



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
St. Helena

Workshop
Sidemount

ALIWAL SHOAL & PROTEA BANKS

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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.

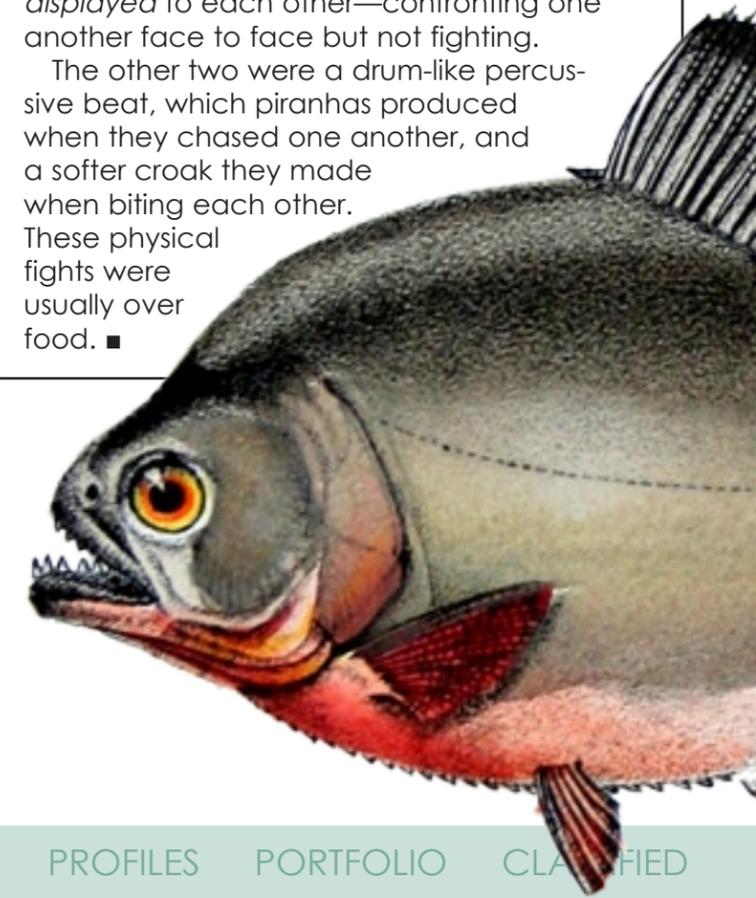
Piranhas, like many other "noisy" fish, produce sounds by vibrating their swim bladders—gas-filled organs in their bodies that help regulate their buoyancy.

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. ■



IP. KRAJEWSKI

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.

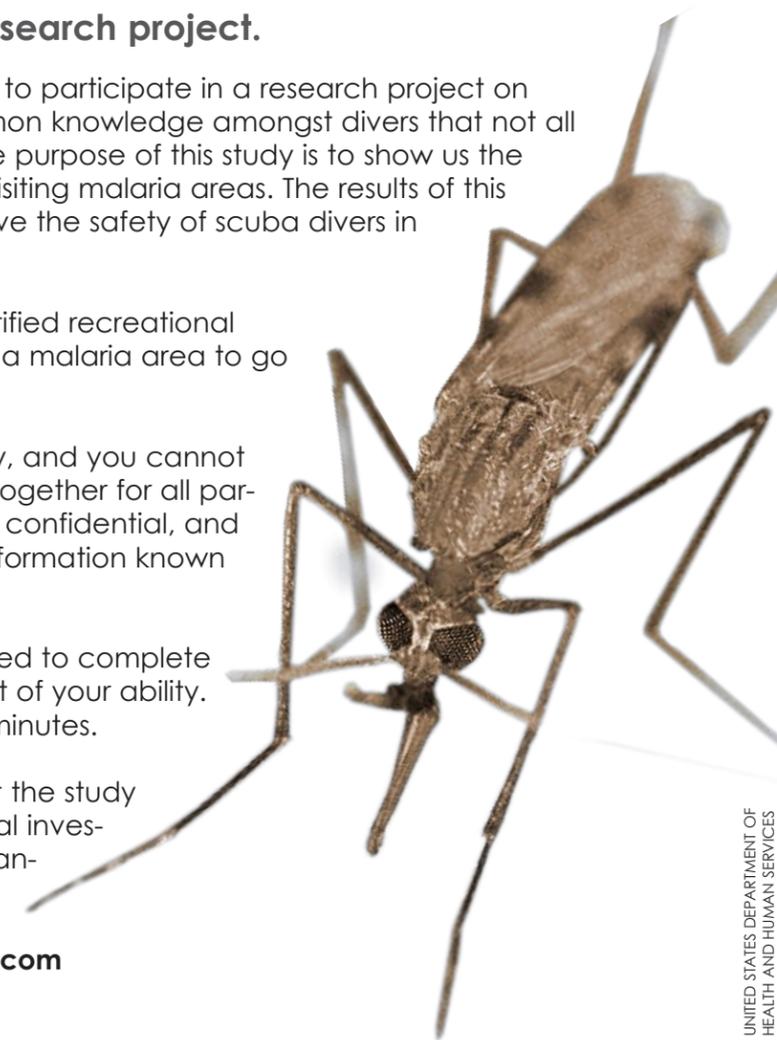
You may participate in this study if you are a certified recreational diver, 16 or more years old and you have visited a malaria area to go diving.

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

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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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.

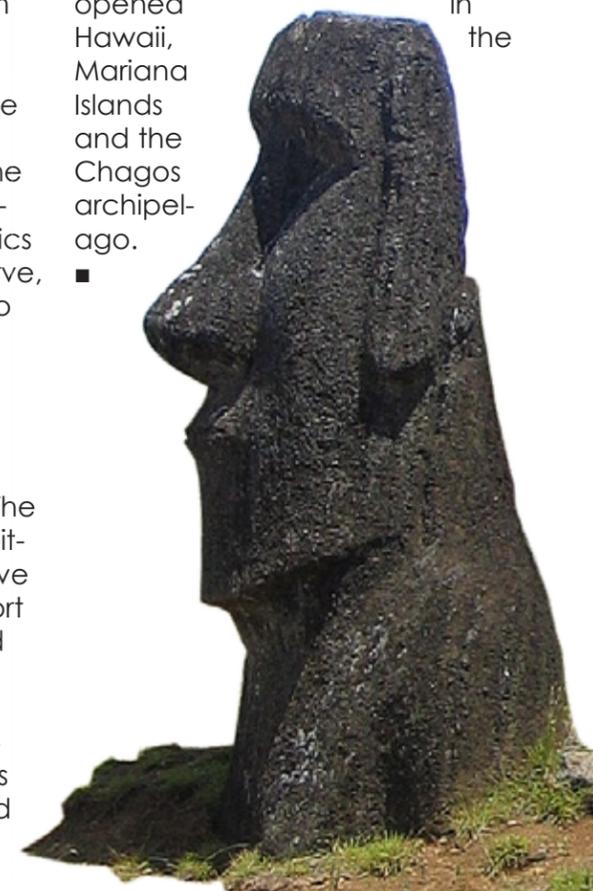
The Easter Island Development Committee (Codeipa) has already given its approval to the project, following measures reviewed by government earlier this year to help preserve the

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 pro-active—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.

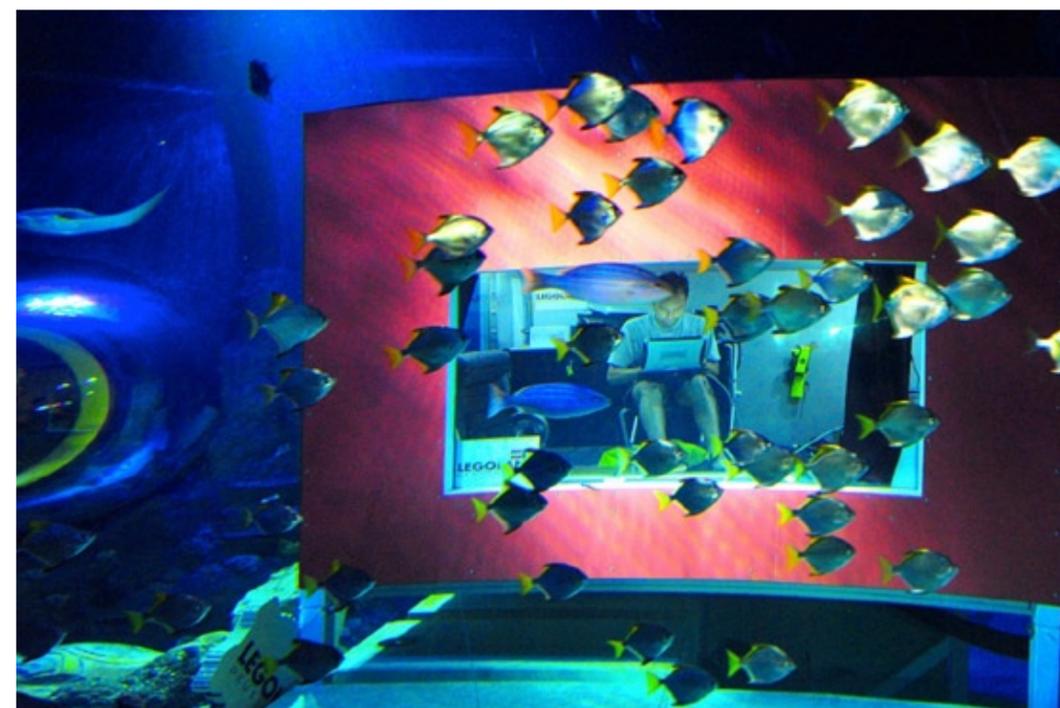
The project leader

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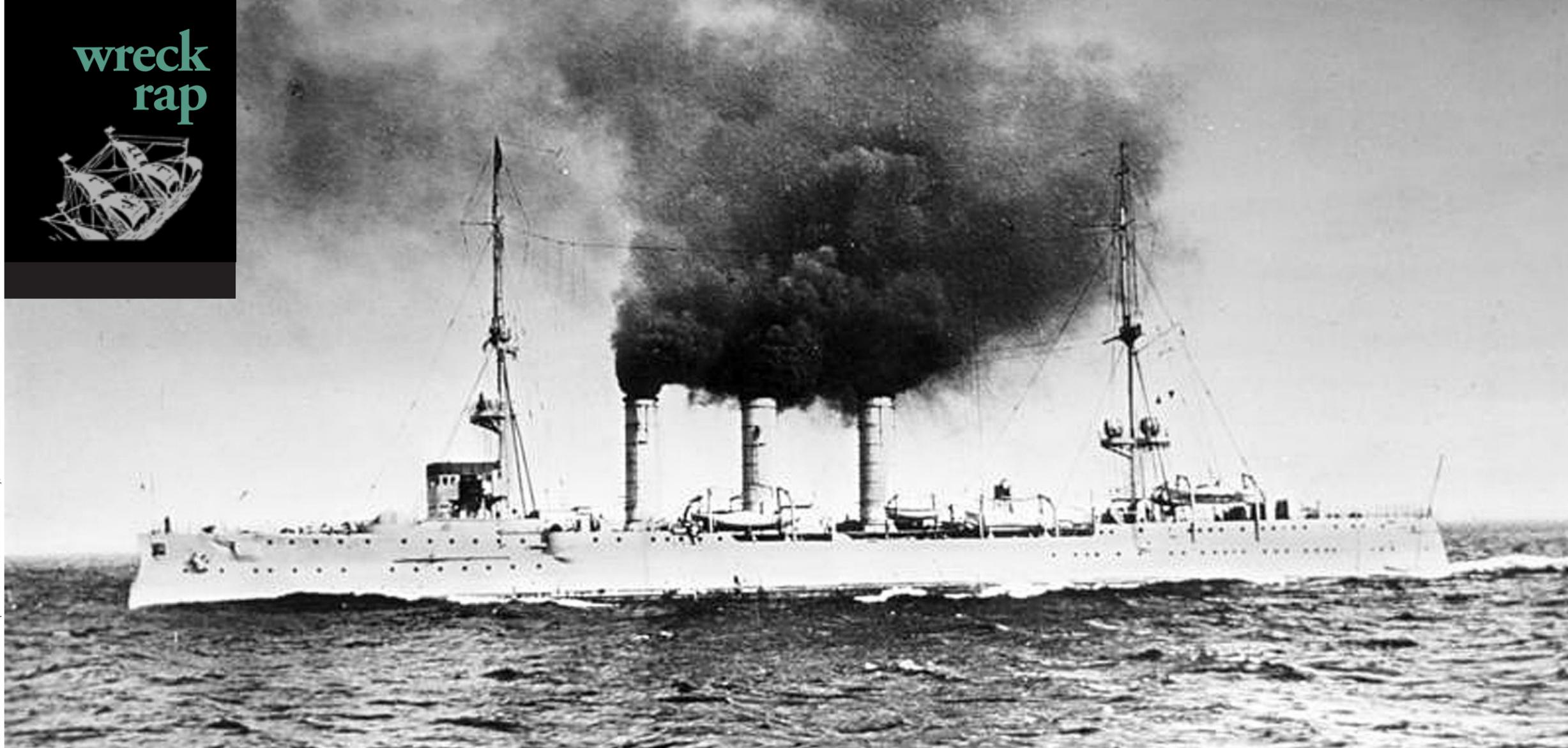
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The light cruiser *SMS Emden I*
at sea in 1910

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.



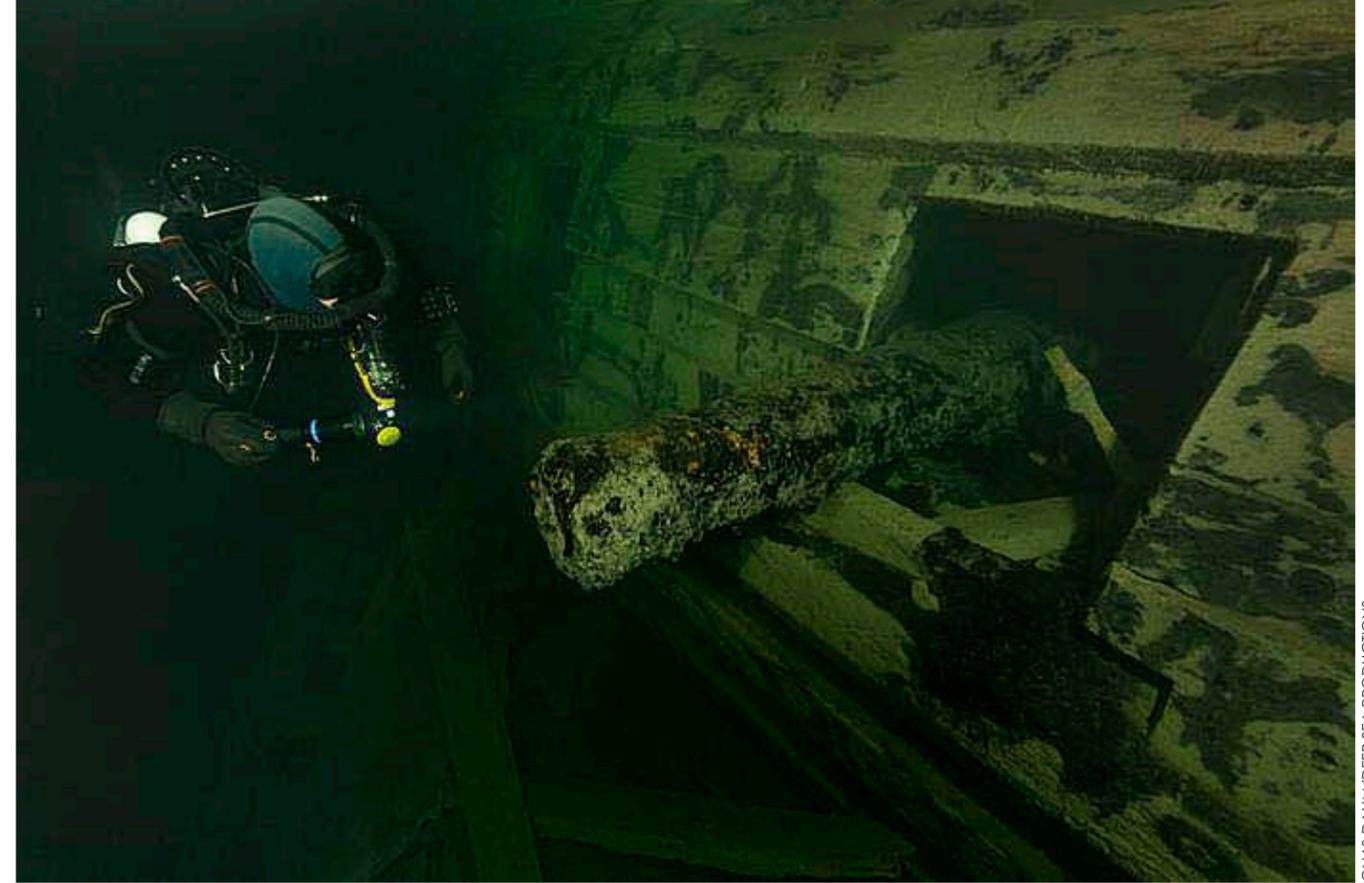
The Maritime Museum in Stockholm is excavating an area in the city center. In front of the Grand Hotel, the remains of a wreck that was sown together was found

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.

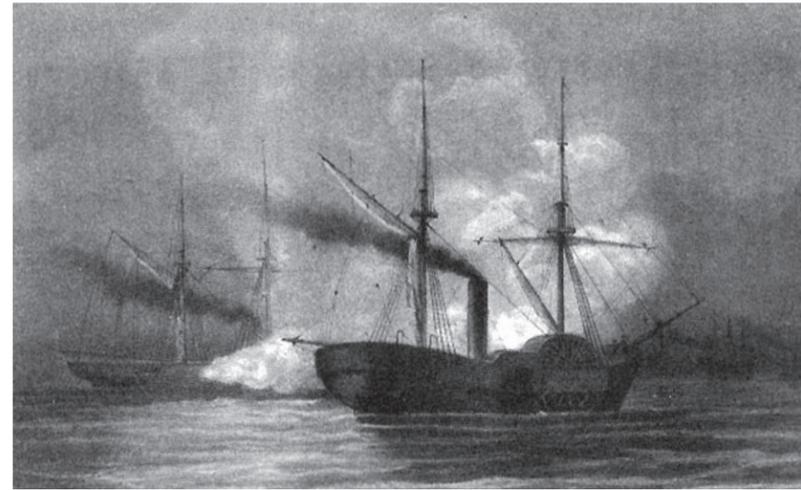
Historical records suggest that some 4,400 ships carrying 140,000 Mongol soldiers landed in Japan in 1281 and skirmished with samurai in northern Kyushu. But after returning to their boats, the fleet was struck by a devastating typhoon that put an end to the invasion plans—a storm known to all Japanese

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

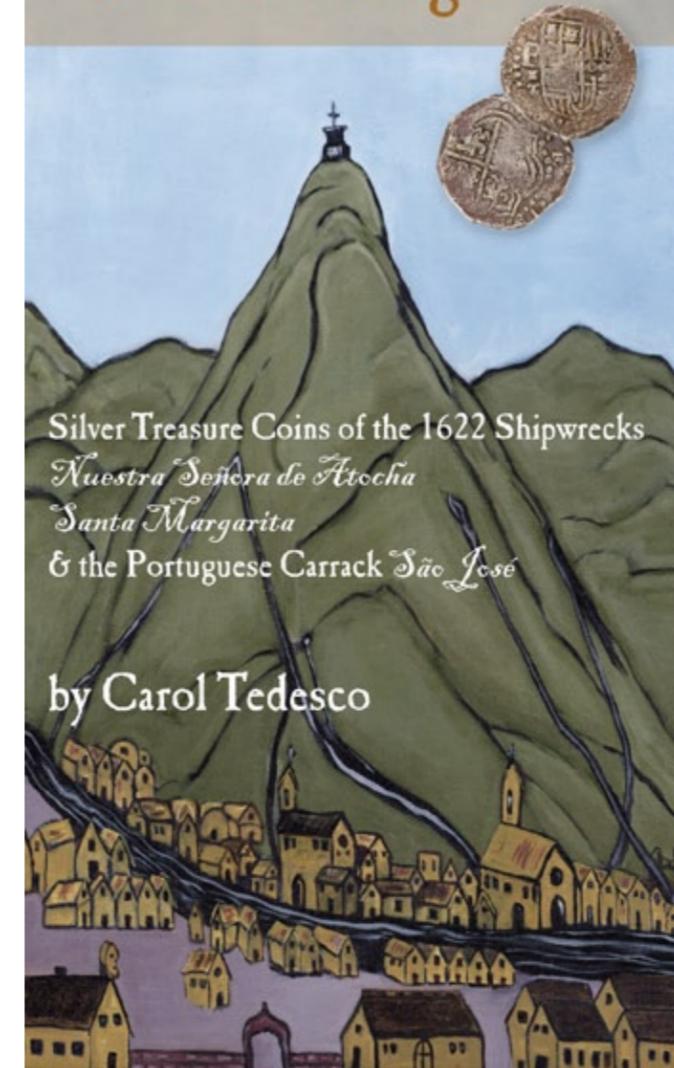


During WWII, numerous planes—such as the depicted Curtiss Helldiver—and landing craft, and occasionally the lives of young servicemen, were lost around the islands

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 Atocchia
Santa Margarita
& the Portuguese Carrack *São José*

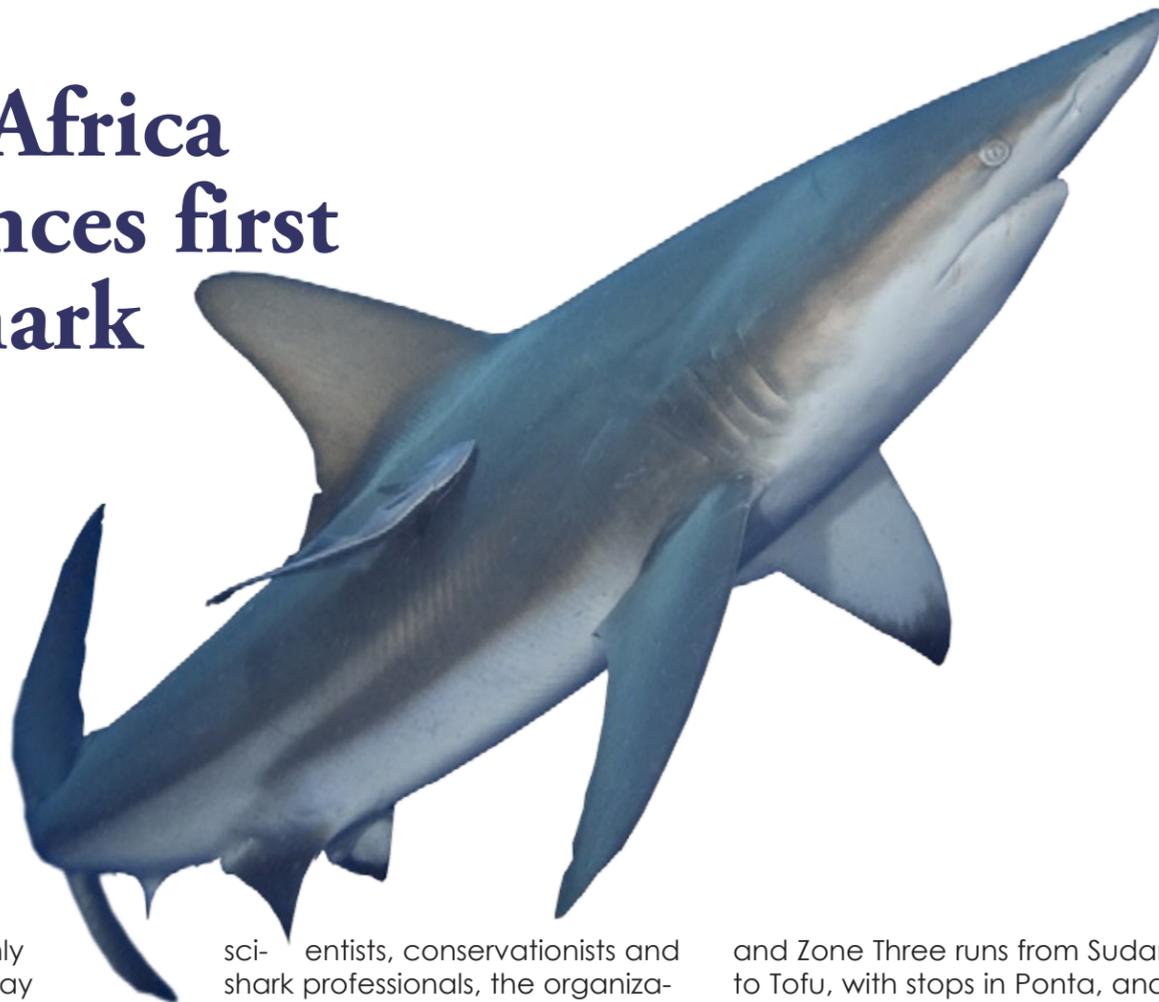
by Carol Tedesco

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. ■

