinity. However, the differences are small.

The big advantage of macro or micro lenses is the variable focusing from infinity to around 1:1 or 1:2 subject ratio without any additions. When they are used on Dslr cameras you are able to see the exact area and point of focus. For most subjects taken with this type of



close up attachment, this freedom when approaching a subject allows different angles to be utilized and shy creatures to be photographed more easily and sympathetically. From a conservation point of view, for photographers, using a longer lens, such as Nikon's 105mm or 200mm lens or any type of macro, zoom removes the need to virtually touch the marine creatures to take the photograph. A Dslr fitted with the appropriate lens allows you to take photographs of the creatures without putting undue stress on the environment, the creature or yourself.

[If you do have to touch the reef to keep yourself steady and in place, select a dead area and use only one finger for leverage to hold you still, or to push you off. Remember that great

buoyancy is the key.]

Working with a Dslr fitted with the equivalent of a 60mm macro lens, allows you the option of setting the scene such as the sea urchin (first page) with a pair of Coleman's Shrimps living amidst its poisonous spines. The only differences in taking the two photographs were a) the distance, as I approached this sea urchin; and b) the aperture, as I increased this to help in the depth of field to get more in focus and colour sat-



close focusing of marine subjects by increasing the focal length of the standard lens fitted onto either the outside of the amphibious camera or compact camera housing systems. These lenses are similar to magnifying

micro lenses is the variable focusing from infinity to around 1:1 or 1:2 subject ratio without any additions. When they are used on Dslr cameras you are able to see the exact area and point of focus. For most subjects taken with this type of

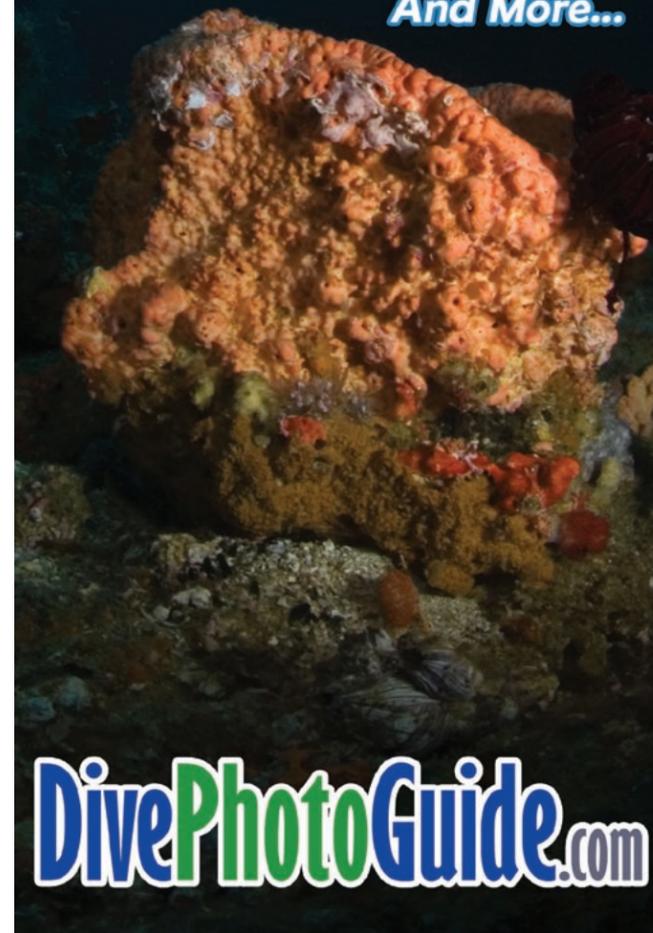


Painted lizardfish (*Trachinocephalus myops*) Lembah Straits, Indonesia. 105mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/80th second at F:11

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RIGHT: Sea spider on fire coral, northern Red Sea. 105mm lens, ISO 100, Twin Sea & Sea YS110 flash, 1/125th second at F16



Eye of peacock flounder (*Bothus lunatus*), Dominica. Canon S95 on automatic with camera's own internal flash F:4.9

uration. The 60mm lens has a wide enough latitude to not only show the subject matter in the context of its surroundings, it is also able to focus down to a true macro size and magnify the smaller additional subjects of interest.

Many macro subjects are completely overlooked underwater in the search for bigger and brighter subjects. It is difficult to stop sometimes and just examine the reef, particularly an area that may be rather drab, or even potentially dangerous. The image above (top right) was taken in an area of broken corals, which had started to be overgrown by fire coral. Fire coral can be particularly irritating if touched accidentally, as it

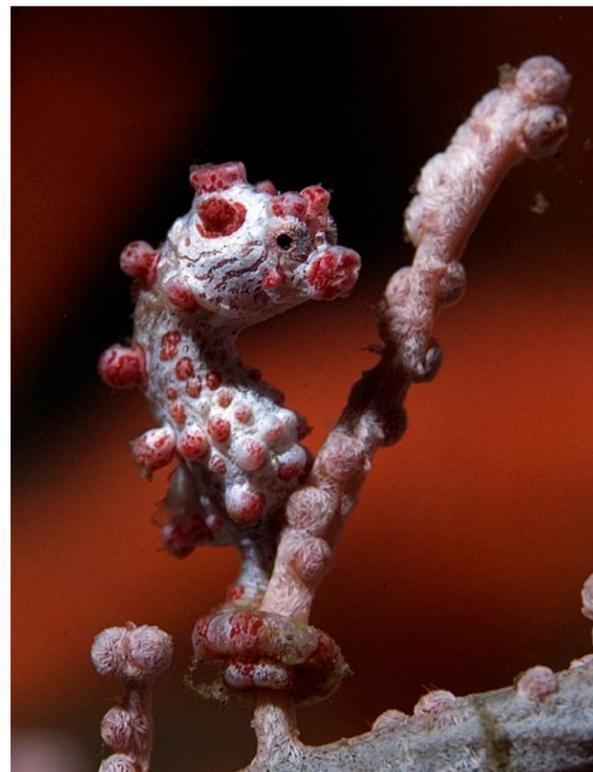
has tiny 'harpoons' that can fire poison into our soft tissue.

However, I knew from experience that tiny sea spiders like to live on fire coral, as I have seen them in several places around the world in the same habitat. By stopping in this almost forgotten area, I was able to search slowly, unhindered by other divers and photographers and indeed, I found my sea spider, barely a half centimeter long.

Close-up and macro photography is, of course, not just a recording tool to catch that little vignette of some marine creature's life, you can also use the technique to photograph small parts of a creature in a more artistic way, which can be almost

abstract in its format. The underwater realm is not just about critter photography, you can also put your own interpretation into your photography and enjoy a much wider aspect of the genre. ■

RIGHT: Pygmy seahorse (*Hippocampus bargibantii*) Bali, Indonesia. 105mm lens, ISO 100, Twin Sea & Sea YS110 flash, 1/100th second at F11



FAR RIGHT: Antenna of a zebra lionfish (*Dendrochirus zebra*) Bali, Indonesia. 105mm lens, ISO 100, Twin Sea & Sea YS110 Flash, 1/100th second at F:16

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Nauticam

Nauticam has released details of their housing for the Sony NEX-7 EVIL camera—claiming pole position as the first housing manufacturer to market with the high-end mirrorless offering from Sony. Nauticam stated that the NA-NEX7 will support all the new controls on the NEX-7, including the triple command wheels. The housing controls are designed to be operated by the users right thumb, without moving hands on the housing. The camera's focus lock is accessible and a lever has been added to allow the user to switch between the electronic viewfinder and the LCD screen. The housing allows the LCD to be angled for easier viewing. The NA-NEX-7 housing will be available from 15 January 2012 at a retail price of US\$1,850. www.nauticamusa.com



Recsea

Recsea has announced the release of a housing for the highly anticipated high-end Canon S100 compact camera. The Recsea housing features an aluminum construction with access to the camera's rotating front control dial via an external control ring around the housing's fixed port. It also has a rear command dial, mirroring that on the camera and an external mount for fiber optic strobe triggering. The housing is available now with a retail price of around US\$880. recsea.com

Canon G1 X

Canon has surprised many with their announcement of the G1 X, an iteration of their very successful G range that are very popular with underwater photographers. In what appears to be a contrarian move, they have adopted a large sensor (similar to what the mirrorless cameras are doing) but without the SLR type ability to change lenses. The Canon G1 X is a fixed lens camera with a 14.3 megapixel sensor similar to that of the EOS 600D. In addition, it is equipped with a DIGIC-5 image processing engine and native ISO range of up to 12800 that will ensure fast processing and a good low-light ability. However, unlike other similar cameras, the camera has a built-in zoom lens with a focal range of 28 to 112mm, with IS vibration reduction and a 3 stop ND filter. The G1X will also record 1080p movies at 24fps and Canon has also announced the WP-DC44 waterproof case for the camera. Retail price is US\$799, and it is expected to be available from late February. www.canon.co.uk



Nikon D4

Nikon has finally announced its long-awaited D4, which is labelled as a 'multi-media DSLR' and signals that the Japanese manufacturer is overcoming the manufacturing problems caused by the tsunami in Japan and the flooding in Thailand. The D4 is a 16MP full-frame (FX) camera capable of shooting ten frames per second with full auto-focus. In addition to a host of ergonomic improvements, the D4 also sees the expansion of its video capabilities, to the extent that Nikon is describing it as a 'multi-media DSLR'. The camera gains an Ethernet port, a 91,000 pixel metering sensor and an uprated AF sensor that can work in lower light and with smaller aperture lenses. Its sensitivity range can be expanded to the equivalent of ISO 204,800 and adds illuminated controls to make it easier to work in the low-light situations in which such a setting becomes useful. The D4 also becomes the first camera to make use of the XQD memory card format. www.nikon.com





ATC Mini

The Oregon Scientific ATC Mini may not have the 1080p shooting of the recently announced Hero2, but it does offer 720p HD video shooting and weighs just 70gr.

Its 20m depth range means that is restricted to shallower dives but it's not just designed for divers though, there are mounting systems for helmets, handle bars and surf boards. There's also a tripod with quick release for grabbing action on the fly.

The ATC Mini comes with a 32GB microSD, enough for 1.5 hours of HD footage and packs a removable and rechargeable lithium battery. There's mini USB and "TV-out" options, and it boasts a built-in mic for capturing all the gnarly noises, too. Costing GB£119.99, the Oregon Scientific ATC Mini will be hitting shops "soon". Pocket-lint.com



Get the colours right

It can be a real challenge for digital photographers to get accurate natural colors with the RAW option. In order to make photographs with sufficient saturation in all channels and with correct hue—where red is red, green is green and blue is blue—QP has addressed these goals with the new QPcard 203 and QPcalibration software, which perform color correction using color management and profiling at the first accessible stage in the digital image workflow, the RAW image. Together with the free application QPcalibration, QPcard 203 takes picture color control one step further. This is real color management of virtually any camera in virtually any light. Take a picture of QPcard 203 in raw mode. Open the picture in QPcalibration. Calculate a profile, give it a name and save. The profile will be saved in the correct folder and can immediately be used in Adobe Photoshop or Lightroom. A custom camera and light profile is created in less than 10 seconds.

A beta release of the software can be downloaded at agraph.com



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St. Helena & Ascension

South Atlantic Adventure

Text and photos by Roland Hanewald



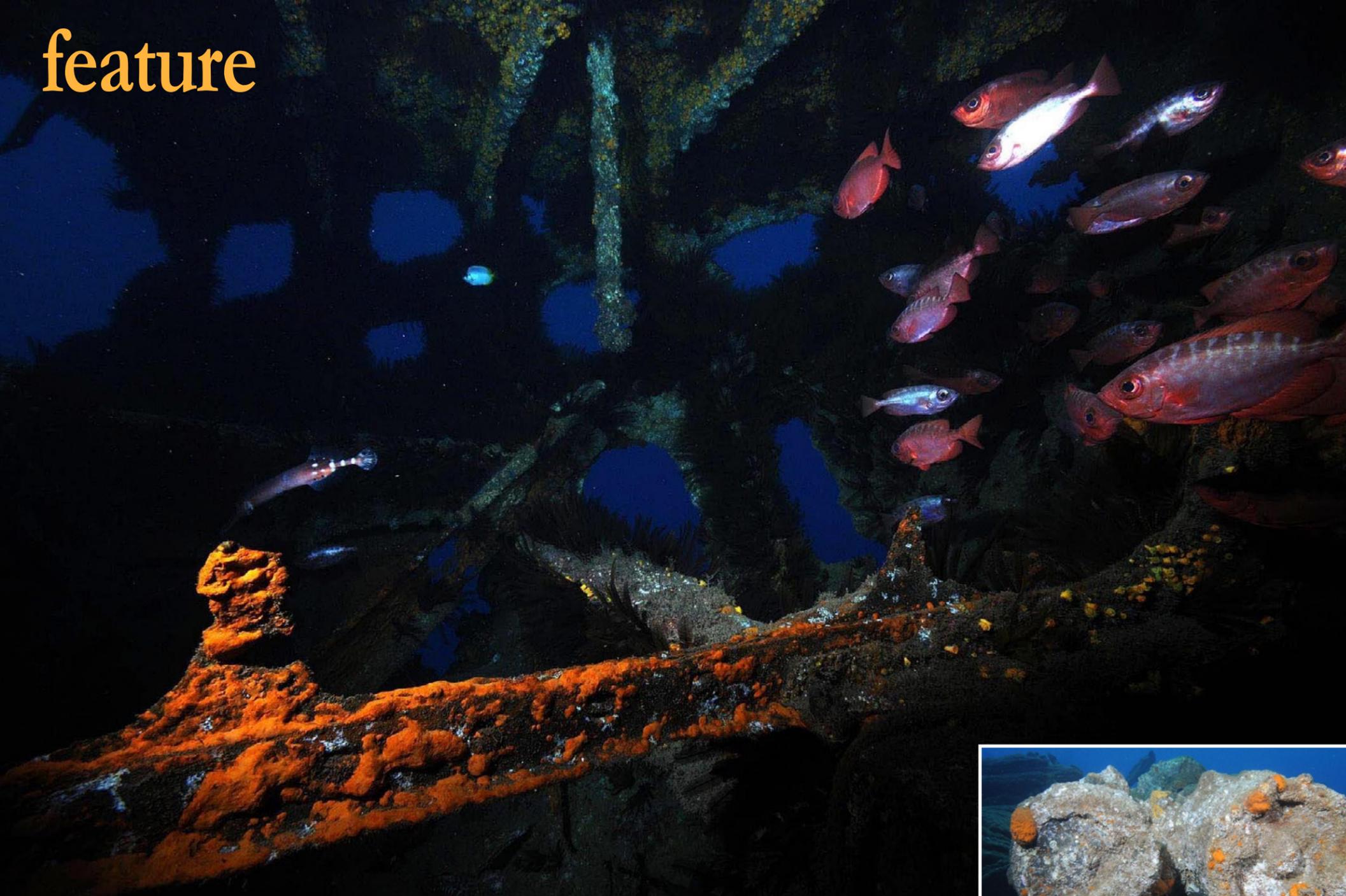


St. Helena and Ascencion—those British-owned islands in the South Atlantic—might as well be located in a remote solar system as far as general knowledge of them is concerned. Care to visit those far-out places as an adventurous traveler and diver? These islands offer exciting diving opportunities and are not as difficult to reach as they initially appear. Neither are they the least bit ‘touristy’ and both offer some of the most unusual diving around.

Upon a closer look the island’s coasts show many lovely aspects; The island capital of Jamestown is snuggled between two canyon walls

Space shot shows that St. Helena is rocky all around





St. Helena

Historically famous as Napoleon's exile, the island was placed on the international diving map in 1975 when Belgian underwater explorer, Robert Sténuit, arrived to search for the remains of the Dutch East India vessel *Witte Leeuw* ("White Lion"), which sank in 1613. Along with three consorts, the Dutch vessel had foolishly attacked two Portuguese carracks anchored off St. Helena's west coast, receiving bloody noses in the process. Due to the enemy gunners' exemplary marksman skills, the *Witte Leeuw* exploded. Heavily laden with treasure including 1,311 diamonds, the ship sank to the bottom at 110 feet where it remained undis-

turbed for 362 years.

Sténuit and his team were able to locate the wreck situated just outside the little island capital of Jamestown. Although they were able to salvage an impressive trove of precious Chinese porcelain, the diamonds remained elusive. It is believed they had been at the center of the explosion and were scattered far and wide. To date, not a single one has been found.

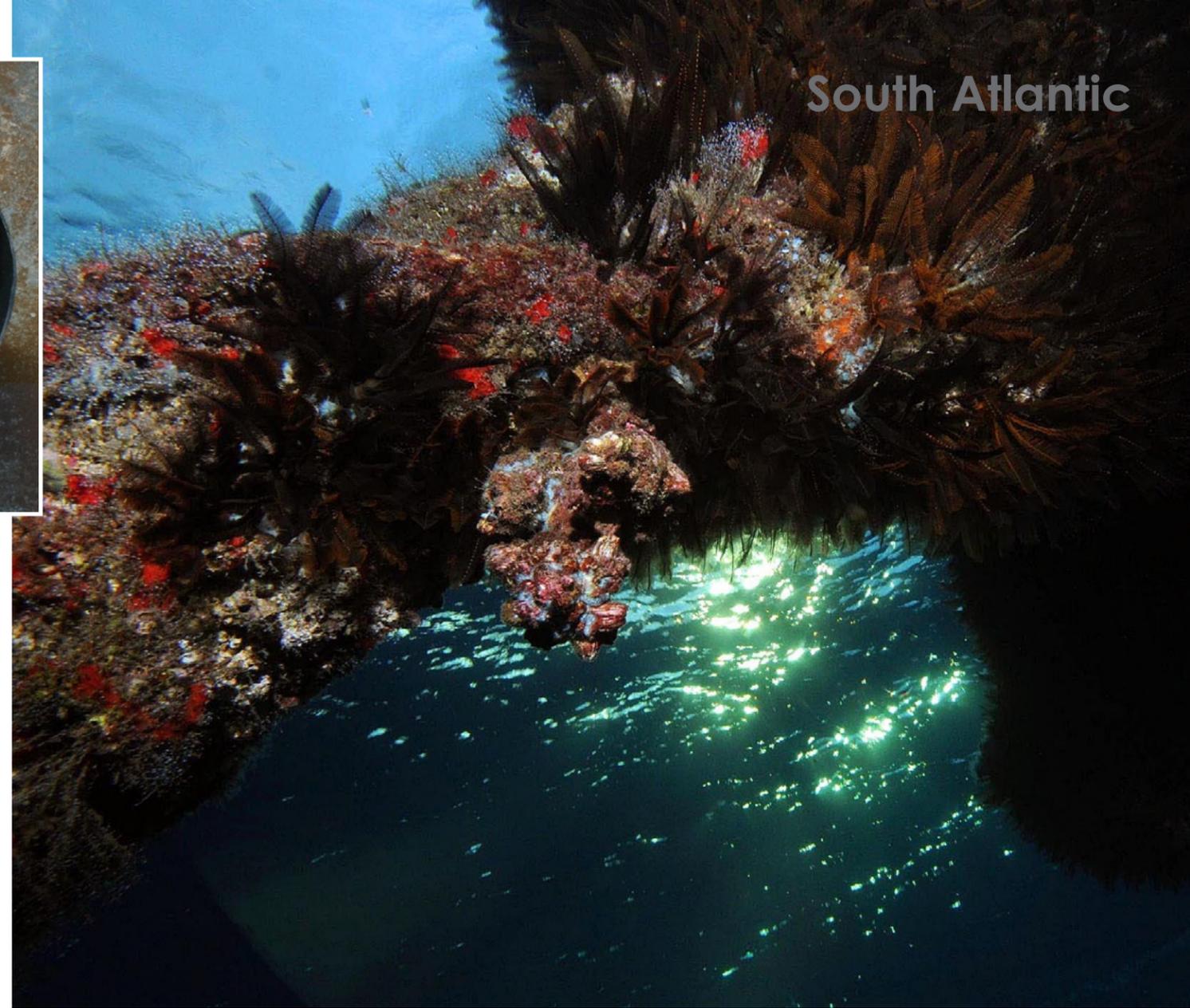
There are many other, equally exciting wrecks right on the doorstep of Jamestown's—St. Helena's solitary landing place. Some 13 ships sank right on the Jamestown anchorage during a storm in 1846. The *SS Papanui* caught fire in 1911 sinking in James'

CLOCKWISE FROM TOP LEFT: Most sections of the *Papanui* can easily be reached at moderate depths; Some shipwrecks in James' Bay date back to the 19th century; The deck of the *Darkdale* still shows the ravages of the erstwhile torpedo attack; Heavily encrusted parts can hardly be recognized as such any more



Bay in easily accessible depths. The *SS Darkdale* was sunk close to this position by a German submarine in 1940, offering a thrilling dive to modern explorers.

However, it is the island's steep coasts and their abundant marine life that offer the most attractions. Exciting wall diving commonly takes place from boats along the protected northwestern shoreline. Strapping young lad, Anthony Thomas, is the local guide who will also furnish all necessary equipment, and the Jamestown tourist office will make the arrangements. Instruction is also offered.



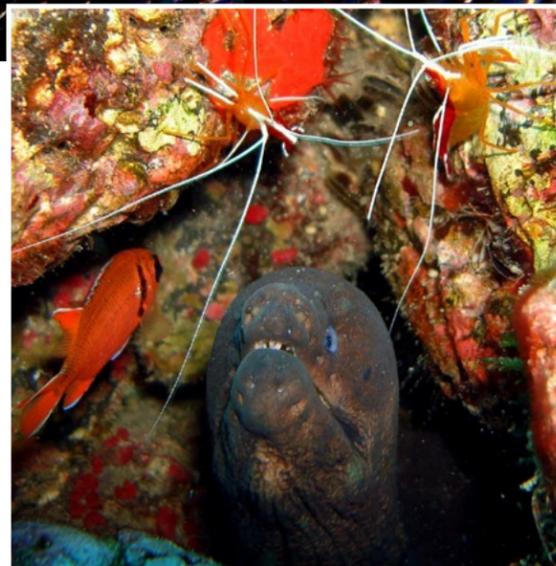
"Comfortless Cove", secluded and diminutive, is another beach inviting exploration; Club members' children practice for big things to come; Thick marine growth is covering many portions of the Papanui wreck; Tracks of a caterpillar-tractor? No, it was one of the many turtles laying their eggs there; Unmindful of the watching photographer, busy turtle digs a hole to deposit her eggs

Ascension

Positioned three days by ship closer to the Equator than St. Helena, the island of Ascension boasts a tropical climate and warmer water (up to 28°C). It remains an important base for the Royal Air Force. Some Americans are also present, operating large communication facilities. The Apollo Missions were conducted through these stations, and various satellites monitored today. Tourism is virtually non-existent as the island was only opened to the outside world in 2002. The "capital" and ship-landing place of Georgetown is but a mere village, but there is a diving club!

Contact must be made through the Conservation Centre in Georgetown.





(conservation@atlantis.co.ac), which will arrange a get-together with club members, including jovial president Bernard "Pete" Peterson. The easiest way is to join the club for a nominal fee. Diving is done on an informal, non-commercial basis; divers from outside should bring along most of their own gear (except tanks).

The topography of Ascension is basically similar to that of St. Helena, with rugged lava cliffs, rocky drop-offs, large caves and minimal coral. The main difference is that Ascension has beaches. Long Beach, just next to Georgetown, is a magnificent stretch of white sand, usually empty except for huge turtles crawling ashore to lay their eggs. The dive club is situated in English Bay, specifically North Point, where the action usually takes place on weekends. The

location has been chosen due to the presence of some wrecks right in front of the site, including the *Tortoise*, a barque sunk in 1859; the *Soudan*, a steamer that sank in 1892; and the *Derb* sunk in 1929. As is the case with St. Helena, it is less the wrecks (of which little remains), but the marine fauna starting in just a few feet of water. It has undeniable Caribbean qualities with an abundance of endemic species, along with turtles, sharks, dolphins and

whales farther out.

Both islands offer a host of other activities including hiking, deep-sea fishing and golfing. The civility and helpfulness of the friendly locals is ample proof that commercial tourism has yet to make inroads, an atmosphere that is all too lacking in the bustle of the 21st century. ■



CLOCKWISE FROM TOP LEFT: Nature unfolds incredible multitudes in the waters around Ascension; Dolphins always delight boaters with their antics; Diver inspects the remaining frames of the *Soudan*, of 1892 vintage; The islands offer great opportunities for hiking in a healthy environment; Time and again, there are opportunities for taking exciting photographs

