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GLOBAL EDITION  
July 2009  
Number 30

Caribbean  
**Turks & Caicos**

Profile

**Roddenberry  
Dive Team**

Florida Keys

**Treasure  
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Portfolio

**Blaschka  
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**North Carolina**

**Bonaire**  
DIVERS' PARADISE

COVER PHOTO BY JP BRESSER

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COVER PHOTO: *Diver explores Salt Peer on Bonaire,*  
by JP Bresser  
(CONTINUED ON PAGE 4)



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Diver explores wreck off Bonaire. Photo by JP Bresser



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As the financial crises have reached around the globe the diving industry has seen its share of falling revenues. Scuba diving often involves traveling and is equipment intensive. When people have to tighten their spending, some of the first things that naturally go out of the window are traveling and leisure activities. On the other hand, if you already possess your own diving equipment, there are ways to keep logging dives without spending big money.

Depending on what access you have to dive sites, divers can keep diving on their home turf—going out after work or on weekends with some friends and doing shore dives, thus keep on diving without forking out too much money. Tough times make it necessary for both the scuba diving industry and the divers to come up with new ideas.

Although diving is a truly world wide sport, how it is organized around the globe differs greatly. While large diving communities like those in Germany have to travel to get wet, while the Japanese have plenty of great dive sites all around their island.

Living near the water does not always mean free diving. In Brazil, for example, this kind of activity is reserved for the top 5-10 percent

wealthy part of the population. While in a country like Norway, anyone without fear of the water can afford scuba diving as much as, say, playing football or skiing. One would think that diving would be more affordable in a developing country like Brazil in comparison to a wealthy country like Norway, which is not known for its low prices. Yet, this is not the case.

Many Norwegian scuba divers are members of diving clubs. These are run by the members themselves, entirely on a voluntary basis. The club members benefit from sharing boats, compressors and safety equipment, making them able to organize low cost diving trips. While in Brazil, divers have to pay commercial operations, almost exclusively, to get into the water.

In Norway, you can easily park your car almost anywhere near the ocean, jump in and enjoy great diving—one just has to worry about the water temperature—while bringing expensive diving equipment and your car to a quiet location at the waterfront is not recommendable in a country like Brazil, with its rampant violent crime.

The downturn in spending on travel and leisure activities is forcing the industry to take on new approaches, to survive in a new

market. On the Cayman Islands, the decline of foreign tourists has made the local diving industry target the locals. Cayman dive shops are doing what they can to lure residents into the water with discounts and special rates on dives and dive training courses.

For those who still want to travel, hotel prices in many places have been slashed by up to 70 percent, and even though most airlines are cutting back on number of seats, there are also many good offers on tickets available.

—Keep on diving!



Arnold Weisz  
Associate Editor

STEIN JOHNSEN



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## New Organic Stuff by Ralph Hagen

When it comes to the environment, we all want to do our part to help reduce pollution and run-off into our fragile oceans and waterways. Choose wisely and choose organic when you select apparel. Help save yourself and your loved ones from toxic exposure to pesticides. You will be helping the seas in more ways than one by lowering pesticide use and run-off killing our reefs. Check out our new collection of **Organic T's** in our online store with hilarious dive cartoons by syndicated Canadian cartoonist, Ralph Hagen.



## X-RAY MAG Adopts a Leatherback Sea Turtle

Using funds collected from sales through our online store, X-RAY MAG is proud to announce that we have adopted a Leatherback sea turtle this year through the Save Our Leatherbacks Organization (saveourleatherbacks.org). In fact, a percent of all sales in our store goes to ocean conservation. So, have a laugh and help save the seas at the same time.

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# Good NEWS

## World's Largest Marine Protected Area closer to becoming reality



**The Coral Sea will become the world's largest marine protected area if Australia's environment minister Peter Garrett gets his say.**

The area, which is found east of Australia's Great Barrier Reef Marine park and amounts to almost a million square kilometers, is home to significant seabirds and migratory marine species, and has remained relatively undisturbed by direct human impact.

Under a conservation zone designation, current tourism and fishing activities can continue, but new commercial activity will be rigorously assessed while the government evaluates the region for its conservation value.

"The Coral Sea is one of the world's healthiest marine wilderness areas, where it is still possible to see healthy populations of sharks, turtles, whales, fish and coral," said Lydia Gibson, WWF's marine policy manager in the region. ■



Australia's environment minister Peter Garrett

## Indonesia Unveils Massive Marine Park

Indonesia has opened Southeast Asia's largest marine park in the Savu Sea, a migration route for almost half the world's whale species and home to vast tracts of rare coral.



The announcement came at the World Ocean Conference in Manado, Indonesia, in May 2009. The marine park will cover 3.5 million hectares in an area of 500 species of coral, 14 species of whales and 336 species of fish living in the Savu Sea near Flores in eastern Indonesia.

Environmental groups, The Nature Conservancy and WWF will help set up the reserve, where efforts will be made to stamp out illegal practices such as dynamite and cyanide fishing. Tourism activities and subsistence fishing by locals will be allowed but restricted to certain areas. ■

*"It is potentially one of the largest marine protected areas in the Coral Triangle."*

Indonesian Minister of Marine Affairs and Fisheries Freddy Numberi

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# Shrimp in trouble

*A \$500 million North Atlantic shrimp fishery may be vulnerable to climate change that could disrupt the crustaceans' life cycle and mislead them into hatching when food is scarce, scientists said.*

The North Atlantic shrimp fishery may suffer under expected climate changes warn scientists from Canada's Bedford Oceanography Institute.

The commercially and ecologically important northern shrimp, *Pandalus borealis*, a species of shrimp found in cold parts of the Atlantic and Pacific Oceans is highly susceptible to climate changes. The species breeds solely based on water temperature, and on the surrounding availability of food.

The species times the birth of the shrimp spawn with the initial spring blooming of the phytoplankton—a fact that guarantees an abundant food supply.

The crustacean adapts its breeding cycles to deal with shorter or longer incubation cycles, but in every case, they synchronise to coincide with local algae blooming that takes place in the spring.

"Over time, they have evolved to adapt to local temperatures. Using genetic adaptation, they were able to synchronise their breeding cycle to local temperature conditions," explains lead scientist Peter Koeller.

They have evolved to mate the previous year at just the right time to take advantage of spring blooms. Eggs carried by the females take between six and ten months to incubate over the winter.

It would not take much to disrupt this synchrony, the researchers say. Climate change could decouple the match between seabed temperatures and food.

If sea surface temperatures increased over time, the bloom might happen earlier. Similarly, if bottom temperatures changed, the eggs would hatch sooner or later, before the full phytoplankton bloom.

In the more temperate ocean zones, such as the waters off the coasts of Maine,

shrimp lay eggs before the annual algae blooming. In other colder areas, like the coastal waters of Iceland, eggs need more time to be incubated. Here, the shrimp breed a year before the blooming.

## Chemical trigger

Previously, one theory had been that the larvae hatched in direct response to a chemical trigger from the blooms, for instance, cued by dead algae drifting down from the surface.

Shrimp are an important link in the food chain—they feed on algae and are in turn eaten by fish. Overfishing of cod has helped a sharp rise in shrimp populations.

The shrimp make up about 70 percent of the 500,000 tons of cold-water shrimp harvested annually from the world's oceans, worth about US\$500 million.

The institute team sustains the findings obtained are very important in terms of assessing the economic and ecological consequences of climate change on the stock.

However, more detailed research is needed to understand the possible effects of climate change on stocks, the scientists say. ■

*"The shrimp is the marine equivalent of the canary in the mine shaft. It's an indicator of climate change."*

Peter Koeller, the lead author of the study at the Bedford Institute of Oceanography in Canada



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# Vast reefs found off Ireland

During a recent deep-water expedition scientists confirmed the existence of a major new coral reef province on the southern end of the Porcupine Bank off the west coast of Ireland.

*While coral reefs are more common in warm waters off Australia, the Maldives and Caribbean, they have increasingly been found in cold waters, including at least 2,000 square kilometers of reef off Norway*

A 'spectacular' series of cold-water coral reefs have been found off the west coast of Ireland, some rising 100 meters (330 feet) from the seabed, say researchers from National University of Ireland, Galway. The province covers an area of some 200 km<sup>2</sup> and contains about 40 coral reef covered carbonate mounds. These underwater hills rise as high as 100m above the seafloor.

Cold-water reefs are important because they provide feeding grounds and nursery areas for fish including commercial species, according to UNEP. Larger warm-water reefs

provide benefits including fisheries and coastal protection worth about US\$30 billion a year, the organization says.

## Spectacular

"These are by far the most pristine, thriving and hence spectacular examples of cold-water coral reefs that I've encountered in almost ten years of study in Irish waters," said Dr Anthony Grehan, NUI Galway, who led the research. "There is also evidence of recent recruitment of corals and many other reef animals in the area suggesting this area is an important source of larvae supply to other

areas further along the Porcupine Bank."

Dr Grehan suggested that given the rugged terrain, its unsuitability for trawling, and its well defined boundaries, that the area would be an excellent additional candidate to the four existing off-shore coral Special Areas of Conservation (SAC).

Some reefs were found by scientists to be in less-than pristine condition. Threats to cold-water reefs include damage from bottom-fishing trawlers, oil and gas exploration, pollution and the installation of cables and pipelines. ■



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# Lake Tahoe Explored

**The Undersea Voyager Project has carried out 58 submersible dives and 33 scuba dives below the cobalt blue waters of Lake Tahoe and Fallen Leaf Lake during May and June, evaluating the underwater environment.**

Text by Arnold Weisz

Utilizing a manned submarine, a remotely operated vehicle and a volunteer dive team, the Undersea Voyager Project (UVP) conducts experiments up to 1,600 feet below Lake Tahoe's surface. "Our mission is to learn more about Lake Tahoe's health, so its beauty can be preserved for future generations," said UVP captain and CEO, Scott Cassell.

## Submerged forest

Natural and man-made findings. The team also explore an ancient submerged forest and documented at least three unmapped trees underneath the surface of Fallen Leaf Lake, an lake adjacent to Tahoe, that are more than 2,000 years old. These trees were sonar tagged and core samples were taken to determine the area's weather patterns at the time of their life. Sonar images show active faulting beneath Lake Tahoe and very little, if any of these faults have been explored.

During a dive to look at the Incline Village seismic fault on the north side of the lake, the team observed nine feet of vertical offset, suggesting the fault might be younger and have a greater potential for causing an earthquake than previously thought.

UVP also came across a potentially undocumented species, which may be a species of Chloromonad. This organism is a unicellular species that produces its own food and has characteristics that are animal-like, plant-like and fungus-like, Cassell said.

## Water weeds

Of the less desirable lifeforms encountered by UVP during its dives were a fair amount of Eurasian watermilfoil. Eurasian watermilfoil was accidentally introduced to North America from Europe. The lake's water quality is being threatened by this invasive plant. The highest alpine lake of its size in the States, it's also one of the clearest with an average underwater visibility of about 70 feet. Last but not least, exploring the lake revealed more than 20 sunken boats dating back 100 years or so.



SeaMagine SeaMobile

## Preparing for the big trip

The Undersea Voyager Project is an ocean exploration team based out of Southern California, USA, and a non-profit organization established to circumnavigate and study the Earth's oceans (27,000 miles) at depths of 100-1,000 feet utilizing human piloted submersibles. The exploration of Lake Tahoe in California is a trial run but with an important mission before the Undersea Voyager Project takes on the main quest—a five-year expedition to study the Earth's oceans.

► [www.underseavoyager.org](http://www.underseavoyager.org)



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# Caribbean coral reefs in peril



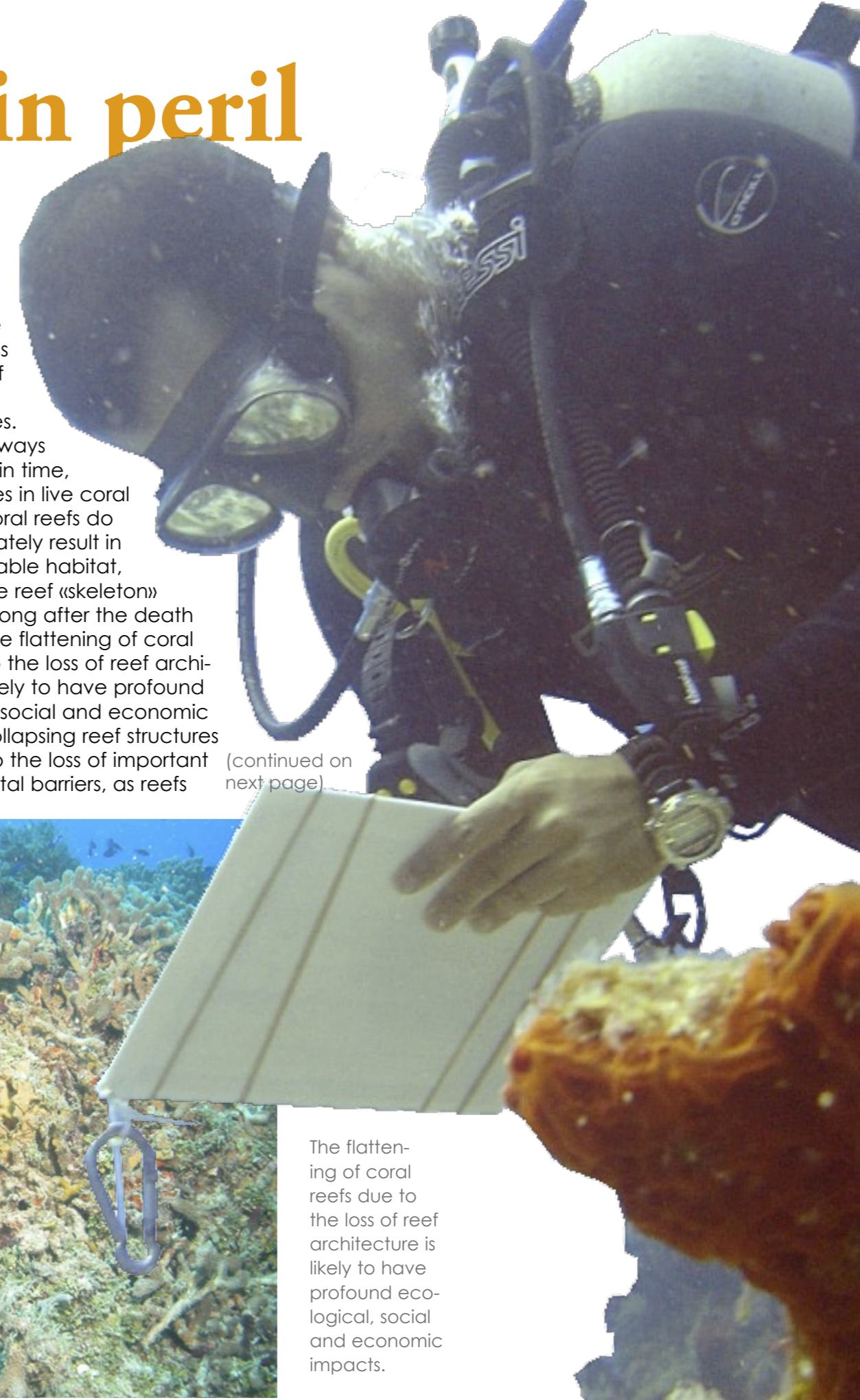
to the present. Most of the coral reefs in the Caribbean have suffered significant changes due to a growing human population.

## Weakening structures

In tropical shallow waters, the calcium carbonate skeletons of stony corals is the backbone of the most diverse ecosystem in the ocean. As so often because they often are situated close to human development, coral reefs have been heavily impacted worldwide by a combination of local and global stressors, including overfishing, climate change-induced coral bleaching, strong algae growth due to polluted water and disease. The marked declines in live hard coral cover documented over recent decades throughout the Caribbean and the Indo-Pacific regions, show that hard coral are

a important piece of the puzzle for species richness, abundance and biomass of coral reef fishes and invertebrates. This is not always discovered in time, as decreases in live coral cover on coral reefs do not immediately result in loss of available habitat, because the reef «skeleton» can persist long after the death of corals. The flattening of coral reefs due to the loss of reef architecture is likely to have profound ecological, social and economic impacts. Collapsing reef structures may lead to the loss of important environmental barriers, as reefs

(continued on next page)



**Over the last couple of decades Caribbean coral reefs are being flattened. This has not only an huge impact on the marine life, but also on the population around the Caribbean. Action to save them can't wait anymore**

By Arnold Weisz. Images courtesy of University of East Anglia

According to researchers from Canada and Great Britain hard corals in the Caribbean have suffered from rapid decline the last few years. The first region-wide analysis of changes in reef architectural complexity, using nearly 500 surveys across 200 reefs, between 1969 and 2008 is worrying. The flattening of Caribbean reefs was apparent by the early 1980s, followed by a period of stasis between 1985 and 1998 and then a resumption of the decline



The flattening of coral reefs due to the loss of reef architecture is likely to have profound ecological, social and economic impacts.

# Heat-tolerant Coral Reefs Discovered

**Stanford University scientists have found evidence that some coral reefs are adapting and may actually survive global warming.**

"The most exciting thing was discovering live, healthy corals on reefs already as hot as the ocean is likely to get 100 years from now," said Stephen Palumbi of Stanford University.

## How is that possible?

Corals have a symbiotic relationship with tiny algae called *zooxanthellae*. The corals give the algae a home and, in exchange, the algae provide the corals

with food. When water temperatures get too hot, the corals expel the algae.

Without their algae symbionts, the reefs die and turn stark white, an event referred to as "coral bleaching", which is expected to kill coral reefs around the world as global temperatures rise.

In the past few years, biologists have discovered that some zooxanthellae can live at warmer temperatures than others, making the corals that host them naturally heat-resistant. What's more, during a heatwave on the Great Barrier Reef in 2006, an Australian team found that many corals that survived the hot period had swapped their algae for more heat-resistant ones.



## Algae 2.0

Palumbi's team set out to investigate how widely dispersed these heat-tolerant coral reefs are across the globe and to learn more about the biological processes that allow them to adapt to higher temperatures.

The heat-tolerant algae allow corals to survive 1.5 °C rises in temperature above

their usual range. In some regions, this may be enough to survive through to the end of the century despite global warming.

## Natural selection in progress

Coral populations could adapt to new conditions by natural selection. This results in a gradual change in the temper-

ature-tolerance of the population through the elimination of the coral colonies that cannot tolerate higher temperatures. Different colonies of the same coral species may respond to thermal stress differently. If only the most temperature-tolerant corals survive a bleaching episode, the offspring from those corals might be more temperature-tolerant than the previous generation. ■

*"Corals may be tougher than we thought"*

Stephen Palumbi, a professor of biology at Stanford's Woods Institute for the Environment



(Cont'd from previous page)

serve as coastal protection. Simulation models predict that a reduction in reef surface roughness of approximately 50 percent could produce a doubling of the wave energy reaching the shores behind those reefs. Since large parts of the population around the Caribbean live near the coast, this will have a dramatic impact, both on the life of the locals and on tourists.

## Coral reefs providing wealth

The Caribbean contains more than ten percent of the world's coral reefs, included the area from Florida through to the French West Indies and the Cayman Islands. In August 2005, severe bleaching affected between 50 and 95 percent of coral colonies and killed more than half, mostly in the Lesser Antilles. Deteriorating coral reefs have not only a direct impact on the environmental conditions, in which the local population

live, but also on their livelihoods. Tourism now accounts for more than 60 percent of the gross domestic product of the economies of the 15-nation Caribbean Community (CARICOM). The Caribbean represents around three percent of global tourism, comparing to the USA, which alone stands for about six percent of the global tourism. As a result of a generation of mass tourism development, the Caribbean has become the most tourist-penetrated region in the world. In the

Caribbean, coral reefs provide more than US\$4bn a year from fisheries, scuba-diving tourism and shoreline protection. According to an analysis by the World Resources Institute: Reefs at Risk, coral loss in the region could cost the local economy up to US\$420m every year.

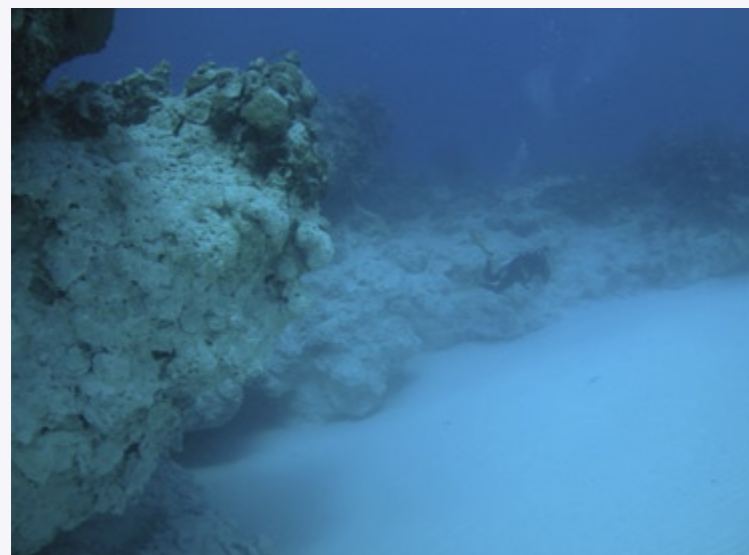
## Save the corals, now!

Although it has been evident that coral reefs are in peril all around the world, not only in the Caribbean, human

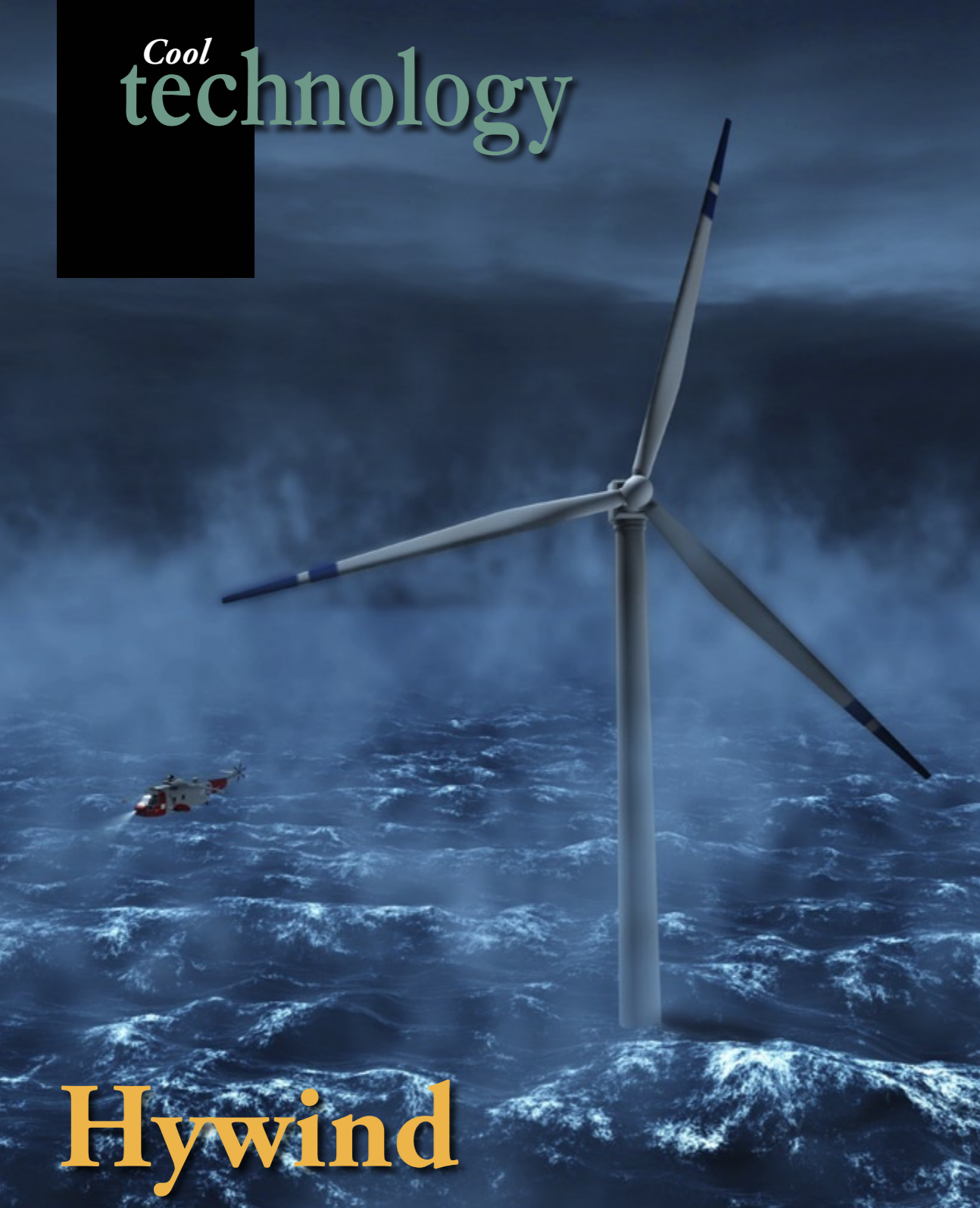
development and tourism keeps putting pressure on the world's reefs. Action needs to take place now, before we pass a threshold from which there is no return.

"The continuing degradation of coral reefs may be soon beyond repair, if threats are not identified and rapidly controlled," said the author of a recent study, Camilo Mora at Dalhousie University, Halifax, Canada. ■

SOURCES: WORLD CONSERVATION UNION (IUCN), FLATTENING OF CARIBBEAN CORAL REEFS: REGION-WIDE DECLINES IN ARCHITECTURAL COMPLEXITY BY LORENZO ALVAREZ-FILIP, NICHOLAS K. DULVY, JENNIFER A. GILL, ISABELLE M. COTE AND ANDREW



Caribbean coral reefs are suffering



# Hywind

The rotor blades on the floating wind turbine will have a diameter of 80 metres, and the nacelle will tower some 65 metres above the sea surface. The floatation element will have a draft of some 100 metres below the sea surface, and will be moored to the seabed using three anchor points

**World's first full scale offshore floating wind turbine is now in operation off the coast of Norway. The project combines known technology in an innovative way. A 2.3 MW wind turbine is attached to the top of a so-called Spar-buoy, a solution familiar from production platforms and offshore loading buoys.**



# Robert Ballard opens Inner Space Center

The Ocean Science and Exploration Center for underwater exploration was unveiled June 1st at University of Rhode Island.

The brand new US\$17 million facility will allow scientists on shore to participate in the research of ships thousands of miles away at sea while sending views of the ocean deep to classrooms and research labs across the country. The Ocean Science and Exploration Center at the University of Rhode Island is the brainchild of URI professor Robert Ballard, who discovered the wreck of the Titanic in 1985.

"This new building is the culmination of a dream I first envisioned 28 years ago to use 'telepresence' technology to not only make it possible for scientists all around the world to participate in live undersea exploration, but also to use the excitement of exploration to motivate the next generation of explorers to prepare them for the continuation of this adventure," said Robert Ballard, URI professor of oceanography, director of the Institute for Archaeological Oceanography, and president of the Institute for Exploration at Mystic Aquarium.

The Ocean Science and Exploration Center houses office and laboratory space, a central computing facility, administrative offices and a new campus gathering place. But the centerpiece of the 41,000 square-foot facility is the Inner Space Center, which will use a satellite system and web2 to make it possible for scientists and students at URI and around the world to participate in deep-sea research expeditions without leaving land.

As Ballard is an explorer-in-residence with the National Geographic Society this secured a contribution from National Geographic, which has equipped the Inner Space Center's television production studio and other facilities to broadcast educational programming around the world. Offices for NOAA personnel, the Institute for Exploration and the Ocean Exploration Trust and Pell Marine Science Library are also located in the building.

<http://isc.gso.uri.edu/>



Professor Ballard tells about the new Inner Space Center. Click on image to listen to interview on [www.xray-mag.com](http://www.xray-mag.com)



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Fighting climate change

# Ocean Fertilisation

— *A flawed concept?*

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Text by Arnold Weisz

As global warming is taking affect, there are many ideas on how to reduce the carbon dioxide levels in the planet's atmosphere. One of the hotly debated and controversial proposals is to stimulate CO<sub>2</sub>-consuming plankton blooms by fertilising swathes of oceans with iron.

There is now widespread consensus that rising levels of greenhouse gases is driving climate change and global warming. Besides controlling emissions, a wide range of more active ways to combat global warming has been proposed. One particular proposal is the addition of iron to the oceans.

The objective is to promote phytoplankton growth in order to reduce atmospheric carbon dioxide through photosynthetic uptake.

**Old idea, new approach**  
Scientists became interested in the concept in the late 1980s when oceanographer John Martin famously told colleagues: "Give me half a tanker of iron and I'll give you the next ice age." Iron fertilization has since been tested in at least a dozen experiments around the world.

Though common on land, dissolved iron is in short supply in the ocean which limits growth of plankton. Therefore, researchers and commercial enterprises have recently proposed that adding this missing nutrient on a large scale could create artificial blooms.

Once absorbed by the algae, some of this carbon will be deposited on the ocean floor in the form of dead cells and fecal matter, and sequestered in deep ocean sediments for millions of years. The rest will enter the food chain when larger organisms consume the algae, or will be transported by ocean currents to middle-depth waters where the carbon will remain for a few decades at most.

Iron sulfate, which the recent experiment, LOHAFEX, used to fertilize a 30x30 km patch of ocean

**Putting it to the test**  
Laboratory experiments suggested that every ton of iron added to the ocean could remove 30,000 to 110,000 tons of carbon from the air. In a series of small scale ocean experiments conducted since 1993, Woods Hole Oceanographic Institution has shown that iron additions do indeed draw carbon into the ocean, though perhaps less efficiently or permanently than first thought.

One recent large scale experiment done by a team of scientists from the German National Institute of Oceanography and the Alfred Wegener Institute showed less than promising results. The so-called LOHAFEX experiment showed that iron fertilization of nutrient-rich waters did not necessarily lead to algal blooms, carbon export, and thus, CO<sub>2</sub> uptake. The accumulation rates of phytoplankton increased for a very short time only (if at all) because of heavy grazing pressure by zooplankton.

**Could iron fertilization of oceans combat global warming?**

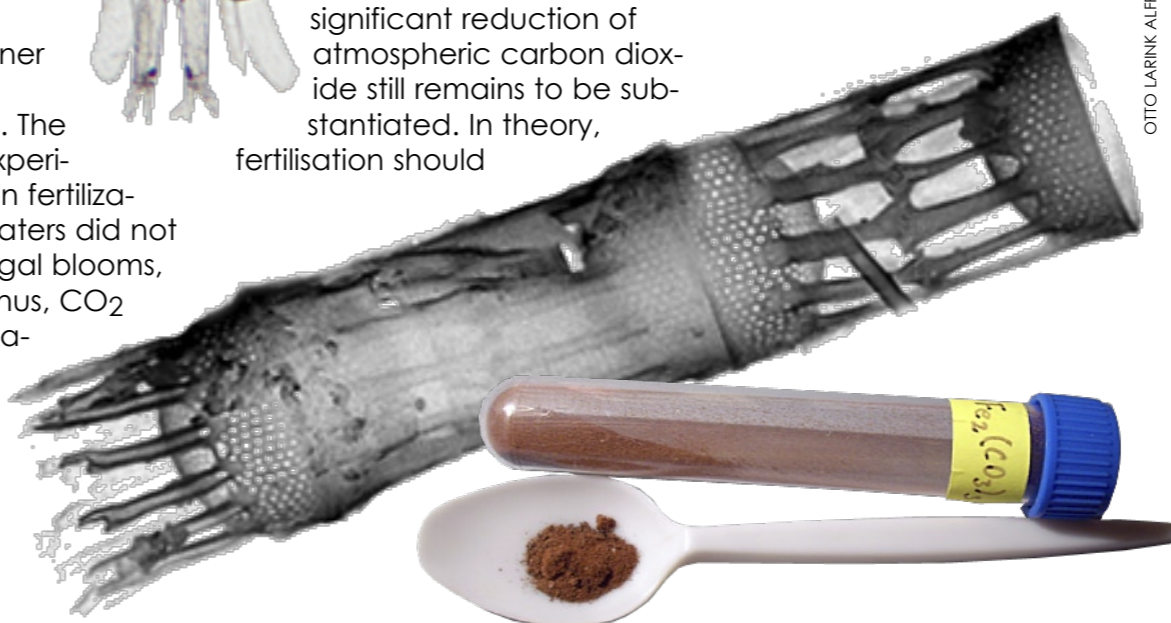
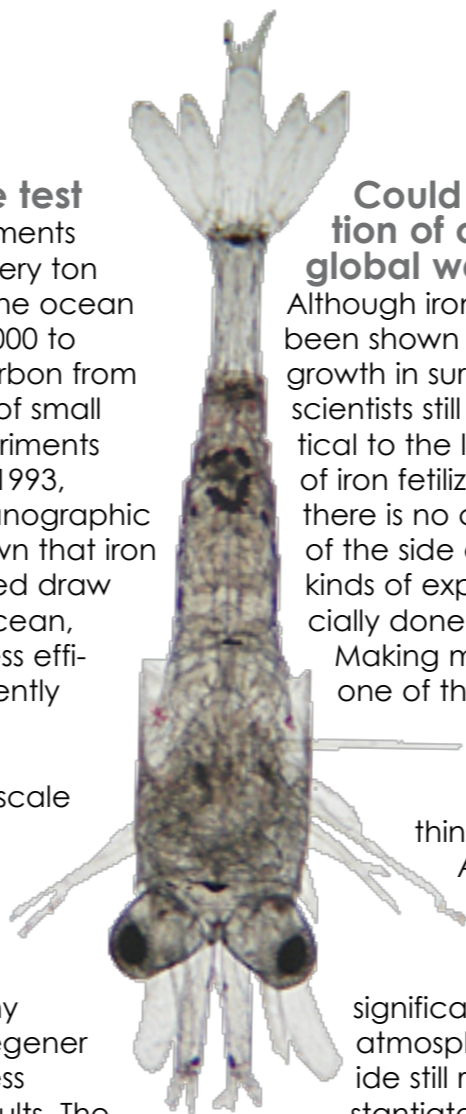
Although iron fertilizers have been shown to promote plant growth in surface waters, many scientists still remain very skeptical to the long term effects of iron fertilization. In addition, there is no certain knowledge of the side effects from these kinds of experiments, especially done on a large scale.

Making major changes to one of the largest ecological systems on the planet, the ocean, is not anything to be taken lightly. And the claim that artificial ocean iron fertilisation will indeed cause any

significant reduction of atmospheric carbon dioxide still remains to be substantiated. In theory, fertilisation should

boost phytoplankton biomass, which is the base of the marine food chain. In turn, krill and other consumers of phytoplankton, should benefit from this increased food-supply.

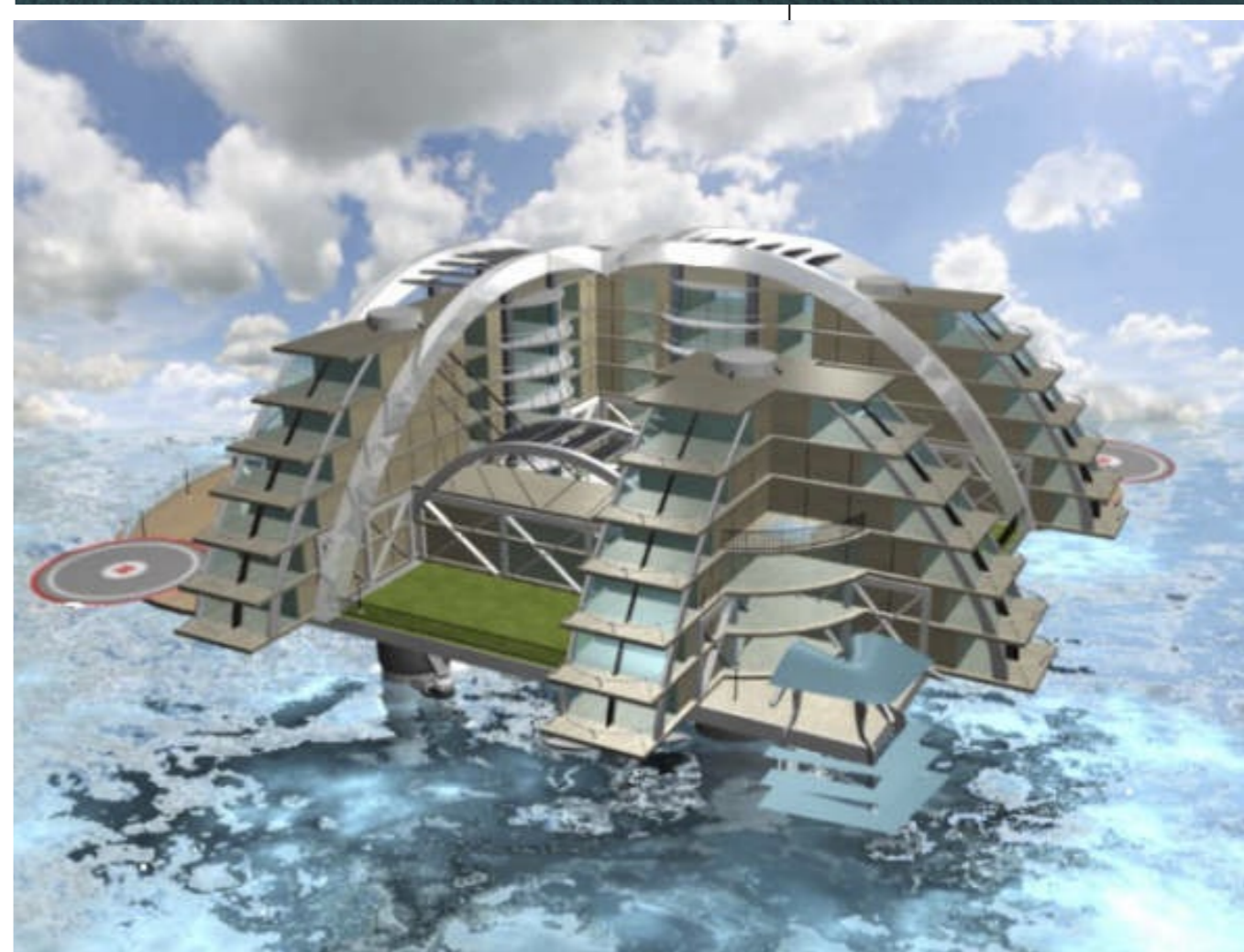
Down the line, this would increase fisherman's catches from the over-fished seas, and even help restore whale populations, which are not yet recovering from over-hunting. However, ocean ecosystems are poorly understood relative to their terrestrial counterparts, and tampering with the base of the food chain could yield undesirable consequences. ■



OTTO LARINK ALFRED WEGENER INSTITUTE FOR POLAR AND MARINE RESEARCH - CREATIVE COMMONS ATTRIBUTION 3.0



The project has been backed by PayPal founder Peter Thiel, who invested \$500,000 in the institute and has since spoken out on behalf of its viability



# Fancy living on the ocean? Seasteads

Seasteading is creating permanent dwellings on the ocean—homesteading the high seas—outside the territories claimed by the governments of any standing nation.

The Seasteading Institute, founded by Wayne Gramlich and Patri Friedman on 15 April 2008, is an organization with the mission to “further the establishment and growth of permanent, autonomous ocean communities, enabling innovation with new political and social systems.”

*“By opening a new frontier, we intend to revolutionize humanity’s capacity to improve quality-of-life worldwide by creating experimentation and competition among governments.”*

Outside the Exclusive Economic Zone of 200 nautical miles (370 km), which countries can claim, the high seas are not subject to the laws of any sovereign nation other than the flag under which a ship sails.

## Technology

The Seasteading Institute has been working on a new approach involving communities floating above the sea in spar buoys, similar to oil platforms. The project would start small, using proven technology as much as possible, and try to find viable, sustainable ways of running a seastead. ■

Images courtesy of the Seasteading Institute’s Seasteading Architectural Design Contest, which ran from February 1 to May 1, invited participants to design the floating city of their dreams



# Cyprus Aphrodite Festival



ANATOLY BELOSHCHIN

Anatoly Beloshchin from Russia came second in the 'Fashion & Nudity Category - 5 Best Images'. All due respect to the winners but this image was

**Aphrodite 2009, the first underwater world of images in Larnaka, Cyprus, sponsored by the Cyprus tourist organization went down well. The participants had a wonderful and unique experience and most are already looking forward to the competition next year**

Valuable prizes were granted to the winning photographers, including 17,000 Euro in cash, expensive underwater photography equipment, luxurious diving vacations and more. The competition was tough, the tension was high and it was a very emotional moment when the lucky winners finally got all up on stage

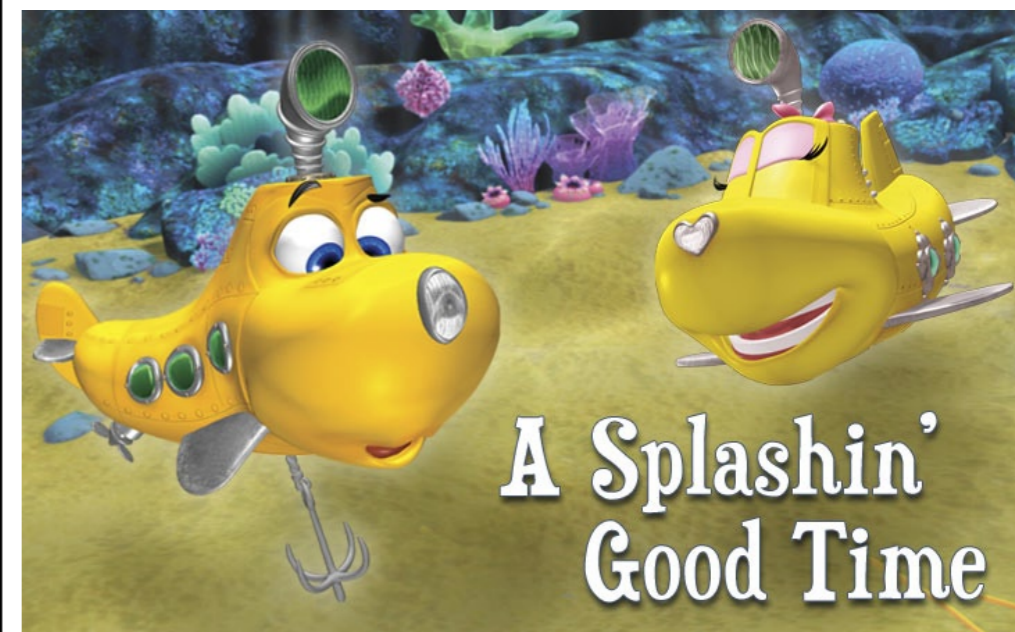
The event consists of three main photography categories. The first is Wreck Photography, mainly focusing on the worldwide famous

"ZENOBIA" wreck. The second is Fashion and Nudity, a category announced in memory of Mike Portelly, in which creative underwater photographers will be making use of Cyprus underwater bedrocks and crystal clear water as a photo studio. Last but not least is the video clip category, which consists of 90 seconds edited underwater videos. The Video Clip category was open to both amateur and professional videographers. Each competitor was allowed to present up to a ninety

seconds video clip that was shot and edited in Cyprus, during the unforgettable 3 days of the competition.

One of the masterminds behind the competition was our good colleague David 'Pilo' Pilosof publisher of the Israeli dive magazine Yam and also organiser of the Red Sea Dive Festival which is held in Eilat, Israel each November.

Daily reports from Aphrodite by Sharon Rainis has been posted on [xray-mag.com/Diveshows](http://xray-mag.com/Diveshows)



## A Splashin' Good Time

### United Nations team up with Olly Dolly Dive cartoon show to teach kids about underwater heritage

**The United Nations Educational, Scientific and Cultural Organization (UNESCO) has teamed up with a popular animated television show about submarines—*Dive Olly Dive!*—to teach children about the world's underwater cultural heritage.**

underwater cultural heritage," UNESCO said in a press release. "The characters are friendly and engaging, and they will be a great aid in our efforts to reach children in an entertaining and easily understood way in every corner of the globe."

The high-definition, 3D computer-generated animation show follows underwater escapades of two young research submarines-in-training, who live in a deep-sea research centre. Its stories educate children on the delicate nature of the ecosystems and submerged archaeological sites beneath the oceans. As part of the agreement, UNESCO is serving as a consultant to the show, as the series begins production on its second season.

UNESCO will use characters from the show on its website and in printed materials distributed to classrooms worldwide in a continuing campaign to protect underwater archaeological heritage sites.

"*Dive Olly Dive!* has done a wonderful job introducing children to the importance of caring for the environment and submerged archaeological sites, and we look forward to working with them on stories about shipwrecks and the ancient ruins that make up our

The show airs on PBS Sprout in the United States, Disney Channel and France 5 in France, KI.KA in Germany, TVE in Spain and dozens more channels worldwide. ■



Edited by  
Mathias Carvalho

# USS Vandenberg is sunk Success at last!

The project took more than over ten years and came with a price tag of US\$8.6 million, from acquiring the ship to cleaning it. Preparation and permits took several months and created some debate.

Florida Keys officials expect the enterprise to pay off, up to \$8 million in annual tourism-related revenue is expected to pour in, mostly from divers paying to peek at the underwater behemoth. The project's goal is to not only to attract tourists and build businesses, but to help protect the Keys' natural reefs, which already suffer from excessive diving, snorkeling and fishing, an added threat to warming ocean temperatures.

Project organizer Joe

Weatherby, working for an artificial reef making company called Reefmakers, said it will be "giving the reef a breather, which is what it needs", as people and local fauna will now be drawn to the wreck from nearby natural coral.

### Try, try again

The first-largest intentionally sunk artificial reef is the *USS Oriskany*, which was sunk three years ago off the coast of Pensacola Beach and is now a popular diving destination.

Another not-so-smooth attempt occurred with the *Spiegel Grove*. The vessel didn't sink immediately after the first charges went off and ended up upside down at the bottom, off Key Largo in 2002.

Sinking vessels that large in order to create artificial reefs is a complex task that not always follows the best laid plans of divers and coordinators. The *USNS Vandenberg* seems to count as one of those successful trials, so far.

During 2009, the company will post videos of its progress as a new reef on their official website at [www.sinkthevandenberg.com/ondemand.html](http://www.sinkthevandenberg.com/ondemand.html). As of the date of publication, it is possible to watch some footage from the vessel's engine room interior, already an impressive sight as divers clear the ship for technical assessments. ■



Before being towed out for sinking, the *Vandenberg* at the dock. A complete environmental cleaning was required before the vessel could be sunk

**After much debate and a long wait, the U.S. Air Force Vandenberg was finally sent to the seabed where it became the world's second-largest artificial reef.**

Images courtesy of Carol Tedesco

The blast from explosives attached to the 17,000-ton *Gen. Hoyt S. Vandenberg's* hull, sent her to her final resting place about seven miles off Key West, Florida



Captain Sheri Lohr, who initiated the artificial reef project with Captain Joe Weatherby more than a decade ago



In the media room after the sinking, Digital Island Media edits footage of the first detonation and the reaction of project co-initiator Captain Joe Weatherby





## Viking ship found in Swedish Lake

Marine archaeologists in Sweden have discovered what they believe to be the wreck of a Viking ship at the bottom of the country's largest lake.

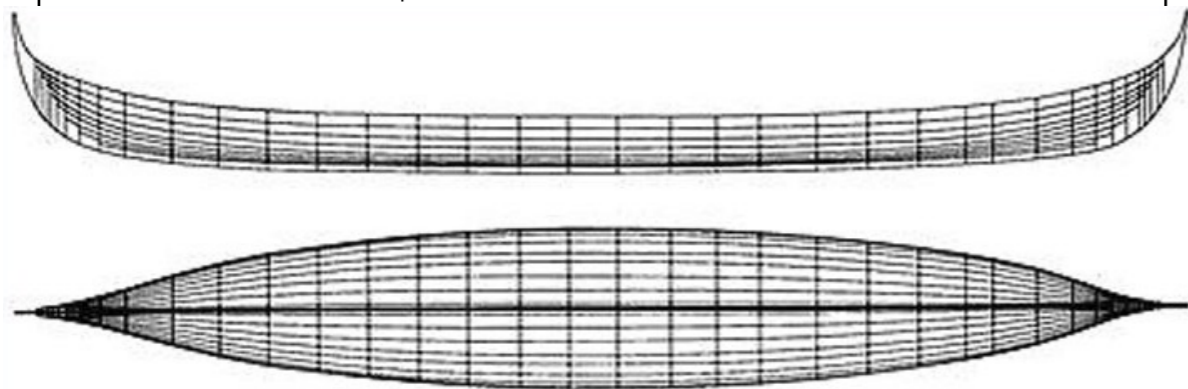
The remains of what might just be the first Viking shipwreck found in Sweden have been located at the bottom of Lake Vänern, the country's largest lake and the third largest in Europe, covering over 5,000 square kilometers. According to the dive team, it was in the midst of an island group in the center of lake. Most of the wreck was covered with one meter of mud, with a single rib sticking out.

Along with six other vessels also lying within a 100-metre radius of the initial find, with three of them on top of each other, the 20-meter long wreck will be analyzed over the weeks to come. Results from samples taken from the ship's wood, as well as from a spear and a sword found inside the vessel, will help determine

its probable origins.

Not all vessels might belong to the same era, mentioned marine archaeologist Roland Peterson, from the Vanern Museum, although the weapons appear to date from the Viking Age. "We can't be sure of anything until we get the dating results back, which could take around a month. But the sword did seem semi-familiar," he added. The ship's clinker-built structure also leans in favor of being Viking-made.

"Never before has a Viking shipwreck been found in Swedish waters," Peterson told the local Swedish newspaper. He said that all Viking vessels unearthed in Sweden before were always done so in dry land, never underwater. ■



This handout photo taken by the Australian navy shows the wreck of a World War II M-24 Japanese midget submarine at the bottom of Sydney Harbour, 21 May 2007. The bodies of two Japanese sailors whose midget submarine sank after a deadly World War II attack in Sydney Harbour will remain undisturbed on the seabed, the Australian government said. Royal Australian Navy divers on May 21 examined the wreck of the submarine M-24, which was discovered late last year off the Sydney coast after going missing in 1942 following its stealth mission into Sydney Harbour

## Japanese midget submarine M-24 declared an historic shipwreck

On the 67th anniversary of the attack on Sydney Harbor during World War II, the Japanese midget submarine M-24 was declared a historic shipwreck by the Australian government

The M-24 was one of three midget submarines that, on the morning of 1 June 1942, attacked Sydney Harbour targeting several vessels and sinking the HMAS *Kuttabul*.

### Sealed fate

Midget A, from the I-24 submarine (or M24, according to the Allied order of identification), commanded by Sub Lieutenant Ban with Petty Officer Ashibe, entered the harbour and followed a Manly ferry through the boom defenses.

The submarine maneuvered around the harbour and was sighted several times around 11:00 pm and while it came under fire from the heavy Cruiser *USS Chicago* as well as several other vessels, the submarine successfully fired its two torpedoes about 12:30 am, from near Bradley's Head.

Both missed the *Chicago*—its prime target, but one struck the ferry *HMAS Kuttabul* after passing under the Dutch submarine *K-IX* at its berth. The explosion sank *Kuttabul* and killed 21 crewmen. The other ran onto Garden Island and failed to explode.

### Speculations

Ban's midget submarine was never recovered. Many theories regarding its final resting place were proposed over the years, with no conclusive results.

Sydney-based No Frills Divers, a recreational scuba club, finally located the remains of Ban and Ashibe's missing M24 midget submarine, off Sydney's northern beaches, in November 2006. The finding was officially confirmed on 1 December 2006.

The M-24 wreck then became protected under an Interim Heritage Order before it was listed on the State Heritage Register in 2007.

"The M-24 submarine holds a great deal of historical significance

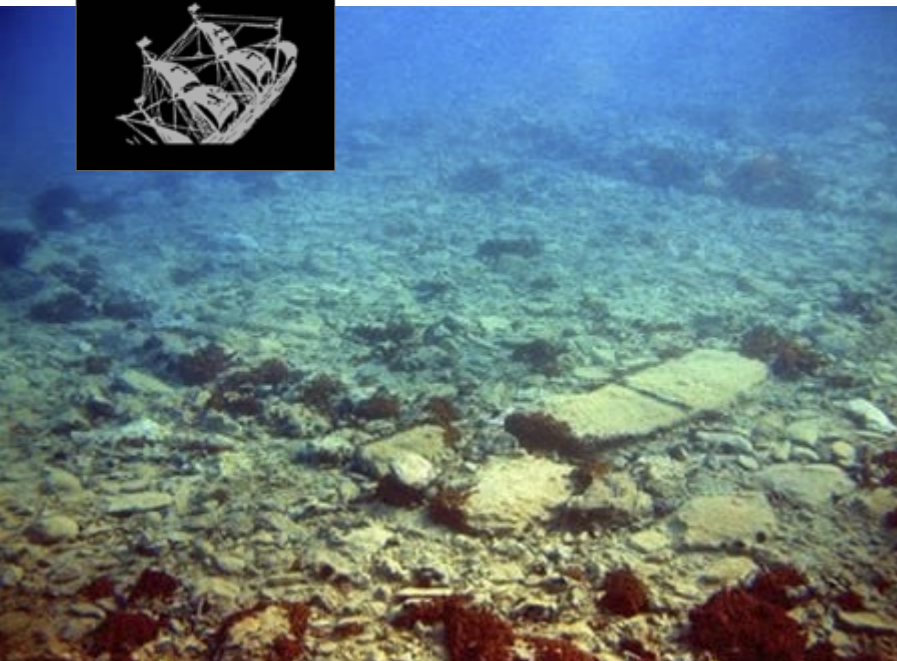
to Australia, NSW and Japan and provides important insights into the historic events of 31 May 1942," said New South Wales Minister for Planning, Kristina Keneally. "Its protection is considered an important responsibility of the Australian nation and the NSW State Government," she added.

The Japanese midget submarine attack on Sydney Harbor was considered very audacious and would have been even more spectacular had the primary military targets been successfully damaged. The attack was important to pinpoint existing vulnerabilities of ports such as Sydney's to long-range Japanese submarine patrols and the pending need for heightening security. ■



HMAS *Kuttabul* sunk in Sydney Harbour





# Pavlopetri

The world's oldest submerged town is again under the scrutiny of a team of British and Greek archeologists, who are struggling to preserve it.

The ancient town of Pavlopetri's ruins, dating from around 2800 BC, still displays intact buildings, courtyards, streets, chamber tombs and some 37 cist graves, which are thought to belong to the Mycenaean period (c.1680-1180 BC). One of many of Greece's golden past monuments, it would seem unremarkable.

The fact that it actually lies in three to four meters of water just off the coast of southern Laconia in Greece sets this Bronze Age relic apart from the others. It also provides the historical setting for much Ancient Greek literature and myth, including Homer's *Age of Heroes*.

Despite its potential international importance, no work has been carried out at the site since it was first mapped in 1968. Underwater archaeologist, Dr Jon Henderson from the University of Nottingham, will be the first archaeologist to have official access to the site in 40 years. After obtaining special permission from the Greek government to examine the submerged town.

The Pavlopetri site offers major

new insights into the workings of Mycenaean society, thought to once have been a thriving harbor town where trade was conducted throughout the Mediterranean Sea — its sandy and well-protected bay would have been ideal for beaching Bronze Age ships.

Dr Henderson will try to uncover the history and development of Pavlopetri, finding more about how and when it was occupied and establish why the town disappeared under the sea.

The survey, made in collaboration with Elias Spondylis of the Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture, will be carried out using equipment origi-



nally developed for the military and offshore oilfield market but adapted to record underwater archaeological imaging.

The equipment can produce photo-realistic, three-dimensional digital surveys of seabed features and accurate underwater structures.

Dr Henderson said: "This site is of rare international archaeological importance. It is imperative that the fragile remains of this town are accurately recorded and preserved before they are lost forever." ■



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# Shipwreck CSI:

Marine archaeology is a specialized science that combines techniques developed by land-based archaeologists, geologists and forensic specialists (to name a few). Documenting and excavating a site means adhering to strict scientific standards. The precise location of every artifact must be recorded and its condition documented just like crime scene investigators do with evidence found at a crime scene. The goal with both is the same, to reconstruct the past!

All artifacts and other features, such as a ship's timbers, are measured, drawn in detail, and photographed. Archaeological excavation underwater is usually done by hand with the aid of a hand-held dredge, commonly called an "air-lift." Sediment is often screened so that not even the smallest artifact is lost. The

excavation of a shipwreck can include the recovery of very large artifacts, such as a 20-foot long anchor, along with delicate ones such as fragments of sailcloth or paper and even the remains of rodents and insects that once lived below deck. Samples are taken for laboratory analysis to determine species or substance identification, metallurgical composition and/or radiocarbon dating.

A shipwreck is more than the sum of its parts. But, the parts provide important information, too! Everything that was on board a vessel, everything that was con-

*A shipwreck is more than the sum of its parts.*

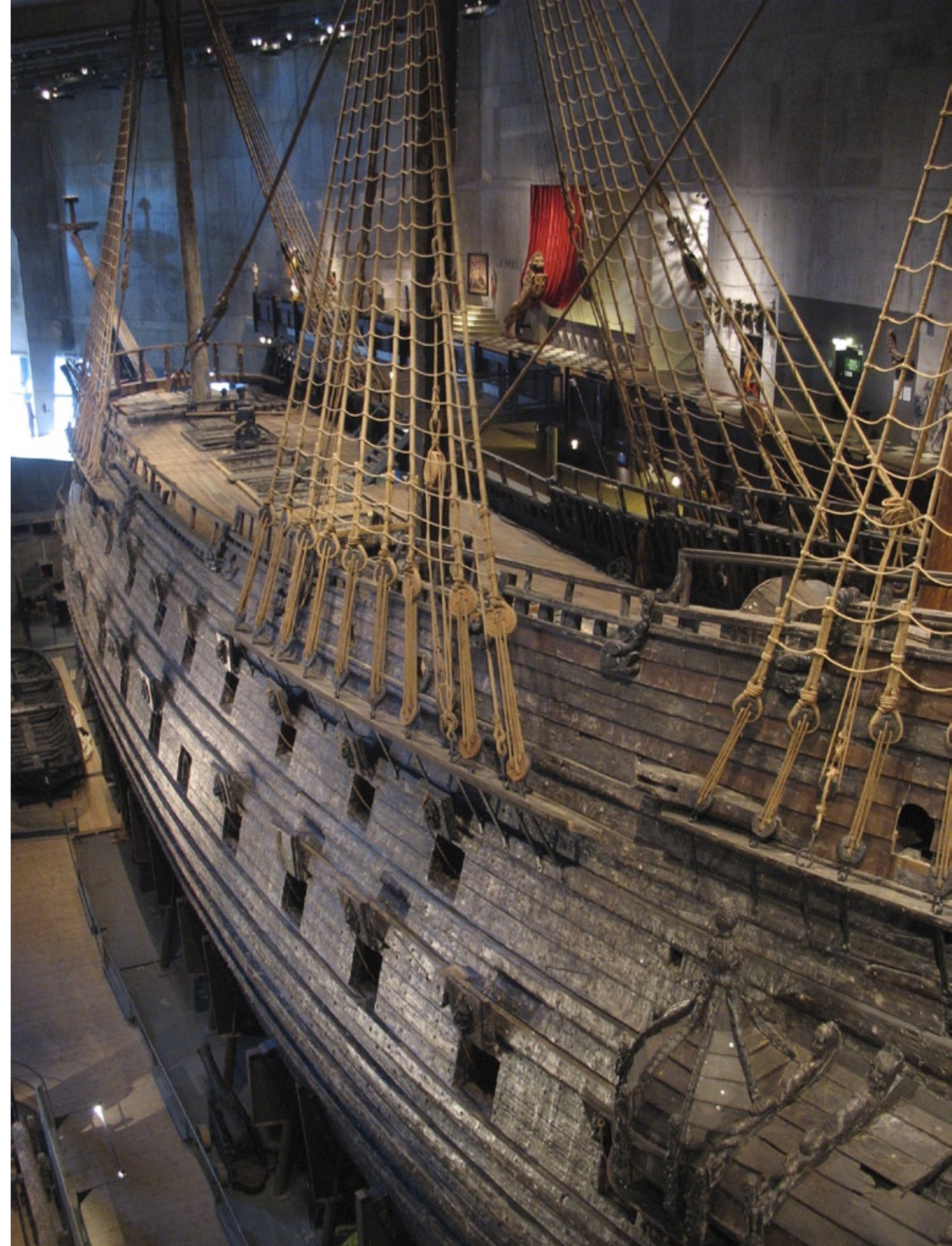
sidered indispensable for a voyage, might potentially be preserved. This includes organic artifacts made

of wood, bone, cloth or leather. Once out of the water, artifacts can be destroyed as they dry out. Most objects recovered from the sea must be treated to prevent them from deteriorating further. A cannon, for example, can take years of electrolytic and chemical treatment to stabilize. Different treatments are required for different materials.

*Documenting and excavating a site means adhering to strict scientific standards.*

More than 20 countries around the world, which have endorsed UNESCO's Convention on the Protection of Underwater Cultural Heritage, now advocate the *in situ* preservation of marine archaeological sites. This means leaving them undisturbed where they're found!

Sometimes this isn't in the best interest of a site though. Just like on land, an underwater archaeological site may be threatened by construction or dredging, such as the expansion of a harbor. What needs to be considered is the long term preservation of cultural heritage underwater. Sometimes this means removing artifacts from the sea, even an entire shipwreck. Recovering, conserving and preserving artifacts, and exhibiting them in a museum, can also enhance people's appreciation of history.





Cannons  
Un-conserved.  
When iron arti-  
facts that have  
been underwater  
for a long time  
are exposed to  
air they quickly  
deteriorate if left  
untreated

"The relocation of certain shipwrecks (and the artifacts contained within) from their original sites to museums or marine parks may potentially bring higher values to society by providing wider exposures or recreational use opportunities," says noted shipwreck management expert Porter Hoagland.

The best example of this is the Swedish warship, *Vasa*. It sunk in Stockholm harbor after being launched in 1628. Discovered in the late 1950's, the wreck is now considered a national treasure and is one of Sweden's most popular tourist attractions. More than one million tourists from around the world visit the dedicated shipwreck museum each year.

Conserving and preserving the massive 201-foot long *Vasa* and its contents was no easy job! Once exposed to air a ship's timbers dry out, crack and warp. To prevent this, the ship had to be thoroughly cleaned with fresh water during the summer of 1961.

Wooden components were then saturated with polyethylene glycol (PEG). Three thousand liters of the liquid plastic was sprayed inside and outside the hull once a day for more than 20 years.

Individual artifacts were treated in a sophisticated lab especially built for the task. Many required years of detailed work. Technical and operational difficulties had to be overcome. Never before had such a large marine archaeological project been undertaken.

Nor has the work stopped! In recent years, scientists were concerned about the rapid spread of sulfate salts and elemental sulfur on the wooden parts of *Vasa*. It was determined that the museum's humid atmosphere was allowing the sulfur contained within the ship's wood and iron parts to oxidize.

Fortunately, a solution to the problem was found. The part of the museum that houses the *Vasa* was especially renovated to cre-



ate a climate-controlled environment for it. Now, the area has a constant humidity of 53 percent and a temperature of 17°C.

With a total surface area of four acres, the *Vasa* is the largest wooden and organic archaeological artifact in the world to undergo conservation and preservation. New techniques were especially developed for it. And, such work became the impetus for even newer ways to conserve and preserve other, more recent, shipwreck finds.

—Rob Rondeau  
Marine Archaeologist  
[www.procomdiving.com](http://www.procomdiving.com) ■



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# Snaketooth

Text and photo by  
Andy Lamb

## —*The Lingcod*

The lingcod is not a true “cod” and is not related to various cod fishes or *Gadidae*. Rather, the lingcod is a member of a small North Pacific family of fishes known as the greenlings (*Hexagrammidae*). Most greenlings live along the coast of North America, and the lingcod is the largest species by far, reaching a length of 1.5m and a weight of over 44kg.

Scientifically known as *Ophiodon elongatus*, from Greek and Latin words that translate to “snaketooth” and “elongate”, the lingcod is very noticeable and easy to find. Even though its colour can vary somewhat, particularly from dark to light, it is very distinctive and recognizable. A lingcod generally rests on rocky substrate and only reluctantly swims

off as a diver approaches too closely. Such an exit is usually preceded by the erection of the specimen's dorsal fin—the optimal photographic moment!

The lingcod lives along the west coast of North America from the Shumagin Islands, central Alaska to Punta Santos, northern Baja California, Mexico. During the various stages



of its life cycle, this impressive fish inhabits all depths from surface waters to 410m. However, British Columbia, with its many fjord-like inlets and islands, appears to be the centre of lingcod abundance.

Wherever located along the coast, a lingcod is generally very sedentary and generally remains within a small section of a reef or shoreline. Although it is often more abundant in areas influenced by tidally generated current, the lingcod can live virtually anywhere in the marine environment.

### It is huge

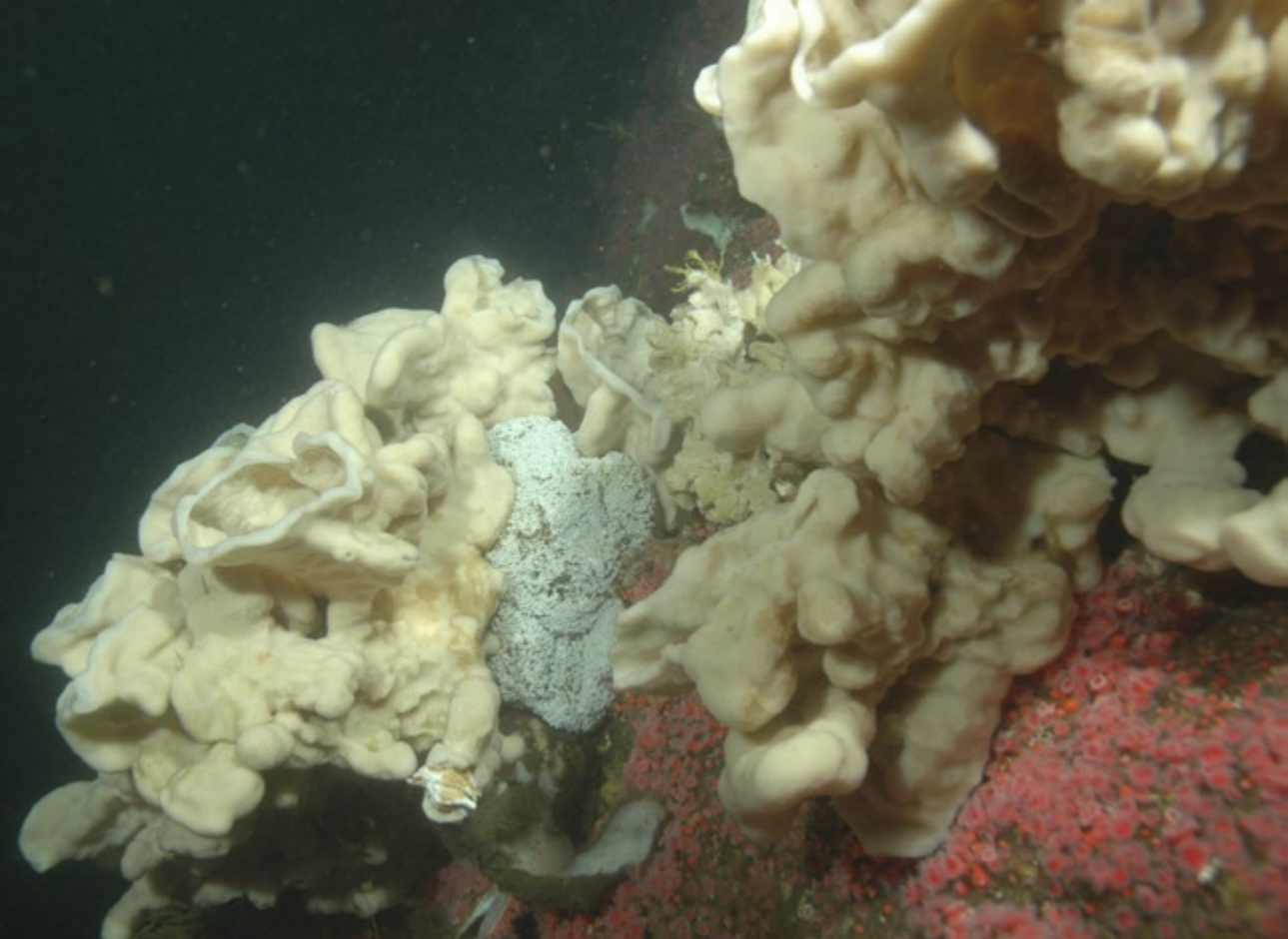
An important commercial and recreational fish, the common lingcod is very popular with divers along coastal British Columbia and adjacent United States. Due to its large size, shallow water habitat and historical abundance, this easily approached fish has been the prime spear fishing target throughout most of its

Lingcod are generally very sedentary and hang out on one small patch of reef





A lingcod egg mass is large and usually obvious—resembling a piece of whitish styrofoam wedged in the rocky substrate



range. More recently however, divers have been “shooting” it more often with cameras and a conservation ethic has replaced the traditional harvesting approach. Fortunately, SCUBA “fish counts” are now popular, and the spear fishing contests are now passé. This activity shift should benefit lingcod populations.

### Egg count event

One recreational diver initiative established in British Columbia 20 years ago is the annual lingcod egg mass count. Administered by the Vancouver Aquarium, this yearly event generates valuable biological data while involving motivated amateur divers in a very simple process.

February is the peak of a late autumn through winter lingcod spawning season. During this month and as part of regular diving activities, participants record sightings of lingcod nests. Each egg mass found is recorded (via a slate) along with its depth, size, situation, development stage and the presence or absence of guarding male lingcod.

Leading up to the actual spawning event, each male lingcod selects a suitable ‘nest site’ within his territory and awaits the arrival of a willing female.

Aside from size, it is not possible to distinguish a male from a female via external anatomical features. The female grows larger and any specimen heavier than 13kg is almost certainly feminine.

After a brief courtship and the actual spawning activity, the female departs and the male remains to guard the egg mass. Occasionally, a male may breed with two females and protects both resulting egg masses.

### Tenacious males

A male is usually very tenacious, attempting to chase away virtually any threat. That may even include a curious diver! Such activities render such a male particularly vulnerable to predators as seals, sea lions, orcas and of course ourselves (as line fishermen using lures).

Hatched in early spring as a tiny transparent larva, a lingcod temporarily swims at the surface, feeding upon planktonic prey, especially copepods. Once it attains approximately one centimetre in length and a silvery colour (several weeks), the juvenile settles to its perma-

*In the latter years, a specimen tends to add weight and girth—not unlike some divers.*

Usually by the end of its first year or so, the rapidly growing young lingcod has moved into the rocky shore or reef habitat that is typical for an adult. An adult lingcod is a voracious ambush predator that consumes virtually any fish species that might pass by, including smaller lingcod and salmon that have been hooked by a startled angler.

While this species may attain an impressive size, the life span of the average lingcod is less than 20 years. It grows most rapidly in its early life, particularly in length. In the latter years, a specimen tends to add weight and girth—not unlike some divers.

nent seafloor habitat.

At first, the juvenile dwells in shallow eel-grass meadows or amid algal cover, where it forages on a variety of food items, including shrimp and small fish. During this several month period, the young lingcod rapidly acquires its typical adult markings and colouration.

### Popular fish

The lingcod is popular not just with divers. This species is a major focus of both commercial and recreational harvesting activities. Its flesh is very firm, white and has a relatively mild taste. Consequently, it is a very popular seafood item and well suited for many culinary uses.

As a result lingcod populations are greatly reduced throughout the species’ range. While Canadian and American Fisheries agencies impose various regulations on its harvest, the popular lingcod continues to be threatened by over exploitation.

While divers may still routinely find lingcod at most popular dive sites, the species is certainly less numerous everywhere. In addition, specimens are not nearly as large as those seen in the early years of recreational SCUBA.

An increased and growing awareness of this unfortunate situation provides hope for the future. Action in the form of lingcod egg mass counts and other volunteer research activities offer divers an opportunity to help reverse the unfortunate trend. ■

Edited by  
Scott Bennett



## Confused about Airline Baggage Rules?

Airline baggage rules. The bane of travellers world-wide, they are especially troublesome for diving enthusiasts. These days, with rules and regulations changing faster than the wind direction, it's difficult to know or anticipate how much gear is too much. Carry-on baggage allowances can become a pre-departure guessing game. There is no set standard size or number, as each airline sets its own policies. I discovered this on a recent flight Air Niugini flight from Cairns to Port Moersby. Not only was I walloped with an excess baggage fee of AUS\$270.00, I was informed there was only one carry-on allowed.

Fortunately, there is a way to check before leaving home. At <http://rickseaney.com/airline-carry-on-baggage-chart>, travellers can view a comprehensive chart featuring many of the world's most popular airlines, listing allowances of carry-on bags and personal items, complete with maximum dimensions, template size and weight. It may not save you from those unwanted excess fees, but can help prevent unexpected surprises at check in. ■

## Swim with basking sharks in Cornwall

Second largest in size only to the whale shark, the basking shark (*Cetorhinus maximus*) can be found in all the oceans of the planet, but is mostly observed in temperate waters. During late spring and the summer, it favours the coastline of the United Kingdom. Despite their size the sharks are harmless to humans. However, animal experts have warned the creatures can become distressed if they are approached or could even lash out with their tails.

A spokesman for the Cornish Wildlife Trust appealed for all water users to be aware of the sharks around them: "Divers and sailors have the same responsibilities as other water users to respect these wonderful creatures." ■



MARK WEBSTER

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## Study clears shark-cage dive tours of risk to public safety

A scientific study of shark-cage dive tours in Hawaii indicates they pose little risk to public safety, largely because they operate at least three miles offshore and are frequented by Galapagos and sandbar sharks, two species rarely involved in attacks on humans.

Hawaii Institute of Marine Biology researchers, using acoustic telemetry to track the movements of sharks tagged during the tours, found that the animals overwhelmingly stayed far out to sea and didn't follow tour boats back to shore.

"When it comes to offshore caged shark-diving tours, there is no evidence of any risk to nearshore recreational users," marine scientist Carl Meyer said. ■ HONOLULU ADVERTISER



## Southeast Asia's First Eco-Centre in the making

Cebu Eco-Centre Inc have announced its plans to build Southeast Asia's first eco-centre on Olango Island, Cebu, Philippines. CEC will be building a 50-room, 100-bed facility along with classrooms, a scuba diving center, electronic library, observation tower, restaurant-bar, mangrove walkways, spa and wellness center, first-aid clinic, and a dock to receive small craft from other islands. The Olango site is ideal because of its proximity to a bird sanctuary and two marine reserves. ■

## Airlines adopt unique measures to offset soaring fuel costs

It seems that tough times call for drastic measures. In a bid to curtail the soaring costs of aviation fuel, a number of airlines have adopted a number of unique initiatives to reduce costs. According to Paul Steele, director of the environment for the International Air Transport Association (IATA), airlines are reducing the size of spoons, dropping in-flight magazines, reducing the weight of catering trolleys and loading less water.

"Airlines are going through what they put on a plane. They are now saying that if we are only carrying 100 passengers, then only load what they need," said Steele. In one instance, JAL of Japan, took every item from a loaded 747 and put it on a school gymnasium floor to see what it really needed. The result? A fraction of a centimetre was cut from all cutlery in order to reduce weight. "When you are talking about a jumbo jet with 400 people on board, being

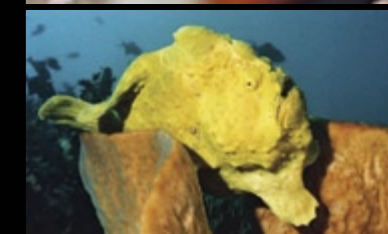
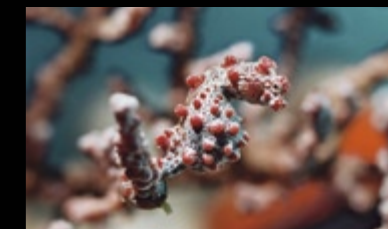
served two to three meals, this can save a few kilos," he said. "You work out how much fuel that consumes over a year, and you can be talking about a considerable amount of money." ■



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*A Diver's Paradise*  
**Bonaire**

Text and photos by JP Bresser



**The small island of Bonaire is part of the island group called the Dutch Caribbean and is located in the southern part of the Caribbean Sea near the coast of Venezuela. Bonaire is formed by volcanic rock about 60 million years ago and later covered with coral stone. These processes created a landscape with hills in the northwest, terraces in the middle and flatland in the south.**

The first inhabitants of Bonaire were Caiquetio Indians who reached the

island from Venezuela about 1000 A.D. On the east coast of Bonaire, remains of these Indians can still be found in the form of rock paintings. In 1499, the Spanish claimed Bonaire. Because there was no gold or other precious metal on the island and because the conditions meant no agricultural possibilities, the Spanish decided not to build a colony. The local Indians were captured and brought away as slaves to work on plantations in South America. In 1526, the Spanish brought cattle to the island, which is the main reason you can encounter donkeys and goats in the wild. In 1633, the Dutch conquered Bonaire from the Spanish and brought slaves to the island to work in salt extraction; the slaves lived in very small huts (about two meters high),







Bonaire

which can still be found near the seashore in the southern part of the island.

Bonaire is 40 kilometers in length and 12 kilometers wide and today has a population of around 14,500. The official language is Dutch. About 75 percent of the locals speak Papiamentu, which is a mix of Dutch, Spanish and Portuguese; but also English and Spanish are widely spoken. The main resources of income on the Island are salt extraction, which is done in the south of the island in an environmentally friendly way, and of course, tourism. Bonaire is well known for its underwater parks and popular with divers worldwide, so it is not surprising that all the license plates of the cars in Bonaire state: "Divers paradise".

I've been coming back to Bonaire for several years now; the combination of the friendly climate, the relaxed atmosphere, the easy diving and the relative small size of the island make for a perfect hideaway





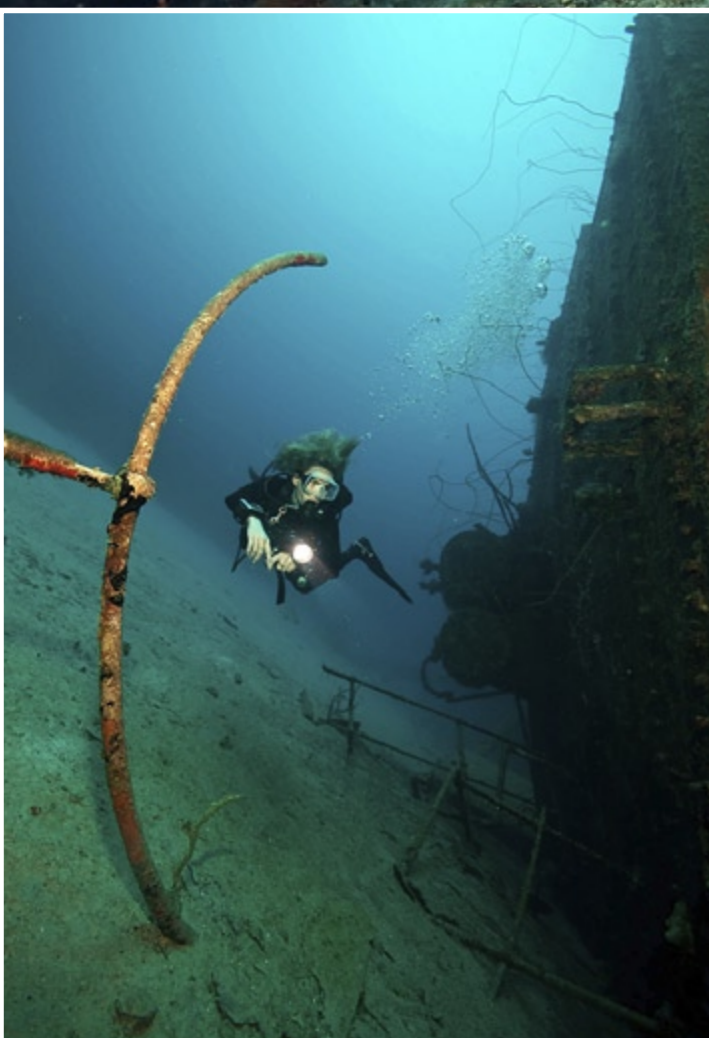
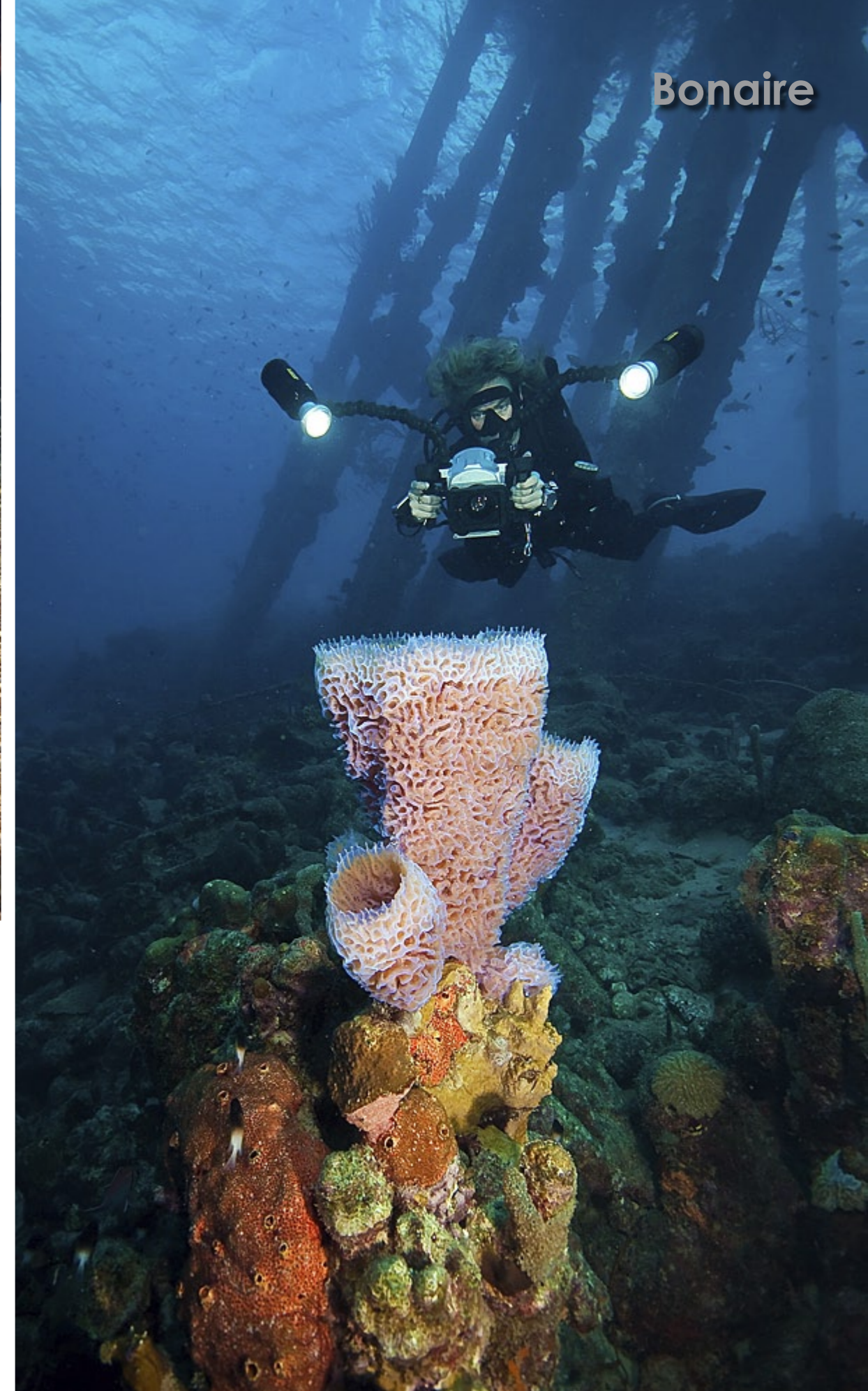
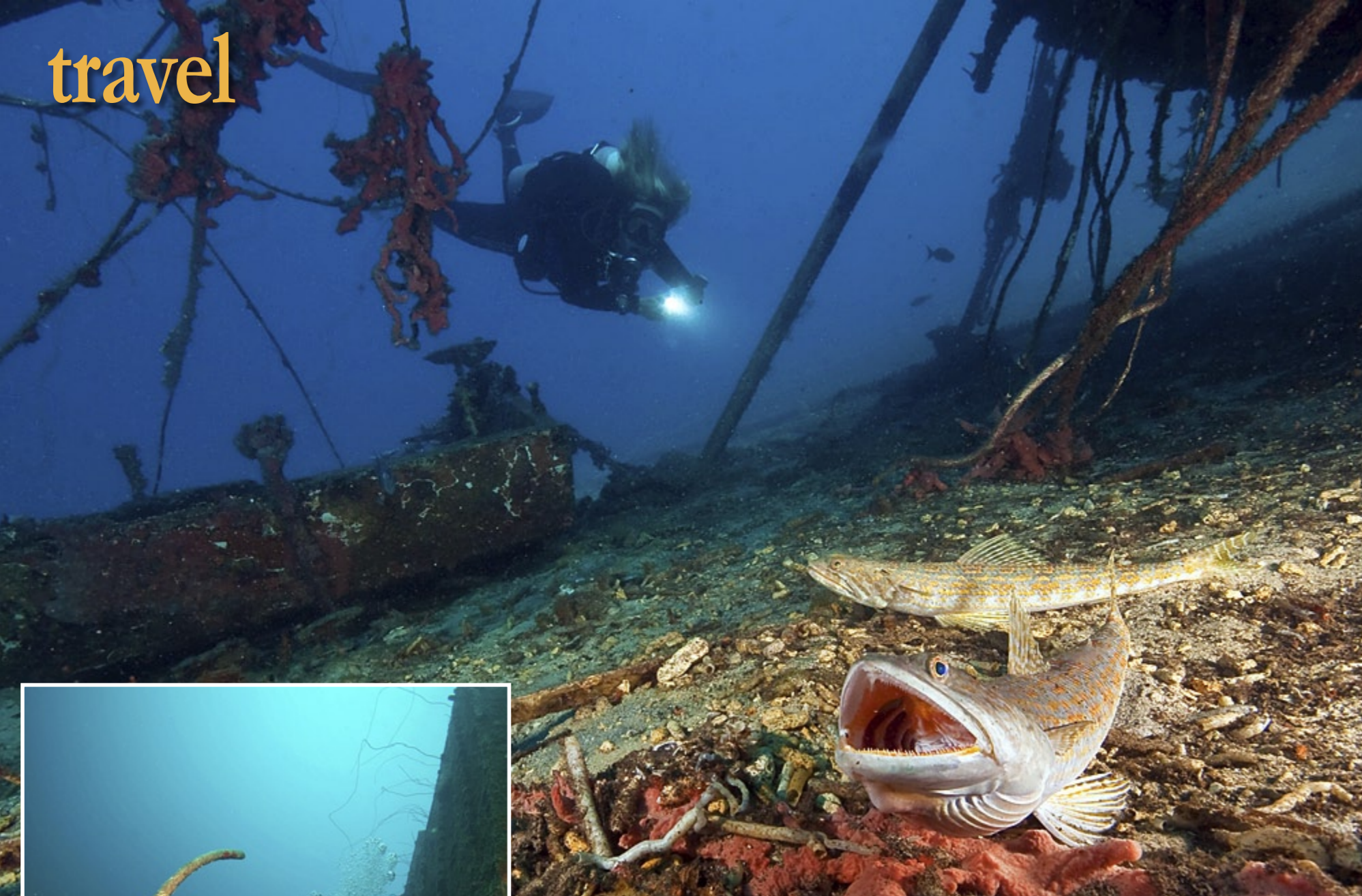
to recharge one's battery.

Do not expect a vivid nightlife or big tourist attractions; the sister islands of Curacao and Aruba are far better suited for this. What you do find on Bonaire is unlimited diving with a nice diversity in locations and conditions. Why unlimited? Unlimited because you can dive almost everywhere without going on a boat, or travel for lengths of time.

The coastline on the west part of the island is covered with dive sites that are all marked with yellow stones at the side of the road, printed with the names of the sites on them—names such as Alice in Wonderland, Pink Beach, Weber's Joy, Small Wall, etc, offer easy access



captions this page...



to a wide variety of dive locations. Just park your car near the water, put on your gear and walk in the blue and warm water.

The conditions near the shoreline are more or less similar on most of the west side of the island; a short and shallow area followed by a wall dropping down to an average depth of 30-35 meters where a sandy and less interesting bottom stretches out. At some locations, the area is followed by a second and deeper reef. In the shallow part, gardens of sea fans and Elkhorn coral can be found including a wide variety of smaller reef fish.

This shallow part can offer an unex-

pected encounter with a large barracuda, one or more sea turtles and even feeding eagle rays, which, if approached with care, can be an experience never to forget.

The wall is covered with an abundance of corals in a variety of colors and sizes. Big schools of fish travel this part of the reef and add to the sensation of flying through fairytale forests.

**Salt peer**

A very special place to dive but unfortunately officially forbidden is the salt peer. This dive site, which lies in the southern part of the island, is actually the location



where the salt extraction process is done and easy to locate by the big white salt pyramids breaking the landscape.

A long pier leads out from these piles of salt to where the water is deep enough for the huge tankers to come in and collect the salt. The countless number of pillars the pier is built upon form a cathedral underwater where huge schools of fish play in the scattered rays of sunlight that dance between the pillars, creating a surreal ambiance.

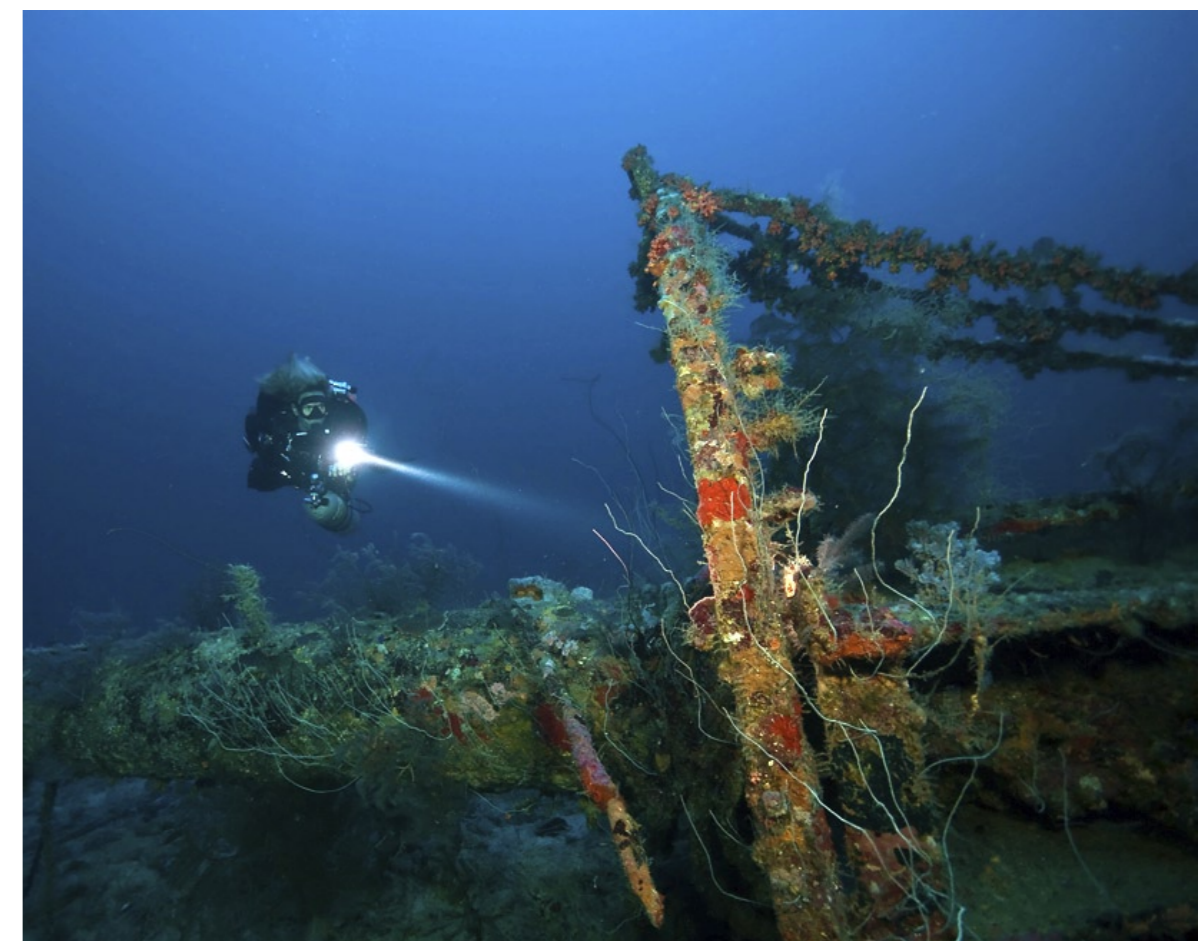
When really lucky, large schools of tarpons can be found here, hunting the smaller fish. Tarpons are big silver coastal fish that can grow up to two meters and weigh more than 150 kilograms. Any encounter especially with large groups of them can be an impressive and even intimidating experience. Normally, you would need an official guide to dive the salt pier, which can be booked by any of the dive schools around the island.

### Wrecks

Some wrecks can be found near the shore of Bonaire, and one, which is easily accessible and divisible, is the *Hilma Hooker*. She was sunk on purpose after a turbulent career which ended smuggling drugs and serves a second life as an attraction for visiting divers. She lies on her starboard side starting at a depth of 18 meters with her deepest point lying at around 30 meters, making up for an easy and relaxed dive. There are lots of nice spots on the wreck, which make great photo or video opportunities, and encounters with big barracudas, or tarpons, are no rarity.

A special location that offers great opportunities





for a more 'technical' dive is the wreck of the *Mairi Bahn*, better known as the Windjammer or Ghostship wreck. The *Mairi Bahn* sunk in 1912 after a questionable explosion to a depth of around 60 meters. She deserved the nickname Ghostship after stories of local islanders plundering the sinking ship, cursing the island with a revenge on the people and their families involved with these plundering.

Ghostship or not, even after her long retirement at the seabed she makes up for a great dive. If you want to make a dive on the Windjammer, be sure to contact Benji Schaub from Caribbean Gas Training. He is a GUE instructor and has a lot of experience diving the wreck and can set you up with all the required equipment and gasses.

You are not allowed to dive on the wreck

yourself but need an official guide, another good reason to contact Benji who will also take care of the necessary paperwork and permits for this dive. And believe me, the hassle is well worth it.

After a short swim from shore you descend in to the blue until the contours of the wreck, lying on the sandy bottom appear. The lady is still beautiful after all these years, although her age is starting to show. Parts of the hull are collapsed, but her shape still recognizable. After about 30 minutes of bottom time, we started our decompression, which is actually quite enjoyable ascending up the beautiful reef.

### Afterthoughts

So, to top it all up, Bonaire is quite a special place to visit, not as crowded as other

Caribbean islands. Oriented to nature and diving, it offers something different. The capital of Kralendijk has some really good restaurants and bars to spend those after-diving hours, watching the sun set behind the small island of Klein Bonaire.

Make sure to pay Washington Slagbaai nature sanctuary a visit. It is a safe habitat for the terrestrial native and endemic species of Bonaire. Parrots, flamingos, parakeets, iguanas and many other species of birds and reptiles can be found in this reserve. The beaches inside the park are an important nesting ground for all four species of sea turtles found in the Caribbean.

For more information, contact JP Bresser at: [www.jpbbresser.tv](http://www.jpbbresser.tv) ■

# fact file



## Bonaire, Netherlands Antilles



SOURCES: US CIA WORLD FACT BOOK, SCUBADOC.COM

**History** At one time, the Netherlands Antilles were the center of the Caribbean slave trade. But the abolition of slavery in 1863 hit island of Curacao hard and its prosperity was not restored until the early 20th century when oil refineries were constructed to service the newly discovered oil fields in Venezuela. Shared with France, the Netherlands Antilles island of Saint Martin—the smallest land mass in the world—is named Sint Maarten in its southern region and Saint Martin in its northern region. Government: parliamentary (each island has its own government). Capital: Willemstad (on Curacao)

**Geography** The Netherlands Antilles is comprised of two island groups in the Caribbean Sea. These islands include Curacao and Bonaire located off the coast of Venezuela, and Sint Maarten, Saba, and Sint Eustatius, which lie east of the US Virgin Islands. Note: the five islands of the Netherlands Antilles are divided geographically into two groups. In the south are the Windward Islands group (Bonaire and Curacao) and in the north, the Leeward Islands) group (Saba, Sint Eustatius, and Sint Maarten). Coastline: 364km. Terrain: generally hilly, volcanic interiors. Lowest point: Caribbean Sea 0m. Highest point: Mount Scenery 862m.

**Economy** The mainstays of the

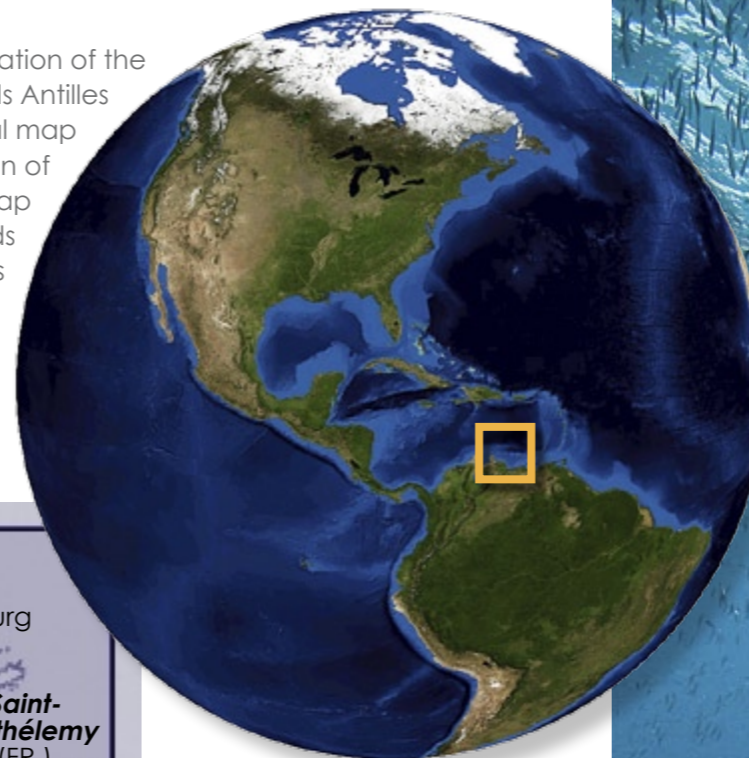
small economy of the Netherlands Antilles, which is closely tied to the outside world, include tourism, petroleum refining and offshore finance. Even though GDP has fluctuated slightly in the past eight years, the islands enjoy a high per capita income and a well-developed infrastructure in comparison to other countries in the region. Most of the oil refined in the Netherlands Antilles comes from Venezuela. Most consumer and capital goods are imported, primarily from the US, Italy and Mexico. Agriculture is hampered by poor soils and inadequate water supplies. Reform of the health and pension systems of an aging population is hampered by budgetary problems. Financial aid to support the economy is provided by the Netherlands. Natural resources: phosphates (Curacao only), salt (Bonaire only)

**Climate** The climate in the

Netherlands Antilles is tropical, relieved by northeast trade winds. Natural hazards: hurricanes from July to October on Sint Maarten, Saba and Sint Eustatius; Curacao and Bonaire are rarely threatened since they are located south of the hurricane belt.

**Currency** Netherlands Antilles Florin or Guilders (ANG). Exchange rates (tied to the USD): 1USD=1.78ANG, 1EUR=2.47ANG, 1GBP=2.92ANG, 1SGD=1.22ANG

RIGHT: Location of the Netherlands Antilles on global map  
BELOW: Location of Bonaire on the map of the Netherlands Antilles



**Population** 227,049 (Jul 2009) Ethnic groups: mixed black 85%, other groups 15% (including Carib Amerindian, white, East Asian). Religion: Roman Catholic 72%, Pentecostal 4.9%, Protestant 3.5%, Seventh-Day Adventist 3.1%, Methodist 2.9%, Jehovah's Witnesses 1.7%, other Christian religions 4.2%, Jewish 1.3%, other or unspecified religions 1.2%, no religion 5.2% (2001 census). Internet users: 2,000 (2000)

**Language** Papiamentu 65.4% (a Spanish-Portuguese-Dutch-English dialect), English 15.9% (widely spoken), Dutch 7.3% (official), Spanish 6.1%, Creole 1.6%, other languages 1.9% (2001 census).

**Recompression Chamber** San Francisco Hospital Kaya Soeur Bartola 2 Krajiendijk, Bonaire 4444 AB tel. +599 717 8900

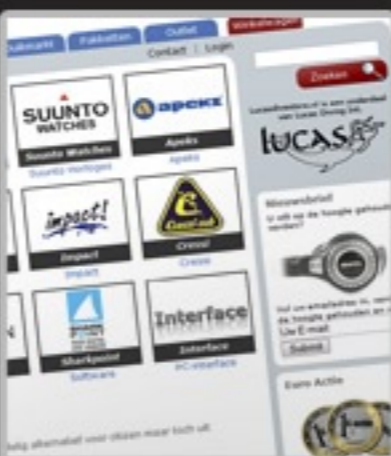
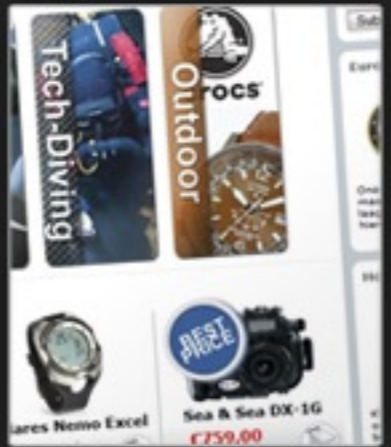
**Links** Tourism Bonaire [www.tourismbonaire.com](http://www.tourismbonaire.com)





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- AUGUST 16<sup>TH</sup> - 22<sup>TH</sup> DEEP 120 AND DEEP 160M
- AUGUST 23<sup>TH</sup> - 28<sup>TH</sup> ADVANCED NITROX  
DECO PROCEDURE
- SEPTEMBER IN TUNISIA TRIMIX  
AND WRECKS EXPLORATION 60 - 100M
- OCTOBER CAVE COURSE IN FRANCE  
DEEP WRECKS 60-120M IN  
ANDALOUSIA LEBANON DEEP 140M  
ON VICTORIA AND SOME WRECKS.
- NOVEMBER NITROX TO TRIMIX  
COURSES IN CROATIA  
WRECKS IN BULGARIA
- DECEMBER DAHAB :  
TRIMIX AND DEEP COURSES.

Photos: François Brun.com

- TRY THE BIG FIVE :
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*Tantalizing Tales From*

# Turks & Caicos Islands

Text and photos by Scott Johnson

*Sharks 'r circlin'!  
Aye, mateys beware!  
Peg legs a plenty,  
if 'n ye hasn't a care!*

*—from The  
Book of Old  
Sea Folk  
Cliches*

LEFT TO RIGHT: Heron lurking in flowers; diver over Barrel sponge; snorkeler walking the beach; sunset at Club Med Turkoise; Caribbean Reef shark cruising

**Oh yes, the sharks are circling. Can you say 'Amen'? With an accent hinting of both Popeye the Sailor and Quint from the movie Jaws, I call to alert my own mateys. It is my best and worst pirate imitation. But, it is appropriate. Aye, it is right as rain.**

Piers Van Der Walt and his wife Annette, co-captains for this *Turks & Caicos Aggressor II* voyage, guaranteed something special would happen this day. They certainly delivered. Within minutes of mooring at the French Cay dive site Rock n' Roll, dorsal fins began to break the water's surface.

This mouth-opening, heart-pounding, ego-busting spectacle harkened back to the days of Errol Flynn and his 1935

performance in *Captain Blood*. If we could turn this modern liveaboard into a pirate ship, find someone to walk the plank (I have a few nominees) and slip into hip Pirates of the Caribbean costumes, the scene would be complete.

Regardless, the sharks were definitely playing ring-around-the-boat and the heroic, swashbuckling Flynn never had the chance to dive with them.

As the initial shock began to dissipate,

curiosity conversely started to grow. What prompted these sharks to appear on cue?

Like marooned pirates who are rescued and returned to port, sharks are primarily driven by the need for food and sex. Since I doubt Rock n' Roll is their sacred breeding ground, food must be the answer.

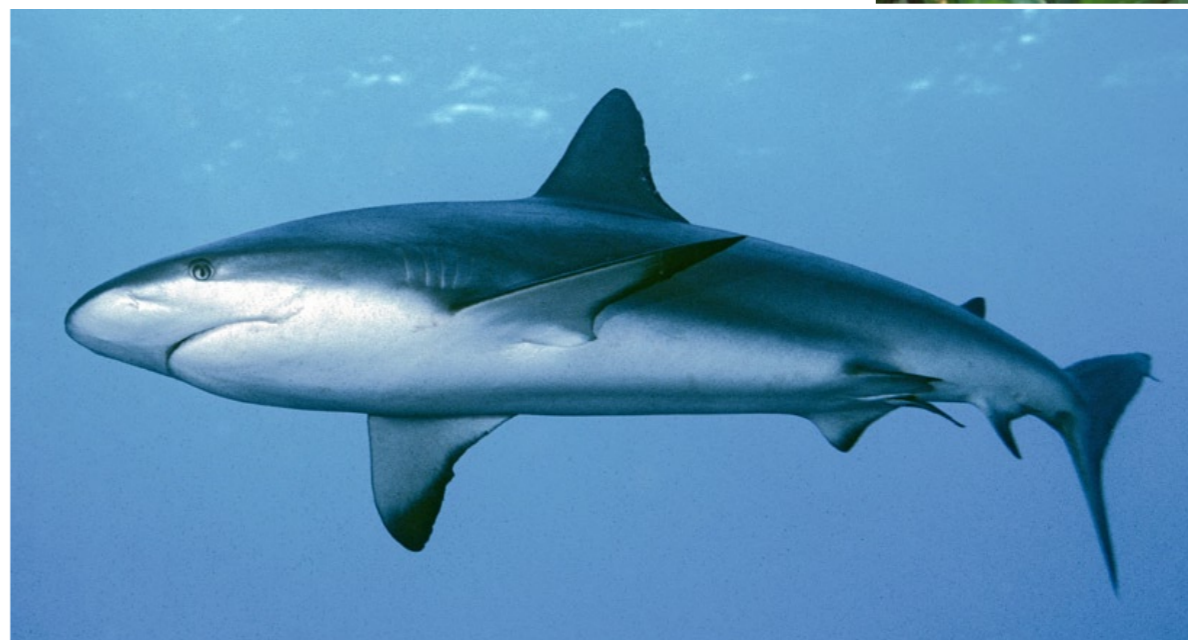
Perhaps divers were feeding these sharks on a regular basis. If so, this was

a staged set, a routine animal act, which certainly tainted the magic of the moment. I wanted to know the facts.

While giving Piers the fifth degree and threatening a walk-the-plank revival, he begs for mercy in his intriguing South African accent and then spilled the beans. His imaginative tale sounded fishy, but not beyond the realm of possibility. The only way to verify or discard his story was to suit up, jump in the water and see







for myself.

Standing on the edge of the dive platform, I waited for the next shark to swim clear. Otherwise, I risked the chance of creating a new, underwater, bronco-busting rodeo event that would likely leave yours truly branded. With ground zero vacated, I plunged into THEIR world.

Weilding a camera as a pirate might brandish a sword, I carefully located each of the patrolling residents and then descended 30 feet to begin the investigation. The first pieces of evidence that collaborated Pier's confession were the relaxed postures of the five Caribbean Reef Sharks. These hearty, six-foot showstoppers were alert, but exhibited no signs of aggression.

The second and more decisive kernels of proof were the large, integrating schools of big-eye jacks, horse-eye jacks and yellow tail snapper congregating directly beneath the boat. Apparently, these fish received the same compelling

invitation as their encircling entourage. As the progressive integration caused individual school boundaries to collapse, a dense, living cloud of eyes and fins was born.

During the interrogation, Piers whimpered something about how the continuous vibrations of the ship's motors attracted schooling fish. It sounded like a scaly version of Woodstock. In addition, the sharks supposedly associated the boat, its rockin' vibrations and the avid, swarming partygoers with a delectable smorgasbord of naturally served entries. After a preponderance of the evidence, I now

concur with the Captain. Call me a believer. I must tell the crew to release Piers, then attempt to make amends. Of course, sincere apologies and groveling could wait until after the dive was over.

Feeling more comfortable in the sharks' domain, I was hungry to

CLOCKWISE FROM TOP LEFT: Caribbean Reef shark with Bigeye jacks; diver looking at Tube sponges; Egret on the lookout; curious Caribbean Reef shark; underside of Caribbean Reef Shark



Divers watching Great barracuda under the boat (top); Christmas tree worm (bottom)



## Turks & Caicos



Variety of sponges (left inset); Coral grouper on sponge (above)

Olympic skaters or synchronized swimmers, I would've scored their performance a 10.0. Watching this action through my viewfinder, I composed and shot. Flashing strobes did not phase the sharks, so my compact flash card filled quickly.

Before I had the opportunity to ascend to change housings, Wendy McSwain, founder of Outback Divers in Houston, Texas, USA, crashed the party. Either in reaction to Wendy's neon, psychedelic suit or the splash of her entry, one of the sharks bolted up straight towards her. Clueless to the presence of her stealthy admirer, Wendy looked in every direction except to her rear. Laughing profusely while trying not to lose my mouthpiece, I gradually ascended, pulled one of her fins and pointed to the drooling

homeboy. Her shocked expression brought new tears of laughter as I rose to the surface.

After freeing a justifiably angry Captain Piers and being flogged by Annette and the crew, I painfully slipped beneath the surface to Rock 'n Roll one more time. Without totally ignoring the sharks, I decided to focus on other aspects of this dynamic site. Along with the mixed school of jacks and yellow tails, which alternately churned like a crowd of punk rockers, then stilled to utter tranquility, numerous stoic barracuda hovered as metallic mid-water sentinels. French, gray and queen angels rushed from one coral formation to another during energetic games of tag.

### Underwater terrain

The surrounding seascape was

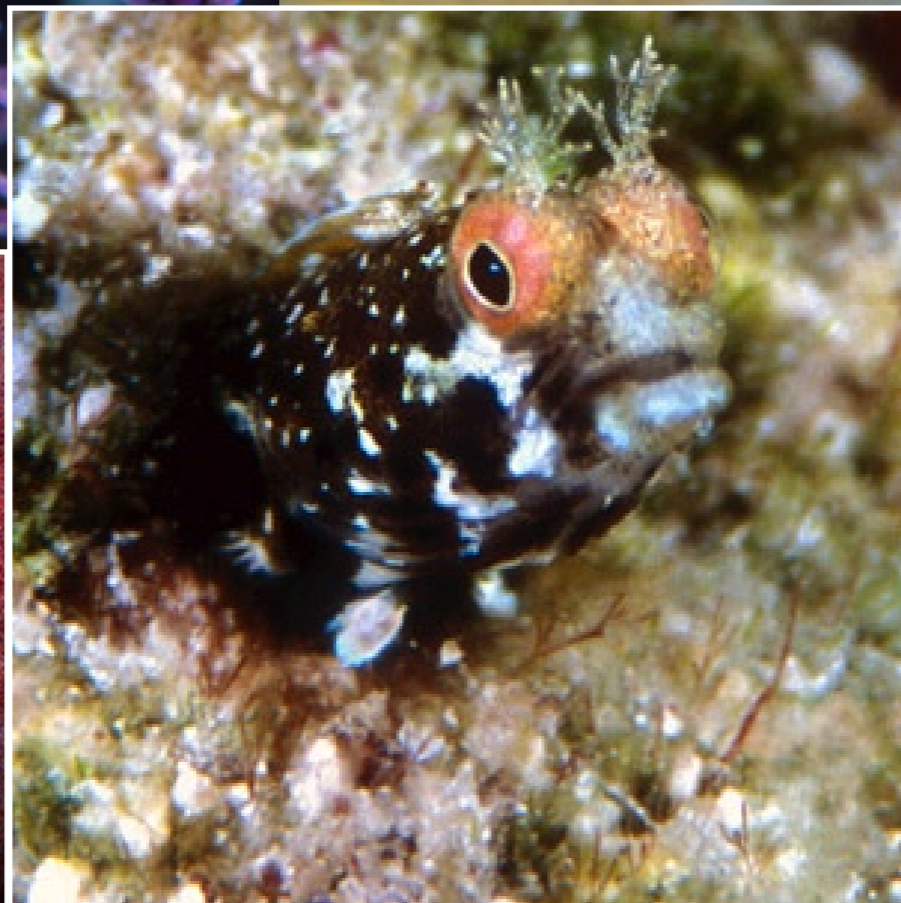
### WELCOME TO TURKS & CAICOS AND PRISTINE FRENCH CAY

The Turks and Caicos Islands ("Turks" for the indigenous Turks Head Cactus and "Caicos" meaning a chain of islands) are located approximately 575 miles southeast of Miami, 39 miles southeast of Mayaguana, Bahamas and 90 miles northwest of the Dominican Republic. Eight major islands—Providenciales, East Caicos, Middle Caicos, West Caicos, North Caicos, South Caicos (these six are part of the Turks Group), Salt Cay and Grand Turk (members of the Caicos Group)—and numerous small cays span over 190 square land miles. The 22-mile wide Columbus Passage, which reaches depths of 7,000 feet, separates the Turks' Islands from the Caicos' Islands.

Turks and Caicos is famous for 230 miles of white sandy beaches and dependable sunny weather. Offshore, these islands feature the third largest coral reef system in the world. In addition, brilliantly colored water gradually changes from an exquisite turquoise hue in the shallows to a rich dark blue in open ocean. The healthy reefs, unlimited wall diving, abundant marine life and excellent underwater visibility keep divers coming back for more.

Like East Caicos, West Caicos and most of the minor cays, French Cay is uninhabited. Named after a 17th century French pirate, Nau L'Ollonois, who once called the island home, French Cay was designated as a protected sanctuary by the 1992 National Parks Order. Due to this extensive legislation, the Turks and Caicos Islands have more protected natural habitats than any other country in the world.

French Cay's remote location and the minimal human impact on its ecology result in some of the most spectacular diving in the north Atlantic. These waters offer divers the chance to encounter various species of sharks (Caribbean Reef, Lemon, Great Hammerhead, Tiger and Whale), whales (Humpback, Pilot, Beaked and Sperm), dolphin (Spotted and Bottlenose) and rays (Southern, Manta and Eagle). The ultimate method for exploring French Cay's amazing dive sites (Rock 'n Roll, Double D, G Spot, Half Mile and West Sand Split) and beautiful, unspoiled beaches is to charter space on a liveaboard. Even then, the opportunity to undertake the crossing to French Cay is dependent upon the weather. ■



decorated with delicate strands of Elkhorn coral, towering formations of pillar coral, robust barrel sponges, bright yellow and orange tube sponges, luminescent rope sponges, white anemones and a vast array of gorgonians, such as sea whips, sea rods, sea plumes, sea fans, sea sprays and sea fingers. In tune with the beauty of this glorious terrain, a hawksbill turtle gracefully glided to the surface for air. Many feet below her, a broad southern stingray stirred up sand while feeding. This incredible panoramic view, a result of the 150-foot visibility, was breathtaking.

Suddenly, one of the sharks slowly passed within inches of my facemask. Caught entirely off guard, I was unable to position the camera for a decent shot. Tracking his movements in hopes of another swim-by, my eyes were drawn to a real life Three

Stooges—actually Two Stooges—comedy routine in progress.

A couple of overly eager divers, one a seasoned videographer and the other a new photographer, were swimming hell bent on a collision course as they zeroed in on the same shark. I could not help but hold my breath, wince, then enjoy another unquenchable belly laugh as the divers crashed head-on. I was sure I could hear the shark chuckling as it cruised past the stunned stooges.

While off-gassing during a much needed safety stop, I witnessed seven

CLOCKWISE FROM TOP LEFT: Flamingo tongue feeding; staring moray eel; Barrel sponge below the *Turks & Caicos Aggressor II*; Peppermint goby on Great Star coral; watchful Roughhead Blenny; two Sharknose gobies



LEFT TO RIGHT: Tonya Streeter examining Pillar coral; Yellowhead jawfish singing opera; scorpionfish frowning

big eye jacks feverishly rubbing against the largest shark's flanks. Whether utilizing its abrasive skin to remove parasites or relying on gang warfare tactics to drive it away from the school, the interesting behavior added to the dive site's well-deserved reputation. Without a doubt, Rock 'n Roll was aptly named... unless, of course, it could be changed to Pirates' Rock n' Roll Rendezvous.

### Topside

Captain Piers and I, now on drinking and speaking terms again, share some after-dinner rum and discuss what areas to explore over the next couple of days. Since no true diving pirate would travel to the Turks & Caicos Islands without visiting West Caicos, we decided to take our diving plunder (wonderful memories and pictures) north. The short 19-mile cruise over calm seas passed quickly.

As I gazed over the limestone cliffs and sand that outline the west coast of West Caicos, I thought about the 17<sup>th</sup> century pirates that used to ambush and seize unwary vessels in these waters. One could certainly bury hordes of looted treasure on this small island. Sand, scrub brush and more than 100 species of birds dominate the landscape. However, the limited number of landmarks would make mapping and treasure recovery challenging. Perhaps there is still unclaimed booty to be found onshore.

The land may be somewhat nondescript, but the



Beaches Resort turret (above); yoga at Club Med Turkoise (bottom left)



### A WHALE OF A TALE

From January through April, almost 3,000 Atlantic humpback whales migrate along the shores of the Turks and Caicos Islands to the Silver Banks. The Silver Banks is designated as the Sanctuary of the Marine Mammals of the Dominican Republic. Located 80 miles southeast of Grand Turk, it is the most extensive humpback breeding ground in the world.

Divers in the waters of Turks and Caicos during the first four months of the year are likely to hear the whales' enchanting song. Sightings are also a possibility. However, to experience the whales interacting with one another and observe a multitude of heartwarming social behaviors, a trip to the Silver Banks is a one of a kind opportunity.

Only a few liveaboards are licensed by the Dominican Republic to venture into the sanctuary. The most prominent of these are the *Turks and Caicos Aggressor I and II* and, through an affiliation with Captain Tom Conlin, the *M/V Turks & Caicos Explorer II*. Rebreathers and scuba gear are not permitted. However, during the typical seven-day charter, guests will spend at least five days snorkeling with humpbacks ranging from newborn calves to adults weighing in excess of 30 tons.

From inflatables, highly trained and experienced crewmembers will position guests near the whales. After gently and gradually slipping into the water, guests may encounter the mating performances of males (bulls) attempting to attract females. These explosive tactics may include breaching, lobtailing and/or finning. It is also possible to watch a mother pushing her newborn calve to the surface for his or her first breath. Calves are observed feeding, being taught to breach and learning the acceptable range of social graces. Life-altering, upclose encounters can last more than 20 minutes.

To start your own whale of a tale collection, contact one of these special liveaboards today. Space is often sold out a year in advance. So, do not delay. ■





## Turks & Caicos

head and lands in the sand before me. I am not used to seeing a scorpionfish advertise its presence, but this ten-inch specimen is not shy. I follow closely behind as it nonchalantly waddles across the sand. It eventually finds a new resting-place atop another outcropping and seemingly disappears.

### Afterthoughts

Though this adventure is at its end, there are still many more tales to be told. In fact, the tantalizing essence of the Turks & Caicos Islands lies in the tales waiting to be born during each and every dive. Be it schooling eagle rays, breaching humpback whales, circling sharks or monolithic pillar corals, the waters surrounding these islands are brimming with imminent encounters. And, while you may not find jewel-encrusted chests overflowing with gold doubloons, the experiences you will share with your own mateys are the real treasures of Turks & Caicos. ■



CLOCKWISE FROM FAR LEFT:  
Yellowtail snapper and sponges;  
Dusky jawfish startled by my Sea&Sea  
strobes; spreading sea fan

### DIVING IN PROVIDENCIALES

The Club Med Turquoise and Dive Provo are unique, excellent operations for exploring the waters around Providenciales, Turks & Caicos. Staying at the Club Med Turquoise is an incredible experience. This adult-only resort is all-inclusive and defines fun, community, food, dancing and sports. Twin 42-foot catamarans carry divers to more than 20 reefs located mere minutes from the village. You can make two dives, snorkel, kayak and then play basketball, beach volleyball, mini soccer, softball, pool polo and/or lift weights before a massive buffet dinner, followed by dancing under the Turks & Caicos moon.

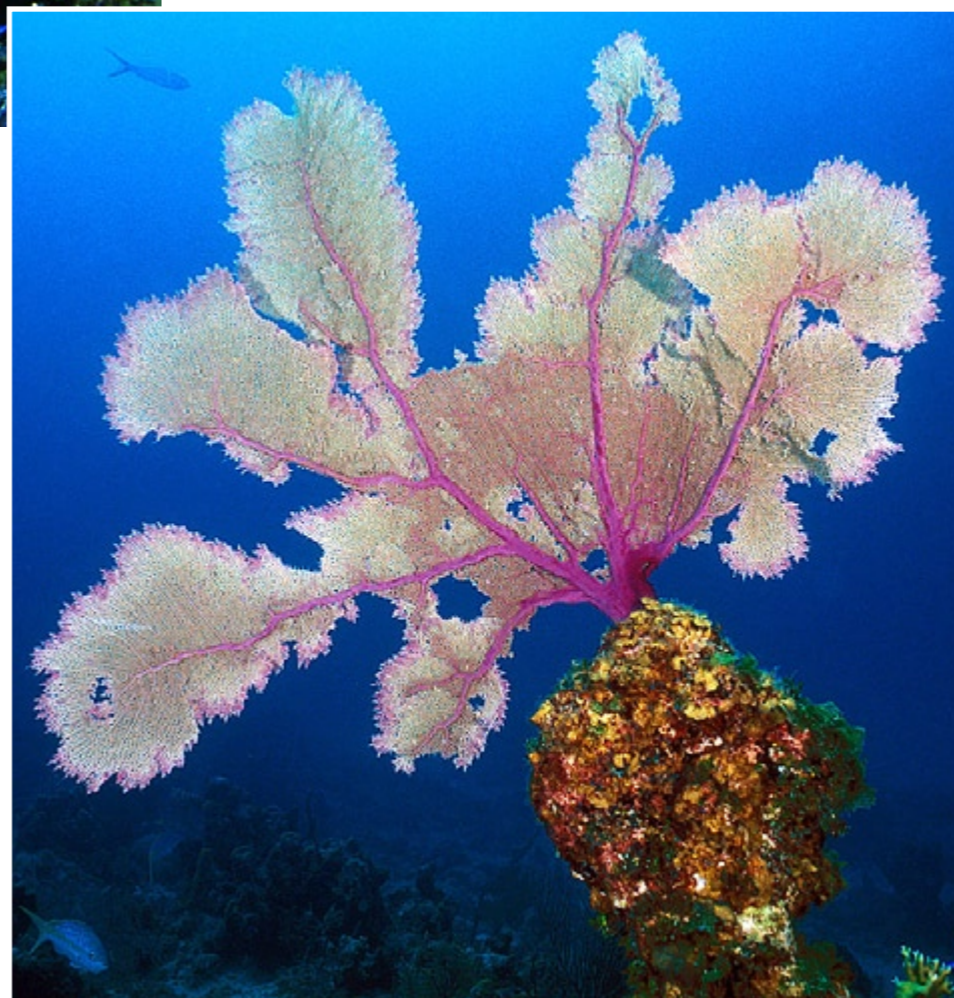
If you want more focused dive explorations, Dive Provo is the ticket. Dive Provo specializes in customized itineraries tailored to meet the needs of their guests. Professional, highly trained staff use a trio of modern boats to lead groups to the best sites in West Caicos, French Cay, Northwest Point, Grace Bay and Pine Cay. ■

underwater world of West Caicos offers radiant colors, eye-catching formations and non-stop action. At Gulley, named for the deep cut that divides the reef, I am captivated by the plentiful, large barrel sponges that accentuate the area. Their exterior texture is so intricately patterned. If you watch patiently, you will find that these rotund sponges host a wide variety of small, entertaining creatures, such as blennies, gobies, shrimp and crabs.

### Whiteface

The next dive is Whiteface, also known as The Anchor. The name Whiteface is derived from the shoreline's white cliffs, while The Anchor recognizes a legacy from the past. During the time that pirates were setting new records in ship-jackings, a vessel managed to embed an anchor into the side of a crevice at 70-feet. The anchor is still there, though it is easy to overlook as centuries of growth cause it to blend into the surrounding reef.

Not to be outdone by an ancient piece of steel, a living master of disguise hops down from a coral



### THE TURKS & CAICOS AGGRESSOR I AND II

The *Turks & Caicos Aggressor I* and *II* are 120-foot luxury yachts that were built for the comfort and safety of the diving community in 2003 and 2008. Accommodations include eight staterooms featuring either a queen size or two single berths, private heads and showers, air-conditioning, TV/VCRs and a port window. A ninth stateroom sleeps four. A computer station feature two Dell computers and flat screen monitors. E-mails may be sent via a satellite phone. Meals are prepared by a trained chef and served buffet style. The sun deck's chaise lounges, wet bar and hot tub attract divers like schools of fish draw sharks.

Each charter offers 20 guests the opportunity to experience tantalizing tales of their own. The focus of these seven-day, Saturday afternoon to Saturday morning, charters is seasonal. From January through March, 15-foot chase boats are used to position guests near humpback whales in the Silver Banks. During the remainder of the year, diving around French Cay, West Caicos and Providenciales is done directly from the dive platform.

For more information, visit the Aggressor Fleet website at [www.aggressor.com](http://www.aggressor.com)



# fact file



X-ray mag

SOURCES: US CIA WORLD FACT BOOK

## Turks & Caicos Islands



**History** Until 1962, the Turks and Caicos Islands were part of the United Kingdom's Jamaican colony. Upon the independence of Jamaica, they assumed the status of a separate crown colony. Affairs were overseen by the governor of The Bahamas from 1965 to 1973. Upon the independence of The Bahamas in 1973, the islands received a separate governor. Even though independence was agreed upon for 1982, the decision

was reversed, so the islands remain a British overseas territory. Legal system: based on laws of England and Wales with a few adopted from Jamaica and The Bahamas

**Geography** Turks and Caicos Islands are located in the Caribbean. They are comprised of two island groups in the North Atlantic Ocean, southeast of The Bahamas and north of Haiti. Coastline: 389km. Terrain



RIGHT: Location of the Turks & Caicos Islands on global map  
BELOW: Map of the Turks & Caicos Islands



includes low, flat limestone as well as extensive marshes and mangrove swamps. Lowest point: Caribbean Sea 0m. Highest point: Blue Hills 49m. Note: In all, the territory includes about 40 islands (eight inhabited)

**Economy** The Turks and Caicos economy is based on tourism, fishing and offshore financial services. Most food for domestic consumption and capital goods are imported. The majority of tourists come from the US,

making up more than 75 percent of the 175,000 visitors that came in 2004. Fees from offshore financial activities and customs receipts also provide major sources of government revenue. Natural resources: spiny lobster and conch. Agriculture: corn, beans, cassava (tapioca), citrus fruits and fish.

**Climate** Turks and Caicos Islands have a tropical marine climate, which is sunny and relatively dry while moderated by trade winds.

Natural hazards include frequent hurricanes. Environmental issues include limited natural fresh water resources—private cisterns are used to collect rainwater

**Currency** US Dollar

**Population** 22,942 (July 2009 est.) Ethnic groups: black 90%, mixed, European, or North American 10%. Religion: Baptist 40%, Anglican 18%, Methodist 16%, Church of God 12%, other religions 14% (1990).

**Language** English (official)

### Recompression Chamber

Associated Medical Practices  
Leeward Highway  
Providenciales, Turks and Caicos. 24-hour tel: 331-HELP  
[www.doctor.tc/dive.html](http://www.doctor.tc/dive.html)

### Links

Turks & Caicos Tourism  
[Turksandcaicostourism.com](http://Turksandcaicostourism.com) ■

Waving flags on the *Turks & Caicos Aggressor II* (top) sunset at Club Med Turkoise (bottom)



Diver studying Tube sponges





Text and photos  
by Scott Johnson

As I stand on the upper deck of the *Midnight Express*, one of two dive boats operated by Olympus Dive Center, goose bumps cover my arms and a chill lies buried deep inside. Perhaps it is the weather or the dives awaiting me after the two hour cruise. More than likely it is both. This brisk November morning, under skies laden with dark, cumulus clouds, the seas are rough and a most ominous stage is set. It will not be long before I explore an underwater tomb, a reminder of the wages of war, a remnant of the follies of man.

A 10-foot sand tiger shark with an entourage of silversides encircling its head surveys its territory on the wreck site of the *U-352*

# North Carolina

*Diving into  
Mysteries Off*





I make my way to the bridge where George Purifoy, a respected pioneer in underwater exploration of the waters off Morehead City, North Carolina, and, along with his son Bobby, the owner/operator of Olympus, captains the boat. To his right, Lauren Hermley, the resourceful manager of this dive operation and my bright spirited model for the weekend, seeks the warmth of a nearby vent.

In search of answers to the mysterious sinking of *U-352*, the first German U-boat sunk in American waters in World War II that yielded prisoners of war and the subject of the upcoming dive, I ask George to share his considerable knowledge of the wreck and its history. So begins a pattern of asking questions and then furiously scribbling down George's responses on a yellow tablet that is speckled with the dried droplets of ocean spray. As I listen, the story unfolds.



LEFT TO RIGHT: Diver explores the wreck of *U-352*; Barracuda at the wreck site of the *USS Aeolus*; Octopus hunts for prey along a North Carolina reef

Location of North Carolina on global map



## North Carolina

### U-352

Commissioned by the German high command in October 1941, the *U-352* and its crew were ordered to set sail for the North American Atlantic coast in the spring of 1942. Their mission was to disrupt allied shipping off North Carolina in an area infamously nicknamed Torpedo Alley by the U.S. Navy due to the numerous merchant ships that were preyed upon and sunk by U-boats.

The *U-352*'s relatively inexperienced crew of 46 men included three officers, the leader of which was Lieutenant Hellmut Rathke. Knowing the United States had failed to protect its waters, as evidenced by the hundreds of tankers and cargo ships that were successfully torpedoed along the east coast, Rathke was hungry for "easy" kills and the subsequent glory such victories would yield.

After only one week of playing cat and mouse with spotter planes and other American anti-submarine forces and failing to score his first prey, Rathke ordered his crew to perform a daylight attack on what he thought was a large merchant ship on 9 May 1942.

After maneuvering into position, a single torpedo was fired and thereafter a satisfying explosion was heard. Victory dances were short lived however, as predator become prey when Rathke found out the merchant ship was really the U.S. Coast Guard Cutter *Icarus* and the torpedo had apparently drilled the ocean bottom.

Reportedly, Rathke not only erred in improperly identifying his target, he was also confused on the *U-352*'s actual depth. In an attempt to hide from the *Icarus* and avoid potential disaster, Rathke grounded the submarine in the vicinity of the torpedo detonation.

Unfortunately for him and the rest of the *U-352*'s crew, the *Icarus*' initial depth charges fell directly on top of the U-boat. What normally would have resulted in hours or even days of playing hide and seek with no guarantee of success, *Icarus*



Diver follows a school of spadefish

shot and scored triumph in minutes.

The *U-352*, with flooding in multiple compartments and having apparently lost both diesel and electric engines (though the officer in charge of the diesels was overheard stating that he could still get the engines to run), briefly surfaced, disgorged Rathke and 32 other frightened sailors, then sank to the bottom for good, entombing the remaining 13 crew members.

Sobering, puzzling thoughts arose during George's account of the *U-352*'s fatal voyage. So many questions were left unanswered: Why was Rathke so confused about his depth? What led to the misidentification of the *Icarus*? What

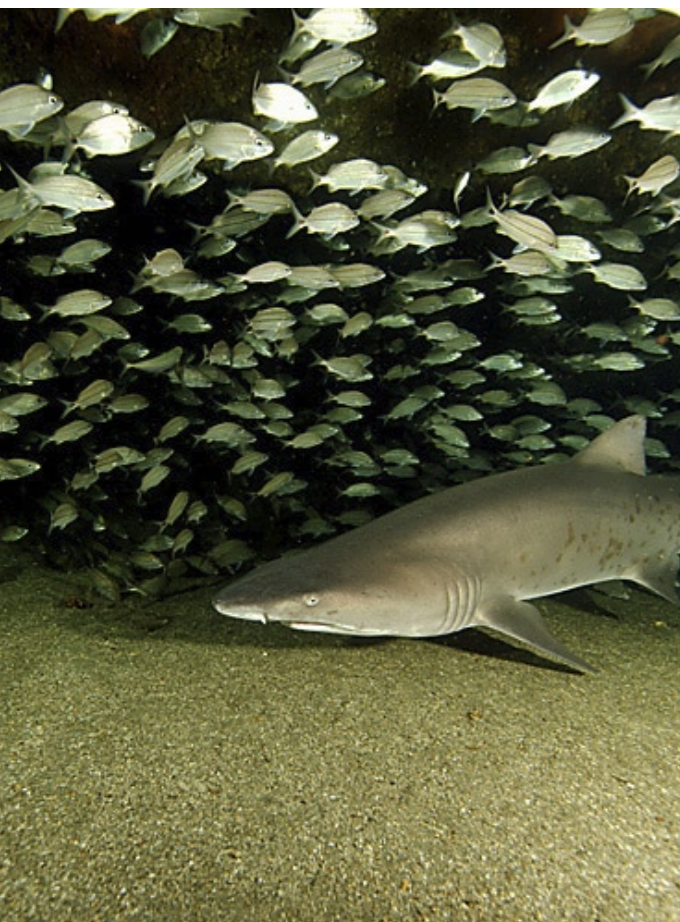
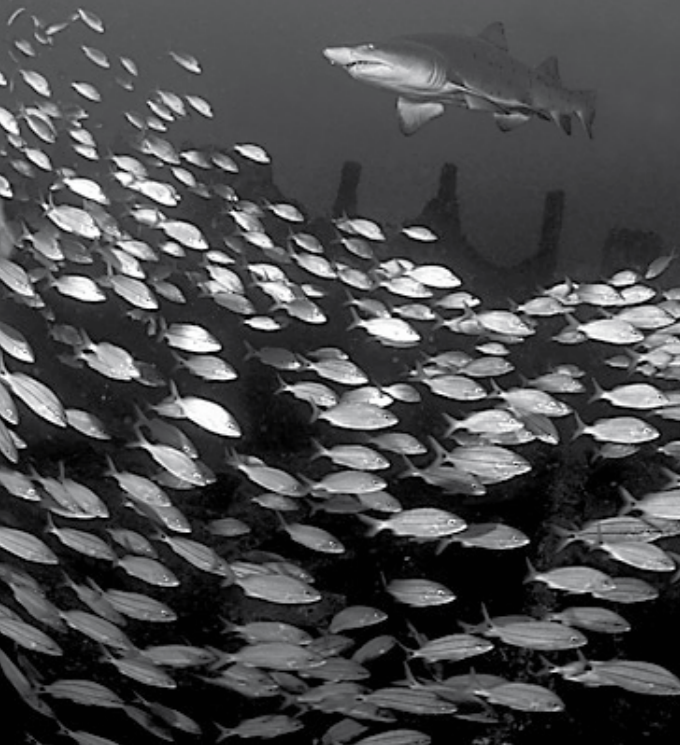
prompted him to break protocol by attacking during the day? How did the *Icarus* locate the *U-352* on the first try? Why did Rathke not try to fight back with the deck guns when he surfaced? What caused 13 crew members to go down with the ship? Why did U.S. intelligence officers allow three months to pass before interrogating the survivors? Why did I not know that U-boats were once so close to our shores that the crews could judge the distance to land at night by the intensity of the nearby lights (Thank God Hitler's U-boats were not equipped with nuclear missiles!)?

Except for a brief examination by U.S. Navy divers in late 1942, the *U-352* lay lost

in time, 35 miles off the Morehead City coast and untouched by human hands for over 30 years.

While her whereabouts were unknown, the *U-352* was definitely not forgotten. Claude Hull, often called the godfather of diving by many in the local community, spent countless hours researching and many years running grid patterns in hopes of finding the missing sub.

In a strange twist of fate, on the one day that Claude decided not to look for her, George, Rod Gross and Dale McCullough used his recommended coordinates and struck gold in April 1975. Now it is my turn to see what remains of *U-352*.



Sand tiger sharks patrol the seas and ocean floor off the coast of North Carolina

### Diving *U-352*

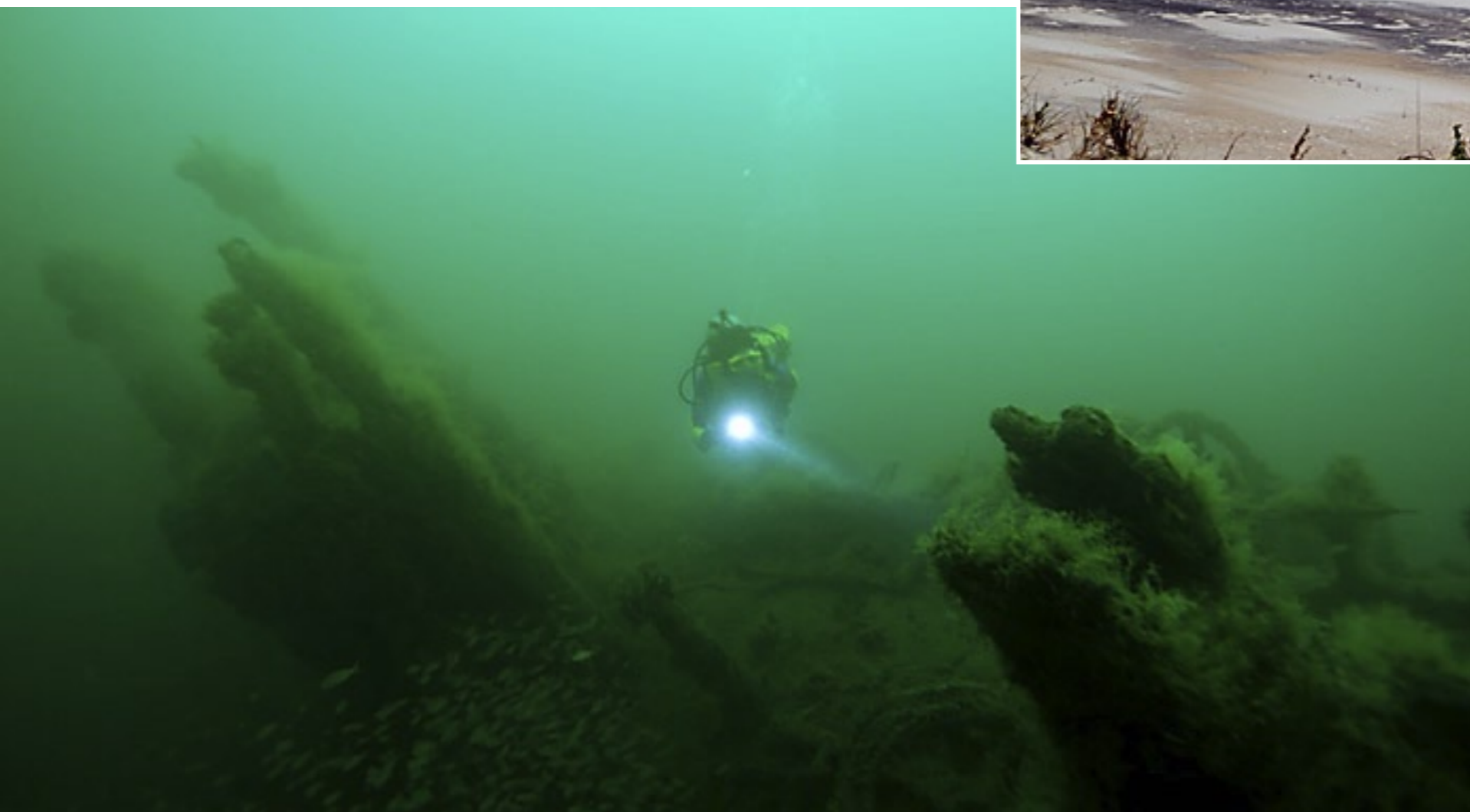
Due to recent storms and the overcast sky, the water I plunge into is green and murky. I estimate the visibility to be 20 feet. The trickle of 65°F water down my back sends chills throughout my body and causes the goose bumps to triple in size. Lauren's vibrant yellow fins serve as a homing beacon as I slowly descend the anchor line. Robust, curious amberjacks play ring around the roses with me at the center of their attention.

Suddenly, hauntingly, like a ghost ship beckoning to one more weary sailor, *U-352* comes into view. Resting upright on the bottom at 115 feet, she lists about 40 degrees to starboard. The effects of repeated depth charges and more than 60 years of lying submerged in salt water have not yet obliterated her

form. Though it is clear the outer hull has rusted away, she still looks like a sub.

Best of all, the *U-352* is seemingly alive and pulsating with fish. Atlantic Spadefish, seabass, various jacks, and large barracuda are abundant. Swarms of silversides dart and dance in unison to the rhythms of the sea, as if performing a ballet in homage to the slain vessel.

Though my tank is filled with nitrox, the depth and relatively flat dive profile mean our time to explore the wreck is short. Lauren motions for me to



follow her and then excitedly points up. At first, I can not tell what it is she sees. Then, as if the *U-352* has fired on the enemy one last, magical time, a torpedo shaped form materializes from the void.

A 10-foot sand tiger shark, with an entourage of silversides encircling its head and hitchhiking remoras attached to its belly, slowly, purposely swims toward me. Mouth agape, its hundreds of white, sharp teeth seem to sparkle in the gloom. Firing off frames as it passes a mere arm's length away, I think of the shark as a sentinel whose duty it is to investigate all intruders. What an awesome sight!

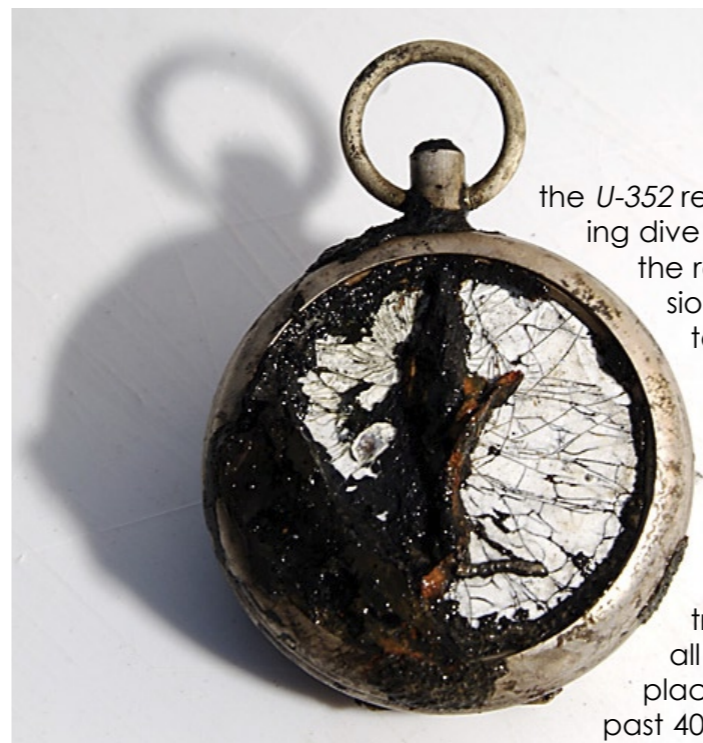
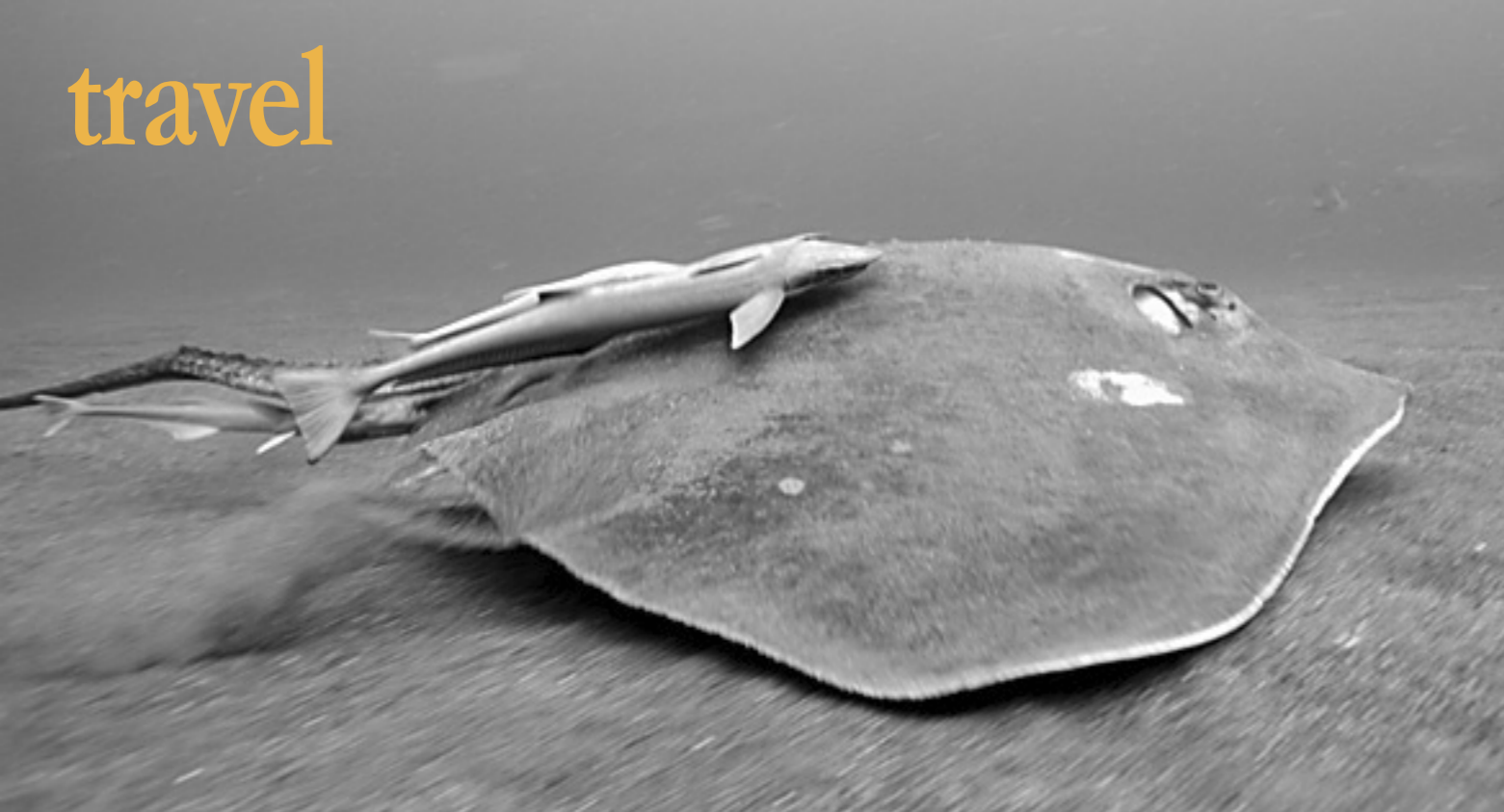
Conscious of the dwindling bottom time, Lauren and I move from the propeller and aft torpedo tube, the happening place for Atlantic spadefish, to the con-

ing tower, the most prominent feature of the wreck. Spotted moray eels have commandeered the tower and make their homes in its recesses. While trying to keep the backscatter to a minimum, I take pictures of Lauren as she shines her flashlight on the structure. After a peek inside the coning hatch, we move on.

While we are swimming above the magnetic compass mount, which is located between the coning tower and the forward gun mount, a southern stingray and seven three-foot cobia comprise a bizarre, almost surreal menagerie that quickly passes along the starboard flank. It is yet one more encounter that makes me wonder if my mind is playing tricks.

We quickly make a u-turn at the bow to examine the port side that tilts toward the surface. A complete circuit around

LEFT TO RIGHT: Diver explores the reef off North Carolina; Angelfish (inset); Brisk beaches along North Carolina's coast make for good strolls to stretch the legs and picnics by the sea



the U-352 results in a flashing dive computer and the reluctant admission that it is time to begin our ascent.

Safely back aboard the *Midnight Express*, I secure my gear and try to recall all that took place over the past 40 minutes.

Meanwhile, after surfacing from his dive at the back of the boat, George clambers up the ladder, plops a net bag on the rear deck and excitedly proclaims, "I think I might have found a watch." Once free of his BC, he opens the bag to reveal a collection of items that look to be a mixture of crusty rocks and really old trash. I certainly do not see any watch.

George proceeds to use the handle of his dive knife to carefully chip away at one of the objects. In just a couple of minutes, what once appeared to be a nondescript rock now clearly resembles a pocket watch. Call me amazed and a bit jealous. The new mystery is how George got inside the control room (a place he estimates he has visited 1,500 times before), stick his hand in silt up to his elbow, feel around in the dark, pull out something that looked like nothing and know he had found a watch?



CLOCKWISE FROM TOP LEFT: Remora fish catch a ride on a swift stingray; Pocket watch found on the wreck of the U-352—could it have belonged to the U-boat's captain Ratke? Graceful ray glides over the wreck of U-352; A spent artillery shell lies on the ocean floor by the wreck; Toadfish makes use of effective camouflage as it blends into its surroundings



Upon more careful inspection, the back of the watch displays a German eagle and swastika. The watch might even have belonged to Rathke.

**More mysteries**

My visit to Morehead City has revealed more mysteries than answers. For example, it has recently been learned that three World War II wrecks were incorrectly identified when first discovered by divers (perhaps we should call it Rathke Syndrome) and the correct names have yet to be confirmed. This is not the first such case of mistaken identity, and I am sure inquiring minds would like the scoop.

Another topic that demands more attention is the influx of Pacific tropical fish, which have invaded the Atlantic via home aquariums. On one site, I counted almost as many lionfish (*Pterois volitans*) as I might

hope to see on a dive in the Red Sea or the Solomon Islands.

The predominant theory suggests that a strong hurricane and the Gulf Stream combined forces to carry the fry or eggs of the invasive species, which were produced by home aquaria specimens illegally released in the Florida Keys, to the Carolinas. Regardless of how the fish arrived, their current populations, range, ability to adapt and the absence of predators mean that it is too late to reverse the trend.

The big question is which endemic species will disappear due to the new competition. Groupers are thought to be at risk high since they feed on the same prey as the lionfish.

The mystery that lingers the most is why I waited so long to visit Morehead City. I have been blessed with the opportunity to dive and explore oceans around the world,



LEFT TO RIGHT: Lionfish on the wreck of the U-352; Prowling stingray; School of Spadefish at the Titan dive site

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Diver finds a school of Spadefish hovering over a wreck site off North Carolina

## North Carolina



always seeking the next big adventure, and yet, in all that I have seen and experienced in far away lands, diving off the coast of North Carolina has mysteries, stories and sights that would take a lifetime to savor. ■

*Special thanks to:*  
Morehead City Dive Operators  
Olympus Dive Center  
[www.olympusdiving.com](http://www.olympusdiving.com)  
Diver Down  
[www.diverdownscubadiving.com](http://www.diverdownscubadiving.com)  
Discover Diving  
[www.discoverydiving.com](http://www.discoverydiving.com)  
Atlantis Dive Charters  
[www.atlantischarters.net](http://www.atlantischarters.net)

IN MEMORY OF GEORGE George Purifoy, 63, owner of Olympus Dive Center located in Morehead City, NC, who is credited alongside his friends with the discovery in 1974 of the wreck of *U-352*, passed away on 14 September 2008 after collapsing on board his boat during a dive at the Queen Anne's Revenge shipwreck site. Purifoy is survived by his son, Robert, who continues the family business; his daughter, Sandra Purifoy Maschmeyer; a brother and sister and four grandchildren. A memorial fund was set up in Purifoy's honor through Diver's Alert Network. ■

Two sand perch guarding their territory



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**POINT & CLICK  
ON BOLD LINKS**



# Equipment

*Summer Splashin'*



Edited by  
Arnold Weisz



## Diverite Intova LED

A narrow 130 lumen bright-white beam with six to eight hours of burn time on standard CR123A batteries. Triple o-ring protection and an anodized aluminum housing means it can take a beating and is depth rated up to 120m (400ft). Features a magnetic switch and triple O-ring protection. [www.diverite.com](http://www.diverite.com)



## Unleaded

The European Union (EU) are planning to prohibit lead in sports equipment from 2012. The French company Sublest already has a solution for this with its lead free weights. The weights are made of cast iron and have a ten percent larger volume than equal lead weights. Presently there are weights available from 0.5 to 3 kilos. The company is also planning to launch ankle weights and "soft weights" next year. [www.sublest.fr](http://www.sublest.fr)

## Galileo Luna

This technical diving computer features POLAR heart rate monitoring system, full-tilt digital compass with bearing memory, extra large Dot-Matrix display, hoseless gas integration with true remaining bottom time calculation, predictive multi gas algorithm, updatable Processor that can be reprogrammed via infrared by the user, user-replaceable battery with tissue loading memory and EN certification to 330m. [www.scubapro.com](http://www.scubapro.com)



## HelO<sub>2</sub>

Suunto's first computer with full mixed gas capability is rated to 120 m/393 ft. It incorporates the new Suunto Technical RGBM algorithm, which introduces helium tissue groups in the decompression model to enable trimix diving, as well as diving on air and nitrox. Up to eight gases can be programmed as primary or secondary gases with an oxygen content of 8-100%, and helium content of 0-92%. The HelO<sub>2</sub> also features a technical dive planner is an easy-to-use graphical planner for planning dive profiles, gases, and back-up plans. The intuitive interface enables the diver to simulate variations of depth, time, gases and partial pressures without having to continuously recalculate. [www.suunto.com](http://www.suunto.com)



## Nat Geo Swordfish 40 set

Mask: CE tempered lenses, feathered edge mask skirt seals and "Ratchet quick lock" masks strap adjustment. Snorkel: orthodontic designed mouth pieces, wide bore tube and a variety of splash guards. Fins: Available in a full foot or adjustable open heel with "Ratchet Quick Lock" system. Both designs can be worn with or without booties or socks. [www.natgeosnorkeler.com](http://www.natgeosnorkeler.com)



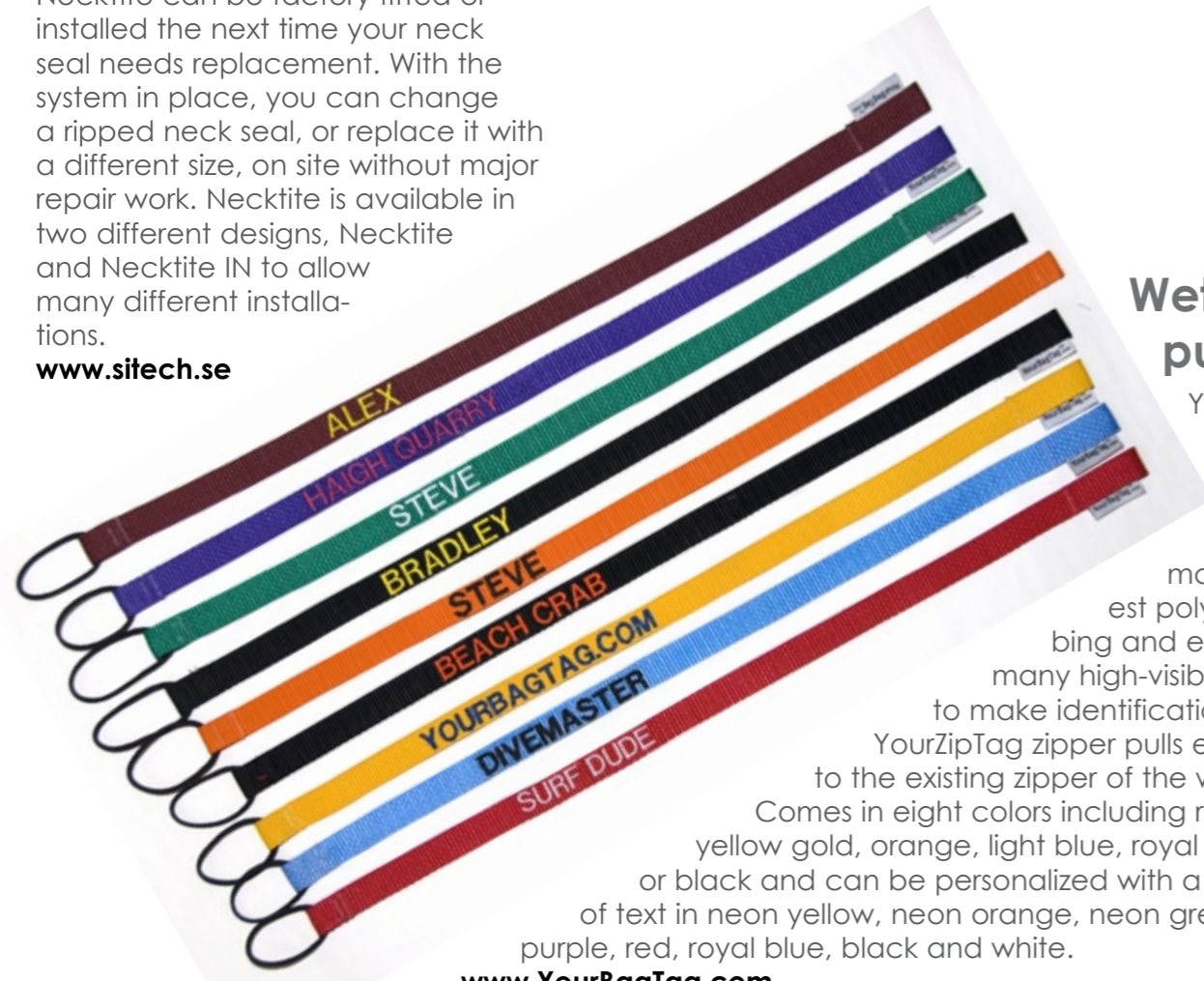
# equipment



## SiTech NeckTite

This design builds on SiTech's exchangeable dry gloves system, where a set of plastic rings makes it possible to change gloves easily. NeckTite can be factory fitted or installed the next time your neck seal needs replacement. With the system in place, you can change a ripped neck seal, or replace it with a different size, on site without major repair work. Necktite is available in two different designs, Necktite and Necktite IN to allow many different installations.

[www.sitech.se](http://www.sitech.se)



## Wetsuit zipper pulls

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YourZipTag zipper pulls easily attach to the existing zipper of the wetsuit.

Comes in eight colors including red, maroon, yellow gold, orange, light blue, royal blue, purple or black and can be personalized with a single line of text in neon yellow, neon orange, neon green, pink, purple, red, royal blue, black and white.

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# To Boldly Go Where ...

—the *Star Trek* legacy goes underwater

*Why Roddenberry Dive Team?*

**Rod:** I've loved it for many years. The beauty, the mystery, the adventure is what attracted me to the underwater realm. It really had nothing to do with *Star Trek*. I was certified during my first year of college in 1993... I didn't even think to connect the two worlds until many years later.

In the same way that *Star Trek* portrays a future where humanity has embraced diversity and reached into space in search of new ideas and life forms, the Roddenberry Dive Team (RDT) is a real world effort to share and preserve the wonder and diversity of our oceans and environment. Through scuba trips, special events and thought-provoking seminars, the dive team will inspire the change that will lead to a future where our species work together for the betterment of all life.

*What do you mean?*

**Rod:** Every diver I have met is considerably aware of the ocean and the state it is in. When I was young, I knew what my father (Gene Roddenberry, creator of

*Star Trek*) did for a living, but I wasn't into it myself. I guess I was a rebellious teenager and didn't see things eye-to-eye with him. When he passed on, I started to look into the bigger picture and the idea behind the series, and I became very proud of him and how he reached out and inspired so many to go beyond their perceived barriers and achieve a better understanding of human values.

When I hear people talk about how *Star Trek* inspired them to achieve greatness, it makes me proud of what my father did. It is those principles that my father stood behind that I want to implement in the Roddenberry Dive Team. When I first met Greg, he told me we could do something more than just a "dive club", and I believed him... and we have spent the past year of planning just that.

**Greg:** I have been a scuba diver for 33 years, and I grew up in Kansas about as far from water as you can get. I'd see scuba divers on TV or read about them, and it was really an exciting adventure for me. I was also as *Star Trek* fan, so



Eugene "Rod" Roddenberry (left) with Greg Martin at a recent event on Catalina Island, California

Text by Peter Symes  
Photos courtesy of  
Roddenberry Dive Team







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Starship Enterprise from the early *Star Trek* series. The *Star Trek* universe created by Gene Roddenberry is the setting of six television series including the original 1966 *Star Trek*, and eleven feature films.

when I heard about Rod's idea, it immediately went together in my mind—it was just a natural.

**Greg:** *Star Trek* has developed a bit of a stigma over the years—you know, over the top fans, etc. I don't know if you have been to a soccer or football game lately; there are some pretty over the top fans there too! These fans are just really embracing Gene's ideals for a better world. The dive team is not about *Star Trek* but about the philosophies that Gene created as part of the overall theme of *Star Trek*. We are using those themes and the fun of it to bring people together to make a difference in our oceans for all of the future generations to come.

What principles or ideas does it share with *Star Trek*?

**Rod:** The two worlds—the exploration of outer and inner space—go hand-in-hand. Instead of starting “just another dive club”, we want to create awareness and get people involved in preserving our

environment. Just in my relatively short diving career of 16 years, I have seen changes for the worse, and that is scary. These changes over time might be forgotten if we don't have anyone around who remembers how it used to be and to help the rest of us. The younger generation also needs to be aware. We hope to involve both science and marine experts (as well as a few celebrities) so that they can explain these matters and help inspire change.

Another parallel is that we don't go out on “dive trips”, we call them “dive missions”—in the same manner that *Star Trek* had “away missions”—since we want to go diving with a purpose. We always want to incorporate a message for what we do. If there is not a concrete message relating to that mission, then there should at least be the message of hope.



Listen to our radio interview with Rod, Greg, Peter Symes and Ken English on [www.xray-mag.com/X-Raydio](http://www.xray-mag.com/X-Raydio)



Gene Roddenberry, creator of *Star Trek* and Rod's father

History is history for a reason, and we shouldn't stop making progress because we are scared of moving forward.

How is Roddenberry Dive Team organised?

**Greg:** Rod is the president and founder, and I am the executive director.

**Rod:** It is membership driven and we would like it to grow into a large “dive collective” that is essentially a global community of divers and ocean lovers who are working together to inspire change for a better future. We would like to do more than just organizing events here on the West Coast and even the US. We plan to have trips and meet up with like-minded dive groups from

all over the world. Preserving our planet and protecting life is a global responsibility, and we know we are not alone in our beliefs. As far as logistics to the dive team membership, there is a membership fee of US\$49.95 per year, which goes towards setting up various activities and events. While not officially a non-profit organization, we are non-profit oriented and are reinvesting all money back into the team objectives.

When we go out on our dive missions, we also want to explore the above-water part of the environment and get into the cultural element. So, if you are not diving, there are a lot of other activities you can participate in and also online.

We have a ton more information of what the RDT is all about at our

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# profile

website. I encourage anyone who's curious to go to [www.RoddenberryDiveTeam.com](http://www.RoddenberryDiveTeam.com) and check it out!

**Greg:** We hope to have as many non-divers as divers joining because we also want to take part in lots of activities such as beach clean-ups and the like.

We won't be able to have the traditional club meetings, but we do hope to be able to have meetings in cyberspace.

*The film studios owns the rights to Star Trek, and I assume, all of the derived merchandise. Couldn't that lead to some conflict over your dive team?*

**Rod:** No, because we work off the Roddenberry Dive Club name and not Star Trek, and the studios have been quite gracious about us and will continue to be so as long as we don't go in and make any money off the Star Trek name.

Of course, they see us as something that also benefits their enterprise, too, and even in the case of any issues arising, I think they would consider it bad PR going into a spat over it. We might consider going into making some underwater vehicle later, so perhaps we have to talk to them there. However, my family does have some rights to sell Star Trek merchandise.

*What are your long term goals?*

**Greg:** First we must build up membership. Then, I would like the dive industry to think of our group as doing some important work. We want to take the next step with the young kids to educate them on what is going on with our oceans. We need that youthful excitement we are hoping to utilize it to make a difference in our oceans. ■



Paramount Pictures has produced eleven Star Trek feature films, the most recent released in May 2009 with a twelfth in development, possibly to be released in 2011, which will celebrate the Star Trek franchise's 45th anniversary



Roddenberry Dive team was introduced to the general public at the recent Scuba Show in Long Beach, California

*For me, the series was best when it was about issues. "Star Trek" has tackled many racial and economic issues. We were the first to do ecological issues, and we always talked about peace on many planets. Those are still such relevant issues for the new film. On the series, a writer would come to the set and say, "I'm really passionate about this issue," then he would work it into the "Trek" world. That's the beauty of these stories.*

—Leonard Nimoy,  
quoted by Los Angeles Times  
on May 3rd



Leonard Nimoy played the character of Spock on the first Star Trek series, that ran for three seasons from 1966 to 1969, and he reprised the role in the movie sequels (most recently 2009's Star Trek) and the follow-up series, Star Trek: The Next Generation

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# Treasure Hunting

*in the 21st Century*

Dan Porter of Blue Water Ventures Key West (left) and new treasure hunting team member, Michael DeMar (right), show off the valuable gold chalice that DeMar recovered from the *Santa Margarita* wreck site off the coast of Florida, USA

Diving for gold or just a cool adventure

Text by Millis Keegan  
Photos by Millis Keegan, Allie Porter

*Treasure hunter for a day —*

**Rumor has it that the sandy beaches of Florida are riddled with gold coins. Now, that may not be 100 percent true. If you stroll along the beach in early morning, chances are you won't see any shiny objects of any worth along your way, but you might see one or two hopeful souls looking for prosperity with a metal detector in their hand. They actually have good reason to search. Florida's coastline is pretty much dotted with colonial wrecks. Those ships belonged to Spanish treasure fleets that perished under violent hurricanes in 1622, 1715 and again in 1733.**



The shipwrecks broke apart, and the remains have been scattered over centuries. It is hard to believe that it is even possible to find anything from those treasure fleets, other than by chance, because the sea is vast, and it is such a huge area to explore. This is warm, salty water, so it's not like you can search for something as big as a wreck. Any wreck here has long since disintegrated, and its contents are spread over miles and miles and buried in sand and mud.

But here I am, ready to be part of Keith Webb's Blue Water Ventures

Key West crew dive team, at least for a day, to do just that. Search for a buried fortune.

I am geared up, about to jump in. Being one of those unfortunate ones dealing with seasickness, I couldn't have asked for a better day... on the boat, that is. The current out here is brutal. It is shallow water, so when the Gulf turns the tide, it is whopping down there. The divers are used to it, and I got some advice: Just stay in the excavation, and keep your head down.

It was not very far from here that

the team found a fabulous gold chalice a few months ago. The guy who found it was Michael DeMar, a new member of the team. What a start to his hunting career! Chris Rackley, a veteran who has been part of the crew a number of seasons and my dive buddy for the day, was right there with him when he found it. We were climbing onto the dive ladder while he told the story.

Finding the gold seemed so easy, and that's when it hit me. There might actually be a possibility that I could find a part of this historical treasure as

well! Thrilling, people, thrilling! The other crew diver diving this day was Chris Tanaka, a younger member of the crew. He was here because he wanted to have fun. Finding treasure was a bonus, and that seemed to be the overall sentiment among these guys. They were here for the adventure.

We took the plunge, and the divers went to work immediately. The metal detectors swept the bottom, left to right, right to left. The team tried to cover as much ground as possible in as short time as possible. The total



## Treasure Hunting

LEFT TO RIGHT: The metal detector picks up on small items hidden in the sand; Something is hiding in the hole, but what? This could be signs of a ship's nail or a hull spike, a great clue that indicates that we are on the right trail; Finds are collected in a box, and brought to the surface for documentation

### HISTORY

According to Blue Water Ventures researchers, it was in the year 1622 that a treasure galleon carrying the wealth of the "Indies" was destroyed in a violent storm. All possible means were attempted to locate and reclaim her riches. After some initial success, salvage was ultimately thwarted by rapidly shifting sands and savage currents. The fortunes of the 1622 Fleet shipwreck *Santa Margarita* were abandoned and left to their fate in the waters of the Florida Straits.

Today, Blue Waters Ventures Key West has launched their fourth consecutive season of search and recovery of the *Santa Margarita* shipwreck. It is known from archival records that up to 169 silver bars weighing between 80 and 100 pounds each, up to 80,000 silver treasure coins, and no less than 800 ounces of gold from the *Santa Margarita* still await discovery. And that is just the documented treasures. The majority of the gold bars, bits, discs and chains found to date (106 pounds in the summer of 1980, alone) were contraband. Because the *Santa Margarita* was battered and broken apart in the storm, its cargo was distributed over an extensive area and now lies scattered and hidden. More info: [www.bluewater-ventureskw.com](http://www.bluewater-ventureskw.com)

search area—the so-called "Ghost Trail"—was huge, and the items searched for were small, so time was of essence.

Visibility was bad, but that was expected. As the prop wash deflectors moved the sand and created a working space for the divers, sediment mixed with the water. It was like diving in watered down milk. The sand had built up on the sides of the search area, but the metal detector would indicate if anything was hidden there.

Michael and his buddy spotted something and signalled for me to come over. A hit, already? This was great! I hurried over, getting the camera ready for the big revelation. What could it be? A nice piece of scrap. Oh, well... next time.

A few minutes later, they were done, and we headed up to hang on the outside of the boat while we moved to the next excavation point, and the prop wash deflectors went to work again. We did not move very far, the search areas overlapped each other, which is a characteristic of the search pattern. Every excavation overlaps so that the team can say for certain that there are no major artifacts left in the area. We got the OK, and jumped in again.

This time, I was more used to the surroundings and the process, and I took some time to look around. The

sand had once again been moved to the side by the prop wash deflectors, and we were moving around



This is an exact replica of the contents of a treasure chest filled with silver coins found in the ocean. The chest is long gone, but the size of it is easily determined...

on the exposed limestone. It was like checking out the holes in a seriously major block of Swiss cheese.

Collected around the edges were large old shells and sand dollar skel-

etons, waiting to be crushed by the ocean to become sand sometime in the future. Who knows how many hundreds of years they have been hiding under the sand. I picked one and took a closer look; they seemed bigger than what you find today, and a thought passed through my mind: were shells larger centuries ago? Like pre-trawler time?

The divers interrupted my profound thought process; it was time to move the boat again.

Every dive was less than five minutes, and the depth between 8-30 feet (3-10 meters). Very tedious, very monotonous, very boring, and as far away from an Indiana Jones life as you can come, yet the divers seemed to like what they were doing. Why? Because once in a while you actually find something that tickles your imagination; once in a while you find gold and jewelry, and seriously, where would the fun and excitement be if you did *that* every day?

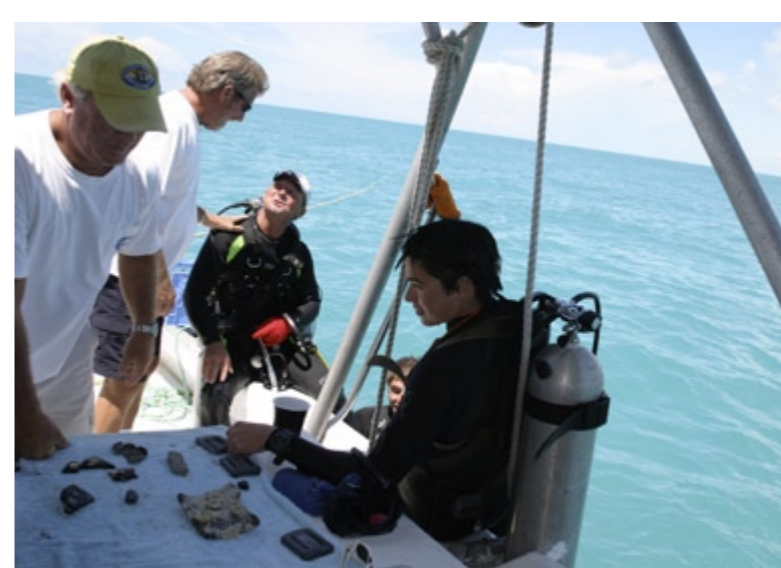
### The *Santa Margarita* wreck

The excavation of the *Margarita* wreck is the result of modern technology and creative minds. It is time for lunch, which gives me the opportunity to visit with the captain, Dan Porter.

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ABOVE LEFT TO RIGHT: Life aboard is pretty much just another day at work, as the pieces found on the bottom is brought to the surface, the deck crew takes over, and the sorting and documenting begins. SECOND ROW: The prop wash deflector allows the divers to search the bottom more effectively. BELOW: Search vessel, *Blue Water Rose*



He tells me that what began as an exploratory expedition quickly changed when the gold chalice was found. The chalice was probably one of the most significant finds in 30 years on this site. That, plus various ship wreck debris found, told them they were on the right track, and from that moment on, the search needed to be more methodical. That meant more work, more of that tedious, monotonous, boring work, but it has turned out to be very successful work as well.

So far, millions of dollars worth of treasures have been recovered, not to mention the historical value of the search.

The captain showed me charts on the computer. What we were doing was following what was referred to as a ghost trail, which sounds more exciting than it really is. What the Blue Water Ventures team did was to calculate possible find sites based on where the *Margarita* sank and weather and current pattern over the course of hundreds of years. Using that information, they plotted a course

that stretched several nautical miles and defined a trail—The Ghost Trail.

### Father and son

Dan Porter is a second-generation treasure hunter, or finder, as he also refers to himself at times. He and his father, Don, worked with Mel Fisher so there is a lot of collected know-how between them—knowledge that has helped refine the search methodology over the years. Porter explains:

"I have gone from every aspect of searching from the mid 80's to today. Back then when we found a shipwreck, we kind of jumped around searching for the treasures. The positioning system used was the one used in the oil field areas when they were setting up oil rigs. It was effective for the time, but nothing compared to today. Today, we are trying to stay on the cutting edge, using technology such as the DGPs system that has an accuracy down to 6 cm, and remote sensing multiple beam sonar, and so on.

We are heavily equipped, and we are advancing every day."

Porter also pointed out that the most powerful tool in archeology and as a modern shipwreck salvor is data. "What happened in the old days determines today's search pattern," he said.

### Historical value

We also discussed the historical value of the search. Everything found isn't gold and precious stones, but it is still a treasure. And preservation means a lot to Blue Water Ventures. Both effort and time goes to documenting and preserving the finds.

Once out of the water items are tagged and documented, a note is made about which area it was found; then it goes into a holding area and is kept submerged until it is delivered to the conservation lab at their joint venture partner, Mel Fishers Treasure, to enter a preservation process. After that, pieces

of historical interest may be donated to the Mel Fisher Maritime Museum, or other museums.

"That is the integrity of what we do, we are striving to set standards for modern day historical ship wreck salvage," said Porter.

I decide to do one more dive for the day; maybe this will be the dive when we find the mother load, and I wouldn't want to miss that!

This time the guys told me to hold on to the line all the way down, which turned out to be good advice. The current was roaring, ripping, pulling. If it wasn't for the weights at the end of the line, there was no way I would have made it down.

We had to fight hard to search, but the crew divers seemed unaffected by the conditions. They motored on with the metal detectors swinging like extended parts of them.

This time, I actually found something.

It looked like a piece of glass deeply imbedded in the coral. I carefully wiggled it out of its hole. It turned out to be a part of a plastic bucket. So much for my day as a treasure hunter. But hey! A day diving is a good day, and if I am not materially richer, at least I am an experience richer. ■





# How to become a Treasure Hunter

— Interview with Keith Webb

LEFT: Treasure!  
Silver coins

Text by Millis Keegan  
Photos by Carol Tedesco

**Treasure hunting is a high-risk venture. To stay on top of the cutting edge technology and to keep the best treasure seekers on staff takes money, money, and yes, more money. There is hard work involved, both in the field, as I found out first hand, and in finding the finances to keep the search going. This is where Keith Webb comes in. He is the founder and CEO of Blue Water Ventures of Key West, Inc, and it is his job raising funds to keep the search going. The company also strives to be responsible shipwreck salvagers and set standards for other treasure salvagers in the world.**

*“You can’t just go out there and recklessly search the bottom. Considerations have to be made both regarding archeological and biological values, in particular in tropical and sub-tropical waters.”*

*MK: So how did you get started, Keith?*

KW “I spent my life in the financial market. When I decided to semi retire, I moved to Key West with my family, but I wasn’t prepared for all that free time. After a short period I got too BORED. I had two choices, start drinking at 10 in the morning or do something more interesting.”

So, what could be an interesting venture for a mind that wasn’t quite ready for retirement? Living in the Keys is living the “Island Lifestyle”. People are laid back, creative minds are at work and you have to be part of that to enjoy yourself full time. When learning the ropes, there was

one thing he did notice early on, something rather intriguing. Pretty much every day you could find a number of divers in the waters of Key West Marine Park with a metal detector seeking gold and silver coins, which is totally illegal by the way. It was a way to finance their lifestyle. Inspired by the fact there are treasures laying on the ocean floor, he began to think about what a good course of direction would be for him, being a business builder and all.

KW: “I contacted Kim Fisher, of Mel Fisher’s Treasures; he gave me a chance in the treasure hunting business, and that was it. Since I love history and I want to solve mysteries, that was a good place to start.”

After some time, he founded Blue Water Ventures and started his search for the treasures of the Santa Margarita.

KW: “It wasn’t part off the plan to become a treasure hunter, but things that happened throughout my life made me ready to accept it when the opportunity was there.”

It is hard work, and there are times when frustration hits, but Keith Webb gets his reward from observing the passion of people that get involved in Blue Water Ventures.

KW: “As they climb up on the ladder, with tears in their eyes after finding a piece of history, that’s it, that’s life. What can I say? I am not in this because I am lured by the gold and silver, I am in this for the adventure, and that’s what I am trying to do with Blue Water Ventures. I

want to sell the adventure, you know? If we find the mother load, well, that’s a bonus.”

MK: Hell of a bonus, if you ask me. Where can I sign on? No, seriously, can anyone be part of this adventure? Does it require some kind of qualifications?

KW: A first hand experience of what it is like to work on a search and salvage vessel and seek treasure can be offered under certain conditions. Diving the site, how ever, is not for everyone. As you experienced yourself Millis, a certain level of diving proficiency is required for this site, so while a journalist might visit the site, only those with strong diving skills are invited to dive with the crew. It is a question of liability. In the past, we have offered a program for mature students pursuing marine archaeological education, and are looking forward to offering more such programs in the future. Requests of this nature should be directed to Carol Tedesco at [bluewaterkw@aol.com](mailto:bluewaterkw@aol.com). Those wishing to participate as investors can contact me through the web site.

This upcoming seasons salvage plan will have the team working in an area that has seen little exploration in the past. The expectations

are high, and why not? What’s the purpose of searching for something if you don’t believe you are going to find it?

MK: What do you see happening in the future? Lets assume that the mother load is found and salvaged, what happens then?

KW: This is not the end. The Santa Margarita project is a golden opportunity to join the adventure; but the adventure does not stop there. We are actively negotiating numerous wreck sites throughout the Caribbean, and there are some extremely good prospects waiting around the corner.

And that’s it, for now. For anyone interested in being part of something as interesting and exciting as this, contact Keith Webb, Blue Water Ventures via the companies web site at [www.bwkw.com](http://www.bwkw.com), and drop us a line if you find something...



Millis Keegan (right) talks treasure hunting with Keith Webb (center)



# A Grooming Tool of Solid Gold

—Discovered on the 17th Century Shipwreck *Santa Margarita*

"I saw a large piece of a ship's mast from a vessel of at least 120 tons. I tried to haul it aboard but was not able to."

These evocative words, recorded by Christopher Columbus in his personal log on 11 September 1492, illustrate how fragile and uncertain was life at sea during the epoch of the great wooden sailing ships. Imagination provides ghostly footage of a ship heaving and battered in a violent tempest; the master of the vessel perhaps urgently ordering the carpenters to cut away the masts, as occurred in the destruction of the Portuguese East Indiaman *Santo Alberto* a century later.

## Hard and brutal

Life at sea was hard, often brutally so, as those who search for sunken shipwrecks today are reminded time and time again. And so, when Keith Webb's Blue Water Ventures Key West (BWVKW) search and recovery team salvaging the remains of the 1622 shipwreck *Santa Margarita* uncovered an artifact so exemplifying love of artistry and elegance—the magnificent solid gold personal grooming tool discovered on 18 May 2008—the contrast was particularly poignant.

## Eccentric artifacts

What is perceived today as a curious and eccentric artifact was at the time a symbol of cultured attention to hygiene, and when exotically crafted in solid gold such as this one, a success symbol and conversation piece. (Oh, this little trinket, Don Philippe? Just a little something I picked up during my recent adventures in the New World.)

In fact, combinations of mani-

cure/ear-scoop/toothpick grooming tools of greater and lesser elaborateness have been discovered on the *Santa Margarita*, the 1622 shipwreck *Atocha*, and on Florida's east coast 1715 Fleet wrecks, indicating their popularity and widespread use.

## Gold toilet set

In his book, *The Toothpick: Technology and Culture*, Henry Petroski quotes toothpicks as "next to the wheel ...man's most universal invention." He writes of an estimated 5,000 year old tradition and describes a particular gold toilet set discovered in present-day Iraq, believed to be from about 3500 B.C. The set includes tweezers, ear spoon and a "spatulate, stiletto-like instrument running to a point." He references discoveries of similar sets made of silver, copper and bronze in Europe as well as in China, Japan and other Eastern countries.

While such instruments phased in and out of style over centuries, Petroski credits the Renaissance period, called "the golden age of toothpicks", as a time in which the toothpick "alone or in a toilette set, exposed or in a decorated case, appears to have been worn and used most conspicuously and proudly."

*"Next to the wheel  
...man's most uni-  
versal invention."  
— Henry Petroski  
quote about  
toothpicks*

## Human/serpent motif

The *Santa Margarita* grooming tool, which was discovered by BWVKW diver Chris Rackley, is of high-karat gold and features a human profile reminiscent of a ship's masthead. This head emerges from the body of what might be a dragon or other fantastical serpentine creature, uniting a toothpick at one extremity and an earwax scoop at the other.

More than one expert perceived an Asian appearance, and African characteristics have been suggested as well. However, because of the merging of artistic traditions that resulted from a rapidly shrinking world, it is conceivable that the creator was a New World artisan influenced by the craftsmanship of foreign cultures.

Elements of creatures emerging from the body of a serpent are an ancient Mayan motif. Noted examples are the jaguar, the quetzal bird and humans. In his book *Ancient Civilizations of Mexico and Central America*, Herbert Joseph Spinden tells of the Mayan god Itzamna, described by Spanish writers as "the creator and father of all, the inventor of writing, the founder of the Maya civilization, and the god of light and life". In Mayan art, Itzamna is represented in the form of an old man with a high forehead, a strongly aquiline nose, and a distended mouth, toothless or with a single enlarged tooth in front.

Interestingly, this artifact, which appears to have a dragon or serpent motif when viewed horizontally, suggests an avian theme when viewed vertically. In his article *The Principal Bird Deity\* in Maya Art – An Iconographic Study of Form and Meaning*, Yale University's Lawrence W. Bardawil describes the Mayan Principal Bird Deity as being incorporated into "expressions of a multi-natured concept." He goes on to describe Itzamna depicted in the Late Classic Period as a "bicephalic bearded dragon" and also makes a reference to the deity being represented as a "fish monster."



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Spanish Galleon (top); 17c. solid gold grooming tool (bottom)

He states, "By including an avian manifestation of Itzamna, and thus depicting three creatures, one terrestrial, another aquatic, and another aerial... the Maya ingeniously define the omnipresence of the concept." Simply put, this god was represented at vari-

Text and Photos by  
Carol Tedesco



Pope Alexander VI (1431–1503)

ure representing the half-bird, half-woman Kinnari of Hindu mythology, whose likeness appears throughout Southeast Asia.

**The East-West connection**

If the artifact was to be of Eastern manufacture, one might ask how such an object found its way onto a Spanish galleon in the Florida Straits in the year 1622. The answer lies in the relationship between Spain and Portugal, and begins in 1493, when Pope Alexander VI, a Spaniard, issued a series of papal bulls adjudicating conflicting Spanish and Portuguese claims by assigning each a geographical zone for their exclusive development.

The following year, Spain and Portugal agreed to a treaty that assigned most of the Western Hemisphere,

except for Brazil, to Spain, while leaving the eastward route to Asia for Portugal. (Walton, *The Spanish Treasure Fleets*)

In 1487, following several decades of Portuguese exploration and penetration into trade with West Africa, explorer Bartolomeu Dias rounded the Cape of Good Hope, demonstrating that the Indian Ocean was accessible from the Atlantic. In 1498, Portuguese navigator Vasco de Gama led an expedition that established an ocean route from Portugal, down the west coast of Africa and around the Cape of Good Hope, to the East.

Just two decades later, in 1519, Portuguese explorer Ferdinand Magellan, in the service of Spain, embarked on

Woodcarving of Kinnari, a mythical creature, which is half bird, half woman, found in Hindu and Buddhist legend. Photo courtesy of TheGoldenLeafThailand.com



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an exploratory voyage where, in 1521, he was the first European to reach the Southeast Asian archipelago later named for King Philip II of Spain—the Philippines.

So, by 1622, Portugal had already



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Portuguese navigator Vasco de Gama (left) and explorer Ferdinand Magellan (below)



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long been trading in Africa, India and the Orient, and at the time of the sailing of the *Santa Margarita*, Portugal and Spain were united under one crown. Therefore, to find artifacts of Eastern origin on a Spanish Colonial shipwreck in the Americas is not surprising.

**Disappearing act**

The toothpick/ear-scoop grooming tool and related toilette-sets-as-jewelry nearly passed from human custom and consciousness altogether. Errol Flynn did not sport one in *Captain Blood*, nor Johnny Depp in *Pirates of the Caribbean*, though it is undeniably a captivating accessory.

There are two particular reasons so very few jewelry pieces of this genre survived the centuries—economics and taste.

Gold and silver money was valued entirely by weight; a person in need of quick cash or goods would use their jewelry as currency, and it would ultimately be melted down. Additionally,

Supernatural beings of Chinese legend: Nuwa, the first female human on Earth and Fuxi, the first male

as jewelry styles passed out of fashion, it was common to melt and rework the metals into more contemporary designs. Consequently, if it were not for sunken shipwrecks and buried hoards, exceptional antiquities such as the *Santa Margarita* grooming tool might never reappear in the world.

Keith Webb's *Blue Water Ventures Key West* is a joint-venture partner of Mel Fisher's *Treasures*, currently searching for and recovering the remains of the lost galleon *Santa Margarita* in the Florida Straits. For more information on the project, visit [www.bluewaterventureskw.com](http://www.bluewaterventureskw.com). ■



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*Going, going, gone...*

# British Columbia's Reefs of Steel

## New Life for Canadian Military Ships

Text and photos by Barb Roy

**I could hear a low rumble as detonated explosives echoed down long empty corridors and through multiple decks of steel. Three hundred and sixty-six feet of ship began to groan and creak while water rushed in to claim its above water existence. Watching from a safe distance, former crewmembers and excited divers marveled at enormous geysers of escaping air mixed with water while the *HMCS Saskatchewan* began its final objective—to become Nanaimo's next artificial reef of steel. As with previous retired Canadian military ships, the *Saskatchewan* gracefully accepted its place in Canadian history as the fifth Destroyer Escort to be transformed from a once powerful tool of war into British Columbia's newest dive site.**

Twelve years have passed since the *Saskatchewan* was scuttled next to Snake Island, on the mid-eastern side of Vancouver Island in British Columbia, Canada. The *Saskatchewan* is one of two Nanaimo wrecks purposely put in place by the Artificial Reef Society of British Columbia (ARSBC).

It is the winter of 2009, and I have joined a few friends to make my annual inspection and photo documentation of the ship's wondrous conversion into a thriving living reef. My husband and fellow wreck explorer, Wayne Grant, and technical dive instructor trainer, Ron Akeson, have joined me. Ron has brought several of his technical diving students along to practice skills and check out their new deep diving gear.

"I would much rather have my students learn how to deal with any gear or performance problems on one of these ships, in a somewhat similar wreck environment, than on a natural, possibly more fragile wreck," states Akeson. "If a technique isn't right, we have the time and depth to practice the skill until it becomes second nature without worry of currents, entanglement or damaging a potentially historic wreck."

During the short journey to the site (about 15 minutes from

Departure Bay), retired Nanaimo dive instructor and charter operator, Ian Hall, told us how the *Saskatchewan* and the other two scuttled wrecks has helped Nanaimo's dive industry:

"Since *Saskatchewan* was scuttled in 1997, we were busy almost every weekend with dive charters for over ten years. From 1997 to 2004 we did over 8,916 logged dives on the *Saskatchewan* alone! People came from all over the world because we had something new and unique. Back then, and now, about 64 percent of our clientele wanted to dive on the *Saskatchewan* or the *Cape Breton*, a 400-foot (122 meter) ship similar to the Liberty-class Ships in the US Military."

Ian went on to tell us that over 50 percent of his customers were divers using double tanks or rebreathers. Technical divers however, seem to prefer the *Cape Breton* because of its depth (140 feet/42.5 meters) and the fact it has a vertical shaft from the main deck leading to the engine room.

Both underwater photographers and naturalist also enjoy the two ships because of the abundance of life attracted to them.

Before sinking both vessels were thoroughly cleaned of all wires and furnishings. Huge 4x6-foot (1.2 - 1.6

Spectators enjoyed a show of pyrotechnics during the sinking of the *HMCS Cape Breton* next to Snake Island near Nanaimo, BC



meter) holes were cut throughout all decks and hull to ease entry and exits.

### Diving the *Saskatchewan*

Once everyone was in the water we descend down the mid-ship line on the *Saskatchewan* (one of three lines). We were blessed with over 80 feet (23m) of visibility! At 30 feet (10m) a gray outline came into view. At 50 feet (15m), I paused to adjust my strobes just below the radar platform, catching a glimpse of a huge lingcod resting at the far end.

On my way to capture the shot, Wayne zoomed

by on his scooter, determined to see how it would handle inside the wreck. Two of the technical students began laying out their practice lines at 90 feet (27 meters). I could hardly wait to see what new critters

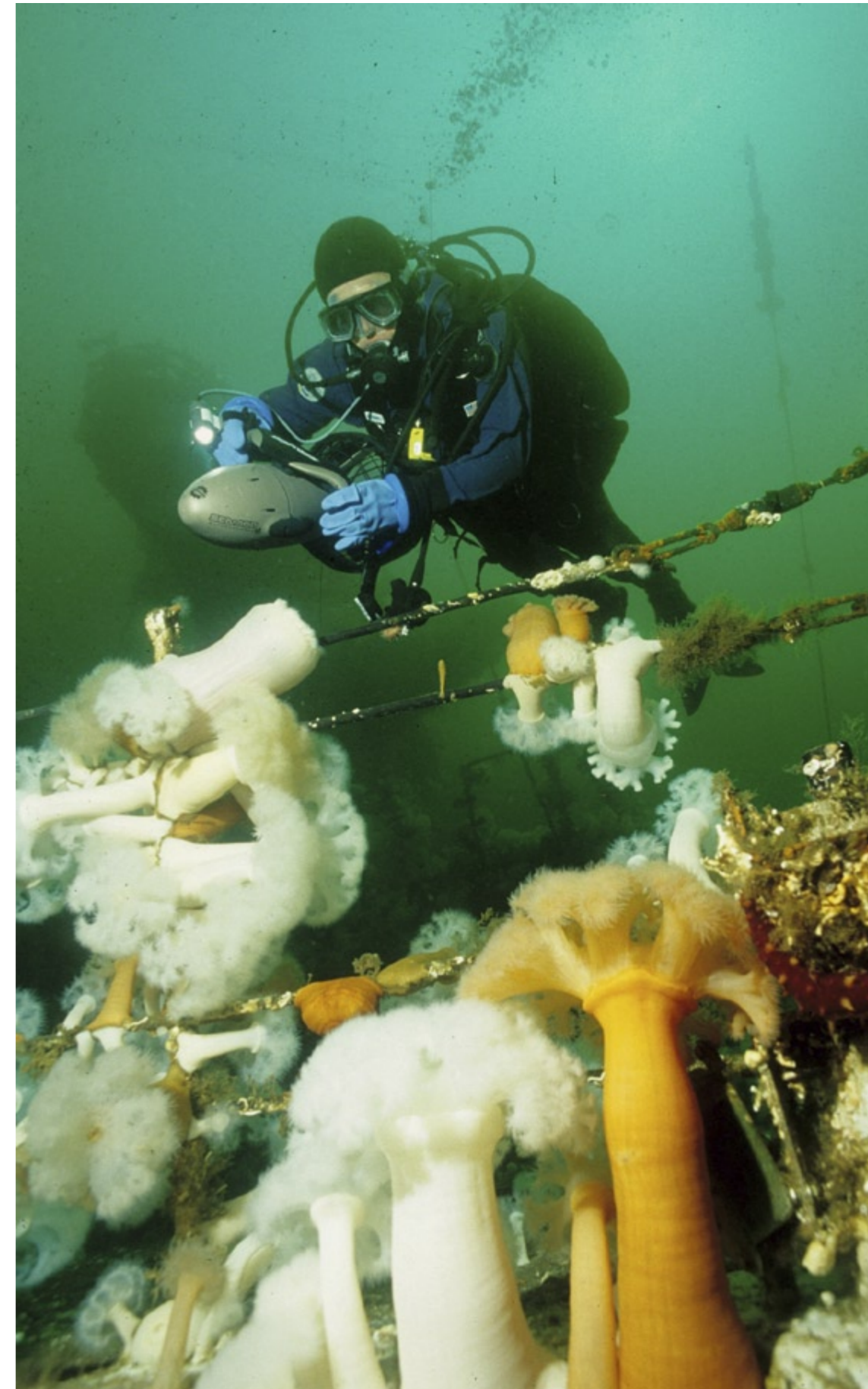
had decided to call the *Saskatchewan* home.

It was unbelievable how the rails, ladders and wheelhouse windows (once void of life) were now completely covered with barnacles, encrusting invertebrates, anemones, swimming

scallops and golden colored feather stars. A rainbow of tiny delicate hydroids and tunicates decorated the outer parts of the ship to gather nourishment in slight currents, which



Powell Lake wooden boats (top left); *Saskatchewan* covered with life since sinking in 1997 (above and left inset)



737 Boeing jet plane in Chemainus (above); Diver Wayne Grant exploring *Saskatchewan* (right)

can occasionally be felt by divers during extreme tides.

At this rate of growth it won't be long before the entire wreck is completely covered with life. Schools of juvenile rockfish and silvery clouds of tiny baitfish elegantly weaved across the upper deck, through the Captain's cabin and towards the forward twin 3-inch 70-caliber gun barrels. I found it hard to imagine these long slender devices supporting so many critters, were once used to fend off aerial attacks.

On the main deck, at the bow, cabezon and lingcod vigilantly guarded their personal territories between white and orange plumose anemones in hopes a passing female would consider their domain a suit-

able nesting site. Smaller sculpins, decorator crabs and shrimp had made their homes in the open spaces in-between the main deck plates, where access holes had been cut.

Every now and then Wayne would pop up through a hatch to check on me. He was like a kid with a new toy zipping in and out of the ship, followed by another diver with a scooter. On a prolific wreck such as this, it doesn't take long for me to burn through a 2GB memory card using video and stills!

After surfacing, everyone was beaming with enthusiasm. Wayne was pleased to find the scooter successfully pulled him through multiple rooms and down Burma Road (a corridor traversing the length of the ship)

without kicking up a trail of silt, as fins usually do. I had plenty of images to add to my documentation records and have noted seeing a new grunt sculpin, about the size of my hand. The students finished their skills in full Trimix gear with all potential problems alleviated or resolved.

"I really like these wrecks for keeping my techniques sharp," exclaimed Rob Wilson, visiting rebreather diver from the Marysville, Washington. "Winter weather conditions always yield excellent visibility and its good practice for when we dive on real wrecks. I can't stress it enough how important it is to stay up on safety procedures and to first do a dive to check out all new equipment. We want no surprises at 250 feet!"



## Artificial Reefs

### Artificial reef projects

Wreck projects of this nature, often called "Artificial Reefs," have always played an essential economic role in British Columbia's dive-tourism market. Positive environmental effects gained from providing additional marine habitat include increased fish populations, additional substrate which attracts algae and kelp—providing protection from predators.

To gain a better perspective, the City of Nanaimo's Economic Development Group did a local study in 2003, concluding dive tourism annually brought in an estimated three million dollars in tourism revenue.

The ARSBC actually began when a group of ambitious Canadian divers who loved to dive on shipwrecks, got together in 1990 over a beer in a local pub. Hence, the society was formed and the craft of sinking ships began in Canada to enhance existing destinations around BC.

They wanted to create safe diving sites for divers to explore within the 100-140 foot (30-43m) depth range. One thing led to another, and the *GB Church*, a 175-

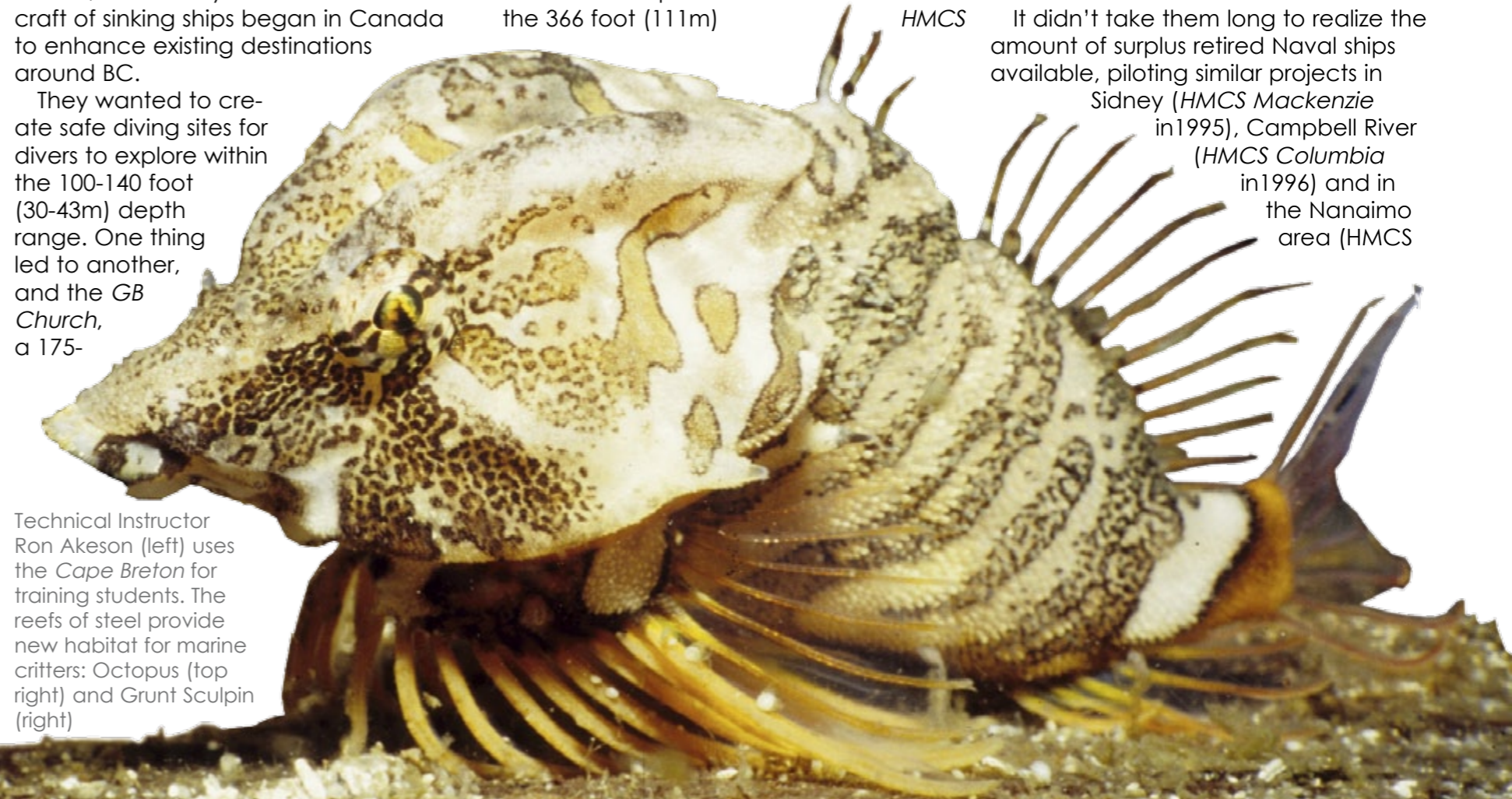


foot (53m) freighter was scuttled near Sidney, BC in 1991. This in turn led to the acquisition of the 366 foot (111m) *HMCS*

*Chaudiere*—another retired Canadian Navy vessel, which was scuttled in Sechart Inlet in 1992 near Kunechin Point.

It didn't take them long to realize the amount of surplus retired Naval ships available, piloting similar projects in Sidney (*HMCS Mackenzie* in 1995), Campbell River (*HMCS Columbia* in 1996) and in the Nanaimo area (*HMCS*

Technical Instructor Ron Akeson (left) uses the *Cape Breton* for training students. The reefs of steel provide new habitat for marine critters: Octopus (top right) and Grunt Sculpin (right)





Saskatchewan in 1997, *HMCS Cape Breton* in 2001). California State and Mexico even collaborated with the ARSBC to acquire a few of these excess Canadian ships, with ARSBC representatives on hand to consult for cleaning and sinking procedures.

In 1992 eastern Canada followed suit starting the Nova Scotia Artificial Reef Society, scuttling the retired *HMCS Saguenay* in 1994 and the 122-foot (37m) trawler, *Matthew Atlantic* in 1998. The society also acquired the retired St Laurent Class *HMCS Fraser* in 1997, docking it on the LaHave River in Bridgeport and turning it into a museum.

"Originally we wanted to sink the *Fraser*," states Rick Welsford, a key member in obtaining the Nova Scotia vessels. "But later we decided to send in a proposal to the Canadian Navy to preserve the *Fraser* by turning it into a Naval Museum. Divers also have an opportunity to see how the ship is laid out before diving on its sister ship, the *Saguenay*."

## Artificial Reefs

In 2000, the Historic Sites and Monuments Board of Canada acknowledged the former *HMCS Fraser* as being historically significant to Canadians.

Whether the reason is to provide substrate to attract marine life, provide a training platform, or for economic

reasons, dive communities around the globe are now or have already pursued having a ship of their own to attract divers. Many even have plans for a series of ships, to be scuttled. In the United States: California, Texas, Florida, and many other coastal states have

similar artificial reef programs in place or are establishing them.

"I think that a lot of people forget about the environmental value of these artificial reefs," points out Mike Lever, owner and operator of the ocean-going live-aboard dive vessel *Nautilus Explorer*. "If it weren't for the protection these ships provide, all of those tiny critters now living on the wrecks might otherwise be fish bait. And the invertebrate life simply wouldn't be on a mud bottom. With the fish stocks under such enormous pressure in Georgia Strait, the wrecks provide some relief for natural reefs to recover and every bit of sanctuary helps."

### Consulting

In an effort to expand and help other countries around the world to start similar artificial reef projects, three members from the Canadian ARSBC branched off, forming a formal consulting company independent of the ARSBC. Canadian Artificial Reef Consulting (CARC) was established in



Rear guns on *Columbia* in Campbell River (above); The *HMCS Annapolis* is the next ship to be put down in Howe Sound, (inset); A fish-eating Rose Anemone (right)



A female wolf eel finds a home on the *Saskatchewan*

ing from the Canadian Navy are pre-cleaned of all hazardous material and dangerous substances. In the United States, however, restrictions from the Environmental Protection Agency (EPA) have proven in the past to be a hurdle of red tape. With new funding available from the Federal Government, cleaning to EPA standards should become more feasible.

"It's very important to us," comments Wes Roots, member of the CARC team and owner of WR Marine (company hired to clean and prepare several ships for the ARSBC), "That these ships are made as 'diver' and 'environmentally' safe as possible. We have a proven track record and a system that works from years of experience."

Currently Wes Roots and CARC are working with the ARSBC to prepare another Destroyer Escort—the 371-foot

2003 to offer expertise in financial matters, preparation and cleaning recommendations and also demolition.

"We have teamed up with groups

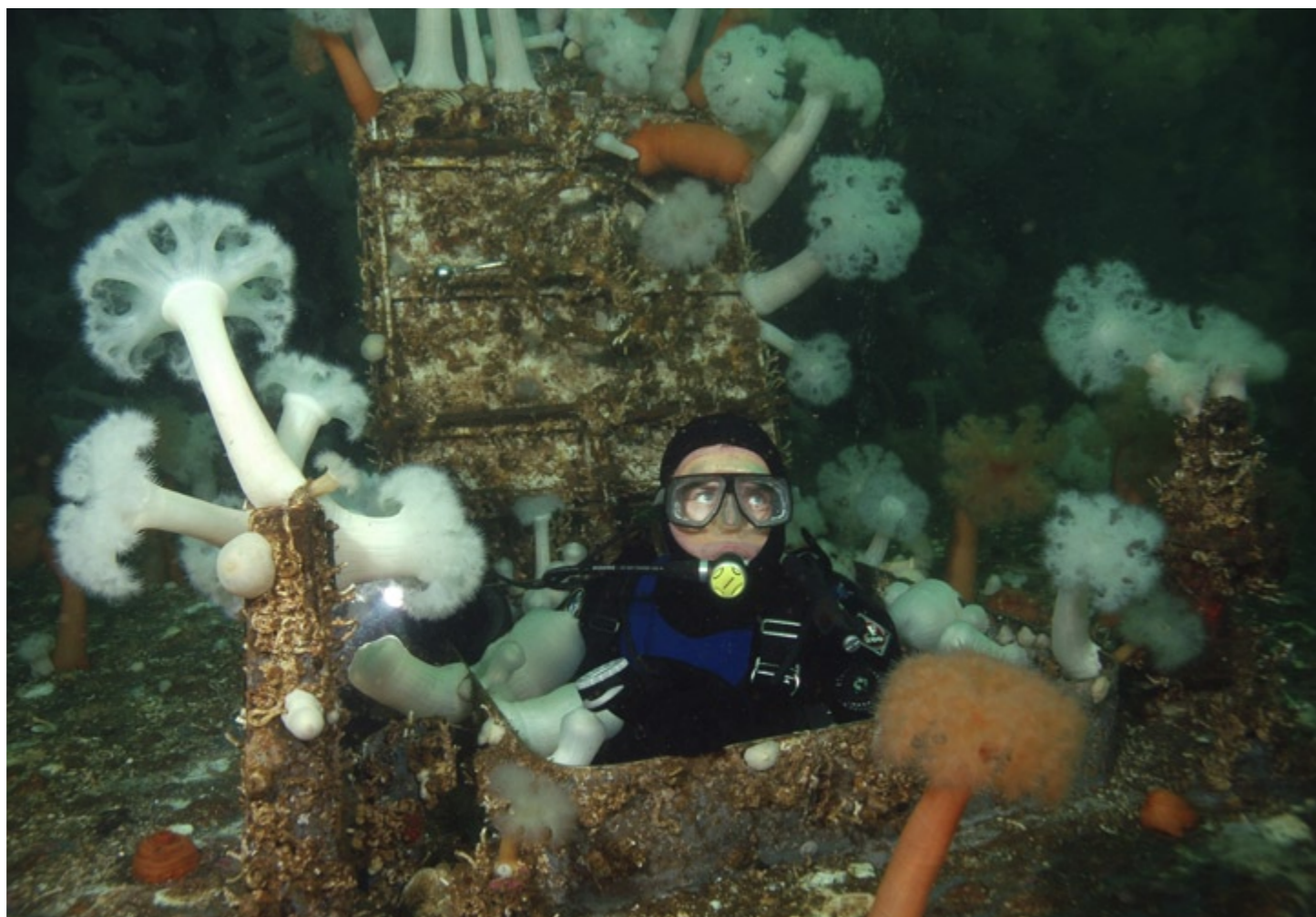
from around the world, helping them establish their own reef making programs," explains Jay Straith, former President of the ARSBC and current President of CARC. "We now have people capable of looking at long term ship stability issues, and issues relating to salvage, ship yards, diver risk mitigation and placement."

To date, team members of the CARC have assisted with projects in Quebec, the Caribbean, Australia, New Zealand, and the United Kingdom. Future projects include the United States and other parts of Europe.

**Preparation**

The whole preparation process for a ship

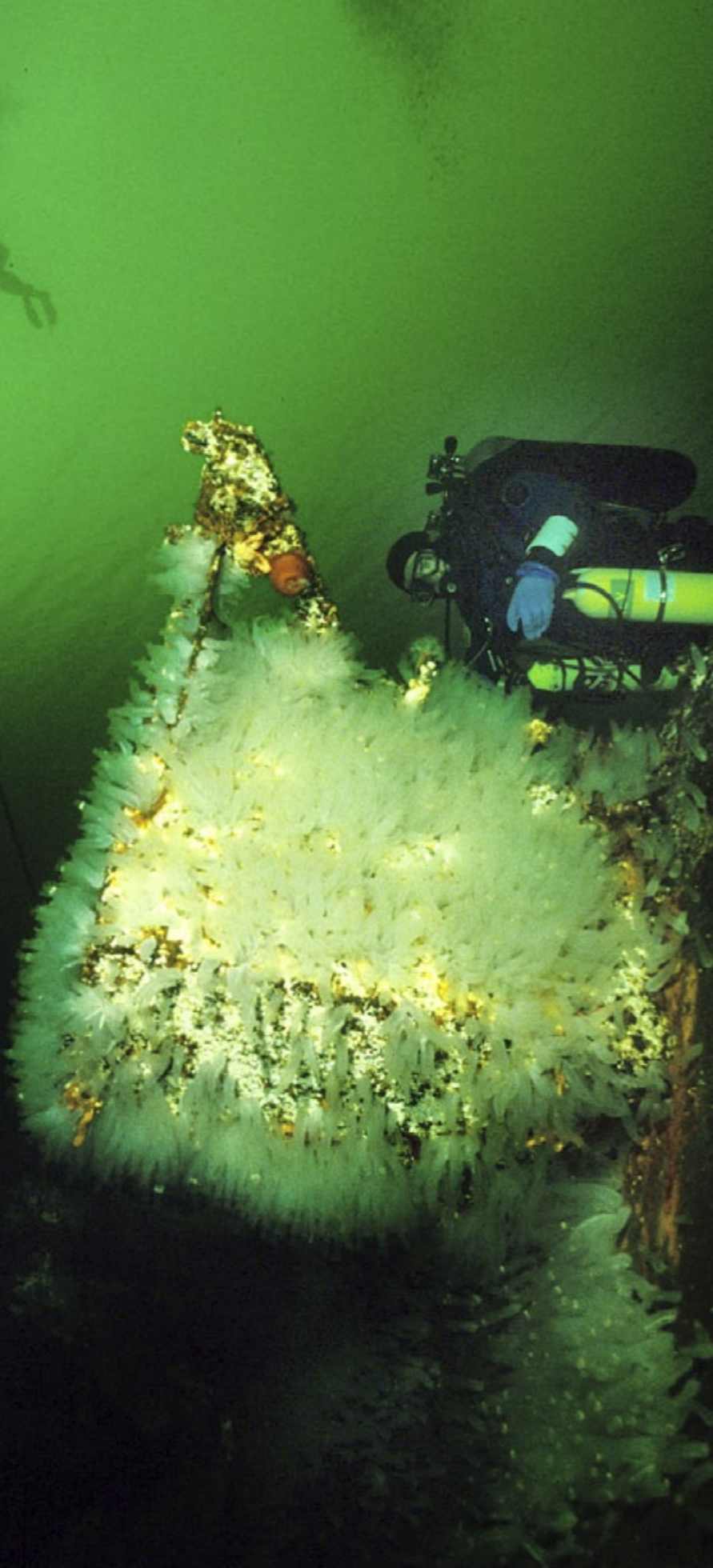
takes anywhere from six to 12 months depending upon the extent of readiness required by the community receiving the ship. In BC, most of the ships com-



**Artificial Reefs**

Anemones soften the texture of the radar tower on the *Cape Breton* (above) Diver Wayne Grant (left) coming up through a hatch on the *Saskatchewan*





Divers descend on the *Chaudiere* in Sechart Inlet; Statue of a bronze mermaid in Powel River (inset); Divers (top right) peer into the skylight shaft of the *Cape Breton*

## Artificial Reefs



(113m) *HMCS Annapolis*, for sinking in Howe Sound. The ship was acquired in 2008 and brought to a cove on Gambier Island for preparation, from the Esquimalt Naval Base on Vancouver Island.

Although volunteers were used in preparation of previous ships, the *Annapolis* has used volunteer help almost exclusively. Since October of 2008, groups of 6-20 volunteers have gathered on weekends from supporting dive stores and clubs in British Columbia and Washington State to be transported by local dive charter operators on their boats to the ship. They bring tools, gloves, dust masks and coveralls to disassemble things,

carry items and sweep floors for the day.

Deirdre McCracken, Director of Public Relations for the ARSBC and co-owner of Ocean Quest Dive Centre in Burnaby explains more on volunteer ship preparations:

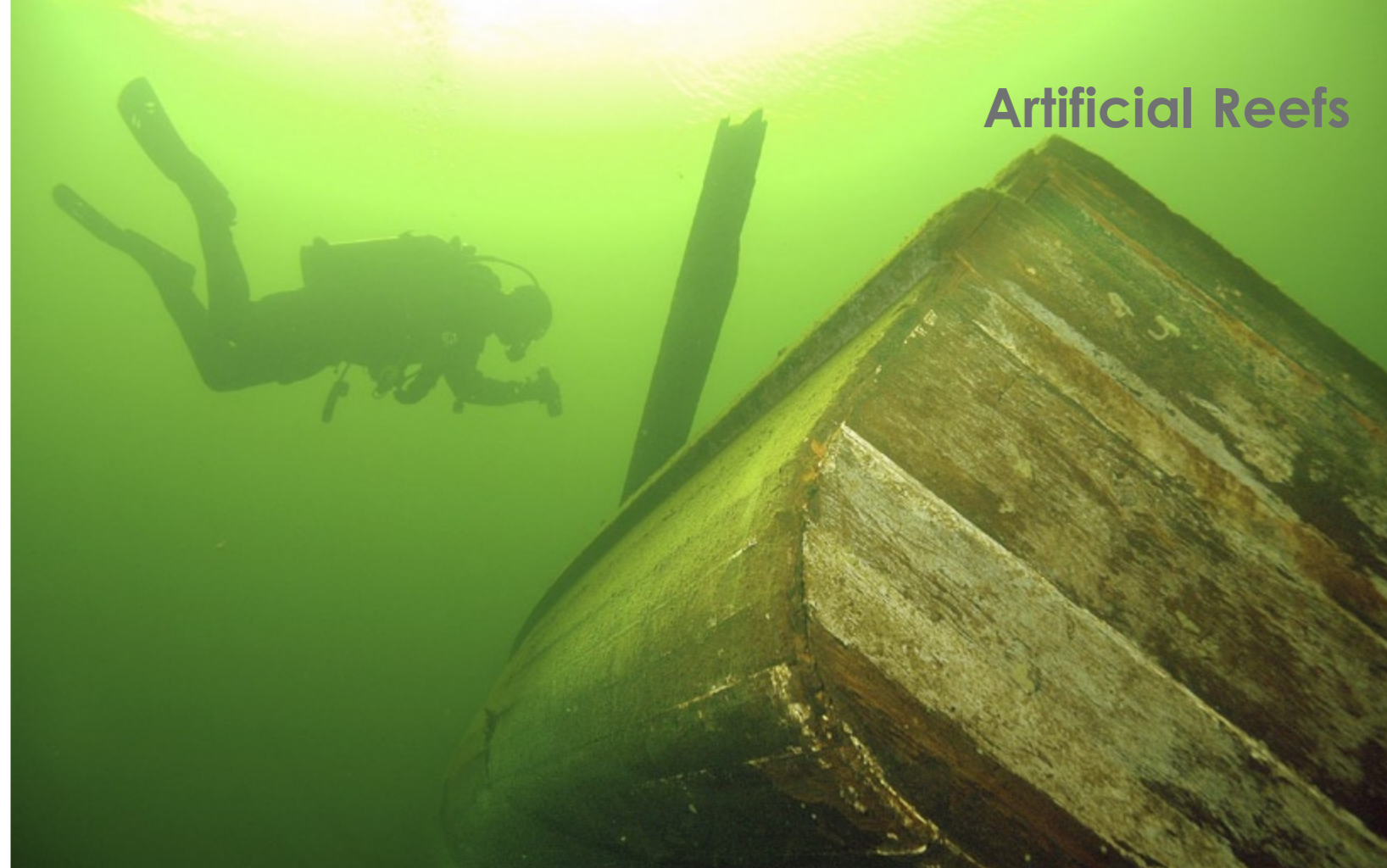
"The plan over the previous months was to mine as much metals as possible to sell as salvage, concentrating on just about every part of the ship. The only areas not mined as intensely is the engine room, boiler room and steering room, but that is yet to come. The accumulation of months of work to clean, clear, stack and strip all manner of materials literally began to choke productivity. Rooms were

stacked with sorted items such as light fixtures, gear boxes, fiber glass, aluminum racks, sinks, bed bunks, ventilation ducts, drawers and the list goes on.

"Getting this volume of work neatly organized and staged is due entirely to the volunteers who love to be a part of each step. We have some serious 'repeat offenders' some of whom have been aboard more than ten times and others are getting as close. When we reach this accumulation level, like in May, a barge is rented to support a 52-foot trailer and two container bins. The trailer is used for debris only, like the estimated removal of 600 bags of fiberglass insulation we



Mosshead warbonnet peeks out from the safety of its barnacle home on the Mackenzie ship; Diver checking out a wooden boat in Powell Lake (top right)



hailed out hand over hand from various parts the ship. The other bins are for metals, mostly aluminum parts."

Deirdre also explained that the *Annapolis* was the only ship acquired by the ARSBC with all of the wire removed, saving additional work. "We had an amazing support from our dive community," continues Deirdre. "With representation from every dive centre in the Lower Mainland, including store owners, managers, customers, various clubs, our American diving friends, as well as our local charter operators, working shoulder to shoulder to make this a truly collaborative effort from the dive community. This is a reflection of the passion, support and driving force behind this unique project, and is what has kept it going though all phases thus far."

"We still need volunteers every weekend up until sinking," adds Howard Robins, President of the

ARSBC. "Most of the permits are in place and after Environmental Canada gives their final approval, we will talk sink dates. If not in 2009, for sure in 2010. Halkett Bay Provincial Marine Park is the location we are currently looking at."

### Protected areas

The ARSBC also hopes to eventually establish protected areas around the all of their projects in British Columbia, falling under BC Parks jurisdiction and protection.

"ONLY THE FIT SURVIVE" is the motto proudly used to represent the former *HMCS Yukon* (now a reef in California) adapted from a Robert Service poem. One can easily find truth in these words when looking at the long-term survival of our oceans.

By placing these reefs of steel beneath the waters of our world today, perhaps natural reefs will have time to replenish. I can't think of a better way or a more suitable

final mission to honor the massive ships that once protected our loved ones during times of world turmoil, when the alternate choice for their use is to the scrap yard. As divers it's our job as oceanic ambassadors in the long run to work together to preserve this environment and ensure its continued existence for future generations.

### Reference Sites

- Artificial Reef Society of British Columbia: [www.artificialreef.bc.ca](http://www.artificialreef.bc.ca)
- Canadian Artificial Reef Consulting: [www.artificialreefs.net](http://www.artificialreefs.net)
- Something fun and educational for kids at National Geographic: [www.nationalgeographic.com/xpeditions/lessons/08/g912/artificialreefs.html](http://www.nationalgeographic.com/xpeditions/lessons/08/g912/artificialreefs.html)
- The Dive Industry Association of British Columbia: [www.diveindustrybc.com](http://www.diveindustrybc.com)
- Tourism British Columbia: [www.hellobc.com](http://www.hellobc.com) ■





silver



[www.seacam.com](http://www.seacam.com)



# turtle tales



Edited by  
Bonnie McKenna

Road sign indicating the area is safe for turtles

*This year, the marine turtle salvation project of Cozumel is celebrating its 25th anniversary*

For hundreds of years the indigenous people of Cozumel, the Mayan, have consumed turtle meat and turtle eggs. The meat was cooked and plated or prepared as a soup, while the eggs were a favorite with drinkers in the cantinas. Today, turtle meat and eggs are no longer available for purchase on the island.

Text and photos by Bonnie McKenna

"The turtle salvation project was started by a core group of divers who would go out on the beaches at night to protect the turtles from poachers," said Sherri Davis, owner of Cozumel Insider and a project leader for the turtle conservation effort.

### Seasons

The predominant species of turtles that nest on the island are Greens and Loggerheads. Greens nest from mid-April to early July; Loggerheads nest from mid-June to mid-September.

A number of local citizens and expats living on Cozumel, wanting to help protect the turtles, banded together in brigades to patrol the beaches on the east side of the island during the nesting season.

After seeing what the brigades were doing, scientists from the city's Department of Ecology got involved. At first, they dug up the nests and moved them to a sanctuary for protection; now it is

no longer done, nor is it necessary. Today, scientists from Mexico City, with new methodologies and ideas come to Cozumel during the nesting season to participate in the conservation of the turtles.

One of the government programs began in the late 1980s. This effort eventually evolved in to a small city-funded program that now operates only on donations from citizens and tourists.

The Parks and Museum Foundation of Punta Sur Park began their program in

2000. Access to the park is closed at night thereby enjoying good protection from poachers. It is a for-profit program; tickets are sold through the museum, cost approximately US\$40, enabling tourists to come out to the beaches during the nesting season.

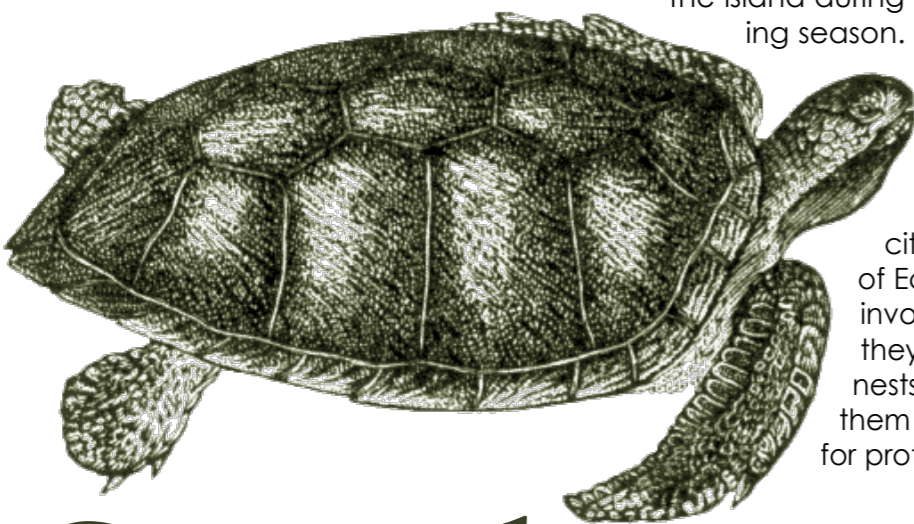
"Fortunately, the original core committee has remained. The government changes here every three years; we can



Sand erosion on the beaches, the result of two major hurricanes in 2005, makes it difficult for turtles to find a place to nest



ABOVE: A number is painted on the road indicating a nest location on the beach. The mark makes it easy for volunteers to find the nest  
CENTER IMAGE: The codes on the red stick markers indicate date of the nesting and the species of turtle. CC is *Caretta caretta* or loggerhead, CM is *Chelonia mydas* or green turtle



# Cozumel, proud of its conservation effort



(Continued from previous page) only hope the new group is interested in protecting the turtles and their nesting areas," Davis commented. "The city oversees the programs, but often times, it is a fiasco. The program is built on sharing information, but sometimes the new regime does not want to share the information. The veracity of the data may be skewed somewhat, but it is close."

During the nesting season, the Cozumel city workers, in co-ordination with the local police and federal armed forces, limit activity on the island's eastside beaches during the nesting season.

Currently, there are seven brigades and two groups from the Department of Ecology who divide up the beach patrols each night during the nesting season.

"The nests are marked with GPS, a stake is planted to mark the nest and paint is sprayed on the road pointing to the location of the nest. All this makes it easy for the volunteers to go back after the hatch to count the fertile eggs and the false eggs," Davis said.

Many visitors inquire about contributing some of their holiday time to participating in the program. Since 2006, in an attempt to generate more awareness and interest in the turtle salvation program, visitors have been allowed to participate under the supervision of a brigade member.

To participate, visitors must request permission in advance of arrival on Cozumel. Make requests to [turtles@cozumelinsider.com](mailto:turtles@cozumelinsider.com). Allow 4-6 weeks for a response. ■

## Failure to protect sea turtles

The U.S. government has banned Costa Rican shrimp from being shipped to the United States until further notice. The embargo is due to Costa Rica's failure to enforce the laws required of commercial shrimpers to protect sea turtles from capture and death by using the Turtle Excluder Devices. Costa Rica's shrimper fleet numbers 55 boats and capture 15,000 turtles per year, the majority of which die by forced immersion. Over the past five years, 29 shrimp trawlers have been caught without TEDs, using tampered TEDs or with other serious problems that compromise the effectiveness to free turtles according to Incopesca and the Costa Rica Coast Guard National Service. Several boats have been caught twice without TEDs. None of the cases have resulted in a sanction of any kind and the boats have been permitted to continue operating. In 2008, Costa Rica exported 161 million pounds of shrimp to the United States. ■

*Costa Rica's shrimper fleet captured 15,000 turtles*



A "Turtle Excluder Device" is a grid of bars with an opening either at the top or the bottom of the trawl net. The grid is fitted into the neck of a shrimp trawl. Small animals such as shrimp pass through the bars and are caught in the bag end of the trawl. When larger animals, such as marine turtles and sharks are captured in the trawl they strike the grid bars and are ejected through the opening

## Plastic garbage a threat to leatherback turtles

Leatherback turtles, the most widely distributed reptiles on earth, are threatened with extinction, in large part due to the carelessness of humans.

We have seen reference to the dangers plastics pose to marine life, garbage that humans indirectly deposit in the ocean, but apparently we have not received the message. This according to co-author Mike James of Dalhousie University in a recent article published in the *Marine Pollution Bulletin*.

In a look back at necropsies

*Turtles often mistake plastic bags for their normal prey of jellyfish, with deadly results*

over the last century from all over the world, more than one-third of the turtles had ingested plastic.

Once leatherbacks ingest plastic, thousands of spines in their esophagus make it nearly impossible to regurgitate. The plastic can lead to partial or complete obstruction of the gastrointestinal tract resulting in decreased digestive efficiency and for some, starvation. ■



## The journey of a green turtle opens the mystery of an oceanic highway

The journey of a green sea turtle from Indonesia to Australia is helping conservationists to understand turtle migratory routes.

The turtle left a nesting beach on East Java and traveled across the Indian Ocean to the Kimberley's in Western Australia. The route highlights the connection of the Kimberley marine ecosystem and its link to the Coral Triangle.

The Coral Triangle spans Indonesia, Malaysia, Philippines, Solomon Islands and Timor Leste and contains the habitats of six of the world's seven species of marine turtles: green, hawksbill, leatherback, flatback, olive ridley and loggerhead.

WWF hopes that this information will lead to networks of marine protected areas. ■



## Illegal trade in Vietnam's marine turtles continues

Marine turtles have all but vanished from Vietnam's waters, and illegal trade is largely to blame, says a new study by TRAFFIC, the wildlife trade monitoring network.

A government-owned souvenir shop selling illegal turtle products is a symbol of how a national ban on turtle products enacted in 2002 has been undermined by lack of enforcement. In Ha Tien and Ho Chi Minh City, traders cited Indonesian and Malaysia as their main source of turtles and raw scutes.

Already threatened by habitat degradation, accidental and opportunistic capture by fishermen, and the direct take of eggs, whole turtles are stuffed and their shells turned into jewelry, fans and handicrafts. ■

## Prehistoric turtle goes to hospital for a CT scan

A 75-million-year-old turtle was taken to Deaconess Hospital in Bozeman, Montana, USA, in hopes of finding its head, eggs and embryos.

The fossil, only the second in the world found with eggs inside, is from the genus *Adocus*. The turtle was found in the Grand Staircase-Escalante National Monument in Kanab, Utah.

The test was inconclusive. The turtle was then taken to the Museum of the Rockies, which has special software for looking at CT images. Results of the findings will be presented at the International Symposium on Dinosaur Eggs and Babies in August 2009. ■



Edited by Peter Symes



*Allowing guests to snorkel at St. Johns and other Far Islands, especially when C. longimanus is present, is highly unprofessional. Not only does it place guests at risk of injury, but such unprofessional action gives the whole Egyptian Red Sea dive industry a bad reputation*  
—HEPCA

Earlier this summer a snorkeler was fatally wounded by an Oceanic Whitetip shark off St. Johns in the Red Sea. The death was especially tragic because it could have been avoided if guests had been stopped from snorkelling, says HEPCA.

Since the death of the snorkeler, dive guides have reported to HEPCA that some *C. longimanus* at the Far Islands are displaying overly inquisitive or even aggressive behaviour towards them while diving. This included sharks near the surface moving rapidly towards divers at 30m. Others have reported being bumped, tanks nudged and sharks swimming extremely close to them

and their guests.

There may be a number of reasons why these animals are behaving this way. It could be due to the illegal actions of some divers who have been feeding them in these areas or boat crews baiting them. Alternatively, or in combination with, it may be due to natural seasonal causes relating to reproduction or the presence of natural prey. Whatever

the reasons, dive guides are urged to be especially vigilant when diving in areas where *C. longimanus* is commonly encountered. In light of this recent information, a list of recommendations—when taking guests to areas where this species is commonly encountered—has been expanded.

The earlier and new recommendations are:

- \* No swimming and snorkelling in waters where this and other large species of sharks are known to frequent
- \* No deliberate feeding of this species or the dumping of waste from boats, which may attract this and other potentially dangerous sharks (both activities are illegal in Egyptian waters)
- \* No SCUBA diving without an experienced
- \* In areas such as the Far Islands, where this species is frequently observed, it is advisable that divers enter (and are retrieved from) the water as close as possible to the reef.
- \* In areas such as the Far Islands it is illegal to be involved in any night diving activities.
- \* Dive in groups and keep close together.
- \* Two dive guides should accompany each group.
- \* Divers should leave the water immediately if sharks display signs of aggression such as nudging or circling divers, or moving rapidly towards them.
- \* Report to HEPCA any incidents of aggressive behaviour by these animals towards divers, and
- \* Report to HEPCA the names of vessels whose divers or crew are observed feeding or baiting sharks. ■

dive guide in waters where this species is known to frequent

## Rays replace sharks on restaurant menus as populations plummet

Falling shark populations is prompting Asian chefs to look for manta and devil rays to help meet the never abating demand for shark fin soup.

Mantas and mobulas are being used as shark fin soup filler where their cartilage is being mixed with low-grade shark fins in cheap versions of the soup.

“The life history of manta rays makes them highly susceptible to overfishing,” said Tim Clark, a marine biologist at the University of Hawaii. With a life span thought to be well over 50 years, the fish reach sexual maturity only in their teens, at which time they produce one pup every one to three years.

While the rays, which are distantly related to sharks, are ending up in Hong Kong’s restaurants, their gills are also being used in traditional Chinese medicines. “The big market is for the gill elements,” Clark added. “They are dried, ground to a powder and used in traditional Asian medicines.”

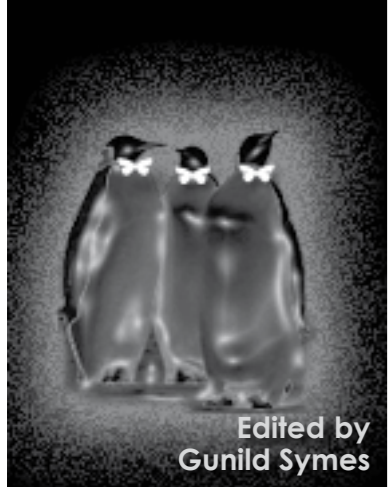
Reaching sizes of up to 7m (23ft) across the wings, the manta’s branchial gill plates, which filter plankton from seawater, constitute a tiny portion of a body that can weigh up to 2.5 tonnes. The plates can fetch up to US\$300 on the street in China. Practitioners of traditional Chinese medicine claim that gill rakers — called peng yu sai — reduce toxins in the body by purifying the blood. ■

HEPCA (Hurghada Environmental Protection and Conservation Association) is a leading NGO (Non Governmental Organisation) working in the field of marine and land conservation. Founded in 1992 by 12 members representing the diving community of the Red Sea, HEPCA is actively working towards the goal of protecting and preserving the natural resources of the Red Sea and Egypt. [www.hepca.com](http://www.hepca.com)

# Be vigilant around the Oceanic Whitetip



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Edited by  
Gunild Symes

POINT & CLICK  
ON BOLD LINKS



# Ocean Arts Emporium

*Exquisite Gifts & Decor*

## Large Hermit Crab

This whimsical glass sculpture of a hermit crab was created by Joe Peters of western Massachusetts who states on his webpage: "After living and scuba diving in areas of Central America, I gained an appreciation for underwater plant and amphibian life. I have tried to integrate these elements into my handblown glasswork by utilizing a technique called torchwork otherwise known as lampworking or flame-working."

Available at Objects of Envy.  
Size: 5.25"H x 5.25"L x 4.75"D. Price: US\$615.00  
[www.objectsofenvy.com](http://www.objectsofenvy.com)



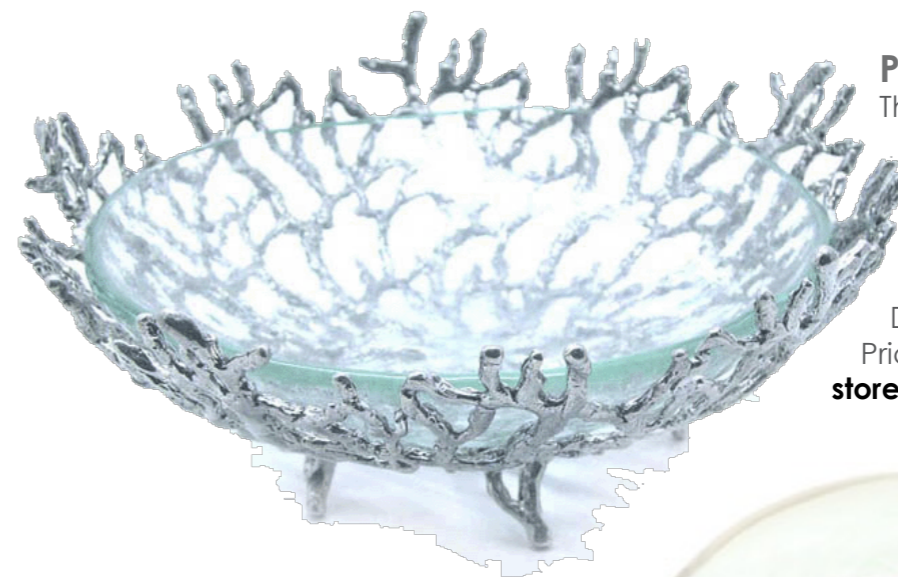
## Sea Kelp Glass Sculpture

This elegant handblown glass sculpture from Plantation Home Accessories in Los Angeles, USA, captures the beauty and natural movement of sea kelp under the waves. Color: green glass on black stand. Size: 15 x 12 x 4 inches. Price: US\$1,375.00.

[store.plantationdesign.com](http://store.plantationdesign.com)

## Glass Octopus

A festive and colorful glass representation of one of the ocean's most mysterious creatures, this octopus sculpture from Plantation Home Accessories in California takes an entire day for an artist to hand sculpt, arranging each slithering arm and suction cup. Available in orange, ruby red, blue, brown, and black with blue glass. Size: 10-12 x 4-5 x 4-5 inches. Price: US\$395.00  
[store.plantationdesign.com](http://store.plantationdesign.com)



## Pewter Coral Bowl

The forms of reef coral inspired this decorative artistic bowl cast in pewter with a clear glass liner. Color: silver. Diameter: 9".

Price: US\$195.00

[store.plantationdesign.com](http://store.plantationdesign.com)



## School of Fish with Moon Jellyfish Sculpture

Master artisan and scuba diver, Chris Heilman, captures reef life inside glass paperweights so beautifully that one of his sculptures was presented to the late Jacques-Yves Cousteau. Price: US\$565.00.  
[www.objectsofenvy.com](http://www.objectsofenvy.com)





# emporium



### Green Crab

This colorful glass sculpture of a crab was created by American diver and artist Joe Peters. It is available at Objects of Envy for US\$265.00. Size: 2 x 3.5 x 3 inches. [www.objectsofenvy.com](http://www.objectsofenvy.com)  
Also available from the artist are unique glass sculptures of deep sea angler fish, tropical fishes, leafy seadragons, octopus, lobsters, crabs, dragonflies, curious insects, frogs and camelions. [www.joepetersglass.com](http://www.joepetersglass.com)



### Octopus & Starfish Pendants

A beautifully detailed Octopus pendant created by Iris Jewelry Design in Los Angeles, California, USA, swings from a 16-inch hand-oxidized necklace chain. The pendant measures 1.5 x 1 inches. Made of sterling silver. Price: US\$27.00. Coordinating octopus earrings also available. [www.etsy.com](http://www.etsy.com)

A starfish pendant made of sterling silver measures 1.5 x 1.375 inches and dangles from a 16-inch sterling silver rolo chain that has been plated with rhodium for a lightly oxidized finish. Price: US\$28.00. Starfish earrings also available. [www.etsy.com](http://www.etsy.com)

### Coral Reef Ring

This ring by Cholula Jewelry in Minnesota, USA, was carved out of wax and then cast in sterling silver. The delicate pattern of tiny holes is like the surface of reef coral found in the sea. The ring, while delicate, has a nice weight to it, and the texture feels good when running your finger over it. Ring is between a size 5.25 and 5.5, not resizable. It has been tumbled to a shiny shiny finish but a satin finish can also be made on request. Price: US\$82.00. [www.etsy.com](http://www.etsy.com)



### Murano Glass Manta Ray Calcedonio Sculpture

Created by Oscar Zanetti, a glass master of the island of Murano, Venice, Italy, this exquisite glass sculpture of two graceful manta rays shows Zanetti's mastery of expressing the shapeable world, encompassing light and color, through glass. Measures 24 x 29 x 21 inches. Price: US\$4,950.00. [www.objectsofenvy.com](http://www.objectsofenvy.com)



### Deep Marine Hoodies

Squid Ink Hoodie (above) created by Black Bird Tees in Seattle, WA, USA, features a jet black design on American Apparel fleece hoodies in asphalt gray, unisex sizes XS-XL. Gals should go one size smaller than usual for desired fit. Price: US\$38.00. [www.etsy.com](http://www.etsy.com)

Keep Your Distance Hoodie (right) features a hand illustrated design in black and white ink on American Apparel fitted hoodies in asphalt gray. Only available in a girly style hoodie, sizes S-XL. Price: US\$29.00. [www.etsy.com](http://www.etsy.com)





# whale tales

Edited by Peter Symes

## Whale-watching generates billions in revenue

According to a report released at a recent International Whaling Commission (IWC) meeting, whale watching generates far more money than whale hunting,

Worldwide, whale tourism now generates about €2.5 billion annually. The report was commissioned by IFAW, the International Fund for Animal Welfare, who argue that whaling countries would

gain from a switch to whale watching. The report, which was compiled by the Australian organisation Economists at Large, found that income from whale watching had doubled over the last decade, with the fastest growth seen in Asia. In 2008, 13 million people went to sea to watch cetaceans in 119 countries, concluded the report. ■

## Thieving Sperm Whales Caught on Video



Underwater videos have revealed how sperm whales steal cod from fishing lines off Alaska. At depths of 100 meters (328 feet) the whales were filmed plucking the fishing line at one end to free the tasty black cod at the other



# Narwhal teeth are really sensors

**It took a dentist to solve the riddle of the longest tooth in the natural world—the unicorn-like tusk of the Narwhal whale. Harvard dentist and National Geographic grantee Dr Martin Nweeia discovered the function of the narwhal whale's unicorn-like tusk.**

The narwhal uses its impressive tusk to measure changes in its environment. According to Dr Nweeia, it seems the tusk has hydrodynamic-sensing capabilities. Nweeia's team found that the narwhal tusk is like a membrane with an extremely sensitive surface. It has ten million nerve connections to the outer surface that would be capable of detecting changes in water temperature, pressure and salinity.

"There is no comparison in nature and certainly none more unique in tooth form, expression, and functional adaptation," Harvard said in a statement.

"Why would a tusk break the rules of normal development by expressing millions of sensory pathways that connect its nervous system to the frigid arctic environment?" Nweeia asked. "Such a finding is startling and indeed surprised all of us who discovered it."

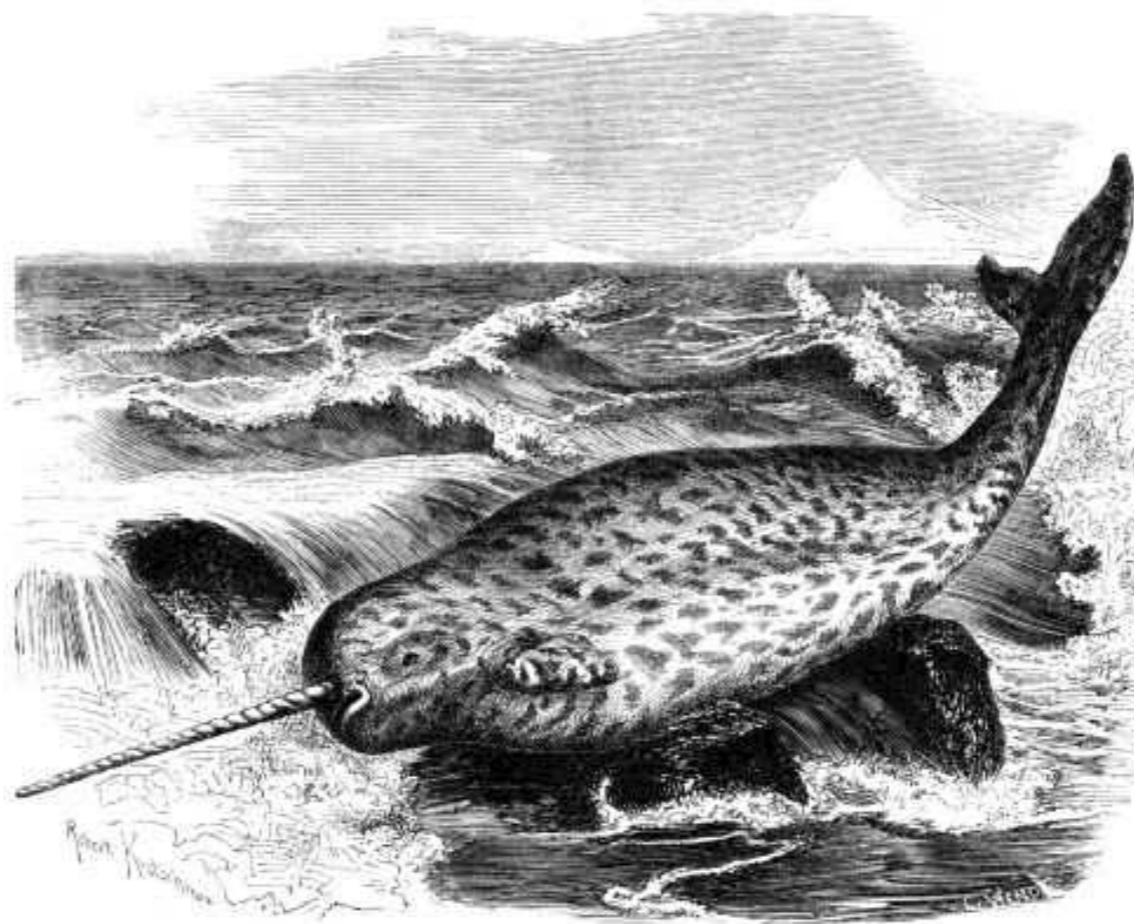
### Left front tooth

Males have the characteristic left front tooth extending approximately eight feet and variable depending on the whale and the age. The right tooth remains embedded in the skull and measure roughly one foot.

About one in 500 males has two tusks, which occurs when the right incisor, also grows out. A female narwhal may also produce a tusk, but this occurs rarely, and there is a single recorded case of a female with dual tusks.

### Ivory

Throughout history, the narwhal tooth has inspired legend and lore. So prized was the fabled tooth of the unicorn that Queen



Elizabeth in the 16th century paid 10,000 pounds for one, equivalent to the cost of an entire castle. ■

*The narwhal tusk is like a membrane with an extremely sensitive surface.*



## Peace talks on whales and whaling are to continue

**Delegates to the International Whaling Commission (IWC) annual meeting have agreed to extending reform talks that began a year ago in an attempt to heal the deep and long standing rift between pro- and anti-whaling countries.**

With attempts to end hunting in Iceland, Japan and Norway showing little signs of success, anti-whaling countries led by the United States embarked last year on talks with Japan and its pro-hunting allies aimed at finding a compromise that everyone could live with.

For the anti-whaling side, potential gains include a possible reduction in the total number of whales being killed each year, greater oversight of hunting, and reform of the IWC's

scientific whaling clause under which any country can set its own catch quotas irrespective of the 1982 global moratorium on commercial hunting.

Whaling nations, particularly Japan, see political benefits in making a deal that would reduce the barrage of criticism they receive from whaling's opponents. Japan also wants to secure quasi-commercial quotas for four coastal communities with a history of whaling. ■



# Blue Whales reestablish past migration patterns

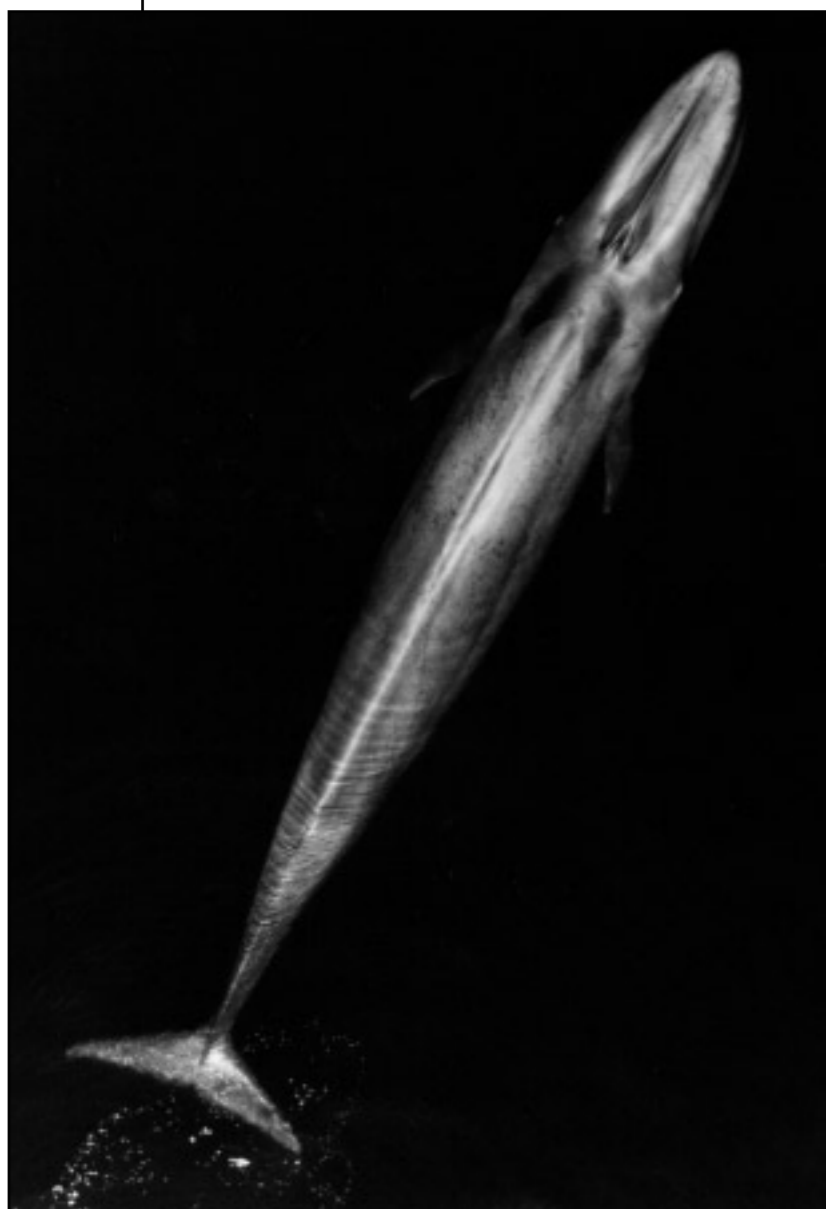
Scientists have documented the first known migration of blue whales from the coast of California to areas off British Columbia and the Gulf of Alaska since the end of commercial whaling in 1965.

U.S. and Canadian researchers identified 15 separate cases where blue whales were seen off British Columbia and the Gulf of Alaska. Four of the whales were identified as animals previously observed off the coast of California, suggesting a re-establishment of a historical migration pattern.

Researchers made this identification by comparing photographs of blue whales taken in the north Pacific Ocean since 1997 with a library of nearly 2,000 photographs of blue whales off the West Coast. A positive match was determined based on pigmentation patterns in skin color and shape of the dorsal fin.

Formerly large populations of blue whales in the north Pacific never rebounded after commercial whaling ended, while those animals off southern California have apparently fared much better.

Scientists are still not certain exactly why blue whales are now beginning to migrate from southern California to the north Pacific Ocean, although changing ocean conditions may have shifted their primary food source of krill further north. ■



Blue whales were severely depleted by commercial whaling activities during the early 1900's in the north Pacific and along the West Coast as far south as Baja California



*"The North Atlantic right whale is an icon for protecting and restoring valuable ocean resources which is a priority for NOAA,"*

Jane Lubchenco,  
NOAA administrator.

The right whales recorded could have migrated from the western North Atlantic right whale population, which is estimated at between 300 and 400 animals. But of the two right whales sighted in the last 50 years on the Cape Farewell Ground, one had only rarely been seen with the western population, and the other had never been seen in the area. The recordings in the Cape Farewell Ground raise the possibility that the eastern North Atlantic right whale population may still exist

## NOAA discover a population of endangered North Atlantic Right Whales off Greenland

A team of scientists have recorded the distinctive calls of endangered North Atlantic right whales in an area where it was believed that the historic resident population was hunted to extinction in the early 20th century. Besides providing a better understanding of the whales, the discovery has implications for future shipping in the region.

Scientists from NOAA's Pacific Marine Environmental Laboratory, NOAA's

National Marine Mammal Laboratory, and Oregon State University deployed "listening" hydrophones to continuously record sounds for a year in the Cape Farewell Ground—an area off the southern tip of Greenland. In July 2007, the team deployed five stationary hydrophones between 200 to 400 miles off the coast of Greenland. After collecting them in July 2008, the team sorted through the year's worth of recorded sound on each

device to find evidence of right whales. Using automated detection software to search for a particular right whale sound—an "up" call—and after months of sifting through false positives, they identified more than 2,000 real whale calls. All of the calls occurred between July and December, with evidence between July and September of a north-south migration covering thousands of miles. ■



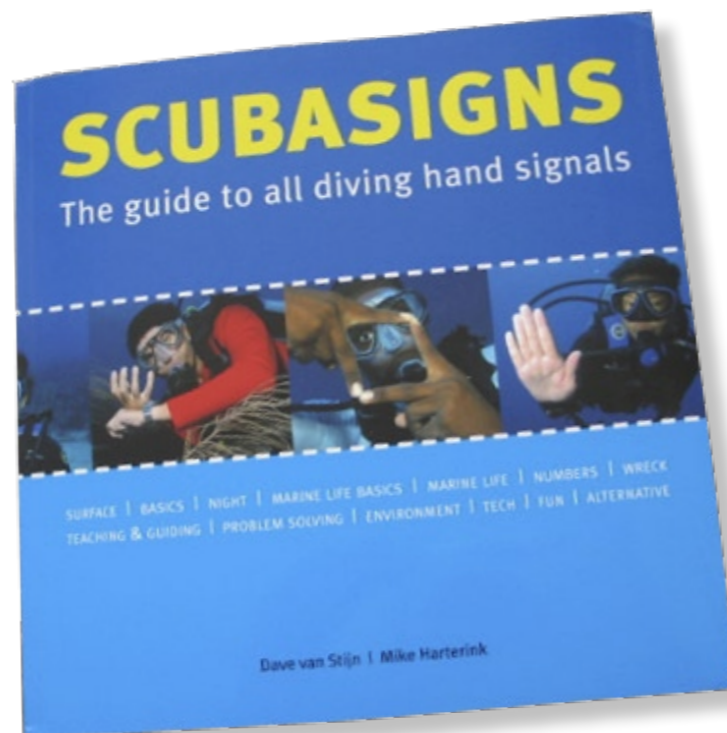




## Books & DVDs

Edited by Catherine GS Lim

POINT & CLICK  
ON BOLD LINKS



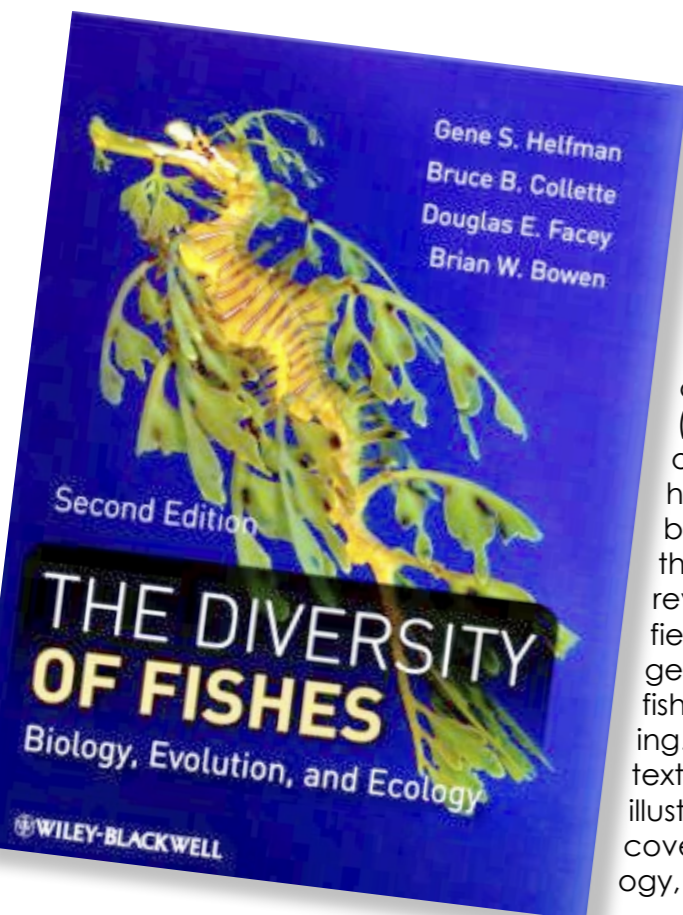
### Scubasigns

Would you believe that there are nearly 500 hand signals that divers can use to communicate with one another while underwater? This book showcases them using large colour photos that are limited to two to three per page, with a short description of their meaning. The hand signals vary in their purpose, from instructional to functional, recreational to just plain fun. Users can use hand signals to call their buddy's attention to a cave or drop-off, to tell them if you're feeling cold, or even if you happen to spot a stonefish or scorpionfish. Research for this book took several years, with the hand signals hailing from various parts of the world. While it is not mandatory to learn all the hand signals found in this book, doing so would definitely make your dives more interesting and safer. 288 pages, ISBN 9789090241654.



### Seahorses and Their Relatives

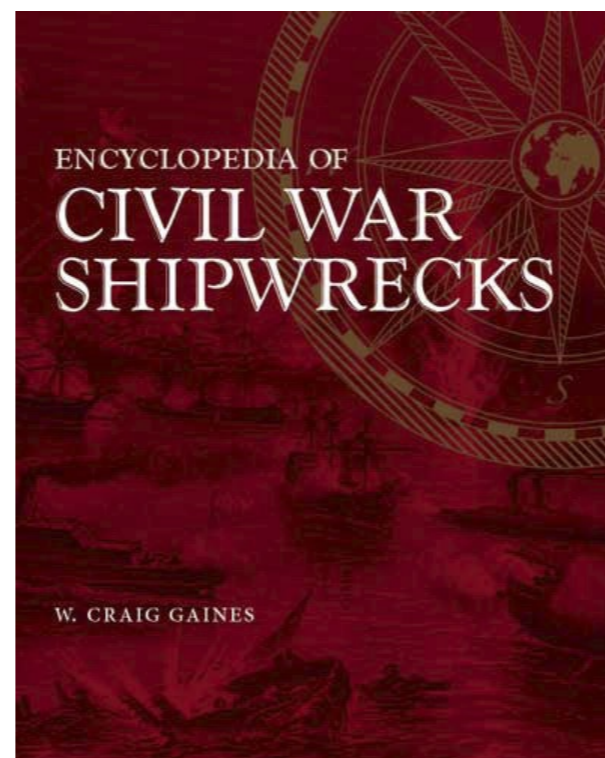
By Rudie H Kuiter, 2009, ISBN 0977537211. This item is about pipefishes, flutemouths, trumpetfishes and bellowfishes. No, we're not talking about the latest Pixar animated movie. Rather, these creatures are part of a group of animal species called syngnathids. This group includes the familiar seahorse and the bizarre-looking seadragon. This revised edition (previously *Seahorses, Pipefishes and Their Relatives*) includes a number of newly discovered species, more than 100 new pages, about 1,200 colour photos as well as chapters on studying and keeping seahorses.



### The Diversity of Fishes — Biology, Evolution and Ecology

By Gene S Helfman, Bruce B Collette, Douglas E Facey and Brian W Bowen, 2nd edition, 2009, ISBN-13 9781405124942.

If ichthyology is your cup of tea, chances are you would have studied (or at least reviewed) the first edition of this book. Now, the second edition has been published, and it promises to be packed with the latest updates on the subject. Every chapter has been revised to reflect developments in the field, with an additional chapter on genetics and the molecular ecology of fishes thrown in to enhance understanding. Despite its technical nature, the text is highly readable (with hundreds of illustrations thrown in for good measure), covering topics such as anatomy, physiology, ecology and behaviour.

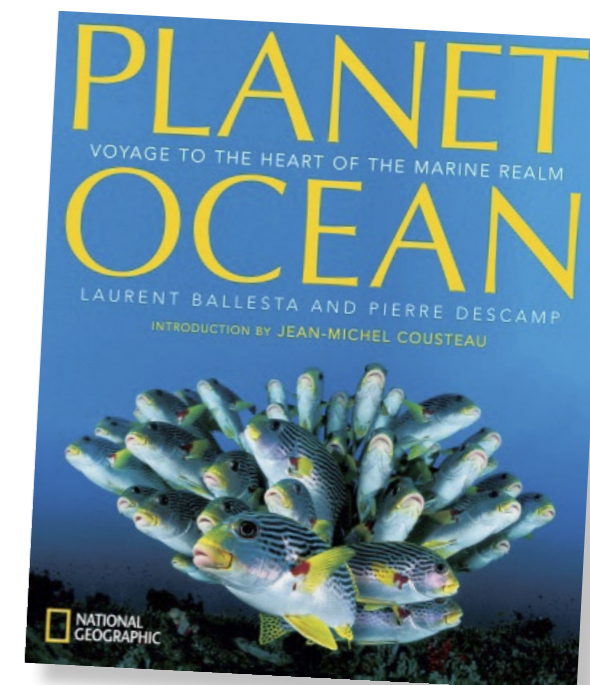


### Civil War Shipwrecks

*The Encyclopedia of Civil War Shipwrecks* by W. Craig Gaines aims to be a one-stop reference source for information on the famous and obscure ships lost in America's bloodiest war. There is a lot of good information in this book. However, as one reviewer, Scott Boyd writing in *Fredericksburg.com* points out in his in-depth going review, there are also a lot of problems: factual errors, misspelled place names, referring to places by the

wrong name and omitting information that could have clarified statements that otherwise seem unusual. The conclusion "in its current form will not live up to the publisher's claim on the rear dust-jacket flap that it is 'an essential reference work' unless it is extensively re-edited and fact-checked."

Review: **Shipwreck Book Sinks**

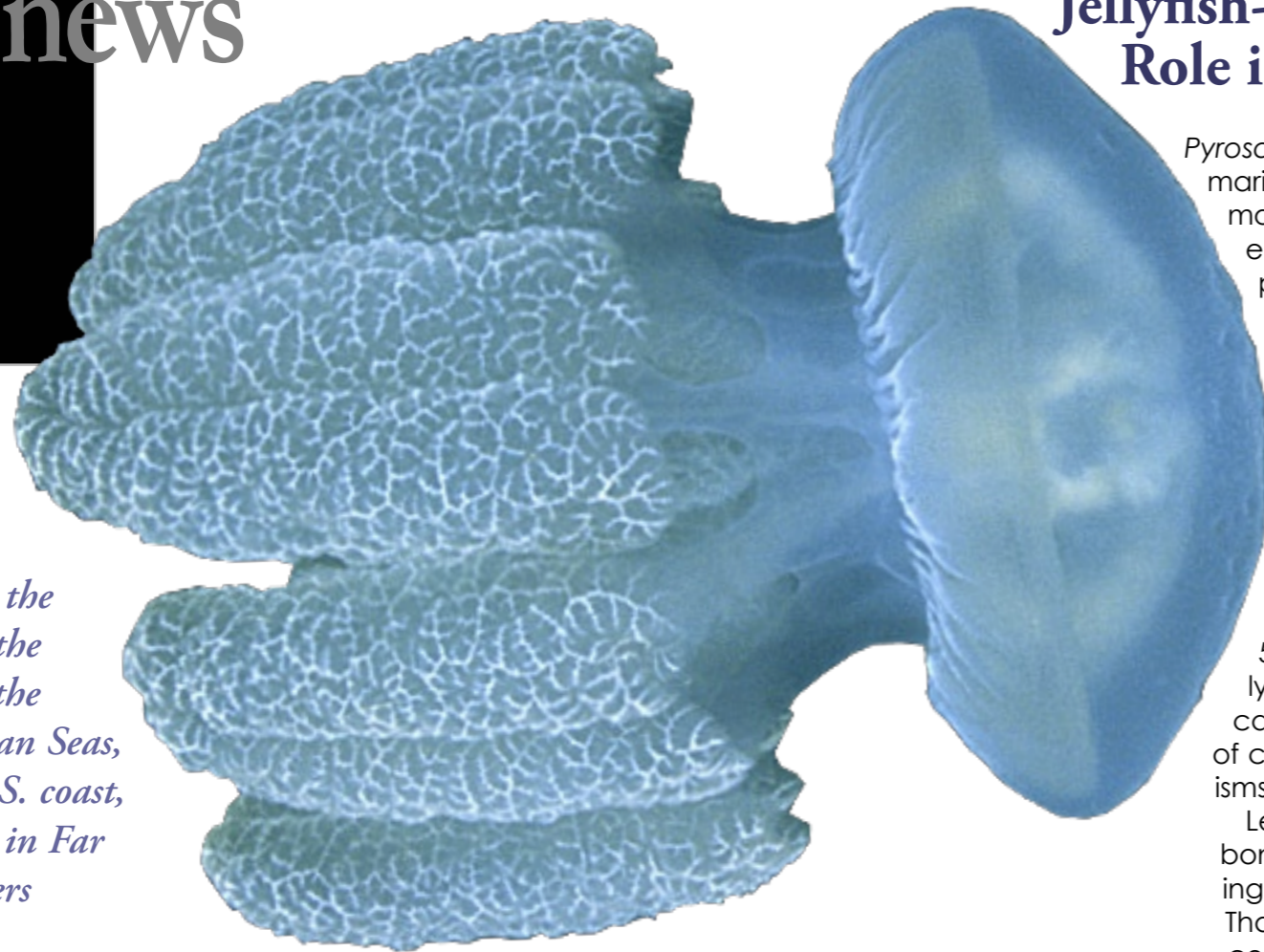


### Planet Ocean — Voyage to the Heart of the Marine Realm

By Laurent Ballesta and Pierre Descamp, 2007, hardcover, 368 pages, ISBN-13 978-1426201868.

Judging from its cover photo of yellowbanded sweetlips swimming outwards in a unique formation, this book promises to be an exceptional collection. It contains 400 colour photographs of marine animals and plants, as seen through the lens of acclaimed photographer Laurent Ballesta. Twenty-five essays give interesting information and analytical insight to the images, aiding the land-stranded reader to momentarily experience the wonders of the underwater world. With an introduction by Jean-Michel Cousteau, it promises to be more than just another coffee table book.

Edited by  
Bonnie McKenna



*In recent years, jellyfish blooms have been recorded in the Mediterranean, the Gulf of Mexico, the Black and Caspian Seas, the Northeast U.S. coast, and particularly in Far East coastal waters*

## Jellyfish-like Creatures May Play Major Role in the Ocean Carbon Cycle

*Pyrosoma atlanticum* are semi-transparent, barrel-shaped marine animals, about the size of a human thumb. They move through the water by drawing water in the front end and propelling it out the rear in a sort of jet propulsion. They belong to the group of thaliacean and consist of gelatinous substance like jellyfish. Swarming by millions in 'hot spots' and also dying by millions like salps. *Pyrosoma atlanticum* may be transporting tons of carbon per year from the ocean surface to the deep sea.

In May 2006 off Ivory Coast (West Africa), Mario Lebrato and Daniel Jones of the National Oceanography Centre in Southampton, England, discovered thousands of moribund thaliacean carcasses on the seafloor, the majority in depths of more than 500 metres in the continental slope. When they analysed dried samples, they were surprised: "A third of the carcasses consists of carbon. This is the highest proportion of carbon that has been measured in gelatinous organisms," states Mario Lebrato.

Lebrato and Jones explain the high proportion of carbon and the density of the creatures with their fast sinking. "They don't have the time to rot in the water column. That's why they reach the seafloor nearly in their original condition, including the carbon inside." ■

## Jellyfish 'Joyrides' a threat to the oceans

New evidence indicates that jellyfish blooms are associated with over-fishing and excess nutrients from fertilisers and sewage.

Dense jellyfish aggregations can be a natural feature of healthy ocean ecosystems, but a clear picture is now emerging of more severe and frequent jellyfish outbreaks worldwide.

"Fish normally keep jellyfish in check through competition and predation but overfishing can destroy that balance. For example, off Namibia, intense fishing has decimated sardine stocks and jellyfish have replaced them as the dominant species," says University of Queensland scientist, Dr Anthony Richardson.

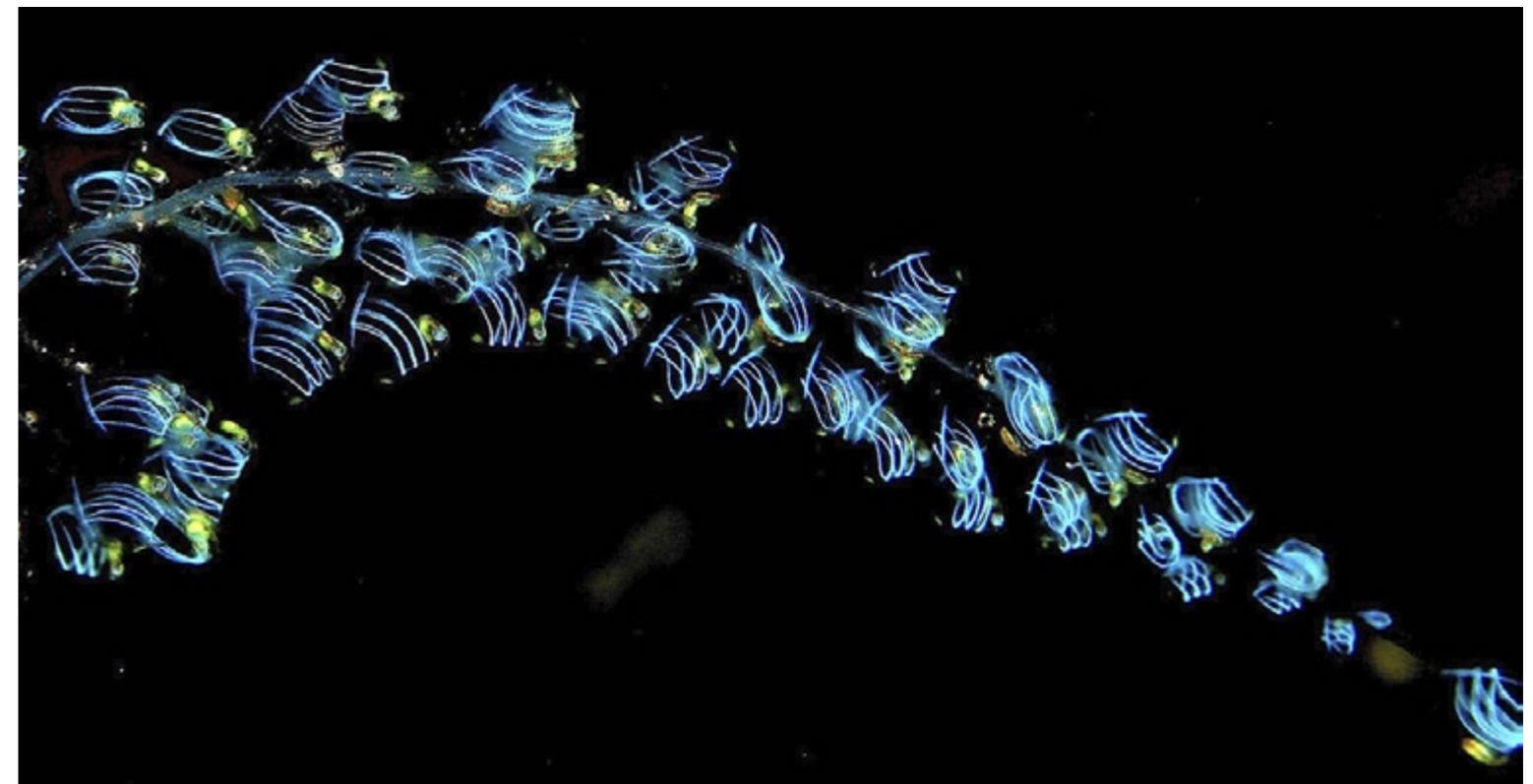
Climate change may favour some jellyfish species by increasing the availability of flagellates in surface waters—a key jellyfish food source. Warmer oceans could also extend the distribution of many jellyfish species.

"Mounting evidence suggests that open-ocean ecosystems can flip from being dominated by fish, to being dominated by jellyfish," Dr Richardson says. "This would have lasting ecological, economic and social consequences. We need to start managing the marine environment in a holistic and precautionary way to prevent more examples of what could be termed a *jellyfish joyride*." ■

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Dead bodies (these below are alive) of the marine organism *Pyrosoma atlanticum* may be transporting much more carbon to the seafloor than phytoplankton or other jellyfish-like creatures



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# Jellyfish, they're weird, they're squishy, but oh so fascinating

Text and photos by Bonnie McKenna



**“Jellies are so different, that is why people are fascinated by them. They are a contradiction, they are delicate yet can survive in the worst conditions,” said Sharyl M.G. Crossley, senior aquarist and jellyfish expert for the Tennessee Aquarium in Chattanooga, TN. “They are important predators as well as prey.”**

Jellyfish can be as small as a peanut or as large as three meters in diameter and 40 meters long. Most cause an irritable sting if the tentacles are touched and one, the smallest one, *Chironex fleckeri*, the sea wasp or box jelly is considered deadly.

## Ancient

The jellyfish is one of the oldest living creatures in the world. Jellyfish have existed on the face of this planet for over 650 million years. They have existed since before the dinosaurs and have survived long after the dinosaurs and million other species have gone extinct.

Jellyfish are amongst the most spectacular marine species in the world. They can be found in all the seas and oceans of the world at every level of the water. Jellyfish are known to exist in the coldest waters of the arctic and Antarctic oceans to warm tropical seas. Very few species, like the moon jelly, are able to survive across different climactic conditions, but most species can only be found in specific locations under specific conditions.

The moon jelly is able to survive across different climactic conditions



Jellyfish are squishy animals because they are composed of approximately 95 percent water. True jellyfish belong to the Phylum Cnidaria along with corals and sea anemones.

Other jellyfish-like critters include sea butterflies, sea elephants and pelagic tunicates such as scalps, doloilids and pyrosomes. The characteristic that unites all these unrelated animals is their delicate gelatinous tissue.

## Life Cycle

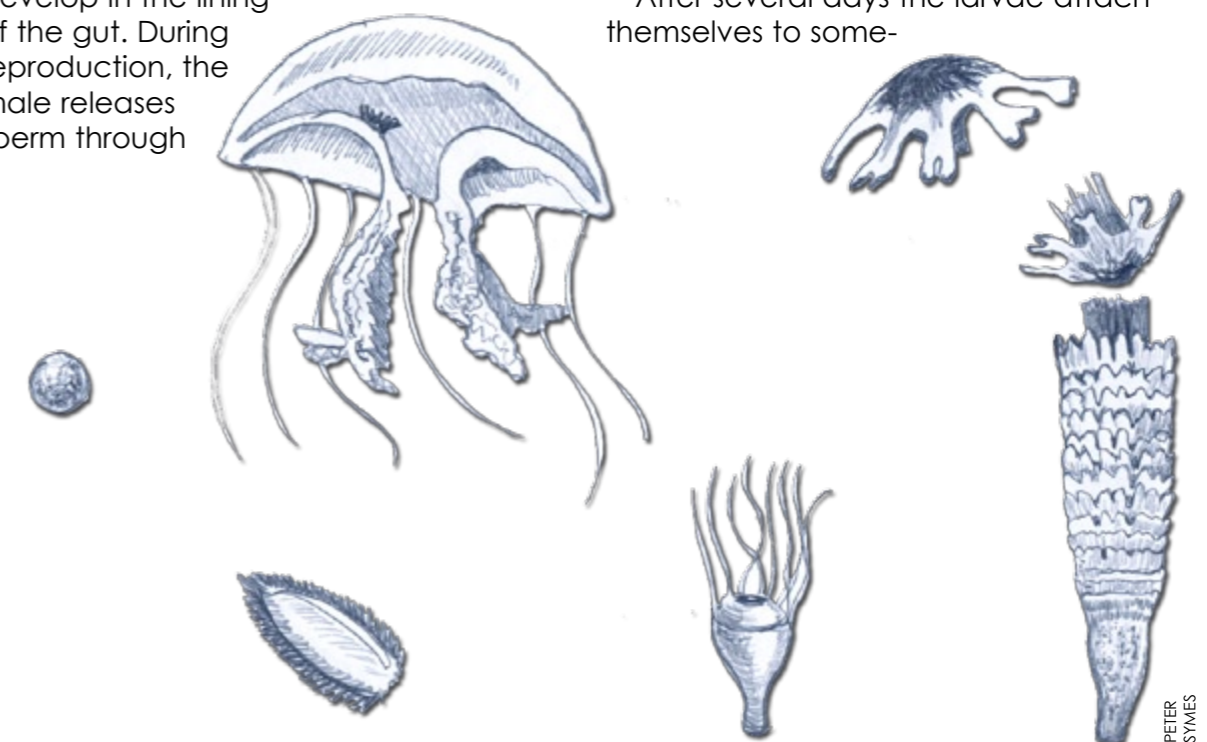
The life cycle of a typical jellyfish is complex and involves an alteration of generations in which the animal passes through two different body forms.

The familiar form of the jellyfish is the medusa; the smaller polyp form is restricted to the larval stage. Jellyfish reproduce sexually and individuals are either male or female. The reproductive organs develop in the lining of the gut. During reproduction, the male releases sperm through

its mouth into the water column. Some of the sperm are swept into the mouth of the female, where fertilization occurs.

Embryonic development begins either inside the female or in brood pouches along the oral arms. Small larvae (planulae) leave the mouth or brood pouches and enter the water column.

After several days the larvae attach themselves to some-



PETER SYMES

PETER SYMES



thing firm on the sea floor (rocks, shells, piers, boats, etc.) and gradually transform into flower-like polyps (scyphistoma). Polyps can multiply by producing buds or cysts that separate from the first polyp and develop into new polyps.

"A colony of polyps can reproduce asexually and give rise to other polyps and this stage, can in theory, go on indefinitely," said Crossley.

When conditions are right, fully developed polyps eventually produce a larval stage (the strobila), which resembles a stack of saucers. Each saucer develops into a tiny jellyfish (ephyra stage), which separates itself from the stack and becomes free swimming. In a few weeks, the ephyra will grow into an adult jellyfish, the medusa, thus completing the life cycle.

### Locomotion

Jellyfish drift with the ocean's currents, but they can swim to move short distances or redirect themselves. They float in the waters and get carried about in the tides and currents of the water.

They move by contracting muscles in their bell forcing water out to propel them in the opposite direction. The pulsating rhythm allows the jelly to regulate its vertical movement. Because jellyfish are sensitive to light, this vertical movement can be important.

Some jellyfish, like the sea wasp, descend to the ocean floor or deeper water during midday to avoid the bright sunlight then surface during early morning, late afternoon and evening.

### Eyes, mouth and stomach

Most jellyfish do not have eyes. Jellies rely on small sensory structures called rhopalia located around the edge of the bell. Within the rhopalia may be ocelli to sense light and statoliths to sense gravity. Box jellies have the most



complex ocelli resembling the image-forming eye of squid and vertebrates and they are able to distinguish between potential prey and non-prey.

As jellies float through the ocean they use their tentacles to snag prey. After the food has been immobilized it is passed up to the mouth. The mouth is located in the center of the underside of the bell.

### Venom apparatus

Jellyfish are equipped with specialized venom apparatus called cnidoblasts used for feeding and defense. A container inside the cnidoblast, the nematocyst, contains the stinging device. The structure of the stinging device varies with the species, but it generally consists of a hollow coiled thread with barbs lining its length.

*jellyfish are sensitive to light*

Nematocysts are concentrated on the tentacles or oral arms. A single tentacle contains thousands of nematocysts, which are activated when the tentacles make contact with an object. Pressure within the nematocyst causes the thread to uncoil acting as a harpoon, firing into the prey and injecting toxins.

Stings usually paralyze or kill small creatures, but some jellyfish are harmful to humans. Jellyfish

do not attack humans, but when humans come into contact with the jellyfish tentacles, they can be stung. The severity of the sting depends on the species of jelly and the sensitivity of the victim.

*A colony of polyps can reproduce asexually and give rise to other polyps and this stage, can in theory, go on indefinitely,*

### Dangerous jellyfish

Although most jellyfish can sting they are completely harmless to human. Only some jellyfish are capable of causing harm to humans, and it is important to identify them, so that they can be avoided. Here are some of the most dangerous jellyfish in the world:

- **Chironex fleckeri** (commonly known as the box jellyfish, marine stinger or sea wasp) is also from the species of Cubozoa. This species of jellyfish is amongst the most dangerous to humans. The tentacles of *Chironex fleckeri* are covered with a very high density of venom containing nematocysts, and their venom itself is also very powerful. A sting from a *Chironex fleckeri* can be excruciatingly painful and will result in death. In fact, a *Chironex fleckeri* sting can kill 60 humans in a span of only three minutes! It is important to remember that box jellyfish are actually an entire subspecies of jellyfish, of which *Chironex fleckeri* is only one species. Not all species of box jellyfish are dangerous to humans.



Chironex Fleckeri

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- **Carukia barnesi** (commonly known as Irukandji jellyfish) are classified as Cubozoans. This species of jellyfish is extremely poisonous. Symptoms of an Irukandji sting including nausea, vomiting, cramps, high blood pressure, etc. The sting itself only causes mild discomfort, but the venom is slow-acting and severe symptoms surface only after a few minutes of the sting. There is no known antidote to the venom of Irukandji venom. In most cases, victims have to be hospitalized and in rare cases, people are known to have died from Irukandji stings.

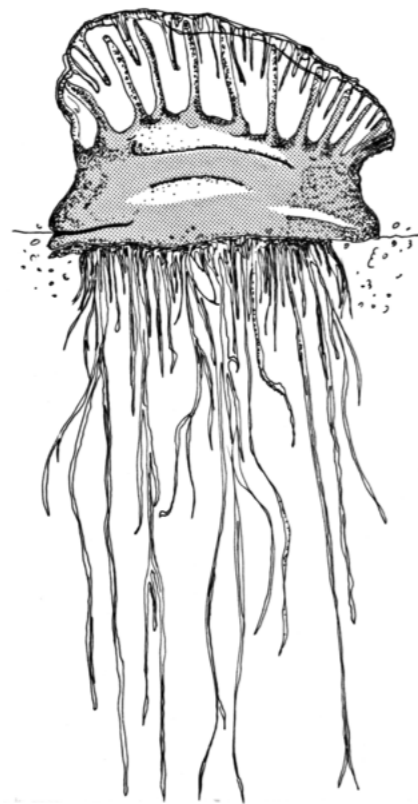


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Irukandji Jellyfish

*To some, jellyfish may appear to have no apparent value, but in fact, they are a very important part of the marine food chain.*

- **Physalia physalis** (commonly known as Portuguese Man O' War, blue bubble, blue bottle, man-of-war): This species is wrongly considered to be a jellyfish, it is not even a single organism. It is, in fact, a colony of four highly specialized polyps. These polyps are all attached to each other and serve different functions similar to different parts of a single body. They cannot survive independently, only as an integrated whole. A man-of-war sting can be extremely painful to humans and may leave red welts where the tentacles have made contact with skin. The sting can also lead to fever, shock, heart and lung problems, and in rare cases, even death. Victims will require hospitalization to complete treatment of the symptoms of a man-of-war sting.



PEARSON SCOTT FORESMAN

Portuguese Man O' War,

- **Chrysaora quinquecirrha** (commonly known as Sea Nettle): This species of jellyfish is reddish-brown in color, has a saucer-like shape, has four oral arms and long tentacles and is usually 6 to 8 inches in size. A single sting from the sea nettle usually causes only mild prickly sensation or mild burning. However, like most jellyfish, they travel in shoals and multiple stings from sea nettle can cause serious harm to humans.



ANASTASIA SHESTERINA - CREATIVE COMMONS

Sea Nettle

### Not jellyfish

Comb jellies, Ctenophora, are not 'true jellyfish' because they lack stinging cells. Their most distinctive feature is the "combs", groups of cilia that they use for swimming, and they are the largest animals that swim by means of cilia



NOAA PHOTO GALLERY

Comb jellies are not cnidarians

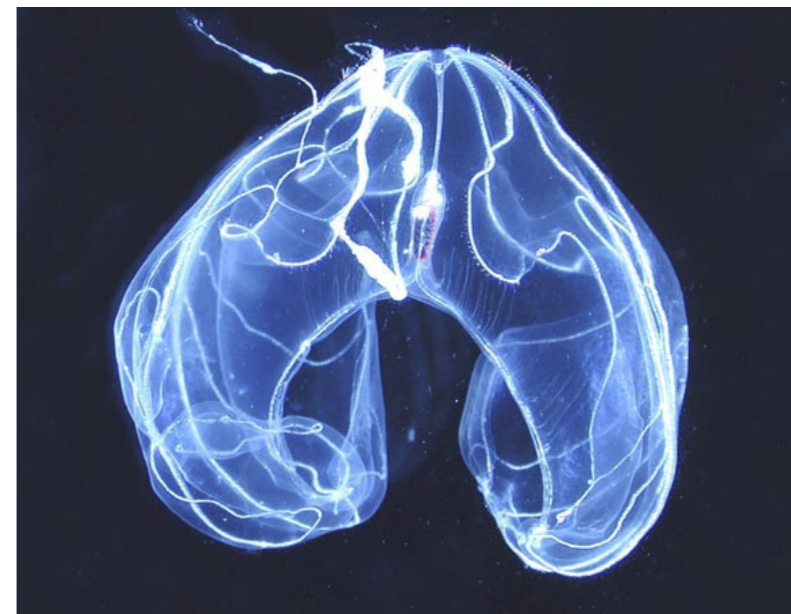
### Ctenophora

Ctenophores are jellyfish-like animals commonly called "comb jellies", "sea gooseberries", "sea walnuts", or "Venus' girdles." Comb jellies are voracious marine predators, feeding mostly on plankton.

Like cnidarians, their bodies consist of a mass of jelly with one layer of cells on the outside and another lining the internal cavity. In ctenophores these layers are two cells deep while those in cnidarians are only one cell deep.

Ctenophores also resemble cnidarians in having a decentralized nerve net rather than a brain

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A ctenophore, *Bathocyroe fosteri*

### Value

To some, jellyfish may appear to have no apparent value, but in fact, they are a very important part of the marine food chain. Jellyfish are carnivorous, feeding mostly on a variety of zooplankton, comb jellies and occasionally other jellyfish. Larger species are capable of capturing and devouring large marine organisms. Jellyfish are preyed upon by turtles, spadefish, sunfish and other marine organisms.

### Culinary delicacies

Some species, such as the mushroom and cannonball jellyfish are considered a delicacy. Pickled or semi-dried mushroom jellies are consumed in large quantities in Asia where they are part of a multi-million dollar seafood industry.



Jellyfish strips with soy sauce, sesame oil, and chili sauce

### Glowing in the dark

Certain species of jellyfish glow in the dark. The *Aequorea Victoria*, found in the north Pacific, emits a bioluminescent glow to startle predators. The green fluorescent protein, or GFP, of this jellyfish is considered as an excellent gene marker. Molecular biologists have been able to splice the gene into different genes of a number of proteins to produce luminous proteins that can easily be switched-on when exposed to blue light. Researchers are able to observe how certain genes act in living cells. GFP has been used in dozens of applications from searching for a cure for deafness to



## Jellyfish

number of polyps into the water. These polyps quickly develop into jellyfish and form new swarms.

Jellyfish are also known to swim in swarms in natural conditions. This is because they do not have very specialized reproductive systems and the male jellyfish releases

Aequorea victoria, also sometimes called the crystal jelly, is a bioluminescent hydrozoan jellyfish

develop treatments for catastrophic illnesses.

### Swarms

Currently, a lot of attention is being paid to jellyfish blooms, actually swarms that are causing havoc in many areas of the world. A large number of jellyfish swarms have suddenly appeared in and around tourist and fishing destinations around the world. The number of jellyfish stings reported every year is rising dramatically, doubling and tripling in the case of some regions.

"Jellyfish are proliferating," said Crossley, "and there are a number of theories. Fertilizers and effluent from agriculture, human habitation, sea farms and over fishing can result in a reduction in the number of predators and deplete the oxygen in the water creating dead zones where jellyfish can thrive."

It is theorized too, that a reduction in rainfall near coastlines is causing an increase in the salinity of water, another favorable factor for jellyfish reproduction. When jellyfish are threatened, they tend to release a

es sperm in the water. To facilitate the fertilization process, jellyfish usually swim in close proximity to each other. "Invasive species, such as the spotted jellies from Australia, now found in the Gulf of Mexico are another reason why more jellies are being spotted," commented Crossley.

It is important to remember that jellyfish do not attack human beings.

*Jellyfish get a bad rap, but they are important to our ecosystem*

They do not have a brain and except for a very few, they cannot control their movement. Instead of a brain, jellyfish possess an elementary nervous system, or nerve net, which consists of receptors capable of detecting light, odor and other stimuli and coordinating appropriate responses.

The abundance of jellyfish in and near our coastlines could be caused by global warming and the jellyfish are just as much impacted as the human race. However, jellyfish have existed on the surface of the earth for more than 650 million years and is known to survive in damaged environments, and that is what it is doing right now.

"Jellyfish get a bad rap, but they are important to our ecosystem," Crossley said.

For more information, go to [www.jellyfishfacts.net](http://www.jellyfishfacts.net)

Jellyfish swarms video ▶



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A thirst for life.  
A story of one dive.

# Lessons learned

Text and photos  
courtesy of Gennady Misan

**Not all technical dives end up successfully; unforeseen circumstances often make an elaborate dive plan go completely wrong. What will a person do when it's a question of life or death? Give it all up and submit, or fight until the end, trying to find the way out? On January 9th, Gennady Misan had a 155m dive that could have ended tragically, but due to accurate work of the diver and the support team, we can learn all the details not from a police record, but from the diver's own words.**

**Deep diving in Lake Baikal**  
Reaching 1,642 meters at its deepest point, Lake Baikal, located in southern Siberia in Russia, is the deepest and largest freshwater lake by volume in the world. A typical dive site on Baikal is a shallow shelf, 10-200m long, turning into a vertical wall. There are only six sheer walls reaching more than 100-120m into the deep.

Usually, in order to be guaranteed a descent of more than 100m, you have to stand on the edge of a drop-off, move along the surface until the wall is out of sight, and then continue for another 30-40m. In other words, the descent always takes place in open water, with no markers, and



from 110m (even at 50m, if the visibility is bad) —in complete darkness. Ascent will usually take place by following the seabed to the slope, then go up along the wall.

### Freedom and beauty

I don't like diving with guidelines (lifelines) and don't practice it. The fall is just a few minutes, and after that, an hour and a half long decompression in deep blue. That's really something special!

Those who have dived on Baikal will understand. Free fall and surfacing allows you to enjoy the incredible beauty of nature when you look up and down from 100m and see picturesque canyons, mountain ranges, grottos. The stark beauty of the lake captures you.

Water temperature in depths of over 60m is never more than 4°C (39° F). On the surface, it depends on the season. In December through January, it's 1°C to 2°C. The thing is that the temperature is the same in all depths available to Trimix divers at this time.

### Planned the whole thing

Why did I plan on diving in January? The answer is simple. Such dives need pro-

CONTRIBUTING EXPERT ON THIS STORY  
Gennady Misan— instructor-trainer IANTD, Advanced Trimix instructor TDI, instructor CMAS3\*; professional diver since 1988; completed more than 8000 dives, most of them on Baikal. Personal achievements: Russian record in cold water diving - 154m (December 2005), 85m night dive (2006, New Year)

*Not all technical dives end up successfully; unforeseen circumstances often make an elaborate dive plan go completely wrong.*

found self-preparation and well-trained buddies. It's not a "why-don't-I-do-it-today?" thing when you wake up in the morning, decide to go to the dive centre, put the equipment into the van, drive one hour, and you're there. Preparation kept me busy the whole summer and autumn.

## Perhaps I was wrong

I'd done my previous 154m dive solo. There was only safety equipment on the surface, and in the

middle of the dive, a support diver came down to me to see if everything was going well.

With other 100-140m dives, I only had safety equipment on the surface (except those connected with courses and deep-water support).

I'm not sure I was right then. The shoulder of a buddy is a great emotional support and a real help. Now, I don't dive deep alone.

In September, Andrei Slepnev

and I began preparing for deep dives. Andrei had been doing Trimix diving for quite a while, passing the IDC qualifications for technical instructor.

We needed training to prepare for diving in complete darkness, especially in two's. We'd been doing this for a few months interrupted by routine work at the dive club. In December, we made four 55-60m ER dives; 70-90m trimix dives; and on January 3rd, a 100-meter dive.

Gennady Misan in his 'Sunday outfit'

Malfunction of equipment included only Andrei's Legend, which froze when going into the water (70m dive). The regulator underwent technical service, and the following dives were successful. My equipment never failed.

### TECHNICAL SPECS OF DIVE

**SUPPORTS:** Andrei Mourzin (CMAS 3\*, EAN IANTD), Tatyana Oparina (ATD TDI, Advanced EAN Instructor IANTD), Sergey Polovnikov (a diver).

**GASES:** TM 8/67 (double tank 12\*2), TM 14/50 (deco 12l, alum.), TM 32/20, EAN 60 (I use the same gas to inflate my dry suit), O<sub>2</sub> Aboard is spare oxygen and EAN50 in case we lose deco gas.

### EQUIPMENT

**Suit:** HD Pro Dry Trilam Bare and dry gloves

**Undergarment:** warm woolen underwear and Weezle Extreme+

**Computers:** VR 3

**Torch:** Metal Sub 50 plau a spare one, Lola.

**Oxygen regulators:** Apex ATX 50

**Main regulator:** Apex TX 100 (connected to the right inflator)

**Spare regulator:** Apex ATX 50 (on the left inflator)

**Wing:** Dive Rite Dual Rec with DIR mount, steel back. (I always use the wing as a mount only and as a spare system for buoyancy, inflating only the dry suit.)



### 160 meter dive

A 160m dive was planned for January 9th. My buddy was Andrei Slepnev (ATMX TDI). It was a great experience diving on Baikal.

### Dive site "Baranchiki"

One of vertical walls descended more than 120m. Approximate visibility was 50m (when I had dived there ten days earlier). The water was nearly frozen; sludge ice ran all along the Circum-Baikal Railway.

**The plan.** The dive boat came to the edge of the drop-off. There have been many dives taking place here before. The wall is about 30m away from the shore.

Andrei and I went into the water and moved away from the wall along the surface. The sheer wall was in sight. We descended together to 100m where Andrei would stay. His bottom time would be ten minutes. His other task was to keep spare decompression



Exploring the rich green underworld of Lake Baikal



*I realized that through a spare regulator, at a great speed, my bottom trimix was getting away!*



Talk about freezing temperatures! Air tanks covered in ice lay on deck

gasses.

Leaving Andrei I kept descending until I reached 160 meters. I spent one minute on the bottom and started my ascent. At 100m, I met Andrei again, and we ascended to surface together, moving slightly to the right.

At 16 meters, where there is a gas shift to EAN60, we met the first support team member; if needed, we would give him the used travel gas. He supported us up to the 6m stop. At 6m, we met with the second support member. He was there to monitor how we felt and keep and eye out.

The total time of the dive was 98 minutes.

### Support team

The support member on the surface has the responsibility of supervising the entire dive. In case a buoy appears or any unplanned situation occurs, he must send a boat and help get divers back on board. There were two other groups of sport divers on board who dived on their own.

### What happened

January 9th, 10 am, our live-aboard headed for the dive site. It was cloudy, relatively warm (-8°C), and Baikal was calm. We came across some smaller isolated ice floes. Water temperature was at the freezing point.

While under way, we were kitting up in a warm lounge, checking everything one more time, and running over the diveplan.

We reached "Baranchiki" at around noon where we anchored without any problems. Visibility was zero. We couldn't see the edge of the drop-off but the echo sounder indicated a depth of 70m.

I went into the water. Meanwhile Andrei had problems with his equipment which delayed him. The edge of the drop-off was all a blur, which meant visibility was no more than 20m. I decided not to wait for Andrei, and having co-ordinated with the support stand-by, I commenced my descent.

**1st minute.** Everything was going according to the plan. At 20m, I switched over to the bottom mix. I couldn't see the wall.

**3rd minute.** At about 80m, there was no daylight left, and I could only see by torch lights. I was outstripping Andrei a lot and hoped he was descending not too far from me. I reached 100m and descended further. No wall was seen. I turned around to look for the wall in the torchlight.

**4th minute.** 130m. There was the wall, five meters away. I pointed my torch downward along the wall which just seemed to disappear into the abyss. I started to slow my descent.

**5th minute.** 150m. I was descending slowly. The wall was still five meters

away but the bottom wasn't visible yet. Somewhere from underneath me, I caught a glimpse of escaping air. I stopped at once and began surfacing. The depth was 155m. I couldn't understand where it was coming from—some stage tank? The current of gas became very powerful, and I realized that through a spare regulator my bottom trimix was bleeding away — and fast!

A couple of seconds later I started to rise. Subconsciously, I realized that it was probably the left inflator; I automatically turned off the valve and did my best to vent. Simultaneously, between the four stage tanks I was carrying, I found the one with the gas I needed.

**7th minute.** Depth 125m. I have managed to shut down the valve but it



*I tried to figure out where the drop-off was and started moving in its supposed direction.*



Heading out towards the drop-off

seemed that all the bottom gas was gone. Finally I found the correct regulator. I hectically switched it over—*what if I mixed up the gases?* The regulator started to free-flow but I didn't pay attention. Now I had a far more serious problem in getting the ascent under control. I couldn't see the wall, so I started surfacing in open water.

While switching over to the travel gas, I lost the venting valve on my dry suit. I was trying to vent the suit and the wing simultaneously. The valve was completely, but it couldn't cope with volumes of expanding air wanting to escape

### Run-away ascent

**8th-9th minutes.** I shot straight up,

while trying to stop. It was completely dark around me. At some point, I must have fainted. I couldn't see anything, everything was hazy.

**10th minute.** I wondered how I managed to come around and keep fighting for life. 35m. It turned out that apparently I have managed to switch over to Trimix 32/20, and it also was at a freezing point. My ascent slowed down.

At 28m, I finally managed to stop. Exhausted, out of breath... Fits of suffocation. There wasn't enough air. I still felt dizzy. I assumed that I got a respiratory form of DCS.

### Assessing the situation

There was a wall of small bubbles in front of me coming from the deep.

I assessed the situation: Bottom gas was spent; travel 32/20 was nearly spent. There was Trimix 14/50, half of EAN60 and pure oxygen left. I felt awful. I didn't want to go deep down and cover the missed stops.

After the assessment of the speed of coming up and its consequences, I decided to switch over to pure oxygen and go for my ascent. I tried to figure out where the drop-off was and started moving in that supposed direction.

### Should have's

I should have ascended to where I had switched over to EAN60, then moved on and switched over to pure oxygen. But I thought that in my situation the sooner I started

*At 28m, I finally managed to stop. Exhausted, out of breath... Fits of suffocation. There wasn't enough air. I still felt dizzy.*



Cruising through ice pack on Lake Baikal



breathing oxygen, the better. The tank had no nitrogen, so it was supposed to lessen the degree of DCS, which meant to kill me as soon as I surfaced.

After a couple of minutes of breathing oxygen, moving towards the drop-off and coming up, there were no changes in the way I felt—it didn't get worse. I kept on ascending. After four minutes, I appeared on the surface and saw the drop-off. I gave a signal for help and tried to go down again—at least to 3 or 4 meters; I thought I should have decompressed at that depth. After giving it a try, I realized that, physically, it was out of

the question.

**17th minute.** On the surface, I looked around, searching for the boat. It was about 70m away from me. I started waving and calling for help. Fits of suffocation came back, I couldn't feel my legs. I tried relaxing while waiting for help. I was breathing oxygen all the time.

### Stand-by's

The hose had burst on the boat; it was impossible to use it. It was then decided to send for the ship *Valeria*, which was moored. However, just five minutes earlier, the recreational divers had gone

into the water. In order not to go over their heads when leaving, it was decided to send one of the stand-by's to fetch them.

It took no more than two minutes, since the stand-by was already ready to get into the water. The divers were found by their bubbles and were ushered onto the shore.

The ship headed for me. Twenty minutes after surfacing, help arrived in the form of my buddy who, when realizing that everything had gone wrong, had decompressed as soon as he could and came up to the surface. And help

*There is always a chance to survive.  
Only those who think and prepare have it.*

## Baikal

was also provided by the *Valeria* crew. I wasn't able to take off the equipment and get aboard myself, besides, it was better not to move at all. My buddy helped me with the equipment; the *Valeria* crew—in icy water up to their knees—were trying to help Andrei.

Finally, I was lifted up, taken to the cabin, released of the equipment, and given pure oxygen. I'm very grateful to the crew and my buddy for their professionalism and cooperation.

### Post decompression

My symptoms included numb legs and a feeling that they'd been whipped by nettles. It finally dawned on me that I was truly saved and safe. People usually die of extensive DCS in such a situation. I survived.

On board, I continued to breath pure oxygen continuously. An immediate call was placed to the pressure chamber of M4C (Nicola settlement) and the boat

headed for Listvyanka.

On my way, I drank about two litres of water. The feeling of suffocation was gone, and I could feel my legs again.

*People usually die of severe DCS in such a situation. I survived.*

Sensitivity to cold appeared. Even a slight temperature fluctuation—like the opening and closing of a cabin door—felt like a burn.

About an hour after getting aboard, I felt extremely tired. Though I didn't feel like sleeping. I didn't observe any other symptoms like aching joints, rash, paralysis, shiver, fever, etc.

When we arrived in Listvyanka, I felt fine, although very tired. We drove to M4C. It had been three hours since I surfaced. As I felt all right, I didn't feel like undergoing any treatment.

### Better be safe than sorry

At the time, the symptoms were exhaustion and a creepy feeling in my legs. It was agreed upon that I would undergo a preventive 30m recompression in the pressure chamber, with one hour exposure and the following two hours decom-





Gennady Misan preparing his equipment

pression.

At a pressure of 4 bar, the creepiness in my legs was gone, but by 18m, the sensation returned, albeit to a lesser degree. The treatment schedule remained unchanged, however.

After the pressure chamber, I went home and kept on breathing pure oxygen. Around 11pm, the back surface of my thighs and calves got numb. Sensitivity to cold increased. Slight local massage gave some temporary relief. As I

could stay physically active, no measures were taken.

On January 10th, I slept all day, but exhaustion went away by the evening. I didn't breathe oxygen that day. The numbness remained.

January 11th was a regular work day. My muscles were numb, but this didn't affect physical activity.

### Serious DCS

These kinds of symptoms—suffocation, numbness, weakness—are signs of a serious form of DCS

## Baikal

affecting the central nervous system. The lung form of DCS (that started when I was still underwater) takes place in only two percent of cases. Also, it is a rare thing when all the aforementioned symptoms aren't accompanied by any others.

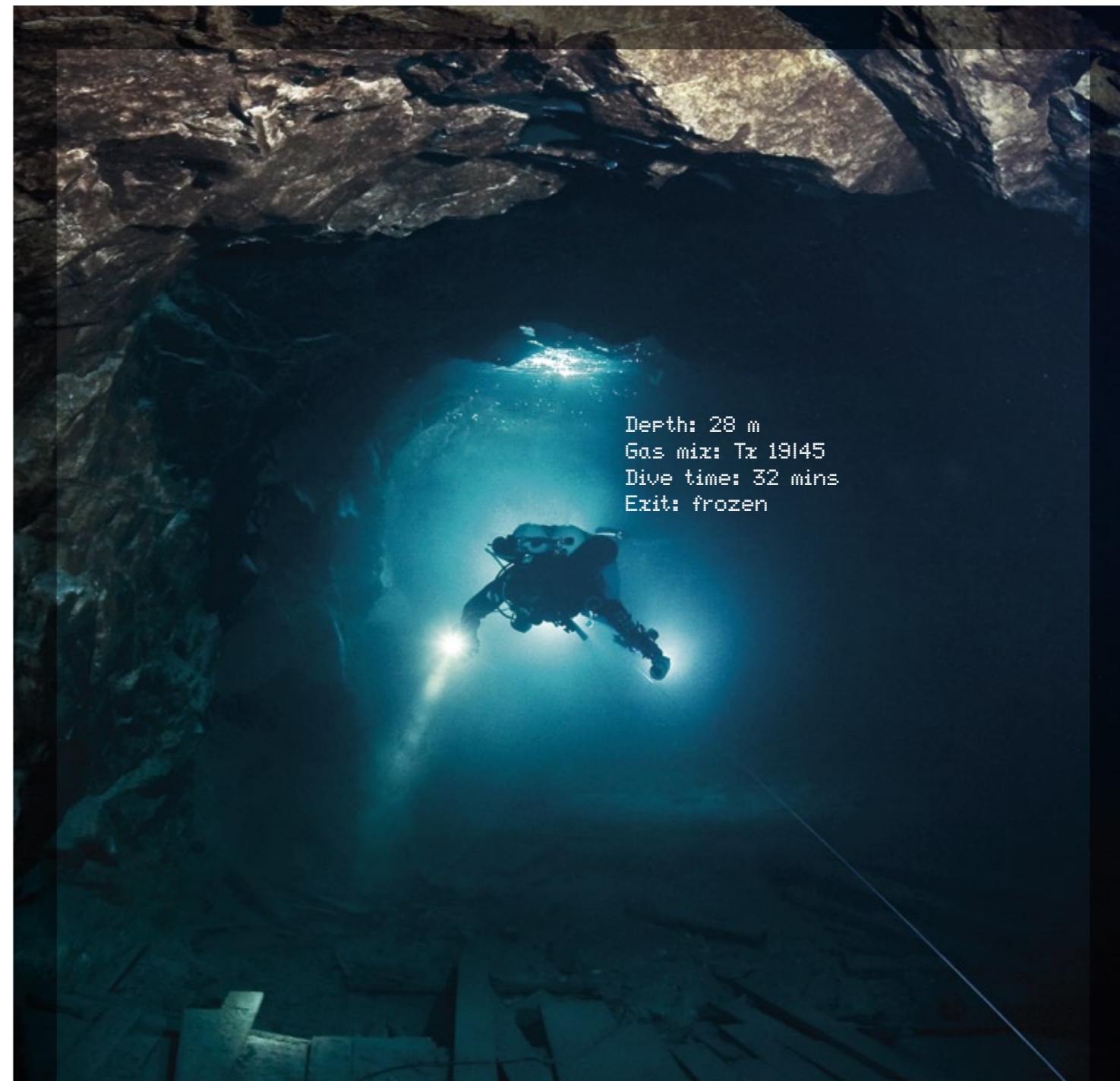
On January 12th, at 11am, I had a 40-minute long session in the oxygen pressure chamber, at a pressure of 1.8 bar. After that, the numbness decreased. On the same day, a diving expert of M4C, Valery Chernikh, phoned Boris Nikolayevich Pavlov. Based on the symptoms, I was considered to have a serious form of DCS. A second regime of medical recompression was recommended. Personally, I thought that I didn't have DCS, but just the remaining signs connected with the trauma of soft tissue.

On January 13th, at 11am, there was one more session of oxygen therapy (2 hours at 2 bar). At 8pm, I stopped arguing with my wife and M4C experts, and went to the M4C pressure centre. At 11pm, they started medical recompression in the pressure chamber. At 70m, all my symptoms disappeared, but after coming up to 38m, they returned. After consulting the M4C experts by phone, we moved on to the third regime of recompression. My total time in the pressure chamber was 60 hours and 45 minutes.

After all I completed this program, DCS was completely eliminated. Symptoms connected with the trauma of soft tissues lingered on though. Further treatment included vitamins.

### Analyzing what happened

This dive should have been cancelled at the beginning when my buddy was delayed by equipment problems. A version of Murphy's



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# SUUNTO



## Baikal

*I didn't do what I always mention at all technical courses: Stop diving if something goes wrong*



Lake Baikal is stunning and has an unique beauty

Law says: "If a few misfortunes are to happen, they happen in the most unfavorable order." Thus, in diving we can say, "The greater the preparation for an extreme dive, the less chance it will be aborted, even if it turns out to be a failure."

*My total time in the pressure chamber was 60 hours and 45 minutes.*

This time, I didn't do what I always mention at all technical courses: Stop diving if something goes wrong. I didn't wait for my buddy, and though there was nothing he

could really do to help me in that situation, I started diving anyway. Regardless, this dive happened the way it happened. It was unique in its own way—unique in the fact that the diver survived and is quite well.

### The reasons why I am still around:

- The dive was short, and there wasn't great saturation.
- I breathed pure oxygen from 28m and continued to do so on the surface

until my dive buddy and the *Valeria* crew arrived.

- Although I refused to go deep again to cover the missed stops, it was quite possible that the gases were enough, and they might as well have been brought by support divers on stand-by.
- Professionalism of the dive buddy and the *Valeria* crew in taking off the equipment and getting me onboard, resulted in absolutely no physical work on the my part.
- I continuously breathed pure oxygen on board.
- What is important is that despite a near tragedy, I didn't lose my sense of self-control and didn't fuss about, or panic.

The issues to mention about this dive are:

- You shouldn't make experimental dives when the water is about to freeze—my second regulator just froze in the very cold water under great pressure, even without being breathed from.

- The dive buddy, a good security team, an understanding ship crew and good ship. They're more than 50 percent of success. I made the mistake of having starting the dive on my own, but my dive buddy, the support divers on stand-by and the crew helped me finish it more or less safely.

There is always a chance to survive. Only those who think and prepare have it. You mustn't give up, you must fight. But you must fight right. Very often concentrated, persistent, unthinking self-rescuing actions lead to death.

### Further plans

Baikal is covered with ice during the winter. Deep dives are closed until May.

Before, we made trimix dives in port Baikal where it is deep and the water is open even in severe frost. But aforementioned story shows that deep dives at temperature of freezing are too dangerous. Deep diving has been planned in April, in Palau. In May – deep sunken ships in the Baltic. In the end of May, we start Baikal deep water training and will practice diving with buddies. 60-80-100-110-120-130. After that... There is an idea to make a 160m dive in two or in three, and exactly on Circum – Baikal Railway where the bottom can offer you so many interesting things. ■

*There is always a chance to survive.*

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Edited by Peter Symes and Scott Bennett



Tiger Shark—rear curtain sync, Sea & Sea housing, D200 camera, 17-35 Nikon zoom lens at 35 end, YS300 and 120 flashguns on half power, 1/15th sec exposure, f22. Faster shutter speed produces less movement in subject and background

As underwater photographers we have a whole world ready made for these techniques. Like it or not, a picture can be given movement and exaggerated colour, turning it from an otherwise boring subject to something that is both vibrant and can truly be called ART. So, let us look at these three techniques and how we can apply them underwater.

### Panning

In its simplest form, panning is either when the photographer is stationary and the subject is moving, or both photographer and subject are moving at the same speed. Let's take the first one first.

Using a diver as a subject getting him to swim past you at a set distance is the easiest way to test and perfect this technique. The key to success is a fluid panning action, usually

from right to left and the correct shutter speed for the job. Using a D200 in a Sea & Sea housing with a 20mm lens set at f16 1/4<sup>th</sup> sec exposure, which makes the best use of available light, allow the diver to swim parallel in front of you. Then, start moving the camera to match the speed of the swimming diver. Before he is directly in front of you, when the panning speed of the camera and swimming diver match, gently press the shutter.

It is important that the panning action starts before and carries on after the shutter has been pressed to create fluidity in movement. It needs practice to achieve. It is also important to bracket the exposure to see which shutter speed f stop combination gives the most artistic result. In this instance, I would also use f11 at 1/8<sup>th</sup> sec and f22 at 1/2 sec.

What you will end up with is a photograph of a diver, his torso frozen, limbs moving and a blurred background, giving exaggerated motion to the subject. This can easily be practiced in your local swimming pool.

The second technique is when the photographer and subject are moving at the same speed and can be applied simply when swimming down a reef knowing that you have a good chance that you will come across certain subjects. The important thing to remember in this situation is that the intent is there, and your camera set up must be ready if the opportunity arises.

There is a reef in Indonesia where I come across hawksbill turtles frequently. My D200 is set at around f16 at 1/4 sec exposure (dependent on the ambient light reading), so when the turtle

# Special Techniques

*Panning,  
Zooming &  
Rear Curtain Sync*

Text and photos by Tony White

These are special in camera photographic techniques that have long been used for many years by both professional and amateur land photographers to add creativity to an otherwise boring shot. A stationary car can be made to look like it is travelling at 100 mph and people can be given movement whilst they are really standing still.



Lionfish—rear curtain sync, Sea & Sea housing, D200 camera, 17-35 Nikon zoom lens at 35 end, YS300 and 120 flashguns on half power, 1/2 sec exposure, f22. Slower shutter speed produces more exaggerated movement in subject and background



Sting Ray—Zooming, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, available light, 1/2 sec exposure, f22. Exaggerated movement due to long shutter speed zooming from 17mm through to 35mm

swims off the reef into the blue, I am ready matching my speed, hopefully, to that of the turtle. I position myself over the top of him and press the shutter, which freezes his image but allows the background to blur, again, giving an impression of great speed.

The key to success in this situation is matching your finning speed to that of the subject. When these match, the chance of success greatly increases.

### Rear Curtain Sync

When we take a photograph with flash in its normal mode, the flash fires as soon as the shutter is activated. In other words, at the very start of the exposure. When we put the flash mode to rear curtain sync, the opposite happens. The flash fires at

the end of the exposure. So if we had an exposure of 1/2 a second, the flash will not go off until the very end of the 1/2 second.

Once again, we are going to use rear curtain sync in conjunction with long exposures to create an exaggerated sense of movement, and when the flash goes off at the end of the exposure, it will freeze and add colour to the picture.

The reason for using rear curtain sync is that the long exposure will record lines of movement which can be very haphazard and jumbled. But when the flash fires, it records the final image on top of all the movement giving a sharp picture of the subject. If, for instance, we did exactly the same thing but using normal flash mode instead of rear curtain sync, then we would have a final picture of the



subject covered with movement from the rest of the exposure, which would make it very indistinct.

Again, practice this in the pool. I have been using wooden coloured fish, which are always on the move and give a good representation of the final image one could achieve in open water. Using a D200 in a Sea & Sea housing with twin strobes set to manual full power main light YS300 fill light YS120, in open water, I pick a subject not too small which is not likely to dart around too much. Lionfish have worked well for me in the past as a starting point. I take an

ambient light reading with emphasis on a long shutter speed. I recommend bracketing around a 1/4 of a second. I set the flash mode to rear curtain sync, compose my photograph and fire.

Head shots sometimes give an indistinct end result, whereas a side view, I feel, gives a recognisable sense of the animal. With distinct lines of movement, it can enhance the colour of the background, so choose one with saturated colours. Obviously, the shutter speed is key to the final image—1/2 a second and longer will give an image with very distorted movement and not so sharp an end

Hawksbill Turtle—Panning with rear curtain sync, Sea & Sea housing, D200 camera, 20mm Nikon lens, YS300 flashgun on full power, 1/15th sec exposure, f22. Background movement evident, only flipper movement showing on turtle

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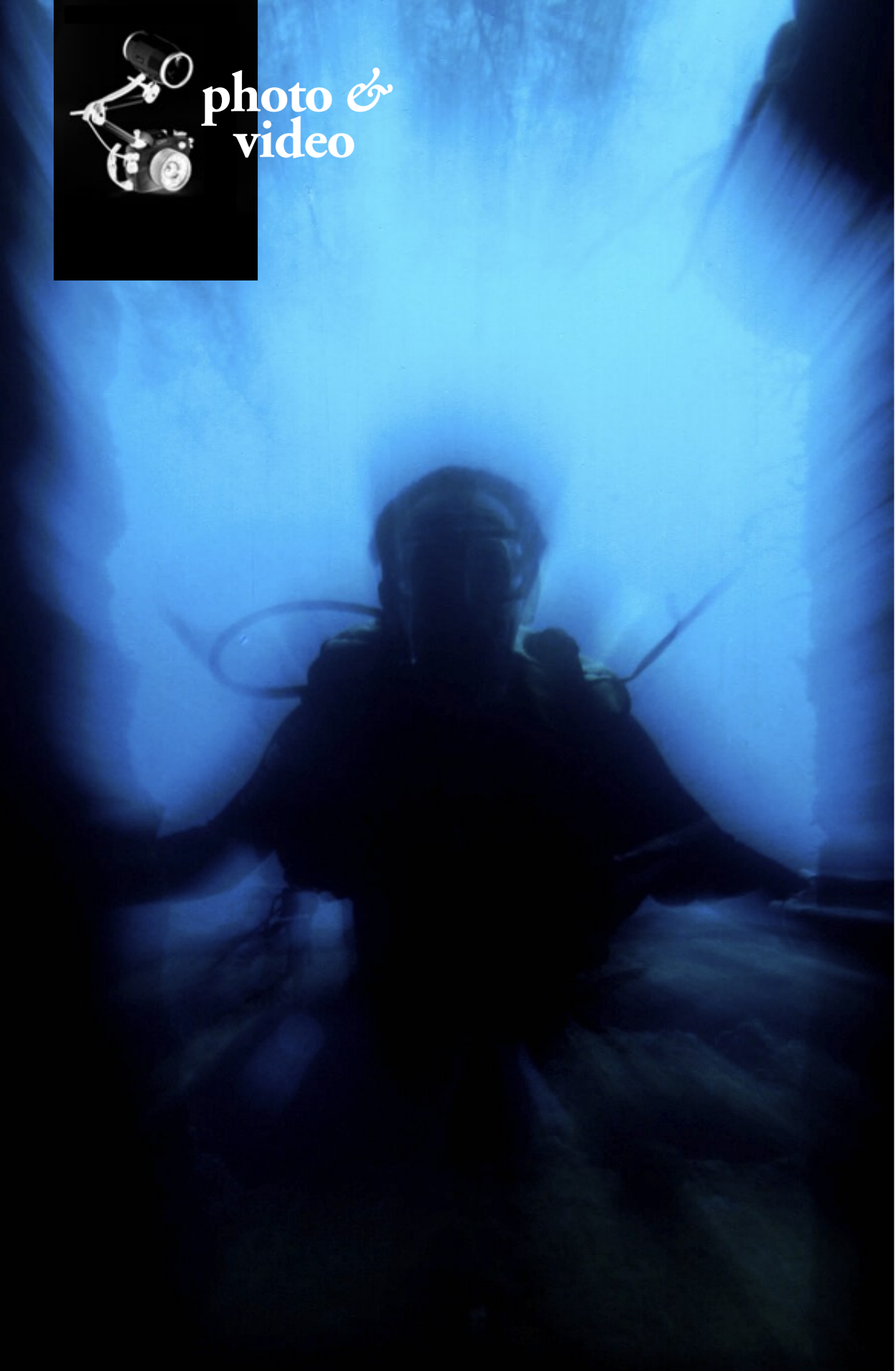
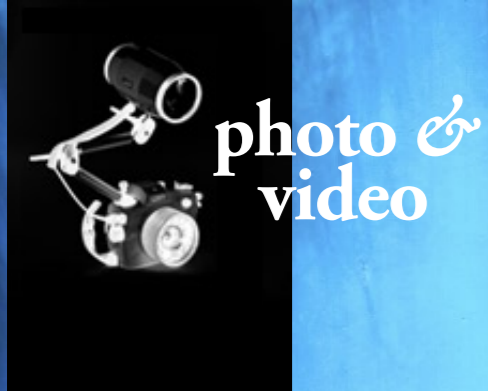


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Diver in wreck doorway—Zooming, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, available light, 1/2 sec exposure, f22. Subject static housing on tripod for stability shows speed lines focusing on divers head in centre of frame



result, whereas a shorter shutter speed of say 1/15<sup>th</sup> a second, will give slight movement around the fin areas and a very sharp final image. It's all a case of what you like, but again this technique adds impact and drama to many photographs.

Note: When the two techniques above have been practiced, for the more adventurous, try combining them both in the same shot. The panning will give lateral speed lines, and the rear curtain sync will give a sharper more colour saturated final picture—again, practice achieves results.

### Zooming

This is exactly what the heading says. Using a zoom lens, we can use a technique to make static subjects look like they are travelling at very high speed. I liken it to watching the Starship Enterprise on Star trek just as it is going into light speed because those flowing lines around the spaceship are the exact results you will get when you use this way of taking a photograph.

Typical subjects are wrecks, highly coloured soft corals, and divers in a stationery position. This may sound complicated but it

isn't. You will get the best results by using a lightweight tripod weighted down with some lead. But if this is too much, then excellent results can be achieved by anchoring yourself in a steady position before shooting. Again, practice this technique in the pool before shooting in open water.

Fluidity of movement again is a key to success. So, in open water using a D200 with a Nikon 17 to 35mm zoom lens in a Sea & Sea housing attached to a lightweight tripod, choose a likely subject—perhaps a diver in the doorway of a wreck. Set-up the tripod at a distance far enough away so that when you zoom on the focal point it stays within the picture area. Take an ambient light reading again with emphasis on a long shutter speed. I find between 1/4 and 1/2 a second gives good results. Starting at the 17mm end of the lense practice zooming through to the 35mm end.

This is where the fluidity comes in again, the zooming must be a constant speed. When you are ready to take your shot, start zooming first, then fire the shutter and continue zooming after the exposure has been taken. This will give a constant image with no

## Special FX

Leather Coral—Zooming and rear curtain sync, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, YS300 and 120 on half power, 1/4 sec exposure, f22. Static subject no tripod hand held flash has given hint of colour in foreground

jerkiness to be seen.

Again, bracket the exposure. In this case, I would bracket around 1/4 second using 1/8th and 1/2 second with the appropriate f stop. The speed of the zooming will obviously give different results—faster, a more distorted image with longer speed lines—slower, a more distinct image with shorter lines.

Obviously, if you are deeper than 10-15 metres, then the final image will be very desaturated in colour. So, once practiced, this technique can again be combined with rear curtain sync. You will get all the speed lines but a more distinct sharper image with good colour saturation.

### Conclusion

I have tried to keep the explanations of how these three techniques work as practical as possible with the intention of allowing photographers the opportunities to get in the water and experiment without too much technical jargon, which can sometimes be confusing. I hope this intent has worked, and in some of you, it will lead to a more creative way of thinking and a greater awareness, which will eventually lead to a form of underwater photography leaning very much towards artistry. If I have not achieved this aim with my explanations, please do contact me, as I will always endeavour to help where I can. E-mail me at [seaofdreams@btinternet.com](mailto:seaofdreams@btinternet.com) ■



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### Zillion

VIA WETPIXEL – Zillions Canon 5D Mk II housing features both optical and wired (optional) bulkheads for strobe sync. The housing is made of ABS plastic and has a suggested retail price of around \$2,870. At the moment, the only

way to get the Zillion housing outside of Japan, Korea and Thailand is by contacting Aquaforum.



### Leo

The Leo housing from Italian Easydive was designed to be compatible with every digital reflex camera available on the market. Easydive designed, produced and patented USB FotoControl, an electronic push-button panel that the manufacturer states is a revolution in underwater photography. This panel can remotely select all reflex camera controls. This feature makes Leo housing universal and unparalleled. The standard version designed by Easydive includes a LEO housing equipped with USB FotoControl push-button panel to select the following controls: time + / - , diaphragm + / - , preliminary shutter release, shutter release, Iso + / - , mode switch, exposure meter. Furthermore an additional push-button panel with customized programs can be installed on request. [www.easydive.eu](http://www.easydive.eu)

### Remora

Fantasea Remora Flash features four different pre-flash settings, to cover the needs of all compact digital cameras in the market, including Nikon, Canon, Sony, Olympus, Fuji, Kodak, Panasonic and more. The flash features a guide number of 20, and therefore is compatible for both macro and wide angle shots. The power output can be manually adjusted to provide the most accurate amount of light in all conditions, and a short recycle time ensures quick responsiveness, even when using the maximum power output.

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### Reconnect

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*Unique Dive Site*  
**Crystal River**  
*Kings Bay, Florida*

*Close encounters of the third kind  
with a 2000 pound kitten*





“Meoww”

## Crystal River

ant of the Vikings, who crossed the Atlantic in open boats, was a woos. I just don't like to be cold all right? And neither do the manatees, it seems, which is why they congregate in this relatively small area of Kings Bay each year.

Kings Bay, which is approximately two miles in diameter or 600 acres, is home to the largest concentration of manatees in the world. The inlet is a bit warmer than the surrounding seas, and despite their generous layer of blubber, the water temperature in the spring-fed rivers, which ranges from 20-22°C (68-72°F), makes for a somewhat cosier place to over-winter than the open coastline.

### “Hello there”

Before we entered the water, our dive guide warned us of the state's policy against harassment of the animals—as with all wildlife, one cannot catch or feed animals, but also one cannot pursue them, ride them or otherwise harass them. However, we were told, if a manatee came up to us on its own accord, it may want a scratch on the head or belly, which we could do with only one hand at a time.

At first, I saw nothing in the murky waters but then I noticed a blimp-shaped silhouette to my right. It was an approaching manatee all right, and it had spotted me. He got closer and closer ... and closer ... until the giant creature just bumped right into me, albeit gently. Once I got over my shock over such an unabashed direct approach of making my acquaintance—no introductions necessary, it seems—I reached out and scratched the cuddly creature right on its coarse head, which immediately produced what I interpreted as an ecstatic expression—or so I imagined.

The manatees are not exactly the prettiest creatures on the planet. They are grey and wrinkly and have coarse skin that is sometimes infested with

Text and photos by Peter Symes

**I once had a cat that approached me exactly like that. Coming right at me, top of the head first until ... bump ... “scratch me!” It then slowly rolled over onto its back to blissfully enjoy a good belly-rub.**

**Only this ‘kitty’ was a 2000-pounder, with flippers instead of paws, but still, unmistakably cute and cuddly.**

A close encounter with the docile manatee leaves no one untouched. These gentle giants seem friendly and curious, as they seek out close contact with humans.

At first, I did not know what to expect. This wee grey November morning in northern Florida seemed a far cry from the archetypical tourist imagery of a tropical paradise. There were palm trees alright, but it was a bit nippy and windy, and that water seemed a bit turbid. As I quietly entered the water—in order not to frighten any manatees—and the cool water started seeping into my wetsuit, I longed for my drysuit and woollies.

Okay, so this undersigned descend-

“So who are you then?”





algae. And their eyes are like those on a potato—not exactly winners of a beauty contest. Yet, is hard not to become enchanted with them, as they come across as being very peaceful, docile and social... and they move with much grace.

### Mermaid Myth

Manatees belong to the mammalian order called *Sirenia*. The word *siren* comes from the ancient Greeks who had a fable about beautiful girls that lived in the sea, called *sirens*, whom we have come to know as mermaids—creatures that were half girl and half fish. These girls sang very beautiful songs that would put sailors in a trance. Hypnotized by these songs, the sailors would run their ships onto rocks and sink.

For a long time it was common belief that these beautiful and strange creatures were real. The

songs heard by sailors were probably whale songs. But what about the eye-reports? What the sailors saw were not really mermaids, naturally, but manatees.

Manatees do not stick their heads out of the water to breathe. Looking down at these creatures under the water, people could only see some strangely shaped creature swimming by. The front half of this creature had a head and arm-like flippers and the back half had a tail like a fish. It didn't require much of a vivid imagination to connect the dots—it had to be a mermaid.

### “Scratchy”

After spending the better part of an hour in the middle of Kings Bay with “Scratchy”—the nickname we gave to our newfound itchy and affectionate manatee friend—the coolness of the water finally had the better of us,

and we retreated back onto the dive boat for a much welcomed hot cup of coffee.

During this little break, we were taken to another nearby canal where the water was much clearer, and through a narrow passage under the trees—too narrow for any boat to pass—we could swim into that appeared to be another little maze of smaller channels.

The clear water in here had a beautiful deep blue hue, as we swam inwards. At first, there were no other creatures around, but then, I turned around to see a mother and a calf catching up with us from behind. They swam right by us, as if we weren't even there. They seemed determined to get somewhere specific right away. The young one was sticking very close by its mother's side.

Coming around the next corner, we found the pair just relaxing in

Is this the real mermaid? TOP LEFT: Kodak moment with manatee





encourage a “look, but don’t touch” policy. But local conservationists of ManateeProtection.com are pushing for more enforcement, stating on their website:

“The reality is that there are already a number of tame manatees in the area and contact will continue. It should not be reinforced and new animals should not be conditioned to accept a human presence without caution. As custodians for the manatee in Citrus County, the USFWS must assure their long term health and safety by limiting physical contact through some form of no touch rule.”

Opponents of the policy, mainly dive operators, say they would lose up to 30 percent of their business, if they did not let their customers touch the manatees. But new tours are already being developed where education through observation only is the emphasis. ■

## Crystal River, Florida

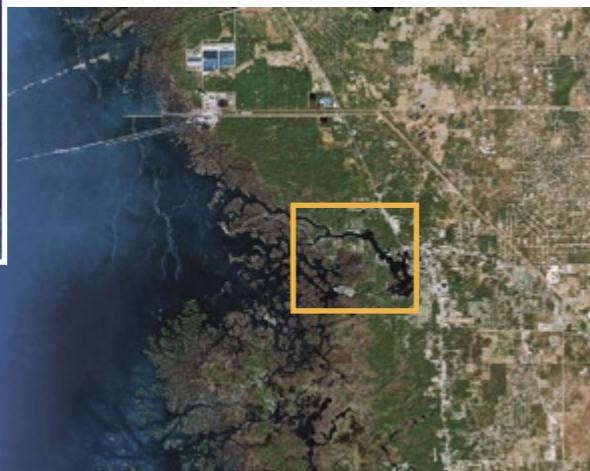
Crystal River is both a river and a city with a population of 3,600 in Citrus County at the heart of the Nature Coast of Florida, United States. The city was incorporated in 1903 and is the self professed “Home of the Manatee”. The City is situated around Kings Bay, which is spring-fed so keeps a constant temperature year round. Kings Bay is home to nearly 400 manatee during the winter and is one of the few places where people can interact with them in their natural habitat. Crystal River Preserve State Park is located nearby, and Crystal River Archaeological State Park is located in the city’s northwest side. ■

what looked like a little lake at the end of the maze. The young one looked as if it was given permission to go out

the mother and the calf. It may not be an aggressive species, but you should never underestimate parental instincts. At least I didn’t want to stress any of them, so I kept my respectful distance.

It is against the law to harass or pursue the manatees in any way. So, if they are sleeping or eating on the bottom, they should be left alone.

federal level, but were downgraded to “threatened” at the state level in 2006. However, there are continued reports of tourists harassing the animals and boat collisions maiming a significant number of manatees each year. According to ManateeProtection.com, a “no touch” policy is needed to ensure the protection of the manatees in Crystal River. The group of local conservationists is appealing to the United States Fish and Wildlife Service (USFWS) to consider and implement such a policy. The existing guidelines of the state Fish and Wildlife Service



and play, because it was frolicking around and curiously investigating different matters on its own, while the mother was keeping a watchful eye out for the youngster. While manatees are friendly creatures I didn’t feel like approaching the young one and coming in between

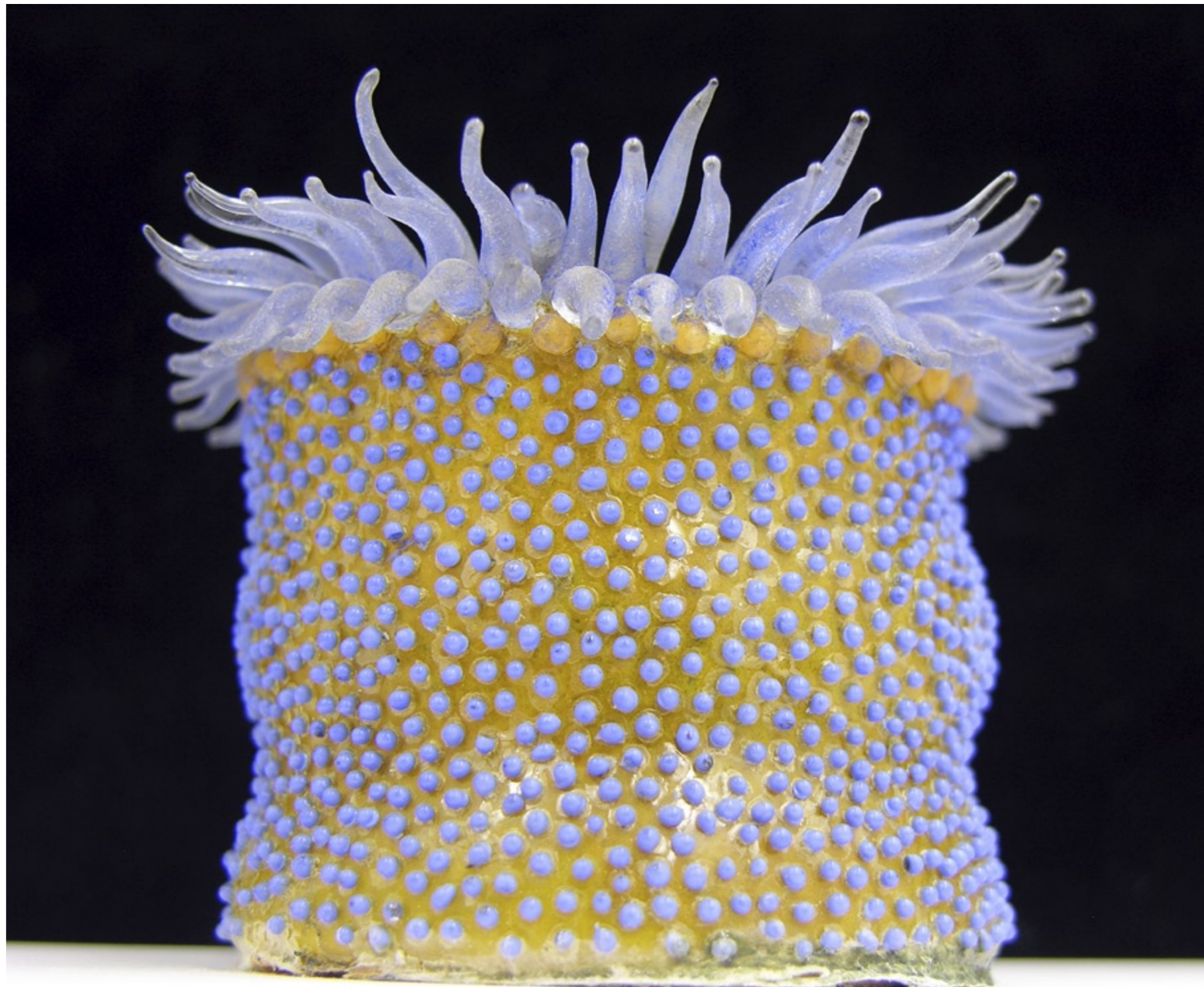
## Controversy

Manatees are still classified as an “endangered” species on the



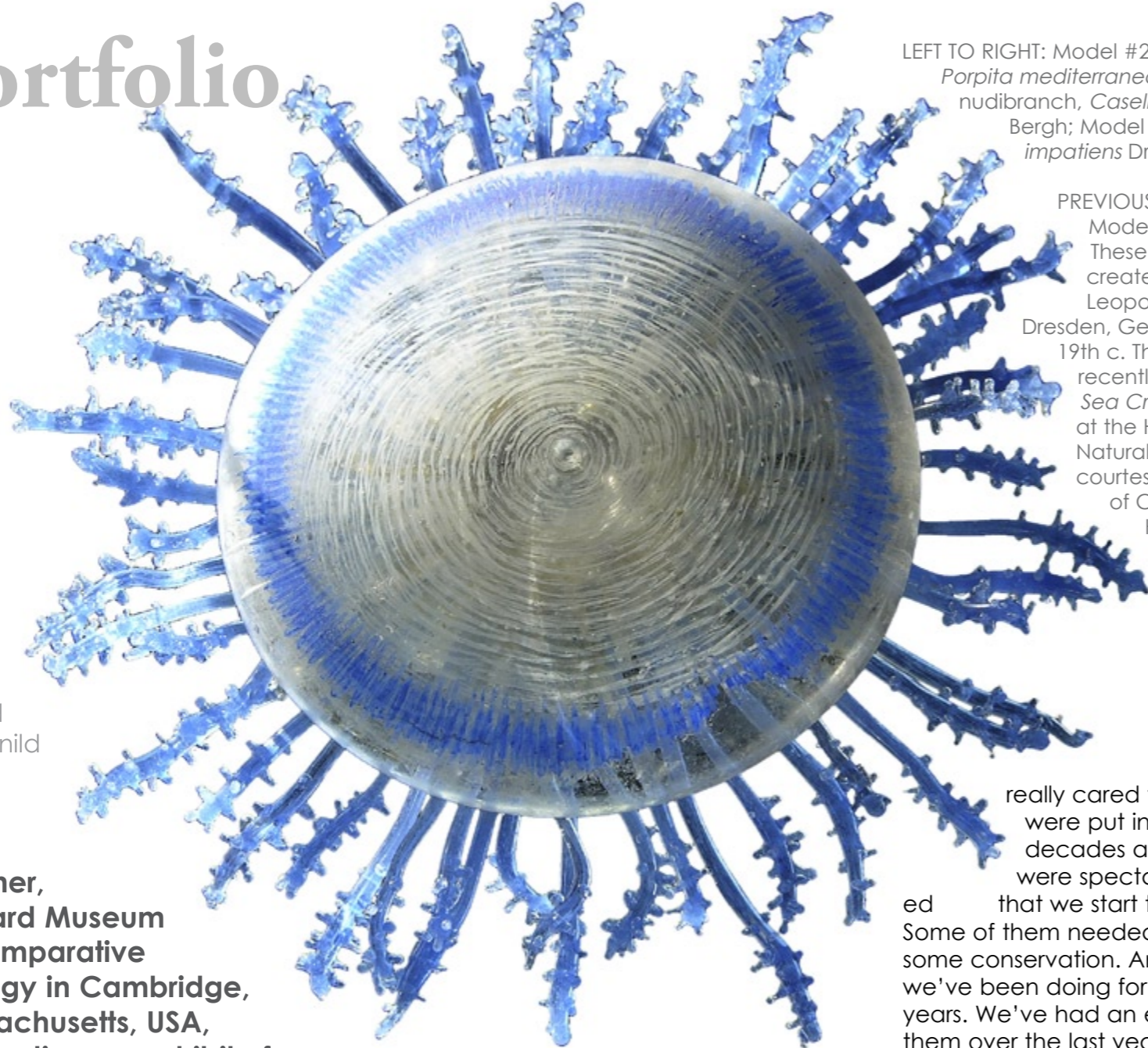
It is against the law to pursue the manatees in any way. So if they are sleeping or eating on the bottom, they should be left alone. This cousin resting on the riverbed seemed sound asleep

# BLASCHKA



P O R T F O L I O





LEFT TO RIGHT: Model #216, sea jelly *Porpita mediterranea*; Model #378 nudibranch, *Casella philippinensis* Bergh; Model #91.3 *Sagartia impatiens* Drayton, Gosse.

PREVIOUS PAGE:

Model #81, Anemone  
These glass models were created by Rudolph and Leopold Blaschka near Dresden, Germany, in the late 19th c. The models were recently displayed in the *Sea Creatures in Glass* exhibit at the Harvard Museum of Natural History. Photos courtesy of the Museum of Comparative Zoology, Harvard University

Text edited by Gunild Symes

**This summer, Harvard Museum of Comparative Zoology in Cambridge, Massachusetts, USA, is mounting an exhibit of glass models of marine invertebrates made by the 17th century German master glassblowers, Leopold and Rudolf Blaschka of Dresden. Professor James Hanken is an evolutionary biologist and the director of the museum. He talked to X-RAY MAG about the exhibit and the Blaschka glass works.**

JH: When I became director a few years ago, I requested a tour of all our collections. We have vast collections here. It's literally millions, more than 20 million

specimens of one sort or another. And in the course of receiving a tour of our invertebrate animal collections, I was shown several shoe boxes and other small boxes of glass animals, which were absolutely remarkable. I had not known that we even had these things. I knew that we had glass flowers—Harvard has a famous collection of glass flowers made by the Blaschka father and son team—but I had not known that they, at one time in their careers, had made glass invertebrate animals. And these were tucked away and not

really cared for very well. They were put in these boxes many decades ago. I thought they were spectacular and suggested that we start to clean them. Some of them needed some restoration, some conservation. And that's what we've been doing for the last several years. We've had an exhibit of some of them over the last year or two. We have about 420 specimens of which we put on exhibit around 60 in our public museum, the Harvard Museum of Natural History. And it was an extremely popular exhibit. I mean, they really are extraordinary specimens. They are anatomically correct, if you will; they're made exactly to life; their colors are accurate. They're exquisite.

That was in our temporary exhibit gallery. We had to remove that exhibit, but we just

installed in its place an exhibit about evolution, and we will be pulling out some of the glass animals to install near the evolution exhibit later this summer. One of the reasons is that the glass animals were extremely popular with the public and

many people were very, very disappointed when we took them away. So, by popular demand, we are bringing some back.

How many visitors did you have to that exhibit?

JH: We don't track the

number of visitors to a particular exhibit or to a particular room, but in the last year, we have had about 180,000 visitors, and actually our attendance figures have been going up steadily over the last several years in response to exhibits such as the glass animals.

What do you know about the Blaschkas, Leopold and his son, Rudolf?

JH: As I understand

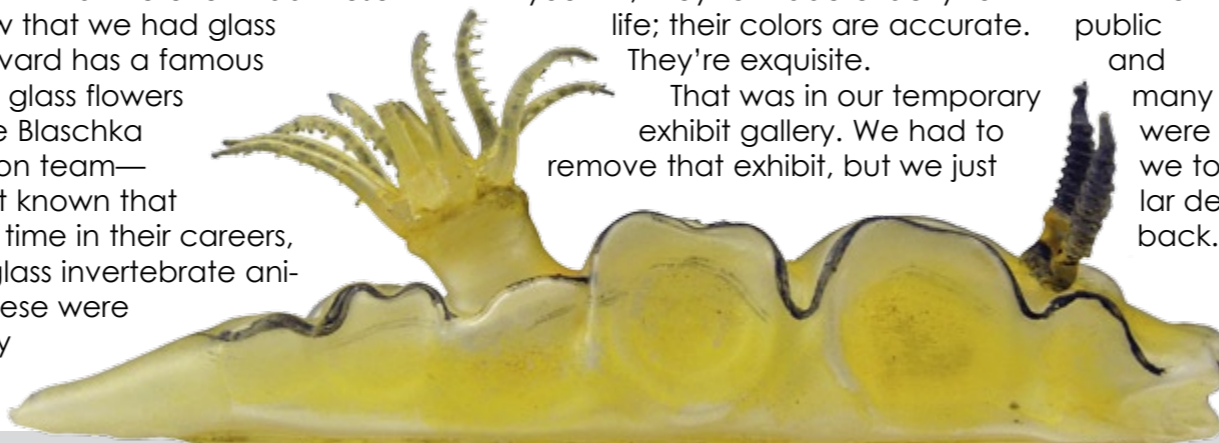
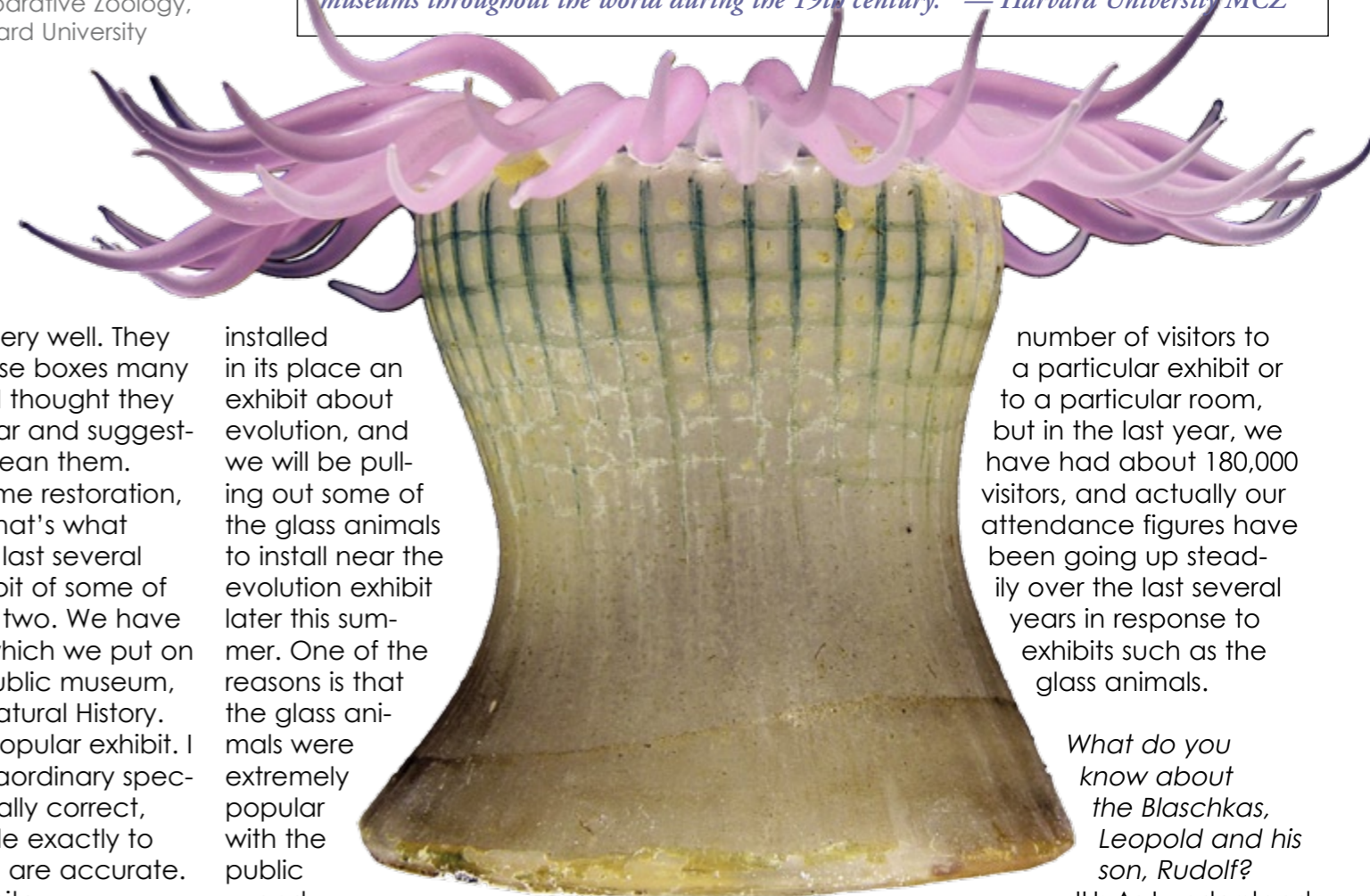
it, they came from a long and distinguished family of glassblowers in Dresden, Germany, beginning in the 15th century. By the late 19th century, it was the adult male in the family, Leopold, who was continuing the tradition, and he and his wife had a son, Rudolf, who basically adopted the same traditions of the family. They really had brought the craft



## Blaschka

Leopold (left) and his son Rudolf Blaschka (right), about 1895. Image courtesy of the Botanical Museum, Harvard University, Cambridge, Massachusetts, USA

*Many years before they were commissioned by Harvard University to make the "Glass Flowers," father and son artists Leopold and Rudolph Blaschka meticulously shaped glass and wire into lifelike models of marine animals. Renowned for their beauty and exacting detail, the Blaschka marine invertebrate models were commissioned by universities and museums throughout the world during the 19th century. — Harvard University MCZ*

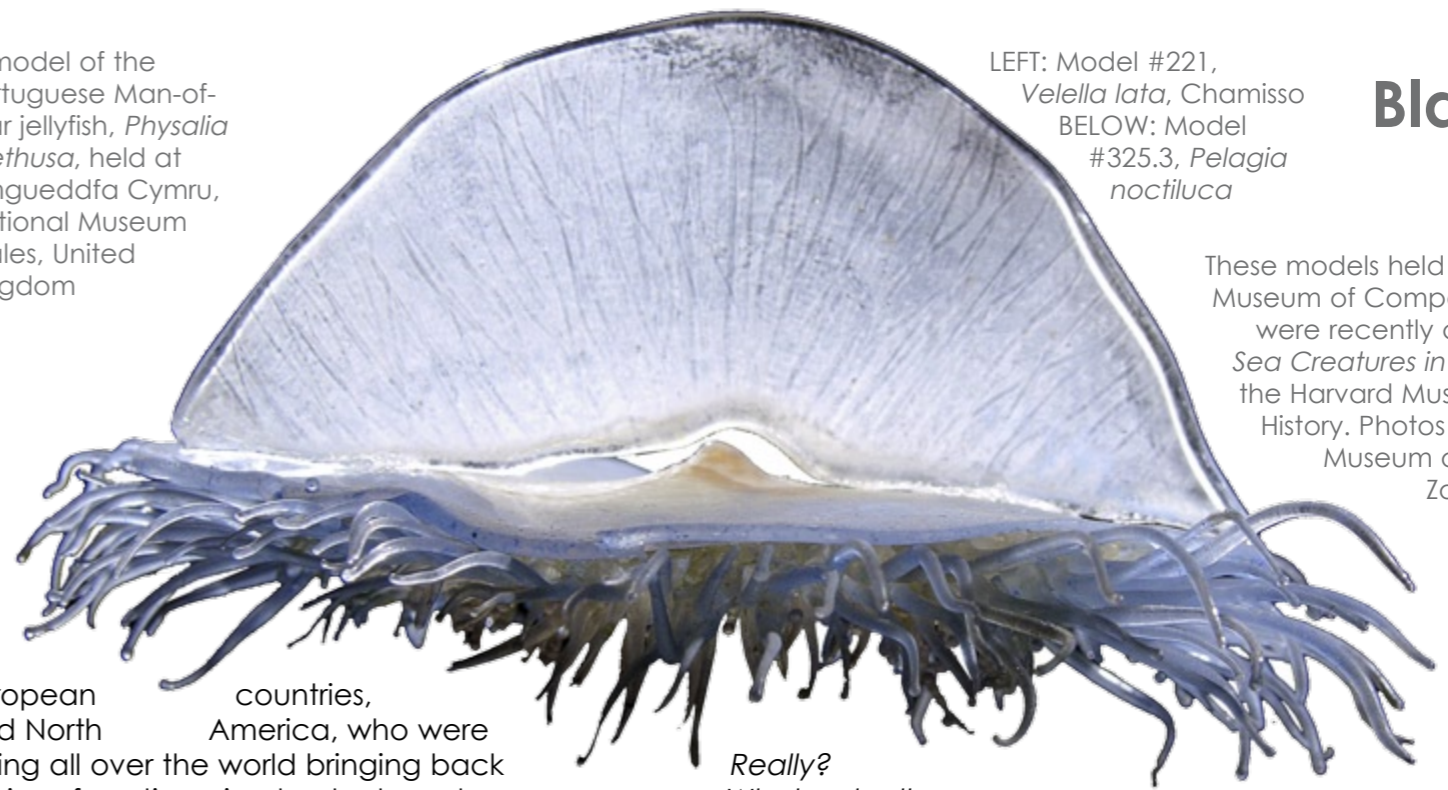




*Chrysaora hysoscella*. jellyfish model held at the Muséum de Genève. Photo by Philippe Wagneur



A model of the Portuguese Man-of-War jellyfish, *Physalia arethusa*, held at Amgueddfa Cymru, National Museum Wales, United Kingdom



LEFT: Model #221, *Velella lata*, Chamisso  
BELOW: Model #325.3, *Pelagia noctiluca*

These models held by the Harvard Museum of Comparative Zoology were recently displayed in the *Sea Creatures in Glass* exhibit at the Harvard Museum of Natural History. Photos courtesy of the Museum of Comparative Zoology, Harvard University

European and North American countries, who were going all over the world bringing back stories of exotic animals, plants and new land. So, there was tremendous public interest in natural history and discovery. As a result, there was a large interest in these models. Of course, we are talking about a time when photography was just in its beginnings; there was just black and white photography. There was no color photography, no video, no ways to depict to people the vivid colors and shapes of animals and certainly not ones that were found in the ocean in the water. So, these models were as good as it got in those days. They were also used as teaching tools. So, biology classes, mostly in universities, I suppose, would purchase these models as teaching aides. They were sold that way by mail order in catalogs around the world.

At some point in the 1880s, people here at Harvard suggested that the Blaschkas start making flowers, which they did, and they also were exquisite. They were just spectacular. But at that point, a wealthy family in Boston, who were associated with Harvard, made the Blaschka father and son team an offer they could not refuse, which was, if they would only make flowers, glass flowers, and only make them for Harvard University, this family in Boston would take care of them financially for the rest of their lives.

Really?  
What a deal!

JH: Yes. So, at that point, the Blaschkas stopped making glass animals. This was a family that was buying these glass flowers for our botanical museum. I guess, they didn't have any interest in glass animals. So, the Blaschkas, from that day forward, made only glass flowers, and they made, literally, thousands of them. We have them here—between 4,000-5,000 glass flowers.

As a result, the glass animals were no longer made. There were some large collections of them in Dresden, as I understand it; there is our collection here; Cornell University in New York State has some more; there's another collection of them in the Natural History Museum in London; and let's see, I think, in Scotland there's also another collection of them. We just learned that there are over 800 models in Ireland, and there are about 350 at the Boston Museum of Science. Unfortunately and tragically, the collection in Dresden was lost in the bombing during World War II.

Yet, there are still additional models here and there. You read stories every once in a while where there are people who discover them. There was one that came to my attention a couple of years ago. A university, I think it was the University of Wisconsin in the Midwest



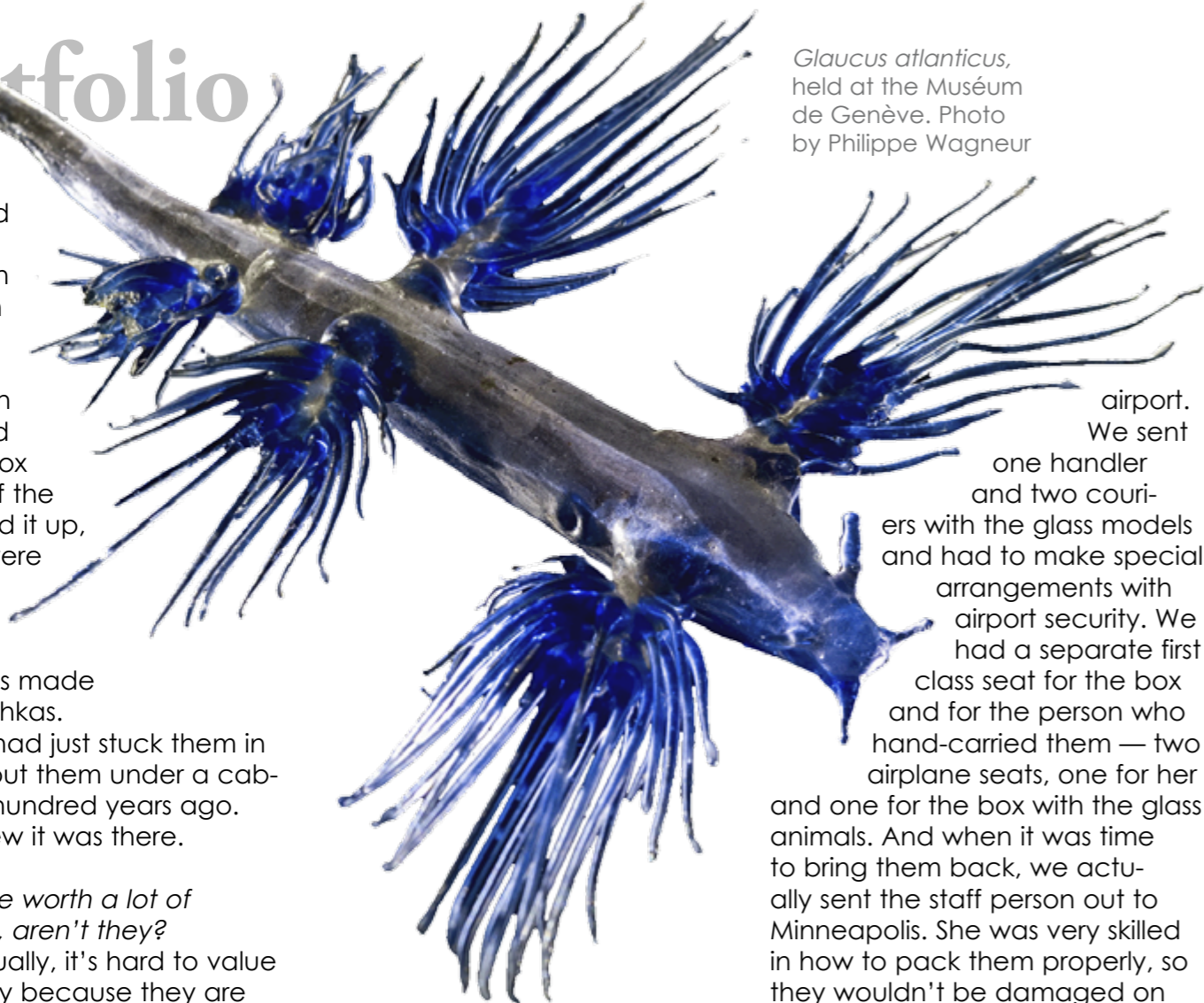


of the United States — somebody in the museum saw a box underneath a cabinet on the floor and pulled this box out, blew off the dust, opened it up, and there were these glass models. They were glass animals made by the Blaschkas. Somebody had just stuck them in a box and put them under a cabinet, say, a hundred years ago. Nobody knew it was there.

*They must be worth a lot of money now, aren't they?*  
 JH: Yes, actually, it's hard to value them, literally because they are never sold, but they're priceless artifacts. All the universities and museums... nobody is interested in selling them. So, as a result, it is hard to put an actual price on them. They're priceless. They're invaluable. But we do have, well, I don't know what we do for insurance purposes, but we do declare them. But I don't know what price is put on them. I honestly don't.

We're also extremely careful with them, as you can imagine, because they're glass. They're very delicate. By and large, we don't let them out of

*Glaucus atlanticus*, held at the Muséum de Genève. Photo by Philippe Wagneur



airport. We sent one handler and two couriers with the glass models and had to make special arrangements with airport security. We had a separate first class seat for the box and for the person who hand-carried them — two airplane seats, one for her and one for the box with the glass animals. And when it was time to bring them back, we actually sent the staff person out to Minneapolis. She was very skilled in how to pack them properly, so they wouldn't be damaged on the way back. And we basically repeated that very complicated transaction, or transportation, bringing them back here.

*As a biologist and an expert, how do you rate the educational value of the glass models made by the Blaschkas?*

JH: Oh, they're remarkable! They're one of a kind. They are interesting teaching tools in several respects. In their day, they were the most modern, up-to-date way to display biological diversity. Remember, all of them are marine invertebrates, so they

are found underwater often on the ocean bottom, and they were the only means of conveying to the general public and all the students, what the animals looked like, their variation. In fact, we do have a few specimens that are of kinds of species that are soft-bodied — that when you bring them up out of the ocean, and certainly when they die, they lose their color and they lose their shape, and when you preserve them in fixative, they just don't look anything like what they really look like in life.

*Yes, and how did the Blaschkas know what the animals looked like?*

JH: As far as the plants go, people would send them live plants and seeds for them to plant there, and they would take notes to themselves about the colors. For the marine animals, they used

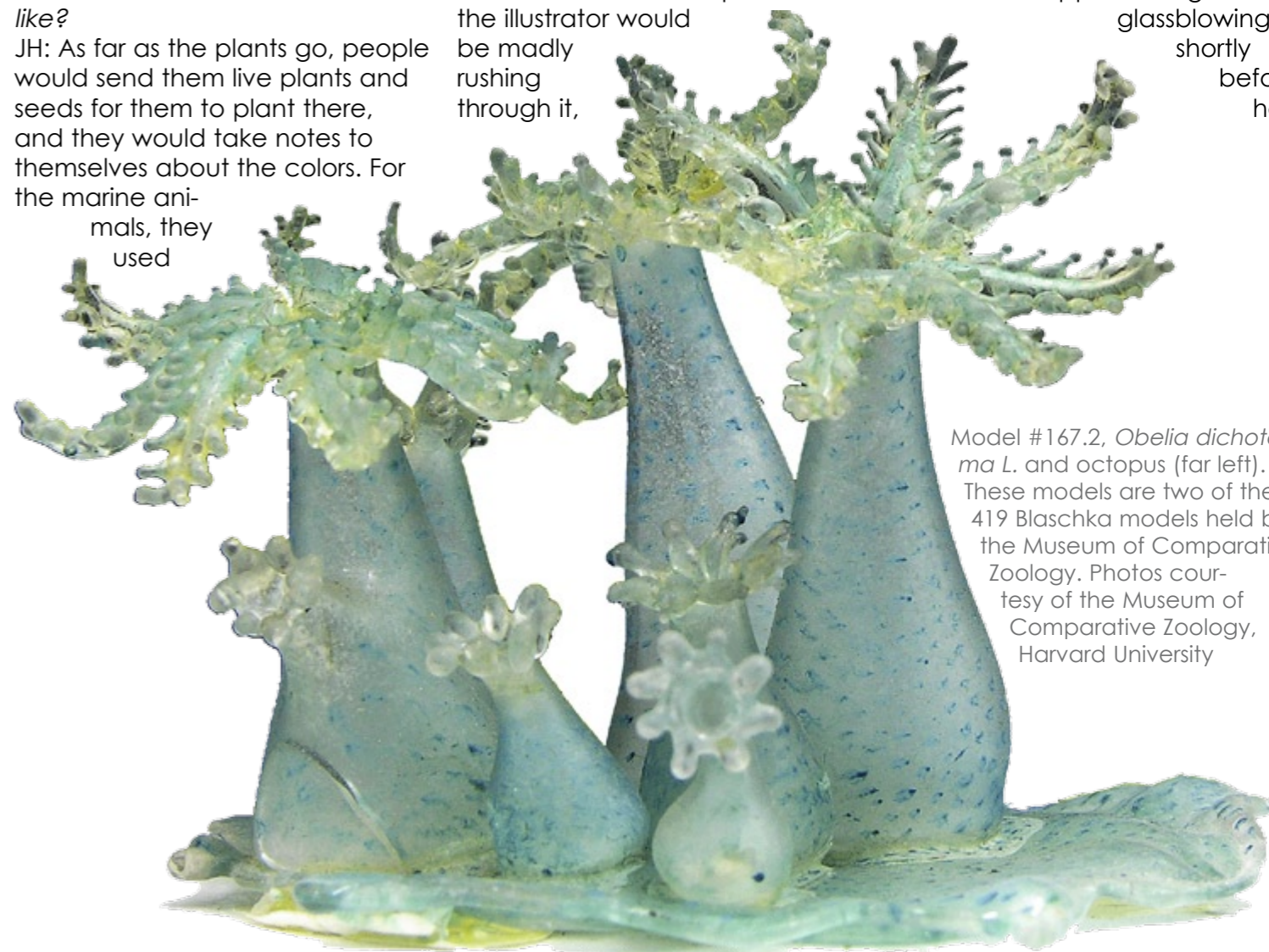
drawings from naturalists and their own drawings from traveling. They also kept live animals in their studio in marine aquariums to observe and sketch.

It was not uncommon in the 19th century when explorations would head out to different parts of the world. They would bring along illustrators. We mounted some expeditions from the 19th century, including to South America and the Amazon, and, literally, you would read these accounts where the illustrator would be up on deck, and as the workers would bring up all these... this mess up and dump the fish on the deck of the ship, the illustrator would be madly rushing through it,

doing a quick sketch of what the animal looked like; wouldn't have time to do the detailed color, but would make notes about the different colors on the parts of the fish. So, maybe a similar kind of activity occurred, although you don't read too much about it, and the Blaschkas certainly didn't make any extensive travels of this nature.

*Did they have apprentices or assistants working with them?*

JH: From what we know, they had a system. But they did the glassblowing themselves. In fact, when Rudolf, the son, finally died—he stopped doing the glassblowing shortly before he



Model #167.2, *Obelia dichotoma* L. and octopus (far left). These models are two of the 419 Blaschka models held by the Museum of Comparative Zoology. Photos courtesy of the Museum of Comparative Zoology, Harvard University

this building. We did agree, a few years ago, to release about 30 models — those that were the most robust and intact — for a temporary exhibit in the Minneapolis Aquarium. In order to get them there, we basically had a police escort from here to the





Some of the many glass models of marine invertebrates created by Rudolph and Leopold Blaschka near Dresden, Germany in the late 19th century. This shows one of many drawers in the Museum of Comparative Zoology, where the marine models have been stored for over a century. A small exhibit of some of the University's 419 models, some of which have never before been seen by the public, will soon go on display at the Harvard Museum of Natural History in Cambridge, MA. Photo Credit: Museum of Comparative Zoology, Harvard University

died—Harvard made arrangements for them, the surviving family members, to send here, the Blaschkas' tools and their work bench. We had them on display for many years. It was remarkable, because you look at it, and what you're talking about is just a wooden bench with a bellows underneath that produced the fire, there was an alcohol burning lamp and a few tweezers, and that was it!

*Speaking as an expert in the field, what role do the Blaschkas' glass invertebrates play in the museum's exhibits?*

JH: We've included them partly because Harvard is a historically rich university—as you can imagine, it's been around for so long. But particularly in evolutionary biology, we have been studying evolutionary biology, and to some extent, leading the field in evolutionary biology for more than 100 years. People

like Ernst W. Mayr (evolutionary biologist from Germany, 1904-2005), Edward O. Wilson (Harvard biologist, 1929-present), Stephen Jay Gould (American paleontologist, evolutionary biologist and science historian, 1941-2002)—these men were all curators here in the Museum of Comparative Zoology. So, we are very proud of our past and our traditions, and what has happened here, and all of our collections. We were in business, if you

## Blaschka

will, during this great age of exploration in the 19th century. So, we have vast collections, which were accumulated for scientific research purposes, and the glass animals, while they were obtained mostly for exhibit purposes or teaching purposes, are part of these collections. They are just part of this very rich repository of material from the 19th century and are still considered very important today. It's a means for us in educating people about the history of evolutionary biology, frankly.

*How ideal that Harvard was participating during that very exciting era of discovery and the time of Darwin...*

JH: Yes, and the great irony, of course, is that while we are, if you will, devout champions of evolutionary biology and Darwin (today), the man who founded the Harvard Museum of Comparative Zoology in 1859, Louis Agassiz (paleontologist, glaciologist and geologist from Switzerland, 1807-1873), was a fierce opponent of Darwin's and a denier of evolution. So, Louis Agassiz—I'm sure if he were alive today—would just be disgusted with what's happened to his museum!

*MCZ museum director, Dr James Hanken, is an evolutionary biologist at Harvard University and is a specialist in amphibians, frogs and salamanders. He does both anatomical studies and molecular studies, but also describes new species, conducting field work in different parts of the world where amphibians are not well known, or haven't been well-studied—where he and his colleagues believe there are many undescribed species. They have discovered many new species of amphibians, frogs and salamanders. They name them and study their evolution and variation.*

*For more information, visit the websites of the museums at Harvard University below: The Museum of Comparative Zoology [www.mcz.harvard.edu/index.html](http://www.mcz.harvard.edu/index.html) Harvard Museum of Natural History [www.hmnh.harvard.edu](http://www.hmnh.harvard.edu) ■*

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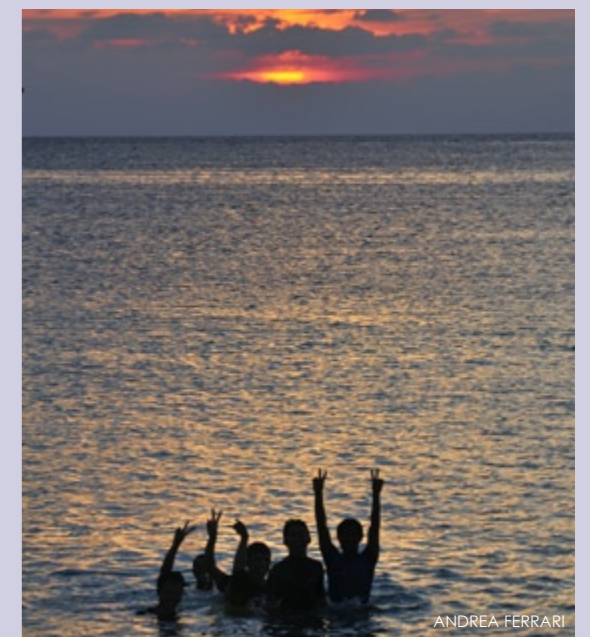
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