



GLOBAL EDITION  
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Number 35

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# Legal matters

## Case 1

On page 10 of this issue, there is an article about the lawsuit being filed against ScubaBoard by a Maldives-based dive tour operator over allegedly libellous comments posted and statements by users on ScubaBoard's forums, as members discussed and vented their opinions on the incidents surrounding and the subsequent handling of a fatal accident that occurred on a liveaboard in 2008, when a young Russian diver tragically lost his life due to contaminated air in scuba tanks. The case is still pending.

While we are naturally bothered by the lawsuit—which at first glance looks to be a frivolous one—on behalf of our media colleagues, it is the far-reaching implications we are more worried about. If at any time a member of the dive industry, or somebody else for that matter, feels miffed about receiving bad publicity in the press when reports on defective products or services appear—or, as in this case, accidents—and thereafter tries to censor the media, then there is a direct threat to our function and obligation to readers and consumers as reporters of information and opinion, a threat that must be fought at all costs.

While the dive industry media may be a far cry from the Washington Post—and we do not exactly uncover scandals of Watergate magnitude or bring down presidents—it is still our function, duty and obligation to act as an independent, authori-

tative and investigative press that keeps an unbiased and critical eye on the industry and its service providers. It is sad that the aforementioned dispute has now come so far that it has to be resolved in the courts, but as far as X-RAY MAG is concerned, we will not be cowed. We will remain critical as always.

## Case 2

It was only days prior to going to press that we received a conspicuously short press release from Teledyne—the manufacturer of oxygen sensors used in many brands of rebreathers—that they were pulling out and ceasing delivery to the dive industry effective immediately, no further reasons given. Several industry insiders close to the magazine who have asked not be named, or directly quoted, have pointed to the lengthy legal case *Barrett v. Ambient Pressure Diving, Ltd.* (the manufacturer of the Inspiration and Evolution rebreathers) as the underlying cause of Teledyne's exit.

The case, which APD won after a four-year trial, was brought by Stephanie Barrett, widow of Robert Barrett, who claimed that a design defect in the Inspiration rebreather caused her husband's death. The details can be read here <http://www.davidconcanon.com/recentcases/barrettvambient.html>.

We haven't been able to obtain a comment directly from Teledyne, but it is alleged that Teledyne, who in some respects

can be seen as co-defendant, settled the matter out of court with a large sum and pulled out, leaving a string of rebreather manufacturers with a bit of a headache, as they scrambled to find a replacement.

We cross our fingers that these legal cases are just aberrations and not the harbingers of a new trend in the dive industry in which members just sue somebody else for what is really only their own fault, or risk, that they should have accepted in the first place.

As our societies seem to be growing steadily more litigious, it is disconcerting. Clearly manufacturers and other service providers should be held accountable for their products and services, but this should be regulated by official bodies that test and approve products according to quality standards set forth in legislation. If the official inspectors are indeed doing their jobs—protecting consumers from faulty products and services—and frivolous or gold-digging lawsuits are still allowed in the already overloaded backed-up court system, then we will undoubtedly see more manufacturers shun the dive industry and take their businesses, products and innovations elsewhere.

And who could blame them?

— Peter Symes  
Editor-in-Chief



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# NEWS

## THE CHAGOSSIANS

The native islanders, the Chagossians, were evicted to make way for a U.S. Air Force base on the largest island, Diego Garcia. The former residents have since fought a long-running battle in the British courts for the right to return. The islanders, who now live in

exile, have expressed concern that the reserve may in effect ban them from returning, since the protected zone could prevent them from fishing—their main livelihood.

The islanders, numbering about 2,000, were removed by the simple means of denying them any supplies. The British govern-

ment bought the company that employed them to harvest coconuts into fibre and lamp oil and then told them the business was closed.

The islanders were dumped in Mauritius and an Immigration Order preventing anyone from going back was issued in 1971. In 2000, a court held

that the Immigration Order was unlawful, and it was said of the commissioner who issued it that he was supposed to govern, not remove the people.

It withdrew the 1971 order, and in fact, allowed islanders the right of return, but nobody could exercise it because there was nothing to go back to. ■

# Chagos Islands world's largest marine reserve

**The UK government has designated an area around the Chagos Islands as the world's largest marine reserve. Conservationists say the islands possess up to half the healthy reefs in the Indian Ocean. While no one lives there permanently now, people once did, and that could be a problem.**

The Chagos archipelago, part of the British Indian Ocean Territory, is a group of 65 tropical islands, spread over half a million square kilometres of Indian Ocean, that have belonged to Britain since they were captured from France in 1814 during the Napoleonic Wars. The islands include Diego Garcia, the site of a controversial joint British-American military base.

Since the 1960's, they have been exclusively set aside for defence purposes, with no inhabitants except for military personnel and civilian contractors on Diego Garcia. As a consequence, between 1967 and 1971, an estimated 2,000 Chagossians were evicted from the archipelago to make way for the Diego Garcia military base. The islanders were

taken to Mauritius and the Seychelles, more than 1,000 miles away, where many have lived in poverty ever since.

In 2008, the islanders lost a long-running battle when the House of Lords, as the final court of appeal in the UK, ruled in favour of the British government by overturning the lower court rulings and finding no right of return on the part of the Chagossians.

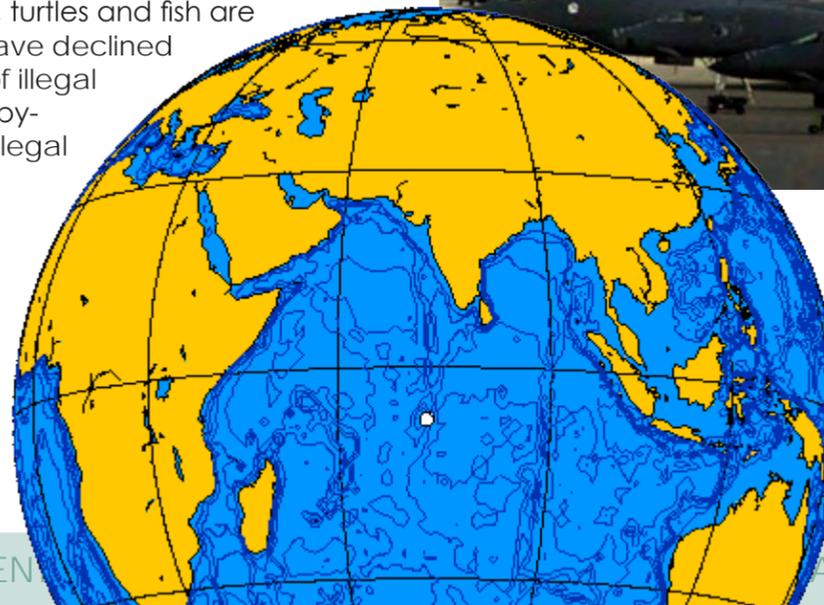
Most of Diego Garcia is a Ramsar site, and five islands and their reefs are Strict Nature Reserves. The Archipelago provides important habitat for marine wildlife and seabirds for all or parts of their lives.

The Chagos archipelago boasts the world's largest coral atoll and the world's cleanest, most pristine waters, which is home to at least 220 coral species and more than 1,000 species of fish. The underwater landscape of 6,000-meter deep trenches, oceanic ridges and sea mounts, is also a refuge and breeding ground for large and important populations of sharks, dolphins, marine turtles,

rare crabs, birds and other vulnerable species.

Pollutant levels in Chagos waters are exceptionally low because of minimal human influence. As a result, the ecosystems of the Chagos have so far proven resilient to climate change and have been largely immune from threats to other reefs worldwide.

Despite a Fisheries Conservation Management Zone with commercial catches limited by licence, legal and illegal fishing has impacted the area, for sharks, sea cucumbers, turtles and fish are known to have declined as a result of illegal fishing and by-catch from legal fishing. ■



In 2004, the government made a new order that nobody had a right to live in the British Indian Ocean Territory, and citing fears of terrorism in the post 9/11 world, it said a permit would be needed to go there. The image shows a U.S. B-1 bomber taking off from the U.S. Air Force base on Diego Garcia. During the Gulf Wars, bombers based on the Chagos Islands—including coldwar era B-52's—conducted bombing missions over Iraq and later over Afghanistan

The new marine reserve would cover a 544,000 sq km area around the Indian Ocean archipelago, which is regarded as one of the world's richest marine ecosystems. This will include a "no-take" marine reserve where commercial fishing will be banned.

# Atlantic Octopus Mimics Flounders

**the Atlantic longarm octopus can shapeshift into the likes of a flounder. Several Atlantic longarm octopuses have been captured on video imitating the sand-dwelling peacock flounder, mimicking not only the shape of the flatfish but also its color and swimming style.**

Mimicking octopus were first reported off the coast of Indonesia in 1998, and now, the first one has been found in the Atlantic Ocean. It is the fourth octopus species known to disguise itself as a completely different species.

Normally, Atlantic longarm octopuses swim with their arms trailing behind their heads. But a newly released video shows

the cephalopods folding their arms back into flounder shapes and undulating in a way that mimicks the peacock flounder, a common flatfish that shares a sandy habitat with the octopus in Caribbean waters. It swims along the contours of the sea floor, even torquing its soft body so both eyes move to the left, just like a flounder.

The animal only assumes flounder form when it's on the move, the scientists observed. Study leader, Roger Hanlon of the Marine Biological Laboratory (MBL) in Woods Hole, Massachusetts, thinks the octopus uses flounder mimicry to avoid predators, which might be alerted to potential prey by motion. "The animals have good camouflage, but when they move, motion gives away camouflage.

Instead of trying to be camouflaged while they're moving, which is difficult if not impossible, they turn themselves into flounder."

How exactly the octopus picked up its flounder-like behavior is still a mystery. When Hanlon saw the wild Atlantic octopuses "becoming" flounders like the species in Indonesia, he went back and looked at snapshots of the lab animal taken in 1985.

In the 1980's, Hanlon had captured Atlantic longarm octopus larvae and brought them back to his lab, eventually raising one to adulthood. The captive animal displayed a weird swim pattern, but the scientists didn't recognize it as mimicry at the time. "It had

never seen another octopus or a flounder, but it did this flounder mimicry," he said. "We didn't know what that meant in the mid-1980's. But it gives a hint that there might be an innate component to this swimming behavior ... that maybe this is hardwired."

Comparing still photographs and video footage from five Caribbean locations collected over the last decade, Hanlon and co-authors—MBL graduate students, Anya Watson and Alexandra Barbosa—observed uncanny similarities between the small and delicate octopus and the peacock flounder, *Bothus lunctus*, one of the most common sand dwellers in the Caribbean. They compared not only coloration, which in each animal resembled the sandy sea floor, but swimming speed and form.

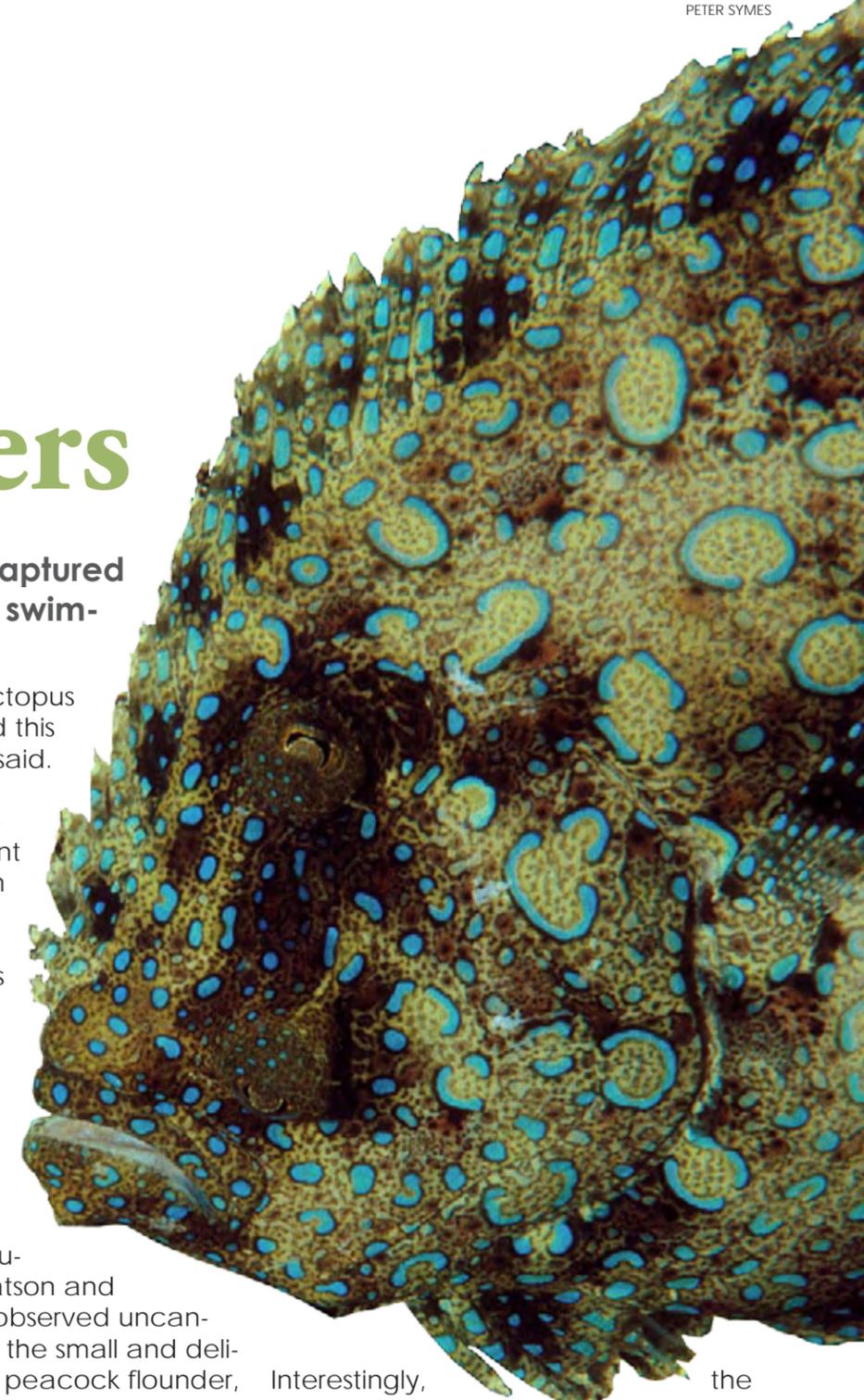
The octopuses not only contoured their bodies to hug the wavy seafloor, but also swam with the same fits and starts as flounder at the same speeds.

Interestingly, the octopuses mimicked flounder only when swimming, when movement would compromise their camouflage. How well the animals blended in with their background differed. The octopus showed more highly controlled and rapid skin patterning than the flounder, whose camouflage was slower and less precise. ■



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Atlantic longarm octopus (*Octopus defillippi*) at the Blue Heron Bridge



# Fish with attitude



Do fish have personalities?

Sticklebacks have different personalities, a team of researchers from University of Illinois led by behavioural ecologist, Dr Alison Bell, has found. Although it sounds like an almost heretical term to use for fish, "personality" is nothing more than consistent, individual differences in behavior, a co-researcher, Katie McGhee, explained. It means that even if their environment is the same, one individual will consistently act dif-

ferently from another.

Classic traits include shyness or boldness in response to threats such as the presence of a predator, and aggression to other members of the species, but also how actively an individual explores a new environment—curiosity, one might say—or how sociable it is, or its general level of activity.

While these are the traits most widely studied so far, Bell and others say they're prob-

ably just a start. In some cases, personality traits might be inherited, while in others they might develop as a learned response to differences in conditions of an organism's life—the kind of parental care it receives.

For example, the team has demonstrated that sticklebacks raised by a father (the species' sole caretaker) tend to take fewer risks with predators than fish raised in incubators.

Despite the environmental component, personality can be more than just a learned response to environment, since a learned behaviour can be forgotten relatively quickly. Scientists hope to probe the genomic underpinnings of this behavioural variation.

Bell likens personality to factors such as height or weight, which clearly can have both a genetic

and an environmental component, while being more stable. "I would say the key thing to personality is that there is individual variation and individual consistency," she said.

That variation and consistency might also explain why some individuals might learn from their environment faster than others.



Dr Bell explains her research

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# Red groupers transform undersea landscapes



A new study led by researchers at Florida State University reveals the red grouper to be an architect and ecosystem engineer at heart.

Most abundant along Florida's west coast but also found on watery ledges and in crevices and caverns from North Carolina to Brazil, the red grouper excavates and maintains

complex, three-dimensional structures on the seabed. Marine creatures like the spiny lobster and the vermillion snapper then use these structures as their habitats.

Led by Florida State University's Felicia Coleman, the research-

ers watched red groupers remove sand from the sea floor. Ala dam-building beavers, the fish excavate and maintain distinct holes, thus providing coral, sponges and other marine life a place to congregate.

"The research is incredibly valuable because it demonstrates how interconnected species are in the sea," said Dr Susan Williams, a professor at the University of California, Davis, who has collaborated with Coleman on an earlier, related study.

"Its sea-floor associates include commercially valuable species such as vermillion snapper, black grouper and spiny lobsters. If the groupers are overfished,

the suite of species that depends on them are likely to suffer."

Working along the West Florida Shelf, Coleman and her colleagues observed the red grouper's excavating activities during both its juvenile stage in inshore waters and its adult stage at depths of 300 feet.

Coleman said, "We found through a series of experiments that they not only dug the holes but also maintained them by carrying mouthfuls of sediment from the centre of the pit to the periphery and expelling them through their gills and mouths, then brushing off the rocks with their tail fins."

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# Fish Communicate in Secret

Certain coral reef fish use ultraviolet (UV) vision to tell the difference between their own and other similar species.

of the same and a different species (with similar overall body coloration but different UV facial patterns) in conditions in which the UV markings could and could not be seen. They observed that there was only a difference in territorial reaction when the UV facial patterns could be seen, demonstrating that these patterns are necessary for the fish to discriminate between their own and another species.

In further experiments, in which the fish were shown pictures of the different facial markings, the team demonstrated that they were reacting to the specific shape of the ultraviolet patterns on the intruder's face, not simply to their ultraviolet colour, she says.

"We came to the conclusion that the fish are using ultraviolet reflecting facial patterns to discriminate between their own species and other, similar-looking fish species—also that they are reacting to the actual pattern, not simply the ultraviolet light they were seeing."

Differences between patterns on the faces of individuals suggest that Ambon damselfish may also be able to use the patterns for the discrimination of individuals, in a

manner directly comparable to the face-based recognition of individuals performed by humans. However, major predatory reef fish like coral trout, wrasse and rock cod do not seem to have the ability to see ultraviolet markings.

"This means the damselfish are effectively exploiting a secret channel of communication among themselves and with other similar, but harmless species—one which cannot be detected by the fish that prey on them.

"It also means damselfish can see a wider spectrum of colours than we can, which is remarkable when you consider how colourful coral reefs are naturally. They must find them even more colourful places than we do." ■

*The UV vision may act as a secret channel of communication because it is invisible to the fishes' predators*

Indeed, the otherwise rather plain-looking Ambon damselfish may even be able to recognise individuals by their faces, in much the same way as humans do, researchers have found

The UV vision may act as a secret channel of communication because it is invisible to the fishes' predators.

"We observed that certain fish had very distinctive ultraviolet markings on their faces—and we wondered what they were using them for," said Dr Ulrike Siebeck of the Vision Centre and the University of Queensland (UQ).

*Ambon damselfish may even be able to recognise individuals by their faces, in much the same way as humans do*

In a series of carefully controlled experiments, the team exposed male Ambon damselfish to males

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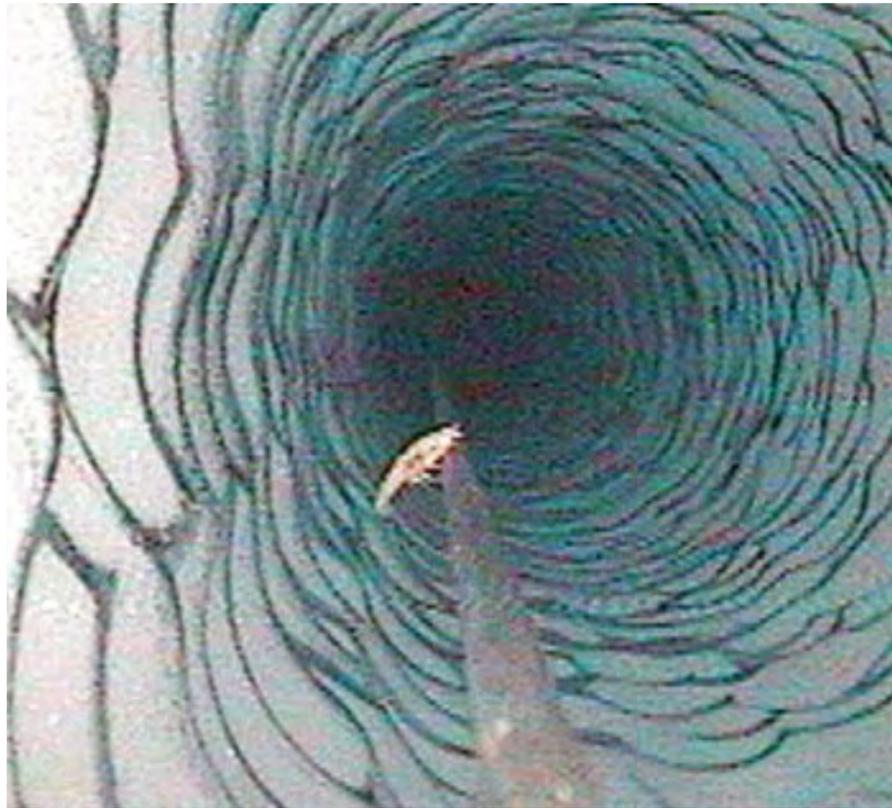


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# Shrimp found *under* the Antarctic ice



NASA

Lyssianasid amphipod found beneath Antarctica's Ross Ice Shelf

Scientists have expressed surprise over the discovery of a shrimp-like creature found beneath the Antarctic. The shrimps and a jellyfish were discovered some 200 meters below the ice where it was previously believed that only microbes could exist.

A team from the National Aeronautics and Space Administration was surprised when they lowered a video camera to get the first long look at the underbelly of an ice sheet in Antarctica. A curious shrimp-like creature came swimming by and then parked itself on the camera's cable. Scientists also pulled up a tentacle they believe came from a foot-long jellyfish. ■



Click to view video

# New website for jellyfish affectionados

A new website set up by Monterey Bay Aquarium Research Institute (MBARI) researcher Steve Haddock combines marine biology and social networking to create a resource that both scientists and ocean lovers can appreciate. Visitors can not only post their sightings and photos, they can also compare their sightings with those of beachcombers around the globe.

"People have been talking about jelly blooms increasing around the world, but we don't really have a lot of data on this. So, it's hard to know how localized these events are. That's why we created this website. The idea is that everyday people can get involved in a real ocean research project. Their eyes are important instruments in this study," said Haddock.

In addition to tracking jelly blooms, the Jellywatch site also allows visitors to report other unusual ocean events such as red tides or mass strandings of other marine creatures. Haddock and his fellow researchers are also interested in historical observations of jelly strandings. "The historical record is really hard to reconstruct" said Haddock. He also encourages people to report the lack of jellies at times or places when they might be expected. "No-jelly observations are useful as well," Haddock said.

Designed with input from the Monterey Bay Aquarium, the Jellywatch site is kid-friendly and very easy to use. Visitors can report sightings anonymously or register to simplify the entry of multiple observations. [www.jellywatch.com](http://www.jellywatch.com) ■



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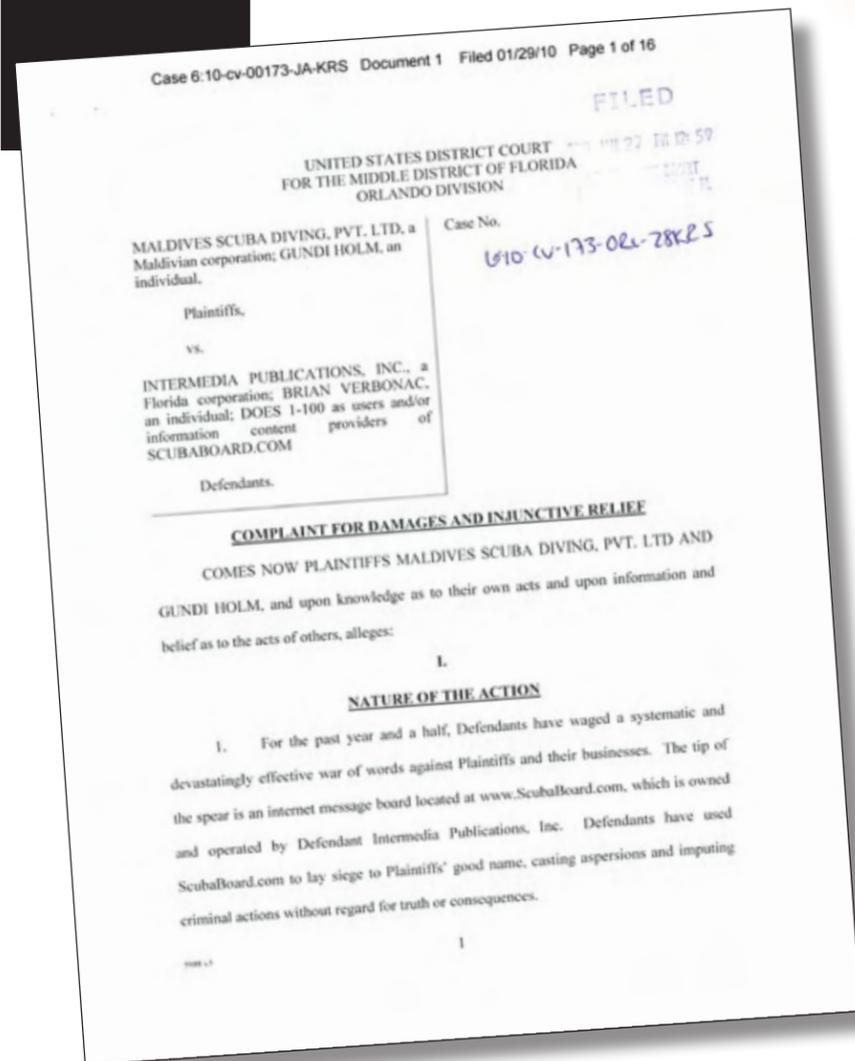


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Click to read the full lawsuit

Text by Peter Symes

## Maldives Scuba Diving, a Maldives-based company that organises dive trips to the Maldives sues Scubaboard over ‘torts, injury — Assault, Libel, and Slander’

This tall tale has its beginnings in the tragic events that happened during a liveaboard trip in the Maldives on 28 May 2008 when 11 divers suddenly fell ill and one diver—the 36-year old Russian national, Roman Rudakov—died due to contaminated air in the scuba tanks. According to one first hand witness, the levels of carbon monoxide were measured to be ten times that of acceptable levels.

The incident was reported by much of the global dive media and widely discussed on many scuba diving forums and discussion boards, including ScubaBoard, which resulted in a great deal of negative publicity for the organiser of the trip, a company, which at that time traded under the name, Strictly Maldives.

Sometime after the incident, the company either changed their name or the company’s owner, Gundi Holm, who is an Austrian national, started up a new company named, Maldives Scuba Diving (MSD). When members of

ScubaBoard caught wind of this, they began to spread the word on the forum, warning others about the owner’s history.

According to MSD—who claims they were nothing more than the travel agent for the diving trip and the local crew was the one responsible for the safety of their guests—the tone on the forum crossed into libel and slander.

### Ten million dollars

On 29 January 2010, MSD filed a libel suit against InterMedia Publications, one of the forum’s members—a Canadian they identified as Brian Verbonac—as well as one hundred “John Does” they do not know the identity of. MSD is seeking an excess of ten million dollars for “damages”. Their lawsuit can be **downloaded here**.

In response, members of ScubaBoard have rallied around their administrators, raising money to help defend the case, which they anticipate may cost them up to US\$100,000. The administrators at ScubaBoard have not (as of the date of publication of this issue)

removed any of the allegedly libellous posts.

### The letter of the law

As far as we could ascertain in most countries and jurisdictions, the administrators of online forum cannot be held accountable for utterings of their users and bloggers.

Since this case has been filed in a Florida court, the U.S. Communications Decency Act applies, which in its section 230 states that, “No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.”

In other words, merely giving someone a platform that they use



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# The boomerang and a ten million dollar lawsuit brought against Scubaboard

to make a libelous statement does not make one liable for those statements.

Libel cases are generally regarded as very difficult to win even in the best of cases, as a heavy burden of proof rest on the plaintiff. And after we have read through the posts and available background information, there seems to be no meat on that bone. So, what motives really drive the plaintiff to push forward with a case that seems largely frivolous and unfounded? Hold on to that thought—we'll get back to it shortly.

Typical lines of defence in libel cases would be:

- **Truth:** The statements were derogatory but were accurate.
- **Opinion:** The statements were not intended to be taken as fact and were merely an expression of one's beliefs.
- **Fair Comment on a Matter of Public Interest:** Statements reasonably believed to be accurate on a matter of public interest, such as a scuba diving accident.
- **Statements Made in Good Faith:** Statements reasonably believed to be true and can be supported, but later turned out to be false (such as quoting an incorrect news article).

On all these accounts, it seems that ScubaBoard would have a pretty good case. A fatal accident did happen. Opinions will be formed and aired. The incident was a matter of public interest and of public debate and so forth.

A legal counsellor told to us that lawyers have a saying about libel suits, which goes approximately like this: "The one who thinks of suing for libel should make his/her deliberations at the ethnographic museum's Australian exhibit where the

boomerangs are on display, as they will hopefully serve as a reminder that these cases tend to swing around and hit one in the neck."

Indeed! Just by placing the complaint, MSD has now cast the spotlight—and not a very flattering one—on the incident and made sure that most of the global diving community now knows what went down and how they handled the event. Secondly, it is generally perceived bad form to shoot the messenger or blame members of the public for forming an opinion.

### How not to handle PR

This seems to be a classic example of how not to handle public relations.

In real life, bad things happen also to good people, conscientious professionals and quality- and safety-oriented companies. So, let us assume, just for the sake of the argument, that the plaintiff's operations were indeed quality-oriented and diligently-managed, and this fatal accident occurs nonetheless. Do we believe the plaintiff was at fault? Not really. Obviously, it was a case of dereliction of

*Freedom of the press, is the freedom of communication and expression through vehicles including various electronic media and published materials. While such freedom mostly implies the absence of interference from an overreaching state, its preservation may be sought through constitutional or other legal protections.*

duty by an employee of a subcontractor.

But as tour operators, they are expected to vet their subcontractors and vouch for their quality, too. So, when incidents do happen, the operator is left with an unpleasant and challenging

situation to clear up and public relations to handle. That is just the nature of the business, and one has to be prepared to face the music and take responsibility.

### Don't shoot the messenger

Imagine if Toyota had sued the press for reporting the recent accidents involving Toyota vehicles, some of which were fatal, too—accidents presumably caused by faulty pedals—and sued members of the general public for airing their opinions or outrage? Instead, the president of the carmaker apologized to the public and to the U.S. Congress and took action to correct matters. Nobody is perfect. Products will occasionally fail even after diligent and thorough testing—accidents will happen. What really matters is how these situations are handled.

### PR 101

Handling situations correctly, such as the



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fatal accident on the liveboard, is not only paramount to protecting the company's good standing, but it can even be turned into an advantage. That is why businesses hire spin doctors and press officers, and why executives get training in how to handle the press. What it comes down to is that, in such cases, one must assume responsibility for what happened, be humble and deal with the critics tactfully, explaining what measures one is going to take to prevent the problem from happening again. Denial or blaming others are the worst things one can do.

**Had** MSD handled this incident properly from the onset, issued the required statements to the press and the public, engaged in the necessary dialogue and responded professionally to the public outcry, they would have eventually come out on top and probably even won some respect, too, for proper and professional conduct, because that **builds trust**. Instead, they elected to pursue this matter by filing a case in court, which will only serve to ridicule the dive industry and enriches nobody but the lawyers. The boomerang has indeed come around. ■

DETAIL OF THE U.S. CONSTITUTION / PUBLIC DOMAIN



## Purple Heart Dive Team develops dive program for Purple Heart recipients

Purple Heart Divers, a non-profit organization dedicate to supporting wounded heroes—American soldiers wounded in action—have developed a dive program for Purple Heart recipients who want to experience scuba diving as part of the rehabilitation process.

One of the organization's goals is to "give something back" to these national heroes and thank them for their service and sacrifice, as stated on their website: "Over 30,000 of our military have been wounded during the engagements in Iraq and

Afghanistan. Regardless of your stand on the war issue, the fact is that we are there, and that many brave men and women have been killed or wounded while serving our country ... They are awarded the Purple Heart in appreciation of their injuries."

The organization is interested in the heroes' stories and wants to help them share their heroic experiences and rehabilitation process with children and adults of the community.

The team finds funding for training and certification of Purple Heart heroes. First dives are reserved for divers who are already certified.

Purple Heart Dive Team was established in South Florida to provide an in-water scuba diving opportunity for Purple Heart recipients. They provide the scuba experience as a self-esteem building and rehabilitation program in a setting where boats are close to artificial and natural reefs.

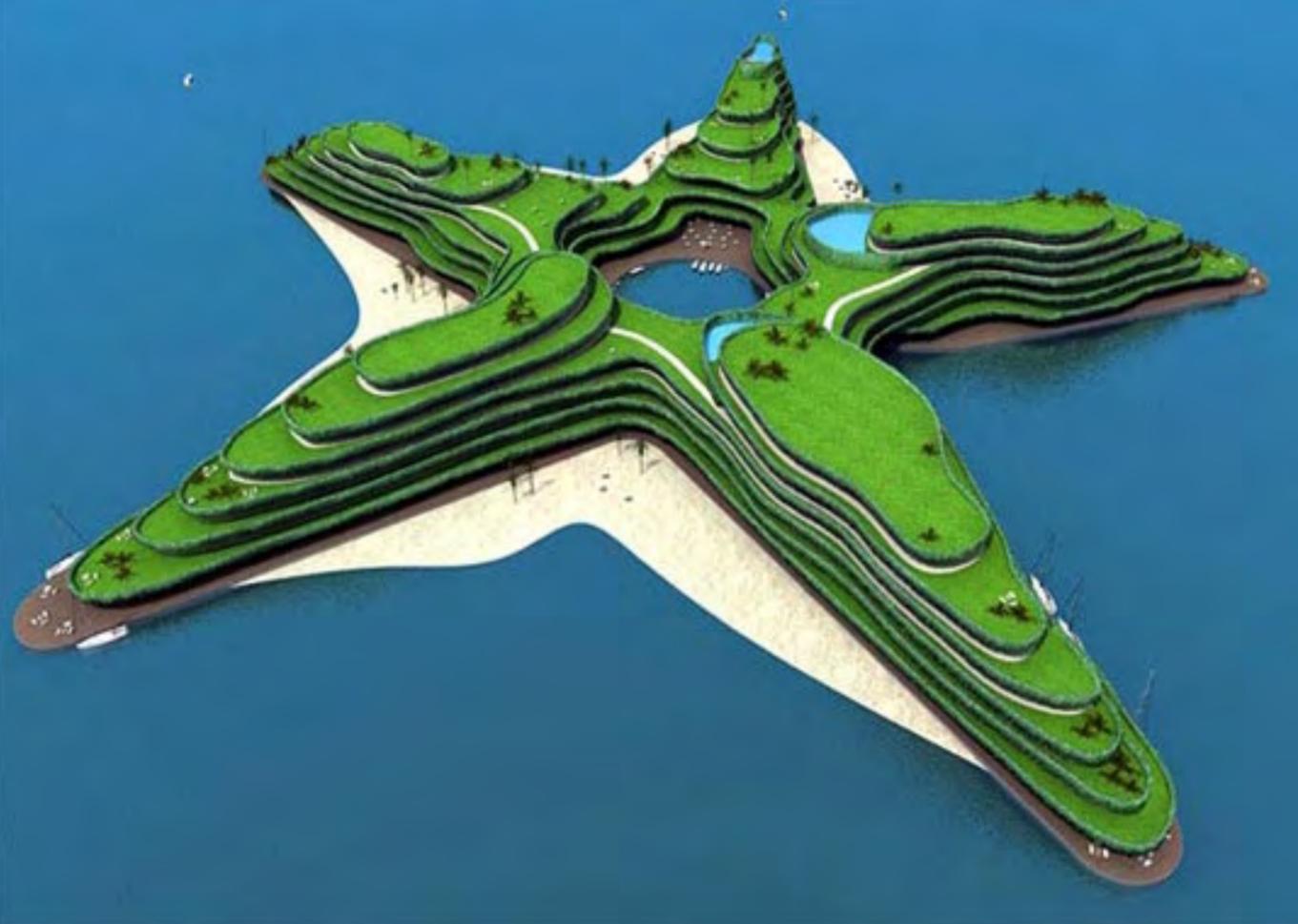
"Our mission is to provide a unique and memorable form of rehabilitation combining the physical exercise

of underwater diving with camaraderie of team efforts in a unique sub-surface experience. Through these programs, those who have been wounded in the line of duty will take part in programs designed to accommodate their special needs while providing them a life-altering perspective often needed to adjust to the severe injuries they endured."

Purple Heart Dive Team's primary goal is to help disabled heroes get "Back in Action" while readjusting skills to lead normal lives.

*Divers interested in getting involved with the Purple Heart Dive Team and want more information or to make a donation can email Gary Levine: [diveteam@rocketmail.com](mailto:diveteam@rocketmail.com)*





# In the Future: Architecture on the ocean

Flotating cities for the Maldives? The tiny island nation of the Maldives is under serious threat from rising sea levels caused by climate change as no part of the 1200-island republic is more than six feet above sea level. Now, in one of several counter measures, the tiny country has teamed with Netherlands-based Docklands/Dutch Watervalley to create a series of floating islands complete with leisure facilities like a nine-hole golf course, pools and a convention centre.

The project will include a star-like formation of floating cities, providing the Maldives' people with a place to live after the rising sea levels have washed away their island nation.

Designed by architect Koen Olthuis, the renderings for the amphibious mini-cities with the Citadel floating apartment complex and the amazing floating homes appear to depict star-shaped, tiered islands with indoor spaces hidden under lush green-roof terraces, complete with interior pools and beaches. While exact design details of these new floating islands are still unavailable, the Dutch Docklands has built a special expertise in creating water developments using methods and procedures that reduce impact on underwater life

and minimize changes to coastal morphology.

## Gyre Seascraper

The Gyre by the Canadian visionary Keith Dewey, the man behind the Zigloo, is a conceptual floating development that has been designed as an underwater skyscraper. The development will bring scientists and vacationers together to understand the ocean, without polluting its delicate ecosystem. Peaking at a depth of 400m, the development will provide space for a comfortable living and working environment, including space for shops, restaurants, gardens and recreation.

As much as a skyscraper is an economical method of reducing humankind's footprint on land,



THIS PAGE: Citadel floating apartment complex

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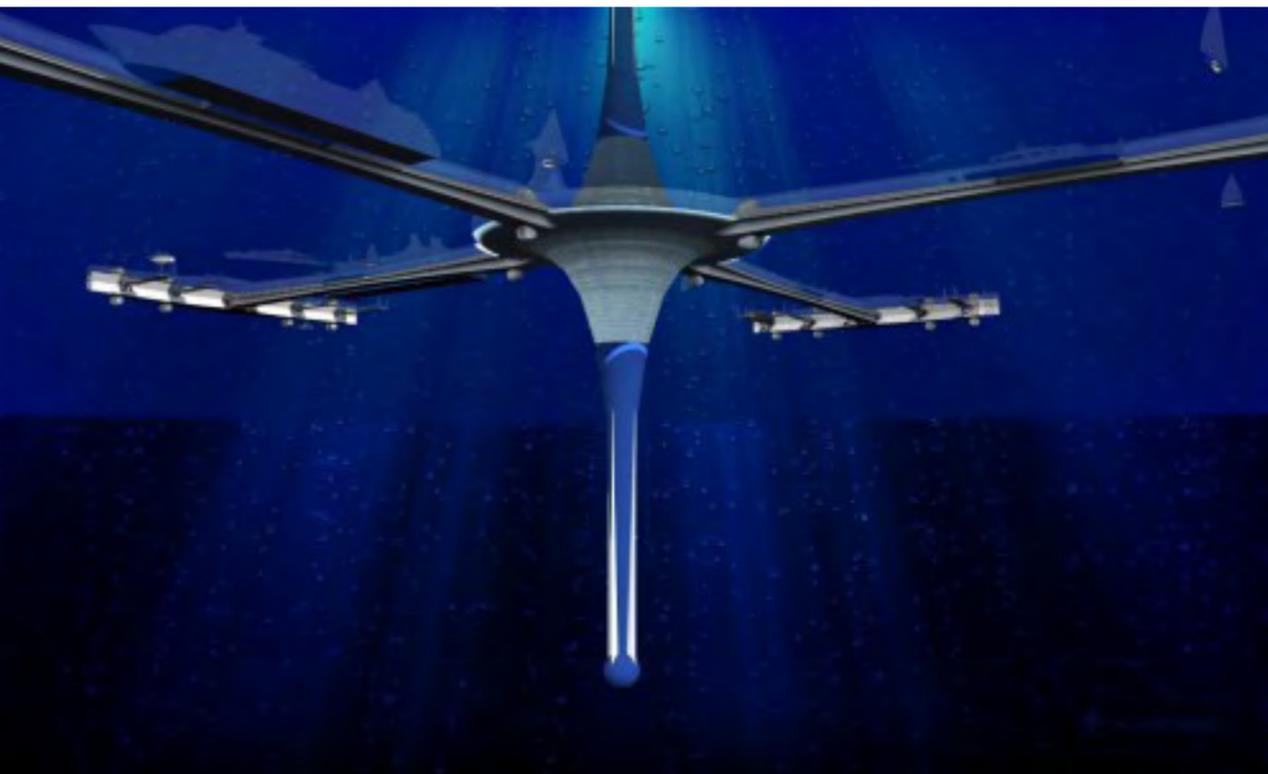
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Gyre goes a step further by juxtaposing that footprint to the ocean, and is perhaps its greenest feature. Its unique design permits the simultaneous application of wind, solar and tidal energy generation technologies thereby making it truly 'off-grid'.

The center piece of the design features a double-hulled vortex with both hulls being clad in reinforced glass, where each of the floor levels are essentially a layering of concentric rings ranging in size from 30,000m<sup>2</sup> down to 600m<sup>2</sup>. Inclinator riding along the inner structural ribs provide for vertical/diagonal transportation between floors. Total floor area of the entire structure (levels, radial arms, barriers) is approximately 212,000m<sup>2</sup> (or roughly 40 football fields). The Gyre's radial arms feature a pedestrian upper level and a transit system





on the lower level to access to the outer protective barriers. The barriers create an inner harbor and port of approximately 1.25km in diameter, accommodating the needs of even the world's largest ships.

**Water-Scraper**

Sarly Adre Bin Sarkum's Water-Scraper is a futuristic self-sufficient floating city, which

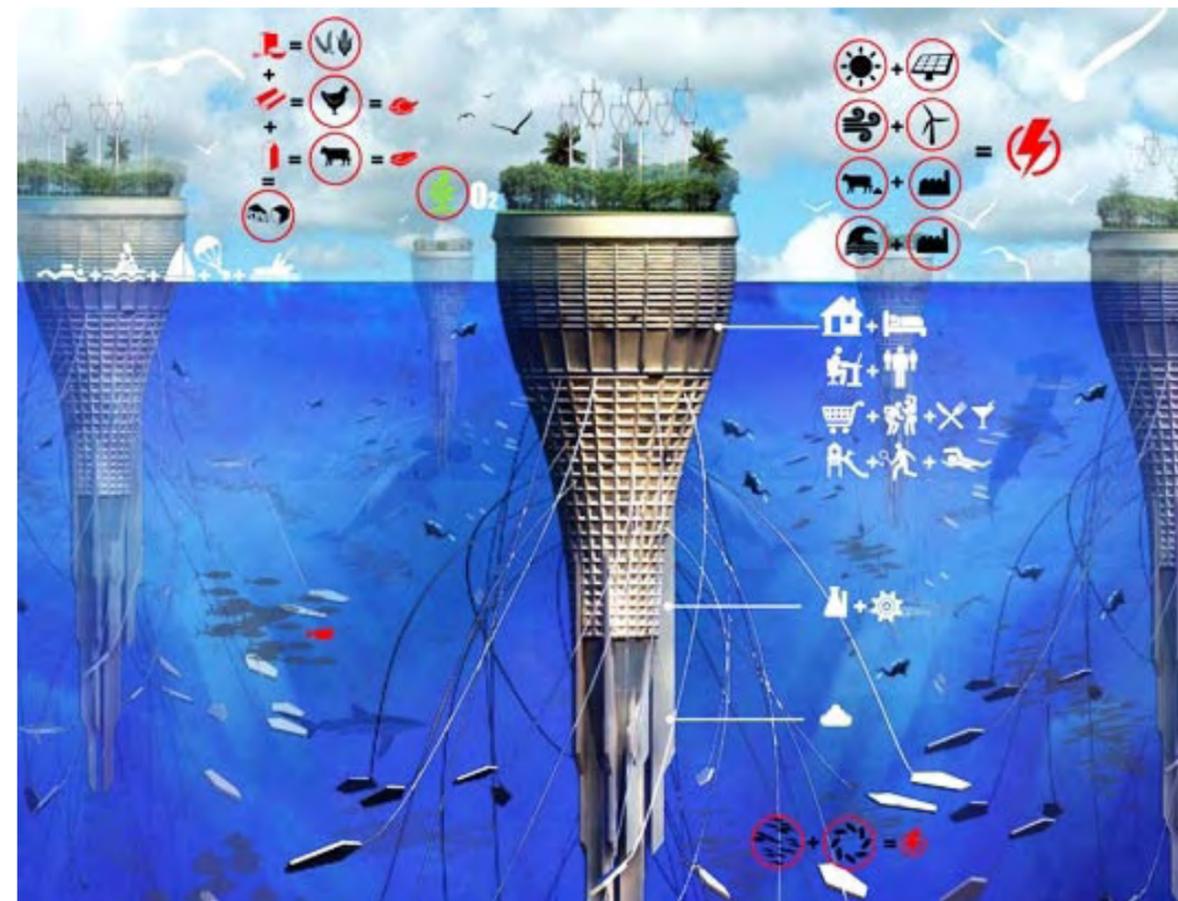
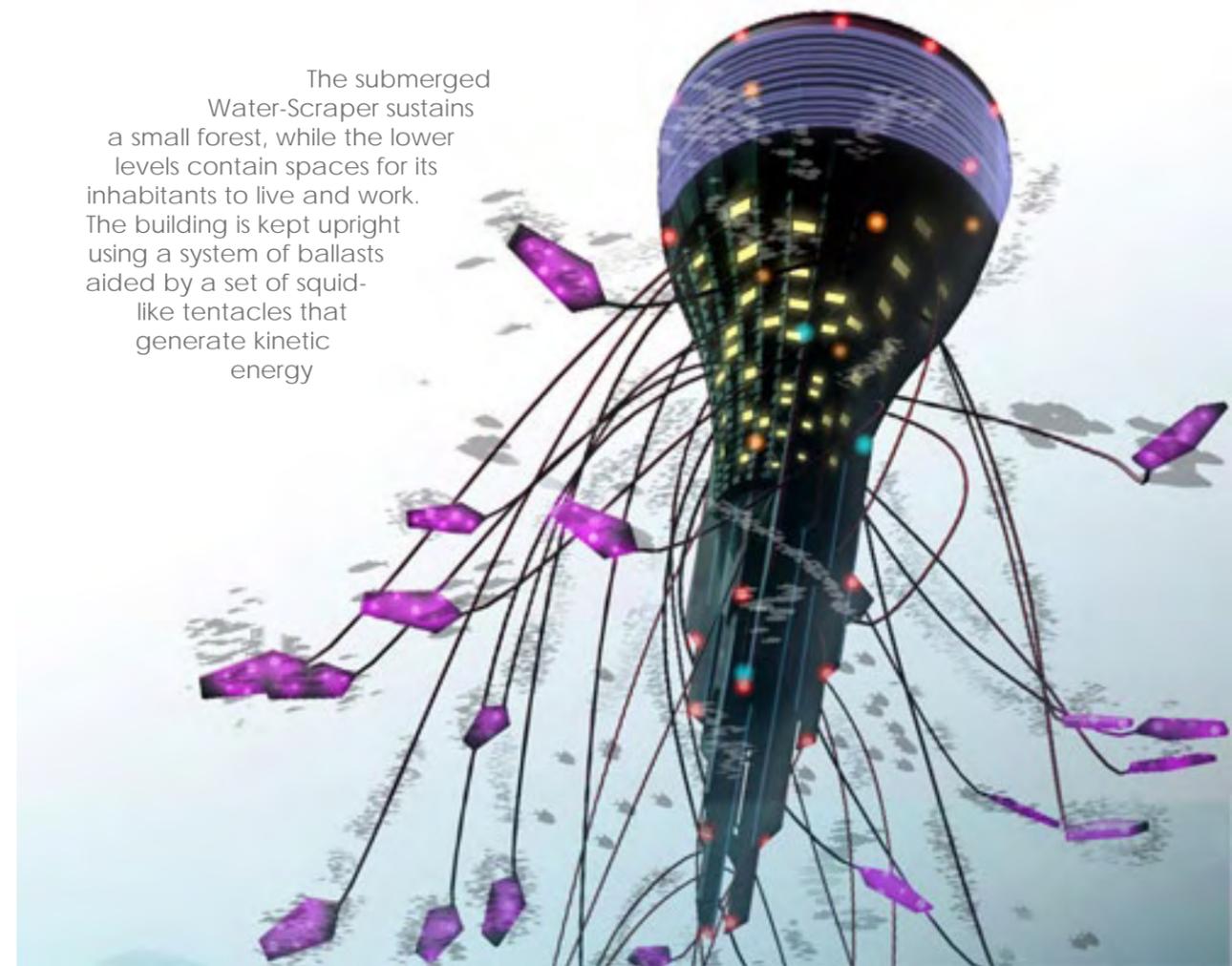
generates its own electricity using wave, wind and solar power, and it produces its own food through farming, aquaculture and hydroponic techniques. The design, which won a special mention in this year's eVolo Skyscraper Competition, expands the concept of a floating island into a full-fledged underwater skyscraper that harvests renewable energy and grows its own

The Gyre's radial arms feature a pedestrian upper level and a transit system on the lower level. The barriers create an inner harbor and a port big enough for even the world's largest ships

food. The surface of the submerged skyscraper sustains a small forest, while the lower levels contain spaces for its inhabitants to live and work. The building is kept upright using a system of ballast aided by a set of squid-like tentacles that generate kinetic energy. The building itself is kept upright using a system of ballast and balancing tanks. The tentacles also serve as balancing elements as they, in generating their power, are constantly moving with the rhythm of the tide. The buoyancy and ballast controls are placed at the lowest portions to create the proper counterforce for keeping the building upright. ■

[evolo.us/competition](http://evolo.us/competition)  
[zigloo.ca](http://zigloo.ca)  
[dutchdocklands.com](http://dutchdocklands.com)

The submerged Water-Scraper sustains a small forest, while the lower levels contain spaces for its inhabitants to live and work. The building is kept upright using a system of ballast aided by a set of squid-like tentacles that generate kinetic energy



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Water-Scraper



"Peek-a-boo"  
Capernwray Diving Centre has just created an incomparable new dive by sinking the largest underwater attraction ever installed at a UK inland dive site

## Airliner becomes new dive site in England

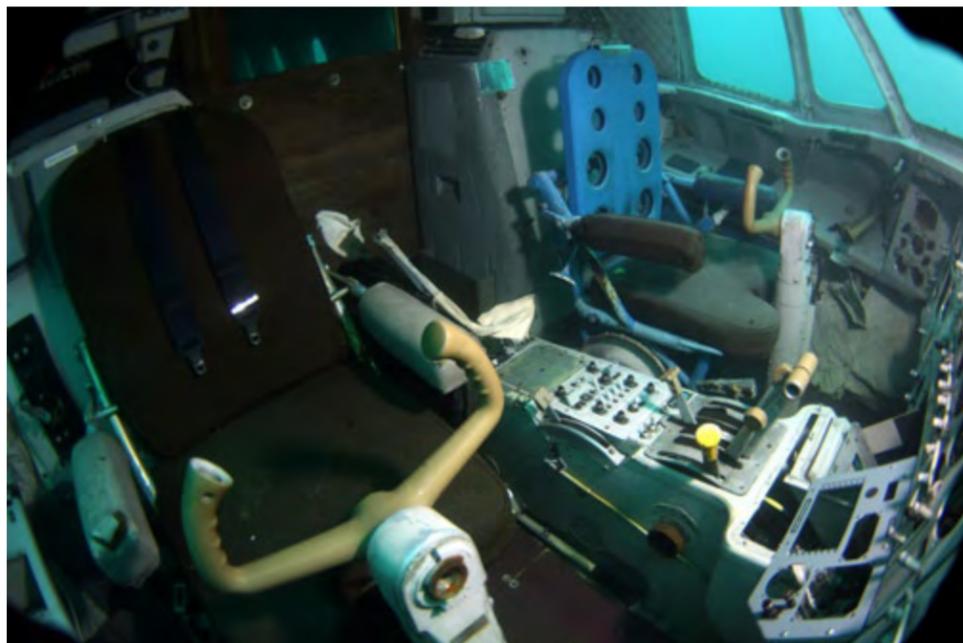
A 70ft Hawker Siddeley 748 was submerged into a quarry at Capernwray Diving Centre in Northern England.

Capernwray Dive Centre has created a new reason to head to the Lake District in the North West region of England, a newly sunken massive airliner, the largest underwater attraction ever installed at an inland dive site in the United Kingdom. Months of preparations over the winter and some GB£25,000 invested by the center brought the Hawker Siddeley 748, a 1960's full-sized 48-seat airliner powered by two Rolls Royce Dart turboprop engines, to its final resting place.

In a recent press release, Capernwray Dive Centre

described the aircraft: "What is particularly impressive is the size of this aircraft; she is simply huge! The fuselage is 67 feet long, the wingspan is 100 feet and the whole thing stands 25 feet high! The first divers have already visited this stunning wreck and have returned to the surface in awe at her sheer scale and visual impact underwater ... With a shining white fuselage, she is resplendent in her Emerald Airways paint scheme and new 'Northern Diver' logo, added as a 'thank you' to a great Lancashire company who kindly contributed to the costs of the project."

The aircraft, which is a series 2A HS748 having an official registration of G-BVOV, has an interesting history. Built at the end of this aircraft's production run in 1980, the craft was first employed by a Portuguese airline, flying between Lisbon and the Azores. Then, she was re-registered in the UK and flew routes from Liverpool under the Emerald Airways banner until 2006 when that company finally closed its doors. The craft experienced some adventures along the way including a dodgy landing at Guernsey Airport in early 2006 when the pilot had a bit of a mishap and managed to run off the end of the runway. ■



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[underwaterfestival.org](http://underwaterfestival.org)

# Diver badly burned by heat packs in freak accident

**Surgeon warns scuba divers against using heat packs on deep dives after treating a man who received severe burns in a freak accident off the Cork coast last year.**

A 31-year old diver was part of a team diving the *Lusitania* when the accident occurred last September. Inside his undersuit he had four air-activated heat packs, one at each shoulder and hip. The pads generate heat through a chemical reaction using sodium

acetate, water and metal. About 20 minutes into the dive when he was 80 metres below the surface, his pads ruptured. The diver suffered deep chemical-related burns to 35 percent of his body. They were made worse by the fact that the polyester and nylon in his dive suits melted.

Doctors believe that due to high pressure and the high concentrations of oxygen in his suit, the chemical reaction happened faster than normal, generating higher temperatures.

Despite his injuries and agony, he

managed to ascend and complete decompression stops, which took about two hours to complete. He was airlifted by Coast Guard helicopter to Cork Airport and was rushed by ambulance to Cork University Hospital (CUH). He has had seven operations but has since been discharged and is recovering well.

"Air-activated heat packs should never be used at high pressures," John Curran, the plastic surgeon who treated the diver for his burns said in an article in the latest edition of the *Journal of Plastic, Reconstructive and Aesthetic Surgery*. "Because of the high pressure and high oxygen, auto-ignition started. The suit was dry on the inside and completely sealed.

"He was lucky that the fire burst his suit open and the in-flowing of sea water put the fire out and relieved his excruciating pain. That allowed him to make a controlled ascent in two hours," Curran added.

**Editors note:** We haven't been able to ascertain whether the heat packs in question were intended or designed for scuba diving activities. ■

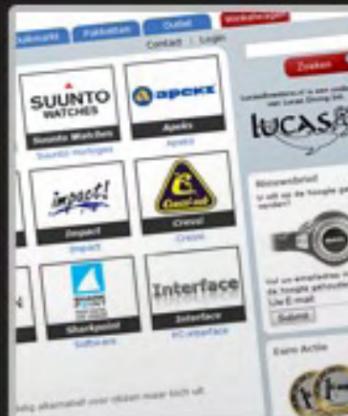


RMS Lusitania was torpedoed by German U-boat U-20 on 7 May 1915



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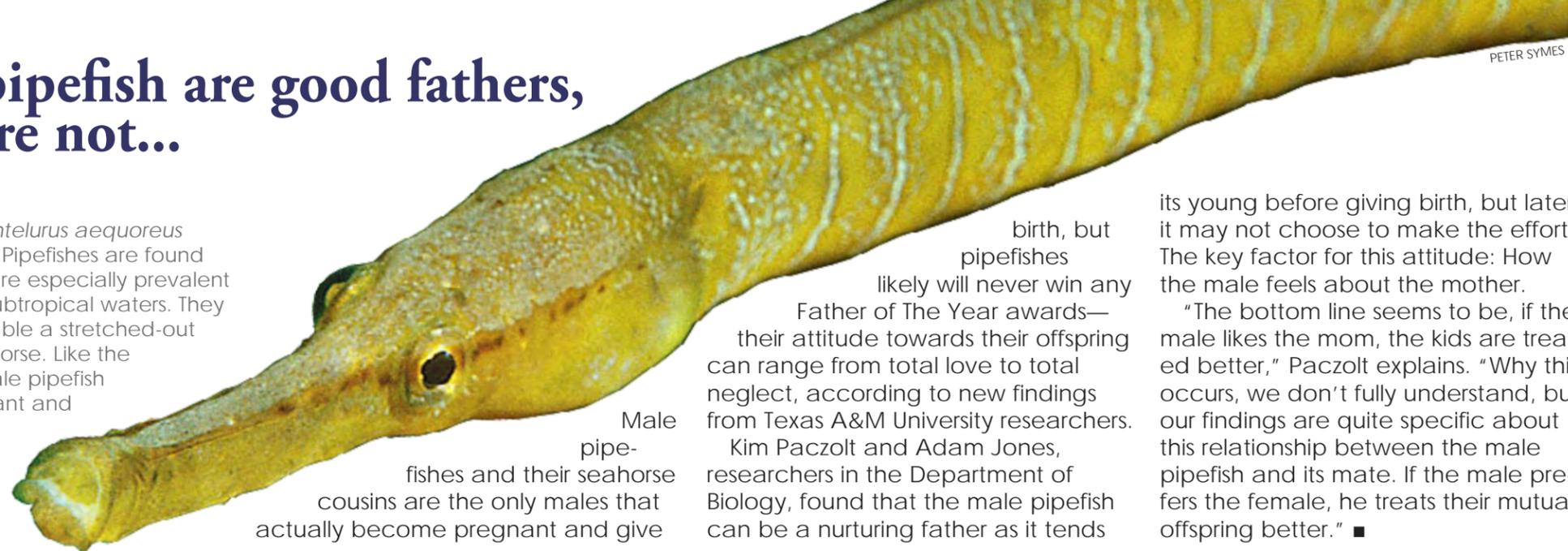
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## Some pipefish are good fathers, some are not...

Snake pipefish *Entelurus aequoreus* (Linnaeus, 1758). Pipefishes are found worldwide and are especially prevalent in tropical and subtropical waters. They somewhat resemble a stretched-out version of a seahorse. Like the seahorse, the male pipefish becomes pregnant and gives birth.



Male pipefishes and their seahorse cousins are the only males that actually become pregnant and give

birth, but pipefishes likely will never win any Father of The Year awards—their attitude towards their offspring can range from total love to total neglect, according to new findings from Texas A&M University researchers. Kim Paczolt and Adam Jones, researchers in the Department of Biology, found that the male pipefish can be a nurturing father as it tends

its young before giving birth, but later it may not choose to make the effort. The key factor for this attitude: How the male feels about the mother.

“The bottom line seems to be, if the male likes the mom, the kids are treated better,” Paczolt explains. “Why this occurs, we don’t fully understand, but our findings are quite specific about this relationship between the male pipefish and its mate. If the male prefers the female, he treats their mutual offspring better.” ■

## Advocacy group vows suit to stop swimming with manatees at Crystal River, Florida



**Citing record manatee deaths this year, an environmental watchdog group wants to close the popular Kings Spring in Crystal River to swimmers and divers.**

Public Employees for Environmental Responsibility filed a notice of intent

to sue on Monday giving the U.S. Fish and Wildlife Service 60 days to close the spring or face a lawsuit.

Annually, an estimated 100,000 tourists swim with manatees in and around Kings Spring at the headwaters of the Crystal River in Kings Bay. The spring is one of the primary sources for the river for the warm water that manatees seek when

temperatures fall.

A record 641 manatees were counted in Citrus and Hernando county waters in January during the extended cold snap. By mid March, cold stress had driven the death count to 431 for 2010, topping last year’s record of 429 deaths for the entire year. ■

## Deep Sea Fish finish up their Spinach

Scientists have for the first time captured footage of one of the most abundant species of deep sea fish feeding on plant material. Though the fish were artificially fed—with spinach—it demonstrates they have much wider tastes than previously thought.

Dr Rachel Jeffreys and her colleagues of the Royal Netherlands Institute for Sea Research simulated a plant food fall by dropping spinach bait into the deep North Atlantic sea, 185km off the coast of Portugal. Attached to a rig containing the bait was a video camera, which recorded any animals that ventured close.

Soon after the bait was dropped 3000m underwater, at least three species of deep sea fish, grenadiers (*Coryphaenoides armatus* and *C. mediterraneus*) and cusk eels (*Spec-tunculus* sp) began to attack it, eating away at the spinach.

“We were very surprised and excited by the results,” said Jeffreys. ■

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## Egypt creates its first marine reserve on its Mediterranean coast

Egypt wants visitors to discover its Mediterranean coast at a newly declared marine reserve being established near the border with Libya, the government said. Falling within the Gulf of el-Salloum, the 383 km<sup>2</sup> protected area is home to over 160 species of birds and over 10,000 marine species. The reserve falls under a number of international and regional conventions, including the Convention on Biological Diversity along with the World Heritage Convention. The declaration of the protected area as a nature reserve aims to protect it against the environmental problems. “The goal is to protect endangered species ... and encourage ecotourism in the reserve area, putting it on the global ecotourism map,” Environment Minister Maged George said. ■

# “New hope for divers with disabilities” Disabled Divers International

A new approach to teaching people with disabilities to scuba dive is promised with the formation of a new non-profit organisation, Disabled Divers International.



Fraser Bathgate

Founders of the DDI are two men with a combined 30 years of working with disabled divers—Fraser Bathgate, its first president, and Vice-President Flemming Thyge, both previously leading lights of the International Association of Handicapped Divers (IAHD). All the DDI's board members are volunteers.

“Our intention with DDI is to ensure that our students and their needs always have priority,” says Bathgate. “The new training programme we're offering moves away

from traditional methods of teaching divers with disabilities.”

Scuba diving has been shown to offer numerous benefits in terms of the social and physical rehabilitation of people with disabilities. Many find that, given the correct equipment and appropriate training, the restrictions they experience on land disappear with the near-weightlessness they experience under water.

“Regular recreation involving physical exercise engenders better physical and mental health,” says Fraser Bathgate. “Scuba diving is also a social sport, and being able to interact with non-disabled divers can have a tremendous positive effect.” The official launch of DDI took place on 27 March at the London International Dive Show, but Bathgate said he had already gathered extensive international support for its formation.

Its courses are designed to dovetail seamlessly with the

work of Depththerapy, the charity Bathgate set up to help rehabilitate through diving Coalition forces personnel seriously wounded in the Iraq and Afghani conflicts.

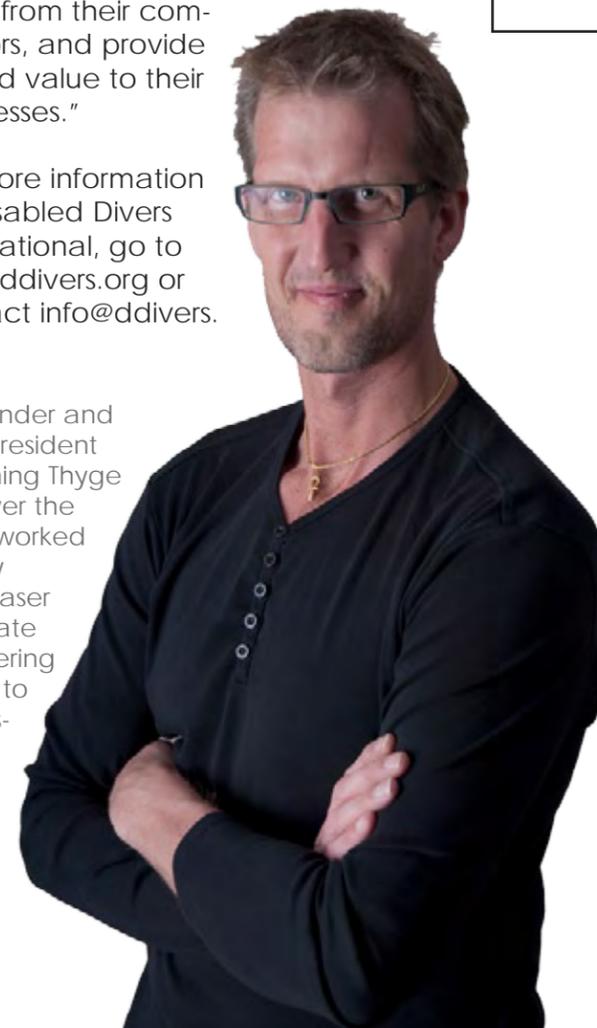
“DDI programmes are designed to work in conjunction with those of existing diver training agencies,” said Fraser Bathgate. “Our new layer of courses allows people who would have difficulty fulfilling standard agency requirements and standards to experience diving safely. We achieve this through modifications and enhancements to standard procedures and equipment.”

Another set of DDI courses is available for training instructors. “For the professionals, we provide the tools and knowledge required to train and certify disabled divers safely, within the various limits imposed by individual students' ability. Work with disabled divers is very rewarding, because the students share the excitement and joy of their experiences with their instructors,” said Bathgate.

Bathgate hopes that individual diving professionals and dive centres will be quick to take up the opportunities offered by DDI courses. “These training programmes can help to differentiate them from their competitors, and provide added value to their businesses.”

For more information on Disabled Divers International, go to [www.ddivers.org](http://www.ddivers.org) or contact [info@ddivers.org](mailto:info@ddivers.org). ■

Cofounder and Vice-President Flemming Thyge has over the years worked closely with Fraser Bathgate on offering diving to the disabled



## Shark Life launches Shark Diver courses

Choose from seven different shark species. Learn about feeding behaviour, biology, habitats. Have a greater understanding of sharks. ■



# Underwater CSI training course

If you are a diver and are interested in taking a new look at the underwater world through the eyes of a forensic scientist, then a novel 3-day course may be just the thing you've been waiting for. Not only will you play a legitimate part in conducting an actual underwater crime scene investigation, but you will also learn how to analyze the data and construct a proper defense, using forensic techniques that you will learn in the program.

So, what exactly is Underwater CSI? Essentially, it is a set of protocols and techniques for investigating underwater crime scenes; as such, it can be quite useful in determining short-term violations that have had negative impacts on our reefs. The results of these investigations can be documented, recorded and analysed in a systematic fashion using tool kits developed to support these types of investigations. Similar techniques are now being used worldwide by marine enforcement officers, environment assessment agencies, coral reef researchers, litigators and natural resource managers.

The application of the forensic sciences to detect and document illegal activities related to coral reefs provides a tool to find and prosecute suspects, assign monetary value to damages caused to a reef as part of illegal activities, and to provide information to the judicial system regarding the magnitude of some of these crimes.

Unlike search and recovery operations, underwater forensic activities focus on identification and documentation of potential

evidence. The evidence is not removed from the water until the underwater crime scene has been properly and completely documented, all facts and potential information are obtained, and the best possible way to remove the evidence with minimal dam-



age is determined.

The objective of this study is to develop methodology to accurately describe unlawful activities, quantifiable damage to the resource, and associate a monetary value useful in determining mitigation relevant to damage inflicted to a reef in addition to current fines and penalties. The experimental design focuses in adapting and validating underwater forensic techniques currently in use in other areas of the forensic sciences. Further, divers will look and discuss ways to utilize this methodology to identify human activities that affect coral reefs that are negligent or unlawful. The findings of this research will be incorporated into Coral Reef Crime Scene Investigation proce-

dures in an effort to increase successful prosecution of violators.

The course is hosted by The Central Caribbean Marine Institute (CCMI) Little Cayman Research Centre as part of its Dive with a Researcher (DWAR)

Program. CCMI, which is located on Little Cayman in the Cayman Islands, was established to create a regional centre for excellence in coral reef science. With a programme of continuing education and outreach to school children, students and coral scientists, it offers a base for the study and monitoring of reef biology on Little Cayman Island.

The lead diver and instructor will be marine forensic biologist, Dr Hector Cruz-Lopez, who is a professor of Forensic Science at the Palm Beach State College Criminal Justice Institute and serves on the National Forensic Science Initiative at West Virginia University. ■

[www.reefresearch.org](http://www.reefresearch.org)

## When Training Matters... Choose NAUI!

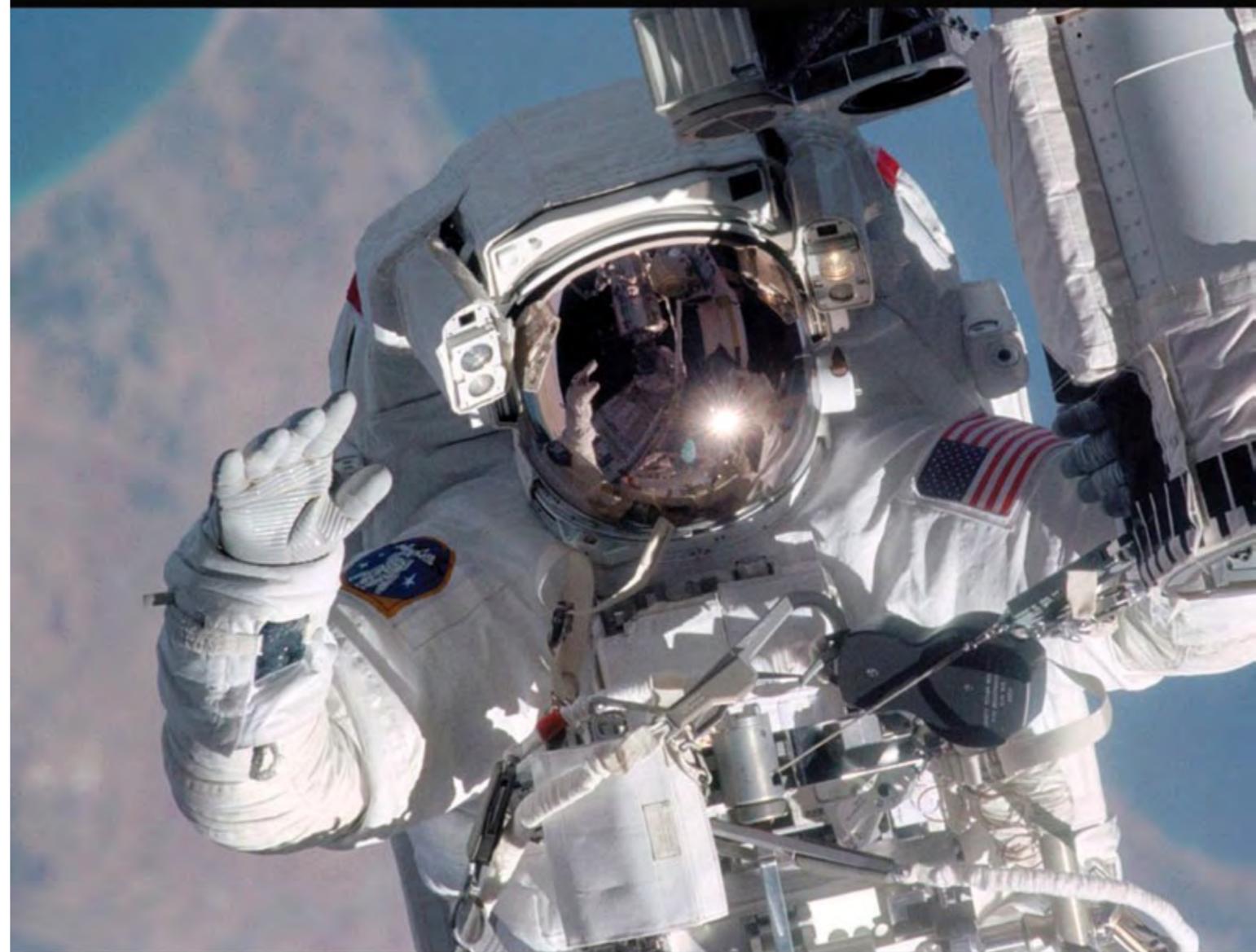


Image courtesy of NASA

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Edited by  
Mathias Carvalho

# 800-year-old shipwrecks found in Baltic Sea

Swedish experts say dozens of centuries-old shipwrecks have been found by a gas company building an underwater pipeline between Russia and Germany.

The oldest wreck probably dates back to medieval times and could be up to 800 years old, while the others are likely from the 17th to 19th centuries, said Peter Norman, of Sweden's National Heritage Board.

"We have managed to identify 12 shipwrecks, and nine of them are considered to be fairly old," Norman, a senior advisor with the heritage board, told AFP. "We think many of the ships are from the 17th and 18th centuries, and we think some could

even be from the Middle Ages," he said, stressing that "this discovery offers enormous culture-historical value".

The shipwrecks were discovered during a probe by the Russian-led Nord Stream consortium of the sea bed route its planned gas pipeline from Russia to the European Union will take through the Baltic.

"They used sonar equipment first and discovered some unevenness along the sea bottom ... so they filmed some of the uneven areas, and we could see the wrecks," Norman explained.

The Nord Stream project, in which Russia's OAO Gazprom holds a 51 percent stake, has uncovered scores of other objects during seabed searches of the route, including about 80 sea mines and a washing machine. ■



# Bronze age wreck found off Devon

One of the world's oldest shipwrecks has been discovered off the English coast after lying on the seabed for almost 3,000 years.



SOUTH WEST MARITIME ARCHAEOLOGICAL GROUP

Archaeologists have described the vessel, which is thought to date back to around 900 B.C., as being a "bulk carrier" of its age, carrying an extremely valuable cargo of tin and hundreds of copper ingots from the continent when it sank.

Archaeologists believe the copper—and possibly the tin—was being imported into Britain and originated in a number of different countries throughout Europe, rather than from a single source, demonstrating the existence of a complex network of trade routes across the continent.

Academics at the University of Oxford are carrying out further analysis of the cargo in order to establish its exact origins.

The wreck has been found in just eight to ten metres of water in a bay near Salcombe, south Devon, by a team of amateur marine archaeologists from the South West Maritime Archaeological Group

who were initially investigating a 17th century wreck, which went down close by.

In 2004, the team decided to concentrate on the southeast area, and a palstave axe head was located in September that year. No longer was the team looking for 17th century artefacts, but Bronze Age ones. It turned out that the pot handle and adze located in 2002 are also from the Bronze Age, and following a re-assessment of the original assemblage at the British Museum, some of the original artefacts recovered were also identified as Bronze Age.

Since 2004, SWMAG has located and recovered a significant number of Bronze Age artefacts that date to the Penard period and are believed to originate predominantly from France. This makes them contemporary to the artefacts from Moor Sand found by Phillip Baker in 1977 and Keith Muckelroy et al during subsequent

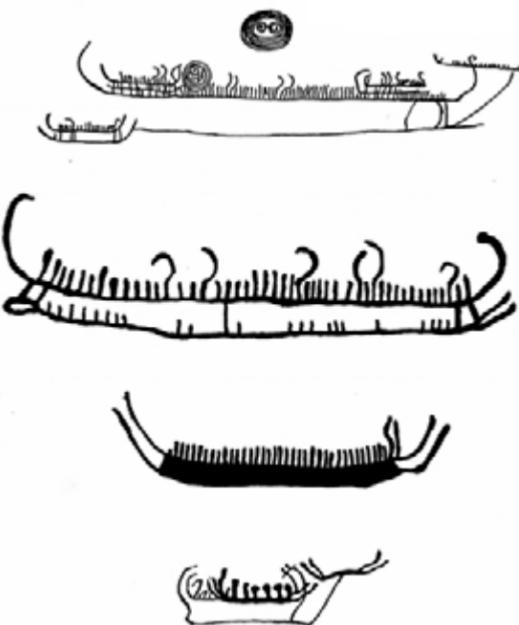
surveys of the site; given the closeness of the two sites (the designated areas overlap) it seemed probable that there was some connection between the two. The Bronze Age site was named the Salcombe B Site to differentiate it from the original 17th century site.

In total, 295 artefacts have so far been recovered, weighing a total of more than 84kg. The cargo recovered includes 259 copper ingots and 27

tin ingots. Also found was a bronze leaf sword, two stone artefacts that could have been sling shots, and three gold wrist torcs—or bracelets.

The team have yet to uncover any of the vessel's structure, which is likely to have eroded away.

[www.swmag.org](http://www.swmag.org) ■



# The battle for Ancona's bounty

Courts curb bounty hunters seeking torpedoed liner's £15m bullion

It is still not very clear what exactly happened on 7 November 1915, between the German U-boat 38 and the Italian-American passenger ship, the *SS Ancona*. The U-boat attack, near Sardinia, sunk the liner and sealed the fate of more than 200 people, out of the total 760 on board, when the transatlantic vessel went down.

What could be considered a war grave also hides immense riches: 12 barrels of gold and a silver shipment, a treasure estimated to be worth €17m (£15m / US\$ 23.2m), a loot that entices the imagination of many bounty hunters around the globe.

The Italian government has joined the race for the recovery. Another heavy competitor is Odyssey Marine Exploration. A spokeswoman for the Florida-based firm, currently searching for the lost treasure, said that it had filed a joint motion with the Italian government

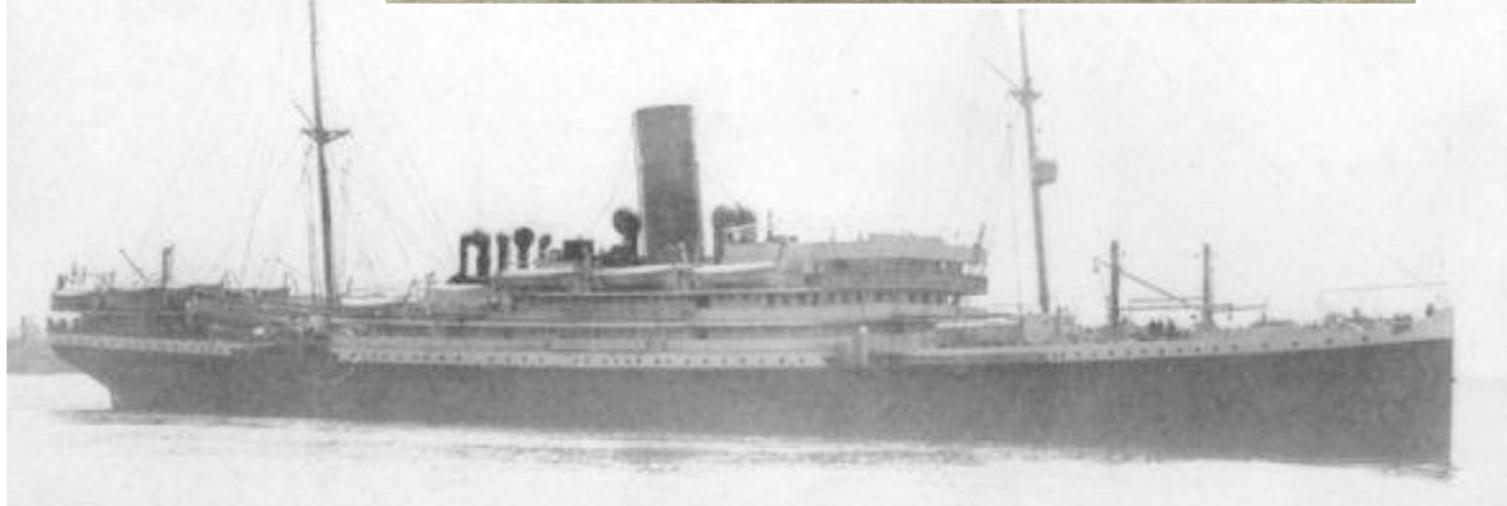
"preserving the administratively closed status of the case". She stressed that, "There is no dispute between Odyssey and the Italian government."

A foreign ministry spokesman, however, declared that lawyers in America had taken action in the U.S. courts. That could mean that neither the salvagers nor the government could take any initiative without first giving 45 days' notice to the other party.

Italian officials view the site as untouchable. Sebastiano Tusa, head of the government's Marine Heritage department on Sicily, declared to the local press: "It is a war cemetery that cannot be defiled by a company looking to

make money. The only acceptable project might be a non-profit-making one for scientific and historical research, with the agreement of all the nations involved in the disaster." ■

In June 2009, a Florida court judge instructed Odyssey to hand over to the Spanish government about US\$500m in gold and silver coins, recovered from the "Black Swan" site, identified as the *Nuestra Señora de Las Mercedes*—a Spanish frigate that sank off Portugal in 1804. The firm is appealing against the judgment. Future dealings with the Italian government on the *SS Ancona* case will tell if the salvage firm will have a better outcome this time around. ■



The German U-boat 38 and the Italian-American passenger ship, the *SS Ancona*, on 7 November 1915

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It is believed that a cargo ship dated from 620 B.C. ran aground near Isla Farallon and Isla Grosa, off La Manga, Spain. Now, 26 centuries later, archaeologists from eleven countries are bringing these antique objects to the light of day once again. The ship was carrying an elephant tusk with Phoenician inscriptions, copper ingots and stones containing silver and lead



J.M. RODRIGUEZ | EL MUSEO NACIONAL DE ARQUEOLOGÍA SUBACUÁTICA

## Wreck from 600 B.C. discovered off Spain

The discovery of a Phoenician wreck beneath the sea off La Manga del Mar menor in Murcia, is being hailed by archaeologists as one of the most important discoveries in the Mediterranean.

The find, which has been described as one of the most important of all archaeological discoveries, appears to be the cargo of a commercial ship carrying ivory from African elephants, amber and lots of ceramic objects. The discovery has been kept secret for the past three years by the team of divers led by the Spaniard Juan Pinedo Reyes and the American Mark Edward Polzer. The recovery is taking place around Grosa Island and El Farallon Island, just off La Manga. Over the last three years,

1,400 objects have been collected. Even some of the wood from the bottom of the ship has survived since the 7th century before Christ (620 B.C.), and has been recovered. It is believed the vessel measured approximately 15 metres long.

The ivory tusks found measure between 70 and 150 centimetres with Phoenician writing inscribed. They have come from a race of elephants, which are now believed to be extinct. There are also copper ingots and stones containing

silver and lead. Ceramic pots, which were used for transporting fish and oil, have been found, too, as well as plates, bowls, combs, ivory knife handles, bronze needles and chandeliers.

It is believed the ship crashed into rocks off the island, which are just a metre and a half below the surface. The ship would have set sail from Cadiz and was probably heading towards Guardamar to a factory there, or to deliver items to a prince living in the area. ■

## Asterix – the Mighty Gaul Endures

A rare sea-going Roman-Celtic barge found on Christmas Day in 1982 is considered to be the largest, most intact sea-going vessel of its antiquity found outside the Mediterranean. First located in Guernsey's St. Peter Port, England, the vessel's remaining timbers were found by diver Richard Keen, lying in the centre of the narrow entrance to the harbor, thus being exposed by the propeller wash of vessels passing overhead.

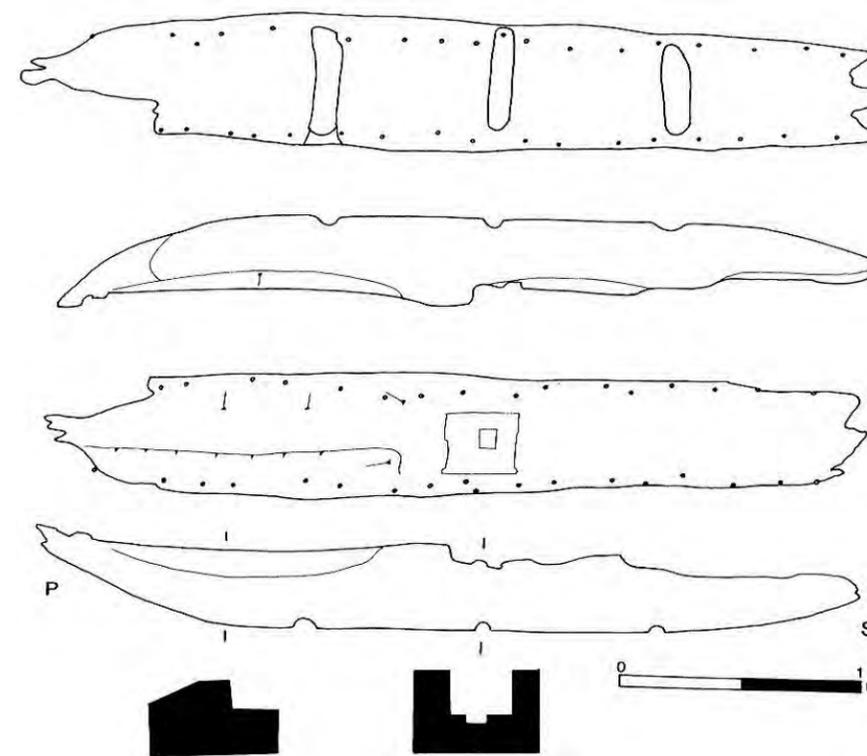
The find is considered an opportunity to expand the understanding of the trade routes used in the period, due to the pottery found that could have been made in areas as far away as Spain and Algeria. Dr Jason Monaghan, from the Guernsey Museum, said that the *Asterix* is "one of only two of its type surviving and it is Britain's largest Roman object".

Banked by the Guernsey Maritime Trust's private funding, the wreck was studied and cleaned up before eventually being

sent to The Mary Rose Trust in England for preservation procedures. Rule is better known for her work on the preservation of King Henry VIII's famous flagship. The preservation work is believed to be largely completed by early this year, and the feasibility of relocating the wreck back to Guernsey in being considered.

It is supposed to be a risky, costly operation. Monaghan declared that, "It would need to be displayed in a 'giant goldfish tank' or glass tank to keep the bugs and dust off and keep the humidity stable... if it gets too dry it will fall apart or too wet it will go mouldy."

A monograph written by Rule and Monaghan is available, describing all facts and the exploration missions that were undertaken: *A Gallo-Roman Trading Vessel from Guernsey – The Excavation and Recovery of a Third Century Shipwreck*. ■



A Gallo-Roman Trading Vessel

The ship's nickname, created by the media, refers to a small and fearless French comic book character, from the only remaining free village in Gaul, when it was a part of the Roman Empire. [www.asterix.com](http://www.asterix.com)

# New Underwater Archaeological Site Designated Off Polyaiagos Island, Greece

A shipwreck located off the small uninhabited Cycladic island of Polyaiagos in the central Aegean will be designated as an "underwater archaeological site" by Greece's Culture Ministry.

The shipwreck, which was first spotted in 2004, was excavated in November 2009 by underwater archaeologists who recovered valuable archaeological objects, including amphorae and ceramic vases dating back to the 4th and 5th centuries B.C.,

as well as fragments of the vessel's anchor. The ancient vessel was loaded with amphorae, which are scattered around the wreck in two main concentrations in depths of 25-49 meters off the coast of Polyaiagos.

In addition, the shipwreck was photographed and filmed in detail, which allowed the creation of a high-definition photo-mosaic, while procedures have been set in motion to designate the area as an underwater archaeological site.

An analysis of the amphorae recovered dated the wreck

to between the end of the 5th century B.C. and the first half of the 4th century B.C. At least three types of amphorae were identified, one of which originated from ancient Peparithos (the island of Skopelos), while the others were closely identified with Classical Era amphorae workshops of the northern Aegean. The Polyaiagos shipwreck, according to the ministry's announcement, cited by the media, sheds light in the study of sea-borne commercial routes of the Classical period and the movement of goods in the southwestern part of the Cyclades island chain. ■



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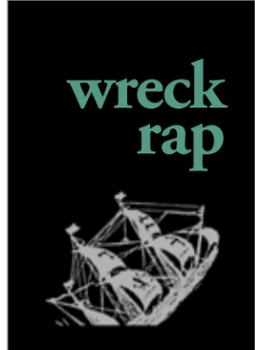
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THIS PAGE:  
Examples of the  
rare 1 reale coins

# The Treasures Within the Treasure

Text by Carol Tedesco

Many people will say that they experience their “a-ha” moments, or flashes of sudden insight while in the shower. These people are very fortunate. When I am in the shower, I typically think about how I need to clean the tiles. My insights occur at about 3:11 in the morning. With the rationale for doing so a complete mystery, I will suddenly sit bolt upright in bed, startling the be-Jesus out of my partner Michael and cat Bleu. Then, I stumble off in the dark to my office, bumping into walls and furniture, muttering about die-punches and assayer initials, to record whatever insight about shipwreck-recovered coins has surfaced from the subterranean depths of my subconscious.

Since 1992, my life has revolved around shipwreck-recovered coins. I have helped to clean them, have documented and authenticated them, and for some time have been writing a book about them. As I’ve said, dreams of coins wake me up at night.

Since people first began trading with one another for goods and goodies, money—in one form or another—truly

has made “the world go around.” Today, we go online to move money—sometimes lots of it—from place to place. But not so terribly long ago, money was transported on wooden ships, and though these ships are often romantically memorialized as “golden galleons”, prior to the California gold-rush of the mid-

1800’s, they were in truth silver galleons.

With a desperate need for money and a conviction of entitlement to acquire it at any cost, the kingdom of Spain’s approach was to plunder the resources of others. By 1622, little more than 100 years after the first voyage of Christopher Columbus, Spain’s

boundless lust for riches—and glory as well as souls to convert—had resulted in the conquest of much of the Caribbean, Mexico and the Americas.

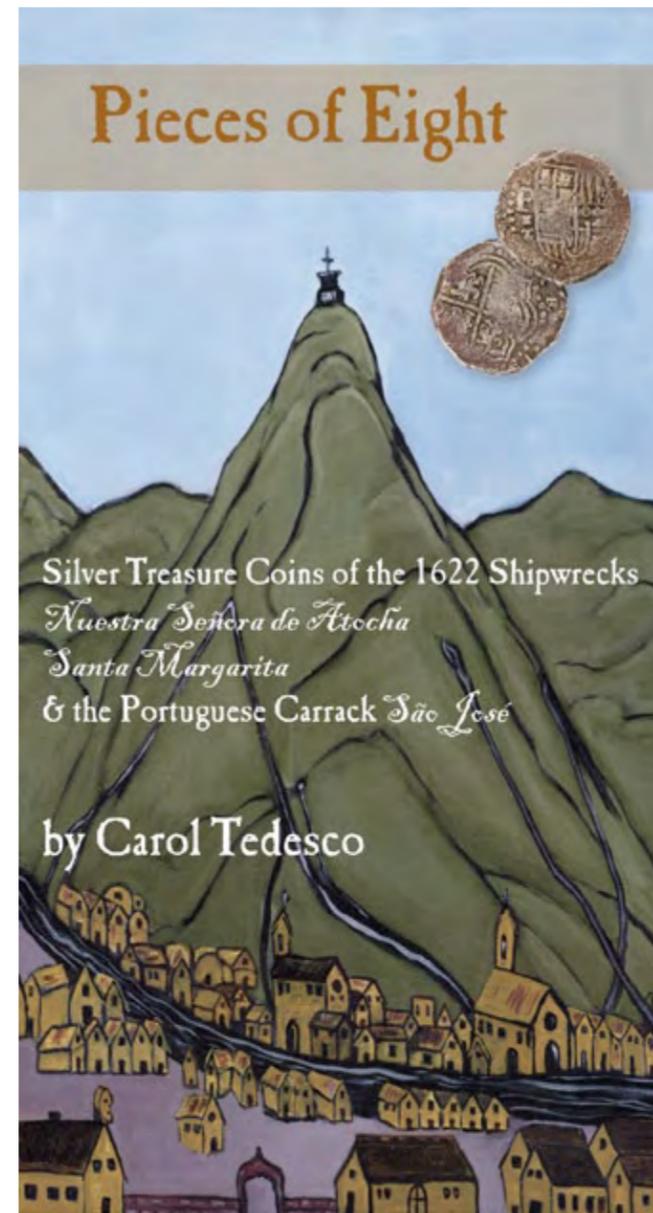
Silver was the most abundant treasure of the “Indies”, and royal mints were established to control and regulate a seemingly endless torrent of mineral wealth pouring from the mines. By 1622, New World silver in the form of the Spanish dollar was the most coveted and widely traded money on earth.

## History

The 1622, Tierra Firme Fleet galleon *Santa Margarita* was carrying almost 150,000 silver coins when she sank in the Florida Straits, but due to the widely scattered nature of the wreck and the deep, rapidly shifting and treacherous sands that conceal her remains, only about a third of these have been recovered to date. Therefore, when I received a call that a conglomeration of encrusted silver coins discovered by Keith Webb’s Blue Water Ventures of



A 16th century woodcut provides a glimpse into the workings of a mint; blanks being cut from sheets of silver, struck into coins, weighed and documented

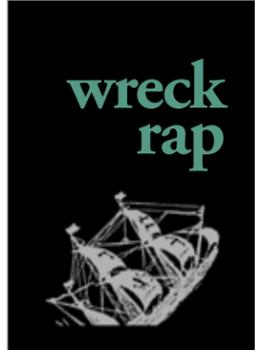


Silver Treasure Coins of the 1622 Shipwrecks  
*Nuestra Señera de Atocchia*  
*Santa Margarita*  
& the Portuguese Carrack *São José*

by Carol Tedesco

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

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



Key West had completed the conservation process—and some of the coins were quite unusual—I was out the door and headed to the conservation laboratory almost before the call was ended.

At the Key West, Florida, conservation lab of Mel Fishers Treasures—Blue Water Ventures' joint-venture partner, chief conservator, John Corcoran, had carefully placed 35 shimmering, newly cleaned silver coins on a soft cloth. Among them were the expected eight reales value coins minted in Potosi, Peru, (now Bolivia) during the reign of King Philip III, which have been the majority of Tierra Firme Fleet coin discoveries. But marvelously, this discovery included seven small and delicate one reale coins—almost unheard of on shipwrecks of this period—that were not from Potosi; they were from



A set of recreated coin dies help to illustrate the labor that went into crafting most money up until the 18th century. Photo by Carol Tedesco



the Mexico City mint, another Tierra Firme Fleet rarity. And, they were old—some of them among the earliest coins minted in the Americas.

Their story was epic. The desire to reach out and touch them was irresistible.

In 1521, Spanish troops led by Hernán Cortés laid siege to Tenochtitlán, a magnificent Aztec city built on an island in a lake and connected to the mainland by a series of causeways.

The Spanish soldier and chronicler, Bernal Díaz del Castillo, in his *True History of the Conquest of New Spain* wrote:

"When we saw so many cities and villages built in the waters of the lake and other large towns on dry land, and that straight, level causeway leading into Mexico City, we were amazed, and we said that it was like the enchanted things related in the book of Amadis because of the huge towers, temples and buildings rising from the water, and all of masonry. And some of the soldiers even asked whether the things we saw were not a dream."

The conquistadors then proceeded to reduce Tenochtitlán to ruins. On that spot, they erected a new Spanish city. Here, Cortés built his own residence atop the dead Aztec ruler Moctezuma's palace

Blackened and encrusted silver shipwreck recovered coins are cleaned by a technique called electrolytic reduction. First, coins are separated from the conglomeration, then suspended individually from metal alligator clips into a tub of soda ash and water. The clips are secured to rods with stainless steel wire, and the rods are wired to a battery, with voltage and amperage determined by the number of coins in each batch. Next, the power supply is engaged, beginning a process of reverse electrolysis. After cleaning, each coin is studied, photographed, documented, graded, and certified. Photo by Carol Tedesco



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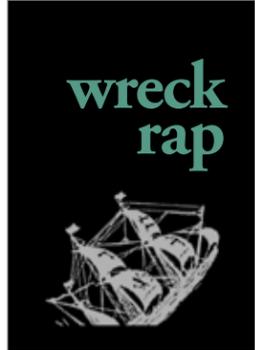
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LEFT: *The Entrance of Cortés into Mexico*, artist unknown. (Library of Congress Prints and Photographs Division Washington, Jay I. Kislak Collection, D.C./Public domain)

ruins; and here, the first Spanish colonial mint was established.

When it was originally founded, the municipality was known as México Tenustitlán. In 1585, it became officially known as ciudad de México—Mexico City. The city's mint was established in 1535, during the monarchy of Johanna and Charles I (reign 1516-1556) and produced its first coins in 1536. These earliest issues expressed the kingdom of Spain's expansionist ideology symbolically: Mexico coins produced from 1536 to circa 1544 display a pillars design with the motto *Plus Ultra*. The pillars represent the Pillars of Hercules, portal to the world beyond Europe, and is Latin for "more beyond".



Around 1544, the design was appended to include the waves of Gibraltar beneath the pillars. Finally, a royal edict issued in 1570 (probably put into practice by 1572), declared a new type—with a crowned shield obverse—compulsory.

The pre-conservation conglomeration that contained seven extremely rare one reale Mexico City mint coin specimens. Because of a chemical reaction between the metal and the salt water, a residue of silver called silver sulfide formed, blackening the coins, and fusing them together into the shape of the object (in this case probably a pouch) that once held them. This fusing helped to protect and preserve the small and fragile one reale coins. Photo courtesy of Mel Fishers Treasures, Inc.

### Making money

Money was valued by weight; it was spent by weight; and what is astounding to consider is that every coin that came out of every mint in the Americas until the 1700's was made one at a time by hand.

To begin production, blanks were cut from strips of silver. A heated blank, or planchet, was then sandwiched between double dies and struck with a hammer. Any silver in excess of the requisite weight was trimmed from the outer edges of the coin until the weight was correct. This resulted in irregularly-shaped coins whose insignia were frequently off-center.

The dies themselves were made of steel with insignia impressed into them by direct engraving or by the sinking (stamping) of multiple die punches, each punch being a component of the coin's design.

Appropriately-sized dies were made for each denomination of coin:

- Eight reales of silver equaled the one-ounce silver dollar of approximately 27.2 grams—which is less than the troy ounce standard today.
- Four reales coins, at half an ounce each, are half the weight and were half the value of the eight reales coin.
- At a quarter of an ounce, two reales coins are half the weight and were half the value of four reales coins.
- Lastly, at an eighth of an ounce, the exceedingly rare one reale coin is half the weight and was half the value of the two reales coin, having an eighth of the value of the eight reales coin.

the weight and was half the value of the two reales coin, having an eighth of the value of the eight reales coin.

Blue Water Ventures chief archaeologist, James Sinclair, commented concerning the rarity of one reale denomination coins on shipwrecks of this period, "It was far more practical to ship large denomination coins—the full 'piece-of-eight' as they came to be called. Small denominations would almost always have been personal property rather than a merchant consignment or royal revenue."

Sinclair then explained why it is that Mexico City mint coins are uncommon on the *Santa Margarita* wreck site, "Every fleet had a specific purpose and route, and the Tierra Firme Fleet ships were loaded in Portobello, Panama, with

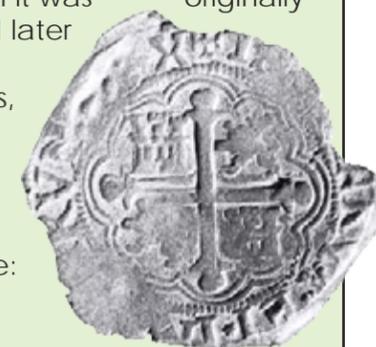
**MEXICO CITY MINT**  
A Mexico City mint eight reales coin (inset) from the reign of Philip III is the denomination and reign—but not the mint—most widely represented on the 1622 Fleet shipwrecks.



The shield side of a Mexico City mint coin is the front, and is called the obverse. On the reverse are the lions of León and the castles of Castile, quartered by a cross with four flared extensions each ending in an orb, surrounded by a curving Moorish design called a tressure, or quatrefoil.

○ above M to the left of the shield is the Mexico City mintmark. The D below is the mint assayer's initial, in this case Diego de Godoy. To the right of the shield is an Arabic 8, expressing the coin's value. This value can also appear in the form of traditional Roman numerals, or in a manner that reflected the handwritten style of the times.

On either side of the coin, the symbols are encircled with a border of dots and a legend. Hand-trimmed to achieve the correct weight when it was originally



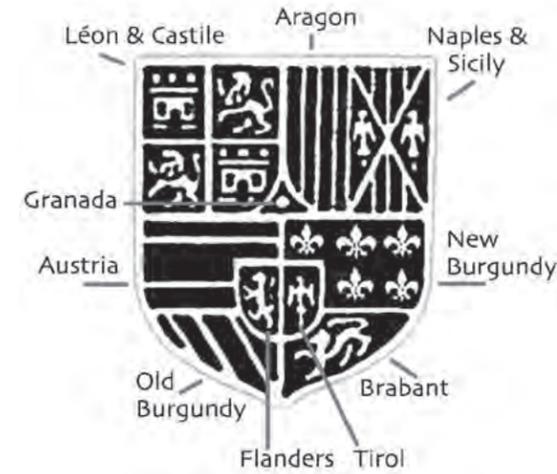
crafted, and later exposure to the elements, have left a portion of this coin legend visible. Obverse: PHILIPPVS III DEI GRATIA 1620. Reverse: HISPANIARVM ET INDIARVM REX. The letter "U" is presented as "V" in the classical Latin style. The Mexico mint did not introduce dates into the legend until the year 1607.

Obverse and reverse of Mexico Mint eight reales. Photos by Scott Neirling © Mel Fisher Maritime Heritage Society



*The Conquest of Tenochtitlán*, artist unknown. (Library of Congress Prints and Photographs Division Washington, Jay I. Kislak Collection, D.C./Public domain)

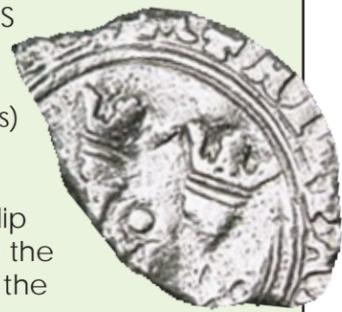
The shield pictured below is the Habsburg Shield, the arms of King Philip III of Spain, and, with some variations, of the other Habsburg Kings: Philip II, Philip IV, and Charles II. The symbols that compose the shield are the various individual arms of lands under Spanish rule at the time. So, the shield side of the coin represents the power of Spain, and when the power changed, the shield changed as well. (Illustration courtesy of Walter Zacharchuk)



**TYPES OF RARE COINS**  
Assayer L, Luis Rodríguez, was assayer of the Mexico City mint circa 1548-1567. Visible portions of the legend on this rare 1 reale coin are CAROLVS (of CAROLVS ET IOHANA REGS) and a portion of the word INDIARVM. Between the pillars, above the partially visible PLVS ULTRA motto, a single dot represents the coin denomination.



The assayer initial L may appear either to the left or the right of the crest. Here a portion of IOHANA REGS (i.e. Charles and Johanna Royals/Monarchs) is visible.



Though the reign of Philip II began in 1556, during the office of Luis Rodríguez the names Charles and Johanna continued to appear on coins into the term of the following assayer O, Bernardo de Oñate.

The shield-type coin is introduced during the office of Bernardo de

Oñate, here with his initial "O" to the right of the shield. Portions of the words GRATIA AND REX are visible on obverse and reverse.



Coins here are shown larger than actual size

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Author Carol Tedesco is an internationally recognized Spanish Colonial coin expert and historic shipwreck professional who has worked with projects in North America, South America, Africa, and the Pacific. A member of the Explorers Club, she is a popular radio guest and speaker throughout the United States on the subject of the 1622 Fleet shipwrecks. Today, she consults for some of the most prominent historic shipwreck search and recovery companies in the world. She likes to relax by hula-hooping on the pier in Key West at sunset.

For more information about Keith Webb's Blue Water Ventures Key West and the treasures of the Santa Margarita shipwreck, visit [www.bwvkw.com](http://www.bwvkw.com). ■

South American treasures—hence, the predominance of coins from Potosi, Peru. Coins minted in Mexico City were transported overland to Vera Cruz, on

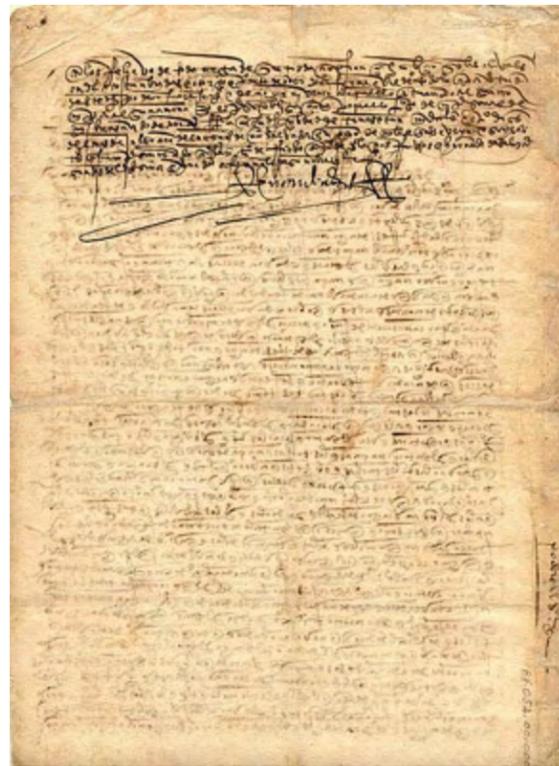
the east coast of Mexico, and there, consigned to New Spain Fleet ships. The owner of these seven coins may have been from Mexico or had dealings with a business that paid with these Central American coins."

Dr Eugene Lyon, Blue Water Ventures consulting historian and the foremost authority in the world on the 1622 Tierra Firme Fleet shipwrecks, provided a fascinating insight about Mexico City minted coins found mixed into chests of mostly Potosi coins on 1622 Tierra Firme Fleet shipwrecks. "The Tierra Firme and New Spain fleets had one port-of-call in common, the port of Havana,

Cuba," he said. Havana was the final port-of-call for all ships before undertaking the return voyage to Spain. In 1622, the Tierra Firme Fleet, which had joined forces in Portobello with a guard fleet under the command of the Marquis de Cadereita, was traveling far behind schedule. The New Spain flota—with its cargo of Mexico City mint coins—reached Havana in advance of the Tierra Firme and Guard Fleet ships. With hurricane season and its dangers upon them, the New Spain flota chose not to wait. It departed for Spain—unfortunately leaving its valuables behind in Havana for the well-armed, but ill-timed, combined Guard Fleet and Tierra Firme ships to transport.

**SOURCES:**  
Portions of this article are excerpted from the forthcoming book, *Pieces of Eight: Silver Treasure Coins of the 1622 Shipwrecks Nuestra Senora de Atocha, Santa Margarita and the Portuguese Carrack São José*, by Carol Tedesco

Signature of Hernán Cortés on a document appointing power of attorney to his agents during an investigation into his administration, 1526. (Kislak 213 Cortes, Hernan Power of Attorney 1526) (Library of Congress, Rare Book and Special Collections Division, Jay I. Kislak Collection, Washington, D.C./Public domain)



Edited by  
Scott Bennett



SANTIKA SEASIDE RESORT



## UK operator Divequest offers tailor-made trips for solo divers

Tired of paying the single supplement? UK specialist tour operator, Divequest, is now offering a selection of trips to Manado in Indonesia with solo divers in mind.

The 13-day holidays feature accommodation at Santika Seaside Resort and diving with on-site Thalassa Divers of Manado, home to some of the world's best diving. The diving package includes 20 dives, which can be taken across a maximum of nine diving days, with the option locally

of "adding in extra dives, night dives, and trips to the world-famous Lembeh Strait or the Bangka archipelago".

"These are special trips for solo divers who would like to travel with like-minded solo companions," said Divequest. "You can meet new, like-minded friends and not have to worry about the hassles of travelling or sitting in a restaurant alone. In addition, two of the departures will be for female divers only. [www.divequest.co.uk](http://www.divequest.co.uk) ■

## World airlines see blue skies ahead

Global airlines are undergoing a surprisingly strong recovery.

According to the International Air Transport Association (IATA), carriers began bouncing back late last year after posting record losses during the global economic crisis.

The group, which represents 240 airline companies worldwide, had predicted in December that 2010 losses would total US\$5.6 billion. However, a year-end rally in 2009 resulted in the group halving their 2010 loss forecast to US\$2.8 billion.

Leading the way are Asian and Latin American carriers, whose surge in passenger traffic has helped offset lagging demand in Europe and the United States.

Passenger demand should grow 5.6 percent for the year, while cargo demand could jump 12 percent according to the IATA. "We are starting to see some blue skies ahead of us," said IATA chief executive,

Giovanni Bisignani. ■

## British Airways greenlights deal for UK jet biofuel plant

Deal will establish first plant in Europe to produce jet fuel from waste matter.

Construction of the plant in east London will commence within two years and is set to produce fuel from 2014 and create up to 1,200 jobs. Some 500,000 tonnes of waste will be used by the UK facility to produce 16 million gallons of fuel annually.

According to BA, the plant will cut the amount of waste that is sent to landfill, reducing the amount of methane that is produced. Methane is thought to be a more potent greenhouse gas than carbon dioxide.

It will be another four years before it starts producing fuel, and it is unlikely to work at full capacity straight away. The waste is fed into a high temperature "gasifier" to produce BioSynGas. A chemical process is then utilized to convert the gas into biofuel. Waste products from the process can be used to power the plant as well as supply electricity to the national grid. ■



## Flight management aids aviation emission cuts

Better air traffic control determining how, when and where planes fly could help quickly achieve significant emission cuts.

An Oxford University study has discovered better flight management may be the quickest route to reduce aircraft emissions. These include more direct flight paths to airports and less waiting to land, according to Dr Carey, aviation expert at Oxford's Smith School of Enterprise and the Environment.

Better traffic control systems should also help aircraft reduce the time spent with their engines running while still on the tarmac. In addition, the inaccuracy of current control systems means planes must be given a wide berth to avoid collisions. "If that

was improved, landing and take-off's could be quicker, stacking would be reduced and planes could fly closer together by taking advantage of prevailing winds," Carey said.

In contrast, technological advances, such as better engines or reduced weight, tend to take a long time before they have an impact. In addition, investing in new technology is both expensive and risky." Major technological innovations are a massive financial risk because you could be making a plane that no-one's going to buy," he added. ■

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# New Flight-Delay Rule in the US



Airlines threaten more flight cancellations ahead of the new ban on extended tarmac waits

A new federal rule that takes effect April 29 aims to end such horror stories by imposing fines on carriers as high as US\$27,500 per passenger for flights that sit for more than three hours without allowing travelers to disembark.

It should be good news for travelers, but some airline industry analyst warn the law of unintended consequences is about to strike air travel, as the seemingly helpful mandate prompts airlines to cancel flights that face a reasonable

prospect of getting stuck in a take-off queue.

In response to the regulation, furious airline executives are hoping air travelers blame the Transportation Department for increased flight cancellations. "Many passengers at two hours and 45 minutes, they really want to go to L.A. or Mumbai or wherever, but the government, by God, says 'We're going to fine you \$27,500.' So, guess what we're going to do? We're going to cancel the flight,"

Continental Airlines (CAL) CEO Jeff Smisek told an investor conference on March 9.

A Transportation Department spokesman, Bill Mosley, said airlines can schedule flights "more realistically" to avoid cancellations, and that the rules will help travelers "choose carriers that do not have tarmac delays, do not routinely cancel their flights, and will provide adequate assistance to passengers." ■

## How old is your plane anyway?

The average age of the fleet of the seven large U.S. passenger airlines—including American, Alaska, Continental, the merged Delta and Northwest, Southwest, United and US Airways—is about 14 years old, according to *The Airline Monitor*. It found American and Delta/

Northwest had the oldest fleets, at about 16 years on average. As of the end of 2008, a small percentage of the merged Delta/Northwest's planes dated back to the late 1960's.

According to aviation analyst Richard Aboulafia, U.S. fleets are

among the oldest in the world, "I'm not really sure that people should read that much into that," Aboulafia said. "From a safety standpoint, a lot of the older planes were built tougher and with proper maintenance, there's no reason why a plane can't stay safe for 25 to 30 years." The United States and most of the developed world have superb standards and maintenance regulations, the result of decades of experience that have made the system incredibly safe, Aboulafia said. It's also important to remember that a plane may be 20 years old, but its engines and other major systems could have been recently manufactured or upgraded, said Todd Curtis, founder of AirSafe.com. ■

American Airlines Douglas DC-3 used in filming a war film in 1943



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