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Andy Murch's
**Shark Diving for
Dummies**

Wreck Treasures
**The *Santa
Margarita***

Korea
**Mermaids
of Jeju**

Expedition
Life

Amphibious

Glass Sea Creatures
Joe Peters

WALINDI & LOLOATA

Papua New Guinea

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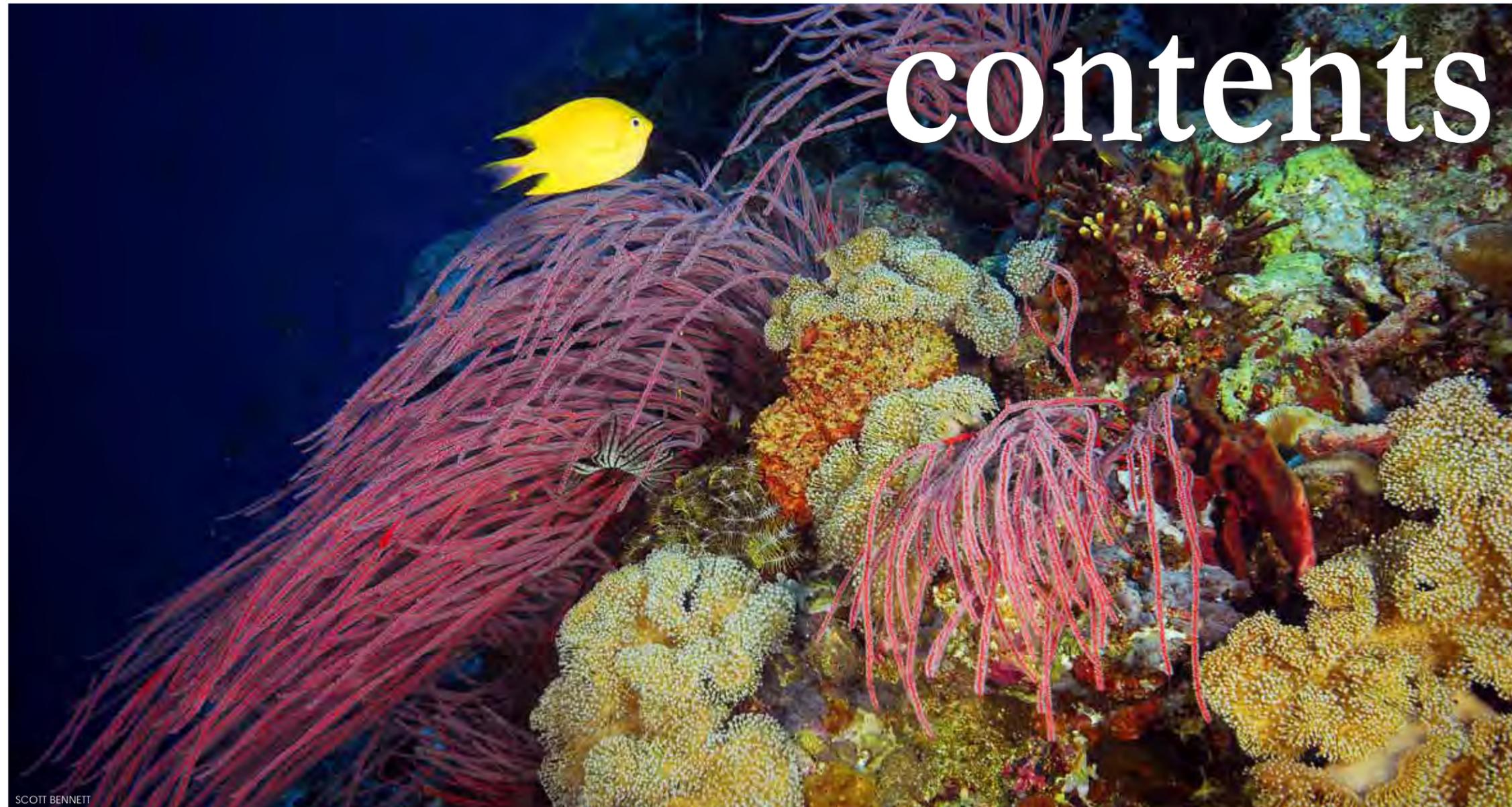
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PHOTO THIS PAGE: *South Emma, Kimbe Bay, Papua New Guinea*. Both photos by Scott Bennett

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Recreational diving is not doing so well these days. Not only has the ongoing global financial crisis, and before that the spiralling fuel costs, had a deep impact on many dive centers and operators, but the dive industry also seems to be struggling to adapt to new realities, after decades of continuous growth and an increasing popularity of diving in the past century.

Did scuba diving just undergo a natural progression reaching a peak or saturation point around the turn of the millennium before falling somewhat out of fashion with the general public — or is something more worrisome going on?

Look around at who is attending dive expos in Europe and the United States these years. It is hard to spot anybody under the age of 30, unless they are kids or teenagers accompanying their parents. The average scuba diver in the West is no longer a young, adventurous and athletic person in their 20's but a graying and somewhat middle-aged person in the late 40's. While it is on one hand impressive and reassuring that so many people have stayed loyal to their hobby for decades, it is also grounds for concern that a whole generation of new divers seems to be missing.

What went wrong? Was it just the fashion pendulum that swung the other way for a while?

A small—but by no means scientific—investigation which we conducted recently revealed that an overwhelming proportion of the over-40's cited their inspiration to start diving came from watching, as kids, the first underwater series on TV with Jacques-Yves Cousteau. This was mentioned over and over again, but so was Hans Hass and Sea Hunt. These pioneers inspired and made a whole generation dream. For baby-boomers, diving stood out as a special achievement and a fulfilment of childhood dreams. Becoming certified as divers became part of our identities.

As our inquiries soon made clear, most of the younger divers have only a vague notion of who these pioneers were and certainly no role models or heroes attracting them to the sport. Many would reply that diving is cool enough, but it ranks on the same level as so many other outdoor activities. Now it is just one of many fun things you can do on your holiday. Or you try it and then go onto something else.

In the 1990's, one leading training agency in particular went to great lengths to market scuba diving as something that everyone, pretty much, could undertake. While the efforts to change the perception of diving as something reserved for young, fit and adventurous athletes did appear to break down barriers and got even more people diving for a while, in

hindsight one must also ask whether there was a hefty price to pay. By turning scuba diving into something more ordinary that even your middle-aged and overweight uncle could do, scuba diving became un-cool and ordinary. It didn't help that a range of companies chose as their role models and marketing figure heads tech divers who were often beer-bellied and bald middle-aged with grumpy or even scary expressions. All due respect to their achievements and skill levels, but as role models go, it was a very unwise choice. No teenager would like to look like them.

Scuba diving will bounce back. I have no doubts about that. The ocean is there and humankind has always been attracted to it and to playing in water. Exploration is also in our genes, and diving makes it possible for many of us to live out that dream,

I do also see signs that a new generation is taking to diving. The dive expos in Asia in particular are now filled with joyful youngsters who are clearly intrigued and attracted to the oceans. If only the West would look in that direction and learn. Jacques-Yves Cousteau and his films were instrumental for the rise of the dive industry, but he is now gone and so are many of the others who inspired a whole generation.

It is now time for the industry to finally move on and embrace the new reality and the new generation.

— Peter Symes, Editor-in-Chief

Bring a friend



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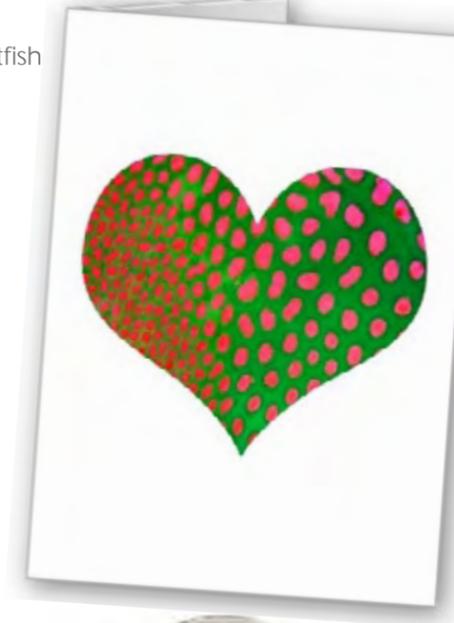


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X-ray mag

News edited
by Peter Symes
& Catherine G S Lim

deep stuff NEWS



The Baltic Sea is full of unique and well preserved shipwrecks, some of which date back to the Medieval and Viking Ages, that have now come under threat from shipworms, *Teredo navalis*. Shipworms are notorious for borrowing into and gradually destroying wooden structures in saltwater. These animals are capable of completely destroying large maritime archaeological finds in only ten years earning them the nickname "termites of the sea". The shipworm, which is really a wood-boring mollusc, has avoided the Baltic Sea in the past, since it does not do well in its low salinity water, but it has now been spotted in several locations along the coast along both the Danish, Swedish and German Baltic Sea coasts.

100,000 wrecks may be at risk
Thanks to the absence of *Teredo navalis* there are currently around 100,000 well-preserved shipwrecks resting in the Baltic Sea, a true treasure for historians and archaeologists. If the shipworm continues to spread, these ships may vanish before anyone has a chance to explore them.

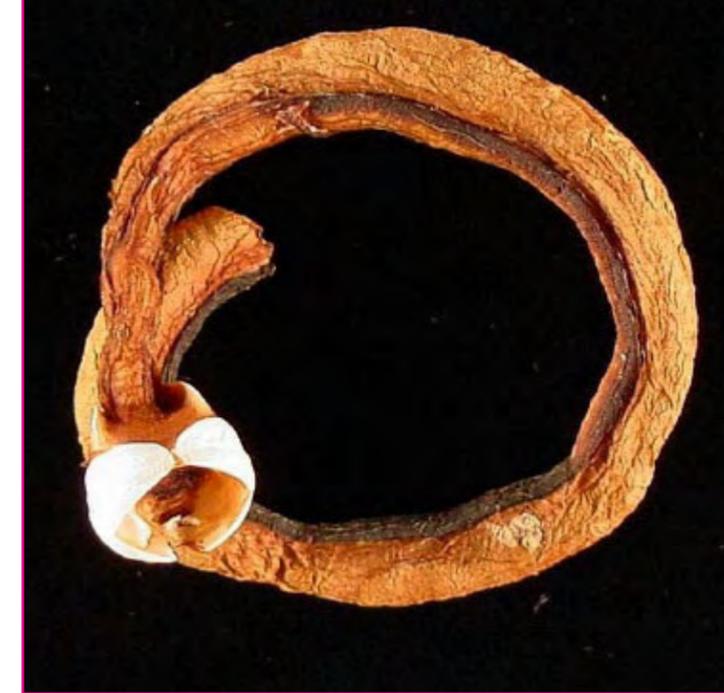
Medieval shipwrecks attacked

"Wrecks that have been resting unharmed since the 14th century have now been attacked off the coast of Rügen in Germany, and we are also noticing attacks along the Swedish coast, including destruction of the Ribersborg cold bath house in Malmö," says Christin Appelqvist, with the Department of Marine Ecology, University of Gothenburg.

Another artefact of global warming? Appelqvist and her colleagues suspect that increased water temperatures may be helping the shipworm to tolerate a lower salinity.

The shipworm invasion could prove disastrous for marine archaeology in the region, home to long-submerged prehistoric timber settlements and remarkably preserved wrecks—such as the salvaged 17th century Swedish warship, the *Vasa*, a major museum attraction in Stockholm.

"Really nice tall ships with the mast and everything intact are still being



Shipworms have slender worm-like forms, but nonetheless possess the characteristic structures of bivalves. The valves of the shell of shipworms are small separate parts located at the anterior end of the worm, used for excavating the burrow

"Around 100 wrecks are already infested in the Southern Baltic"

discovered," Appelqvist said. "Every time researchers go down there with remotely operated vehicles they find new wrecks."

Shipworms greatly damage wooden hulls and marine piling, and have been the subject of much study to find methods to avoid their attacks. Copper sheathing was used on wooden ships during the Age of Exploration, as a method of preventing damage by "teredo worms". ■

When shipworms bore into submerged wood, bacteria in a special organ allow them to digest cellulose. The excavated burrow is usually lined with a calcareous tube



Shipworm enters the Baltic, threatens wooden wrecks and marine treasures

The shipworm invasion could prove disastrous for marine archaeology in the region, home to long-submerged prehistoric timber settlements and remarkably preserved wrecks such as the salvaged 17th century Swedish warship *the Vasa*



Freshwater stingrays use water as a “tool” in problem-solving tests, scientists have demonstrated for the first time. Using a plastic pipe with one end sealed and containing hidden food, researchers observed how the fish overcame the challenge of getting the meal from the container

Stingrays use tools to solve problems

Stingray tool use showcases its cognitive abilities

In a recent study just published in the scientific journal *Animal Cognition* a team of researchers tested the ability of captive South American stingrays *Potamotrygon castexi* to solve problems, by setting them a series of underwater tasks. All five test subjects quickly learned to use jets of water as a tool to extract a meal of hidden food from a plastic pipe. It reveals that the fish, once thought a “simple reflex animal”, has cognitive abilities to rival birds, reptiles and mammals, scientists say.

The experimental protocol, which gave the animals the opportunity of correcting a wrong visual cue decision, resulted in four out of five subjects correcting an error rather than making an initial right choice. One of five subjects reached 100 percent correct trials in the visual discrimination task.

The ability to use water as an agent to extract food from the testing apparatus is a first indication of tool use in batoid fishes. Freshwater stingrays, found in many tropical waters such as the Amazon River, are related to ocean stingrays. Like sharks, they have skeletons made of cartilage, rather than bony skeletons of less closely related teleost fish. In the past, scientists have assumed that such cartilaginous fish have limited cognitive abilities, in part because they have been difficult to study, says Dr Michael Kuba from the Hebrew University of Jerusalem in Israel who undertook the latest study. The stingrays not only performed the tasks well but also demonstrated a range of problem-solving strategies.

“Tool use in fish is far from anything seen in birds or mammals,” explained Kuba. He said that the definition of tool use, using an agent to achieve a goal, was set by cognitive scientist Dr Benjamin Beck in 1980. The stingrays meet this definition by using water as a tool, manipulating their bodies to create a flow of water that moves food towards them. ■

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Why and how did gills really evolve?

Biologists have cast doubt on the long-held theory that fish gills evolved primarily for the purpose of breathing.

A new experiment suggests that it is likely that fish evolved gills for the primary purpose of regulating the chemicals in their bodies.

Gills usually consist of thin filaments of tissue that have a highly folded surface to increase surface area. A high surface area is crucial to the gas exchange of aquatic organisms, as water contains only 1/20 parts dissolved oxygen compared to air. The filaments contain blood by which gases are exchanged through the thin walls. Oxygen is carried by the blood to other parts of the body. Carbon dioxide passes from the blood through the thin gill tissue into the water.

Clarice Fu, a zoologist from the University of British Columbia in Canada, and colleagues who studied the development of gills in rainbow trout larvae found, as the larvae matured, their gills developed the ability to regulate the

chemicals in their blood earlier than they began to take up oxygen.

The team measured the uptake of ions across the gills. Ions, which are charged chemical particles such as sodium, are necessary for the body's cells to function, but they become toxic if their levels in the blood become too high. To maintain this delicate ion balance in their blood, fish exchange these ions with the surrounding water through their gills

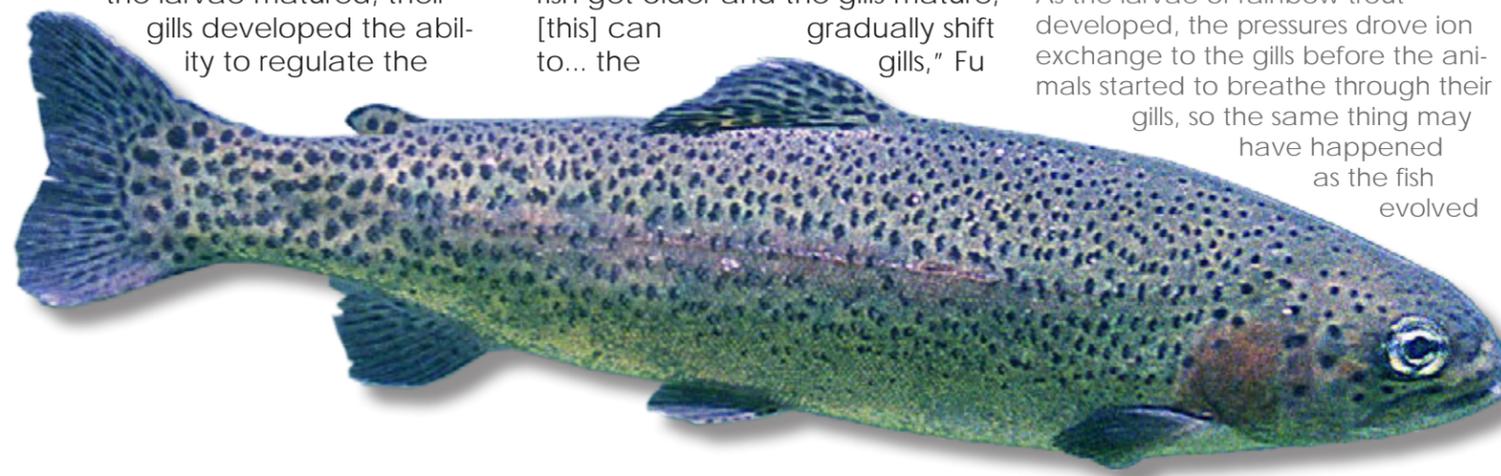
“In freshwater fish, like rainbow trout, they tend to lose ions from their blood to the water, because the ion concentration in blood is greater than that of freshwater,” Fu told the BBC.

“When the gills are still immature, a significant portion of ion uptake occurs at the skin. As the fish get older and the gills mature, [this] can gradually shift to... the gills,” Fu

added.

“We found that ion uptake shifted from the skin to the gills earlier than oxygen uptake. This led us to propose that the gills are needed for ion regulation earlier than they are needed for oxygen uptake.” ■

As the larvae of rainbow trout developed, the pressures drove ion exchange to the gills before the animals started to breathe through their gills, so the same thing may have happened as the fish evolved



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Amorous leafy sea dragons succumb to Christmas tradition

Blame it on the mistletoe

When Christmas decorations were put up at the Sea Life Centre in Weymouth, Dorset, UK, the leafy sea dragons went all-flutter. And this was precisely the reaction that the staff had wanted.

To encourage the leafy sea dragons to mate, the staff had placed some mistletoe in their tank. This intrusion caused the males to go into a mating frenzy.

"The males have suddenly started engaging in heated courtship with the females. It seems they view the Christmas decorations as potential rivals, and they are making sure they don't lose out," said display supervisor Fiona Smith. ■



Underwater sponges could soak up uranium for nuclear power stations in Japan

A new fabric that's able to soak up minute amounts of uranium from the sea has been developed by a scientist from the Japan Atomic Energy Agency. This innovation, would enable the island nation of Japan to harvest the 8,000

tons of uranium needed yearly by its nuclear power industry. This would end its reliance on imports sourced from the uranium mines in Canada and Australia within five years. This situation would be most ideal, as about 4.5 billion tons of uranium can be found in the ocean, 1,000 times more than that found within uranium mines. In ad-

dition, the former is more environmentally friendly.

So, if things go according to plan, the future would see huge uranium farms on the seabed along Japan's eastern seaboard. At this initial stage, the fabric's developer, Dr Masao Tanada, simply hopes to build a 400 square mile underwater uranium farm once he manages to

get the funding. This would meet one-sixth of Japan's uranium needs.

According to him, "Other countries are conducting similar research but none are as advanced as we are. We need to conduct more development research and be able to produce the absorbent material on a large scale, but we could achieve this within five years." ■

Sponges recycle carbon to give life to coral reefs

Even though *Halisarca caerulea* sponges grow in the deep cavities beneath coral reefs, they provide the colony with nutrients by recycling dissolved organic carbon.

In fact, 90 percent of the sponge's diet comprises of dissolved organic carbon, which their neighbours in the coral reef find inedible. This amounts to as much as half their body weight every day. Yet, as excessive as this sounds, the sponge does not get any larger.

Could this be the weight loss

solution that so many overweight individuals seek? Not necessarily.

What happens is that during the intake of carbon, half of the sponge's choanocyte (filtration) cells divide, with a cell division cycle was a surprisingly short 5.4 hours. "That is quicker than most bacteria divide," said researcher Jasper De Goeij.

Yet he still could not figure out where the excess weight was disappearing to. Then, working on a hunch from the audience when

he presented his findings, he discovered that the division caused choanocytes to be shed everywhere. In the aquarium in the lab, tiny piles of brown material were found next to the sponges every morning.

De Goeij explained, "The sponges were shedding the newly divided cells, which other reef residents could now consume. *Halisarca caerulea* is the great recycler of energy for the reef by turning over energy that nobody else can use into energy that everyone can use." ■



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Cultivated conch pearls demystified

For over 25 years, researchers have attempted the tricky business of culturing pearls from the queen conch, *Strombus gigas*. Now, scientists from the Florida Atlantic University's Harbor Branch Oceanographic Institute (HBOI) have succeeded where others have failed. They have for the first time produced beaded, or nucleated, and non-beaded cultured pearls from the queen conch.

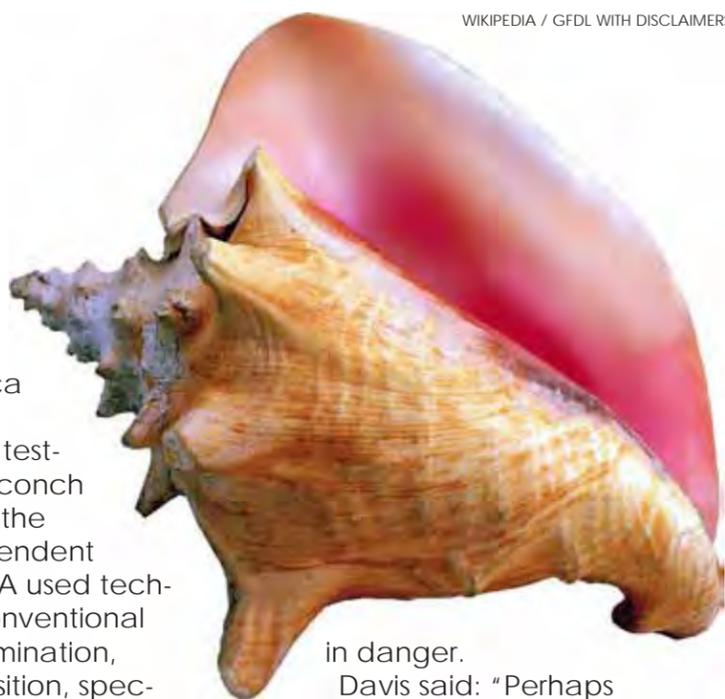
Using new methods they developed, co-inventors Dr Héctor Acosta-Salmón and Dr Megan Davis produced over 200 cultured pearls within just two years of research and experimentation. It is a major accomplishment as no high-quality queen conch pearls have been cultured prior to this breakthrough. It is thought to be a feat comparable to the commercial application by the Japanese of the original pearl culture techniques for pearl oysters in the 1920's. With this discovery, a new gem can be introduced to the gem industry.

In collaboration with the Gemological Institute of America (GIA), HBOI conducted extensive testing of the queen conch cultured pearls in the laboratory. Independent analysis by the GIA used techniques such as conventional gemological examination, chemical composition, spectroscopy, spectrometry and microscopy. Results of the trials are to appear in the scientific journal, *Gems & Gemology*.

Senior vice president of the GIA Laboratory and Research, Tom Moses, said, "Several of the pearls we examined are truly top-quality gems. With the equipment and expertise available at the GIA Laboratory, identification criteria are being compiled to separate queen conch cultured pearls from their natural counterparts."

Shell issues

It is most likely due to the queen conch's complex shell and sensitivity to traditional pearl seeding techniques that previous efforts in culturing conch pearls were not successful. The challenging spiral shape of the shell makes it almost impossible to reach the gonad, one of the pearl-forming parts of pearl oysters, without putting the life of the animal



in danger.

Davis said: "Perhaps the most significant outcome from our research is that the technique we have developed does not require sacrificing the conch in the process ... The 100 percent survival rate of queen conch after seeding and the fact that it will produce another pearl after the first pearl is harvested will make this culturing process more efficient and environmentally sustainable for commercial application."

In recent years, commercial fishing has depleted wild populations of queen conch, which were once abundant. They are now considered a commercially threatened species in Florida and throughout the Caribbean.

Of the six conch, or molluscan gastropod, species found in the shallow seagrass beds in these regions as well as the Bahamas, Bermuda, and the northern coasts of Central and South America, the queen conch is the largest. SOURCE:

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Drawing of *Strombus gigas* by Louis Charles Kiener, 1834

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Caribbean dive operators enlist divers to fight lionfish invasion

Over 300 scuba divers have been certified to catch red lionfish in a race to prevent the invasive and voracious species from consuming all the young and small fish on the Cayman Islands' corals reefs.

Native to the Indian and Pacific Oceans, red lionfish have no natural predators in the Caribbean and can produce 30,000 eggs each month. Within five weeks, they can consume all the juvenile and small fish on a reef, threatening the delicate ecosystem, said Mark Hixon, a marine biologist at Oregon State University.

U.S. government researchers believe the red lionfish was introduced into Florida waters during Hurricane Andrew in 1992 when an aquarium broke and at least six fish spilled into Miami's Biscayne

Bay.

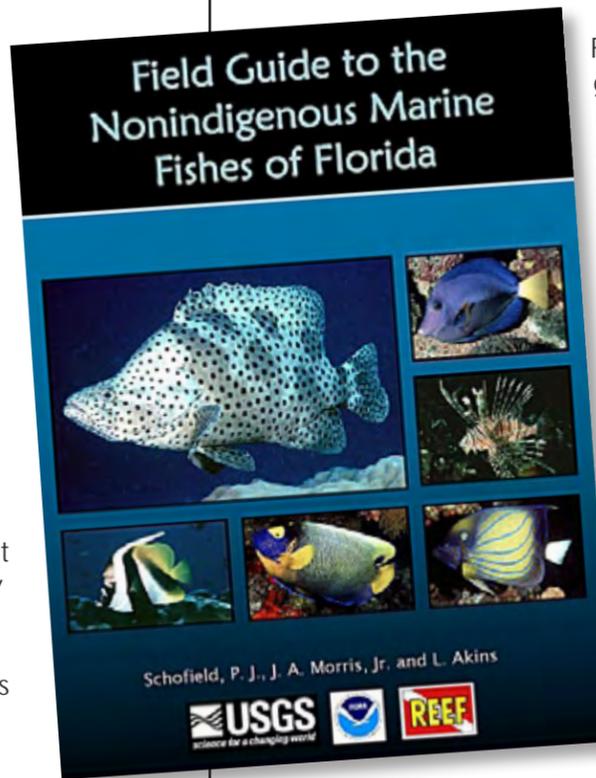
Captain Don's Habitat on Bonaire is hosting the first "Lionfish Wrangler" event aimed at doing something about the growing lionfish problem. From March 6-13, scuba divers can actually earn a "bounty" every time they spot a lionfish during this weeklong event.

DiveTech on Grand Cayman is running a boat each week to specifically catch the fish. Licensed fishermen also collect them on regular boat trips and dives from the shore.

Divers typically work in teams of two, using plastic nets, gloves, and sometimes sticks, to capture the fish, which has a large head with reddish-brown and white stripes and elongated, venomous spines. Without careful handling, it can cause a painful sting.

"We tell them this is not a pleasure dive and they are hunting fish," said Simon Dixon, a lionfish hunter and scuba instructor for DiveTech. ■

Florida: New watch list helps citizens report invasive marine fish



For the first time, a field guide for non-native marine fishes can be used to help prevent the establishment of invasive species that could pose risks to Florida's coastal ecosystems.

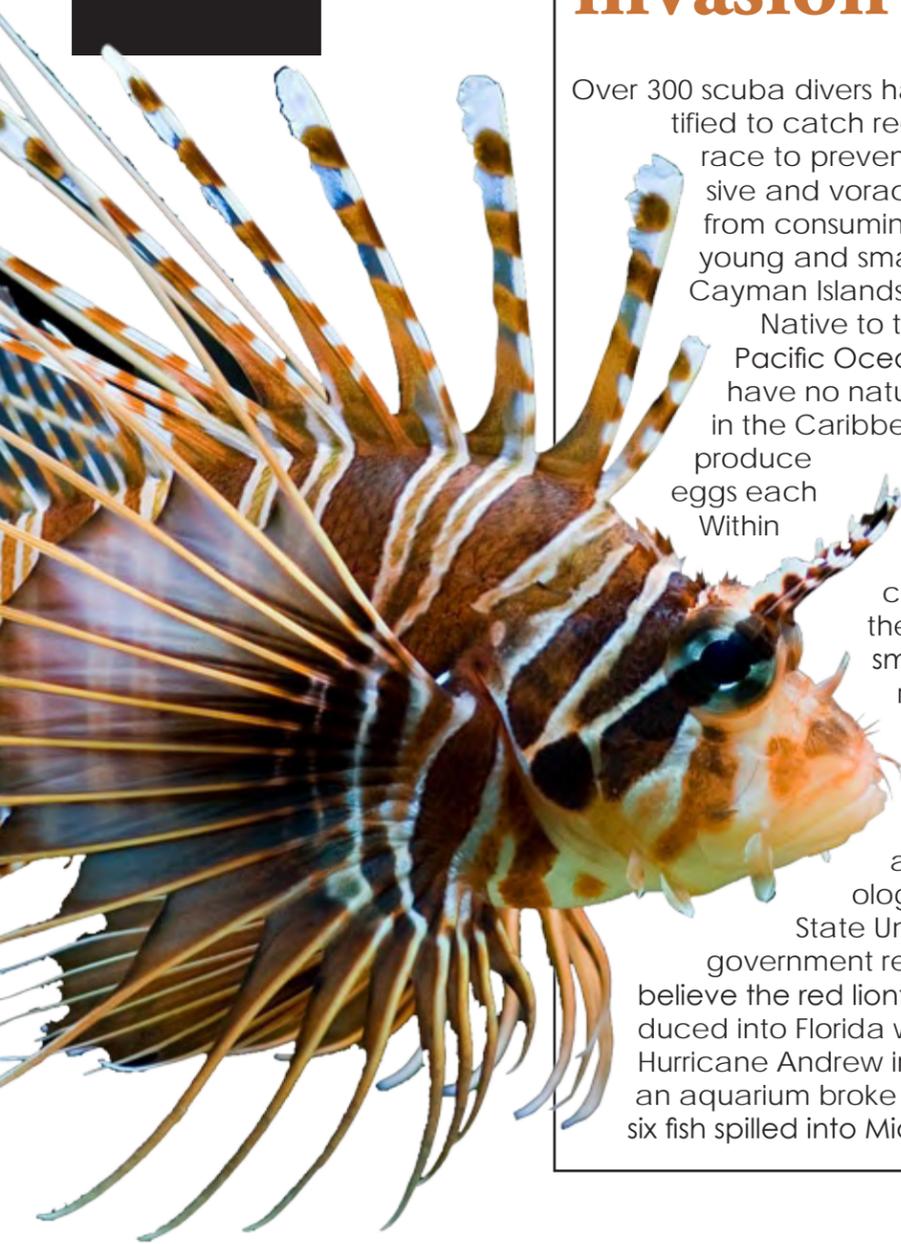
"Non-native fishes can have cascading effects that ultimately degrade the productivity and diversity of coral ecosystems," said Dr Pam Schofield, a USGS biologist and lead author of the field guide.

Many non-native fish spotted in coastal waters are thought to be aquarium fish that were released or escaped captivity. There may be a small window of opportunity to remove these invasive fish immediately, before they begin reproducing.

"Once they are established—that is, once their populations are self-sustaining—there's no known method for eradicating them," added Schofield.

The red lionfish, which was first documented off Florida in 1985, provides an example of what can happen once an invasive fish species becomes established. It is now widespread along the southeast United States and parts of the Caribbean, preying upon ecologically-important native species such as fishes and crustaceans.

If you want to help by volunteering your time to survey reefs, contact REEF (www.reef.org). ■



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Ocean acidification rates pose disaster for marine life, major study shows

Ocean acidification is an “underwater time-bomb” that threatens fish stocks, marine life and coastal communities around the world, a Natural England report has warned.

The world’s oceans are becoming acidic at a faster rate than at any time in the last 55 million years, threatening disaster for marine life and food supplies across the globe. A report by more than 100 of Europe’s leading marine scientists, released at the recent climate talks in Copenhagen, states that the seas are absorbing dangerous levels of carbon dioxide as a direct result of human activity. This is already affecting marine species, for example, by interfering with whale navigation and depleting planktonic species at the base of the food chain.

Acidity in the seas has increased 30 percent since the start of the industrial revolution. Many of the effects of this acidification are already irreversible and are expected to accelerate, according to the scientists.

The report, published by the EU-funded European Project on Ocean Acidification, a consortium of 27 research institutes and environment agencies, states that the survival of a number of marine species is affected or threatened, in ways not recognised and understood until now.



Dr Helen Phillips

Dr Helen Phillips, chief executive of Natural England, which co-sponsored the report, said, “The threat to the delicate balance of the marine environment cannot be overstated; this is a conservation challenge of unprecedented scale and highlights the urgent need for effective marine management and protection.”

Although oceans have acidified naturally in the past, the current rate of acidification is so fast that it is becoming extremely difficult for species and habitats to adapt. “We’re counting it in decades, and that’s the real take-home message,” said Dr John Baxter, a senior scientist with Scottish Natural Heritage and the report’s co-author. “This is happening fast.” ■

Starfish and sea urchins counteract our carbon emissions

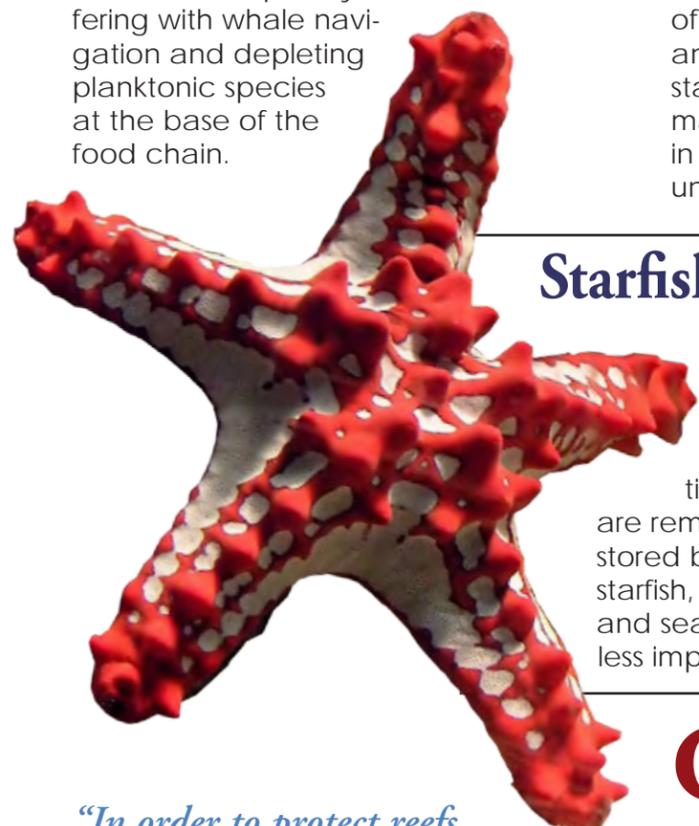
Out of the estimated 5.5 gigatonnes of carbon emitted each year by human activities, about 1.8 percent are removed from the air and stored by echinoderms such as starfish, sea urchins, brittle stars and sea lilies. This makes them less important “carbon sinkers”

than plankton, but the finding is still significant since no one expected them to catch such a large proportion of our wayward carbon.

The new discovery is the result of a study led by Mario Lebrato, a PhD student at the Leibniz Institute of Marine Science. The body of an echi-

noderm consists of up to 80 percent calcium carbonate, and according to the Lebrato study, these hard-shelled animals collectively capture 100 billion tons of carbon each year. ■

The study has been published in the journal, *ESA Ecological Monographs*



“In order to protect reefs in the long-term, we need radical action to reduce CO₂ emissions. However, our research shows that local action to reduce the effects of fishing can contribute meaningfully to the fate of reefs.”

Coral able to recover from climate change damage

A surprising and encouraging research study performed by scientists at the University of Exeter indicates that coral reefs may be far more resilient and capable of bouncing back than we had previously believed.

Scientists and environmentalists have warned that coral reefs may not be able to recover from the damage caused by climate change, and that these unique environments could soon be lost forever. Now, this new research adds weight to the argument that reducing levels of fishing is a viable way of protecting the world’s most delicate aquatic ecosystems.

Approximately two percent of the world’s coral reefs are located within marine reserves, areas of the sea that are protected against potentially-damaging human activity like dredging and fishing.

The researchers conducted surveys of ten sites inside and outside marine reserves of the Bahamas over 2.5 years. These reefs have been severely dam-

aged by bleaching and then by hurricane Frances in the summer of 2004. At the beginning of the study, the reefs had an average of seven percent coral cover. By the end of the project, coral cover in marine protected areas had increased by an average of 19 percent, while reefs in non-reserve sites showed no recovery. ■

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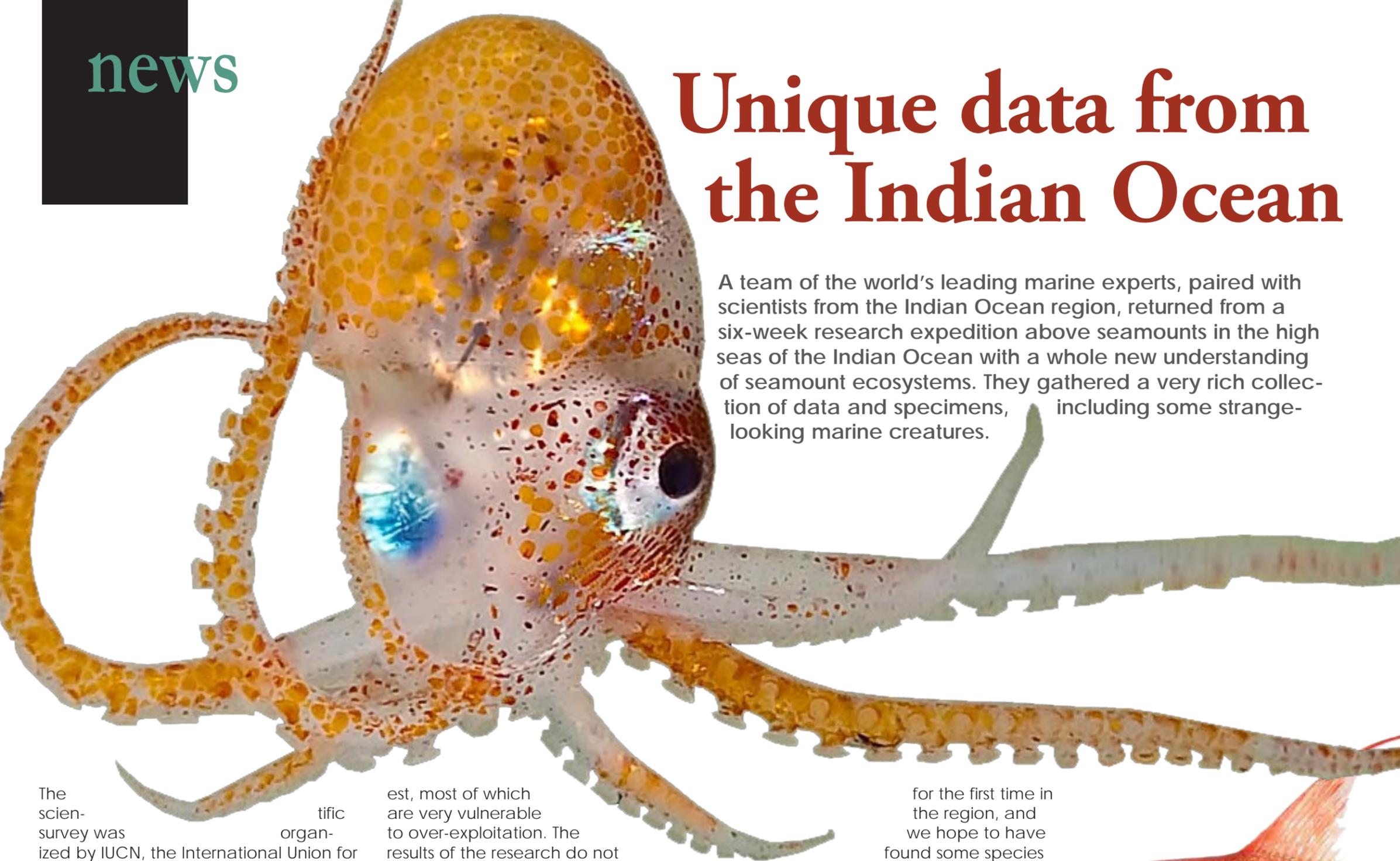
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“This sort of evidence may help persuade governments to reduce the fishing of key herbivores like parrotfishes, and help reefs cope with the inevitable threats posed by climate change.”

Unique data from the Indian Ocean

A team of the world's leading marine experts, paired with scientists from the Indian Ocean region, returned from a six-week research expedition above seamounts in the high seas of the Indian Ocean with a whole new understanding of seamount ecosystems. They gathered a very rich collection of data and specimens, including some strange-looking marine creatures.



The scientific survey was organized by IUCN, the International Union for Conservation of Nature, and its partners to improve knowledge of seamounts across the southwest Indian Ocean ridge.

Hotspots

Seamounts, underwater mountains of volcanic and tectonic origin, are known to be hotspots of biodiversity and attract a range of oceanic predators, including seabirds, whales and sharks. They also attract deepwater fisheries, as they host many species of commercial inter-

est, most of which are very vulnerable to over-exploitation. The results of the research do not only have a scientific interest, but will help improve conservation and management of Indian Ocean marine resources.

"I am extremely pleased with the data that we have collected and the number of species that we have encountered", says Dr Alex David Rogers, Chief Scientist of the Cruise and Senior Research Fellow at the Zoological Society of London. "The diversity of species that we sampled is higher than what I would have expected. Some species have been recorded

for the first time in the region, and we hope to have found some species new to science. It was

also very interesting to discover that the six seamounts we surveyed are very different from each other, and I believe our findings will certainly improve our global knowledge of seamount ecosystems".

The Norwegian research vessel Dr Fridtjof Nansen left on 12 November from Reunion island, and travelled 6,000 miles in 40 days to



Splendid Alfonsino, *Beryx splendens*. Photo by Oddgeir Alvhaeim

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Silver spinyfin, *Diretmus argenteus*

The six seamounts we surveyed are very different from each other

study five seamounts on the southwest Indian Ocean Ridge, and one seamount further north on Walters Shoal, south of Madagascar, before docking in Port Elisabeth, South Africa, today.

International waters

All features were located in waters beyond national jurisdictions, at two to three days' sailing from the nearest land. Two of them had been set aside on a voluntary basis as protected areas by the Southern Indian Ocean Deepsea Fishers Association, which would allow comparison between fished and unfished seamounts.

"It is grati-

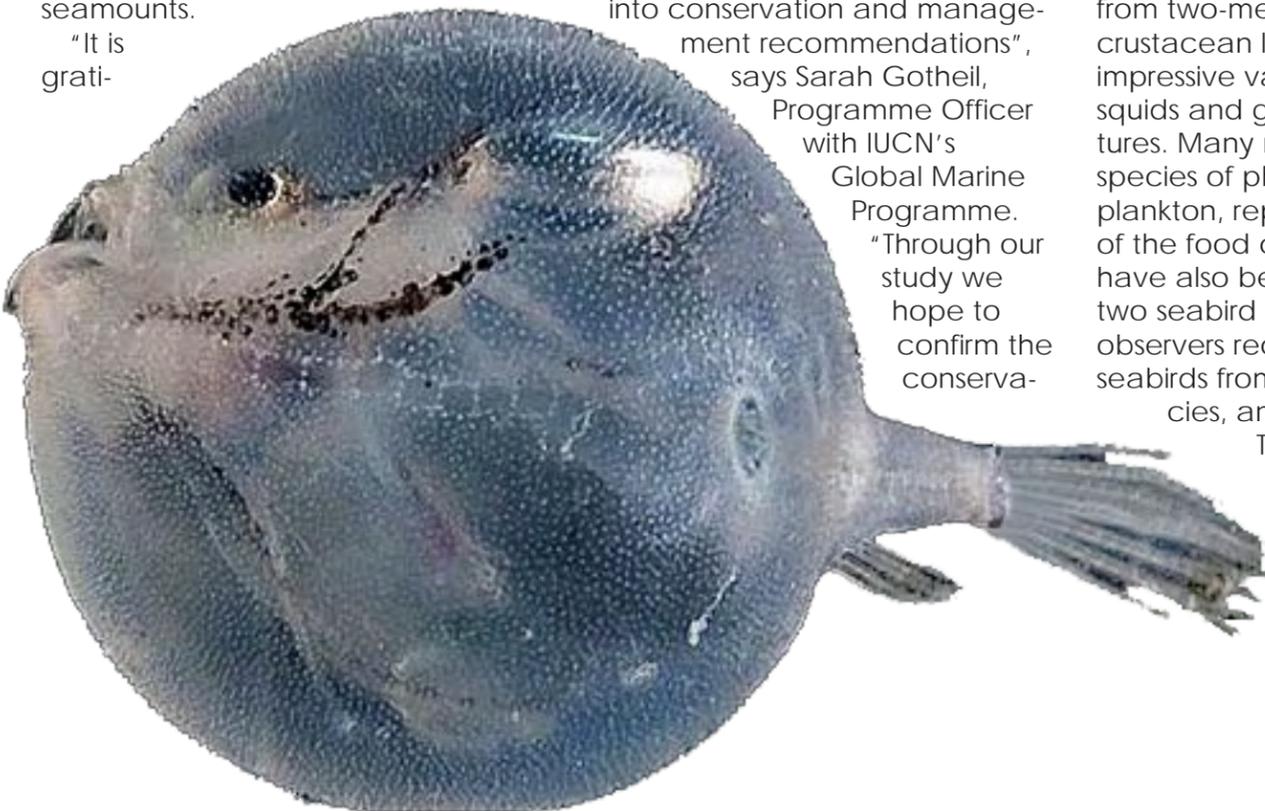
fyng to know that this work is not an isolated scientific trip, but will directly feed into conservation and management recommendations", says Sarah Gotheil, Programme Officer with IUCN's Global Marine Programme. "Through our study we hope to confirm the conserva-

tion benefits of protecting seamount features on the ridge. This will inform future management of deep-sea ecosystems in the high seas globally".

New species

In total, nearly 7,000 specimens have been collected and labeled, from two-metre long fish to tiny crustacean larvae. They include an impressive variety of fish, shrimps, squids and gelatinous marine creatures. Many more microscopic species of phytoplankton and zooplankton, representing the base of the food chain in the ocean, have also been collected. The two seabird and marine mammal observers recorded thousands of seabirds from as many as 36 species, and 26 marine mammals.

Two of them, majestic humpback whales, even offered the team a wonderful 30-minute show of jumping around at just a few metres from the ship. ■



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AIDA elects new president and board

AIDA International has a new executive board. The number of board members has been reduced from 12 to nine, and they also have some new positions. AIDA has also created a special Medical and Science Commission for which Dr John Fritz-Clarke will be the chairman. The original election in late November 2009 re-elected Bill Stromberg president, who promptly resigned two days later. Kimmo Lahtinen was voted in as the new president. ■



Kimmo Lahtinen is the new president of AIDA International

WWW.AIDA-INTERNATIONAL.ORG

Mark Caney appointed President of European Underwater Federation

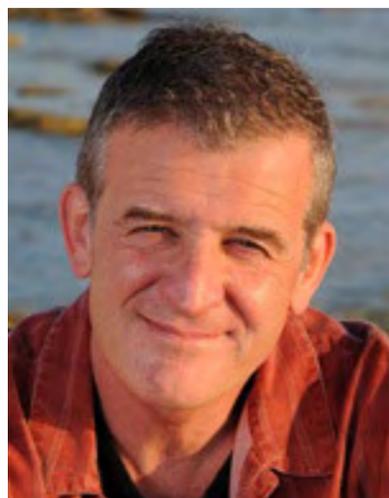
During the European Underwater Federation's recent General Assembly in Amsterdam, Mark Caney was elected President. He will serve in this position until the end of 2012.

It is the second time Mark Caney, who is also Vice President of Training, Education and Memberships at PADI International Limited in England, is serving as president of the EUF.

The European Underwater Federation (EUF) is a body representing the interests of over three million divers in the European region and has a membership consisting of a broad range of European training agencies, including both for-profit and non-profit organisations.

The EUF has become a highly influential body within world of diving, in part through its involvement in EUF Certification International—a separate body that audits training systems and, where appropriate, certifies them as being compliant with European and ISO Standards for Recreational Diving. Such certification has become a legal requirement for dive operations in several countries such as Egypt and Greece.

For more information about the EUF, visit www.euf.eu ■



Mark Caney

WWW.PADI.COM



Freediving legend Patrick Musimu returns, teams up with Karol Meyer



Patrick Musimu and Karol Meyer attempt new world record in Tandem No Limit

Belgian freediver, Patrick Musimu, has announced his comeback to freediving and world record attempts together with Brazilian freediver, Karol Meyer, who have jointly announced a No-Limits Tandem World Record attempt for May 2010, to -140 metres.

Sponsored by Buddy Dive of Bonaire, where the attempt will be held, Musimu and Meyer will stage the Tandem No-Limit, which is a unique category of freediving created by the International Freediving Association under the supervision of Francisco (Pipin) Ferreras. ■



Austrian Freediver Herbert Nitsch sets three new World Records

Herbert set a Variable Weight record to 142m, a Free Immersion record to 112m, and a Constant Weight (CWT) record to 123m at the Dean's Blue Hole in the Bahamas. In Variable Weight, the freediver descends with the help of a ballast weight and ascends using his own strength—arms and/or legs—either by pulling or not pulling on the rope. In Free Immersion, the freediver dives underwater without the use of propulsion equipment, but only by pulling on the rope during descent and ascent. In Constant Weight, the freediver descends and ascends using his fins, or monofin, and/or with the use of his arms without pulling on the rope or changing his ballast; only a single hold of the rope to stop the descent and start the ascent is allowed. ■



Herbert Nitsch

WWW.AIDA-INTERNATIONAL.ORG

Longest dive

Will Goodman broke the world record for staying underwater by remaining submerged for a total of 48 hours, nine minutes and 17 seconds.

The 33-year-old Briton has previously made two unofficial world records—the first in 2005 when he spent 24 hours underwater and a second in 2008 when he spent 33 hours underwater. This new record has been duly witnessed and will be registered with Guinness World Records. ■

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Director of *The Cove* wins for best documentary

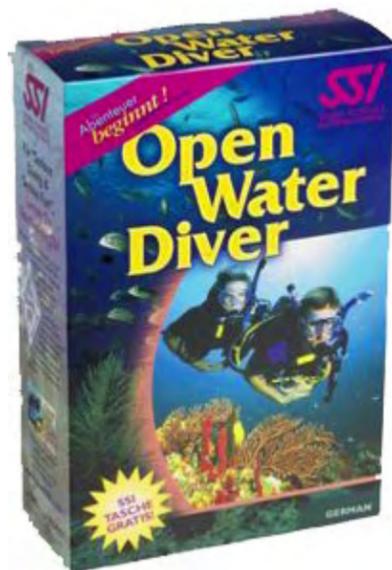
The Directors Guild of America named Louie Psihoyos the best documentary director of 2009 for *The Cove*.

The film, a shocking piece of advocacy filmmaking about dolphin slaughter in Japan, documented the clandestine killing of the mammals in a small fishing village of Taiji. ■

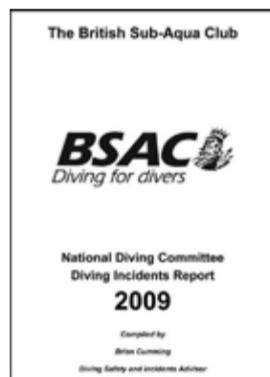


SSI Moves Dive Tables in the Open Water Diver Student Manual

SSI has chosen to focus on the use of dive computers in their Open Water Program. Dive tables are not being eliminated from the manual altogether, but they are now placed in the Appendix. This will allow dive centers and dive professionals the option to use the tables if they choose. For the past two years, it has been optional for SSI dive centers and professionals to train with either dive tables or computers. The dive tables can still be used as another way to help students understand how divers absorb, eliminate and track nitrogen. Then, students will have the knowledge they need to complete their recreational dives with a computer. ■



BSAC has published their Annual Diving Incident Report



IAHD acquired by WOSD

As of 1 January 2010, IAHD, International Association for Handicapped Divers, has a new owner, the World Organisation of Scuba Diving (WOSD).

IAHD aims to be a leading global dive training organisation for people who are either physically or mentally challenged. In this regard, IAHD has undergone a substantial expansion in the later years though not without certain 'growing pains'. In response, the organisation has extended its board of directors to cope with the additional tasks at hand.

In the next phases, IAHD plans to further professionalize its staff and implement a number of necessary changes all of which requires more resources than hitherto available. For this reason, Klaas Brouwer, president of IAHD and previous owner of IAHD, initiated contact with various parties.

WOSD came forward as an

organisation that presented itself with viable ideas and a clear strategy for the future. IAHD will remain IAHD while bringing to the board of directors the new main shareholders, Gerard Oynhausen and Fred Siebers.

Plans

As of the publication date of this issue, the two organisations have been cooperating for a period of time. Over the coming months, additional changes are going to be implemented. A new website is said to be in the pipeline, and a new 'house style' with a fresh new logo has won approval. Additional projects are on the planning board. Already in place is a new members' area of

the IAHD website, the link to the Member Database, which was developed by WOSD. WOSD has a logistic system, into which IAHD can be seamlessly integrated. Through this system, the entire application process for scuba certification will be improved and simplified. In addition, WOSD has developed a completely new training system, which can be used by IAHD for their courses. This system is called the "Digital Learning System" or "D-Learning". This system provides the trainee with a highly flexible approach to learning the required theoretical knowledge using multi-media tools and the Internet, or, a traditional classroom with an instructor. ■

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Edited by
Mathias Carvalho



The sunken freighter is expected to provide a boost to both the South Florida diving and fishing industries, as well as strengthen the marine habitat



Sea Taxi scuttled for new artificial reef off Miami

In an effort to help the local marine ecosystem, as well as the diving and fishing industries, the 40-year-old *Ophelia Brian*, a.k.a. Sea Taxi, was scuttled off the coast of Miami-Dade County, Florida. It used to be a German freighter until it was seized in a drug bust.

After such a shady past, it's rechristening was due after Miami philanthropists

Brian and Lavinia Snyder bought the ship for their daughter, Ophelia, and the ship was later donated to the county. The ship was the latest addition to a long list of retired vessels, currently laying on the seabed of Key Biscayne. The event was the largest artificial reef sinking off the coast of Miami-Dade, since 2003.

"Over the years, we've put down approximately about 30 to 40 various

large-sized vessels, as well as a variety of other materials that help to enhance and create a habitat on the bottom for corals, sea life," said Stephen Blair, a member of the Miami-Dade Department of Environmental Resources Management

Many SCUBA diving companies in the area base their outings around artificial reefs. "This is going to add to a destination for environmentalists looking at fish and reef restoration and sports divers looking for another opportunity to seize underneath-the-water adventures," said Miami-Dade County Commissioner Sally Heyman.

Immediately after the vessel settled down, over twenty amateur scuba divers started exploring the wreck. "It was the first time for me to see something like this. It was great to be able to witness it. It'd be great to come back in a few years and see what's new and what sea life has moved in," said one of the divers.

Environmental experts declared that it should take only a few weeks before wildlife begins to settle in on the wreck. ■

German WW2 U-Boat discovered in Gulf of Oman

In the deep waters of the Gulf of Oman lies the remains of a twin-screwed, 76.8-meter-long Nazi U-boat, the *U-533* that was lost during the Second World War.

Dubai shipwreck hunter and diver William Leeman discovered the U-boat, lying 108 meters deep on the seabed a few years ago, and a new deep-sea mission deployed in October 2009 confirmed that the vessel went down after a blast ripped her rear port side, sealing the fate of her 52 crew members.

Equipped with electric underwater scooters and high-powered spotlights, Leeman's team observed a two-meter gash near the U-boat's propellers, confirming reports made by 244 RAF Squadron of a British light bomber aircraft direct strike attack on 16 October 1943.

"This is where she was hit by a depth charge by a British Blenheim that struck from the air," said Leeman. "During our last dive, we could see the jagged edges of the hole where she was blown up. That was the moment of truth—the

ship then sank to the bottom in a forward motion marking the epic death of 52 German mariners."

Only one crewmember somehow made it to safety from the wreckage. Mechanic, Gunther Schmidt, survived the heavy seas for more than a day before reaching the coast, only to be taken prisoner. "How the survivor got out, we can't say," Leeman said.

In recent years, along with fellow members of the Desert Sports Diving Club of Dubai, Leeman returned often to the wreck, but usually in poor visibility conditions. The last expedition found surprisingly clear waters, with great visibility that enabled an unobstructed view of the *U-533*.

"A lot of people have told me I don't have proof that the ship we found is the *U-533*. If you look at the British and German military records, they confirm that this is, in fact, that submarine. The British recorded a direct hit on the sub, we have a German survivor, and we have dived it." ■



IMAGE SUPPLIED VIA PRESS RELEASE

The two-metre gash near the propellers confirms reports that a British aircraft scored a direct strike on the submarine

Newly discovered *Centaur* paid special homage



Australian Federal Environment Minister, Peter Garrett, approved a special permit allowing a unique homage to be performed on a protected shipwreck.

Under any normal circumstances, the

Historic Shipwrecks Act 1976 would have prevented a ROV (remote operated vehicle) from carrying a plaque more than two thousand meters deep, and attaching it to the wreck of the recently discovered *AHS Centaur*.

She was finally discovered after going down 67 years ago, sunk by a Japanese sub that was patrolling the area off Queensland. The *Centaur* was a hospital ship on its way to Port Moresby, during the final days of WWII. The vessel's end marked the highest number of casualties on any non-military ship sunk in the Pacific stage of the War.

Acting Premier Paul Lucas said the war grave, would be policed by Australian Customs.

British shipwreck hunter David Mearns,

the wreck's discoverer, believes it was done just in time. "Probably in ten or 15, 20 years, all the paintwork on the vessel that really gave it that iconic look that everybody could recognize (and say) 'that's the *Centaur*'—the white background, the red cross, the green band—will be gone. Mearns was also responsible for finding *HMAS Sydney* and the German raider *Kormoran* in 2008, both off Western Australia.

"The 47s (identification numbers) are nearly gone now, and slowly but surely, the vessel will erode away. So, it was very timely to do that so the families could get comfort from looking at a ship that they recognized." The *Centaur* task force's next mission is to memorial service for survivors and relatives, in consultation with the *Centaur* Association, the RSL and other interested parties. ■

Expedition seeks to uncover secrets of Great Barrier Reef wrecks

—A testament to human endurance

The 430 ton armed cargo ship *Cato* was making its way to when got grounded, along with another ship called *HMS Porpoise* on a sandbank, northeast of Sand Cape, on the Great Barrier Reef, Australia, on the morning of 17 August 1803. A third vessel, the *Bridgewater*, made it from the treacherous waters and sailed away, not risking an attempted salvage operation. The shipwrecked crews and passengers were able to land on a sandbank (today known as Wreck Reefs and located in the southern part of the Coral Sea Islands, nearby *Cato* Reef, so named after the wreck-age) just as both their ships broke up.

With no sign of rescue by August 26, *HMS Porpoise's* passenger Matthew Flinders (the explorer and author of *A Voyage to Terra Australis*), *Cato's* captain, John Park, and 12 crewmen sailed to Sydney on the only ship left available (aptly rechristened *Hope*) and headed to Sydney to seek rescue.

The *Hope* made it to Port Jackson by September 8, under hard conditions, and the remaining passengers were rescued. Only three lives were lost in the joint shipwreck when many more could might have perished, if not for the courageous endeavors of a few.

The Unknown Wreck

While most of the survivors remained aboard the *HMS Porpoise*, other crewmembers made a startling discovery on the treeless sandbank: the tim-

ber remains of a previous wreck. Among the crew were master's mate and a ship's carpenter, both expert witnesses with an intimate knowledge of marine technology.

Apparently, the timber used on their vessel's repair came from the stern of a 400-ton, sturdily built ship, which had already been on the reef for a long time. There is no other hard evidence, as they immediately burnt the timber as firewood.

"What was another wreck doing there when the *Cato* hit the sandbank?" That is a truly intriguing mystery, which a team of maritime archaeologists, divers and marine scientists will try to solve on that remote location.

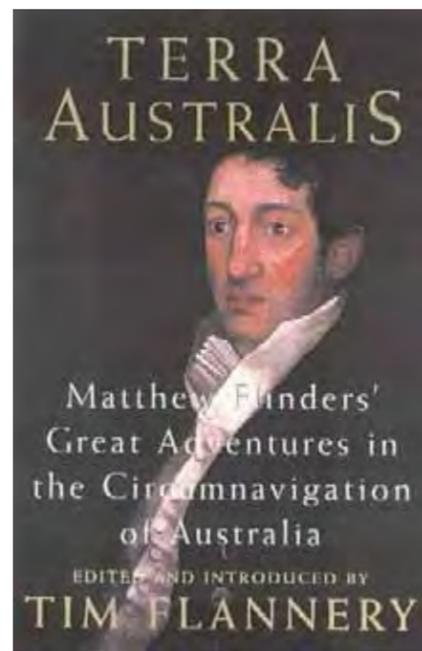
Kieran Hosty, the expedition's leader, explained that the expedition might well provide clues to one of many untold sagas of maritime history.

At the time, when Flinders heard of the discovery, he deduced the wreckage must be the remains of one of the French explorer La Perouse's shipwrecked vessels, the *Astrolabe* or the *Boussole*, which had gone missing after leaving Botany Bay in 1788. We know today, however, that the *Boussole* lies on another location, on the Santa Cruz Islands.

Alternatives to the wreck's origin include the Dutch (however unlikely) and the Portuguese fleets.

"I think it is most likely to have been American," Hosty concludes. "There were certainly American whalers in that area around that time."

"Our objective is to continue to



Matthew Flinders is the man who gave Australia its name. *A Voyage to Terra Australis*, first published in two volumes in 1814, is his masterwork describing his circumnavigation of the great island continent in the late eighteenth and early nineteenth centuries

explore the *Porpoise*, confirm the wreck of the *Cato* and, hopefully, locate the pre-1803 wreck. We presume it did the same thing as the *Porpoise* and *Cato*: came up on the southern side of the reef, where the wreckage was found, then sank in between ten and 20 meters of water."

If that wreck truly predates Cook's voyages along the east coast of Australia, they might uncover another important part of Australian maritime history.

Hosty declares that it will probably not be as spectacular as finding a ship as old as the Dutch *Duyfken* (which translates to "Little Dove" in English), credited with the first authenticated European discovery of Australia, in 1606. "The crew from the *Porpoise* would have recognized it if the wreckage was that old." ■

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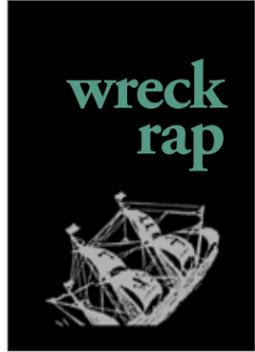
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U-Boats

Separating Cultural Myth from Historical Reality

Text by Rob Rondeau
Photos courtesy of the
North Carolina Aquarium
at Pine Knoll Shores, USA

Interpreting artifacts is the most important aspect of archaeology—either on land or underwater. Deciding what an artifact is, or rather—what it was, can be tricky though.

Who built it and why? How was it used? Why did it end up where it did?

On land, artifacts from different periods can get mixed up. And, most artifacts recovered from sites on land are mere remnants—broken bits and pieces that were either thrown away intentionally or were left behind accidentally.

Archaeological sites found underwater are unique because they were lost (usually) due to a single event, such as a ship sinking

or a city flooding. A shipwreck contains everything that was aboard at the time it went down. If people were forced to flee their community because of an impending flood, they didn't have time to take much, if anything. In either case, more is left for an archaeologist to find underwater than would be on a typical land site.

The older a culture is the easier it is to be objective about it. I've never had anyone criticize me

U-352

A Type VIIC u-boat, the *U-352*, was sunk on 9 May 1942 after being depth charged by the U.S. Coast Guard cutter *Icarus*. Many of the u-boat's crew died in the initial attack, and the sub's engines were disabled, leaving its captain no choice but to order the remainder of his crew to surface the boat and abandon ship.

The damaged u-boat didn't remain at the surface for long though. It quickly took on water and sunk to the bottom, coming to rest off the coast of North Carolina. The wreck of the *U-352* was discovered in 1975. Since then, it's been stripped of most of its artifacts. But, it's still a popular destination with recreational scuba divers.

The u-boat is also the topic of

a unique display at the North Carolina Aquarium at Pine Knoll Shores. The main section of the sunken u-boat has been replicated in fiberglass, at three-quarter scale, and is the centerpiece of the 306,000-gallon "Living Shipwreck" exhibit. The giant aquarium tank is home to hundreds of schooling fishes and a nine foot-long sand tiger shark. ■

for working on ancient Greek and Roman underwater sites—or what I've said about the need to protect them. Everyone seems to appreciate their historical significance—partly because they're so rare!

But, this isn't the case with newer shipwrecks I've worked on, especially those from WWII. Artifacts from this period, most notably German ones, are (for many) irresistible.

Our current popular culture

loves u-boats. They're the topic of books and movies, and genuine artifacts from them command high prices from collectors and enthusiasts. Divers have risked their lives (some losing them) to acquire trophies.

But, such u-boat worship is directly at odds with the historical record. True, they were fearsome killing machines, but u-boats were ineffective in changing the War's outcome.

One group on the Web, which

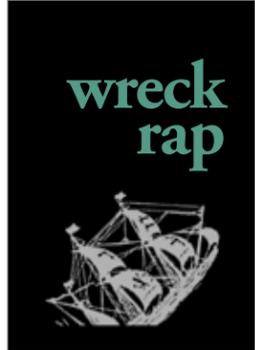
describes itself as "the" authority on all things u-boat helps perpetuate the myth—going so far as to organize annual social events where enthusiasts can meet former u-boat captains. They dine and drink with the old submariners, sing *Kriegsmarine* songs and listen to stories from the u-boats' "happy time!"

But, the perception that the u-boat war was good for Germany isn't reality. The facts tell a much different story. Of



Composite photo of the wreck of *U-532*





the 42,682 merchant ships that traveled between North America and Britain carrying much needed war supplies for the Allies, only 438 were sunk by u-boats.

This isn't to say that the damage caused by u-boats wasn't significant. It was. Canada, for example, lost 22 navy ships defending the convoys. And, more than 4,000 Canadian sailors and merchant seamen died during "the Battle of the Atlantic". It was the longest campaign of



THIS PAGE: You don't have to be a diver to appreciate the wreck of the U-532

LOWER LEFT: The replica fiberglass u-boat under construction

anyone looking for such if asked. I know this from first-hand experience.

U-boats are a good example of why marine archaeology is important. It helps set history straight, separating fact from fiction—reality from perception ■

— Rob Rondeau
Marine Archaeologist
PROCOM Marine Survey & Archaeology



WWII.

In fact, Germany's u-boat effort was an abject military failure. More than two-thirds of its u-boats, and their crews, didn't survive the war. The fact that we are increasingly finding so many of them on

the seafloor confirms this.

And, the German government of today wants nothing to do with its Nazi past. It turns a blind eye when u-boat wrecks are found and expressly forbids



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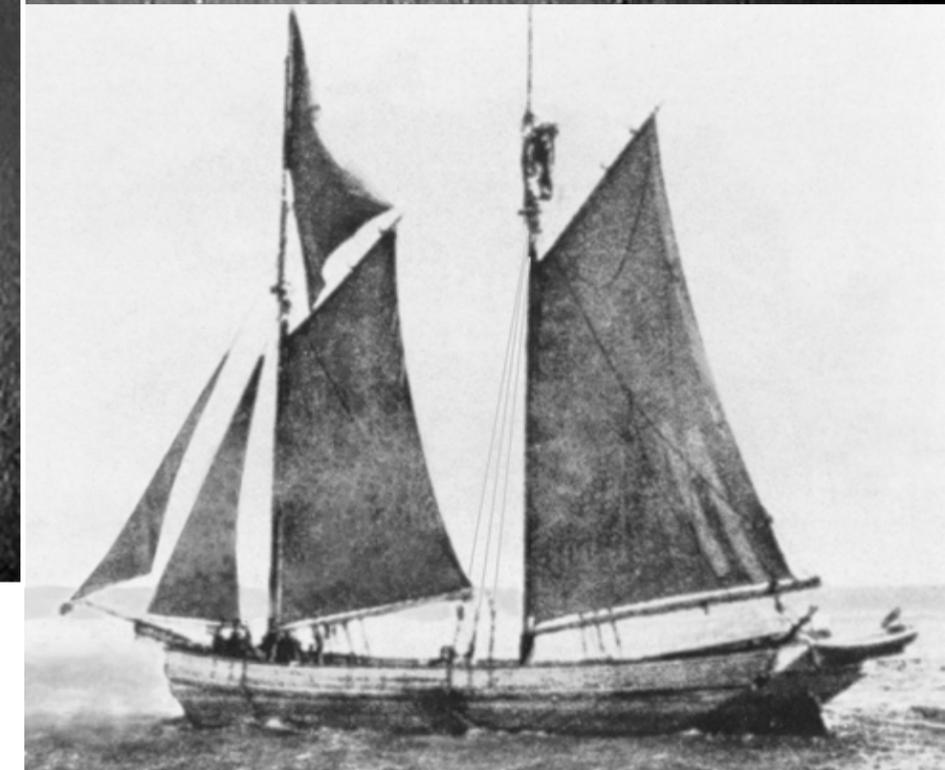
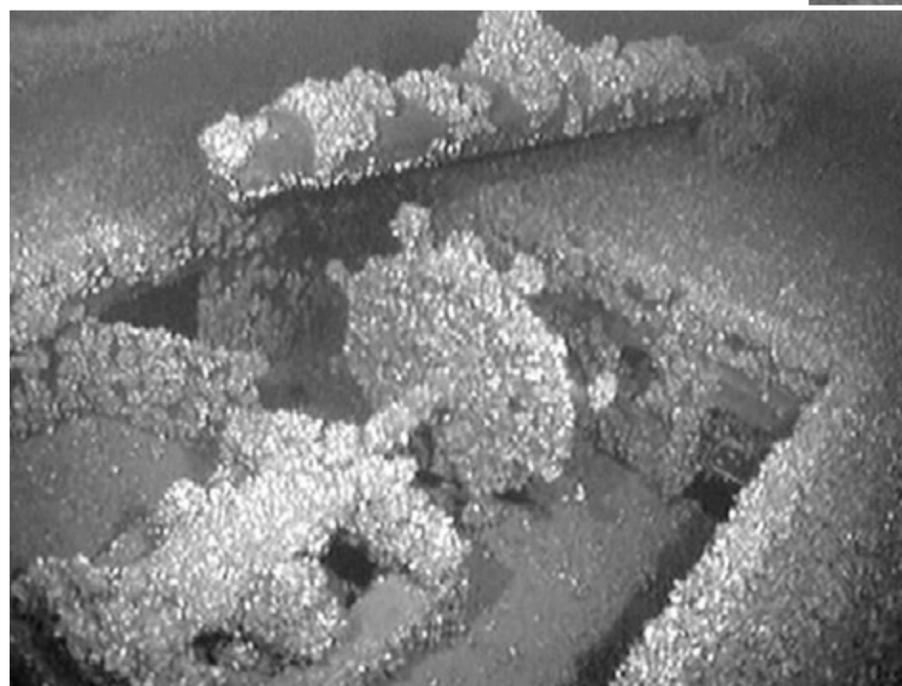
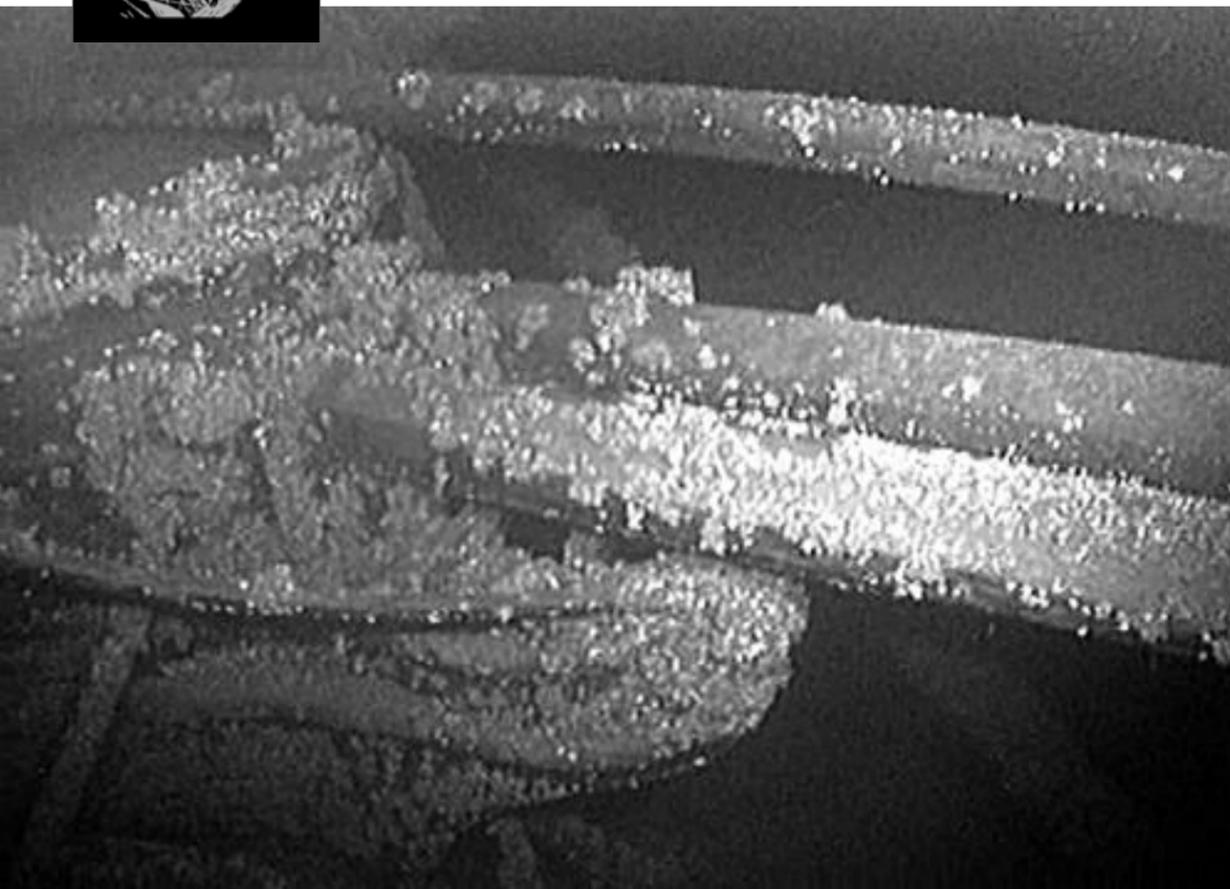
If you pay by **cash** or **check** you can get an additional 3% discount with a \$300 deposit if booked by February 28. Contact Gwen at 419-306-3923 or wyblegs@hotmail.com.



Wreck hunters find another intact schooner in Lake Ontario

Text and images courtesy of Dan Scoville and Jim Kennard

A 19th century schooner has been discovered in deep water off the southern shore of Lake Ontario near Oak Orchard, New York, USA. Shipwreck enthusiasts, Jim Kennard and Dan Scoville, finally located the old schooner after a search effort that took them more than five years.



Schooners collide at night

During the early evening hours on 22 November 1862, a blinding snow storm set in across Lake Erie with a strong wind coming out of the North and visibility was almost nonexistent. The schooner *C. Reeve* was travelling east to Oswego, New York, and the *Exchange* was headed west for the Welland Canal. Neither crew could see ahead of them, and the schooner *Exchange* collided with the *Reeve*. The accident occurred approximately three to four miles off the port of Oak Orchard, New York.

The *Exchange* had plowed right into the rigging that secured the *Reeve*'s foremast to the starboard side of the ship. This caused the foremast to lose any support, and it immediately toppled over the side of the ship. The collision also created

a large gap in the side of the *Reeve*'s hull allowing water to pour into the schooner. Within a few minutes, the *Reeve* sank out of sight into the depths of Lake Ontario.

No lives lost

The *Exchange* was not without significant damage either, as she lost her bowsprit, which became tangled in the foremast rigging. She also sustained severe damage to her cutwater, the forward portion of the stem of the vessel which cuts through the water. Leaking but still afloat, the *Exchange* was able to take on board the crew of the *Reeve*, then turned about and headed back for the port of Rochester. The crew of the *Reeve* only had enough time to save themselves, and consequently, lost all their personal effects.

Discovered by chance

After searching for many hours with sophisticated sonar technology and precise positioning equipment and not finding any potential targets to check out, the shipwreck searchers were in the process of packing up their equipment for the day and took a few minutes to eat before heading back to port. Meanwhile the boat was being pushed along the lake by a light breeze. Dan Scoville glanced over at the depth recorder just as the wind was taking their boat for a

ride right over the top of a shipwreck. The position was quickly noted for a return trip. In August, the explorers returned to the wreck site and deployed a remote operated vehicle (ROV) developed by Scoville to do the actual underwater exploration and to try to confirm the identity of the shipwreck that they had discovered by chance. The ship was lying nearly 400

Two masted gaff rigged schooner similar to the *C. Reeve*

feet beneath the surface and at a depth beyond the limits (135 feet) for recreational SCUBA divers and for most technical divers utilizing mixed gases. ■





The Lost Treasures of the *Santa Margarita*

Text by Carol Tedesco

Inconveniently for mere mortals, serendipity is not concerned with time, so twists of fate often pass unknown, witnessed only by the sun, wind, and ripples on the sea. For W. Keith Webb and the team of the shipwreck search and discovery company Blue Water Ventures of Key West, the quest for the famed treasure galleon *Santa Margarita* has been as much about discovering her mysteries as in uncovering her treasures.

The saga of the *Santa Margarita* begins in 1622. Namesake of the patron saint of homeless people, midwives and reformed prostitutes, *Santa Margarita* was a Spanish galleon of 600 tons, armed with 25 cannon. One of a fleet of 28 ships, she was voyaging to Spain with an enormous cargo of plundered New World trea-

sures. In registered wealth, the *Santa Margarita* carried 166,574 silver "pieces of eight" treasure coins, more than 550 ingots of silver weighing some 10,000 pounds, and over 9,000 ounces of gold in the form of bars, discs and bits. Additionally, there was contraband—a fortune in "unregistered" treasure having been smuggled on board to avoid paying a 20 percent tax to the Spanish king. The *Santa Margarita* also carried riches in the form of copper, silverware, indigo, and personal possessions of officers, passengers, and crew, including medical tools, navigational instruments, gold coins, and precious jewelry of almost unimaginable opulence.

Spain and her creditors awaited the arrival of the fleet anxiously, as its return would refresh the royal coffers, repay loans, and lessen the financial pressures that plagued the kingdom. But when news of the fleet arrived, it wasn't good. Subsequent to departing the island of Cuba on September 4, the fleet was overtaken by a rapidly developing storm. Within days, the *Santa Margarita*, along with five other ships in the fleet, were wrecked near the

Marqueses Keys in the Florida Straits. Drowned were 550 passengers and crew, 142 from the *Santa Margarita*. Lost was a king's ransom in treasure, a serious setback for Spain, whose supremacy in the world was upheld by the wealth of the Indies.

Salvage

Margarita in Greek means "pearl," and the first attempt to find and salvage the *Santa Margarita* and other fleet casualties was undertaken almost immediately by the Spanish mariner Captain Gaspar de Vargas, who, knowing of their skill's, sent for pearl divers—from the island of Margarita—to aid in the search.

Then, in 1624, Havana politician Francisco Melián obtained a royal salvage contract for the fleet galleons. This inventive risk-taker manufactured a remarkable piece of equipment that allowed his divers to see and breathe while working underwater. It was a diving bell, and it was this invention that allowed an enslaved diver to locate the first treasure of

Gold chalice discovered by Blue Water Ventures (right) and detail of chalice arms (bottom); Gold toothpick and earwax scoop grooming tool (below). Photos this page by Ron Pierson, Blue Water Productions



the *Santa Margarita* and win his freedom.

Melián continued, with some success, to salvage treasure from the galleon for several years, though his efforts were frequently interrupted by weather and Dutch sea forces. Eventually, however, search and recovery became unfeasible, and ended, and a vast fortune was left buried in the deep shifting sands of the Florida Straits. In time, the *Santa*

Margarita was forgotten, but not forever. Records of Melián's salvage efforts survived in fragile worm chewed papers in Spain's archives.

Fast forward to the 21st century, and the emergence of search and salvage company Blue Water Ventures, founded by entrepreneur W. Keith Webb.

Largely the result of extensive research conducted for the late treasure hunter Mel Fisher by historian Dr Eugene



W. Keith Webb,
President and CEO,
Blue Water Ventures
Key West

Lyon, a portion of the *Santa Margarita* was discovered in 1980. “The rest—multi-millions in treasures and artifacts—is still out there,” said Webb. “Remote sensing technology has progressed dramatically since the last significant finds occurred, and this advancement prompted me to contact Mel Fishers Treasures (MFT), the company that holds the federal permit to search the area. I proposed a joint-venture partnership whereby I would bring my own team, vessels, and technology to work.”

With a partnership agreed upon, Webb began to recruit a world-class lineup of professionals that today includes historian Lyon; archaeologist/conservator James Sinclair; and as Operations Manager, second-generation search and recovery specialist Dan Porter. Captain Porter and Gary Randolph, Blue Water’s Chief Technical Advisor and MFT Vice President of Operations, immediately began digitizing old charts and coalescing the past with the present.

This aligning of knowledge, experience and skill, backed by resources, technology, and the requisite touch of

luck has resulted in the most successful series of discoveries on the site in more than 20 years.

Treasure

The value of the treasure recovered from the *Santa Margarita* by the Blue Water Ventures team has well exceeded US\$16 million to date. The search and recovery is funded by investors who share in the discoveries, receiving their portions each year following a formal legal adjudication and division procedure.

The *Santa Margarita* broke apart and was scattered in a series of storms. Over time the wood disintegrated and the ship’s remains and cargo became buried in deep sand and mud. By mapping and recording all finds, the team is able to identify scatter patterns, which eventually serve as pointers to substantial



deposits. Now, working further north than ever before, the crew of the companies primary search vessel, *Blue Water Rose*, have made astounding discoveries of elaborate gold artifacts, chains and jewelry, gold bars, rare silver coins, a

gold and rock crystal religious reliquary, a captivating solid gold combination toothpick/earwax removal spoon, a magnificent solid gold chalice, and one of *Santa Margarita*’s most serendipitous hidden treasures—a lead box containing 16,184 rare and valuable natural pearls, not listed on the ship’s manifest—now believed to have originated from the pearl island of Margarita.

For more information on Keith Webb’s Blue Water Ventures of Key West, visit the companies web site at www.bwvkw.com. ■

LEFT TO RIGHT: Crew diver Gavin Rall (left) and Captain Dan Porter (right) surface with encrusted silver candlestick; Gold and rock crystal reliquary; Search and recovery vessel, *Blue Water Rose*; CENTER: The newly discovered gold chalice before conservation held by Mike DeMar, the diver who discovered it on his first expedition at age 21. Photos by Ron Pierson, Blue Water Productions



ABOVE:
Close up of some of the rare natural pearls discovered on name-sake *Santa Margarita* by Blue Water Ventures Key West
LEFT: Box of *Santa Margarita* pearls. Photos by Ron Pierson, Blue Water Productions



Exploring the mystery of a

17th Century Seal Discovered

Text by Carol Tedesco

On 6 September 1622, a violent tempest ripped through the Florida Straits, destroying no less than half a dozen vessels of the 28 ship *Tierra Firme* fleet. Among the fatalities were two of the richest Spanish galleons ever lost at sea, the legendary *Nuestra Senora de Atocha* and *Santa Margarita*.

It was the final quarter of the 20th century and I was a teenager in Texas when I began dreaming about shipwrecks and their treasures. It was the *Atocha* and the *Margarita* that inspired those dreams. What else to do but follow them to Key West, Florida? By the summer of 2000, I had nearly a decade of historic shipwreck professional work behind me, and now was partnering up with two world-class diving and shipwreck professionals, Andy Matroci and Kevin Gurr, in a project to conduct search and recovery on the *Santa Margarita*. On the deck of the *MV Southland*, surrounded by a blazing sunset at the end of our first day at sea, I blissfully whispered to myself, "My dreams are coming true!"

The mirthful universe must have thought this story in need of a twist, because soon I was jerked awake from my happy

dream. In a ludicrous accident that occurred between the deck of the *Southland* and the shallow ocean floor, I fractured a bone in my ankle. It was a sharp, quick pain that I chose to ignore.

Settling down on the sea floor not far from Andy, who was operating the airlift, I immediately and happily discovered one silver "piece of eight" treasure coin. Then, still refusing to look at my foot, I began to perform my work of measuring and recording the dimensions of the excavation area, and exploring it with a metal detector.

Finally, I could no longer ignore the discomfort, nor the odd "clicking" sensation when I tried to kick with my left fin. Looking back over my shoulder I gasped with dismay; my ankle had swollen to immense proportions. Returning to the boat ladder, I discovered that my foot could not bear even the slightest weight. Kevin had to haul me up the ladder.

The next day, after 24 hours of staring at my foot and waiting for it to miraculously heal itself, I returned to Key West and a doctor who (gleefully, it seemed to me) pronounced a spiral fracture and

a sentence of at least three months in a no-weight cast.

I believed the adventure was done for me—our funding and our window of opportunity was limited. Then, one of our team discovered an artifact; it was dark, flat, and circular—about the size of a quarter—but with one side folded under, and the other folded up. There were markings on it, but barely visible due to a layer of marine encrustation. It was so small and nondescript that it could easily

have been disregarded and passed over if it had been happened upon anywhere else, but on the site of a historic shipwreck, everything is of consequence.

Research

Our group was a subcontractor of Motivation, Inc., now Mel Fisher's Treasures, who holds the admiralty claim on the *Santa Margarita*, so every artifact we discovered went to their lab in Key West for conservation and



DYLAN KIBLER



Lead seal obverse view (left) and reverse view (right)

The Conferring of the Sword on the Coat-of-Arms of Haarlem, by Pieter Franz de Grebber



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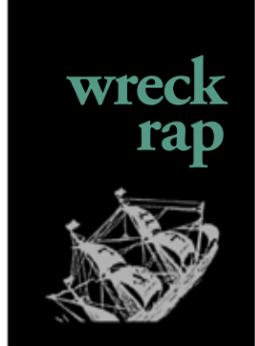
curation. Once their conservator had done his magic, the markings on the artifact became visible. We could see that an Arabic number 20 clearly dominated one side, but the design on the opposite side was difficult to fully decipher, due to the folding.

No one on the *Southland* or MFT teams was familiar with an artifact of this sort, so the next step was to consult with historian Dr Eugene Lyon, an expert on the Spanish colonial period. He immediately recognized the

small disc as a type of identification seal used between the 13th and 19th centuries for merchandise and cargo regulation. Dr Lyon added that the partially visible markings were a coat of arms, though it was not a crest that he could immediately identify.

How intriguing! Whose arms were they? What did the number 20 represent? This was just the mystery and challenge needed to take my mind off of my foot.

We documented the arms side of the seal as the "obverse," noting: Within a "bouche" style frame, a centered sword blade points directly above to a cross. Three visible stars located at approximate positions of 1.5 o'clock, 3.5 o'clock, and 10.5 o'clock frame the sword blade, suggesting a fourth star would be located at the 7.5 o'clock



position, under the fold. Some letters of a surrounding legend are visible, including the letters "ET", preceded by what could be an "O" or a "D" from approximately 9:00 to 11:00 positions, and an "R" near 4:00.

In the year 2000, the internet was just beginning to emerge as the invaluable research resource it is today. There was not much information to be had on lead seals; but there were a number of resources for family arms. Initially, I suspected that the legend on our seal was similar to the legend found on Spanish Colonial coins, with the letters "ET" being as in "Hispaniarum EI Indiarum Rex," and since the *Santa Margarita* was a Spanish galleon, it seemed reasonable to start my research with Spanish family arms.

None looked remotely like those on our seal. When they returned from the sea every ten days or so to re-supply, Andy and Kevin would climb the three flights of stairs to my apartment, and we would exchange discovery stories: theirs—silver coins, a rare 16th century gold "doubloon" coin, gold jewelry and beads, a pre-Colombian jade pendant, and little flakes of gold that had to be picked out of the sand with tweezers—and mine—two different types of seals, disc cloth seals joined by a connecting strip.

This kind of seal was the most thoroughly documented type. These were folded



LEFT & BELOW: 17th century Dutch bale seal R & A — Regten en Accisen, state finance department

BELOW LEFT: 1678 Dutch lead bale seal. Photos this page courtesy of Wiard Krook



around each side of a textile and were stamped closed, similar to the way coins were stamped. Ours, however, was a single disc without a connecting strip, and the fact that it folded under and over indicated that it was a bale seal, used to fasten a cord that once encircled a parcel of merchandise.

Origins

So, now we knew more about types of seals, and how they were used, but still no information had come to light on the origin of this particular one. Then, one sleepless night while sending out a string of internet search queries, a miracle occurred. It was a link to an article about a special event in which a particular guest was named, Professor Alexander Wieber—an expert on lead seals.

By early morning I had found contact information for Professor Wieber. I was so excited that I could hardly wait until the sun was up to call him. Professor Wieber was kind and gracious and said he would be happy to look at the seal. But he soon called to say that after combing more than 10,000 European coats of arms in his research books, he had not

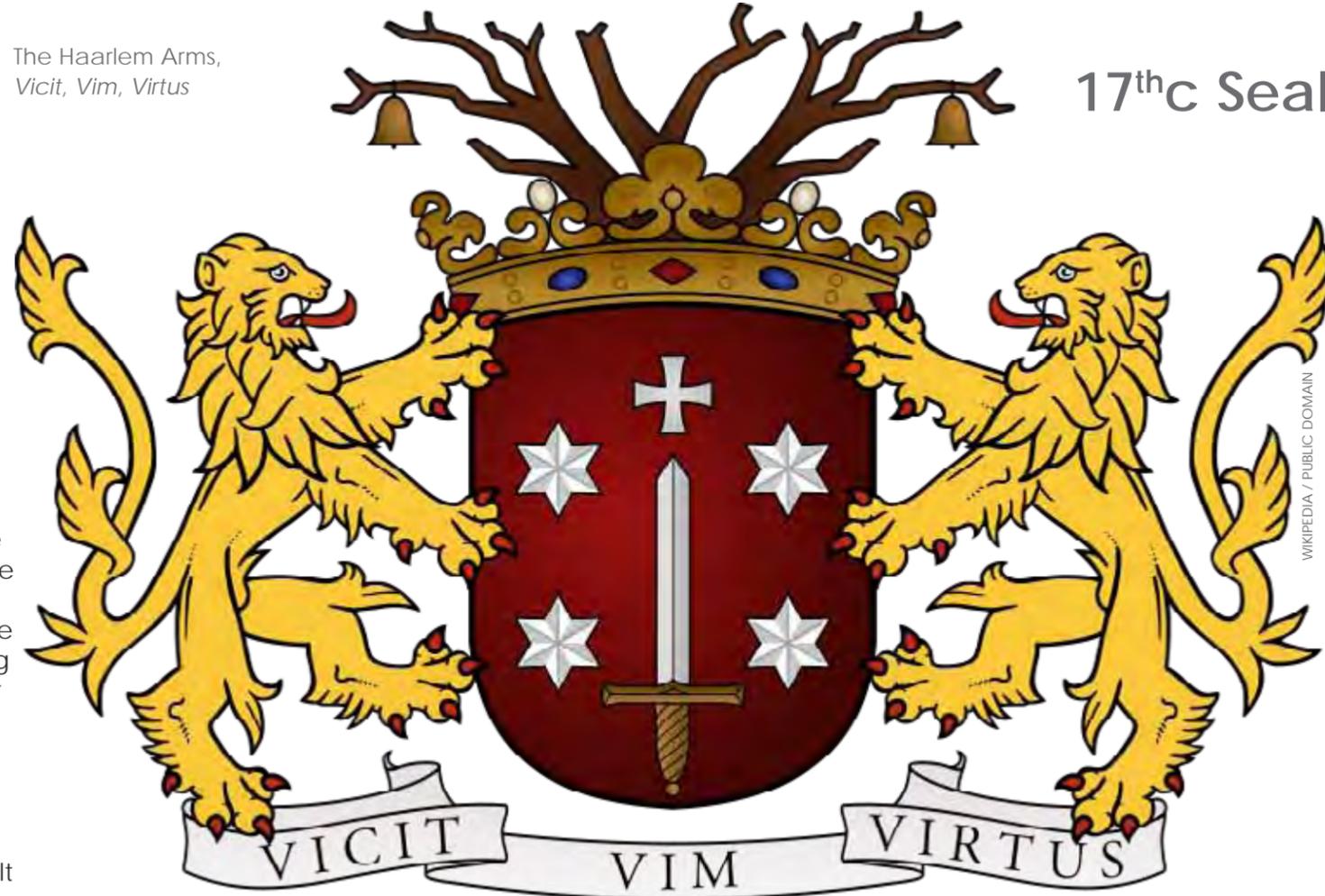
found a match.

Shortly thereafter, he called again. He had solved the mystery.

Professor Wieber had received a large shipment of seals—the contents of a small private museum in the Netherlands. Opening the first box, Professor Wieber reached inside, and to his astonishment there in his hand was the same coat of arms—sword and four stars. It was not Spanish, and it was not a family crest. It was the seal of the city of Haarlem, Netherlands.

Professor Weiber explained that this

The Haarlem Arms, *Vicit, Vim, Virtus*



17thc Seal

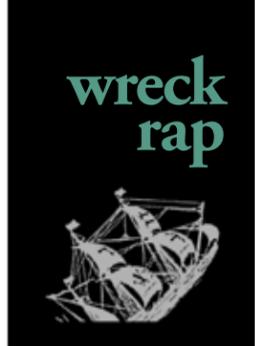
type of seal would typically display a city's arms, while the reverse would record data such as the length or width

of fabric or the weight of a parcel. The visible letters "ET" in the legend of the *Santa Margarita* lead seal is, in fact, a

Capturing Damietta by Cornelis Claesz. van Wieringen, oil on canvas, 1628, Frans Hals Museum, Haarlem, the Netherlands



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portion of the legend "HAERLEMS GOET" or "Goods from Haarlem."

Haarlem

Now that we had a place of origin for our seal, the next step was to find experts able to solve the remaining pieces of the puzzle. These materialized in the forms of Karla Brouwer, of the Stichting Archeologische Werkgroep Haarlem, and Wiard Krook, of the Amsterdam Department of Archeology.

Krook revealed that the Arabic number 20 located on the seal's reverse refers to a length of fabric measured in Dutch els. The Low Countries city of Haarlem was the hub of the linen industry for much of the 16th and 17th centuries and was renowned for the fine linens it exported.

He wrote, "From the official regulations of the city of Leiden, we know that one full woolen laken (in 17th century Dutch spelled as "laeken" or "laecken", meaning one uncut length of woven woolen fabric packed and folded to a bundle), should measure 40 Leidse (or old Dutch) el in total.

So, a half laken should be 20 el

long. Before it was released for selling, it was officially measured, and the final length indicated on a lead seal. One Leidse el is converted to 69 centimeters, making one full laken 27.6 meter and one half laken 13.8 meter. The width of a laken from Leiden was between 1 el (69 cm) and 3 3/4 el."

As for the arms symbolism, Brouwer explained that the interpretation is found in a poem by 15th century poet Dirc Mathijszen, inspired by a legend from the time of the fifth crusade. It tells of crusaders from Haarlem who fought as knights and succeeded

in taking the town of Damiate in Egypt. In reward, the Emperor bequeathed Haarlem a banner red as blood with a sword pointing toward heaven. The Pope gave them their cross, and because they came so far, the patriarchs of Jerusalem delivered the stars. A painting of this event, entitled, *Wapenvermeerdering* (The Increasing of Arms) by Pieter Franz de Grebber (1630), hangs in Haarlem's City Hall. The accompanying legend, "Vicit Vim Virtus", translates to English as "Virtue Has Conquered Violence".

The presence of a Dutch seal

LEFT: City map of Haarlem, ca 1550. BELOW: *Dutch Ships Ramming Spanish Galleys off the Flemish Coast in October 1602*, by Hendrick Cornelisz. Vroom, oil on canvas, 1617. Rijksmuseum, Amsterdam

on a 1622 Spanish galleon in the Florida Straits is tantalizing because of the complex historic relationship that existed between the Netherlands and Spain at the time. But that is another story.

The lead bale seal our team discovered during the summer of 2000 is now on permanent display at the Mel Fisher Maritime Museum in Key West,

Florida. I am back to work on the *Santa Margarita* adventure, now as a consultant for Keith Webb's Blue Water Ventures Key West (joint venture partner/Mel Fishers Treasures) whose team is working to solve *Santa Margarita's* foremost puzzle—the location of the missing portions of the vessel and the treasures stowed there—and a smaller, but familiarly tantalizing enigma—the origin of a

mysterious coat of arms roughly engraved in a recently discovered, magnificent solid gold drinking cup.

To learn more about the adventures of Blue Water Ventures Key West, and to see pictures of the golden chalice and its yet unidentified coat of arms, visit www.bwvkw.com. ■

17th Seal



WIKIPEDIA / PUBLIC DOMAIN

Edited by
Scott Bennett



Queensland tourism authorities back away from proposal to sink F-111 fighter jet off the Gold Coast

Queensland Scuba Diving Company owner, Mark Salter, initially proposed the sinking of military aircraft to Gold Coast City Council in January last year. The proposal has won

eager support from scuba dive operators, who say it could become the first of its kind. Gold Coast dive operator, Ian Banks, said a sunken F-111 would be a major drawcard for domestic and international tourists but would only work as part of an artificial reef. The F-111 jets are due to be decommissioned in December of this year.

Gold Coast Tourism spokesman John Kaarsberg said it was too early to specu-

late on what the artificial reef may feature. "We were putting the horse before the cart in making any suggestion of possible dive structures," he said. "It may not be financially feasible." In response, the state government has commissioned a AU\$71,800 study into the feasibility of a man-made reef, among a range of new attractions on the Gold Coast.

Sunken military aircraft had proven to be hugely popular in waters off Phuket, in south-east Thailand. ■



Cebu Pacific offers excess baggage fees to be paid at time of booking

The mere mention of the term "Excess baggage" is enough to make the average air traveller wince. We divers are especially cursed.

Travelling with dive gear is bad enough, but add underwater photo gear to the mix coupled with baggage restriction rules that change like the wind direction, and its enough to put a damper on any dive trip. Fortunately, in this sea of travel

gloom is the odd glimmer of reprieve.

While making an online booking for a Cebu Pacific domestic flight in the Philippines, I was somewhat surprised to see options for excess baggage payment. There are a variety of selections based on weight; just figure out how much weight you are over, click the box, and the amount will be added to the purchase price. Divers will like the sporting goods option, which includes dive equipment. The payment will be indicated on your e-ticket. ■



HMAS Canberra

Australian shipwreck proves popular on debut

Since its official unveiling on 9 December 2009, hundreds of divers flocked to the *HMAS Canberra* dive site in the Australian state of Victoria.

Queenscliff Dive Centre managing director, Jason Salter, said business has boomed since the inaugural weekend in December. "Without a doubt this is the best artificial reef in Australia, and I think it will make people realise just how good the diving is around here," Salter said. "The thing is

it will take one person about 20 dives to really see everything the wreck has to offer."

Resting in approximately 28m of water, experienced divers can explore many sections of the ship including flight decks, the bridge, engine rooms, galley, and accommodation quarters. Many of the vessel's original fixtures and fittings have been preserved. Over time, the vessel will become a haven for marine life, transforming it into a spectacular reef. ■

A dive booking and permit is required from Parks Victoria for recreational dives from private boats on the ex-*HMAS Canberra*. The currently proposed fee for a dive/snorkel permit is AU\$5 per diver/snorkeller. The ex-*HMAS Canberra* is located offshore from Ocean Grove within Bass Strait in Victoria. It is approximately 25 minutes by boat from Queenscliff Harbour (on the Bellarine Peninsula) or Portsea (on the Mornington Peninsula). ■

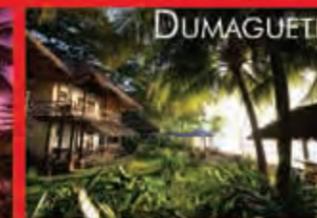


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Fiji flights make Guam stronger hub



As a result of the new non-stop Continental Micronesia service between Guam and Fiji, Guam will become a major transit hub for passengers flying from Japan and Hawaii. The twice weekly flights are operated using two-cabin Boeing

737-800 aircraft with 155 seats. "Nadi is a popular vacation spot that attracts visitors from around the world and fits well with our portfolio of destinations throughout the Pacific," said Jim Compton, Continental's executive vice president of marketing. "We've sched-

uled the Fiji flights to conveniently connect with Continental's flights from the U.S. mainland, Japan and Micronesia," he said in a press release.

The Fiji to Guam service commenced after another airline's direct flights between Tokyo and Fiji ceased in April. Continental Micronesia is the Guam-based subsidiary of Continental Airlines. ■

Four Red Sea liveaboards destroyed by fire

The four boats—*MY Typhoon*, *MY VIP One*, *MY Hyatt* and *Sweet Dream*—were in dry dock at Suez when the fire started, according to the Egyptian Chamber of Diving and Water Sports (CDWS). Nobody was injured in the fire.

Authorities are conducting an investigation, and preliminary findings indicate that the fire started in the electrical system aboard *MY Typhoon*. Firefighters tried rescue the four boats, but they fought in vain as the fire spread quickly and was difficult to



MY Typhoon of the Tornado Marine Fleet was one of the Red Sea liveaboards that were lost in the blaze

control because of strong winds and sandstorms in the Suez region.

The operators are now working hard on finding alternative options for guests who would be with the four boats later this year. Guests who have booked tours will be contacted as soon as possible, a spokesman for one of the affected

operators, Red Sea Diving College, which owned *MY VIP One*, tells CDWS.

"The boat will be missed, but we hope to announce an expansion of the fleet in the near future," Typhoon Marine Fleet, who owned *MY Typhoon*, added in a statement. ■

Snuba Gains Popularity in the Caribbean

A hybrid of snorkeling and scuba diving, snuba provides the unique opportunity for people to experience the underwater world without dive certification. While offered in a few places in California, Florida and Hawaii, the activity has caught on in the Caribbean, where tourists can experience Snuba diving in Aruba, Turks and Caicos, Cancun, and San Juan, Puerto Rico.

Snuba has been around since

at least the late 1980s, when a group of California divers started Snuba International. The Snuba experience starts with a training session on safety procedures. Participants are then outfitted with flippers, a weight belt, a mask and a regulator linked to a long, snaking tube connected to an oxygen tank that rests on a small raft at the surface. There are limitations however, specifically the 20-foot air line attached to a raft above. ■



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