Cool Fall Dive Fashions for Divers

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BC Canada
Vancouver Island

Deep Wreck
Yamashiro

Focus
Drysuits

Portfolio
Carlos Hiller

Science
Water Colour

Ecology
Medicines from the Sea

Equador
Galapagos

COVER PHOTO BY BERNARDO SAMBRA

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COVER PHOTO
Diver with Barracuda, by Bernardo Sambra

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Anemone, Galapagos Islands. Photo by Bernardo Sambra

A clearer perspective

Well, I know this is a dive magazine but what's really on my mind these days, are the same inescable issues that we all seem to worry about; Daily reports about global warming and the war in the Middleeast that both seem to escalate out of control. Did I hear that 500 billion usd has now been spent on the latter? And not a fraction thereof on global warming. I am having issues with those priorities. I don't what the politicians are thinking. Do they want to battle over a barren planet? They should be divers.

As divers we have a different and much clearer perspective. Perhaps not as clear as those people who live in nature and off nature - like the iniut. Most of us are, after all, city dwellers and consumers in modern societies.

But what we witness below the surface have helped put the spotlight on some environmental issues that would otherwise have gone undetected for a long while. And helped us white and blue collar workers reconnect to Mother nature. Thanks to divers, environmental awareness has risen and even caused a range of new projects to see the light of day.

Don a drysuit

Which leads me to my next point, presenting this issues underlying theme: Seeing what's below the surface where and when the waters get cool. I am in part referring to this issues travel reports - from Galapagos and Vancouver Island. But most of all to extending the dive season in the temperate climate zone under whick many of us live - by putting on a drysuit instead of wrapping it all up for the season.

It has been a long while but I still vividly remember when I got my first drysuit and just went on diving throughout the fall, and even winter. All of a sudden I could follow the seasons changed also below the surface and I got a much clearer picturer of cycles and successions. I started to notice changes when various species started to emerge, like when in a forest or field, one sees flowers bloom in the spring, or the mushrooms during the autumn.

The drysuit extended my field of view immensely as regards to the connection I felt with the blue realm and I came to treasure going out diving on a cool but clear day where I could see my breath in the bleak sunlight. Regardless of water temperature I was always cozy and comfy in my drysuit. On a real cold day I just wore another sweater or extra socks. The beauty of cool water is that it can extremely clear as there are no algae so you got this immense space around you. And breathing cold air does something for the metabolism - I don't know what. But I usually come up from a winter diver a lot warmer than when I went in. As for clarity, take an extra look at some of the images from crystal clear waters on Iceland in this issue.

Support SOS-SeaTurtles

KURT AMSLER / SOS SEATURTLES

Sign the petition online, click here ☼
Thousands of sea turtles are being slaughtered often suffering an ugly painful death by being skinned alive. Click **here** to send an email with a "Letter of Protest" to the Governor of Bali and copies sent to other important officials
Click here to visit SOS Sea Turtle's webpage ☼

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NAUI WORLDWIDE
DIVE SAFETY THROUGH EDUCATION

News from NAUI in X-RAY MAG:

This issue of X-RAY MAG includes news and press releases from NAUI in sections designated by the NAUI logo. While the page design is done by X-RAY MAG as an integrated part of the magazine, these news stories are brought to you by NAUI at NAUI's discretion.

X-ray mag

News edited by
Catherine GS Lim
and Peter Symes

way down deep

NEWS

The conflict is over

Lebanon is Resurfacing

Lebanon. What springs to mind? The recent strife between Hezbollah and Israel and a recent past dominated by endless years of civil war tend to spring to mind, right? But as always, reality is far more nuanced than the often one-sided picture painted by mass media. Lebanon is also a culturally diverse country, a young democracy and a diving situation. X-Ray Mag got this update from Alain Sassine.

X-Ray Mag: Can you give us an update on the current situation in Lebanon?

Alain Sassine: The situation is calm as we now have the Unifil force to monitor our coastline and prevent any weapons from entering by sea. This tourist season has obviously been upset by the recent conflict, but I am confident that next season will be a great one. As regards to the oilspill, it does cover some of the coastline, but it doesn't effect the diving as almost all diving here is boat diving and not off the beaches. The water is still very clean, the dive sites are not affected and the fish not polluted. The oil is only at some of the coast and we have international companies working on cleaning it as we speak. I think in 4-5 months everything will be back to normal.

Alain Sassine is also the NAUI representative for Lebanon

X-Ray Mag: So all the dive sites are some distance off the coast and not on the coast?

Alain Sassine: We are diving daily and most of the dive sites in Lebanon are more or less deep, so we have to go out by boat. Shore diving is very rare here. 95% of the diving in Lebanon is done by boat.

X-Ray Mag: Is it difficult diving or technical diving? Is it mainly wreck diving or do you have reefs to go to?

Alain Sassine: It is not like the Red sea—it is the Mediteranean, but we have very nice reefs and dropoffs with exciting marine life. We also have very nice wrecks, i.e. a WW2 French Vichy government submarine that was sunk by the British Navy. It lies at 37m. There are also a large number of exciting deep wrecks for trimix divers. So, it is both reefs and wrecks. In addition, the water temperature is always nice—it is up to 29°C in summer but never below 18°C in winter.

X-Ray Mag: So you can dive all year round?

Alain Sassine: Yes, unless there is a storm, we can dive all year. And all the tourism infrastructure remains in place. The Israelis only bombed bridges and some infrastructures in the southern regions. All the hotels are still intact and

Divers enjoying the clear water off the Lebanese coast

They used to call Lebanon the "petit Paris"

Alain Sassaine is the managing director of Zouk, Lebanon based Xtreme Team Dive Center. xtreme-divecenter.com

Destination Lebanon

Thanks to its location at the crossroads of Asia, Europe and Africa, Lebanon has been shaped by many civilizations throughout history. Modern Lebanese society is characterized by the same cultural diversity.

Cultural epicenter

Fashionable and trendy, Beirut is the cultural epicenter of Lebanon. The city is bustling with life and oozing with charisma. Beirutis live life to the fullest, taking in all the city's gastronomic delights, ambience and leisure activities until the first hours of the morning. Between the time they leave work and the time they arrive home, a true Beiruti fits in shopping, drinks with friends at a new bar, dinner around 10pm, and a Lebanese espresso, before hitting a nightclub in Achrafieh around midnight.

200km coastline

Nature lovers and divers are also well served in Lebanon. With 200 km of Mediterranean coastline, as well as numerous rivers throughout the country, Lebanon offers many salt and fresh water sporting activities. Lebanon's rocky coastline and underwater terrain make it a unique destination for snorkeling and diving. A 600m deep underwater valley runs

FILE PHOTO: KURT AMSLER

Baby Loggerhead Sea Turtles Saved During Conflict

In the midst of ongoing turmoil between Israel and Hezbollah, militants in Lebanon, volunteers and staff at the Jerusalem-based Israel Nature and Parks Protection Authority took time to ensure baby turtles got a safe passage to the Mediterranean Sea.

Ecologists with the authority recently transplanted loggerhead nests from open beaches to a protected hatchery near the northern Israeli town of Nahariyya. After three nights of natural hatchings, the conservationists dug out baby turtles that couldn't climb from their nests and helped them reach the water.

The oil spill caused by the Hezbollah-Israeli conflict also claimed the lives of many sea turtles. An Israeli strike against a Lebanese power plant dumped 15,000 tons (13,600 metric tons) of oil into the ocean, contaminating Lebanese beaches where turtles nest and threatening other eastern Mediterranean coastal habitats.

Turtle eggs need to incubate in sandy nests without parental patrols for about two months. Then the tiny hatchlings, which average 45 millimeters long, must emerge to make a night time dash to the ocean.

Pollution and habitat loss is already taking a serious toll on loggerheads of all ages, and the species is currently classified as endangered by the World Conservation Union. ■

A group of TEK divers preparing to dive

ready to accept as many tourists as we want.

X-Ray Mag: What is your usual season and where did your usual guests come from?

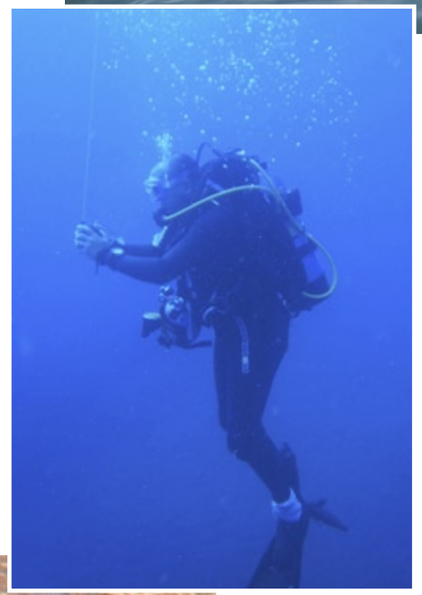
Alain Sassine: The high season for watersports is, obviously, the summer time. From June to mid November, the sea is great. For the other sports, it is more year round. We have for example also mountains offering alpine skiing, so you can do all sports here—snow sports and aquasports. There is always something to do in Lebanon, plus we have an amazing nightlife. They used to call Lebanon the "petit Paris".

Alain Sassine: We have many Europeans. We have Germans, Italians, we have French. But most of the tourists that come to Lebanon come from the Arab gulf. But we have plenty of Europeans and also some Americans.

X-Ray Mag: Do you feel that the general political situation and unrest in the Middle East affects Europeans' and American's perception and willingness to come visit you?

Alain Sassine: Yes, I think on the short term it will. As you know, they were all just evacuated out of the country by their governments. But I hope that we will reach stability soon, and I don't expect

Technical diver decomressing in the clear Lebanese water



The hotels are still intact and ready to accept as many tourists as we want.

that Lebanon will pay a high price this time. We will reach stability again soon, and now the UN is watching the country closely. I don't expect any problems with it—as long as the Americans are not in command, the peacekeepers will be welcomed as tourists here. I can understand why the American audience is afraid with all that has been going on in the media, but it is safe here. ■

A crab is soiled in oil during the oil spill

"Lebanon might take years to fully recover from oil spills caused bombing by Israeli warplanes of three major fuel storage tanks at a power plant in Jiyeh resulting in 10-15,000 tons of heavy fuel oil to flow out into the Mediterranean. Just the cleaning work, including dredging the floating oil and shovelling the black soiled sand from the beach, will take us at least one year," Lebanese Environment Minister Yacoub Sarraf said. The oil spill has dealt a heavy blow to Lebanon's fishing industry as fishermen could not go to sea to fish during the cleaning. "The government will ask the Israeli government to compensate the fishermen. Even after the completion of the cleaning work, we'll have to monitor and inspect the sea food closely before it enters the market, because it may be toxic."

(CONTINUED FROM PAGE 5)

from Beirut to the Bay of Jounieh, creating interesting rocky gorges, underwater cliffs and drop-offs for divers to explore. Another popular diving area is at Chekka (near Tripoli), which offers some of the best marine landscapes, flora and fauna off the Lebanese coast that is rich with other dive sites like Barbur, which is considered to be one of the most exotic dives in the north of the country. Barbur features two tunnels at around 35 meters, which leads divers to a drop off up to 60 meters.

Shark diving

If you're interested in sharks, this is also your spot, particularly in July and August when the water is quite warm. The top of this finger-like series of reefs starts at 23m at its shallowest and drops to a little over 60m at its deepest. Shark point features statues of saints sunken by divers in homage to their faith, a cavern, families of stingrays, and best of all, small tooth sand tiger sharks, which you will usually meet at the fourth reef (shark island). These pregnant females are accustomed to the bubbly critters that visit their summer home, and they almost always come and check you out.

Underwater ruins

Exploring the underwater ruins near Byblos, Sidon and Tyr is another popular activity for divers; however, you are required to obtain a special permit to dive near archaeological sites. There are also several world-class shipwreck sites, including *Le Souffleur* (a French submarine from World War II) near Khaldeh, for underwater exploration.

Lebanon's coastline is lined with many private beach resorts and diving clubs offering facilities and equipment rentals for diving and snorkeling, as well as a variety of other water activities, Nitrox, equipment and Gas blending are also available for technical divers to explore wrecks as the *Victoria* (a British military ship from WW2) in North Lebanon. Culture, sports and, above all, climate are sufficient reasons to be confident in seeing you soon in Lebanon. ■

CONTRIBUTED BY XTREME DIVE TEAM

Earth's Most Diverse Marine Life Found Off Indonesia's Papua Province

New Species of Sharks, Shrimp, Coral Need Protection

GERRY ALLEN

Pseudanthias pleurotaenia, a species normally found extremely deep, but observed in shallow waters in Cenderawasih Bay

Two recent expeditions led by Conservation International (CI) to the heart of Asia's "Coral Triangle" discovered dozens of new species of marine life including epaulette sharks, "flasher" wrasse and reef-building coral, confirming the region as the Earth's richest seascape.

All images courtesy of Conservation International

The unmatched marine biodiversity of the Bird's Head Seascape, named for the shape of the distinctive peninsula on the northwestern end of Indonesia's Papua province, includes more than 1,200 species of fish and almost 600 species of reef-building (scleractinian) coral, or 75 percent of the world's known total.

Researchers described an underwater world of visual wonders, such as the small epaulette shark that "walks" on its fins and colorful schools of reef fish populating abundant and healthy corals of all shapes and sizes.

Species factories

Threats from over-fishing with dynamite and cyanide, as well as deforestation and mining that degrade coastal waters, require immediate steps to protect the unique marine life that sustains local communities. The seascape's central location in the Coral Triangle of the Pacific, which exports and maintains biodiversity in the entire Indo-Pacific marine realm, makes it one of the planet's most urgent marine conservation priorities.

"These Papuan reefs are literally 'species factories' that require special attention to protect them from unsustainable fisheries and other threats, so they can continue to benefit their local owners and the global community," said Mark Erdmann, senior adviser of CI's Indonesian Marine Program, who led the surveys. "Six of our survey sites, which are areas the size of two football fields, had over 250 species of reef-building coral each – that's more than four times the number of coral species of the entire Caribbean Sea."

Though human population density in the region is low, the coastal people of the Bird's Head peninsula are heavily dependent on the sea for their livelihoods, which are now under threat from a plan to transfer fishing pressures from Indonesia's over-fished western seas to the east toward Papua province.

"The coastal villages we surveyed were mostly engaged in subsistence fishing, farming and gathering, and they require healthy marine ecosystems to survive," said Paulus Boli, a State University of Papua researcher led the socioeconomic component of the expeditions. "We are very concerned about the potential impact of planned commercial fisheries expansion in the region, and we urge a precautionary approach that emphasizes sustainability over intensive exploitation."

The two Rapid Assessment Program (RAP) surveys earlier this year, along with a third expedition in 2001, studied waters surrounding Papua province from Teluk Cenderawasih in the north to the Raja Ampat archipelago off the western coast and southeast to the FakFak-Kaimana coastline. A few hundred kilometers inland are Papua's Foja Mountains, where a team led by CI and the Indonesian Institute of Science (LIPI) last year discovered a virtual "Lost World" of new species of birds, butterflies, frogs and other wildlife.

Off the coast, researchers found more than 50 species of fish, coral and mantis shrimp previously unknown to science in the Bird's Head Seascape that covers 18 million hectares, including 2,500 islands and submerged reefs. The seascape also includes the largest Pacific leatherback turtle nesting area in the world, and migratory populations of sperm and Bryde's whales, orcas and several dolphin species.

"We're thankful to the Ministry of Forestry and CI for the significant data from these surveys, and we are excited to be planning further surveys in 2007 to fill in remaining data gaps that will help us plan the most effective management possible for this exceedingly crucial area," said Dr. Suharsono, head of LIPI's Oceanography Center.

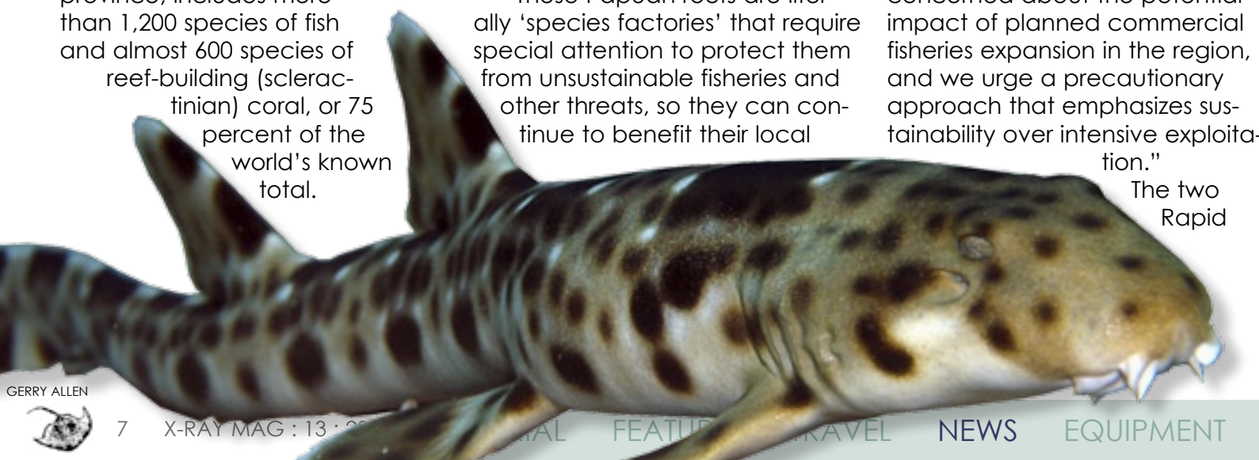
GERRY ALLEN

Paracheilinus walton, a new species of "flasher wrasse" discovered during the recent Bird's Head Seascape surveys

"Six of our survey sites, which are areas the size of two football fields, had over 250 species of reef-building coral each – that's more than four times the number of coral species of the entire Caribbean Sea."

Only 11 percent of the seascape is currently protected, most of it in the Teluk Cenderawasih National Park that is supported by the World Wide Fund for Nature-Indonesia (WWF-Indonesia). Results of the CI-led surveys highlight the need for a well-managed network of multiple-use Marine Protected Areas (MPAs) to conserve the seascape's biodiversity and ensure the long-term sustainability of commercial and subsistence fishing. ■

Partners in the two 2006 surveys funded by the Walton Family Foundation included the Indonesian Ministry of Forestry's Department of Forest Protection and Nature Conservation and its local offices in Papua; Teluk Cenderawasih National Park Authority, the State University of Papua, and WWF-Indonesia.



GERRY ALLEN

A newly discovered species of epaulette shark

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

How Deep Sea Isopods Turned Into Giants

This giant deep-sea isopod is an example of an animal that has evolved to a much larger size in deeper water. These isopods are distant relatives of the tiny "pill bugs" found in many gardens. They are also related to small shallow-water isopods that live in tide pools.

Why is it so huge?

Biologists ever since Charles Darwin have observed that when animals colonize and evolve on isolated islands, small animals tend to become larger while large animals tend to become smaller, a general trend that has become known as the "island rule". After millions of years, they may even evolve into entirely new species that look very different from the original colonizers.

Recent research led by MBARI postdoctoral fellow Craig McClain suggests that a similar trend affects animals as they adapt to life in the deep sea. ■

A FULL ARTICLE IS IN PRESS IN THE PEER-REVIEWED JOURNAL OF BIOGEOGRAPHY.

Fish Surveys Demonstrate Clear Benefits of New Great Barrier Reef Zoning Plans

When the Great Barrier Reef Zoning Plan was introduced in 2004, it significantly increased the amount of habitat protected from fishing and provided a unique opportunity to determine how quickly reef fish stocks respond to reduced fishing pressure. The 'no-take' Green zones established in the Zoning Plan are designed to create protected areas where fish can grow and mature to their full potential. As the oldest and largest fish produce far more offspring than smaller individuals, the adults living in Green zones are expected to add to the replenishment of populations on nearby reefs that remain open to fishing.

In the last 12 months, the Australian Institute of Marine Science (AIMS) surveyed fish populations on 26 reefs closed to fishing by the rezoning and 25 matched reefs that remained open to fishing, representing five geographic regions adjacent to coastal communities between Cairns and Gladstone.

Scientists from James Cook University surveyed fish and coral populations on fringing reefs of the Whitsunday Islands. Before the rezoning in 2004, abundance of fish like coral trout and stripey sea perch were approximately the same on reefs open to fishing with those earmarked to be closed to fishing under the new zoning. Just under two years after the rezoning, both of these fish species targeted by fisheries were almost 60% more abundant on reefs closed than open to fishing.

AIMS Research Director, Dr Peter Doherty, is excited to see such clear results within two years of the changed management arrangements.

"The extent of the difference is quite surprising at this early stage, but the consistency of the differences between zones in all of the places that were examined last year leaves me in no doubt that this is a real result." ■

SOURCE: AIMS - AUSTRALIAN INSTITUTE OF MARINE SCIENCE

Other Positive News

Florida Keys National Marine Sanctuary is Fulfilling Its Goal of Protecting the Marine Life

Three studies examining the Tortugas Ecological Reserve, protected from fishing since July 2001, documented increasing numbers and sizes of commercially and recreationally important species of fish and other marine life. Because the Tortugas region is upstream from the Florida Keys reef tract, improvements in the reserve's fish populations may help sustain fish stocks in the Keys and further north, as more and larger fish produce larvae that are carried away from the reserve on ocean currents. Adult fish may also move to areas outside the reserve as competition for space increases within. These fish then become available to the fishery, an effect known as spillover. SOURCE: NOAA ■

Underwater Grasses Recovering — Sanctuary to Expand

Beds of underwater grasses in the Chesapeake Bay that suffered a major die-off last summer are recovering. Beds of eelgrass provide habitat for blue crabs, rockfish and other dominant species in the bay. But as the plant does not tolerate hot water temperatures, global warming may continue to be a hurdle in the struggle to keep the grasses thriving, according to Bob Orth, a biologist at the Virginia Institute of Marine Science. Governments working to clean up the Chesapeake Bay set a goal of restoring 185,000 acres of underwater grasses by 2010. SOURCE: NOAA ■

Philippines' Apo Island a 'Ray of Hope' in Marine Protection and Conservation Efforts

Greenpeace has described Apo Island as a "ray of hope" in environmentalists' efforts to promote the protection and conservation of the environment worldwide. The Greenpeace ship *MY Esperanza* anchored off the coast as part of its global tour to defend the oceans from all forms of environmental destruction. Janet Cotter, oceans scientist of Greenpeace International, stated she was happy to see in this part of the country a blue print in place on how marine reserves should be managed through the years. ■

Phu Quoc Island to Preserve Coral Reefs

VIETNAM - Authorities and oceanographers are working to zone off the coral reefs and seaweed-inhabited areas around the Phu Quoc Island. Studies released by the Nha Trang Oceanography Institute said that the archipelago is home to nine species of seaweed, which cover an area of over 7,200ha. The seaweeds provide an abundant source of food to the Dugong.

According to the results of the studies, coral reefs flourish in the south of Phu Quoc Island with a total area estimated at 362ha. ■

news

Edited by
Peter Symes

Australia and France to Sign Southern Ocean Fishing Treaty

Australia and France have agreed to sign a treaty to fight illegal fishing in the Southern Ocean, the waters encircling the continent of Antarctica.

Australian Fisheries Minister Peter McGauran said the treaty would allow a French vessel to apprehend an illegal fishing boat caught in Australian waters, and vice versa. "Our combined efforts on the water are proving a very powerful deterrent to illegal fishing."

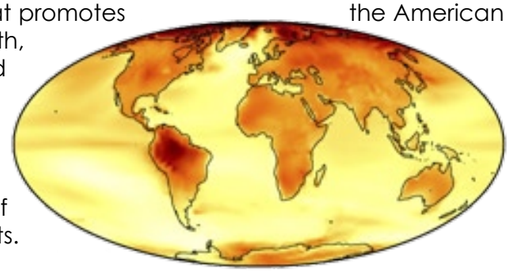
Australia has waged an intensive campaign against illegal fishing of its southern waters. ■

California Takes On Global Warming

If things go according to plan, the US state of California will implement a plan to ensure that it would no longer be the world's 12th largest emitter of greenhouse gases. This scenario would be the result of AB 32, a landmark agreement in which businesses that generate greenhouse gases have to cut their emission of such gases by 25% by the year 2020.

Hailed by Californian Governor Arnold Schwarzenegger as "an example for other states and nations to follow", the bill makes California the first US state to limit the emission of greenhouse gases.

When it is implemented in 2012, businesses that generate greenhouse gases, like oil refineries, power plants, factories and cement kilns, are required to report their emission levels to the Air Resources Board, a department of the California Environmental Protection Agency that promotes public health, welfare and ecological resources through effective reduction of air pollutants.



In cases where firms are unable — or unwilling — to cut their emissions by the required amount, a provision in the bill allows them to purchase 'credit' from firms whose emissions are below the 25% limit.

While this 'cap-and-trade' provision is designed to give flexibility to businesses, it is seen by some as a way that companies can 'buy' their way out of reducing their emissions. Some politicians and business leaders have also predicted that the bill, while having limited impact, would increase business costs.

Whether the bill will have sufficient positive impact on the environment is debatable. In a recent interview with the BBC, Professor John Holdren, president of the American Association for the Advancement of Science, felt that our planet was already experiencing a dangerous climate change.

He feels that if immediate drastic action is not taken, sea levels may raise by four meters within this century. More specifically, the melting of the Greenland ice cap alone would cause global sea levels to raise by seven meters, leading to the destruction of many cities. ■

Study Shows Significant Coral Reef Regeneration in the Arabian Gulf

An ongoing study of coral reefs in the Arabian Gulf has shown significant regeneration of coral reefs in Abu Dhabi and eastern Qatar, according the WWF. At least 18 out of an original 36 species of coral found in the region have recovered from damage suffered due to past climatic events. In particular, Halul in Qatar and Ras Ghanda in Abu Dhabi are two areas where the most vigorous coral regeneration is taking place. Yasat and Dalma islands in Abu Dhabi have also recorded good coral growth and high coral cover.

"The entire range of the region's coral species could be re-established within a decade."

"We are encouraged by the results of extensive surveys undertaken as part of the coral reef project," said Razan Al Mubarak, Director of the WWF office in the United Arab Emirates.

"Assuming no further disturbances to their habitat occur, the rate of regeneration suggests that the entire range of the region's coral species would be re-established within a decade." ■

GEOLOGICAL SURVEY OF SWEDEN

Thousands of barrels with Mercury laden waste have been discovered on the Baltic seabed

Huge Chemical Dump Discovered in the Baltic

During a routine survey in August, Ingemar Cato, a cartographer with the Geological Survey of Sweden stumbled across 30 barrels of industrial waste in 80-meter-deep water in the outer part of Sundsvall Bay in the Baltic Sea about halfway up the east coast of Sweden. But that was just the start of it. As this issue went to press, some 3,500 barrels of mercury have been found and there may be thousands more to be discovered. Experts say the sea is full of industrial waste and recently discovered documents from a local paper mill indicate that the factory may have dumped tens of thousands of barrels in the bay in the 1950s and 60s. The depressing conclusion is that there could be as many as 23,000 barrels.

"We knew there were mercury barrels in the bay," Cato stated to the German daily Spiegel. "In 1976, a fishing trawler pulled one up in its net. For me the surprise was the number." ■

news

Edited by
Willy Volk

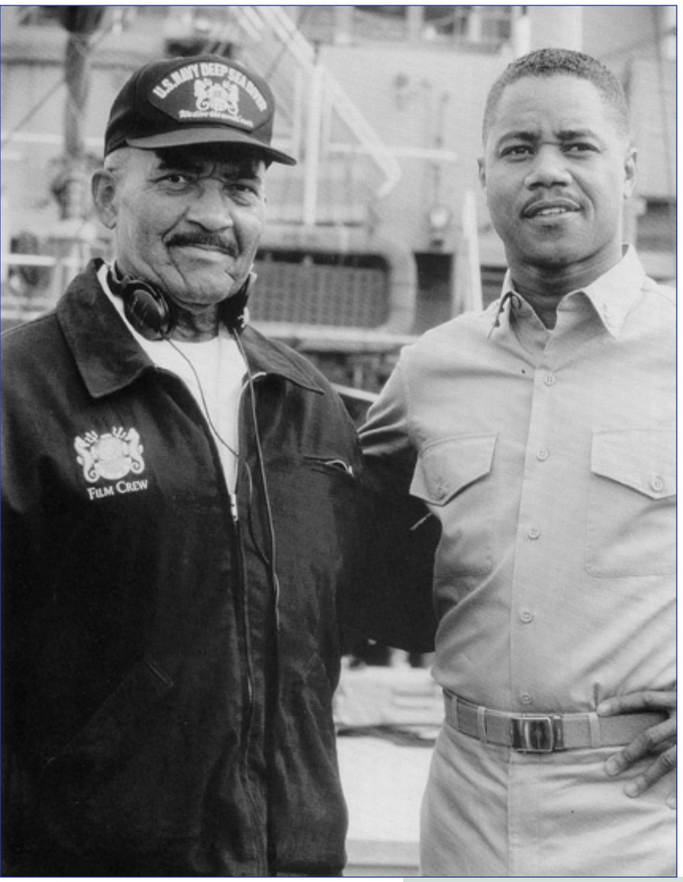
US Navy's first African American deep sea diver dies

Carl Brashear (1931-2006)

On July 25, 2006, Carl Maxie Brashear, the first African American to become a deep sea diver for the Navy, died at the Naval Medical Center Portsmouth of respiratory and heart failure. He was 75.

Brashear joined the Navy in 1948, shortly after the US military desegregated. Compelled to pursue something "challenging," Brashear decided to try diving. After becoming the Navy's first African American diver, he quickly set about to become a master diver, the highest level in the Navy's diving hierarchy. In 1966, while on his way to achieving that goal, two US Air Force planes collided off the coast of Spain, dropping a nuclear weapon into the water. During the recovery mission, Brashear injured his left leg, part of which had to be amputated. The Navy was prepared for Brashear to retire; however, he surprised everyone by announcing that he was moving forward with his Master Diver certification. After completing rigorous coursework—including numerous deep dives—and enduring threats from white shipmates and efforts by Navy officers to sabotage his final exam, Brashear became the Navy's first African American master diver in 1970. Ultimately, Brashear became the first amputee in the Navy's history to be restored to full active duty; the first amputee to rise to master chief petty officer; and the only amputee deep sea diver to gain the title of master diver. After retiring, he was portrayed by actor Cuba Gooding Jr. in the film Men of Honor. He is survived by sons Phillip, DaWayne, and Patrick.

If you doubt Brashear's toughness, consider this statement: "Sometimes I would come back from a run, and my artificial leg would have a puddle of blood from my stump. I wouldn't go to sick bay because they would have taken me out of the program. Instead, I'd go hide somewhere and soak my leg in a bucket of hot water with salt in it—that's an old remedy I learned growing up." ■



U. S. Navy diver Carl Brashear (left) whose life story inspired the film "Men of Honor" starring Cuba Gooding Jr., (right)

Chief Navy Diver Daniel Jackson completes a successful certification dive of the Atmospheric Diving System (ADS) aboard the special mission charter ship *M/V Kellie Chouest*

Navy Chief Submerges 2,000 Feet, Sets Record

On August 1, Chief Navy Diver Daniel P. Jackson of the Navy Reserve Deep Submergence Unit (DSU) donned an Atmospheric Diving System (ADS) suit—a virtually un-crushable exoskeleton for divers—descended 2000 feet below the waters off La Jolla, California, and broke a record for deep diving. Jackson had been randomly selected to certify the ADS—also known as the Hardsuit 2000 —for use by the Navy.

"It was the best ride in the world."

Designed by OceanWorks International to support submarine rescue, the ADS is the culmination of 11 years of planning, designing and testing by multiple agencies. According to Cmdr. Keith W. Lehnhardt, the officer in charge of the project, "This is the biggest piece of teamwork that I have ever seen in the Navy." So, what's it like to dive solo in 2000 feet of water in a metal casing? According to Jackson, "At 2,000 feet, I had topside turn off all the lights, and it was like a star show. The phosphorescence that was naturally in the water and in most of the sea life down there started to glow. When I started to travel back up, all the lights looked like a shower of stars going down as I was coming up. It was the best ride in the world."■ SOURCE: WWW.MILITARY.COM

DEMA's Scuba Tour Help Wounded Veterans Experience Scuba Diving

The Wounded Warrior Project raises the public's awareness and enlists support for the needs of severely injured service men and women. One component of the program, the Disabled Sports Project, provides injured soldiers with an opportunity to experience various water sports. Meanwhile, each year, the Diving Equipment & Marketing Association (DEMA) organizes a traveling Scuba Tour, to promote awareness of diving to the public at large. This summer, the two organizations crossed paths in Rockaway Point, NY, at the Disabled Sports USA 2006 Adaptive Water Sports Festival. There, 24 US troops—all of whom were severely injured in Iraq and Afghanistan—were introduced to adaptive scuba diving in the Scuba Tour's portable 17,000-gallon pool. During the four-day event, the Scuba Tour staff, local dive shops, specially-trained volunteers and firefighters from the New York City Fire Department introduced diving to these service men and women. After learning what diving was like, nine of the participants decided to pursue their dive certifications. This month, those individuals and their families will travel to Bonaire to obtain their C-cards. Bonaire was chosen for its easy, accessible reefs, calm waters and local staff with prior experience training disabled divers. ■

WOUNDED WARRIOR PROJECT

SOURCE: WOUNDEDWARRIORPROJECT.ORG

news

Edited by Willy Volk

Three fishermen. One boat. Nine months at sea.

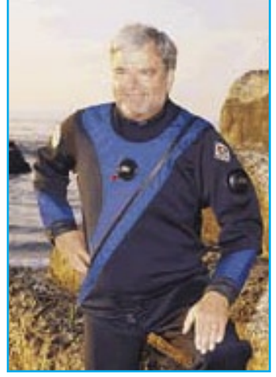
On October 28, 2005, five Mexican fishermen launched a 27-foot-long boat from San Blas, a tiny fishing village on Mexico's Pacific coast. They intended to fish for sharks for a few days. After accidentally losing their fishing gear, the boat's owner, "Senor Juan," ordered the crew to search for the missing equipment.

Soon, though, the group ran out of gas, and ocean currents swiftly swept them out to sea. Exposed to the elements in their open vessel, the men drank rain water and caught and ate raw fish and birds. However, two of the men, including "Senor Juan," refused to eat uncooked food and died.

Finally, after 285 days adrift, a Taiwanese fishing boat spotted the vessel near the Marshall Islands, roughly 8000km from their home and rescued the men. What do fishermen do when drifting aimlessly in the seemingly-endless Pacific? Denying that they resorted to cannibalism, the fishermen claim they passed time reading the Bible, singing and dancing.

When journalists asked what they planned to do next, one of the men said, "see the family for three or four days and then get back to work." Arguably, it might be time for a vacation. In the desert. ■ SOURCE: CNN

Dick Long receives prestigious Roger Revelle Award



Each year, the San Diego Oceans Foundation bestows the Roger Revelle Award on a San Diegan who has made a significant contribution to humankind's ability to coexist with the marine environment. This year, the Foundation honored Dick Long with this prestigious award. For more than 40 years, Long and the oceans have been enmeshed. In 1960, Long founded National Association of Underwater Instructors (NAUI); as President of SDOF, he helped coordinate the sinking of the Yukon off Mission Beach, California; and in the 1960s, he developed a hot water suit, allowing scientists, military, and commercial divers to engage in saturation diving. In addition to an evening of dinner, dancing and the promise of being remembered into perpetuity, Long was presented with a hand-carved wooden Garibaldi -- California's official fish. ■

US Dive Travel Operators Merge

Two of the industry's leading dive travel specialists, Caradonna Dive Adventures and Trip-N-Tour Pacific, announced that they will merge operations and join forces to become North America's most exclusive dive travel company offering expertise and experience unmatched in the U.S. and Canadian dive market.

The collaboration is the result of several years of cooperation, which has recently led to the purchase of Trip-N-Tour Pacific by Caradonna Dive Adventures, part of First Choice Holidays, PLC, a UK based international leisure travel company. ■

A Ballsy Team of Divers Raises Money For Charity

Recently, one woman and six men engaged in an unusual fundraising event for the Orchid Cancer Appeal, a charity for men with testicular cancer. Attempting an underwater relay across the English Channel, the upright team entered the water at Dover at 6:10am on a Saturday morning and reached France's Cap Gris Nez roughly 12 hours later, just in time for wine and cheese.

Diving in shifts, each participant spent between 30 and 90 minutes underwater (at a depth of around 4m), before handing the baton to the next diver. Organizer Colin Osbourne—the Appeal's founder and himself a testicular cancer survivor—said the team had no problems making the 34km crossing. Claiming that "there was hardly any wind" during the event", Osbourne has given new meaning to the phrase limited sea swells.

Ultimately, the team raised $50,000 for the charity. ■

SOURCE: DIVE MAGAZINE

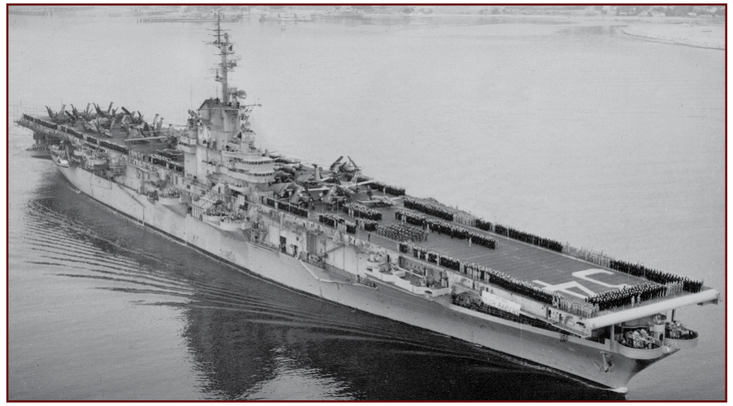
Ready to Take the Plunge? Captain Beermunder Wants You!

If you and your significant other are ready to take The Big Plunge, here's an idea: Florida's Pensacola Dive Company is looking for couples to exchange vows at the world's largest artificial reef, the recently-sunk *USS Oriskany*.

The dive company's owner, Capt. Ron Beermunder, sounds like a really sweet guy. He's a Navy special warfare trained diver, a former Navy water survival instructor, a CPR instructor and an instructor in nine diving safety courses. However, as an ordained minister, he's qualified to conduct the ceremony. (Who knows? Maybe he'll even sing.)

Getting hitched 70 feet below the surface on the carrier's navigation tower will cost US$1200. However, the price includes a four-person, two-tank dive charter. Wedding cake is extra. ■

SOURCE: WWW.PENSACOLADIVECOMPANY.COM



Tour Operators Face Trial After Diver Dies

In January 2004, a PADI-certified yet relatively inexperienced diver named Robert Grant rented dive gear from Australia's Melbourne Diving Services and signed up for a supervised dive trip. Joined by two friends, Grant hit the water and quickly disappeared from view. Moments later, he was pulled from the water but could not be revived. Now, Melbourne Diving Services faces charges for failing to ensure the care of people other than its employees under the Occupational Health and Safety Act of 1985. The prosecution alleges that the dive company failed to carry out standard equipment checks and that Grant lacked adequate supervision from the instructors. However, a separate diver on the same dive trip has defended the dive instructors, asserting they were competent. The case is set to go to trial in November. If convicted, the firm could be fined up to US$250,000. ■

SOURCE: WWW.NEWS.COM.AU

Orbituaries

Noted Shipwreck Expert David Bright Dies

American David Bright, underwater explorer and shipwreck expert, died on July 8, 2006. Bright had been diving on the *Andrea Doria* where he was working in preparation for the wreck's 50th anniversary. According to the Coast Guard, Bright surfaced from an afternoon dive with decompression sickness and went into cardiac arrest. He was pronounced dead soon after. He was 49.

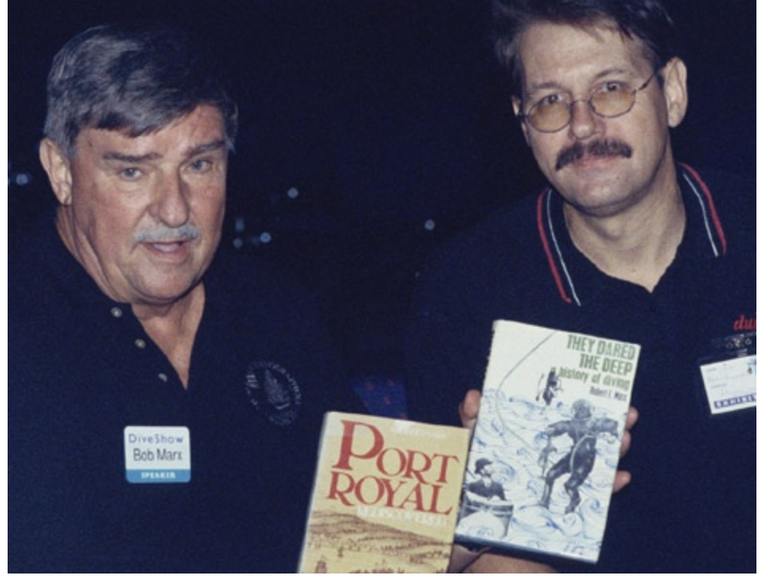
An experienced wreck researcher, Bright had explored *Titanic*, the *USS Monitor* and other shipwrecks throughout his career. In fact, he had dived the *Andrea Doria*—considered the "Mount Everest of scuba diving" due to the challenge of reaching it—more than 120 times.

Bright also started the Nautical Research Group, a consulting firm dealing with shipwreck disasters throughout the world. A former pharmaceutical research scientist, Bright's hobby quickly became his career, and he frequently lectured on shipwrecks and participated in documentaries. ■ SOURCE: WWW.BOSTON.COM

Creator of Diving Decompression Tables Dr Val Hempleman Dies

Dr Val Hempleman, a leading British scientist in the development of diving decompression tables, has died. He was 84.

Dr Hempleman worked at the Royal Naval Physiological Laboratory (RNPL) from the early 1950s to the mid-1980s. During that time, he oversaw the development of the Royal Navy's postwar diving tables, a predecessor of today's modern diving tables. Between 1970 and 1980, Dr Hempleman also managed landmark deep-diving experiments in which volunteers made dry chamber dives to 660m, where they lived for several days. ■ SOURCE: WWW.DIVERNET.COM



Robert Marx (left) with our late colleague John Neuschwander in 2002

And You Thought You Were Busy!

Underwater archaeologist Bob Marx -- who will turn 70 next year -- is a busy man. In addition to authoring books (like *The Battle of the Spanish Armada: 1588*, and *The Voyage of the Nina II*), he also has several excavation operations scattered throughout the world including one in Ecuador that requires a small army to protect the finds from nosy neighbors. He and his wife, Jenifer, have been filmed more than 50 times by television crews, and they have served as guest lecturers aboard cruise lines and at universities. Yet, amazingly, Marx still averages 71 hours a week underwater, although he claims his third pacemaker is "slowing me down." ■

SOURCE: WWW.FLORIDATODAY.COM

NAUI Pacific Rim recently hosted twenty-five lucky students at the Coral Redang Resort in Terengganu, Malaysia to participate and study about marine life as part of its Student Marine Education Program.

The program, which was held from August 19-21, is a school vacation program involving snorkeling and marine education for students ages 12-14. The Student Marine Education Program was designed as a way to instill in students the importance of marine life and its conservation. Students who participated in the program also studied the marine environment and were introduced to skin diving and entry-level scuba. ■

Body Glove Co-founder Bill Meistrell Dies

Throughout his career, Bill Meistrell helped bring the sports of surfing and diving into the mainstream. Mesitrell died from Parkinson's disease on July 26, 2006, surrounded by family and friends at his home. He was 77.

Bill and his twin brother Bob started diving in the pond of their boyhood farm using an oil can for a helmet and a bicycle pump and a hose for air. Later, in the 1940s, Bill and Bob were among the first Los Angeles County Ocean Lifeguards. In 1953, Bill co-founded a retail store, called Dive N' Surf, with Bob and several other men. Soon after, Bill and several of his partners invented the first wetsuit. Bill came up with the phrase "fits like a glove" and Body Glove was born. Soon, the Dive N' Surf crew was consulting with Hollywood on both TV shows and feature films. Today, Bill is one of only three men named to both the surfing and diving halls of fame. According to Bill's brother, "We had three goals when we were small boys: own a submarine, go deep-sea diving and treasure-hunting. Somehow we managed all three." ■ SOURCE: WWW.DIVENEWSWIRE.COM

"Crocodile Hunter" Steve Irwin Dies

Steve Irwin, the famed Australian naturalist, died after a freak encounter with a stingray. The large bull ray, apparently frightened, launched the serrated barb in its tail into Irwin's chest, puncturing his heart. Irwin pulled the barb from his chest and died. He was 44.

Irwin's parents founded the Queensland Reptile and Fauna Park in 1970, which later became Australia Zoo. Surrounded by animals while growing up, Irwin decided to help his father when the elder man decided to do something about the hunting that threatened the area's crocodile population. After gaining experience with the animals, Irwin was soon spotted by a television producer. The pair quickly began making conservationist-themed documentaries in which Irwin would wrestle crocodiles, snakes and other dangerous animals. In moments of danger, he would shout the word, "Crikey!", a phrase which will not doubt be forever associated with him. Although immensely popular, his unconventional approach drew criticism from those who believed he was irresponsible and reckless with animals. Irwin was filming a documentary called Ocean's Deadliest off Australia's coast when he was attacked. Worldwide, researchers know of only 17 people who have died from stingrays, and only three in Australia. Irwin is survived by his wife, Terri, his daughter, Bindi Sue, and his son, Bob. ■ SOURCES: BBC, REUTERS, CNN

NAUI AND DISNEY: Few Friendships Run This Deep

When you think of Disney, you think "mouse," right? Think again.

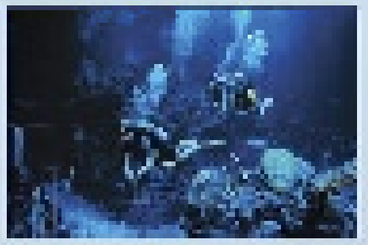
How awesome is The Living Seas? Here are a few fin-tastic facts!

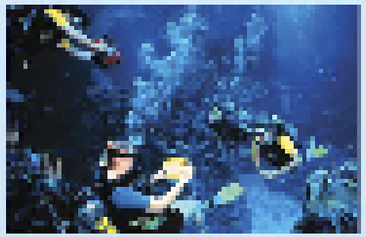
- **1,700,000**
  The volume of water in gallons in the world's largest aquarium at The Living Seas pavilion.
- **22,000**
  The number of gallons of water per minute pumped into the tank from the ocean to maintain the perfect temperature, salinity and clarity for the health of the living seas inside the pavilion's flagship attraction.
- **5,000**
  The estimated number of animals and creatures that call The Living Seas home.
- **200**
  The number of species found in The Living Seas, from the smallest tropical fish to the largest creature in the sea, the whale shark. Divers can swim with the whale shark, sharks, manta rays, sea turtles and more in the 5.7 million gallon Seas with Nemo & Friends dive.
- **35'**
  The depth of the tank at its deepest point.
- **8**
  The thickness in inches of the glass used to construct the tank's viewing window.

The list of fun you can have at Disney doesn't end in Orlando, you'll be amazed to see so much of the park in one week.

We've had an amazing year at the Disney parks and have fallen in love with The Living Seas. Disney has created a new world in the Epcot pavilion, and it's one of the most breathtaking, relaxing, fun, and educational experiences you can have at Disney. A 5.7 million gallon marvel of modern technology and design, the Seas is home to more than 5,000 fish and other sea creatures, plus divers, coral reefs, and tons of fascinating exhibits that show off the ocean's beauty and mystery in a way that's both entertaining and educational.

Divers love The Living Seas, because





There are interesting creatures to see in every part of the pavilion, but the Coral Reef exhibit promises to be an official sanctuary of Shark Reef at Tarawa Atoll. The huge saltwater reef environment is home to dozens of sharks, including sandbar sharks, nurse sharks, and black tip reef sharks, as well as hundreds of other species of fish, sea turtles, and other creatures.

Along with the sharks and other Shark Reef residents, there are two different dive experiences in the pavilion. You'll be able to dive with the sharks, and you'll also have the opportunity to swim with manatees in the Seas with Nemo & Friends dive. Both dives are open water certification dives, and you'll be able to log them in your dive book.

While you're there, you'll also have the opportunity to dive with the sharks in the Shark Reef exhibit. Here, you'll be able to see the sharks up close and personal, and you'll be able to ask questions of the dive professionals who are leading the dive. Each dive is limited to a small group of divers, so you'll have the chance to get personal attention.

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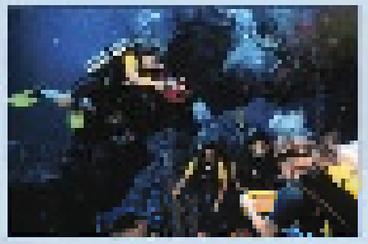
For divers, there's a lot of fun to be had at Disney during your visit to The Living Seas. Not only can you dive with the sharks, but you can also swim with manatees in the Seas with Nemo & Friends dive. You can also dive with the sharks in the Shark Reef exhibit. Here, you'll be able to see the sharks up close and personal, and you'll be able to ask questions of the dive professionals who are leading the dive. Each dive is limited to a small group of divers, so you'll have the chance to get personal attention.

Visit Disney's Living Seas at Epcot and experience the wonder of the ocean for yourself. Call 407.560.4052 for more information.

Visit Disney's Typhoon Lagoon and Blizzard Beach water parks and experience the thrill of the ride. Call 407.560.4052 for more information.



There are many more ways to enjoy the Disney parks. Visit www.disney.com for more information.

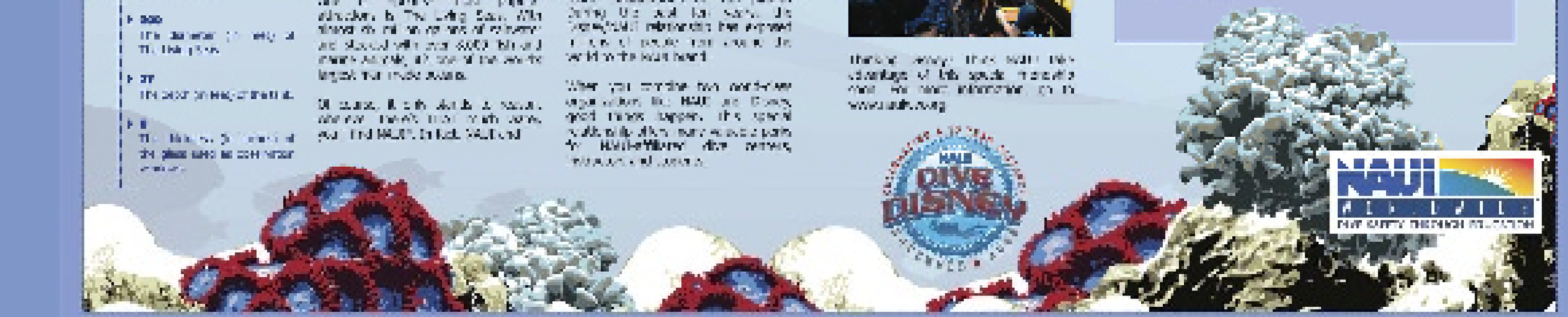
Doing Orlando in November? Do the Dive!

[illegible] Disney's Typhoon Lagoon and Blizzard Beach water parks and experience the thrill of the ride. Call 407.560.4052 for more information.

There are plans for one of the coolest DiveQuest at Walt Disney World's Epcot in the Seas with Nemo & Friends dive. Here, you'll be able to see the sharks up close and personal. Epcot's Typhoon Lagoon and Blizzard Beach water parks are also fantastic. The wonderful tropical ocean.

As Walt Disney World's Epcot is the perfect place to [illegible] Walt Disney World's Epcot is the perfect place to [illegible] Epcot, Typhoon Lagoon, Blizzard Beach, Disney's Animal Kingdom, and more.

This dive will be awarded to the performing NAUI dive centers and licensed NAUI Instructors. NAUI is kicking off a new fabulous cutting-edge [illegible] "Dive Disney" on November 8. But wait, it's not all fun and games. A limited number of dives are available for purchase on a first come, first served basis on the NAUI Web site at www.naui.org.



World's First Paraplegic NAUI Course Director

Paraplegic Fraser Bathgate has become the world's first Course Director to qualify from a wheelchair with NAUI, the National Association of Underwater Instructors.

Bathgate, who is Vice President and Director of Training for the International Association for Handicapped Divers (IAHD), has been a NAUI Instructor Trainer since 2003. He achieved this qualification at Atlantis Dive Centre, Key Largo, Florida, with Bruce Klaiber and Captain Spencer Slate, having earlier completed his instructor course there.

He has now completed the NAUI Course Director programme, a three-day workshop held in the Netherlands by Jelle Buisman, NAUI Europe Training Manager and Klaas Brouwer, NAUI Course Director and President of the IAHD. "Hopefully, this will open the door to people with disabilities and give them the courage to go down the professional route in scuba diving," commented Brouwer.

Jelle Buisman added: "NAUI has always been known to be a market leader for new and forward-thinking programmes and certifications. We see this as the next logical step."

Fraser Bathgate's training included pool work, academic classes and a visit to the NAUI Europe head office in Nijverdal.

Bathgate had to prove his diving and teaching skills in a swimming pool. The weather was not very cooperative but that didn't really stop the instructors and Bathgate from completing this part of the training. The outdoor pool is based in the village of Abbekerk, Netherlands. It is the homebase of diveteam "Verpleegsterhaai". The dive team has a broad experience with training disabled people to different levels in sport diving, all instructors are trained by both the IAHD and NAUI.

"With the completion of this course, it is proven that scuba diving is a very accessible activity. For me, it is the completion of the circle, which started when I became the first Paraplegic scuba instructor, now I can train anyone to any scuba diving level," commented Bathgate.

With a visit to NAUI Europe's head office, the training program was completed. The signatures were placed on the necessary documents and then followed by a firm handshake from Richard Lucas, General Director NAUI Europe.

"I'm very happy that we have been able to support this training program. It is great to have Bathgate on board as NAUI Course Director. I believe this will help both Bathgate and NAUI to further develop scuba diving," commented Richard Lucas.

Fraser Bathgate's training was the first of its kind for NAUI

Fraser started diving in 1992 in Dubai—his first break after he ended up in a wheelchair after a climbing accident in 1986. It turned out to be a major life changing event for him.

As the first person in a wheelchair ever to qualify as a PADI scuba-diving instructor in 1994, Fraser has been responsible for teaching thousands of people with disabilities to dive since that day. And as the guru on disability access, his advice is sought by the organisers of major sporting events and outdoor concerts.

It was back in 1996 that Fraser Bathgate conducted the first of his "No Barriers" tours, an ambitious programme of motivational presentations at spinal rehabilitation units sponsored by PADI and Breitling. But the project was coming under severe pressure until Ford stepped in to offer him sponsorship. Equipped with a specially adapted Ford car, Fraser was soon covering 20,000 miles a year in the UK alone.

"It was originally a six-month gig, but it's been renewed ever since, and it's worked out ten times better than I ever expected," says Fraser. He travelled to many places around the world to promote scuba diving for the disabled and train instructors in places as far away as Japan, Australia, Cayman Islands but also closer to home in Slovenia and throughout the UK.

Ever since he became involved with the International Association for Handicapped Divers in 1994, he has put even more energy in developing new programs and training aids for divers.

Fraser has been involved with a number of manufacturers in the diving branch, Oceanic and Weezle to name a couple. With his help, most times only small adjustments have been made to equipment to make it more user friendly. Everything focused on making Scuba Diving more accessible. ■

Training

Edited by
Peter Symes

TDI Unveils New Materials for Inspiration / Evolution CCR Course

TDI is the first of the major training agencies to release support materials for the popular Inspiration and Evolution Closed Circuit Rebreathers.

The student manual primary author is John Garvin, a CCR Instructor for the Inspiration since it was first launched in 1998, but there have been several other highly qualified Instructor Trainers and Instructors that assisted with input and final review.

"The manual is generously illustrated manual with excellent photographs and diagrams, and the Inspiration / Evolution CCR product line is the first we have developed using multiple contributors and input from our complete product development team. There are currently several other CCR manuals in development scheduled to be released within the next six months. Although the project took longer to develop than expected, we are very excited with the final product," stated Brian Carney, President of SDI/TDI. "The student manual, Instructor Resource CD (Instructor guide, exams, PowerPoint) and workbook were designed to work in conjunction with manufactures owner's manual." ■

Scuba degree

Students at Kingston University in Surrey, United Kingdom, will soon be heading underwater as part of a new BA (Hons) degree in Outdoor Education. Focusing on environmental education, the new BA (Hons) degree involves a number of adventure activities such as scuba diving, climbing and kayaking. For details, phone Kingston University on (+44) 020 8547 7053 or see its website. **www.kingston.ac.uk**

TDI Releases New Nitrox Manual and Support Materials

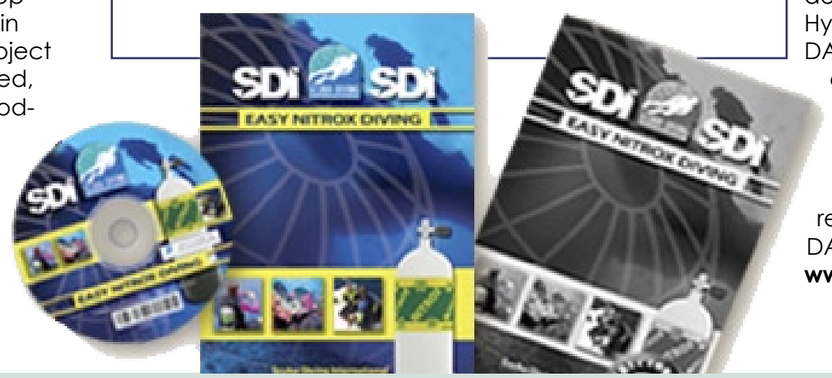
TDI has released new teaching and learning materials today for its popular and ground-breaking Nitrox course. These materials include a student manual, knowledge review, instructor guide and new Instructor Resource CD (includes PowerPoint, exams and an electronic instructor guide) all of which have been completely re-written and redesigned to meet the agency's new training materials guidelines and reflecting the learning needs of today's Nitrox diver candidate.

The TDI student manual includes more than 60 specially created illustrations and photographs in a 120-page perfect-bound format. TDI's Nitrox course teaches students to execute dives utilizing Nitrox mixtures up to 40%.

In the new Nitrox manual, learning objectives and key concepts for each of its nine chapters are highlighted and clearly defined. The content covers the benefits of Nitrox, Equivalent Air Depth concept, oxygen toxicity, and nitrox equipment considerations.

The support materials for TDI's Nitrox program have also been redesigned from the ground up. "What our instructors will notice is that the instructor guide and PowerPoint® materials have been structured in a way that will assist them to present the most complex concepts of Nitrox diving in a concise and organized fashion reflecting the needs of today's diver education.

TDI: worldhq@tdisdi.com or (+1) 207-729-4201. ■



PADI Europe: "NITROX is more popular than ever"

It has been two years since PADI Europe launched Diving with NITROX. The success was immediate. And two years later the certification numbers surpass all original expectations. Diving with NITROX is more popular than ever. The certification numbers have increased from 5,417 in 2003 to an average of 20,000 in 2004 and 2005.

Jean-Claude Monachon, PADI Europe's CEO, takes a confident look at the future: "The NITROX story of success will be continued in 2006. There is still an enormous potential of divers who have not tried out the unique advantages of NITROX over regular pressurized air but would like to give it a try at the next occasion."

This is becoming easier all the time, because two years after the launch, more than 530 of the 1,000 PADI Dive Centers and Resorts within PADI Europe's territory offer NITROX diving. ■

DAN Announces New Online Training Course

Divers Alert Network now offers three online seminars, addressing safety and health issues of interest to divers. Courses are easily accessible through the DAN website.

The most recent addition to the online seminars is Inert Gas Exchange, Bubbles, and Decompression Theory, presented by Richard Vann Ph.D., DAN vice president of research, at a recent Diving and Hyperbaric Medicine course offered by DAN. Participants can learn about inert gas exchange in the body and the affects those bubbles can have on one's dive.

Open to the general public at a cost of US$25, this online presentation takes 60-90 minutes to complete. Participants receive certificates of completion from DAN. See this presentation and others at **www.diversalertnetwork.org** ■

Jelly News

Edited by
Peter Symes

CRAIG SMITH, UNIVERSITY OF HAWAII

A deep-sea stone crab living on a blue whale bone on the ocean floor of the Santa Cruz Basin

How Whaling Impacts Deep-Sea Biodiversity

When the bodies of dead whales sink to the ocean floor, they create island-like habitats for deep-sea life that last for decades, according to a recent study by Craig Smith at the University of Hawaii and his colleagues. So far, biologists have discovered 28 new species that may depend exclusively on whale carcasses for food. Whaling, however, deprives the ocean floor of this resource and can cause the extinction of the species dependent on the energy-rich carcasses of whales for survival.

Whale falls

"Whale falls" are the bodies of dead whales after they have sunk to the deep sea floor. Whale-fall specialists are marine organisms which need whale-fall environments to sustain their population and to avoid extinction. After a recent research project, Smith and his colleagues concluded that there were at least 37 species—up from 28 known—that could be whale-fall specialists.

Succession

Smith's whale-sinking experiments show that whale falls provide several successions of communities, one after another. First, the mobile scavengers, such as sharks, eat the flesh of the dead whales, thereby removing the soft tissue. The remainder of the whale-fall is bones. Second, the enrichment opportunists, such as worms and crabs, land on the bones and live and reproduce there.

Smith and his colleagues applied simple models from conservation biology to explore the impact of whaling on the extinction of deep-sea animals that live on whale carcasses. Their results suggested that species extinctions may have already occurred in the North Atlantic where great whales were decimated in the 1800s. Extinction may also be ongoing in the Southern Ocean, where intense whaling persisted until the 1970s.

These findings highlight the need to consider the effects of whaling and other types of fishing on entire ecosystems, rather than focussing narrowly on target species. "The possibility that whaling has caused species extinctions at the remote deep-sea floor gives me new appreciation for the scale of human impacts on the ocean," says Smith. "We need to recognise that the oceans consist of a stack of tightly connected ecosystems – over-fishing or pollution in surface waters is bound to cause problems thousands of metres below." ■

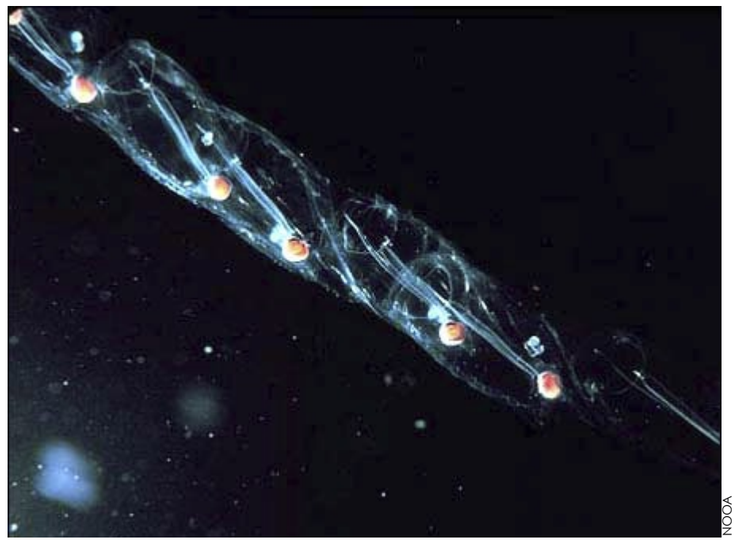
Jellyfish Blooms linked to Global Warming

This summer thousands of holidaymakers in the Mediterranean have been stung by jellyfish as huge swarms of the creatures invade coastal waters. Spanish beaches have been closed, and Sicily and North Africa were also reported to be badly affected. A survey by the Oceana environmental group found concentrations of jellyfish of more than 10 per square meter in some areas off the Spanish coast.

Marine biologists blame hot dry weather for bringing jellyfish closer to the shore, and say overfishing may also be increasing jellyfish numbers by removing predators and competitors. Jellyfish are themselves voracious eaters, and experts say that because they consume fish at a very high rate, it may be hard for the fish they replace to re-establish themselves.

Meanwhile, semi-transparent barrel-shaped creatures called salps have also been documented in recurring dense swarms in waters all over the globe. And they play a critical role in transporting a greenhouse gas deep into the deep sea, scientists have found.

Phytoplankton extract the carbon from atmospheric carbon dioxide to build their skeletons and shells. Salps are among the larger creatures that eat phytoplankton, consuming up to 74 percent of them from the surface water in a day. When the animals die or defecate, the carbon dissolves back into the oceans. Just their sinking feecal pellets transport up to 4,000 tons of carbon daily to deeper water. Salps release fecal pellets in deep water, where few animals consume them, making them efficient transporters of carbon away from the atmosphere. ■



NOOA

FILEPHOTO: PETER SYMES

Restaurant with live fish, Malaysia

Live Fish Trade Threatens Coral Reefs

Twenty of the world's leading marine scientists have called for tighter controls on the trade that sees juvenile fish taken to tanks in luxury restaurants, so that diners can choose one to eat. Already under threat from global warming, the $1billion live reef fish trade could wipe out species and destroy weakened reefs in the Indo-Pacific region around Malaysia and Borneo and even further afield.

It also threatens to destroy the tourist diving industry in affected areas as endangered species could vanish and coral reefs crumble because tropical fish are being stunned with cyanide, which also damages the reef.

The giant tropical Napoleon wrasse, which can live to 30 and grow to up to two metres long, is almost extinct in the Indo-Pacific region and is now being hunted in the Red Sea and transported over 4,500 miles to the Far East.

The Napoleon wrasse has been virtually wiped out in the region, and you don't find any when diving. It is estimated there are only 100 adults left in the area. Most are caught when they are juveniles when they are the size of a plate.

They never get the chance to breed. Strong international demand and liberal global trade laws means a single fish can be worth $10,000 at the Hong Kong markets that deal with most of the trade. ■

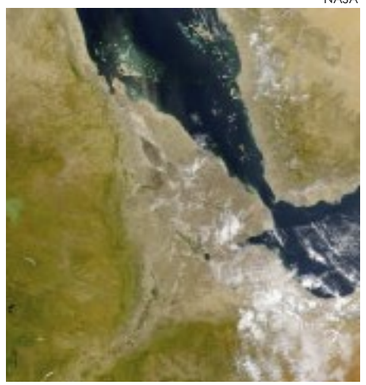
Napolean wrasse, *Cheilinus undulatus*

OCEANNENVIRONMENT

Red Sea parting, creating new ocean because of shifting of tectonic plates

The Red Sea is widening to create a new ocean basin between Africa and Arabia, according to a report in Nature. A huge rift appeared in 2005 along a fault in Ethiopia's Afar desert. Eritrea and north east Ethiopia are likely to become a new offshore island as the Red Sea widens and extends, but the process will take around a million years. ■

NASA



The southern Red Sea with Ethiopia on the left

Researchers reveal underwater canyons along New Jersey coast

Just 100 miles off the New Jersey-New York coast and hidden beneath hundreds of feet of water, lies a vast underwater canyon, rivalling Grand Caynon in size scientists find. The area's centerpiece is the giant underwater chasm called the Hudson Canyon, which is the largest submarine canyon off the East Coast of the United States and one of the largest submarine canyons in the world. ■

Pollution Threatens Coral Health by Preventing Lesions from Healing

Coral tissue damage that normally heals on its own will not mend when the colonies are near pollution sources on land that release industrial chemicals, fuel oils and other contaminants, researchers from University of Central Florida have found. The scientists have used the equivalent of blood tests on humans to identify likely causes of low coral vitality near wastewater discharge pipes and the Port Everglades inlet. Coral that were growing near both areas were found to be unable to repair tissue damage, while coral colonies at control sites healed the small areas where the scientists removed tissue for analysis.

The loss of coral harms natural reef ecosystems and can hurt Florida's tourism economy if divers decide to go elsewhere. Reefs also help to protect coastal areas from hurricanes, as they break up storm surge in the same manner that sea walls do. ■

Coral Disease Outbreak is Preventable

An Australian marine scientist says water quality management plans and reef closures will help protect the Great Barrier Reef off Queensland's coast from coral disease outbreaks seen in other parts of the world.

Dr Bette Willis, Centre of Excellence for Coral Reef Studies scientist, says some reefs are being hit by coral diseases, including black band, white plague, white pox and white syndrome. The diseases are presently restricted to small sections of isolated reef, but the problem could spread if global warming and water quality issues are not continually addressed.

"Strategies which maintain the resilience of the coral reefs are important and ways of managing coral disease. Otherwise we have very few strategies -- we can't give them courses of antibiotics or isolate them. It's very difficult in a marine environment to use a traditional strategy for disease management," said Dr Willis. ■

Enough to make you want to swim with your mouth closed?

20,000 Kinds of Bacteria Found in 1 Liter of Seawater

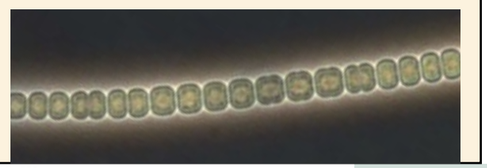
In a paper published in Proceedings of the National Academy of Sciences journal, scentiists reveal marine microbial diversity may be some 10 to 100 times more than expected, and the vast majority are previously unknown, low-abundance organisms theorized to play an important role in the marine environment as part of a "rare biosphere".

"These observations blow away all previous estimates of bacterial diversity in the ocean," says lead author Mitchell L. Sogin, director of the Marine Biological Laboratory (MBL)'s Josephine Bay Paul Center for Comparative and Molecular Biology and Evolution.

"These observations blow away all previous estimates of bacterial diversity in the ocean"

Microbes make up the majority of life in the oceans and are described as the "primary engines" of the Earth's biosphere. Finding so many more species than expected fundamentally affects our understanding of how more complex life first evolved and also how climate change will impact on its continued survival.

Scientists now want to know how so many kinds of micro- organisms evolved and survived, and what effect they might have on the environment. ■



NASA Solves Plankton Mystery

"We concluded that nitrogen is the primary element missing for algae growth and photosynthesis in the northern portion of the tropical Pacific, while it was iron that was most lacking everywhere else."

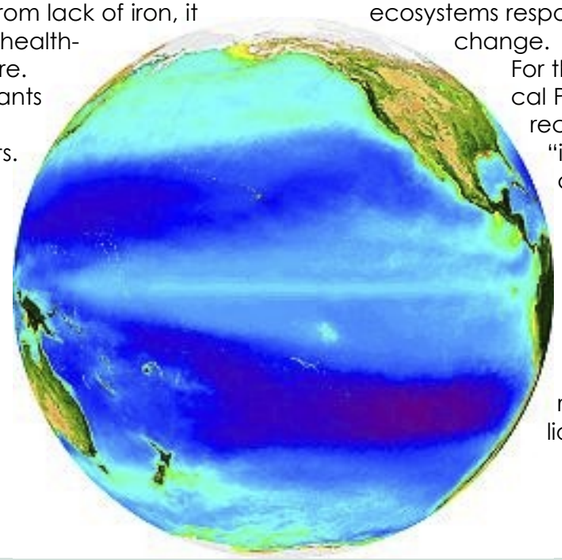
By combining satellite data from NASA's Sea-viewing Wide Field-of-view Sensor and ship-based measurements of fluorescence, scientists can now determine what limits the growth of ocean algae, or phytoplankton, and how this affects Earth's climate. Fluorescence occurs when plants absorb sunlight and scientists found that phytoplankton give off much more fluorescence when the plants do not have sufficient iron. It is this signal they used to fingerprint what parts of the ocean are iron-stressed and what parts are nitrogen-stressed.

Iron or Nitrogen?

Scientists determined when phytoplankton is stressed from lack of iron, it appears greener, or healthier than they really are. Normally, greener plants are growing faster than less green plants. When iron is lacking, enhanced greenness does not mean phytoplankton are growing better. They are actually under stress and unhealthy. These conclusions solved the mystery why healthy looking phytoplankton are actually not so healthy.

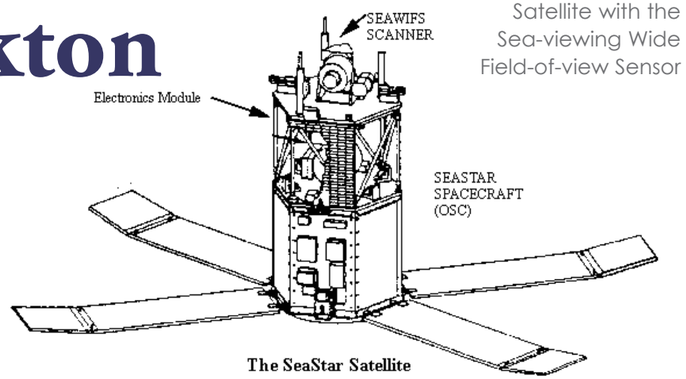
"Because we didn't know about this effect of iron stress on the greenness of algae or phytoplankton before, we have always assumed that equally green waters were equally productive," said Michael J. Behrenfeld, an ocean plant ecologist from Oregon State University, Corvallis, Oregon. "We now know this is not the case, and that we have to treat areas lacking iron differently."

The NASA sponsored study focused on phytoplankton in the tropical Pacific Ocean. It is an area of the ocean that plays a particularly important role in regulating atmospheric carbon dioxide and the world's climate. This area of the ocean is the largest natural source of carbon dioxide to the atmosphere. By knowing what limits planktonic growth scientists can better understand how ecosystems respond to climate change.



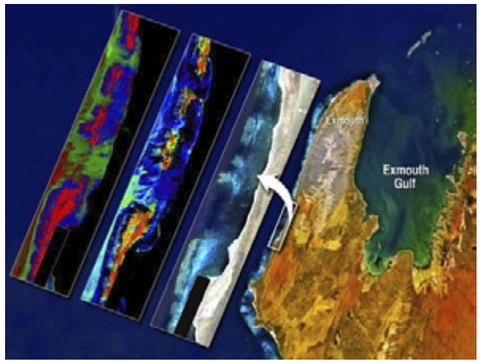
For the tropical Pacific, correction for this "iron-effect" decreases scientists' estimates of how much carbon ocean plants photosynthesize for the region by roughly two billion tons. This figure represents a tremendous amount of carbon that remains in the atmosphere that scientists previously thought were being removed. Approximately, half of the photosynthesis on Earth occurs in the oceans, and the remainder on land.

The results about the false health of phytoplankton allow scientists using computer models to re-create the movement of carbon around the world much more accurately, and can incorporate these findings in future modeling, analysis and predictions. ■



NASA's SeaStar Satellite with the Sea-viewing Wide Field-of-view Sensor

The SeaStar Satellite



Airborne imaging completes first digital map of Ningaloo Marine Park

The images will be cross referenced with information gathered from the Australian Institute of Marine Science (AIMS) underwater biological surveys, which include dive expeditions and deep water investigations using video, sled sampling and acoustic echo sounders.

"For example one image may depict substantial areas of pink and purple, which we know is an area dense with table corals. Where we see these shades elsewhere along the vast tract of the reef, we can assume there are table corals."said Dr Andrew Heyward of AIMS. "The broad-scale data captured sets the stage for exciting science projects. From this we will be able to separate out habitats and monitor change." ■

CA DEPT OF FISH AND GAME

A Chinese Mitten Crab has been caught on the US East coast

Marine Species Are Getting Out Of Place

While fishing his crab pots in early June, a Chesapeake Bay fisherman hauled in an unusual catch, a mature male Chinese Mitten Crab, *Eriocheir sinensis*. It was the first time anyone had ever reported finding a Mitten Crab in Chesapeake Bay waters. Native to East Asia, the crab is significant as a potentially harmful invasive species that has caused economic damage in Europe and on the West Coast of the U.S. There are several possible ways the crab could have arrived in the bay, including imported seafood trade or commercial shipping in near-by Baltimore Harbor. ■

Meanwhile

Tuna turned up on beaches in Wales, UK; in Norway, the Kamchatka crab continues marching south; and tropical lionfish are now often sighted off Rhode Island on the US north-eastern seaboard. ■

Poles Locate German WW2 Aircraft Carrier *Graf Zeppelin* in the Baltic

A search for oil in the Baltic sea has turned up the wreck of the German World War Two aircraft carrier *Graf Zeppelin*, whose whereabouts had been a mystery since it was sunk by the Soviet navy after the war. A research ship belonging to Polish oil company Petrobaltic found the 250-metre wreck 55 km north of the Polish port Wladyslawowo at a depth of more than 80m.

A Polish Navy ship, sent to the site, identified the wrecked ship as the *Graf Zeppelin*, which was captured by the Soviet navy, used for target practice and sunk as part of a training exercise in 1947. The *Graf Zeppelin* was Germany's only aircraft carrier in the war. Its final resting place had been a mystery. ■

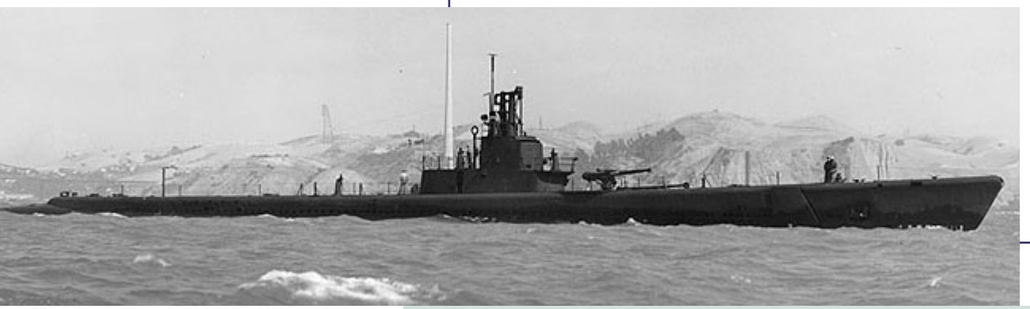
Full article on www.xray-mag.com

Russians Find Wreckage of U.S. Submarine

Russian divers have spotted the wreckage of a legendary U.S. submarine that was lost in the Pacific in 1943, a Russian news agency ITAR-Tass reported. A diving team from the Far Eastern State Technological University in Vladivostok found the *USS Wahoo* in the La Perouse Strait and took pictures of it during a recent expedition.

Under the command of Dudley "Mush" Morton, the *Wahoo* became one of the most famous U.S. submarines of World War II. With 19 Japanese ships sunk, Morton was ranked as one of the war's top three sub skippers.

The *Wahoo* was sunk by the Japanese navy as it returned from its seventh patrol on Oct. 11, 1943. All 79 crewmen died. ■



Ghosts of Jutland Exhibition

Ghosts of Jutland is a commemorative exhibition onboard *HMS Belfast*, a branch of the Imperial War Museum and London's floating naval museum, was launched 31 May 2006, exactly 90 years to the day since the Battle of Jutland took place during WWI. The tragedy of the Western Front and the Battle of the Somme has perhaps overshadowed that of the Battle of Jutland and this exhibition has been specially curated to commemorate the 8,648 British and German sailors lost over the course of one day. The exhibition will be on display until 2007.

Fought in the summer of 1916, Jutland was the only major encounter between Britain and Germany at sea during World War One, and the last one in which all the classic ship types played their parts (Battleships, Battlecruisers, Armoured Cruisers, Light Cruisers and Destroyers). Today, it remains the largest naval conflagration ever to have taken place, bigger even than the massive battles in the Pacific in World War II. So much was expected of Jutland, and yet so little resulted. The end was a bloody draw with a tragic butcher's bill for both countries. The battle may have only raged for 24 hours, but during this period, twenty-five ships (14 British and 11 German) were sunk and 8,648 sailors died.

For Britain, Jutland was meant to be the next Trafalgar and confirmation that she still ruled the waves. Whilst the Germans expected the High Seas Fleet to achieve supremacy of the North Sea by attrition—repeatedly attacking the Grand Fleet. Instead, the battle was a shambles. ■

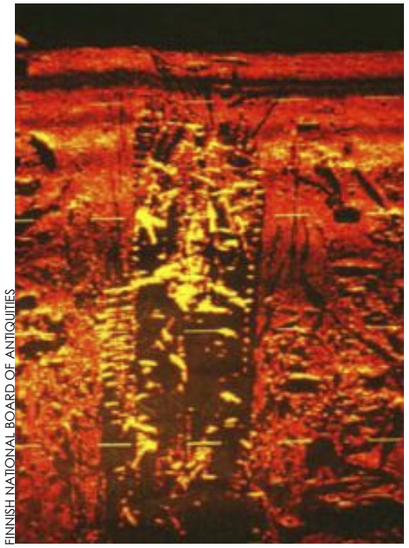
*Based on a contribution by Rosemary E Lunn. Find her **Jutland Wrecks Treaty Proposal** on **xray-mag.com***

Shipwrecks Off Coast of Helsinki Contain Oil, Mercury and Explosives

Most of the 30-odd well known shipwrecks off the coast of Helsinki are old, badly decomposed wooden vessels that fail to offer much excitement for recreational divers. But thanks to the drop in price of side scan sonar, which enables a more precise mapping of the seabed, private groups hunting for shipwrecks as a hobby will most likely locate new wrecks. But not all the wrecks are open for recreational diving purposes. Particularly dangerous are warships and vessels containing oil. Finland's Environmental Administration has estimated that there are around 40 wrecks in Finland's territorial waters presenting a threat of an oil spill.

Old warships provide an altogether different risk. Most of them sank in full combat readiness. During World War II, there were more sea mines in the Gulf of Finland outside Helsinki than anywhere else in the world due to the German desire to keep the Russian fleet tied up in harbour. The minelayer *Königin Luise* is presumably the most unpredictable wreck off the coast of Helsinki, and diving to the vessel is forbidden. It contains depth charges, among other things. There is debris spread over a large area around the ship. The vessel struck a Russian mine and went down in 1941 with the loss of 40 of its crew. The mine clearance equipment may also contain mercury.

Many of the warship wreck locations have not been revealed to the general public. Most of them belong to the Defence Forces, until one hundred years have passed from the sinking. ■



The best-preserved wreck outside of Helsinki is the Swedish warship *Kronprins Gustav Adolf*, around which the Maritime Museum of Finland has constructed an underwater park with signs and visitors' books

Australia: Iron Knight Protected

The wreck of the *SS Iron Knight*, sunk in Australian waters during the Second World War, will be protected as an historic shipwreck due to its maritime heritage significance, according to the Minister for the Environment and Heritage, Senator Ian Campbell.

As part of a wartime convoy, the Australian cargo steamer *SS Iron Knight* was en route from Whyalla to Newcastle with a load of iron ore when it was torpedoed and sunk by a Japanese submarine in the early hours of 8 February 1943.

"Of the 50 crew on board only 14 survived. Although historic shipwrecks in Australian waters are usually at least 75 years old, the *SS Iron Knight* deserves our protection as a war grave of the lost crew," Senator Campbell said.

"I consider vessels such as *SS Iron Knight*, sunk during enemy action in the Second World War, to be a significant part of Australia's maritime heritage, and so I have declared the vessel an historic shipwreck to ensure its protection now and for future generations."

The Historic Shipwrecks Act of 1976 aims to protect maritime archaeological sites, while encouraging public access to them. The Act prohibits damage, interference or removal of historic shipwrecks and their associated relics.

The discovery of the wreck of the *SS Iron Knight* was made by a team of specialist divers from The Sydney Project dive team 22 miles south of Montague Island, off the coast of NSW, in 125 metres of water. ■

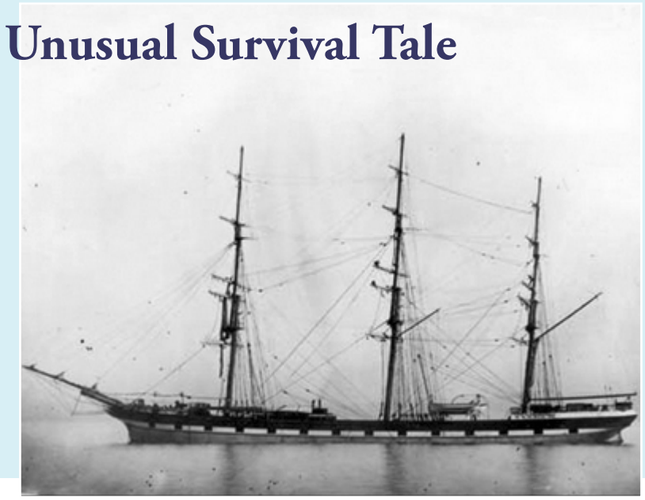
Odyssey Marine to Move New Orleans Shipwreck Attraction

Odyssey's Shipwreck & Treasure Adventure will close in September 2006 due to the continuing economic and business difficulties in the area since Hurricane Katrina. Odyssey plans to re-open the attraction in another market later in 2006. The attraction originally opened in New Orleans on August 27, 2005, but closed almost immediately due to Hurricane Katrina. The attraction re-opened in early 2006, along with many other businesses who hoped to help bring the tourism industry back to life in the city. ■

Ancient treasures from shipwrecks on display in Vietnam

Ancient treasures from five ships sunken in Vietnam's waters are now on display for the first time at the Can Tho City Museum and the Vietnam History Museum. On show are many documentary films and photos as well as more than 400 artifacts selected from about 10,000 items retrieved from the five sunken vessels off Quang Nam, Ba Ria-Vung Tau, Kien Giang, Binh Thuan and Ca Mau provinces. The exhibition is open until the end of this year. ■

Wreck's Discovery Revives Unusual Survival Tale



The ocean has revealed a secret 120 years old on the most remote island in the Hawaiian chain.

The wreck of the full-rigged ship *Dunotter Castle*, which sank on the reef off Kure Atoll 120 years ago, has been found surprisingly intact 25 feet below the surface.

The wreck made headlines in 1886 after seven survivors sailed 52 days and 1,200 miles in an open boat and were picked up off Kaua'i. A voyage to rescue crew members remaining on Kure set out the next day via the steamer Wai'ale'ale. ■

Andrea Doria Wreck Turns 50

On July 25, 1956, while sailing off the coast of Nantucket, Massachusetts bound for New York City, the luxury liner *Andrea Doria* collided with the *SS Stockholm* of the Swedish-American Line. Most passengers and crew survived. The evacuated *Andrea Doria* capsized and sank the following morning. It has since become one of the most legendary wrecks in the world alluring challenge seeking divers from afar and sometimes to an untimely death. Numerous are the divers who have lost their lives diving the wreck (see the Obituary over shipwreck expert David Brigh) and diving conditions at the wreck site are considered even more dangerous today.

The shipwreck lies in an area of the Atlantic called the Bermuda Triangle of the Northeast—50 miles south of Nantucket, MA, and 200 miles east of Sandy Hook, NJ in the US. When it sank, the top portion of the *Andrea Doria* was 150 feet deep. The top section is now at 190 feet, and the hull rests at 240 feet, much deeper than the scope of recreational diving.

Strong currents and heavy sediment seriously reduce visibility to near zero and add serious risk to the dive. The main difficulty lies in the depth and the cold water. Also, a nearly invisible spiderweb of very fine fishing lines covers parts of the wreck and can become entangled with scuba gear causing problems for divers especially when operating at that depth.

Because the wreck is gradually disintegrating and the interior shell collapsing, many of its passageways are also caving in. The wreck's distance from land is another issue as decompression sickness has claimed a number of victims. ■

UNITED STATES COAST GUARD

Ancient ship-wrecks found in Malaysia

WWW.MARITIME-EXPLORATIONS.COM

Bronze cannon with lifting rings

Three ship-wrecks including one resembling a Portuguese warship have been discovered in the Straits of Malacca.

Well-known Australian maritime archaeologist Dr Michael Flecker, who has carried out more than 100 explorations in numerous countries around the region, made the discovery last year using sonar for a blanket survey along the Straits. The location and authenticity was later confirmed through dives. He said the warship was located in an area between Pulau Upeh and Pulau Panjang off the coast of Malacca and at another location, two vessels lying side by side was found, though the precise locations are undisclosed to prevent looting.

Dr Flecker said, although his findings were very preliminary, he was excited about the prospect of possibly finding what could be the oldest European ship found in Malaysian waters. The ship could be a Portuguese ship, under the command of Admiral Coutinho, which sank in 1583 during a battle.

He also revealed pictures he had taken of cannons, cannon balls, bones of animals that were consumed on the ships and broken Ming dynasty porcelain. ■

Artificial Reefs

Two vessels scuttled at Xatt l-Ahmar, Gozo

Two decommissioned passenger ferries were sunk as artificial reefs for divers off the Maltese Island of Gozo in August as part of a European Union funded project to boost tourism in the area. The two vessels, *MV Karwela* and the *MV Comino Land*, sank upright within 50m of each other at a depth of 36m. It took more than seven hours for the 56m-long *MV Karwela* and 35m-long *MV Comino Land* to sink at Ix-Xatt l-Ahmar, Gozo. ■
SOURCE: MALTAMEDIA NEWS

Old subway cars become fish habitat

Up to 250 old New York City subway cars will become artificial reefs off New Jersey Atlantic Coast adding to the 140 ships that have been deployed in the Jersey deep along with Army tanks, reef balls and tires since the program's start in 1984. ■

The recent scutling of patrol boats off Cozumel

Live Broadcast From Historic US Schooner

Stellwagen Bank National Marine Sanctuary conducted two 30 minute live wireless broadcasts from the shipwreck of the coal schooner *Frank A. Palmer.* Viewers at the Gloucester Maritime Heritage Center in Gloucester, MA, the Great Lakes Maritime Heritage Center in Alpena, MI, and over the World Wide Web, watched live underwater video and asked the research team questions as they investigated the shipwreck. ■

NOAA

Viewers get a live peek at *Monitor* wreckage

An expedition to the site of the wreck of the Civil War ironclad off North Carolina's Cape Hatteras was broadcast live from a University of Rhode Island research vessel, *Endeavor*. It could be seen on the Internet, at www.oceanslive.org, and at the theater inside Nauticus.

NOAA

This remote-controlled submersible is one of two that are shooting images of the *USS Monitor* wreckage to create a huge photomosaic

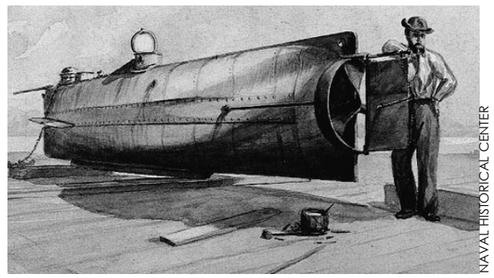
Just months after its historic battle with the Confederate ironclad *CSS Virginia* in Hampton Roads, the *Monitor* sank in 1862 in a storm off Hatteras, with the loss of 16 lives. The wreck was discovered in the 1970s. It's a marine sanctuary now, and recovery work is ongoing as the iron and wood are slowly degrading. The warship's revolving turret was brought to the surface in 2002 and is being preserved at the Mariner's Museum in Newport. ■

Scientists Say *Hunley's* Forward Hatch Was Unlocked

Scientists say they may have found a clue as to why the Confederate submarine *Hunley* sank after sinking a Union warship in 1864. Archaeologists in North Charleston working to restore the submarine recovered six years ago from the Atlantic Ocean off Sullivans Island have found evidence the forward hatch may have been intentionally opened the night the sub sank.

The forward hatch is one of two ways crew members got in and out. The group Friends of the *Hunley* says X-rays show the hatch is open about half an inch. Earlier reports said rods that could have been part of the watertight locking mechanism were found at the feet of the sub's commander, Lieutenant George Dixon.

Scientists also speculate the hatch could have been damaged after the sub sank. ■



NAVAL HISTORICAL CENTER

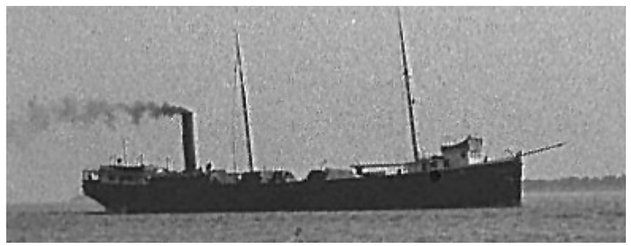
H.L. Hunley was a Confederate submersible

Russian Divers locate historic wreck in the Arctic

Russian divers claim they have found the wreck of a Soviet ship, which sank attempting a historic journey along the Arctic coast in 1934. It was supposed to show that a normal vessel—rather than an icebreaker—could complete the journey from Murmansk in northwestern Russia to Vladivostok in the Pacific Ocean. However, as the *Chelyuskin* neared the end of its journey in December 1933, it became trapped in ice and eventually sank in February 1934. But the failure became a triumph after the rescue operation where more than 100 of the crew were rescued by pilots who were hailed as heroes. Artifacts from the wreck are to be sent to Denmark, where the ship was built, to confirm its identity. ■

SOURCE: BBC

Michigan Divers locate *SS Hennepin* vitually intact at 200ft

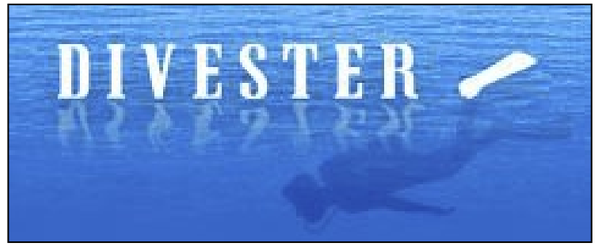


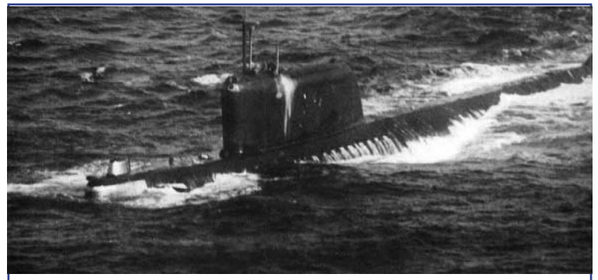
The well-preserved remains of the *SS Hennepin*, a Milwaukee-built, 208-foot-long vessel that sank during an Aug. 18, 1927, storm, has been found by Michigan Shipwreck Research Associates. Members of the group who searches for and documents shipwrecks, stated they located the *Hennepin* upright in 230 feet of water off South Haven.

The *Hennepin* was a steamer built in Milwaukee in 1888. It was later transformed into the Great Lakes' first self-unloader, a cargo ship with an A-shaped crane and a series of conveyors that made it faster and easier to unload its contents. "It's in perfect condition," said Craig Rich, a group board member and search assistant. "The A-frame arm that moved the cargo conveyor is there, the conveyor rollers and even the ship's wheel." The ship was being towed by a tugboat from Chicago to Grand Haven when it sank during a storm. The captain and his 13-member crew survived by abandoning the vessel, which took about four hours to sink, for the safety of the tug. ■

www.michiganshipwrecks.org

MICHIGAN SHIPWRECK RESEARCH ASSOCIATES





The *K-19* ballistic missile sub was also the star feature of a Hollywood film called '*K-19*: The Widow Maker' featuring Harrison Ford and Liam Neeson.

K-19 Missile Crew Honored, Sub to be Restored

In memory of their sacrifice and valor, golden anniversary medals were awarded to Russian veteran sailors, who served on the famous nuclear-power submarine *K-19*, ITAR-TASS reports. The *K-19*, the first Soviet submarine to carry ballistic missiles, was on its first training voyage in the North Atlantic in 1961, when its reactor cooling system sprang a leak, sending the core temperature soaring and threatened a meltdown. The captain and 139-man crew stayed on board to repair the system and to prevent a nuclear catastrophe, exposing themselves to severe radiation. Eight died within weeks, 12 died over the next two years and 20 suffered longer-term illnesses. Today, *K-19* crew is nominated for Nobel Peace Prize. In a recent twist of the tale of the *K-19*, the Russian oligarch and billionaire Vladimir Romanov, has bought the legendary Soviet nuclear submarine, which he plans to have restored and turned into a museum, possibly on the Moscow River. Mr Romanov did his own military service on the *K-19* from 1966-69. When he heard that it had fallen into disrepair, he felt it was important to put back into the water.

In turning the vessel into a museum, he is fulfilling the wishes of the *K-19*'s late captain Nikolai Zateev on whose watch the nuclear accident occurred. ■

New Oceanography Centers and Vessels

Oceanography Center On Hawaii Gets US$19 Million Grant

A new federal 5-year grant will help fund a University of Hawaii-led center focusing on the study of microscopic organisms in the world's oceans. The project is expected to help uncover new technologies and to educate scientists and engineers.

"We are on the verge of a revolution in our understanding of the sea around us, especially the role of microbes in global ecosystem processes," said David Karl, a UH-Manoa oceanography professor and principal investigator for the new center. The University of Hawaii has already committed $12 million for the first five years. The Agouron Institute and the Gordon and Betty Moore Foundation are also providing funding. ■

New Oceanography Centre in Portugal

Construction of the Sagres Oceanography Centre, located close to the Porto da Baleeira, will get underway by the end of the year. The centre will include an aquarium dedicated to marine wildlife, a feature within the museum area that will also boast various thematic sections dedicated to the water cycle and a small auditorium. It is due to open to the public at the end of 2008. ■

Oregon-based coastal research center funded

The National Science Foundation has selected Oregon Health & Science University to become the first Science and Technology Center to focus on coastal margins and river-to-coast transition. The five-year program may be extended into a $39 million, 10-year program. ■

NOAA Accepts Delivery of New Fisheries Survey Vessel

NOAA took delivery of *Henry B. Bigelow*, one of a new class of fisheries survey vessels being built under contract with VT Halter Marine Inc., in Pascagoula, MS. The vessel will support NOAA research efforts in conservation and management of fisheries and marine ecosystems primarily in northeastern U.S. waters, replacing the 45-year old *Albatross IV*. The ship will be home ported in New England, although a permanent base has not been named. ■

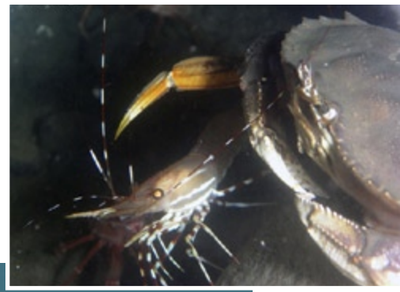
Venus - Your Internet Connection to the Ocean Floor

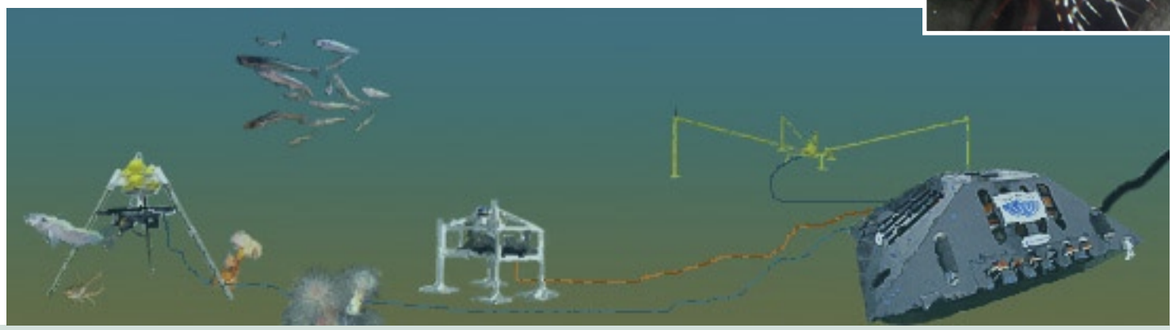
VENUS, The Victoria Experimental Network Under the Sea, is a facility that connects you to underwater instruments on the ocean floor near Victoria and Vancouver, British Columbia, Canada.

CSI Undersea?

Find out what happens to a dead body on the seafloor. Check Research Highlights and read why VENUS deployed a dead pig near our underwater camera.

Designed as an undersea laboratory for ocean researchers, you can examine their research and see the same data yourself through this website. ■
www.venus.uvic.ca





Travel News

EU Funds New Hyperbaric Chamber for Dominica

The tourism sector in Dominica has received a major boost with the installation of a hyperbaric chamber at the Princess Margaret Hospital. Funded by the European Union under the Eco-Tourism Development Programme at a cost of $750,000, the well equipped and functional facility will be used for treating emergencies associated with scuba diving. ■

Ship's scuttling brings in tourism dollars

The Queensland Tourism Minister Desley Boyle, says the scuttling of *HMAS Brisbane* off the Sunshine Coast has raked in a million dollars in tourism revenue. The former Navy ship was sunk a year ago to create a dive site. "There is also the amazing story of the artificial reef that has grown at a great rate around the wreck, very much faster than had been predicted," she said. ■

New Zealand Far North Gets Frigate for Artificial Reef

The Far North district has won the right to scuttle the decommissioned naval frigate *HMNZS Canterbury* in the Bay of Islands. Far North Mayor Yvonne Sharp said Minister of Defence Phil Goff had told her that it was the strength of community support for the trust's bid that had impressed him. ■

SA plans "Cape Peninsula Historical Shipwreck Route"

The South African Heritage Resources Agency and the South African Maritime Museum are currently planning a wreck route consisting of a series of information signboards or story boards erected at important or interesting historical wreck sites along a stretch of coastline. ■

Construction Projects on Sipadan "Terminated"

by Willy Volk

After the press coverage and public outcry concerning the barge that destroyed a section of Sipadan's reef last May, Malaysian officials have finally agreed to halt all major construction on the island. The restaurant and clubhouse that were being constructed to serve visiting divers have been "terminated with immediate effect," Chief Minister Datuk Musa Aman announced yesterday. Moreover, the entire Sabah Parks—the agency that oversees Sipadan as well as some other parks and islands in Malaysia—will receive a "management revamp," due to its bungling of the incident. In other words: heads are gonna roll. (The Sabah Parks website is out of service, at the moment; I don't know if that's related or not.)

Nevertheless, the Chief Minister did admit that officials were still planning to implement severely scaled-down facilities for divers, involving eco-friendly toilets and a small rest area. "We will come up with a new development concept that is environmental- friendly and suits (the island's) eco-system. We will announce it two or three months from now," he said this week. Considering ample rest areas exist on neighboring islands, I don't understand the need for these facilities, but Musa insists they're essential. ■

PETER SYMES

More divers going to Sipadan illegally

The permitted number of divers on Sipadan per day is 120, but dive operators have been taking as many 200 divers daily, according to a recent consultant's report, writes the Malaysian daily The Star.

The state government has tried to put a stop to divers entering Sipadan without permits. This has led to friction between dive operators and Sabah Parks officials, resulting in divers being evicted for entering the area without proper permit. In January, the daily average of divers to the island was 141 and the number rose to 159 in February. It then went up to an average of 219 a day in March, 235 in April and 201 in May. ■

Latest Trend In Red Sea Liveaboards:

Wreck Safaris in Luxury

IMAGE SUPPLIED BY BLUE O TWO

Over the last decades, the Red Sea has become one of the most popular diving destinations in the world. Divers from across the globe congregate to experience the crystal clear waters and abundance of marine life. The attraction stems not only from the unique marine ecosystem, but also from the plethora of shipwrecks that lay in rest stretching from the Gulf of Suez to the eastern Straits of Tiran, and reaching as far south to where the Red Sea meets the Indian Ocean.

The UK-based tour operator Blue o two has now taken Red Sea liveaboard to a new evolutionary level by introducing the next generation in liveaboard vessels and offering built-in adventurous safaris with one mission in mind—wreck hunting. Joining forces with renowned explorer Peter Collings, their escorted safaris are an introduction to wreck exploration, presenting divers with the opportunity to develop an entirely new diving interest and add a definite purpose to their diving holiday. Each safari is unique in its own right, with as many as 15 different wrecks to be explored within a one week safari depending on the itinerary.

Blue o two and Collings run two wreck hunting weeks every year, often enlisting experts in the field of side scan promoting impromptu workshops detailing the art of wreck location and exploration. In 2005 alone, 12 new wrecks were added to the growing list. The last two expeditions have netted 7 and 5 new wrecks respectively.

Following his devotion to wrecks, Collings has been the vanguard to the record of over 60 wrecks that are currently dived by sport divers on a regular basis with over 20 further target spots identified by Collings for exploration. Even in 2006, the Red Sea will remain a mysterious arena, ripe for adventure and exploration. Further information: www.blueotwo.com ■

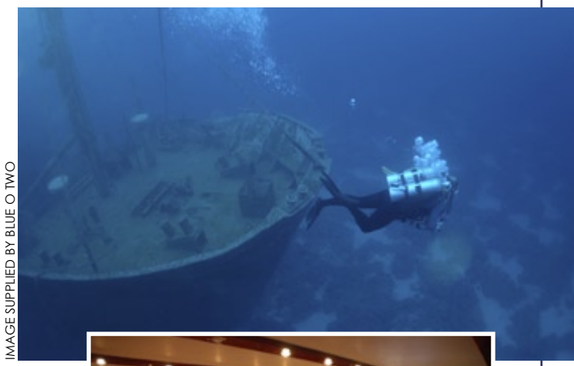


IMAGE SUPPLIED BY BLUE O TWO

IMAGE SUPPLIED BY BLUE O TWO

The Situation in Thailand Following the Coup

Mike Stark of Scuba Cat Diving in Thailand sent an inside report:

Obviously after the recent coup in Bangkok, there is a desire for factual information on what is happening in Thailand and Phuket in particular.

To sum things up at the present, life goes on pretty much as normal. My daughter is having an unwelcomed day off from school, but I got a good bicycle ride in. There is a little less traffic on the roads, which is also kind of nice.

In any case, please do not rely on television networks such as CNN or even BBC for unbiased news. Let's face it—good news to them is boring, so no point in letting the truth get in the way of a good story! Did we ever learn that after the tsunami!

Watching BBC the other night, even as they were showing the speeches at the UN, the words BANGKOK TANKS were splashed across the screen.

Give us a break!

The unfolding event is fairly routine in Thai history and is the logical conclusion to the political impasse of the past year in which one man's ego is holding up an entire nation.

At this moment, there has been absolutely no violence and most likely will be none. The world's press and international leaders are frothing at the mouth about the Thai military destroying a major democracy.

WIKIPEDIA

Sonthi Boonyaratglin Commander-in-Chief of the Royal Thai Army became the de facto head of government of Thailand after a coup d'état on Sept 19

This is *wrong*—the Administrative Reform Council (ARC) is made up of the very highest and most patriotic members of Thai society—the ones that have not sold out to greed and desire. The ARC is trying to restore democracy in Thailand and pledges to move forward quickly—the deadlock is finally over.

To sum things up at the present life goes on pretty much as normal

Please remember that the previous government, while being democratically elected, certainly did not rule in a democratic manner.

For more information please see the link below and rest assured that your visit to Thailand will be a fun and relaxing as ever. ■

—Mike Stark
Scuba Cat Diving

Legends Week Postponed to May

'Legends Week' is the brain child of world record deep diver Mark Andrews, the emphasis being on a master class role by ten of the world's leading divers in their field.

All of the 'legends' will be attending based on achievements made in the diving industry, some will be world record holders, some involved in developing specialist equipment and others working in specialist fields such as commercial/military training.

The legends week will enable guests to interact with diving 'legends' on a level never before obtainable. The week long event will include five days diving. The time table will allow for all guests to dive with each of the 'legends' at least once during the five days of diving.

As well as diving, there will be nightly lectures from the 'legends' on their chosen subject as well as workshops for equipment configuration, photography and expedition planning among others.

The event in Meridien Hotel in Dahab Egypt was scheduled for 9-16 December but has now been moved to May due to the hotel not being ready. The Meridien is the newest luxury hotel in Dahab and offers the perfect setting for such a prestigious event. Hosting the event will be Poseidon Dive Centre, sponsoring the event with use of the dive centre facilities including arrangement of all diving activities and logistics. 'Legends' for the week include such names as: Pascal Bernabe, Jack Ingle, Leigh Cunningham, Monty Halls, Paul Haynes, Dan Burton, Bob Evans, Rick Stanton and Phil Short. ■ **www.poseidontechnical.com/legends**

Leigh Cunningham also runs X-Ray's regular "Technical Matters" column

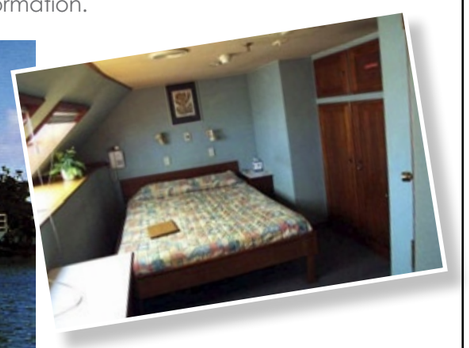
Ocean Quest

New Liveaboard to be lauched ...with a slight delay

Divers Den writes: Due to unforeseen circumstances we cannot at the present time offer OceanQuest liveaboard dive trips or OceanQuest liveaboard dive courses.

We are still running all PADI courses on day trips,and offering overnight trips on Taka and Spirit of Freedom, please contact us for full information.

The New OceanQuest will commence operations on 20th December 2006. ■



Emperor Divers, Egypt to Offer Child Care While Mum and Dad Are Out Diving

Mums and Dads can now enjoy guilt-free diving, knowing their children are being cared for in a safe, professional environment. Recent feedback from diving sources pinpointed a distinct lack of facilities for families who want to combine diving with a family holiday. So, Emperor Divers, the Red Sea specialist diving company with six dive centres throughout the area, listened and has now responded by providing a dedicated crèche and kids camp service in conjunction with the highly respected company, Family Diving Limited. ■ **www.emperordivers.com**

Phuket Underwater Park Ready for Divers

Sculptures worth 4 million baht have been placed on the seabed at a depth of 15 meters close to Koh Racha Yai, Phuket, and are being promoted as a special "must see" site for divers in the coming high season.

Phuket Diving Park, as the site is now known, features sculptures including Thai demons (yak), traditional decorative arches, a sala, two elephants and a giant pearl oyster. ■

SOURCE: PHUKET GAZETTE

Dive Tutukaka Wins Supreme Tourism Award

New Zealand's largest dive charter operator, Dive Tutukaka, has won the supreme Tourism Industry Association award for 2006. Only set up six years ago, Dive Tutukaka has won a string of awards. Last year it won the Qualmark Tourism Mark of Quality award. ■

Ginnie Springs 30th Anniversary

2006 marks the 30th Anniversary for Ginnie Springs and would like to thank everyone for visiting with them over the last thirty year. Watch their website www.ginniespringsoutdoors.com for anniversary events. ■

The Airbus A380 Took Off From Toulouse on First Passenger Flight

The Airbus A380 has taken off for the first time with 474 passengers on board for the first in a series of four long flights or "Early Long Flights". During the flights, the passengers, comprised of Airbus employees and cabin experts put the cabin through its paces. ■

Duty Free Items

In the US, due to enhanced security measures, duty free items are now only permitted if delivered directly onto the aircraft. However, passengers making connections from international to domestic flights must transfer the items to their checked bag before boarding their flight. At "pre-clearance airports" passengers must put duty free items into their checked luggage since the aircraft deplanes behind passenger security checkpoints. Most liquids, gels, lotions and other items of similar consistency will not be permitted in carry-on baggage. ■

whales & dolphins

Whales Can Age Up To 200 Years

Scientists who have studied the eye tissues of Bowhead whales say that some of these rare creatures can live to 200 years old.

Jeffrey Bada, marine chemist at Scripps Institution of Oceanography in la Jolla, California, USA, told National Geographic News that around 5 percent of the population are over 100 years old with some reaching 160 and 180 years. Bada claims that the whales may be the most aged animals on the planet.

Bowheads, which are also called Greenland right whales, are a type of baleen whale that have bonelike plates that strain food from the sea rather than teeth. They live in the Arctic region and can reach 18m (60 ft) in length and weigh up to 89 metric tons (100 tons).

In 1946, the International Whaling Commission banned the commercial whaling of bowheads. However, Inupiat Eskimos are allowed a certain number to hunt for food and oil which maintains in their traditional way of life.

The Eskimos used stone harpoons to hunt these whales up to 1870, a practice that disappeared when Europeans came to the Arctic. However, whale hunts in the 1990s revealed some with stone harpoons in them. Scientists deducted from this that some of the whales may be a hundred years old. ■

Fossil Whale Was "T-Rex" of the Sea

Today's gentle filter-feeder baleen whales may have evolved from a ferocious beast with razor sharp teeth, say Australian researchers in a recent study of a 25 million year old fossil skill uncovered among the cliffs of Southern Australia.

The specimen, which was unveiled at the Melbourne Museum this year, is called *Janjucetus hunderi.*

Prior to the finding, whales had been divided into two groups by researchers: filter-feeders and whales with teeth that hunted and evolved into species such as the killer whale, dolphin and sperm whale.

The new research, which appeared in Prodeeding of the Royal Society B, suggests that the baleen whale's ancestor may have been one of these latter class hunting relatives. The ancient species had large teeth to catch and eat large prey including sharks and large fish according to researchers at the Victoria Museum and Monash University where the study was done. SOURCE: DISCOVERY CHANNEL ■

Killer Whales Kiss and Make Up

Researchers have discovered that killer whales reconcile their differences after squabbles.

Based on findings from 2,800 hourse of video-taped observation, Dr Michael Noonan, Professor of Animal Behaviorat Canisius College found significant indicators that individuals would separate for 10 minutes after an obvious quarrel, usually between a father and mother, after which the pair would reunite for a 10 minute period of sinchronous swimming side by side, or echelon.

It has long been thought that periods of aggression in most animal species are followed by a cooling-off period when behavior can gradually return to normal. This is seen in human beings who have special pro-social behaviors that speed up the process of moving towards reconciliation.

Scientists say that similar behaviors appear to play an important role in some primate species such as macaques and chimpanzees.

The new findings from the whale study suggest that the whales experience a re-establishment of social bonds through their close physical proximity and precise coordination during echelon swimming rounds. Noonan claims that this discovery opens a window for further study into the evolution of peacemaking in complex societies.

Although killer whales do not often display aggressive behavior toward other individuals in a group, the researchers were able to identify 21 squabbles and investigate whether the possibility of reconciliation might occur in the species. ■

Are Dolphins really Dumb?

Australian scientists are split over controversial research claiming that dolphins are not as smart as commonly thought.

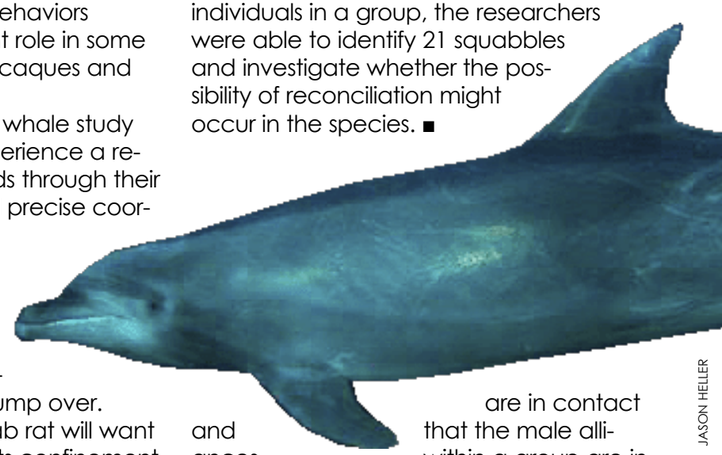
According to Paul Manger, a South African scientist from the University of Witwatersrand, the large brains of dolphins and whales are not a sign of intelligence but assist the warm-blooded species cope in cold water.

Manger goes so far as to argue that the dolphin is no smarter than a lab rat or goldfish. He told the Daily Telegraph that if a dolphin is placed in a marine park with dividers to keep other dolphins apart with not much obstacle to jump over the boundary, the dolphins will never jump over. While a goldfish or even a lab rat will want to climb out or jump out of its confinement.

Manger states that the structur of the dolphin brain is not built for processing complex information.

However, critics of the report say that dolphins under study display the most complex social behaviour outside the realm of human beings. Researcher who work with the species argue that the dolphins appear to be thinking and reacting to stimuli and the humans with whom they are in contact and that the male alliances within a group are in constant flux suggesting some sort of brain capacity is in play.

The controvesy seems to put people up in arms say the Australian Dolphin Research Institute officials who agree that there is something special about dolphins that has fascinated people for thousands of year even though there islittle evidence that they are as intelligent as everyone wants to believe. ■



JASON HELLER

Whales, Dolphins Turning Up in Weird Places

Unusually large numbers of whales and dolphins are showing up off Scotland's east coast. Scientists attribute the increase to the current heatwave as warmer water temperatures lure the marine mammals further north than they normally migrate.

Researchers from the Sea Watch Foundation state that Aberdeenshire and Moray Firth seem to be particular hot spots for the creatures, including more minke whales than usual.

Other sightings include a fin whale at North Berwick, a pilot whale at St Cyrus and six Risso's dolphins off Gifleness near Aberdean with large groups of white-beaked dolphins sighted further offshore. A humpback whales was seen in the Outer Hebrides and dozens of common dolphins were sighted at Fraserburgh. ■


NOAA

Right Habitat for Right Whales

The U.S. federal government has designated a region of thousands of square miles of sea off the state of Alaska as critical habitat for the North Pacific right whales, which are considered the most endangered whale species in the world. Some 36,750 square miles in the Bering Sea and the Gulf of Alaska are now protected habitat for the right whales, whose numbers that reached at least 11,000 were dessimated by commercial whalers who prized the marine mammals for their oil and baleen. In 1973, the whales were listed as endangered and are thought to number less than 100 individuals off the coast of Alaska, with a few hundred more that may dwell near Russia. Their recovery is still tenuous say NOAA officials. ■

Thames Whale Had Arthritis

A whale which lost its way in the Thames River in England was discovered to have arthritis.

Researchers from the Natural History Museum who studied the 11-year-old female northern bottlenose whale found that the creature was suffering from severe pain in her neck.

The 5.85m (19.2ft) whale was first sightedin January after swimming into the North Sea and up the Thames. Rescuers attempted to take it towards deeper waters, but the whale died during the attempt. It is thought she was heading toward the west to the Atlantic Ocean to feed on deep sea squid but lost her way taking a wrong turn that landed her near the Chelsea Bridge in central London.

Later examination of the whale found that she was dehydrated and starving for around a week before dying. Also her bones and joinst in her spine and skull displayed the indications of a degenerative joint disease similar to what humans call arthitis. The whale was unable to rehydrate due to the lack of a normal squid diet. ■

New Methods for Discovering Whales' Age

Age study of humpback whales may help save them. Researchers have found a way to discover the age of a whale without involving its death before hand.

Previously, the only way to find out how old some whales were was to count the layers of wax in their ears. This could only be doen if the animal was dead.

Now, researchers can test the dead skin flakes that whales leave in the sea in order to calculate the whale's age. Which makes killing whale for science a moot reason for their slaughter. Up to now, killing whales for science was justified. Although it only applies to certain whale that do not have teeth such as the humpback. Whales who have teeth can be studied for age while still alive.

Ironically, killing certain whales for scientific study to learn more about the ages of whales assisted scientists to find out how their populations where affected by humans killing them for commercial gain. Now this practice can change for the benefit of the whales. ■

Beluga whales: half Russian, half Canadian

It has been discovered that beluga whales in Canada actually spend half their lives in Russian waters according to a research team that used aboriginal know-how and high-tech equipment in the study. ■

Beluga Whale Population Dwindling

Pollution, conflict with human activities, global warming and loss of food sources have been cited as possible reasons for the decline of the beluga whale population in Canada. ■

Manatee Pelvic Bones Hold Gene Key to Evolution of Leglessness

Stanford University researcher David Kingsley, PhD, discovered a link in gene mutations across a wide field of animals after weighing 114 pairs of manatee pelvic bones. He found the left pelvic bone outweighed the right in almost every case by an average of 10 percent, which suggests that mutations in the same gene may be the key to the evolution of leglessness in animals that can be as distantly related as tiny fish in lakes and streams around the world and the 1,000-pound manatees in Florida. ■

Manatees Can Be Trained

According to Universiy of Florida neuroscientist and co-author of *The Florida Manatee: Biology and Conservation*, Roger Reep, manatees are not only trainable, they're as smart as dolphins only slower and less motivated by fish treats. ■

Japan is killing pregnant whales

The next generation of whales is being slaughtered by Japanese whalers who capture and kill a large number of these sea giants who are pregnant.

A report issued by the Japanese government stated that 60 percent of all female whales killed in Antarctica over the summer were pregnant.

The Human Society International reported that 853 minke whales and 10 fine whales were killed. In this group there were 391 female minke whales of which 224 were carrying 227 fetuses.

In addition, two of the fin whales were pregnant with one fetus each. Three more female minke whales were lactating. It is assumed that their calves also died.

The overall death toll in whales killed by the Japanese scientific whaling program in Antarctica over the summer was 1092 according to society statistics who also reported that 90 percent of the whales killed were taken from the Australian Whale Sanctuary. ■

TURTLES

Edited by
Gunild Symes


JASON HELLER

Sea Turtles Gone Wild

Scientists from the US National Oceanic and Atmospheric Administration and New England Aquarium assisted 13 Kemp's Ridley sea turtles and one Loggerhead turtle to return to the wild in New England. Five of the turtles were tagged with tracking devices, which can be monitored by satellite online for up to one year. It is hoped that data collected will show behavior after release, survival, migration, habitat and how the rehabilitation techniques affected the turtles.

Dr Bridget Dunnigan of NOAA Fisheries Service said the released turtles were in pretty bad shape when they were first rescued, but have since made a a great recovery with the help of their caretakers. The Kemp's Ridley and Loggerhead turtles are listed as an endangered species. ■


NOAA

Hawksbill Turtles Tracking Devices

Satelite tags were attached to a number of hawksbill turtles by UK researchers of the Zoological Society of London in order to learn how to better protect the species, which is now critically endangered due to excessive poaching, fishing and habitat loss. Since little is known about the migratory patterns of the hawksbill, conservationists want to find out where the turtles go the rest of the year. Findings from the tracking study may lead to a better understanding of relationships between different populations. ■

Loggerheads Make a Comback Along Italy's Coast

Appearing in increasing numbers along the southern shores of Italy, loggerhead sea turtles are being spotted in the waters off Sicily, Calabriea, Publia and Sardinia according to reports by Italien scientists to the local news agency ANSA. In addition, more than 15 nesting sites have been discovered even though the turtles' main nesting areas are along the coasts of Turkey, Libya and Cyprus.

While this is good news, scientists warn that the Loggerhead is increasingly under threat from destructive fishing practices, shipping traffic, pollution and habitat degradation due to tourism. ■

Super Bottom-Breathing Turtles

Research has found that the rare freshwater Mary River Turtle can stay submerged for at least three days and maybe up to a week when conditions are right. This skill may protect the reptile from falling prey to predators.

Natalie Mathie of the University of Queensland in Australia told UQ News that unlike most freshwater turtles, the Mary River Turtle has special sacs in its bottom that can extract half of its oxygen requirements from river water.

The Mary River Turtle is endangered and unique to the Mary River. It is thought that the turtles lay only one hundred eggs each breeding season, many of which end up being eaten by cats, dogs and foxes or trampled by cows. Future plans to build a dam in the area may damage turtle habitat and deplete the oxygen levels of the river. ■

Sea Turtles in Canada?

Local fishermen in Canada pulled up more than they bargained for this summer when they discovered a large leatherback turtle that got caught and drowned in one of their whelk pot lines.

Garnish Capt. Terrence Legge and his crew told the Southern Gazette that they immediately called officials at the Department of Fisheries and Ocean. They reported that the sea turtle's front flipper was snared by twisted line and already deceased when the found it.

Officials told him to bring to back to port where the department studied the animal for research purposes.

Local bystanders at the port told reporters that they were amazed at the catch, which weighed in at 832 pounds. Leatherback turtles are the largest living turtle and rarely seen in the waters along the south coast. ■

Invasive Plant Threatens Turtles

Action is being taken by a nonprofit group to eradicate an exotic species of plant that is wreaking havoc along the coast of South Carolina, USA, and threatening nesting sea turtles whose hatchlings get caught and die in the long vines of the plant.

The plant called Beach Vitex, was introduced to the area in the mid 80s to stabilize eroding beaches. But local officials say it is choking native plants and may be costing the lives of new hatchlings. ■

Turtles to Combat Jellyfish Plague

In the Mediterranean, sea turtles who were recuperating from injurinies at the Oceanografic in El Saler were released. Measures have been put into place by the Valencian government to protect the species which is in danger of extinction. Jellyfish are their main food source, so it is hoped that the released turtles will help diminish the current plague of jellyfish that clog up the region's beaches. Various installations in Valencia have assisted in the recovery and recuperation of more than 200 sea turtles. ■

Diving in a Darwinian World

Galapagos

Text by Bernardo Sambra
Photos by Bernardo Sambra
and Valerie Crousse

PHOTO BY VALERIE CROUSSE

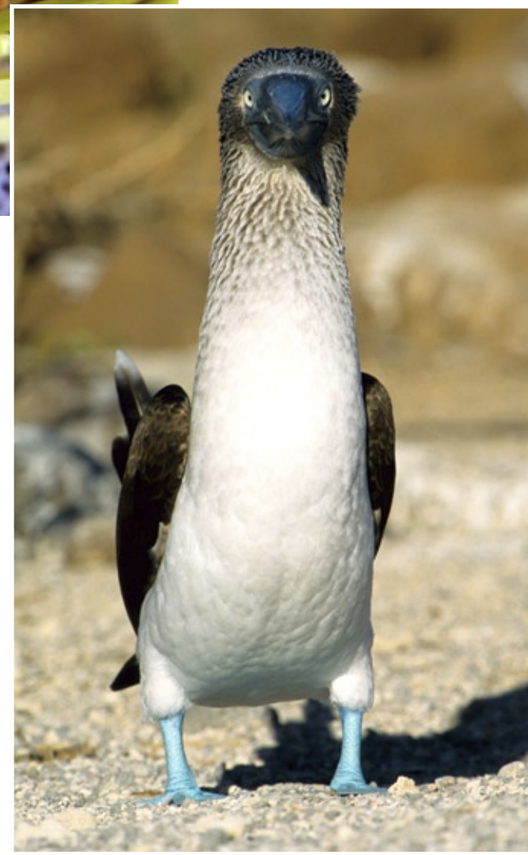
Galapagos

LEFT:
Amarillo coral

FAR LEFT:
Diver and school of Barracuda

BELOW: Blue Footed Booby

PREVIOUS PAGE:
Silhouette of Sea turtle



"Sui Generis" is the most appropriate way I find to describe the Galapagos Islands. A place where the intruder is the human being. A place where many of its inhabitants are animals that exist only in this small piece of the world. A place where evolution seems to have been suspended at some moment in time. A place where we can feel like pioneers in each corner.

The Charmed Islands

The Galapagos Islands can be considered a living museum where life can be seen as it was thousands of years ago, a paradise where man can feel like a complete intruder and inclusively to picture himself diminished before the total indifference of the animals that live in that place.

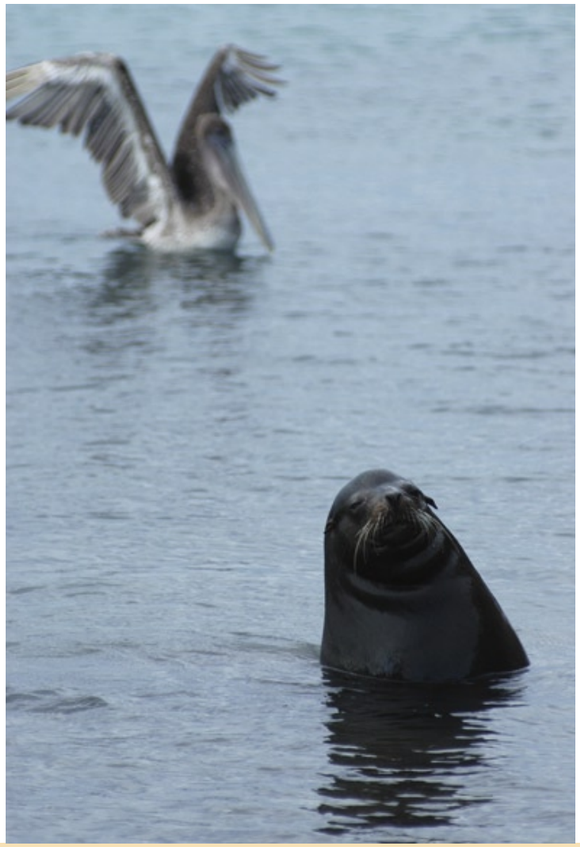
The archipelago that was baptized as the Enchanted Islands by the first Spanish navigators jumped to fame when Charles Darwin, the famous English naturalist, published the notes of what he observed after five weeks of permanence in these islands (1835) as part of his Theory of the Evolution of the Species.

The Galapagos Islands National Park is conformed by twenty islands and thirty small rocky islands distributed on a surface of 80.000 square kilometers. This group of volcanic islands is isolated in the Pacific Ocean, more than thousand kilometers off the coast of South America. The origin of these islands (geographic, biological and climatic) is until now a mystery. Of all these islands only four them are occupied by man and only some of the rest can be visited by tourists whereas others maintain the access reserved exclusively for scientists.

The combination of a unique climate and the fast currents rich in nutrients that bathe the islands, sustain surroundings that are as extraordinary in the sea as in the mainland. There is no doubt that from the first moment man put his eyes on the Galapagos and until nowadays, all that has made a big impres-

CLOCKWISE FROM ABOVE: Amarillo coral; Sea lion; Goby; Underwater photographer and playful sea lion

Galapagos



ABOVE: Sea lion on the hunt

LEFT: Pelican and Sea lion at the surface

FAR LEFT: Stingrays gliding under the surf

sion is the oddity of the abundant animals in the virgin coasts: from the prehistoric giant turtles to small boobies that now take the name of Darwin. The isolation of the islands and time, that has allowed life to evolve and adapt to an environment in which predators never existed, ended in species that, when the first men arrived, were unusual and imperturbable.

The majority of reptiles and birds of Galapagos are endemic. Even within the archipelago there are different species, each one limited to a single island.

A world of contrasts

Contrary to what would be thought, the climate of the Galapagos Islands is atypical for a tropical oceanic archipelago. The changing cold water presence, brought by the current of Peru (Humboldt) that arrives at the north from the southern ocean, cools and dries the Galapagos during great part of the year. When these currents are debilitated and warmer waters from the north, typically tropical, surround the islands, begins the warm rainy season.

The experience to dive in the Galapagos is like everything what you find here, very particular, and without a doubt requires an advanced level of diving. Strong currents, drastic changes of temperature (termoclines), cold water and often little visibility, represent a challenge for any experienced diver and mainly for the submarine photographer who will have to add a good amount of preoccupations to the already large list of things that must consider to obtain photographies in an atmosphere that can be considered hostile.

Nevertheless, the opportunity to dive in waters literally filled with life and to be part of an almost infinite procession of fish, sharks, rays, turtles, dolphins, mantas and others, justifies the greater of the efforts.

Puerto Ayora

The forced entrance to these islands is Puerto Ayora, a charming town that, with the years, has stopped being calm and quite and became the center of the movement of these islands. This port, located in Santa Cruz Island, is the place

Galapagos

Diver with spotted Eagle ray

where starts all the tourist movement that is distributed to the different points of the archipelago. Colorful by day, agitated by nights, Puerto Ayora stays in the memory of the traveler as the closest point to civilization in these islands. In Santa Cruz two obligatory visits have to be done. The first one, are the humid forests in the heights of the island to visit the majestic and gigantic Galápagos turtles and the second, is the creek of the Black Turtle. This creek is a place of manglares in which, thanks to the little depth and the transparency of the waters, sharks and schools of golden head of cow mantas can be observed. A typical excursion in these manglares is on board of a zodiac moved only by oars since in this site bathing, diving or make excess noises is not allowed. It is also restricted to twelve passengers by boat.

Way to the South: San Cristóbal, Española and Floreana

Three islands are normally visited by the divers before the long and spectacular voyage towards the remote north islands. San Cristobal, Espanola and Floreana stand out due to their particular natural attractive and landscapes. These islands are south and south west of the Santa Cruz Island.

In Leon Dormido I found a wall covered of barnacle shells which sheltered small, aggressive and endemic Galapagos blennies that after making me suffer for several minutes trying to focus with my camera their face in the middle of their frenzy movement allowed me to portray his magnificent color and expression. After the immersion we made an excursion to mainland to visit the modern Center of Interpretation.

Afterwards we went to La Espanola, the southern island of the archipelago, very appreciated by bird's specialists due to the great variety of species you can find on the Island. This island offers mainly two places of interest: Punta Suarez and Garner Bay. In Punta Suarez, it is possible to have the first real approach to Galapagos, by mingling

LEFT: Flamingo fishing for food
FAR LEFT: Closeup of a reef fish

Sea lion rests on the beach

with tens of blue footed boobies and hundreds of sea iguanas that let to us stay with them without problem. For a photographer this is like "Disneyland"... taking pictures of wild animals will never be so easy! In a place like this, you can observe behaviors as interesting as the ones of the blue footed boobies or the spectacular Albatroz of Waved executing the hallucinating and fascinating ritual of courtship in front of our eyes.

In Garner Bay it is allowed to make immersions with snorkel surrounded by schools of surgeonfish, butterflyfish, angelfishs and mainly of sea iguanas.

To arrive to Floreana we sailed just a short time but it would be possible to say that we were transported to the other end of the world. First we walked to a lagoon, hided after hundreds of trees and vegetation. A still lagoon filled with pink brilliant flamencos that digged the muddy ground of the lagoon in the search of food. Later, we followed a winding footpath that took us to a beach in the other side of the island where rays can frequently be observed feeding themselves in the surf of small waves. It is worth to stay in this place until dusk and enjoy a sundown without precedents.

Floreana offers at least four exceptional places for diving: Corona del Diablo, Champion, Enderby and Gardner. The famous Corona del Diablo is formed by the eroded rest of a symmetrical volcanic cone. Even though coral has suf-

Galapagos

TOP RIGHT: Iguana
BOTTOM RIGHT: Gray heron

Goby

Frog fish

Shrimp on sea coral

fered the effect of El Nino, you can dive between eaglerays, hawkfishes, creole fishes, grunts and endemic garden eels. Moving away from the Corona, in the deep side, Jacks, Turtles and sometimes hammerheads and reef sharks can be found.

Enderby and Champion Rock offer two magnificent dives in walls covered by forests of black coral where magnificent sea horses of the Pacific can be seen.

Heading North

Finishing this trip, we went to the famous islands of the north. The voyage would take through the Bartolome Island, to the small island of Round Rock and Punta Vicente Roca in the Isabela Island. All the dives that we made during the following two days, were complemented at the end of the day with walks that allowed us to complete the panorama that is mandatory when visiting these islands. No matter how devoted to diving you are, it is indispensable to know Galapagos outside and underneath the water to be able to appreciate it in its total dimension.

Punta Vicente Roca was a particularly memorable place. We dived during night and day. Some of the divers that accompanied us had the luck to dive with two Mola Molas (Sunfish) that sometimes visit this place.

The legendary Darwin and Wolf

After the last dive near the Isabela Island we started a twelve hour trip to the legendary islands of the North: Darwin and Wolf.

A single immersion in the islands of the North end, Darwin and Wolf, located 87 miles off the north of the rest of the archipelago, can be overwhelming. Tens of

Galapagos sharks, aggressive silky sharks and hammerhead sharks swimming together without showing the minimum rush or concern due to the diver's presence. Turtles, gigantic schools of creole fish and of course magnificent and gentle whale sharks appear simultaneously, offering a spectacle dif-

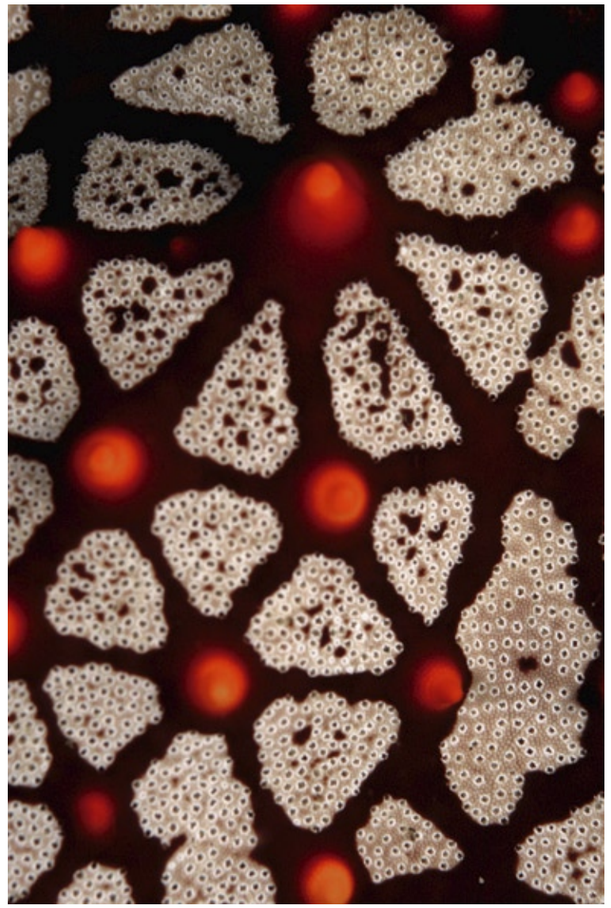
LEFT: Sea star
ABOVE: Frog fish

Galapagos

Black turtle cove

Galapagos

White Cormoran



▲ Red-lipped Batfish

ficult to find in any other part of the planet. During three days we were anchored closely to the mythical Arc of Darwin, reunion place for the whale sharks during the months of September to November. The wait for the encounter with one of these gigantic animals was long. After six divings we managed to face this magnificent animal. Regrettable, there was no current during those days and as Luis Rodriguez, our experienced guide said, with not current, not sharks.

The end of the trip was crowned with a visit to Seymour Island, to spend the afternoon with the magnificent frigate birds. Seymour is the only island where one can find these awesome birds in courtship all year round. Male frigate birds have a bright red gular sac at their throat, which they use to advertise their manhood by inflating it to astronomical size to attract the attention of potential mates.

The great majority of the people who visit Galapagos Islands feel so touched while diving in their pacific natural world that, sincerely, would want anything to grant its future. The tourist operators, whose future depends on the adequate management of this natural paradise, also support the conservation. The tourism increases day to day in these islands also the furtive fishing.

Wave Albatros

Galapagos Books

Recommended guides and books:

Galapagos: Islands Born of Fire by Tui De Roy (Hardcover - Jan 2000)

The Diving Guide: Galapagos Islands by Steve Rosenberg and Ellen I. Sarbone (April 2004)

Lonely Planet Ecuador & the Galapagos Islands by Danny Palmerlee, Carolyn McCarthy, and Michael Grosberg (Paperback - Nov 30, 2006)

Close up detail of coral

School of hammerhead sharks on the hunt

Happily there are many people and efforts dedicated nowadays to preserve and take care of these wonderful islands. Discovering without destroying is what Galapagos need. Visit Galapagos and spread the word about its magnificence and richness but always, always remind people that this is one of the last truly wild places on earth.

Lagarita lizard

About the author

Bernardo Sambra is a peruvian underwater and wildlife photographer. His articles an photographies has appeared in a number of international publications such as Aqua, Asian Geographic, Panorama de las Américas, Golden Dolphin, Rumbos, Conde Nast Traveler, Travesías, Underwater Photography Magazine, Somos and Scuba Diver. His images and work have achieved international recognition in several international specialist competitions and his work has been presented as part of a number of underwater exhibitions as "Oceans Expo 2005", "Master Image Makers Gallery" (2005) in Singapore and "Reflejos Submarinos" (2006). In 2005, Bernardo was a speaker and jury at Celebrate The Sea Festival in Singapore.

In the latest years, Bernardo has added to his work as a photographer, the production and edition of books related to the oceans and its inhabitants joining together the work of the world's most talented underwater image makers. His most recent titles are "Oceans Expo" (2005) , "Oceans" (2006) y "Oceans in Options" (2006).

Starting in 2006, Bernardo has started leading expeditions to some of the finest diving destinations in the world.

"Protecting through images" is the slogan of The Living Oceans, an organization founded by Bernardo and his wife Valerie, that aims to raise awareness about the oceans and its inhabitants and promote the underwater photography as medium for artistic expressions in Latin America and the rest of the world. For more information and to order Sambra's work, please visit: **www.bernardosambra.com, www.thelivingoceans.com** or e-mail **info@bernardosambra.com**. ■

The Living Oceans
protecting through images

november 15, Lima-Peru

www.thelivingoceans.com

NEXT PRESENTATIONS
USA & CHILE
dates to be announced

In its second edition, Oceans Expo will present what is probably one of the most amazing photographic journeys through the oceans.

Oceans Expo 2006 seeks to reflect the grandiosity, beauty and immensity of the oceans and its inhabitants. In order to achieve this ambitious and somewhat utopist objective, fourteen of the most renowned and experienced underwater photographers has been asked to share their spectacular images, the history behind each one and their particular point of view regarding the significance and importance of discovering the oceans.

The lenses of David Doubilet, Doug Perrine, Brian Skerry, Amos Nachoum, Stephen Frink, Bernardo Sambra, Rod Klein, Stuart and Michele Westmorland, Takako Uno, Mauricio Handler, Bill Curtsinger, Stephen Wong, Mirko Zanni have been conjugated in one amazing exhibition.

More than 150 large format images will act as an open invitation to all of those who are interested in knowing the more wild, spectacular and magical side of our planet. Discovering without destroying is the challenge for all of those who accept this invitation.

As part of Oceans Expo, a book called Oceans will be released. With a foreword by David Doubilet, this very limited edition coffee table book will be unveiled on the opening date of the exhibition.

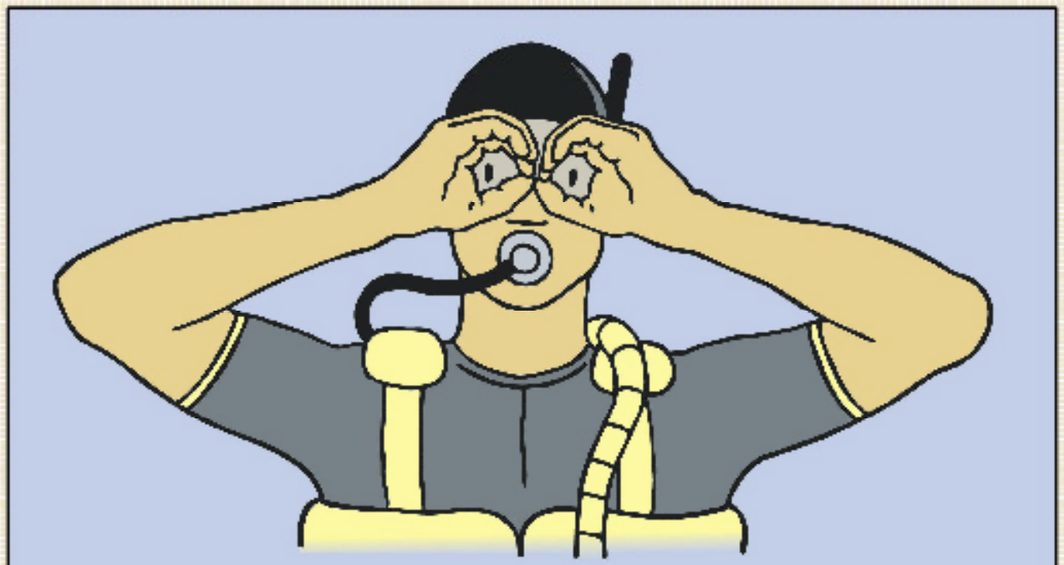
Oceans Expo opening will be in November 15th, at the ICPNA Gallery in Lima, Peru. The expo will also be presented in Chile and USA in 2007. Dates to be announced.

For more information please visit: **thelivingoceans.com**

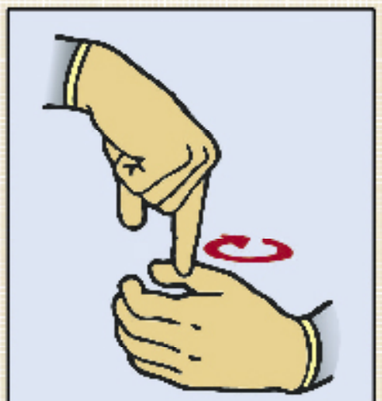
COMMUNICATING IN DIVING

The Most Common Handsigns

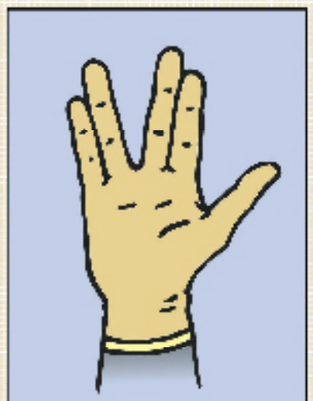
PART 17



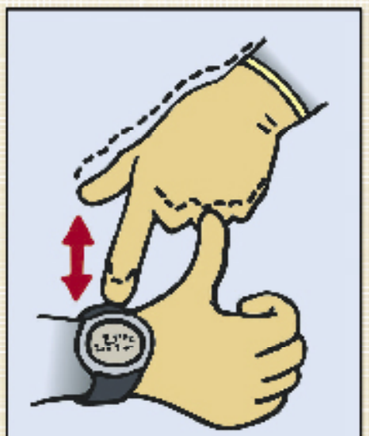
1. I am on my way to watch penguins, do you by any chance know where South Pole is?



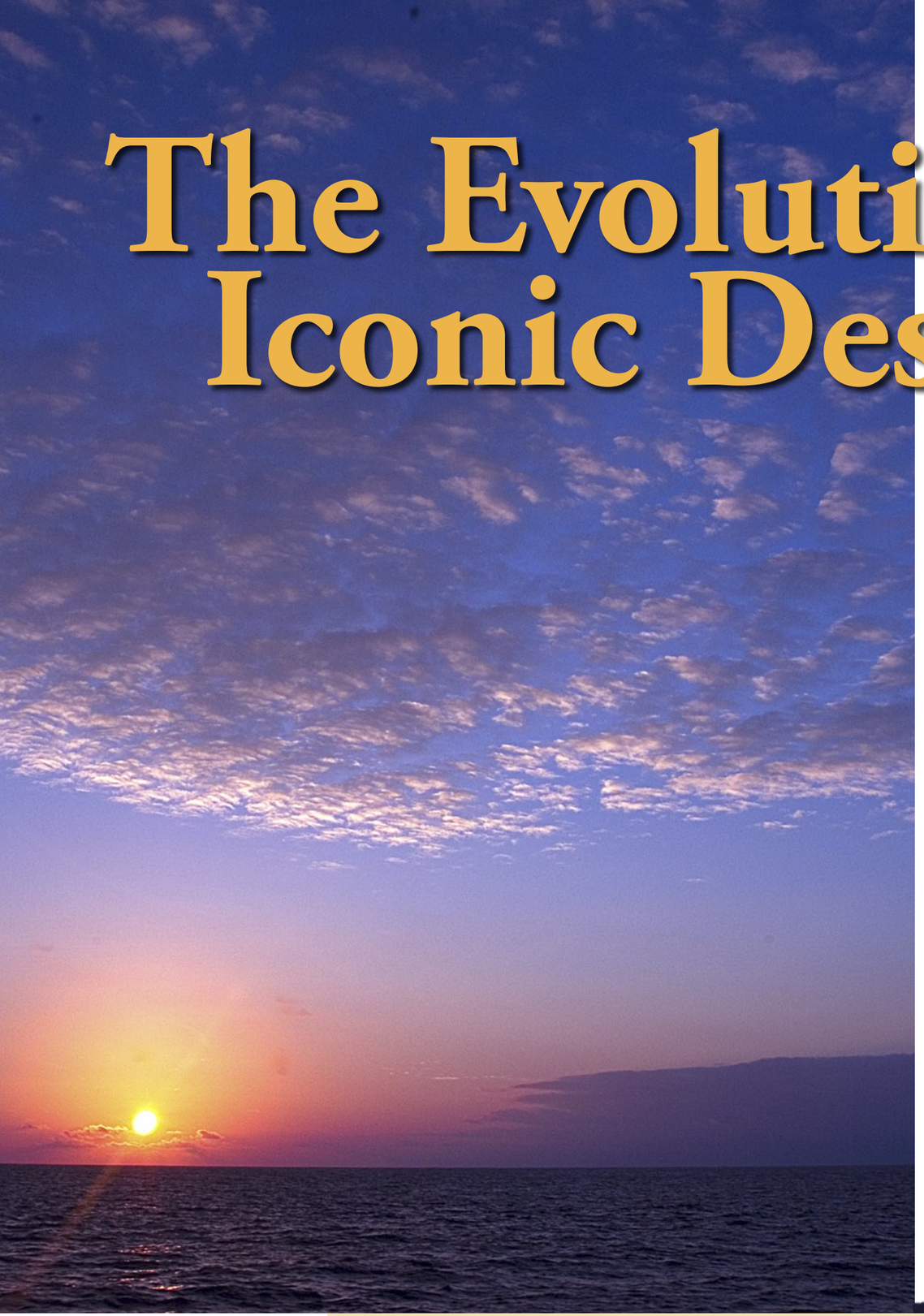
2. I need some ice for my drink, do you by any chance know where North is?



3. Do you want to boldly go where no man has gone before?

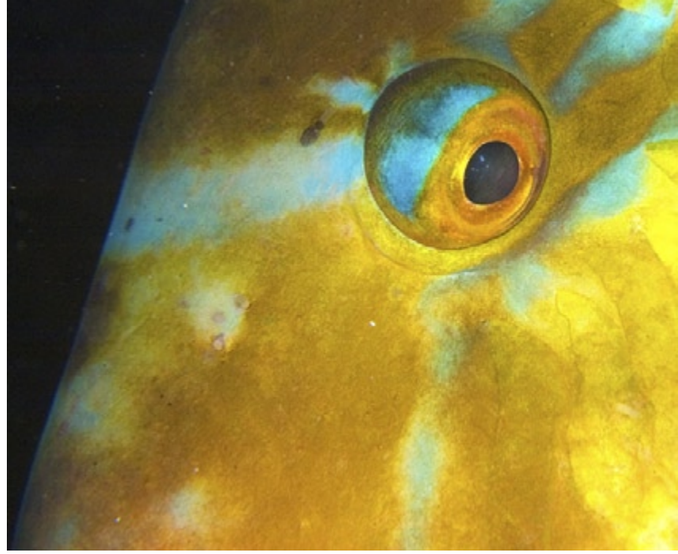


4. Use the Suunto D6.



A new dawn greets the Galapagos

The Evolution of an Iconic Destination



Closeup of the eye of a parrot fish

Text and photos by Jason Heller

Sensory overload!

No two words better describe the exhilarating diving in the Galapagos Islands, home to an extraordinary number of marine species in numbers that can at times even exceed your expectations and imagination. From the moment you back roll from the inflatable panga into the chilly equatorial waters, you enter a world unlike any other —a world least impacted by the environmental atrocities of man—an underwater marvel seen only by a relatively small number of privileged individuals with one thing in common…a well traveled c-card and a sense for adventure.

A Timeless Gem in the Eastern Pacific

The Galapagos Archipelago is 960 km west of mainland Ecuador, straddling the equator within a unique corridor in the Pacific Ocean. The volcanic islands are washed by a convergence of seven currents, including three major ocean currents. In fact, it is these very currents that are the fuel for the abundance and diversity of marine life in the Galapagos. The contrasting warm and cold currents bring a plethora of marine life in explosive numbers. Where else on earth can you dive with mantas and turtles along with penguins and fur seals?

The Humboldt current originates near the Antarctic and is a sub tropical current with very nutrient-rich water. The Humboldt meets the warm tropical Panama current at a point north of the archipelago, resulting in the northern islands of Wolf and Darwin having warmer water.

The Cromwell current is a bottom flowing current, which brings nitrates and phosphates to the islands. This cold current hits the islands head-on and results in major upwellings of cold water to the west of Isabela and to the southwest of San Cristobal, Floreana, Española as well as the north of Santiago. Best bet is to bring a 7mm wetsuit and prepare for some cold, but amazing dives.

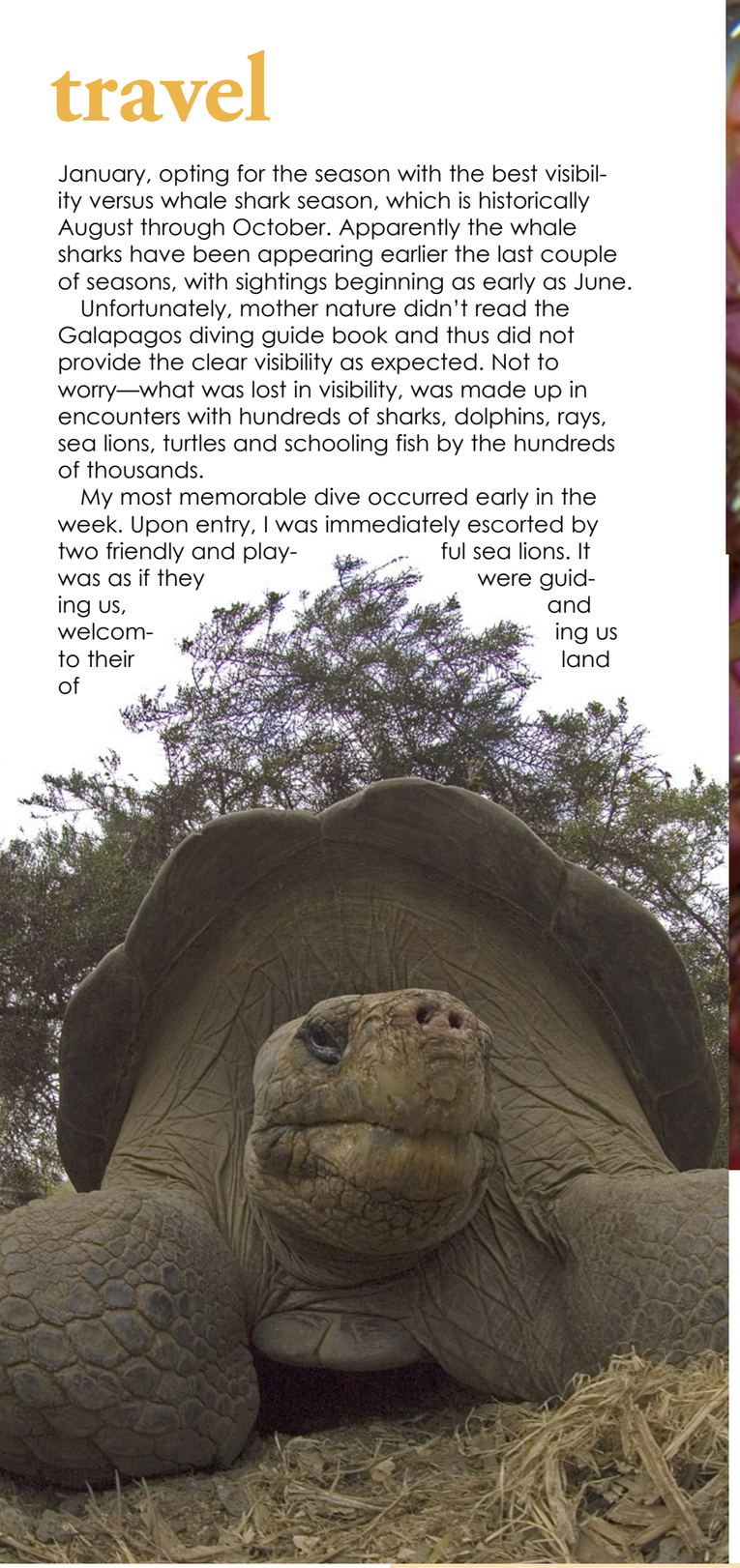
Bottom time

Since this was my first trip to the Galapagos, I chose

January, opting for the season with the best visibility versus whale shark season, which is historically August through October. Apparently the whale sharks have been appearing earlier the last couple of seasons, with sightings beginning as early as June.

Unfortunately, mother nature didn't read the Galapagos diving guide book and thus did not provide the clear visibility as expected. Not to worry—what was lost in visibility, was made up in encounters with hundreds of sharks, dolphins, rays, sea lions, turtles and schooling fish by the hundreds of thousands.

My most memorable dive occurred early in the week. Upon entry, I was immediately escorted by two friendly and playful sea lions. It was as if they were guiding us, and welcoming us to their land of plenty. I looked up, only to find a small group of hammerheads swimming above (my first of hundreds observed during a typical week).



Just minutes later, I was diverted by a small school of eagle rays, swimming together with a handful of large and girthy Galapagos sharks, a scene rivaling anything my imagination could have conjured up.

All the while, dozens of white tip sharks, many with recent mating scars, scoured the reef below looking for an easy meal.

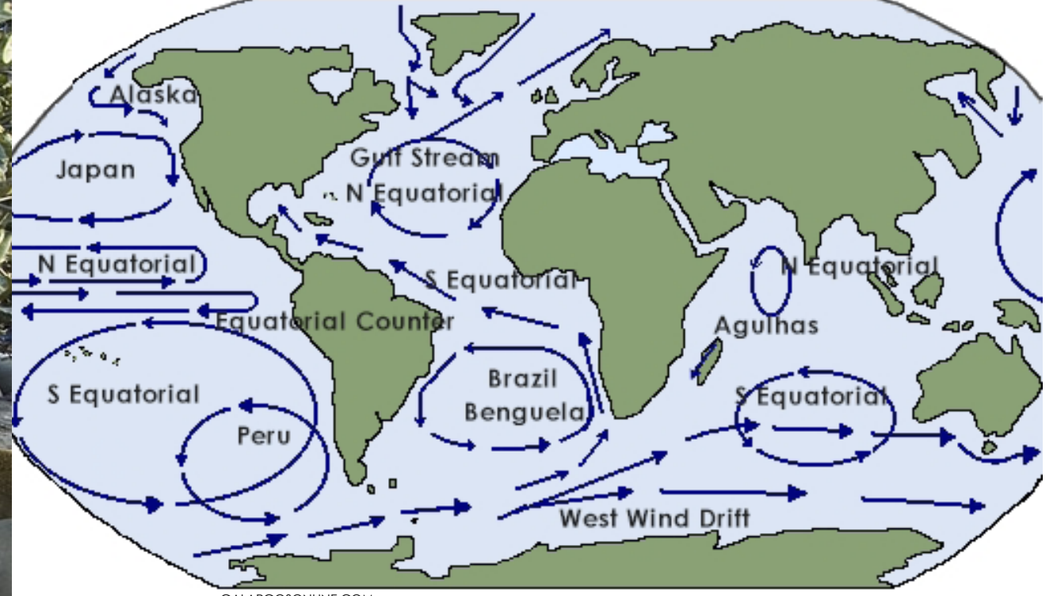
If life came with background music, this would have been a classic scene, complete with a poetic zen-like rendition of the jaws theme fused with Asian melodies and tribal drums. But even without the background music, this dive has been etched in my memory forever.

Towards the end of the dive, I was in for a truly grand finale. While attempting to photograph a sea lion against a background of Galapagos shark silhouettes, my serenity was broken by a symphony of tank banging. I reluctantly turned away from my surreal scene, only to catch a final glimpse of four mantas parading off single file into the distance. I can see everyone else grinning around their regulators, elated from the experience.

Encounters that could have otherwise taken half a lifetime of diving to fill a log book, have all been experienced on one dive. I could have hung up my fins and camera and never dived again, and would have still been happy…well, metaphorically speaking of course!

One of the Galapagos tortoises. Recently, Harriot the Tortoise who was one of the world's oldest known living creatures, passed away at age 175 this year in the Galapagos due to heart failure after a brief illness. SOURCE: BBC

ABOVE: Close-up of a banded shrimp



GALAPGOSONLINE.COM.

Maps of the world and Western Hemisphere show the currents of the oceans and the unique placement of the Galapagos Islands in these currents denoted by the red star

LEFT: Female sea lions rest in the shade on a Galapagos beach
INSET: Close-up of a fish eye
BELOW: Sea Lion poses on the rocks

GALAPGOSONLINE.COM.

An Evolving Destination

All diving and land excursion itineraries are moderated by the Galapagos National Park. This process evenly distributes the impact of over 100,000 tourists annually, in an effort to preserve the natural behavior of the islands' inhabitants. Some species, such as the endemic marine iguanas, playful sea lions, and a variety of sea birds, still have an apathetic view of human presence and have not learned to fear man. But how long will this last? And at what threshold of tourism does this fragile ecosystem change?

The Ecuadorian government wants to boost tourism in a down economy, and 2006 indeed marks a change in tourism for the Galapagos. Approval for the 500-passenger cruise ship *MV Discovery* to include an itinerary, thankfully limited to San Cristobal, might just be the beginning of a trend to increase tourism revenues at the expense of one of the last true frontiers on earth. The local government has struggled with illegal fishing, shark finning, sea cucumber harvesting and corruption. It's actually quite easy to understand. The illegal fishing trade is a multi-billion dollar market worldwide. One illegal long-line vessel can catch hundreds of thousands of dollars worth of tuna and shark fins. One can imagine the difficulty and complexities associated with preventing and combating corruption within the political system. But without ongoing proactive protection, the Galapagos can not remain what

it is, and what it hopefully will always be. These rich open waters are one of the last of their kind.

Rouge fishing vessels spend the days outside the boundaries of the national park and then under the guise of night, swoop into the fish-rich waters within the park and deploy a horribly wasteful fishing practice known as long-lining. This technique involves laying miles of line with thousands of baited hooks across the ocean, indiscriminately catching everything in their path, from tuna to turtles, manta rays to dolphins, sharks and even birds.

The sharks are finned, with the carcasses thrown back into the ocean sometimes still alive, the tuna and swordfish are harvested, and the remaining by catch, up to 90% of the total catch, will have been brutally killed and discarded.

On a dive at remote Wolf Island, we discovered a discarded longline hook right on the dive site. Further protective measures are essential to ensure that the uniquely abundant and bio-diverse waters of the Galapagos remain preserved.

ABOVE. Dusk descends over the Galapagos waters
LEFT: Sea turtle soars through schools of fish
RIGHT: Hammerhead sharks on patrol

History

The Galapagos are indeed a special place. In 1835, English naturalist Charles Darwin visited these very islands, and based on five weeks of research in 1859, released his book, *On the Origin of the Species By Means of Natural Selection*.

Unfortunately, Darwin wasn't a diver and only got to skim the surface regarding the wonders underneath the waters in the Galapagos. If Darwin had ever dived the Galapagos, his renowned book might have had an underwater sequel, and English research vessel *HMS Beagle* would have went down in history as the first live-aboard in the Galapagos.

To the North

By far the best way to dive the Galapagos is by live-aboard. There are a small number of land-based operators, but they are limited to dive sites around one or two islands. I chose to

Foreign species invade Galapagos, threaten natives

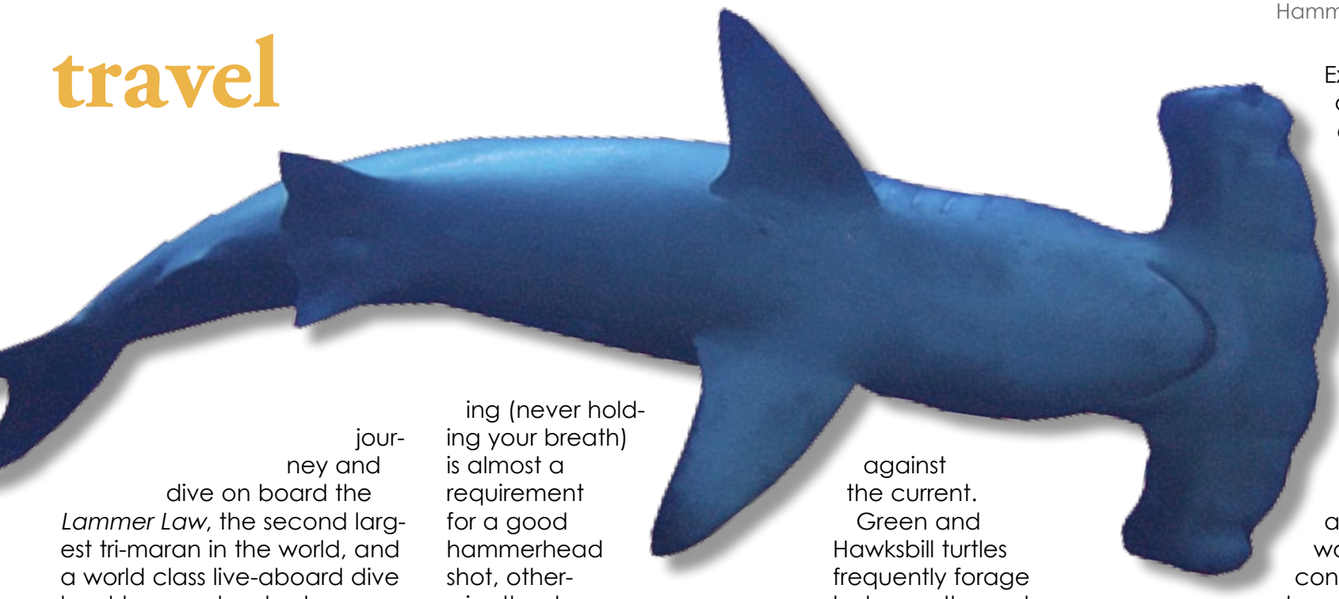
The disovery of foreign species on the Galapagos Islands has got Ecuadorian officials worried. Even though incoming ships and planes are inspected regularly, locals found a turtle and an iquana that most likely came from mainland South America.

One of the main threats to native species is Invasive foreign species, specifically animals that compete with native species for food and prey. Affected natives include the giant tortoise, finches, and marine iguanas—the very same animals that enchanted Darwin as he developed his theory of evolution.Islands which makes their ecology unique. The islands' isolation was and is what makes the Galapagos unique in flora and fauna.

Now the booming tourist industry, migration and fisherman brings foreign tortoises, turtles and monkeys.

SOURCE: BBC NEWS

travel



Hammerhead shark

journey and dive on board the *Lammer Law*, the second largest tri-maran in the world, and a world class live-aboard dive boat by any standards.

Although there is no bad diving in the Galapagos, the real action is at the northern islands of Wolf and Darwin, home to schooling hammerheads, Galapagos sharks and other varieties of "Mr. Big" (a.k.a. large pelagic species).

Many live aboards offer specific itineraries that focus mainly on Wolf and Darwin, and rightfully so! My first dive at Wolf was an adrenaline rush. Schools of hammerheads in the hundreds circle the island, allowing careful and relaxed photographers the opportunity to capture some great images of the oddly beautiful creatures.

Since Hammerheads are timid around exhaling divers, it is essential to keep your exhaust bubbles to a bear minimum. Blatantly violating the first rule of diving (never holding your breath) is almost a requirement for a good hammerhead shot, otherwise the shy and majestic creatures will keep their distance.

Wolf was all about the hammerheads. The dive plan was always the same. Drop down and figure out which way the current is moving, find a convenient spot to wedge yourself into the rocks and don't get swept out into the swift current. Then you can relax as a procession of hammerheads, Galapagos sharks and the occasional turtle or eagle ray eventually swim slowly past you against the current.

Green and Hawksbill turtles frequently forage between the rocks for a quick meal. Not nearly as aerodynamic as the large sharks and rays, the turtles would sometimes have to fight the currents, which would flip them upside down or pin them to the rocks while they explored the crevices between the large boulders.

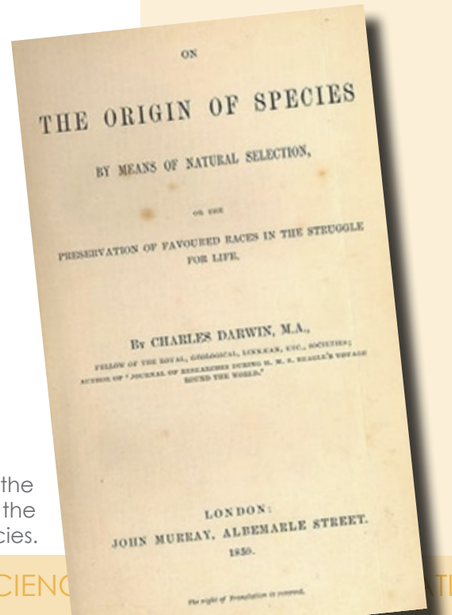
If shooting photography, a reef hook is recommended in order to keep your hands on your camera versus clinging onto the rocks to prevent drifting off with the currents.

Extending the cord on your reef hook and hanging tethered in the current is a pretty cool feeling. Realizing that the current is so strong that it bends your reef hook out of shape and sends you flying into the current is not.

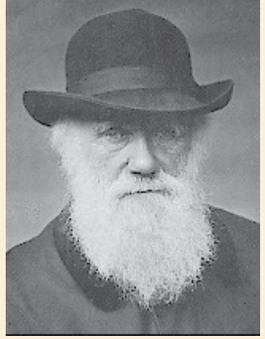
Darwin Island and Darwin's Arch, world renowned for consistent schooling hammerheads, was sadly under-inhabited. We witnessed only one sole hammerhead in two dives at Darwin's Arch. The silver lining was a special encounter with another large pelagic. For an entire dive, I could hear the tell-tale chirping of a nearby dolphin. Towards the end of the dive, he appeared, gracefully swimming right towards me, slowing down to stare into my eyes with as much curiosity as I into his. Without warning he darted upwards to catch a meal, polarizing a school of baitfish and creating a beautiful silhouette against the azure background. Then he swam out of site. I could hear the distant chirping throughout my safety stop.

Just before climbing on board the panga, I took one more deep breath

HMS Beagle in the seaways of Tierra del Fuego, painting by Conrad Martens during the voyage of the Beagle (1831-1836), from The Illustrated Origin of Species by Charles Darwin, abridged and illustrated by Richard Leakey ISBN 0-571-14586-8


ON
THE ORIGIN OF SPECIES
BY MEANS OF NATURAL SELECTION,
OR THE
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.
By CHARLES DARWIN, M.A.,
FELLOW OF THE ROYAL, GEOLOGICAL, LINNEAN, ETC., SOCIETIES;
AUTHOR OF "JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD."
LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

The title page of the 1859 edition of On the Origin of Species.



Charles Darwin 1809 – 1882

Darwin normally considered a biologist, actually began his university education by studying medicine at Edinburgh. Not finding it to his taste, however, he began to prepare for the Church at Cambridge University. Obviously, this didn't seem to grab his attention either, for friendships with the geologist Adam Sedgwick and the botanist John Henslow led to an interest in natural history i.e. the study of animals and plants in their wild state. This interest, luckily for the future of what would become evolutionary theory, was to remain with him for the rest of his life.

This interest, and contacts through Sedgwick and Henslow, led to Darwin obtaining a position of naturalist on board *HMS Beagle*, which was preparing to survey the coast of South America and the Pacific.

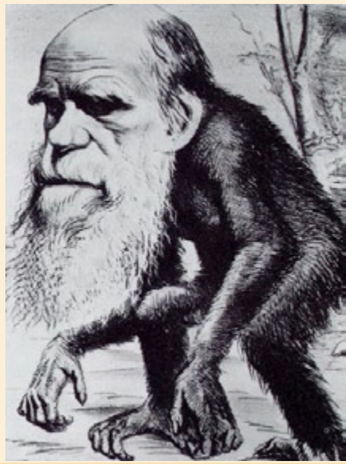
The *Beagle* sailed in 1831, and Darwin was initially mostly concerned with the geological aspects of his work. Yet, he was also struck by the way animal species gradually changed from region to region, causing him to ponder on the development of life.

It was his arrival in the Galápagos Islands, which eventually was to lead to his theory on the development of the species. For it was here that he observed the, now forever famous, finches. He was particularly struck by their variation where he found 14 different species, each thriving in a particular region of the islands.

Arguing that it was unlikely that each species was individually created, he reasoned that they had probably evolved from a parent species of finch on mainland Ecuador. This led him to question the theory of the immutability of the species and to formulate a theory of evolution by natural selection. Darwin was to spend more than the next 20 years amassing evidence to support this theory. The results of these deliberations was to lead to the publication, in 1859, of one of the classics of scientific literature: *On the Origin of Species*. This was followed in 1871 by *The Descent of Man*, which applies the theory of evolution to man.

There were still flaws in his theory, for he could not explain, for example, how the variations, so essential for natural selection to act on, come about. This question was first resolved nearly 20 years after his death by the rediscovery of Mendel's work on the principles of heredity

And the rest, as they say, is history. Well! Not quite. To this day, and perhaps even more so, the battle is still being fought between Darwinism and the Creationists. When will they ever learn? ■



A typical satire was the later caricature in Hornet magazine portraying Darwin as a non-human ape.

and listened to the last chirps from my new friend. I thought about just how remote we were, about the wild frontier around me, about how harsh a fight for life and death that dolphin has to endure each and every day, even without humans in the equation. Will he survive or will he succumb to natural selection, or worse, get caught by a long line hook? Yet, he seemed happy and blissfully unaware of the gravity of life, he seemed to be smiling. One surface interval later, with Darwin's Arch behind us, we decided to return to the action at Wolf.

The islands of Wolf and Darwin don't provide many anchorages suitable for night diving. The sheer faces of the large mesa-shaped shield volcano islands do not have many bays or other safe havens free from the raging currents. There is however at least one such place, on the lee side of Wolf. This would be the only night we were able to go diving. Having spent our days face to face with large Galapagos sharks, and stories of silky sharks and the occasional tiger feeding in the area at night, we otherwise didn't mind not diving at night.

Sunset against the landscapes and natural monuments of Bartolome

At about 20 meters, we hit a no-nonsense thermocline. The temperature difference was steep enough to make me consider hovering on the warmer side for the remainder of the dive, but not strong enough to keep me from getting up close and personal with a small school of odd red lipped batfish scuttling on the floor below at 30 meters.

The rocks surrounding the site were littered with one species of endemic nudibranch, the blue striped Tambja mullineri. I must have counted about 30 or 40 before I realized that they were simply everywhere.

As far as night dives go, it was mediocre—I've done much better. But the experiences we had each and every day more than balanced out the lack of night diving.

The Rest of the Archipelago

A typical itinerary begins with a shallow dive at the sea lion rookery at Isla Lobos. Scores of playful female sea lions and their pups take to the water as soon as they hear visitors.

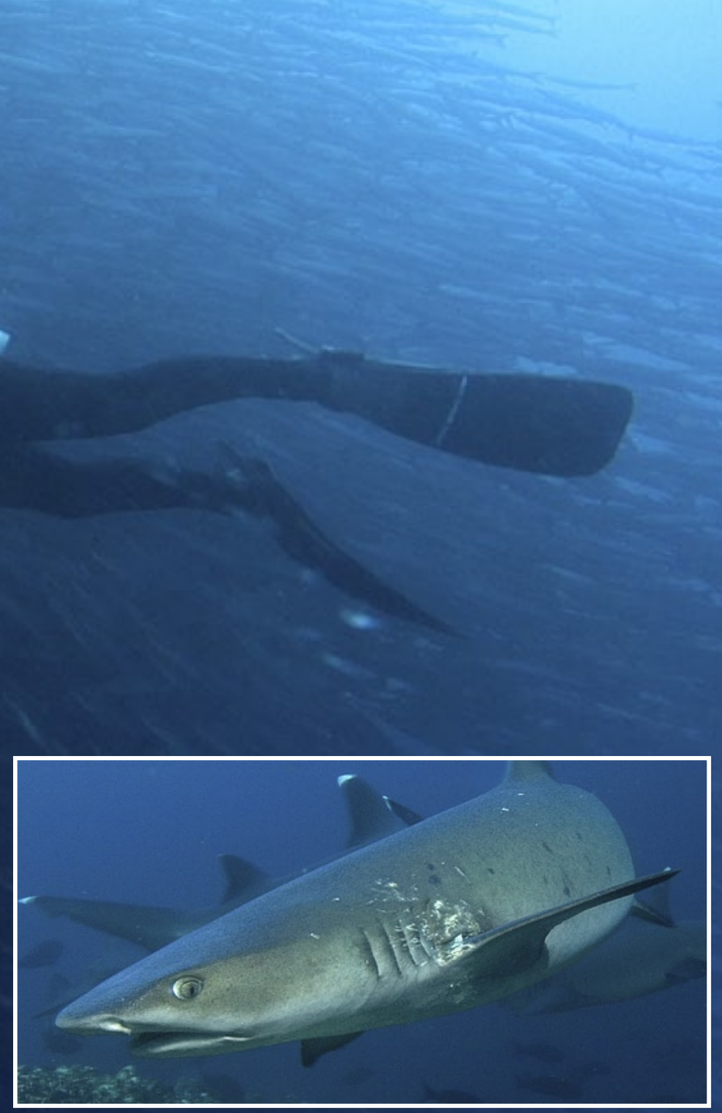
We were warned several times to stay clear of any males. Male sea lions are easily discernable by their size and the shape of their heads. Males are significantly larger than the females, and sport very large "sea lion chic" humps on their heads. Male sea lions vigorously protect their harems of sea lion vixens. An attack by a large bull can inflict some serious wounds. On land you may have a chance to out run an angry male, but in the water, the sea lion is master

Sea Lion pups play in the sun while their mother watches from a distance

This goat skull is a reminder of the desired fate of non-native species. Goats are not native to the Galapagos and the government has been attempting to eliminate them

of their domain and amazingly agile. Fortunately, the males will bark and warn you when they're upset, and that's your cue to back off.

However, the females and pups would want nothing more than to play with you all day long. Like bullets that change trajectory at the very last second, they dart in and out of view, usually too fast for your camera to focus on. However, as soon as one of these furry projectiles catches a glimpse of her reflection in my camera dome port, she stops to curiously investigate the pretty stranger intruding on her territory. Strobes fire —moment captured. Unfortunately the shallow



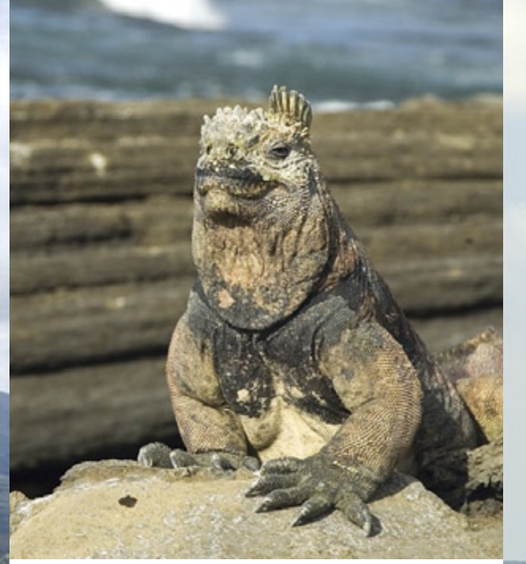
LEFT: Bright orange cup coral polyps at night. INSET: Large blue Seastar. ABOVE: A diver meets a massive school of fish swarming through the waters around Galapagos. INSET: White tip shark

water and 14 other divers stirring up the 3-meter water made for less than desirable photography conditions. However, since this was my first time diving with sea lions, I thoroughly enjoyed every minute of it!

Towards the end of our itinerary, we dived the eastern corner of Isabella, where we were on a quest for mantas. OK, *I* was on a quest for mantas. Early in the week some of the other divers were fortunate enough to see 4 mantas parading in single file while my viewfinder focused on a sea lion and Galapagos sharks. So, it was my turn to see the mantas.

We encountered some soupy visibility while on Isabella and at some point commenced on a swim towards a large pinnacle in the hopes to find mantas or other pelagics swimming in the blue.

We continued on a bee-line towards the pinnacle, but found ourselves approaching it much more slowly than anticipated. As we drew nearer, the pinnacle began slowly moving away from us! What we had initially thought was a pinnacle turned out to be the largest



ABOVE: Marine Iguana, endemic to the Galapagos Islands. RIGHT: The beautiful highlands and volcanoes of mainland Ecuador. LEFT: The naturally sculpted and remote Darwin's Arch

Galapagos

school of Chevron Barracuda I have ever seen.

We slowly approach from in front and below. We see a mass of reflective scales and fins so dense that it blocked the sunlight from penetrating underneath. There must have been several hundred thousand fish tightly packed in this uniformly undulating and polarizing ball of life.

We each take turns immersing ourselves in the school, and then slowly retreating, overcome by the feeling of such a mass of life swirling around us.

Our last dive was at a site called Gordon Rocks, which are actually no ordinary rocks, rather the opposite sides of a once intact caldera, now home to fur seals and Galapagos sea lions.

The dive encompasses navigating the inner wall of one side of the caldera, and shooting through the channel to the other opposite caldera wall and completing the dive on the far outside wall. Exposed to the currents, Gordon Rocks also gets its share of pelagics, and we were happily shown off by a farewell procession of schooling cow nosed rays.

Top side

Our land excursions took place on the islands of Bartolome, Santiago and Santa Cruz. The Galapagos are young, actively volcanic islands, and nowhere is that more evident than among the small calderas from the vents of shield volcanoes on Bartolome.

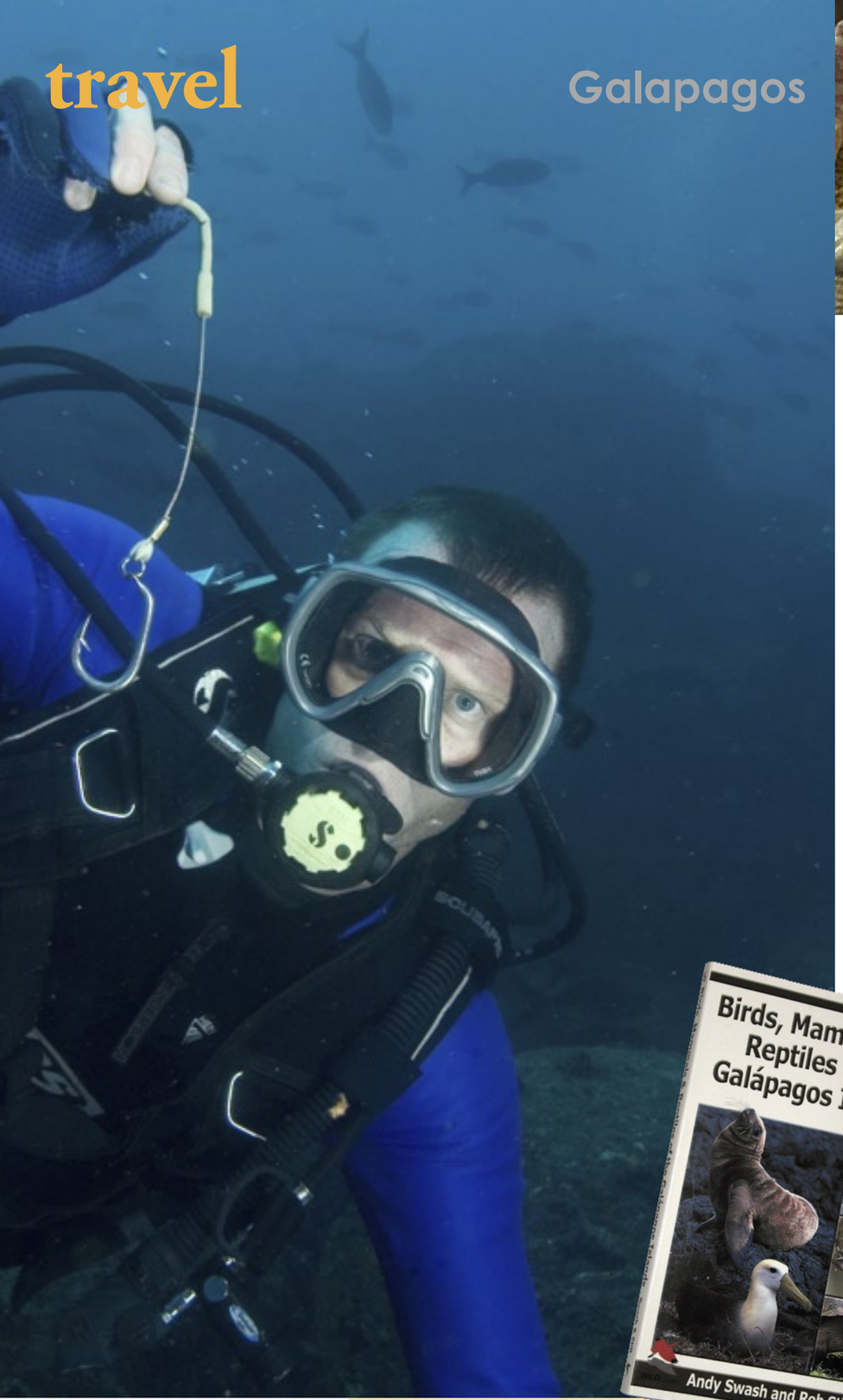
The hike to the top of the island provides some beautiful vistas of other nearby volcanic islands, submerged calderas just off shore, and picturesque beaches. Galapagos penguins and fur seals are among some of the species that call Bartolome home, but our itinerary did not include diving on this island.

The second land excursion on our week long journey was on the island of Santiago, home to hundreds if not thousands of marine iguanas, as well as a healthy community of sea lions. Sea lion pups just barely weeks old can be found in the warm tidal pools, with their mothers keeping a close eye from nearby. Marine iguanas fill their lungs with saltwater and submerge beneath the waves to feed on algae, emerging to congregate and warm up with others, group-snorting the excess salt out of their nostrils.

Other than the constant reminders of the impact of tourism from the many other boats visiting the island, it was a privilege to be in the presence of nature at its rawest and purist. As divers, we are accustomed to having the utmost respect for the pristine environments that we visit. I often worry about tourists that are not accustomed to such self-regulated restraint to remove anything from or leave anything behind in such fragile environments. Only time will tell. The Galapagos National Park and the Charles Darwin Research Station have done a great job so far.

We spent the last night drying our wetsuits anchored off of Puerta Ayora on Santa Cruz. This is the central city of the Galapagos and home of the Charles Darwin Research Center, where we saw our only giant Galapagos tortoises of this itinerary.

I learned that there are actually seven distinct species of Galapagos tortoises. They are magnificent animals. Looking into a 120 year old pair of black eyes makes you wonder what events of natural or man-made history



this creature has witnessed and weathered on these islands.

Beyond tortoises, Puerto Ayora has a few bars and lounges and enough souvenir shops to rival some popular Caribbean destinations. In retrospect, that last afternoon and evening in Puerto Ayora was a good way of easing back into human society without too much of a shock after a week of living in one of the last frontiers.

Revel in South American Culture

A trip to the Galapagos is not complete without a visit to mainland Ecuador. If you allocate appropriate time you can hike Cotopaxie, an immense glacial volcano, or visit the Amazon rain forest. A quick one or two-day layover in the high altitude capital city of Quito gives you enough time to visit the Otovalo market, an indigenous market of local crafts and foods in the highlands. The scenic drive to the market provides views of large volcanoes and lakes. The history of geologic activity of the region is evident everywhere.

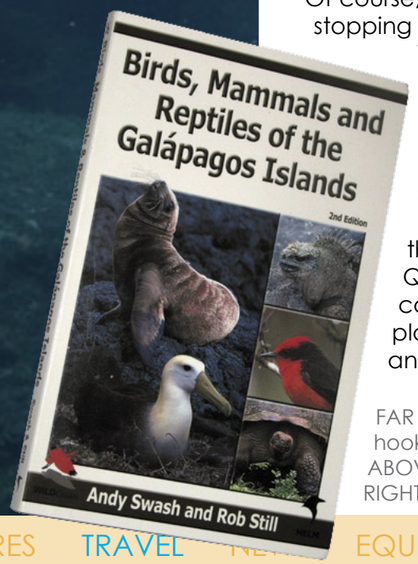
Of course, no trip is complete without stopping to straddle the equatorial line. The theory is that on the equator, you can balance an egg on its bottom. Just to be sure, the display egg was nailed in place and very well balanced—so it must be true.

While in Quito, a must-visit is the historic district of Colonial Quito. Surrounded by over 30 colonial churches, the central plaza, complete with its cafes and shops, is still a step back in time. The cobble stone streets and large gothic doors instill an authentic renaissance feel, a nice touch in the heart of the otherwise hectic capital city.

As demand for Galapagos tourism increases, supply is sure to follow. The islands still have a serious illegal fishing and shark finning problem. In other developing nations, tourism revenues have helped to offset the revenues and corruption of illegal fishing, but in the Galapagos it is not that straightforward. The government does plan on exponentially increasing tourism over the next decade, but must do so delicately as to not disrupt the ecosystem. To date, the National Park Service has done a great job of maintaining the delicate balance between growing tourism and the fragile ecosystems that deserve vigilant conservation. Let's hope it remains this way.

Old salts always start every dive story with, "You should have seen [insert favorite dive destination here] 20 years ago…", I don't want that to be the first line of the Galapagos stories I tell my children and grand children one day.

You can help to support the Galapagos simply by diving there. Our support, our voices and our images all help to further shape the evolution of this iconic marvel as a sustainable eco-tourism destination, not a port for large cruise ships! ■



FAR LEFT: *Lammer Law* dive guide Robert Grimstone with a discarded long line hook on Wolf Island. INSET: Reference guidebook for Galapagos creatures. ABOVE: Colorful beans in the Otovalo market in the highlands of Ecuador. RIGHT & CENTER INSET: Dramatic Colonial Quito at night

fact file

Galapagos, Equador

Schooling fish make way for a dolphin hunting the fish for a meal

History The Galapagos Islands are part of the country of Equador, which is located in Western South America, bordering the Pacific Ocean at the Equator, between Colombia and Peru. The region that now makes up Equador was once part of the northern Inca Empire. In 1533, the Spanish conquered the region. In 1563, the city of Quito became a seat of Spanish colonial government, and in 1717, became part of the Viceroyalty of New Granada. Independence was won by the territories of the Viceroyalty - New Granada (Colombia), Venezuela, and Quito - in 1819. They formed a federation known as Gran Colombia. In 1830, Quito withdrew and the traditional name was changed to the "Republic of the Equator." However, territories were lost between 1904 and 1942 in a series of conflicts with the country's neighbors. In 1995, a border war with Peru errupted, but was resolved in 1999. In 2004, Ecuador celebrated 25 years of civilian governance. However, political instability marred this period. No less than seven presidents governed Ecuador since 1996. Government: republic. Capital: Quito

Geography Equador encompasses coastal plain (costa), inter-Andean central highlands (sierra), and flat to rolling eastern jungle (oriente). Lowest point: Pacific Ocean 0 m. Highest point: Chimborazo 6,267 m. The highest active volcano in the world is Cotopaxi in the Andes.

Climate is tropical along coast and cooler inland at higher elevations; Tropicalclimate is found in Amazonian jungle lowlands

Environmental issues Equador experiences frequent earthquakes, landslides, volcanic activity, floods and periodic droughts.

Economic Petroleum resources have accounted for 40% of Equador's export earnings and one-third of central government budget revenues over the past few years. Thus, fluctuations in world market prices have a substantial impact domestically. Ecuador suffered its worst economic crisis in the late 1990s. In 1999, natural disasters and sharp declines in world petroleum prices drove Ecuador's economy into a tail spin. There was a contraction of more than 6% in real GDP. Poverty worsened significantly. In addition, the banking system collapsed, and later that year, the country defaulted on its external debt. In 1999, the currency depreciated by around 70%. Under the threat of hyperinflation, the MAHAUD government said it would switch the economy to the dollar. However, MAHAUD was ousted from office by a coup in January 2000. But the short-lived junta failed to obtain military support. Consequently, Vice President Gustavo NOBOA became president, and in March 2000, structural reforms were approved by Congress that also provided the framework for the dollarizing thee economy in Equador. This led to stabilization of the economy, and economic growth regained its pre-crisis levels in the following years. Equador's economy benefited from higher world petroleum prices in 2003-05 but reversed reforms led to the country's vulnerability to petroleum price swings and financial crises. Natural resources: petroleum, fish, timber, hydropower. Agriculture: bananas, coffee, cocoa, rice, potatoes, manioc (tapioca), plantains, sugarcane; cattle, sheep, pigs, beef, pork, dairy products; balsa wood; fish, shrimp. Industries: petroleum, food processing, textiles, wood products, chemicals

Population 13,547,510 (July 2006 est.) Ethnic groups: mestizo (mixed Amerindian and white) 65%, Amerindian 25%, Spanish and others 7%, black 3%. Religiions: Roman Catholic 95%, other religions 5%

Languages Spanish (official), Amerindian languages (Quechua)

Deco Chambers
SSS NETWORK / Gapalagos Protesub S.A.
Calle 18 de Febrero y General Rodriguez Lara
Puerto Ayora, Santa Cruz
Galapagos, Ecuador
Phone/Fax: +593 (52) 526 91

Web sites
Equador Tourism Board
www.ecuadortouristboard.com
■

Diving hot spots of Vancouver Island

Text and photos by Barb Roy

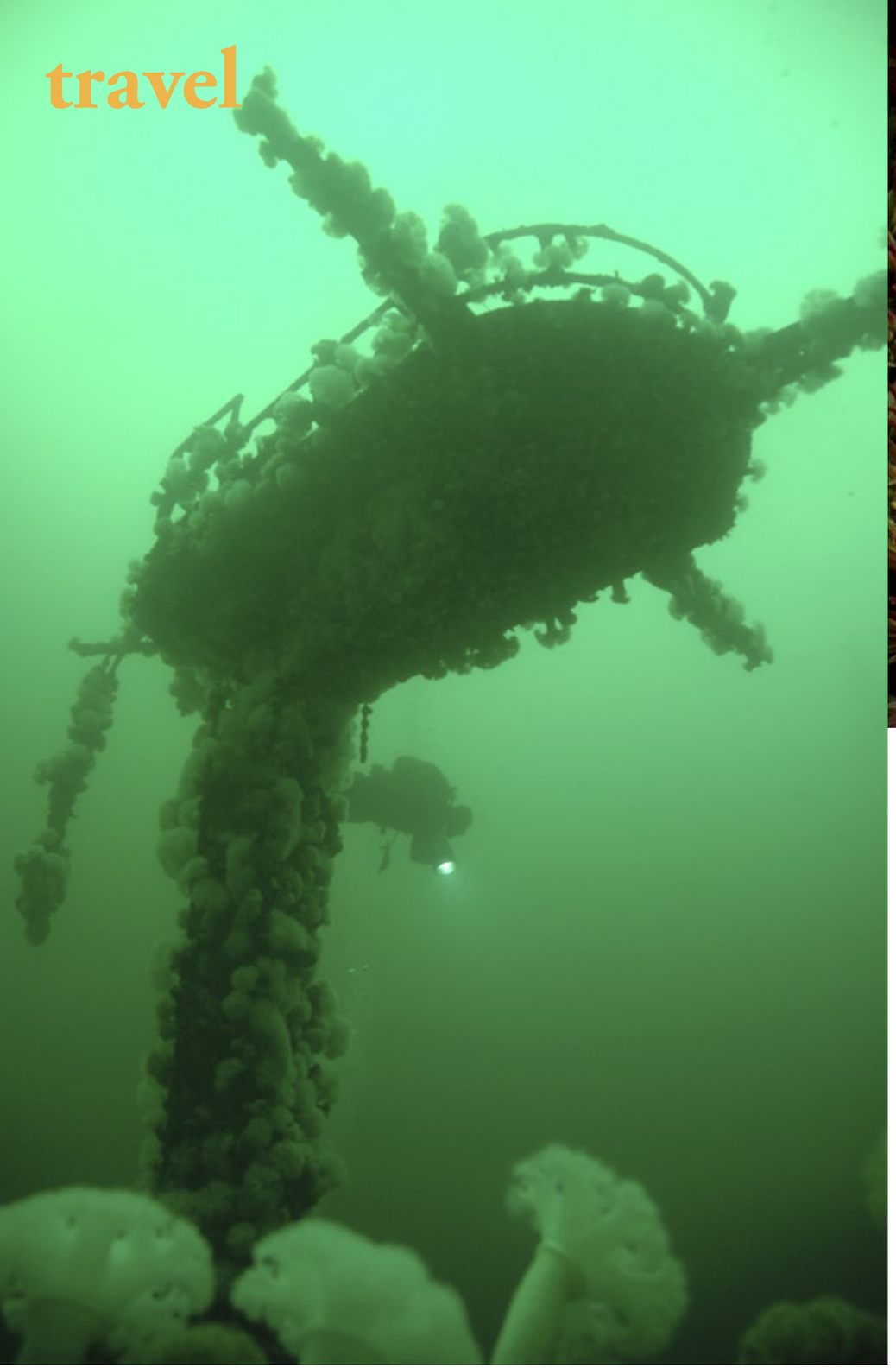
My dive buddy and I enter the cool clear water and descend down a mooring line to the deck of the 110-meter (366-ft) wreck Saskatchewan. The water is 8°C (47°F). I look up to see the rest of the group silhouetted in a light emerald hue arrive like slow motion skydivers. Visibility is at least 27 meters (90ft). My buddy and two others glide by on their scooters, anxious to explore the ships interior while I join underwater photographers equally as anxious to explore the wreck's exterior cloak of invertebrate life.

Upon the railings and deck resides an outline of white plumose anemones, all varying in height. Small swimming scallops, curious juvenile rockfish, brittle stars, decorator crabs and colourful nudibranchs seem to occupy the rest of the deck structures. Clusters of sponge, delicate feather stars and small orange anemones crowd any

vacant spots between giant lingcod and cabezon as the fish settle in on prime breeding grounds. As we proceed to the bow, the once battle-ready forward guns now lay dormant, softened over time by the duties of a sea life refuge. Even the wheelhouse wears a disguise of colourful critters. From there I am enthralled by the sight of the mast and radar tower as I look up towards the surface. No straight lines can be found amongst the anemone camouflage. Although it is possible to see most of the ship on just one dive, two to three will permit a more detailed coverage. We ascend up the line, all pleased with our photographic treasures and exploratory jaunts, anxious to soon return.

British Columbia (BC) has always been known for its scenic beauty, powder ski slopes, and excellent restaurants, but most global visitors have no idea that this coastal Canadian province also has some of the best temperate scuba diving in the world! In fact, Vancouver Island boasts a cold-water paradise like no other, complete with unique underwater residents, nutrient rich currents and vibrant colors that will put most tropical reefs to shame. Of the many choice diving sites in British Columbia to choose from, I have selected four on the 460kilometer (286 miles) long Vancouver Island to cover for this story. These are by no means the only four on the island, just four that will

LEFT: Large fish-eating anemone. TOP: Kayaking in Rainy Bay. INSET: Bloodstar



Tower of the *Cape Breton* wreck

Vancouver

portray BC's incredible diversity.

When flying into this region there are three main airport terminals; Sea-Tac International in Seattle, Vancouver International on the BC mainland and Victoria International on Vancouver Island. Proof of citizenship is highly recommended when entering Canada. Many of the dive stores and operators offer travel packages, which include diving, accommodations, tanks and weights. Live-aboard dive boats commonly pick up in Vancouver, Nanaimo and Port Hardy. Rental dive gear is readily available throughout the island as well as specialized Nitrox, Trimix and Argon gas.

BC Ferries offer daily service from Tsawwassen or Horseshoe Bay on the mainland, across Georgia Strait to Duke Point or Departure Bay in Nanaimo, taking approximately two hours. When traveling at peak times, ferry reservations are a good bet and can be made on-line.

Vancouver Island Travel Info

- Tourism Vancouver Island
  www.islands.bc.ca
  1-250-754-3500
- Tourism British Columbia
  www.hellobc.com
  1-800-435-5622
- BC Ferries – **www.bcferries.com**
  1-888-223-3779 or 250-386-3431

Nanaimo

I refer to Nanaimo as Vancouver Island's "front door" because it opens up to a variety of diving activities to suit anyone's needs. There are 8-12 excellent boat dives and several good shore dives to pick from.

Popular wrecks include the retired naval ships *Saskatchewan* (111m/366f) and *Cape Breton* (122m/400f) scuttled as artificial reefs in 1997 and 2001 by the local dive community and the Artificial Reef Society of British Columbia (ARSBC). The latest edition is a 47m/157ft North Sea Rescue Tug *Rivtow Lion* scuttled in 2005. Technical and extended

TOP: Glorious green anemones, Dodd Narrows
BOTTOM: Dockside dining in Nanaimo

Divers explore the wreck of *Cape Breton*

RIGHT: Brittle star
LOWER RIGHT: Diver and Wolf Eel

Vancouver

range divers like to practice their skills in and on the two larger wrecks while photographers and naturalists enjoy them all. Maximum depth on the *Saskatchewan* is 36m/120ft, the *Cape Breton* – 43m/142ft and the *Rivtow Lion* – 24m/80ft.

If wall diving is your pleasure, huge deep walls can be found at Snake Island and Orlebar, on Gabriola Island. The Snake Island wall has enormous white plumose anemones cascading down sandstone formations, dotted with bright pink snakelock anemones, red blood stars and orange finger sponge. I have also seen wolf eels out in the open at 12m/40ft and clusters of cloud sponge at depth. In between dives, snorkeling with resident harbour seals is always an option. Orlebar is steeper, hosting an array of odd shaped chimney sponge (boot sponge), tiger and quillback rockfish and an assortment of crustaceans. This is also a shore-accessible site utilized by technical divers.

As for drift diving, there are two narrow passageways where the currents reach 8 knots at full flow. This in turn provides a nutrient-rich environment for a multitude of invertebrate life to flourish. Both are divable during slack times (when the water stops to change direction). Dodd Narrows is located southeast of town between Nanaimo and Mudge Island.

Brilliant giant green anemones and aggregating green anemones with pink tips line the shore of Mudge in the shallows, along with yellow zoanthids, orange cup corals, and metridium anemones on the boulders below. Patches of orange colonial tunicates, burrowing sea cucumbers and several species of rockfish can also be found at depth.

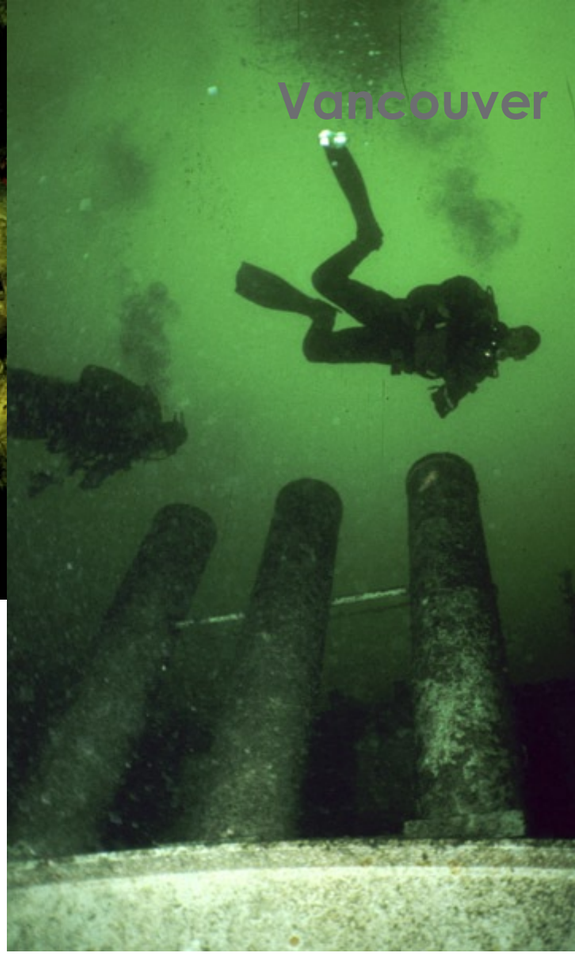
Gabriola Passage is equally as picturesque, hosting a population array similar to Dodd. In addition I have found red sea urchins, gray encrusting lobed ascidians, cabezon fish, grunt sculpins hiding in empty giant barnacle shells and the ever brave little painted greenlings. Small healthy aquarium-like kelp forests are located at both ends of both channels.

When not diving, kayaking is one of the many fun activities to do. Kayak rentals and guided tours can be found in Nanaimo and on the artsy laid-back neighboring Gabriola Island (20-minute ferry ride from Nanaimo). Malaspina Galleries (sandstone overhangs) and the aboriginal petroglyphs on Gabriola is another attraction worthy of a stop.

I wish to thank Ian Hall of Ocean Explorers Diving for taking us out on many memorable dive adventures during our Nanaimo visit!

Travel Information Nanaimo

- Tourism Nanaimo
  www.tourismnanaimo.com
  1-800-663-7337 or 250-756-0106
- Ocean Explorers Diving Ltd.
  www.oceanexplorersdiving.com
  1-800-233-4145 or 250-753-2055
- Sundown Diving
  www.sundowndiving.com
  1-888-773-3483 or 250-753-1880
- The Dive Outfitters Ltd.
  www.thediveoutfitters.ca 1-250-756-1863
- Divers Choice Charters
  www.divingbccanada.com
  1-866-716-8867 or 250-716-8867
- The Buccaneer Inn
  www.buccaneerinn.com
  1-877-282-6337 or 250-753-1246
- Inn on Long Lake
  www.longlakeinn.com
  1-800-565-1144 or 250-758-1144
- Long Lake B&B
  www.lodgingnanaimo.com



CLOCKWISE: Rockfish: Diver explores reef of strawberry anemone: Curious sea lion; Ling cod: Mortar guns of the *Columbia*

1-877-758-5010 or 250-758-5010
- Painted Turtle Guest House
  www.paintedturtle.ca
  1-866-309-4432 or 250-753-4432

Campbell River

The community encompassing Campbell River stretches close to 24km (15 miles) along the mid-eastern coast of Vancouver Island north of Nanaimo. Quadra Island lies parallel to the town with the narrow current swept Discovery Passage in between. A majority of the diving is located within Discovery Passage along the Quadra Island side. Current slack times must always be followed and are well known by local dive charter operators.

In 1996, the ARSBC scuttled the retired 111m/366ft *Columbia* in northern Discovery Passage off Maud Island. The vessel is not as populated as the two in Nanaimo, but its six back mortar guns are very impressive. I have photographed three large giant Pacific octopuses next to the ship at 28m/95ft as two males courted a female. Around the corner is Seymour Narrows where whirlpools and standing waves form during full flow. For an underwater observer it is anemone heaven. Tan and yellow staghorn bryozoans, green urchins, China and quillback rockfish, and orange tennis ball sponge are all over this rocky terrain.

Copper cliffs or bluffs are as interesting above water as below. Minerals seem to bleed through exposed topside rock leaving it rippled in green. Below water is a colorful wall with ledges and huge algae covered boulders. Rose sea stars, juvenile box crabs, red Irish lords, and cup corals are just a few of the many residents. Massive clusters of giant purple-plumed feather duster tube worms can be found at Steep Island and a carpet of pink and red strawberry anemones are always a treat at Whiskey Point. On a single dive here I counted four large Puget Sound king crabs! End-of-the-road is similar, yet more of a nursery with young octopus and sculpins hiding amongst the blanket of invertebrates.

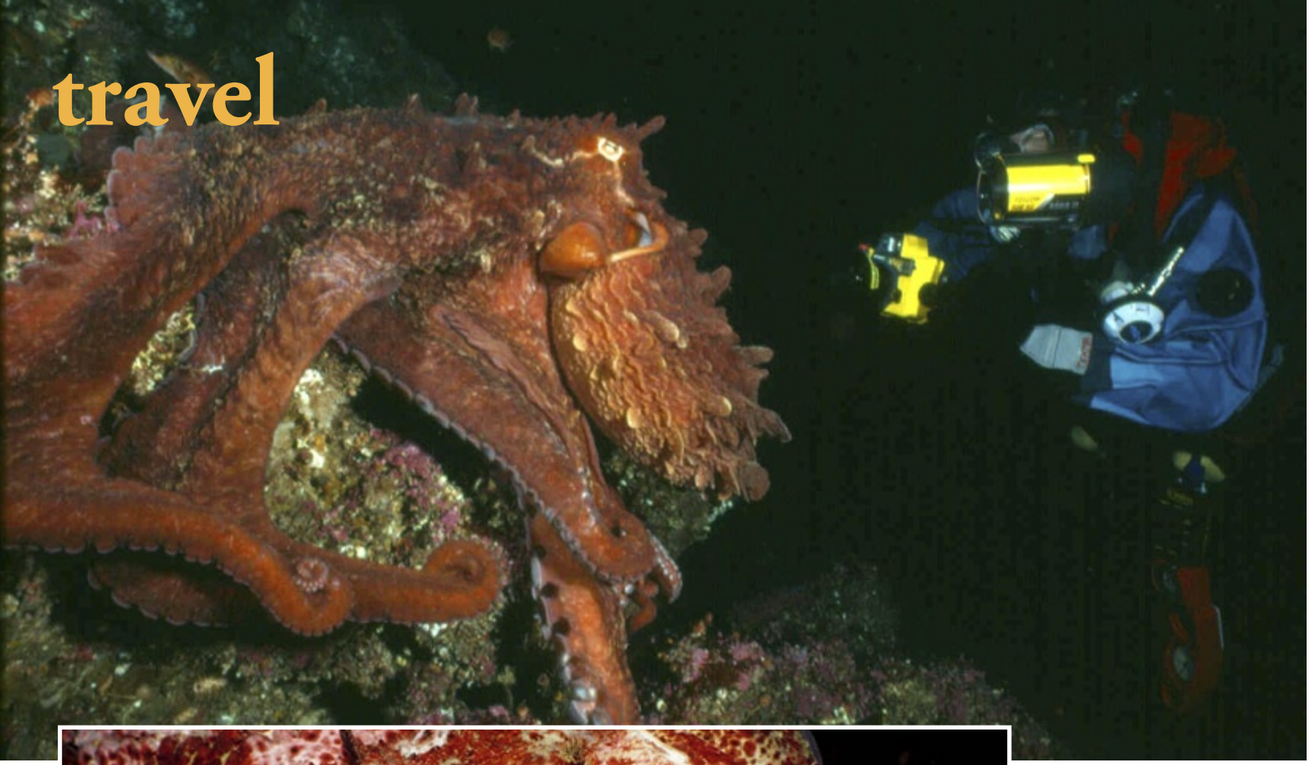
If weather permits, a day excursion south to Mitlenatch Island and the nearby wreck of the *Capilano* is well worth an extra day. Located on the south side of Grant Reef, between Savary and Harwood Islands, the 36m/120ft *Capilano* sits upright in 30-43 meters (100-145 feet) covered in a shroud of giant white plumose anemones. Here you will find lingcod, an assortment of gargantuan rockfish and bouquets of yellow and white cloud sponge. The wreck's natural beauty creates exceptional video footage for documentation.

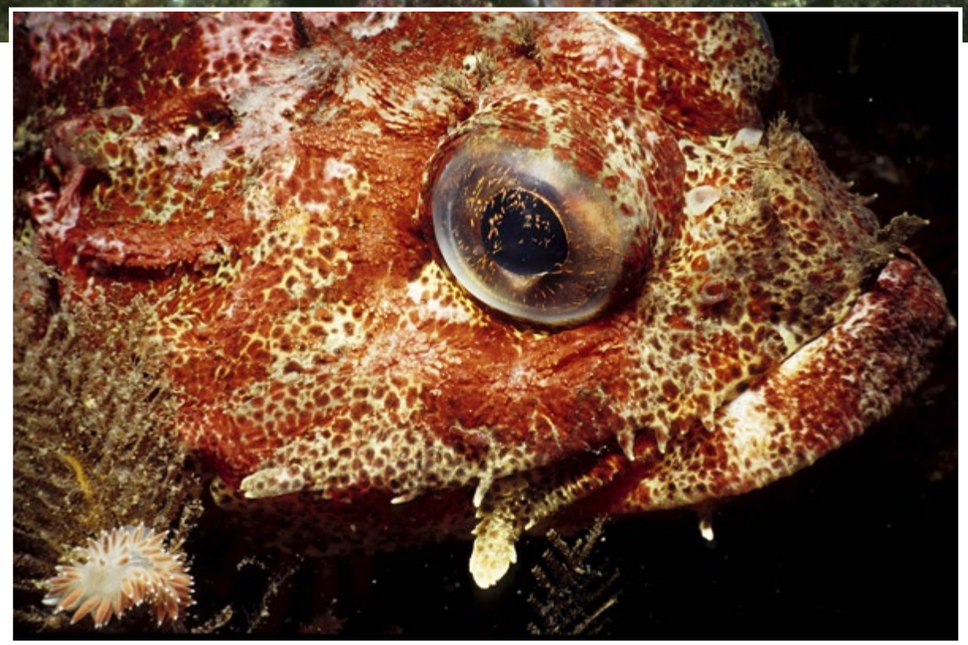
Another excellent site for diving and wildlife viewing is the semi-arid island of Mitlenatch. In Coast Salish language "Mitlenatch" means 'calm water all around'. On a sunny day in May the island's wildflower meadows explode in color. Due to the large number of nesting sea bird colonies Mitlenatch was designated a Provincial Nature Park in 1961.

Today, the island is home to the largest seabird colony in Georgia Strait, attracting Glaucous-winged gulls, pelagic cormorants, pigeon gillemots and black oystercatchers. Otters, harbour seals, Steller's and California sea lions can be found lounging on smooth warm boulders along the eastern coast, with heavier concentrations occurring between November and May.

When not diving, visitors might want to check out a salmon snorkel float down the Campbell River during the annual salmon run in mid-July through early October.

I would like to extend a thank you to Earl Lowe with Abyssal Dive Charters for introducing us to some awesome dives!





Vancouver

CLOCKWISE FROM LOWER LEFT: Red Irish Lord and nudibranch; Giant Pacific Octopus meets diver; Frosted nudibranch; Diver on *Saskatchewan*; Northern kelp crab

Travel Information:

- Campbell River Tourism
  www.campbellrivertourism.com
- Tourism North Central Island
  www.northcentralisland.com
  1-866-830-1113 or 250-830-0660
- Abyssal Dive Charters and Lodge
  www.abyssal.com
  1-800-499-2297 or 250-285-2420
- Beaver Aquatics
  baquatics@connected.bc.ca
  1-250-287-7625
- Aqua Shack Diving Services Ltd.
  www.aquashack.ca
  1-888-467-2822 or 250-287-9844
- DynaMike Charters
  www.divedynamike.com
  1-250-285-2891
- Paradise Found Adventure Tours
  www.snorkelwithsalmon.com
  1-866-704-4611 or 250-287-2652
- Anchor Inn & Suites
  www.anchorinn.ca
  1-800-663-7227 or 250-286-1131

Port Hardy

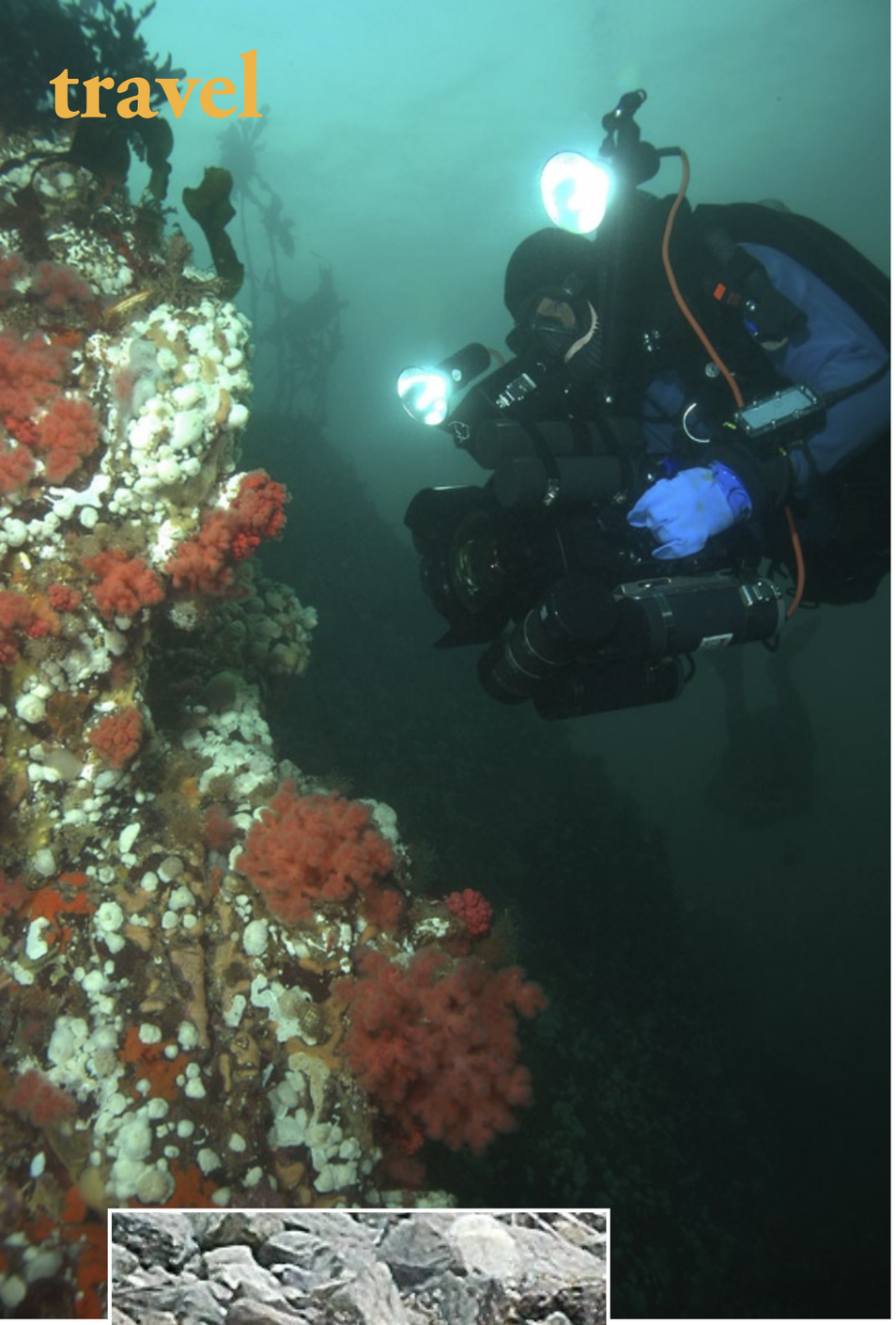
This gateway to the Inside Passage and the Queen Charlotte Strait is located at the northern end of the Island Highway. Most of the diving in this area is done from live-aboard boats, land based resorts or remote lodges with small fast boats, departing from Port McNeill (south of town) or Port Hardy. Currents vary, allowing a wide selection of sites to choose from.

Perhaps the most famous site is the prolific Browning Wall, located in Browning Passage on the south eastern side of Nigei Island. Strong currents feed the multitudes of life so well it is rare to find an area void of life. During one of my winter visits, my buddy and I could see the boat and trees above from 27m/90ft! Hordes of red, pink, and orange soft coral flourish at this site next to arm-length clusters of glove sponge, ruffled orange-peel nudibranchs

and white-spotted rose anemones. Macro photographers should keep an eye out for tiny white or yellow sea spiders, found covering strands of sea strawberry soft coral.

Seven Tree Island also flanks Nigei and is another lush site where I have always had good luck finding the illusive decorated warbonnets, mosshead warbonnets and an endless supply of rockfish. Barry Islet offers fields of miniature red, pink and white gorgonians, some even hosting small basket stars. Macro subjects at Dillon include purple-ringed topsnails, several species of nudibranchs and bright orange juvenile Puget Sound crabs. Larger subjects at Dillon include octopus, ancient-looking ratfish and friendly wolf eels.

On the north side of Crocker Rock, at the northern entrance to Browning Passage, the remains of the Themis can



ABOVE: Underwater photographer Roy Akeson on Browning Wall

LEFT: Black bear on beach next to lodge

be found half in a forest of kelp and half covering a reef. At 12m/40ft the area clears somewhat, revealing weathered ribs and twisted sections of metal down to 21m/70ft. Although a bit unsightly, the distorted garble wears a colorful invertebrate cloak of textured life. Both harbour seals and sea lions have been sighted here. Keep an eye out for the bathtub!

Weather permitting, I have always enjoyed spending the day across the Strait exploring Slingsby Channel. Almost anywhere along the outer walls are excellent for photography or nature watching, above and below the water. Talk about seeing everything on a single dive, these walls deserve nothing less than a two-GB memory card with a macro or close-up lens!

Turret Rock (aka Tremble Rock) is another close site, in the middle of Nakwakto Rapids. Recorded at speeds of up to 22 knots, these fast-moving currents will take your breath away! Below the surface a diver will find huge clusters of unique Nakwakto goose-neck barnacles with 'red' lips and six-rayed white sea stars.

Large schools of Pacific white-sided dolphins tend to frequent the area around Nigei, presenting the opportunity for divers to see these fast moving critters in action. In mid-water when we have encountered them, they have always put on a spectacular show! Be sure to have a weighted reference line because they will spiral around you, sending you deeper than planned.

When not diving, kayak exploration in the calm bays and coves is both fun and easy. Paddlers have the opportunity to see black bears, orcas, porpoise, eagles, sea birds, otters, harbor seals and river otters.

I would like to thank John deBoeck of Browning Pass Hide Away on Nigei Island for sharing his area expertise and site knowledge. The orca rubbing beach was amazing!

Travel Information

- Port Hardy Visitor Info Centre
  www.ph-chamber.bc.ca
  1-250-949-7622
- Port McNeill Visitor Info Centre
  www.portmcneaill.net
  1-250-956-3131
- Browning Pass Hide Away (Nigei Island)
  www.vancouverislanddive.com
  1-877-725-2835 or 250-753-3751
- North Island Dive & Charter
  www.northislanddiver.com
  1-250-949-2664
- Sun Fun Divers (Port McNeill)
  www.sunfundivers.com
  1-250-956-2243
- God's Pocket Diving Resort (Hurst Island)
  www.godspocket.com
  1-888-534-8322 or 250-949-1755

Red-lipped Goose-necked barnacles

LEFT:
Banfield

RIGHT:
Kayaking
in Barkley
Sounds

INSET:
Six gill shark

Diver and Wolf eel

Barkley Sound

Located within the boundaries of the Pacific Rim National Park on the west coast of Vancouver Island, Barkley Sound has always been a favorite among divers. This unique wild coast wonderland is easily accessed by boat from Port Alberni, via the narrow 40km/25mi Alberni Inlet. An 89km/56mi gravel logging road from Port Alberni to Bamfield provides another access. Diving is available year-round from several operators offering both day and multi-day excursions. With over 100 islands in the Broken Group alone, it's easy to find a dive site even if the weather doesn't cooperate.

Chup Point is a favorite of mine for macro photography, night diving and being able to spot over five different species of rockfish on a single dive! The depths vary from shallow to deep with little to no hint of currents. The colorful assortment of nudibranchs includes; yellow and white dorids, orange-peel nudibranchs, frosted and opalescent nudibranchs. Perhaps Renate's Reef should have been called "Wolf eel city" because of its numerous long gray residents of varying length and age. It's a rare occasion that I am not able to photograph at least five on a dive. Octopus, china and tiger rockfish and medium size lingcod also reside here.

Tyler rock is special because the first time I dove here I was greeted by eight six gill sharks, the largest one a female at over 3.6m/12ft! Waterfalls of white plumose anemones spill over steep slopes beginning at the top of the reef. Ratfish, orange sea pens, octopus and sculpins can be found at 27m/90ft upon a sandy bottom within a valley separating two reefs. Unfortunately, recent sightings have not yielded as many, but other six gill sites are being discovered each year.

Although Barkley Sound has several shipwrecks to explore, there are two easily accessible ones: the *Vanlene* and an abandoned Chinese migrant ship scuttled as an artificial reef in 2003. Not much remains of the 142m/473ft freighter *Vanlene* since it went down in 1972 near Austin Island except sheets of mangled steel and knarled sections of hull structure. It too has broken apart from years of wild weather and storms.

In the midst of this twisted turmoil, I have spotted adult Puget Sound king crab, multi-colored sunflower stars, rockfish, California sea cucumbers and abalone to photograph.

The *Vanlene's* bow can be found in the shallows as the rest of the ship seems to unfold down the bank like a broken puzzle to over 30m/100ft. The migrant ship is approximately 30m/100ft in length and sits upright with a maximum depth of 28m/95ft, near Canoe Island in Sechart Channel. The hull and wheelhouse are easy to explore, but we found most of the life growing on the outer hull and bow area.

When not diving, humpback and gray whale watching is superb during the warm summer months. Kayaking is another way to take in the areas magnificent scenery and wildlife.

I would like to thank Peter and Kathy from Rendezvous Dive Adventures for taking us out and letting us use their kayaks for a great photo shoot!

Travel Information

- Bamfield Chamber of Commerce **www.bamfieldchamber.com** 1-250-728-3006
- Rendezvous Dive Adventures, Ltd. **www.rendezvousdiving.com** 1-877-777-9994 or 250-753-5050
- Bamfield Dive Shed **www.dive-shed.com** 1-877-723-4837
- Broken Island Adventures, Ltd. **brokenislandadventures.com** 1-888-728-6200 or 250-728-3500
- Six Gill Adventure Tours **www.sixgill.com** 1-800-761-5661 or 250-720-7386
- Alberni Valley Divers **www.albernievalleydivers.com** 1-250-720-1118
- Fat Salmon Backpackers (in Port Alberni) **www.fatsalmonbackpackers.com** 1-250-723-6924

Water temperature doesn't change much from one end of the island to the other, staying between 6-11°C (43-52°F) between November and April, increasing to 8-15°C (47-59°F) between May and October. This in turn requires a diver to wear full-body thermal protection in the form of a dry suit or a thick 6.5mm wetsuit.

Please remember, when visiting British Columbia, as with most prime dive destinations, the taking of marine life on dive trips is frowned upon and not permitted by most operators. Enjoy nature's cold water paradise as a respectful visitor, because it will take you more than ten return trips to see a mere portion of British Columbia's underwater wonders. ■

CLOCKWISE: Reflections in Clam Cove; Bald eagle landing; Snake Island snorkling

LEFT: Resting at Abyssal Lodge

fact file

Vancouver Island
British Columbia
Canada

ABOVE: Map of Canada
LEFT: Map of Vancouver Island

History Canada is a country of rich natural resources and vast distances. In 1867, Canada became a self-governing territory while retaining its relationship with the British crown. The country has developed economically and technologically in parallel with its southen neighbor along an unfortified border, the United States. After a decade of budget cuts, the country's greatest political issues are improving education and health care services. Recently, the issue of reconciling Quebec's francophone heritage with the rest of the country's population which is anglophone, has receded after a referendum held by the Quebec government failed to pass in 1995. Government: confederation with parliamentary democracy.

Geography Located on the northern half of the North American continent, Canada is bordered by three oceans: the North Atlantic Ocean on the east and the North Pacific Ocean on the west, as well as the Artic Ocean to the north. After Russia, Canada is the second largest country in the world. It has a strategic position between Russia and the US on the north polar route; about 90% of Canadianss are concentrated in the area within 160 km of the border with the US. Terrain: wide plains with mountains in the west and lowlands in the southeast; Natural resources: iron ore, nickel, zinc, copper, gold, lead, molybdenum, potash, diamonds, silver, fish, timber, wildlife, coal, petroleum, natural gas, hydropower; Natural hazards: continuous permafrost in north is a serious obstacle to development; as a result of the mixing of air masses from the Arctic, Pacific, and North American interior, cyclonic storms form east of the Rocky Mountains and produce most of the country's rain and snow east of the mountains.

Economy Canada closely resembles the US in its market-oriented economic system, pattern of production, and high living standards. It is an affluent, high-tech industrial society. Agriculture: wheat, barley, oilseed, tobacco, fruits, vegetables; dairy products; forest products; fish; Industries: transportation equipment, chemicals, processed and unprocessed minerals, food products; wood and paper products; fish products, petroleum and natural gas.

Climate varies from temperate in the south to subarctic and arctic in the north

Population 32,507,874 (July 2004 est.) Ethnicity: British Isles origin 28%, French origin 23%, other European 15%, Amerindian 2%, other, mostly Asian, African, Arab 6%, mixed background 26%; Religions: Roman Catholic 46%, Protestant 36%, other 18%

Currency Canadian dollar (CAD)

Exchange rate: 1 CAD = $ .82 USD / € .63 EURO

Language English 59.3% (official), French 23.2% (official), other 17.5%

Web sites
Vancouver Island Tourism
www.islands.bc.ca
Vancouver Island & Victoria BC Tourism Travel Guide
www.vancouverisland.com
Diving Vancouver Island
www.bcdiving.com

Dive Operators
British Columbia Dive Guide
www.bcdiveguide.com
Dive charter operators and dive resorts in British Columbia
dive.bc.ca/links/charters.html
Ocean Explorers Diving
www.oceanexplorersdiving.com
Abyssal Dive Charter & Lodge
www.abyssal.com
Browning Pass Hideaway
www.vancouverislanddive.com

Rendezvous Dive Adventures
www.rendezvousdiving.com

Deco Chamber
Vancouver Coastal Health
10th Floor, 601 West Broadway
Vancouver, BC, V5Z 4C2
Information Line:
1.866.884.0888 or 604.875.4252
www.vanhosp.bc.ca ■

Edited by
Andrey Bizuykin
& Peter Symes

POINT & CLICK
ON BOLD LINKS

Gotta have it

Equipment

Oceanic Viper

The new Viper is made for all diving and snorkeling skill levels and is extremely lightweight for increased performance and ease of travel. The Viper blade's Flexible Power Thrust Channel directs water off the tip of the blade for improved power and efficiency. The engineered channels and side rails direct water flow off the tips of the fin without allowing water to "spill" from the sides of the blade for uncompromising power and efficiency. Power Vents reduce stress while accelerating water over the blade. A generous yet streamlined foot pocket fits a wide range of boot styles while significantly reducing drag. Comes with easy adjust quick-release buckles. **www.oceanicworldwide.com**

Vuf

Now this is perfect for your Scuba Pup - The Dive Flag Dog Collar. And don't forget to pick up a matching Leash. Available in sizes S, M and L. Webbing Width is 5/8 inch, 3/4 inch or 1 inch. Neck Sizes: 8-13 inches, 11.5-19 inches and 15-25 inches. Price: US$9.95 **www.amazon.com**

Beuchat

The Beuchat Masterlift TEK BC has been designed to meet the high standards of technical dives. It is a single 35-liter bag BC with 1000-denier Cordura structure backplate with multiple fastenings for the structure, bag, tank, and accessories and a wealth of features including a maximum demand emergency regulator unit with dump valve. **www.beuchat.fr**

Gravity Zero

The Zero Ranger TXT trilaminate is intended for the demanding user be it a commercial, technical, military or sport diver. A telescopic torso and elasticized waist design make for a perfect fit. The front diagonal zipper is non-magnetic and covered by a protective flap made in Cordura. Knee pads and other exposed areas are also reinforced with an extra layer of Cordura. The suit is fully taped and sealed on the inside with ADS 2000 Polymer Sealant that comes with a lifetime warranty. **www.gravityzero.it**

Aeris T3

The elite T3 hoseless air-integrated dive computer from Aeris achieves a remarkable balance between features and usability. With Aeris' wireless transmitter, the diver can also monitor gas pressure from up to three independent cylinders – ideal for both technical diving applications with compatibility with up to three Nitrox mixes to 100% oxygen and recreational diving with their new Buddy Pressure Check™ feature. **www.DiveAeris.com**

Aquatec Aquastar

At 15cm, this AquaStar Led Torch Flashlight is not only sleek but also boasts an impressive 5-hour burntime on standard AA-sized batteries while operated at high intensity. The nominal rated output is 23 Lumens. The rugged military style casing makes this flashlight practically indestructible and maintenance free. It is depth-rated at 100m. The electronics of this flashlight also include a constant current control circuitry that maintains the LED's brightness output throughout the entire life of the battery.

www.duton.com.tw

Oceanic

The Veo 100 Nx from Oceanic is a full-featured entry level Air or Nitrox Dive Computer. The Veo 100 Nx coordinates carefully arranged information with ease-of-use, oversized digits, bar graphs and intuitive icons. Loaded with features but still very user friendly with a single operating button. Features include Air and Nitrox Operating Modes, water activation, Safety stop prompt and a12 dive log book. Diver-replaceable battery with Hot Swap memory allows battery change between dives.

www.amazon.com

Aqualung

Aqua Lung's New Latitude XLT features the same proven mechanical system as some of the most technically advanced BCs on the market. Solidly constructed with the patented SURELOCK technology, the Latitude XLT features a balanced and integrated weight system that releases with one single instinctive action. The BC, available in red/black and black/gray/silver color combos, is made of the rugged Armorshield Cordura with the weight system "integrated" into the jacket, making it functional and comfortable. Other features include: two large zippered utility pockets, chest strap, grommets for knife attachments, right shoulder pull dump for quick and easy deflation. **www.aqualung.com**

Ocean REEF wants to know what you think about full face masks

Ocean Reef is conducting a survey to learn how scuba divers feel about full face masks and underwater communication systems. By participating in the survey, you will be entered in a drawing for a Limited Edition Ocean REEF ScubaDoRag!

www.oceanreefgroup.com

MINI REVIEW

Nocturnal SLX LED Dive/Photo Light

By Larry Tackett

I must admit that I am a creature of habit. I have been using the same aiming/focus light for my housed cameras for about ten years. It is a small plastic housing light with one tungsten (halogen) bulb and uses four AA batteries. It mounts on the macro port, moves up and down, and it works... always has. Never thought much about it. But recently, I had the opportunity to use one of Nocturnal Lights LED photo lights. What a joy! It was several times brighter than my existing light, having three LED bulbs, which are easily changed with different wattage bulbs being available. With the included diffuser it produced a wide, even beam of light which meant that I did not have to move the light every time my camera-to-subject changed. It is very durable with an aluminum housing and handle.

The light uses six AA batteries and the advertised burn time for alkaline batts is 4.5 hours. I used Lithium AAs and changed them only twice in 16 days of diving. I was shooting supermacro for a pygmy seahorse project that required manually focusing in low-light conditions. The brightness of this light and its wide beam angle made it much easier to see focus points.

The handle is pre-drilled with two holes to fit readily available mounting options. My light came with a mounting ball that worked fine with my UltraLight strobe arms. My only complaint was with the very large knob used to hold the ball. It was so large that it made it difficult to hold the light by the handle. There are better ways to do this. As a suggestion it would be nice to have a red diffuser, or a filter gel that fits inside the diffuser, for night shots of crustaceans and other critters bothered by white light.

In all, this is a great light that has now replaced my previous one. Yes, even creatures of habit need to consider new ideas and products! ■

Press release

Halcyon Recalls some of it's Explorer wings

Voluntary Recall of Select Explorer 40 BC's. (Serial Numbers Listed Below)

Halcyon is committed to manufacturing dive gear that exceeds the industry's highest standards. Nevertheless, they recognize that eventually a component could be shipped to their customers that does not meet Halcyon's expectation of quality. Even as they do their best to ship only the highest quality gear, they will announce any recall in a timely manner, along with the procedure that will need to be followed to ensure a quick and unbureaucratic handling of the issue.

Halcyon Manufacturing has identified a very small number of Halcyon Explorer-40 BC's sold after July 2005 that could develop problems over time. In these few units it is possible that the over pressure valve (OPV) could delaminate, causing the BC to leak. It is unlikely that most of these units will experience any problems; yet, given their rigorous desire to produce only the finest quality equipment, Halcyon would like to ensure this problem does not affect the safety or convenience of their customers. This problem was identified during regular quality control evaluations in which a lamination machine (RF welder) showed slight inconsistency during production. The machine has been replaced and the few BC's affected have been identified by quality control. Halcyon is seeking to minimize any inconvenience to their customers. To this end, all Halcyon distributors have been notified and are prepared to assist any affected customers. If you have an affected BC (see serial numbers below) please return the unit to any Halcyon dealer; you may also contact your local distributor for replacement. If you have any questions or prefer to work directly with Halcyon please contact Halcyon tech services via the contact information listed below.

Halcyon Contact Information:

1-800-HALCYON
(800-425-2966) x307

techservices@halcyon.net

EXPLORER 40 Serial Numbers

255015005	255015091
355147031	355147058
255015008	255015092
355147033	355147059
255015015	255015099
355147035	355147061
255015016	355147001
355147036	355147062
255015025	355147003
355147037	355147064
255015031	355147006
355147038	355147065
255015035	355147010
355147040	355147068
255015053	355147011
355147043	355147070
255015054	355147013
355147045	355147072
255015057	355147014
355147046	355147073
255015061	355147016
355147047	355147074
255015062	355147017
355147049	355147075
255015063	355147018
355147050	555603031
255015067	355147019
355147051	555603034
255015068	355147020
355147052	555603039
255015073	355147022
355147053	555603062
255015075	355147023
355147054	555603070
255015081	355147026
355147055	C44679024
255015083	355147028
355147056	255015085
355147030	355147057

www.halcyon.net

Filephoto of Halcyon Explorer CCR-35 (*NOT* the Explorer 40 in question)

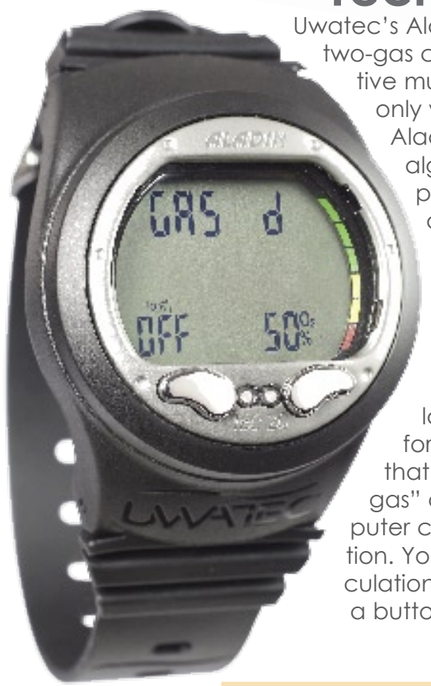
MB Sub

The two most successful diver's lamps of MB Sub are now also available with new high energy lithium manganese accumulators, which don't need protective circuits, don't self-discharge and retain high capacity also in the cold. The cells are rechargeable at any time regardless of the charge state and they don't suffer from memory effect.

The FUN Light LiMn comes at a lower priced as it uses an external charger, whereas the extreme LiMn can be charged without opening it. The extreme LiMn uses halogen burners with separate, replaceable aluminium reflectors. These are available with an angle of reflected beam with 12° Spot, 80° (with hotspot) and 90° Flood as photo or video light.

www.mbsub.com

Tech 2G



Uwatec's Aladin TEC 2G is an easy to use two-gas computer which offers a predictive multi-gas algorithm (PMG) shared only with the Uwatec Smart TEC. The Aladin TEC 2G predictive multi-gas algorithm performs its decompression calculation taking into account all planned gas switches throughout the dive. This means that the decompression schedule shown on the display gives you the actual total time of ascent. In the background, however, the algorithm also calculates the decompression schedule for the currently active gas only, so that if you fail to switch to the "deco gas" at the planned depth, the computer can quickly revert to this calculation. You can look up the active gas calculation at any time at the press of a button. **Scubapro-uwatec.com**

Atomic Aquatics SubFrameMask Receives Prestigious International Design Award

Atomic Aquatics have been awarded the prestigious Red Dot Award, an international award that has been presented for the last 50 years in recognizing true product design excellence in a wide range of categories.

This year, there were more than 50,000 entries from more than 50 countries. With the selection of its SubFrame mask, introduced earlier this year, Atomic Aquatics became the first company in the dive industry to be recognized by the Red Dot committee in the sporting goods category.

More details on this honor and the worldwide competition can be found at: en.red-dot.org

Hangair

Divers and others who use a wetsuit have been trying for years to dry the suit before their next chance to hit the surf. After use, wetsuits often take several days to dry completely. Wetsuit users, and those who live with them, will testify that they often develop a strong, unpleasant and unique odor. Twenty-three-year-old Michael Appelman, an avid surfer and scuba diver, knew there had to be a better way, so he created the Hangair Drying System. The system was officially lauched at expos in September and first shipments of Hangairs is expected be arriving in stores the first week of November. **www.hangair.com**

Keep fit with Suunto

SUUNTO t6 accurately records how your body performs during exercise, enabling later analysis and planning with Suunto Training Manager. By measuring your exercise load and relating it to your personal fitness level, Suunto t6 tells you if the session improved your condition or not. **www.amazon.com**

Scubapro Panther

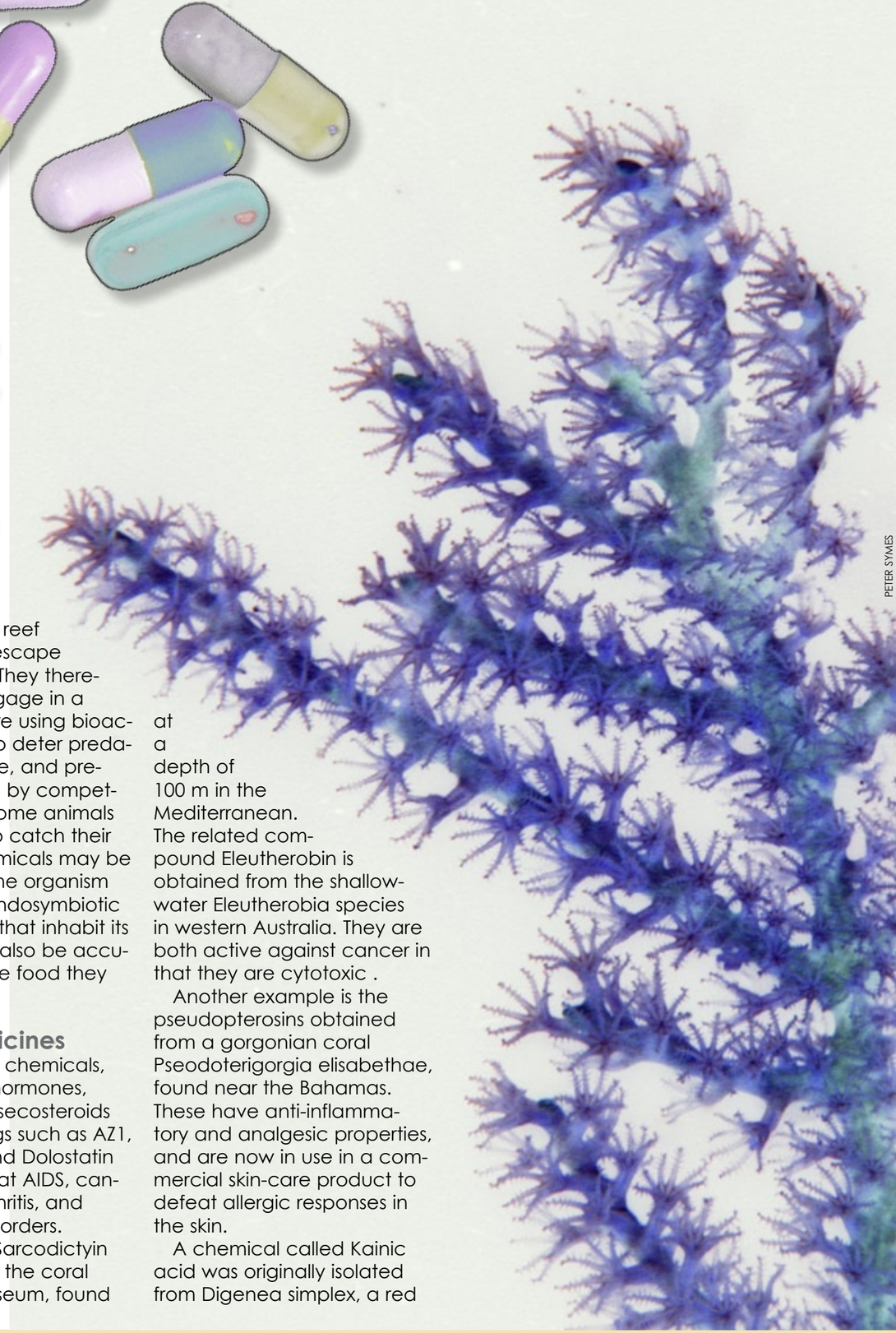
The all-new Panther N1 drysuits are made from 5mm high-quality pre-compressed neoprene insulates with little or no need for extra undergarments necessary, whilst ensuring buoyancy stability at depth. The Panther C1 (not shown) is a new membrane suit for warm or cold water allowing you to wear as many undergarment layers as necessary to stay warm and dry. Panther C1 is anatomically pre-shaped and the diagonal dry front zipper ensures easy access without requiring help from your buddy. Additionally the adjustable telescopic torso system provides the perfect fit and makes for easy donning; this is particularly beneficial to divers with slightly longer upper bodies. Both suits comes with anti-allergic extra long latex wrist seals combined with nylon neoprene wrist cuffs. The self-draining two-sided nylon neoprene collar with Velcro closure and self-draining front valve protects the latex neck seal from water damage.

www.scubapro-uwatec.com

Edited by
Michael Arvedlund
& Peter Symes

Medicines unlimited from the Oceans

The Oceanic Cornucopia



PETER SYMES

Text by Michael Symes

For millennia, mankind has been obtaining nourishment from the oceans, not only from fish and shellfish but also from the various types of plant life. The oceans are also home to some of the most poisonous and deadly organisms in the world, for example the Banded Sea Snake, the Scorpion Fish, and even the humble cone snail. Yet these selfsame creatures may well be our salvation, in that they may eventually provide us with life-saving substances against many of the ailments that affect us.

UNITED STATES GEOLOGICAL SURVEY

There has long been folk lore about various prophylactic substances that can be obtained from the oceans. For centuries, coastal communities have used reef plants and animals for their medicinal properties. In the Philippines, for instance, giant clams are eaten as a malaria treatment.

Today, more and more research is taking place into the possibilities of obtaining pharmaceutically active chemicals from the oceans. The majority of marine-derived compounds are obtained from either microorganisms or stationary, bottom-dwelling organisms such as corals, sponges and tunicates.

There are already many of these compounds that can, for example, possibly provide cures for cancer, AIDS, malaria, herpes infections, etc., but can also act as pain-killers and sun-screens. The sources of these compounds are legion, ranging from coral reefs, molluscs, sponges, to bacteria found in the sediments at the bottom of the oceans.

Coral reefs

Currently, one the most important source of pharmaceutically active chemicals appears to be in the coral reefs to be found around the world. As readers of this magazine will know, corals are formed of polyps living within a hard skeleton of calcium carbonate. They are to be found almost everywhere in the world, not only in the warm tropical seas but also in the colder waters of the Atlantic. Although they mostly live in shallower waters they are also to be found in deep sea waters.

Coral reefs are also home to a diverse mixture of invertebrates such as tunicates, molluscs, bryozoans, sponges and echinoderms. These animals spend most of their time attached to the reef and so cannot escape from predators. They therefore have to engage in a chemical warfare using bioactive chemicals to deter predation, fight disease, and prevent overgrowth by competing organisms. Some animals also use toxins to catch their prey. These chemicals may be synthesized by the organism itself or by the endosymbiotic microorganisms that inhabit its tissue. They can also be accumulated from the food they eat.

Cancer medicines

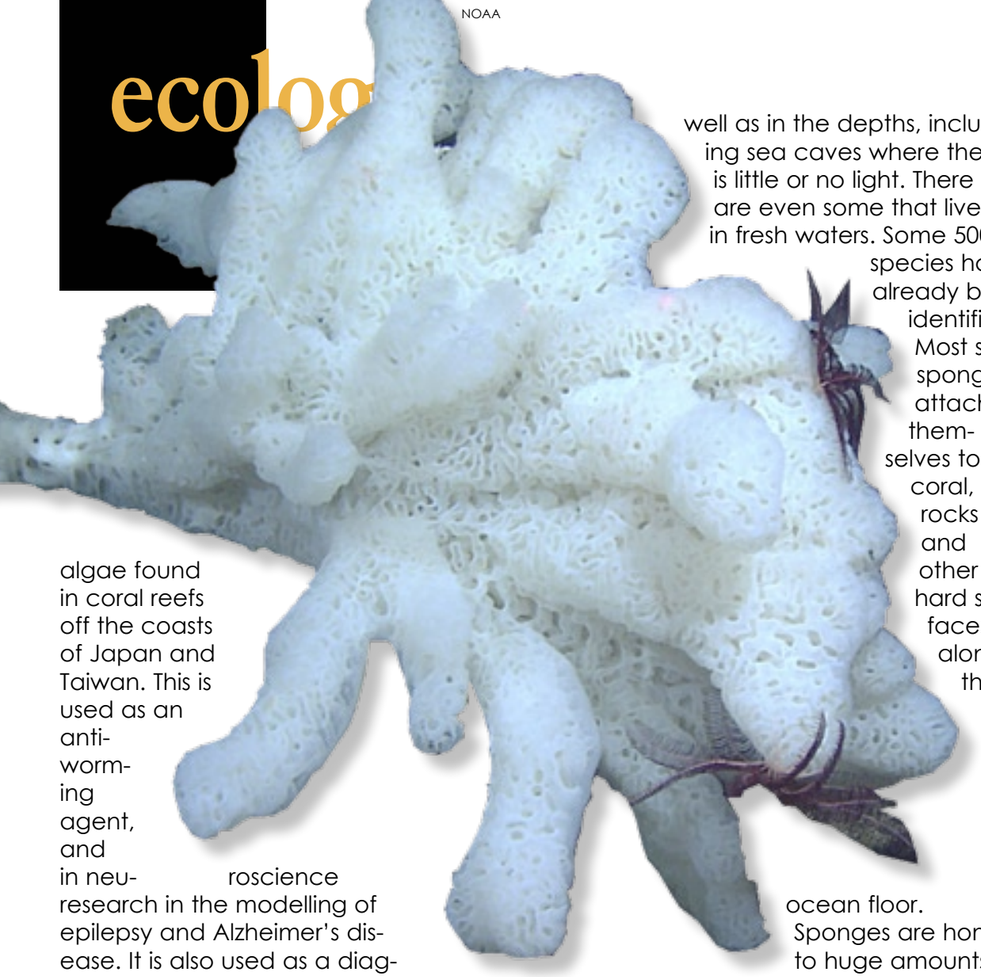
Extracts of these chemicals, like histamines, hormones, antibiotics, and secosteroids have led to drugs such as AZ1, Ara-A, Ara-C, and Dolostatin 10, which combat AIDS, cancer, asthma, arthritis, and inflammatory disorders.

For example, Sarcodictyin is obtained from the coral Sarcodictyon roseum, found at a depth of 100 m in the Mediterranean. The related compound Eleutherobin is obtained from the shallow-water Eleutherobia species in western Australia. They are both active against cancer in that they are cytotoxic .

Another example is the pseudopterosins obtained from a gorgonian coral Pseodoterigorgia elisabethae, found near the Bahamas. These have anti-inflammatory and analgesic properties, and are now in use in a commercial skin-care product to defeat allergic responses in the skin.

A chemical called Kainic acid was originally isolated from Digenea simplex, a red

NOAA



algae found in coral reefs off the coasts of Japan and Taiwan. This is used as an anti-worming agent, and in neuroscience research in the modelling of epilepsy and Alzheimer's disease. It is also used as a diagnostic chemical to investigate Huntington's chorea, a rare but fatal disease of the nervous system.

Porifera

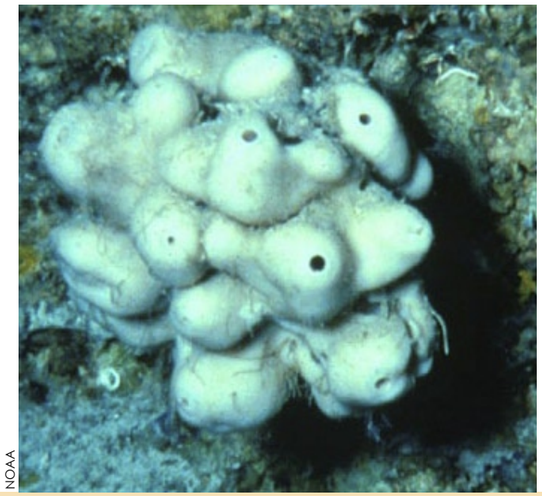
The Porifera, more commonly known as the sea sponges, are multicellular marine animals usually occurring in complex sessile colonies in which the porous body is supported by a fibrous framework. They are to be found in every ocean of the world, particularly the Antarctic, both in shallow waters as well as in the depths, including sea caves where there is little or no light. There are even some that live in fresh waters. Some 5000 species have already been identified. Most sea sponges attach themselves to coral, rocks and other hard surfaces along the ocean floor.

WIKIPEDIA

Sponges are home to huge amounts of bacteria, cyanobacteria, and fungi, and because a single sponge can be populated by dozens of different symbiotic bacteria that produce an extraordinary range of chemicals, they are ideal candidates for bioprospecting. These associated microorganisms have been shown in some cases to be responsible for the defensive chemicals produced by sponges. Many sponge species have elevated microbial populations.

An example of these chemicals are those that have been collected from the sponges of the Lithistid family, discovered at depths of 300 to 600 meters off the coast of Florida. Drugs extracted from them have been used not only to treat acute myelocytic leukemia and non-Hodgkin's lymphoma but also for the treatment of herpes infections using the antiviral drug Ara-A.

Another sponge with an elevated microbial population which is exceptionally bioactive is the Halichondria okadai sponge which lives in remote tropical waters off the coast of Japan. This sponge contains halichondrin B, a chemical which has been described as 'exquisitely potent' in killing cancer cells. A synthetic version of this chemical, E7389, has been produced, which is currently being tested in humans for the treatment of non-small cell lung cancer and other cancers. The drug functions by disrupting cell division. In a recent Phase II clinical study E7389 gave promises of a treatment for slowing and possibly reversing the spread of breast cancer. The deep sea sponge Lissodendoryx was later discovered at depths of 100 meters off the coast of New Zealand. This sponge contains halichondrins in greater concentrations than the shallow-water species. The deep sea sponge Discodermia dissolute is found at a depth of 140 meters off the Bahamas. A compound, Discodermolide, which interferes with dividing cells, has been extracted from



NOAA

The sponge, *Discodermia dissolute,* contains agents agent against solid tumours

PETER SYMES

Microbes that live inside sea squirts produce two compounds thought to have anti-cancer properties

this sponge. It is an active agent against solid tumours, especially multi-drug resistant tumours. Phase I clinical trials have been completed

Furthermore, products from two other deep sea sponges are in pre-clinical development. These are Topsentin, which is an anti-inflammatory useful against arthritis and skin irritations, and also against colon cancer. It can also possibly be used in treating Alzheimer's disease. It is obtained from the sponge Spongosporites ruetzleri, found at a depth of 300-600 m off the Bahamas. The second product is Dicytostatin-1, used against cancer. It is obtained from a sponge of the order Lithistida, family corallistadae, living off Jamaica at a depth of 440 m.

Tunicates

Tunicates, commonly called sea squirts, are marine animals that spend most of their lives attached to rocks or the bottoms of boats. The photosynthetic microbe Prochloron didemni lives as an endosymbiont inside the sea squirt Lissoclinum patella. This produces two compounds called Patellamide A and C, which are thought to have anti-cancer properties. These patellamides are small peptides that appear useful in treating some cancers.

NOAA

Cone snail

Molluscs

These consist of the gastropods (snails, slugs), the bivalves (clams, mussels) and the cephalopods (cuttlefish, octopuses). One of the most interesting gastropods from the medicine point of view is the beautiful but deadly cone snail, of which there are more than 500 known species, found primarily in coral reefs in warm, tropical waters but also in mangrove swamps. They harpoon other invertebrates with a concealed hollow tooth, though which they inject conotoxin venom. Despite its small size, it is only a few centimetres in length, it has enough venom to paralyse or kill a human.

The most scientifically interesting venoms are those produced by conus geographus and conus magus. Their venoms contain substances called conotoxins. These are small peptides, normally only 20-30 amino acids in length. This short length means that synthetic derivatives are relatively easy to manufacture. There are a number of different types of conotoxin, each acting on different receptors.

Conotoxins also have the potential to treat epilepsy and clinical depression.

The molluscs' venom was found to be able to block pain signals in the human spinal cord. Ziconotide, developed from the venom, works by blocking the calcium gateways of the nerve synapses, so that transmission of the pain signal to the brain is blocked. Ziconotide, also commercially known as Prialt®, was isolated from Conus magus.

One of the most significant developments is from an omega-conotoxin of conus geographus. Using the snail's natural conotoxin, a synthetic derivative called SNX-111 was produced. It has been shown to have analgesic properties, and has therefore the potential for being the basis for a new pain-relieving drug. Studies have already shown SNX-111 to be 100-1000 times more powerful than morphine, without many of the associated side effects

Conotoxins also have the potential to treat epilepsy and clinical depression.

Synthetic derivatives are relatively easy to manufacture.

Each species is able to produce more than a hundred unique toxins. Cone snails as a group may thus have more potential for new medicines than any other genus. So far, the venoms of only just over fifty species of cone snail have been investigated. As it takes 50-100 snails to obtain enough venom for analysis the environmental impact of removing cone snails must be considered.

Bacteria

Salinispora, a new class of marine gram-positive bacteria, have been isolated in large numbers from many different ecosystems, including the Caribbean Sea , the Red Sea, the oceans around Hawaii, and the Sea of Cortez, together with such extreme environments as the sediment on the ocean floor more than 1000 m down in the North Pacific Ocean. A substance, Salinosporamide A, has been isolated from these bacteria, which shows strong anti-cancer properties against melanoma, colon-, breast- and lung-cancer.

MURIEL GOTTROP

Mangrove (*Rhizophora sp.*) in Queensland

Plants

Just like the land plants from which we have previously obtained practically all our medicines, the plants that grow in and around the oceans have a potential as a source of biologically active chemicals. This potential, though, is nowhere as great as that for medicines produced from animal species.

One minor example is the extracts derived from the fruit of a mangrove species found on the coastal regions of the Andaman & Nicobar Islands, which shows both anti-diabetic and anti-diarrhoeal activities. Fractionation of the fruit can separate the anti-diabetic activity from the constipation-inducing activity.

Non-pharmaceutical Applications

Corals

Corals have a skeletal structure similar to that of bone, with a hard outer sheath and a spongy inner core. They are therefore well suited to be used as orthopaedic implants in bone grafting. At the present time, the best for this purpose are found to be the tropical genera Porites, Alveopora, and Goniopora. The bamboo corals of the family Isididae, genera Keratoistis and Isidella, which live more than 1000m down in the North Pacific Ocean, are also being used, as the dimensions of bamboo coral are almost identical to that of bone. They are still in preclinical development but have already been found to reduce the risk of mammalian disease. The corals have also developed natural sunscreens to cope with long-term exposure to the high-intensity ultra-violet radiation penetrating shallow reef waters. This sunscreen, structurally unlike compounds in current use, has demonstrated great efficiency in absorbing and dissipating UV radiation in the damaging UV-B region of the spectrum. Luckily, these materials can now be synthetically produced, thus avoiding the destructive exploitation of natural resources.

Actinaria

The Actinaria, better known as the sea anemones, belong to the phylum Cnidaria which also includes the jellyfish, corals and hydras. The jelly fish and sea anem-

PETER SYMES

Urticina sp from the White sea, Russia

ones have soft bodies and long, stinging, poisonous tentacles that they use to catch fish. They do this by paralysing the fish with venom sent out through stinging cells called nemocysts. The venom of some of the jelly fish is so strong that it can kill a person. However, it is the mechanism of the sting that is of interest, for the nemocysts can be used to inject drugs through the human skin.

It has been shown that the minuscule stingers of the sea anemones can be employed to deliver important pharmaceuticals painlessly through the skin of a patient. Research is going forward into imbedding a drug such as insulin into the stingers which can be mass-culled from the sea anemones. These are then made up into a cream which, when rubbed on the skin, activates the stingers to inject the drug. These tiny injectors, which are invisible to the naked eye, can deliver up to more than 100 thousand penetration points per square centimetre of skin contact. It is hoped that the method can be used to deliver chemotherapy drugs, antibiotics and anti-rejection drugs after organ transplant operations.

Cure for AIDS?

It will be seen that the oceans are potentially a huge source of medically important compounds. It is therefore necessary that we protect them from destructive fishing practices such as the trawling of the ocean beds. Otherwise, we might lose the chance to find just that substance or mechanism that could cure cancer or AIDS. But that's another story. ■

Scripps Institution of Oceanography and UC San Diego's School of Medicine have teamed up to hunt for new antibiotics on the ocean floor and get them to market

Bill Fenical, director of Scripps' Center for Marine Biotechnology and Biomedicine, is sorting out how to make the potential new antibiotic discoveries effort more attractive to investors. He hopes an interdisciplinary approach to finding medicines from the sea could draw more resources. The biggest obstacle, he said, is that the largest donor of research grants, the National Institutes of Health, has stopped supporting antibiotic research. This lack of support extends from a 25-year-old agreement to keep the National Institute of Allergy and Infectious Diseases - an NIH arm - from competing with private enterprise, he said.

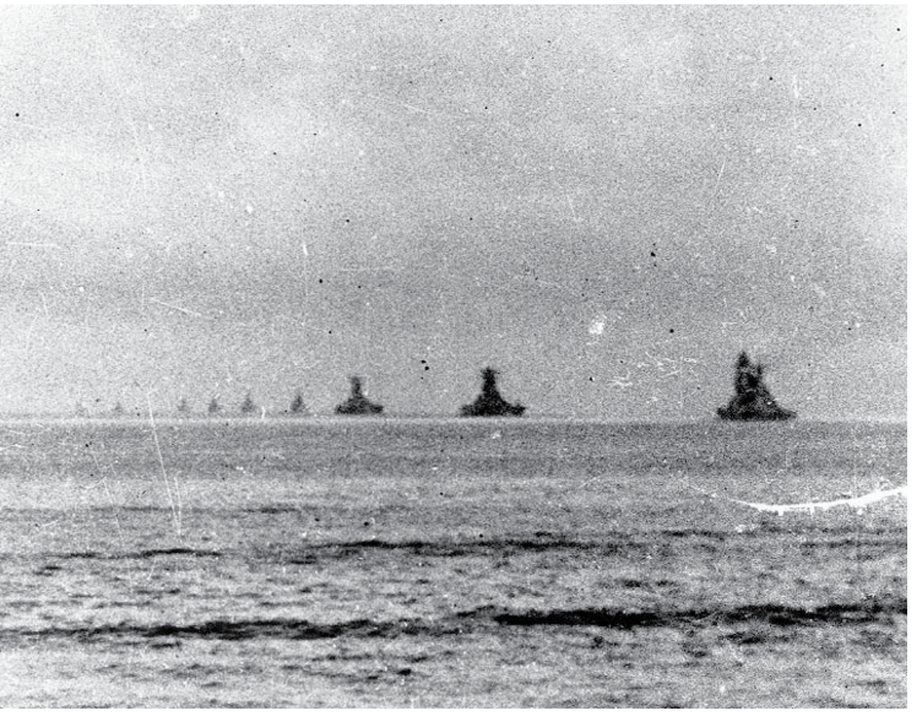
"It's completely out of date," Fenical said. "Where are we in terms of developing new antibiotics? We are in trouble. My colleagues believe it is a national emergency." Victor Nizet, associate professor of pediatrics at the Division of Infectious diseases at UCSD's School of Medicine, said more than 50 percent of strains of bacteria are resistant to common, first-line antibiotics.

A dozen researchers are working on the interdisciplinary push to find new antibiotics. ■

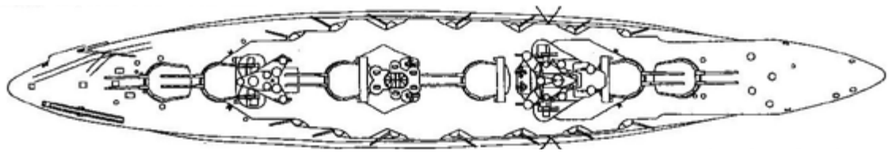
Japanese Battleship

Vice-Admiral Shoji Nishimura

Text and images courtesy of Cedric Verdier



Japanese fleet leaves Brunei, 22 October 1944



Top view of *Yamashiro*

Is there anything more difficult in diving?

Nowadays, the name Yamashiro could have different meanings depending on where you come from. If you live in Los Angeles, a huge pagoda near Hollywood is the oldest structure in California and hosts a famous restaurant named Yamashiro or "Mountain palace" in Japanese. If you live in Kyoto, Japan, Yamashiro is the name of an area close-by. And for the older generation, it's also the name of a never forgotten Japanese battleship lost during WWII during one of the major battles of naval history, the battle of Leyte, October 1944. Finally, if you're a scuba diver, you might have heard about the wreck of the *HIJMS Yamashiro* as definitely the most challenging shipwreck in the world, because of the remoteness of the location, the extreme depth and the very bad diving conditions.

When the dramatic story of a Japanese hero meets the dream of a few technical divers.

October 24th, 1944

Vice-Admiral Shoji Nishimura doesn't like the way everything goes. Nishimura is known for his high respect of the orders. No matter what orders he had, he would carry them out even though they could result in the annihilation of himself and his command. For the time being, he doesn't know that it's exactly what will happen in the next few hours in the Surigao Strait.

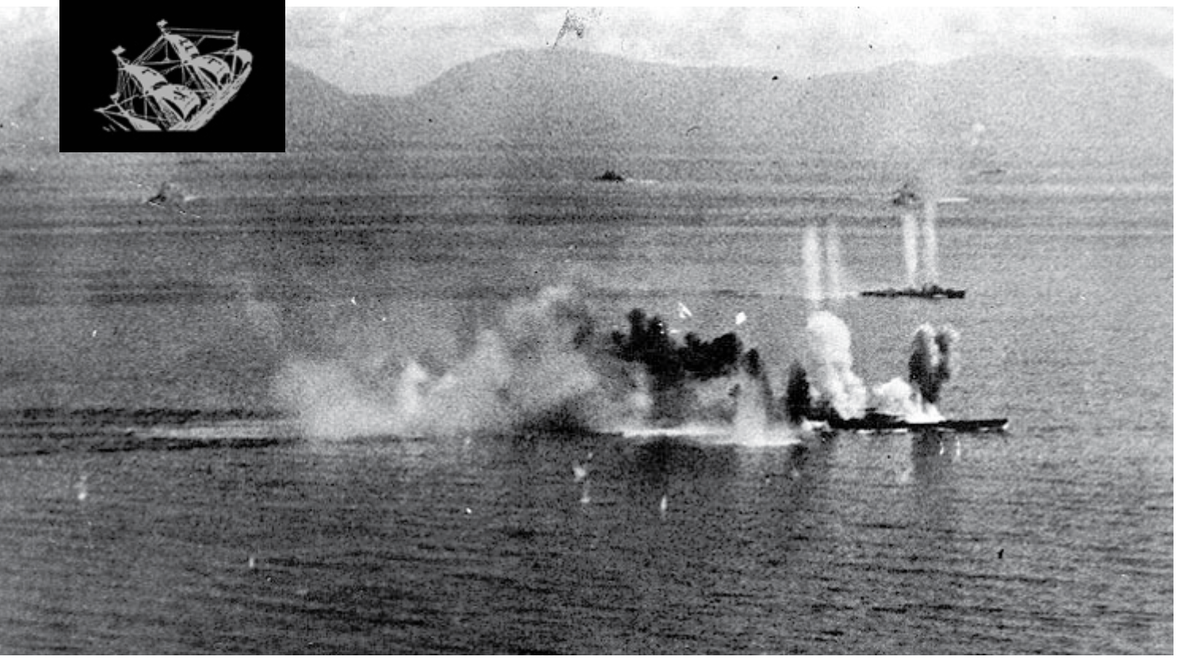
Only a year after being nominated as a Vice-Admiral, he is named commander of the Southern force of the Operation Sho-Go, as the Imperial Japanese Navy Headquarters in Tokyo search for a final and decisive naval battle against the Americans in the Philippines. His force (named Force C) consists of battleships *Fuso* and *Yamashiro* (his flagship), heavy cruiser *Mogami*, and destroyers *Shigure, Michishio, Asagumo,* and *Yamagumo*. And now, he has to go through the Strait of Surigao to attack the Allied invasion shipping in Leyte Gulf.

July 18th, 2006

Three technical divers and more than six hundred kilograms of diving equipment are boarding the boat that Rob Lalumiere, an

Ron Lalumiere's dive boat in the Philippines

Yamashiro



Japanese battleship *Musashi* under attack in the Sibuyan Sea, October 24th, 1944

American expatriate and an avid deep wreck diver, uses to provide the surface support to the Yamashiro Project team. A team made of three technical divers coming from very different horizons. I am originally from France but spend most of my time travelling around the world to teach rebreather diving. Pim van dem Horst does the same in his dive school in the Netherlands. Bruce Konefe, also an American citizen, resides and teaches

Preparations for the dive

technical diving in Thailand. We all come to Leyte, a remote island in the Philippines, to dive the *Yamashiro* and the *Fuso*.

Bruce and I spent the last ten months gathering information about the wrecks and the logistics that could be used for such extreme dives. We quickly both came to the conclusion that it's a combination of heaven and hell.

Heaven because the wreck of the *Yamashiro* lies in pristine condition, still proud of her 213 m/699 feet length, her twelve heavy 14 inch guns and her famous 44 m/144 feet high superstructure nicknamed Pagoda.

Hell because the current is never less than 7 knots, the visibility on the bottom is close to 5m/15 feet, the maximum depth is almost 200m/656 fsw (only 160m/525 fsw for her sistership *HIJMS Fuso*, sunk in two parts only a few miles away). It also means that the team knows what a "Logistical nightmare" is.

There is no dive center to fill the tanks or rent some equipment. There is no recompression chamber less than twelve hours away. The closest boat available for technical divers, a private boat owned by Rob, comes from Ormoc, fifteen hours north. The closest town, Hinundayan, has only a few houses on a small road that looks like it is constantly being repaired, and more than ten people talking together at the same time is a major event in this very quiet area.

Everything has to be brought from Europe, Thailand or Manila. Soda Lime and small tanks for the rebreathers, spare parts, Helium, Oxygen... in short, an expedition as easy to set up as a wedding party on top of Mt. Everest.

Divers Bruce and Cedric prepare to dive the deep wreck *Yamashiro*

Shooting a fish in a barrel

October 24th, 1944

Since its departure from Brunei two days ago, Vice-Admiral Nishimura considers himself lucky, as his force has remained undetected by the US Navy. Unknown to him though, some aircrafts took off the *USS Franklin* to strike an attack on his ships. They are spotted a few minutes later, as they prepared to drop their bombs on the two battleships. Fortunately, the damages will be minor and nothing will happen for the rest of the afternoon. However, Force C has been uncovered, and US Navy ships from the 7th Fleet gather in the Strait of Surigao to welcome the Japanese fleet.

Its American opponent, Rear Admiral Oldendorf, had deployed his overwhelming forces to gain the maximum advantage, barring the Strait with an incredible layer of PT boats, destroyers, and finally, the great guns of cruisers and no less than six battleships. Amongst them, the deadly *USS West Virginia, California* and *Tennessee*, recently equipped with the new Mark 8 fire control radar, an improved system that better discriminated narrow targets in close proximity.

It's late in the afternoon when Vice-Admiral Nishimura heads to the Strait. He is now well aware of the trap that is waiting for him, as a scout plane from

Philippine island

Yamashiro

the *HIJMS Mogami* has provided him with a report about the American forces and their location. Nevertheless, he knows that following the orders he has received will help Operation Sho-Go to succeed.

All of a sudden, US Torpedo Boats come from nowhere and directly aim at the battleships. As the night falls, the fight seems to last forever, finally ending around two o'clock in the night. But it's actually only a pause, waiting for the next phase of the battle…

Then, an hour later, the US destroyers start to launch their torpedoes, hit the *HIJMS Fuso,* breaking her in two parts. *HIJMS Yamashiro* also takes a hit but keeps on firing from all guns, trying to find the enemy in total darkness. Most of the Japanese destroyers are lost or crippled by this time.

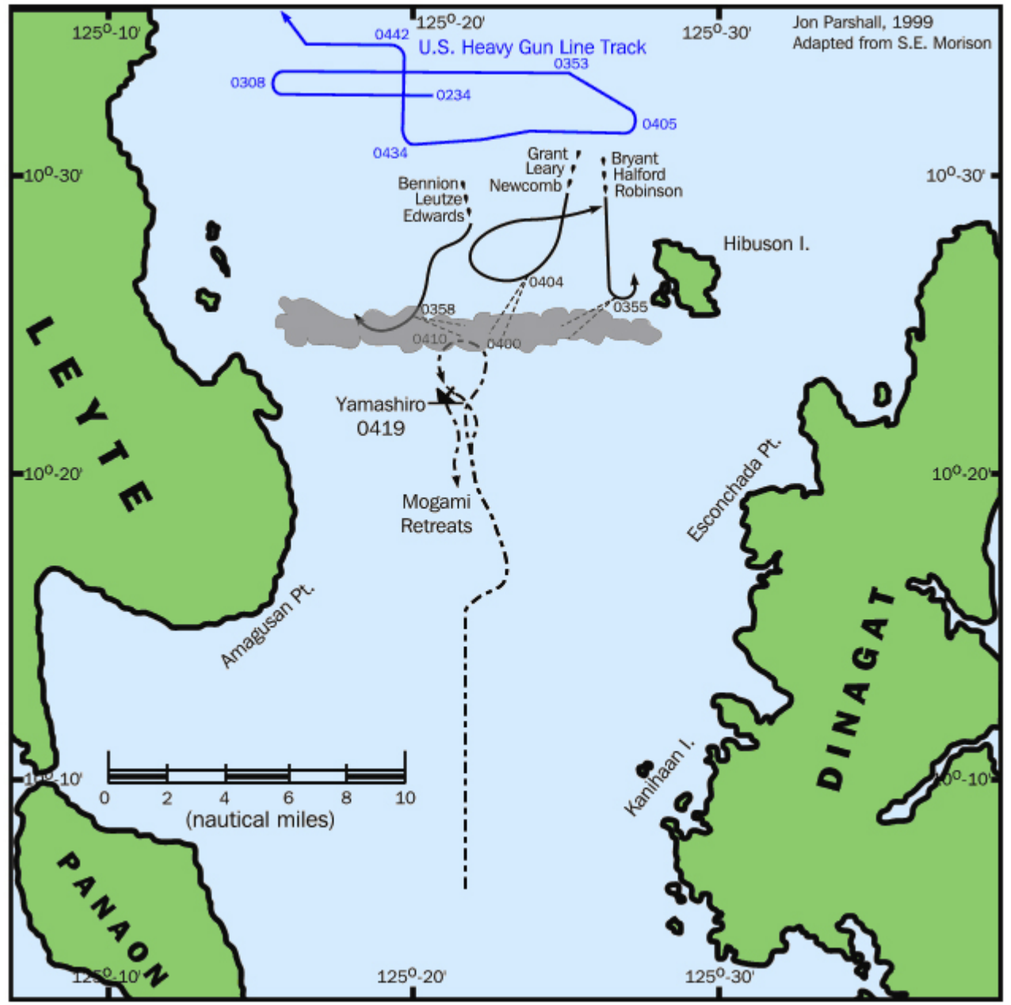
Another hour and the remaining American force is within range of fire. All the battleships, some being veterans of the Pearl Harbour attack, start a terrific concentration of gunfire, and every size of projectiles, from 6-inch through 16-inch, come pouring into the few remaining Japanese ships.

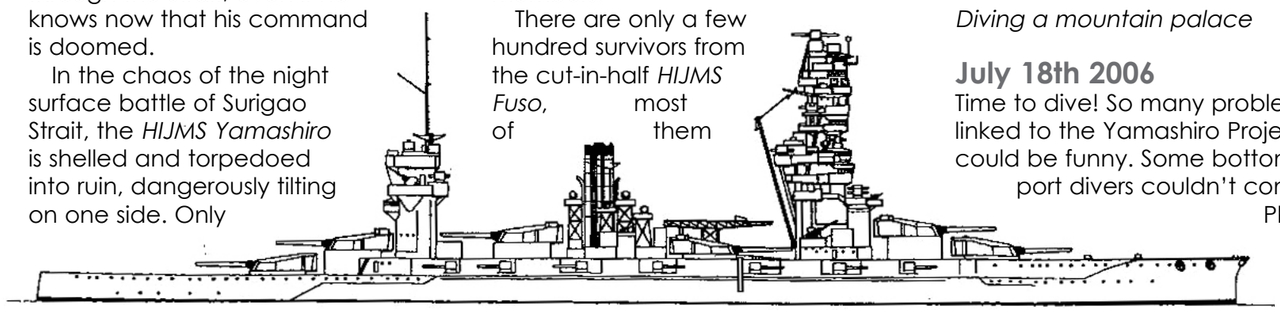
Shells come down like rain all around Vice-Admiral Nishimura. Nevertheless, he relentlessly keeps his force on its course, trying to make it through the Strait, even if he knows now that his command is doomed.

In the chaos of the night surface battle of Surigao Strait, the *HIJMS Yamashiro* is shelled and torpedoed into ruin, dangerously tilting on one side. Only a few minutes after the order comes to abandon the ship, the distressed ship suddenly capsizes and sinks stern first following a final hit from two torpedos in the starboard side amidships and aft. Aboard are Vice-Admiral Nishimura and most of her 1400 crew members.

There are only a few hundred survivors from the cut-in-half *HIJMS Fuso,* most of them refusing to be rescued by the US Ships, preferring to swim ashore to be butchered by the Philippines natives.

From all the Japanese Force C, only the cruiser *Mogami* and destroyers *Asagumo* and *Shigure* will remain operable. Every other ship had sunk.





HIJMS Yamashiro

Diving a mountain palace

July 18th 2006

Time to dive! So many problems are linked to the Yamashiro Project that it could be funny. Some bottom or support divers couldn't come to the Philippines,

Bruce doing his deco
BELOW: Rob's dive boat

Cedric learning to fly during deco

Yamashiro

due to professional, financial or personal reasons; a tropical storm named "Florita" (why such a sexy name for such a devastating climatic phenomenon?) flooded some islands and delayed the arrival of the team in Leyte; some equipment proved to be ineffective at depth, flooded, broke or were lost; even the boat had some problems and lost all the shotlines the crew set up; the helm broke and the boat drifted away; some electronics like the GPS or the depth sounder decided to display inaccurately and to switch off at the worst moment.

Even the weather played with the nerves of all the team members by alternating sun and rain, storm and gentle breeze; and finally the current, a ripping current, almost constant even at slack tide, was the worst enemy of the Yamashiro Project. The divers had to fight against it at the surface, during the descent and the ascent, and even on the bottom.

After a day of extensive search in the area, in order to avoid any confusion with other wrecks in the Strait of Surigao, the team was convinced that the huge profile on the echo sounder was the wreck of the *HIJMS Yamashiro*, as it also matches with side-scan sonar images and GPS locations found by previous expeditions (like the one conducted by the late John Bennett). None of these expeditions were able to explore the wreck, mainly because of the current, but they all came back with a lot of useful information.

After several attempts to hook the boat on the wreck, Rob and the team decide to drop a shotline on the wreck. Quickly, Eveline Verdier, one of the support divers swims to the buoys to remove the excess line. There is no slack. The current pushes everything so hard that it will be very difficult for her to set up the deco line with the stage tanks.

Pim, Bruce and I start to gear up. A long process with the equipment used: dry suit, rebreathers (Ouroboros CCR for Pim, Inspiration CCR for Bruce, Megalodon CCR for myself), bail-out tanks, etc...

Even with the boat very close to the shotline, the strong current makes it very hard for the divers to reach the buoys. At the surface, Pim has a 1st stage regulator O-ring that blows up at the last minute. The whole crew helps him to fix the reg, but it's already too late. After having swum hard against the current at the surface, he decides to abort the dive.

Bruce, who had some problems with the Hammerhead, decided to switch back to the normal Inspiration electronics, therefore limited in depth. He will stop at 120m/393fsw.

Only I can descend along the shotline that is now at a 45 degree angle. The only way to go down is to pull myself with the rope. That's the plan, but it's quite hard work even with all the tanks side-mounted and a configuration as streamlined as possible. Several times I had to stop for a few seconds to catch my breath, even with a very efficient pre-production radial scrubber in my Meg.

At 120m/393 fsw, I meet a big thermocline and the temperature drops from a comfortable 29°C/84°F to a chilly 22°C/71°F. It becomes darker, and the current does not decrease.

At 180m/590 fsw, the line is horizontal—well above the bottom. I follow it and discover a huge hull. My heart is beating as fast as a runaway train. My canister light has flooded and I now rely on a 10W HID light. The beam is narrow and hardly covers more than a small part of the impressive wreck. A quick check at my instruments will tell me that I just finished a very long 14 minute descent!

It's so dark and the wreck is so huge that it's difficult to have any clue about where I am. Some superstructures are still intact, some are lying on the bottom. A tilted hull... It looks like the complete wreck sits on her side.

Unfortunately, after only a few minutes on the bottom, computers and tables clearly agree that it's time to start an ascent that will take 6 hours to complete.

The current is still there, the line still almost horizontal, and it takes quite a while to reach the first deco stop at 150m/490 fsw.

Above the thermocline, the water is warm and the visibility excellent. Bruce is still deco-ing some 40m/130 fsw above. Because of the current, we both use a Jon-line to relax a little bit while maintaining a constant depth.

The support divers bring down a plastic bag with drinks and magazines. They also visit the us to take some pictures. Everything looks fine, so far...

9m/30 fsw

The current is picking up big time, and I jump all over the place at the end of my Jon-line. It's made in Thailand but it doesn't break, fortunately, as other problems are waiting for me…

I suddenly notice that the oxygen level in my rebreather starts to drop. The oxygen tank is simply empty because of the high exertion level, much higher than

the worst case scenario. Another tank is plugged in the rebreather and the oxygen is now manually injected. But it looks like the injector leaks, even after having been checked multiple times. Buoyancy control becomes a problem. I have to exhale a lot, and I am loosing quite a lot of gas. It becomes even worse at the shallower stops... Another empty oxygen tank, and one of the support divers has to bring a new one.

The last deco stop seems very long, filled with boredom and cold. The dry suit is full of water because of the last two hours of me spinning around at the end of the Jon-line like in a washing machine.

A very slow final ascent and I reach the surface in a place that looks like it's in the middle of a storm... A lot of wind, big waves at the start of evening and a boat that tries to approach me is going up and down. A support diver jumps at the surface and catches all the tanks to help me to safely climb the ladder. As soon as I sit on the boat, everyone can see how tired I look. Nevertheless, they all want to congratulate the first (and only) diver on the *Yamashiro*.

The mood is quite good, even if all the divers have not been able to go to the bottom, this day or the next few. The team has done what they could to explore the *Yamashiro*. The spirit of the survivors just opened a window for us to visit the final resting place of the fallen. This window is now closed, and all divers have to respect that. There is no other explanation for all the problems that occurred during this expedition. In this trip were lost, broke or flooded:
- 1 Hammerhead Electronics for Inspiration CCR
- 1 video camera and its housing
- 1 Halcyon canister light
- 1 Poseidon regulator
- 2 anchors
- 550m of ropes
- 10 buoys and containers
- 2 dumbbells (??)
- 1 Otter dry suit
- 1 Decorider bail-out rebreather

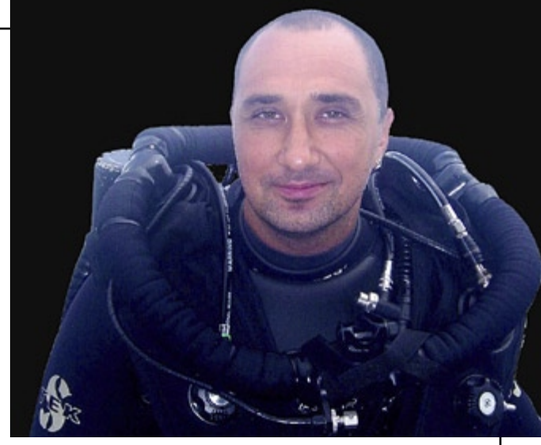
The team also needed:
- 400kg of personal equipment
- 14 porters in various airports and ferry terminal
- 20kg of rice and chicken
- 54cans of Diet Coke and Pepsi Max

The tables used were designed by V-Planner and ANDI-GAP, with a 5/75 diluent and a progressive setpoint (1.0 on the bottom increasing up to 1.3 during deco). They were backed-up with VR3-VPM computers.

Thanks to Rob Lalumiere, Ross Hemingway, Eveline Verdier, the support divers. Congratulations to Anthony Tully for his so informative articles about the Battle of Leyte. Thanks to our sponsors: ANDI, PSAI, Golem Gear, Mermaid's Dive Center, OMS, Otter Dry Suit, Northern Diver, Cochran, RebreatherWorld Forum. ■

About the Author

Cedric Verdier is the founder of the TRIADE Project, established in 1999, discovering and exploring more than 20 virgin wrecks located in the south of France between 70 and 130m (230 ft) and 430 fsw. In 2002, he was the first diver to identify and dive the British cruiser *HMS Manchester* off Tunisia. Amongst other dive firsts, he pushed the limits of the Sra Keow cave in Thailand in May 2006, using his Megalodon Closed Circuit Rebreather, to an Asia-Pacific cave depth record of 201m (660 ft). He is currently planning the Yamishiro Project, an international expedition aiming to dive the Japanese battleship *HIJMS Yamashiro* sunk in the Battle of Leyte in the Philippines in November 1944 and resting at a depth of 200m (660 ft). Cedric is a PADI Course Director and a Trimix Instructor Trainer for IANTD, PSAI, ANDI, DSAT and TDI. He spends most of his time teaching cave and mixed-gas rebreather courses at the diver and the instructor level. He is a past Regional Manager for PADI Europe and DAN and has written five books and more than 150 articles about diving. As he is always travelling all over the world, you can mainly contact him by email at: **info@cedricverdier.com**



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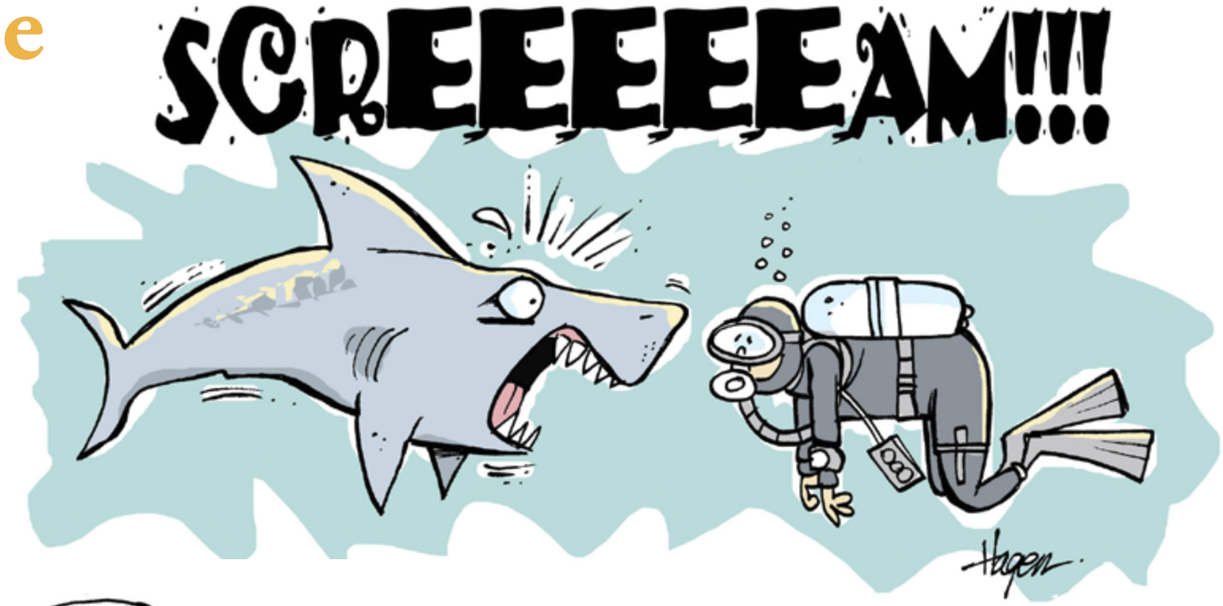
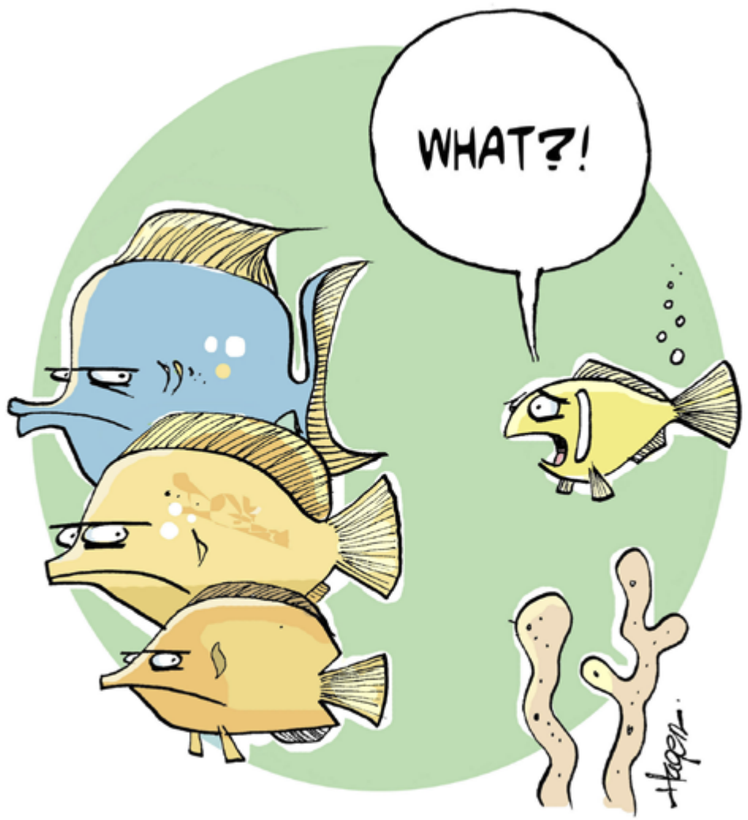




SKUNK CLOWN
(WHATSTHATIUS SMELLUM)

Ralph Hagen

Canadian Syndicated Cartoonist Dives to a Different Toon

Ralph Hagen can remember the actual moment he started cartooning as if it were yesterday. Hagen says that he was about four when he saw a cartoon pencil sketch hanging on his grandfather's porch drawn by a second cousin of his, who eventually grew up to become a commercial artist. The drawing was a rendering of Alfred E. Neuman of MAD Magazine, exclaiming, "What, me worry? "

Hagen spent hours just staring at that cartoon, "trying to figure out how someone could use just an ordinary pencil and a piece of paper and come up with that". From that day forward, all he did was cartoon.

The young Hagen would cut open paper grocery bags for drawing paper and draw until there wasn't an inch of space left. In first grade, Hagen would turn over the handouts and draw before he had done the school work on the other side. "Now, why wouldn't my teacher and her wooden yardstick approve of that?" he kids.

Hagen sold his first cartoon at age 17, and thought, "Cool! People will pay money for these? Bonus!" He was hooked and couldn't stop cartooning if he tried. Hagen said that if he lost his hands, he would draw with his feet —"those cartoons would just have to come out".

Hagen has been procartooning since 1976 when he landed a job as editorial cartoonist at his local paper. Hagen also did the color work on the strip, 'Mudpie' for renowned artist Guy Gilchrist, of 'Nancy' and 'Muppet Babies' fame.

Hagen says that he owes Guy Gilchrist many thanks for entrusting him with his panel and all the support Gilchrist gave him over the years. "He truly is one of the best", says Hagen.

In the early years, ideas and punchlines were harder to come by said Hagen. He really had to work at it. But after 23 years of professional cartooning, Hagen seems

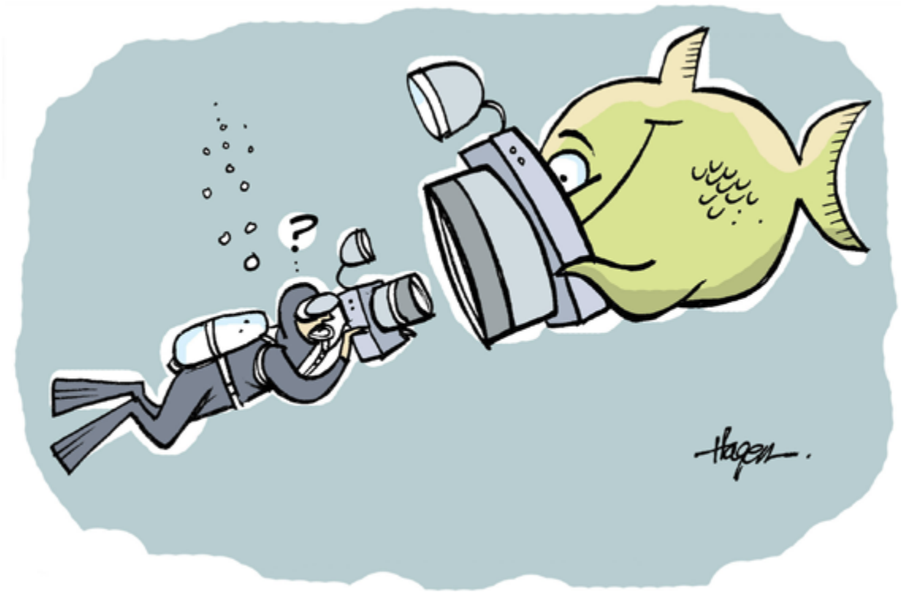
MINE URCHINS
(EVERYTHINGIS MINUS)

Ralph Hagen Dive Toons

Every time you buy a Ralph Hagen t-shirt, calendar, mug or tote bag, a percent of the sale goes to help save the seas! Go ahead... be a hero. Buy 'em at ***cafepress.com/xraymag***

PERCENT FOR THE OCEANS CAMPAIGN

Do you love the sea? Do you want to help save our oceans and reefs from destruction by global warming, over-fishing, deep sea trawling, coral bleaching, algae blooms, run-off and emissions? Do you want to make sure your money goes to solid organizations really doing good work out on the front lines? Join X-RAY MAG in the Percent for the Oceans campaign where businesses and local communities can sign up to give a percent of their sales to ocean conservation. Contact Gunild Symes at: **gsymes@xray-mag.com**



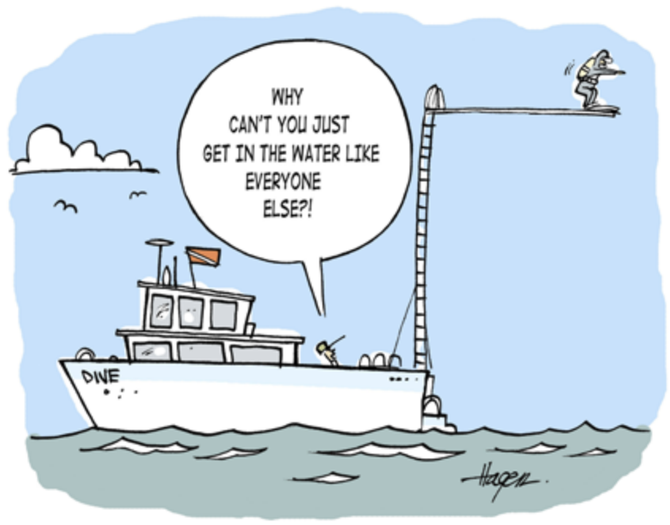
to have taught himself a different way of thinking, "one that comes naturally now," says Hagen, "without effort." In fact, now he says it's hard to shut it off.

Currently, Hagen does editorial work for two papers as well as his panel SCREAMS syndicated by DBR Media. He freelances and has been published in hundreds of magazines and papers such as The Saturday Evening Post, The Reader's Digest and The Birmingham Post Daily. Hagen has also done illustration work for preschool books as well as assignment work for clients and businesses throughout the US and Canada. Hagen says, "I produce quality work and believe the customer's needs come first."

Ralph Hagen lives north of Edmonton, Alberta, Canada, with his wife, three kids, two horses and "the odd moose".

See the hilarious dive cartoons Hagen creates for X-RAY MAG on t-shirts, calendars, posters, mugs and tote bags. Visit X-RAY MAG's new online store at: ***cafepress.com/xraymag***

For more information about the cartoonist, please visit Ralph Hagen's own website at: ***www.hagenstoons.com*** ■



The Zen of Diving Drysuits

The editors wish to thank:

Si Tech (Sweden)
Aquata (Germany)
Dykkercentret (DK)
Thyge Dive (DK)

who contributed with valuable advice and technical assistance in preparing this article

Editor Peter Symes. Location: Thingvellir, Iceland

All the questions about drysuits you always wanted to know the answer to but never dared to ask: Why dive drysuits? Neoprene or membrane type? Purchasing a suit. Zippers and care. Getting the Bouyancy right. Diving the suits. Special training and tips.

Peter Symes with Andrey Bizyuikin

I am a confessed drysuit nuttie. I prefer my drysuit anytime, even on a hot summer day where I, while kitting up, will subject myself to bystander's snide comments about my apparent lack of Viking genes and tolerance to the elements. Not that I mind diving in wetsuits, which I often have to do whenever I go traveling with a limited luggage allowance, and I gladly admit that diving in wetsuits does tend to give you a more real experience of being in the wet element, whereas a drysuit does tend to isolate you, which, by the way, also has its advantages. Some would even

It is all about being comfortable

say that this is the very point of using drysuits. My point is, aside from the range of obvious technical advantages over wetsuits, there is this unique feeling of diving the suit, almost as in driving a car and becoming one with it through the seat of your pants.

Diving the suit

My drysuit is a vehicle too. It can be finely controlled and maneuvered to the point where I can ultimately come to rest and relax totally outstretched as if I was lying on a mattress. I have, in fact, often amused myself by the thought that the suit was like a waterbed that was just wrapped around you. It is all about comfort.

Being comfortable may mean a lot of things and most of them applies to diving drysuits. It is about protection from the environment, thermal protection first of all, but also against abrasion from sharp rocks, jagged wrecks, spiky sea creatures. And it is about taking as much of the strain out of the dive as possible, making it a pleasurable excursion or exploration into the underwater realm.

As for the thermal protection, there is a lot to be said. As most are well aware, unlike wetsuits, which are almost solely manufactured in neoprene, drysuits comes in two main types (with some overlaps and cross breeds): Neoprene and membrane suits (such as tri-laminate, rubber or nylon). Membrane suits are sometimes also called shell suits. The main difference being that neoprene provides thermal insulation in itself whereas membrane suits require an undergarment worn underneath for thermal protection. Entry level training taught us that the body loses heat 20 times more quickly in water than in air. This makes proper thermal protection priority-one in a good suit. Not only do we want to have a good time down below being cozy rather than cold and miserable, but once we get cooled off, our air consumption also goes up, risk of DCS increases, not to mention, dedicated hypothermia is dangerous and ultimately fatal. In all types of drysuits, air plays the dual role of both providing thermal protection and buoyancy, and fulfilling these two requirements simultaneously is the key.

PHOTOS OF DRYSUIT & DRYSUIT COMPONENTS ARE COURTESY OF THE MANUFACTURERS

Types of Drysuits

Some ask: Why crush the neoprene and ruin the insulating air bubbles?

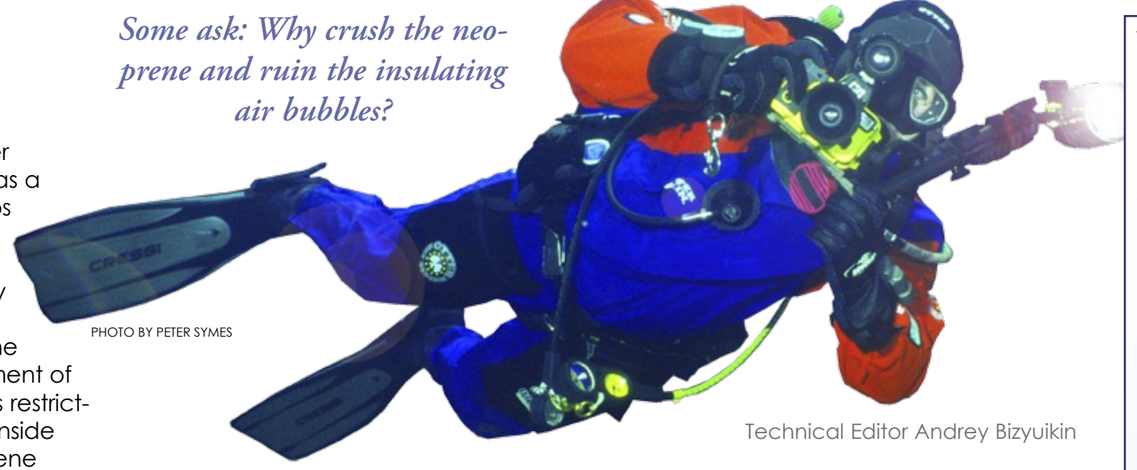


PHOTO BY PETER SYMES

Technical Editor Andrey Bizyuikin

Neoprene or membrane?

This is a matter of a probably never ending dispute. Not quite as bad as a religious quarrel but the two camps each have their outspoken proponents. Speaking in very general terms, neoprene suits are generally more hydrodynamic due to their smoother surface, and as neoprene allows for some stretch the movement of joints, are less restricting. The downside is that neoprene drysuits compresses with depth, just like wetsuits, whereby they suffer from a loss of both buoyancy and thermal protection exactly there where you need it most. As the suit's buoyancy changes with depth, it also calls for slightly more precision in controlling the buoyancy at any stage. Finally, neoprene suits are generally viewed as requiring more weights than membrane suits, but *ultimately, this depends on the undergarment used.*

Membrane suits, on the other hand, don't compress. They are light-weight and easy to enter, but do require additional protective underwear, for example, Thinsulate underwear from 100 up to 400 gram or some of the special garments advertised on these pages. Membrane suits generally require less lead, but the amount of needed weights will also depend on the choice of undergarment.

Another and less important consideration is that membrane suits tend to be baggier and have a wrinklier appearance causing more drag, which however, to be fair, I haven't been able to really notice. Also, the membrane material doesn't stretch, which, depending on the design and 'tailor cut' of the suit, can limit movement in some directions, for example, if you try to reach out for a tank valve behind your head (a maneuver you should be able to execute in technical diving).

Finally, there are some high-end hybrid models aimed at combining the best of both worlds. Foremost and best known of these models are suits made out of compressed neoprene, a special neoprene in which the characteristic air bubbles have been compressed or 'collapsed'. This produces a much thinner, yet flexible material, but obviously also far less insulating, for which reason an undergarment is necessary for thermal protection. These suits are generally more expensive. We have also seen suits lately where a thin metal-foil that reflects body heat are incorporated into the fabric.

Choice of material is ultimately down to personal preference and the type of diving you want to do - and perhaps also the size of your wallet

Poseidon's Vesta is made from 5mm semi-compressed neoprene

Whites Catalyst is a membrane suit made from QuadFlex incorporating the Captive Suspension System

Aquata Crush - Crushed Neoprene Dry - Overall 5 mm crushed HD-neoprene

TUSA's H.R.S. uses a 5-layered structure with a 3.5mm hyper-compressed neoprene and a double titanium alpha lining

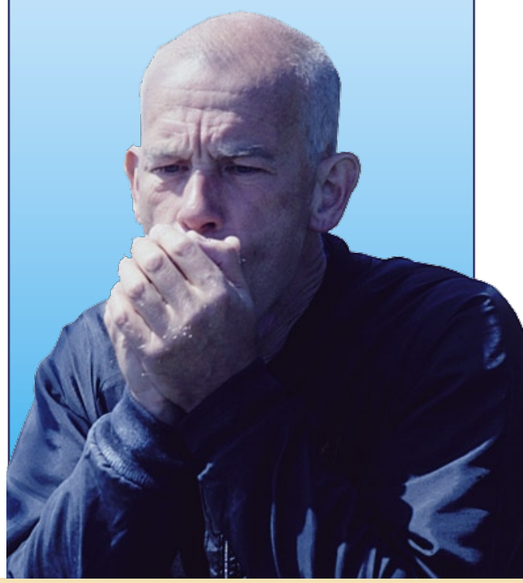
Why you should stay warm

The recent rise in popularity of technical diving with mixed gasses, rebreathers and advances in computer technologies have enabled us to vastly increase the time we can remain underwater.

Consequently, the requirements for thermal protection are higher than ever. If the protection is insufficient, our bodies will react by increasing metabolism to compensate for the loss of body heat. This in turn increases our breathing rate and gas consumption, sometimes depleting our supplies prematurely and forcing us to finish a dive early. Being cold also increases the risk of decompression illness. In the beginning of dive, when the body is still warm, the tissues saturate with nitrogen relatively fast. But once the tissues have cooled, the off-gassing occurs much more slowly.

Most people can do one dive and stay comfortable, but, the second or third dive of a day is when heat loss becomes very noticeable. Even in the tropics, after a week of heavy vacation diving, many people start getting chilled during the last few days.

Also, water temperature in many dive areas can change up to ten degrees or more between winter and summer, so this factor must also be considered when choosing a dive suit. ■



Standard latex neck seal (conical)

Standard latex wrist seal (conical)

Seals & Hoods

Shit Happens

This option from DUI, the ZipSeal, comprises of a flexible urethane ring installed on the neck and/or wrist, which permits the user to replace a torn seal in minutes

Tucking down the seal, like an inverse turtle neck collar, will trap air in a way that will strengthen the sealing effect

Bellow neck seals allow for more head movement without ingress of water

Air is kept inside the suit by seals or cuffs at the wrists and either a neck seal or a hood with face seal. It is inflated through the inlet valve and deflated through an exhaust valve or by air escaping out under the cuffs. The amount of air in the suit is thus variable. How much will always be a compromise. Put more air in and the insulation improves but this also makes the suit more buoyant, calling for the addition of more weights to maintain overall neutral buoyancy. Conversely, if you can do away with less air in the suit—i.e. by using high quality undergarments—you can save on weights. As compared to diving with wetsuits, most will need at least 5kg extra weight for starters.

However, the extra air and the added weight also calls for better buoyancy skills. A drysuit is less forgiving and requires more compensation than a BCD once you start to sink or ascend... more on that on page 74.

Here, I use a neoprene neck seal with a seperate hood. I fancy that neoprene provides me with more warmth around the neck (I am such a wimp) than latex. And it is softer, feeling less tight. A separate hood also makes it more comfortable wearing the suit out of the water—ie during transport to dive site.

Neoprene suits require more weights than membrane suits to compensate for their relatively higher buoyancy at the surface. But as they compress with depth and lose buoyancy this has to be offset by adding extra air. Therefore the air pressure inside a neoprene suit will often be slightly higher. This puts a stronger pressure upon neck and wrist seals. These seals can be made of either latex or neoprene. Neoprene seals have to have the outermost 1-2 cm folded inwards like an inverted turtle neck collar and tucked down along the skin to provide a tighter seal.

When air tries to get out of the sleeve, it gets trapped under this fold and presses the folded-down flap against the skin. It is not always necessary to fold down latex seals as this material is more elastic than neoprene but many do anyway. A word of caution however, a neck seal should hold tight but not be so tight that it restricts the blood flow in the veins leading to the head nor should it be pressing on the vagus nerve. This can lead to increased blood pressure in the head, causing headaches and perhaps even unconsciousness. This can be avoided by using an isolating latex hood, which seals around the face. This latter option is more often seen with commercial divers who have to work for many hours under water, while recreational divers seem to favour the neck seal with either a fixed or separate hood.

Separate hood. You'll get your hair moist like in a wetsuit

Face seal as seen on a Viking suit. This option is mostly favoured by the commercial divers

The 'Winter Shrink'

After a long break or during cold periods, you *may* find that your seals have shrunken and become too tight to pull over your head. You can try to expand and soften them by inserting plastic bottles or balls into the sleeves and neck and leaving them overnight to stretch.

Trimming Seals To Size

Both neck and wrist latex seals are conical. Trimming off the ends willl thus make the fit less tight. Make sure you use a proper pair of scissors and a stable support. One nick and you might tear the seal, which then needs to be replaced. So be careful!

Lubricating seals

Most use talcum powder, but soapy water is also an excellent lubricant for putting the wrist seals on and off. A word of caution however: Avoid anything that contains perfume as it may degrade the seals. Spray a small amount of the soapy water on the inside. Avoid silicone lubricants, which can build up on the suit resulting in problems when repairs are needed. Talcum is the best option.

COUNTERCLOCKWISE FROM TOP RIGHT: Zipper configurations 1. Poseidons first Unisuit had a crotch zip (1963) that went between the legs. This design is no longer used. 2. Round the head permits for easy entry. 3. Across the shoulders are the most common, but this typre requires assistance to get in and out of. 4. Across the chest. 5. The flipover.

Configurations & Care

Zippers

The zipper is the most expensive feature on a dry suit. It requires both protection, careful handling and maintenance. But with proper care the zipper could outlast the suit.

How exposed the zipper is to wear and tear, grit and dirt depends on the design of the suit and whether it is protected under some flap or cover. The zipper needs to be kept clean and lubricated to ensure that it doesn't jam and damage itself and remains watertight. It should open and close smoothly.

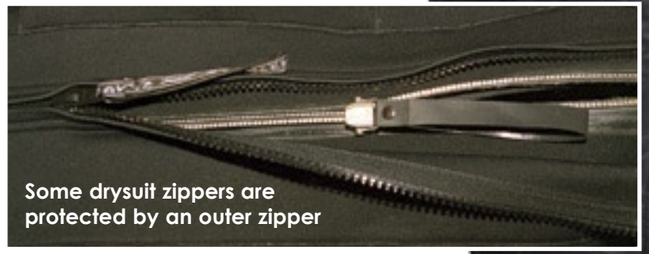
Keeping the zipper clean may include rinsing the zipper off after the dive before unzipping. Divers who dive off beaches may get sand grains deposited as they scramble ashore, which must be rinsed off or swept off before the buddy opens the zipper. An old toothbrush may also come in hand to clean out dirt and salt crystals from between the zipper teeth.

Make sure that care is taken when opening and closing the zipper. Drag evenly and carefully.

Lubrication

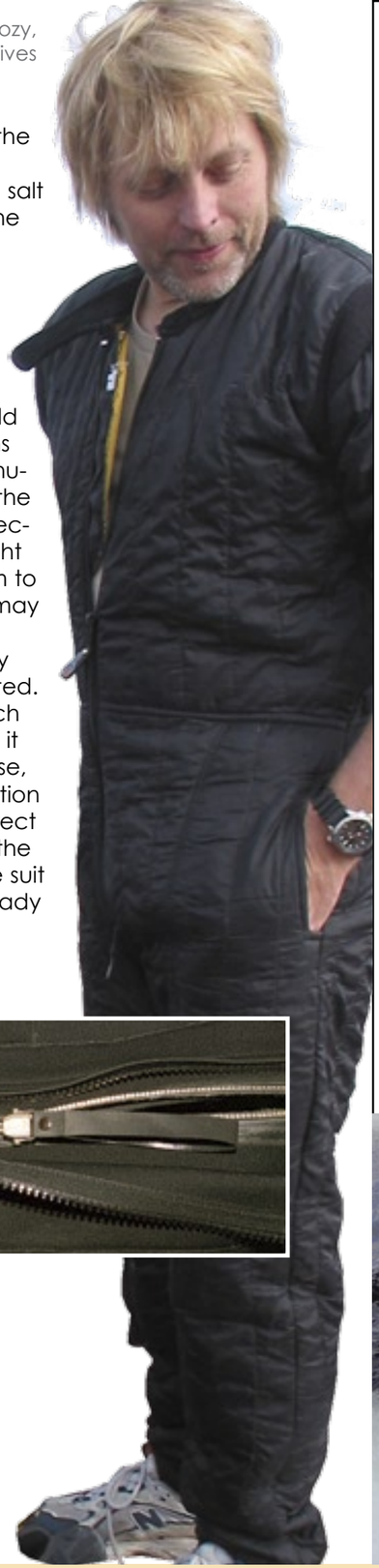
It is also important to keep the zipper well lubricated. Wax or liquid are the main choices. Silicone should never be used as it causes problems with glue used in repairs. Some manufacturers recommend sticking with the wax only. In any case, follow their recommendations – otherwise you might void the warranty. Liquid does seem to seep better into the corners, but it may also attract and trap dirt particles.

Some manuals also state that only the outside teeth should be lubricated. Lubricating the zipper, once for each diving day, should suffice. But once it feels tight to open and close, it's time for another lubrication or cleaning. Apply the correct lubricant, open and close the zipper twice, then store the suit with the zipper open ready for the next use.



Some drysuit zippers are protected by an outer zipper

WWW.KALLWEIT.DE



Nice, dry and cozy, also between dives

Dry Gloves

The head, neck, hands and legs can be responsible for up to 70 % of the loss of total body heat. Dry glove systems should be considered when diving in water temperatures below 12°C to minimize the risk of non-freezing cold injures. Inside the membrane, you wear gloves of wool or Thinsulate. There are two main types—with or without a coupling.

PHOTO COURTESY OF NEREIS DIVE CENTER, WHITE SEA, RUSSIA

Some assorted & excessive

Accessories

Ankleweights?

Some scoff at ankleweights denoting them "training wheels for novice divers" and that they just add to the strain of finning. I beg to differ on both accounts. It is about finding your personal trim and what works for you. In my case, as my legs are rather buoyant, in part also thanks to the fact that I, as photographer, favour swimming in a slightly head down position, I need those weights to keep my legs down and balanced. It also spares strain on my back that I can re-distribute the weight more evenly. Swimming? Can't feel the difference? Who got the idea that diving was an underwater marathon anyway?

OMS® ankle weights are fabricated from abrasion and puncture resistant 1600 Denier Nylon with individually sewn pouches to prevent shifting of the coated metal shot.
www.omsdive.com

The Bio-Seal from Apollo not only helps with the sealing. As it does not contain latex, it also helps those who are allergic or prone to neck rash. It is extremely pliable and molds itself to seals and skin equally well. This product can reduce, and in most cases, eliminate water leakage in the neck area while allowing for a more comfortable fit.

Guilty as charged

Cold Feet?

How about an electrical sole wamer from German Kallweit?
www.kallweit.de

Any Colour you like

Regular (3.3 lbs per pair) and Long (3.9 lbs per pair) Ankle Weights are available in Black, Blue, Neon Green and Yellow. **www.mcnett.com**

Argon for suit inflation

Argon is an inert gas which also happens to be a bad conductor of heat. Using Argon as a drysuit inflation gas therefore yields a far better thermal insulation than using air. Argon is carried in a little separate cylinder mounted with its own regulator. **www.omsdive.com**

P-Valve

If you gotta go, you gotta go. The overboard discharge or "pee valve" is a must for any male drysuit diver doing moderate to long exposures. (Sorry, gals. We are out of luck on this option. See 'Drysuits for Divas' on page 71 for advice on this subject). Without a way to relieve himself, the diver will often intentionally keep himself in a state of dehydration. The Pee-valve from OMS is usually installed on the inner thigh. The valve has a hose that attaches to a condom (supplied). When the plumbing is all set up, the diver can urinate at will and the effluent automatically passes from the condom, down the tube and through the valve for an "outboard" dump into the water.
www.halcyon.net

Neoprene Warm Collar - to be fitted over a Latex Seal
www.drysuits.co.uk

Shopping for a Drysuit

Contributed by Peter Fitschen
Sales Manager at Aquata

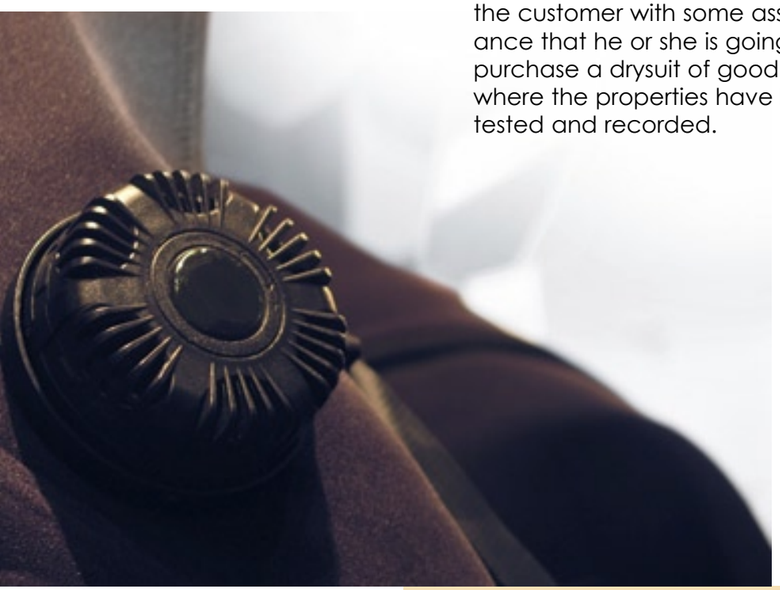
A prospective drysuit diver should begin with considering the following questions before buying a drysuit:

Where and how will I dive the suit and what are the temperatures from which the suit has to protect me? Do I only dive occassionally or do I frequently make more than one dive in one day in cold water? What will the suit have to sustain? Am I a sport diver or will I need the suit for professional uses? How do I dive—wreck diving, underwater photography or videography, underwater work or training?

Drysuits are classified as personal protective equipment, and as such, they are subject to commercial standards. Make sure that the drysuit, regardless

Ask for professional advice

of which materials it is produced from, have met these standards. In Europe, for example, this means a valid EU Conformity Declaration and test certificate. This provides the customer with some assurance that he or she is going to purchase a drysuit of good quality where the properties have been tested and recorded.



In particular, this matters when it comes to the degree of thermal protection offered by different materials. Here, it is important to pay close attention to the level of personal activity and anticipated use of the dry suit and match this to what classification of thermal protection the suit has. These data and physical characteristics should be shown in the dry suit and is the only reliable and standardised information available to the customer. Whether the suit is actually made from crushed neoprene, a 7mm neoprene with a Titan coating or other material should be a secondary consideration.

The standards also stipulate how sizes should be presented. Also, any manufacturer is obligated to produce at least two different sizes. In order to offer a perfect fit, however, two sizes will not be enough, so this part of the standards can only be seen as a rough orientation.

A very important issue when it comes to the purchase of drysuits—and wetsuits for that matter—remains finding the best cut and a perfect fit. Even a drysuit made in the finest materials with the best thermal protection characteristics available will not be of much use if it doesn't fit.

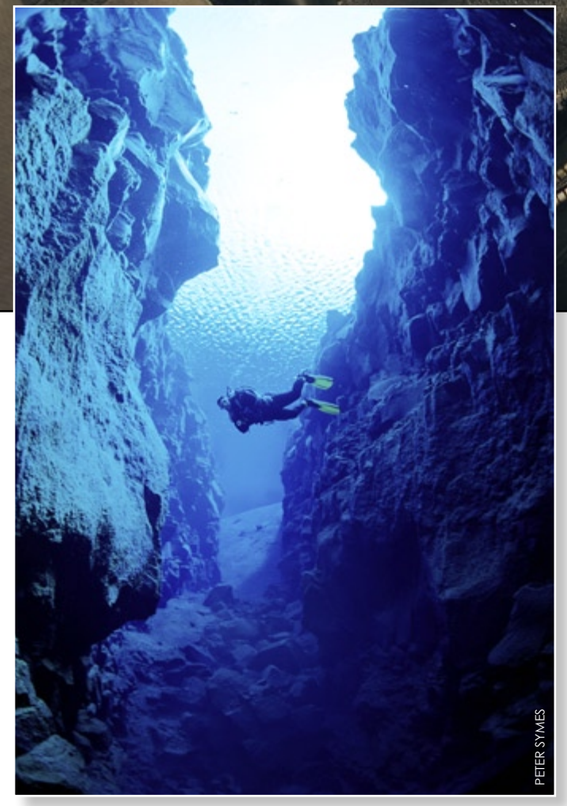
The last consideration is the quality of the workmanship of the suit. Take a look at the flexibility and stability of the material and the arm seals, compensation of cold bridges (see note), sensible use of materials at neuralgic body points, like the joints, and for women, the breast area. Also look at the overall functionality of the drysuit. Are the boots interchangable? Are the hood and seals interchangable too? Can you get additional pockets for additional equipment? It is the sum of the parts that makes a good drysuit.

But it is the combination of the suit's properties and your individual needs and charactistics that will ultimate define what's right for you. We recommend that you seek out a qualifed dealer who can offer you professional advice and guidance in finding a suit that fits correctly. Beginners should also consider special courses in drysuit diving and take the opportunity to make a try dive in a drysuit where offered.

For further advice and details, please visit our website **www.aquata.com.** Look under the category "Guide".

Direct **Link** (click here)

Shopping for thermal underwear, see next page.



What are you going to use your suit for?

A glued and taped seal of high qualty. There is a tight bond between the materials

Heat-sealed seams. It might be difficult to see the difference, but there is not the same degree of bonding

Checking the quality

Drysuits are not unlike other clothes, shoes or backpacks. Taking a closer look at the finish will tell you a lot about the build quality. Are there any loose threads or uneven seams? Is the material even? The seams are of particular importance because any leaks will arise here. Are they glued (and how) or heat-sealed? Glued and taped seals may look messier on the inside, but heat-sealing is a process whereby the material is welded together under high pressure and temperature, which might affect the materials characteristics locally and create cold bridges that are bands of low thermal insulation.

What to keep in mind when

Shopping for Undergarments

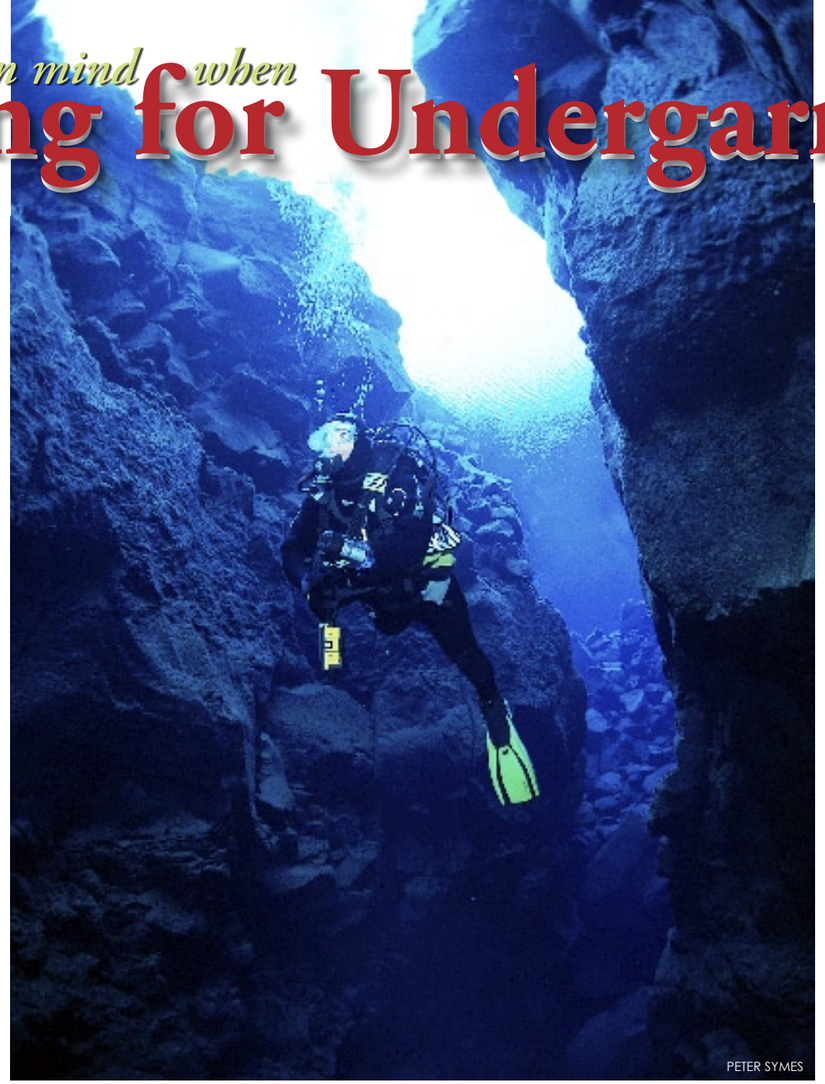
Hilary Child of Weezle Diving Systems has the following advice:

Any thermal underwear should be appropriate and 'fit for the purpose' for the diving being undertaken and flexible enough to be suitable for any diving being considered in the near future. It should also take into consideration the existing equipment such as which drysuit is being worn. When the desirable qualities of diving underwear comes into consideration, there are 3 W's: Warmth, Wicking and Washable

Warmth either through layering, trapped air, reflective heat (a combination of these) or even a mechanical process such as an electrical device, if the others aren't present.

Wicking The body releases water in the form of sweat even on cold dives, up to 12 litres in 24 hours in extreme circumstances but usually nearer to half a litre per day. In good undergarments, small suit leaks should be kept to the exterior of underwear often making the wearer unaware of a wet undersuit.

Washable & Fast Drying
if it is going to wick the sweat to the outer layer, it needs to be washable not only to make it less offensive after a couple of dives, but also to keep the efficiency of the wicking fibres. Fast drying removes the need for a tumble dry and means suit leaks can be dried between dives.



Diving the crystal clear glacial waters near Thingvellir, Iceland

Other good questions

1. Is the cost appropriate to the style and amount of diving being done?
2. How long will the suit last, giving good 'cost per dive' value?
3. Is it compatible with my existing equipment?
4. Reputation; What is the likely customer care back up from manufacturer?
5. Does the fit allow room for the dry suit and ease of movement for all diving drills and actions? Can you fit fins, climb a ladder and do valve isolation drills?
6. Is it well made and hard wearing?
7. Can I add to or reduce the thermal properties of the suit should my needs change?
8. If any diver is going to be wearing this for a full day's diving, is it comfortable?
9. Can it be packed away simply and small enough to travel with?
10. Does it match my eyes? :o) ■

Jim Standing of Fourth Element writes:

Thermal performance

Loft is not necessarily the answer to greater thermal performance. Whilst a thicker layer of air will be a better insulator, reducing conductive heat loss, the management of the air is a far greater challenge and often an irritation to a diver. The greater the amount of air needed to keep the undersuit "fluffed up", the more a diver will need to monitor the air and adjust the air in his or her suit with changing depth. Also, there is a greater risk of "floaty feet" with a larger quantity of air within the suit, and the wearer will be likely to need more lead to achieve neutral buoyancy—a problem particularly before and after the dive, above the surface. If your drysuit undersuit requires a lot of air in order to perform its function, it will require more management underwater.

Density

If something packs down to a small size relative to its size when in use, it is advantageous from the point of view of packing it to transport it, but it is also indicative of how easily it can be compressed during the dive. Generally speaking a dense material will not compact as much and therefore will not compress as much during a dive.

If your drysuit undersuit requires a lot of air in order to perform its function, it will require more management underwater.

Wicking

Ensure that you have a good base layer next to your skin. Ideally, this should wick away moisture from perspiration or suit leaks. Keeping the skin dry is crucial to the overall performance of the drysuit and undersuit. Some products wick via a chemical treatment, but this will wash out after a time. Others have a mechanical wicking process due to the precise knit pattern of the fabric. They tend to be more expensive, but their performance will last the lifetime of the garments. All "natural fiber" base layers have mechanical wicking properties, but the best wicking fabrics are the top end synthetics. These do tend to get quite smelly after prolonged use, so machine washability is also a key factor. Look out for branded fabrics such as Polartec and Goretex. They have a large R&D budget, which is well spent on producing high performance fibers that are effective in insulating the wearer more effectively with less bulk.

The best wicking fabrics are the top end synthetics

Layering

Layering is a solution to attaining greater protection without bulk. It's a tried and tested approach in other outdoor sports, and is just as effective under a drysuit. Think of the drysuit as the water proof outer layer. What you need is an appropriate combination of base layer and mid layer. Use a thermal baselayer with lighter weight undersuits, and a wicking base layer with the heavier weight suits to maximise moisture management. Better still, use a thermal wicking base layer —the best of both worlds.


PHOTO COURTESY OF NEREIS DIVE CENTER, RUSSIA

Price vs. Quality

Beware of undersuits in a range where the price increment is not that great between the different levels of protection. It means that the cost is in the garment rather than the insulating material used. If you see a suit that uses a good quality material, the increase in price between a 200g and 300g suit will be significant showing that using more of the insulating material contributes significantly to the overall cost, as the work to produce the suit itself will have remained the same.

Look good

Makes sure you look good too. James Bond wore a tuxedo under his drysuit. I don't think we have to aspire to looking *that* good, but we can come close! ■

Drysuits for Divas

Text by Cindy Ross
Photos courtesy of the manufacturers

THE NIGHTMARE: Emerging from a dive wrapped in a cold neoprene sponge, which needs to be peeled off of your pasty body, while onlookers gasp, as your swimsuit shows more of your bottom than it covers.

Enter the Drysuit...Diva Style

Drysuits come in all flavours. From vulcanized rubber (for the commercial dive diva) to compressed/crushed neoprene and heavy nylon shell suits. No matter how you choose to dry up your diving, there are some considerations GirlDivers must ponder, that the boys know nothing about.

These are not bikini's. Not sexy. Not sensual. But they are HOT! Hot in the best sense of the word underwater. So, we'll save the sexy black dress for post-dive activities, and realize that staying warm sometimes means sacrificing fashion. Be sure that your drysuit has ample room to add some layers, after all, no matter how tight fitting your suit, no one will see the 10 pounds you struggled to lose.

When will they ever learn?

Now, why would any self-respecting woman invest up to $2800 in a drysuit that makes her look like a sack of potatoes, or a badly stuffed sausage, or a boy? Some manufacturers simply place men's designs on women's bodies, or create dowdy flat-chested designs that don't acknowledge women's curves and cut the line of the leg across the widest part of the hips or thighs—a BIG No-No. Four words: *Hire a fashion designer!* Perhaps then we women will buy your drysuit rather than a Gucci bag.

LEFT TO RIGHT: Waterproof Sedna, Aqualung Blizzard, DUI FLX50/50 drysuit

Layering In order to achieve warmth with most drysuits, you'll need to layer a bit underneath the suit. The type of suit you dive will determine the extent of layering that is needed.

You will always need a base layer. This layer should be made of a wicking fabric to move moisture away from the skin through to the outer layer of fabric in your suit. One yummy solution for a base layer is long underwear made of silk. Silk is the warmest natural fibre and feels soft against your skin. It's the weave of the fabric which achieves the wicking properties, and most outdoor sports retailers will carry silk long underwear.

Why is the insulation layer always black? Whether fleece or a synthetic "down-like" fill, we should be able to add a bit of color with this layer. Go for pink. Or tangerine or lime-green. We aren't limited to black here. For ease in the head, you may want to try a two piece heavy weight fleece outfit. The synthetic filled undergarments are usually a one piece that make that visit difficult.

Digits & Crowns Most GirlDivers suffer from "my fingers and toes are cold" syndrome. It's just the way we're wired. To help with this malady, be sure to wear two pairs of heavy wool socks in your boots. For your fingers, go dry. Investing in dry gloves may be the best dive money spent. Even if, in the coldest of seas, your fingers get chilled in the gloves, by keeping dry they will rewarm almost instantly during your surface interval.

Don't forget your hood. Most of the heat lost in your body is through your head. Blood flows continuously through your body, and when it reaches your scalp, with no fat for insulation, it cools as it moves through those veins. Find the warmest hood you can. Going from a mediocre hood to a thick warm hood will provide a noticeable difference in the heat retention in the rest of your body.

LEFT TO RIGHT: TUSA X-PERT, Northern Diver (above center & inset) and Aqualung drysuits

Pee Valves and Relief Zippers Not really available to us. To consider a pee valve for a GirlDiver would be to consider "catheterization"...let's not. And while I've seen a female version of a relief zipper, I'm really not sure how that works with the layering of clothing underneath. A "male" relief zipper could work, if you use a FUD (female urinary device). This plastic device, recognized by the outdoor industry, is designed to allow females to pee in the woods. And while you can perfect the aim enough to pee on a tree, I'm not sure your boat mates would be impressed with your aim in the loo.

So, GirlDivers remain in the state of hydrated enough to have healthy dives, but not to the point of a full bladder. Note: this is a skill that takes time and patience to master.

Whether diving under ice caps or simply taking a plunge in your local quarry, drysuit diving insures that there is no season that GirlDivers need miss their time with the fish. And with these few considerations, this may be your most comfortable and colorful drysuit season ever.

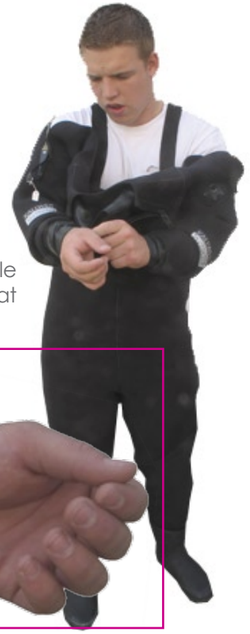
Scuba Lifestyle writer, soft goods stylist, and PADI Instructor, Cindy Ross is passionate about promoting the sport of scuba to females of all ages, all over the globe.
girldiver.com ■

Some manufacturers are more successful with designing for the female figure by acknowleging women's curves and creating a flattering line of the leg and bodice like this BARE Pro neoprene (but why the bull's eye circles around the knees?) and the TUSA X-PERT drysuit with flattering bodice cut (4th from right).

Donning a Suit

Pull up your boots and make sure that there are no folds in legs of the undergarments either

Put your fingertips together. Hold onto the sleeve of your undergarment until you gently push your hand out through the wrist seal. Use the other hand to ease it through and protect the seal. A little talcum usually helps. Make sure that there are no folds in the seal



Grab hold of neck seal with both hands. Take care that your nails don't tear seal

Pull outwards while you press your head gently through. Talcum will lessen the friction

And presto! You're reborn like a newborn babe. Make sure that seal lies even against the skin, with no folds or kinks

You might want to fold it down. In case of a neoprene seal, this is must to avoid water ingress

If you have a shoulder zipper, have your buddy help. Pull even and gently. Make sure that the undergarment doesn't get caught in the zipper

Cleaning & Storage

Rinse the suit off in freshwater after each dive, paying particular attention to the zipper. Never use washing powder, detergent or other household cleaning agent but use the specially formulated shampoos to get rid of salt, grime and dirt as well as bacterial build up. Keep the zipper lubricated with wax or liquid. Avoid using silicone or other greases. Cut of any loose threads and carefully seal the ends with the flame from a lighter. Neoprene suits are best stored hanging on a hanger, whereas membrane suits are best kept in their bag. Keep suits away from heat and out of direct sunlight.

Tip: Let the suit dry with the inside out first. If there is any bad odours, rinse it with one of the specially formulated agents. Never put a drysuit in a washing machine nor in spinner. Read the manual.

FROM DYKKERCENTERET (DK) WWW DYKCEN.DK

Seal Saver protects and conditions dry suit seals, gaskets, O-rings and rubber products

Fold your drysuit with your zipper pointing out. Avoid strains og kinks as this may damage the zipper

Stig Insuláns guide to perfect buoyancy control

Mastering Bouyancy in Drysuits

The following procedure will help you obtain perfect buoyancy control in a drysuit. It should be performed several times and in a comfortable environment. The goal is to master a controlled ascent without effort, similar to taking an escalator to the surface.

The starting point for these exercises is wearing enough weight to compensate for the gas pressure needed to force the exhaust valves open to vent expanding gas. The exhaust valve must also be properly set and located on the highest point on the suit or close to it, i.e. on the shoulder.

Basic buoyancy adjustments

Kit up in full equipment wearing undergarments suited for the water temperature. Adjust your weight belt accordingly. Enter shallow water with all your gear. Open the exhaust valve fully by turning it counter clockwise as far as it goes. This reduces the gas volume in the suit to the minimum by venting excess gas. While breathing normally, deflate your BC completely if you have any gas therein. Now, add or remove weights until you can hang feet down just below the surface touching it with the top of your head only. In this position, when you stretch your arms out horizontally in front of your chest the exhaust valve should be at the highest point of the suit (excl. the hood). The reason for this is when the exhaust valve is elevated, the water pressure will decrease and a spring loaded piston will automatically open and let out expanding gas.

Compensating for gas consumption

During a dive you will loose additional weight as you consume your gas supplies. To compensate for the extra buoyancy at the end of a dive more weights need to be carried. But how much? This requires a little calculation as detailed in the side bar "Calculating increase in Buoyancy", but even just a standard 12l cylinder (~80 cu feet) pumped to 200 bars will contain over 3 kg of air.

Adding some additional weight, say 1-1.5 kg, will allow you the option to do a safety stop with enough margin for comfort. Next, having added all the extra weights necessary, inflate your drysuit. Then slowly close the exhaust valve by turning it clockwise until you once more reach neutral buoyancy. Because you have more weight, you need more gas in the suit. In turn, this results in a slightly higher gas pressure that would otherwise just exit the exhaust valve if it hadn't been turned down.

Initiate the descent by exhaling and by elevating your elbow to cause some gas to exit the exhaust valve. (It can be aided by pressing the cover

Two happy campers in Lake Baikal, Russia. Make your first bouyancy adjustments by adding or removing weights at the beginning of the dive

PETER SYMES

Diving Membrane suits? Don't Use the BCD

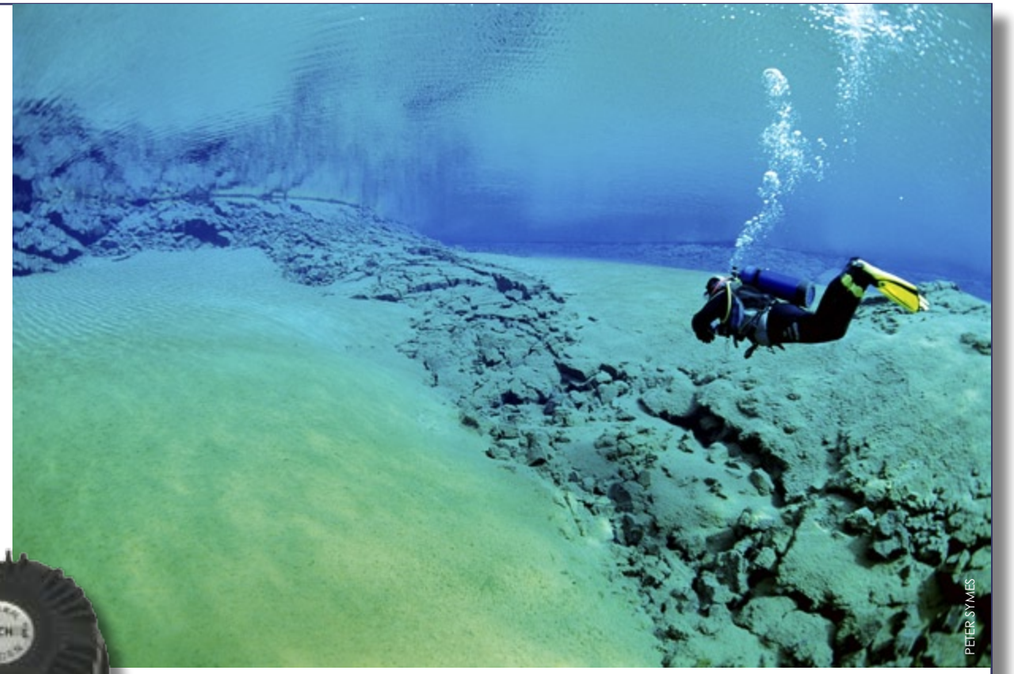
The BCD should remain empty during the bottom time of the dive and be used as a back-up buoyancy device only. The only, or primary, buoyancy device should be the suit. This also serves to reduce the task load—which is specially important during stressful sitations—and to focus on the proper buoyancy control through the suit only. The BCD should be kept empty at all times except while floating in the surface. However, some divers with neoprene suits favour also adding a little gas to the BCD during the shallow parts to avoid having excessive amounts of gas in the suits themselves. But that is beyond the main point, which is that you should be capable of controling your buoyancy through the suit alone.

Your buoyancy will increase while diving as you consume the gas through breathing. If you feel that the deflation capacity of the exhaust valve is insufficient, the reason may well be that you started the dive with not enough weight.

Setting the Exhaust Valve for Automatic Buoyancy Control

You can remain neutrally buoyant during a dive without resorting to manual inflation or deflation provided that the exhaust valve is correctly located at the highest point of the suit, that it is properly set and that you are wearing the correct amount of weight.

When you adjust the setting by turning the valve cover, a clicking sound or sensation will help you determine the fine tuning. When the valve is properly set, you will be able to fine tune the gas volume in the suit just by rolling the body on one side or by raising or lowering your elbow. The valve may need further fine-tuning during the dive depending on the duration of the dive and the suit material:



For reduced buoyancy:
Adjust counter clockwise (towards -) = lower pressure = less gas retained in the suit

For increased buoyancy:
Adjust clockwise (towards +) = higher pressure in the suit compared to ambient pressure = more gas retained in the suit

Once back in the surface, close all valves and inflate suit and BCD

of the valve forcing it open). Once you start descending, take your elbow down and start reinjecting gas into the suit in gentle squirts on the inlet valve to control the descent rate and avoid getting a suit squeeze.

During the dive

The suit should be used for buoyancy control at all times—not your BCD, which contains no gas at any stage of the dive. When diving drysuits the BCD is relegated to being a backup device i.e. in case your suits gets flooded and loses buoyancy. Do the fine tuning by adjusting the exhaust valve little by little in either direction by turning the valve's cover.

The ascent

During ascent or while changing depths during the dive, you can adjust the gas volume within the suit by rolling the body or by raising or lowering the elbow—provided the valve is properly set and you are correctly weighted. (Also see " Setting the Exhaust valve for Automatic Bouyancy control"). For slower ascent, raise the arm with the exhaust valve. The internal suit pressure will increase compared to the ambient water pressure on the valve. Gas will be vented faster and ascent rate will slow.

Post-dive buoyancy check

At the end of the dive, see if you are able to maintain neutral buoyancy at 3m with less than 50 bar in your tanks.

At the surface

To obtain maximum flotation and to preserve the insulating effects of the gas, close the exhaust valve fully by turning it clockwise all the way to a full stop. You can then add additional air for further inflation and insulation. Also you can now use your BC to help you float.

Stig Insulan is CEO of SI TECH, the renowned manufacturer of drysuit valves, gloves and other accessories. See ***www.sitech.com***

How to Calculate Expected Increase in Buoyancy

Compressed air (or breathing gas mix) has density. Two to three kilograms of gas is spent just on a typical recreational dive from breathing and inflating a suit or BCD. During technical dives gas consumption is often significantly more—and more than can be compensated for by wearing more weights. Therefore, on deep dives a technical diver will take on additional weights—which may be placed on the down line or handed over by a support diver—to counter for lost weight in gas. Ideally, one should always calculate the weight loss during a dive. For most recreational dives, most of us can do with a general setting, but once we move beyond that, it's time to do some calculations. Each dive is unique, but the diver should always have complete buoyancy control and make contingencies for deco-stops and unforeseen events,

In the following examples, metric units are used and the breathing gas is assumed to be air. Air weighs 1.29gr pr liter.

Example A:

A typical volume for a rental tank on a tropical resort is 10 liters. At a service pressure of 200 bar this tank can contain 10 liter x 200 bar x 1.29 gr/l = 2.6 kg air. This can be felt but most will manage with out any further ado.

Example B:

A technical diver elsewhere might carry a 2 x 12 l twin set charged to 230 bar. In this case, it carries (230 x 2 x 12) liters x 1.26 gr/l = 7.1 kg of potential weight loss.

In either case, add a maximum of 1500 g for the option of a decompression stop. ■

A good suit is when you have you had it for two years and you ask yourself if you would buy it again if you had to and the answer is yes
—John Womack,
Otter WaterSports

...summing it all up

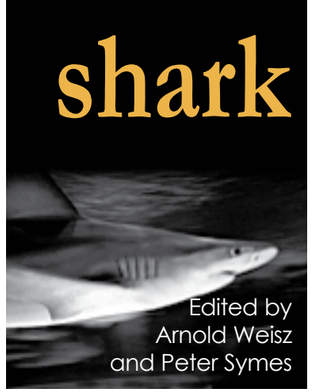
- Use a drysuit that fits and is suited for the dives you're planning
- Practice your drysuit diving skills under controlled conditions until they become second nature.
- Know your equipment and emergency procedures.
- Make sure your dive partner understands your drysuit system too.
- Check your valves, zipper and seals before each dive.
- Also wear a BCD and use it for surface flotation and back up.
- Use the correct amount of insulation for the water temperature you're diving in and your exercise rate.
- Water or air temperatures below 21°C (70°F) constitute cold water diving.
- Water or air temperatures below 4°C (40 °F) should be considered as ice diving. This comes with added hazards and requires special equipment, training, preparation and procedures.
- Know your limitations and do not exceed them.
- Complete a drysuit diving course from an instructor and stay current by practicing your skills ■

Go on a course - a drysuit specialty course

Diving drysuits is not difficult and a lot of dive suit divers have just started using them without any further ado or problems.

But they do require a bit more technique and skills so why not master these under the watchfull eye of a qualified instructor, who can help you settling into the correct habits. All the major training agencies offer some sort of drysuit specialty course.

Check with your usual diveshop or instructor.



Bits & Bites

EU To Lax Restrictions On Shark Finning

Launching a report about the dangerous decline in shark populations caused by European fishing policy, Shark Alliance expresses dismay at the European Parliament Fisheries Committee's push for weaker restrictions on shark finning.

In their report, entitled "Shark Alert: Revealing Europe's Impact on Shark Populations," details the depletion of European shark populations and threats to global populations as a result of European Union (EU) policy. Highlighting shark finning as a major and escalating threat, the Shark Alliance stresses that the EU finning ban is already fraught with loopholes and urgently needs tightening rather than weakening.

"The EU finning regulation is already one of the weakest in the world," said Uta Bellion, coordinator of the Shark Alliance. "This is a classic example of how the fisheries and policies of the EU dominate global policy and affect the marine environment around the world. If the EU permits this restriction to be weakened, it will be a license to fin and may well be actively copied by other nations and international bodies."

"The EU finning regulation is already one of the weakest in the world"

One third of European shark, skate and ray populations assessed, now qualify for the IUCN (World Conservation Union) Red List of Threatened Species, with another 20 per cent considered at risk of becoming so in the near future.

Europe plays a major role in the global catch and trade of sharks. In 2003, Spain was the world's largest importer of shark products, the second largest exporter, and had the fourth largest catch of sharks. Other EU members also contribute significantly to global shark fishing and trade.

SOURCE: SHARK ALLIANCE

Costa Rican Supreme Court Says Shark Policies Have Been Unconstitutional For Years

Pretoma wins important legal victory in the battle against illegal shark finning as Costa Rican Supreme Court ruling slaps government for putting shark populations at grave risk by shielding illegal shark finning.

ROB STEWART / TORTUGA MARINA

The Court also ordered the immediate halt of all landings of shark products at private docks, unless they are equipped with public installations and ideal conditions to exert controls and protect the public interest, writes the environmental organisation Pretoma from San José, Costa Rica

Likewise, the Court confirmed that the National Fishery Department, the Customs Department and the Ministry of Public Works and Transportation, have abdicated their constitutional duties by implementing policies which have endangered shark populations. While not a defendant in the case, the Ministry of Environment was ordered to guarantee compliance with environmental legisation at the private docks as well.

ROB STEWART / TORTUGA MARINA

The case was filed 2.5 years ago by Pretoma because national law states that foreign vessels must land at public docks, to ensure the protection of the public interest. Yet since the first foreign vessels arrived to Puntarenas in 1998, the Costa Rican government has been allowing them to land at private docks, facilitating shark finning and promoting overfishing. The authorities argued that state infrastructure does not exist where foreign shark vessels can land but the Court ruled that "*the lack of resources is no excuse for such institutions to avoid complying with the law. A 'material impossibility' does not justify indifference on behalf of public authorities in the application of their elemental obligations.*"

At Puntarenas Pretoma documented massive illegal landings of shark fins by foreign vessels at the private dock. "We should point out that a perfectly good public dock has existed for years in Golfito, but oddly the State disregards its existence," explains Jorge Ballestero, Vice-President of Pretoma. "So the argument that State infrastructure is lacking simply doesn't hold water."

"The Court ruling shows that Costa Rican shark fishing policies over the last years have been tailored to meet foreign shark fin interests"

The public dock in Golfito has plenty of available spage

"The Court ruling shows that Costa Rican shark fishing policies over the last years have been tailored to meet foreign shark fin interests," confirmed Randall Arauz, President of Pretoma.

"The authorities seem to be dragging their feet to comply with this ruling, because of which I call on President Oscar Arias to end Costa Rica's reputation as a country which hands over resources to foreign interests, simply by ordering his Ministers to comply immediately with the ruling of the Court and urge protection of regional marine resources."

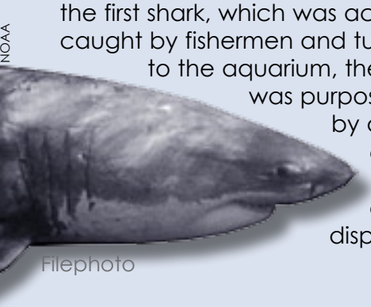
SOURCE: PRETOMA - WWW.TORTUGAMARINA.ORG

Monterrey Bay Aquarium Gets Another Great White

California - The Monterey Bay Aquarium has put another great white shark on display in its Outer Bay exhibit.

In 2004 and 2005, a female great white shark was on display in the aquarium's Outer Bay exhibit for approximately six months and became ``the most powerful emissary for ocean conservation in our history,'' according to aquarium Executive Director Julie Packard. Attendance at the aquarium increased by approximately 30 percent, to more than 1 million people, during the 198 days the shark was on display.

The new shark on display is a 5-foot-8-inch male weighing approximately 104 pounds. He was caught on Aug. 17 in Santa Monica Bay. In contrast to the first shark, which was accidentally caught by fishermen and turned over to the aquarium, the new shark was purposely caught by aquarium animal husbandry experts for display.



NOAA

Filephoto

A window into the secret lives of White Shark

A new shark research project by the German-based Shark Project which will employ a mini-submarine to film the great white sharks swimming off the South African coastline in the hope of getting footage of sharks mating and birthing. The mini-sub has room for a pilot and a photographer/scientist. Emphasising that negotiations were still proceeding, Marine biologist Hermann Oosthuizen, of the Marine and Coastal Management branch, said there could be many spin-offs from this venture. Researchers from the Natal Sharks Board and Iziko Museum in Cape Town will also become involved, because Shark Project will be working closely with local scientists on the project. Marine and Coastal Management will co-ordinate all the research.

STATE OF HAWAI

Canada Satellite Tags Blue Sharks

Researchers in Nova Scotia are hoping that tracking a single female blue shark by satellite will help them protect the entire species, which has been in decline in recent years. Earlier this year, the scientific Committee on the Status of Endangered Wildlife in Canada recommended the blue shark be listed as of special concern.

By tracking the tagged female, Warren Joyce, a researcher with the federal Department of Fisheries and Oceans, wants to learn where large female sharks gather so he can protect the area from fisheries that often kill the sharks by accident.

Such accidents are reported as the main cause for the species' decline, but Joyce said learning more about mature females might make life easier for the younger ones too.

"We don't see any mature female sharks up here in our waters, and we just don't know why they're not up here," said Joyce.

"It might just be that the mature females are going other places to protect themselves or protect their young against mature males who are very aggressive when it comes to mating practices, or even just larger sharks feeding on the small sharks when they're born," he said.

That tag through her dorsal fin will allow him to track the shark for the next year.

Tope to be protected

THE FISHERIES AND FISHERIES INDUSTRIES OF THE UNITED STATES

UK's Department for Environment, Food and Rural Affairs has published proposals to stop new fisheries targeting tope - a large coastal shark. The fishery never materialised, but the department remains concerned that any future plans for catching tope would be unsustainable because of the shark's life-cycle.

Marine and Fisheries Minister Ben Bradshaw said: "There isn't a targeted fishery for tope in our waters at the moment, but it's important that we decide now how we can ensure tope remain a sustainable resource. Tope can live for more than 50 years but they don't mature until around the age of 12. Even then, they produce a relatively low number of pups compared with other marine species, typically 20 every two or three years.

"This life-cycle makes them very vulnerable to fishing pressure."

There are two, not one, species of Wobbegong

The wobbegongs were, until recently, considered a single species. Although Orectolobus halei was described as a distinct species by Whitley in 1940, a lack of specimens available for comparison saw it being placed into synonymy with the related Orectolobus ornatus. Charlie Huveneers from Macquarie University in Australia has now shown that the two fish are indeeddistinct species, so he's elevated the status of halei back to species level once again.

WIKIPEDIA/ RICHARD LING

Orectolobus ornatus is a different colour to halei and reaches a smaller adult size. It also has fewer dermal lobes at the posterior preorbital group, as well as a number of other anatomical differences. It also has a longer pelvic fin to anal fin interspace, smaller pectorals, a smaller head and smaller claspers than halei when mature.

Help Protect North Carolina's Sharks from Finning!

by Willy Volk

Hammerhead Quasimodo is dead. In the Seychelles, once-plentiful shark populations are declining rapidly, due largely to increasing demand for shark products -- mainly fins -- from Asia. But those sharks are all far away, right? Guess what? According the Ocean Conservancy, North Carolina is (quite unbelievably) considering relaxing its ban on shark finning:

"Shark finning prohibitions were first adopted for the U.S. Atlantic and, with your help, have spread to the U.S. Pacific, many other countries, and most of the world's international waters. But now North Carolina commercial fishermen are attempting to reverse this progress by relaxing shark finning rules. We need your help to block this troubling maneuver. Lawmakers need to hear that the public, especially those from North Carolina, still strongly opposes the finning of sharks. Please take action today by urging your U.S. Senators to keep the shark finning ban strong."

(Despite laws protecting sharks, it seems some NC fishermen are ignoring the rules altogether.) If you are opposed to North Carolina relaxing its rules on shark finning, head to the Ocean Conservancy immediately, get some more details, and click the blue "Take Action" button. You'll be taken to a form that will enable you to send a pre-formatted email to your representatives, telling them you oppose this absurd proposal. Don't worry if you're not a resident of North Carolina -- you can change the text to read "As a visitor to North Carolina," or "As a concerned American," etc. I did it. Did you?

Test-tube Sharks planned

Keeping squabbling children apart is a problem that taxes all parents, but for the grey nurse shark it is a little more serious. Its embryos have a nasty and potentially species-threatening habit: In the womb, they engage in a survival-of-the-fittest orgy. This intra-uterine cannibalism means that despite starting a pregnancy with up to 40 embryos in her two uteruses, a female shark only gives birth to two pups. This is a real headache for Australian conservationists trying to save the species from extinction.

Australian scientists at Cronulla Fisheries Centre in New South Wales may now have the answer: Before they start attacking each other the babies will be flushed out of the uterus and into separate tanks - a prototype artificial uterus, in the shape of a 1-metre-long test tube whcih is to be filled with a yet-to-be developed artificial uterine fluid.

All photos courtesy of the manufacturers

POINT & CLICK ON BOLD LINKS

Cool Fall Duds & Doodads for Divers

Dive Fashion

Dive Diva GirlDiver is promoting the scuba lifestyle for female divers all over the world. Dive Diva shirt: $24.95. Clothing, accessories and informative articles available at **www.girldiver.com**

Barefooting
Discover the exhilarating joy of going barefoot without leaving yourself naked with Vibram Five Fingers, an entirely new kind of footwear that offers the protection of a second Vibram skin and gives the feeling of gently separating each toe while stimulating and exercising the foot muscles with every step. Comes in black and black/gray/orange combination. Price: US$70.00. **www.vibramfivefingers.com**

Maneater spagetti strap tank for women from Amphibious Outfitters doesn't mince words when it comes to diet preference. Price: US$17.95 plus shipping and handling. Check out their new tint on tint designs for both men and women at www.**aoshirts.com**

Kids Only World
Surfing dolphins tie dye children's short sleeve t-shirt. 100% preshrunk heavy weight cotton. Youth shirt has front artwork only. Price: US$11.95 **kidsonlyworld.com**

Super Slimming suit by Carol Wior®. Designed with black and white slash insets at the sides help create your slimmest dive bod ever! Soft-cup bra and wide straps that crisscross at the back give maximum lift and support. Nylon/spandex. Misses Price: US$59.99. Sale: $44.99. **metrostyle.com**

Got Gas GirlDiver does not neglect the gents. With this Got Gas t-shirt for men, techies can leave 'em wondering... $24.95 at **girldiver.com**

fashion

Stylin' Dive Threads

Sharks!
Kids Only World has some tees with a bite to them. Break-through Shark (left) childrens 100% cotton short sleeve hand dye t-shirt and Great White Shark with mouth open wide (right) chil-drens 100% cotton short sleeve hand dye t-shirt. Price: US$12.95 each. **kidsonlyworld.com**

SevenTenths New Divin' Styles
Vintage Scuba '43 (above) Women's Skinnyfit Tee has Retro tropicana banana-republic style celebrating the arguable birth-year of Scuba, 100% cotton with vintage distressed print for that authentic worn-in look. Price: €29.95. Men's tee (left) with Invaders character goes techie style in a silver-grey reflective print on matt black or battleship-grey on misty green. Heavy-weight T-shirt, 100% ringspun cotton with taped seams. Price: €29.25 **www.seventenths.com**

Fourth Element
Top quality, style and elegance in casual ap-parel for divers. Manta tee (left) for men in cocoa. Price: £19.95. Manta 3/4 Sleeve for women (inset) in white and ocean blue. Price: £19.95. HMS Vest for women (top right) in black and white stripes. Price: £17.95. Ionian hooded longsleeve tee in vintage pink (right inset) for women. Price: £39.00. **www.fourthelement.com**

New Dive Junkie Tees
Ladies tube top, 95% cotton, 5% span-dex, comes in green and gray with logo, one size fits all. The Scuba Kit t-shirt (right) is inspired by those fa-vorite assembly-only kids' toys. Comes in pebble gray and island green. The Surface Interval t-shirt (bottom right) comes in white. Both tees are 100% fully combed cotton, Lycra-ribbed collar, 200 gsm pre-shrunk fab-ric, re-inforced stitching at shoulders and seams. **divejunkie.com.sg**

Water Girl from Patagonia
Long-Sleeved Dolphins In Mo-tion in aubergine and Bubbler in beach glass are soft, or-ganic cotton tees with original artwork, generous crew neck, contoured silhouette, and gently tapered sleeves for a non-binding, feminine fit. Per-fect for beach-coming after a dive. Price: US$28.00 each. **www.watergirlusa.com**

fashion

Jackets for the boat ride & the beach

Fleecy Things Fourth Element's Fleece pull-over for men in charcoal (above) and Icelandic Fleece jacket with zip-up front for women (left) keeps divers toasty warm after a dive into the deep. Price: £64.00 **fourthelement.com**

Tiki 3mm Apollo Wetsuit Shoe This high performance reef shoe features holes for water drainage, glued and blinstitched for durability and warmth, adjustable ankle strap for comfort and fit, flexable rubber sole increased responsiveness. Price: £23.00 **www.tikisurf.co.uk**

Water Girl Whirlwind Jacket Get out of the teeth-chattering cold sea and into the welcoming warmth of a fleecy hood that heats your soggy head and feels soft against chilled cheeks, while the feminine fit hugs your core. Beach Glass/Bluegrass, Alpaca Brown/Boulder Brown, Hot Ember/Chili, Natural/ and Beach Wood. Price: US$88.00 **watergirlusa.com**

Gul Newport Jacket for men. New GCX2 EVO fabric, minimum weight, breathable, waterproof, windproof, heat taped seams, mesh lining, lightweight performance and comfort, high visibility fluorescent hood with 3-way adjustment stows in high coastal collar with Quick-Dry lining, high visibility Gul prismatic reflective strips on shoulder and cuff, lifejacket loops, secure communications inner chest pocket, inner storm cuff for near dry seal, Quick-Dry hand warmer pockets, Self-draining cargo pockets. Eclipse/ Navy, Flame Red, Steel. **Gul.com**

Monsoon Jacket► Don't let a little rain or a few sea swells dampen your diving day. This jacket from Isis offers the best performance-driven protection for active women in a lightweight, waterproof, breathable and highly packable rain jacket with athletic styling enhanced by reflective piping so you will stay cool, dry and visible when the weather turns for the worse. Comes in honeydew, shark, sangria, wave. Price: US$120.00 **www.isisforwomen.com**

◄The Windy Seas are expert at whisking heat away from your core. Patagonia Puff Bowl Jacket is an insulated, freeriding jacket for full-on storm protection. Combats cold with 2-layer waterproof/ breathable shell with lightweight, supple Thermolite® insulation. A lining of stretch taffeta glides easily over layers, exterior fabric's durable dobby weave resists abrasion and sharp edges, removable hood is helmet-compatible and two-way adjustable, chest and left bicep pocket have zipper closures. Men's sizes available in orange jolt, alpaca brown, black, hot ember, deep blue and women's sizes in batik blue, black, elderberry and starfruit. Price: US$279.00. **Patagonia.com**

L.L. Bean's Stowaway Rainwear®, Parka for women, guaranteed waterproof and breathable rugged Gore-Tex rainwear, will to keep you dry in extreme wet weather or rough seas on the dive boat. It's lightweight and packable (stows in its own pocket), knee length for increased coverage when seated. Aegean Blue, Alpine Gold (shown), Carbon, Colonial Red, Green Tea, Plum Grape, Trillium Red, Ultramarine and Vapor Gray. Price: US$169.00 LLB**ean.com**

New Purist Jacket► for men by Patagonia is lightweight, compressible and made from R3® fleece, a mix of long fibers to provide more loft with less bulk, and shorter, dense fibers to improve insulation and wind-resistance. Supersoft R1® lines collar, cuffs and hem for skin comfort and moisture-wicking. A Supplex® nylon chin flap protects neck from heat-stealing wind. Price: US$130.00 **Patagonia.com**

fashion

Drybase for Drysuit Diving

Patagonia Capilene® 4 Wrap Neck Top & Bottoms for women are each a low-bulk but highly insulative performance base layer for activities in cool to very cold conditions. Can also be worn as outerwear. Capilene 4 is the warmest of the moisture-wicking Capilene fabrics, which are the best option for high-sweat activities and wet conditions. It features an inside-facing grid pattern that disperses moisture, aids in compressibility, dries fast and retains warmth in cold conditions. Made from 50% recycled-fiber polyester from the Common Threads Recycling Program, with Gladiodor™ natural odor control. Sleek feminine fit. Colours: Ocean Blue Heather, Beach Glass Heather (shown), Black, Elderberry Heather, Petal Pink. Price: US$75.00. Bottoms come in Ocean Blue Heather and Black. Price: US$65.00 **www.patagonia.com**

Helly Hansen base layers keep you warm and dry. The Hurricane Windproof Longsleeve Shirt (left) cuts through the wind. It is designed to hold heat where you need it and block wind from the front so you never feel the wind through your clothes. Seamless Top has fewer seams for less friction, more mobility and lower weight. Built with HH Dry fabric that keeps you warm and dry even during high intensity activities that require maximum transport of extensive moisture. With LIFA® stay dry technology ™, HH DRY acts like a second skin, which wicks moisture away from the body and to the next layer, so you can stay comfortable and active longer. **hellyhansen.com**

Cotton Doesn't Wick

Divers who wear cotton t-shirts underneath their undersuits may actually feel colder and less comfortable than diving without them. As a fabric, cotton aborbs and holds persperation and moisture next to the skin. It can feel cold, clammy and uncomfortable. The new high wicking features of Fourth Element's Drybase underwear system for drysuit diving make these garments an ideal alternative to cotton underwear and t-shirts. With Drybase, skin keeps dry and divers are much more comfortable during and after a dive. Drybase Longsleeve Men's Top (left) Priced £37.95 and Drybase Women's Vest (right) Priced £33.95 F**ourthelement.com**

Patagonia Wool 4 Base Layer Crew for men is Super warm, 100% chlorine-free wool pull-over baselayer for active use on cold to very cold days or as outerwear. Price: US$115.00 **Patagonia.com**

Men's Wool 3 Crew A soft, medium-weight, 100% chlorine-free wool crew base layer for endurance activities in moderate to cold temperatures. Price: US$92.00 **Patagonia.com**

Capilene® 3 Henley for men is a smooth, high-performance first or second layer great for activities in a wide range of temperatures. Side seams and the single-piece shoulder yoke merge safely out of the way of pack or straps to prevent chafing. Made of 64% recycled (and 100% recyclable) polyester from the Common Threads Recycling Program, with Gladiodor™ natural odor control. With a smooth exterior, easy layering, sleek fit, improved performance. Colours: Stainless Heather/Whale Blue, Boulder Brown Heather/Alpaca Brown (shown), Black and Classic Navy. Price: US$50.00. Men's Capilene® 4 Bottoms (top right) are a highly insulative but low-bulk performance base layer ideal for active legs in very cold conditions comes in Black and Black Heather. Price: US$65.00 **Patagonia.com**

fashion

Dive Watches

Citizen Men's 200 Meter

Professional Diver Titanium Watch AT0100-51A has quartz movement, Eco-Drive—no battery changes needed, 60 minute chronograph, low charge and time reset advisory, luminous hands and hour markers, date display, 150 day power reserve, racheting titanium bezel, screw-down crown, screw-in caseback, titanium band, safety-fold-over-clasp-with-push-button. PRICE $188.89 **www.amazon.com**

Citizen Men's 300m Eco-Drive

Professional Diver Titanium Watch BJ8040-01E has reinforced urethane band with extendor for drysuits, salt corrosion resistant hypo-allergenic titanium case, buckle clasp, scratch resistant 6mm curved mineral crystal, analog-quartz movement. Water-resistant to 300m/990 ft. Mixed gas diving, ratcheted elapsed-time titanium bezel, helium gas release, extra large luminous hands and dial markers, date function, powered by light, 180-day power reserve, recharged in 1.5 hours. PRICE: US$279.00 **www.amazon.com**

Invicta Men's Russian Diver

Watch 2625 replica of an original 1959 Soviet diving watch is water-resistant to 100m/330 ft. Genuine leather band, polished stainless-steel bezel and case, buckle clasp, mineral crystal, mechanical-hand-wind movement, luminous hands and markers, oversized screw-in crown with a protective cap, spare black dial background, Arabic numerals in neo-modern font, CCCP markings. PRICE: US$575.00 **www.amazon.com**

Citizen Women's 300 Meter

Eco-Drive Professional Diver analog watch never needs a battery, uses Citizen Eco-Drive technology: harnesses the power of light-from any natural or artificial light source, converts it into energy stored in an Eco-Drive energy cell. Recharges continuously. Water resistant to 300m. Mineral glass crystal. Stainless steel case. Rubber strap. Buckle clasp. Grey dial. Screw-back case and screw down crown. Date. Luminous hands and markers. PRICE $209.00 **www.amazon.com**

Omega Men's Seamaster 300M

Watch # 2594.52 with stainless-steel band, bezel and case, black dial, scratch resistant anitreflective-sapphire crystal window, luminous silver Dauphine hands and thick baton dial markers, 42-hour power reserve, screw-in caseback, screw-locked crown, self-winding-automatic movement. Calculate dive time.Water-resistant to 300m/1000 feet. Highly accurate. Powerful chronograph offers 12-hour, 30 minute and 1/10 second subdials. PRICE: US$2765.00 **www.amazon.com**

Omega Men's Seamaster

300M Watch #2561.80 from the James Bond collection has stainless-steel band and case material with brushed/polished rhodium-plated finish, blue dial with anitreflective scratch resistant domed sapphire crystal window, analog-quartz movement, luminous hands and dial markers, date display, screw-in caseback, screw-locked crown. Water-resistant to 300m/1000 ft. Helium escape valve allows helium to escape at high pressures. Calculate dive time with aluminum unidirectional bezel engraved with graduated scale. Price: $1,089.00 **www.amazon.com**

St Moritz NEREOS

Dive planning and timing made easy! Time, day and date, with alarm and 1/100th second chronograph, precision depth gauge, automatic bottom timer, water temperature monitor, programmable depth alarm, programmable bottom time alarm, ascent rate alarm, dive log for easy recall of all data from last four dives. PRICE: US$299.85 **www.amazon.com**

Luminox Navy SEAL Dive Watch 3900 Series II

Developed for the Navy SEAL's, meets military specifications of all branches of the US Armed Forces, fiberglass reinforced polyester injection molded case, stainless steel plate case back secured with stainless steel screws, double gasket crown/stem confers water resistance of 20atm/200m/660ft, unidirectional ratcheting bezel features bright traser "dot" encased in aluminum housing protected by sapphire glass window, tempered scratch resistant mineral glass crystal, multi-jewel Swiss quartz movement with date function, end of life (EOL) feature and four year battery life, new signature nylon/velcro pullback strap with navy SEAL and Luminox logos, new bezel format and new bold font military numeral dial design, choice of black, blue, yellow, khaki and forest green dial. PRICE: $194.95 **www.amazon.com**

Seiko Men's "Black Monster"

21-jewel automatic movement watch with analog day and date display, luminous/white hands and markers, white numbers and small markers, stainless steel band, crown, caseback and bezel with black numbers and markers, hardlex crystal, winds itself with the motion of your wrist, so it never needs a change of battery. elapsed time. Designed for diving: water-tested to 200m/660ft. It meets ISO standards and is suitable for scuba diving. PRICE: $153.00 **www.amazon.com**

Luminox Navy Seal Women's Watch with Rubber Band

Finally one for the women! A smaller version of the original Navy Seal Watch, this Ladies (3/4) Size Navy Seal Dive Watch was designed in conjunction with and supplied to the US Navy SEAL Dive teams. Rigorous Military testing earned it official qualification for use in the US Army and US Navy as well as all branches of the armed Military services. PRICE: $194.95 **www.amazon.com**

fashion

Swimwear from the East & West

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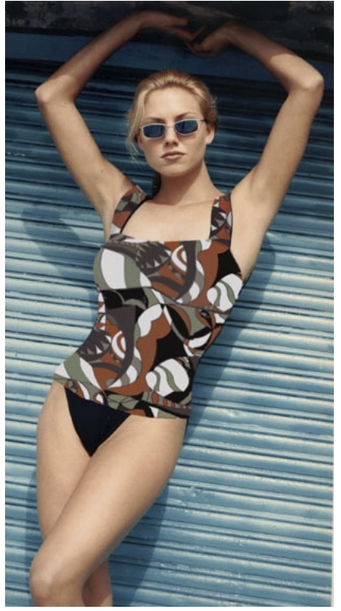
Get inspired by top athletes in water-sports at Speedo. Check out their gallery of smart looking swimwear, for both women and men, made from high performance fabrics that live up to the challenge of serial immersions and exposure to the elements as well as repeated exposure to chlorine in the pool.
www.speedousa.com



ZOGGS

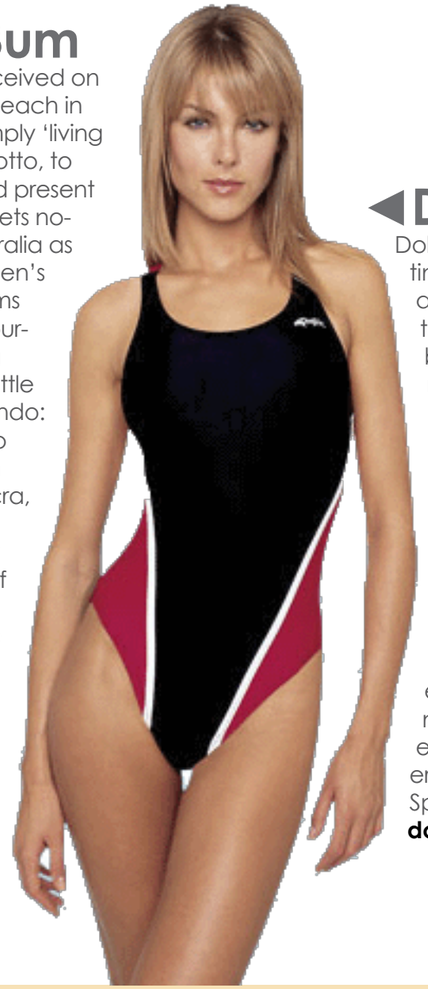
An Aussie original is now 'swimming all around the world'. Zoggs staff cares deeply and passionately about what designing highly innovative, quality swimming equipment and swimwear. Flinders Racer and Hip Racer Marine Performance CR25™ 47% PBT/53% Polyester.
www.zoggs.com

Bondi Bathers ▶

Chloe geometric print swuimsuit for women. Model 1119. Price: US$112

◀aussieBum

aussieBum was conceived on the shores of Bondi Beach in Sydney Australia. Simply 'living the dream'is their motto, to be independent and present gear in a way that gets noticed. Known in Australia as the 'Spinal Tap' of men's swimwear, aussieBums say, "If you doubt yourself, wear something else." Prepare for battle with Scuba Commando: Alpha, Charlie, Bravo (top left) made from 72% Nylon & 28% Lycra, features a unique scuba diving military print. Retro Bones surf shorts (bottom left) are perfect for those that dare to bare all with a tough skull design on side panels. **aussiebum.com**



◀Dolfin

Dolphin founder, John Hoff, was sitting by a pool one day fifty years ago, and overheard lifeguards talking how they were missed being able to buy their favorite racing briefs from Australia. Being the innovative enterpreneur that he is, Hoff realized that the same nylon tricot fabric he used to manufacture women's lingerie could be used to make these treasured guard suits. The next weekend, Hoff outfitted all of the lifeguards and launched his new swimwear business called Dolfin. Today, Dolphin outfits dozens of NCAA team champions, numberous state champions and even some world record holders. Sizes 22-40. 80% Nylon/20% Spandex, fully lined.
dolfinswimwear.com

Seafolly
Swimwear

A beautiful new line of swimwear for women from the land down under. Check out the new models coming soon in ther online gallery at:
seafolly.com.au

Dolfin Racers & Jammers for Men

'Cosmos' & 'Shatter' **www.dolfinswimwear.com**

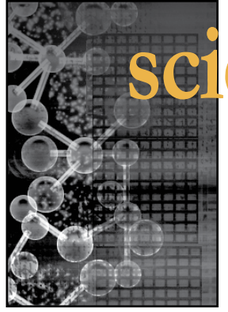
Coloured Water

Text by Michael Symes
Photos by Peter Symes

No! I am not talking about American beer but about ordinary clean water, water that should come out of your tap.

From the air, shallow coastal sea-waters above white sands often appear to be blue or green, most of this colouring being due to either reflection from the sky or from organic growths such as chlorophyll-containing algae. A glass of tap water, on the other hand, seems to be colourless, yet divers know that water has a definite blue tinge below the surface.

Water is, in fact, blue in colour, albeit a very pale blue.



science

This colour arises from very weak absorptions at the yellow-red end of the electromagnetic spectrum. The visible part of this spectrum stretches from the UV region, starting at a wavelength of about 380 nm, to the start of the infra-red region, at about 770 nm. These are the wavelengths that can stimulate the retinal cells of the eye and which give rise to the perception of colour. Each wavelength has, of course, a corresponding frequency. For visible light these frequencies are given in the table.

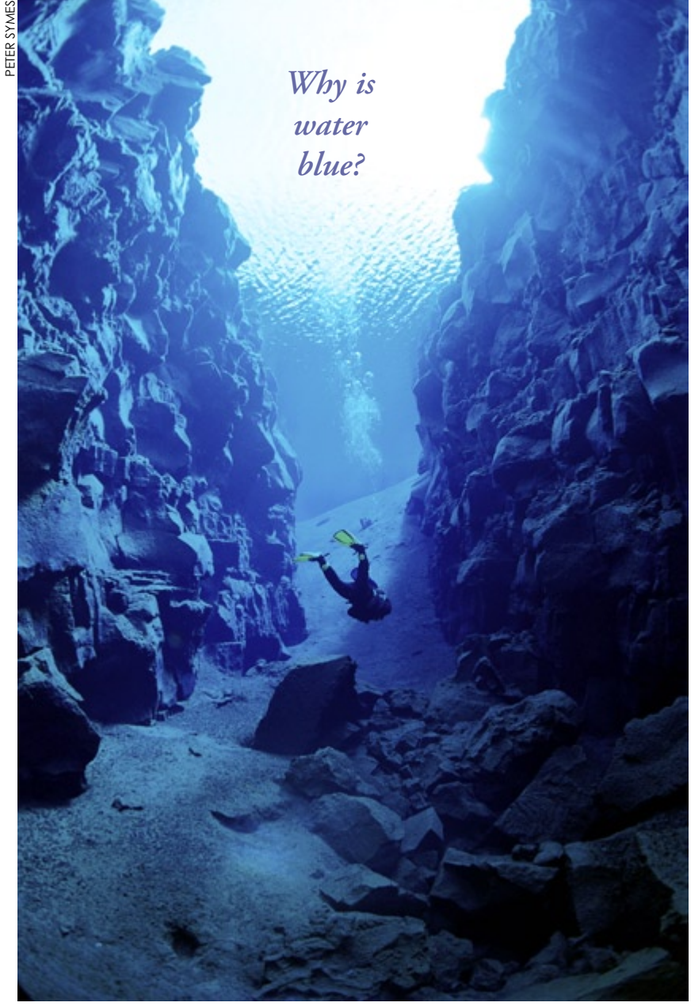
Colour	Wavelength nm (10^{-9}m)	Frequency 10^{14} sec^{-1}
Start of Infra Red	**770**	**3.89**
Red	**700**	**4.28**
Yellow	**600**	**5.00**
Green	**500**	**6.00**
Blue	**400**	**7.50**
Start of Ultra Violet	**380**	**7.89**

Molecular Vibrations

Now, absorptions occur when a molecule can vibrate in harmony with the radiation falling on it. Thus, if a water molecule can vibrate at a frequency of about 4.28 x 10^{14} vibrations per second then light having this frequency, which has a wavelength of 700 nm, and which is perceived as red, will be absorbed by the molecule. *And if you remove some of the red light from white light then it will appear bluish.*

White light is made up of all colours in the visible spectrum. Remove the reds and you are left with the blues.

PETER SYMES



Thingvellir, Iceland

We can illustrate this with the example of water. The absorption coefficient of water at 700 nm is 0.006 cm^{-1} i.e. 0.6 % is absorbed per cm. This means that for a glass of water in which the thickness of the water is 6 cm, the intensity of the transmitted light of wavelength 700 nm will be 96.5 % of the initial intensity, with just 3.5 % of it being absorbed. This small change in the composition of the light is hardly observable.

On the other hand, however, with a thickness of 5 meters of water the transmitted light of 700 nm wavelength will only have an intensity of 4.98 % of that of the incident light i.e. 95.02 % of it will have been absorbed. Removal of so much red light will give the water a distinctive blue tinge.

Amount of light absorbed

To find the total absorbtion of light over a passage-length of l cm we use Lambert's Law, which states that each layer of equal thickness absorbs an equc fraction of the light which traverses it. The constant a is called the absorption coefficient, and is defined for a given unit of length and a given wavelength. Lambert's Law can therefore be expressed in the equation:

$$I_l = I_o e^{-al}$$

Where I_o = intensity of incident light and I_l = intensity after passage of length l.

The intensity of the transmitted radiation thus falls exponentially with the thickness of the substance being transversed.

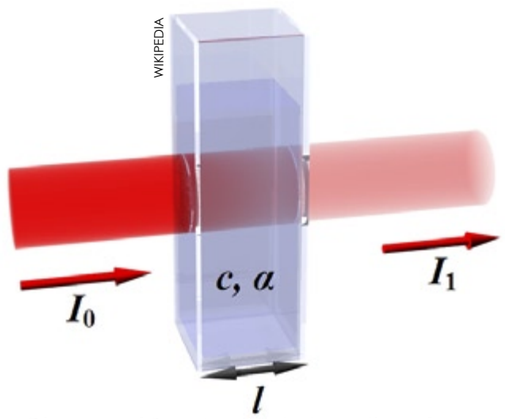
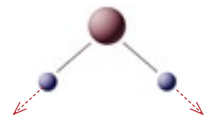


Diagram of Beer-Lambert absorption of a beam of light as it travels through a cuvette of size l.

How Do These Absorptions Arise In Water?

A free water molecule has three basic vibrations. These are:

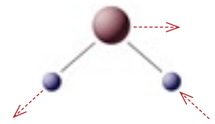


(I) The symmetrical stretch, v_1

This has a vibrational frequency of 1.05 x 10^{14} sec^{-1}

(II) The symmetrical bend, v_2

This has a vibrational frequency of 0.48 x 10^{14} sec^{-1}



(III) The antisymmetrical bend, v_3

This has a vibrational frequency of 1.14 x 10^{14} sec^{-1}

The mean H–O bond-length in the water molecule is 0.096 nm.

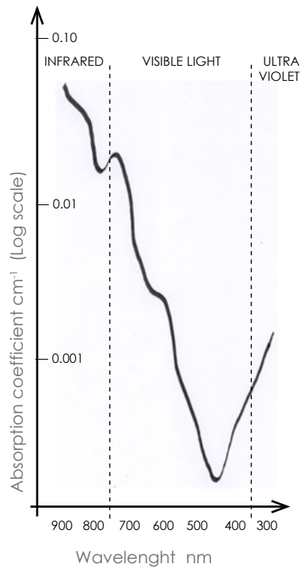
Harmonic overtones

From the table above it will be seen that these frequencies lie well below those of the visible range. However, there can be both overtones, or harmonics, and also combination tones, of these frequencies, given by (av1 + bv2+ cv3), where a,b,c are integers not all = 0. For example, 2 v1 will be an absorbable harmonic, giving an absorption at 1428 nm, which is still in the infra-red region. For such vibrations to lie within the visible range there would have to be very high harmonics such as v1 + 4v3 , which would give an absorption at 534 nm, a green wavelength. At any one time, however, there will be only a relatively few molecules with these complex resonances. These will therefore be too weak to be detectable.

The influence of hydrogen-bonding

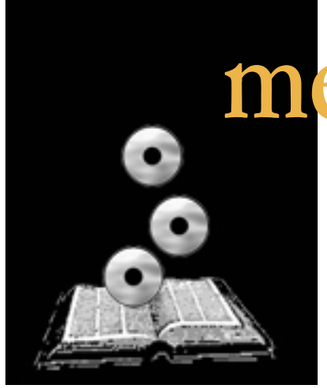
We have previously had occasion to refer to the effect of hydrogen-bonding on the properties of water. Here, hydrogen-bonding causes a stronger bonding in the molecules of water which, because strong bonds resonate at higher frequencies than weaker bonds, raises the frequency of the vibrations. The resulting absorption spectrum is quite complex, with many bands in the infra-red but now also with some weak absorption bands reaching into the red end of the spectrum. It is these weak bands which cause the water to appear slightly blue.

The plot shows the absorption coefficient of water as a function of wavelength.



Hydrogen-bonding in ice is similar in magnitude to that in liquid water. Ice has therefore also a pale blue colour, which it is easily discernible in the solid ice of glaciers and icebergs.

It might be thought that some other hydrogen-containing liquids besides water would posses traces of a bluish colour because of similar absorption patterns. However, water and ice are the only two chemical substances that we normally have the opportunity to observe in pure form in sufficiently large bulk so that such a weak coloration becomes detectable. ■



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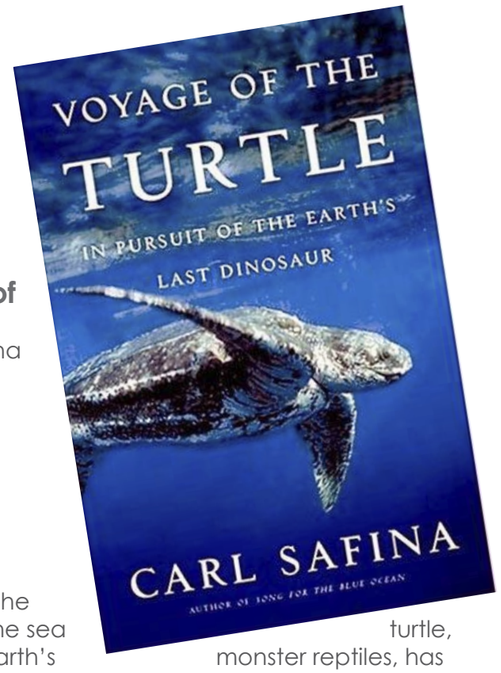
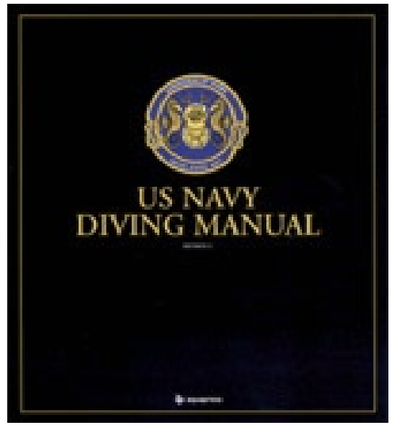


Voyage of the Turtle

by Carl Safina
Publisher: Henry Holt
Hardcover: 383 pages
ISBN: 0805078916
List Price: US$27.50

Older than the dinosaurs, the sea turtle, the last of Earth's monster reptiles, has lost 95 percent of its population in the last 20 years due to direct or indirect human contact, long-line fishing nets, primates feeding on their eggs and hatchlings and people killing them for their shells in order to make tourist souvenirs and gourmet soup. Despite these obstacles, some sea turtle species are recovering in the Atlantic ecosystems. Carl Safina sets out to find out why there is such a discrepancy between the recovery of sea turtles in the Pacific compared to the Atlantic ecosystems. Funded by the MacArthur Foundation, the author scoured the world's beaches for answers and interviewed scientists, conservationists, poachers and fishermen.
Sale Price: US$17.33 at **www.amazon.com** or GB£12.98 **www.amazon.co.uk**



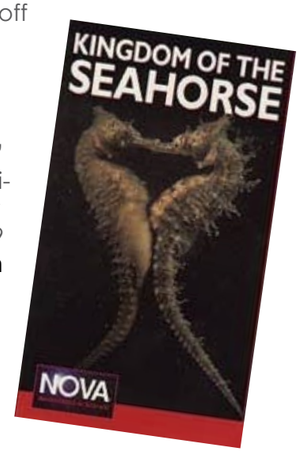
US Navy Diving Manual Revision 5

Hardback : 968 pages
Publisher/Date : AquaPress, Sep 2006
A must for all serious divers, this manual is the fifth version of the U.S. Navy Diving Manual published by AquaPress. Widely regarded as the technical standard in the field of diving information and protocal, the US Navy Diving Manual is comprehensive but surprisingly easy to read with user-friendly volumes divided by subject matter including diving principles and policies, air diving operations, mixed gas surface supplied diving operations, closed circuit and semiclosed circuit diving operations, diving medicine and recompression chamber operations. Extensively researched, this manual is used internationally by recreational, commercial and military divers. Out soon: Get in line for your copy at **www.amazon.com** or £89.98 at **www.amazon.co.uk**

From 5thD-X/Breakthrudiving comes a new DVD, Technical v.1.0, which is targetted at divers who are thinking about getting into technical diving or just want a review of those skills that need a brush up or were not covered in their own training. Topics covered include line skills, no mask skills, nine failures when things go wrong, stage bottle work plus flow sheets for the nine failures, technical/trimix instructor voice-over on key points, grease pencil illustrations that clarify principles and increase visual retention, flow charts, ratio deco, battle field calculations and video of actual technical dives around the world. See how things are done correctly on video before you do it yourself, plus what to do when things go wrong. Supporting PDF files. While the DVD is not a replacement for actual training led by a qualified instructor, it does serve as a useful study tool and reference linking theory with practice. Price: US$32.95 **www.amazon.com**

Kingdom of the Seahorse

Running time: 56 minutes
Rating: NR (Not Rated)
Formats: Closed-captioned, Color, NTSC
New from WGBH Boston Video, Kingdom of the Seahorse explores the life and times of these amazing creatures in an underwater enclave off the reefs of Australia. Biologist Amanda Vincent gives a fascinating account of the curious creatures' importance and habitat in the underwater realm. Price: US$17.99 at **www.amazon.com**



NEW GAME: Red Ocean

From the development house Collision Studio and publisher Anaconda comes a new game, Red Ocean FPS, to be released in February 2007. In the game, underwater elements are combined with innovative shooter gameplay. You are Jack Hard, diving instructor and treasure hunter, who discovers an abandoned Russian underwater research station controlled by a terrorist cell. You, of course, get caught in their devious plans, but there's a twist. Players can use water in solid, liquid or gas to get rid of enemies. With hot steam or slippery ice, you ambush enemies while scuba diving.

Below Freezing: The Antarctic Dive Guide

By Lisa Eareckson Trotter
Paperback: 116 pages
Publisher: Wildguides
Date: 2006 July 25
Having logged over 400 hours exploring the Antarctic waters, author Lisa Eareckson Trotter has a wealth of experience and information to share with readers regarding diving and dive sites around the South Georgia Islands and the Antarctic Peninsula.No less than 25 dive sites with easy-to-readmaps and user-friendly descriptions fill the books pages, which also includes a hitory of local diving, how to choose a dive operator for your needs, what you will see and what you can expect, special notes about leopard seals, site conditions, awesome color photographs and a description of the wildlife you will see above and below 7 meters. A must-have guide for anyone serious about diving in the Antarctic, Below Freezing offers a quality dive guide and reference for those with a thirst for adventure. Price: GB£21.95 **www.wildguides.co.uk**

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Utopia Village *—Coming 2007: Dive, Fish, Relax in Utila, Honduras. Opening specials sign up* ***www.utopiautila.com***

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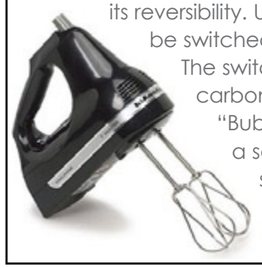
Oil and Water do mix!

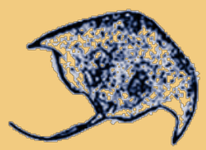


Oil and water can for the first time be mixed and separated on demand thanks to a new, reversible surfactant. The genius of the new surfactant lies in its reversibility. Unlike existing ones, it can be switched "on" or "off" repeatedly. The switches are very simple too: carbon dioxide and air.

"Bubble carbon dioxide through a solution and the surfactant switches on, leading the oil-and-water mix to form an emulsion," explains Philip Jessop at Queen's University in Kingston, Ontario, Canada. "To switch it off again, you bubble air through it, and the oil and water separate again," he says.

The liquid molecule could prove invaluable in mitigating the environmental damage caused by oil spills, such as the one currently spreading along the coasts of Lebanon and Syria. Surfactants must have two ends – a water-repelling hydrophobic bit that binds to the oily substance; and a water-attracting hydrophilic bit, which has an ionic charge that binds to water. ■

Wet & Weird



News edited by Peter Symes

X-ray mag

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DiveGuru, Deerfield, FL, USA
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Dive links by Larry "Harris" Taylor, PhD
www-personal.umich.edu
WetPixel, USA
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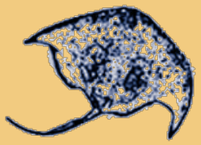
Wet & Weird



News edited by Peter Symes

Dolphin trapped in Speedos

A lucky adolescent male bottlenose dolphin, known as Scrappy, is back to living nude and free in Florida's Sarasota Bay after making a potentially fatal wardrobe choice, the Chicago Tribune reported.

The drama began July 6, when a member of the Brookfield Zoo marine mammal research team working in the bay spotted Scrappy unaccountably and uncomfortably swimming around while wearing a black, Speedo-brand man's swimsuit.

"He must have found the swimsuit floating in the water," said Randall Wells, a population biologist who runs the Sarasota Dolphin Research Program for the Chicago Zoological Society, Brookfield Zoo's parent organization. "Somehow he got his head and torso through the waist and one of the leg holes of the suit, and it was hugging him right where his pectoral fins and body meet."

The project team feared the tight-fitting, non-rotting synthetic cloth suit could injure or kill the dolphin as eventually it could cut deeply enough to sever arteries, causing him to bleed.

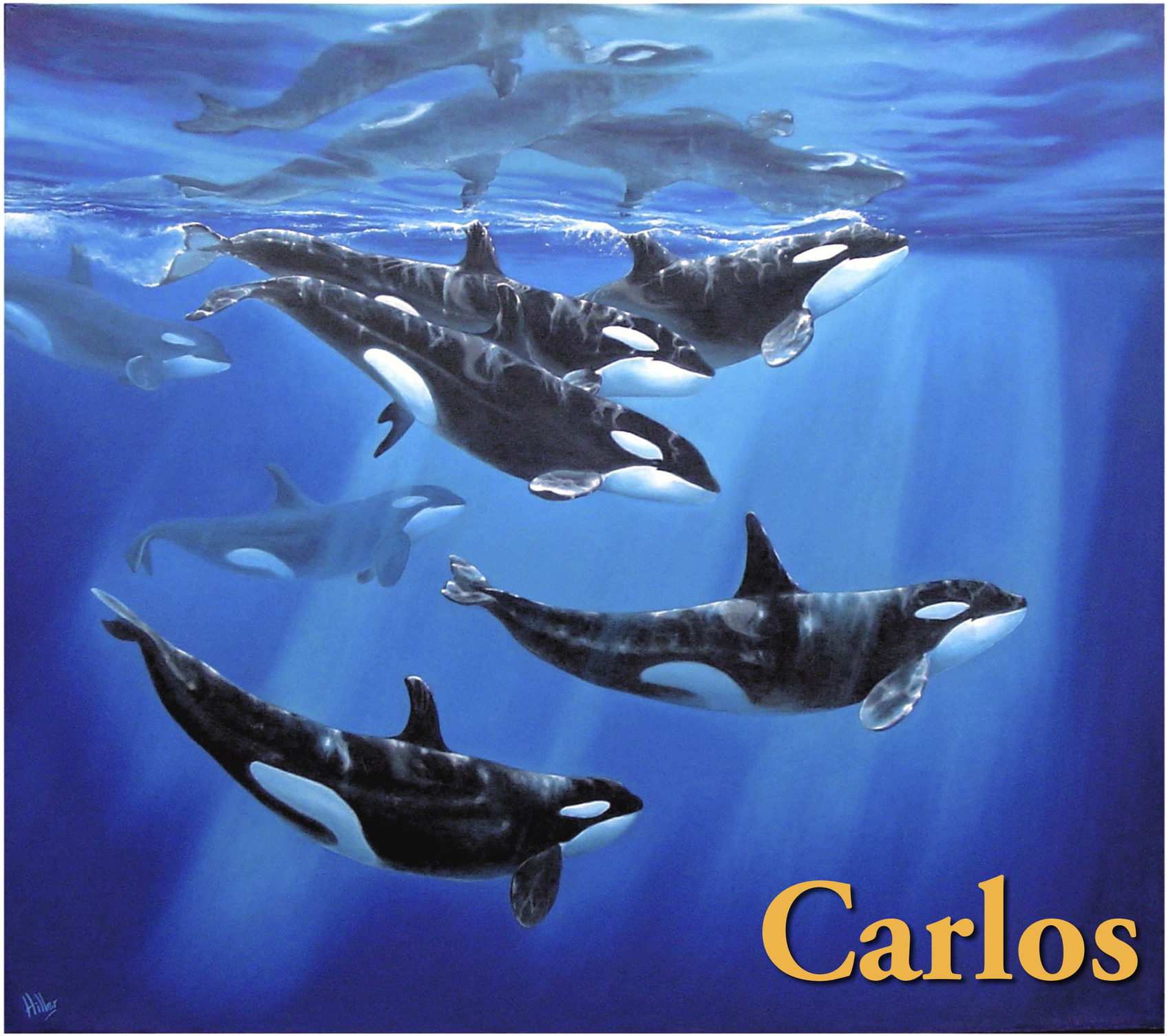
When the swimsuit was still stubbornly clinging to Scrappy after three weeks, the team got an emergency rescue authorization from federal officials who monitor its work in the bay.

Scrappy's capture turned into an all-day ordeal with fast boats carrying 31 people in total racing across the bay after the animal, trying to surround it with a net. When they finally dolphin caught the dolphin, the suit had made cuts a half-inch deep and three-quarters of an inch long in front of each fin. Scrappy was visibly underweight and also had a fresh, visible but non-serious shark bite, both conditions probably caused by a hampered ability to swim because of the suit.

"We felt his injuries weren't that serious, so after we removed the swimsuit, we cleaned the wounds and gave him a strong antibiotic. Then we attached a small radio tag to one of his fins and, after about half an hour, we let him go." With the radio tag, his team can locate the animal easily every day, Wells said, and Scrappy, who as an immature male still lives mostly by himself, has shown no ill effects from his wardrobe experiment. ■

VIVIANE FROST

Text editted by Gunild Pak Symes
All images by Carlos Hiller



Carlos Hiller

Painter of Ocean Light

ABOVE: *Manatíes*, by Carlos Hiller. Oil on canvas
LEFT: *El Viaje*, 2001, by Carlos Hiller. Oil on canvas, 47x53 inches

"When I am diving or just snorkelling, all I have in mind is the marine environment, the light travelling to the deepness, my breathing. I only care about the life surrounding me, the exploration, and the colours…"

— Carlos Hiller

Carlos Hiller

Calma, 2003, by Carlos Hiller. Acryllic and oil on cavas, 59 x 27.5 inches

The art of Carlos Hiller is devoted to the ocean. His paintings bring powerful images brimming with energy and marine life into our daily lives. Huge schools of fish and diverse marine creatures are usually present on his paintings which evoke the mysterious atmosphere of the underwater world. Some works are split images, giving us views above and below the surface of the water at the same time in one painting.

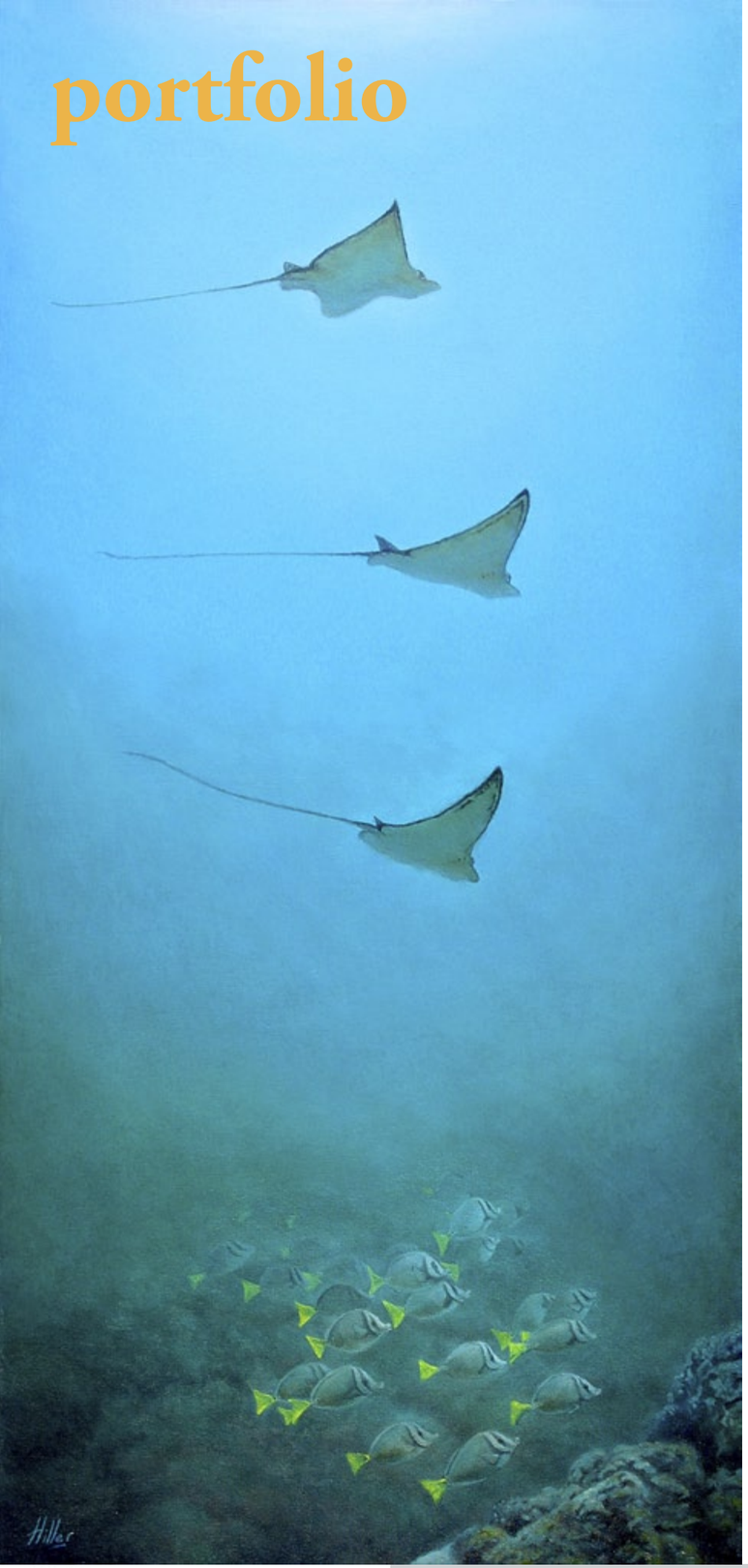
His images have an extraordinary sense of depth and dimension. Carlos explains, "The ocean makes me feel happy, and my paintings reflect that feeling. It is very simple, like the best things in life. My aim is to capture emotions and to capture the ocean light."

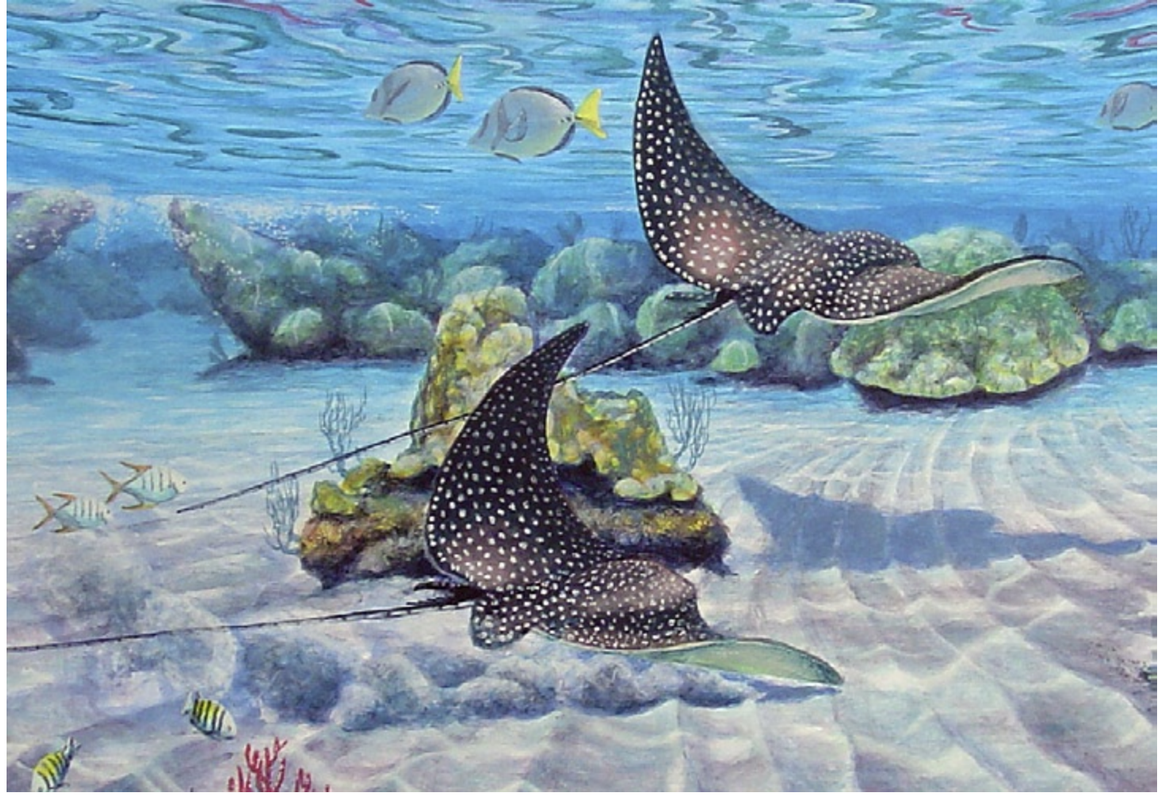
To achieve this, Carlos uses a laborious technique involving the layering of colors in paint. He starts with an initial background colour and adds thin colourful layers of paint that form a complex final colour. When light passes through these different layers, it gives us an impression of atmosphere and water. Rather than passing through the canvas, light is returned to us from the various layers of colours of paint.

Early beginnings

Carlos was born in Argentina. From an early age, he enjoyed travel, adventure and exploring new places. Indeed, he once travelled the length of the Parana River in Argentina on a rudimentary river craft, right down to the sea.

portfolio





Carlos Hiller

As a result of the impressions he aquired during travels in Latin America, the young Carlos painted landscapes of the Amazon and the Central American forest. When Carlos started diving and investigating the submarine world, he began to incorporate ocean elements into his forest paintings, such as schools of fishes and dolphins swimming into the vegetation. "It was a confusing phase" said Carlos smiling.

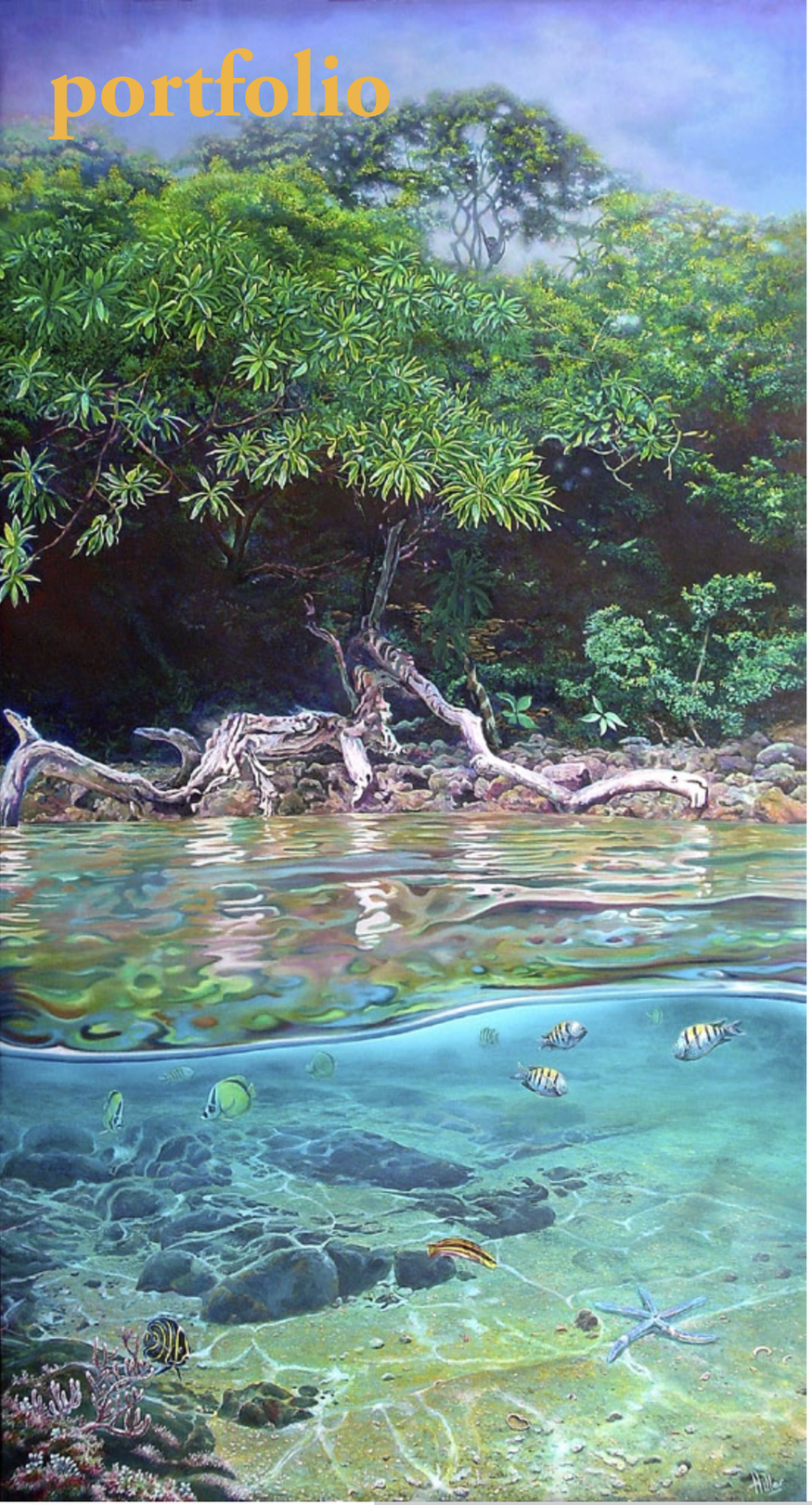
He then decided to immerse himself into the underwater realm completely by taking a diving course and devoted himself exclusively to the ocean and painting.

Now, at age 34, Carlos sells all his paintings systematically: "I like the idea of my paintings hanging on the walls of different offices and homes and people having a moment of relaxation at the sight of them."

When one looks at his art, one can see a great diversity of subjects and ways in which they are approached. There is a great deal of quality in the details. Carlos explains:

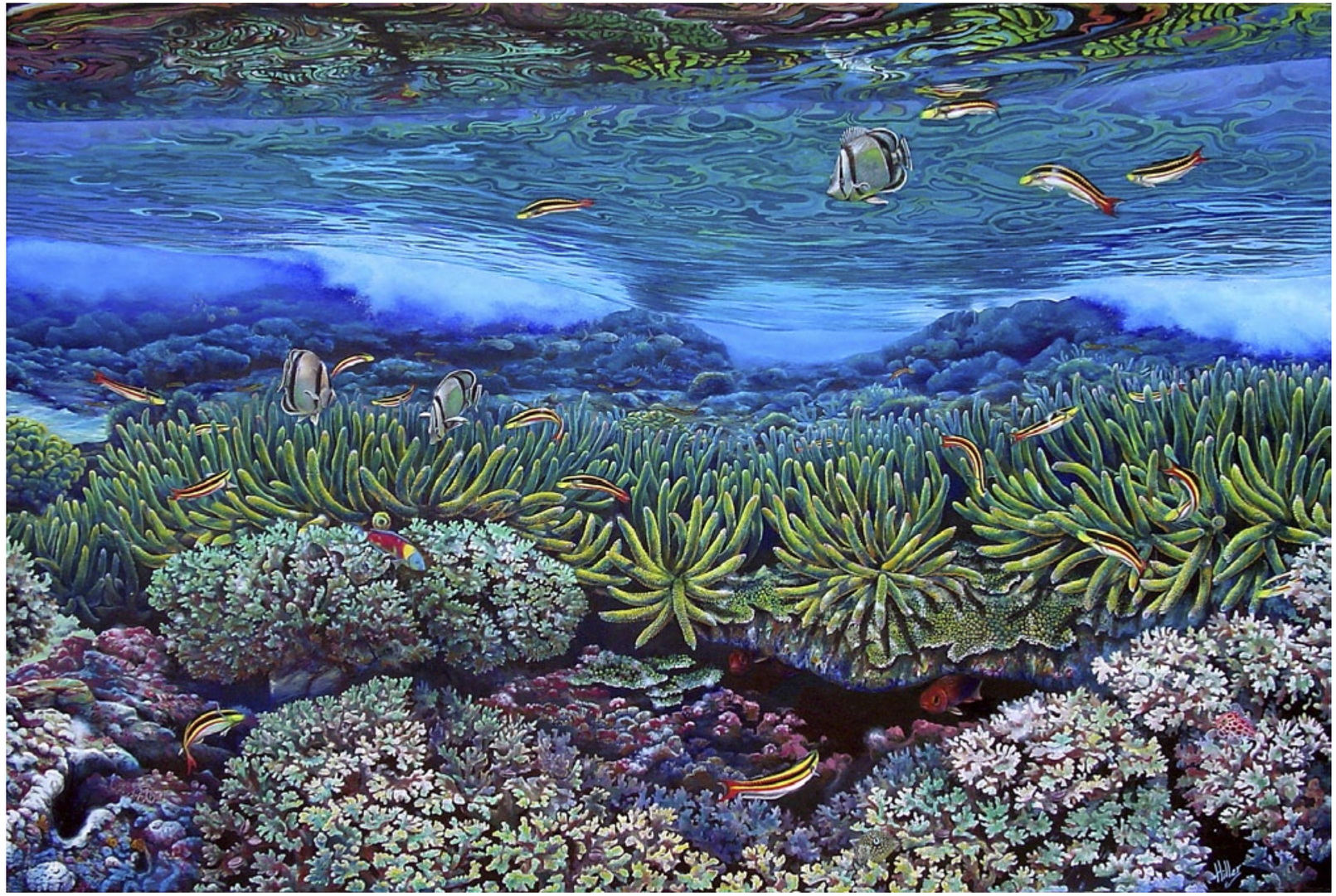
CLOCKWISE FROM LEFT:
Tres Àguilas. Oil on canvas
El Jardín de las Àquilas. Oil on canvas
Manta y Cardumen. Oil on canvas
Manta. Watercolor on paper

All images by Carlos Hiller



LEFT: *Àrbol y Mar*, 2003, by Carlos Hiller. Acryllic and oil on canvas, 89 x 47 inches
BELOW: *El Bajo del Coral*, 2002, by Carlos Hiller. Oil on canvas, 48 x 72 inches

Carlos Hiller



"Sometimes it happens that only one dive provides me with so many images that I really get busy for a long time. Then, it is difficult to decide what to paint—everything is so wonderful! As I do not follow any formula, I do not repeat my paintings. The ocean is like that—every image it offers is unique and unrepeatable. Anyway, who has had two diving experiences exactly the same? People often ask me how long it takes to finish a painting, the answer is: Until I feel I have finished it! It can be 20 days or a lot longer. The important thing for me is to work only when I feel inspired and happy. If something is missing, it is time for a plunge!"

Carlos also practices underwater photography. For him, this is a useful tool to capture fundamental details.

He exhibits his artwork in Costa Rica, where he has lived for 12 years, and lately, he has started exhibiting his work in other countries, especially in the United States.

Whenever requested, Carlos gives live performances of painting as a new way of getting closer to the public. In the course of a few hours, Carlos will create a painting with a wonderful display of colour and energy and spectators become participants of the process of creation.

Carlos often creates commissioned works too, and he paints anything from miniatures to murals, although it is clear enough that he prefers the big format, considering that the ocean itself gives us immediately the sensation of great breadth and space.

One of Carlos' next challenges is to paint a

CLOCKWISE FROM LEFT:
Confluenca (detail), 2001
Oil on canvas, 56 x 45 inches

Energía II (detail)
Oil on canvas

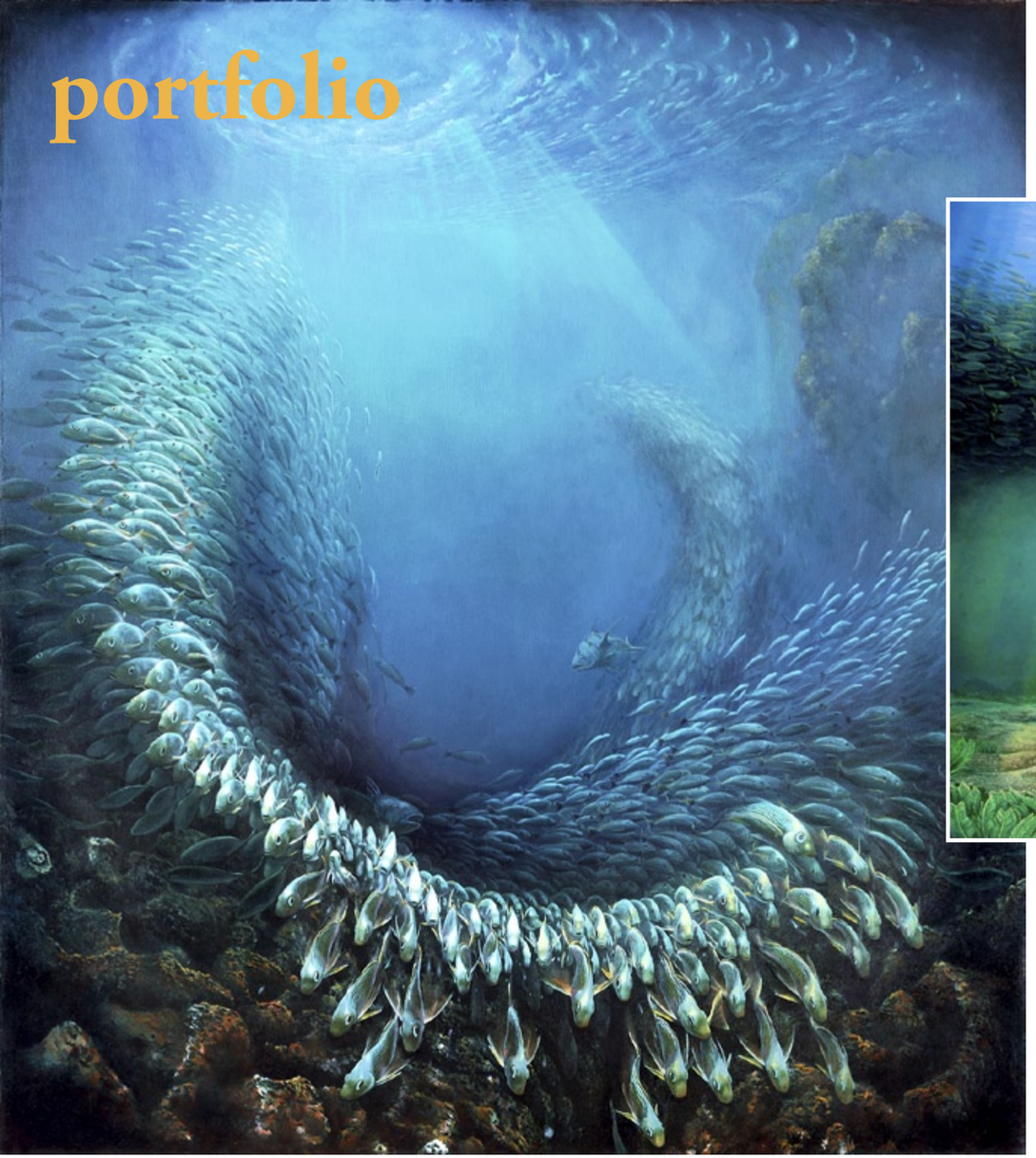
Morena y Pulpo
Oli on canvas

Mar Amor, 2002
Oil on canvas, 46.5 x 51 inches

All images by Carlos Hiller

portfolio

Carlos Hiller



CLOCKWISE FROM LEFT: *Escape Marino*, 2002, oil on canvas, 65 x 58 inches; *Totuga y Nube*; *Centallas*; *Peces y Atmósfera*, 2003, acryllic and oil on canvas, 59 x 44 inches; *Roca Mantas*

gigantic mural, with plenty of details, and to capture again the emotion, the colour, the energy of the sea and the ocean light.

Carlos achieves an exact representation of marine nature in his paintings, even though this is not his principal aim. Through symbolic associations, beyond our common senses, he enhances the images emotionally. This way, Carlos melds, in a new dimension, nature and art as a bearer of purely abstract elements. His paintings irresistibly attract all eyes. The images are so powerful that they even transmit a sense of freshness.

The painter brilliantly combines diverse factors, like the selection of colours, the "big format", which is Carlos' favourite, to give us the possibility of feeling "immersed" in the painting. Carlos makes a deliberate use of

portfolio

CLOCKWISE FROM LEFT
Escuadron (detail)
Oil on canvas

La Playa de Aquas Claras, 2002
Oil on canvas, 33 x 43 inches

Isla
Oil on canvas

All images by Carlos Hiller

optical illusion as a resource to help viewers transcend from the ocean depths into the depths of our own humanity.

For more information and to order directly from the artist, please visit Carlos Hiller's web site: ***www.carloshiller.com***

For inquiries about original artwork or prints please e-mail: ***info@carloshiller.com*** *or call +(506) 6664878 in Costa Rica.*

Greeting cards of Carlos Hiller's artworks are available at the X-RAY MAG Boutique: ***www.cafepress.com/xray-mag*** ■

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KAREN GOWLETT HOLMES


KAREN GOWLETT HOLMES


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