



GLOBAL EDITION  
May 2008  
Number 23

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Denmark's  
**Bubbling  
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**Fitness  
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### COVER PHOTO

*Buoy, Sinai, Egypt* by Steve Jones  
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# we can all be Explorers

Editorial

This past Saturday evening, I made myself very comfortable.

Equipped with a remote control, an ample supply of snacks and soft drinks, and with a soft couch mounted on my back plate, I was all kitted up for a marathon viewing of science fiction movies on TV.

In these fictitious universes, we can boldly go where no one has gone before, experience other worlds of a different physical nature and appearance and encounter alien

creatures of sometimes bewildering structure and form. Since childhood, I have often daydreamed, or pondered, what it would be like to be a future captain of the Starship Enterprise or some explorer donning his sophisticated survival suit enabling him to survive in an otherwise strange and hostile environment.

In fiction and our fantasy, we can travel anywhere at the speed of thought, but how about places that lie beyond our imagination?

I can explore worlds that are more diverse, more surprising and more astonishing than anything science fiction or virtual reality can produce—and I can do it in the real world.

Actually, it was only last week that I found myself face to face with a multi-legged creature with lots of antennae, composite eyes and weird appendages. I also saw creatures that started their lifecycles as stalks with tentacles before morphing into hovering pulsating discs with intricate patterns. And I watched an



MARK WEBSTER

Alien from the deep?



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amorphous sausage-shaped body with odd filaments and psychedelic patterns slide across the substrate in front of me. I was in another strange world where I needed special equipment and suits to venture.

I wasn't light years away however. I was just a short drive away, outside the city, and the above mentioned creatures were crustaceans, jellyfish and nudibranchs. The nearby beaches outside Copenhagen can't compete with those in the tropics or the great green water sites in Canada or Norway, but I can

always find something new I haven't seen before—a creature that I had not come across before.

I do have a lot of fancy equipment—it comes with the territory in this line of work—and training that could take me pretty deep, but perhaps the thing I fancy most is lying very relaxed in a bank of marine grass in the shallows and just spot the life there. Hidden among stalks, a bewildering array of macro life is taking refuge, and the top layer of sediment is home to weirder creatures still.

Here, in our own inner space, we can all be explorers. We need not belong to an elite few or be excessively fit. Almost anyone who wants to do so can dive—and regularly, divers find new species. Going over past issues of this magazine is a testament to new discoveries constantly being made and new species being found—also by common people like you and me.

Diving is your direct access to the last true frontier.

— Peter Symes



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News edited  
by Peter Symes  
& Catherine GS IIm

# NEWS

## Throw the big ones back

**Contrary to conventional wisdom, it is not the young fish that should be thrown back to sea but the larger older ones.**

"The type of regulation, which we see in many commercial and sport fisheries, is exactly wrong," George Sugihara of the Scripps Institution of Oceanography at the University of California San Diego said in a statement.

Writing in the journal *Nature*, Sugihara said conventional fishing practices that targets the biggest and oldest fish effectively destabilize fish populations by leaving younger fish to proliferate too wildly. A single large fish will simply grow a little when it gets more food, or lose a little weight when food is scarce. A population of many young, small fish, however, may explode in number or collapse depending on food availability.

Imagine a container of water with a 500-pound fish. With food, it grows a little bigger. Without food it gets a bit smaller. Imagine the same container with 500 one-pound fish. They eat, reproduce, and the resulting thousands of fish boom, quickly outstripping the resources, and the population crashes. These many smaller fish—with the same initial "biomass" as the larger fish—

can't average out the environmental fluctuations, and in fact, amplify them through higher turnover rates that promote boom and bust cycles.

Not only do the older fish provide stability to the population, they provide more and better quality offspring. Nils Stenseth of the University of Oslo said fishing practices that stress taking only the oldest and biggest fish can actually force quick evolutionary changes in the fish populations.

Fishing can alter the "age pyramid" by lopping off the few large, older fish that make up the top of the pyramid, leaving a broad base of faster-growing small younglings. The team found that this rapidly growing and transitory base is dynamically unstable—a finding having profound implications for the ecosystem and the fishing industries built upon it.

"The data show that fished species appear to be significantly more nonlinear and less stable than unfished species," The US researchers said fisheries should in fact encourage the taking of smaller, younger fish instead of requiring that they be thrown back. This is especially important to know when trying to rebuild fish stocks, Sugihara said. ■

### Explaining the Mystic Metallic Sheen of Fish

The bright, mirror-like metallic sheen of fish skin is due to a sophisticated system of guanine crystals in the skin underneath the scales of fish.

This silvery reflectance acts as a form of camouflage that helps protect fish from predators as fish swim near the water's surface. However, the exact shape of these guanine crystals and how they work remained a mystery.

Researchers extracted guanine crystals from the skin of the Japanese Koi fish and analyzed the crystals using X-ray diffraction and an electron microscope. They compared the results to guanine crystals made in the laboratory. The researchers found that the biogenic crystals develop in an unexpected direction that differs from the lab-made crystals, and that their unique shape improves light reflectivity, which may help fish hide from predators in the wild, scientists in Israel are reporting. ■

The study, *Biogenic Guanine Crystals from the Skin of Fish May Be Designed to Enhance Light Reflectance* is scheduled for publication in ACS' *Crystal Growth & Design*





The Amazon molly, *Poecilia formosa*, is a freshwater fish, which reproduces through gynogenesis, where genetic material from the male is not incorporated into the already diploid egg cells that the mother is carrying resulting in identical clones of the mother being produced en masse. This unusual characteristic has led to the Amazon molly becoming an all female species. The common name acknowledges this trait as a reference to the Amazon warriors, a female run society in Greek mythology



THOMAS, BONNER AND WHITESIDE  
TEXAS STATE UNIVERSITY BIOLOGY  
DEPARTMENT

# No sex for 70,000 years

**A fish species, which is all female, has survived for 70,000 years without reproducing sexually, experts believe. The species, found in Texas and Mexico, interacts with males of other species to trigger its reproduction process. The offspring are clones of their mother and do not inherit any of the male's DNA.**

Typically, when creatures reproduce asexually, harmful changes creep into their genes over many generations. The species will eventually have problems reproducing and can often fall victim to extinction. Scientists from the University of Edinburgh think the Amazon Molly may be employing special genetic survival "tricks" to avoid becoming extinct. The fish ought to have become extinct within the past 70,000 years,

One theory is that the fish may occasionally be taking some of the DNA

from the males that trigger reproduction, in order to refresh their gene pool. Dr Laurence Loewe, of the university's School of Biological Sciences, said: "Maybe there is still occasional sex with strangers that keeps the species alive. Future research may give us some answers. I think one of the interesting things is that we are learning more about how other species might use these tricks as well," he said. "It might have a more general importance." ■

SOURCE: BMC EVOLUTIONARY BIOLOGY

# Microbes could be the key to coral death

**Coral reefs could be dying out not just because of the direct rise in temperature caused by global warming but just as much as from changes to the microbes that live in them.**

"Many of the deaths we see in the coral reefs, which occur following coral bleaching events, can be put down to changes in the microbes which live in and around the reefs," says Dr John Bythell, a biologist from Newcastle University. When the water warms up, some disease-causing bacteria are more successful and can attack the corals that have reduced defences from suffering from the heat. Also, some of the friendly bacteria that normally live in the corals' guts become weakened, allowing other harmful bacteria to multiply and cause diseases or other problems.

A key factor newly identified by the Newcastle team is the role of surface mucus secreted by corals. This seems to act as a shield, preventing disease-causing pathogens such as bacteria and some viruses from penetrating their tissues. "The reefs' defensive mucus or slime is also at risk from stresses brought on by climate change. This seems to happen just at a time when some of the key functional microbe groups are changing, reducing the corals' other defences and boosting some disease-causing bacteria, making them more virulent," said Dr Bythell.

Another research team led by San Diego State University biology professor Forest Rohwer have recently found how overfishing can also endanger coral reefs at four Pacific islands. As fish popu-

lations decline, algae, which is usually eaten by fish, flourishes and potentially leaches organic matter that feeds the excess microbes that kill off coral.

Ten times as many microbial cells and virus-like particles than normal was found in the water surrounding the island of Kiritimati. The Kiritimati microbial community was dominated by micro-organisms that feed off of organic matter, many of which were disease-causing organisms. The fact that Kiritimati also had the highest prevalence of coral disease and the lowest coral cover led the researchers to believe that the microbes were likely related to declining coral health." ■





# Rabbitfish Comes to the Rescue of Reefs



If the vegetation on a reef is a problem, the rabbit fish could be the answer

While rabbits continue to ravage Australia's native landscapes, their submarine counterpart, the rabbit fish (*Siganus canaliculatus*) may help save large areas of the Great Barrier Reef from destruction.

In a study to be published in the journal, *Coral Reefs*, Rebecca Fox and David Bellwood of James Cook University, shows that the rabbit fish is an efficient herbivore, capable of stripping an area

of vegetation. Just like its counterpart on land. However, in the case of the Reef, it is the vegetation that is the problem—and the rabbit fish, is the answer.

The rabbit fish were caught on underwater videocams, in schools of up to 15 fish, grazing the crest, slopes and outer flats of the reef, and chomping away at more than ten times the rate of other weed-eaters such as parrot and surgeon fish. However, the rabbit fish appeared to be most effective on clearing algae from reef crests, and were significantly less effective in clearing the reef flats and slopes of macro algal growth. The reasons for this preference

remain unclear.

Still, these findings have important ramifications for the rehabilitation of coral reef habitats. The main problem is that for a few years now, the fish that used to feed on these weeds have been diminished largely due to human having fished them out. With the result that these weeds have nothing to keep them in check and are thus taking over the corals. Thus the chances of surviving and redeveloping again is little next to nothing.

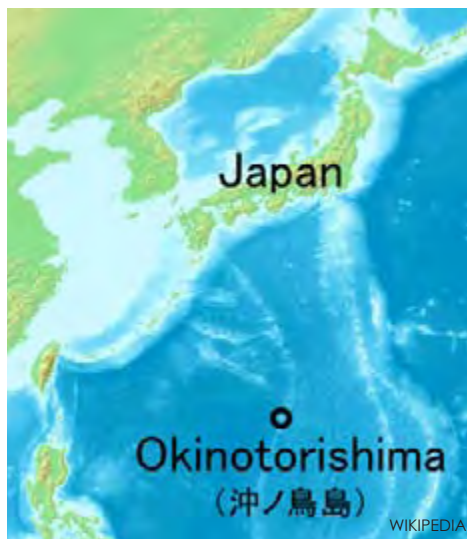
The 28 species of rabbit fishes are found in shallow lagoons in the Indo-Pacific and eastern Mediterranean. ■

## Japan Plants Coral on Disputed Island

Japan is mounting a US \$7 million coral transplanting operation in the Pacific to bolster its claim in a territorial dispute with China and cement Tokyo's right to exploit a wide expanse of ocean.

Over the next year, scientists intend to plant more than 50,000 fast-growing *Acropora* coral fragments on Okinotorishima, two uninhabited rocky outcroppings about 1,060 miles southwest of Tokyo, project officials say. The aim is to protect the islets from further erosion and maintain Japan's claim that they are bona fide islands and can be used to map its exclusive economic zone in the Pacific. "We hope the corals will grow larger and eventually preserve the islets and their environment," said Mayumi Tamura, of the Fisheries Agency. "We see corals as an important marine resource, not as a mere tool of territorial claims."

In a sometimes heated dispute, China has challenged Japan's claim, arguing the outcroppings are too small to be defined as islands under international law, meaning the waters around them are open to use by other nations. Tokyo uses the islet "as the basis of their claim for vast ocean areas, and it is not keeping with recognized international law," the Chinese Foreign Ministry said in a statement faxed to The Associated Press. ■



## EU to prioritize fish over fisheries

The fishing industry has lost out in a Brussels policy battle that now seems certain to favour interests of the marine environment over the interests of fishermen. A major reorganisation of the fisheries directorate has come about because Commissioners were embarrassed by the management of the Common Fisheries Policy—which often doles out fish quotas in defiance of scientific advice. They were also concerned by DG Fish's defence of the interests of the fishing industry over the interests of other EU citizens, for example divers, anglers and the renewable energy industry.

José Manuel Barroso, the president of the EU commission stated: "The new set-up highlights the Commission's determination to conduct an integrated and tailor-made maritime policy." A senior

Commission official said: "This will get fisheries out of its ghetto and make it more sensitive to sustainable development and ecosystem management."

The reorganisation is expected to allow greater focus on the Mediterranean, where fishing for the bluefin tuna remains out of control, and on control of illegal fishing by EU vessels in international waters. DG Fish's existing directorates for external policy and legal affairs will remain unchanged.

Under the changes, it is intended that fishermen would have to be consulted more on the siting of wind farms in the North Sea, but environmental groups would have to be consulted more on where a new network of marine reserves would go. ■ SOURCE: TELEGRAPH

José Manuel Barroso, president of the EU commission

*They were also concerned by DG Fish's defence of the interests of the fishing industry over the interests of other EU citizens, for example divers*



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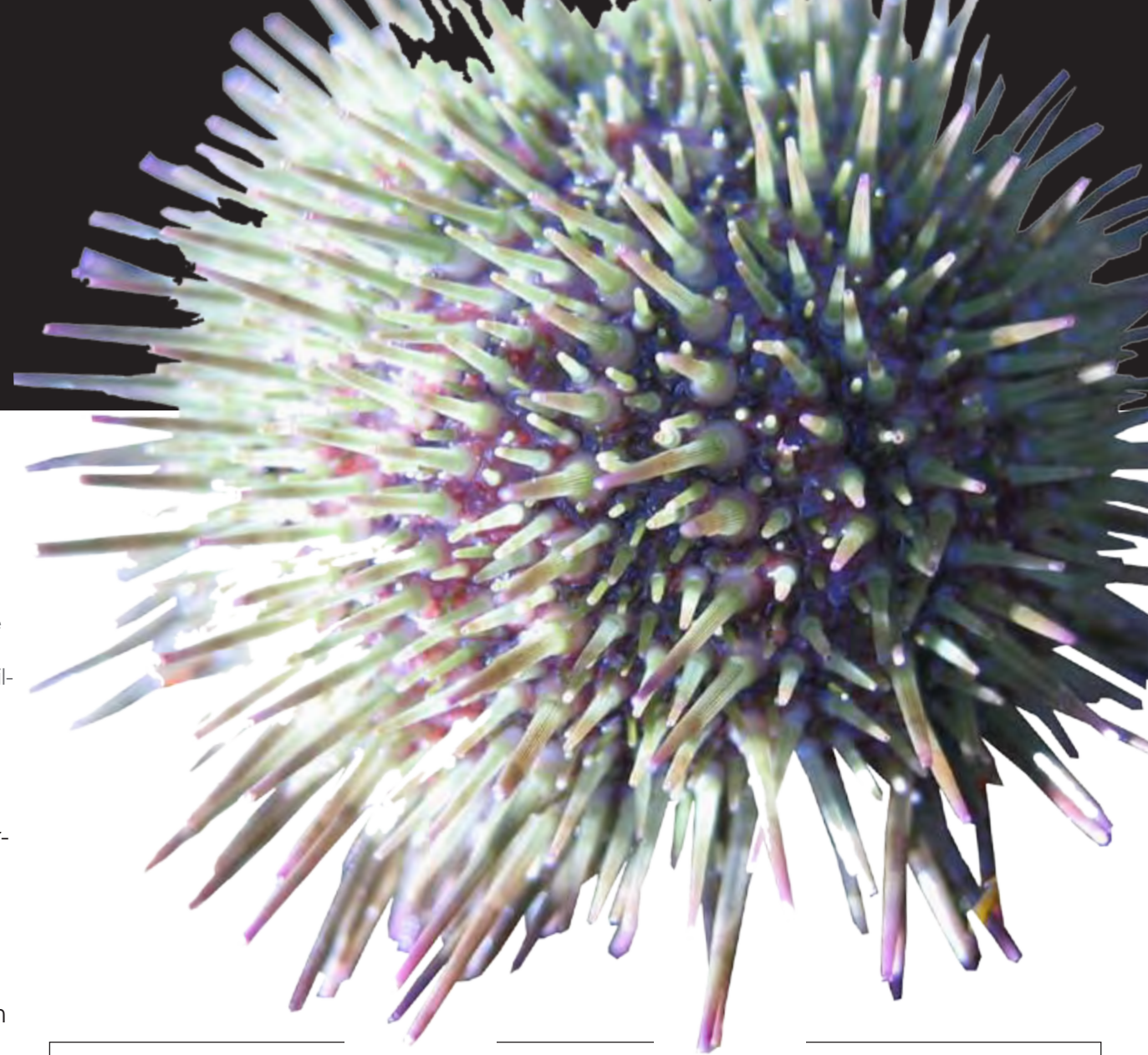
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This newly discovered *Osedax* worm will be named in honor of a supporter of the Scripps Oceanographic Collections



## Scripps Oceanography Invites Donors to Name an Ocean Species

Several of the most important libraries of ocean specimens in the world are housed at Scripps Institution of Oceanography at UC San Diego. Known as the Scripps Oceanographic Collections, and referenced by scientists all over the world, these holdings of biological and geological marine specimens tell a unique and evolving story of life on Earth, and provide answers to questions about Earth's future.

In response to severe budget cuts to the collections over the past several years, Scripps is introducing a novel way for donors to show their support for these valuable and irreplaceable science and teaching resources: by naming a newly discovered marine species.

Every year collections staff and researchers discover new species of marine creatures. Some specimens set new records, such as the stout infantfish (*Schindleria brevipinguis*), co-described by Scripps as the world's smallest fish in 2004.

Traditionally, the person who first describes a newfound plant or animal is entitled to name it, but now, Scripps is inviting the public to share in the process by naming select newly discovered species acquired by the institution. The names can be selected by a donor for themselves or a friend or family member, and are then introduced in scientific publications that establishes the new species name permanently.



This newly discovered nudibranch, housed in the Scripps Oceanographic Collections, is available to be named by a donor

Currently, the Scripps Oceanographic Collections hold several new marine species that are available for naming. They include a rare hydrothermal vent worm (\$50,000), two types of worms found living on deep-sea whale bones (\$25,000), an orange, speckled nudibranch (\$15,000), and a spiny worm found in the kelp forests of La Jolla cove (\$10,000). Several fishes from the Gulf of California as well as several new species discovered in local La Jolla waters are also available to be named. ■

## Ocean acidification seem to benefit some plankton

Most life in the ocean will suffer as carbon dioxide levels increase and the water becomes more acidic. Some plankton will buck the trend, however, thriving and putting on weight as carbon dioxide levels rise.

Coccolithophores are single-celled algae, phytoplankton, which are found in large numbers throughout the surface euphotic zone of the ocean. Coccolithophores have long been thought to respond to increased ocean acidity, caused by increasing CO<sub>2</sub> levels, by becoming less calcified. However, the opposite happens. The species *E. huxleyi*

has been becoming 40 percent heavier, and more abundant, in more acidic waters. The extra carbon dioxide aids photosynthesis, while the more acidic waters increase the concentration of bicarbonate. "Increased bicarbonate appears to stimulate an increase in mass of calcium carbonate produced by each coccolithophore cell," says Paul Halloran, from the University of Oxford.

The team's result is not confined to the lab. By studying fossil coccolithophores from a deep ocean core, they found that there has been a 40 percent increase in average coccolith mass over the last 220 years, mirroring the rise in carbon dioxide levels. ■

## Sea Urchins help Us Understand Diseases

Although they are invertebrates, sea urchins share a common ancestor with humans sharing more genes with us than fruit flies and worms. In fact, we have more than 7,000 of the same genes.

Indeed, there are several genes in the sea urchin involving Alzheimer's, Parkinson's disease, muscular dystrophy and many other cancer-related genes. With a complete map of their urchin's DNA, scientists can better understand how genes work and hopefully unlock the mysteries of these human diseases. Maybe someday doctors will know exactly how to treat and even prevent them.

And infertility may be another problem the sea urchin helps solve. No wonder—each urchin can produce 20 million eggs. This also means they can be reproduced for research faster than other animals. That means researchers can produce large amount, practically unlimited amount of material. ■

*Sea urchins don't have eyes, ears or a nose, but they have the genes humans have for vision, hearing and smelling.*





# Why don't we just train fish to catch themselves?

At least that is what researchers with the Researchers at the Marine Biological Laboratory at Wood's Hole in Massachusetts hope to achieve if fish can be taught to associate certain sounds with feeding.

*"It sounds crazy, but it's real"*

They plan to put thousands of fish in a dome-shaped structure at the bottom of Buzzards Bay and feed them pellets after playing a tone underwater. After they are released to supplement their diet with natural forage, the hope is they will return to the dome for recapture. The process is called "acoustic ranching".

If it works, the system could eventually allow black sea bass to be released into the open ocean, where they would grow to market size, then swim into an underwater cage to be harvested when they hear the signal.

The project began last summer using 6,500 black sea bass, a stout, bottom-dwelling fish found between Florida and Cape Cod that migrates south of New Jersey in the winter. The species grows up to three pounds and 20 inches long and has a thick, white flesh that can be filleted for broiling or cut into nuggets for frying.

"It sounds crazy, but it's real," said Simon Miner, a research assistant at the Marine Biological Laboratory at Wood's Hole, which received a US \$270,000 grant for the project from

the National Oceanic and Atmospheric Administration.

Miner said

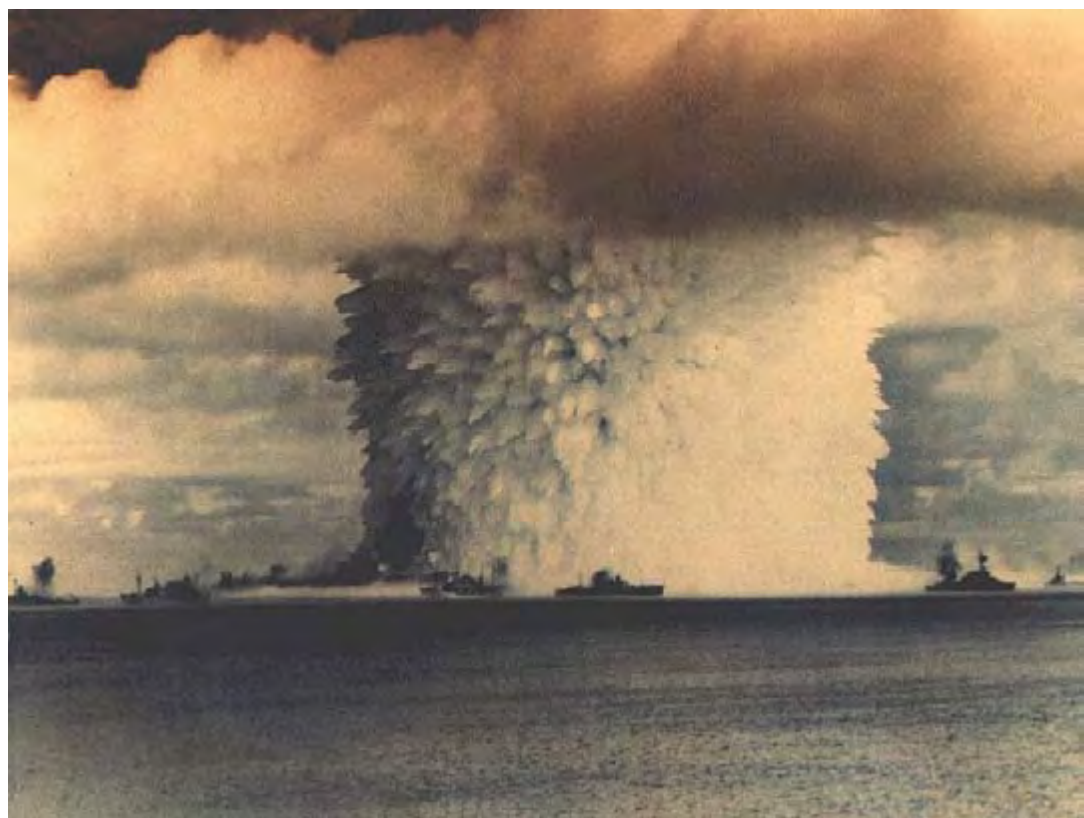


the specially trained fish could someday be used to bolster the depleted black sea bass stock. Farmed fish might become better acclimated to the wild if they can be called back for food every few days. "Basically the whole concept is: what if you can go out in the ocean and call only the fish you want into the net?" said Simon Miner.

The bigger goal is to defray the costs of fish farming, an increasingly important source of the world's seafood. If fish can be trained to return to the farmer after feeding in the open ocean for several days, farms could save money on feed and reduce the amount of

fish waste released in concentrated areas. The key question for fish farmers: How many fish will actually return, and how many will be lost to predators or simply swim away? ■

**We could call them "Pavlov's fish". They respond to a tone that signals feeding time, not by salivating as the dogs in Pavlov's classical experiment, but by swimming into a net essentially catching themselves.**



The nuclear blast at Bikini Atoll in 1954. Between 1946 and 1958, the United States government detonated 23 nuclear devices (with a total yield of 76.3 megatons) on the reef, in the sea, in the air and underwater in the vicinity of Bikini Atoll.

## Nuked coral reef has recovered well

**Scientists have found out that coral reefs recover surprisingly well 50 years after being bombed to smithereens with a nuclear weapon**

Fifty years after being blasted with atom bombs Bikini Atoll boast a diverse coral reef community and presents a convincing example of resilience of coral biodiversity to "non-chronic disturbance events", the authors of a study recently published in the journal *Marine Pollution Bulletin* have found.

During their survey of Bikini Atoll the researchers were able to find no less than 183 species of hard (scleractinian) corals. That compares to an astonishing 70 per cent of the coral species that were present at surveys conducted prior to the nuclear tests.

A possible explanation for this remarkable recovery is that modern Bikini Atoll community may have been replenished by self-seeding from brooded larvae from surviving adults and survival of fragments of branching corals. The patchy nature of

impacts may have mitigated the overall effect of disturbance at Bikini Atoll, with some patches surviving after each impact. Corals living on deep exposed reefs on Bikini Atoll may also have escaped some of the direct impacts, and thus have played an integral role in mitigating the overall effect of the disturbance event.

It is also likely that the extremely large and highly diverse neighbouring Rongelap Atoll has contributed a significant proportion of new propagules to enable recovery of the Bikini coral community, as Bikini Atoll lies downstream of the prevailing surface current from Rongelap.

The authors conclude that "...in a twist of fate, the radioactive contamination of northern Marshall Island Atolls has enabled the recovery of the reefs of Bikini Atoll to take place in the absence of further anthropogenic pressure. ■

dive in.  
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discover.



Tailgating the lone dugong, KAT, on Cocos (Keeling) Islands. Photographed by Karen Willshaw ~ underwater.com.au member





Antoine de Saint-Exupéry as featured on a French note



## Wartime author mystery solved

**A former Luftwaffe fighter pilot may have ended the 64-year-old mystery surrounding the death of a French writer and aviator. The author of *The Little Prince* disappeared during a wartime aerial reconnaissance mission in July 1944.**

His disappearance became one of the most enduring mysteries in post-war France. Eventually, a bracelet belonging to him washed up in a fishing net off Marseille in 2004, wreckage from his plane was found off the coast of Marseilles by French diver Luc Vanrell, but there was no indication of how he died.

Now former German pilot Horst Rippert says he fears he may have shot down the author—though he cannot be sure. The former Messerschmitt pilot describes spotting a twin-tailed Lightning P-38 plane flying below him. He went in pursuit and shot him down. "I didn't see the pilot and even so, it would have been impossible for me to know that it was Saint-Exupéry. I hoped and I still hope it wasn't him," he said.

After his finds Mr. Vanrell set to work with Lino von Gartzten of the Bavarian Society for Underwater Archaeology. Mr. von Gartzten

told the BBC News website that he made 1,200 phone calls to former Luftwaffe pilots and their families in search of the man who shot down the French writer.

Finally, he was told about a man who had a clear memory of the events of 31 July 1944, the date Antoine de Saint-Exupéry disappeared. "I presented myself as doing research and he said: 'You can stop researching now because I shot down Saint-Exupéry'." Lino von Gartzten said it came as a big shock: "I never thought I would find who shot him down. I was quiet for some minutes as this was too much for me".

"He feels guilty and very, very sorry about it. He was very scared that the cheap press would massacre him." Mr. Rippert describes being a fan of de Saint-Exupéry's work. "In our youth, at school, we had all read him. We loved his books," he said. ■ SOURCE: BBC

## Families of killed North Sea divers sue Norway

**Relatives of British deep-sea divers killed in the North Sea during the boom years of oil exploration seek compensation from the Norwegian government, which is expected to run to millions of pounds.**

In the early 1970's, the North Sea was a watery Wild West. The North Sea oil rush of the 1970's offered big rewards for high-risk work and claimed several lives. Now families of British workers who died in Norwegian waters want to understand what happened to their loved ones. The families also hope to join a class action lawsuit against the government by 24 former divers who claim that

*A disproportionate number of British divers perished in Norwegian hands because safety was routinely and knowingly compromised in the interests of profits.*

they were treated as "human guinea-pigs" and sent to extreme and dangerous depths. Tempted by the high rewards—some would say greed—hundreds of British deep-sea divers took part in the exploration of the North Sea oil fields in British and Norwegian territorial waters.

According to a 1975 article in the *Times*, a North Sea deep-sea diver could earn as much as GB£2,000 a month—the equivalent of GB£14,000 (USD 28,000) today. But according to retired divers on both sides of the North Sea, a disproportionate number of British divers perished in Norwegian hands because safety was routinely and knowingly compromised in the interests of profits.

The Norwegian governments response is clear: "The Norwegian government has taken responsibility for the pioneer divers at a moral and political basis, but has not acknowledged any legal responsibilities for the damage that has been inflicted upon the pioneer divers." ■



## BYRON UNDERWATER FESTIVAL 08

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For more info and booking go to [www.underwaterfestival.com.au](http://www.underwaterfestival.com.au)





## Wyland coral reef mural to decorate hospital

This year is the International Year of the Reef. In celebration, environmental organizations have invited environmental artist Robert Wyland to paint a mural of a coral reef on the exterior wall of a local hospital.

An informational meeting hosted by Marianis Dive was held in April to provide more information regarding the project. MINA sponsored Wyland's visit to the event.



Artist Robert Wyland

Wyland is well-known for painting marine life in life size murals. His murals are displayed in 12 countries and viewed by approximately one billion people per year, writes the artist on his website. Wyland's work has been recognized by the United Nations, the Underwater Academy of the Arts and Sciences and the Sierra Club. ■

## New Record: World's Longest Open Salt Water Dive

Will Goodman of Borehamwood, UK, has set a new world record for the longest open salt water scuba dive at a location off the coast of Gili Trawangan, Lombok, Indonesia. He broke his previous world record of 24 hours and 3 minutes set in 2005. The 31-year-old diver's goal for his last attempt was 100 hours, but he reached a respectable 33.5 hours at a depth of 12 meters, which won him a place in the *Guinness Book of World Records*. Challenges of the dive included loss of oxygen pressure, skin loss and cold, the last of which forced him to the surface in the end.

With no contact with the surface, the dive was made using a combination of open circuit and rebreather systems. Support teams for this dive included divers from dive shops on the islands as well as experienced international divers. Equipment and surface logistics were organized by Blue Marlin and Trawangan Dive supported by members of the Trawangan-based Gili Eco Trust.

The event was aimed at raising funds and awareness for children's charities in Indonesia that help parents—earning an average of US\$25 per week on the smaller islands—who struggle to provide education and clothing for their children.

A professional in the technical diving industry, Goodman is an advanced Trimix Instructor and currently works for Blue Marlin Dive on Gili Trawangan as a technical instructor. He also manages Trawangan Dive's live-aboard charter trip to the Komodo islands and Balikpapan Wreck Safari. ■

## New Record: World's Longest Underwater Painting

In April, Singapore and Malaysia broke the record for the world's longest underwater painting. On a 56.4-meter long canvas, members of Coral Malaysia, the National Arts Gallery and Pelukis Aneka Daya Singapura (APAD) carried out their record-breaking feat, which took 44 artists and divers three dives to complete at a depth of 12 meters off Air Batang Beach. The event took place to commemorate World Earth Day and won the participants a place



in the *Malaysia Book of Records*.

Malaysian artists who took part included the country's first underwater painter, Ajis Mohamad, Fauzan Omar, Young Jefri and Fauziah Latif—the ambassador of Coral Malaysia and one of Malaysia's most popular singers. From Singapore were artists Suhaimi Sukiyyar, Rosman Shahid, Victor Goh and Dominique Chin. The painting will be on display at the National Arts Gallery in Kuala Lumpur according to Haned Masjak, Director of Exhibition and Services, who told Bernama: "We look forward to exhibit the painting in other public places to educate the public on the marine ecosystem. We also hope to make this collaboration with Coral Malaysia an annual event." ■ SOURCE: BERNAMA.COM

## Watson DeVore takes helm at SSI

Watson DeVore is the new National Director of Education at Scuba Schools International (SSI). He brings a wealth of experience and industry knowledge to the position.

After a careful review of numerous candidates for the job, SSI chose DeVore because his experience in sales and diver education matched the goals the organization has set for their Dive Leader Training Program. DeVore's primary goal will be raising the numbers of SSI Dive Leaders to serve the US and resort markets, which currently have high levels of demand. DeVore said, "I am looking forward to the new direction of SSI and being able to stream line many of the old processes to better serve our dealers and dive leaders."

Active in the SSI/NASDS organization for over ten years, DeVore has been an SSI Business Consultant for the Midwest region since 2001. Prior to his work with SSI, DeVore owned and operated a successful dive store and hydrostatic testing facility for 12 years in Oregon, USA. Fresh out of college, DeVore became an instructor in 1990 and later became an Instructor Certifier and Master Instructor for First Aid/CPR, O<sub>2</sub>, AED, and Bloodborne Pathogens. In 2002, DeVore received the Platinum Pro 5000 Diver award.

In the past, DeVore was a field technician with Ingersol-Rand where he serviced compressors. A new father and enthusiastic underwater photographer and videographer, DeVore has an acute understanding of the mechanical aspect of dive business and enjoys the daily hands-on operations of the occupation. ■ SOURCE: SSI

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## Vatican adds degrading environment to list of sins

This year, there are more sins to worry about including degrading the environment, according to the Vatican, which upgraded its list of sins with seven new ones. Bishop Gianfranco Girotti, head of the Apostolic Penitentiary—the body of the Vatican that oversees confessions and plenary indulgences—told the Vatican's newspaper, *L'Osservatore Romano*: "You offend God not only by stealing, blaspheming or coveting your neighbour's wife, but also by ruining the environment, carrying out morally debatable scientific experiments, or allowing genetic manipulations which alter DNA or compromise embryos." Additional new sins joining old sins such as greed, sloth, and envy include paedophilia, abortion, taking or dealing drugs and excessive accumulation of riches by a few. ■





Modern meets old, Europe meets Asia, tall meets low—everything blends in Singapore

Meet Kevin Deacon, Seacam's new regional representative



Show review

# ADEX is back *in Singapore*

Text and photos by Peter Symes

It was not without some trepidation with which I attended this year's ADEX. Last year's instalment held in Bangkok was—let us call a spade a spade—pretty disastrous. There, the choice of a new but remotely located venue was a bad mistake, and the attendance was miserable.

The return to Singapore and a change of organiser could only mean a change for the better. And indeed it was. The city-state of Singapore is much smaller than Bangkok and its surroundings, but as an international hub and gateway it stands far above. It is vibrant, colourful and intense—

and it is truly the point where Asia and Europe meet and mix, blending almost seamlessly. The city is always exciting to visit.

ADEX was held once again at the conveniently located Suntec exposition and business complex, which can be reached by foot

from many of the international hotels or by a short metro or taxi ride. Despite the lack of a high profile photo competition, compelling presentations or famous speakers to lure in the crowds—a point I recommend the new management look into for future shows, especially as there was

an admittance fee—attendance turned out to be pretty good. Friday was predictably on the slow side during usual working hours enabling the attending businesses to flesh out deals with one another, but Saturday and Sunday, the general audience flooded the floors, and it



Saturday and Sunday were busy in the exposition halls of the Suntec complex







Joe Moreira and Emily Chan from Ocean Geographic

new items and products there. Korean S-Sun and Taiwanese Wookang Tech, both lamp manufacturers, were new to me. I also made my first acquaintance with Red Army Watches showcasing the Nauticfish line of massive diving time pieces. Poseidon of Sweden displayed one of the first production models of their Discovery recreational rebreather, which has undergone further improvements since we presented the early pre-production models last fall. Fellow Swedes from Waterproof, the suit manufacturer and UK-based Delta P was also there to offer their wares to an inquisitive audience. On the travel side of matters a string of new or upgraded resorts competed to woo the holiday makers. Most notably, it seems that the fabled Sangalaki (off the eastern coast of Borneo) is back on offer after a prolonged period of uncertainty or lack of operators. Now both Odyssey Divers and Rainbow Divers are putting it back on the map.

got pretty busy. ADEX is not known as the venue where new equipment is presented—that honour mostly falls on DEMA in the USA—but I saw quite a good deal of



Michael Wallentin, manager of Kon-tiki in Thailand, seems happy being awarded the Project Aware Marine Environmental Award

**The future**

After years of alternating between Bangkok and Singapore, ADEX will now stay put in Singapore until further notice. A wise choice in my humble opinion. Asia Dive Expo used to be the Asian dive show, an institution that once pretty much covered the whole region. However, as the later years have seen how national dive shows shoot up and establish themselves in Thailand, Malaysia, Indonesia, Philippines, Taiwan and China, the roles and impor-

# ADEX Singapore

tance have definitively changed for the better. While it is certainly a positive development that the recreational diving industry seems to be growing in the region, the market for dive expos has certainly become far more crowded. The audiences are certainly there, but it is clear that the international exhibitors now have some tough choices to make and the show organisers have a new challenge to stay in front of the lot. It will be interesting to see how it all unfolds in the upcoming years. ■



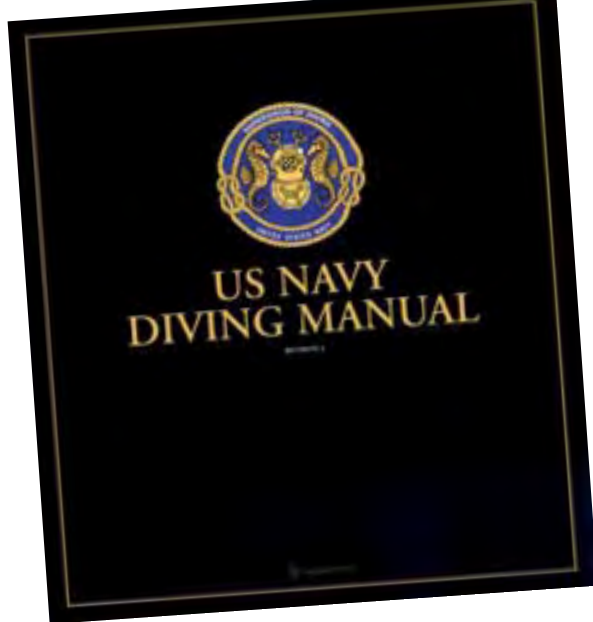
LEFT: Joaquin Krass of Minahasa Lagoon resort with Cassandra Dragon who is also ADEX's marketing manager

ABOVE: "Headlamps" from Taiwanese S-Sun is a good example of products or brands not seen on display on European or US dive shows

FAR LEFT: DEMA's president Tom Imgram gave a refreshingly blunt and direct opening talk about ocean awareness, the responsibilities of the diving industry and each one of us



Edited by Peter Symes



## US Navy diving manual gets major overhaul

The US Navy has just released sweeping revisions to its Dive Manual, a set of procedures, diving equipment and safety guidelines used widely by military and commercial divers. The changes, which the service said are the most significant in 52 years, aim to make diving safer and more efficient for those who work underwater. Driven by decades of research and advances in technology, the Navy's new guidelines will allow divers to spend more time underwater and decompress more safely and with fewer complications, said Capt. John G. Gray, supervisor

of the Navy's salvage and diving sector. "It includes many updates that make things more efficient for the Navy and more efficient to the taxpayer," Gray said. Commercial divers who have long used the Navy's Dive Manual and its dive tables as a base for their own guidelines, will take a close look at the new manual to update their own operations. "Typically, commercial diving almost mirrors what the Navy does, so we pay attention any time there's a change," says a Portsmouth-based commercial diving company. ■ SOURCE: DAILYPRESS.COM

## PADI X

This year will see the first stage of an exciting new program that will eventually spread to many US universities. PADI Americas's new PADI X campaign is aimed at providing scuba diving internships to college students across the United States. The new program allows students to complete internships with local dive businesses learning not only to dive, but also the business of diving.

Students gain valuable real world experience and become PADI X representatives, marketing diving to their classmates as part of their training. This means that it's a real win-win situation for the students who can gain credit for something that feels more like fun than your average course and for the diving industry who benefit by creating new interest in diving in the key 18-24 demographic.

The program will be offered widely in the future, but will begin this year at the following universities:

- Indiana University
- University of Central Florida
- Arizona State University
- University of Oregon
- University of San Diego ■

## New Emergency Oxygen Provider Specialty course



WWW.LARESCUE.COM

The Professional Association of Diving Instructors (PADI) is launching a new Emergency Oxygen Provider Specialty course with the goal of improving diver accident preparedness by teaching how and when to give oxygen to an injured diver and the recognition of dive illnesses treatable by emergency oxygen.

Drew Richardson, President and Chief Operating Officer, PADI Worldwide says. "Only 50 percent of all injured divers receive emergency oxygen in the field. This new specialty course will improve the percentage of injured

divers receiving appropriate and effective emergency oxygen treatment." Though suited for divers, the new course has no prerequisites and doesn't include dives, which means it is equally applicable to those who are around divers—boat crew, non-diving buddies, lifeguards, and shore staff. No previous CPR or first aid training is required to take the course. ■ SOURCE: DIVENEWSWIRE



## NAUI offers sporty new cards



NAUI Worldwide has always had the reputation of offering the most attractive certification cards. With the goal to equip stores and instructors with the tools and options for success, divers can now choose a card that have very stunning certification and recognition card images. The new Limited Edition Certification Card images include: Clownfish, Shark, Nudibranch, Dive Site, and Sunset. These incredible images were submitted by participants of the 2007 Just Dive Photo Contest. Among the new cards is the much anticipated Team Scuba Card. This card is only available to official NAUI Team Scuba Enrollees. NAUI is also introducing new First Aid certification card options in two categories. The "First Aid" card and the "First Aid for Dive



Professionals" card. For divers with an appreciation for history, they are now offered the Classic Card. which is a replica of the first NAUI certification card. This card is also available as a Limited Edition certification card. ■

SOURCE: WWW.NAUIWW.ORG

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## Want to be better and safer rebreather diver?

### What is DIRrebreather?

Since its implementation a few years ago, the Doing It Right (DIR) philosophy has gained in popularity not only in the cave diving community and amongst technical divers, but it has also spread to the recreational diving community across the world.

Until recently, it was only open circuit scuba divers and a handful of semi-closed circuit rebreather divers who could apply these good principles to their equipment configuration and dive procedures. In this context Closed-Circuit Rebreather divers have been the black sheep of the family, as their units were dangerous and their procedures dodgy.

However, almost clandestinely, some CCR divers and Instructors decided to found what is now called DIRrebreather and to set up logical and simple rules, so we could apply the DIR principles to CCR diving. We just dreamt about bringing together the best of both worlds!

The DIRrebreather team is made of experienced and active rebreather explorers and instructors who share the

same goal: implementing the DIR Philosophy into rebreather diving. But why use DIR with a rebreather? Well, ask yourself the following: How many times have you seen rebreather divers with poor diving skills,

bad propulsion techniques and inefficient buoyancy control? How many times have you seen rebreather divers with gear configurations that could easily be improved? How many times did you observe rebreather divers following complex procedures that were dif-

ferent for each diver even within the same team?

We strongly believe that with proper training, thorough planning, team procedures, equipment selection and adaptation, the rebreather diver can also be a DIR diver. Standardization should make for simpler and safer dives, avoid confusion and improve team work and communication, especially when problems occur.

### Why another Training Agency?

DIRrebreather is not a training agency. We don't sell certification cards. We inform rebreather divers about what we do and how we do it. All DIRrebreather members and instructors work on CCR gear and procedures

standardization. Based on some extensive cave and wreck explorations, and physiological studies, we try to adapt the most current thoughts in decompression into rebreather diving.

We also have the goal to help rebreather divers to improve their personal skills and techniques through articles, DVDs, manuals and specific workshops. To that end, we have set up a forum to discuss how to improve the standards and the equipment.

We also have a newsletter to keep our members informed about current expeditions and how to participate. We set up

*Standardization should make for simpler and safer dives*

*DIRrebreather is not a training agency.*

### What does DIR mean anyway?

DIR, "Doing It Right", is a holistic approach to scuba diving originally developed by members of the Woodville Karst Plain Project, who also gained fame for their explorations of the extensive underwater cave systems in Florida and elsewhere.

One of the tenets of the DIR approach is to improve safety by standardizing equipment configuration and procedures for preventing and dealing with emergencies, in particular handling out-of-air scenarios. This is achieved by placing emphasis on fundamental skills, teamwork, environmental awareness, and the use of highly optimized and streamlined, yet simple and versatile, equipment configuration. DIR is often perceived as being an equipment system, but it also encompasses a general philosophy or attitude of how to approach scuba diving including aspects of diving procedures and techniques as well as diver fitness and preparedness.

DIR has often been the source of heated debates in the diving community. Many feel that the name itself "Doing it Right" implies that if they are not utilizing DIR, then they are "doing it wrong". One of the rules of DIR diving is to not dive with anyone with a poor or unsafe attitude, sometimes referred to by overly enthusiastic DIR proponents with the derogatory term "strokes", which has been perceived by others as an antagonizing elitist attitude.

While many people see the advantages of the DIR philosophy others have in particular challenged the requirement that divers must go all-DIR and cannot use other equipment.

Proponents counter that the whole point of standardisation is to allow DIR divers to very easily dive with alternative buddies, swap damaged equipment and have less equipment stress. Those who disagree argue that the lack of choice and customization means being forced to use equipment that might not be optimal for some environments.

These days DIR diving is less controversial and many of the ideas suggested by DIR have become mainstream and adopted by various other training agencies. ■

## 10 Q & A's About

# DIR Rebreather

By Cedric Verdier  
Chairman, DIRrebreather







"It also makes the transition from open circuit to closed circuit rebreathers, or the integration of CCR divers in a team of OC divers easier."

gear as well as your own. It also makes the transition from open circuit to closed circuit rebreathers, or the integration of CCR divers in a team of OC divers easier.

### Are you affiliated with a diving equipment manufacturer?

Not at all. We don't work exclusively with any rebreather manufacturer. As a matter of fact, a lot of the rebreathers on the market can be adapted (more or less easily) to the DIR configuration. Some pieces of equipment are more adaptable than others, and some others are not adapted at all. The principles apply to any piece of equipment, from the fins to the rebreather.

### What are the standards regarding procedures?

Effective dive planning means reducing the variables. The most important part of that is the equipment, mixes and procedures. When divers use standard equipment and mixes, and follow the same procedures (deco tables, emergency procedures, etc), they become team members who actually add to each other's safety. Remember that having the right equipment won't make anyone a great diver unless they also apply the right procedures in the right team and have the right skills and experience in the water.

So, we set up standards on normal diving procedures (separated in three different parts depending on when they are followed: before, during or after the dive) and about Emergency Procedures. All these procedures are extensively taught

KEY: \*) The Hogarthian configuration is named after Bill 'Hogarth' Main where two sets of regulators are connected to both valves of a twin-set's manifold. It is based on cutting equipment to a minimum streamlined configuration that nevertheless includes sufficient redundancy for extended decompression dives

workshops and seminars to educate already certified rebreather divers.

### What about the name?

DIRrebreather is exactly what it means: DIR diving with a rebreather. Some people already found the name a bit provocative. It is as some people don't see the irony if combining of DIR and rebreathers!

We could have chosen to name it "Association for the Promotion of Safe Rebreather Practices in the DIR Way". But how clumsy and unsexy does that sound?

### Are DIRrebreather and GUE\*) related?

No. DIR is not a trademark or a diving group. It's a mindset. Many people want to dive DIR worldwide. They try to learn new techniques and improve their equipment through articles, discussions with friends or on Internet forums.

The most efficient way to become a DIR diver is obviously to participate in a GUE-sanctioned course. They benefit

from the experience of members of the WKPP or other DIR-related projects in Mexico, Europe, etc.

Unfortunately, such an opportunity has not been possible for CCR divers. Consequently, we are not in competition with GUE. As a matter of fact, some of the DIRrebreather team members have also done GUE courses for OC or SCR divers. From our viewpoint, we just adapt the techniques and the concept to CCRs and develop procedures specifically for Closed Circuits.

*If I could learn techniques that make my dives safer and more efficient, I would not hesitate to spend the equivalent of the price of a taxi ride in London*

### Why become a member?

DIRrebreather is a private group. Most of our members have spent a lot of time discussing the standards, trying out dif-

ferent techniques and procedures, and adapting the skills to most of the commercially available rebreathers. Some of our members are extremely experienced instructors who teach rebreathers diving on a daily basis, encountering all kind of problems, including stupid procedures and poor techniques. We just try to change that, but it's a big job.

So, only people who are really motivated to improve the way they dive a rebreather become members. And we don't waste time to convince the others.

If I could learn techniques that make my dives safer and more efficient, I would not hesitate to spend the equivalent of the price of a taxi ride in London or a standard hotel room in Manhattan. That's the price of our membership. For the same membership fees, I can also participate in expeditions, seminars and

*In case of emergency, if everyone uses similar equipment, you will know their gear as well as your own*

workshops, buy some goodies and get some discount on specific products.

### What are the standards regarding the equipment?

Most of the ideas are a direct application of the Hogarthian configuration \*). They have just been adapted to CCR diving in a formal way. We expect the equipment to be safe, simple, logical, robust and streamlined. We also need a rig that is adaptable and modular. But more importantly, we want to use a consistent system within the team. It gives us the ability to interchange/swap equipment.

For instance, having the same fitting on all your low pressure hoses allows you to deal with an empty tank or to help another diver in case of emergency. In case of emergency, if everyone uses similar equipment, you will know their

*More important, we want to use a consistent system within the team.*







ards that can be applied in any kind of diving environment. Now we have members in Asia, Australia, Scandinavian countries, Europe and the US. It will help us to fully understand all the diving practices and how to adapt our procedures.

### What are the DIRrebreather workshops?

Training is definitely one of the most important aspects of what we do. DIRrebreather is here to help all the

in the DIRrebreather Fundamentals workshops, discussed in details on our forum and applied during expeditions.

Local groups of rebreather divers (in Australia, in the UK, etc) have also successfully set up some standards for their exploration. We try to have stand-

rebreather divers to improve their skills, techniques, knowledge and equipment. DIRrebreather Instructors propose highly specialized workshops to rebreather divers around the world. These workshops are focused mainly on areas specific to rebreather diving, and their goal is to

help any rebreather diver acquire the skills and knowledge required to safely dive according to DIRrebreather diving procedures and standards.

### Fundamentals workshop

All the basics that rebreather courses don't teach: how to properly configure a streamlined and easy to use rebreather, how to work on your trim and buoyancy control, how to improve your environmental and team awareness, etc. This workshop normally lasts at least three days and is open to any certified rebreather diver.

### Expedition / Mixed-Gas workshop

Fine-tuning the skills and team/individual procedures for safe decompression, and giving the tools to participate in expeditions in remote locations are the goal of this workshop. It's very intensive and only for experienced rebreather divers who have already successfully completed the DIRrebreather Fundamentals workshop and who have an in-depth knowledge of their rebreather. This workshop normally lasts three to four days.

### DPV / Scooter workshop

Depending on the participant's previous experience and qualifications, this very specialized workshop teaches all the necessary skills to properly use a Diver Propulsion Vehicle (scooter) for Team cave, wreck or reef diving with a rebreather. This workshop usually lasts one or two days.

### Rescue workshop

No one can expect to be an efficient team member without having the proper training in case of emergency. This unique workshop is directly aimed at the rebreather divers who wish to learn all the advanced techniques for self-assistance, assistance and rescue you can't find

anywhere else. This workshop usually lasts two days.

### Overhead Environment workshop

Wrecks and Caves are very specific environments. Even if divers have been trained to safely do these types of dives on Open Circuit, it doesn't mean they are able to do that on a rebreather. This workshop is designed to give them all the specific techniques for safe team rebreather diving in wrecks or caves. This workshop usually lasts three and a half days depending on the environment where it's been taught.

To better train the participants, all these workshops have a companion workbook and some slide presentations. We are also working on videos and DVDs

### What is a DIRrebreather-sponsored expedition?

A DIRrebreather-sponsored expedition is simply a project launched by some of our members in which other members can also participate. They know that we will all follow the same procedures to make the exploration, either in caves or wrecks, as safe as possible.

In 2008 for example, we have wreck expeditions in Cyprus, Lebanon, Spain, Malaysia and Norway. We also have some deep cave expeditions in Greece and Thailand.

### Does it work?

- How to safely dive with a rebreather?
- Could we be a DIR diver and a rebreather diver at the same time?
- How to improve CCR diving techniques?
- How to effectively mix rebreather divers and open circuit divers in the same team?

Rebreather divers ask these questions every day, all over the world, in virtually all kind of environments. Even if the rebreather principle is quite old, proper units were not commercially available until the last few years. The technology

Check out the DIRrebreather books by Cedric Verdier



(electronics, O<sub>2</sub> sensors, etc) was simply not available. So it is not surprising that closed-circuit rebreathers might be considered unsafe and unreliable. However, recent diving explorations have been safely achieved using the basic concept designed and tested by the DIRrebreather Team. Impressive shallow and deep cave diving surveys and deep wreck explorations were based on these guidelines.

So yes, it works!

For any in-depth question, don't hesitate to contact DIRrebreather at [DIRrebreather@yahoo.com](mailto:DIRrebreather@yahoo.com) and visit us at [www.DIRrebreather.com](http://www.DIRrebreather.com) ■







# Guantanamo Hosts Wounded Warriors for SCUBA Program

# SUDS



Text by CPT Kevin Cowan  
Photos courtesy of SUDS

**In February, the base at Guantanamo Bay, Cuba, hosted six wounded service members, all amputees, helping them complete their dive certification as part of the Soldiers Undertaking Disabled Scuba program.**

SUDS, in coordination with the Wounded Warriors program, Ocean Enterprises, the Reef Raiders Dive Club and Joint Task Force Guantanamo, coordinated the efforts to bring the divers to Cuba. The divers, two Marines and four Soldiers, got involved in the SUDS program at the Walter Reed

Medical Center. According to SUDS founder John Thompson, "SUDS is designed to help improve the lives of injured soldiers. By training the soldiers in a challenging and rewarding activity, it can help facilitate the rehabilitation process and promote mobility."

Although these divers have some physical limitations, they had the same issues that most beginning divers have. But they all seemed to have that initial interest in diving. Nick Paupore, a Soldier injured while serving in Kirkuk, was always interested in diving. Now, because of his injury and these programs, he is now able to enjoy it.

"I had problems with clearing and removing my mask and clearing my ears," said Paupore. "But SUDS understands disabilities and has patience. They work with you until you get it [right]."

The divers completed the first part



of their certification at Walter Reed and needed to complete the required open-water dives before they could be certified. What better place to do it than in Guantanamo Bay, Cuba?

"It's been awesome seeing all of the sea life and beautiful beaches," says Josh Bleill, a double-leg amputee Marine injured while serving in Fallujah. "I plan on coming back." While he was here, he said he enjoyed the diving immensely, and it was an incredible experience. Describing that first open-water dive, "It hit every nerve in my body when I entered the water. It was a feeling I've never had before," he said. And that is what SUDS is trying to achieve.

"It's the most rewarding project I have ever been involved in," Thompson said, calling water the great equalizer. "Many things are just easier to do in the water with these types of injuries," he added. "It's part rehabilitation, part con-

fidence building, part adventure for these wounded warriors."

That adventure, as far as Cuba goes, could not have been realized without the coordination between all the organizations involved. "When the JTF got involved, things took off," said Thompson. "They took the bull by the horns and made it happen."

While coordination from the JTF and other organizations was vital to the trip, it was donations through Wounded Warriors, Disabled Sports USA and SUDS that helped pay for expenses like airfare and lodging. Thanks to donations, charitable organizations and volunteers, this trip turned out to be a memorable experience. Although this was only the first group of divers to travel to get their certification, everyone hopes this will be continued, so we can try to give back to those who have sacrificed so much. ■







## Underwater Habitat Being Constructed In Germany

On April 26 an underwater habitat will be placed in the deep old stone quarry at Diving School Buder in Wildschütz, Germany.

Sponsored by renowned German suit manufacturer Aquata, the underwater stations will, first of all, allow commercial divers to test their equipment under realistic scenarios. The new facility will also be opened to recreational divers, who can rent dry suits on location.

The heaviest segment of what is probably going to be the only habitat of its kind in Europe weighs in at five tonnes. The placements of the two first units to go down—the RI and RII is a delicate operation which requires

the utmost precision.

The total of three segments will be placed at respectively three, six and nine meters enabling them to act as decompression stations for dives up to 74 meters. The underwater station will be supplied with fresh air and energy from a land operated basic station, which remains connected to the habitat via a permanent video and voice link.

The quarry at Wildschütz is renowned for its good visibility, which can reach 25 meters. On the bottom,

there is an old ammunition depot, a block house and a telephone switchboard, which was connected to the old pump house now found at a depth of 74 meters.

The project is the brainchild of Aquata's CEO, Dr Wolfgang Dressler and Mr Volker Buder who have been working on the restoration of the underwater station for over ten years. It was built by the old East German Regime out of old disused cement tanks and used for 25 years. ■

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Edited by Peter Symes



The APS consists of one or more naval vessels providing a persistent presence in the Gulf of Guinea and Western Africa, led by a multi-national staff. The current staff is made up of officers from Cameroon, France, Germany, Ghana, Portugal, the UK and the US, embarked on the *USS Fort McHenry LSD-43*. High Speed Vessel Swift (above) is the other current APS ship

## Western Naval Leaders Seeks to Expand African Sea Police

**Western and African naval leaders have met in Dakar to expand a multi-national programme to protect and police Africa's coast and maritime resources.**

The Africa Partnership Station (APS) was set up by the United States in November 2007 to bring the latest training and techniques to maritime professionals in west and central African countries, to address common threats of illegal fishing, smuggling and human trafficking. Topping the list of problems affecting west and central African countries on the Atlantic and Gulf of Guinea coasts is illegal fishing, which, according to some estimates costs the local economies over a billion dollars (650 million euros) each year.

"We are trying to get more European allies involved in APS, in its staff, by providing ships or

training teams. We want to internationalise this initiative," said Admiral Anthony Kurta, head of politics, resources and strategy for American naval forces in Europe. To date, it has brought 13 countries into the maritime alliance. Those in Africa are Cameroon, Gabon, Ghana, Equatorial Guinea, Liberia, Nigeria, Senegal and the state of Sao Tome and Principe islands, while Germany, Denmark, Spain, France and Portugal are participating from Europe.

Kurta also expressed hopes of extending the initiative to Africa's eastern seaboard on the Indian Ocean. ■

*APS activities consist of joint exercise, port visits, professional training and community outreach with the nations of West and Central Africa. The focus is on building maritime capacity of the nations in the region and increasing the level of cooperation between them to improve maritime safety and security and to address common threats such as illegal fishing*



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By Arnold Weisz

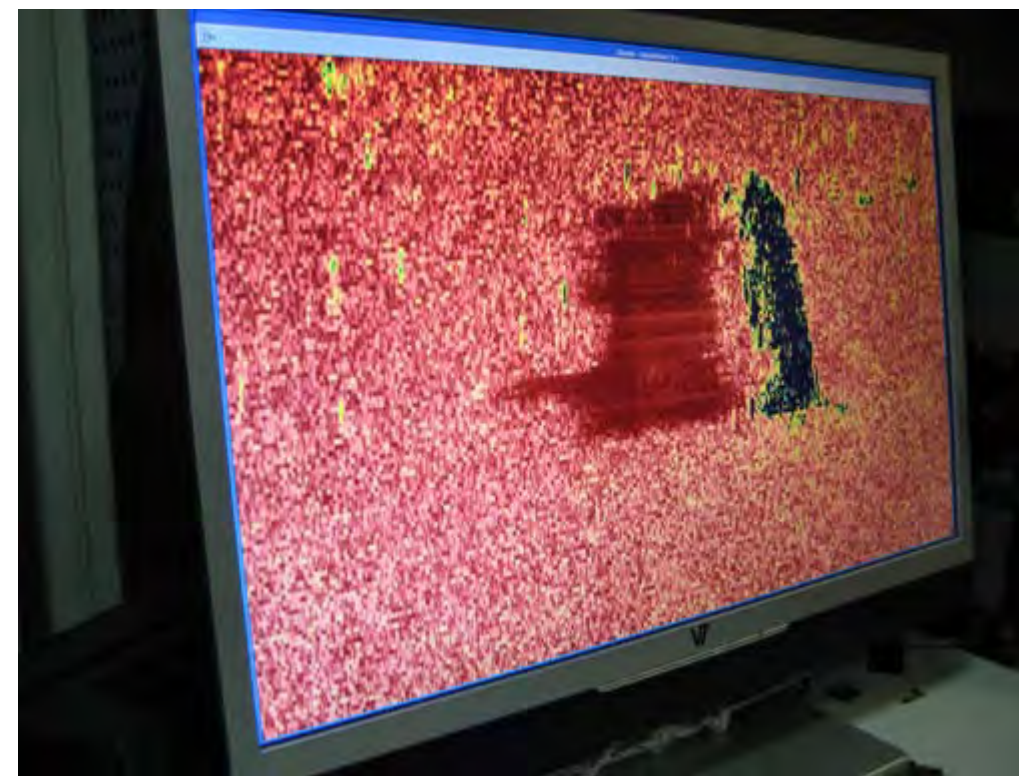
More than six decades after the war, closure was finally found



The *HMAS Sydney* tragedy was Australia's largest loss of life in a naval battle, with all the crew of 645 following the ship to the bottom of the sea. On 16 March 2008, it was finally confirmed that the wreck of the *Sydney* was found. Many had hoped that this would shed some light on the controversy that has surrounded the loss of *HMAS Sydney* since it went down in 1941.

In Australia, it has since been a controversy as to how a converted freighter could sink a well-armed battle ship in the midst of war. In 1941, *HMAS Sydney II* was the pride of the Royal Australian Navy fleet. After engagements in the Mediterranean during 1940 when she famously sank the Italian battle cruiser *Bartolomeo Colleoni*, *HMAS Sydney* returned to Australian waters. In late 1941, she was carrying out troop ship escort duties between Australia and south east Asia. On 19 November 1941, after handing over escort of the troop ship *Zealandia* in the Sunda Strait,

Bingo. The sonar image that unequivocally established the location of the *HMAS Sydney*



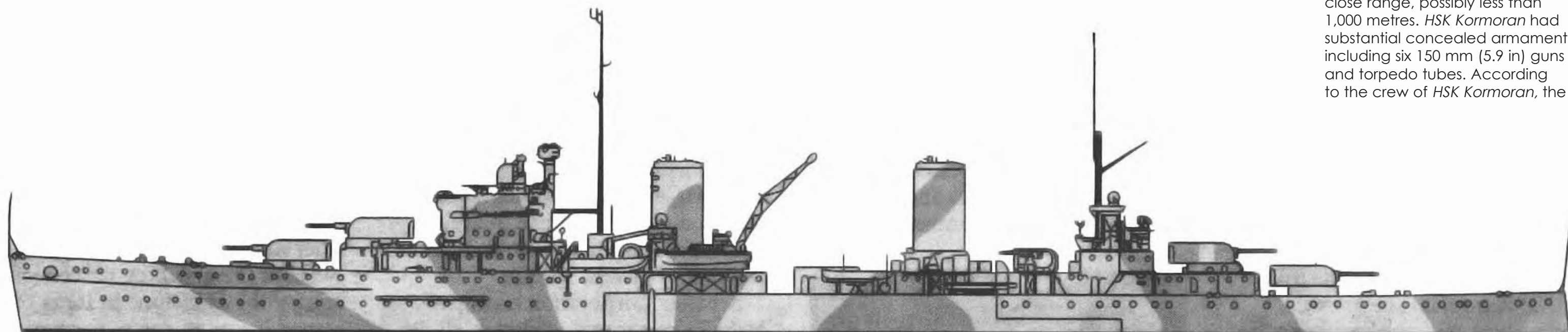
*HMAS Sydney* was en route back to port in Fremantle, Western Australia. The German raider, *HSK Kormoran*, which was first located on 12 March 2008 approximately 112 nautical miles off Steep Point, Western Australia, lies in 2,560 metres of water. Four days later the *HMAS Sydney* was found under 2,470 metres of water, approximately 12 nautical miles from the *Kormoran*.

### The battle

On 19 November 1941, the German auxiliary cruiser *HSK Kormoran* was detected by the Australian *HMAS Sydney*. In open ocean southwest of Carnarvon, *HMAS Sydney* spotted an unidentified merchant vessel and closed requesting identification. Unaware that the *HSK Kormoran* was armed, the *HMAS Sydney* came close-up to the German ship, which opened fire from very close range, possibly less than 1,000 metres. *HSK Kormoran* had substantial concealed armament, including six 150 mm (5.9 in) guns and torpedo tubes. According to the crew of *HSK Kormoran*, the

# Found at Last

*Finding the Australian and German WW II wrecks raises old questions*







Before (above) and after (left)—the forward gun turret



*HMAS Sydney* was hit 50 times by the raider's 150 mm (5.9 in) heavy guns in addition to further hits with smaller guns. Even though the Australians answered the fire from the German ship almost immediately, their capability was reduced as the *HMAS Sydney's* gunnery direction tower was one of the first things the German hit. *HSK Kormoran*, which suffered from engine problems already before the battle started, took hits in the engine room and funnel. *HMAS Sydney* received further fire and left the battle scene. Some time later the Germans had to abandon their ship. Explosive charges were placed, and the surviving crew took to the boats.

### All hands lost

The *HMAS Sydney* was badly damaged and on fire when it was last seen by the German ship and sunk after the battle. The *HSK*

*Kormoran* was so heavily damaged in this battle that it had to be abandoned and blown up.

Whilst the *HMAS Sydney* was lost with all hands (645 young men), 317 of the German were rescued. At least 20 of *HSK Kormoran's* crew died onboard, and a further 40 men lost their lives when their lifeboat capsized. The 320 Germans were later rescued by merchant ships.

The fate of the two or three Chinese prisoners of war on board is uncertain. Different sources state that they were survivors or were lost in the battle.

Nearly all of the Germans spent the rest of the war in POW Camps in Victoria, Australia, from which they were not released until January 1947.

The only eyewitness accounts of the battle are from the crew of *HSK Kormoran*, and as the two ships were separated after the

battle, the exact reason why *HMAS Sydney* sank is unknown.

The recent finding of the two wrecks is raising hopes of getting some answers. Theodor Detmers, the commanding officer of *HSK Kormoran* returned to Germany in 1947, and was released from British captivity in Munster. He lived the last three decades of his life with his nephew in Hamburg-Rahlstedt and died there in 1976. He wrote a book about his *Kormoran* experiences, which was published in 1959.

### Speculations

The speculations into what happened to the most famous ship in Australian history began almost immediately after the sinking. The fate of the *Sydney* has fascinated Australia and has been the subject of a range of television programs, articles and books.

Some of the theories sparked

be speculation was that a Japanese submarine was involved. But none of the many theories have been proved. In 1997, a joint standing committee held a parliamentary inquiry into the circumstances surrounding the sinking of *Sydney*. The enquiry was the largest in Australia's history, receiving submissions from hundreds of parties.

The Australian Government hopes that the discovery of *HMAS Sydney* brings some closure to the families of the 645 Australian Defence Force personnel who lost their lives bravely in this naval action in World War II, said Kevin Rudd Australia's prime minister. Even with the remains of both ships involved in the battle on 19 November 1941 being found, and the families of the lost receiving some closure, the debate over what happened will continue.

### Australian governments sponsors search

Searches for the wrecks of the two ships have been ongoing for a long time, both as historical research projects and, with increasing capability to detect





Gas mask laying in the sediment



## Handelsstörkreuzer 8 (HSK-8 Kormoran)

*Kormoran* was built by Germaniawerft of Kiel and launched on 15 September 1938 as the merchant ship *Steiermark* of HAPAG, the Hamburg-America Line. Renamed *HSK Kormoran* (German for "Cormorant"), she entered service as a Kriegsmarine auxiliary cruiser on 9 October 1940, commanded by Korvettenkapitän (Lieutenant Commander) Theodor Detmers. The *HSK Kormoran* was the biggest auxiliary cruiser used by the Kriegsmarine in World War II. Besides this, it was the only one that was able to sink a major warship in a direct battle.

The ship left Germany on 3 December 1940 and entered the North Atlantic through the Denmark Strait. Until April of the following year, the ship operated in the Atlantic, before it sailed into the Indian Ocean. During its 352 days at sea, the *HSK Kormoran* sank ten merchant ships, comprising a total of 56,965 tons, in addition to one captured and sent to France. ■

SOURCES:  
FINDINGSYDNEY.COM  
GERMAN-NAVY.DE  
BISMARCK-CLASS.DK/HILFSKREUZER/KORMORAN.HTML

The last watch  
is finally over

## New Convention on Wrecks

Estonia has become the first country to sign, subject to ratification, the Nairobi International Convention on the Removal of Wrecks. The Nairobi Wreck Removal Convention was adopted in May 2007 and will provide the legal basis for States to remove, or have removed, shipwrecks that may have the potential to affect adversely the safety of lives, goods and property at sea, as well as the marine environment. The Convention is open for signature until 18 November 2008 and, thereafter, will be open for ratification, accession or acceptance.

Secretary General of the IMO, Efthimios E. Mitropoulos, welcomed the signature by Estonia and urged other states to follow suit, at the earliest opportunity, so that, "as intended, the Nairobi Wreck Removal Convention, once in force, can fill a gap in the existing international legal framework by providing the first set of uniform international rules aimed at ensuring the prompt and effective removal of wrecks beyond the territorial sea, thereby also contributing to the IMO goals of safe navigation and marine environmental protection." ■



submersed wrecks, as actual expeditions into the supposed sinking area. After the turn of the millenium, the Australian government also invested substantial funds into the search. The Howard Government granted \$2.9 million to assist *HMAS Sydney Search Pty Ltd* to locate missing Royal Australian Navy cruiser *HMAS Sydney II*. This grant is in addition to an initial Commonwealth grant of \$1.3 million approved in August 2005 to assist the Western Australian-based nonprofit search group. Also, the state of New South Wales

contributed AUS 250,000 for the search.

Formed in 2001, the non-profit organisation *HMAS Sydney Search Pty Ltd* planned an attempt to locate the wrecks since receiving a government grant in August 2005. It had a memorandum of understanding with shipwreck hunter David Mearns, who believed that he could find the wrecks using the latest sonar technology and recently-revealed details recorded by the commander of the *Kormoran*, Theodor Detmers.



# HMAS Sydney shipwreck hunter offers to find Centaur remains

David Mearns, the world-renowned shipwreck hunter and the man responsible for finding *HMAS Sydney* has offered to help find the lost Australian hospital ship *Centaur*, saying the vessel would be easier to find than the *Sydney* and the *Kormoran* and is feasible so long as there is funding.

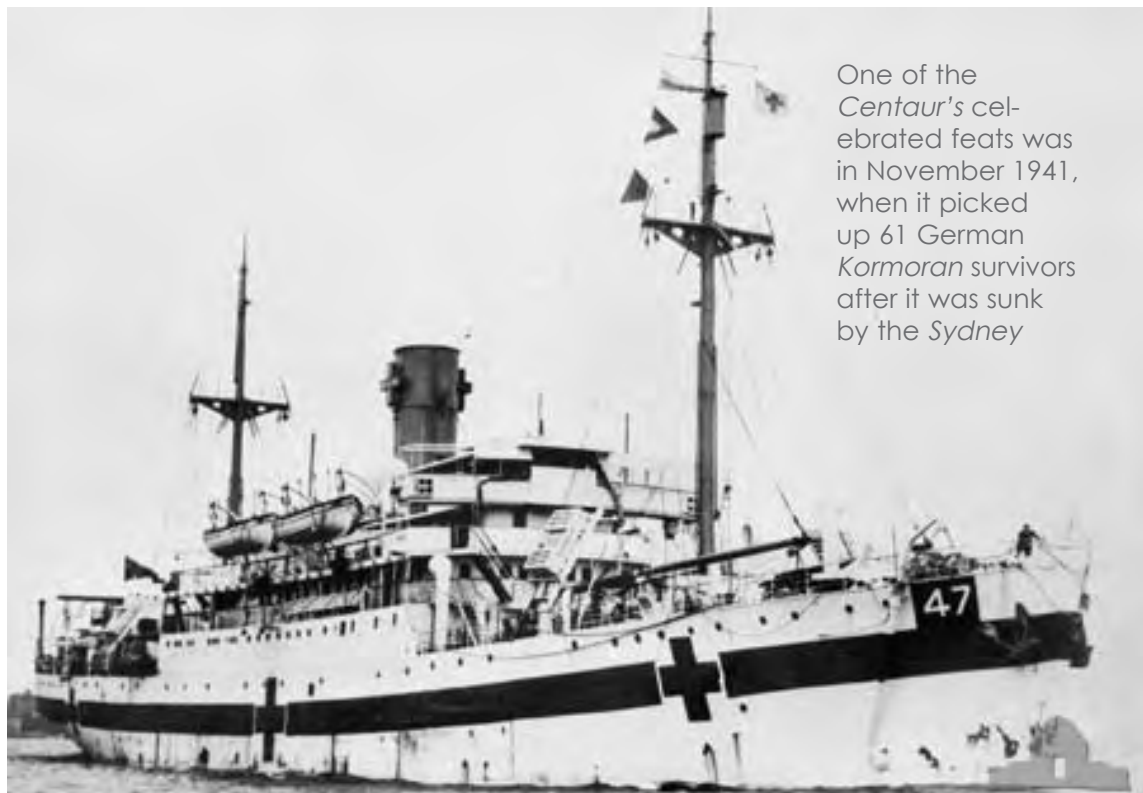
The Scottish-built Australian Hospital Ship (AHS) *Centaur* was launched in 1924 as a combination passenger liner/freighter. In 1943, she was converted to a hospital ship, and served with the Second Australian Imperial Force.

Before dawn on 14 May 1943, while on her second voyage, *Centaur* was torpedoed and sunk by a Japanese submarine off North Stradbroke Island, Queensland. Of the 332 medical personnel and crew aboard, 268 died. The attack resulted in public outrage, as it was considered to be a war crime. The ship displayed the red cross—the international symbol for a hospital ship—meaning that under international law, it should have been immune to attack.

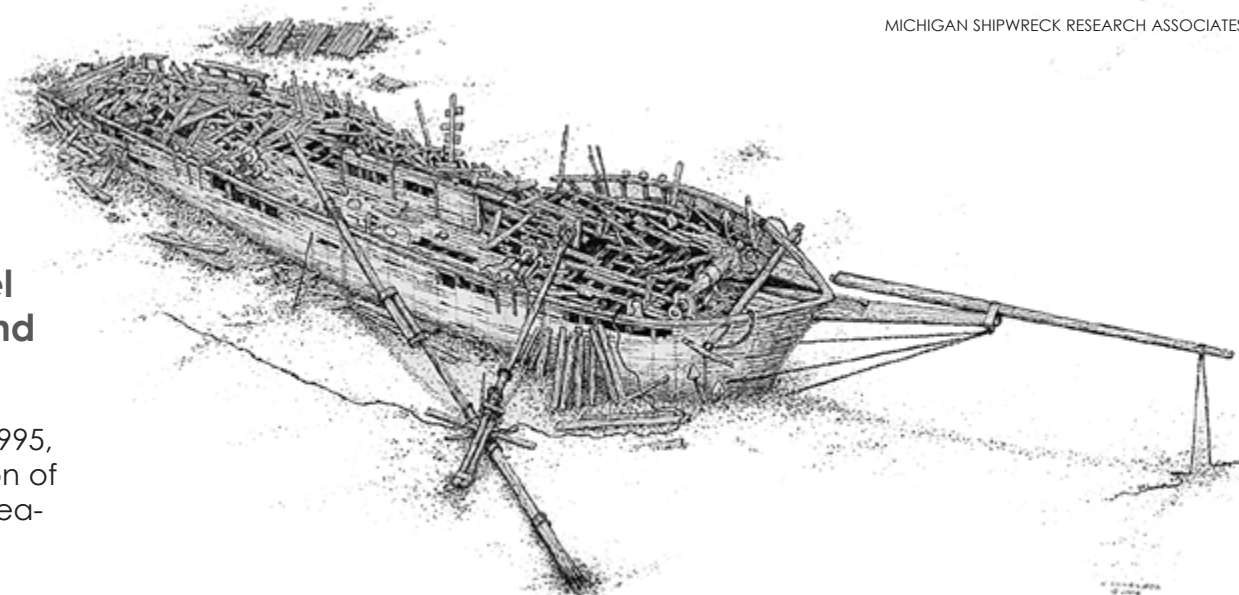
Efforts to locate the final resting place of the ship have been made but in spite

of a false identification made in 1995, which stood until 2003, the location of *Centaur* is still unknown, as is the reason for the attack.

One of the last remaining survivors from the *Centaur*, Martin Pash, renewed calls for the wreck to be found in the Herald last month, saying: "It's time the arguments over the exact location can be settled and protected." Mr Mearns said the only barriers to finding the *Centaur* was a lack of money and political will. "On the basis of what I've seen of her, I believe she's findable," he said. "The information, even at this preliminary stage, is better than what I had to deal with in locating *Kormoran* and *Sydney*." ■



One of the *Centaur's* celebrated feats was in November 1941, when it picked up 61 German *Kormoran* survivors after it was sunk by the *Sydney*



MICHIGAN SHIPWRECK RESEARCH ASSOCIATES

## Two-masted schooner in Lake Michigan identified as the Hamilton

Michigan Shipwreck Research Associates said it has located the *Hamilton*, a two-masted schooner that sank in Lake Michigan in 1873 during a November gale.

The identification of the wreck, which sits upright in 85m (275 ft) of water off Saugatuck, took over a year and was facilitated by technical scuba divers Todd White of Saugatuck, Bob Underhill of Kalamazoo and Jeff Vos of Holland working in conjunction with Michigan Shipwreck Research Associates (MSRA). These three divers comprise the premiere deep technical dive team in West Michigan.

The 113-foot long *Hamilton* was built in 1847 in Oswego, New York, for the Red Bird Line and plied the Great Lakes for a quarter century before foundering between the lumber port of Muskegon and Chicago. Capt. Harvey L. Burch and his six-man crew left Muskegon on a cold November morning in 1873 with a cargo of 117,000 board feet of lumber bound for the ongoing rebuilding effort in Chicago, which

had only recently been devastated by the Great Fire of 1871. By noon the southbound vessel encountered heavy seas and began to take on water.

The crew manned the hand-operated pumps for three hours before taking to the 17-foot yawl boat. They stayed alongside their waterlogged vessel until midnight, when she finally sank beneath the waves in 270 feet of water, leaving the men storm-tossed in an open boat. Prevailing winds pushed the little boat, now covered with ice, ashore near South Haven the next day.

Michigan Shipwreck Research Associates is partially funded through a grant and private contributions. Click on the following link if you want to become a member and support the ongoing work of MSRA [www.michiganshipwrecks.org](http://www.michiganshipwrecks.org) ■

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## Maryland Eyes *USS Radford* as Artificial Reef



### 2008 could turn out to be a really big year for the Maryland Artificial Reef Initiative

The Ocean City Reef Foundation is currently raising funds to sink New York City subway cars off the coast. "We have got about two barge loads or close to that," said Greg Hall, the foundation's president. "We've raised \$40,000 and the people have been wonderful about dona-

tions."

The Ocean City Reef Foundation is also hopeful that funds can be raised in time so the state can acquire the *Radford*, a 600-foot Navy destroyer, while they are busy with their subway car endeavor.

According to Marty Gary, a member of the Maryland Department of Natural Resources Fisheries Service, more than \$1 million has already been invested into artificial reefs in the

Chesapeake Bay last year, and two developments are currently on the horizon for Maryland's Atlantic coastline.

The project is being billed as a multi-state effort, combining funding from Maryland, Delaware and New Jersey to sink the ship in the Delaware Bay in an area designated "Deljerseyland." The location is 30 nautical miles from the Ocean City inlet, 28 from the Indian River inlet and 32 from Cape May, New Jersey.

The total cost has been

estimated at \$600,000, split between three states. It is hoped the state will receive large corporate donations to fund the project, but even individual donations can be made by visiting [www.marylandreefs.org](http://www.marylandreefs.org). ■



## Sinking of the *Vandenberg* Postponed

Artificial reef project organizers coordinating the cleanup and sinking of the former United States Air Force missile tracking ship *Hoyt S. Vandenberg* off Key West,

Florida, announced a postponement of the scuttling, which was scheduled for May 15. A new date will be announced in the future

Although most of the clean-

up has been completed, unanticipated cost overruns are keeping the ship in a Norfolk, Virginia, shipyard until the yard bill can be satisfied. The yard filed a federal maritime lien on the ship to ensure payment is made on the remaining balance of \$1.6 million.

Key West City Commissioner Bill Vergé said he, the city attorney and city manager have actively been engaged in discussions with shipyard management and local, state and federal officials as well as lending institutions endeavoring to arrange a financial solution.

"Right now everyone is trying to work towards the goal of sinking this ship off Key West," said Vergé. "No one wants to see the ship sent to the scrap yard."

The cleanup has been intensive. Begun a year ago, more than 50,000 hours of labour have been invested to rid the vessel of all environmental hazards.

The ship is destined to be sunk about six miles south of Key West in 140 feet of water in the Florida Keys National Marine Sanctuary. ■



## Coral Reef Squadron

Phuket will soon boast a new dive site after ten decommissioned aircraft of the Royal Thai Air Force were recently towed to Bangtao Bay in Thalang district and allowed to sink to the bottom of the sea to form an artificial reef

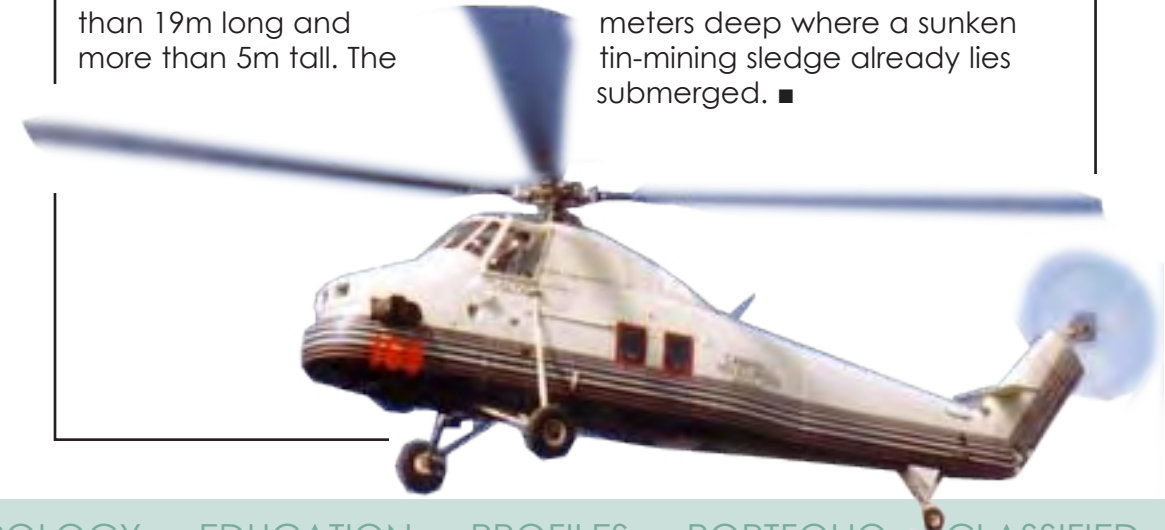
The new tourism attraction will draw at least 3,000 visitors a year, according to Phuket deputy governor Vorapot Rathasima. The artificial reef is a joint effort of the provincial administration, Thailand Diving Association (TDA), the Department of Marine and Coastal Resources, For Sea Foundation, and the Royal Thai Air Force.

The air force donated four Douglas C-47s and six helicopters that saw action during Vietnam and Korean wars. The Douglas C-47 Skytrains, commonly called "Dakotas", have a wingspan of 29m and are more than 19m long and more than 5m tall. The

Sikorsky S-58T is a large helicopter built for a crew of two and 12 passengers. It is more than 14m long and 4m tall. All the aircraft were thoroughly sanitised, towed about a kilometre offshore to a point where the sea is 15-20 metres deep, and allowed to sink to the bottom—their final resting place.

For Sea Foundation secretary Vittayen Muttamura said his organization was established by a group of Bangkok-based divers in April 2005 to survey and restore coral reefs damaged by the tsunami.

The aircraft will rest about 20 meters deep where a sunken tin-mining sledge already lies submerged. ■







## Lalumiere to dive the *Shimakaze* (at 250m)

**On May 17, Rob Lalumiere will attempt his second world record dive to a sunken WWII ship by diving to the wreck of the Japanese destroyer *Shimakaze*, which rests at a depth of 250 meters in the waters off Ormoc Bay, Philippines.**

The dive will be the deepest wreck dive conducted by a scuba diver, and Lalumiere will be breaking his own record of 193m he made while diving to the *USS Cooper*, also resting in Olmoc Bay, on May 29, 2005.

The *Shimakaze* was the fastest destroyer built for the Imperial

Japanese Navy during World War II, capable of reaching a speed of 40 knots. The ship was a test-bed for an enormously powerful high-temperature, high-pressure steam engine that was able to develop nearly 80,000 shaft horsepower. At 127 meters she was almost the size of a cruiser, and

armed with six 127mm dual purpose guns, conventional anti-aircraft and anti-submarine weaponry—and 15 torpedoes. She was a formidable opponent.

The Battle of Ormoc Bay was a series of air-sea battles between Imperial Japan and the United States in the Camotes Sea in the Philippines between 11 November 1944 and 21 December 1944, part of the Battle of Leyte in the Pacific campaign of World War II. The battles resulted from Japanese operations to reinforce and resupply their forces on Leyte and US attempts to interdict them. While flagship of Destroyer Squadron 2, she was sunk by American aircraft on 8 November 1944 during the Battle of Ormoc Bay with an unconfirmed complement of 267 officers and crew. ■

Rob Lalumiere made a world record 633 foot dive to the sunken wreck of the *USS Cooper* (DD-695) on May 29, 2005



WWW.DD-692.COM

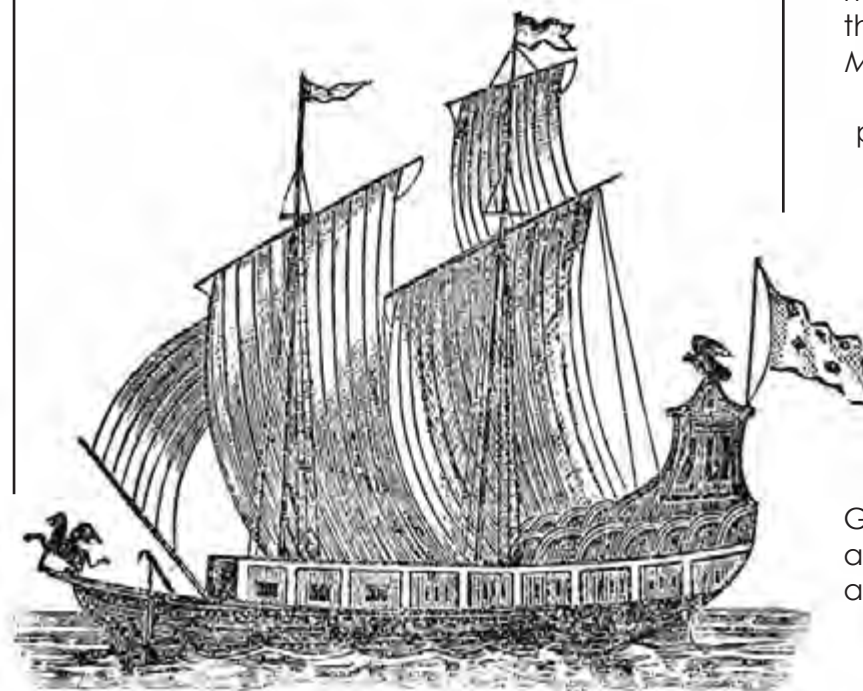
## US court orders federal jurisdiction over possible *Griffin* shipwreck

A federal appeals court says the federal government should have authority over a Lake Michigan shipwreck that could be the *Griffin*, a 17th century vessel built by the French explorer La Salle.

The *Griffin* (also spelled "Griffon") disappeared on its maiden voyage in 1679 after setting sail from an island near Green Bay, Wisconsin, with a crew of six and a cargo of furs and other goods. It's believed to have sunk in northern Lake Michigan.

The company, which found the wreck six years ago—the Great Lakes Exploration Group LLC—has, however refused to tell the state where the wreckage is until it gets assurances that it'll have a say over what is done with the shipwreck if proves to be the *Griffin*. It wants the federal government to have jurisdiction but to appoint the company as custodian until the courts determine who has ownership and salvage rights. The company says the French government may want to submit a claim.

The state is seeking title, saying federal law gives it ownership of all abandoned vessels "embedded in the state's submerged lands." state archaeologist, John Halsey, said he was still waiting for evidence that the shipwreck is the *Griffin*. ■



## Ongoing legal spat between Wreckhunters Odyssey and Spain goes into overtime

Spain has rejected as "preposterous" recent claims by Florida treasure hunters about the origin of a US\$500 million haul of silver and gold from the disputed shipwreck code-named *Black Swan*.

Spain suspects the 17 metric tons of silver coins and gold recovered by Odyssey came from a sunken colonial-era Spanish galleon and is suing Odyssey on grounds that Madrid is the rightful owner. Odyssey, which has shipped most of the treasure recovered to the United States, has countered it was found outside any country's territorial waters.

Lawyers for Odyssey Marine Exploration have stated the *Nuestra Senora de las Mercedes y las Animas*, a Spanish vessel that sank in the Atlantic Ocean in 1804, was possibly linked to the site where the trove was found last year. But in its court papers, filed under seal on April 14 and later made public, Odyssey said it was unable to conclusively identify the vessel and was reviewing information that may be inconsistent with the hypothesis that the wreck site, was that of the *Mercedes*.

Lawyer James Gould, who represents Spain, disparaged Odyssey's contention that it could only offer a working hypothesis as to the identity of the shipwreck. "The answer Odyssey provided to the court included preposterous claims such as that 17 metric tons of silver coins and hundreds of other artifacts may have (been) thrown overboard from a mystery ship," Gould said in a statement to Reuters.

In October a Spanish warship intercepted the company's treasure-hunting ship, *Odyssey Explorer*, after it left the British territory of Gibraltar and escorted it to a Spanish port. Police arrested the ship's captain but released him soon after. ■

*"Just because Spain files a claim against a particular wreck site does not mean it has a valid basis, or as in this case, any evidence whatsoever to support that claim"*

ODYSSEY GENERAL COUNSEL MELINDA MACCONNEL



# Travel News

Edited by  
Scott Bennett



## Mike Ball Offers Discount Combo Vacation Packages

Get great discounts by combining one of Mike Ball's Great Barrier Reef live-aboard vacations aboard *Spoilsport* with one of Tawali Adventures' PNG holidays at Tawali Resort and/or aboard *MV Chertan* or *M/Y Spirit of Niugini*.

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for a stay of 7 or more nights. Your total discount will be between \$200 and \$400, so the longer you stay the greater the saving. While either holiday can be first on your itinerary, both operators must be combined in order to receive the discounts. Cairns, Australia is only a 90-minute flight from PNG's capitol of Port Moresby. With 7 flights weekly, it's the most convenient international gateway city for most travelers. For more information or reservations, contact Tawali Adventures at [reservations@tawali.com](mailto:reservations@tawali.com) or Mike Ball Dive Expeditions at [resv@mikeball.com](mailto:resv@mikeball.com) ■

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## Peter Hughes Liveaboards Visit Kimbe Bay

On a recent visit to Papua New Guinea's Kimbe Bay, renowned coral reef researcher Professor Charles Vernon enthused, "The coral reefs of Kimbe Bay take me back 40 years, to a time when corals grew in lush profusion, untroubled by all the problems that beset them today. A short boat ride from Walindi Resort, and I am diving on reefs that have half of the coral species of the world, all awaiting those rare photo opportunities that come only with the clearest water. I am hard pressed to think of anywhere on earth that has this combination of vibrant health, diversity and beauty."

Situated on the island of New Britain in the Bismarck Sea, Kimbe Bay is a world-

class dive destination. In a mere two days of diving, Professor Vernon recorded a total of 410 coral species, which is over half of the known world total. For the past 30 years, these bountiful waters have been explored by Max Benjamin and Capt. Alan Raabe, the Dancer Fleet's local partners. Their extensive explorations have charted a wealth of dive sites throughout the entire area. The *M/V Star Dancer*, along with her sister operations the Walindi Plantation Resort and the *M/V Febrina*, allows guests to explore the incredible diversity that Kimbe Bay has to offer. On board the *M/V Star Dancer*, Kimbe Bay is visited on the North Coast itinerary, which also includes the Witu Islands and Fathers

Reef. It is also featured in the Walindi/Rabaul itineraries, which include Fathers Reef and the historic Rabaul area, where relics from the Second World War can be seen both above and below the surface.

Part of the renowned Peter Hughes Dancer Fleet, the *M/V Star Dancer* offers a combination of superb diving coupled with luxurious accommodation. Other Dancer Fleet destinations include Tobago, Grenada, Belize, the Galapagos, Komodo, the Alor Islands and the Maldives. In 2008, the new *Paradise Dancer* will feature itineraries to North Sulawesi and Raja Ampat, Indonesia.

For additional enquires or to make a reservation, visit [www.peterhughes.com](http://www.peterhughes.com) ■

## Rebreather Event: Inner Space Comes to Grand Cayman

Inner Space, the world's largest Closed Circuit Rebreather event, is coming to Grand Cayman

From May 17-24th 2008, Divetech will be hosting the fifth anniversary of Inner Space at the Cobalt Coast Dive Resort. More than 60 Closed Circuit Rebreather divers from around the world will attend an action-packed week of diving and events.

Grand Cayman offers some of the world's most spectacular wall diving, with a proliferation of healthy corals and copious marine life. From shallow reefs to

sheer walls plunging to 400 feet, Rebreather divers of all skill levels can join in. Dive sites are a short hop by boat from the resort and shore dives are available around the clock

In addition, Inner Space attracts many of the "Who's Who" in the CCR world. Representatives from around the world will be attending to show the latest products including Rebreathers, computer software, accessories, electronics and more. Two new products will be showcased: the new Sentinel CCR from Closed Circuit Research

and the new Fusion underwater diver propulsion vehicle from Silent Diving Systems. Evening presentations will include pool demos to test out new units, a product trade show evening and seminars on a wide range of topics featuring many representatives from the industry.

Those interested in learning about Rebreather diving can attend the cocktail hour held night-

ly, where they can hobnob with industry leaders, pick up a weekly schedule or even try out a Rebreather in one of the pool demos. Jim Kozmik and Ralph Hoskins from Sport Diver TV will be filming the event for the

National Geographic TV series, *Ship Sinkers*.

To find out more about Inner Space, visit: [www.divetech.com/Innerspace.htm](http://www.divetech.com/Innerspace.htm) or contact Nancy Easterbrook, at [divetech@candw.ky](mailto:divetech@candw.ky) ■



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Edited by  
Scott Bennett

## Emirates Launches In-Flight Mobile Phone Service

In a move that will delight some and irritate others, Dubai-based Emirates Airlines has become the first commercial airline to allow passengers to make mobile phone calls during flights. The first mobile phone call was made on a recent Airbus A340 flight between Dubai and Casablanca. The decision was reached after experiencing high demand for the phones previously installed in aircraft seats.

Designed by the AeroMobile

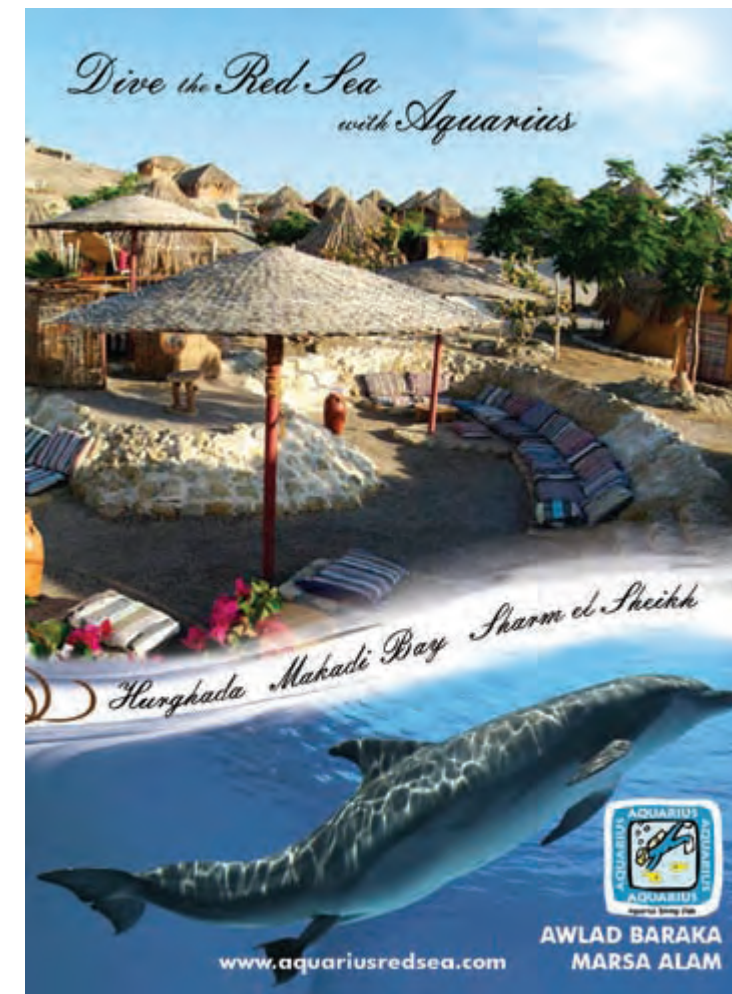
Company, the aircraft is fitted with a system that prevents mobiles from interfering with a plane's electronics. The service will only be activated when the aircraft attains cruising altitude, and the cabin crew will be able to monitor the system. Passengers will be able to receive and send text messages, but voice messages will be prevented during night flights. In addition, passengers will be requested to set their phones on "silent" mode.

Prior to utilizing the system, it was necessary for the airline to attain approval from international air safety organizations. "We have gone to considerable lengths to ensure that all safety and regulatory issues have been fully addressed," said AeroMobile Chief Executive Bjorn-Taale Sandberg. Emirates plans to extend the system to more aircraft later this year, as well as adding BlackBerry and other data services. ■

## De-valved Compressed Gas Cylinders Permitted on Airplanes



According to the United States Transportation Security Administration, air travelers are permitted compressed gas cylinders as checked baggage or as carry-ons provided that the regulator valve is completely disconnected from the cylinder. The seal must be removed in order to allow a visual inspection. This must be done prior to check-in, as security officers will not remove the seal or regulator valve from the cylinder at the checkpoint. Sealed cylinders will not be allowed to pass through security regardless of the reading on the pressure gauge indicator. However, once the valve is opened, contamination may enter the tank. Cleaning would be required upon arrival, which may not be possible. To avoid this potential problem, it is recommended that passengers ship compressed gas cylinders to their final destination via a parcel service prior to their departure. ■



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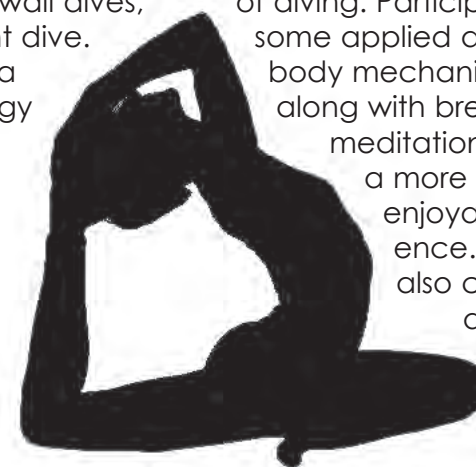
## Scuba & Yoga Trip in Dominica

Kimberlee and Todd Stedl, authors of *Yoga for Scuba Divers*, are offering a special Scuba Diving & Yoga Adventure from March 7 - 14, 2009, on the island of Dominica in the Caribbean. Participants will experience the pristine reefs and spectacular 1,000-foot walls of the Scotts Head Marine Reserve. Dives will be a combination of wall dives, drift dives, and a night dive. Included in the trip is a Project AWARE ecology course for all participants.

Accommodation will be at Jungle Bay, voted one of the world's top ten luxury eco resorts by Forbes

magazine in 2007. Dominica was the first country to be Green Globe benchmarked, and the resort's owners are leaders in ecologically and culturally sustainable tourism.

On this unique trip, the Stedls will offer yoga routines specifically designed to help strengthen and restore the body after a day of diving. Participants will learn some applied anatomy and body mechanics of diving along with breathing and meditation exercises for a more relaxed and enjoyable dive experience. The Stedls will also conduct group discussions about yoga



philosophy and its relevance on diver ethics and underwater ecology.

A number of options are available to divers and non-divers alike. A wide selection of hikes is offered by the resort to experience the island's lush pristine environment or guests can indulge in the resort's range of amenities including yoga studio, outdoor pool, and spa treatments. A number of group activities, including whale watching, are also planned. Spaces are limited, so an early sign-up is strongly recommended. For prices, package options, and registration deadlines, please visit: [www.8thElementDiving.com/retreat](http://www.8thElementDiving.com/retreat) or contact [GoDive@8thElementDiving.com](mailto:GoDive@8thElementDiving.com) ■



Edited by  
Scott Bennett

## Dubai Diving Sites Threatened

According to a local tour operator, Dubai's ever-burgeoning construction boom is threatening the existence of the Emirate's dive sites. Stephanie Davies, owner of Scuba Dubai, asserts that few sites remain near Dubai itself, with the majority to be found far off shore. "Dubai never had too many natural dive sites, but the ongoing construction has meant that many existing wrecks have also been removed," she said. "While construction is important for the future of Dubai, developers should create artificial reefs in surrounding areas to recreate a habitat for marine life," Davies said.

Although the creation of artificial reefs is a viable alternative, John Burt, a marine biologist and lecturer at Zayed University, said it could never replicate the same marine organisms and fish. Another alternative would be to relocate existing reefs away from the construction. However, Burt said, "A coral should be moved only when the construction will directly impact the dive site, and there is no other alternative." ■



The Marina Promenade of Dubai under construction



*Dogenpalast in Venedig*, by Francesco Guardi, painted in the second half of the 18th century

## Diving in Venice?

The mere mention of this historic city conjures up images of gondoliers in striped jerseys, the Rialto Bridge, St. Mark's Square and a captivating pageant of watercraft plying the extensive labyrinth of canals. Now, it can add a new attraction to its myriad of attractions: diving.

Biologists have discovered that the new sea barrier being erected to protect the city from rising waters has attracted a plethora of marine life. Known as The Moses Project, a series of mobile barriers, are currently under construction across the three channels accessing Venice Lagoon. Two of the barriers are protected by breakwa-

ters, which have inadvertently provided Venice with an instant barrier reef.

"There are people already showing up to dive, and I envisage tourists coming to Venice to see the canals before indulging in a spot of scuba diving," said marine biologist Andrea Rismondo.

Extending for nearly 2km at depths up to 14m deep, the rocky breakwater is home to numerous sponges and tree-like *Cystoseira* algae, which grow up to 1.5m in height. In turn, these provide homes for cuttlefish, starfish, crabs, jellyfish, molluscs and up to 50 species of fish.

"It is mostly sandy around here, so the breakwaters were a real chance for sea life to set up, but we were still surprised by the numbers," said Rismondo. "One hypothesis is that warmer water here due to climate change has helped." The project has drawn the ire of environmentalists, concerned that the lagoon's fragile ecosystem could be turned into a marine park. ■



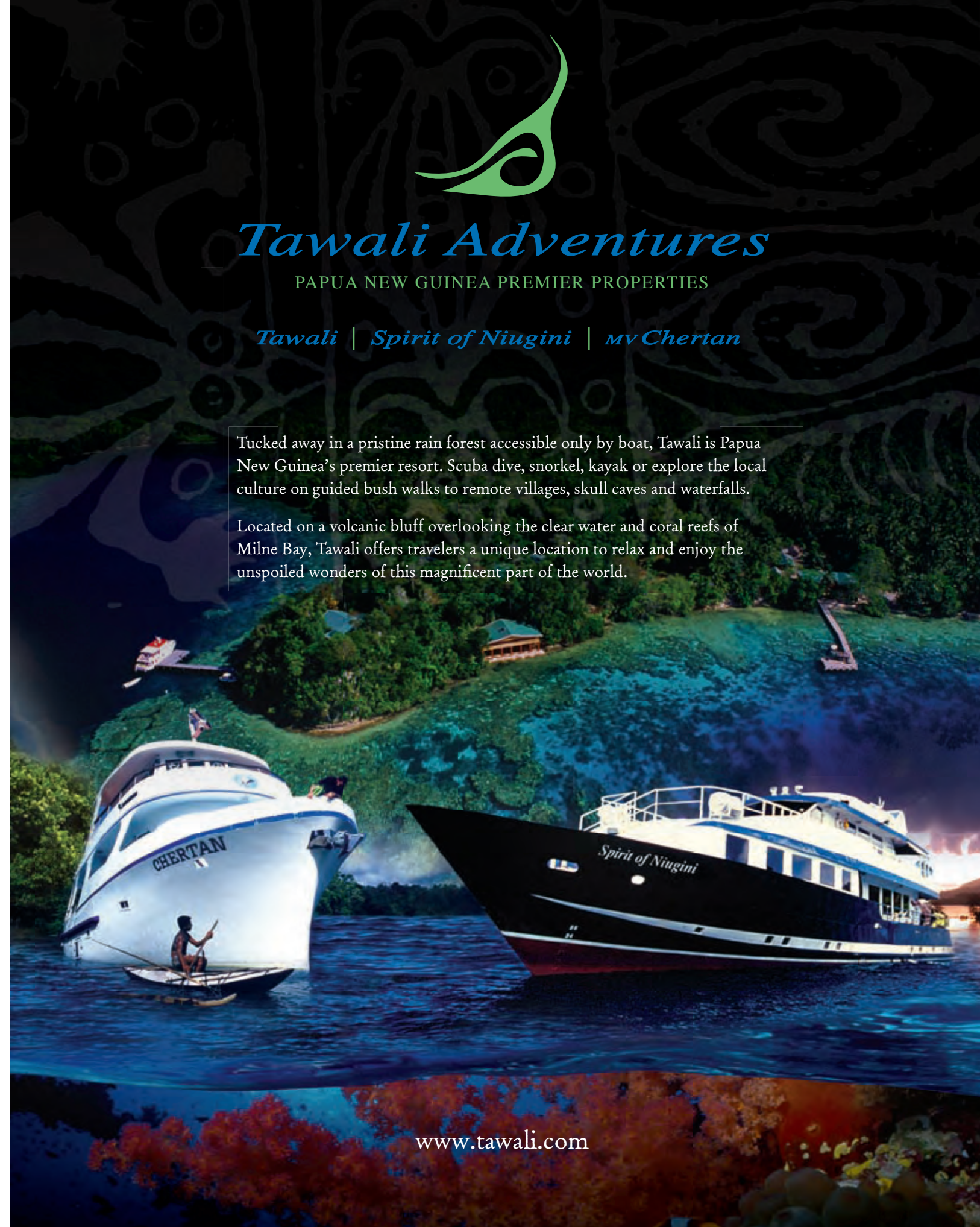
## Tawali Adventures

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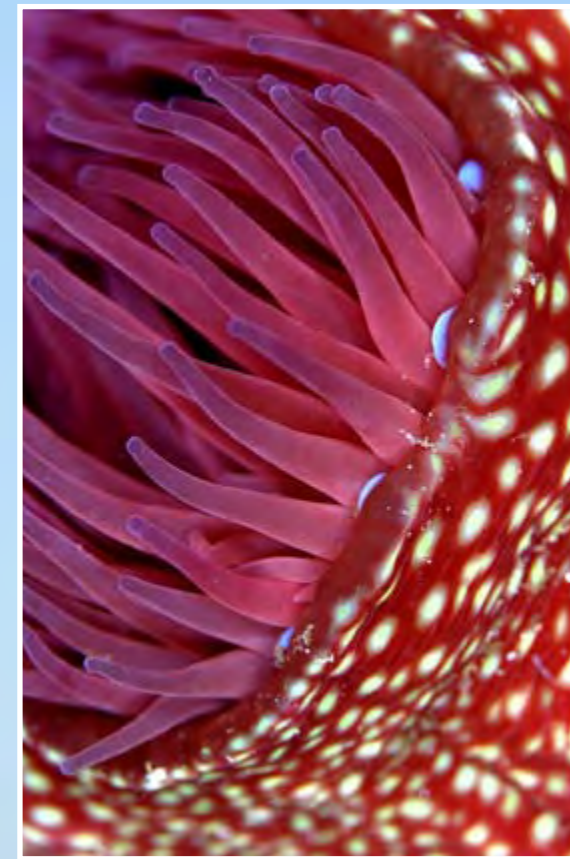


# Cornish Reefs

Global diving travel has become increasingly easy over the last decade or so, providing easy access to a growing number of tropical and exotic destinations. So, for many divers residing in cooler climates or new to the sport, it is tempting to look only towards these warm distant destinations and perhaps ignore the wealth of marine life on their own doorstep.

Text and photos by Mark Webster

St. Michael's Mount is the most striking land mark of Mount's Bay with its prominent medieval castle. Only accessible at low water on foot via a cobbled causeway or by boat, it is the home of St. Aubyn family and is now managed by the National Trust.  
RIGHT: Detail of Strawberry anemone (*Actina fragacea*)



RIGHT TO LEFT: *Limacia clavigera* nudibranch feeding on red sea lettuce sea weed; Plumose anemones (*Metridium senile*) carpet a reef wall near Land's End; A diver explores a deep gulley decorated with soft corals (*Alcyonium digitatum*) at Logan's Rock







Although I have the opportunity to travel regularly to warmer climates, this never discourages me from diving as often as I can in my cooler, but no less spectacular, home waters around the south west peninsula of Cornwall in the United Kingdom. The south west peninsula and county of Cornwall is physically remote from the remainder of the British Isles and also has a rich history full of myth, legend, smuggling and illicit ship wrecking. Industry is sparse in this area, which boasts spectacular countryside, and as a consequence, it is one of the UK's most popular tourist destinations offering both a slower pace of life, a mild climate and miles of unspoiled coast line and secluded beaches.

The rugged granite of the peninsula juts out into the Atlantic and has a striking contrast between its two coasts. There are calm sleepy inlets, coves and fishing villages on the south coast, while there are dramatic towering cliffs and the

power of the Atlantic on the north coast. The rugged topography of the peninsula extends far out to sea, forming reefs, pinnacles and shoals teeming with life.

You can dive a deep wreck in the morning, a spectacular sheer drop-off in the afternoon, and explore shoreline gullies and tunnels in the evening, or after dark. All this makes the area popular with both diving and marine life enthusiasts seeking the variety this coastline provides. It is also popular with the family diver who wishes to mix his or her sport with exploring the attractions on land, some lazy days on the beaches, and the occasional foray under the waves.

### The Gulf Stream

The Gulf Stream divides round the



CLOCKWISE FROM TOP LEFT: There is excellent snorkeling all around the coast – here a snorkeller explores the reef at Pendennis Point, Falmouth Bay; Yachts at anchor in the harbour at Penzance; Juvenile cuttle fish (*Sepia officinalis*) are commonly found in late summer in the shallow water eel grass beds; The plankton blooms of late spring bring the basking sharks (*Cetorhinus maximus*) which can reach 8-10m in length; Springtime sees the arrival of many spe-

cies of nudibranchs (this *Polycera quadrilineata*) that congregate to breed; Kelp (*Laminaria sp*) covers the tops of many of the shallow water reefs and provides a habitat for numerous marine species





## New Cornish basking shark surveys

Cornwall Wildlife Trust (CWT) is calling for volunteers to help them survey basking sharks off Cornwall this summer as part of their new BBC Wildlife Fund-supported Seaquest Basking Shark Project. CWT is joining forces with SeaWatch SW to carry out surveys from the coast in order to collect vital data on basking sharks and other marine wildlife.

During 2007, SeaWatch SW surveys recorded an astonishing 656 basking sharks from mid-July to the beginning of October from Gwennap Head, West Cornwall. Russell Wynn, SeaWatch SW co-ordinator says: "The results of this survey are starting to help us understand a lot more about basking sharks off Cornwall and identify the areas that are important for them. This data will be useful in influencing the development of a network of Marine Protected Areas around Cornwall, which the Finding Sanctuary project is currently working towards."

During the Seawatch SW survey last year, six species of cetacean (whale, dolphin and porpoise) were seen, including a fin whale, the second biggest whale next to the blue whale. Huge pods of up to 400 common dolphins were encountered and a massive 460 basking sharks were recorded during one day alone! This survey highlights the importance of Cornish waters for supporting an abundance of marine wildlife.

Basking sharks were recorded almost daily off Gwennap Head during last year's survey.

These gentle giants are regular visitors to the Cornish coast, but very little is understood about the status of their population or about their behaviour. The basking shark is the UK's biggest wild visitor and the second largest fish in the world. Harmless to humans, eating only plankton sifted from the ocean, they can grow up to 12 metres

in length and weigh up to seven tonnes. They remain rare in UK waters and despite being a protected species are consistently under threat from human activities in the marine environment.

Lauren Davis, Seaquest Basking Shark Project volunteer says: "Our seas are so poorly protected compared to the land; hopefully these surveys will provide decision makers with the data necessary to give basking sharks and other marine wildlife the protection that is urgently needed."

Lauren continues: "Seeing a basking shark moving majestically through the calm water is truly a wonderful sight, and one which you will never forget. If you are over 16 and interested in spending some time sitting on the cliffs recording basking sharks and other marine life, join Cornwall Wildlife Trust and SeaWatch SW this summer." Previous experience is useful but not essential as training can be provided. For more information on how to get involved, contact Lauren Davis on 07979736661.

Go to [www.seawatch-sw.org](http://www.seawatch-sw.org) and 2007 annual report for more information. ■







John Dory (*Zeus faber*)

**Zues faber**

John Dory (*Zues faber*) is also known as St Pierre. Easily identified by its large dark spot on its flank used to warn off predators, the John Dory is an edible deep-sea fish with a laterally compressed olive-yellow body -- which makes it a poor swimmer -- with microscopic, sharp scales and long spines on the dorsal fin. The fish can grow up to a maximum size of 65cm and 3kg in weight.

John Dory live in the Mediterranean Sea, the Indian Ocean, and the Atlantic Ocean. They can be found on the coast of Australia, South East Asia, the coasts of Japan, South West Africa, and off the coasts of Europe. Normally solitary creatures, they live near the seabed, in depths of 5 to 360 meters. They live about 12 years and reproduce at around 3

or 4 years old by releasing sperm and eggs into the water usually during the winter months.

The top predator in its habitat, the John Dory usually stalks its prey, then shoots out a tube in its mouth to capture food such as sardines, squid and cuttlefish. They are preyed upon by sharks such as the dusky shark.

It is thought that the name John Dory stems from the French *dorée* for gilded, or the French *jaune* for yellow, or is associated with the hero of an old ballad of the same name. Jules Verne said that the name came from an allusion to St. Peter, *Janitore*, the door-keeper or gate-keeper of Heaven, who brought the fish at God's command and that the dark spot on the back of the fish is St. Peter's thumbprint. ■ SOURCE: WIKIPEDIA.ORG



CLOCKWISE FROM ABOVE: There are numerous species of colourful sponges like this breadcrumb sponge (*Halichondria panacea*) that give the reefs a tropical feel; Local fishermen are great characters - there are many small coves and harbours around the coast that support traditional fishing methods from tiny cove boats; One of the most colourful reef fish to be seen in the inquisitive male Cuckoo wrasse (*Labrus bimiculatus*); Colourful sea urchins (*Echinus esculentus*) make great abstract macro subjects

peninsula on its path north. The warmer, clearer waters it carries propagates a diversity of indigenous and visiting marine life not generally found elsewhere around the UK's coastline.

The headlands and offshore reefs are bombarded by nutrients born by the strong tides on both coasts feeding a multitude of species of anemones, soft and stony corals and invertebrate life. These organisms are surprisingly colourful and can give an almost tropical feel to many dives as one swims among gorgonian fan corals, Ross coral, cup corals and walls of brilliantly hued plumose and jewel anemones.

Fish life is profuse with shoals of bass and mackerel, reef dwelling wrasse, flatfish, blennies, scorpion fish, tope, sharks and occasional foreign visitors from warmer southern waters. Spring and early summer brings the basking sharks, which have been increasing number year by year, and in late summer groups of grey Atlantic trigger fish are common. If one is lucky, sun fish and even leather back turtles can be seen. The variety is almost endless and will keep a photographer or marine

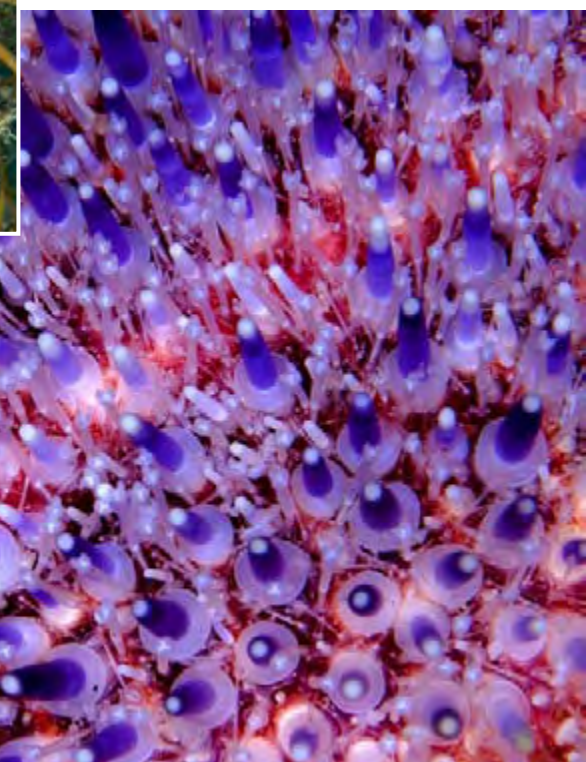
life enthusiast busy for months!

The South Western Approaches have been one of the world's busiest shipping lanes for hundreds of years, and Cornwall has been the first land-fall and the site of tragedy for many mariners. Armada ships, East Indiamen, liners, merchant convoy shipping from both World Wars have all met their fate along this coastline.

The two most infamous reefs, the Manacles and the Runnel Stone, located on the south coast are responsible for more than 200 recorded losses between them. There are literally hundreds of documented losses, with many still awaiting discovery either by chance or through dedicated research. Recent years have seen no less than three expeditions seeking the infamous *Merchant Royal*, the richest wreck in UK waters, lost in the deep somewhere between Lands End and the Scilly Isles.



Cornwall







The area is a wreck diver's paradise. There are many classic dives, which can be easily located with the help of many publications, or guidance from the local diving centres and clubs.

### Habitat variety

There are a variety of marine habitats to explore around this coastline, each of which has unique features to offer. On the south coast of the peninsula are the three lush river valleys of the Helford, Fowey and the Fal, which form the third largest natural deep water anchorage in the

## Cornwall

These river systems were 'drowned' at the end of the last ice age by a combination of sinking land and rising sea levels.

The Fal in particular offers quite dramatic profiles underwater from the shallow drowned flood plains to the remnants of the original river valley, which penetrates far inland and retains depths of up to 35m (110ft).

The industrial revolution and expansion early this century once threatened these habitats with careless waste disposal from copper and tin mining and china clay extraction. Fortunately, recent decades have propagated a more educated and enlightened appreciation of the damage caused by pollution. Now, strict controls and marine reserves have returned many areas to their former glory.

In the shallow waters of the Fal, Helford and Mounts Bay are the most northern concentrations of eel grass that is so common in Mediterranean. This habitat is an attractive breeding ground for all manner of marine life.

During the spring months, clusters of eggs will often be found at the base of the eel grass leaves left by fish, nudibranchs, squid and cuttlefish. In slightly deeper



waters, there are sweeping beds of maerl, a form of encrusting algae that forms little coral-like clusters.

The fauna of these maerl beds is very rich with many species of fish, crustaceans, worms and molluscs hiding amongst the delicate branches. In the upper reaches of the Fal estuary are thriving beds of wild oysters, which now can only be fished commercially by hand from licensed punts.

### Inshore reefs

The coastal topography varies dramatically from sheltered bays and coves to sheer cliffs that plunge straight into the sea. They have in common the same rich marine life, which inhabits both the littoral zone and the shallow reefs,



world. The tidal estuaries of these rivers are rich in marine life and are often teeming with juvenile fish.



CLOCKWISE FROM ABOVE: A diver jumps from a local dive boat; Traditional gaff rigged sailing boats are regularly seen around the coast; A topknot flat fish (*Zeugopterus punctatus*) is one of the stranger looking reef residents; The largest jellyfish found in Cornish waters is the Rhizostoma jellyfish (*Rhizostoma octopus*) which can appear in large numbers during the summer months; A diver gazes at a dense bed of jewels anemones (*Corynactis viridis*) on the Raglan's pinnacle in the Manacles Reef; A thornback ray (*Raja clavata*) rests on a gravel seabed







## Cornwall

dwells in deep water.

The surrounding shallow seabed is home to all sorts of bottom dwelling fish, crus-

are many coves where squadrons of juvenile and adult cuttlefish can be found shoaling together ranging in size from 5cm to 30cm all displaying their amazing camouflage skills.

### Offshore reefs

The geology of this area has produced many spectacular offshore reefs that rise steeply from the seabed, each one slightly different and offering often

and gullies to a depth of 10m. Whereas, on deeper reefs further offshore where waters are clearer, kelp can be found growing as deep as 18m (60ft).

The reefs are often dissected by deep cuts and gullies and steps and ledges, which are exciting to explore. Even in the shallows, where many rock faces are exposed to tidal current, filter feeding soft coral *Alcyonium digitatum* (locally known as Dead Men's Fingers), jewel anemones and sponges will all thrive.

These areas are home to many varieties of fish including Pollack, bass, ballan and corkwing wrasse, cheeky cuckoo wrasse, who peer right into your mask or camera port, and more unusual species such as red gurnard and red mullet. In late spring and early summer, you will find many species of fish tending their egg clusters. These are normally the males guarding the nursery for perhaps 3-4 weeks and include butter fish, shannies, tom pot blennies, corkwing wrasse and the weird looking lump-sucker, which normally

taceans, tube worms and anemones. In the spring and summer months, there



gullies and caves.

During the winter months, these inshore areas are often lashed by severe storms swept in from the Atlantic. But as spring arrives, the waters become calmer, and the annual cycle of life commences once more.

During the summer, the shallows are full of beds of boot lace, Jap weed

and lettuce sea weeds, which offer protection to juveniles, and so are a favourite hunting ground for small shoals of Pollack, grey mullet, and lone John Dory that prey on the newly hatched fish and plankton.

As with many other temperate sea areas, there are kelp forests to explore inshore. The kelp here does not reach the proportions of the giant species of the Californian coast, but it is equally prolific and provides a wide range of habitats amongst its fronds, stipes and hold-fasts.

The depth to which the kelp extends will vary with topography and water clarity. Generally, it clings to the top of the rocks



CLOCKWISE FROM ABOVE: The largest anemone is the Plumose (*Metridium senile*) which is found on exposed reefs where they feed in the strong currents; There are two species of soft coral in Cornish waters – these are 'Red Fingers' (*Alcyonium glomeratum*) that grow in large colonies wherever there is a tidal flow; The male cuckoo wrasse is perhaps the boldest on the reef. He will often approach within a few centimetres to challenge his reflection in your mask or camera port; The striking looking male Lumsucker (*Cyclopterus lumpus*) appears from deep water in early spring for a short time to tend his mate's eggs until they hatch; There are numerous quaint seaside cottages with equally quaint names to be found in the coastal villages





LEFT: The Tompot blenny (*Parablennius gattorugine*) has to be the cutest looking reef resident found on almost every shallow coastal reef; INSET CENTER: There are several species of plume and fan worms to be found on the reef. The detail of *Bispira volutacornis* makes an interesting macro shot

south, in an area that is open to Atlantic oceanic conditions, and so, there is often a deep and powerful swell running here (locally known as ground sea).

Planning to dive here means waiting for the best tides and weather conditions as even in good weather there can be a swell of 1-2m

to contend with, which can be felt as deep as 20m. Local knowledge is essential as the tides are vicious and sometimes unpredictable, and the weather can

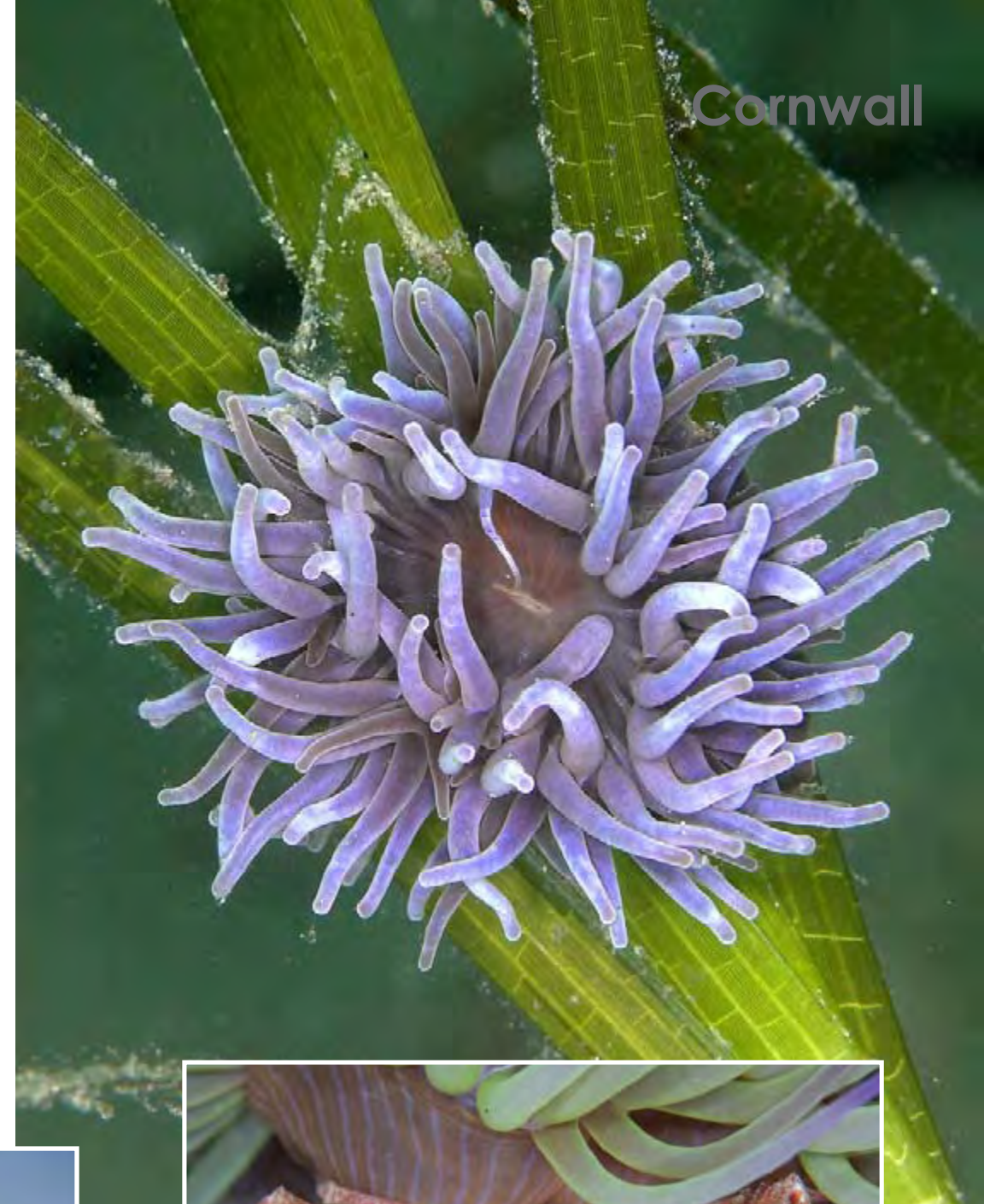
change very quickly. But under the right conditions, the Stone is one of the most spectacular dives in the area.

In this area close to Land's End, there are no river out-falls to upset the visibility, and the bright yellow heavy granite sand settles quickly after stormy

conditions. These ingredients and the swift currents are perfect for a dense proliferation of invertebrate marine life, which in turn attracts fish who enjoy the shelter the reef provides, whilst others are tidal feeders, or perhaps dwell in the sand.

Kelp sea weed is able to withstand the strong currents with their sturdy holdfast roots and growth can extend down to between 15 and 18 metres in places, due to the water

clarity, and in turn provides shelter and habitat for more sedentary marine life. Cowries, topshells, and clingfish are common on the kelp holdfasts, and there is normally an abundance of spider crabs and pipe fish picking their way amongst the kelp stypes. Several varie-



TOP RIGHT: Snakelock anemones (*Anemonia viridis*) will settle almost anywhere – here this juvenile clings to the blades of eel grass. ABOVE INSET: The tiny Leach's spider crab lives in symbiosis with the Snakelock anemone (*Anemonia viridis*) just like many tropical species. LEFT: The Cornish coastline is distinguished by the numerous deserted bays and coves with clear water – a great temptation to explore with a snorkel or SCUBA



challenging diving.

Close to the end of the peninsula, where Lands End reaches out into the often wild waters of the Atlantic, is the infamous Runnel Stone, which is reputed to have wrecked more than 27 ships. The Runnel Stone

used to break the surface until the last vessel to be wrecked here, the City of Westminster in 1923, struck and broke it away. The edge of the reef area is now marked by a buoy, within sight of Lands End and the Longships reef lighthouse to the





## Cornwall



LEFT TO RIGHT: The common lobster (*Homarus gammarus*) is unmistakable with its bright blue livery; The tiny squat lobster (*Galathea strigosa*) has a dazzling blue and orange colour pattern; The common prawn (*Palaemon serratus*) is almost completely transparent and is often found in large groups in cracks and crevices on the reef; The spider crab (*Maja squinado*) is found in a number of different habitats and will often climb the reef in search of food

on them, particularly in late spring, when they are reproducing. Remaining space on the rock surface is mostly occupied by soft corals (*Alcyonium digitatum* or Dead Men's Fingers), tunicates and masses of feather stars and brittle

shoals of mackerel, bass and pollock, which show little fear of divers.

In amongst the rocks of the Runnel Stone are the remains of the numerous wrecks, which, in some cases, are so close or overlapping, that it is difficult to tell when one is swimming from one wreck to another.

Finds include ship's fittings, cargo items and munitions—although these should be left well alone. British law dictates that any recovered items must be declared to the Receiver of Wrecks.

The visibility here is generally very good, with 20m not uncommon, and up to 30m on calm cold winter days. The plankton bloom in late spring/early summer will reduce this but will also bring



the possibility of an encounter with a massive basking shark or squadrons of huge *Rhysostoma* jelly fish.

Snorkelling with a huge basking shark is an awesome experience not to be missed, but divers need to get into training, as keeping up, particularly with a camera,



can be very hard work!

Diving is possible all year round, but naturally, winter diving can be more of a lottery due to the frequently stormy conditions. Summertime is therefore the best time to plan a diving expedition when the weather is more predictable, but winter diving can

produce some amazing visibility and balmy conditions between the storms. The season also has an effect on the water temperature, with the coldest months being February and March after the sea has cooled during the autumn and winter. Underwater temperatures can range from 14-16°C

ties of sponge are common, and the first signs of jewel and daisy anemones can be found in as little as three metres of depth.

Below the kelp line, there are swathes of pastel-hued plumose anemones extended to sift nutrients from the current. In amongst them are daisy and dahlia anemones and fields of jewel anemones in almost every colour one can imagine—from vivid yellows to deep purples, reds and oranges. These are interspersed with clusters of delicate pink oaten pipe hydroids reaching out to grasp nutrients from the current.

Inspecting these hydroids closely often reveals two or three species of nudibranch feeding

stars.

Exploring the shallow walls at the reef top reveals numerous nooks, crannies and ledges that are home to crabs, squat lobsters, prawns blennies and shannies, most of which are both inquisitive and co-operative for the camera. It is sometimes difficult to pick the best photographic tool, as there are so many macro and wide angle subjects—the image opportunities are endless. Inshore reef species are also seen in the shallows—scorpion fish and the Corkwing wrasse, which can be found busy building its nest in the kelp early in the summer. It is common to encounter large





Almost every beach has a fringing reef which is easily explored with basic snorkeling equipment. LEFT: The tiny jewel anemone (*Corynactis viridis*) is one of the most colourful species on the reef and a great macro subject. RIGHT INSET: The spiny starfish (*Marthasterias glacialis*) has an intricate pattern and texture when viewed in close up

during the summer, although surface temperatures often reach 20-22°C, to a chillier 8-10°C during the coldest winter months.

**Be safe, get local advice**

Cornwall's waters offer so much to the visiting diver but should be treated with respect even on high summer days when the water may resemble a sheet of

can change quickly, especially on the north coast and towards Land's End. Dives should not be planned without complete details of tides and weather forecasts and the benefit of local advice, which is freely available from the Coast Guard and the diving centres, in order to keep one's visit memorable for the right reasons. Alternatively, you can choose to dive with one of the many day boats, or live aboard boats, which operate within this area, and leave the planning to a skipper who deals with these waters on a daily basis.



LEFT: This species of cowrie (*Simnia patula*) is only found on the gorgonian *Enicella verrucosa* on deep water reefs and is very difficult to find due to its camouflage; RIGHT INSET: This tiny juvenile hermit crab (*Pagurus bernhardus*) is walking the tightrope of a single blade of eel grass

glass. Sadly, there have been a number of diver fatalities here, and many could have been avoided with a little forward planning and local knowledge.

The tides can be very strong in many areas, and the weather

**History**

The name "Cornwall" originates from two words in the Cornish language: *Cornovii*, meaning hill dwellers, and *Waelas*, meaning strangers. This language arrived with the Celts from Europe



ABOVE: When you are not diving make sure to take some time to explore the attractive coastal villages and hamlets. BELOW: There are several species of scorpion fish to be found on the reefs. This one is the long spined sea scorpion (*Taurulus bubalis*)

around 1000 BC, and its use gradually declined until the late 1890s, when English became the dominant language. There are various groups who strive to preserve the language for future generations.

Although referred to as a county in England, Cornwall is in fact a Duchy, which is a territory ruled by a Duke. The first Duke of Cornwall was Edward, the Black Prince, son of Edward III. The current Duke of Cornwall is Prince Charles. During the Middle Ages there was a succession of rebellions and even an invasion by the Spanish at Mounts Bay in 1595. During the Civil War of the 1600s, there were several major battles fought in Cornwall. Thereafter, life became relatively peaceful.

The area was largely agricul-







ABOVE: A diver photographs a group of snakelock anemones (*Anemonia viridis*) on a reef in Falmouth Bay. RIGHT: Map of the county of Cornwall, United Kingdom. TOP RIGHT: Some villages and hamlets are right on the water's edge and still support communities of fishermen, although tourism is now the mainstay of the Cornish economy

# Cornwall

tural, with some mining for copper and tin dating back to ancient Roman times. Cornwall played a big part in the industrial revolution in the 1700s and 1800s. Several revolutionary steam engines were developed for the mining industry by Cornishmen. This led to Cornwall being one of the world's largest suppliers of tin world wide for more than 100 years.

Mining began a decline by the middle of the 20th century and virtually stopped in the 1980s, although there are still attempts to revive some mines as the price of tin and copper increase on world markets.

## Myth & legend

There are many myths and legends interwoven into the history of the area. Certainly, the Cornish believe that King Arthur and his knights of the round table were Cornishmen. This story is centred on the remains of the castle at Tintagel, and all the places in the legend of King Arthur are to be found here, from where he was



Some parts of the rugged coastline are only accessible by boat for diving but make spectacular views on coastal walks. The Cornish coastline is littered with numerous shipwrecks driven ashore during winter gales. The Tater Du light house warns shipping of the treacherous Bucks Reef close to Lamorna Cove

born to where he had his last battle, and even where he obtained the sword, Excalibur, from the anvil to the lake where it was returned.

One of the remaining industries

of Cornwall has been commercial fishing, but this is now also in decline due to over fishing throughout Europe and the strict EU catch quotas. So now Cornwall has little industry,

but it has its spectacular scenery and the best climate in the UK. Therefore, tourism is now the mainstay of the Cornish economy. ■





# Pascal Bernabé

**A conversation with technical diver and depth record breaker, Pascal Bernabé.**

*Pascal Bernabé has just held a press conference at the Moscow dive show answering questions from an enthusiastic audience about his 330 meter record dive. The soft spoken Frenchman seems relieved to slip out of the uncomfortable limelight on the stage. Having escaped the massive attention for a while, he grabs a chair beside me, and we begin to converse about the meaning of it all.*

*Why do you dive so deep? Is it for seeking adventure, exploration, or developing equipment?*

Actually, it is about all of those good reasons. Above all, I am a cave and wreck explorer, and it was because of the caves that I started diving deeper and deeper. I also happened to work as a safety

diver for the free dive champions, Pipin Ferraras and Audrey Mestre, so there are several factors behind it. It was also a matter of pushing the frontiers. It was exciting to go places where nobody had ever been before. It wasn't out of competitive reasons, in order to be the best, go the deepest, or anything like that. I did it just for my own sake.

*For the exploration?*  
Yes, and for fun—although that record dive did not leave all that much room for having fun—and to be the only one, besides commercial or military divers, that has ventured that deep on scuba.

*But working as a safety diver for Pipin Ferraras and Audrey Mestre is something completely different.*

This goes back a while. The deepest free dives at that time were Pipin's and Mestre's dives to 170m. It took place off Cabo san Lucas in Mexico. But

even before that event, we were working together while they trained for the record attempt. For a cave diver like me, it was something very new and different and also kind of a dream coming true because of the cult movie, *The Big Blue*. Before I went to see that movie, I had never dived. But after I watched it, I wanted to experience the same sensations and kinds of challenges. I then got to meet Pipin, and we developed a very good relationship that has lasted to this day.

*So, it was a mix of sport and challenge?*

You can say that, and it was very different from cave diving. Once, I was also a coal diver in Tunisia. So, I have had a lot of different experiences. But a core issue has always been that I never wanted to be a Kamikaze diver either. I tried to make the deepest parts, where the diver is subjected to HPNS and everything, the safest

# A *talk with* Cool Teacher

Text edited by Peter Symes  
Photos courtesy of Pascal Bernabé  
Peter Symes and Andrey Bizyukin



# profile



*there is like a third of a kilometre back to the surface”?*

My first sensation was fear. This is normal experience also on cave dives. I naturally also had some stress before the dive, but soon all these emotions get replaced by concentration. However, when, on the bottom, one of my instruments, imploded, the fear came rushing back, because I became afraid that I was about to suffer an accident. Aside from that, you become very focused on what is at stake. I did have a few tremors during the dive, but it wasn't much.

possible. I brought lots of gas, much more than was really necessary. I did rapid descents, but very slow ascents. For my first deep dives, I brought an incredible amount of tanks.

*What do you perceive when you are down there? Do you feel clear in your head? Do you perceive that you are 330 meters down and go, “Oh,*

*How do you mentally prepare to go so deep?*



X-RAY MAG's Russian editor, Andrey Byzuikin, assists Pascal Bernabe with translations during the Russian dive expo



## Bernabé

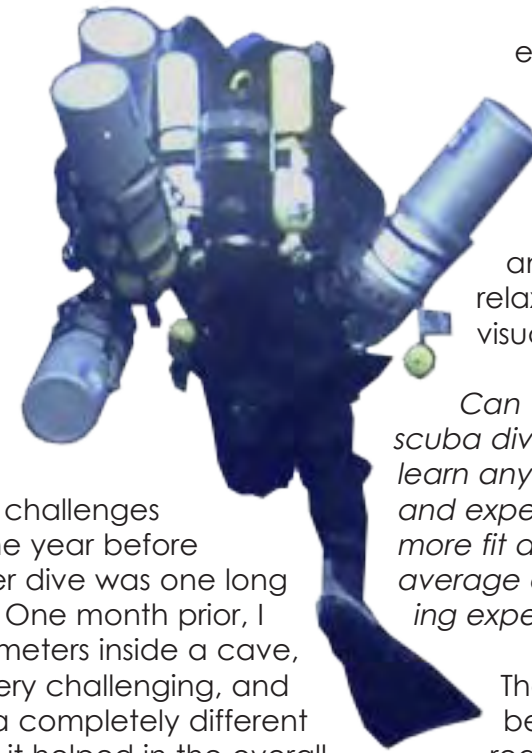
### Who are Francisco “Pipin” Ferreras & Andrey Mestre?

Ferreras was born on the northern coast of Cuba, and began to practice free-diving at the age of five. “Pipin” was his nickname from childhood. Little is known about Ferreras' life in Cuba before his freediving career. From the late 1980s and onward, he made a name for himself in the so-called “no-limits” discipline of freediving where he established his first known world record of 112 meters (367 feet) depth in November 1989. Shortly hereafter, he defected to Italy and later migrated to Florida, United States. Through the 1990s, he established a long series of world records, often in close rivalry with Italian Umberto Pelizzari.

In 1996, he met French-born Mexican-national Audrey Mestre who turned out to be a natural freediver herself. In 1999, they married, and quickly the two became a regular record-breaking couple in the sport of freediving, dividing men and women's records between them.

On 12 October 2002, Mestre died in an attempt to break the no-limits world record (this attempt was a bid to break both the men's and women's record) in a setup that was widely criticized within freediving circles. Much of the criticism went to Ferreras who had organized all of his and Mestre's record attempts for years. ■

SOURCE: WIKIPEDIA



equipment and plenty of tanks. It should also be mentioned that I keep fit through a lot of physical exercising like running, biking and swimming. I also use relaxation techniques and visualisations.

*Can ‘normal’ recreational scuba divers and holiday makers learn anything from your insights and experiences. Would being more fit and eating right give the average diver a much better diving experience do you think?*

The idea should always be to make every dive, regardless of depth, the safest and best possible experience by all possible means. Every dive comes with some level of risk. So, be fit and use the best possible equipment you can afford. In my case, I applied these principles to move my limits. But, in essence, there is no difference.

It depends on the type of dive and what kind of challenges lie ahead. The year before the 330 meter dive was one long preparation. One month prior, I went to 150 meters inside a cave, which was very challenging, and while it was a completely different type of dive, it helped in the overall mental training.

*So, it is essentially all your training and getting acquainted with your equipment that instills confidence before a deep dive?*

I also try to get the best possible



X-RAY MAG's publisher Peter Symes with Pascal Bernabe





# profile

All dives should be made as safe as possible.

*What other knowledge do we gain from deep dives? Do we learn something new about physiology or technology?*

The circumstances of a dive seem to change significantly around the 250 meter mark. Down to this, everything usually feels okay to me.

*Is there something like a barrier at that particular depth? And why 250m?*

At this point, there is a huge increase in the amount of equipment needed. Even if you dive rebreathers, also if you have a double rebreather, it is my opinion that you also need open circuit. At these extreme depths, the breathing performance of rebreathers can be quite poor.

*They get hard to breathe?*

You might recall the sad accident that happened to David Shaw in the cave of Boesmangat in South Africa a couple of years ago (see X-RAY MAG issue and the YouTube video on our X-RAY MAG website). This was a tragic example,



but we really don't have so many options to choose from. At a certain depth, you just need so many tanks. Also HPNS starts to become an issue, which you will then have to find ways to manage. I have also taken a closer look into dive profiles and experiences of other deep divers such as the late John Bennett, Jim Bowden, etc., and from the logged stats. It seemed to me, once dives went past the 250m mark, the

## Bernabé

occurrences of problems and cases of DCI seemed to spike.

*So, pretty much all the factors, from equipment, physiology, mental aspects, seem to change at that same point?*

Yes. It does not feel extreme until 220-230 meters. But after that, you have the sensation of pushing limits in every aspect and being in a game of Russian Roulette.

*How do you feel after such an experience? Do you get the sense of having achieved or conquered something?* It is funny, because after all my biggest cave dives, I just felt happy. During the decompression stages, I felt elated and relieved of stress. However, after the getting out of the water, I would also feel exhausted, have headaches and feel a bit empty. As a cave explorer, your purpose is not to break records, so when someone tells me that the record dive was sort of a stupid thing to do, I can understand where that comes from. I am actu-

ally not quite sure myself as to why I wanted to make that dive. It was only much later that I started appreciating the dive more, and that was for a number of other reasons, too. It helped in getting sponsors, which is not very easy to get when you are a cave diver, as many sponsors do not want to get into that area. Having set that record has given me new opportunities, for example, to do master classes and get equipment for my next projects.

*What would you want to do with fame, now that you got the recognition?*

Pretty much the same. Explore caves and wrecks. There are some



### What's HPNS?

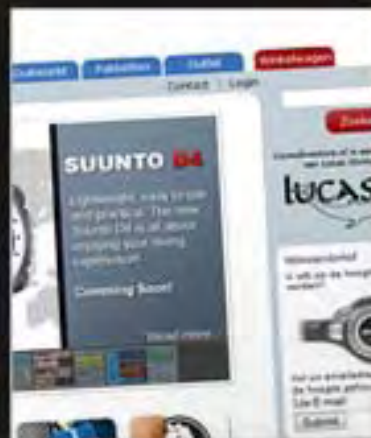
High pressure nervous syndrome (HPNS) is a neurological disturbance that may result from breathing a high-pressure mixture of helium and oxygen—such as trimix or heliox—under high pressure for an extended amount of time, putting a physiological limit on deep technical dives.

"Helium tremors" were first described in the early 1960's by among others, Royal Navy physiologist, Peter B. Bennett, who later founded the Divers Alert Network. The term high pressure nervous syndrome was first used by Brauer to describe the combined symptoms of tremors, electroencephalography (EEG) changes, and somnolence that appeared during a 1,189 foot chamber dive in Marseilles.

Symptoms of HPNS include tremors, visual disturbances, nausea and dizziness, and decreased mental performance. It is not likely that HPNS can be prevented entirely, but there are effective methods to delay or change the development of the symptoms. Slow rates of compression, or adding stops on the ascent, have been found to prevent large initial decrements in performance. Also, the levels of nitrogen or hydrogen in the gas mix seem to play a role in preventing the onset of HPNS. The susceptibility of divers to HPNS depends on the individual. ■







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7442 CX, Nijverdal



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Tel: 0031 548 615106  
Fax: 0031 548 611769

www.lucasdivestore.com

## Bernabé

good wrecks in the Mediterranean that I can now explore, since I have now found a sponsor for a rebreather and other equipment. I like caves the most, but I would also like to explore the wreck of *Kirk Pride* that rests at a depth 238 meters off Grand Cayman. It is deep, but the conditions there a good. It will, however, require a lot of equipment. I also want to do a number of projects with Jim Bowden, the deepest cave diver and dive legend.

*How do you define which risk levels are acceptable, and how do you manage risks?*

I am not sure, that just because you dive deeper or penetrate further into a cave, that your risks are necessarily greater, or you are forced to accept higher risks. I have had friends that died unnecessarily, because they did quite stupid dives. They didn't have to die. If you take a closer look at some of the decompression software that is around, you will see that you can choose conservatism and risk levels for i.e DCI. You can't completely remove all risk, but you can minimize it to an acceptably low level. So, you have to put some thought



The movie, *Big Blue* (1988) by French director Luc Besson, has inspired a lot of divers. While it became a cult movie Europe, the film was a commercial failure in North America

bringing backups. Experience, good planning, and organisation are also essential contributions towards reducing risk.

Make sure that you exercise enough. That does not necessarily mean twice a day, but at least make sure you have the sufficient fitness for the dives you plan to do.

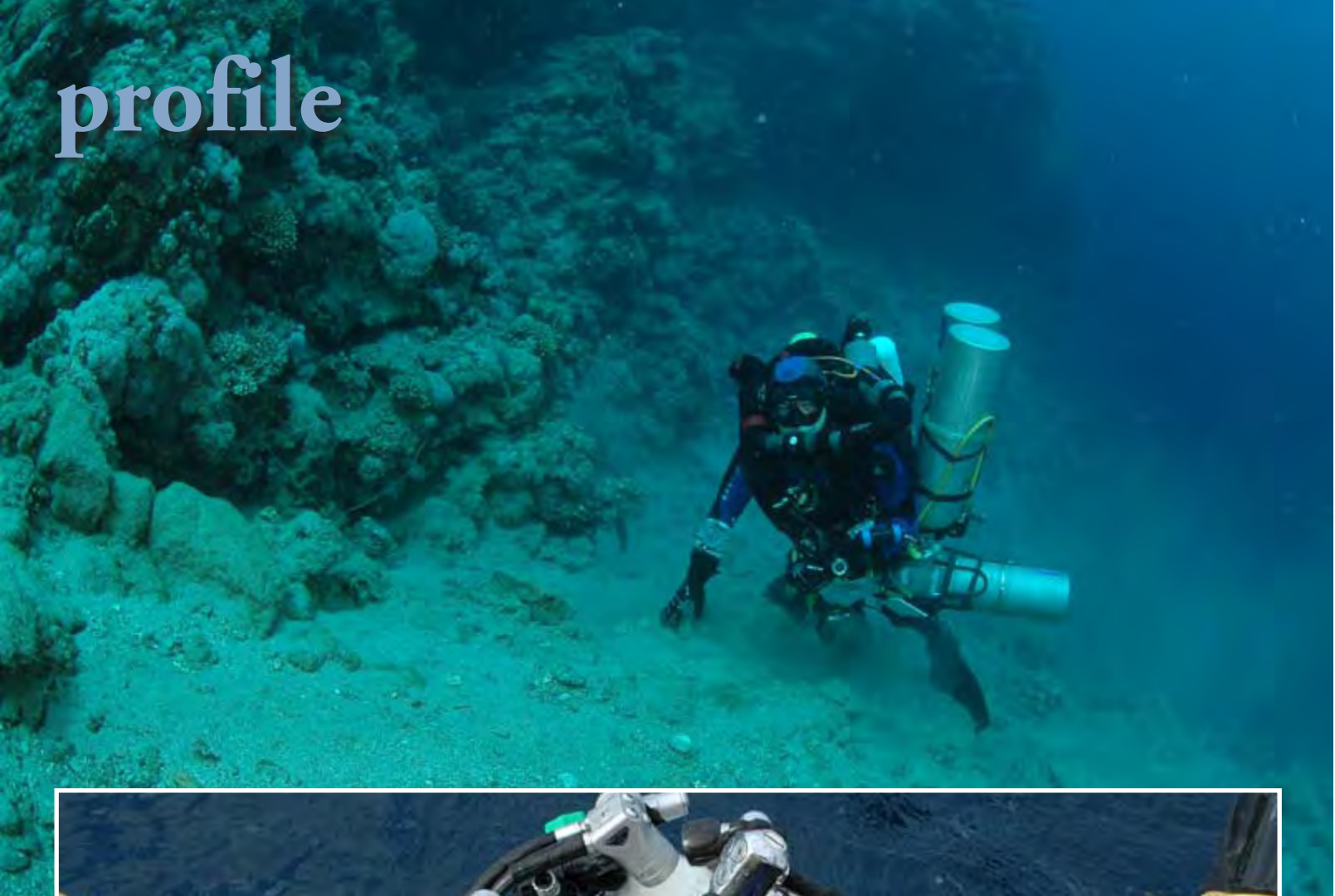
*What are the best experiences diving has given you?*

I have many good ones, in many different areas—especially with cave diving. It is not the biggest dive projects, but the ones where everything just works perfectly. Discovering a 50 or 100 meter gallery in a virgin cave ranks up there. After such an experience, I

into it and make some choices. You can go on an extreme dive and experience no problems, and then have an accident on a shallow dive just because you didn't think.

As regards to equipment, it can fail, but you reduce risk by





can walk on clouds for a couple of months. I also appreciate all the great people that I have met through diving, and the friendships I have made. I value the conversations we have had and the opinions I have heard. The coral diving I did in Tunisia was in a place where there was nobody else around, and the underwater mountains there were of magnificent beauty. Diving with Pipin and Audrey was also special. I like people.

is not a sport where one should push at all. It is about enjoyment and having a good time.

mal recreational dives not going under 40m. We had a marvellous time, where we relaxed and were able to enjoy a couple of beers in the company of good friends after the dives.

My general advice to all divers is to enjoy the experiences that diving can give you and don't make matters too complicated or serious. Last year, I spent time with my team doing a series of nor-

Enjoy it! ■

Pascal Bernabés latest title—so far, just in French

*So, you like teaching, too?*

My main profession is actually being a primary school teacher. So, yes, I like it. I like teaching cave diving, too. There is nothing like seeing the happy expressions on the faces of your students after they have completed a cave dive.

*What do you tell your pupils in the school where you teach? Do you tell them about all your exploits and adventures?*

They know already. They bring me magazine articles about it. But they are very natural about it. I can sense a little admiration, but they also make jokes about it.

*It must be a cool thing to have a teacher who is a famous diver and record breaker. Do you encourage the kids to take up diving?*

Not at all. They are too young and will have to arrive at making their own decision and only much later. I have an 11-year-old daughter myself. She has tried diving a couple of times, and if she wants to pursue it, it's up to her. I don't want to push her. It





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POINT & CLICK  
ON BOLD LINKS



# Equipment

Fresheezze



Edited by  
Arnold Weisz

## Pinnacle Aquatics Evolution 2 drysuit

Pinnacle Aquatics front-entry Evolution 2 drysuit is now available in both male and female sizes. Previously only available in unisex sizes, the "Evo 2" now comes in

stock sizes. Pinnacle also continues to build all of its drysuits in custom sizes for those who do not fit into one of the 29 standard sizes. Standard features are 220-gram German Cordura, heavy-duty latex wrist and neck seals, a neoprene beck warmer, protective zipper flap, two thigh pockets with elastic lanyards, a drysuit bag, a 7 mm drysuit hood, suspenders, an inflator hose, and the diver's choice of neoprene socks or vulcanized rubber boots. Additional options are also available.

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



## IST ProEar Mask

Difficulty in equalizing and ear infection are problems that can happen to anyone regardless of their diving experience and may potentially stop one from diving. IST ProEar Mask has designed a mask to counter the terrible effects pressure and water have on your ears and bring you more enjoyment underwater. [www.istsports.com](http://www.istsports.com)



## Dive Containers

The Kiwi product, the Dive Container, has been designed to enable divers to carry communications equipment with them on the dive, so if they drift away from the boat, or there is some other emergency, they can contact help.

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



## Technisub Marina mask

The Marina is characterised by a structure that makes it possible to insert the mask lenses into the ocular orbit thereby obtaining a compact internal volume. The "double joint" buckles (cardan joint buckles) rotate up and down, inwards and outwards. A quick counterposed push button activation allows for simple and easy use even when wearing gloves. [www.technisub.com](http://www.technisub.com)

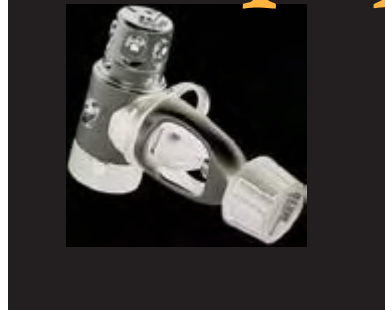
## Frog Colbalt BCD

This South African manufacturer has a variety of diving equipment. Their Colbalt BCD as made of heavy duty 1000 denier bladder material and 1680 denier nylon non-fade outer. The BCD also features; two 2.3 kg / 5 lbs rear pockets, two integrated dumpable weight pockets holding up to 4.5 kg / 11 lbs each, two large, self-draining expandable side pockets, fully adjustable cummerbund, reinforced integral backplate with comfort padding on the inside and three dump valves. To see more details, visit: [www.frog.fm](http://www.frog.fm)





# equipment



## H2Odyssey Pulsar

The Pulsar is an environmentally sealed, balanced diaphragm first stage that is made to thread into any standard tank, from 4 cu ft to 120 cu ft. This design eliminates the need for a tank valve, thus reducing the bulk, weight, and one possible point of failure for your redundant air system. The Pulsar features 2 HP ports and 4LP ports and an easy grip on/off valve. It is used in their EAS3 hand off system with a 6 cu ft bottle, or mounted RAS 3 system that utilizes any size tank you desire. Options include an easily seen mini pressure gauge, with or w/out mini SPG hose; quick disconnect hoses for LP and HP, and it can be filled via YOKE, DIN, or STATION fillers.

[www.h2odyssey.com](http://www.h2odyssey.com)



## Dive Rite Thigh Pocket

These pockets include daisy chain webbing on the external pocket for clipping Z-knives, trauma shears or any tool that you need in easy reach.

The Thigh Pocket includes a leg band made of a proprietary material used in bandages. The material holds up to salt water and dries quickly, plus silicone strips placed on the inside of the band grip your exposure suit and keep the leg band in place. At 4-inches in width (10 cm), the new leg band will be comfortable and secure. The pocket is attached via a buckle on the waist belt, allowing a diver to don or doff the thigh pocket without having to unbuckle the waist belt and slide the pocket off.

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



## Mares Pegasus

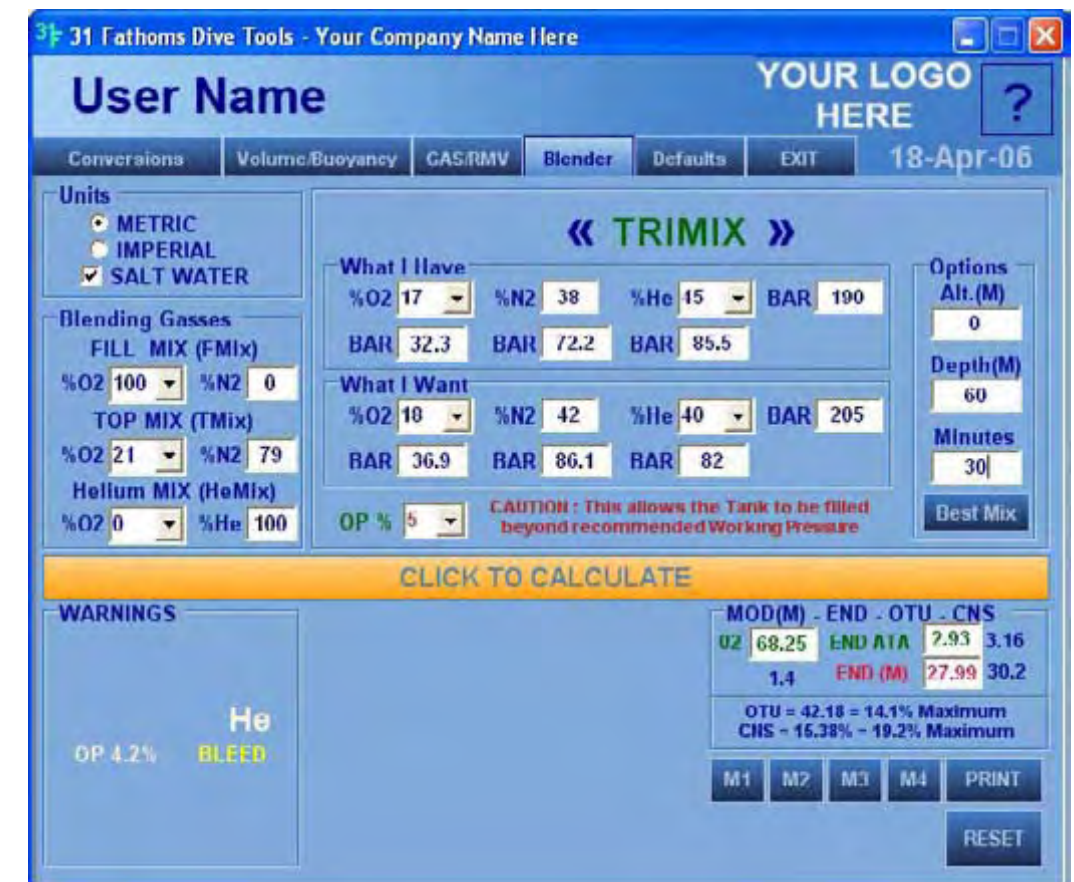
The new Mares Pegasus is a light-weight, (7lbs, 7oz) durable, full feature BCD. The Pegasus back mounted bladder offers a lift capacity of (45 lbs). Additional features include Mares MRS Plus weight release system, pre-shaped shoulder straps and dual position adjustable chest straps, removable double crotch strap for added stability, knife attachment grommets, roll-up zippered pocket, two heavy duty techno polymer D-rings, and a dual position hose clip, to secure equipment and accessories.

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

## 31 Fathoms Dive Tools

Dive Tools is a utility software program for new and experienced divers. It provides a basic set of mathematical dive tools. Planning a dive will be easier with tools for Unit Conversions, Volume/Buoyancy calculations, GAS/RMV Calculations and a binary/trimix GAS Blender. 31 Fathoms will not be selling or distributing Dive Tools directly to the consumer. Instead, 31 Fathoms will private label the product to qualified individual dive shops for free distribution to the consumer.

[www.31fathoms.com](http://www.31fathoms.com)







**Lucasdivestore.com**  
one site for all your divefun



ecology



# Why is the head shaped like that?

Text by Peter Symes  
Photos by Wolfgang Leander



**Why the peculiar head shape of the hammerhead shark developed as it did has been the subject of much speculation. Few other morphological oddities have inspired so many fanciful and sensible theories about its function as the weirdly shaped head that characterises the hammerhead shark. Recent experimental**

**evidence supports some ideas and refutes others, while pointing to a previously unsuspected role for this peculiar feature.**

All nine known species of hammerhead sharks have a projection on each side of the head that gives it a resemblance to a flattened hammer with the eyes and nostrils of the shark being positioned at the tips of the extensions. The persistence of this unique head shape, which has been termed the cephalofoil in recognition of its wing-like ap-

## Hammerheads

pearance over the past 20-25 million years and its presence in several hammerhead shark species of diverse head morphologies, tell of its evolutionary success. Several hypotheses are proposed to explain the evolution of the cephalofoil, but few have been empirically tested.

There are two main lines of thought about the function of this peculiar feature. One advocates that it improves sensory perception, the other that it provides the shark with hydrodynamic advantages such as extra lift or maneuverability.



### Supersenses

Hammerheads are aggressive predators but have disproportionately small mouths and seem to do a lot of bottom-hunting for fish, rays, cephalopods, and crustaceans. A favorite meal of the hammerheads is the stingray.

The sensory hypotheses focus on the advantages of widely spaced eyes for enhanced binocular vision,

nostrils for better tracking of odours and more precise detection of the electric currents generated by potential prey. Sharks are equipped electrically sensitive organs on their heads known as ampullae of Lorenzine. These ampullae, which appear as hundreds of minute dark pores in the skin, enable the animal to detect the minute electrical fields produced by

*Hammerheads can hear sounds in the entire range we can. But their specialty is low frequency vibrations like those made by a wounded fish. A hammerhead's ear also contains canals used for balance and motion detection.*

Hammerhead sharks are found in warmer waters along coastlines and continental shelves. They can also be spotted in the Gulf of Mexico along the Western coast of Florida. They are often caught by fisherman. However, they are released back into the wild, as they are protected species. They are also known to form schools during the day, sometimes in groups of over 100. In the evening, like other sharks, they become solitary hunters.

Hammerheads come in many widths and shapes. The winghead shark (*Eusphyra blochii*), which lives in

the western Pacific and Indian oceans, looks like the letter T when viewed from above, its head nearly half as wide as the body is long. The bonnethead shark (*Sphyrna tiburo*), common throughout the Western Hemisphere's warm waters, has a relatively modest foil, less than five inches across. A phylogenetic tree based on comparisons of DNA from different species indicates that the cephalofoil is shrinking (evolutionarily speaking); the wingspans of more ancient hammerhead species are much larger than those of more recent additions to the family. ■



SU NEKO



## Schools

Unlike any other sharks, hammerheads form schools. These schools can contain hundreds of individuals, with the largest known schools containing as many as 500. The reason why hammerheads school and other sharks do not is unknown. Hammerheads only school during the day. They break up at night to do their feeding. Because the schools contain mainly small to medium sized hammerheads, it is believed that they school to reduce the risk of predation from larger sharks. It is also believed that an order of dominance exists in the schools based on age, size and sex.

## Communication

Scientists know of nine different communications in hammerhead sharks. One such communication is when a large female hammerhead in the center of a school shakes her head violently back and forth. This motion sends out pulses in the water that smaller females respond to by swimming to the outside of the school. Scientists believe large females do this for mating. When the smaller females are forced to the outer edges of the school, the large female becomes the center of attention for males.

muscles in prey that have perhaps burrowed under the sand of the seabed.

Hammerheads can sweep for prey more effectively. By distributing the receptors over a wider area—across the flat and broad heads—the search area for this electrosensory capability is maximized thereby increasing the opportunity to detect food sources.

The resemblance of the cephalofoil to a metal detector springs to mind. To maintain a comparable spatial resolution of small, prey-generated electric fields there is a corresponding increase in the number of electrosensory pores over the wider head area.

These sharks have been able to

detect an electrical signal of half a billionth of a volt. The sharks can even discern between the two kinds of electric fields: the DC field that results from the osmotic potential between the prey's body tissue and seawater, and the AC fields generated by the contraction of the prey's muscles.

The hammer-shaped head also gives these sharks larger nasal tracts, increasing the chance of finding a particle in the water by at least ten times the ability of other 'classical' sharks.

## Hydrodynamics

The hydrodynamic hypotheses about the cephalofoil ('head-wing') is based on the observation that hammerheads are able to make exceptionally fast turns when pursuing prey or fleeing from danger. The idea is that when a hammerhead changes direction, it can tilt its big winglike head, which is far forward of its center of gravity, and so exert a huge turning force on the body. The same concept is known from aeronautics

where the latest generation of hyper manoeuvrable fighter jets are equipped with small wings, canards, at the front.

However, it was found that it was the special design of its vertebrae that enabled it to make the sharp turns rather than its head. But as a wing, the hammer could also provide lift, and hammerheads are one of the most negatively buoyant of sharks.

## Experiments

Stephen M. Kajiura from UCLA designed an elegant set of ex-

periments to simultaneously test the sensory and hydrodynamic significance of the cephalofoil. In large, screened-in pens, Kajiura compared the ability of scalloped hammerhead to sandbar sharks (which have blunt noses) to perceive an electric field and videotaped them as they interacted with simulated prey made up of pairs of electrodes set in a large, clear acrylic sheet.

When Kajiura activated one of the electrode pairs, the hungry young sharks immediately turned toward it, swam rapidly around it, and bit the acrylic surface. His observations confirmed the conventional wisdom among shark watchers: that hammerheads

turn more quickly and make sharp turns more often than reef sharks do. The hammerheads also sensed the electric field 50 percent farther away than could sandbar sharks of the same size.

Kajiura's experiments also documented that the hammerheads do not roll their heads to turn, negating the possibility that the cephalofoil acts as a steering wing and ruling out essential parts of the hydrodynamic hypothesis.

Through analysis of video footage of the sharks swimming straight and turning, it was apparent that the sharks stayed perfectly level, as if they were turning on rails. In retrospect, that finding is not surprising.







The European Typhoon fighter is equipped with canard wings in the front to improve maneuverability

**Area of head + area of pectoral fins = constant?**

It has been noted that the species with larger heads have smaller pectoral fins, while those with small heads in relation to body size have bigger pectoral fins.



*Hammerheads are notably one of the only creatures in the animal kingdom to acquire a tan from prolonged exposure to sunlight, a feature shared by pigs and humans. Tanning occurs when a hammerhead is in shallow waters or close to the surface for long periods.*

During a turn, a shark tries to maintain an electrical picture of the prey. If the shark tilted its head, its reception of the electric signal on one side would sharply decline. By holding its head steady, the shark can more effectively keep its senses focused on the object of its desires—whether that's a nutritious fish buried in the sand or an inedible electrode.

The findings demonstrate that while hammerhead sharks are more flexible than carcharhinids—show a greater propensity for executing sharp turns, and maintain a higher speed through the turn—this flexibility seems due to the cross sectional shape of their vertebrae.

**Another explanation**

But perhaps the head still has a role, although a different one,

in hydrodynamics. The width and winglike shape of the cephalofoil help stabilize the body as the shark turns, twisting the head in the opposite direction from the torque generated by shark's beating tail.

As the shark turns, the outside wing of its head travels faster than the inside wing. Because the lift of a wing is proportional to its speed, the outside wing also develops more lift than the inside wing. That lift tends to roll the shark, so that its belly is oriented toward the outside of the turn.

The upper lobe of the shark's tail, however, is larger than the lower lobe. Thus, as the tail beats harder to one side (to effect the turn), the first dorsal fin feels the more powerful push of the upper lobe and so tends to roll towards the outside as well. The two op-

posite effects could cancel each other out, leading to increased stability in the turn. The net result is that even though hammerheads do turn heads, they do not turn with their heads.

The two hammerhead species examined exhibited different strategies for high-speed turns: bonnethead sharks use their pectoral fins to steer, whereas scalloped

hammerheads use their greater flexibility to power through the turn.

However, the results do not present a complete picture of biologically relevant maneuverability. For example, stopping ability, and carrying velocity through a turn are also mobility related parameters that were not assessed in Stephen M. Kajiura examinations,

though they obviously have biological relevance too.

A finer scale study of the flow regimes around the shark's planing surfaces has the potential to unravel the specific morphological features that are vital for agile swimming. ■





# whale tales

Edited by Peter & Gunild Symes

## Beaked Whales Listen With Their Throats

A new pathway for sound entering the head and ears in beaked whales has been found by researchers from San Diego State University and the University of California. It was previously thought that noise vibrations travelled up the thin bony walls of the lower jaws of toothed whales and onto a body of fat near the ear complex. But this research shows that this is not the case, that the noise vibrations actually enter through the throat and travel along a fatty channel to reach the bony ear complex.

Researchers used computer models to copy the effects of underwater noise on this unusual whale species. Improvements in Finite Element Modelling (FEM), Computed tomography (CT) scanning, and computer processing have made the simulation of environment, sonar and its effects on Cuvier's beaked whale anatomy possible. It is hoped that the study, which was published in *Bioinspiration and Biomimetics* 3, 1 in March, 2008, will be a catalyst for future research that could shed some light and possibly end speculation on the effects of underwater sound on marine mammals. ■

SOURCE: SCIENCEDAILY



PHOTO COURTESY OF NATACHA AGUILAR, UNIVERSITY OF LA LAGUNA

## Look who's talking now: humpback calves?

New research has shown that the calves of humpback whales make sounds. In a study conducted by the nonprofit group, Cetos Research Organization, in waters off Hawaii, scientists have for the first time identified the source of the grunts and squeals emitted from pods, which has eluded researchers prior to this investigation. According to the study, the sounds come from the young humpbacks-- both male and female-- calling to their mothers. The sounds may be expressions of curiosity or warnings of potential danger. ■ SOURCE: ASSOCIATED PRESS

## Whale Deaths May Be Linked to Exposure to Intense Underwater Sound

More and more evidence collected by the NOAA Fisheries Service suggests that stranding and death of certain marine mammals may be linked to exposure to intense underwater sound in particular settings. Two types of beaked whales, Cuvier's beaked whale (*Ziphius cavirostris*) and the genus *Mesoplodon* have shown to be affected by mid-frequency active military sonar, which may be leading to the strandings of individuals from these groups. However, there is insufficient information available to pin-point whether other species are at risk and whether other signals pose similar risks as those emitted during active sonar exercises.

A current multi-phase field research project is conducting Behavioral Response Studies to assess the connection between various underwater sounds and the strandings of marine mammals, including beaked whales and odontocetes. The goal of the study is to find out what the start of the chain of events is that leads to atypical mass strandings of whales in order to figure out a safe response, which can be used to indicate risk. ■

SOURCE: SCIENCEDAILY/NOAA  
CLOCKWISE FROM LEFT: Beaked, Grey and Minke whales

# For oil and gas, Britain flouts own advisors' warnings on whale extinction

A three-year cover-up by British government involving oil and gas drilling and the risk of grey whale extinction has been revealed. The government fought to suppress deeply embarrassing documents, which show that the British government's powerful export credits and guarantees department (ECGD) agreed to bankroll controversial drilling for oil and gas off Sakhalin Island in the far east of Russia, disregarding warnings from its own advisors under the Foreign Office and the Department for Environment, Food and Rural Affairs (Defra) of the "potentially devastating effects" on the few remaining western grey whales left in the world.

Thanks to the Freedom of Information Act and an inquiry led by Friends of the Earth, the documents were finally released after a High Court ruling. However, the damage

has already been done as the drilling project to exploit "world-class oil and gas province" off the island is nearing completion. Sakhalin Energy



USFG

Investment Company, in which Shell has a major share, benefited from the government's backing of the \$20bn (£10bn) project.

The grey whales are one of the most critically endangered species of

marine mammals with only 120 individuals estimated to exist. The only known feeding ground for western grey whales is located in the waters off Sakhalin Island. Researchers say the death of only one of the breeding females per year for the next three years would be enough to lead to the species' extinction.

WWF and The Corner House environmental organization took the ECGD's decision to judicial review which led to the withdrawal of the Sakhalin Energy Investment Company request for backing.

Phil Michaels, legal director for Friends of the Earth, told the Independent, "It is shameful ECGD should even consider supporting such a project and even more so that it should keep official warnings of the consequences secret for so long."

■ SOURCE: INDEPENDENT.CO.UK

## Icelandic Whale Hunt Imminent

This summer, Iceland is likely to approve the commercial hunting of whales. A quota of about 100 minke whales and a number of fin whales is being requested by Iceland's whaling industry. Officials say that this year's hunt, which starts in May, is likely to go ahead.

Commercial whaling in Iceland was resumed in 2006, but last year, authorities said that quotas would only be issued if there was a market for

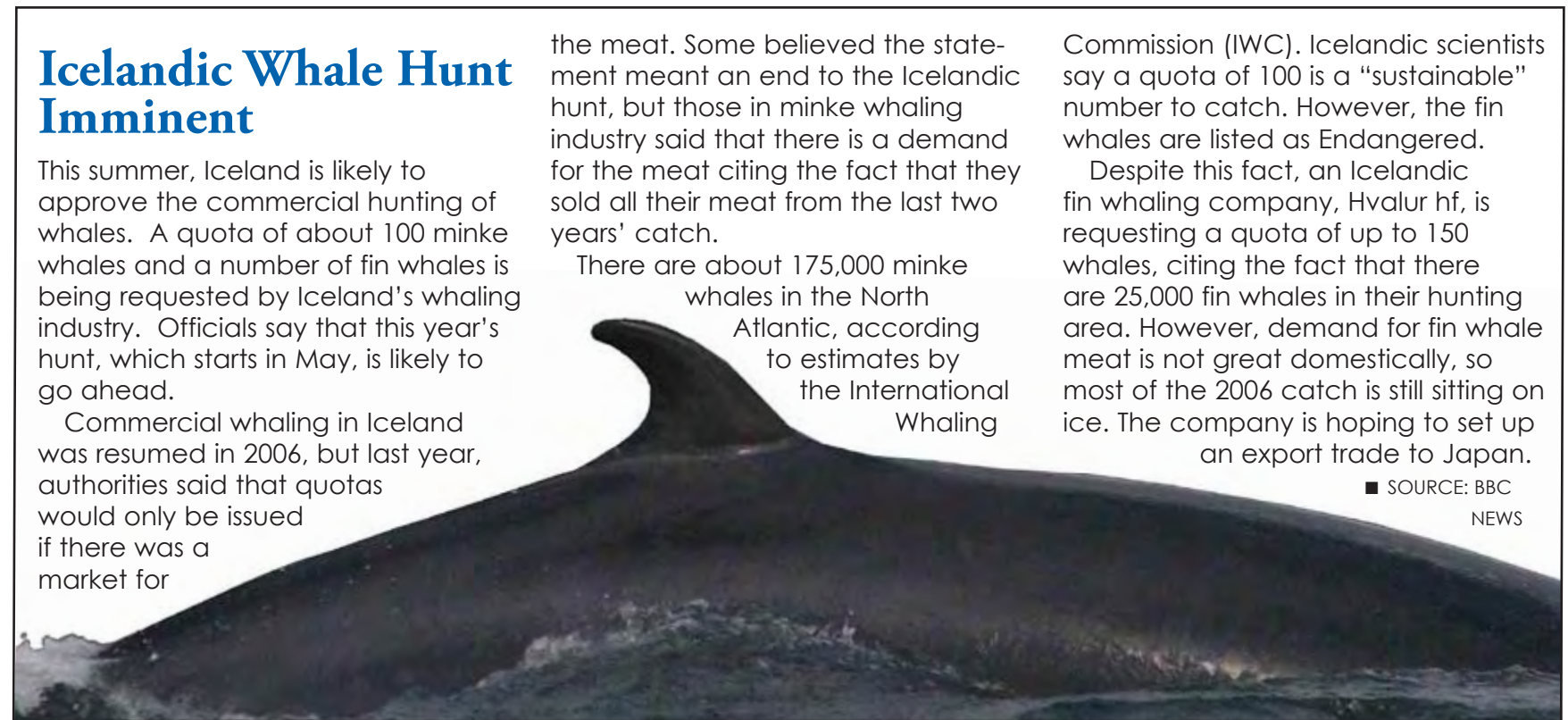
the meat. Some believed the statement meant an end to the Icelandic hunt, but those in minke whaling industry said that there is a demand for the meat citing the fact that they sold all their meat from the last two years' catch.

There are about 175,000 minke whales in the North Atlantic, according to estimates by the International Whaling

Commission (IWC). Icelandic scientists say a quota of 100 is a "sustainable" number to catch. However, the fin whales are listed as Endangered.

Despite this fact, an Icelandic fin whaling company, Hvalur hf, is requesting a quota of up to 150 whales, citing the fact that there are 25,000 fin whales in their hunting area. However, demand for fin whale meat is not great domestically, so most of the 2006 catch is still sitting on ice. The company is hoping to set up an export trade to Japan.

■ SOURCE: BBC NEWS



WIKIPEDIA: GFDL

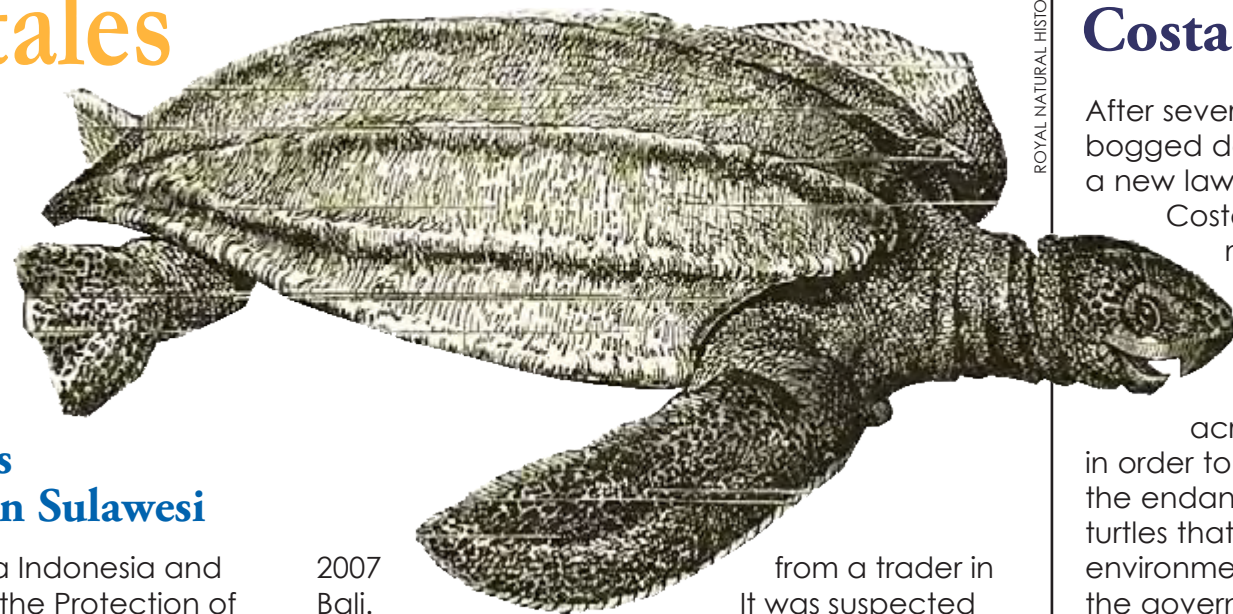




# turtle tales



Edited by Peter & Gunild Symes



ROYAL NATURAL HISTORY

## Costa Rica Gives Rare Leatherback Turtles Protection

After several years of being bogged down in the process, a new law has been passed by Costa Rica's government that mandates the confiscation of several properties, which are located inside the no-building zone on a total of 113 acres (46 hectares) of land, in order to increase protection of the endangered Leatherback sea turtles that nest there. In a move environmentalists see as a victory, the government plans to pay compensation of about US\$ 500 million to landowners, most of whom are Europeans and U.S. citizens, including some who resisted the decision. The Costa Rican beach in question is a 2-mile stretch (3.2km) of sand at Playa Grande, guarded

day and night by a group of biologists and volunteers from the Leatherback Trust, a non-profit organization working to save the planet's largest sea turtles from extinction. Gabriela Blanco, head of the Leatherback Trust's monitoring station, told National Geographic News: "This is the most important nesting beach for leatherbacks in the eastern Pacific... If we don't protect the beach, this population is going to disappear." Leatherback turtles can grow up to 6.5 feet (two meters) in length and weigh up to 2,000 pounds (900 kilograms). With the most wide ranging area of habitation of all sea turtles, Leatherbacks are found in the Mediterranean Sea and the Pacific, Atlantic and Indian Oceans. Travelling farther than any

other sea vertebrate, these turtles have been recorded to migrate as far as 12,774 miles (20,558 kilometers) across the Pacific Ocean. Due to human threats such as harmful fishing practices, beach development and poaching, the sea creatures are highly endangered. There has been a 95 percent drop in nesting leatherbacks since 1980, according to researchers who estimate that there are less than 5,000 remaining in the Pacific Ocean today. Experts say that the overall number of turtles nesting at Playa Grande is also down dramatically from the 1980s. "There used to be more than a thousand turtles on the beach every night, but now we see at most four to five turtles [a] night," Blanco said. ■ SOURCE: NATIONAL GEOGRAPHIC NEWS

## Profauna investigates sea turtle trafficking in Sulawesi

An investigation by ProFauna Indonesia and WSPA (the World Society for the Protection of Animals) showed that around 1,115 green turtles (*Chelonia mydas*) are poached each year in South East Sulawesi, Indonesia. Most of them are caught in the Wakatobi National Park areas and smuggled to Bali where there is a high demand for turtle meat. Other poaching areas include the Moramo, Ereke, and Tikep regions. ProFauna's Sea Turtle Campaign Coordinator, I Wayan Wiradnyana, stated in a press release that despite a drastic reduction in the sea turtle trade in South East Sulawesi since 2006, park rangers and police must maintain vigilance as the smuggling still continues enroute to Bali. Twelve green sea turtles were seized by police in

2007 from a trader in Bali. It was suspected that they had been smuggled from South East Sulawesi. Six out of seven sea turtle species in the world are indigenous to Indonesian waters and have been protected by Indonesian wildlife law since 1990. These turtles include the green sea turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*), the olive ridley (*Lepidochelys olivacea*), the loggerhead sea turtle (*Caretta caretta*), the leatherback turtle (*Dermochelys coriacea*), and the flatback turtle (*Natator depressus*). Offenders are sentenced to a maximum five-year prison term and a maximum fine of 100 million Rupiah. ■ SOURCE: PROFAUNA.ORG

## SOS Seaturtles to focus on Wakatobi

This year, the conservation activist organization, SOS Seaturtles, will focus on the illegal hunting of sea turtles in Wakatobi National Park and Marine Reserve on Sulawesi, Indonesia. According to SOS Seaturtles' founder, Kurt Amsler, the marine park is considered a "diving paradise" by many divers around the world. It has been reported that more than 600 turtles have been poached there last year and shipped to Bali. SOS Seaturtles' actions will concern the tour operators. Letters of protest will be collected and sent to Indonesian officials, and a boycott of the destination will be promoted until the police rein-



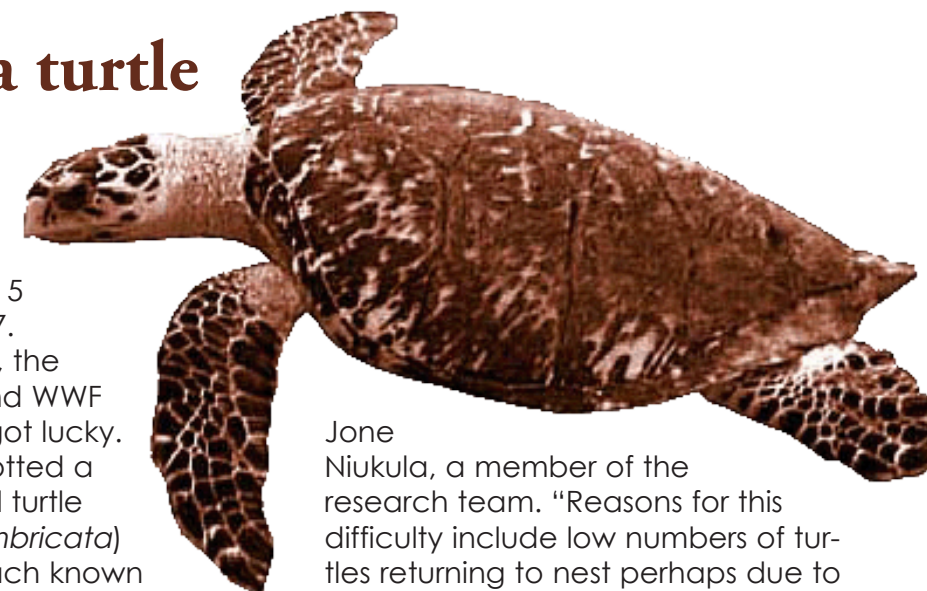
Location of Sulawesi on map of Indonesia and southeast Asia

force the existing laws in this region. For more information, see: [www.sos-seaturtles.ch](http://www.sos-seaturtles.ch) ■

## Fiji satellite tags its first sea turtle

For more than two years, Fiji researchers have been attempting to satellite tag a sea turtle. Why? It is the primary method of finding out migration patterns of sea turtles around the vast open waters and multiple island groups of the Pacific. During a final attempt to tag a turtle during the past nesting season, a sea turtle was finally tagged. It was a first for Fiji. Several road blocks faced researchers in their quest to tag a turtle including lack of funding to reach isolated islands thought to support the remaining individuals of the once numerous Fiji turtle population. In Fiji, there is no one large known nesting beach, unlike that of Indonesia, Papua New Guinea and the Solomon Islands. Nesting incidences have been minimal in recent years on various islands through the Fijian Archipelago. In the past 20 years, nesting tallies

have fallen—21 nests were recorded on Makagai island in 1987 and only 5 recorded in 2007. But in January, the National Trust and WWF research team got lucky. The scientists spotted a nesting hawksbill turtle (*Eretmochelys imbricata*) on a barren beach known locally as Talice, northeast of Yadua Taba Island. The community of Yadua has collaborated with The National Trust of Fiji (NTF), The Secretariat of the Pacific Regional Environment Programme (SPREP), the National Ocean & Atmospheric Administration (NOAA) and WWF over the past years to protect endangered sea turtles. "It has become increasingly difficult to find nesting turtles in Fiji", said



Jone Niukula, a member of the research team. "Reasons for this difficulty include low numbers of turtles returning to nest perhaps due to the low numbers of hatchlings that mature to an age where they're capable of reproducing. This could be due to many reasons including domestic consumption of turtles and eggs, loss of feeding and nesting grounds or being accidentally caught in fisheries gear. So when the team saw Marama ni Yadua (the sea turtle's name), we quickly reacted to ensure that we could satellite tag a turtle out of Fiji." ■ SOURCE: WWF





# photo & videography

Edited by Kurt Amsler & Peter Symes



Text and photos by Kurt Amsler  
Translation by Arnold Weisz

# Workflow *The perfect*

**Without a proper workflow when doing digital photographing, the quality of your images won't improve. When all the elements of your photography come together, then you can get the best out of your work. I'll explain how!**

For those who think that the term, "workflow", just arrived with digital photography, I have to say you're wrong. Workflow was just as important before digital imaging caught on—when film and developing photographs on paper were the *in* thing. Only when all the different processes of photography come together

correctly, can you bring out the best from your images.

After you have captured the pictures, you need to store them securely—the sooner, the better. The underwater photographer seldom works in a practical studio environment, but usually under much more extreme conditions, such as dive

boats and tent camps. Therefore, it is of outmost importance that a proper workflow already kicks in here, even without a reliable energy source available—starting with your choice of memory card.

It doesn't matter what format you are working in (JPEG, Tiff or RAW), or which resolution you are using. The storage de-







## Workflow

vice or memory card should be able to hold at least 200 images. This is sufficient for up to three dives per day. Thus, you can avoid opening your camera housing to change the memory card on a sandy beach or on a rolling boat deck. At the end of the day, you have ample time to transfer your images from the camera memory card over to your computer or other storage devices.

### Data storage

The next stage in the workflow is the storage of data. We have many options to store our images. Laptops, CD burners or portable harddrives, or so-called portable storage devices. The best choice would be a portable storage device, either powered by a charger or by batteries. If you have a portable storage device that can hold 80 Gigabytes, you can store images from one week of diving without any problem. Some portable storage device models, like the Coolwalker MSV-01 from Nikon (about 360 Euro for 30 GB) or the Epson P 2000 (about 430 Euro for 40 GB) also have displays, which allow you to see the images and to process them.

Additionally, you should carry back-up memory cards. You can keep all the originals and change to fresh cards whenever one is full, or you could go for the more expensive option, a laptop. With a computer you can also view your images and start editing them. With a CD burner at hand, you can also give away some nice memories to your diving buddies.

### Digital workflow

The digital workflow is actually nothing else than keeping your images safe and to retain the colour fidelity—even if you have to transfer the images from one device to another, or from one kind of software to another. Only when the colourspace corresponds, will your images appear in with the natural colours.

## TIPS:

Always get a memory card with plenty of storage space. Just remember that not all cameras can use memory cards which are larger than 1 GB. Read the camera manual before you purchase cards.

Using a large card not only allow you to store a large quantity of images, but also make multiple dives without having to open the housing. Where ever you are, on a boat or on a beach, opening the camera housing is always connected to some risk.



The short shutter lag your camera utilizes is of no use if your memory card isn't fast enough. Hence, look for high speed cards. But these kind of pricey cards only make sense if you have a high quality camera.



Always keep a back-up of your images, either on a memory card or on a harddrive.

Make sure that all data from the cards are stored elsewhere before you format the card.

Always carry at least one of your storage devices in your hand luggage. X-Ray machines at airports, however old they are, don't affect digital images.

Always keep your computer monitors calibrated, as they change over time. The older your screen, the more often you need to calibrate.

Calibrate your screen in a room with dimmed lights, so that other light sources don't cause false optical interference.

All image processing with a computer except the RAW-format, makes you loose quality. It is always better to get the right light and colours when you take the shot, instead of stressing the image by computer processing.

Every time you save a jpeg image, the image deteriorates. Always save the original image as a TIFF, and you can save as many copies as you want without diminishing the image.

As the camera, all your other hardware (computer and monitor) should be of equal quality. ■

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# photo & video

Calibration unit. There are now some quite affordable models around



It shouldn't matter if your image is published as a photoprint or on a magazine spread. On simpler compact digital cameras, colorspace is already pre-adjusted. On high-quality cameras, you can adjust the colorspace manually.

The RGB colorspace is a limited colour matrix and ideal for web images and for the html standard. For anything else, you need a complete colour matrix, because you always have to process the images in a RGB/Adobe colour profile, which is optimized for printing.

You need to be careful when working in picture editing systems as some systems just add a preset colour profile to your images, if you don't manually choose the correct one. To avoid this, have a look at the preset profiles, and if possible, choose the same profile which is integrated into the camera. The same goes for printing.

## Calibration

Another important part of your workflow is the screen, where you view your images. Most screens are well calibrated and show the real colours. But if you want to process images you need to calibrate your screen.

Software like Photoshop and Photoshop Elements from Adobe contains a "Gamma" program that lets you calibrate your screen. Even better and more accurate is a colour management device like Eye One from Gretag MCBETH.

As the colour profile on computer screens regularly change, you should calibrate your screen monthly. The expense for a good functional, secure and colour proof workflow, can seem a bit lavish. On the other hand, getting the best out of your images always pays off.

For more information, please visit: [www.photosub.com](http://www.photosub.com) ■







## photo & video



### Universal housing

Sealux' universal lightweight housing with a large (3.6") integrated high-resolution 16:9 colour monitor is depth rated to 90 m. The overall dimensions have been minimized but will fit all Canon camcorders equipped with a LANC-socket or IR for remote control. Camera dimensions must not exceed 190 x 132 x 116mm. (l x w x h). Up to ten functions can be operated via the handle.

[www.sealux.de](http://www.sealux.de)



### Aquatica proudly presents...

Aquatica latest addition is the housing for the 21.1 megapixel Canon 1DS mark III. Machined from solid aluminum, treated and anodized to military specification, then painted with a robust weather and wear resistant finish, this housing is depth rated at 90m (300 ft). The Aquatica 1DS Mk III uses a viewfinder that derives the biggest and the brightest image possible in full frame viewing to your eye. An accessory Aqua View Finder is also available giving the user unparallel viewing of the camera's viewfinder for sharp focusing and exact composition. Positive bayonet mounting and locking leaves no doubt that your ports are secure in place and water tight. The bayonet system dome, macro ports and extension rings, offers the fastest access to lenses for rapid changing without having to remove the SLR from the housing. Allows use of lenses from a 15mm fisheye lens to a 180mm macro lens. Tele-converter port extensions are also available.

More on [www.aquatica.ca](http://www.aquatica.ca)



### Ikelite housing for Sony Video Cameras

Molded of clear polycarbonate to provide seamless construction and corrosion proof performance. This "Clearly Superior" design provides full view of the camcorder, control functions, and back "O" ring seal for assurance the system is safe. Maximum operating depth is 200 feet (60 m). The camera's LCD monitor can be viewed from the rear of the housing using the External Mirror featured on the side of the housing. The housing includes Image Reversing Circuitry. The circuitry "flips" the image in the camera's LCD so that its reflection in the mirror appears correct left-to-right.\* The External Mirror is hinged to fold against the housing side for travel. [www.ikelite.com](http://www.ikelite.com)

Adobe has released Camera Raw 4.4.1 and Lightroom 1.4.1, having corrected the faults with the previously withdrawn updates. The revised updates, as well as fixing a selection of bugs, bring support for the latest DSLRs from Canon, Sony, Pentax and Nikon, along with the FujiFilm S100fs and Olympus SP-570 UZ.

Aquatica has announced that the Nikon D60 camera also fits perfectly into the Aquatica D40x housing. Aquatica is not sure at this time if the housing will retain its original name or be renamed to reflect this new compatibility.

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United Kingdom

## Ocean Optics and Mavericks Diving Move to Action Underwater Studios in Essex

The move will provide the underwater photography and diving specialists with access to Action Underwater Studios unique filming tank. The 10 x 12 metre tank is six metres deep.



According to Steve Warren, owner of Ocean Optics and Mavericks Diving: "Sharing Action Underwater Studios facilities means that we

can provide our underwater photography equipment clients with a basic in-water camera familiarisation session at the time of purchase. We're also consulting with underwater photography guru, Martin Edge, on constructing a dedicated underwater set to meet the needs of wide angle and other specialised underwater photography courses. Ocean Visions has already signed up to run underwater photography courses at the tank."

Ocean Optics - Mavericks Diving also teaches NAUI scuba courses and BTSI (Buoyancy System Training Inc) precision buoyancy clinics. "Our NAUI instructors use radiophones that allow them to coach students by voice under the water. For teaching complex skills, like underwater photography or buoyancy control, being able to talk to the student is highly effective and makes time in the tank far more productive. We think we may be the only UK dive school that offers this service," explains Steve.

Steve and Mark will also be hosting regular tank sessions for qualified divers to jump in and keep their skills up to date. A two-hour session including air, tank and weights is GB£35.00. A Simulaid mannequin is available for practicing rescue skills including lifts and in-water resuscitation. Other equipment diver's can try include commercial band masks and, of course, a selection of Inon lenses and strobes for compact underwater cameras.

Action Underwater Studios, located at Archers Fields, Basildon, is equipped with classrooms, individual changing rooms with showers, and free car parking. The studio is associated with the filming of the "Star Wars", "Bourne", "Bond" and "Harry Potter" blockbusters. ■

## Apple Releases Aperture 2.1 with Powerful Image Editing Plug-In Architecture

Available as a free software update, Aperture 2.1, introduces an open plug-in architecture allowing photographers to use specialized third party imaging software right from within Aperture. Over the coming months, third party software developers will deliver image editing plug-ins for localized editing, filters and effects, noise analysis and reduction, fisheye lens correction and more. By clicking on one or more images within Aperture, users can choose from a menu of installed plug-ins and apply specialized imaging operations to either TIFF or RAW images. Apple is working closely with key developers to bring the most requested plug-ins to Aperture such as Nik Software's Viveza, PictureCode's Noise Ninja, Digital Film Tools' Power Stroke and The Tiffen Company's Dfx. [www.apple.com/aperture](http://www.apple.com/aperture)



## Kodak Professional Image Enhancement Plug-Ins

Kodak has launched new versions of its professional image retouching plug-ins range compatible with the latest software. V2.1 of the ROC Pro, SHO Pro, GEM Pro and GEM Airbrush Pro plug-ins are compatible with Windows Vista, Intel-based Macs and Adobe Photoshop CS3. Trial versions are available from the company's website, with discounts available to customers buying more than one plug-in.



## Sanyo Cab

Sanyo has unveiled the newest addition to its Xacti underwater digital camera line with the CA8. The camera is rated for underwater use at a maximum depth of nearly five feet and one hour safely and will shoot 60fps MPEG-4 video at 640x480-pixel resolution or 3264x2448-pixel photos via its 8-megapixel CMOS sensor. Sanyo's pixel-interpolation technology allows bumping up the photos to an equivalent 12 megapixel. [www.sanyo.com](http://www.sanyo.com)



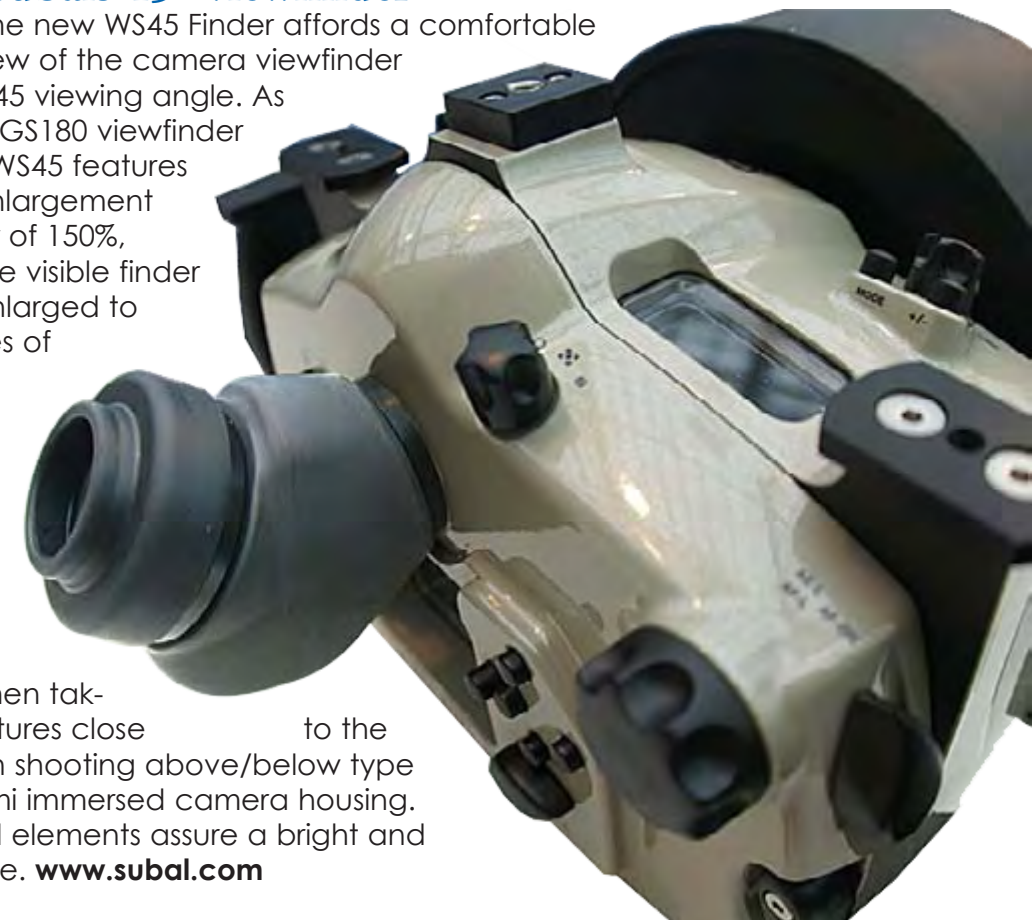
## BS Kinetics Releases New Universal Housing

BS Kinetics has released their new Negev universal housing, which is compatible with a variety of different camcorders including the Sony TRV 890, 900, 950 and PD 100. The lightweight carbon fibre construction can withstand depths up to 80m, while a large 3.5" LCD monitor provides optimal viewing on the display. All primary camera functions can be accessed and additional ones can be custom installed. The housing is available immediately with standard or changeport options. Prices start at 1.760,00 €. [www.bskinetics.com](http://www.bskinetics.com)



## Subals 45° viewfinder

The new WS45 Finder affords a comfortable view of the camera viewfinder at 45 viewing angle. As the GS180 viewfinder the WS45 features an enlargement factor of 150%, with the visible finder area enlarged to 2 1/2 times of the original. WS45 pivots through 360°, with stops every 90°. The 45° viewing angle offers distinct advantages when taking close-up pictures close to the sea floor or when shooting above/below type situations with semi immersed camera housing. Top quality optical elements assure a bright and brilliant finder image. [www.subal.com](http://www.subal.com)







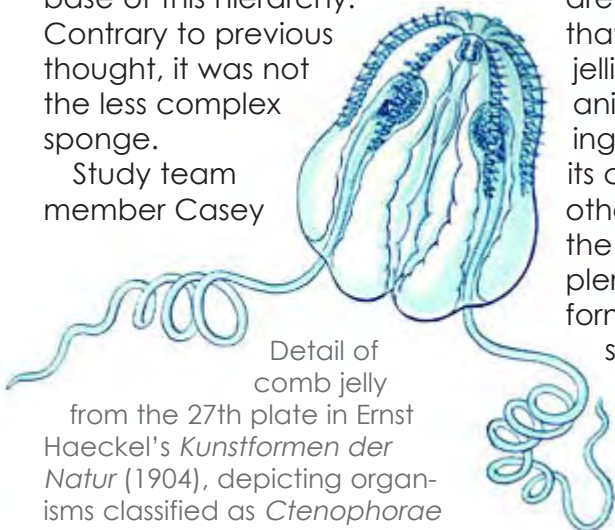
edited by  
Peter & Gunild Symes

## First Animal on Earth Was a Jellyfish

A new find shows that Earth's first animal was the ocean-drifting comb jelly, not the simple sponge, according to a new study that has rocked the scientific community that had not suspected that the earliest creature could be so complex.

Through the study of fossils and related animals today, data on the planet's first animal can only be inferred. How the discovery was made involved the analysis of huge volumes of genetic data in order to identify the earliest splits at the bottom of the animal tree of life, a hierarchy of evolutionary relationships among species. The comb jelly was the first animal to split off on their own evolutionary path from the base of this hierarchy. Contrary to previous thought, it was not the less complex sponge.

Study team member Casey



Detail of comb jelly

from the 27th plate in Ernst Haeckel's *Kunstformen der Natur* (1904), depicting organisms classified as *Ctenophorae*

Dunn of Brown University in Rhode Island told LiveScience: "This was a complete shocker... so shocking that we initially thought something had gone very wrong." However, rechecking several times brought the same results—the comb jelly. Results of the study were published in the April 10 issue of the journal *Nature*.

Comb jellies have a nervous system and connective tissues, and so are more complex than sponges, which do not. However they are not true jellyfish even though they are squishy and have tentacles. True jellyfish have a classic bell-shaped body and characteristic stinging cells, which the comb jelly does not.

According to researchers, there are two evolutionary scenarios that can explain why the comb jellies would be first among animals. Firstly, after branching off, the comb jelly evolved its complexity independent of other creatures, and secondly, the sponge developed its simpler form from the more complex form. This latter scenario underscores the fact that "evolution is not necessarily just a march towards increased complexity," said Dunn. ■ SOURCE: LIVESCIENCE

is not necessarily just a march towards increased complexity," said Dunn. ■ SOURCE: LIVESCIENCE



## Inspired by nature—the bionic Jellyfish is here

Welcome the AquaJelly and the Air Jelly with their structure and kinematics based on their biological model, the unassuming jellyfish. Taking inspiration from nature and its inherent aesthetic beauty, these new projects from the Bionic Learning Network of Festo—a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation—utilize cutting-edge technologies.

A man-made autonomous jellyfish, AquaJelly has an electric drive and an intelligent, adaptive mechanical system. Fully automatic control is possible with the aid of mechatronics, Festo's YoYo product, which also demonstrates the company's core competency—automation

with air.

Consisting of a translucent hemisphere and eight tentacles used for propulsion, AquaJelly has a watertight center that is a laser-sintered pressure vessel comprised of a central, electric drive, two lithium-ion-polymer batteries, a charge control device and swashplate of servo motors.

A construction design derived from the functional anatomy of a fish fin called Fin Ray Effect® makes up the structure of each tentacle. Just like real jellyfish, the AquaJelly moves with the aid of wave-like contractions created by a peristaltic propulsion system based on the reaction thrust principle. By shifting its weight, the motion of the AquaJelly in three-dimensional

environments is controlled.

In contrast to AquaJelly, which swims through water, AirJelly glides through the air. Kept in the air by its helium-filled ballonet, the remote-controlled AquaJelly transports itself with the aid of its central electric drive and an intelligent, adaptive mechanical system driven by AirJelly's only energy source—two lithium-ion-polymer batteries—to which the central electric drive is attached.

The AirJelly is the first indoor flying object that utilizes a peristaltic propulsion system and the reaction thrust principle, which has never before been used in aviation history to drive an object like a balloon. ■

SOURCE: FESTO.COM

## Re-engineered jellyfish gene aids screening for HIV drugs

Drug screening technology, which utilizes a re-engineered jellyfish gene, has been patented. The technology developed by Geneart—a company that provides solutions for DNA engineering and processing in the field of improved medicine and biotechnology—could help in discovering new types of antiviral drugs for HIV and other viruses.

Similar to the fluorescent properties of jellyfish, the cell-based assay produces a fluorescent product when it copies the HIV virus's behaviour successfully. It means that researchers can now identify new antiviral drugs, which, for the first time, would target pathways transferring genetic material, a key process of the virus' infection of a human white blood cell.

Re-engineered

a gene from the jellyfish normally responsible for a fluorescent green protein, caused it to transfer its information through pathways similar to those used by the HIV virus. The cell lights up once the information encoded in the gene's mRNA is transferred to the cytoplasm and triggers the production of the fluorescent green protein.

It is hoped that drugs that target this export mechanism may prevent the HIV virus from copying itself within the body and leave untouched the human pathways in healthy cells. ■

SOURCE: LABTECHNOLOGIST.COM





# Debugging the Sunscreen Factor

*Dive Diva Skin Care*

Text by Cindy Ross  
GirlDiver.com

## Diving into Skin... Sun Protection Revisited

Just like GirlDivers don't go under the waves without our "life support system", we shouldn't go under the rays without a "life support system". Yes, ladies (and gentlemen), we're talking about sun protection. And while sometimes this topic seems over played, hopefully this article will share new information and remind you of the need for adequate skin care under the sun.

Growing up as a fair skinned red head with a passion for the water, I was exposed to many a nasty burn, leaving my

skin peeling, blistered and sore. I learned, early on, that sunscreen would stop the burning, but how I longed for the healthy, tanned skin of my peers. As I've gotten older, the tanned skin of my peers is beginning to look leathery, and I have learned that the tanned look is not really a "healthy" look.

There is NO SUCH THING as a safe tan, whether from the sun or the latest technological breakthrough in "safe" tanning booths. UVA and UVB rays both have harmful effects on your skin. So, what's the difference between the two?

**UVA:** These are the silent killers. You can't feel them, but they can penetrate clear glass that doesn't have a UV block. UVA rays cause 80 percent of the damage from the sun. Even low exposure to UVA destroys your skin's support structure causing sagging, wrinkling, DNA damage and ultimately skin cancer.

**UVB:** These are the burning rays. Within the first 60 seconds of walking outside, damage from UVB rays begins. The impact is immediate and harmful. These also attribute to skin cancers.

Caribbean Solutions formulator and Florida biochemist, Celia Ferreira, PhD., says, "We don't need to choose between protecting our skin and protecting coral reefs... In my experience, sun products without petroleum derivatives actually protect the skin better."

### Cool facts about sun rays:

They are there...even when the sun isn't. On cloudy or hazy days, the rays are still present and damaging.

They can bounce. Surfaces like water, cement and grass reflect the rays from the ground, so you can get a double whammy of sun exposure. A layer of water on a diver's face will magnify the exposure.

### Enter the sunscreens.

SPF? UVA/UVB coverage? Waterproof sunscreen? Let's debug some of these mysteries.

SPF (Sunscreen Protection Factor) is supposed to tell you how long you can stay in the sun before getting burned. If you can normally stay in the sun for 15 minutes before turning pink, an SPF 15 will allow you to stay in the sun for 3 ½ hours without burning. The formula is 15 (minutes) x 15 (SPF).

Unfortunately, the SPF only applies to UVB rays. Not UVA. Some sunscreens don't even offer UVA protection. And, remember, UVA is the skin cancer ray.

So, if you don't burn easily, can you go with a lower SPF?

Not necessarily. The effectiveness of SPF goes up relatively. An SPF 2 blocks about 50 percent of the UVB rays, an SPF15 blocks 95 percent and an SPF 30 blocks about 97 percent. An SPF higher than 30 only gives you more time in the sun without burning, but does not effectively block any additional UVB rays. So, at best, you're going to let approximately 3 percent of the radiation penetrate your

for 79 percent of skin cancer deaths.

**Wow #5:** While men are twice as likely to develop skin cancer, women are more likely than men to develop malignant melanoma. The most common place for women to get melanoma is on the legs.

**Wow #6:** Early detection works. In Stage 1 Melanoma, there is a 99 percent five year survival rate, whereas Stage 3 Melanoma has only a 15 percent five year survival rate.

**THE ABCD's for early detection of Melanoma.** Be on alert for:

- A - Asymmetry:** one half of a mole or birthmark does not match the other.
- B - Border:** the edges of area are irregular, notched or blurred.
- C - Color:** the area is not even in color but has differing patches of brown and black, sometime white, blue or red.
- D - Diameter:** the diameter is larger than 6 mm or growing larger. ■

## Skin Cancer Facts: The WOW'S of Skin Cancer

**Wow #1:** Skin cancer: the most commonly diagnosed cancer in the U.S. and Australia, and second in the U.K. If detected early, skin cancer has a 90 percent cure rate.

**Wow #2:** More than 90 percent of skin cancer is caused by sun exposure.

**Wow #3:** The World Health Organization estimates that as many as 65,161 people per year worldwide die from too much sun, mostly from malignant skin cancer.

**Wow #4:** There are two types of skin cancer: Malignant melanoma and non-melanoma (usually basal cell or squamous cell cancers). Melanoma is less common (accounting for 4 percent of all skin cancer cases) but accounts



Dr Lani Simpson of Berkeley, California, has developed a coral reef safe line of skin and suncare products called, ECOLANI, which is chemical free, hypo-allergenic, non-comedogenic and ecologically friendly. ECOLANI's ingredients are 100 percent natural and plant based





# mermaid matters

skin, which explains why you still might get some color despite lathering sunscreen profusely on your skin.

Touted as the best sunscreen available, La Roche-Posay Anthelios XL Lait SPF 60, made by L'Oreal, adds a compound known as encamsule, or Mexoryl, to their screen. This blocks both long and short UVA rays for the most effective coverage available. If this product isn't available, look for avobenzene, titanium oxide or zinc oxide on the active ingredient list for UVA protection.

To get the best sunscreen protection, apply the lotion 30 minutes prior to exposure to allow active ingredients to bond to your skin. A second coat, applied 20 minutes later, gives maximum filtration of the sun's rays. Sunscreen doesn't block the rays, rather it acts as a filter, diffusing and scattering the light rays to reduce exposure and damage.

Since there is no such thing as a truly "waterproof" sunscreen, most brands are now using "water resistant" on their packaging, which means they need to be reapplied if you've been swimming, sweating or diving for more than 40 minutes. No matter what the bottle claims, to avoid a burn on holiday, reapply after departing the water every time.

And for our fair-skinned mermaids, it's smart to pack an aloe gel in your bags, just in case. Don't assume the resort you're visiting will have sunburn remedies. To ease the pain of a nasty burn, keep aloe refrigerated and reapply frequently.

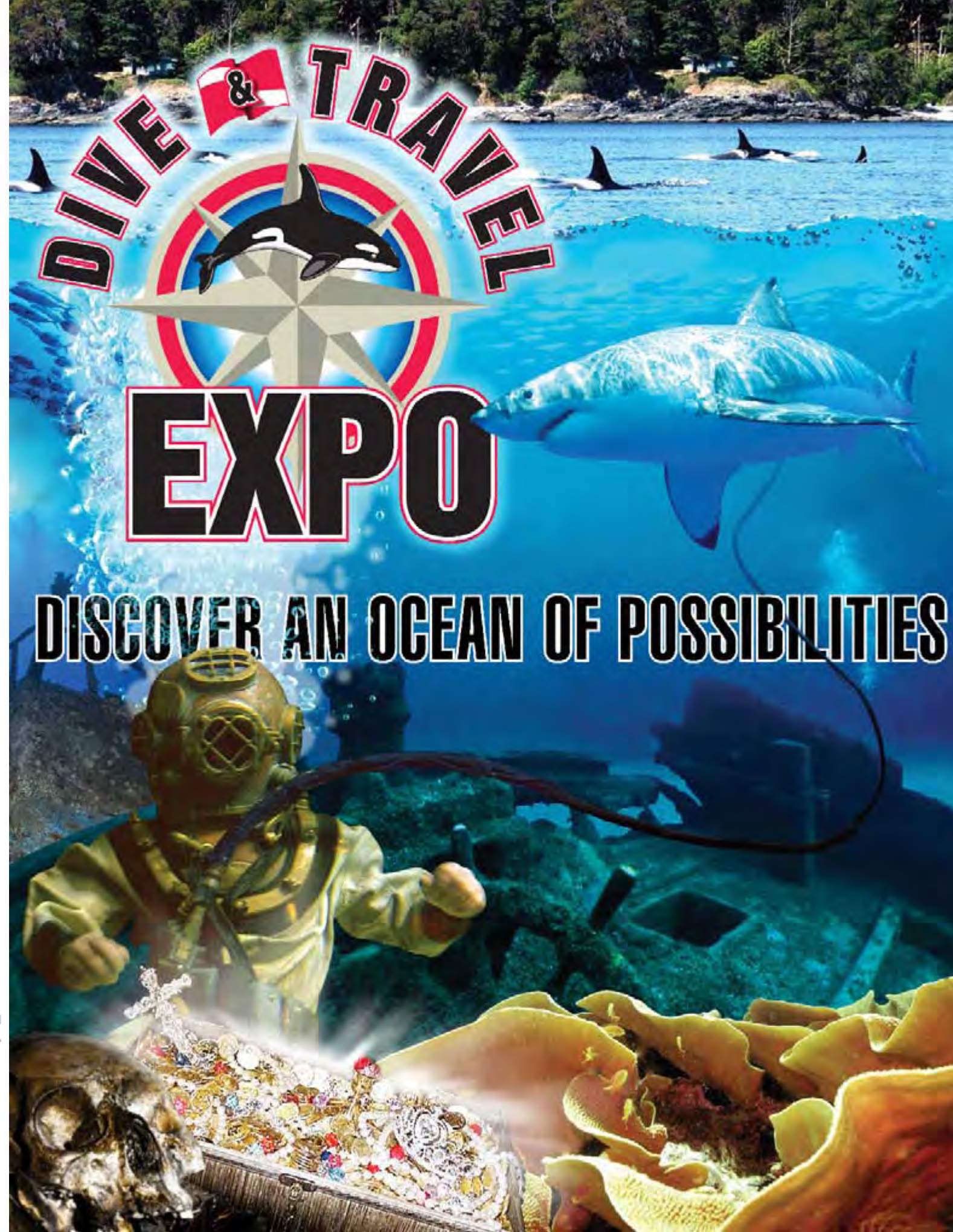
Choose your protection carefully, and for that bronzed skin look that swimsuit models everywhere have, you may want to look at self-tanners. After all, being taken out of the underwater world to soothe a serious burn on your dive holiday...well, it just isn't worth it. ■

*Editor's note: some sunscreens have been found to be damaging to coral reefs. Please check the label and choose with discretion. Seek biodegradable, organic, oil free, petroleum derivative free and PABA free products where available. Or wear 50+ SPF (UVF) sunscreen clothing, or rash guards, to minimize use of sunscreen lotions. Protect yourself and protect the environment.*

According to Environmental Health Perspectives, four common sunscreen ingredients—octinoxate, oxybenzone, 4-methylbenzylidene camphor and the preservative butylparaben—activate viruses that destroy an important symbiotic algae that provide nutrients to coral through photosynthesis. Without this algae, corals bleach and die. SOURCE: ENVIRONMENTAL WORKING GROUP (EWG) ■

An alternative to sunscreen lotions, is sunscreen clothing, or UV protective swimwear. Check out these cool duds from Coolibar.com. Swim shirt, swim tights and swim skirt block 98% UV (UPF 50+)

Beach Buff's website says its products truly are reef-safe in a statement written by an official who is a diver. They use Titanium Dioxide, a category one sunscreen, to help block out UV rays in their high SPF product (with no whitening), Octyl Salicylate to help protect against UVB rays, Benzophenone-3 and Octyl Methoxycinnamate to help protect against UVA and UVB rays







Edited by Peter & Gunild Symes

## US to end shark finning

US fishermen now must bring their shark catches to shore with fins still attached. The new rule, put forward last week by the US fisheries service aims to prevent fishermen from slicing fins off vulnerable species and discarding the rest at sea. Shark finning is already illegal in the US and elsewhere, but the ban is difficult to enforce. Right now, fishermen may land piles of fins separate from shark bodies, so long as the fins weigh less than 5 percent of the total catch. The new rule, which will come into effect in time for the shark-fishing season in June, is part of a plan to help badly overfished populations of sharks recover. It will only protect sharks until 2012, when fisheries managers will re-evaluate the stocks. ■ SOURCE: NEWS SCIENTIST.COM

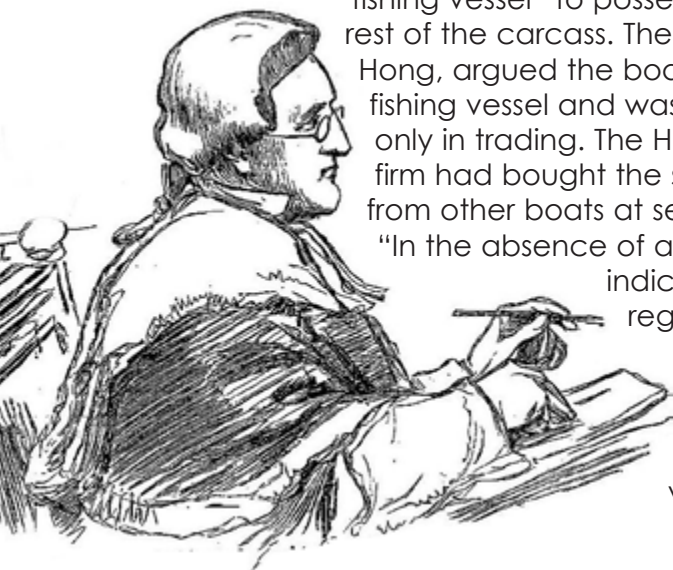
## In US court battle, shark fins win

The US 9th Circuit Court of Appeals has decided that the seizure of the 29,407 kg of shark fins was not legitimate because the ship was not actually a fishing vessel. The US seizure of \$618,956 worth of the fins—used in Asian soups—from the *King Diamond II*, an American vessel stopped about 250 miles off the coast of Guatemala in 2002, was deemed unlawful. According to a 2000 US law, it is illegal for a

“fishing vessel” to possess shark fins without the rest of the carcass. The Hong Kong firm, Tai Loong Hong, argued the boat was not a fishing vessel and was engaged only in trading. The Hong Kong firm had bought the shark fins from other boats at sea.

“In the absence of any other indication in the statutes or the regulations, a vessel engaged in such trade has reason to believe that it is not subject to the possession prohibition as a fishing vessel,” the court said. ■

*Fishing vessel – or not?*



# EU has plan to save sharks

A senior marine scientist has welcomed European Commission proposals for a shark conservation action plan. Sarah Fowler, co-chairwoman of the IUCN shark specialist group, described the plan as great news for the creatures. About 32 percent of shark species that are found in the northeastern Atlantic are said to be threatened with extinction. The main threats to the slow-growing creatures were overfishing and being caught in nets as bycatch. The EU, primarily Spain, is a major exporter of shark fins to China and Hong Kong.

Species such as the angel shark and common skate were among the species to be assessed as “critically endangered” by the IUCN Red List, which was last updated in 2007. The structure of the Commission’s proposal is great; it makes me very optimistic,” Ms Fowler said to BCC News. It is long overdue that the EU looks at itself when it comes to catching sharks.

### EU is the worst offender

The Community Action Plan for Sharks, which will be presented to the European Parliament and member nations at the end of

the year, is designed to reverse the decline of sharks in European waters.

“The European Union, the second largest shark catching community in the world and the largest exporter of frozen shark fins, should lead shark conservation by example instead of undermining shark protection laws in countries with vulnerable ecosystems like French Polynesia. The EU should act at



once the IUU fishing by the Spanish vessels in the Pacific,” commented Ricardo Aguilar, Director of Investigations for Oceana Europe in their press release December 5, 2007.

The EU has recognized that

declines in other fish stocks have made sharks a more valuable fisheries resource. Thus, shark fisheries have experienced rapid growth since the mid-1980s due to an increased demand for shark products. Between 1984 and 2004, world catches of sharks grew from 600,000 to more than 810,000 tonnes.

The UN Food and Agriculture Organization brought forward an inter-national plan of

action for the conservation and management of sharks, but the EU did not adopt all of the voluntary measures. The European Commission said that it did not feel the measures adopted by member states were sufficient to rebuild the depleted populations of sharks. Now it seems that the EU has changed its position on the matter.

The key to the success of the EU action plan would be the effective management of the waters, which would be underpinned by improved data. This would include improved investment in catch, biological and trade data. It would also be necessary to be able to assess threats to populations, and identify and protect critical habitats, said Ms Fowler. ■

## “A real live shark for just \$ 49.99”

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By adopting a shark you will be contributing to shark research and conservation. Information on the location and movements of tagged sharks will provide important knowledge that will assist us make recommendations for the design of more effective conservation efforts and protective

measures for sharks. For adopting a shark, you will receive a membership package that includes your Certificate of Shark Adoption, an Adopt-a-Shark T-shirt, post-cards, stickers and bumper sticker, and a subscription to the electronic newsletter. ■

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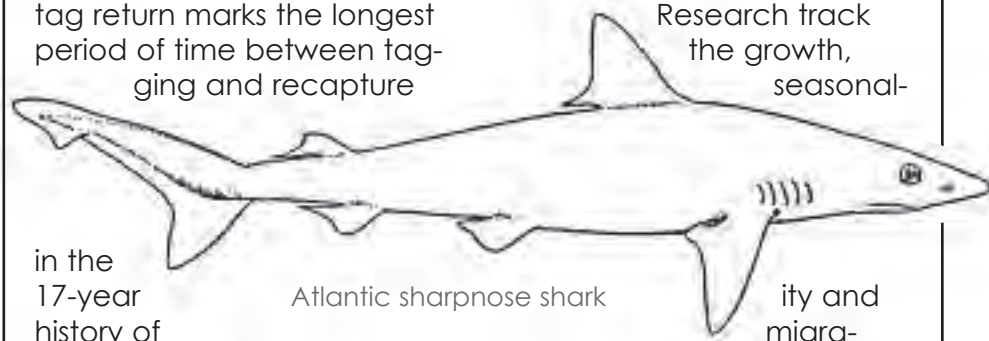


Edited by  
Peter & Gunild Symes

## Shark Recaptured 11 Years After Being Tagged by Mote Marine Laboratory

A shark tagged by Mote Marine Laboratory scientists off Pensacola, Florida, spent nearly 11 years at liberty before being caught last May by a fisherman who returned the tag to Mote. The tag return marks the longest period of time between tagging and recapture

Mississippi, about 103 nautical miles from the area where it was originally tagged. This tag return—and others like it—help scientists in Mote's Congressionally designated Center for Shark Research track the growth, seasonal-



Atlantic sharpnose shark

in the 17-year history of Mote's shark-tagging program. The male Atlantic sharpnose shark was tagged by Mote scientists while aboard a National Marine Fisheries Service research cruise in the northern Gulf of Mexico in 1996. The shark was caught again 11 years later by charter boat Capt. Kenny Bellais off Ship Island

ity and migration along the Gulf Coast and the Florida Keys to better understand the status of wild shark populations and how they might be affected by human influences. Mote has tagged more than 16,000 sharks of 16 species in U.S. waters since 1991. ■



Scientists are tracking sharks off the Australian coast with acoustic devices.

Marine Research Vessel *Ngerin*, with fishing assistance provided by scientists from the Australian Maritime College National Centre for Marine Conservation and Resource Sustainability. Some sharks were released at the surface while others were lowered to the seabed in large cages fitted with video surveillance systems to monitor their recovery.

The sharks will be tracked for the next three years by a network of 24 acoustic listening stations moored 100 metres off the complex and steep seabed. These listening stations were deployed with pinpoint accuracy using the precise positioning capabilities of the Marine National Facility. Four listening sta-

## Deep-sea Sharks Get Wired

**Deep-sea sharks have been tagged and tracked and their habitats precisely mapped in world-first research to test the conservation value of areas closed to commercial fishing.**

Scientists from the CSIRO Wealth from Oceans National Research Flagship recently fitted acoustic tags to 50 gulper sharks, swellsharks and green eye dogfish near Port Lincoln, South Australia. They will track the sharks movements in a closed area designed to protect the gulper shark—a species which is severely depleted over much of its range and is nominated for protection

under the Environment Protection and Biodiversity Conservation Act 1999. The research applied tagging techniques never before tested at such depths and developed new handling practices to minimise stress caused by the tag and release process. The sharks were caught and tagged from the South Australian Research and Development Institute (SARDI)

tions raised for an early preview have detected a flurry of activity, receiving 5700 acoustic 'pings' in five days from 42 of the sharks moving in all directions.

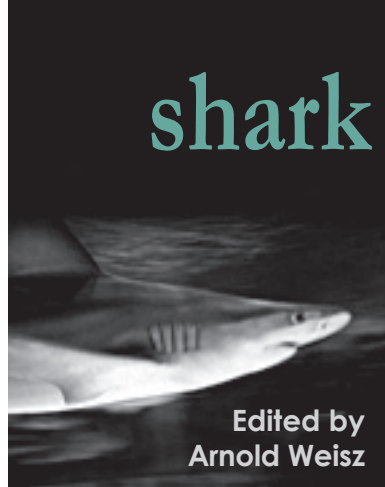
This large scale experiment, the deepest of its kind in the world, will be important to understand the balance between maintaining fisheries, and protecting the marine ecosystem, says Dr Williams, a CSIRO Wealth from Oceans Flagship scientist. ■



Gulper shark, *Centrophorus granulosus*. From plate 3 of *Oceanic Ichthyology* by G. Brown Goode and Tarleton H. Bean, published 1896

CSIRO





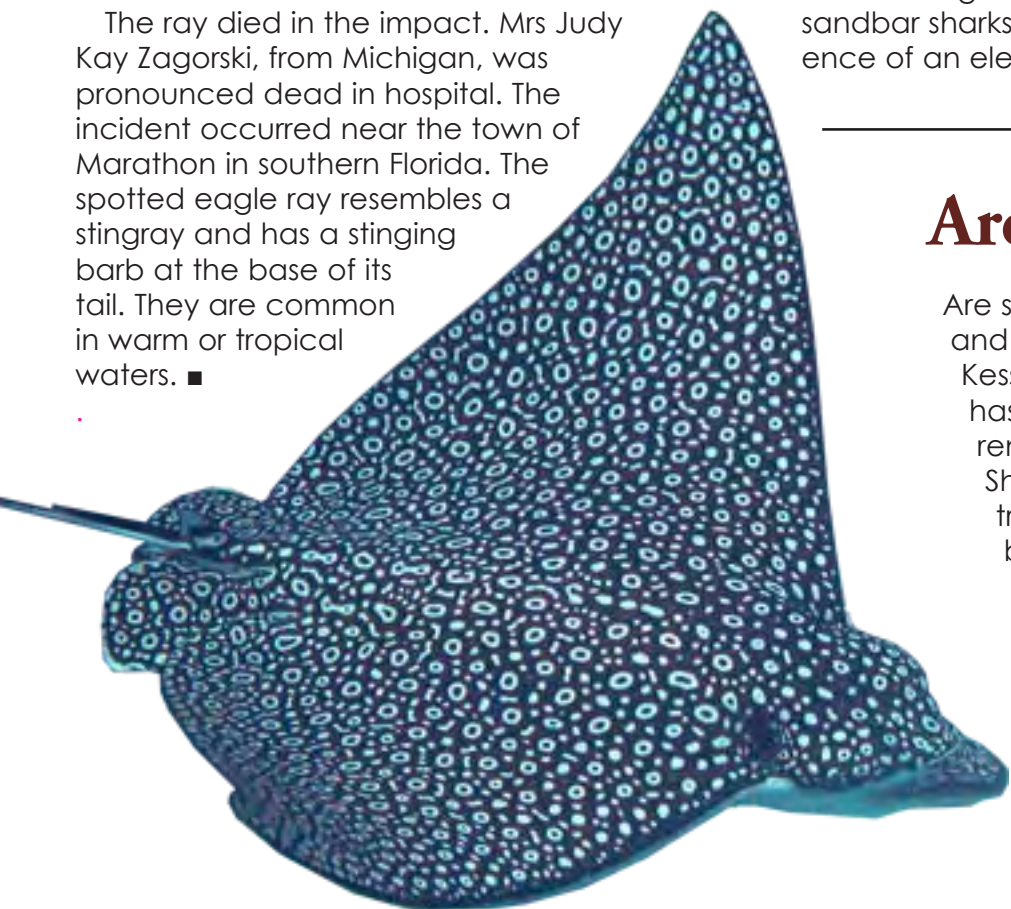
Edited by  
Arnold Weisz

## Leaping stingray collides with woman—both died

A US woman on a boat off the Florida Keys has died after a 75lb (34kg) spotted eagle ray leapt up and struck her. The force of the blow knocked the woman in her mid fifties over, and her head struck the deck of the vessel in what officials called a "bizarre incident".

"It is the most freakish accident I have heard. The chances of this occurring are so remote that most of us are completely astonished that this happened" said Jorge Pino of Florida Fish and Wildlife Conservation Commission.

The ray died in the impact. Mrs Judy Kay Zagorski, from Michigan, was pronounced dead in hospital. The incident occurred near the town of Marathon in southern Florida. The spotted eagle ray resembles a stingray and has a stinging barb at the base of its tail. They are common in warm or tropical waters. ■



FIONA AYERST

## Can Certain Metals Repel Sharks From Fishing Gear?

Sharks in captivity avoid metals that react with seawater to produce an electric field, a behavior that may help fishery biologists develop a strategy to reduce the bycatch of sharks in longline gear. A recent study by NOAA scientists and colleagues on captive juvenile sandbar sharks showed the presence of an electropositive alloy,

in this case palladium neodymium, clearly altered the swimming patterns of individual animals and temporarily deterred feeding in groups of sharks. Electric fields generated by electropositive alloys are believed to deter or repel sharks by overloading their sensory systems. Individual sandbar sharks would generally not approach the metal

What we would like to avoid. Bull shark caught in net where it drowns

ingots closer than about 24 inches, nor attack pieces of cut bait suspended within approximately 12 inches. This study clearly shows the alloy has the potential to repel sharks from pelagic longline fishing gear so they are not caught as bycatch, but the optimal size and shape of the alloy and other factors needs to be determined, says Richard Brill, a research scientist at NOAA's Northeast Fisheries Science Center and head of the Cooperative Marine Education and Research (CMER) Program at the Virginia Institute of Marine Science.

This study by Brill and colleagues is among the first to rigorously test the use of rare earth materials on repelling elasmobranchs, and supports a recent study using metal alloys to repel spiny dogfish conducted by NOAA researchers in Oregon.

Results of the sandbar shark study were presented at a NOAA-sponsored shark deterrent workshop in Boston in April 2008. ■

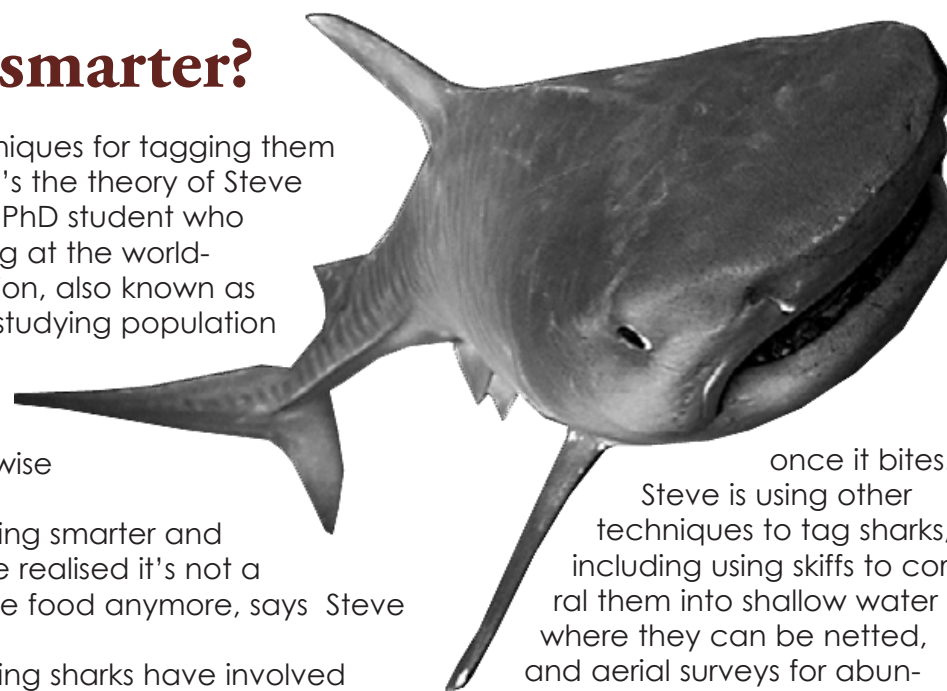
SOURCE: NOAA NATIONAL MARINE FISHERIES SERVICE

## Are sharks getting smarter?

Are sharks catching on to human techniques for tagging them and learning how to avoid them? That's the theory of Steve Kessel, an Earth and Ocean Sciences PhD student who has spent the past three years working at the world-renowned Bimini Biological Field Station, also known as Shark Lab, in the Bahamas. Steve is studying population trends among lemon sharks and believes current research techniques may underestimate numbers, because sharks are getting wise to human methods of counting.

The sharks do seem to be getting smarter and learning our techniques. They've realised it's not a good thing to be eating this free food anymore, says Steve Kessel.

Traditional methods of tagging sharks have involved putting bait on a long line, then implanting a transmitter



once it bites. Steve is using other techniques to tag sharks, including using skiffs to corral them into shallow water where they can be netted, and aerial surveys for abundance counts. ■

## Wobbegong



The two newly discovered species of wobbegong sharks have made their public debut in the scientific journal, *Zootaxa*. The wobbegong sharks were found off the south west coast of Western Australia.

"When I first saw the floral banded wobbegong, it looked similar to the species many fishers know as the cobbler wobbegong (*Sutorectus tentaculatus*), but on closer inspection there were some very obvious differences that help define it as a separate species," writes WA Department of Fisheries shark researcher Justin Chidlow in a press release.

The colour of the floral banded species was mainly dark brown with yellowish blotches on the upper surface and white on the underbelly, whereas the adult of the dwarf spotted was a lighter yellowish brown with large white blotches on top and creamy coloured underneath.

Wobbegongs, which are often sold in fish shops under the name of carpet shark, are probably the most common shark species seen by divers. It's amazing to think that the new species has been present off that coast, but that it's only now that they have been formally identified as separate and been added to the list of known wobbegong species. ■





PETER SYMES

The beach at L'Estartit, Cataluña, North Eastern Spain. The bathers probably being blissfully unawares that the shark population has increased vastly

## Huge increase in number of sharks off Spanish coasts

Spanish scientists have reported a ten-fold increase in the number of sharks spotted off popular tourist beaches in north eastern Spain. The CRAM Foundation in Cataluña, for the Conservation and Recovery of Marine Animals, has noted in a recent report that shark numbers are on the increase off the coast of north eastern Spain. Up to 20 sharks and ray were recorded last year, a marked increase on previous figures, which showed only two in both 2006 and 2005, and five in 2004. It's an unexplained phenomenon that has received attention not only in the press in Cataluña, but CRAM says surface water temperatures have remained more or less unchanged in the past five years, and add that there is insufficient data to establish any relationship between these events and certain changes in weather patterns. ■

More hammerheads are now patrolling the Spanish coast



*Approximately 100 people a year die from ostrich attacks. Dogs bite over 50,000 people a year and kill over 100. This makes dogs and ostriches 20 times more dangerous than sharks, yet we don't call for the eradication of big birds and puppies.*  
—Capt. Paul Watson, SeaSheperd.org

## Sea Shepherd Supports Responsible Shark Diving

The recent death of a scuba diver who was bitten by a shark during an organized shark dive has sparked an intense public debate about the safety and ethics of diving with sharks. Irresponsible media have falsely vilified both sharks and reputable shark diving operations, causing irrational reactions in many. In response, Sea Shepherd Conservation Society has joined forces with Shark Savers and Blue Sphere Media to deliver a petition to the Bahamas Diving Association and the Bahamas Ministry of Tourism in support of diving with sharks.

Captain Paul Watson, Founder and President of Sea Shepherd, has issued the following statement on the safety of diving with sharks:

"Less than five people a year die from shark bites, yet every time a human dies because of a shark bite, the media goes on a hysterical binge of shark hatred. It's completely irrational. Approximately 100 people a year die from ostrich attacks. Dogs bite over 50,000 people a year and kill over 100. This makes dogs and ostriches 20 times more dangerous than sharks, yet we don't call for the eradication of big birds and puppies. On the other hand, humans slaughter tens of millions of sharks a year for soup. Which species is the monster?"

"Shark Savers, a New York-based grassroots conservation group, has partnered with Sea Shepherd Conservation Society and Blue Sphere Media to rally the support of the diving community by releasing a petition in favor of the right to dive with sharks without cages. The coalition developed the petition in response to the media's reaction to the recent fatal, tragic accident in which a diver died in the Bahamas after being bitten by a shark. The dive community was deeply saddened by the news. In addition, many were taken aback at the news because, contrary to popular misconceptions, human accidents involving sharks are extremely rare, especially when diving with them. Before the accident, no known fatalities had occurred in the decades of commercial shark diving expeditions. The petition, housed at [www.sharksavers.org](http://www.sharksavers.org) provides conservationists, divers, photographers, filmmakers, and others throughout the world an opportunity to express their continued support for shark diving, responsible shark diving operations, and the sharks themselves." [www.seasheperd.org](http://www.seasheperd.org) ■



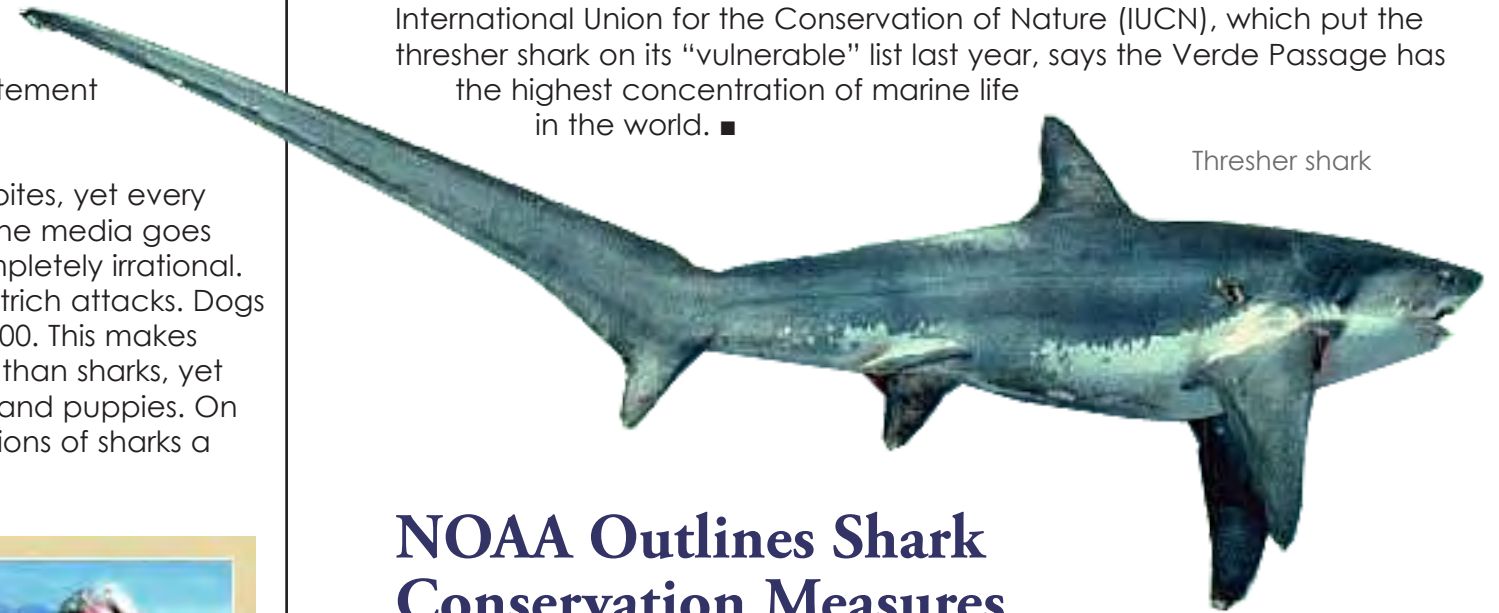
Capt. Paul Watson

SEASHEPERD.ORG

## Philippines Raises Alarm Over Slaughter of Thresher Sharks

The Philippines expressed alarm over the commercial hunting of the thresher shark, considered a vulnerable species worldwide. They said there had been a wholesale slaughter of the shark with the spectacular tail, considered a delicacy in Chinese restaurants here.

"We should stop this slaughter to preserve the ecological balance of our priceless natural heritage," said Environment and Natural Resources Secretary Joselito Atienza. Local marine conservationist Gerry Reyes said many of the sharks were caught in the Verde Passage off the south coast of the main Philippine island of Luzon, which the government has designated a protected area. Patrols have recently seized thresher sharks caught by local fishermen living on the northern edge of the Verde Passage. The International Union for the Conservation of Nature (IUCN), which put the thresher shark on its "vulnerable" list last year, says the Verde Passage has the highest concentration of marine life in the world. ■



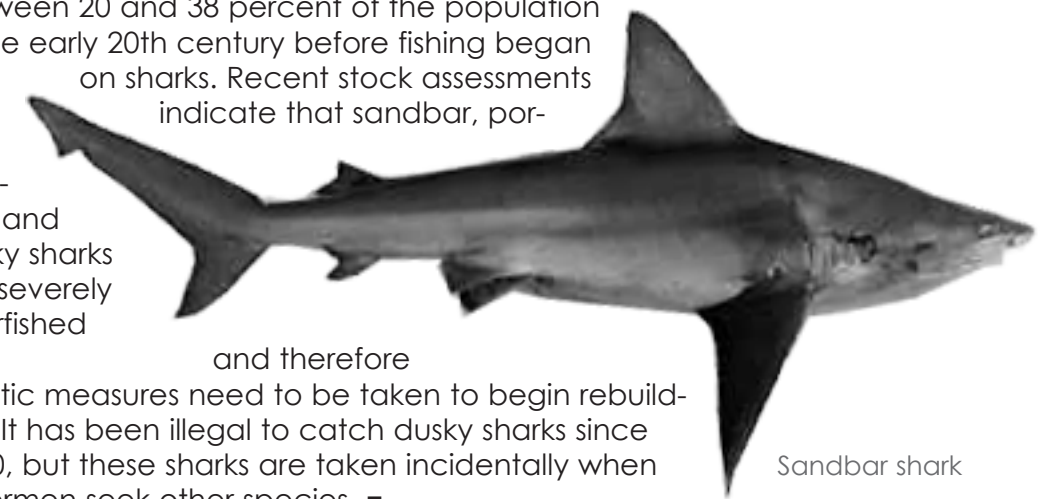
Thresher shark

## NOAA Outlines Shark Conservation Measures

NOAA's Fisheries Service has outlined new measures to prevent overfishing and rebuild the number of sandbar and other shark species. The public may comment on the final environmental impact statement (FEIS) until May 19. The measures in the FEIS include revised quotas and a ban on cutting fins off before landing a shark. A final rule is expected to be published in June and implemented 30 days later. The number of sandbar sharks was between 20 and 38 percent of the population in the early 20th century before fishing began on sharks. Recent stock assessments indicate that sandbar, por-

beagle, and dusky sharks are severely overfished

and therefore drastic measures need to be taken to begin rebuilding. It has been illegal to catch dusky sharks since 2000, but these sharks are taken incidentally when fishermen seek other species. ■

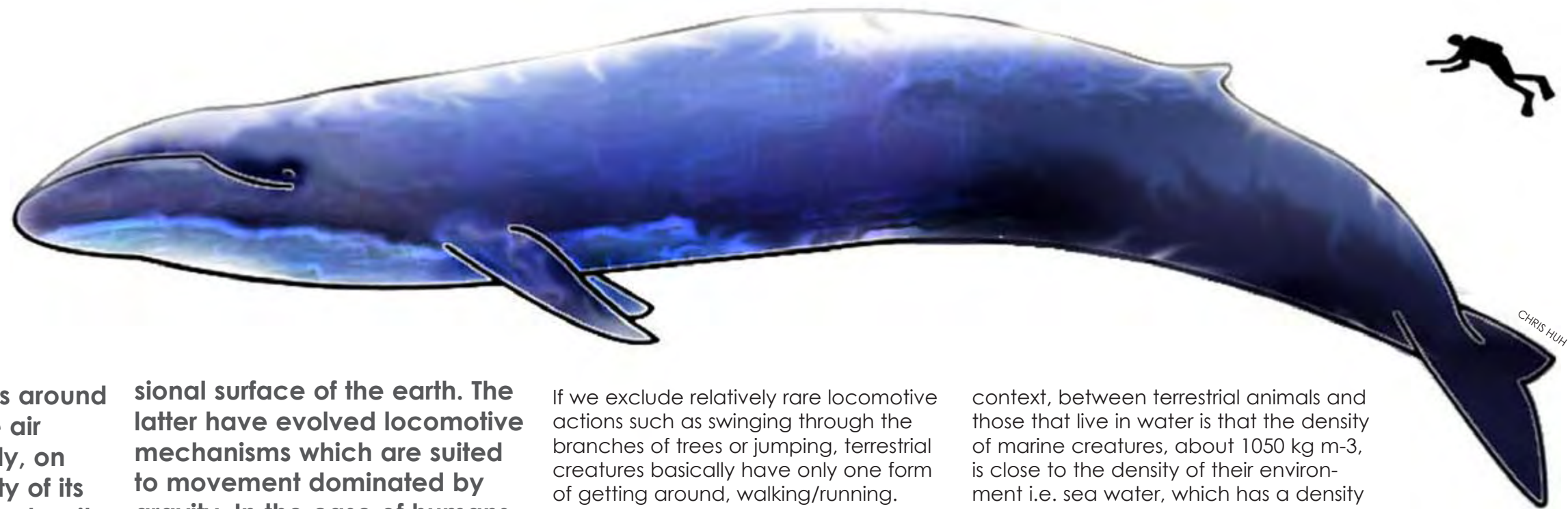


Sandbar shark



Size and movement style comparison of an average diver and a blue whale (*Balaenoptera musculus*)

Edited by Michael Symes



The way an animal gets around in the sea and or in the air depends, fundamentally, on the density and viscosity of its milieu. Birds use the low density and viscosity of the atmosphere to fly or glide, with the range of their movement being limited only by their endurance and the height to which they can fly. This is similar to the fishes and similar marine creatures who can also move three-dimensionally within their aqueous milieu though unlike the terrestrial creatures which live on the, essentially, two dimen-

sional surface of the earth. The latter have evolved locomotive mechanisms which are suited to movement dominated by gravity. In the case of humans, for example, a two-legged mode of locomotion suited to this situation has evolved. To a certain extent, birds may seem to be independent of gravity as they fly around in the air. However, unlike marine creatures in their aqueous milieu, if they stop flying they immediately crash to the ground – unless, of course, they can glide for a little while.

If we exclude relatively rare locomotive actions such as swinging through the branches of trees or jumping, terrestrial creatures basically have only one form of getting around, walking/running. Marine creatures, however, have several for they live in a three-dimensional world in which they can move more or less at will, with their range of action in this aqueous world constrained only by the upper surface of the oceans and the sea bed. There may be some constraint imposed by pressure differences between the upper water and the depths, but within quite large limits, marine creatures can move around just where they like. Humans have had to invent machines, for example aeroplanes and submarines, to overcome similar restraints imposed by their milieu.

One of the primary differences, in this

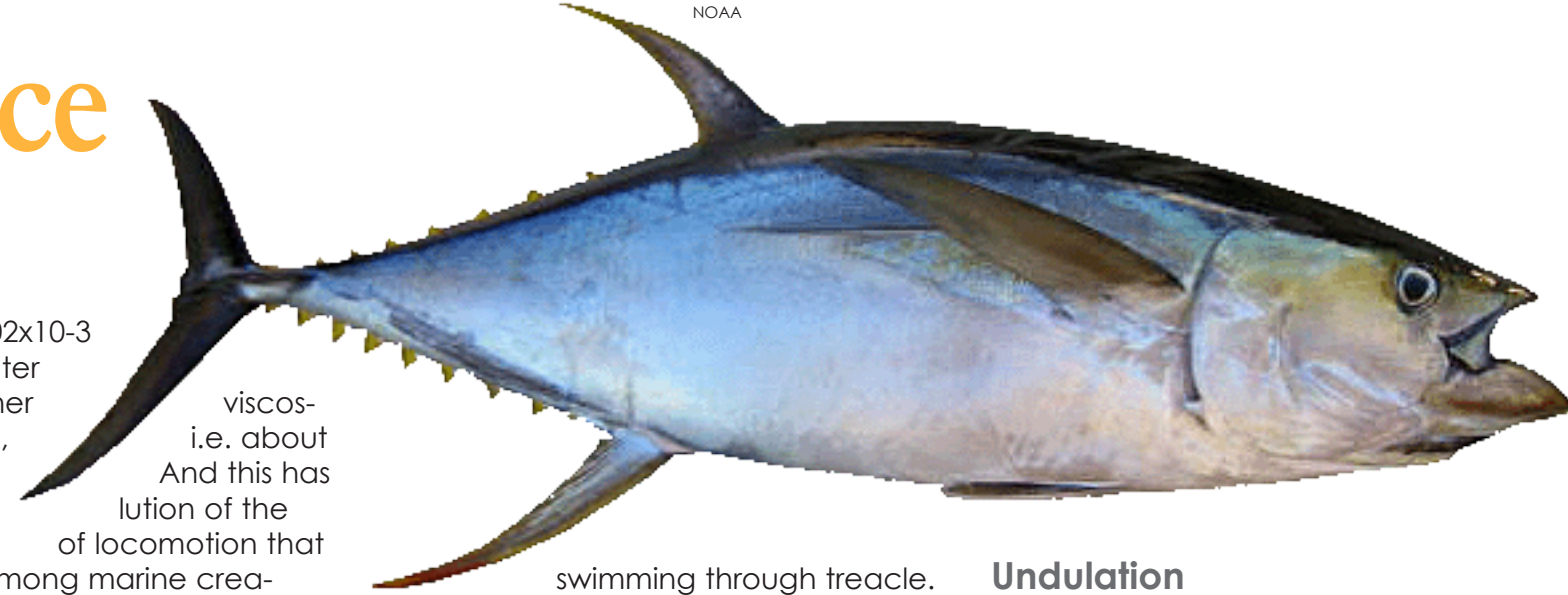
context, between terrestrial animals and those that live in water is that the density of marine creatures, about 1050 kg m<sup>-3</sup>, is close to the density of their environment i.e. sea water, which has a density ranging from about 1020 to 1029 kg m<sup>-3</sup> (although deep in the oceans, under high pressure, it can be 1050 kg m<sup>-3</sup>, or more). This is definitely not the case for terrestrial animals whose milieu is the air with a density of only about 1.2 kg m<sup>-3</sup> at ordinary temperatures and pressures. This means that, unlike the land-based creatures, the marine creatures can utilise their milieu in their different forms of locomotion whereas, with the exception of birds and some insects, terrestrial creatures do not utilise the atmosphere at all to move around.

A second important difference is the fact that, compared to air with a vis-

# Locomotion

## How marine animals get around





viscosity of about  $0.02 \times 10^{-3} \text{ Nsm}^{-2}$  at  $20^\circ\text{C}$ , water has the much higher viscosity of  $1 \times 10^{-3} \text{ Nsm}^{-2}$ , 50 times greater. And this has affected the evolution of the different modes of locomotion that are to be found among marine creatures. Unlike for the terrestrial creatures, size plays a great part in what mode of locomotion has been evolved by marine creatures. For even quite small terrestrial creatures, even those down to almost microbial size the viscosity of air places no significant limitation on how these organisms get around. Even the tiniest ant or aphid, for example, does not find the viscosity of air much impedence to their movement. This is in sharp contrast to small organisms in water whose movement is greatly affected by the water viscosity which for humans would seem like

**VISCOSITY**  
This is the property of a liquid whereby it tends to resist relative motion within itself. If different layers of fluid move with different velocities, viscous forces arise. In SI units, it is measured in Newton seconds per square meter,  $\text{Nsm}^{-2}$  or Pascal seconds, Pas.

Some people still prefer to use the old nomenclature of poise and centipoise, where one poise is equal to  $10^{-1} \text{ Nsm}^{-2}$

Some examples given in centipoise at  $20^\circ\text{C}$ .

Air 0.02  
Water 1.0  
Ethanol 1.2  
Olive oil 84  
75% sucrose solution 2328

swimming through treacle. Thus, we see that the two most important factors for the development of types of locomotion of marine creatures are that sea water, relative to air, has both a high density and a high viscosity.

Depending on their size and body construction different strategies have been evolved by the different marine species for getting around in their aquatic environment. Evolution has, as always, ensured that these strategies are the most effective, be it in terms of energy used, manoeuvrability or speed. These strategies are the result of millions of years of evolutionary selection during which the more efficient swimmers will be better at surviving. So, what has evolution produced?

### How fish swim

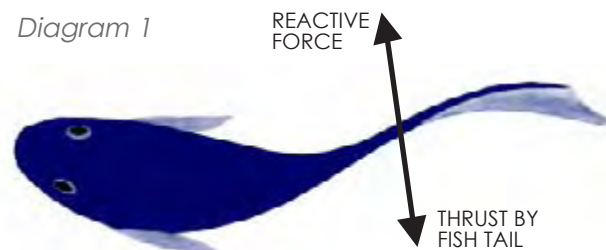
As any swimmer knows, water restrains movement, especially if one tries to move quickly or suddenly. This is due to the viscosity of the water. Divers, especially, will also know that fishes can certainly move rapidly and abruptly in spite of this; and furthermore, unlike the human swimmer, they can move very smoothly.

Marine creatures can move around in a number of ways of which swimming by fishes is by far the most important. Fish swim in basically two sorts of way, either by undulation of their bodies or by using their fins as oars i.e. rowing.

### Undulation

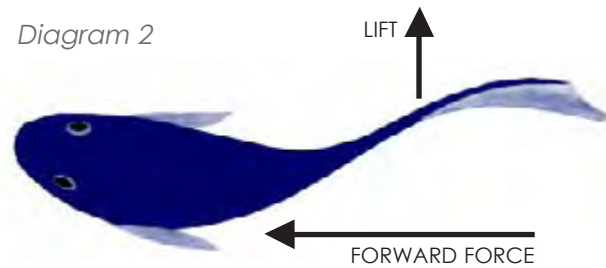
In undulation, a contraction of the muscles down each side of the body in turn causes a sinusoidal wave to pass from the head to the tail. The amplitude of this wave increases as it passes down along the body of the fish. This provides thrust forces, arising from the reaction of the push of the fish against the dense and viscous water, forcing the fish forwards.

Diagram 1



The reactive force can be resolved into (i) a forward thrust in the direction of motion and (ii) a lateral force generally called the lift, although it actually is in the horizontal plane, at right-angles to the direction of motion.

Diagram 2



The lift force, which actually causes a slight transient lateral movement, can-

A Yellow-fin tuna. The tuna family of fish are some of the fastest creatures in the sea with some species clocking in at 100km per hour

cells out over one complete stroke of the tail. The fish therefore moves forward by a certain amount for each completed oscillation. The distance travelled in one cycle of undulation is called the stride length. This is a unit of motion analogous to that used to characterise the motion of the legged terrestrial animals.

The resulting forward thrust force is, however, not completely available for moving the fish forward because there are also retarding forces known as the drag forces. There are (i) the pressure drag at the front of the fish as it swims through the dense water (ii) the frictional forces at the skin in contact with the moving water (iii) the vortices formed behind the moving fish.

Diagram 3

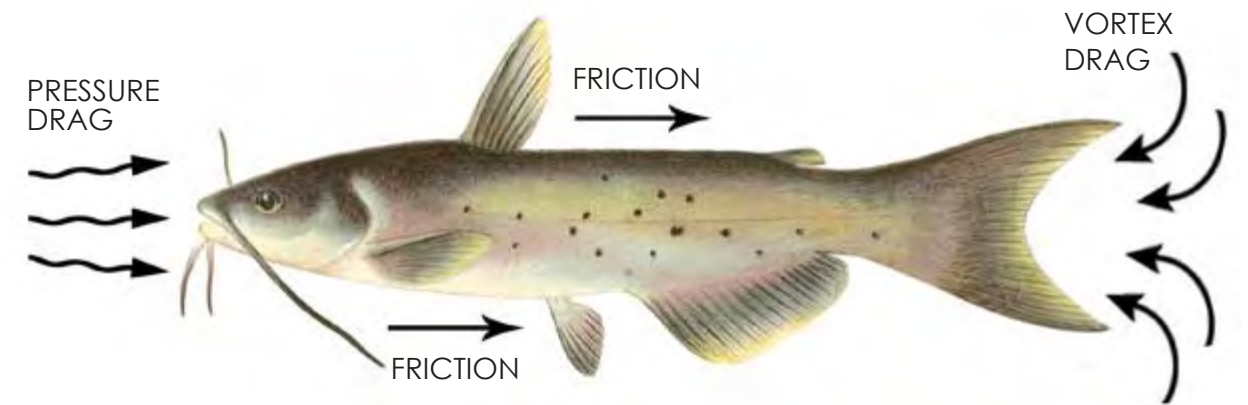
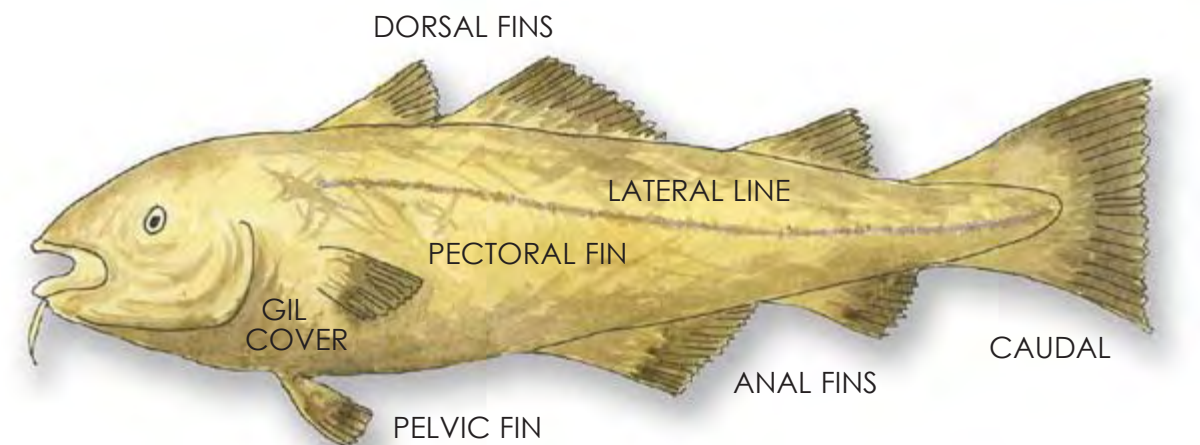


Diagram 4

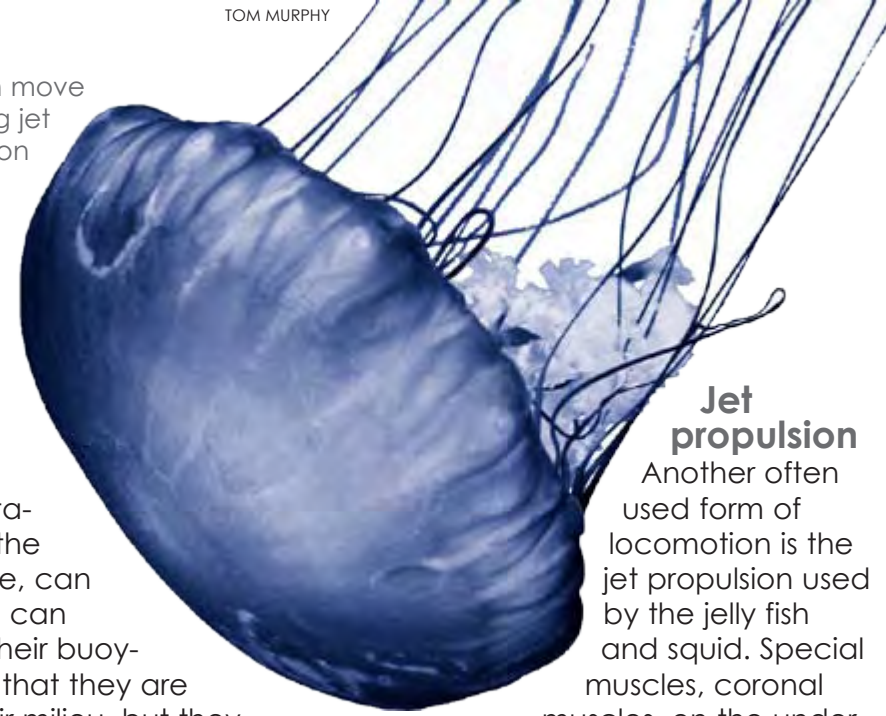






The sailfish is considered the fastest fish in the sea at over 110km per hour

Jellyfish move by using jet propulsion



### Jet propulsion

Another often used form of locomotion is the jet propulsion used by the jelly fish and squid. Special muscles, coronal muscles, on the under-

side of the bell contract and push water out of the bell. In compliance with the conservation of momentum, the jellyfish move in the opposite direction to the thrust of the water jet. This jet is not very powerful, though, as the expelled water jet has only a low speed; they are therefore not capable of countering the power of oceanic currents and waves.

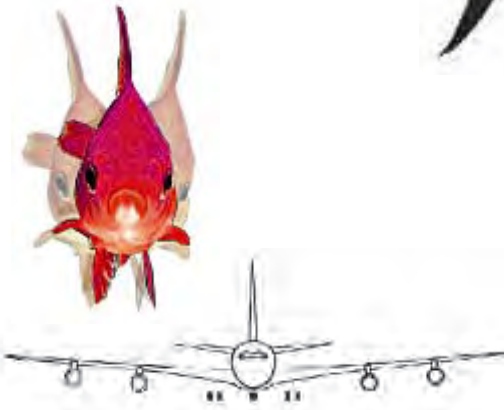
### Non-muscular forms of locomotion

The different forms of motion that we have considered above have all been based on muscle power acting on a skeleton. However, invertebrate planktonic larvae such as echinoderms, annelids, and molluscs depend not on muscle power for locomotion but on cilia; and spermatozoa swim using flagella that form their tails. Protozoa move by means of cilia, flagella or pseudopodia. As a curiosity some of the most primitive forms of life, the amoebae, can move at speeds that, relative to their absolute size, are quite impressive. Of course, unlike for other much larger aquatic creatures, the viscosity of water plays a significant role for their locomotion.

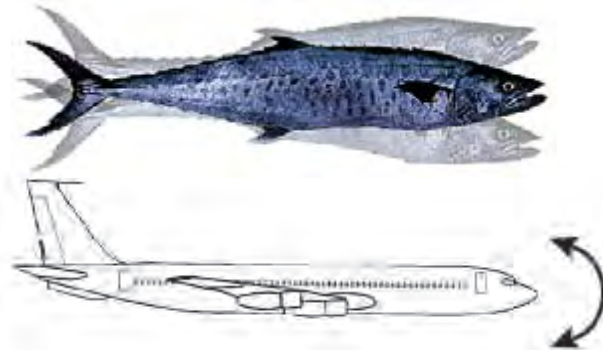
### Non-swimmers

Although we have discussed the locomotive behaviour of aquatic creatures, which generally live completely within

**Roll:**  
The control of roll is carried out by the dorsal and anal fins.



**Pitch:**  
Pitch is controlled by the pelvic fins (mostly) and the pectoral fins.



**Yaw:**  
Yaw is controlled by the pectoral fins.



### Direction:

As a boat requires some sort of a rudder to control the direction of motion, fish, too, can control their direction with the help of the caudal fin and the pectorals.

### 'Rowing' with fins

Although the fins are used primarily for control purposes they can also be used for propulsion. Some fish use their pectoral fins as hydrofoils, and others use them to row with. Marine turtles beat their fore flippers to attain speeds of up to 5km per hour. In a similar way whales swim by beating a hydrofoil, in this case, it is the single fin of the tail that beats up and down. This is unlike the vertical tails of tunas that beat from side to side. This is apparently a very effective means of propulsion, for whales can attain speeds of up to 45km per hour and more in sprints while the Black Tuna can attain speeds of more than 100km per hour. (The sailfish is considered the fastest fish in the sea at over 110km per hour.)

A fish thus needs specialised and strong muscles to move it through the viscous water: it also needs a strong skeleton to support these muscles which can make up to 80 percent and more of the body mass of the fish. And of all the vertebrates the skeleton of a fish is the most complex.

In fish, the body and tail act as a single unit. However, although the cetaceans use the same undulation

movement for propulsion it is only the tail that is involved and not the main body, which takes little part in the locomotion.

The largest of the cetaceans are the whales; the blue whale, for example, can be up to 30m long and can weigh up to 150 tons. Their buoyancy, however, is such that they are nearly weightless in their milieu, but they still have a large inertial mass, which requires a lot of energy to move around. For this, it needs both strong muscles and a correspondingly strong skeleton to attach them to. Not only that, it needs an efficient method of propulsion. This means that like all other creatures, be they marine or terrestrial, it has to be parsimonious in its use of energy.

That whales have adapted to live a weight-free existence can be seen from the fact that when they become beached their bodies tend to collapse under the, for them, unaccustomed force of gravity.



Sea turtles use "rowing" to get around

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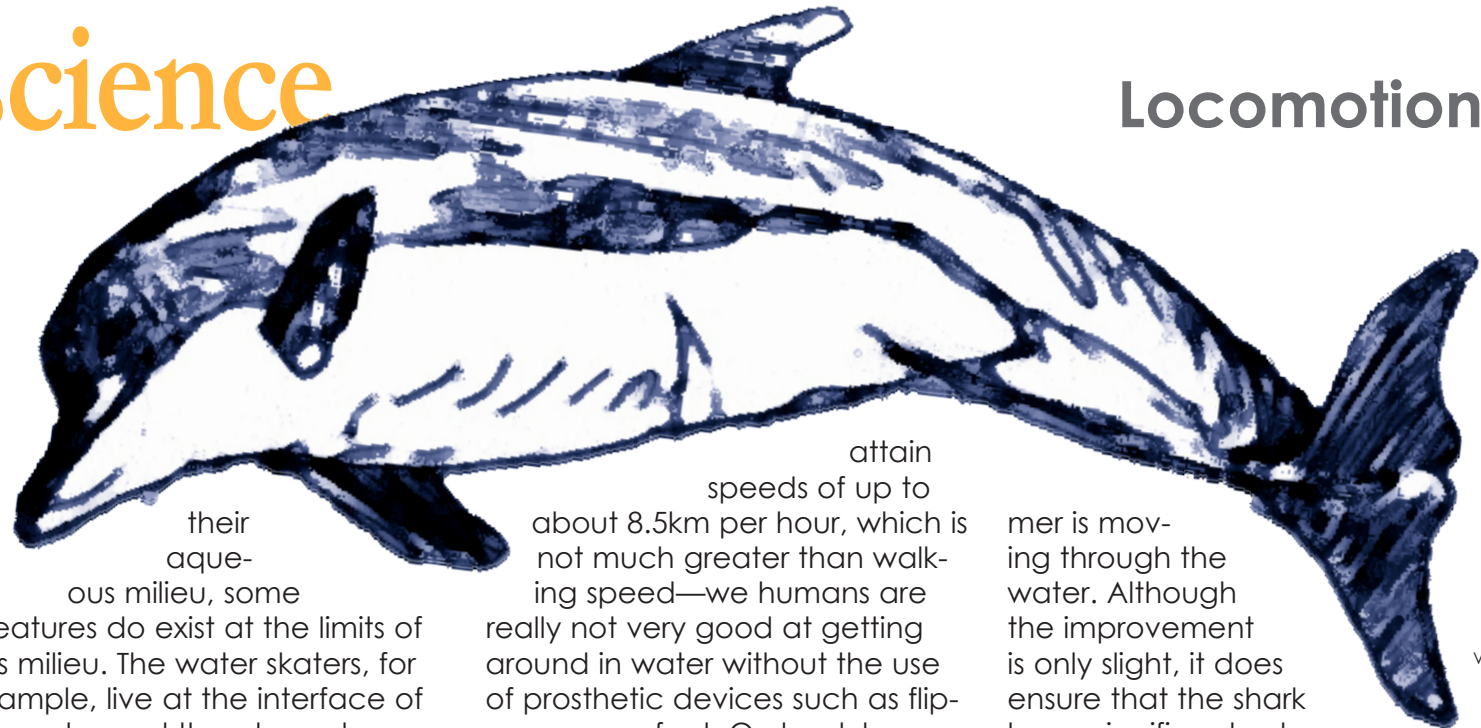
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their aqueous milieu, some creatures do exist at the limits of this milieu. The water skaters, for example, live at the interface of the water and the atmosphere (See X-RAY MAG, no.6, 2005). However, these can be considered as walkers on dry land. On the other hand, there are other creatures such as the crustacea which, although they do live completely immersed in the aquatic milieu, move about on the sea bed. In fact, they too, like terrestrial animals live in a 2D world.

**Divers**

In the context of this article, we can consider divers as aquatic creatures. So how do they compare with the fishes, say? Are there lessons to be learned from the aquatic animals? Divers are certainly not very streamlined, although much can be done to improve this. (See Cedric Verdier's article about efficiency in rebreather kits in X-RAY MAG no. 16, 2007). Compared with a tuna fish which, as we have seen, can swim at speeds of over 100km per hour, olympic swimmers can only



NOAA

attain speeds of up to about 8.5km per hour, which is not much greater than walking speed—we humans are really not very good at getting around in water without the use of prosthetic devices such as flippers on our feet. On land, however, sprinters over 100 meters can attain speeds of up to 37km per hour.

Can divers learn anything from the different forms of locomotion of aquatic creatures? Of course, they have copied the flippers or fins of sea lions and fish to improve their speeds through the water.

But swimmers have also copied the rough skins of sharks, which are covered with thousands of small teeth, to make low-friction swimsuits, for example the new Speedo® swimsuits. These have the function of maintaining a stable thin layer of water close to the body thereby reducing the resistance when the swim-

Scaly wetsuits for divers? How about this model from a 1696 illustration by Johann Zahn, Germany, of a merman complete with scales said to be caught in the Baltic Sea in 1531

mer is moving through the water. Although the improvement is only slight, it does ensure that the shark has a significant advantage over most of its prey. And so it is with competition swimmers, for it is estimated that

these new suits can reduce record times by up to two percent, which certainly gives the wearers of such suits an advantage.

Perhaps divers could obtain an advantage if wetsuits were designed with such surfaces, for it is clear that energy could be saved.

**Reference**

For anyone interested in animal locomotion in general, I can recommend *Principles of Animal Locomotion*, R. McNeill Alexander, 2003, Princeton University Press. It is somewhat mathematical but looks at all forms of locomotion on the land and in the sea and air. ■



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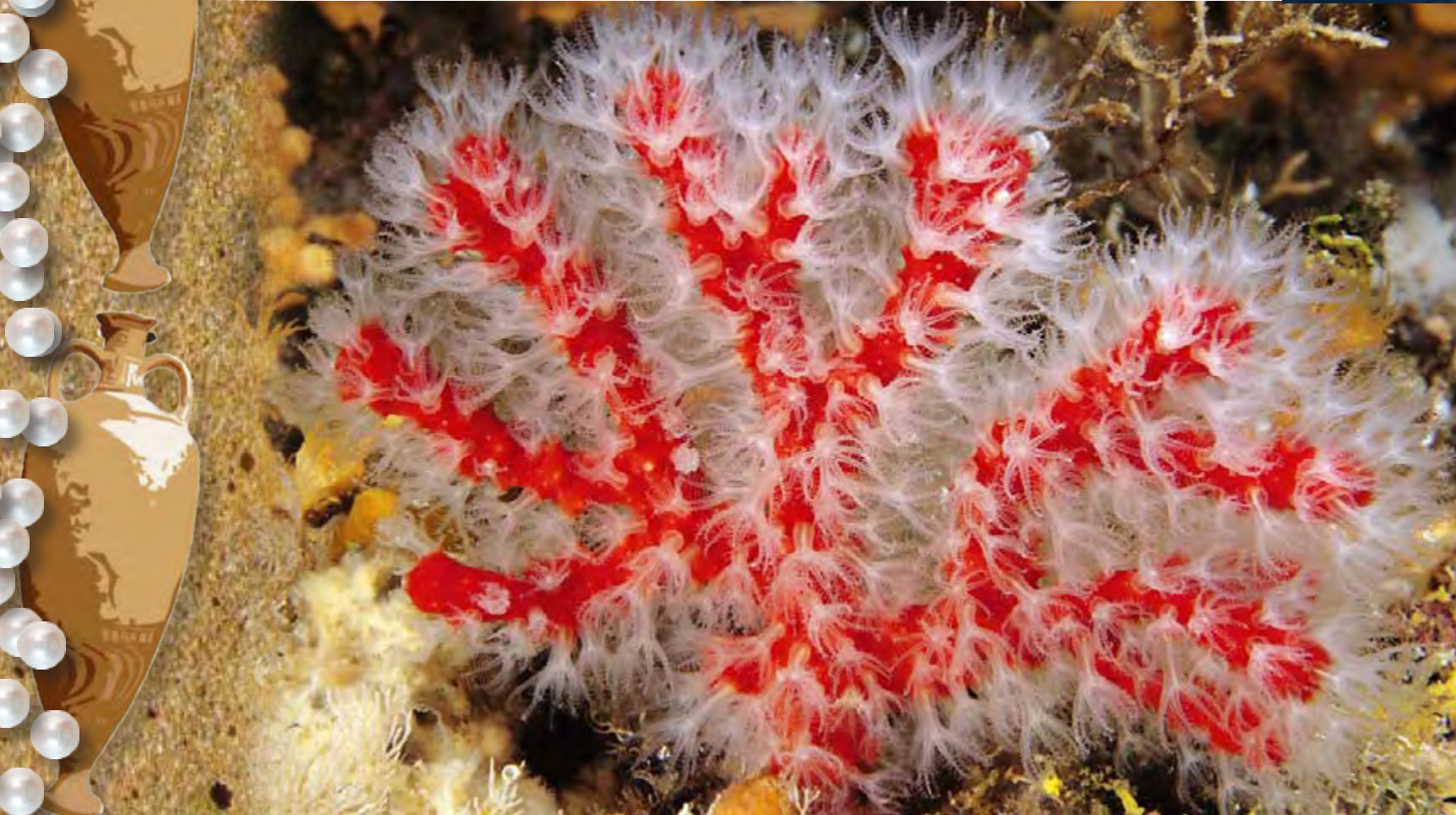
pearls of the  
mediterranean

The picturesque little port town  
of Komiza is the home of the  
Manta Diving Centre

# Vis

*Tito's bastion*

Text by Harald Apelt and Wolfgang Pölzer  
Photos by Wolfgang Pölzer



**If there is any hidden secret in the Mediterranean, it is the island of Vis. For many years, it was a forbidden and restricted military area. It was not until 1991, when the iron curtain finally came down, that it was opened up for tourism and diving. On Vis, small picturesque port towns and spectacular wrecks, drop-offs and caverns are waiting to be discovered by divers.**

#### **The drop-off**

Although I have had several hundreds of dives in Croatia, I have never seen a drop-off like this before. It is not just the vertical fall into the deep blue, but the unbelievable natural growth that impressed me. Between the numerous red fan corals, I spotted what I first thought were other bright corals and bushes.

The precious red coral can be discovered even in depths that can be reached by scuba divers

From a distance, they just looked like a yellow variety of a gorgonian, but as I got closer, the real secret of this drop-off revealed itself in the beam of my lamp. The remarkable growths in front of me were black corals, a very rare species of cnidarian in the Mediterranean.

Scientists assume that these beautifully coloured polyp colonies can reach the age of 1,800 years, and as such, are one of the longest living sea creatures in the world. Inspired, I began to position my lights. These corals were not only scientifically interesting, but also a beautiful photo subject.

Some minutes later, our dive guide Lorenz signalled us onwards. He wanted to show us a grotto full of red corals. And indeed, not far from the yellow corals, a cavern entrance big enough to contain three divers, opened up a few meters into the rock. Unbelievable, but true, the ceiling of the cavern was completely covered with precious red corals. As the bubbles from our exhalations rose to the ceiling and brushed against the furry white polyps, they retracted, leaving their fire red skeletons naked and exposed. For thousands of years,



# pearls of the mediterranean



ABOVE: One of the colourful drop-offs covered with colour changing gorgones and the rare black corals. INSET RIGHT: "laaaahhh": Stubborn mule, but historically, the most reliable transportation mode in the pathless hills

## Croatia

they have served as raw materials for making jewellery. These growths remind me of gnarly fingers, as they stick 10 cms out of the ceiling.

After a couple of quick shots, it was time to start our ascent. In shallow water, we had a final glide through the spacious tunnel before being picked up by Lorenz Marovic's dive boat.

### Coral diver

This Croatian, who is also fluent in English, has constructed his vessel from the bottom up. Marovic's boat design includes a large dive deck and a decompression chamber, which is included not only as a matter of safety, but also to support Marovic's professional as a commercial coral diver. In Croatia, Marovic is one of just a dozen who are licensed to harvest and sell genuine red coral.

The biggest specimens that we saw on our last dive could possibly bring in 200 Euros, which is, however, hardly worth considering. "Real" red corals would bring in ten times as much, but you would have to

go to twice the depth to find them.

But we do not have much time to listen to Marovic's tales of his work as a commercial diver. Aniska, his wife and able helmsman, has swiftly brought the speedy dive boat back to their dive centre, which they run together.

### Island history

We are on the small Croatian island of Vis, which is located on the Dalmatian coast not far from the Italian border and about 45 km off the main coast. This strategically important position has secured Vis a place in history books, not always for the better.

In the 4th century B.C., Vis became the first Greek colony in the Eastern Adriatic. In a short time span, the island developed into a prosperous democratic city-state and an important centre of commerce, which soon founded its own colonies. It wasn't until several centuries later, during the 7th and 8th centuries AD, that the Croats arrived on the island, where they mixed with the existing population of Greek and Roman origin. The original name of the island, Issa, was soon "Croatified" to Vis.



Josip Broz Tito

## Josip Broz Tito

Josip Broz Tito was the leader of the Socialist Federal Republic of Yugoslavia from 1945 until his death in 1980.

During World War II, Tito organized the anti-fascist resistance movement known as the Yugoslav Partisans. Tito was the most prominent leader of the Anti-Fascist Council of National Liberation of Yugoslavia (AVNOJ), which in 1943 established the basis for post-war organisation of the country, making

it a federation. In Jajce, Tito was named President of the National Committee of Liberation. On December 4, 1943, while most of the country was still occupied by the Axis, Tito proclaimed a provisional democratic Yugoslav government.

After Tito's communist partisans stood up to intense Axis attacks between January and June 1943, Allied leaders switched their support to the partisans. King Peter II of Yugoslavia, American President Franklin Roosevelt and British Prime Minister Winston Churchill joined Soviet dictator Joseph Stalin in officially recognizing Tito and his partisans at the Tehran Conference. This resulted in Allied aid being parachuted behind Axis lines to assist the partisans. The Balkan Air Force was formed in June 1944 to control operations that were mainly aimed at helping his forces.

On 5 April 1945, Tito signed an agreement with the USSR allowing "temporary entry of Soviet troops into Yugoslav territory". Aided by the Red Army, the partisans won the war for liberation in 1945. At the end of the war, all external forces were ordered off Yugoslav soil after the end of hostilities in Europe. Later, he was a founding member of Cominform, but resisted Soviet influence, and became one of the founders and promoters of the Non-Aligned Movement. He died on May 4, 1980, in Ljubljana. SOURCE: WIKIPEDIA ■



# pearls of the mediterranean

Harvest: A Vis farmer brings in heavy grapes for the tasteful Vis wine "Plavac Mali"



## Tito's Bastion

It was not until the Croats arrived on the island that it became an important navy base in the Eastern Adriatic. Countless bloody bat-

tles and changes of power took place here, and later, during World War II, it regained its strategic importance. Vis became a base for Allied Air Forces and Navies, and was, at one time, also the headquarters for the staff of commander Josip Broz, more famously known as Tito, and later, as president of Yugoslavia.

Its unique location as a strategic stronghold and outpost in the Adriatic unavoidably made Vis part of the war. Even 45 years after the war, most of the inhabitants were military personnel. For this reason, the island has been completely off-limits for foreign tourists. No investments in infrastructure or tourism were made on the island, since only the needs of the Army and the few inhabitants of the island were accommodated. The only factory on the island was a small textile manufacturer, which supplied the military.

It was not until the 1970's when two hotels,

Lorenz Marovic inspects the results of an extended dive for red corals

## Red Coral Jewelry



In jewellery, it is corals such as *Corallium rubrum* and *Corallium japonicum* that are used. The unprocessed hard skeleton of red coral branches is naturally matte, but can be polished to a glassy beautiful shine.

Red corals resemble small leafless bushes up to a meter tall. Their valuable skeletons are composed of intermeshed spicules of hard calcium carbonate, coloured in shades of red by carotenoid pigment.

Even if red is thought of as their typical colour, corals come in a wide range of colours from red to white and from blue and brown to black. The most popular are the red hues from pale pink, or salmon, to a deep dark red. Black corals and gold corals are very much in fashion, whilst the blue ones are extremely rare. The white of the angel skin coral, suffused with pink, is regarded as particularly precious. Other well known colours are the rich red Japanese Moro coral, the pale pink "Boke" and the red "Sardegna".

Red corals grow on rocky sea bottom with low sedimentation, typically in dark environments, either in the depths or in dark caverns or crevices and have traditionally been brought up from the depths with trawl nets. However, since first-class corals have now

become rather rare as the shallower of these habitats have been largely depleted by harvesting, divers are now deployed, in a less destructive process, which

involves divers going down and harvesting the sensitive coral branches. After that, the branches are cleaned, sorted and processed by means of saws, knives, files or drills. Coral is not usually ground or cut on a wheel.

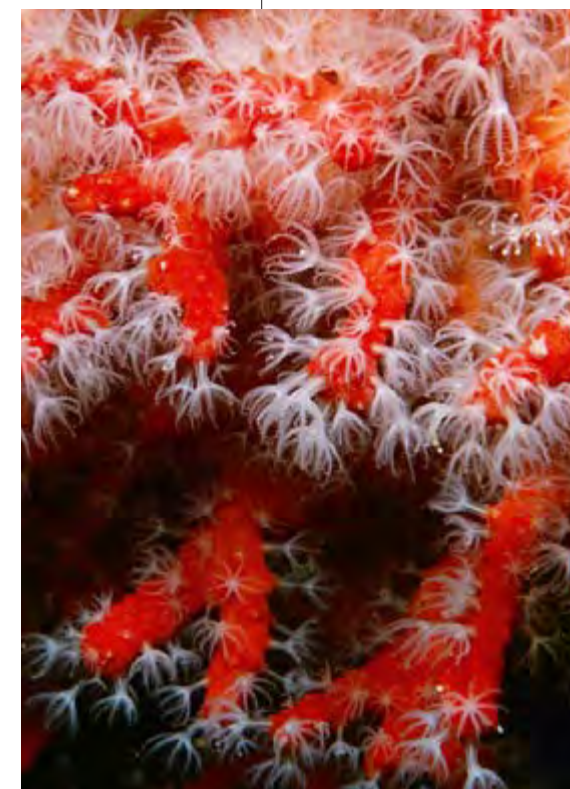
It is often porous, full of holes or cracked, and in these cases it is of lesser quality. Coral of that kind is sometimes filled with coloured wax to improve its appearance. High-quality coral is of an even colour and free of cracks, blotches, striations and holes. Since genuine untreated coral is rare, it does fetch good prices. For that reason, anyone being offered what appears to be high-quality coral cheaply should be sceptical. The best thing to do is to purchase one's high-quality coral jewellery from a reputable merchant.

Like the pearls, these are also organic jewellery materials. It certainly is an interesting fact that both of these are products of the water, chemically closely related with each other. Both consist of more than 90 percent calcium carbonate. And it really is a miraculous thing that nature has created both the scarlet coral and the pearl from the same, unprepossessing raw material.

On the one hand, corals are not particularly sensitive, but with a hardness of only 3.5, they are much softer than any other gemstone material. Their beauty can easily be impaired by the wrong treatment with, for example, cosmetics, hot water or bright light. Coral jewellery should be kept in a safe place, and from time to time, cleaned with a soft, damp towel. If the surface of the coral does get scratched, the jeweller can have it repolished. ■

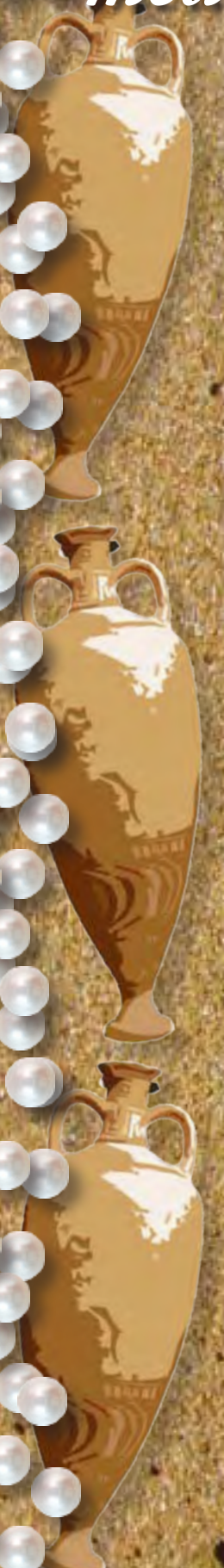
## Endangered or not

Red coral has been widely sought after since ancient times to supply a prosperous jewel industry, but over-harvesting of the deep-dwelling, commercial populations of this slow-growing, long-lived species has led to drastic reductions in the size of harvested colonies and has depressed the regeneration of the commercial banks. Red coral, however, is not an endangered species as such, due to the wide distribution of small, non-commercial colonies spread out over numerous predominantly coastal reproductive populations. ■





# pearls of the mediterranean



A really lovely Mediterranean port town: Vis is the capital of the island of Vis

## Croatia

What you see topside on Vis is also quite attractive, thanks in large part to the artesian wells under the island, which provide a plentiful supply of freshwater that makes the island one of greenest in the entire Adriatic.

Apart from the typical Mediterranean vegetation, wine also seems to favour the sandy soils of the island. From their grapes, a full-bodied red wine, the "Plavac mali" is produced. This wine will please the palate of any discerning visitor with an interest in wine. Add some grilled fish, fresh out the ocean, or a lamb chop with some potatoes and rosemary, and what more can you ask for?

### The five best dive spots

**Blue Grotto.** A very impressive cave, which is not to be confused with its more famous name sake on the island of Capri. From the little island of Bisevo in front of Vis, you either swim or dive through a narrow tunnel in shallow water. After a few meters, you will arrive in an expansive hall,



one in Vis and one in Komiza, were built to stimulate a bit of tourism on the island. But because only domestic Yugoslavian tourists were permitted to go, it was all just an exercise in futility. The only enterprises that really functioned were the ancient wine growing and fishing industries.

### A virgin island

When the military finally evacuated island in 1991 and the long-standing travel restrictions were lifted, Vis was a virgin destination. Even to this day, more than 17 years later, the island retains its original charm.

There are only a limited number of hotel beds on the island, of which most are private bed and

breakfasts. So, even in the high season, Vis hasn't got more than 4000 inhabitants and will not turn into a tourist hell like so many other places in the region.

A majority of the few guests that visit the island are Italians, who arrive by ferry from the ports of Ancona and Pescara on the opposite coast of the Adriatic.

### Divers' paradise

From a diver's point of view, we can thank the military for hiding these little secrets for so many years. Long stretches of coastline and the surrounding archipelago have hardly been dived at all. The impressive cover of marine life, as well as the many wrecks and caves that lie further north, put

the more famous dive sites in the Northern Adriatic to shame.

Under the huge gorgonians, you can find red corals of considerable size, even at air diving depths. It appears that the years during which the island was off-limits have protected and preserved Vis in a historic time capsule. Independent of Croatian dive regulations that were enforced in more recent years, Vis has already been using licensed dive guides for six years. Thanks to this diligence, underwater archeological artefacts, which date all the way back to ancient Greek and Roman eras, have remained largely intact.

Professional diving in extended ranges: Lorenz Marovic harvesting red corals at 70 meters of depth





# pearls of the mediterranean



LEFT: The wreck of the Greek freight ship *Vassilios T* can be discovered in a depth between 20 meters and 55 meters. The ship was transporting coal when on the night of March 19th, 1939, it hit the rocks of "Cape Stupisce" outside of Komiza. RIGHT: A diver investigates some black coral



which stretches out before the visitor. It seems possible to enter only through this entirely submerged, but huge entrance, which is illuminated by reflected sunlight from above, which paints the ceiling of the huge vault blue. Past a ridge of rocks and some other weird formations, it is possible to reach the bottom of the cave at a depth of 20 meters. Right after that, a drop-off follows.

**Teti Wreck.** A partially well-preserved shipwreck in 7 to 35 meters depth that is easy to dive. The 70-meter long Italian freighter wrecked on the northern coast in 1930 after running aground due to a navigational error. The bow is completely destroyed. The wreck is erect, resting at an angled slope, with the stern covered by beautiful coral growth. The steering wheel is an excellent photo subject. Quite often, you will see conger eels on the wreck.

**Vassilios Wreck.** Resting on its port side off the northern coast of Vis, this 104-meter long Greek freighter remains

in an excellent state of preservation. Laden with coal, it ran aground under mysterious circumstances on the night of March 18th, 1939. Since no one was injured, it was suspected that it was intentional, and probably a case of insurance fraud.

The bow and gigantic anchor are the shallowest and easiest part to dive. The stern, with the richly encrusted propellor and rudder, should only be visited by experienced and appropriately trained divers, since it is located at a depth of 55 meters.

**Totac.** A fantastic and richly overgrown drop-off that extends down to great depths. It measures up to anything that you could see in the tropics. A rocky ridge runs from the island and seems to disappear in the bottomless clear blue abyss. The region of about 30 to 40 meters of depth seems to be covered with red and yellow gorgonians and countless cup corals. There are small caves in which it is possible to see red corals. Stately langusters are eve-



rywhere. In shallow water, there is another cave to tempt divers.

**Seal's Cave.** An extensive, yet uncomplicated, cave to dive on the island of Bisevo. It is named after the colony of monk seals that, until a few years ago, took up residence in the rear of the cave. Here, it is possible to exit onto the beach, which was once the peaceful refuge of the seals. Aside from incredible visibility, it is also possible to locate rare creatures such as orange cleaner shrimps and porcelain snails.

*This trip was supported by Manta Diving Centre. ■*



# pearls of the mediterranean



The cowrie shell looks beautiful but is—besides human beings—the most dangerous enemy of the red corals. BELOW: Drop-off walls are brightly covered with red gorgones

## Croatia

pation of Yugoslavia (represented by Josip Broz Tito) The treaty became known as the Tito-Šubašić Agreement.

Despite the signing, the new government that would have resulted was not formed until more than four months later, on November 2nd, with the signing of the Belgrade Agreement. This brought an interim government into the picture, effective until post-war democratic elections could take place. At least, this was what

Winston Churchill had in mind when he supported the Agreement.

In reality, although Tito led a coalition government and Šubašić became its foreign minister, the real power was in the hands of the Communist-led Anti-Fascist Council of Yugoslavia.

It was only in the following year, in the autumn that the Treaty became void, following elections held by the Communists. Following a communist victory at the

polls, Šubašić and other officials stepped down in October.

On 29 November 1945, while he was still in exile and after a questionable referendum, Peter II was deposed by Yugoslavia's Communist Constituent Assembly of the "Anti-Fascist Council of National Liberation of Yugoslavia" (Antifašističko V(ij)eće Narodnog Oslobođenja Jugoslavije, or AVNOJ). On the same day, the Federal People's

Republic of Yugoslavia was established as a socialist state during the first meeting of the Communist-led Parliament in Belgrade. Josip Broz Tito was named Prime Minister.

The official Yugoslav post-war estimate of victims in Yugoslavia during World War II is 1,704,000. Subsequent data gathering in the 1980s by historians Vladimir Žerjavić (Croatian) and Bogoljub Kočović (Serb) showed that the actual number of dead was about one million. ■



## The Treaty of Vis

Edited by Catherine GS Lim

Vis is a small Croatian island in the Adriatic Sea, measuring roughly 90.3 square kilometres. Its highest peak stands at 587 metres high, and oversees about 5,000 citizens living in two towns and several smaller settlements.

It is your typical idyllic Mediterranean isle, complete with clear blue seas, sunken wrecks and unique marine

creatures just waiting to pop up in your viewfinder.

One wonders what the scene was like on 16 June 1944, during the second world war, when this isle became the venue of the signing of the Treaty of Vis. This historic agreement was an attempt at a merger between the exiled Yugoslav government (represented by Ivan Šubašić) and the Communist-led partisans who fought against the occu-



# fact file



Croatia's coat-of-arms



ABOVE: The island of Vis. RIGHT: Regional map with location of Vis



SOURCE: HARALD APELT, CIA WORLD FACT BOOK

## Croatia



**History** Up to the close of World War I, the lands that comprise Croatia today were part of the Austro-Hungarian Empire. In 1918, a kingdom was formed by the Croats, Serbs, and Slovenes, which became known as Yugoslavia after 1929. The country became a federal independent Communist state after WWII, under the strong leadership of Marshal Tito. In 1991, Croatia declared its independence from Yugoslavia, but it took four more years to be realized. These years were marked by sporadic and bitter fighting between Croats and the occupying Serb armies. In 1998, the UN supervised the return of the last Serb-held enclave in eastern Slovenia to Croatia. Government: presidential/parliamentary democracy. Capital: Zagreb

**Geography** Croatia is located in southeastern Europe. It borders the Adriatic Sea, between Bosnia and Herzegovina and Slovenia. Strategic location: Croatia controls most land routes from Western Europe to the Aegean Sea and Turkish Straits; Off the coast of Croatia lie a vast majority of the Adriatic

Sea islands, which are made up of 1,200 islands, islets, rocks and ridges. Coastline: 5,835 km combines 1,777 km of the mainland and 4,058 km of the islands. The terrain of Croatia is geographically diverse. Along the Hungarian border are flat plains; near the Adriatic coastline and islands are low mountains and highlands. Lowest point: Adriatic Sea 0 m. Highest point: Dinara 1,830 m. Natural hazards: destructive earthquakes.

**Climate** Croatia has both Mediterranean and continental climate with predominately hot summers and cold winters inland and dry summers and mild winters along the coast.

**Environmental issues** forests are being damaged by air pollution from metallurgical plants and its resulting acid rain; industrial and domestic waste is causing coastal pollution; civil strife between 1992-95 led to the need for land mine removal and reconstruction of infrastructure. Croatia is party to these agreements: Air Pollution, Air Pollution-Sulfur 94, Biodiversity, Climate Change, Desertification,

Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, Ship Pollution, Wetlands, Whaling. Agreements signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Climate Change-Kyoto Protocol

**Population** 4,493,312 (July 2007 estimate). Ethnic groups: Croat 89.6%, Serb 4.5%, other groups 5.9%—including Bosniak, Hungarian, Slovene, Czech, and Roma (2001 census). Religions: Roman Catholic 87.8%, Orthodox 4.4%, other Christian religions 0.4%, Muslim 1.3%, other religions 0.9%, those with no religion 5.2% (2001 census). Internet users: 1.576 million (2006)

**Languages** Croatian 96.1%, Serbian 1%, other and undesignated languages 2.9%—include Italian, Hungarian, Czech, Slovak, and German (2001 census)

**Currency** kuna (HRK). Exchange rates: 1EUR=7.2HRK, 1USD=4.6HRK, 1GBP=9HRK, 1AUD=4.26HRK, 1SGD=3.38HRK

**Travel** by car or plane to Split: During summertime there are

good ferry connections from Split via Hvar to Vis. The transfer takes about two hours. Price (car + 2 persons): € 35. Time tables are available at [www.jadrolinija.hr](http://www.jadrolinija.hr) Entry to Croatia with passport (valid for six months) or identity card for EG-members.

**Best time to visit** The climate on the island of Vis is milder than at the coastline. In summertime, temperatures are about two degrees lower, and in winter, two degrees higher than at the Croatian coast. Season starts in beginning of May and runs until the end of September.

**Accommodation** During the high season, it is difficult to get transfer tickets and accommodations. There are only a few small hotels on the island (three in Vis, one in Komiza). But there are some more private rooms and apartments available, which can be booked through the diving centres or at the tourist agency, Darlic & Darlic: tel. 00385-21-717 205 [www.darlic-travel.hr](http://www.darlic-travel.hr)

**Diving** The underwater scenery around Vis is diversified and offers all that scuba divers and experienced tech divers are looking for: colourful drop-off's, caverns, grottos and wrecks. Good visibility is one of the big advantages of this Mediterranean region. Most of the year, a 5-7 mm wetsuit is suitable; only in the beginning of the dive season is a drysuit more comfortable. There are four dive centres on Vis:

Manta Diving, Komiza [www.manta-diving.com](http://www.manta-diving.com)  
Issa Diving Centre, Komiza [www.diving.hr/idc](http://www.diving.hr/idc)  
Diving Centre ANMA, Vis [www.anma.hr](http://www.anma.hr)  
Dodoro Diving, Vis [www.dodoro-diving.com](http://www.dodoro-diving.com)

**Deco Chamber** The Manta Diving Centre has its own decompression chamber on board the dive boat. The next big decompression chamber is at Split. Transportation via speedboat or helicopter. ■



Boats in the harbour at Komiza







# Dealing with Fitness Training

By Cedric Verdier,

BAFA, International Fitness Association Instructor, IFA Sport Nutritionist

**There is no such thing as safe technical rebreather diving without proper preparation. But preparation means much more than just checking equipment, going through dive planning and "What-ifs". It is also a matter of long-term preparation.**

Just think about how strenuous a technical dive could be and how it impacts your body. You carry tons of tanks, cases, bags and equipment, travel for hours in an uncomfortable position, gear up with a dry suit under a tropical sun, and wait long minutes before being able to jump in the water. And this is just the beginning of the stress you are going to put your body through. You still have to swim to go down, swim on the bottom, swim to go up, on-gas, off-gas, fight against the cur-

rent and drag off your deco tanks, your bailout tank(s), your huge twinset (the one you nicknamed Potemkin!) or your favourite rebreather, swim at the surface, climb the ladder or the shore and carry everything again! And some people think we do that just for fun! Needless to say, preparing for these kinds of dives goes beyond just resting the evening before the dive and drinking a so-called energy drink a few minutes before kitting up. It takes year-round preparation. Moreover, it's a lifestyle!

## The benefits of fitness training

A better cardiovascular system means a lot for your body. It doesn't only improve your dives but also your general health. Some studies show that there is a relationship between  $VO_2max$  (your maximal  $O_2$  consumption,

i.e. the ability of your body to efficiently transport and use the  $O_2$  in your lungs) and risks of Decompression Sickness. And a better use of the oxygen means a better/slower ventilation. You are less exerted if you have to swim for a long time, or harder than usual, and it becomes easier for your body to get rid of the  $CO_2$  you produce.

The Body Mass Index (BMI) is

a way to determine the ratio between fat tissues and muscles in your body, based on your age. A lower BMI has the following significance for a rebreather diver:

- Less fat and more muscles is a good way to decrease your susceptibility to DCS. Because of a higher vascularisation, muscles tend to be less prone to DCS than poorly perfused fat tissues.

- Muscles are heavier and less buoyant than fat tissues (1.10gr/cm<sup>3</sup> for muscles and only 0.90 gr/cm<sup>3</sup>

for fat tissues). So, a

lower BMI means a less buoyant body, which in turn means a lesser need for weights, something that all divers should appreciate. And with less weight, rebreather divers have usually a better trim.

- More muscles also mean more strength, something that can prove to be useful in case of an unexpected situation (fighting against a strong current, holding on a shotline, etc.) or an emergency (helping another diver to surface, rescuing a diver and removing him/her from the water, etc.).

The Body Mass Index can be calculated by different complex equations based on the skin thickness, or more simply, with modern digital scales. Obesity is when your BMI is



# for Technical Divers



# education

over 20 percent, if you are under 35 years of age (31 percent for women). But if you are older than 35, then obesity only appears if your BMI is over 25 percent (37 percent for women). So, check it out on a regular basis!

## More comfort

Fitness is of paramount importance for your comfort level at the surface and underwater. Before the dive it gives you more strength to carry the tanks and all your kit, noticeably reducing the pre-dive stress. It also helps you

to stand up, walk and jump in

(or

anything else), minutes

the water with all the gear on. During the dive, swimming becomes less tiring and less stressful, allowing your muscles to better avoid cramps. You swim more efficiently and more relaxed, and your gas consumption (or your oxygen consumption, if you dive with a rebreather) doesn't go through the roof every time

you have to swim slightly harder. After the dive, your body will be subjected to a certain level of post-dive decompression stress. But one of the most stressful events is to climb a ladder

## Fitness Training

after surfacing. Your heart has to pump faster and harder to supply blood to your muscles when you already have a peak in

bubble formation in your bloodstream.

### A good program

Fitness training is like so much else in life. You have to find the right balance between too much and not enough. Too much and your body becomes tired, reducing your motivation. Not enough and the results are difficult to perceive. So, no need to hurt yourself, if the only kind of physical activity you've done in the last few years was to move your giant flat screen TV from your living room to your bedroom. Better to start slowly and gradually, rather than giving up after a week.

1. Get more muscles. Which ones? The ones you use the most in diving. You don't need to become the future governor of California for that. Just slowly increase the mass of your legs, chest and back and their ability to transform into energy the nutrients they store. Between one and three times a week, go to a gym club and work out for 20 to 40 minutes. Focus on some critical muscular groups like quadriceps (the thighs), back, deltoids (shoulders) and arms. If you have enough free time to go working out several times a week, a complete circuit (all body muscles) once a week is a good idea. And

never forget to spend five minutes every time to exercise your abs. They help you to keep a good posture at the surface and to stay horizontal underwater, hence avoiding back problems when you carry heavy stuff.

### Improving your cardiovascular system

Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic[2] or energy-generating process. Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time—about 85 percent of your maximum output, depending on your age—but is more or less stable for a long period of time. Anaerobic exercise is what happens when you need your muscles for a very short and intense period of time. Of the two forms of metabolism, aerobic is the one you use the most in diving, while you swim at the surface or underwater.

Aerobic activity has a beneficial effect on your Vital Capacity (the maximum amount of gas you can exhale from your lungs), Stroke Volume (the blood pumped by your heart at each

heartbeat) and Cardiac output, and improving any of these comes with some clear benefits to a rebreather diver. The best way to train your aerobic energy production system is to use the muscular group you're supposed to use in diving. Swimming, but also running or bicycling are some of the best training methods. Practice two or three times a week, at moderate intensity but for at least 30 to 60 minutes. A heartbeat monitor can help you to adjust your intensity, following these recommendations:

Maximum heart rate = 220 - age

If you haven't done any exercise for a couple of years, keep your heart rate between 60 and 70 percent of maximum heart rate. With more training, you can slowly increase your target heart rate.

### Become more flexible.

Proper stretching is an important part of any fitness program. It helps to protect your muscles, ten-

dons, ligaments and joints. It also helps you to reach all your equipment (sling tank clips and D-rings, isolation valve on your twinset, etc) more easily. Always do a short—about five minutes—but careful and slow stretching session at the end of each aerobic training session. Go through all the main muscles and joints and gently stretch them one by one for at least 20 seconds.

### Don't forget hydration and diet

A proper hydration program doesn't start a few minutes before a "big" decompression dive. You should at least increase your fluid intake 24 to 48 hours before the dive. Food is also a very important issue, as most of the people have an improper balance between the different types of nutrients: carbohydrates (glucose, or glycogen stored in the cells), lipids (fat) and proteins.

A good starting point for your daily intake is 60 percent of sugar ("slow sugars" like bread, pasta

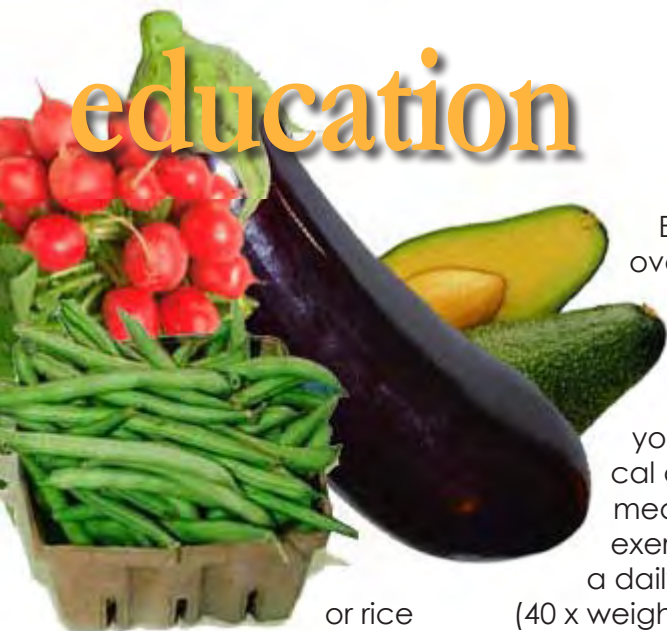


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# education



or rice are more useful than "fast sugars" like candies), 30 percent of proteins (meat, fish, cheese, milk, eggs) and 10 percent of lipids (unsaturated oils). Don't forget a large portion of fibres (salads, fruits) to help your digestion and get the necessary vitamins and minerals your body needs.

Some proteins (amino-acids) are good anti-oxydants, but physiologists are still puzzled with their ability to decrease one's susceptibility to oxygen toxicity. More proteins also actually helps to decrease your Respiratory Quotient, the ratio between oxygen metabolized (used by your body) and the CO<sub>2</sub> produced. A good way to decrease your CO<sub>2</sub> production and to save your scrubber!

Even if you feel over-weight, don't try to reduce your food intake. Just select carefully what you eat. A technical diver with a light/medium level of exercise should have a daily intake around (40 x weight) calories. For instance, if you weight 80kg, you should eat 3200 calories per day, and that's quite a lot of food. Have a look at a nutrient table to have an idea of what it is. Spread this food over three meals, according to the above 60-30-10 ratio.

**A healthy lifestyle**  
If you committed to a fitness training program, it might be the right time to also improve your lifestyle. Quit smoking. Nicotine and 32 other components decrease your ability to properly use your alveoli for efficient gas exchange. Slow down your alcohol intake. Alcohol is as high as fat in caloric content. No chance to loose your love handles if you don't give up the 20 beers you usually drink to celebrate a good and safe deep dive. Slow down your caffeine intake. Caffeine (in tea, coffee, soda) is a stimulant of the basal metabolic rate, increasing (and



# Fitness

after a while decreasing) blood pressure and heart rate, something you don't really need during a technical dive. And caffeine is a diuretic that increases dehydration and definitely requires a P-valve on your dry suit.

Most technical divers spend a lot of time preparing their equipment and fine-tuning their dive plan and decompression.

Just don't forget that your most important tool is not your dive gear but your body! ■

Aboard the NOAA research vessel, *Ron Brown*, Operations Officer LT Mike Hoshlyk's duties include acting as the liaison between the scientists and the ship's crew, serving as dive master for the ship, standing in as the ship's medical officer, conducting damage control drills, and safety and lifesaving equipment maintenance. He endures long periods at sea by keeping to a daily routine. From 12-4am, Mike is on navigational bridge watch; he catches a bit of shut eye before he is on watch again from 12-4pm; he exercises a bit and then gets to do it all again the next day, seven days per week. Mike's daily fitness regime, proper hydration and diet, rest and relaxation helps him maintain a healthy outlook, focus and concentration on the job.

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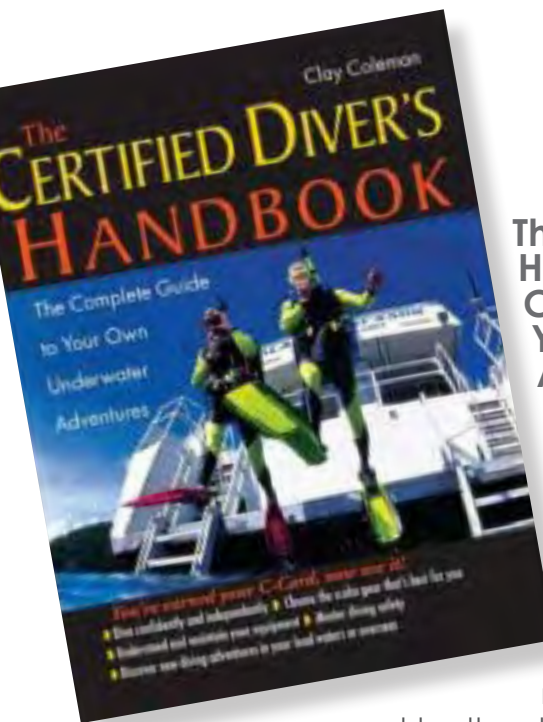




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Edited by  
Catherine GS Lim

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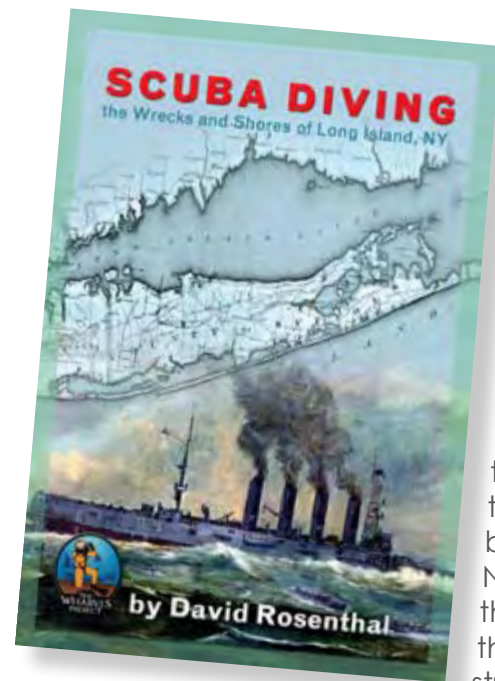


### The Certified Diver's Handbook: The Complete Guide to Your Own Underwater Adventures

by Clay Coleman

Yes, we know that this book first appeared on the bookstores way back in 1994. However, it still warrants a read from new as well as seasoned divers. The reason is simple. This book

must be the ultimate how-to guide to how life should be like after receiving your C-Card. Call it a 384-page passport to your new life as a diver. This book covers the many many aspects of diving, from renting/buying equipment at the right prices, planning dives, executing dive expeditions, safety, rescue procedures, etc. Different types of dives are covered, including wreck diving, reef diving, diving at night and underwater photography. One thing that we can identify with is the fact that this book shows how one can get on a dive trip regardless of the location, budget, time of the year, and availability of your regular dive buddy. No need to confine this wonderful sport to sporadic weekend trips (too short!) and Christmas vacations (too crowded!). Author Clay Coleman shows how divers can make diving an integral part of their lives (the way it should be). As it says on the cover: "You've earned your C-Card, now use it!" Yes, we know how that feels like... ■

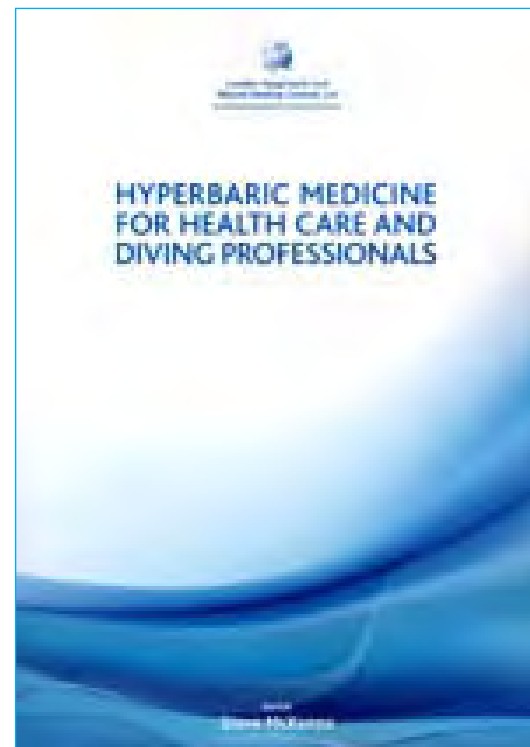


### Scuba Diving the Wrecks and Shores of Long Island, NY

by David Rosenthal  
372 pages

We admit that the waters will be cold. The currents will be strong, and alas, the visibility usually isn't much to brag about. So why dive in the waters of New York? Well, the more-than-70 stories in this book tell you precisely that. Written for the diver and non-diver, this book allows you to savour the excitement of Northeast Technical scuba diving. Indeed, the very difficulties of diving off Long Island – the variable visibility, cold temperatures and strong currents must be some of the reasons that divers continue to make the location their

underwater playground. That, and the countless shipwrecks in the vicinity (some more than 500 feet long)... Writer David Rosenthal is a native New Yorker with more than 500 local dives to his name. While the stories provide sufficient adventure for the reader, there are also site maps and photos to enhance the story-telling. For the convenience of readers who want to read about specific wrecks or sites, he has added a site/equipment index in the book. ■



### Hyperbaric Medicine for Health Care and Diving Professionals

Softback: 186 pages,  
Aqua Press, April 2008

If your interest veers towards the medical side of diving, particularly in the area of hyperbaric medicine, then this book should somehow find its way onto your bookshelf soon. This 186-page book is a comprehensive manual covering the many aspects of hyperbaric medicine. Targeted at those who see themselves as a future Certified Hyperbaric Technologist or Certified Registered Nurse, the topics covered run the gauntlet of the regulations, chamber design and operation, environmental health, diving and hyperbaric physics, various roles of team members, fire suppression systems, patient care and management, etc.

Edited by Steve McKenna, this manual

incorporates the British Hyperbaric Association Core Curriculum and serves as an approved course for health care and diving professionals. ■



### A Shark Documentary Made With Heart

*Sharkwater*  
Directed by Rod Stewart  
89 minutes

"I wanted to make a film that shows sharks the way they really are, as beautiful and magnificent creatures that don't want to hurt humans, and to

show how our fear has blinded us to the fact that their populations have been reduced by 90 percent over the last 50 years." —Rod Stewart, Director

To say that the filming of the documentary, *Sharkwater*, was a challenge must be the understatement of the year. Despite having never shot a video camera before, Director Rod Stewart wanted to produce a beautiful film about sharks. This promising premise turned potentially deadly as Stewart, in teaming up with conservationist Paul Watson of the Sea Shepherd Conservation Society, gets on the trail of the international sharkfin trade.

During the production, they had to contend with a pirate fishing boat in Guatemala, a gunboat chase, espionage, gangsters, corrupt legal systems and attempted murder charges, putting their lives at risk countless times.

Filming took place in 15 countries, with the majesty of the world's sharks taking centerstage. Amid the exploitation and corruption surrounding these creatures, viewers get to revel at these fascinating creatures. Watch this documentary and you'll come away in awe of the beauty of life and how our actions affect (and threaten) its tenacious balance. It's no wonder the film enjoyed a record-breaking box-office opening weekend, as well as receiving 21 international awards at film festivals worldwide. ■



## Practical Handbook of Marine Science, Third Edition

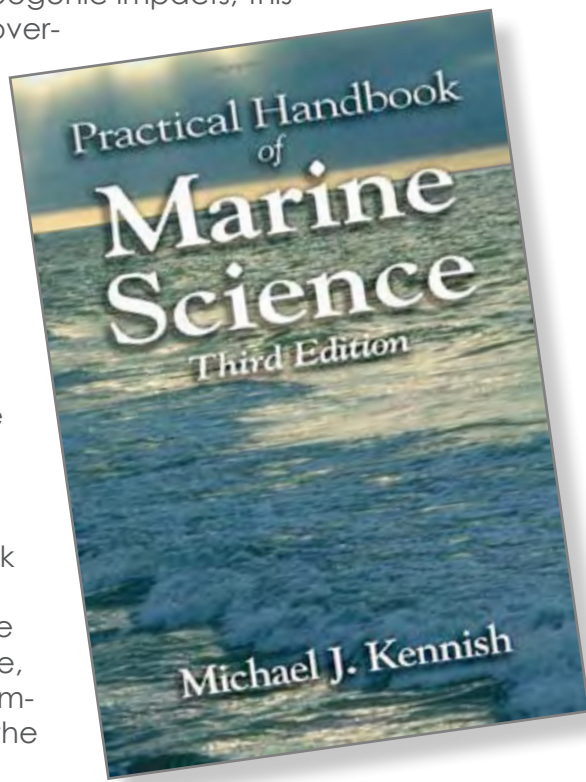
edited by Michael J Kennish  
896 pages  
ISBN: 0849323916

The oceans cover 71 percent of the earth's surface. The mean volume of the oceans is ~1.35 x 10<sup>9</sup> kilometres. The mean depth of the oceans is ~3,700 metres. The Pacific Ocean is the deepest at 4,188 metres, followed by the Indian Ocean at 3,872 metres and the Atlantic Ocean at 3,844 metres.

You can find this information within the first four lines of the first page of this book's first chapter. The rest of the page practically overflows with information, and the same can be said for the remainder of this impressive volume.

Weighing in at an impressive 896 pages, this third edition is not to be taken lightly. Covering ocean physiography, marine chemistry, physical oceanography, marine geology, marine biology, and marine pollution and other anthropogenic impacts, this book offers an extensive coverage of practically all aspects of the marine environment.

With such a wide scope, this third edition takes care of the multi-disciplinary needs of anyone working in the realm of marine science and geology. With more than 800 tables and figures, this single reference does away with the hassle of heading to the library or scouring online databases every time you need to look up some obscure information. This handy guide is sure to have the info somewhere, and lets you log in some arm-strengthening exercises at the same time. ■



## Diver

by Tony Groom  
Seafarer Books  
216 x 135mm, 336 pages  
20 bw / 12 colour illustrations  
ISBN: 978 1906 266 066

This book reads like an adventure novel, complete with wartime action and intrigue. It tells about the life and times of one Tony Groom, who has been diving since the age of 17 in the Royal Navy, and continued his underwater adventures as a saturation diver in civilian life.

While in the navy, Tony specialised in diving and bond disposal in the Falklands War. It was not a job for the ordinary soldier, as it required

a lot of courage and steel-mindedness. The special breed of men who took upon themselves the incredible task of ensuring the safety of their comrades and civilians shared a bond that those outside their circle would never understand.

Despite this, Tony chronicles his wartime experiences in a down-to-earth, matter-of-factly sort of manner. There is no arrogance in the prose, no excessive patriotism. In other words, he tells it as it is.

And the same goes for his life after the military, as a commercial saturation diver. Spending as many as 28 days in a diving bell isn't for everyone. Sometimes, you're on your own, sometimes you're there with five other guys living in that compact space. Yet, in the oil fields of the North Sea, the dangers that abound are no less harrowing than those found in the battlefield.

As one flips one page after another, one gains a strong respect for Tony, as well as the men who served and worked alongside him. This book is truly a page-turner, giving readers a rare (and long overdue) insight into the lives and experiences of wartime mine disposal and saturation diving, made all the more exciting and mind-boggling by the fact that the incidents in the book are true. ■

# Review

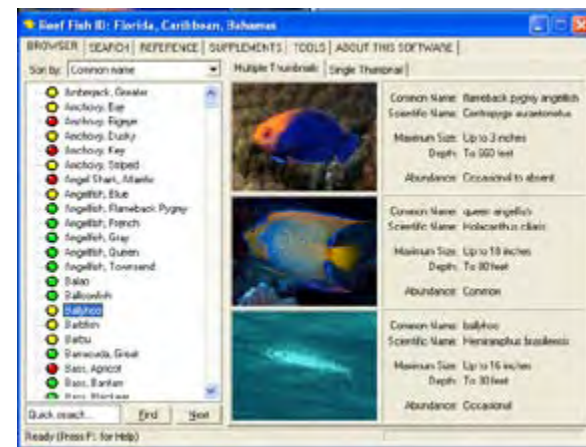
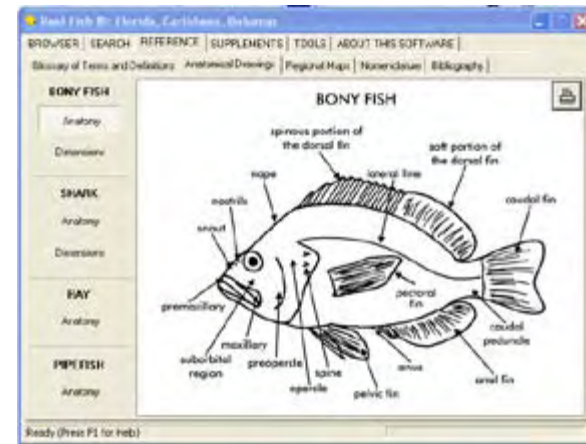
## Show me your fish identification, please!

By Arnold Weisz

The interactive reef fish identification DVD for Florida, Caribbean and the Bahamas by Canadian Reefnet is out in its fourth edition. They have put together a rather impressive package containing more than 4500 images, 1800 video clips describing over 840 species from Florida, the Bahamas and the Caribbean. I have used a bunch of such books and CD's over the years, as "knowing your fish" is an important part of the job-description. Without hesitation, this is one of the better products. After having flipped through images, video clips from awesome hammerhead sharks to tiny dwarf seahorses, I don't really miss the books with colour drawings that do not really match the real thing out there in the blue. Having the fish swim around in their little virtual reality ocean on your computer screen is a far better option.

With a few clicks you can have a unicorn file-fish swimming around on the top right of your screen, while you take a closer look at a sketch to get to know the fellow intimately. You can also get a lot of information about his nearest family members, where to find him and what his favourite dinner is. The small windows that pop up on your screen don't have as fancy a design as the CODIS program frequently used in CSI Miami, but they work well and fast. What they have in common is a lot of information.

Eyewitness accounts from divers are as unaccurate as from fishermen. And picking a fish out of an "mugshot" catalog, hours or days after a dive, has never been easy. If



you can't go back into the ocean to round up all the suspects, use your computer. For any Underwater CSI, the search panel makes the job of looking for the "most wanted" easy. There are a wide range of search criteria, so you can narrow

down the final line-up to a few choices. There are far more features in this program than I can manage to fit into this article, but I would also like to mention the articles and also the identification charts. They are all in the very handy PDF format, which means you can get nice prints. If you can't bring the laptop on your dive trip, at least you can make some prints with some of the information you would like to use. And to help you register your sightings, there is a Sighting Log.

Having heavily endorsed this product, I can't leave it without mentioning some points where improvements could be made. More images! Yes, I know not all the fantastic creatures of our oceans are readily available as models, *but...* Maybe I'm getting a bit slow sighted, but I would love another font used for the text—maybe one size larger as well. Or... I could get some spectacles! ■

For more information: [www.reefnet.ca](http://www.reefnet.ca)  
Product: Reef Fish Identification (Florida – Caribbean – Bahamas), 4th edition  
Publisher: Reefnet Inc.  
ISBN: 978-0-9685300-7-8





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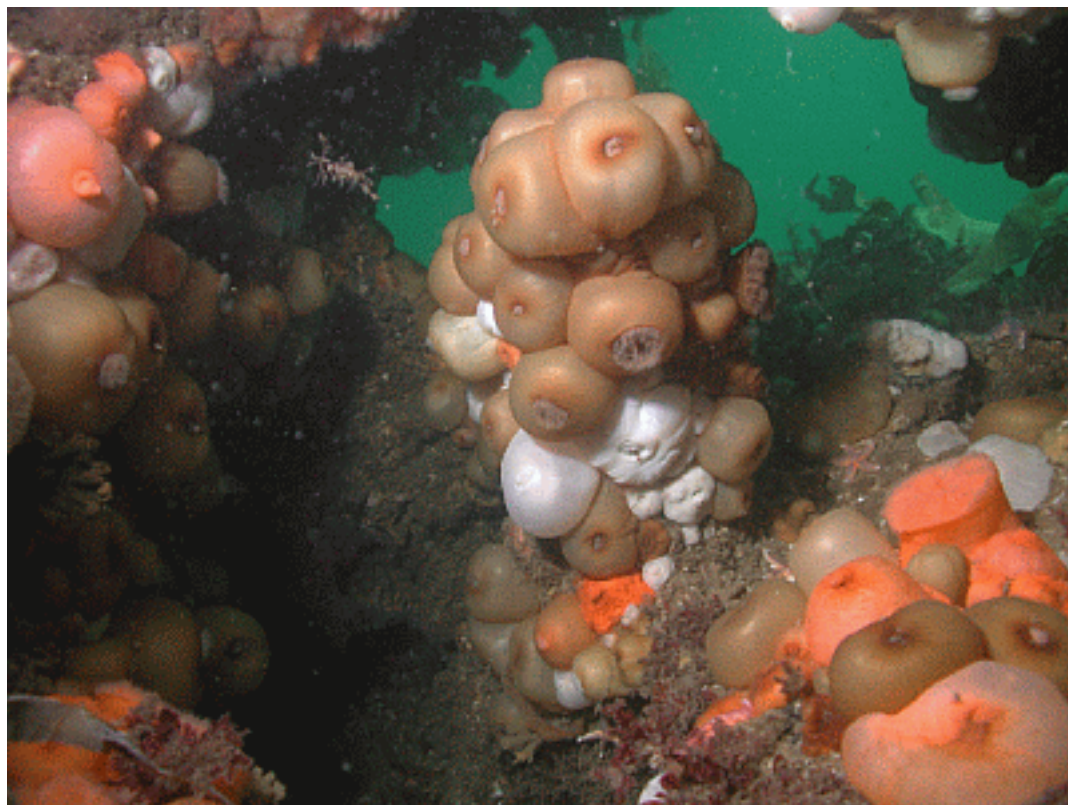
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## Unique Dive Site

Imagine a beautiful shallow green water reef with kelp, anemones and sponges among which lots of colourful fauna darting in and out and. Now imagine that the reef is growing on some weird sandstone arches and that the water is fizzy like sparkly mineral water, with bubbles coming out of the reef structure.



Text by Peter Symes  
Photos and illustrations  
courtesy of Hans Christian  
Andersen, BubblingReefs.com



# The Bubbling Reefs

At first glance, from a distance, the shallow stone reefs in the shallow water off the northern peninsula of Jutland, Denmark, does not seem to be much out of the ordinary. Diving in Denmark is all right—it has its moments and decent locations, but cannot compare to the often exceptional diving that the other brethren Scandinavian countries can offer—with a few exceptions, and this is one of them.

As you get closer, you will soon realise that this location is

anything but ordinary. The thriving reef is not only full of interesting macro life—in large part thanks to the marine reserve status the area enjoys—but delicate arches and pole-like structures poke out of the sand. The overgrowth of kelp and sponges gives them a furry appearance. But it is the slow fizz of bubbles coming out from the inside of these structures that gives the dive experience here a definitely surreal tint.

*So, what's going on here?*

The gas is methane, and what lies beneath the seabed is what you could call an oil field still in the process of forming.

The methane most likely stems from microbial decomposition of plant material deposited during the Eemian and early Weichselian periods, i.e. 100,000 to 125,000 years B.P. The gas then seeps up through the sandy seabed forming channels, or funnels, along the paths of least resistance.

As other aerobic microbes

in the upper layers oxidise the methane, they turn the loose sand into solid carbonate cemented sandstone structures. It is believed that the cementation occurred in the subsurface, and that the rocks were exposed in the open by subsequent erosion of the surrounding unconsolidated sediment. In other words, the surrounding sand was later washed away by changing currents, leaving the solidified parts standing free as a sculpture garden.

These structures can be up to 500 m<sup>2</sup> and consist of columns up to four meters high, arches, complex formations of overlying slab-type layers, and pillars up to 4m high. The rocks support a diverse ecosystem ranging from bacteria to macroalgae and anthozoans.

Many animals live within the rocks in holes bored by sponges, polychaetes and bivalves. Within the sediments surrounding the seeps, the abundance and diversity of metazoan fauna





Distribution of 'bubbling reefs' in the northern part of the Kattegat and in the Skagerrak off Hirtshals, and gas wells in Vendsyssel and on Læsø (light area). The seeps and gas wells follow a NW-SE direction parallel to faults along the Fennoscandian border

is poor—probably due to the toxicity of the hydrogen sulphide contents in the gas.

### The Hirsholm islets

Hirsholmene (the Hirsholm islets) are located approximately five kilometers north-east of the port of Frederikshavn, at the tip of the Jutland peninsula. Beside the main islet, Hirshold, there is one larger islet, Græsholm, and a group of smaller islets called,



ABOVE & RIGHT: Views of the columns that rise up from the sea floor at the bubbling reefs. Images captured and compiled from the DiveFilm Podcast Video by Hans Christian Andersen, which can be viewed at: [www.mefeedia.com](http://www.mefeedia.com)

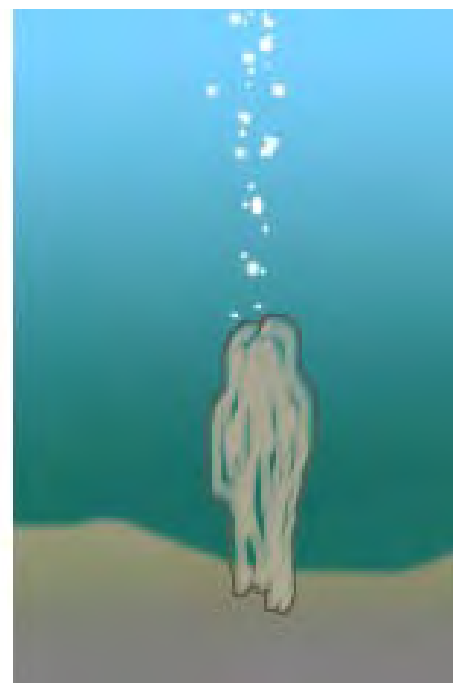
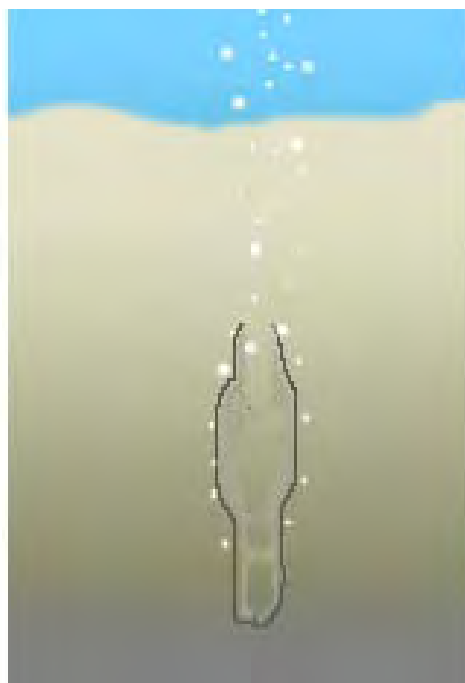
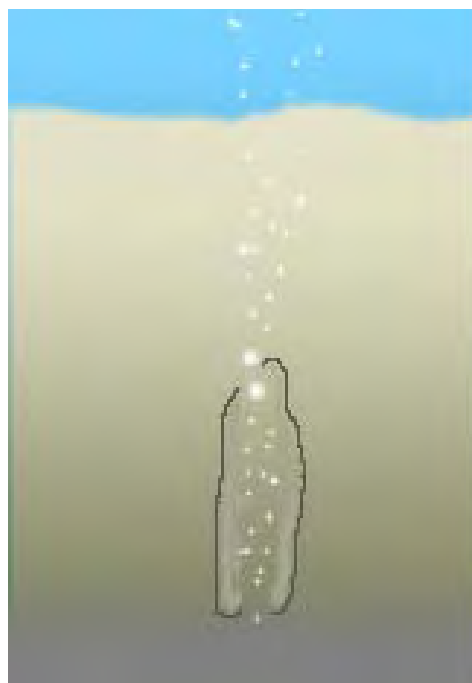
Tyvholm, Kølpen and Deget, making up about 45 hectares all together.

Only the biggest islet is inhabited, most of the time by no more than 8-10 residents though through the summer season. Yachters will visit or come over by a small ferry.

The islets are state-owned and surrounded by territorial waters. In 1929, the site was declared a Scientific Sanctuary, mainly

due to the vast number of birds nesting on the islets, including a number of rare and protected species.

In 1981, the reserve was expanded to include the surrounding sea area consisting of about 2,400 hectares. The landscape is dominated by rocky embankments and banks of deposited sand and sediments along the beaches. On some of the islets, the rocks

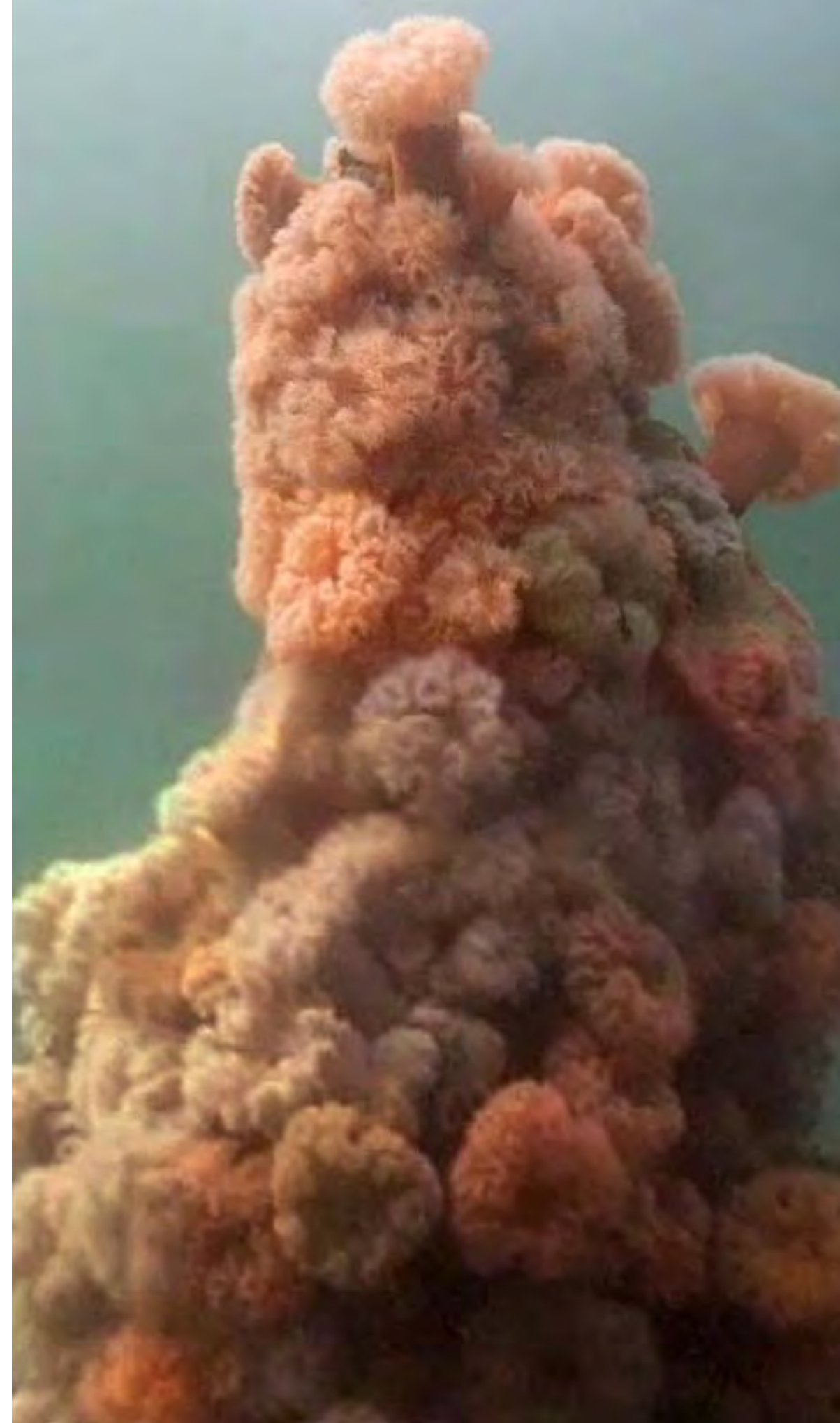


Proposed formation of a 4 m high pillar at 10 m water depth in the Kattegat:

(A) Methane-oxidation induces precipitation of carbonate, which lithifies the sediment along gas channel.

(B) Cementation of sediment fills channel and the pillar structure grows from outside.

(C) Exposure of the carbonate-cemented sandstone pillar on sea floor as a result of erosion of unconsolidated sediment; methane seepage visible in the vicinity. Erosion may have been triggered by post-glacial isostatic uplift in the Kattegat







THIS PAGE: Some of the marine life found at the bubbling reefs  
 ABOVE: Detail view of the spines on a starfish

have been covered by a thin layer of top soil formed by decomposed seaweed.

The small islets, Tyvholm and Kølpen, are almost completely barren and consist only of rocks, giving an impression of how the whole area looked in times past.

Sediment carried by currents around the islets have been deposited in some locations creating small sandy beaches, especially on the north side of Græsholm and the main Islet, Hirsholm. The site is important for marine biology research. There is a visitor centre at the site.

### Diving there

There are no regular dive trips going out there, although some of the local dive shops in Northern Denmark will occasionally put excursions to the islets on their tour programmes.

The islets are only 20-30 minutes sailing with a RIB from the main coastline, so dive clubs, or dive centres, will often launch their boats from a jetty in one of the local marinas. Diving is easy with depths ranging from only 9-12 meters, although visibility can vary from the extraordinary to pea soup. ■

LEFT: *Alcyonium digitatum*, attaches itself to rocks, shells and stones in locations with strong currents and where the normally predominant algae do not grow to abundance due to lack of light or the presence of preying crabs and gastropods. Found on the lower shore but more often sublittorally at depths of approximately 50m

CENTER INSET: One of the largest species of jellyfish, *Cyanea capillata* is commonly called the Lion's mane jellyfish because of its highly distinguishable mass of thin, long, hair-like tentacles. Growing up to 30-50cm in diameter, it is usually yellowish brown or reddish in colour

Illustration of the underwater landscape at the bubbling reefs



ABOVE: Instead of scales, *Agonus cataphractus* is totally covered with hard bony plates aligned in lateral rows of sharp spines. It has a wide, flattened, triangular head that is over three times its body length, which is elongated and tapered. This fish can grow up to a length of 21cm

TOP LEFT: *Metridium senile* is an anemone, which varies a lot in its form and can grow up to 30cm. Its irregular base is wider than the column. Its many tentacles make a 'plume' over a parapet at the top of a smooth column when the anemone is expanded





POINT & CLICK  
ON BOLD LINKS



Edited by  
Gunild Symes

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ARTISTS AND GALLERIES

# Ocean Arts

*Paintings & Sculptures inspired by the sea...*



## Gini Holmes

*BP*, 2005, Printmaking Giclée, Open Edition, 16 x 13 inches  
Original Price: US\$ 150, € 95, UK £ 74. [www.mesart.com](http://www.mesart.com)

A traditionally trained print maker, Gini Holmes focused on more experimental methods after she received her BFA from Stanford University in lithography and painting. She completed a Masters of Science in Visual Studies specializing in experimental graphics from the Massachusetts Institute of Technology (MIT) where she worked with Electrographic Printing using a variety of copiers and handmade papers. She is now working with dye-sublimation transfers onto fabric and tile surfaces.



## Jens Poulsen

*Fisk*, Oil on Canvas, 160 x 160 cm  
[www.Poulsen-Arts.dk](http://www.Poulsen-Arts.dk)

An autodidactic Danish artist who primarily works with oil on canvas,

Jens Poulsen says, "I'm attempting to catch a coherence with my surroundings, a gathering of information/situations—simplified in composition."



## Donna Schaffer

*Rainbow Starfish in Monterey Bay*, Oil on Canvas, 20 x 20 inches. RIGHT: *Reflection of a Humpback Pectoral Fin*, Limited-Edition Museum-Quality Giclée on Somerset Watercolor Paper, 16 x 24 inches. [www.underwaterpaintings.com](http://www.underwaterpaintings.com)

Donna Schaffer has been a scuba diver since 1976 and an underwater photographer since 1983. Since 1998, she has been a full-time fine arts oil painter. She travels to dive locations in many parts of the world where she photographs the underwater marine life and scenes, and makes reference sketches for her paintings.







# ocean arts

*Art of the Sea*



## William Nutt

*Octopus*, 2003, Champlain Black (Marble/Limestone) Sculpture, 29 x 34 x 22 inches

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

William Nutt was an engineer before turning to fine art. He says that many have asked him, "How does one go from engineering to an artist sculpting stone?" To that he has two answers: "One, how could I not; and two, I don't find there to be much difference between art, science, and engineering." He believes that great works of art and theory and results of engineering and scientific discovery are similar in that they both can contain incredible beauty, artistry, elegance and meaning.



## Steven Forrai

*Untitled*, 1999, Steel Sculpture, 75 x 17 x 31 inches

Price: US\$ 17,000, € 10,858, UK£ 8,416. [Absolutearts.com](http://Absolutearts.com)

The work of self-taught artist, Steven Forrai, evolved from the bending, shaping and fusing of scrap electrical metallic tubing. Later, he focused his energies on fine art and replaced his stock with refined materials including steel and aluminum, brushed then sealed with an epoxy base coat and an aliphatic urethane at the end. He says, "My creations are never completely planned, but started with a size and object in mind. From there my mood, sounds and atmosphere finishes off the piece for me."



## Joe Pogan

*Fish*, 2006, Found Metal Sculpture, 23 x 19 x 11 inches

Native Oregonian, Joe Pogan, received college education in art and welding after serving four years in the US Navy. He worked for more than 20 years as a professional welder. Combining his welding expertise and artistic talent, he has created a variety of animal sculptures using "found metal" objects such as old watches, sprockets, nuts and bolts. He says, "...the end goal is an eye-catching, fascinating amalgamation of metal with odd nooks and crannies you can explore for hours." [www.joepogan.com](http://www.joepogan.com)



## Sandra & Carl Bryant

*Tradewinds*, 2007, Mosaic, 30 x 28 x 1 inches. Original Price: US\$ 1,890, € 1,207, UK£ 935. An abstract swirl of waterlife in blues, greens and warm hues. BELOW: *Beautiful Dreamer*, 2007, Mosaic, 24 x 24 x 1 inches, original sold. Abstract mosaic of the sand clouds sky and sea.

Artistic husband and wife team, Carl and Sandra Bryant, specialize in handmade glass and ceramic fine art mosaics. Their studio is located in the Pacific Northwest where they first started painting and making handmade

## Jangling Jack

*Octopus* made from two recycled silver forks features two crystal eyes. Height: 10cm. Price: AUD \$35 + delivery

[www.janglingjack.com.au](http://www.janglingjack.com.au)

Jangling Jack is the creation of Chris Hartshorn and Steve Dessaix who have been working together since 1989 in a joint effort to "recycle the past to create the present". On 25 acres of virgin Australian bushland, their workshop is located on the Hawkesbury River in New South Wales. Their work is inspired by the natural beauty of their surroundings as well as "the historical past and industrial beginnings".



tile. In 2001, they discovered their passion for mosaics, which combined the two. Each piece is made by hand blending high quality glass, ceramics and other fine materials into a piece of art that is unique and lasting. Most of their fine art works have an average of 1,600 individually shaped pieces of glass per square foot.

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







# ocean arts

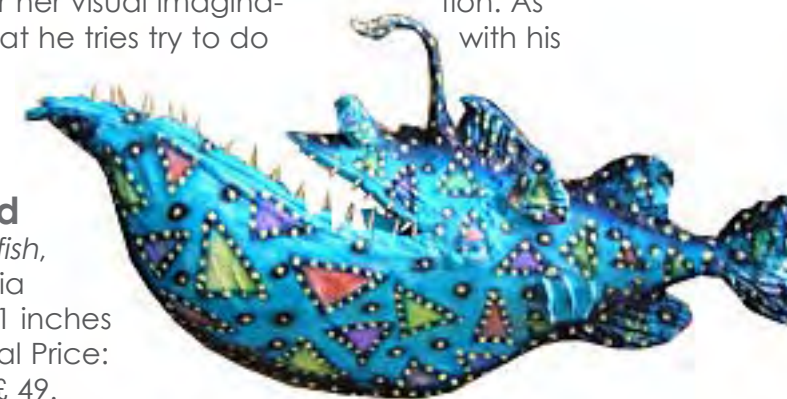
*Art of the Sea*



## John Brooke

*Pacific Warrior*, 2007  
Wood Sculpture, 23 cm x 67 cm x 18 cm  
Original Price: US\$ 2000, € 1277, UK£ 990  
[www.absolutearts.com](http://www.absolutearts.com)

John Brooke's home overlooks a beach, and so, he has ample opportunities to swim on most days. This sculpture is all about the amazing underwater creatures he meets. He says that more often than not, "Contemporary Art talks only to the cognoscenti" and feels that this defeats its original purpose, which is to speak to anyone who wants to use his or her visual imagination. As an artist, this is what he tries to do with his work.



## Dan Townsend

*Alice the Angler fish*, 2007, Mixed Media  
Sculpture, 22 x 11 inches x 4 inches. Original Price: US\$ 100, € 63, UK£ 49.  
[www.absolutearts.com](http://www.absolutearts.com)

A fun whimsical fish, *Alice the Angler* is made from palm fronds and papier maché. She is then air brushed and hand painted. Dan Townsend says she is the only true palmfish in the world, just Google "Palmfish" and find out. A true invention of a creative mind, the artist discovered this fresh new idea 14 years ago and is still having fun with it.

## Fatmir Gjevukaj

*Underwater*, Painting  
36 x 48 inches. Original Price: US\$ 3,200, € 2,044, UK£ 1,584.  
[www.fatmiri.com](http://www.fatmiri.com)

says, "I have learned that tactile surfaces in nature are formed through a process of growth and layering. I borrow this method to build the organic forms in the composition using fabrics and papers with different qualities. I structure the forms within the painting, but the surface area, such as folds and ripples, are created randomly through the flexibility of the materials, further imitating nature's process."



## Bernadette Badali

*Travel Lines - Water*, 2006, Mixed Media on Canvas  
36 x 60 inches.  
[www.badalibeal.ca](http://www.badalibeal.ca)

Toronto artist, Bernadette Badali, graduated from the Ontario College of Art and the University of Guelph, where she studied painting and photography. Working in these two mediums, she continues to explore textures in nature and architecture as her subject matter. She

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