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North Sea
Dogger Bank

Moby-Dick's
Sperm Whales

Bali
Tulamben

Wrecks
U-2511

Tech
Checklists

UW Photo
Modeling Tips

Shark Art
Wolfgang Leander

ITALY'S

Ponza Island

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COVER PHOTO: Eye of giant rockfish, Ponza Island, Italy
Photo by Franco Banfi

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Diver with giant rockfish, Ponza Island, Italy. Photo by Franco Banfi



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On life and death

In this issue there is an obituary.

As long as I have been involved with making this publication and the one before this one, it has been my policy and principle not to delve into deaths and accidents. After all, would a classic car magazine go on about all those killed in traffic accidents, or a travel magazine about the crime and corruption in the various cities and countries it covers?

Diving is about joy, life and providing pleasurable adventures and enriching experiences.

And that is how we are going to keep looking at it going forward.

Our friend and associate Ron Akeson died while he was doing what he loved.

Diving was his passion, calling and profession, and he took it

to the highest levels, introducing others to the wondrous realm underwater, opening their eyes to a new world full of adventure and excitement. For that, many of his past students are eternally grateful.

After spending more than two decades in this line of work, I have unfortunately lost a number of friends and colleagues to the deep. As some of these were explorers operating at and often pushing the boundaries, it is what happens sometimes.

It also happens that we lose loved ones due to accidents in traffic or in the work place or because they succumb to illness.

It doesn't matter what we do.

There is always a risk. We could keel over while playing tennis or while shopping at the local supermarket.

What matters is living our life

and making the most of it while we have it.

Losing Ron made me sad and pensive, but it did not shake my interest or belief in diving.

While his passing did serve as a somber reminder never to compromise on safety, it rather reaffirmed my belief in diving.

Diving makes me feel alive and appreciative of the natural beauty and wonders of our blue planet.

Ron, by living his passion and teaching by example, reminded me of this feeling, and I have all good intentions to keep following his lead. I don't think he would approve if I did otherwise, and getting wet is the best homage I can pay.

Keep the adventures going!

—X-RAY MAG



News edited by Peter Symes

NEWS

from the deep

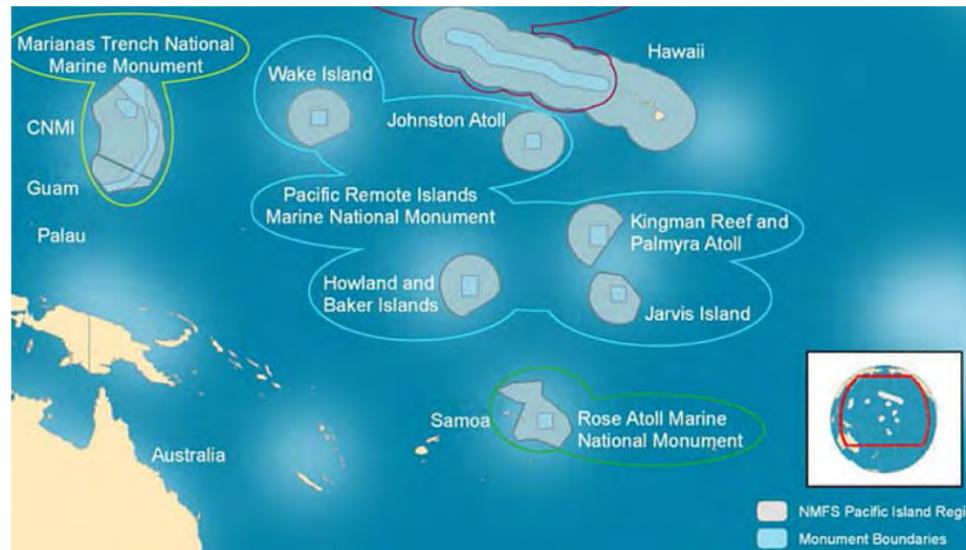
US to create world's largest marine park

President Barack Obama has announced plans to create the world's largest marine park in the Pacific Ocean by expanding the Pacific Remote Islands Marine National Monument. Environmentalists are hailing the move, which aims to protect fragile marine life, as a step in the right direction.

In a video message, Obama said: "Let's make sure that years from now we can look

our children in the eye and tell them that, yes, we did our part, we took action, and we led the way toward a safer, more stable world," adding that while protecting the oceans is a task requiring the cooperation of many countries working together, the United States must take the lead in conserving fragile marine ecosystems.

Detractors say the newly expanded park



Pacific Remote Islands Marine National Monument (center of map) is to be expanded significantly to create the world's largest marine park

will have little impact as there is not much commercial fishing or drilling in the area since it is so far away from ports.

However, conservationists said proactive steps now will protect ecosystems in the future. Lance Morgan of the Marine Conservation Institute said, "These are fairly long distances from any ports, and they're very expensive to get to," but added, "Still, we don't know what all the future uses are going to be."

Using the 1906 Antiquities Act, Obama could protect up to 780,000 square miles, or nine times

what his predecessor, President George W. Bush, set aside for the Pacific Remote Islands Marine national monument in 2009, according to a geographic analysis by the Pew Charitable Trusts.

In addition to expanding the marine park, Obama launched a task force to curb illegal fishing and fraud in the seafood industry, preventing mislabelling to hide a product's origin. The White House said that one-fifth of wild fish caught each year are sold on the black market, which costs the legal fishing trade US\$23 billion. □

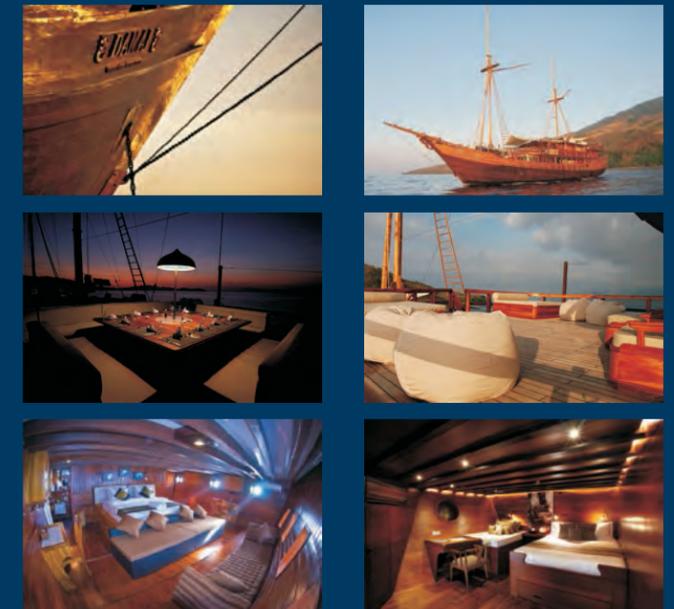
SOURCE: WASHINGTON POST



NOAA

USFWS

Palmira Atoll National Wildlife Refuge



• Raja Ampat

• Komodo

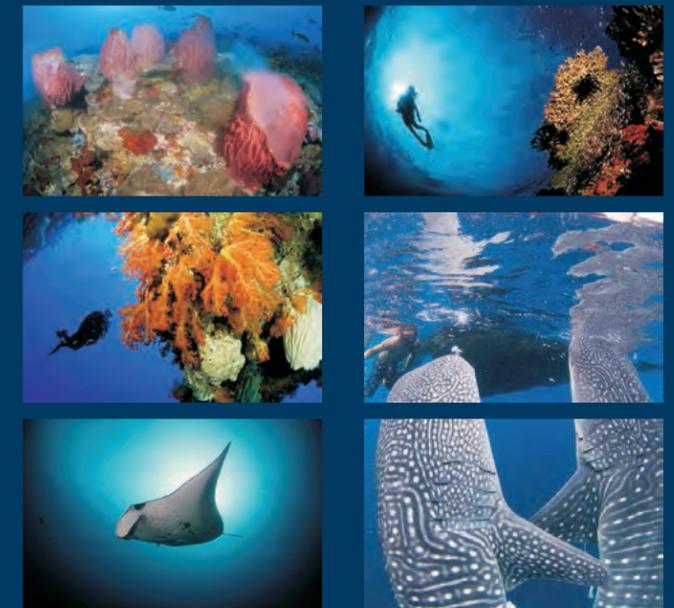


• Forgotten islands

• ...and more •



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Entrance to Akaroa Harbour



PHILLIP CAPPER / WIKIMEDIA COMMONS

New Zealand opens new marine park

On World Oceans Day, New Zealand formally opened its newest marine reserve in Akaroa Harbour. With this measure, the marine life of the area is protected and fishing is not permitted in the reserve.

Conservation Minister Nick Smith said, "Some of the hundreds of species that will benefit from the reserve include giant bull kelp, green and horse mussels, sea tulips, hydroids, sponges, sea squirts, sea anemones, cushion, snake and biscuit stars; fish like blue cod, butterflyfish, blue moki, leatherjacket and white pointer

sharks; birds like penguins and shags and marine mammals like fur seals and Hector's dolphins."

Visitors flock to this iconic harbour for its incredible scenery of volcanic cliffs and odd sea stacks as well as the various recreational opportunities available in the area, according to Environment Minister Amy Adams. "The reserve will enhance Akaroa's growing nature-based tourism and will be an economic as well as an environmental asset for the Banks Peninsula commu-

nity," she said.

While conservationists applaud the creation of the 512-hectare reserve, they say a lot more needs to be done. "New Zealand's territorial and Exclusive Economic Zones cover 400 million hectares. And 99 per cent of those waters are open to deep sea oil drilling and various types of sea-

bed mining," said Forest & Bird advocacy manager Kevin Hackwell. "New Zealand has the world's fourth largest marine jurisdiction. It is so vast, a third of the world's seabird species and nearly half of the world's whale, porpoise and dolphin species have been reported within it." □

SOURCE: TVNZ.CO.NZ



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Araucaria columnaris trees, New Caledonia

New Caledonia creates massive new marine park

In excess of 1.3 million square kilometres, the new park will be one of the world's largest. The protected area will be almost the size of Queensland.

Tourism authorities in New Caledonia have announced the establishment of one of the world's largest nature preserves as a historic moment for sustainable tourism. Years in the making, the recent government decree has paved the way for a management plan for this vast, biologically-rich area of the Pacific.

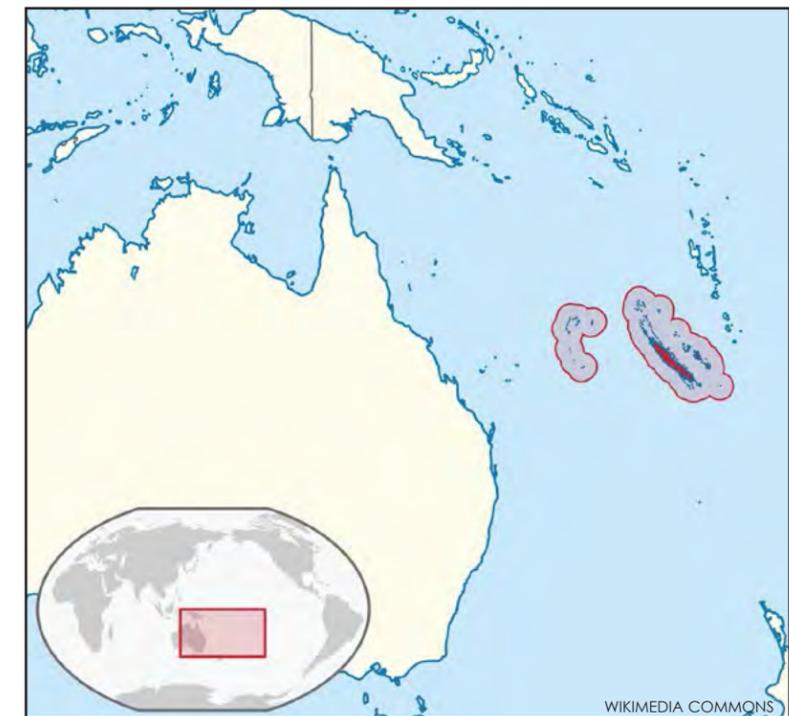
It is called Le Parc Naturel de la Mer de Corail Marine Sanctuary, or Natural Park of the Coral Sea. It includes about 450,000 hectares of coral reefs and is home to 25 species of marine

mammals, 48 shark species, 19 species of nesting birds and five species of sea turtles.

The government of New Caledonia wanted to establish one of the world's largest protected areas on land and sea, and protect the country's natural wealth.

"This is an historic moment in marine conservation, as well as sustainable tourism," said Caroline Brunel, New Caledonia Tourism's sales and marketing director. "Such a measure exemplifies that it is possible to invest in the long-term health and productivity of our ocean resources, whilst also investing in our tourism industry," she said. □

SOURCE: DAILYMAIL.CO.UK



Location of New Caledonia in Melanesia, east of Australia

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Fish have feelings too

German scientists discover that chronic stress can lead to depression and anxiety in fish, while a Norwegian researcher looking into stress response and frustration in fish finds that salmon have emotional responses.

Meanwhile a doctoral thesis on stress response and frustration in fish by research fellow Marco Antonio Vindas at Norway's environmental and life sciences university has also established that salmon have emotional responses, defined as more or less unconscious reactions in the brain triggered by consuming or

positive situations.

In the German investigation, zebrafish suffering from chronic stress as a result of a genetic mutation showed signs of depression in behavioural tests. An analysis of the "lethargic" zebrafish showed that they had an extremely elevated concentration of the stress hormones cortisol, CRH and ACTH.

Fish on Prozac

The scientists therefore postulated that these fish were suffering from chronic stress and were exhibiting certain aspects of depressive or perhaps hyper-anxious behaviour. To put this assumption to the test, the researchers added the antidepressant fluoxetine (a.k.a. Prozac

Feeling blue!?

to some) to the water. Shortly afterwards, the fish's behaviour returned to normal.

Frustrated salmon

In the Norwegian experiment, salmon were taught to associate light with a reward in the form of food. Omitting an expected reward triggered frustration. Levels of dopamin—a neurotransmitter that is produced when new situations are encountered and helps increase attention—not only increased but did to a quite high level. It was as if encountering ongoing unpredictability required the fish to be more attentive, which led to an constant production of

dopamin.

An adverse effect of sustained heightened levels of dopamin is diminished memory and reduced capacity to react normally. As dopamin is also associated with the sensation of pleasure and plays a role in addiction, decreasing levels can create withdrawal, with all the sensations of feeling blue that comes with it.

Crabs too

As reported a couple of years ago in this publication, a study conducted by researchers from Queen's University demonstrated that crabs not only suffer pain too but also retain a memory of it. □



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Champagne stored on the bottom of the Baltic near classic wrecks

The champagnes were lowered into the water close to the Åland shipwreck discovery almost exactly four years ago, where a stash of 47 bottles of Veuve Clicquot from 1839 and 1841 were recovered.

Four years ago a cargo of old champagne was discovered at the bottom of the Baltic Sea near the Åland archipelago close to Finland. Experts believed the vessel carrying the champagne had been shipwrecked in the 1840s en route to Russia and spent more than 165 years underwater.

Out of the bottles that were salvaged, 95 were from the Juglar champagne house, which closed down in 1829. The same owners produce Jacquesson today. Veuve Clicquot was represented by 46 bottles and Heidsieck & Co by four. The Veuve Clicquot bottles were dated 1841–1850.

Record prices

The Juglar bottle was sold for 24,000 euros while the Veuve Clicquot champagne, dating back to approximately 1841, went for 30,000 euros, setting a new world record. The earlier record, set in 2008, was US\$84,700 for two bottles of 1959 Dom Perignon Rosé.

According to the the cellarmas-

ter of Veuve Clicquot, Dominique Demarville a tasting of the more than century-old champagne showed an astonishing freshness and inspired the house to embark on the program.

Åland vault

Veuve Clicquot has named the underwater champagne cellar the Åland Vault, and filled it with non-vintage Yellow Label (in 75cl and magnum bottles), Vintage Rosé 2004 and demi-sec wines.

Demarville said about their underground cellar, "The Baltic Sea is a cool dark sea with a temperature around 4°C (39°F). There is very little current so the pressure remains constant and it is significantly less salty than other seas. These conditions allow us to measure the impact of the absence of oxygen on the aging process in a stable environment." The Reims cellars are at a constant 11°C (52°F).

Veuve Clicquot plans to retrieve some wines from the sea on a regular basis and conduct comparative tastings with the duplicate bottles from the cellars in Reims in the presence of a panel of professional tasters. □



Waters around Pitcairn Islands have "unique global value that is irreplaceable" said an international team of scientists

Pitcairn Islands a treasure trove of new species

An international team of scientists have carried out the first underwater surveys of the deep and shallow waters around the islands and discover 80 new species of fish, coral and algae.

The islands, which are best known for their connection to the mutiny on the Royal Navy ship, *Bounty*, in the 18th century, are one of the most remote places on Earth and have escaped overfishing and pollution that has damaged many other regions of the world's oceans.

The researchers conducted the first surveys of the deep habitats around the Pitcairn Islands using drop-cameras at 21 sites from depths of 78 to 1,585m. The scientists found healthy coral reefs and an abundance of fish, around half of them not found anywhere else in the world.

A key indicator of the water's good state were the number of top predators like sharks that the scientists recorded. They accounted for over half of the

biomass at Ducie Atoll, one of the least disturbed locations.

Pure water

Perhaps the most significant discovery was down to the purity of the water. The scientists found a type of coralline algae living deeper than anywhere else on Earth. "It lives at 382m that's more than 100m deeper than the previous record, because of the clarity of the water," expedition leader and co-author Dr Enric Sala told BBC News.

Pitcairn Islands is a British overseas territory and, with only about 56 inhabitants, it is the least populous national jurisdiction in the world. The inhabitants are descendants of the *Bounty* mutineers and the Polynesians who accompanied them. □



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Divers on
the wreck
of the
U-2511

Text and photos by Vic Verlinden

At the end of Second World War, the allied forces were in possession of 120 German U-boats. They decided to let them sink in the deep water of the Atlantic Ocean during a special operation for this purpose. The Grey Wolves was the nickname for the German U-boats that often assaulted the allied convoys in groups and torpedoed numerous ships. When the British battleships became more long-range and sonar was developed, the U-boats were no longer invisible and many of them were sunk. That is the reason why the Germans constructed a new 21-type that they called *Elektroboot*. These were created to stay entirely underwater during an operation and were able to top a speed of 18 knots. Other types had to rise to the surface in order to charge their batteries and aerate the boat.



Operation Deadlight

On the January 30, the U-2511 finished its test trip in the Bay of Dantzig with Adelbert Schnee and his crew who already had a lot of experience with U-boats. He

also commanded successfully the U-201 with which he sunk several ships. On the return to Bergen in Norway, a few dozen survivors from the torpedoed liner *Wilhelm*

Gustloff was taken on board. On April 30, the first type 21 U-boat went on patrol in the Caribbean in order to test the ship in all circumstances. On May 1, the U-2511

had its first contact with the enemy, but three days later, Adelbert Schnee received the order to "cease-fire". The war was officially over at that moment, but



Team member Joeri Vinks (left) coming aboard the dive vessel *Loyal Watcher*



a few hours later, he caught sight of the British cruiser *Norfolk* and a few other warships that he could approach within 500 metres. Schnee had the possibility to execute a perfect assault, but he changed his mind and ordered the crew to continue the voyage to their home port in Bergen which they reached on May 5. The U-2511 proved its efficacy but it was too late to bet on the powerful weapon with success. No member of the crew was wounded or killed during the patrol, and there were no victims on the enemy side.

Burying the Wolves in the depths

After the end of the Second World War, the seized U-boats were gathered together in Lishally, Ireland. The Allied forces decided to sink an enormous quantity of U-boats, which they torpedoed to the depths of the Atlantic Ocean off the Irish coastline. Operation Deadlight was created, and they started to sink the 121 U-boats.

Under the circumstances, a good many U-boats never reached the planned area. As there were sometimes problems during the rigging with bad



Historical photo of elektroboats in the harbor



Divers ready to enter the water from the dive boat



Diver Frank Robert near the hull of the U-2511 (left); Historical photo of the elektroboots in harbor (below)

the neighbourhood of Malin Head in Northern Ireland. As I had already experienced something of the sort in the past, so I knew this was easier said than done.

Considering the rounded form of the hull, the grapnel or anchor, glided easily from the wreck, and the *Linda* was able to raise the grapnel several times before it finally clung to the wreck. The teams were dropped one by one, and my dive buddy and I were the fourth pair to go into the water.

Floating to the buoy, I kept an eye on it just to be sure that this time I would not miss it. There was not much current and everything went smoothly going down. The visibility on the wreck was at least

weather, it was possible that a decision was made to sink the U-boat in shallow water.

The U-2511 was rigged on 7 January 1946, but the weather was so bad that the gear broke, and the U-2511 went round in circles without anybody in command of it out in open ocean. They decided then to sink the submarine with gunfire. After a while the boat sank little by little and reached a depth of 72 metres in 20 minutes. Many other submarines

sank that way in the shallows, contrary to prevailing belief at the time, and some of them were discovered when the technical divers came out in the 90's.

Most important U-boat wreck

A local diver, Al Wright, discovered one of the wrecks in 1999. Then in 2001, the English U-boat specialist, Innes McCartney, undertook an expedition in the area and filmed several

wrecks. One of them was the U-2511. The wreck was still in good condition, so the expedition was able to capture magnificent images of the *elektroboot*. The U-2511 is the only type that was well preserved and is therefore an important archaeological find.

Diving a gigantic U-boat

Everything was implemented in order to grab the wreck of the U-2511 with the submarine *Loyal Watcher*, which was in



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THE BLOCK





Diver with scooter at the propeller of U-2511 (left); Rebreather diver Steve Brown inspects the midship section at 70m depth (below)

TECHNICAL INFORMATION

Builder: Blohm & Voss, Hamburg
 Date: 7 July 1944
 Tonnage: 1,621 tons
 Length: 76 metres
 Width: 8 metres
 Propulsion: Diesel/electric 2 propellers
 Speed: 16 knots
 Range: 16,000 miles
 Armament: 6 torpedo tubes, 21 torpedoes

that one is not afraid of the cold and the sometimes rainy weather, you will enjoy a memorable dive in this area. □

Having dived over 400 wrecks, Vic Verlinden is an avid and pioneering wreck diver, award-winning underwater photographer and dive guide from Belgium. His work has been published in dive magazines and technical diving publications in the United States, Russia, France, Germany, Belgium, United Kingdom and the Netherlands. He is also the organizer of tekDive-Europe technical dive show. For more information, visit: www.vicverlinden.com

eight metres, and the grapnel was situated near the tower in the middle of the wreck.

I have dived on several wrecks of submarines from the First World War in the North Sea, but they were nothing compared to this giant with a length of 80 metres.

We first went along the imposing tower and then followed the hull to the back of the wreck. A few minutes later we arrived at a gaping hole where the submarine was hit when the Allies sank it. From here we could see a part of the interior and spied several spare parts. A bit later in the dive, we saw the two propellers of the wreck, with the blades still in good condition.

We were already at the halfway point of the dive and had to return to

the centre of the boat where we would find the accent line to follow in order to return to the surface. The hull of the wreck was decorated with sea anemones of all colours, which transformed the wreck into a brilliant scene.

We were now back at the tower with the periscope and several antennas, and we swam once more around in order to have a good view of the wreck. Inevitably, our dive computers indicated that we had to start the climb back to the surface. During the decompression stop of about one hour, I had enough time to review the digital images I took during the dive.

The U-2511 is an absolutely superb wreck to dive, and I recommend it to anyone who intends to dive in the region. Based on the condition, of course,



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Baltic tunnel project uncovers several 17th century wrecks

Archeologists surveying the seabed ahead of the construction of a fixed link between Denmark and Germany across the Fehmarnbelt find untouched wrecks of Dutch and Danish warships from The Battle of Fehmarn, which took place in 1644. The marine archaeology expeditions are the largest ever mounted in Scandinavia.

Working from both sides of the Fehmarn Belt, archaeologists surveying the area of the future Fehmarn Belt Tunnel for important wrecks and prehistoric sites have come up with at least two significant wrecks.

One lies in German waters only 3km north of Puttgarten from where the ferries to Denmark depart. This is probably the Danish warship, *Lindormen*, which sank in October 1644 during the Battle of Fehmarn, which was fought against a Swedish-Dutch fleet. As position of the wreck has been widely known for several years, archaeologists therefore expect that it is partially looted by sports divers.

The wreck is severely damaged by shipworm and will not last long even if it is saved. Therefore, the plan is to bury the wreck under 4,000 tons of sand to protect it from further deterioration during the construction of the tunnel.

Dutch wreck

The discovery of a second wreck located at depth of 24 metres in Dan-

ish waters around 8km south of Rødby has, however, been kept in complete secrecy since it was first located in 2008 while marine archaeologists prepared for further investigations. Whether the second wreck also dates to the same battle has not yet been determined.

The investigation is one of the biggest marine archaeological surveys conducted in Scandinavia for many years. Curator and marine archaeologist, Jørgen Dencker, from the Viking Ship Museum in Roskilde, Denmark, explains:

"On most wrecks in Danish waters, only the bottom is preserved. The wreck of the Fehmarn Belt is truly a gem, a treasure trove. As many as possible of the delicate various artifacts must be salvaged

and protected for the future.

"We were struck by the extent of ship timber and cannons strewn criss-cross on the seabed almost like a Mikado game. Some of the guns are on top of each other and must come from the gun deck that collapsed."

Furthermore, pottery jars, metal vessels, rigging and ammunition has been found.

Full deck preserved

Until the artifacts have been salvaged, it is not possible to estimate the full size and condition of the wreck, but archaeologists believe that at least one full deck is preserved.

However, while relatively well-preserved, centuries beneath the sea have taken their toll, leaving a number of unanswered questions surrounding the wreck. One of the mysteries is the vessel's identity, although Dencker is confident

that it is likely to be a vessel known either as *Zvaarte Arend* or *Zvaarte Adelaar* (or Black Eagle).

In the many naval battles fought in 1644 between Denmark and Sweden in the Baltic Sea, this vessel sided with Sweden. The most famous is the Battle of Colberger Heath between Fehmarn and Kiel Bay on 1 July 1644. The Danish fleet was under the command of King Christian IV, who lost the sight of his right eye in this battle, which was otherwise not decisive for the outcome of the war.

However, on October 13 of

that year, *Zvaarte Arend*, entered the scene, engaging in the naval battle fought in the Fehmarnbelt where the Danes suffered an ignominious defeat. The Danish fleet was devastated—some vessels sunk, others ran aground while the crews tried to escape. Only three of the 17 Danish vessels got away. With this defeat, Denmark lost control of the Baltic Sea for a long time.

Both wrecks are protected by Danish and German law and must therefore be examined more closely to figure out how best to ensure the findings for posterity. □



VIKINGESKIBSMUSEET

The first task for the maritime archaeologists is to sort out the chaotic tangle of fallen timbers, cannons, ropes and other artefacts

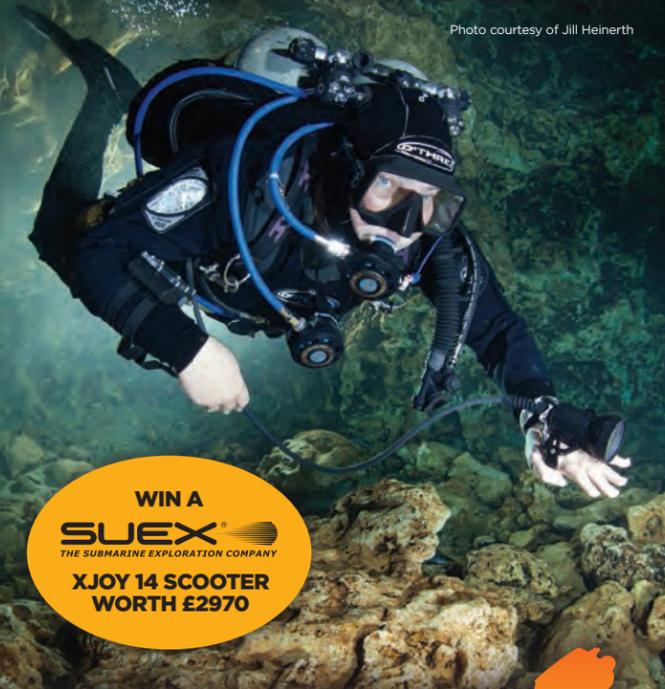


Battle of Fehmarn (1644)

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Photo courtesy of Jill Heinerth



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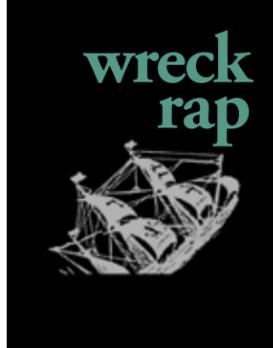
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If it can be verified that the wreck found off Haiti's coast is the Santa Maria which wrecked over 500 years ago it would rank among the world's most important underwater archaeological discoveries.

Has Columbus' flagship, Santa Maria, been found?

Archaeological investigators think they may have discovered the wreck of Christopher Columbus's flagship, the *Santa Maria*. Haiti asks for international assistance with the investigation.

U.S. underwater investigator Barry Clifford tells BBC evidence "strongly suggests" a wreck off Haiti's north coast is the *Santa Maria*. He said he is working with the Haitian government to protect the site for a more detailed investigation.

The *Santa Maria*, along with the *La Nina* and *La Pinta*, were part of Columbus's expedition in 1492, which explored islands in the Caribbean in an attempt to find a westward passage to Asia. The

flagship, which was the largest of the three ships, was lost during the expedition, shortly before Columbus returned to Spain.

Clifford told CNN he identified the potential location of the *Santa Maria* through earlier archaeological findings that pinpointed a likely location for Columbus's fort—a building that experts always thought was erected near to where the ship ran aground.

He also used information from the explorer's diary, and a recent diving mission near the site further burnished Clifford's belief the wreck was the *Santa Maria*.

The ship was found in the exact area where Columbus said the *Santa Maria* ran aground more than 500 years ago, Clifford said. The wreck is stuck on a reef off Haiti's northern coast, 10 to 15 feet beneath the water's surface. Clifford

said the "smoking gun" was a cannon of 15th century design found at the site.

UNESCO to investigate

In a letter dated June 12, Haitian Culture Minister Monique Rocourt asked for the support of the Scientific and Technical Advisory Body of UNESCO's 2001 Convention on the Protection of Underwater Cultural Heritage, requesting that a mission of experts be sent to the site. On June 23, UNESCO confirmed it will provide technical assistance requested.

The agency said in a press release that it will send a mission in the coming months to examine the wreck located off the town of Cap-Haïtien, in the north of the country. Irina Bokova, the Director-General of UNESCO, expressed concern about the risk "of looting of underwater heritage sites off the shores of Haiti".

Explorers, including Bill Clifford's team, already visited the wreck in 2003 and identified a cannon believed to date from the 15th century. It has since disappeared. □



Painting (ca.1624) of the *Santa Maria* ship by the Flemish Baroque painter Andries van Eertvelt

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Greater protection for ships lost in First World War

Many of the wrecks from WWI have for a long time been threatened by salvage operations, deliberate destruction and looting. With the centenary of the conflict coming up, these wrecks will now begin to fall under the protection of the UNESCO Convention on the Protection of Underwater Cultural Heritage,

which applies to ships sunk at least 100 years ago. The locations of many of the wrecks of these ships are known and have proved popular with recreational divers but also with commercial salvage companies. For example, in 2011, salvagers dismantled the remains of

three British cruisers sunk in 1914 in the North Sea. HMS *Aboukir*, HMS *Hogue* and HMS *Cressy* went down with the loss of 1,500 lives but the remains of the ships were destroyed for the copper and bronze they contained. □

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News edited by Peter Symes



VERNON SMITH, NOAA

James Delgado honoured by the Spanish King

Dr James Delgado, Director of the Maritime Heritage Program, has been decorated by His Majesty King Juan Carlos of Spain for his role in protecting Spain's underwater cultural patrimony.

the good of the nation, it is occasionally awarded to foreign nations for extraordinary services and to foreign heads of state. Delgado's services on behalf of Spain are separate from and were not part of his duties with NOAA.

As President and CEO of the Institute of Nautical Archaeology, Delgado provided detailed and extensive pro bono services as the archaeologist for Spain in its lengthy and successful litigation to recover artifacts including more than 500,000 in silver coins taken without authorization from the Spanish Navy's frigate *Nuestra Senora De Las Mercedes*, lost in combat in 1804 off the coast of Portugal in international waters nearly a mile

deep. Delgado's identification of the wreck as *Mercedes* played a key role in Spain being able to recover its property and patrimony. Based on his work, Spain requested his pro bono assistance in another case before the International Tribunal of the Law of the Sea in Hamburg, Germany, over excavations in the Bay of Cadiz by a foreign vessel ostensibly searching for oil and gas but found to have artifacts on-board that had been clandestinely removed from the seabed without authorization. Spain's seizure of the foreign vessel and its crew for these violations was being contested; Delgado's testimony was also key in Spain's ability to prevail in that case. □

The King has named Dr Delgado an Officer in the Order of Civil Merit, and decorated him with the Cruz de Oficial, or the Officer's Cross. Usually awarded to Spanish officials for exceptional service to their communities, provinces or the state, and for extraordinary services performed by Spanish citizens for

Malaysia Minister of Science invites Kids Scuba to celebrate World Oceans Day

Every year on June 8, the international community celebrates World Oceans Day, designated by the United Nations as a day to raise awareness of the importance of the seas to humanity and the fragile balance of our threatened ocean ecosystems.

This year, Kids Scuba Malaysia, the largest organization of its kind in the world which won the PADI Outstanding Contribution to Diver Education Award in 2014, took part in the national event, as the head of the organization, Syed Abd Rahman, was invited by the Ministry of Science, Technology and Innovation (MOSTI) to help with preparations for the celebration in Kuala Lumpur.

On June 8, YB Datuk Dr. Ewon Ebin, head of MOSTI, the government agency that manages the nation's marine parks as well as all marine-related government organizations, joined Kids Scuba along with other dignitaries for the opening ceremony at the National Science Center in

Damansara, Kuala Lumpur.

This year's theme and slogan was "Together we have the power to protect the ocean". Holding a World Oceans Day banner, three PADI Junior Open Water Scuba students from Kids Scuba—Hanani, Danial Hafiz and Najwa Amni, ages 16, 12 and 11 years old respectively—scuba dived in the waters of the aquarium, posing underwater for the press during the opening ceremony. Marine awareness talks for kids and teens and an underwater image gallery were also presented by Kids Scuba during the event.

Other leaders in the region's diving community who attended included PADI Course Director Clement Lee from Sabah, Regional Manager of PADI Asia Pacific Johnny Chew, and Tim Hunt from PADI Asia Pacific Sydney office. □

For more information on Kids Scuba, visit: www.kidsscuba.com



Kids Scuba Malaysia submerged in Kuala Lumpur's aquarium for World Oceans Day

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Edited by
Scott Bennett

The creation of the diver trail on the HMS/m A1 submarine worked on the premise that as a complete (single context) submarine wreck, every visiting diver would be able to navigate and orientate themselves easily, even in poor underwater visibility.



ENGLISH HERITAGE

An underwater information guide for divers visiting the site has been designed that will aid navigation and assist visitors in recognising features on the HMS/m A1 submarine wreck

UK's first underwater submarine dive trail opens

The trail is based around the protected wreck of a HMS/mA1 which is the first British-designed submarine used by the navy that sank in 1911 in the Solent. The project was launched by the English Heritage as part of an initiative to create up to a dozen trails by 2018 for historic wreck sites from the 17th to 20th centuries. Trails are already running on three sunken warships including HMS *Colossus* in 1787, which off sank off the Isles of Scilly.

The *Coronation* sunk off the

coast of Plymouth in 1691 and the *Norman's Bay* sank during the Battle of Beachy Head in 1690 in Sussex.

Diving with Nautical Archaeology Society (NAS)

Every year the NAS offers chances to dive the A1 Submarine Protected Wreck site (15m maximum) along with the wreck of HMS *Invincible* (lost in 1758; 14m maximum depth). Please visit their **Calendar page** for a list of dates. Additional dates can be made available for

group bookings of eight divers on demand. Contact the **NAS**.

An underwater information guide for divers visiting the site has been designed that will aid navigation and assist visitors in recognising features on the wreck. The guide can be downloaded **here**.

The NAS intends to continue to develop and administer the trail and to look for new mechanisms to promote the experience of diving on this underwater cultural heritage asset.

Watch video here □

Worldwide Dive and Sail to offer Galapagos trips

Under the new brand "Master Liveaboards", the first yacht will be the *Galapagos Master*, currently operating as *Deep Blue*. Built in 2004, the vessel will undergo a full refit in November 2014. A sister brand to the Siren Fleet, both brands will operate under the WWDS parent company. With a 12.5-knot cruising speed, the 32m steel vessel features nine modern cabins, spacious interior and generous outside relaxation space as well as room for dive gear preparation. The vessel is set to be the most eco-friendly dive liveaboard in the Galapagos. Trips will commence May 2015, offering 7-night and 10-night trips year round to cover the "whale shark season" (May - Nov) and the "manta ray season" (Dec -April). Read more at: www.masterliveaboards.com/galapagos. □

Arriving without your gear

On average one in every 150 passengers who consigns luggage to an airline's baggage system arrives at their destination without it. While about 85 percent of these bags are reunited with their owners within 48 hours, this is cold comfort for ongoing dive travellers bound for remotely located resorts or liveaboards. The airline industry suggests the only way of preventing baggage mishandling incidents is to travel with hand-luggage only. Obviously few airline executives have ever been on a dive trip.

Be aware that only the most comprehensive travel policies cover lost luggage; and even then, individual items can be limited to a maximum that won't cover expensive items like a dive computer or regulator. So you need to establish what the airline's policy is for reimbursing miscellaneous items required in the short term, as well as compensating you for new clothing you deem essential. Remember to keep all receipts for any necessary purchases. Airlines will usually only compensate lost luggage to a maximum that is well short of the actual value. □

British Virgin Islands establish shark sanctuary

The British Virgin Islands recently became the third Caribbean territory to declare its waters a safe haven for sharks. The ban on shark fishing covers nearly 80,117 sq km (31,000 sq mi) of water and also prohibits the sale and trade of shark products on the islands. The decision to establish a shark sanctuary in the British Virgin Islands was made official on May 22 by cabinet members of the British-controlled territory. □

See more of Cuba

Cubanacan Travel Agency has expanded its scuba diving programmes in Cuba. New nine to ten-day itineraries will cover the west and east shores of Cuba visiting Cayo Levisa, Havana coastline, the Zapata Swamp, Santa Lucia and Marea del Portillo.

Cuba boasts 14 thriving national parks, six world biosphere reserves and 236 protected areas. □

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You may have salad

The most common cause of travelers' diarrhea is food contaminated by fecal bacteria. A classic advice reads: *cook it, boil it, peel it or leave it*. It is also true that bacteria and viruses are killed by being fried or boiled. Common belief therefore has it that it's enough that the food is thoroughly cooked and hot and fresh salad should be avoided altogether.

However, according to physician Carsten Schade Larsen from Aarhus University hospital, it has never been scientifically documented that the risk of travelers' diarrhea can be reduced by following dietary restrictions—which contradicts prevailing common sense. You should not drink tap water, but avoiding the salad does not reduce the risk of contracting a runny stomach a.k.a. Dehli Belly, Pharaoh's Curse or Montezuma's Revenge.

Wash your hands

The most effective prevention is proper hand hygiene in particular

around meals. Wash your hands often and use a disinfectant when you travel.

Travelers' diarrhea is a frequent occurrence and in some countries almost unavoidable. While it is always inconvenient and will jinx many travel plans, it is rarely dangerous, and in most cases, it will pass within three to five days. Prophylactic vaccinations do exist but their efficiency is up for much debate as they only offer protection against a limited range bacteria such as E.coli but not salmonella.

How about Cola?

Dr Larsen also dispels the common myth that Cola is a good remedy. The important issue is to replenish lost fluids and electrolytes or salts. Cola provides sugar but no salts. The simplest remedy is to add two tablespoons of sugar and a pinch of salt to a liter of water. Alternatively, have juice with some salty crackers. □



WIKIMEDIA COMMONS



FILE PHOTO: Whale watching near Tadoussac, Quebec, Canada

Could whale-watching replace whaling in Japan?

Newly created Japan Whale and Dolphin Watching Council to promote marine mammal ecotourism. As interest in whaling wanes, tourism offers a lucrative alternative.

Japan has long had a bad reputation for the killing of whales and dolphins, practices that persist despite mounting international criticism and a recent U.N. ruling that declares the country's whale hunts illegal. However, the tide of public opinion is also turning; a 2012 poll found 90 percent of respondents hadn't bought whale meat in a year. As Japan's interest in whaling wanes, another, more mutually beneficial industry is helping take its place: whale watching.

Tour operators from across coastal Japan recently gathered in Tokyo for the inaugural meeting of the Japan Whale and Dolphin

Watching Council, a new organization to promote marine mammals as ecotourism resources.

200 whale tour operators

Japan already has a robust whale watching industry, despite overshadowed by its notorious whale and dolphin harvests. Established in the 1980s, it now includes 200 tour operators who served more than 200,000 tourists in 2013. With a yearly growth rate of six percent, Japan is actually in the top ten percent of the global whale-watching market.

Customers are Japanese

Most of the customers on these

tours are Japanese, said Matthew Collis of the International Fund for Animal Welfare (IFAW). This suggests the industry is capitalizing on and possibly even encouraging a cultural shift in the way Japan interacts with the cetaceans residing off its coasts.

New generations

"I think it's demonstrating that there's a new generation in Japan that doesn't look at whales as food, but looks at them as the living, breathing, magnificent creatures that they are," said Matthew Collis. "Whales are far more fun to shoot with a camera than with a harpoon." □



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Unlike other remote dive areas, Wakatobi is comfortably reached by direct charter flight from Denpasar, Bali, to the resort's own airstrip. No need to worry about whether your gear is going to make it onboard a domestic flight to some far away airport. This is luxury all the way.

With more than three staff members for every guest at the resort, your every need will be catered to before you even knew you had it.

Dates at Wakatobi are 9-19 January 2015. The latest departure from the United States is January 6, and Europe, January 7 (for latest January 8 arrival in Bali), returning January 19, 5:30PM or later.

On the way to the resort we need to overnight on Bali at least one night, but you may wish to arrive a few days earlier and spend a few days on Bali as there's so much to do on this magical and very beautiful island, filled with what may be the most gentle and gracious people in the world.



Wakatobi Workshop Week 2015

9-19 January 2015

Resort stay:

- 10 nights with 9 days of diving and charter flight (January 9-19 2015)
- Palm Bungalow: USD 5,192
- Ocean Bungalow: USD 5,762
- 1 BR Villa: USD 7,852 (with private dive guide and butler)
- 2 BR Villa: USD 10,132 (with private dive guide and butler)

For a better idea of the rooms at Wakatobi: <http://www.wakatobi.com/amenities/rooms.html>. Have a look at this brand new not-yet-made-public 360° virtual tour of Wakatobi, too.

Flights:

In addition to the above you need flights to DPS, Denpasar, Bali (approximately US\$1,500 for an economy return ticket) as well as your overnight there (US\$200). More information on the Bali stopover is available upon request.

Trip includes:

Meet and greet at Bali's international airport when you arrive; curbside check in (at DPS) to Wakatobi's air charter; standard luggage allowance on charter flight, VIP lounge on departure; comfortable accommodations in your choice of room; delicious and varied meals (breakfast, lunch and dinner);

24-hour coffee, tea, hot chocolate or drinking water; daily turndown service; romantic private dinner on secluded beach; warm towels, hot drinks or water and snacks on boat dives; complimentary in-room Internet access; aromatherapy bath products in all rooms; three 70-minute boat dives daily AND unlimited shore diving; dive and photo gear porter service on boats and shore dives; guided village visit on penultimate day; significant contribution to Wakatobi's award-winning conservation program.

Optional extras:

Spa treatments; nitrox fills, (O₂), (He) and rebreather absorbent; sodas, beers, wines, cocktails, cigars; à la carte meal items or snacks; laundry service; FLUO diving or snorkeling; private Dive Experience Manager (included with Villas); full scuba gear rental package; specialty and advanced scuba certification courses; "Best Friend in Town" VIP service for your Bali stopover

Topside activities:

The main attraction at Wakatobi is, of course, the world-renowned diving, but you can also enjoy snorkeling, kayaking, cave explorations, stand up

paddle boarding, kite boarding, wake boarding, yoga, wonderful spa treatments, tours to local villages as well as romantic dinners on the beach for just you and yours.

Wakatobi has facilities to make a stay very comfortable for travelers of all ages. The resort is one of the most remote on Earth and as such there are no other development outside of the resort itself. No restaurants, no hotels, no shopping... nothing except some basic local villages. That said, the resort's own restaurant is truly spectacular offering a very wide range of dining options. You could travel here just for the dining! There is also a very nice boutique at the resort where you can buy clothing items and necessities.

Wakatobi is a great place even if you (or your spouse) do not dive. The snorkeling is out of this world, and they have dedicated snorkeling guides. As a snorkeler, you can join the dive boats throughout the day (so that non-divers are not left on land alone all day). There are comfortable facilities on the boats with drinks, snacks, tiled toilets with showers, etc. Watch a **video** showing the reefs found at Wakatobi □

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Ron Akeson

1957-2014

Mission Well Done

Text and photos
courtesy of Barb Roy

I don't think a week ever went by where I didn't hear Ron tell someone at his Bellingham dive store, "My motto in life follows the saying: growing old is mandatory, but growing up is optional." If you ever had the pleasure of knowing or meeting Ron Akeson, you probably understood how he viewed life, because he truly believed in trying to squeeze in every little bit of living into each and every day!

On 23 April 2014, the northwestern part of the United States and Canada lost a true pioneer of diving as wreck explorer, Ron Akeson, passed away due to complications after a dive accident. The reason is still under investigation, but family and close friends surrounded him until the end. A cascade of grief seemed to grip the local dive community in a domino effect as more and more heard of his passing. Multitudes continue to call in, shocked to hear their mentor, past dive instructor and friend would no longer be around. Ron was also a contributing writer for *X-RAY MAG* for many years, specializing in technical diving articles.

As the owner of Adventures Down Under, a retail travel and full service dive store in Bellingham, Washington, Ron's reputation for his dive training, vast knowledge, technical dive expeditions and great stories preceded him everywhere he went. He loved diving like no other activity. When he wasn't able to go diving, he enjoyed hiking in the mountains, kayaking, bird watching, filming wildlife and teaching others to dive.

History

I first met Ron in Alaska when I was running a dive store and local dive travel business. He wanted to write a story about diving in Alaska for

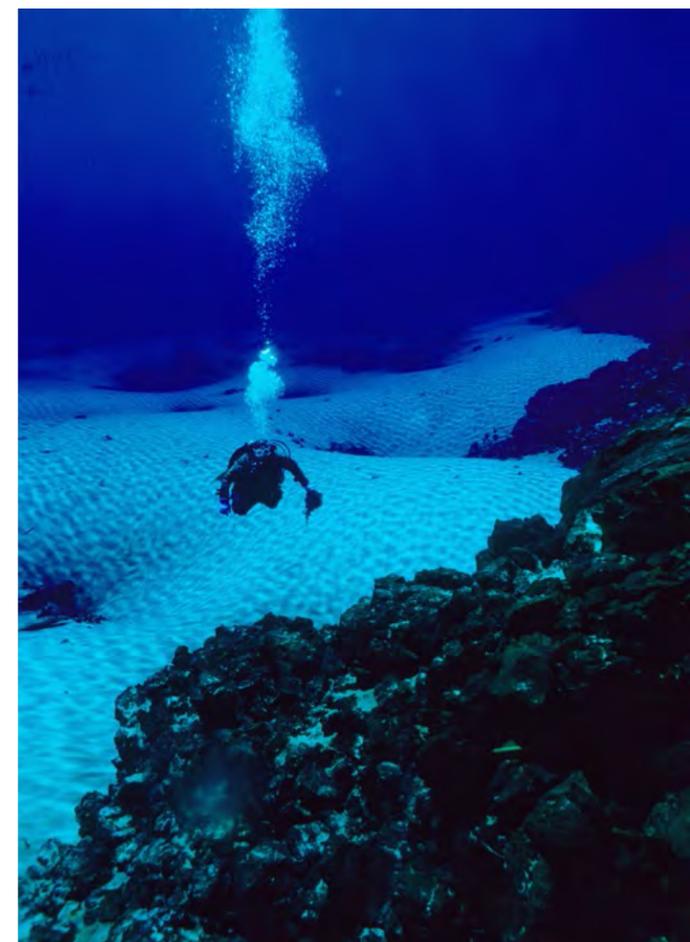


Skin Diver Magazine so I took him to my favorite sites. That was around 1985. We quickly became good friends, and I began my underwater photography lessons with a Nikonos III camera in exchange for introducing him to the critters of Alaska above and below the water.

That was a long time ago. Since then Ron has provided my technical diving instruction, been a strict proofreading editor for all of my stories and has passed on to me a portion of his massive marine critter identification knowledge (he is also a marine biologist). We have enjoyed countless discussions of shipwrecks and future dive sites we wanted to explore over gallons of coffee and green tea.

Wreck diving

I believe wreck diving was his greatest passion though. As a founding member and president of the Maritime Documentation Society (MDS), Ron was always



CLOCKWISE FROM ABOVE: Ron Akeson at propellor blade of HIJMS *Nagato*, Bikini Atoll; As a dive instructor, Ron often led dive trips to Port Hardy, British Columbia, Canada; Ron diving Clear Lake, Oregon, and with vermilion rockfish in Hood Canal, Washington State, USA



As a technical dive instructor, Ron was a favourite, as he shared not only a wealth of knowledge and advice but great stories too

was to dive in the world, he always replied: "Right here in the Pacific Northwest, hands down! We have so much color and diversity of life in our own backyard; you just have to get out and go see it."

Fond memories

When my husband, Wayne, could not dive with me, Ron usually filled in, anxious to have another chance to jump in with his engine block. The last dive Ron and I enjoyed together was this past March under the Deception Pass Bridge on Whidbey Island in Washington State, while on *Lu Jac's Quest*—the boat Ron always used for his San Juan Islands charters (in Washington State). It was a beautiful day and visibility underwater was great. The amount of life reminded me of why I dive cold water.

"Ron taught me how to dive Deception Pass," commented Phil Jensen, owner and operator of *Lu Jac's Quest* dive boat, "He taught me how to take a group of divers in there and choose the right slack current time for them to jump in. He always knew what day would be best too. He

lining up deep wreck expeditions and activities for the team. During their many journeys, Ron would always be seen lugging around his massive professional Gates video system with dual strobes that could turn night into day. He liked to refer to his housing as his engine block! I'm sure those who had to lift it out of the water would agree with this description. Personally, from carrying it a few times myself, it seemed more like a freight train engine! Nevertheless, from the film clips we viewed after dives, the footage was spectacular. He loved his team like family.

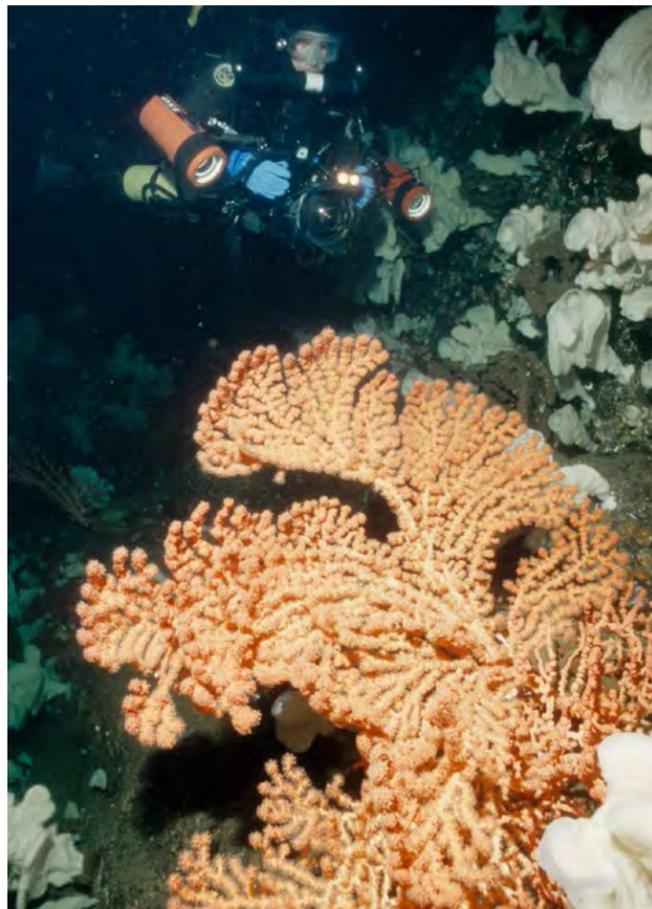
Ron did enjoy owning a dive store though, but those of us who knew him best liked to tease that he needed the store to support his wreck diving addiction. On several occasions Ron told me he never tired of introducing new divers to the fascination of what the underwater world had to offer, especially here in the northwest. And when asked where his favorite place



picked his technical dives that way too."

Rob Wilson, friend and MDS founding member felt the same way, "Ron always planned all of our tech dives. He would have everything all planned out—which wreck we would dive on, when to jump in and how long we would stay. We just showed up and followed his lead. He will be missed but we plan to continue doing what we all love to do—diving on and exploring wrecks. He would have wanted that."

Ron was also an active member of the Washington Scuba Alliance (WSA), serving as their president then vice president for many years. For over five years he served on the board of directors for the Dive Industry



Ron helping to clean the HMCS *Annapolis* before its sinking as an artificial reef (left) and with gorgonian sea fan at Agamemnon Wall (above), British Columbia, Canada

Ron Akeson

Association of British Columbia as a U.S. representative. He was also actively involved with the Marine Resource Committee (MRC) in Whatcom County and worked with his local Whatcom County Dive Rescue Team. The list goes on...

Not only does Ron leave behind countless friends, students and business associates in the dive community but also a sister, Jeannette, who resides in southern California; his four stepchildren, including Tallen Patrick, who many divers have met working by his side in the store for over five years; and nine grandchildren.

With each passing day, I am realizing just how often Ron and I talked on the phone, almost daily.

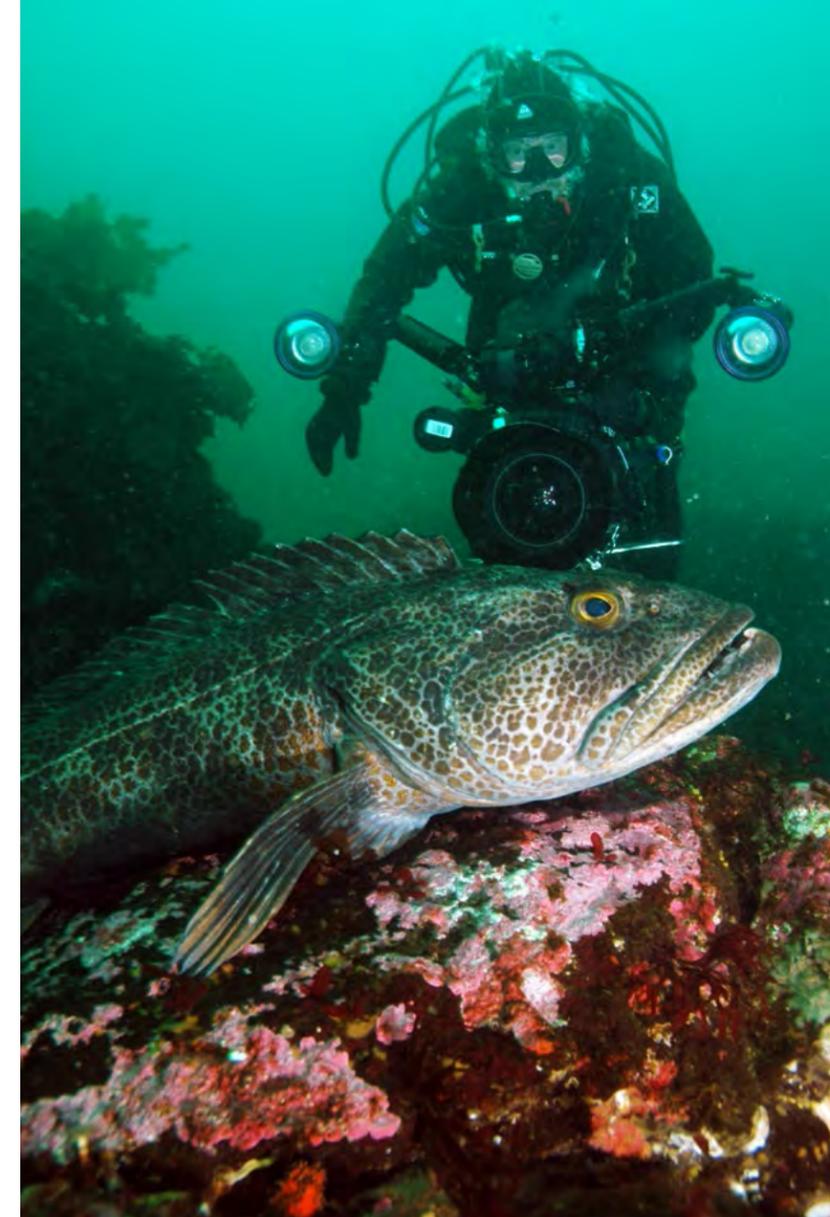
He touched so many lives around the world with his dive stories, photography, wisdom, advice and friendly attitude.

I would like to close this story about him with what I feel is an appropriate quote from Abraham Lincoln: "It's not the years in your life that count; it's the life in your years!"

Memorial

A Celebration of Life was held for Ron Akeson on Sunday, 22 June 2014, at the Squalicum Yacht Club in Bellingham, Washington.

I have decided to assist Tallen Patrick in continuing her father's legacy in helping her open a new dive business in the same location, 2821 Meridian Street in Bellingham, Washington State, beginning in July 2014. Watch for more details to come. □



Editor Barb Roy with Ron Akeson on dive trip in California; Ron with lingcod in Hood Canal, Washington State (top)



Italy's
Ponza Island

Text by Sabrina Belloni
Photos by Franco Banfi

— *The Isle of Circe the Sorceress*



Red and yellow gorgonian sea fans on wall of reef off Ponza Island



View of Ponza's harbour. PREVIOUS PAGE: Diver with red gorgonia at Le Formiche

The power of the island of Ponza lies in its ability to preserve an intangible aura of magic, which nature has given it, in the marriage of heaven and earth, water and fire, in the racing of land and sea after each other, relentlessly.

The archipelago of the Pontine Islands is an inexhaustible source of surprises, with its extraordinary landscapes, cliffs, caves and laces of rocks. The island's coasts are very jagged, formed mostly by high banks of volcanic rock, tuffaceous and vulcanite structures of wonderful colours. The only exception is Zannone, which is formed by limestone and dolomite, and looks like a gem. It is so green, covered with Mediter-

anean shrubs. All are characterized by a succession of small coves, bays and inlets that give them a special charm.

The charm of the island of Ponza, one of the most beautiful in Mediterranean Sea, remains unchanged, year after year; at sunset, the sun colours the sky red and the rocks pink—a thin strip of rose on the horizon, a line dividing the turquoise of the sea from that of the sky.

When getting to Ponza from a city, it always seems a bit like a step back in time. A short ride on the sea and everything changes—the sounds, the smells, the atmosphere. Whenever one discovers Ponza from afar, one sees the same magic; its slim profile seems to be the gateway to an archipelago that doesn't exist. A crest of tuffaceous rocks that rises vertically from the crystal clear water, and climbs up,



Seahorse in seagrass



Ponza



View overlooking the rugged and varied landscape and coastline of Ponza Island

running sinuous upon the sea, forming bays and inlets. It doesn't change while climbing through the narrow streets of the countryside, or on the heights of the island, towards the village of Le Fornace, where the houses seem to be balanced on the sharp ridge overlooking the two sides.

Ponza should be experienced in autumn, when the time of the pink sunset comes earlier and lasts longer, or in spring, when the island is covered by yellow blooms. September is a wonderful month: the summer tourist chaos gives way to the tranquillity of the island; the sea is crystal clear; the water turns blue or emerald green, depending on the time of day and the depth of seabed; the creeks are almost deserted; and the rocks appear to have sunnier and warmer colours.

In autumn, the beauty of Ponza pervades the streets and the staircases

that climb to elevated places, along the lines of the hills, where the eye sweeps over a breathtaking horizon. And breath taking, too, because of the effort to climb up the steep stairs, the muscles of the legs groaning, the breath becoming short. But it's all worth it, because below, one can see a panorama of rocks sculpted by wind and sea, the wide expanse of the Tyrrhenian Sea criss-crossed by white trails of small boats of a few tourists and a few fishing boats. Gusts of wind carry delicate scents of Mediterranean flowers and play on the waves. When the winds turn violent, they rush through the lanes and stairways, sculpting the rocks as if they were smoothed by the carving and expertise of an artist.

A walk to the promontory of Mount Guard takes us to the homonymous lighthouse on the southern side of the island. It is one of the best sites to go

ISLE OF CIRCE THE SORCERESS

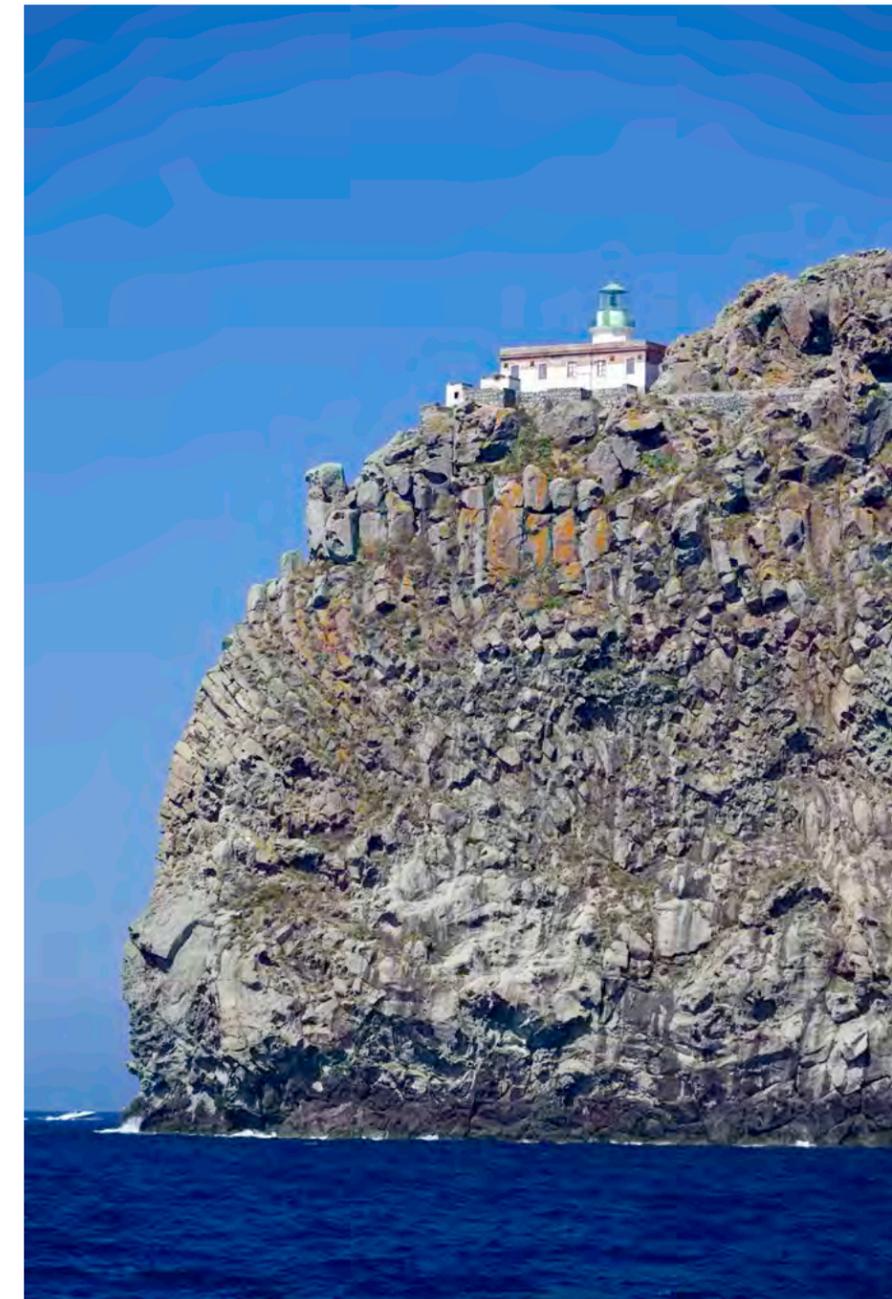
Suspected to be the mythical island of Aeaëa in Homer's *Odyssey*, Ponza Island is thought to house the cave of Circe, the sorceress who bewitched and seduced Odysseus, living with him for over a year, and turning his men into animals. Known today as Grotta della Maga Circe, the cave is located on the west side of the island, between Chaia di Luna beach and Capo Bianco. Apparently, there are archaeologists looking for evidence of Homer's *Odyssey* on Ponza today. □

SOURCE: WIKIPEDIA

to see one of Ponza's famous sunsets, when the calm sea becomes golden and the sun sets over the horizon.

Dive operation

Similar to the harbour of nearby Ventotene Island, the main harbor of Ponza is a blaze of joyful colours and history as well as the hub of life on the island. Here at the harbor, fellow divers and I are awaited by Andrea Donati and



Faro della Guardia, lighthouse of Mount Guard; Church of Ponza (top)



Ponza



Tanks and gear inside the dive center

LEFT TO RIGHT: Cave with encrusting red sponge; Ponza Harbor; Dive boat *Neptune*

the team of Ponza Diving Center: Daniela, Maria Paola and seasonal workers—a close-knit group of professionals devoted to and passionate about diving—who have made customer satisfaction a modus operandi, and safety and environmental protection a calling card, leaving nothing to chance. Last but not least, they offer delicious dishes from the kitchen of the dive boat *Neptune* during full-day dive trips.

The 16m-long *Neptune* is the flagship of the diving center—a fishing vessel that has been completely renovated and adapted for diving, with

a spacious, comfortable, furnished sundeck. Normally, it is moored in front of the door of the diving center, from whence guest divers discover the most beautiful dive sites of the island, with different characteristics and depths.

In recent years, Andrea Donati—the director and owner of Ponza Diving Center—has started specializing in rebreather and technical diving. Even in diving, as in all things, there is a trend, which has led to more and more divers going down into the water on CCR. Andrea firmly believes that beyond the high performance

that helps divers survive underwater on a rebreather, CCR's are much safer than open circuit. And he aims to encourage and help divers to try this different experience as well as support technical divers who like to play safer, longer and deeper.

Diving

The unifying feature of all the waters surrounding the islands of the Ponza's

archipelago is the extreme clarity, with backdrops that offer spectacular views and a set of colours and contrasts that are really unique.

While the natural world of the island has lost most of its native species, replaced by flora and fauna introduced by the inhabitants, under the surface of the water, nature has remained healthy, with an extraordinary richness of life that makes these





Ponza



Mediterranean fairy basslet at La Botte (left); Octopus on reef (above)

saic of environments that support the establishment of diverse benthic life. In the shadows, the rockslides are covered by bright orange-coloured colonies of *Astroides calycularis*, one of the few Mediterranean representatives of the Madreporite stony coral genus.

At the base of the walls, small tunnels and caves open up. Here, the darkness favours the establishment of typical biotic communities, with sciophilous characteristics that are usually seen in much deeper areas. Among the cascade of boulders and rocks full of holes and crevices, it is common to encounter octopuses and moray eels, blennies and damselfish, white bream and sea bream. There are huge and healthy fields of *Posidonia oceanica* seagrass.

Dive sites

Le Formiche. One of the most popular sites is definitely Le Formiche, a group of rocky outcrops that emerges in the southeastern side of the island, in front of the stacks of Calzone Muto. Le Formiche spreads out over a vast area of seabed and therefore offers different paths, allowing for multiple dives. Here, divers can swim among giant collapsed boulders that have holes where fish settle; or among lush meadows of seagrass, miniature forests where dozens of unusual and curious creatures rest, especially visible during night dives; or, if one prefers, the steep walls that descend to the sandy bottom at a depth of about 50m.

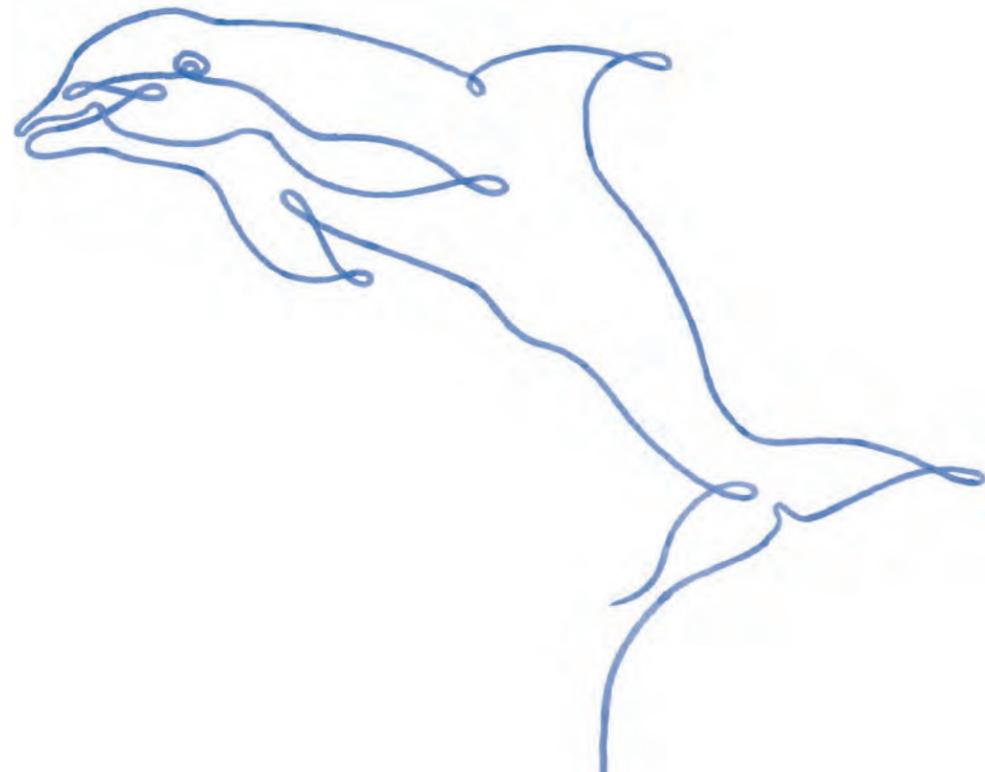
These walls, especially in deep and shadowy areas of the northeastern



Cleaner shrimp and moray eel (above); Small rockfish inside a shell (top)

SEACAM

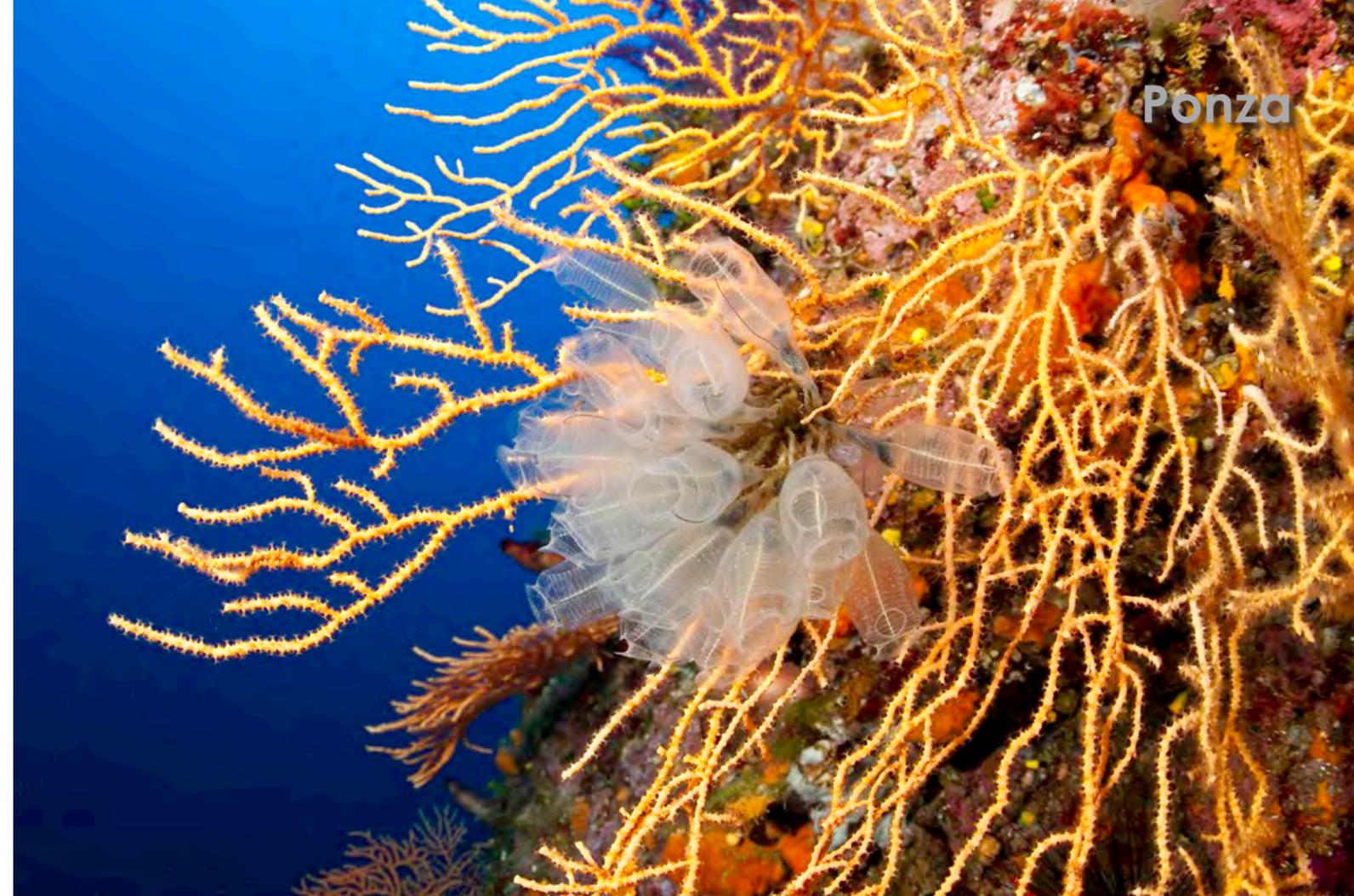
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www.seacam.com



Ponza



Hypselodoris fontandraui nudibranchs (left) Tunicates on yellow seafan at Le Formiche (above); Yellow cluster anemone at La Botte (below)

covered by *Parazoanthus axinellae*, or yellow cluster anemone. The arch is on the threshold of a wide canyon that narrows gradually. Divers swim in single file, being careful not to damage the walls, and arrive in a beautiful round cave. On the return, halfway into the canyon, divers come to a tunnel connected to the rocky plateau from which they started the dive, and find themselves under the dive boat, *Neptune*.

dive, recommended only for experienced divers.

Here, divers dive into absolute blue waters and follow the anchor chain down to the top of the bank, at a depth of 34m. The long descent offers one a feeling of total aloofness from the known world

side, are exposed to the currents of the east and colonized by red gorgonian sea fans and dense colonies of yellow gorgonians (*Eunicella cavolinii*). They are home to an exceptionally rich ecosystem, colonized by crinoids anchored on gorgonians, as well as sea slugs, forkbeards and groupers.

connected to the rocky plateau from which they started the dive, and find themselves under the dive boat, *Neptune*.

Secca of Punta Papa. On the western side, beyond the Faraglioni of Lucia Rosa and the cape of Capo Bosco, there is a fascinating spot—the Secca of Punta Papa. It is a challenging





THIS PAGE: Scenes from the wreck of the LST 349

and prepares you to enjoy the marine life that lurks beneath.

A cloud of frantic damselfish greeted our group. We passed over them and stopped at our ascent point. Now we needed to reach the depth limit as soon as possible, down along a wall that ended at a depth of 56m on a sandy bottom.

The wall was colonized by large red and yellow sea fans, oriented in the direction of the current, where the long antennae of lobsters could be seen peeping in and out. Among the crevices, we saw some moray eels and a pair of octopuses.

Unfortunately, at these depths, the minutes of decompression stops builds up fast, and our bottom time was penalized. For us it was time to go back, a journey that gave us some opportunities for long views into the blue in search of some pelagic fishes that often frequent the bank.

This is probably one of the reasons why Andrea, a TDI Instructor, is now specializing in technical diving with Inspiration and JJ rebreathers. Sometimes he whizzed by us with an underwater scooter, a comfortable Zeuxo, with which we admired his twirls and excellent agility.

Punta Papa wreck. Not far from the Secca of Punta Papa, there is a dive suitable for



everyone. It is the wreck of Punta Papa, the LST 349 (Landing Ship Tank)—a flat-bottomed boat used for the transportation of the troops and trucks of the Allied forces during World War II.

She was launched on 7 February 1943



Ponza



Wreck of the LST 349, a British Landing Ship Tank sunk in 1944



Ponza



TOP TO BOTTOM: Nudibranch, seaslug and tubeworms

Cuttlefish (left); Invertebrate (above); Diver with scooter at rock with yellow cluster anemone and bryozoans, La Botte (above)

subsequent explosion of her boilers caused the ship to brake in two.

The bow lies in a perfect position for navigation to a depth of 26m. Its dark shape, which stands out on the white sand, offers a truly evocative scene. On the main deck, winches and machine guns are still present, while below deck divers can explore the holds that now provide shelter to some conger eel, small moray eels, scorpion fish and other marine life. The surrounding sandy bottom is littered with wreckage. Unfortunately there is not much left of the stern. It lies not far away, at a depth of 20m.

Punta Madonna. Another easy dive, suitable for all, is Punta Madonna, which is a fascinating site for

a night dive. It is only a few minutes from the port, behind the Grotte di Pilato.

At dusk, we moored the *Nep-tune* behind the stacks of the Punta della Madonna cape and dived to a depth of only seven meters—a dive which gently sloped down towards the sea. Along the wall we saw small groupers, very colourful sponges and tubeworms. On the sandy bottom, millet butterflyfish sifted the sand in search of prey.

At about 18m, we encountered some rocks around which a group of striped white bream swam. The light of day gave way to the shadows of the night and the sessile fauna, illuminated by our torches, fascinated us with its bright colours.

The vault of an arch was com-

pletely colonized by beautiful orange *Astroides calycularis* coral. A curious cuttlefish, with the characteristic w-shaped eyes, watched us trying to go unnoticed, making its mantle quiver with the rhythm of the surf, suspended above a prairie of Mediterranean seagrass. We climbed back into the boat that was now dark, but the lights of the harbour welcomed us as soon as we turned the corner around the Cape and the Red Rock.

Topside excursions

There are many topside adventures to enjoy on Ponza Island. Bring comfortable and light casual clothing, a sweater for cooler evenings, comfortable walking shoes and a map if you want to hike and



and assigned to military operations in the Mediterranean. The vessel sank a year later, on 26 February 1944 at Cala dell'Acqua because of a storm that caused the ship to break on the rocks. A



CLOCKWISE FROM TOP CENTER: Sea urchin; Cnidarian on seagrass; Stingray resting on sandy seafloor; Diver with sidemount investigates sea fans on reef

Inside Ancient Roman *murenario* (left); Piana Bianca rock formation at Ponza Harbour (above)

ty of tourists.

The boat tour continues to Punta Santa Maria, which welcomes visitors with its many coloured houses that give the island its unique character. The tour continues past a rugged coastline and arrives in the Baia del Frontone.

After passing the famous rock known as “La Foca” in the bay of Punta Bianca, the tour boat will reach the Cala del Core, which has a wide pebble beach. Here, visitors arrive at the Scoglio del Parroco and the unsettling Cala dell'Inferno, named for the famous remains of a wrecked ship.

After Punta Nera and Faraglione of Antonio Aniello, the tour boat reaches Cala Spaccapolpi which lies next to a natural arch.

Further on, visitors can see Cala Felce, Cala Caparra, Capo Rame, Punta Beppe Antonio, Cala Cecata, Cala Cavone, Punta di Papa and Cala dell'Acqua, where ships procure the island's water supplies.

Turning around Punta Corte, visitors see a wonderful show: the Cala Feola, one of the most fascinating corners of the island. You have to explore the beach of Lucia Rosa, Punta Capo Bianco, with its caves, and Chiaia di Luna, a wide sandy beach surrounded by a wall of clear rocks.

The tour of the island ends with the Punta del Fieno, Punta della Guardia, the inlet of Bagno Vecchio, the Faraglioni del Calzone Muto and Punta della Madonna.

Afterthoughts

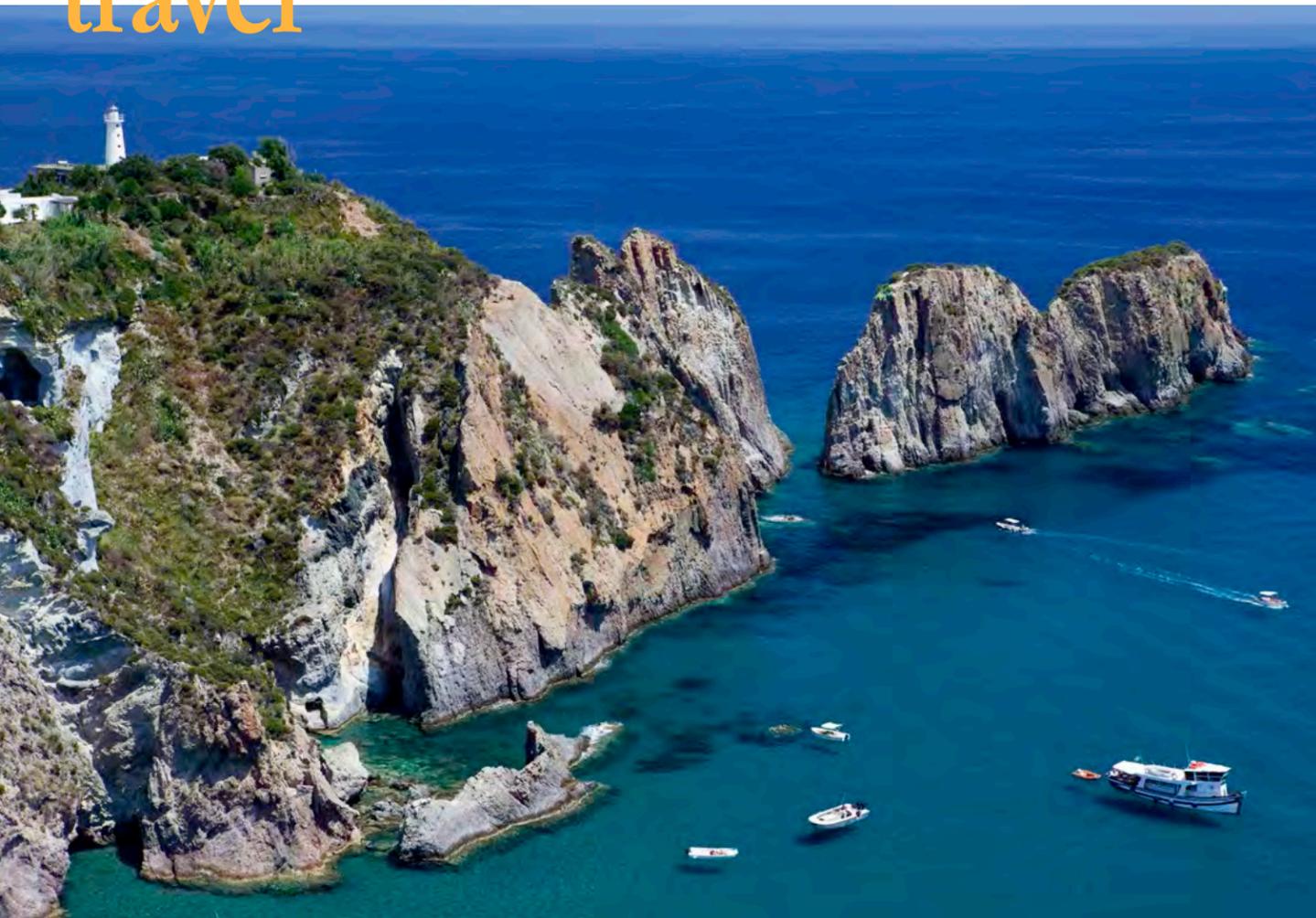
Ponza Island has some of the most beautiful and wild dive sites of the Tyrrhenian Sea. There is an ease of access to the diving; with just a few metres from the diving centre to the dive boat, trips are run by a professional dive team and a functional dive center. And the diving is suitable for rebreather and technical divers, with relatively cheap dive packages. Honestly, I didn't find any minuses to the place except perhaps that while English is spoken, German is not. However, this is Italy after all, and in town, there are superb restaurants, pizzerias, pubs and wineries serving excellent fare at decent prices. □



explore the island.

The tour around the island by boat requires a few hours. The boat tour passes by the two beaches of St. Anthony and Giancos outside Porto. They are very easy to reach and because of this reason, unfortunately, there are plen-





continues to Formia and Anzio Harbour. By train, you can get to Ponza Island from the railway stations of Formia and Anzio. Reaching the station you will walk (5 minutes), following the signs to the harbour. By car, you must get to the harbour of Anzio. From Rome, you can take the highway, then the mainroad Pontina towards Latina, exit at junction Anzio-

Nettuno, continue on the road following the signs for Nettunense Anzio. By boat, the season to reach the island of Ponza on a ferry are mainly in the summer. Check with the ferry service for times of departure.

From Anzio and Formia: Hydrofoils Vetur www.vetor.it Motorboat Laziomar www.laziomar.it

From Terracina: Motorboat Snap Navigation www.snapnavigazione.it

From Naples: SNAV hydrofoils www.snav.it



Parmesan cheese wheel and sausage (far left); Red chili peppers in shop window (lower left) and fruit and vegetable stand in Ponza (below)

Diving and lodging

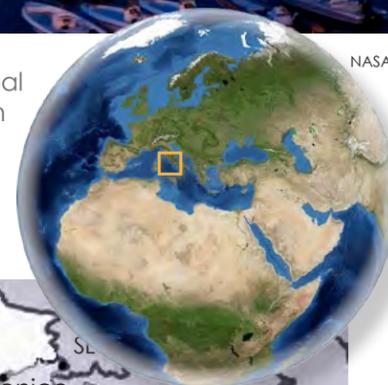
The center rents out Mares equipment, Santi drysuits, JJ rebreathers, and Teseo and Zeuxo underwater scooters. Write an email to the diving centre to get advice on travel, accommodations, restaurants, etc. Apartments are also available to rent, and the dive centre can help you find what you are looking for. As for telecommunications, hand phones with national operators work properly. Visit Ponzadiving.it or email: info@ponzadiving.com

Franco Banfi is a widely published, award-winning underwater and wildlife photographer and author based in southern

Switzerland. His work has been published in Animan, Focus, GEO, National Geographic Italy and Terre Sauvage. He has won awards for his images from the Travel Photographer of the Year 2011 competition, Nature's Best Photography Ocean View Photo Contest 2011 and the 2010 International Photography Awards. Visit: www.banfi.ch



RIGHT: Global map with location of Ponza Island
BELOW: Location of Ponza Island on map of Italy



Bali's Tulamben

Text and photos by Nick Shallcross
Wreck photos by Christian Loader

— *Muck Diving Heaven*





Pair of Coleman shrimp on a fire urchin. PREVIOUS PAGE: *Risbecia tryoni* nudibranch

Standing on the beach staring out at the deep blue water, it's hard to imagine a world so vibrant and full of life lying just a few meters away from our feet. My dive group and I shuffle slowly into the water, careful not to slip on the smooth black stones beneath our boots. With all our gear in place and a quick press of our deflators, we descend down into this beautiful wonderland hidden just below the surface.

Tulamben

Widely known as one of Bali's most popular diving destinations, Tulamben was put on the diving map after the discovery of the USAT *Liberty* wreck lying just meters offshore. Once a sleepy fishing village, it has now been transformed into a world famous dive destination, and for good reason too. Located in the North East of the island, Tulamben sits in the shadow of Mount Agung, Bali's highest volcano. Its name even derives from the word *batulambih* meaning many stones, a reference to Mount Agung's destructive past. It is these eruptions that have shaped the region into what it



Tiny juvenile clown frogfish near the *Liberty* wreck



A local porter carrying dive equipment to the beach



The main street running through town is lined with flowering trees

Tulamben

through the middle with nothing more than a handful of restaurants, bars and shops, and of course, plenty of dive centres.

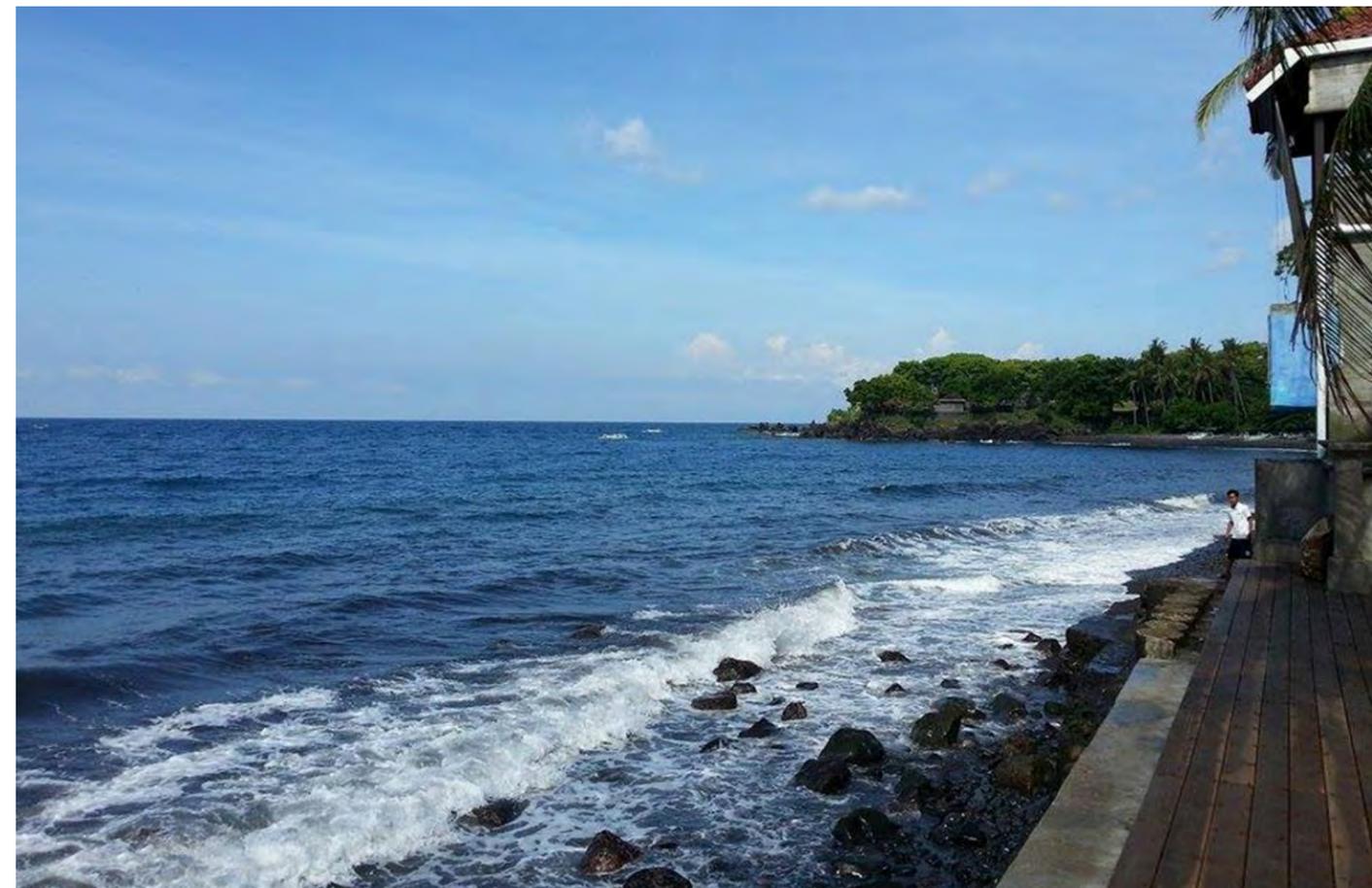
There is limited access to ATM machines, with only one located in the town so don't forget to bring enough cash for your stay or ask your driver to stop at one of the many moneychangers along the way. Most dive centres take payment by card for the diving but you will need cash when paying for meals in town or any other activities. As far as eating goes, there are a few options in the dive resorts and around town with restaurants and bars offering both local and western dishes to suit everybody's taste. Local

dishes such as Gado Gado, Nasi Campur and the various Satay sticks with delicious peanut sauce are all delicious and fantastic value.

If you find yourself with some free time when not diving, take a drive to the nearby temples and water palaces to take in some local history and culture, visit neighbouring town Kubu for some relaxing Spa treatments or even just take a walk in the hills behind the town to get a feel for the spectacular scenery. No trip to Bali is complete without a stop off in Ubud, located high up in the hills on the way back to the airport and making a great stop off for a few nights before heading home. Visit the local markets and

is today and gives the landscape above and below the water a very distinctive feel.

The fishing trade that once drove the town has made way for the diving industry leaving the protected waters in the surrounding area teeming with marine life. The many people who would have once played their part in the busy fishing scene now keep the booming diving industry heading in the right direction by carrying out important jobs such as expert dive guides, Jukung boat drivers and tank porters. These porters can often be seen carrying up to 3 full sets of equipment on the back of their bike or balanced effortlessly on top of their heads without even breaking a sweat, don't try that at home! The town itself still has that sleepy village feel, with one main road cutting



View looking down the bay towards Drop Off



Peacock mantis shrimp (left) emerging from its burrow; Scorpionfish (right) resting on a sponge; *Glosodoris atromarginata* nudibranch (lower right) sitting the current

tanks, the ease of diving in Tulamben was a welcome surprise. With our masks, fins and cameras in hand, we followed our expert guide on foot to the various entry points at the beach and moments later, our gear would arrive balanced on the head of one of the porters or piled up on the back of a motorbike ready to go diving. When we were done, we simply left our tanks lined up at the beach and our guide would call out to a passing porter on the short walk home, and the gear would then arrive back at the dive centre ready for a full tank of air for the next dive.

The entries can be a bit wobbly and thick-soled div-



jewellers, take a scenic stroll through mile upon mile of rice paddies or even white water rafting for the more adventurous.

Diving

Most of the diving in Tulamben is done from the shore along the large curved bay making the cost of diving incredibly low. Prices start from as

little as US\$20 per dive and most dive centres offer accommodation and diving packages to keep things easy. There are loads of dive centres in and around town to choose from, with most of them situated within walking distance of the beach. After seeming to spend most of my working career in the dive industry loading boats or trucks with dive equipment and



Crinoid squat lobster



sloped off into the distance making for an easy relaxed descent. At around 6m the stones give way to a black volcanic sandy sea floor, which is home to the huge variety of fish and critters that make

ing booties are recommended to protect your feet while getting in and out. I had my camera passed to me once I was in the water and fully kitted up to minimize the risk of it being dropped while getting in. Wading out just a few meters however, the seafloor slowly

Tulamben so popular with underwater photographers. The bay itself is home to many dive sites, most of which are accessible from the beach, the most famous being the Drop Off, Coral Garden and of course the Liberty Wreck. Conditions at these dive sites



LEFT TO RIGHT: Huge frogfish lying in wait for its next meal; Ornate ghost pipefish; Longnose hawkfish on the wall at Drop Off

cater for most divers experience levels, with generally mild currents and great visibility and all sites can be dived at various depths.

Coral Garden.

Lying in the centre of the bay, the Coral Garden hosts a huge coral reef spanning over 100m across the sea floor at depths of 5–12m and provides plenty of photographic opportunities, both macro and wide angle. With its sheer size and abundance of marine life, you can spend dive after dive swimming between the beautiful coral formations.

This area of reef gives everyone something to see, whether that is sitting back and watching the schools of snapper and sweetlips dance their dance or get your face right in close to search for the smaller things the reef has to offer. Keep

an eye out for cuttlefish impressively camouflaging themselves with their surroundings, or catch a glimpse of the stunning blue and yellow ribbon eels.

These delicate little eels are usually seen with their heads poking out of their burrows, but it's easy to see how they get their names when you see one swimming freely along the reef. I found myself momentarily mesmerised by a small black and yellow object fluttering towards me just like a ribbon on the end of a stick. It wasn't long before it disappeared into a small crack in the reef and my brief hypnosis came to an end and it was time to catch up with the group.

Have a look out into the blue every now and again to have a chance at seeing some of Tulamben's rare sightings like the occasional blacktip reef shark and Napoleon wrasse.

Drop Off. Head towards the southeast corner of the bay, you will find the Drop Off, a stunning selection of lava flows



Brightly coloured ribbon eel



Hypselodoris infucata nudibranch



jutting out into the bay. You can either enter from the beach or rent one of the many Jukung boats to take you a little further round the headland for a change from the usual shore dive. When entering from the shore, we usually started from an area known as The River, which for most of the year is a dry riverbed running down from the hills and out into the bay. During the wet season, this is the main source of the sediment that settles on the seabed. This area at the start and end

of the dive is famous in itself for the infrequent sightings of the bizarre critters like mimic octopus, skeleton shrimp and tiny juvenile frogfish. Descending down past this sandy plateau you soon find yourself staring down over the Drop Off. Depths here vary from the shallow reef down to 12m, before a sheer vertical wall drops down well in to technical diving ranges. It is here where you will find a vast array of fish and stunning scenery along the face of the steep



Frogfish (left) on an artificial reef at Seraya Secrets; Anemone shrimp (above) in its protective home; Tiny pygmy seahorse blends perfectly with its surroundings (right); The brightly coloured *Nembrotha cristata* nudibranch (lower right)

sloping rock faces that plummet down to the depths below you. Scour the rocks as you slowly swim along for longnose hawkfish, hairy squat lobsters, soft coral crabs and leaf scorpionfish among many other things. Look carefully in the huge sea fans to find the elusive pygmy seahorses

that without the expert guidance of our guide, Komang, we would have easily missed. Once presented with a large gorgonian sea fan, he gestured to us to search the fan ourselves to see if we could spot them. After a few minutes of staring cross-eyed we finally found one,



Leaf scorpionfish on the wall at Drop Off



Tulamben



Seraya Secrets. Travelling a little further South, Seraya Secrets is a must see for any real macro enthusiasts, accessible by car only a short drive from the main town. With no real major coral formations, the gently sloping black sand is home to some of the amazing critters that make the area famous for macro diving. Seahorses, nudibranches, frogfish, Coleman's shrimp and harlequin shrimp are amongst some of the marine life you are likely to see while exploring the sandy ridges. The rich abundance of macro life makes this many divers' favourite site in the area, providing many interesting macro photography opportunities.

camouflaged almost perfectly with the fan behind it. Ecstatic and very proud of ourselves, we turned to Komang who sat quietly giggling to himself while signalling to us that there were another five living in the same sea fan. Admitting defeat we invited him closer to effortlessly point them out for us.



CHRISTIAN LOADER / SCUBAZOO



CHRISTIAN LOADER / SCUBAZOO



CHRISTIAN LOADER / SCUBAZOO

The wreck

Without a doubt the most popular dive site in the area, the USAT *Liberty* wreck is what made Tulamben famous as a dive destination and really put it on the map, drawing people from around the world to come and dive it.

Once a United States Army transporter, she was torpedoed by the Japanese in 1942 during WWII. In an attempt to save the ship from sinking, it was towed towards land but had to be beached before it reached port after taking on too much water. This is where she sat until 1963 when Mount Agung's most recent and violent eruption drove her into the sea to where she lies today.

Lying on her starboard side just 40m off the beach, the wreck is very easily accessible to all divers and even snorkelers. Walking in off the beach, we were led down a small valley in the sand until the stern of the wreck appeared in front of us, instantly recognizable by the intact rudder sticking out of the black sand. Looming over us, the wreck shows clear signs of its disastrous history, with large pieces of its thick metal hull twisted and broken where it lies in its final resting place.

Due to the healthiness of the water, the entire structure is now encrusted with corals and sea fans, and if it wasn't for the recognizable features that our still visible, it would

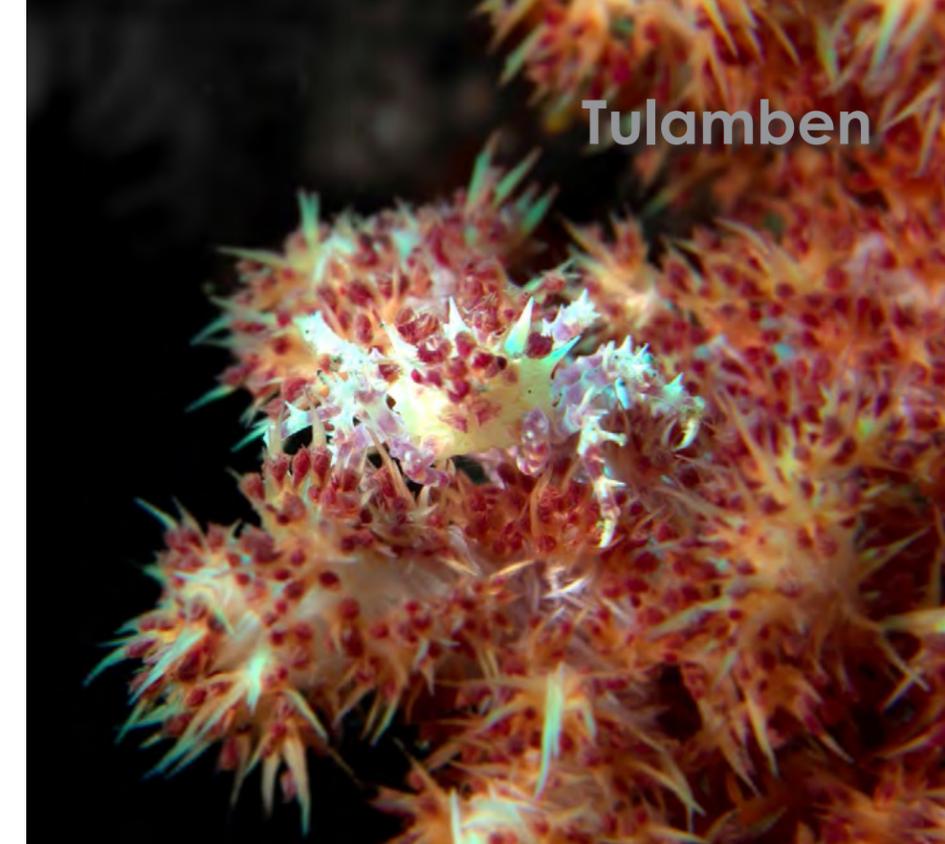
be very easy to forget that you are diving on what used to be ship.

Making your way down its side, you quickly get an idea of the sheer size of the wreck. Lying on her side at depths ranging from 5m all the way down to 30m, and being over 120m long, it can take a few dives too really see the whole thing.

While the wreck is home to a huge amount of macro life, it's the big stuff that a lot of people come to see, such as Napoleon wrasse, barracuda and the resident school of bump-head parrotfish. These bizarre giants arrive late in the afternoon and rest on the wreck overnight before heading off into the depths again early in the morning.

THIS PAGE: Scenes from the wreck of the USAT *Liberty*





The day trippers arrive later in the morning so make this the first dive of the day and enjoy peaceful dives at some of the area's other dive sites for the rest of the day.

Even safety stops on the wreck are interesting with a large colony of garden eels living in the sand that has built up against the stern of the ship. These shy little creatures look like a field of grass in the distance

but duck away as you approach them, leaving nothing but tiny holes in the sea floor, making photographing them a fun challenge.

When to visit

Diving in the area can be done all year round, however, from April to November the conditions are generally at their best, with great visibility and amazing marine life. Water temperatures range around 27-29°C, and temperatures do not drop as much as other areas of Bali so a 3mm suit is perfect.

Timing your trip right means you can combine your trip with some of Bali's other great dives such as the mola mola (sunfish) season in Nusa Penida from July to October. Nusa Penida is also one of the best places to see manta rays year round at the aptly named Manta Point and Manta Bay.



CLOCKWISE FROM TOP LEFT: Bumphead parrotfish descending on *Liberty* wreck, late afternoon; Clown frogfish with colourful markings; Well-camouflaged soft coral crab; *Mexichromis multituberculata* nudibranch; Bright orange frogfish stands out against the dark sea floor; Spearing mantis shrimp

Getting there

With Bali being such a popular destination for tourists and backpackers from around the world, there are many flights landing in the island's main airport in Denpasar everyday, making getting there easy from most countries.

Tulamben is a three-hour drive from the airport; you can either take a taxi or arrange a pickup from the airport through your resort in advance. With spectacular views of the ocean, rice

paddies and if you are lucky, even a few monkeys, the drive is a mini adventure in itself, so have your camera to hand for any photo opportunities along the way. □

Nick Shallcross is a British underwater photographer based in the Gulf of Thailand. More of his work can be seen at www.nickshallcrossphotography.co.uk

Night dives and dawn dives are a must on the wreck, get up early to avoid the crowds, enjoy a nice long dive and be back at the resort in time for breakfast.

fact file



Bali, Indonesia



SOURCES: U.S. CIA WORLD FACTBOOK, WIKIPEDIA, D. SILCOCK

History Originally populated by Chinese migrants, the island of Bali has had a heavy influence from Chinese, Indian and Hindu cultures. The Dutch East India Company ruled Bali after their invasions of Indonesia in the 1800s, until World War II when the island fell to the hands of the Japanese. Shortly after the end of the war, Indonesia got its independence, which was officially recognized by the Dutch in 1949. Strife continued in Indonesia's unstable parliamentary democracy until President Soekarno declared martial law in 1957. Soekarno was removed from power following a fruitless coup in 1965 by alleged Communist sympathizers. President Suharto ruled Indonesia from 1966 until 1988. Suharto was toppled in 1998 following a round of riots, and in 1999, free and fair legislative elections took place. Indonesia is the world's third most populous democracy, Government: Republic. Capital: Jakarta.

Geography Located in Southeastern Asia, Indonesia is an archipelago situated between the Indian and Pacific Oceans. One of Indonesia's thousands of islands, Bali lies in the tropical Indo Pacific region, giving it huge ecological diversity. Mount Agung, Bali's highest point at 3,142m has shaped the island over the years

with its many volcanic eruptions. The 1963 eruption saw the death of thousands and the displacement of many others to other parts of Indonesia. Terrain consists primarily of coastal lowlands, with interior mountains on larger islands. Coastline: 54,716km.

Climate Tropical, hot and humid, with more moderate climate in the highlands. The water temperature is normally 28-29°C (84-86°F) year round, with an occasional "chilly" 27°C (82°F) spot. Most divers use 1mm neoprene suits. However, some people prefer 3mm.

Environmental issues Challenges include industrial waste water pollution, sewage, urban air pollution, deforestation, smoke and haze due to forest fires. Logging—the rainforests within the combined West Papua/Papua New Guinea land mass are second in size only to those of the Amazon, making it 'the lungs of Asia'. In 2001, there were 57 forest concession-holders in

operation around the country and untold other forest ventures operating illegally. Mining—tailings from copper, nickel, and gold mining are real threats.

Economy A vast polyglot nation, Indonesia has experienced modest economic growth in recent years. Economic advances were made with significant financial reforms. In 2009, when the global financial crisis hit, Indonesia fared well compared to its regional neighbors. It was one of the only G20 members posting growth in 2009, alongside China and India. However, the government still faces ongoing chal-

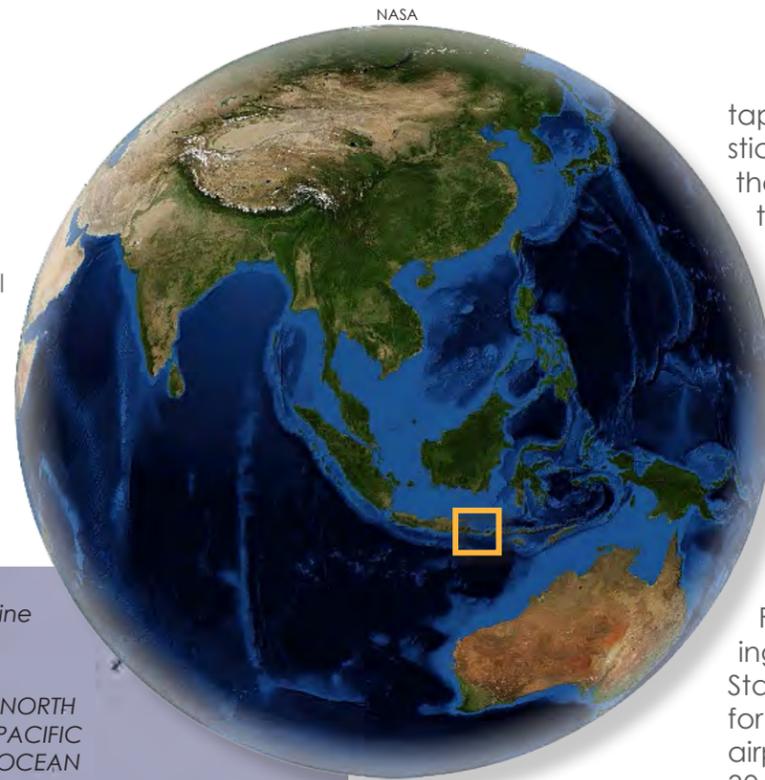
lenges of improving the country's insufficient infrastructure, labor unrest over wages, and high oil prices affecting fuel subsidy programs.

Currency The local currency is Indonesian Rupiah, although U.S. Dollars, Euros and Visa cards are also widely accepted around the island. ATM machines usually offer the best exchange rate and the use of traveller cheques is becoming harder except in the main banks. Exchange rates: 1EUR=16,071IDR; 1USD=11,811IDR; 1GBP=19,785IDR; 1AUD=10,946IDR; 1SGD= 9,398IDR

Hindu 1.8% (2000 census). Note: Indonesia is the largest Muslim country in the world. Visitors are encouraged to respect local traditions and dress modestly. Internet users: 20 million (2009)

Language Bahasa Indonesian is the official language, plus English, Dutch and local dialects are spoken. In tourist areas, English, Spanish and German are spoken.

Health There are no major health risks in this region of Bali. Stomach upsets can be common due to food and water, and it is not recommended to consume



RIGHT: Global map with location of Bali
BELOW: Location of Bali on map of Indonesia
BOTTOM RIGHT: Pair of ornate ghost pipefish



Population 251,160,124 (July 2013 est.) Ethnic groups: Javanese 40.6%, Sundanese 15%, Madurese 3.3%, Minangkabau 2.7%, Betawi 2.4%, Bugis 2.4%, Banten 2%, Banjar 1.7% (2000 census). Religions: Muslim 86.1%, Protestant 5.7%, Roman Catholic 3%,

tap water for health reasons, so stick to bottled water. Check with the WHO for up to date vaccination recommendations for the region.

Decompression chambers

Bali Hyperbaric Chamber, Sanglah Public Hospital, Jalan Diponegoro, Denpasar tel 62-361-227911

Travel/Visa/Security

For most nationalities, including the United Kingdom, United States and Australia, you pay for your Visa On Arrival at the airport at a cost of US\$25 for a 30-day tourist visa and a passport with at least six months validity is required. Bali has a history of terrorist attacks targeted at tourists, however the situation is much more stable and security is at a high level nowadays. It is worth noting that Bali has very strict laws on narcotics and extreme sentences apply to anyone caught in the possession of drugs.

Web sites

Indonesia Travel
www.indonesia.travel/en



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Equipment

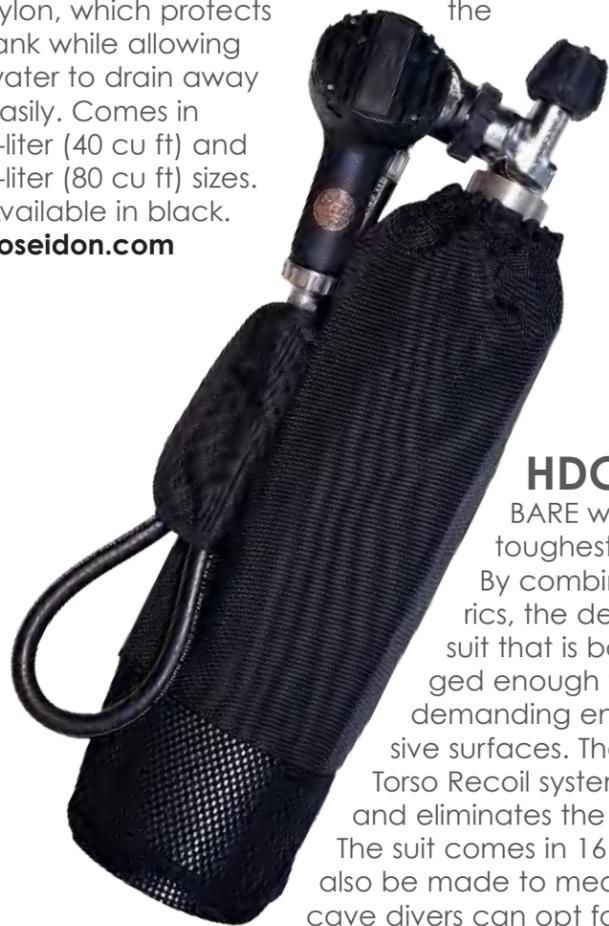


Edited by Peter Symes

Wingman

This practical bag for a bailout tank keeps your hoses tidy and regulator handy with no need for bungees and straps. Simply put the tank in the bag, close the zipper and place the regulator inside the strap. The bag is made from a mesh of ballistic nylon, which protects the tank while allowing water to drain away easily. Comes in 5-liter (40 cu ft) and 7-liter (80 cu ft) sizes. Available in black.

Poseidon.com



HDC Tech Dry

BARE writes that this suit is the toughest they have ever made. By combining three stretchy fabrics, the designers have created a suit that is both lightweight yet rugged enough to sustain heavy use in demanding environments with abrasive surfaces. The patented Automatic Torso Recoil system controls torso length and eliminates the need for a crotch strap. The suit comes in 16 standard sizes but can also be made to measure. Technical and cave divers can opt for an Expedition model that comes with a slim cut, crotch strap, big pockets, Tech boots and a new Sealtek dry hood. Baresports.com



SMS75

The Hollis SMS75 side-mount system fills the gap between the sturdy SMS100 and the minimalist SMS50 lightweight siblings making it a hybrid that combines the best of the two into this new harness. Hollis states that it was designed with all environments in mind, with a wing optimised for horizontal diving with increased lift around the hips. The SMS75 also supports rear-mounted tanks and reversible inflator positions. Hollis.com



Trimix mixer

Spotted at the recent TekDiveUSA conference, Nardi Compressori's TT-Mixing panel (photo at right shows near identical N-Mix) produces ready trimix gases simply by keying the blend on the touchscreen. According to the presentation, the panel can even analyse leftover gases in used tanks and calculate how to top them off with a new blend according to specs, minimising the loss of expensive gases while calculating the price for the fill. The panel, which can be remotely controlled with an app, weighs 13kg and comes with brackets for easy mounting on a wall. NardiCompressori.com



Cobalt 2

The Atomic Cobalt 2 is a hose integrated recreational dive computer capable of supporting up to six gas mixes, each up to 99% oxygen. The display has been updated and now the Cobalt 2 benefits from a bright, full colour, high contrast LCD screen. Atomic has also upgraded the processor, making the Cobalt 2 more reactive. Atomic states that the 'soft touch' magnetic button navigation on the built-in compass is easy to use. The Cobalt 2 is powered by a built-in lithium ion battery that provides 40 to 60 hours of dive time, with two options for charging. A fast charge via a mains socket or a slower charge when you use a powered USB port. AtomicAquatics.com





Review

Watershed Chattooga Drybag

Text by Matthew Meier

The Chattooga Drybag is a top-loading duffel sealed with a ZipDry waterproof closure. Created and patented by Watershed, the closure resembles a large ziplock seal and is both air and watertight. The bag is made of backpack-grade nylon coated sheets of polyurethane film making it incredibly durable. Upon completion each and every bag is inspected to ensure that it is 100% leakproof.

The Chattooga comes with a pair of rugged yet comfortable, padded handles, numerous hard lash points and various compressions straps. The bag weighs in at less than 2lbs and measures 12 x 20 x 10 inches, with a capacity of 1,800 cubic inches (30 liters). Optional accessories include a shoulder strap, a padded liner and a padded divider set.

As an underwater photographer, I spend a lot of time on boats and like to bring along my topside camera for shooting between dives. However, I have

never found the perfect bag to keep the camera protected and dry. The Chattooga performed beautifully on both counts. The large 17in opening at the top of the bag made it easy to get gear in and out, while the padded liner gave me piece of mind when the bag was placed along the floorboards of a small skiff. For different shooting scenarios, the padded dividers allowed me to travel with multiple lenses, plus a flash. The top closure was simple to operate and sealed airtight.

While no bag is perfect, the Chattooga worked incredibly well and my gear came home safe and dry.

For more information on the Chattooga DryBag and the rest of the Watershed line, please visit: Drybags.com

Bring your iPad down under

iDive and Watershot have unveiled the first fully functional underwater touchscreen for smart devices. The team built the housing with a flexible membrane with the key component called the "Balance Module", which automatically manages a positive pressure supply and enables the full functionality of the touchscreen. The diver can choose between supplying air via a CO₂ cartridge or the first stage regulator or pony bottle. The iDive currently has a recommended depth rating of 40 meters for CO₂ supply and 100 meters for the first stage supply. idive-and-watershot



HOG Zenith

The Zenith second stage from HOG is a pneumatically balanced second stage. All good second stages use a venturi effect to assist in maintaining flow, but the venturi performance is less critical if the second stage is pneumatically balanced. The center portion utilizes a durable soft touch silicone to make purging easier. According to manufacturer the new design also helps controlling a free flow in a current. Edge-gear.com



AP Diving announces additional oxygen cell supply for their Inspiration range CCRs

Due to interruptions in oxygen cell supply this year, AP Diving has taken steps to secure a second supplier. The cell from the new supplier, the same supplier as the Narked @ 90 cell, will have the designation APD16 and has a white label (shown left). AP Diving points out, while the APD16 has an unfortunate trait in that once the Inspiration scrubber warms up, the cells read 0.05 bar higher than the actual PO₂, this trait is repeatable and reliable and so is easily compensated for. APDiving.com



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info@divecbr.com
DIVECBR.COM

Interviewing
Wreckers
 — Four Pioneering Wreck Divers

Author's note: Though for the most part, the cave diving community was the first to pioneer mixed gas sport diving, beginning with Dale Sweet's successful 1980 Heliox dive to 110m (360ft) at Diepolder II in Hernando County, Florida, USA, leading shipwreck divers were not far behind. By 1995, numerous groups of wreck divers in the United States, United Kingdom and Europe were using Trimix to improve the safety and performance of their dives. That year I interviewed some of the vanguard to get their perspectives on mix and how it was impacting exploration. Here are the original interviews as they appeared in aquaCORPS Journal #9: Wreckers, August 1995.

— Michael Menduno

Text by Michael Menduno
 Photos courtesy of aquaCORPS,
 Leigh Bishop, John Chatterton,
 Joe Pass and Joel Silverstein

August 1995—Today, shipwrecks are at the heart of a technological revolution that is redefining the limits of what is possible. Within the last year, a leading team of tekkies mounted the first mix expedition on the Lusitania to 90m (300ft), long thought out of the practical reach of scuba aficionados, and racked up over 120 dives. Other tech divers opted for the safety of a hose and commercial cutting tools to liberate the artifacts of their dreams.

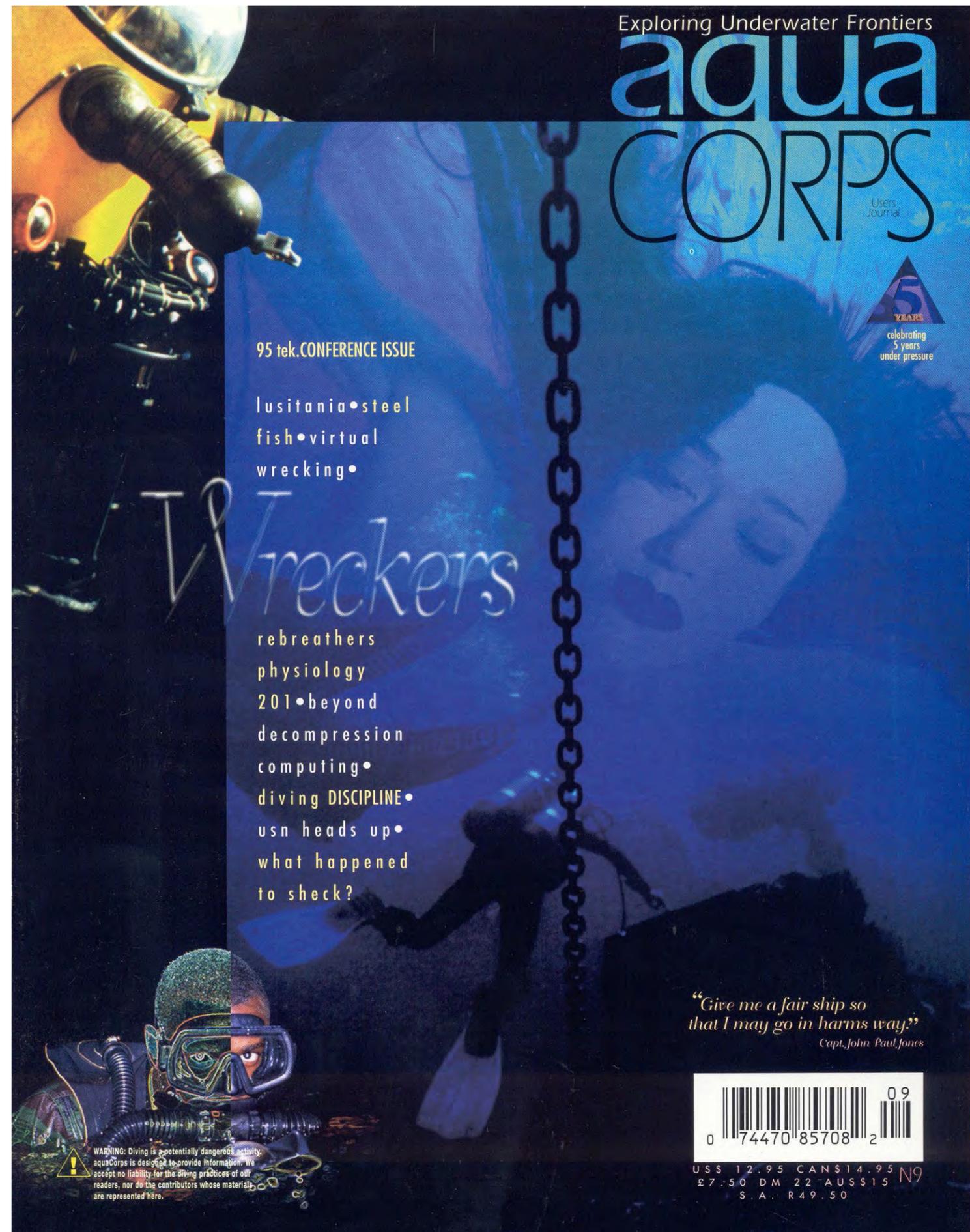
And to further stir the soup, grand daddy wrecker, Oceaneering International, the global commercial diving contractor whose crews dived the *Lusitania* over a decade ago, recently completed salvaging treasure—five tons of silver and gold coins from the Spanish Brig of War, *El Cazador*, sunk in 1784 in the Gulf of Mexico—using their WASP Atmospheric Diving Systems (ADS) fleet to limit their ambient exposure. This after the technical diving team led by Captain Billy Deans were found in violation of the Occupational Safety and Health Administration (OSHA) standards prohibiting deep self-contained diving the prior year and was thrown off the job. "It's a mental barrier, not a technological one," explained commercial diving supervisor and wrecker John Chatterton.

Although underwater limits are being redefined, the painfully learned maxim of diving still applies, maybe more than ever:

SAFETY COMES FIRST. Though the rewards of shipwreck diving are great, a diver can easily end up paying the ultimate price if all the parameters of the dive (and diver) are not taken fully into account. And when this happens, the entire community suffers. Training and experience are critical. Particularly today, when competition for new wrecks has driven the cutting edge ever deeper and more remote, increasing the operational and safety requirements for the dives, as well as the costs.

What is it about shipwrecks that inspire us to invest time and ingenuity and put our human frailties on the line? Is it simply the knowledge that these failed human outposts may yield up potent treasures, or is it some complex piece of genetic code that compels us to seek out our remaining remnants in the vastness of the sea?

Better go and ask a wrecker, if she'll tell you. Or better yet, go ask two of three.



"Give me a fair ship so that I may go in harms way."
 Capt. John Paul Jones



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WARNING: Diving is a potentially dangerous activity. aquaCORPS is designed to provide information. We accept no liability for the diving practices of our readers, nor do the contributors whose materials are represented here.



JOEL SILVERSTEIN

Captain Billy Deans

Owner of Key West Diver Technical Training Center and Deep Sea Technologies, 38-year-old Captain Billy Deans is recognized as one of the pioneers of technical diving.

MM: Billy you've been involved in technical diving since the beginning. What would you say are the differences with recreational diving?

BD: We still do a lot of recreational diving. It's fun and it's easy. You put your equipment in a bag, sniff your air, throw your equipment on, jump in, and swim around in 25m (80ft) of water. Technical diving is totally different. It's a philosophy, a mindset. Everything you do is based on making that dive absolutely perfect because if you don't account for all of the param-

eters of the dive you could get killed. It's a constant vigilance that wears on a human being. To do it well you have to live, eat and breathe technical diving.

That's the negative side—it's so demanding. It has put bags under my eyes, gray hair on my head and led to fights with my girlfriend. But I won't compromise on safety because once you do, you become complacent and you get killed. That's the thing that bothers me; it's like a black cloud on the horizon. The technical diving market expanding and I have an uneasy feeling that we're going to have an increase in fatalities. That's what we're trying to avoid.

MM: Because of the new people coming in?

BD: New people coming in who do not have the proper training. That's one of the reasons we're so adamant

about having tiered levels of training and broad base of experience. Experience is critical.

In the early days, there was a small cadre of technical divers. These people were highly trained, and committed to diver safety. I

remember when Parker [Turner] got killed. It sent a shiver up my back, because they were doing everything right, right down to the last minute, and he still died.

People need to understand this. They can still have fun but they need to approach technical diving with the idea that it is very dangerous. You learn to be very, very cautious in this type of diving. The positive rewards are great but on the negative side you can end up paying the ultimate price. And when divers die, we all pay.

MM: What are the limits of open circuit gas diving?

BD: Sport diving has become much more reliable and safer. The technology and equipment that we have today has essentially doubled our working depth from 40m (130ft) to about 80m (250ft). That's our playground and I consider it to be a reliable working range. Outside of those limits, it's a little more dangerous. It can be done, but it's not for the people that are just getting into technical diving.

MM: I understand that your focus has shifted over the last two years from technical training to the commercial aspects of diving.

BD: It's an aspect of the diving that has been a natural evolution for us. Karl Shreeves (PADI's Technical Diving Liaison) once said that he was so excited to be in on the next evolution in sport diving. And I guess that I'm excited to be involved in one offshoot of technical diving and that is, work for pay. There are definite, viable opportunities there. The commercial market sees it. And with closed circuit equip-



PHOTO COURTESY OF AQUACORPS

ment coming on stream, I believe there are going to be a lot of opportunities opening up.

MM: For self-contained diving in a commercial setting?

BD: That's correct.

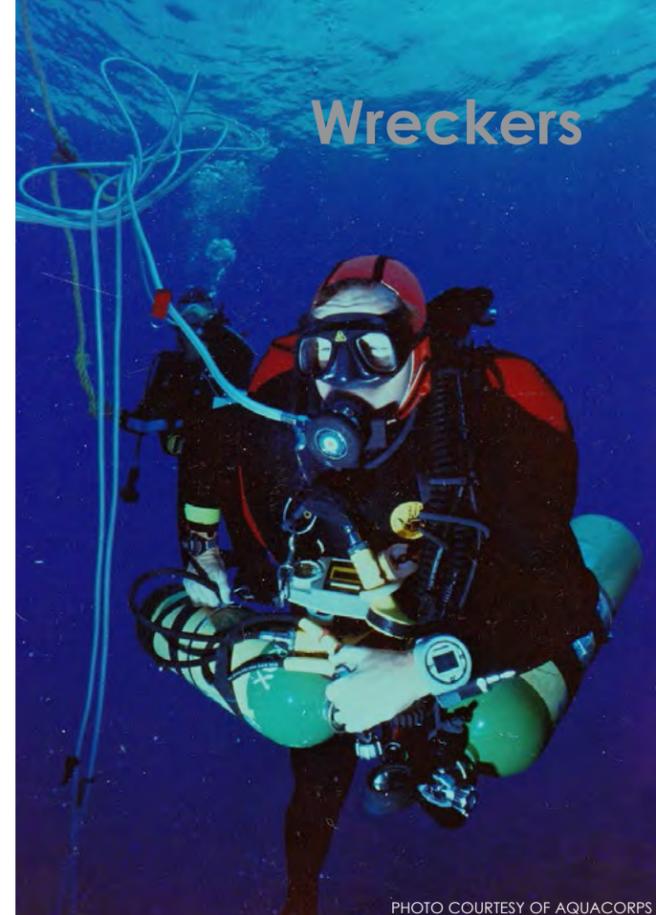
MM: Commercial diving today is based around surface supplied technology. What kind of tasks can better be accomplished with self-contained equipment?

BD: Reconnaissance. You can put a team of self-contained divers on site with a minimal amount of equipment. They can survey an area, a wreck site, you name it, come back and look at the data. And it's actually very, very cost effective to do that. We're talking a 1 to 5 ratio. Then if there's work to do, you can bring in a surface-supplied gear.

MM: How about just sending down a ROV?

BD: Our experience is that the two go hand in hand. On the Cazador project we called it "hunter-gatherer" mode. An ROV was sent down to sniff out a possible target site, in this case, to find coins. Then the diver would navigate out the ROV cable and survey and work the area.

Of course, putting a diver in the water is very, very inefficient; I don't care if it's on a hose, closed circuit, or open-circuit. The advantage is that diver on site can make rational decisions. It's easier to mobilize an open-circuit team then it is to bring in an ROV. But I think that the best combination is to use them both.



Wreckers

PHOTO COURTESY OF AQUACORPS

MM: The Cazador was such an interesting project. Your team found the booty and then Oceaneering came in with their fleet of WASPs and...

BD: ...and picked up five tons of silver. Yeah, it was great @#?#!

MM: It would take a team of open-circuit divers a long time to pick up five tons of silver.

BD: I agree with you, particularly at the 90m (295ft) depths we were working. My only regret was that I wish we could have had another five manned dives. It would have been nice to see what our capability was, but if you look at it, putting a guy down for four to six hours in a WASP is really the way to go. But you also have to look at the cost. We fulfilled our contractual obligation. We went down. We found the coins and we were able to bring a few up. That is the limitation of open-circuit diving.

MM: Do you think that commercial regulations are going to evolve to the point of allowing self-contained equipment for

Captain Billy Deans in action (left and below)

Polly Tapson all kitted up



JOEL SILVERSTEIN

certain types of activities?

BD: I truly hope so. The guys in the commercial industry are smart. They see what's going on and a number of them are turned on by it. They'll take advantage of the technology and eventually there will be changes in the Code of Federal Regulations (CFR). That would be the smart thing to do.

MM: What do you see today as the frontiers of wreck diving?

BD: Discovering new wrecks. When we first started planning to diver the *Doria* ten years ago the *Lusitania* seemed unreachable—nobody thought it was possible. Now you can charter a boat to it. Even diving the *Doria* has changed. In the early days the big thing was going down on the outside of the wreck and getting windows. Now everyone is making penetration dives and looking for artifacts.

MM: And the dives are getting longer.

BD: Fifteen minutes used to be a long dive. Now people are doing 25, 30, and 35 minute dives at 61-77m (220-250ft). That's what I see happening in wreck diving.

MM: What are your personal goals for the next 18 months?

BD: What I'm trying to do, is stay focused. We're one of the very few dive centers that are trying to make a living at technical diving. It's very difficult to make a living in the dive industry. You can drop your safety standards and make a lot of money and kill somebody. But we won't do that. We're trying to make a comparable living at our type of diving through qualified teaching, keeping our standards up, and doing these projects. But we also want to have fun at it.

We get a lot of neat offers to dive wrecks and we could spend the whole year traveling and doing all these dives. There just isn't enough time. That's why I'm targeting the wrecks here locally. There is a tremendous amount of history from in the Florida Keys. We have a number of targets off the Tortugas including a

German U-boat.

We're also looking at wrecks from the perspective of coming in as a professional team and helping people get set up, for a fee. It has consistently been shown that it's better to pay a profession to come in and set it up right as opposed to making all the mistakes and possibly hurt someone. In the long run, it's more cost effective to pay professionals. So that's what we're targeting, wrecks that could possibly turn some revenue for us.

We have three real interesting projects coming up in 1995 that will probably take us away for a month or two. We're talking 17th century shipwrecks that are well into the technical diving range outside the U.S.

Polly Tapson

Thirty-one-year old filmmaker and British wrecker, Polly Tapson, led the first technical diving expedition to the *Lusitania* in June 1994.

MM: How long did it take to plan and train for the expedition?

PT: I began to ask people if they would

commit to the training and the cost of the expedition about 18 months to two years before we dived. That was more than enough lead-time to actually set up the expedition. One factor was that the U.K. members of the team were not trained in the use of Trimix and had very little knowledge of gas mixing and the implication of this kind of technical diving at that time. Four months out, I knew exactly what we were going to do and what contingencies were available. We were meeting on a regular basis to discuss how to improve what had been planned.

MM: How many dives did you do in preparation for the dive?

PT: We scheduled 49 dives in preparation for the *Lusitania*. We were going out every other weekend last winter. We conducted a lot of the deep training in a close controlled environmental quarry in North Wales. The U.K. team trained in excess of 90m (293ft) because we didn't want the *Lusitania* to be the team's deepest dive when we arrived in Ireland. We needed to test everything.

MM: How important was diver safety in your planning?

PT: A great deal of thought went into our 'what ifs' and 'what thens.' I would stay up until 3:00 in the morning contemplating what could happen and how we would deal with it. We agreed as a team to ban any form of competitiveness and encourage discussion. As a result our post dive briefings became incredibly honest.

MM: Did the expedition come out as you had planned?

PT: Yes, in every way. It was a perfect

execution of our plan, right down to the number of vegetarian meals in the packed lunches. We could have spent more money to hire assistants to help with the gas mixing or to help with unloading the boat, but we decided not to. It was hard work. We got up early. We worked through the morning setting everything up. Everyone had a designated task. We worked very well as a team. Of course, I didn't really have a great sense of relief until after the last day's diving when I knew that it had been an incident-free trip.

MM: Technical diving appears to be predominantly a male bastion. Did you find that being a woman was ever an issue?

PT: I don't have anything to say on that subject. The answer is no. It was never an issue. I have encountered sexist attitudes from some men along the way but

Wreckers



LEIGH BISHOP



JOEL SILVERSTEIN





LEIGH BISHOP

nothing I couldn't handle. Most of the *Lusitania* team was intelligent enough to be above it.

MM: *It seems that technical diving has a lot fewer women than recreational diving as a whole (about 37% female according to PADI statistics). Our surveys suggest it's 5% or less. Can you offer any insights as to why that is?*

PT: It has more to do with perception more than reality. Men probably find the sport easier than women because of the equipment and intensive nature of technical diving. However, having said that, I've seen men who are not particularly strong who are able to wheel some heavy equipment. I believe that women can overcome what might be perceived to be a physical lack of strength if it's something that they really want to do.

MM: *I understand that you got "bent" on a practice run a week prior to the expedition. That must have been a very difficult personal decision for you to decide*

to carry on anyway. Are you comfortable talking about it?

PT: I don't like talking about it or discussing it in much detail for a very obvious reason. People are going to read this and there is no guarantee of how they're going to interpret what I have to say. What I don't want to do is to be an example of someone who acted irresponsibly and got away with it. And then have someone else do the same thing and subsequently ends up in a wheelchair for life. It is very difficult for me to talk about it for that reason.

MM: *It was obviously a very personal decision on your part. You had worked on the project for two years.*

PT: Yes, of course it was a personal decision. I believed that my recovery was totally satisfactory in so much that I was not going to cancel that trip. That's not to say that I intended to dive. I reserved that decision for the trip. However, I definitely was not going to let it stop the

wheels that were in motion, the imminent arrival of the American divers and everything that had been planned.

MM: Cave divers have a saying, "Take only pictures, leave only bubbles." I know that doesn't really apply to a lot of shipwreck diving, but your team decided not to take artifacts off the *Lusitania*. What was your motivation?

PT: It's very simple really. There is a man who claims he owns the *Lusitania* and told us that we weren't allowed to visit the shipwreck. His claim has yet to be proven. But the maritime and merchant marine laws were such that I felt that no laws were being broken in visiting the shipwreck, which is why we were able to proceed unhindered. In addition, we were visited by the Irish Customs and Excise people and informed that if we recovered anything the *Lusitania*, we would have to hand it over to Customs. As a result, we felt that there was a certain risk in recovering anything from the ship and so we decided not to take that risk.

MM: *What would you say are the frontiers today in shipwreck diving?*

PT: I don't think there are really any frontiers.

MM: *What do you mean by that?*

PT: The limits are more a matter of economics than anything else. Unless there is a promise of great gain, progress will be relatively slow. I see the most potential for progress being made in commercial and scientific diving. Recreational divers will hang onto their coat tails as far as they can go. It's an expensive sport.

MM: *How much did it cost to mount the expedition, the training, planning the whole thing?*

PT: By the time I had finished pulling in

"deals", the financial costs were viable for everyone who I wanted to be involved, but the indirect costs of our time and relationships were higher than anticipated. Everyone agrees that their contribution in man-hours was excessive and cannot be adequately quantified. This was largely due to the learning curve we had to climb as a team and taking the "what if/what then" approach to planning. One of our team reckoned it personally cost him in the range of GB£10,000 (about US\$15,000 in 1994) hard cash to prepare and participate in the expedition.

MM: *What are your personal exploration goals over the next 18 months?*

PT: My goals are to identify several virgin wrecks beyond the 70m (228ft) off the

southwest coast of England. We have the coordinates and we'll be diving on mix. Another member of the team is handling the organizational side of the expedition because of the time involved. I have professional commitments and other affairs, which are my priority for the time being.

John Chatterton

Hardhat wrecker, John Chatterton, 42, is an avid deep wreck explorer and works as a commercial diving supervisor. He and Richie Kohler identified the "U-Who" as the U-869, later heralded in the New York Times best seller, *Shadow Divers*.

MM: *You're a commercial dive supervisor as well as a wreck diver. Why do you dive scuba?*

JC: I started wreck diving the same time I got involved in commercial diving. To me, scuba is just another technology. Philosophically, surface supplied diving is a group project. The diver is just a cog in a big machine. Scuba is freedom. Independence. It's the difference between the guy driving down the road in his Lincoln Continental with a house, mortgage payments, and responsibilities which can be really good compared to the guy hitchhiking down the road who's totally free. That can be a good thing too. Remember, in commercial diving, nobody pays you to dive. They pay you to do something that happens to be under water and the way to get there is to dive.

MM: *There seems to be considerable fear and trepidation about scuba in commercial circles.*



PHOTO COURTESY OF JOHN CHATTERTON

John Chatterton





PHOTO COURTESY OF JOHN CHATTERTON

John Chatterton diving the *Britannic* (left); near the wreck site of the *Lusitania* (right) 18km (11mi) south of Kinsale lighthouse in Ireland; and kitted up for a dive (below)



PHOTO COURTESY OF JOHN CHATTERTON

limits are. There are still a lot of things to be done with open circuit and it seems like there's always a new formula, a new recipe being cooked up in somebody's kitchen.

MM: Do you feel a lot safer when you're diving a surface supplied system?

JC: No. It's different. I don't feel a greater degree of safety. There are assets and liabilities to using either technology on a particular site. If I'm diving scuba, I'm diving solo. I'm not in direct contact with the surface. That's a disadvantage, and I have to take into consideration important aspects of my dive, like navigation, gas management, things like that. When I'm on surface-supplies, those issues are

much less important, but I've got to deal with other aspects, my umbilical, for instance. The umbilical could actually end up tethering me to the wreck. Generally, I prefer to rely on myself over a machine top-side. Maybe that's why I like scuba as much as I do.

interested in the wrecks in my area that have been beyond sport diving until now.

JC: Most of the people in commercial circles view scuba as a toy that's good to about 9m (30ft). I find scuba a very interesting technology and technical diving has added another dimension.

MM: How has technical diving changed shipwreck diving over the last five years?

JC: Two major things have happened. Number one, the surface area of the ocean floor that we're able to claim has been dramatically increased. You could draw a line and say, here's our 40m (130ft) limit, but today, more and more guys are going out and diving 60m (200ft) and 60m (200ft) plus. 'We're down to where?' Technical diving has come along and nobody's sure where the line is. And with things like rebreathers on the horizon, if you draw a line, you better draw it in pencil. It's probably not going to stay there long.

The second thing is productivity. The technically-oriented diver is a more productive diver. He's much more goal oriented and in a better position to accomplish the goals he sets. Setting up goals for each particular dive is the way to make progress. That's the way to be productive. We used to do a lot of 60m (200ft), 60m (200ft) plus dives, scare the

shit out of ourselves, and be glad to get up alive. That wouldn't wash anymore.

MM: When you say tech diving in that context, are you really referring to mix?

JC: It's a little more subtle. Not everyone is using mix or taking full advantage of the technology. But even air divers using an accelerated decompression on oxygen or nitrox are seeing an advantage in terms of increased bottom time. Increased bottom time is going to give the diver increased productivity.

MM: What are the practical working limits of open circuit wreck diving?

JC: For a while, I was really into asking people, 'Where is this going to stop?' I went to Billy Deans, I went to this guy and that guy, and just about everybody said, "The limits are right about where my feet are." We're limited by the technology to some degree, but I also think we are limited by our vision...

MM: Of what's possible?

JC: Yeah. And looking at the limits of technology, I don't think we have enough insight to say where the absolute

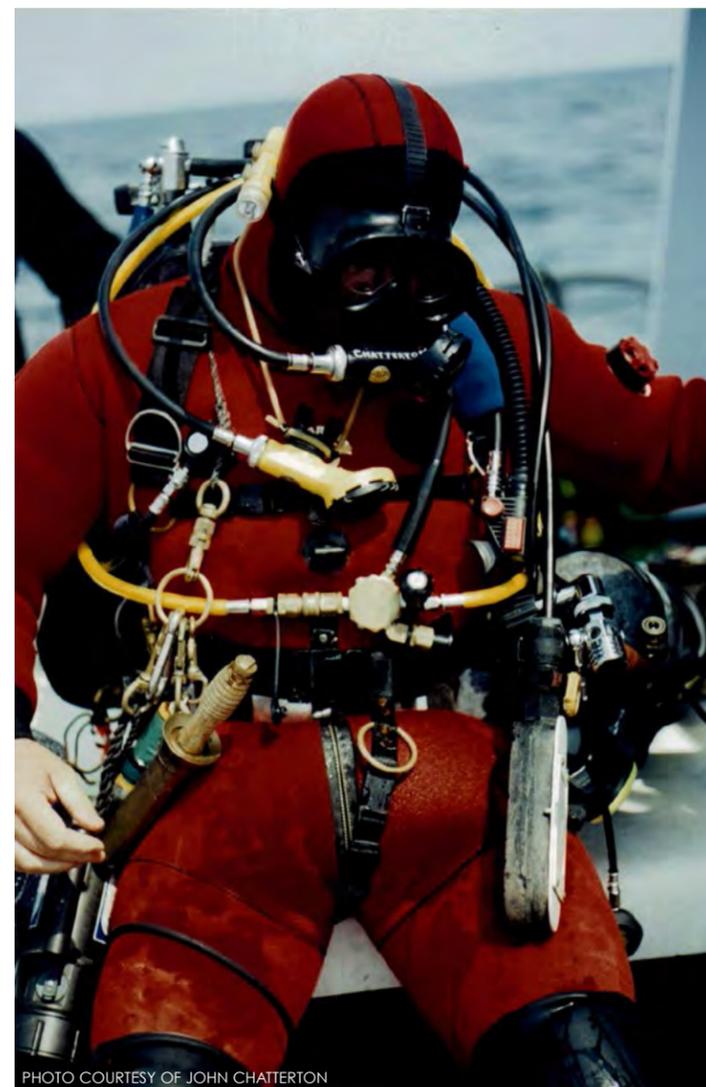


PHOTO COURTESY OF JOHN CHATTERTON

MM: What would you say are today's frontiers in self-contained ship wreck diving?

JC: Shipwreck diving is becoming a more global activity. The oceans are getting smaller. When I first thought about the *Lusitania*, my reaction was "Wow. The *Lusitania*. It's a shame that it's too deep." Well, depth is subjective. The *Lusitania* was a lot deeper on my first dive than it was on my last dive. People are beginning to look at wreck that they haven't considered diving before and saying, "Hey, wait a minute. We can go there. We can do that. We can make it happen." It's a mental barrier; it's not a technology barrier.

MM: What are your personal exploration goals over the next year?

JC: I want to focus on locating some specific wrecks. One is the U-550. Another is a liner called the *Carolina* that's off the New Jersey coast. I'm very

MM: Are both in deep water?

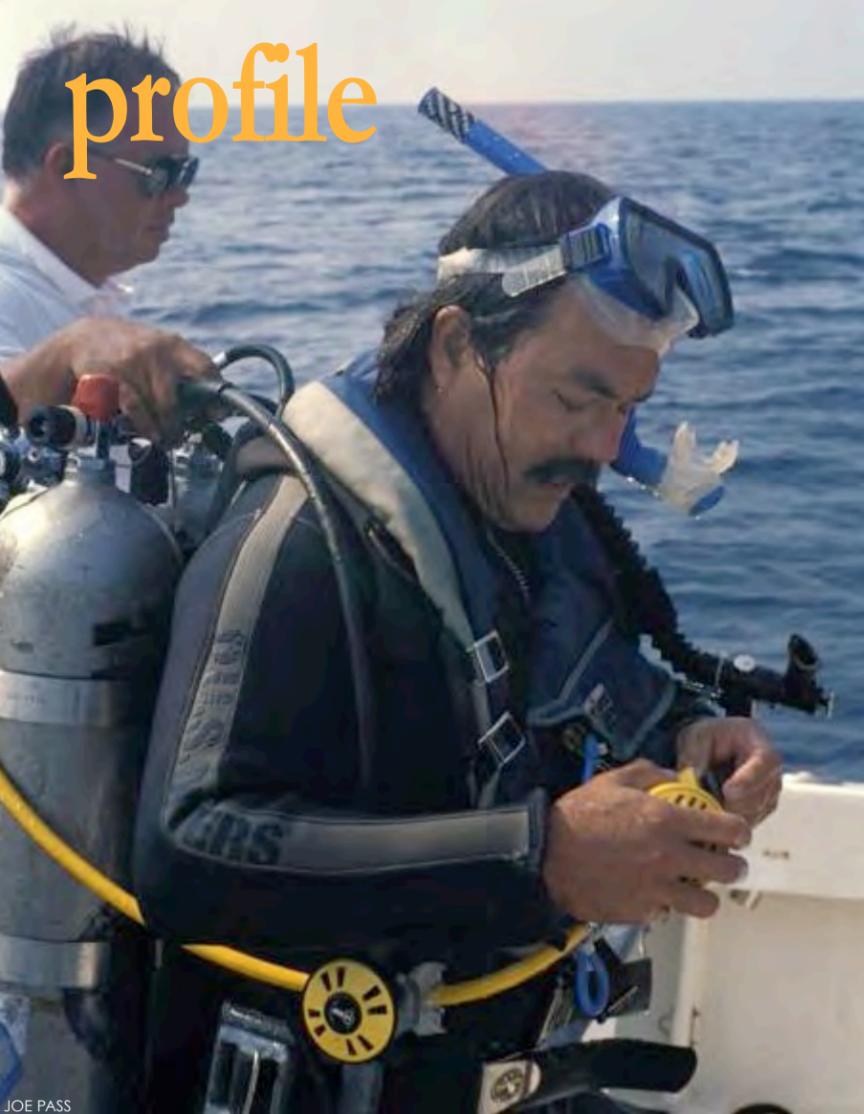
JC: The U-550 is probably going to be about 100m (325ft) and it's 125 miles (201km) offshore. I'm not certain about the *Carolina*. The problem is that it has been reported in several areas, but I believe it's going to be as deep as 80m (260ft), something like that.

MM: I understand you recently made a positive I.D. on the U-Who? That sounds exciting.

JC: I believe we have positively identified the wreck as the U-869, but I'm more interested in finding out exactly how it got off the coast of New Jersey. The sub was not supposed to be there.

MM: Wasn't it supposedly lost off the coast of Africa?

JC: Right. I've been to London, to the Ministry of Defense and worked in their foreign documents section, and I have been to Germany and talked with a bunch of the U-boaters and examined their archives. It's amazing how much of history is just somebody's reasonable guess. We have this boat that was supposed to be in Gibraltar, but it seems to



Roderick "Rod" Farb in action (left and below)

Historical painting of CSS *Alabama*



US NAVY'S NAVAL HISTORICAL CENTER / WIKIMEDIA COMMONS

MM: Why's that?

JC: It's going to take time before the people who are doing deep wreck exploration are comfortable with rebreathers. It's going to go the same way the air-closed circuit diving went, starting off in shallow water. "I went a little deeper today than yesterday. Maybe I will go a little deeper tomorrow."

Roderick Farb

Photographer and filmmaker Roderick ("Rod") Farb, 43, recently filmed the CSS *Alabama* off the coast of France for *National Geographic*. Farb's team was the first group of sport divers to get permission to dive the USS *Monitor* in 1991.

increases the risk. So I think it works both ways.

MM: What are the practical working limits of open circuit scuba these days as far as wreck diving is concerned?

RF: A practical limit that most people use is 74m (240ft). You could probably go deeper. I worked in Europe and divers there routinely dive 61m (200ft) with open circuit on air. There is also an active technical diving community that uses mixed gas at those depths and beyond, but quite frankly, from my experience 72m (240ft) is about the deepest most wreck divers regularly go. And most of it is still being done on air.

MM: What impact has mix had?

RF: The impact has been rather limited to a small group. It's obviously growing, but locating sources of gas, or getting the equipment to mix it yourself is still a problem. It's still beyond the average wreck diver. In Europe, for example, I've been involved with a club on the coast of France with several hundred avid deep-water wreck divers, and none of them dive mix at all because it is too expensive. They don't have equipment. They all



JOE PASS

be lying off the New Jersey coast. WWII wrecks are really fascinating because the first hand history, the people who were there, are disappearing. A lot of what wreck diving is about is understanding the historical aspect of the wrecks. That kind of information tells us who we all are.

MM: It puts our culture in context?

JC: History isn't always what you've been told.

MM: There's a huge interest in rebreathers right now. What will the impact of rebreather technology be on wreck diving?

JC: We are going to see nitrox rebreathers moving in to the recreational area but deeper exploration is not going to benefit for that for a while.

MM: How has shipwreck diving changed over the last five years?

RF: Judging from the divers I see, and the questions posted on the Internet, I'd say that the big changes are the volume of gas that divers are carrying. They're going to bigger systems. Twin 80's used to be the standard. Then there were twin 100's. And now twin pumped-up 120's from Europe, and the big titanium tanks that have been imported from Russia. There has also been a blossoming of support equipment for wreck diving, like up-lines, reels, lights.

MM: Has it made wreck diving safer?

RF: I believe it has, but it also has opened access to areas that were inaccessible, for example, the degree of penetrations divers are attempting, which of course

dive on air, and they do very well. If you look at the overall number of shipwreck divers here in the States, the percentage using mix gas is relatively low.

MM: I understand you were recently in Europe filming the CSS *Alabama*?

RF: Right, I was on assignment for *Geographic* for six weeks during the summer. It was one of the most difficult projects I've ever done diving-wise. The *Alabama* lies at 61m (200ft) 61m in the English Channel in extremely dark 9°C (49°F) water. And though the wreck's not extraordinarily deep, there is a narrow window of time when you can actually make the dive because of very strong currents. It's only about a one-hour window twice a day, and that's decompression, bottom time the whole nine yards. It is an extremely, technically difficult dive.

MM: Is it a closed site?

RF: The site is not opened to sport diving. The Ministry of Culture and the United States government regulate it by treaty. The ship belongs to the U.S., but the French have the authority to do archeo-

logical excavations. There's a Franco-American committee that oversees the work on the site, and a group of volunteers screened from a local wreck diving club are participating.

MM: What are today's frontiers in shipwreck diving?

RF: Most technical divers want to reach deeper wrecks because they have been out of the reach of most divers and have a lot of artifacts. But as the wrecks get deeper and deeper the technology required gets more sophisticated. The result is a point of diminishing return. The cost, the expense to go and collect ordinary artifacts from a shipwreck is going to far outweigh the value, unless they have some monetary value. The ordinary tech diver will have a limit on what they're willing to spend to mount an expedition. Of course there will always be a very small group of people out there looking for the rare wrecks that haven't been visited or found. Their work will continue, limited by their imagination and the equipment available to them to reach those sites.

MM: You recently purchased a Biomarine





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Historical painting of USS *Monitor* in action against CSS *Virginia* by Julian Oliver Davidson (1853-1894)

A shipwreck is a unique thing; it's not like a car or train wreck on land that gets cleaned up. It's a time capsule and historically important wrecks should be preserved. Unfortunately, bureaucrats tend to get carried away with being proprietary over their sites. I see that increasing. I'm fighting to get my foot in the door, establish trust that I'm not going to pillage and rape the wreck. I'm going to be doing something useful and valuable to the agency. It takes a long time.

MM: You mentioned the Internet. How important is it to your work?

RF: The Internet might be an old part of the information super highway, but in terms of technical diving it's very young. I use Mosaic, a user friendly graphical based internet interface as a vehicle to get into the literature, the libraries, the journals. It provides a lot of information for my research. It's invaluable from that point of view. In terms of getting information from fellow divers, I haven't found it to be that valuable thus far.

MM: Do you have a favorite online hang out?

RF: I use the Techdiver list, but I am becoming increasingly unhappy with the amount of useless information that's posted.

Where they are today?

Billy Deans is retired from diving and is a registered nurse and helicopter medic with LifeNet Key West, Key West, Florida. John Chatterton remains an active wreck diver and resides in Ft. Lauderdale, Florida. He is a partner with Underwater Archaeology & Exploration Corp, an underwater survey and salvage company, and continues as the owner of Last Breath Productions, which develops underwater projects for television. Polly Tapson and Rod Farb both passed away from non-diving related causes in 2000 and 2003 respectively. □

Writer and technologist Michael Menduno published and edited aquaCorps: The Journal for Technical Diving (1990-1996), which helped usher tech diving into the mainstream of sports diving, and coined the term "technical diving." He also organized the first Tek, EuroTek and AsiaTek conferences, and Rebreather Forums 1.0 and 2.0. Menduno, who is based in California, USA, remains an avid diver.

155 rebreather. Are rebreathers the enabling technology to allow wreck divers to explore more?

RF: Absolutely. Rebreathers are going to be extraordinarily useful for a limited number of people. They aren't going to have a high appeal for recreational divers because of all the equipment and support required. They are going to be useful only to people with a specific need that could bring a return on a financial investment. The ordinary technical diver is not going to go out and get a rebreather. But for a small group of explorers, it's going to be a very useful piece of equipment.

MM: What are your personal exploration goals over the next 18 months?

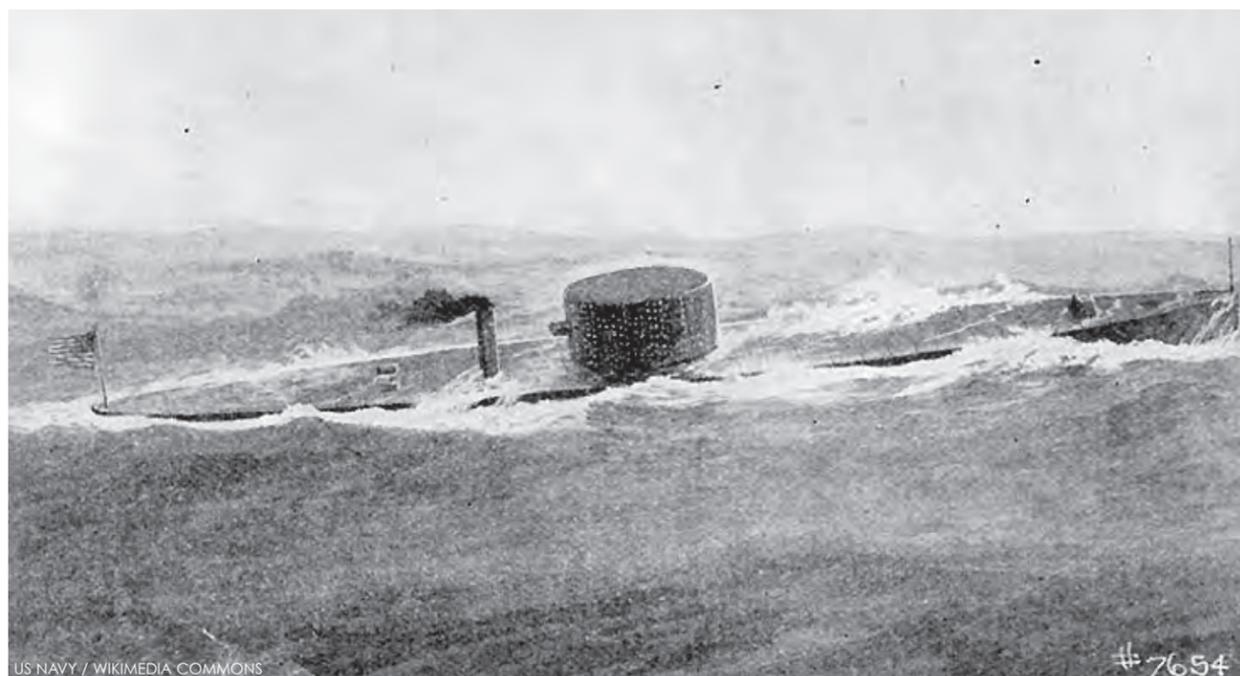
RF: I'm hoping to do a documentary on a new shipwreck in another part of the world. One that is very historically important.

MM: Are you going to tell me the name of it or...

RF: No. I can't. It's an unexpected shipwreck that's quite important in American history and it's in a country where access is very difficult. I have permission from the respective governments and so it's a matter of doing the work.

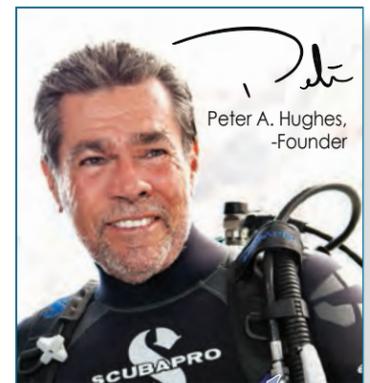
MM: Your exploits have forced you to negotiate with a number of governments. There was the Monitor project with NOAA, the Alabama with the French. Do you see this as an increasing activity on your part?

RF: It is, and getting more difficult because of the sheer number of wreck sites falling under government jurisdiction. Access is difficult. Governments are run by bureaucrats who are human beings; and human beings, being what they are, are inherently suspicious and proprietary of their territory. The problem becomes what I perceive as a matter of trust. They want to know "why you want to do it." In many instances, unique sites should be protected. However sites should allow diving access so that at the very least, people can be educated about them.



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Historical illustration of USS *Monitor* at sea



Peter A. Hughes, -Founder

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The Drowned Lands of **Doggerland**

Text by Peter Symes
Photos courtesy of Cor Kuyvenhoven,
Jesca Zweijtzer and St. Andrews University

Doggerland

Once upon a time there was a land... Doggerland—a huge area of dry land that once stretched from Scotland to Denmark—was slowly submerged by water between 18,000 BC and 5,500 BC. Today it is a shallow bank and productive fishing ground in the middle of the North Sea.



Doggerland, or Dogger Bank as it is called today, is located in the middle of the North Sea between the countries of Great Britain and Denmark; Diver at offshore drilling rig ((left)

PREVIOUS PAGE: Sunken fishing vessel with nets

COR KUYVENHOVEN

An Agent Based model, a virtual visualisation, of life in the Mesolithic Age in Doggerland (right); Illustration of settlement (below); Fossil of mammoth remains found at Dogger Bank (below inset)

“Doggerland was the real heartland of Europe until sea levels rose to give us the U.K. coastline of today.”
— Dr Richard Bates, geophysicist, St Andrews University

Glancing at a map of Europe, the North Sea appears to be quite an expanse of featureless open sea separating Scandinavia and the European mainland from the British Isles. The North Sea is, however, not an oceanic abyss but a shallow sea flooding a low-lying part of the continent. During the last Ice Age when sea levels were much lower, Britain was connected to mainland Europe by a big land-mass called Doggerland. Geological surveys have suggested that it stretched from Britain's east



coast to the Netherlands and the western coasts of Germany and Denmark and down the English Channel as far as the Channel Islands. Research suggests that it was a rich habitat sustaining a

human population numbered in the tens of thousands during the Stone Age. It had its maximum extent about 20,000 years ago although part of this area would have been covered with ice.



Excavation site at Lepe Country Park, United Kingdom



When the ice melted, more land was revealed, but the sea level also rose.

For over 100 years, fishing boats and dredgers have recovered bones, ancient tree stumps, flint used by humans and the fossilized remains of a mammoth and rhi-

noceros. Interest in the area intensified in the 1930s when commercial trawlers dragged up a number of prehistoric tools and weapons dating to an era when the area was tundra. But it was only when oil companies started doing extensive surveys and geophysical modeling that researchers were able to re-create what this lost land looked like. Findings suggested a picture of a land with hills

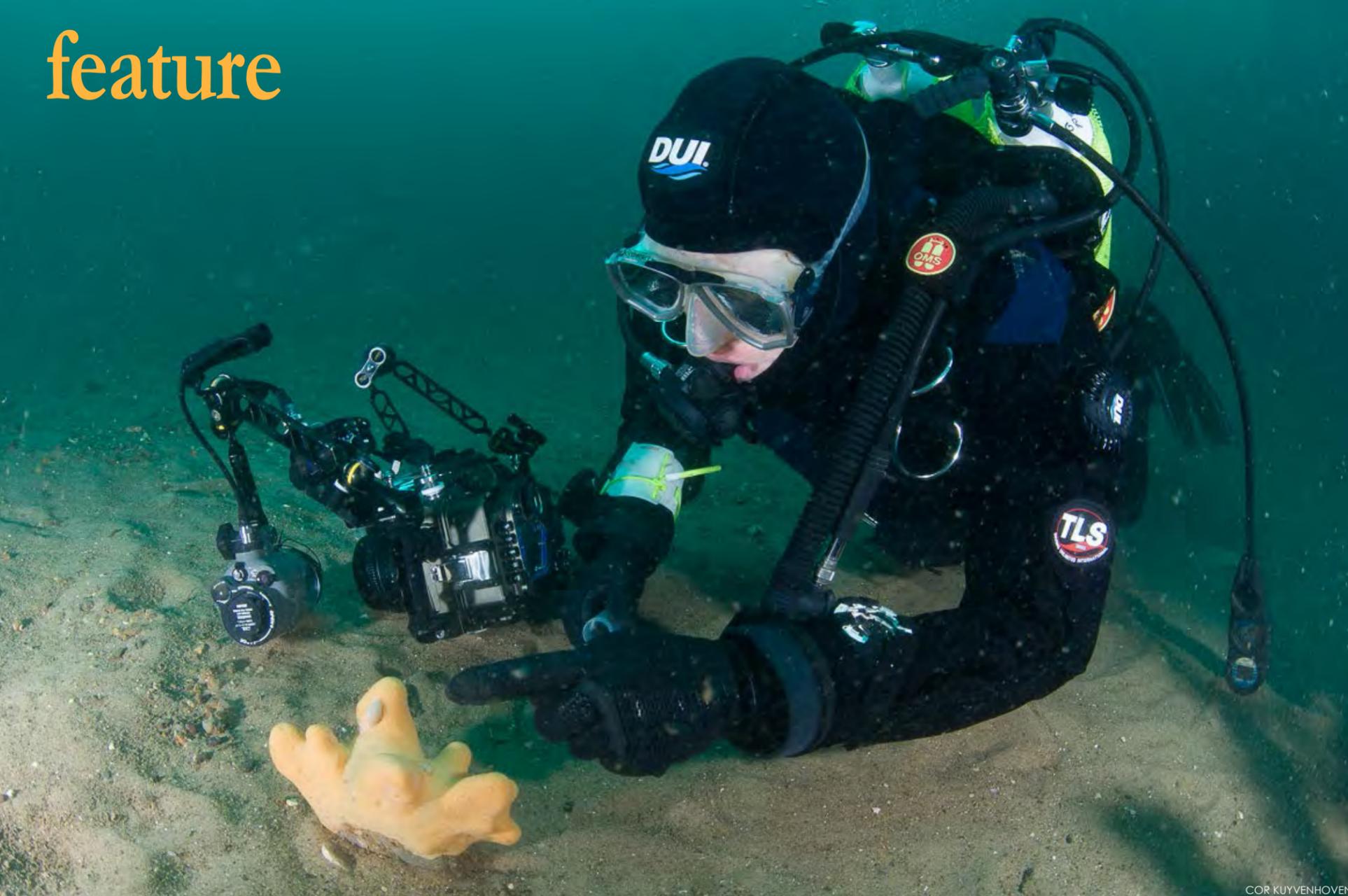
and valleys, large swamps and lakes with major rivers dissecting a convoluted coastline. As the sea rose, the hills would have become an isolated archipelago of low islands.

At about 8000 BC, the north-facing coastal area of Doggerland had a coastline of lagoons, saltmarshes, mudflats, and beaches, and inland streams and rivers and marshes, and sometimes lakes. A large freshwater basin occupied the cen-

tre of Doggerland, fed by the River Thames from the west and by the Rhine in the east. It may have been the richest hunting, fowling and fishing ground in Europe in the Mesolithic period. From about 6500 BC it gradually became flooded by rising sea levels, reducing the lands to low-lying islands which was probably abandoned for good after being devastated by a catastrophic tsunami.

The wave was generated by

DR EUGENE CH'NG, UNIVERSITY OF BIRMINGHAM / COURTESY OF ST. ANDREWS UNIVERSITY



COR KUYVENHOVEN

THIS PAGE: Expedition team members document marine life thriving on Dogger Bank or caught in nets; Biologist Arjan Gittenberger (left) with sea snail on coral

Doggerland

up to 97km (60mi) broad located approximately right in the middle of the North Sea. The bank which is now a productive fishing ground extends over approximately 17,600 sq km

(6,800 sq mi) with a depth range from 15 to 36 meters (49 to 118 feet) which puts most of this extensive area well within recreational diving range. Atlantic water enters the North



COR KUYVENHOVEN

a catastrophic subsea landslide off the coast of Norway. The last of the three so-called Storegga landslides happened underwater in the Norwegian Sea, during which an estimated 290km (180mi) length of Norway's continental shelf collapsed. The slide, which according to carbon dating occurred between 6225-6170 BC, involved the collapse of some 3,500 cubic km of sediment, enough to cover Scotland in a layer 45 meters thick. Given that the majority of Doggerland was by this time less than 5m in height, it would have experienced widespread

flooding. Analysis suggests the tsunami over-ran Doggerland that has since vanished beneath the waves.

Dr Jon Hill from Imperial College London and one of the many researchers who has been analyzing this event told BBC News: "The impact on anyone who was living on Doggerland at the time would have been massive—comparable to the Japanese tsunami of 2011."

The area today

The Dogger bank, as it is called today, is a large sandbank about 260km (160mi) long and



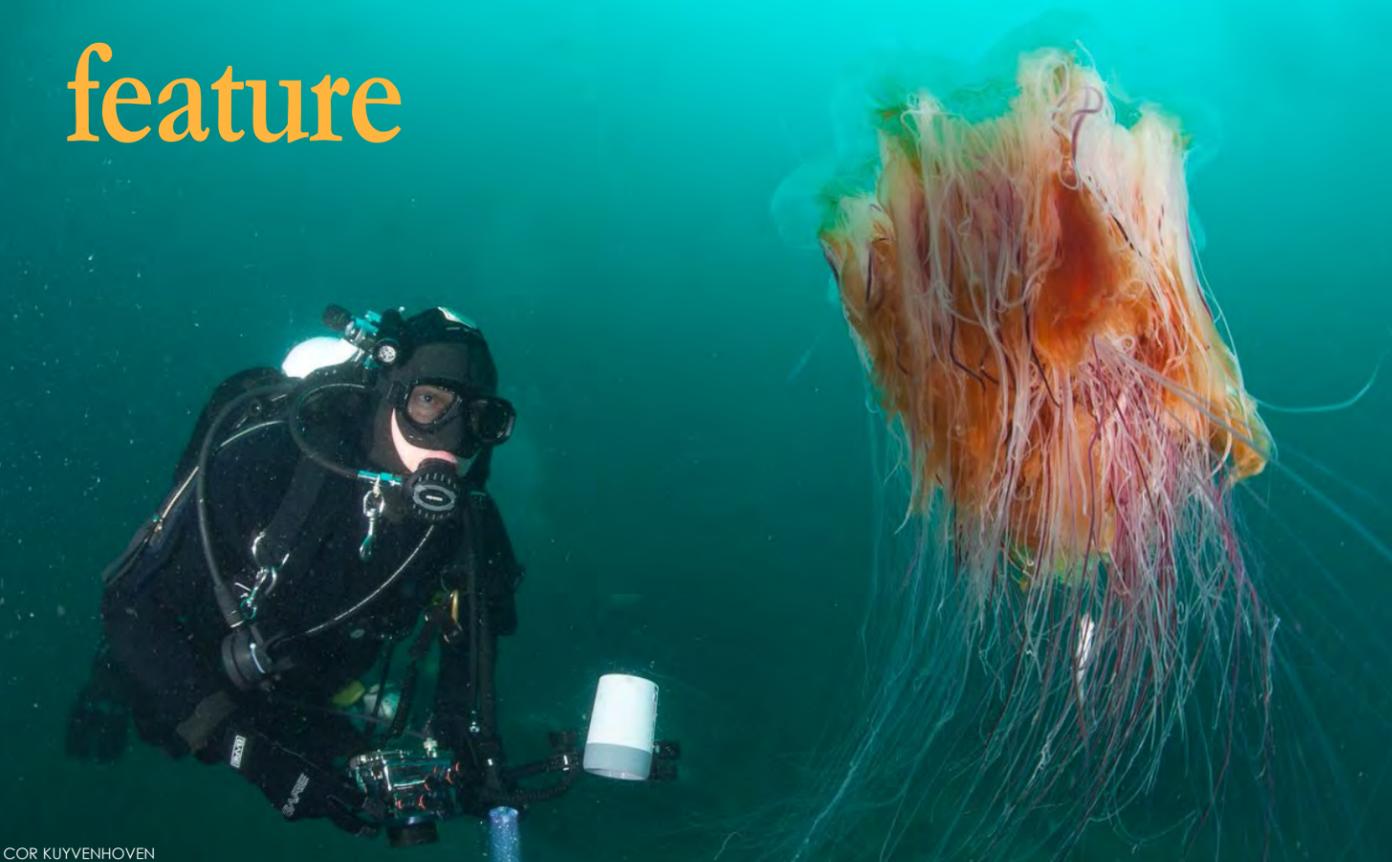
JESCA ZWELTZER

Monkfish (above); Biologists busy with samples (right)



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Doggerland

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THIS PAGE: Scenes from expeditions to Dogger Bank to document marine life and archeological sites as well as remove fishing nets; Diving this remote area requires a larger vessel suitable for weather conditions on open sea such as the Old Begium marineship *Cdt.Fourcault* (left)



JESCA ZWEITZER

Sea mainly from the north. The topography produces an counter-clockwise circulation. Water entering from the Channel moves eastward along the Belgian and Dutch coast. In the Skagerrak, the

North Sea water mixes with less saline water from the Baltic, and is transported north along the Norwegian west coast.

With the North Sea being criss-crossed by some of the busiest

shipping routes in the world and having been the stage of several epic navy battles, the area is also home to many good dive-able wrecks whose misfortunes seem to have been strewn generously across the banks.

But it is its natural resources that are its prime asset. The North Sea is one of the world's most productive areas for fish, and a large number of commercially important species are caught in this

area. The German federal agency for nature conservation calls it a "fascinating gem of European marine life" and a world of reefs and sandbanks that "offer a rich home to exceptionally rare and vulnerable species".

Being located in the middle of the North Sea, Dogger Bank constitutes a bio-geographical divide with cold-adapted benthic (living on or in sea bottoms -- ed.) species to the north and life forms preferring more temperate waters to the south. A 1986 survey,

covering the whole of the main North Sea basin, showed clear north-south differences in diversity, abundance, biomass and average individual weight of the soft-bottom fauna. The deeper northern regions had higher diversity, lower biomass, and lower individual weights than the shallow southern regions.

Most of the seabed in the North Sea hosts soft-bottom communities. On the rocky bottom, kelp forests are widespread, and many species of flora and fauna find shelter, food and surfaces for attachment on the kelp and the surrounding rocky substrate. The benthos consists of the organisms living near, on or in the seabed. A wide variety of animals belong

to the benthic community: crustaceans, molluscs, annelids, echinoderms and others.

As the North Sea is shallow, there is a strong coupling between benthic and pelagic



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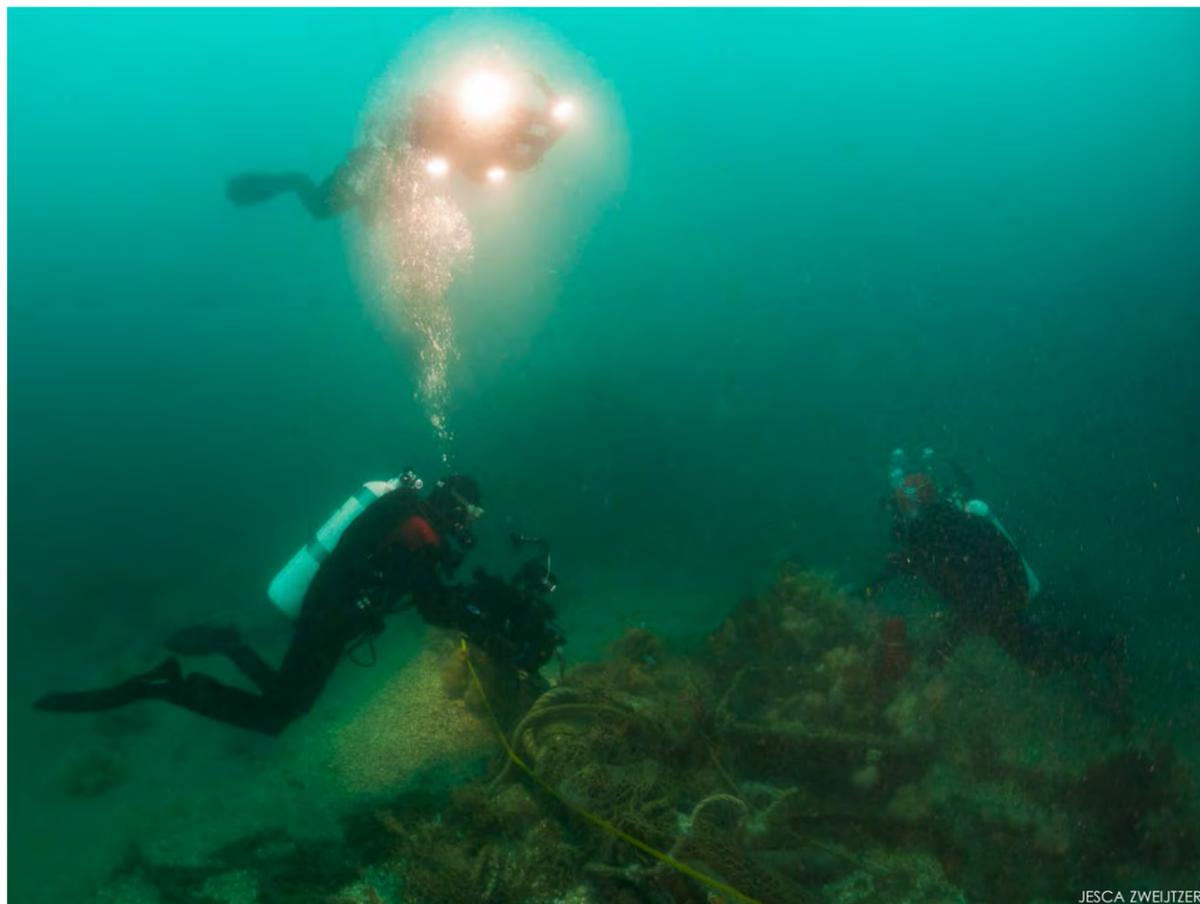
JESCA ZWEIJTZER

processes, making the region extremely productive. The diversity of the offshore benthic communities is high, except in areas of direct industrial impact, such as offshore oil fields.

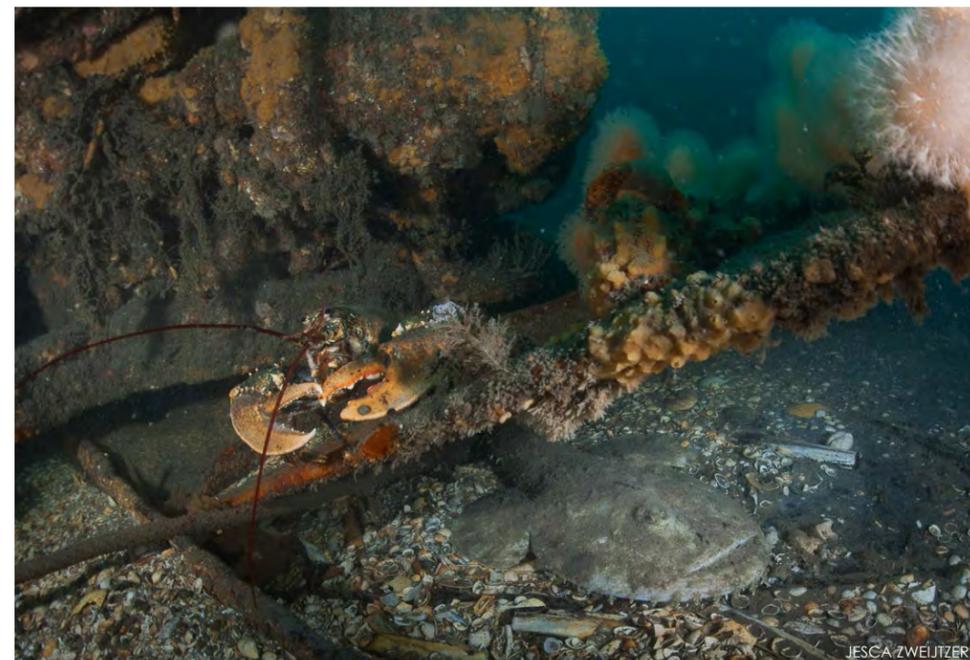
There are also only a few areas of the North Sea that are not fished or left undamaged by trawling. In particular the beam trawl -- which virtually ploughed up the seabed -- can cause damage to substrates and benthic habitats by altering sediment structure and destroying benthic organisms. These structural changes may have long-term negative effects on the structure and productivity of the benthic community.

Diving

With its location far out to sea, diving on the Dogger Bank requires the support of a larger vessel suitable for the conditions in the open sea, as weather can



JESCA ZWEIJTZER



JESCA ZWEIJTZER

be unpredictable. Due to its remoteness and the logistical challenges, the area is largely unexplored by divers and with that comes a unique sense of exploration and adventure that is otherwise hard to find in the middle of Europe. Since 2011 a Dutch team, Duik de Noordzee Schoon (Dive Our

North Sea Clean), has been organizing expeditions to the Dogger Bank with the aim of both documenting the nature in these remote areas and to remove lost fishing gear. The removal of the ghost-fishing nets have previously been described by Peter Verhoog in X-RAY MAG #40: www.xray-mag.com/content/ghostfishing. □

For more information on the Dutch expeditions, visit: www.expeditedoggersbank.nl. For more information on the photographer, Cor Kuyvenhoven, visit: www.corkuyvenhoven.com.

THIS PAGE: Expedition members explore wreckage, marine life, documenting findings on film



Scuba Confidential

How Did That Get in There?

—Water in the Tank Mystery

Text by Simon Pridmore

Anna's story: "I was on my eighth or ninth dive, about five minutes in and at a depth of around 13 metres when I realized that my air was not coming out smoothly. I couldn't think why this should be. I had checked my pressure gauge on descent and it had shown 190 bar. I switched to my octopus, but there was no difference. Soon the air became very thin. I tried to stay calm and thought for a few seconds. Everyone was going deeper and nobody was looking at me. By now the air had completely stopped and I was holding my breath. I knew something was very wrong.

Then my husband looked around and saw that I was not following. He came back to me, gave me his regulator and took me up to the surface with him."

Anna's husband, an experienced instructor, takes up the story. "I had checked my wife's set up as usual pre-dive. The pressure gauge was showing 190 bar on the surface. I had a habit of checking on Anna frequently because she was still quite new to diving. A few minutes into the dive, I saw her hovering away from the reef in mid water, sensed something was wrong and swam towards her. She gave me a wide-eyed look and pointed at her regulator. I glanced at her gauge and saw it was at zero so I gave her my octopus and we went up together.

"I was puzzled as to how a full tank could become empty so quickly. It was definitely no more than ten minutes into the dive that the incident took place and there had been no O-ring blow out. I removed the regulator from her tank after the dive then turned the valve on fully. Nothing came out. Some instinct made me turn the tank upside down and, to my surprise, and to the surprise of everyone around us, water started flowing out of the valve—fresh water!"

An incredible story?

It seems incredible that a standard size scuba cylinder should be so full of water

that a diver would only get a few minutes of air. Some might interpret the story simply as a mistake or a misunderstanding on the part of a new diver with a supportive husband.

However, when I heard the story, it brought to mind something that I came across when I ran my dive store in Guam a few years ago. We used to conduct annual visual inspections on cylinders owned by local residents and were surprised to often find a few centimetres of water in the bottom of the cylinder. This was always fresh water, not seawater. We made some enquiries and found that this is fairly common and comes from the almost universal practice in dive stores around the world of filling scuba cylinders while they are standing in a bucket or a trough of water.

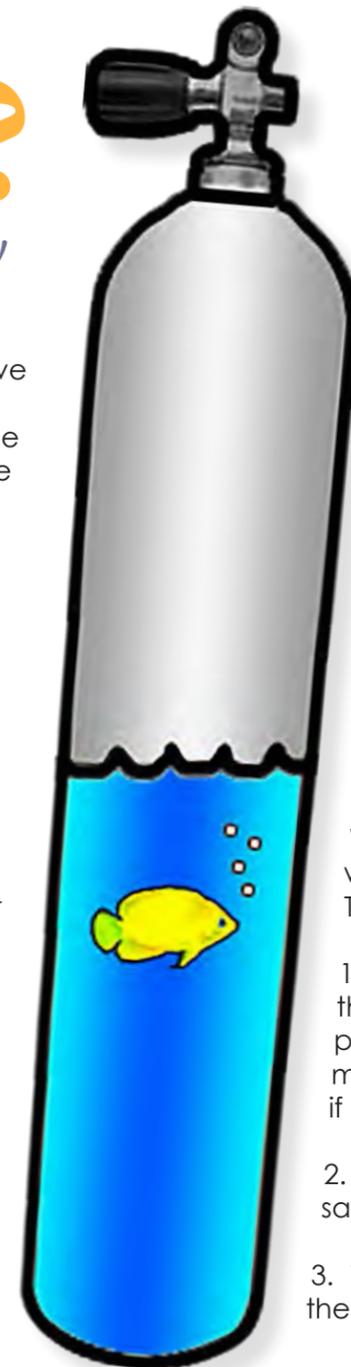
The fill whips, hoses that are clamped onto the valves of scuba cylinders to fill them, sometimes drop into the water trough between cylinder fills. When they are then attached to the valve of the next cylinder and the airflow is turned on, the pressure of the air in the fill whip is higher than the pressure of the air in the cylinder and the water droplets are driven into the cylinder.

Fill the cylinder several times and the

amount of water inside accumulates until you have little pools forming in the bottom. The moisture inside causes corrosion inside the cylinder, too.

Bear in mind that we were in Guam, part of the United States where a stringent system of cylinder inspections applies and is enforced by dive operators. The maximum length of time between inspections is 12 months, so inside the cylinders we were opening, several centimetres of fresh water had built up in less than a year.

In many places in the world where people dive, including the island nation where Anna's dive took place, there are no regulations governing cylinder inspection, so it is not impossible that a cylinder could go for many years without anyone examin-



ing the interior.

So apparently Anna's story is not far-fetched after all. With her cylinder containing a large amount of fresh water, the volume of air in the cylinder was quite small, so once she started her dive, she used it up very quickly. The reading on her pressure gauge must have been dropping fast during those first few minutes of her dive, but she did not notice.

Fuzzy thinking

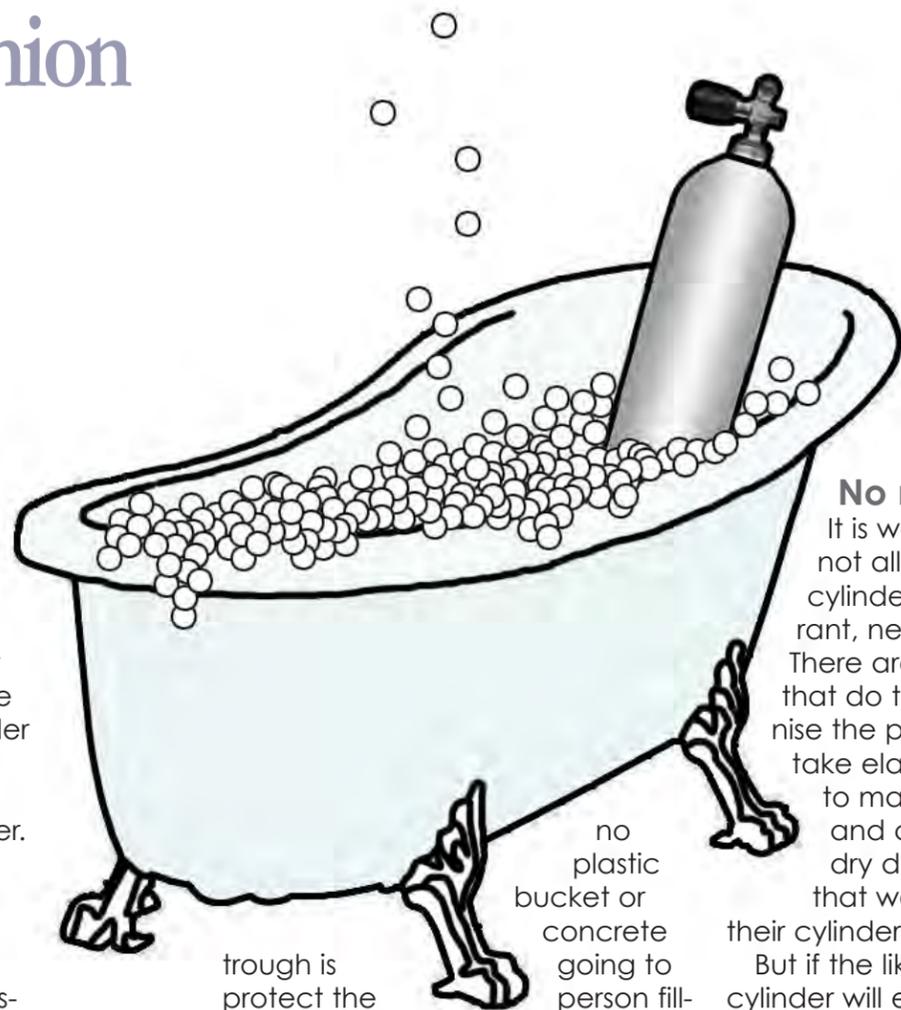
Why do dive centres fill cylinders while they are standing in water? They do it for three reasons:

1. To keep the cylinder cool so they can fill it faster and the air pressure inside will not drop so much when it cools. (Divers object if they don't get a "full" tank!)
2. As a convenient way to wash salt off the cylinder post dive
3. To protect the filler from harm if the cylinder explodes during filling





opinion



All three of these reasons are the product of fuzzy thinking.

1. Filling the cylinder in water has very little impact on the cylinder temperature, partly because the water around it gets warmer. Fast filling still causes the cylinder to get hot, and it has to be filled to 20 bar or so beyond its rated pressure, so that when it cools, the pressure of the air inside will be 200 bar. (The only effective way to stop a cylinder getting too hot while it is being filled is to fill it slowly and from a bank of large cool high-pressure air cylinders rather than directly from the compressor.)

2. Using the fill bucket to wash the salt off the cylinder is ineffective as all that happens is that the water the cylinder stands becomes a little salty. A quick blast with a hose before the cylinder is taken into the compressor room does a much better job.

3. Aluminium cylinders have exploded during the filling process in the past, and when this happened, the consequences have often been fatal. However, an exploding cylinder is a bomb, and

trough is protect the ing it. Instead, just contribute more shrapnel to the explosion.

Having said this, those aluminium cylinders that exploded were made from a 6351 alloy containing lead, and it was the presence of lead in the alloy that created the problems that caused them to explode. Since 1988, no aluminium scuba cylinders have been made using this alloy or with any alloy containing lead. The vast majority of scuba cylinders in service today worldwide (including all cylinders made by Luxfer and Catalina—the top two manufacturers) are made from an alloy called 6061.

Although during annual inspections, cracks have occasionally been found in 6061 cylinders, none has exploded—ever! And there are hundreds of millions out there.

No need for a bath?

It is worth noting here that not all dive centres that fill cylinders in water are ignorant, negligent and unsafe. There are many dive centres that do this but fully recognise the potential issues and take elaborate precautions to make sure the fill whips and cylinder valves stay dry during the process so that water does not get into their cylinders.

But if the likelihood that a scuba cylinder will explode during filling is so remote, if a water trough will not protect a filler if it does happen, if the water is not really an effective way of removing salt or reducing the cylinder's temperature, and, crucially, if the practice of wet-filling can lead to an incident such as Anna's, why do it at all?

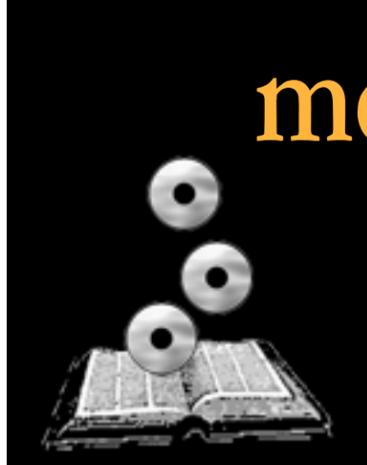
Ironic, isn't it, that, from day one, divers are constantly told always to leave some air in their cylinder at the end of a dive so that no water can get in! And yet... □

Simon Pridmore has been part of the scuba diving scene in Asia, Europe and the USA (well, Guam) for the past 20 years or so. His latest book, also called Scuba Confidential, is available in paperback and e-Book on Amazon.

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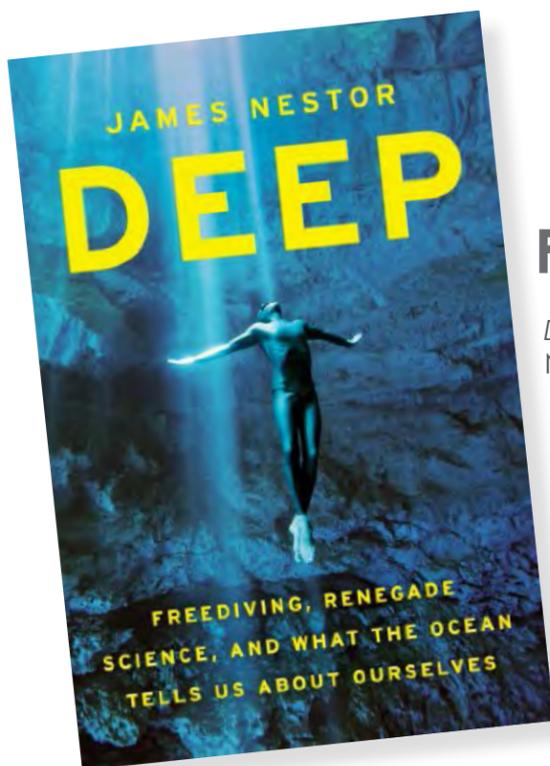
www.poseidon.com



Truk Lagoon

Dive Truk Lagoon: The Japanese WWII Pacific Shipwrecks, by Rod Macdonald. Everything you wanted to know and more about one of the greatest wreck diving locations in the world, all here in one book. Held in secret and fortified by the Japanese during the 1930s, this hidden lagoon in the central Pacific served as a forward anchorage for the Japanese fleet. Around 1944, the U.S. and Allied forces discovered this haven and attacked. Many ships were sunk, which are now grown over with rich marine life. Mostly forgotten since the end of the war in the Pacific, the many underwater treasures of this lagoon came to world-wide attention after Jacques Cousteau filmed several of the wrecks for a television documentary in 1969. Many of the wrecks were untouched since WWII. Today, thousands of divers flock to Truk to see the wrecks for themselves, from Japanese Navy battleships to U.S. carriers, laden with war cargoes.

Hardcover: 288 pages
 Publisher: Whittles Publishing
 Date: 31 July 2014
 ISBN-10: 1849951314
 ISBN-13: 978-1849951319

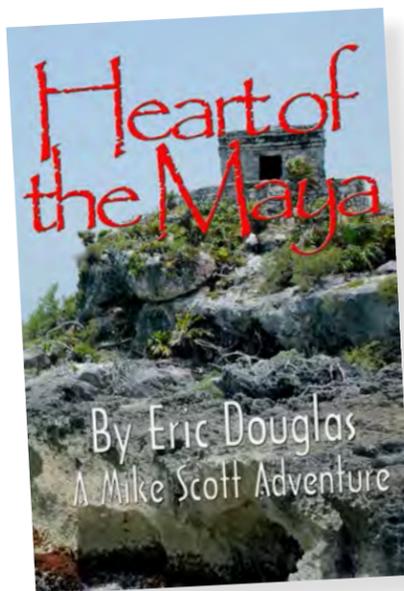


Freediving

Deep, by James Nestor. Follow the author as he journeys into the world of freediving, inspired by the extreme athletes in the field and renegade scientists investigating the limits of the human body and mind. He addresses other

secrets of the underwater world, little known abilities of marine life, how whales can communicate with each other over huge distances, how sharks can swim straight lines through areas of ocean where no light reaches, and how seals can dive for up to 80 minutes to depths previously thought impossible. He shares his own experience in freediving, as he trains with the pioneers.

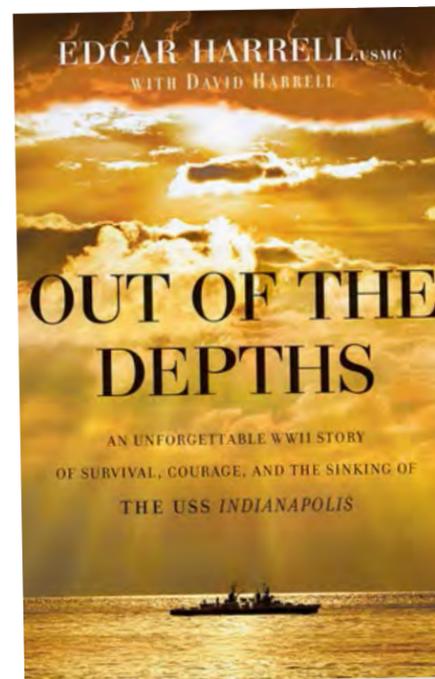
Hardcover: 272 pages
 Publisher: Eamon Dolan/Houghton Mifflin Harcourt
 Date: 24 June 2014
 ISBN-10: 0547985525
 ISBN-13: 978-0547985527



Cenote Adventure

Heart of the Maya, by Eric Douglas. The fifth book in the Mike Scott Adventure series evolves around the theft of an ancient Mayan statue as well as a kidnapping and a murder, leading the story's protagonist, Mike Scott, on a diving adventure in the cenotes of the Mayan Riviera. By chance he finds out that the death of a friend 25 years ago was not an accident. To solve this murder mystery, Mike sets out in pursuit of a missing Mayan statue containing the "heart of the Maya" while a deranged drug dealer murders a friend and sows corruption among the Mayan people.

Paperback: 220 pages
 Publisher: CreateSpace Independent Publishing Platform; 1st ed.
 Date: 13 May 2014
 ISBN-10: 1499544367
 ISBN-13: 978-1499544367



USS Indianapolis

Out of the Depths: An Unforgettable WWII Story of Survival, Courage, and the Sinking of the USS Indianapolis, by Edgar USMC Harrell, David Harrell, Oliver North. The authors delve into a tale of one of the worst naval disasters in U.S. history. On 30 July 1945, the USS *Indianapolis*, in the South Pacific with 1196 souls aboard and a secret cargo of uranium for atomic bombs, was hit by six torpedoes in the middle of the night. The ship sank and the crew faced five terrible days fending for themselves in open ocean. Dehydration, exposure, shark attacks and saltwater poisoning plagued the crew, many of whom perished by the time they were miraculously rescued.

Hardcover: 192 pages
 Publisher: Bethany House Publishers
 Date: 6 May 2014
 ISBN-10: 0764212605
 ISBN-13: 978-0764212604



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ED.— ALWAYS CONSULT A PHYSICIAN FIRST BEFORE BEGINNING ANY EXERCISE OR FITNESS PROGRAM.



Leg Strong

Training Legs for Diving

Text and photos courtesy of Gretchen M. Ashton, CFT, SFT, SFN, NBFE

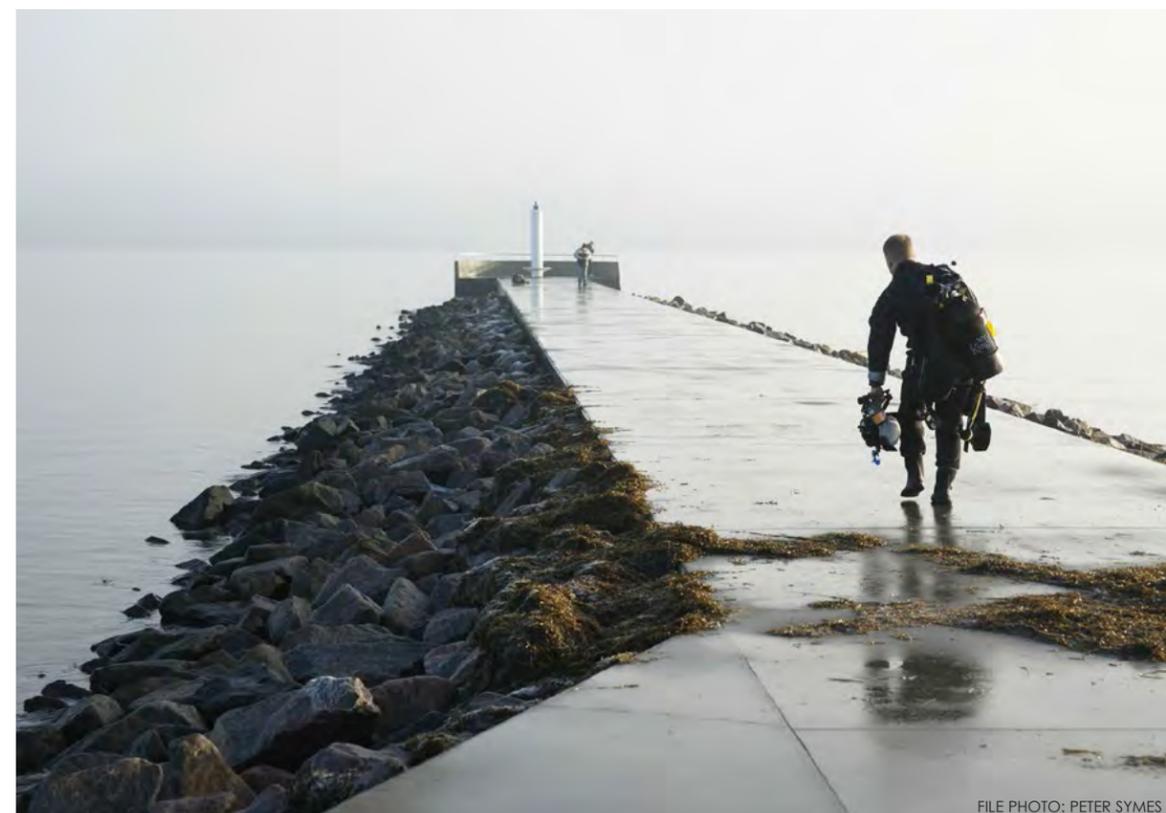
When exercising the legs to keep them strong for scuba diving, it is important to develop muscle strength, endurance and flexibility. The legs must be versatile for diving activities, which place unique demands on the body. During this leg workout, divers will benefit from imagining themselves: safely rising from a seated position under the weight of gear; climbing boat ladders; traversing uneven shore terrain; turtling distances on the surface, moving against and across currents; kicking into high gear in an emergency; positioning the body for underwater photography; maintaining overall self-control preventing collisions with reefs and other divers with efficient fin-kick swimming.

Quad stretch

Divers also need to be particularly aware of balanced leg strength to maximize equipment design. The most ideal set of fins will function better with good muscle balance and biomechanics of the legs. The focus of this fitness for diving workout is training the muscles of the legs, for strength, endurance and flexibility to aid in proper function of the hip and knee joints.

Body mechanics

Most leg exercises train more than one muscle group with each movement. Without getting overly complicated, a close stance targets the outer thigh (abductors), but in the same position, simply pressing the thighs together, as if squeezing a ball between the knees, focuses on the inner thigh (adductors). A wide stance targets the inner thigh (adductors), yet in the same position, pressing



FILE PHOTO: PETER SYMES

Strong legs come in handy when schlepping gear to and from a dive site



away from the center of the body against resistance targets the outer thigh (abductors). Squats target the front upper thigh while leg extensions target the front lower thigh (quadriceps). The quadriceps muscles extend the knee joint so resistance against extension of the knee joint trains the front of the thigh

(quadriceps). The hamstring muscles flex the knee joint so resistance during flexion of the knee trains the back of the thigh (hamstrings). These muscles of the upper leg also act on the hip joint. In the lower leg, the calf muscles assist forward movement when walking and fin-kick swimming.



Sissy Squat starting position

Leg strength and endurance may also be developed with many forms of aerobic exercise such as walking, running, jumping rope, cycling, group exercise classes, dancing, hiking, swimming and sports activities. Leg muscle imbalance can affect gait, foot, hip and back comfort when performing aerobic activities possibly leading to injuries, pain and interruption of exercise programs.

Stretching is important for flexibility and muscle balance. For example, tight hamstrings often lead to low back complications and pain, and tight quadriceps may pull the knee cap (patella) out of alignment. A few minutes of stretching every morning will make a noticeable difference in how divers feel and move. Stretching is best performed after a warm-up or a hot shower.

Location

The featured exercises are performed outside in a local park but with a bit of ingenuity the workout can be completed at a fitness facility or other indoor location. Some gyms have Sissy Squat apparatus that divers can lock their feet into instead of holding a rope or strap.

Equipment

All that is needed for this workout is a good pair of athletic shoes, a strong cotton jump rope or strap, a dumbbell, and a set of stairs or curb (preferably with a railing). A sturdy tree trunk works well in lieu of a railing and a large rock might even do the trick instead of a dumbbell. It is

not recommended to use exercise cables or jump ropes that stretch, diving weights that contain lead, or scuba tanks that lack good hand holds. It is also very important to hold the rope or strap not just the handles.

Breathing

For all of the exercises in this workout inhale through the nose before starting the exercise and during the downward motion; exhale through the mouth during the upward motion (during exertion). If additional breaths are needed during hold positions, work to keep the rhythm and timing of the additional breaths in sequence with the exercise.

Form

Distribute body weight evenly throughout the muscles of the lower body and keep the abdominal muscles contracted during all exercises.

Repetitions

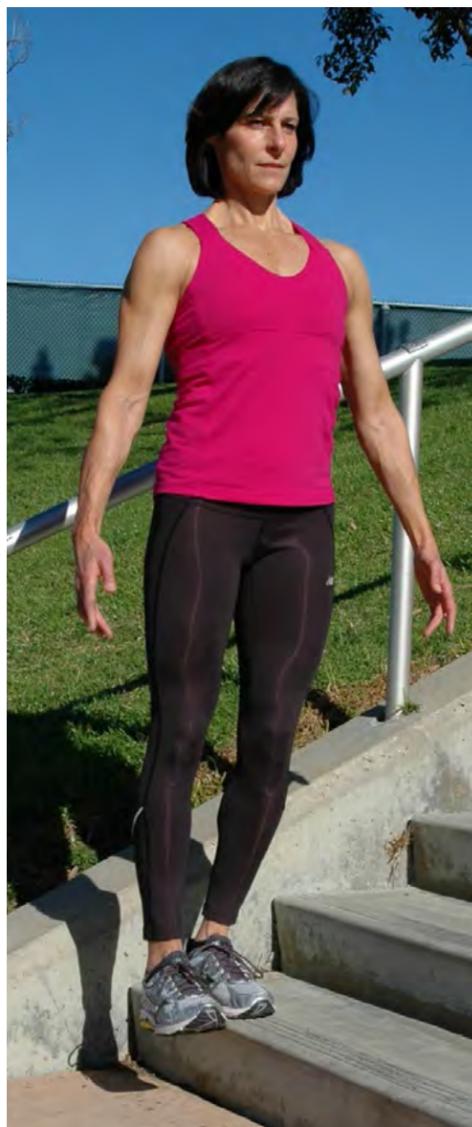
Perform as many repetitions of each exercise as possible in one minute. Repeat the entire sequence one to four times.

Exercise: Sissy Squat – Close Stance

Wrap a non-stretch rope or strap around a railing, pole or tree as shown. With feet in a close stance, rise as high as possible onto the toes. Lean back slightly and use the rope to suspend the position. Sit back into a squat as if reaching for a chair that is just a bit too far behind. Establish a position of

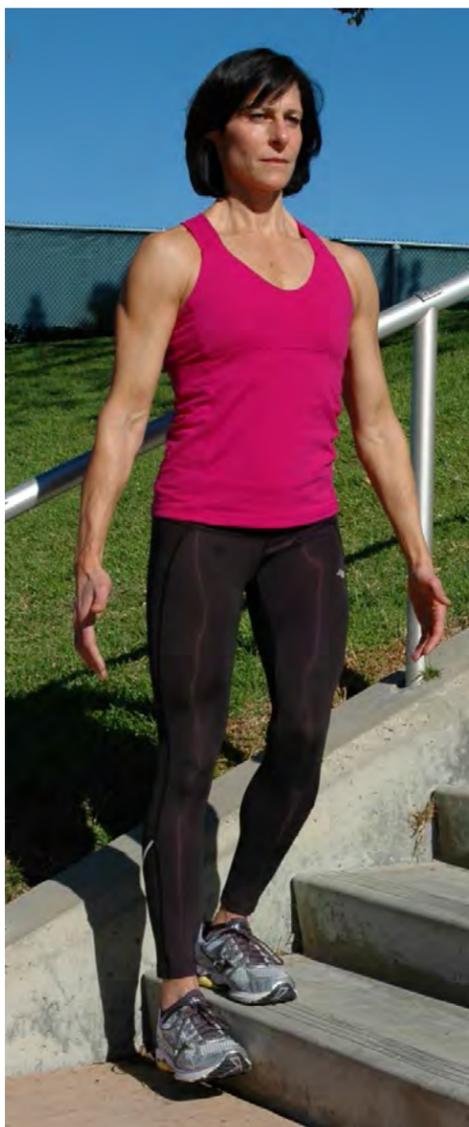
TOP TO BOTTOM RIGHT:
Sissy Squat ending
position for beginner,
intermediate and
advanced





Step Down starting position (above); Step Down ending position (right)

right angles at the knees and hips. Hold this position for 3 to 5 seconds, return to the starting position and repeat. For more challenge, continue to lean back and press the hips upward by squeezing the glutes. Be sure to maintain the 90 degree angle at the knees. Progress over a period of weeks from beginner to advanced.



Exercise: Wide Stance Squat
Establish a wide stance as shown. Look down each leg to make sure that the hip, knee and toe are aligned. Hold a dumbbell or other weighted object in front of the hips with elbows slightly bent. Sit back and down reaching for that chair or bench that is too far behind. Once in the seated position, the knee, hip and ankle joints are to be as close as possible to right angles. At the bottom of the squat, squeeze the glutes (buttocks) to reverse the direction of the squat. Note: Do not lock out the knees at the top of the range of motion. Always look up (never look down) when performing a squat.

Exercise: Step Down
Stand sideways with one foot on a step or platform and the other foot suspended at the same height alongside as shown. Hold a railing or carefully balance while bending the knee of



the supported leg and lowering the suspended foot toward the ground. Hover for a few seconds in the lower position before contracting the glutes and leg muscles straightening the supported leg and returning to the starting

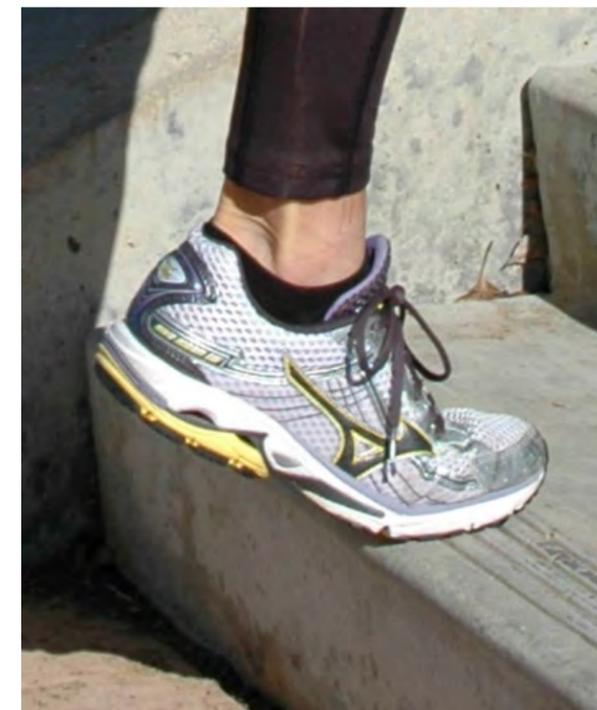
position. In the lower position, the knee of the supported leg may be over the toes. If there is any pressure through the knee or the knee moves well beyond the toes, stop the exercise and reposition the supported foot in a more forward position in relation to the body. Make sure to move the buttocks out behind the body slightly when bending the knee to help with proper form.

Exercise: Calf Raise
Finish the workout with calf raises. Position a single foot with the heel off of a step or platform as shown. Press on the toes, contract the glutes and raise the heel high above the toe to contract the muscles of the calf. With control, lower the heel and repeat. Bend the knee of the working leg slightly, hold a railing if needed for balance, and pause at the top for a few seconds to maximize the exercise. □

Gretchen M. Ashton is registered with the National Board of Fitness Examiners. An advanced diver, International Sports Sciences Association Elite Trainer, and world champion athlete, Ashton developed the ScubaFit program and the comprehensive Fit-Diver program, which includes the first mobile app for scuba diver fitness. Ashton is the co-author of the PADI ScubaFit Diver Distinctive Specialty course. For more information, visit: Scubafit.com



Calf Raise starting position



Calf Raise ending position

Leg Strong

marine mammals



Looking for Moby Dick

ANDREAS GRUBER

It's an adventure. You swim like a champion, trying to be as streamlined as possible and glide effortlessly through the water. Your heart rate is already at its limits and your breathing borders on hyperventilation. Your focus is on the sperm whale and its blow, which you can see just as you slide into the water. You are hoping to get the animal in front of your camera, but it is a bit of gamble.

Text by Kurt Amsler. Translation by Peter Symes, edited by Gunild Symes. Photos by Kurt Amsler, Fred Buyle and Andreas Gruber

Azores. Yet the whales are elusive and their behavior is nowhere near what Herman Melville described in his famous novel, "Moby Dick". Suddenly, a bul-

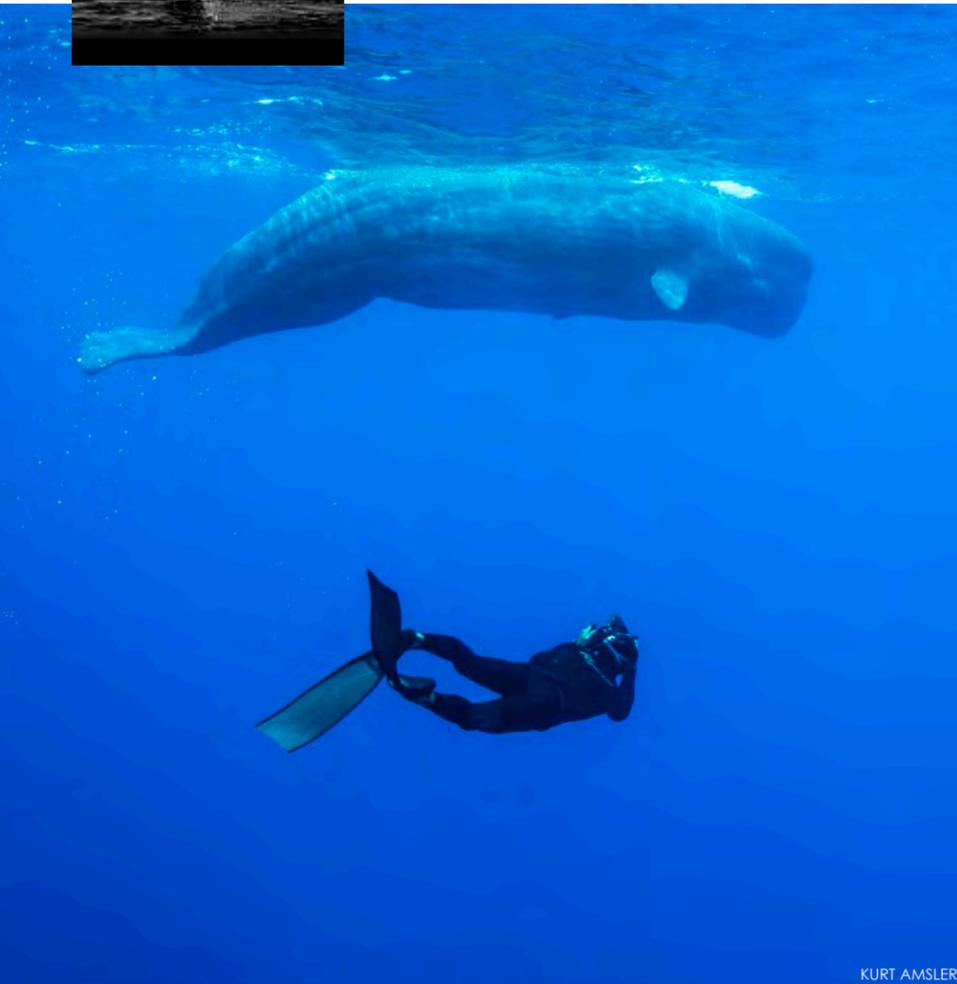
For three days now we've been cross-crossing the ocean between the islands Fajal and Pico in the Azores, in Norberto Diver's bright red RIB, for six to seven hours each day. We are joined on board by freediving champion Fred Buhle and photographer Andreas Gruber. It's peak season, the weather is great and the sea is calm here in the



KURT AMSLER

Author Kurt Amsler photographing a sperm whale, photographed by freediving icon, Fred Buyle

Whale spotter on the lookout for sperm whales



KURT AMSLER



Kurt Amsler and Fred Buyle prepare to dive with sperm whales



KURT AMSLER

bous head sticks high out of the water. With flippers slapping the water, the sperm whale heads straight for us in order to ram us.

"Baleya Baleya!" Ahead to starboard, Norberto cries out. He's both excited and visibly relieved after having searched for the whales for over three hours. What now ensues is a carefully choreographed sequence of maneuvers that has been practiced countless times but still feels tense. The animal may stay on the surface, but in most cases it dives, and you have to start all over.

I perform a superfast last check of my camera equipment and I am all set. Norberto has years of experience in dealing with marine mammals and knows exactly how to proceed in order not to scare away a whale. At a distance of around 150 meters, he throttles back and keeps pace with the

animal, waiting to see whether the 4m (12ft) long female sperm whale remains calm in our presence. Next, he very carefully closes the distance to about 100 meters while maneuvering into a position a little bit in front of the whale.

It is now or never: "Go, go!" With a last glance at the animal to fix its position, we slide into the water. During this 100-meter sprint towards the whale, every second counts. The angle of the light rays steaming down from the sky serve as a reference point in order to stay on course, with our eyes searching ahead into the blue, trying to catch the outline of a whale. We are about to find out if we got our hopes up for nothing or whether the whales have, as so often before, dived and slipped away out of sight. I am just about to give up when I finally see him.

First vaguely, then more clearly, as it swims, to my astonishment and delight, in a 45 degree angle towards me. Crunch time! Now, it is about not screwing up this golden opportunity.

I focus, bring my galloping breathing under control and catch the right moment to dive. Not only is going down a better camera position, but it also allows to me to forestall any changes of direction and dive along with the whale. Going vertically down head first is the hardest part. If you lose sight of the animal, it is gone.

As I level out, I find myself at about 10m, and I start following the action through the viewfinder. I gently keep triggering the shutter and seconds turn into minutes until the whale finally breaks off and dives, with no chance for us to follow it.

Once I am back at the surface, I try to catch my breath,



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Marlies and Wolfgang Liebau, November 2013



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mammals



Moby Dick

KURT AMSLER

Sperm whale family (above); Fred Buyle photographs sperm whale (left)

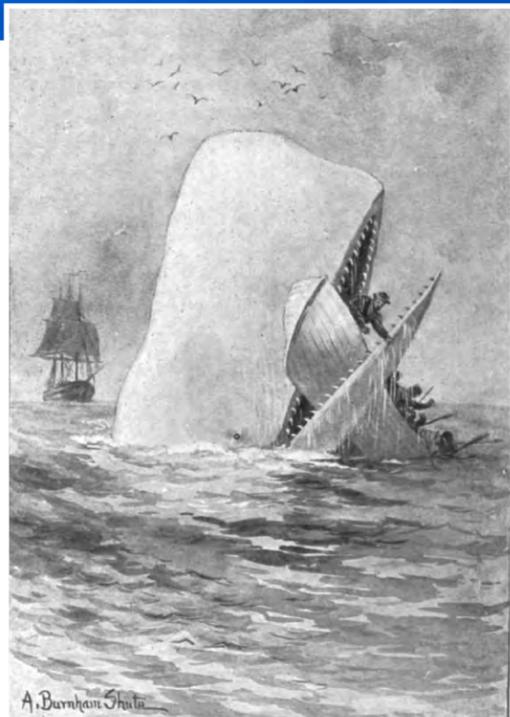
and the words of freediving champion Fred Buyle comes to mind: "Don't feel bad, Kurt. They always win!"

Moby Dick

This novel, which is now a literary classic, was a commercial failure when it was first published in London and New York in 1851. And it

was only a long time after the author's death in 1891, when the book was well out of print, that its reputation rose during the 20th century. The first translations into German appeared in 1927.

One of the most distinctive features of the book is the variety of genres that appear. Melville uses a wide range of pastyles and literary devices to blend the complexity of the fascinating whale, the ethical ambivalence of hunting these magnificent creatures, and the incredibly diverse appreciation of whales and whaling across the



KURT AMSLER

world's cultures. Moby Dick is based on Melville's actual experience on a whaling vessel. He described the whale in either florid mythical terms or in the language of the early marine biologists. Some pas-

sages are written using the old jargon of the New England Quakers, others like the preaching tales of old bible translations. He moved with ease from the language of a sailor to the dry prose of expedition reports. He

described exotic cultures in the style of the racist adventure literature of the day in order to fit right into the prevailing tone of the establishment.

The sperm whale

(Physeter macrocephalus or Physeter catodon). Even at birth the sperm whale breaks all records for toothed whales; A baby whale can weight over a ton. But it is their diving capabilities that really stand out. One specimen which was equipped with sensors and transmitters dove to a depth of 2,270 meters. The bulls can reach a length of 18 meters and a weight of 40 tons. As such they are the biggest predators on the planet. The body is stocky and the characteristic bulbous head can account for a third of the total length. The dorsal fin is small and it has short and stubby pectoral fins. The tail fluke is shaped like two equilateral triangles and is

slightly rounded at the top and deeply notched in the middle.

The one blowhole is located at the upper tip of the head. The huge head of a sperm whale is to a large part filled with an oily substance, also called spermaceti. It is believed that the head also serves as an "acoustic lens" focusing sound waves sent out during echo location. Emitting high-frequency clicking sounds the animals scan the surrounding environment and are able to image a large area.

The sperm whale is found in all oceans. It is most common in the tropics and subtropics, but is also found in colder seas. In 2004, a sperm whale was even spotted in the Baltic Sea for the first time.

On average, the males dive deeper than females. The duration of a dive can be from 20 to 120 minutes. How it's possible for sperm whales to hold their breath for such extended periods of time has not yet been fully



Herman Melville



KURT AMSLER

Whale museum in Horta (above); Illustration by A. Burnham Shute from early edition of Moby-Dick by Herman Melville (left inset)



mammals



KURT AMSLER

Moby Dick



FRED BUYLE



Sperm whale underwater; and in illustration from *Moby-Dick* (left)

than humans do, enabling them to store large supplies of oxygen. Sperm whales' preferred prey is squid, and parts of the fabled giant squid has regularly been found in their stomachs.

Females form social networks with their young and live in groups of about 15 to 20 animals. Sexually

mature males then leave and later form associations or groups with older males but travel alone.

Whaling in the Azores

Whalers from America and later, England, brought whaling to the Azores. Whaling was not actually performed in

these waters, but the islands were used for provisions and supplementing crews with young, brave and energetic men from the archipelago. In time, the Azoreans took up whaling themselves and established their own whaling stations along the coast.

On the islands, high above sea level, lookouts were established from whence the so-called "Vigias da Baleia" or "looking for whales" could be conducted using binoculars overlooking the ocean. These observers were the most important men in the whaling, because only their eyes could direct the whalers to their targets. When a whale was spotted, at first smoke signals were used, later rockets were shot into the sky until finally radios were used.

The whalers were fishermen, craftsmen or farmers who dropped what they were doing once a whale was sighted. The cry "Baleia! Baleia!" signaled the men in the fields to leave what they were doing and head as fast as possible to the har-

explained. It is known that they are able to restrict and slow down their metabolism to a minimum while diving, during which time, blood is directed only towards essential organs such as the heart, brain and spinal cord.

In addition, sperm whales have 50 per cent more hemoglobin in their blood

Kurt Amsler underwater with sperm whale





mammals

Display of sperm whale in the whale museum of Horta, which is housed in a former whale factory on Faial Island in the Azores



bor where their boats were constantly ready to sail.

Early on, they went out in long slender rowing boats called "Canoas" sometimes assisted by sails. In the second half of the 20th century, motor boats were used to power the whaling boats, which had a crew of up to seven

out at sea.

If the whale surfaced, the crew had to row over to it as quickly as possible. The "Arpoador" hurled the harpoon by hand into the flanks of the giant. Hit by the harpoon, the whales would flee, in most cases, by diving deep. In such cases, the up to one kilome-

ter-long rope wound out rapidly. This was the most dangerous part of the hunt, because if anyone got snagged by the rope reeling out, he would be pulled under.

Many whalers lost their lives in the hunt. Whole boats could be pulled to the depths if the rope was not cut before the end was



Moby Dick



reached.

In 1984, whaling in the Azores came to an end, making room for a new lucrative business; nowadays, the only hunting done is with photo and video cameras and not with harpoons. Many of the old observation posts are also in use again this time by whale watching companies taking tourists and divers out. Even some of the old "Vigias" are now back in action many years after the ban on whaling came into place; they now assist the tourists with their good eyes, which still provide an important service.

Freediving with whales

I have been so fortunate to dive with some of the largest whales of the oceans. The first encounter I had was in 1990 diving with resident pilot whales. At that time, there were virtually no commercial whale watching or snorkelling tours and no regulations. We

could spend days with the animals without being disturbed. In Polynesia, I have been freediving with humpback whales, which bring their young to the warm waters there.

Another unforgettable experience

Experiencing these giants was simply huge. Appreciating that humpbacks expend their energy reserves during the long trek from the Arctic, I cannot let go of the idea of also diving with these creatures in the Arctic. But the most impressive of all cetaceans, is the sperm whale which "Moby Dick" once made world-famous! He is the beast of superlatives and the largest predator that ever lived on our planet. He can hold his breath for two hours, dive to 3,000 meters and eats a ton of

squid per day!

The Azores, which are now my second home, is probably the best place to get a camera in front of these giants. There are places, Mauritius and Dominica, where the access is much easier, but the challenge and adventure cannot compare.

Despite being hunted to the brink of extinction by humans, the animals show absolutely no aggression when you are with them in the water. Catch

them on a good day, the sperm whales can also be quite curious and try to communicate with their extremely well-developed cognitive abilities—our problem is to figure out how to answer. □

"We can only dream about the diving skills of these whales."

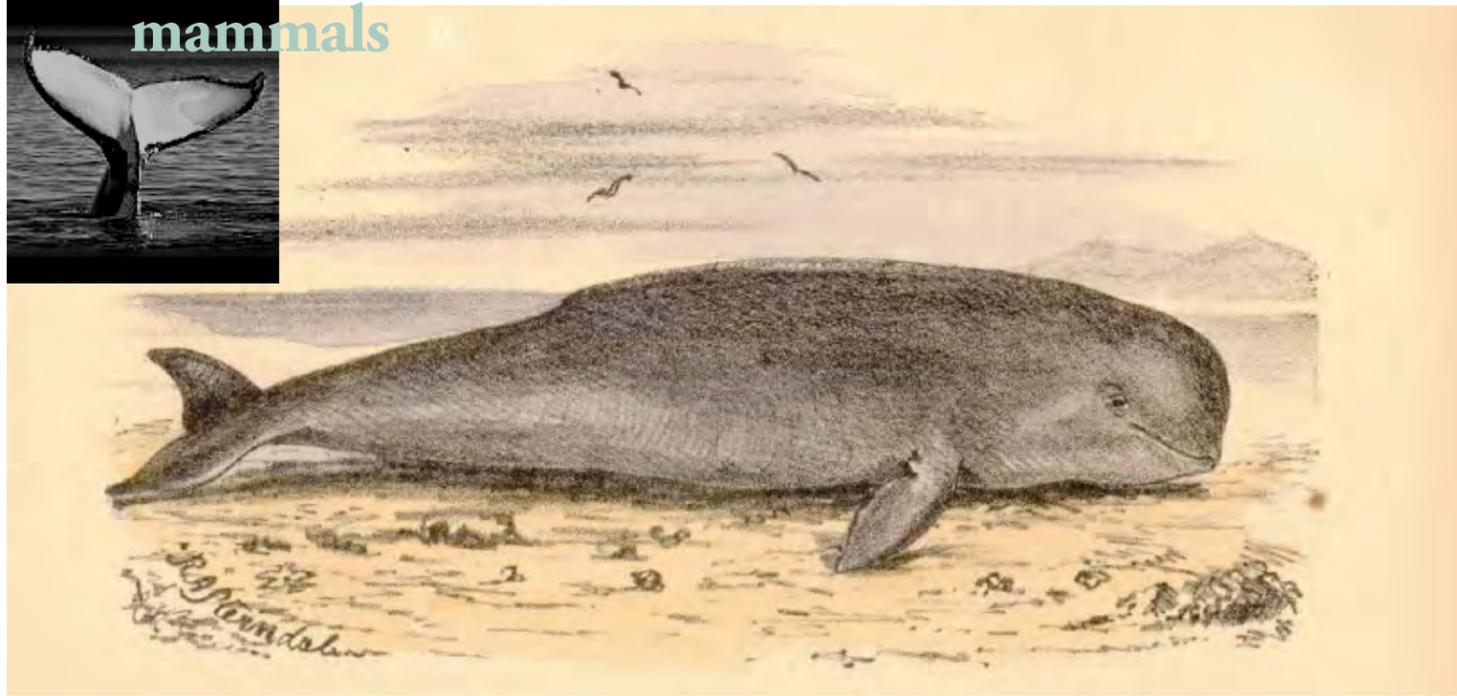
—Freediving icon
Fred Buyle

For more information, please visit Kurt Amsler's website at: www.photosub.com

THIS PAGE: Holding its breath for two hours, a sperm whale can dive to depths up to 3,000m



mammals



Rewards offered for sighting Yangtze porpoise

In a bid to try and save the Yangtze finless porpoise, Chinese authorities are giving people who report an injured or dead finless porpoise a cash reward.

The Yangtze finless porpoise is one of three recognised subspecies and is the world's only freshwater porpoise. The porpoises stay in shallow waters, up to 50m (160ft) deep, close to the shore, in waters with soft or sandy seabeds, or in estuaries and mangrove swamps. Unfortunately, it seems to now be on a similar path to extinction as the now infamous

baiji, or Yangtze River dolphin, that was declared functionally extinct at the end of 2006.

Experts say pollution and low water levels are harming the fragile species. It is thought only about 1,000 of these freshwater animals remain in the wild. About half the population lives in Poyang Lake, which used to be China's largest freshwater lake,

but the construction of a dam and recent droughts have reportedly reduced its size by nearly 95 percent.

Reporting that a Yangtze finless porpoise has been injured or is at risk—and helping to save the animal before officials arrive—could be rewarded with 300 yuan (US\$48, GB£29), the People's Daily newspaper said. □

Female humpbacks head to shallower waters to shake off bothersome males

Scientists believe females could be choosing shallower waters to avoid unwanted advances from males, save energy and give their calves a better chance of survival.

Lead scientist Dr Alison Craig, from Edinburgh Napier University explained: "There are no long-

term social bonds between male and female whales, and the males approach lots of females in the hope that they will get the chance to mate."

The findings revealed that females with a newborn calf were frequently chased by one or more males in deeper waters. This

meant that the mother and her baby had to speed up their swimming nearly 75 percent. However, as they swam to shallower depths, the number of males pursuing the mother decreased. Hence, more often than not, the mothers in the shallows were found to be alone with their calves. □

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Ann Donahue, October 2013



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Mystery solved: Minke whale cause of bizarre quacking sound

For decades, the noise—nick-named "the bio-duck"—has been recorded in the Southern Ocean, but the animal producing it has remained a mystery. The strange sound was first detected by submarines about 50 years ago. Those who heard it were surprised by its quack-like qualities. The researchers now say they have "conclusive evidence" that the bio-duck is produced by the Antarctic minke whale. In 2013, acoustic recorders were attached to two of the marine mammals and recorded the whales making the strange noise.

□ SOURCE: BIOLOGY LETTERS



Antarctic minke whale

NOAA





Edited by
Ila France Porcher

Text by Ila France Porcher
Photos courtesy of Wolfgang Leander

At the almost venerable age of 73, Wolfgang Leander is one of the great pioneers of freediving with sharks, whose writing and photography have made him a legend.



Wolfgang Leander



The Art of **Wolfgang Leander** *— Freediving With Sharks*

Of German descent and now living in Cochabamba, Bolivia, Leander was fascinated from early childhood by the sea and its occupants. By the time he was a teenager, he was spending his time spearfishing in the Mediterranean, which was then a diver's paradise. Inspired by

the feeling of flying weightlessly through the spectacular submarine landscapes, he honed his skills while exploring and fishing.

Freediving

Freediving gave him the sensation of

being at one with nature, and he resisted scuba diving, and finally refused it, because he thought he would lose that sensation of freedom of motion under the weight of the gear and tank.

The first time Leander saw a shark close-up, he was spearfishing alone in

1968 in the British Virgin Islands, and just as he targeted a fish, a four-metre shark glided by him. He was riveted by the sight of it, and replayed the moment over again and again, trying to keep the enchantment alive. He found the experience so moving that he began to seek





Leander



sharks out, and tried not only to see them, but to interact with them.

Caribbean reef sharks were his favourites. He found them to be the most elegantly designed of sharks, and they accompanied him on his lone spearfishing sojourns. He saw them in many situations, and became increasingly familiar with them and the other sharks on the reef. He had always had an intuitive sensitivity to animals, and knowing their body language, he learned to move with them in harmony with their moods. He soon perceived that they were intelligent animals, and was awed by their capacities to win out in countless situations that developed in their

THIS PAGE: Scenes with tiger sharks





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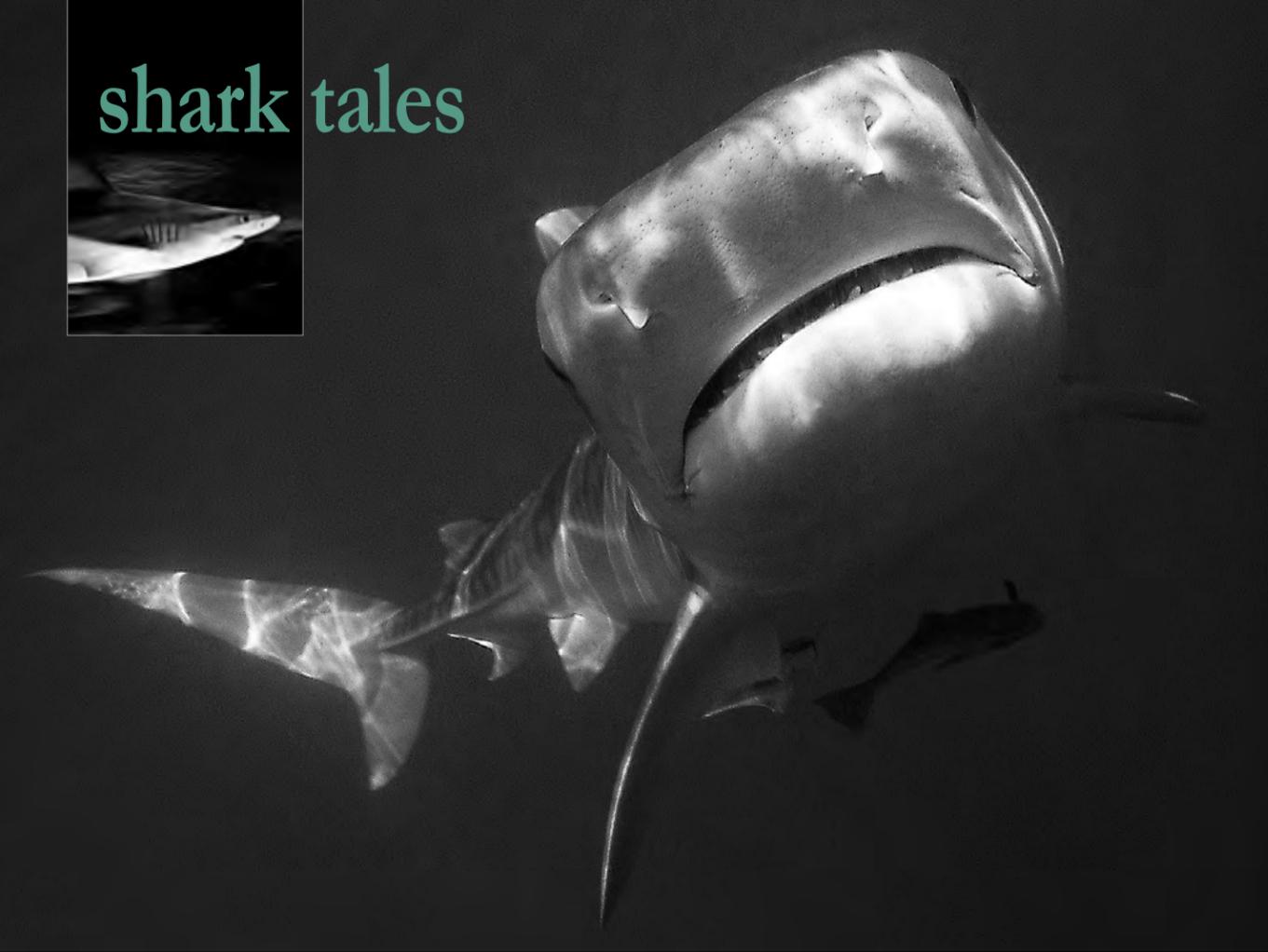
Leander



complex environment.
Leander was one of the rare individuals who discovered on his own, independently of the rest of human kind, that sharks were nothing like what he had been taught, that they do not behave the way people believe they do, as shark mythology tells us that they do. Once he knew this, he became an avid shark advocate and a leader in the effort to save these maligned fish from extinction.

Sharks in art
Photographing them regularly, he tried to capture their essence in black and white, and followed his own instincts as he had always done, to remain faithful to his old Nikonos V camera long after the world went digital.

THIS PAGE: Tiger sharks



THIS PAGE: Various portraits of tiger sharks

Leander's photography is straightforward. He describes it as "minimalistic" as he concentrates on what he calls the bare essentials in photography in general: composition, composition, composition, with nothing extraneous to distract from the centre of attention.

He is one of the very few underwater photographers who works with available light only, and he does not use distorting ultra-wide-angle lenses to create special effects. His camera becomes an extension of his eye, literally focussed on his subjects, as he works.

Leander sees himself as a purist when it comes to diving and pho-

tography, and his uncanny sense of harmony may be behind his skill in capturing striking images that reflect the supernatural beauty he found in the ocean. He says that he has most images in his head before squeezing the shutter.

With their delicate shadows illuminated by the white sand, Leander's lighted images enhance the clean and graceful silhouettes of sharks in motion. The black and white medium emphasizes the play of light over the streamlined forms of his subjects while his sharp eye captures dramatic compositions that highlight their elegance. His works present the most fragile-looking harmonies of form.

The presence of the tiger

In March, 2007, Leander dove with tiger sharks at Tiger Beach in the Bahamas, and found the underwater presence of these great sharks spellbinding. Their curious and very slow approaches to gaze at him were unexpected and irresistible. He writes, "I looked into their dark eyes, and I immediately felt what the French call 'le coup de foudre,' love at first sight."

Leander returned again and again to swim and interact with tiger sharks, each time marvelling anew at the intelligence he found reflected in their eyes.

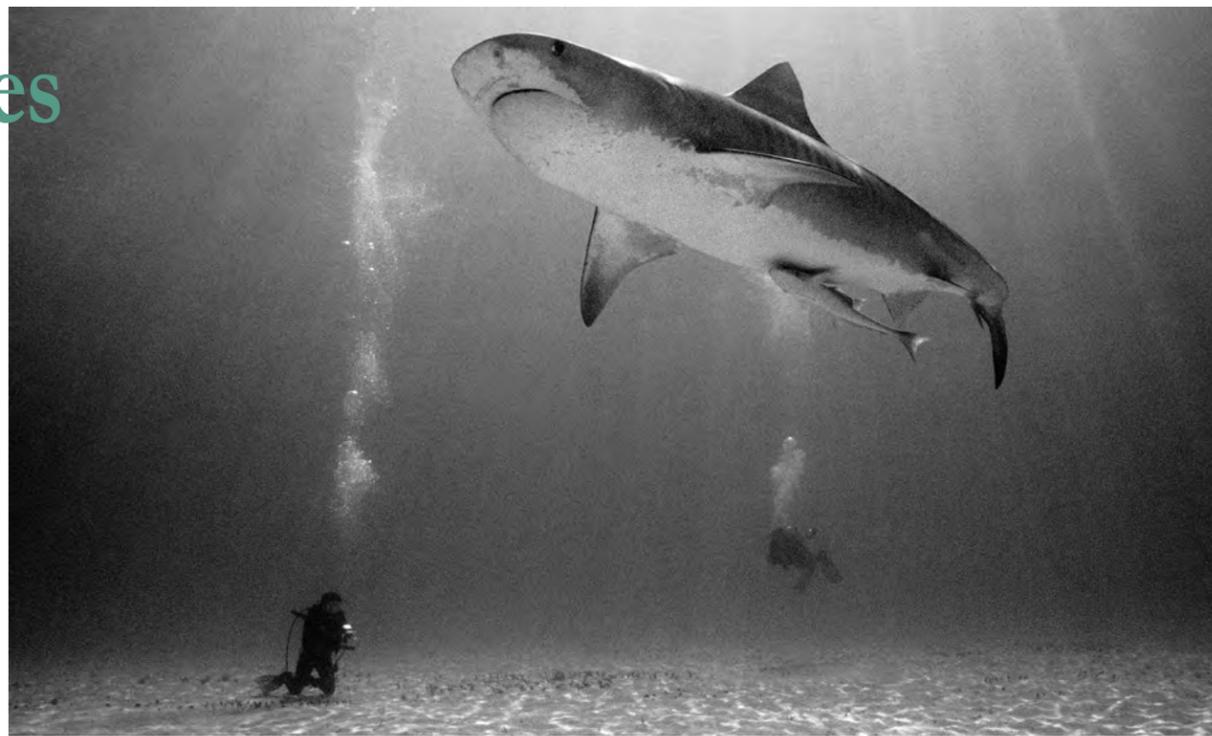
At the same time, he has been a passionate, and at times vociferous,



shark tales



Divers with large tiger shark (right); Hammerhead shark on sandy bottom (far right and below)



Leander



Mystic Manta Ray, by Wolfgang Leander (left)



makes eye contact with the living shark, will recognize that it is not the monster it is portrayed to be. To Leander, no one can meet a tiger shark and fail to be enchanted by his or her beauty, peacefulness and intelligence, sensed, rather than seen, in the "dark and inquisitive" eyes of the tiger. □

spokesperson for sharks, assuring others that humans are not on their menu, and that they are intelligent and peaceful animals who treat humans gently. He regularly denounces their demonization by the media, their slaughter for shark fin soup, and the shark tro-

phy fishing culture that dominates public thinking in many regions. He urges all those who fish for sharks, and those who fear or hate them, to go and meet them underwater, because he is convinced that anyone who sees them in their habitat and

For more information about how Leander crafts his images to transmit powerful visual messages visit: **fleander.blogspot.ca**





Blacktip reef shark at Sea Life Centre; Baby blacktip reef shark at Sea Life Centre in Weymouth (lower right)

Flirting sharks at Sea Life Centres hold promise for wild populations

Text by Ila France Porcher
Photos by Mark Oakley of Sea Life Centre and Ila France Porcher

A breeding programme for blacktip reef sharks has been launched at Sea Life Centres in Britain and Europe, with the goal of restocking wild populations fished out for the shark fin market.

Marine scientists are hopeful it will provide a model for future captive breeding programmes. There are about 70 blacktip reef sharks in Sea Life Centres across Europe, and they are all reaching reproductive age at the same time. The facilities are preparing to welcome the many pups soon to arrive with the best possible care.

A pup born in Scheveningen, Holland is now more than a year old, and three more born in Oberhausen, Germany, two months ago, are thriving in a special

nursery tank in Weymouth, Dorset. Several centres in Britain are expecting pups soon. The females give birth to up to six live young, and since the species pursues a complicated social life in the wild, plans are being made, and ways are being found, to ease the capricious shark mothers-to-be through a successful birthing.

"We have the opportunity to establish a world-leading captive breeding programme, but we will need to learn a great deal very quickly—we have suspected pregnancies at several centres," said Sea Life senior curator, marine biologist Chris Brown. "The pressures on sharks in the wild, mainly from shark-finning, could result in captive-breeding programmes becoming vital to their survival. Reintroduction could soon offer their last hope, in which case we would like to be able either to provide animals for release, or to be able to advise any specially established breeding centres how to achieve the best results."

Shark Watchers

To help staff at the centres remain up to date on all mating activity, Sea Life is calling on their visitors to help watch for signs of mating behaviour, through a new program named Shark Watch, which has recently received a lot of publicity. Helpful visitors are given a questionnaire and guide to make it as straight forward as possible to report their observations.

What is learned in this exciting new program of hands-on research could be critical to successfully raising sharks in captivity, and later reintroducing



MARK OAKLEY / SEA LIFE CENTRE

them into the wild. Tropical sharks have never been captive-bred before on a significant scale, but the Sea Life team believes it has a unique opportunity to achieve a breakthrough. A special blacktip stud-book has been set up to help ensure a strong gene pool.

Raising sharks

With my background observing the species in the wild, I was invited to Britain to discuss the care of the pregnant

females and pups at various centres, and make suggestions for the questionnaire. I was most impressed by the concerned dedication of all staff members involved, as well as the radiant health of their sharks.

"Blacktips are classed as 'near threatened' in the wild," said Sea Life curator, Carey Duckhouse. "Though still fairly common, some populations, like the one Ila studied, have declined sharply through over-fishing for the shark



ILA FRANCE PORCHER

Brighton Sea Life Centre



MARK OAKLEY / SEA LIFE CENTRE

shark tales



fin market. It's possible that a captive breeding programme for reintroduction could become necessary in the future, in which case everything we learn from our programme could prove valuable. "As our own displays teams are unable to monitor our sharks day-long, we are recruiting volunteer

Shark Watchers from amongst our visitors," Carey explained, "and with Ila's help have devised a simple, and we hope fun, survey form, to help alert us to courtship and mating at the earliest opportunity, so we can plan accordingly."

At 25 centres across Europe

housing blacktip reef sharks, visitors will be invited to serve as Shark Watchers throughout the summer.

If visitors report mating activity or see it taking place, it will help enable Sea Life experts to predict the likely birth period and plan accordingly. The mother could be corralled in a special region in the main display, where she could give birth without other sharks preying on her pups, or she could be placed in private in a nursery area.

Decades of shark finning have stripped these tropical reef sharks from their habitats on coral islands throughout the Pacific, the Indian Ocean, and the Middle East. The exact extent of the depletion is unknown, but every time it is studied, the conclusions are more dire.

About the centre

As my host and Sea Life public relations manager, Mark

Author Ila France Porcher



MARK OAKLEY / SEA LIFE CENTRES

Oakley explained, the first Sea Life centre opened in 1979 on the shores of Loch Creran in Scotland. It was a new concept, the inspiration of John Mace, a fish farmer who wanted to display the sea life off the shores of Britain, for the first time. Visitors were enthralled by his imaginative exhibits, showing local sea life in attractive natural settings. All animals were displayed with greater room for movement and larger viewing windows than had ever been done before, and the centre was so popular that within a year, it was the leading visitor attraction on the west coast of Scotland. When outdoor pools for rescued seals were added, its popularity grew further.

The marine specialists at Sea Life didn't consider mammals, such as seals, dolphins and whales, appropriate inhabitants of an aquarium, and only housed animals who adjusted easily to life in the spacious exhibits.

More and more Sea Life Centres were acquired around the world, and each time, the mammals they had once housed were carefully released. Currently, the release of a beluga that was housed in the latest Sea Life

acquisition in Shanghai, is being arranged. Stranded, injured, sick, or orphaned seals, dolphins and whales found along the shores of Britain are systematically rescued by Sea Life, and housed in one of its specialized hospital facilities.

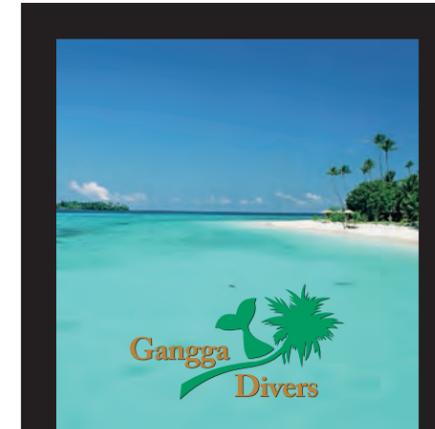
Breeding

Breeding endangered sea animals is another important aspect of the Sea Life Centres, of which the tropical shark project is one of the latest. Sea Life is also breeding 13 species of endangered rays. Since its inception, Sea Life has tried to play a direct role in helping sea life of all kinds, and its enlightened approach stands as a dramatic example of how rescue, rehabilitation, release and education can make aquaria into important facilities for aiding wildlife, as well as displaying it. Sea Life's work provides a ray of hope for the survival of the many species of sharks threatened with extinction. □

Ila France Porcher, author of My Sunset Rendezvous: Crisis in Tahiti, is an ethologist who focused on the study of reef sharks after she moved to Tahiti in 1995. Her observations, which are the first of their kind, have yielded valuable details about their lives, including their reproductive cycle, social biology, population structure, daily behaviour patterns, roaming tendencies and cognitive abilities. Her next book, On the Ethology of Reef Sharks, will soon be released.



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opinion

Text and photos
courtesy of Gareth Lock

At the Rebreather Forum 3 conference held in Florida in May 2012, a number of presentations were made which advocated the use of checklists as a means to prevent diving incidents from occurring, or at least reducing the likelihood of occurrence. Consequently, there was a consensus opinion made at the end of the conference that checklists should be more actively promoted by both the manufacturer and the training agencies and should become the norm. Significantly, there should be overt use by senior members of the diving community in the same way that leading figures in snowboarding and skiing have changed the attitudes over the use of helmets, with the result that it is 'not cool' to not wear a helmet. To further emphasise the endorsement of the use of checklists, at the 2014 TEK Dive USA held in Miami from 17-18 May 2014, PADI provided T-Type CCR checklists for all attendees in the delegates' bags.



Checklists

— *A Tick in the Box*

Checklists aren't just about diving equipment, but also about the aim of the dive. Make sure the camera is not stuck on Manual Focus before taking the shot!

The reason why the presentations and consensus statement arrived at this position was because there is considerable evidence from aviation, medi-

cine and other fields and disciplines that shows the proper use of checklists reduces the probability of incidents occurring. Simple examples of how

checklists have improved safety include making sure the limb for amputation has been actively and correctly identified, positive confirmation of the dose

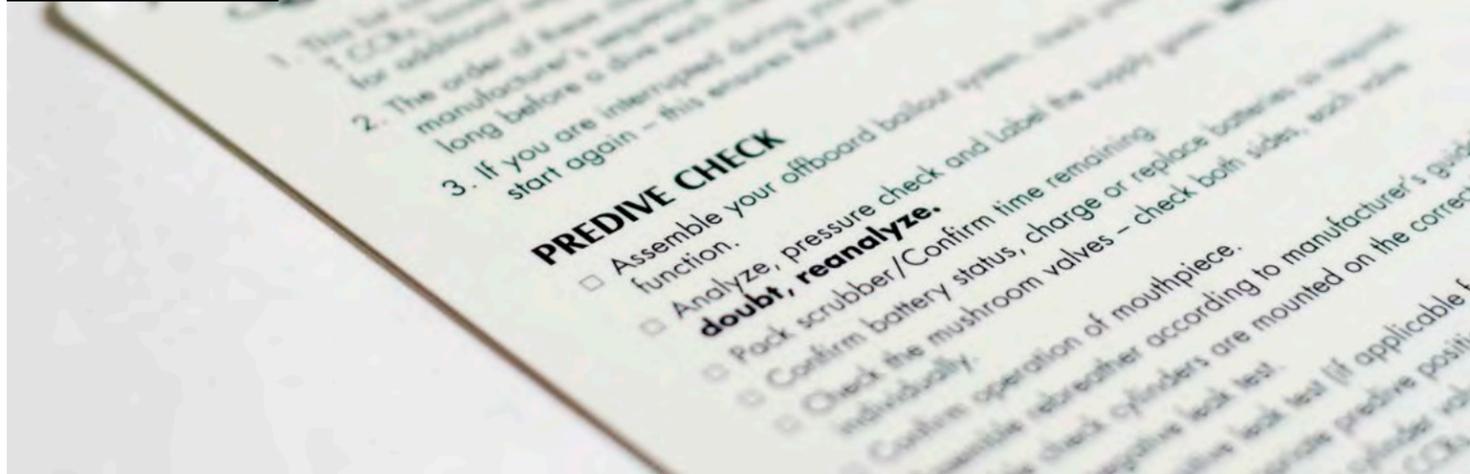
and identity of the drugs being administered or making sure the correct engine is being shut-down in the event of an aircraft engine fire. Whilst these may

appear to be really obvious situations which should not need an additional level of oversight, there are a considerable number of documented events





opinion



Checklist

where these things had gone wrong because the wrong selection or decision was made.

However, just because you have a checklist it doesn't mean you won't prevent incidents from occurring. An oft-quoted line, "In all of the CCR fatality investigations I have been involved in, there wasn't a single checklist present on the diver," can be countered with, "All of the commercial airliners which have crashed in the last ten years have had checklists (hardcopy or electronic) in the cockpit."

This counter doesn't mean that checklists don't have their use, they do, but to make them effective, the community has to create the environment where their use is the norm and also allows divers to be challenged if they are not completed properly. Given the culture in some parts of the community, this will be a major challenge.

The Checklist Manifesto

Between October 2007 and

September 2008 there was a World Health Organisation study to investigate the effectiveness of checklists in operating theatres and hospitals to reduce the numbers of incidents, accidents and fatalities; at the time there were 150,000 people dying every year in hospitals following surgery. Despite these statistics, there was considerable resistance, especially from the more senior doctors, surgeons and consultants because they did not believe they made the mistakes and felt that they should be trusted to carry on with the status quo.

However, despite the protestations, the trial was run across eight hospitals in eight cities around the world. The results were staggering. "Overall, in this group of nearly 4,000 patients, 435 would

have been expected to develop serious complications based on our earlier observation data. But instead just 277 did. Using the checklist had spared more than 150 people from harm—and 27 of

To make [checklists] effective, the community has to create the environment where their use is the norm and also allows divers to be challenged if they are not completed properly.

them from death," and, "The rate of death was 1.5% before the checklist was introduced and declined to 0.8% afterward. Inpatient complications occurred in 11% of patients at baseline and in 7% after introduction of the checklist."

The checklists themselves were really simple but they required an active element to tick off items against a list rather than being verbally completed from memory. However, it wasn't the checklist per se that was the most important factor in improving the safety in the surgical theatres, it was empowering the very junior staff to prevent procedures from start-



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As the dive gets more complicated, the complexity of the checks also increases

Checklists

being rushed, 'rent a buddy' and not being sure what they are expecting, not wanting to question another diver and so on. This situation is made worse when divemasters or instructors do not undertake buddy checks either and therefore set a bad example for their charges to follow: "my instructor isn't doing a buddy check, why should I?"

Following RF3.0 a number of agencies provided CCR checklists for use on their courses, some of which were small enough to be clipped onto the unit at all time, whereas others were the size of a training slate.

Evidence of effectiveness of checklists in diving

A recent study by DAN in the summer of 2013 appears to have shown the benefit of completing checklists by conducting a trial where the group was split into a control group who could choose to complete formal checklists before they started their dive, and the subject group who were given a checklist to use just before they entered the water. The checklist group had fewer reported incidents than the control group and

a number of issues were detected which would have otherwise been missed had the checklist not been followed.

A full analysis is expected to be published shortly in the scientific literature. Now this is only one study and only involved one environment so

there are likely to be some biases involved, but it certainly showed the merit of using checklists.

Another example was the Guam

ing or progressing until the checklist items had been completed.

This empowerment came from the most senior management within the hospitals and, in effect, provided 'top cover' for the nurses and assistants to tell a consultant or surgeon to not progress, no matter how much they protested.

This was a massive change to the culture in the operating theatre where it had always been considered that the surgeon or consultant was 'God', but now one of the most junior staff could question this authority.

By providing a means by which someone else confirms that the checklist is completed, it ensures that someone doesn't pay lip ser-

vice to the checks. (Whilst it can't reduce this possibility to zero, it seriously reduced the opportunity).

This is the same process used in multi-crew flight deck operations where one pilot reads the checklist out loud and the other actions it, confirming that the action has been completed when they have done so. This process is known as "challenge and response".

Notwithstanding the above, care must be taken to ensure that there are not checklists for checklists, or that checklists are appropriate for their intended use. A single checklist cannot cover equipment preparation, pre-dive equipment/configuration checks, in-water emergencies, or post-dive dismantling of

equipment and therefore there is considerable skill required to target checklists and their application.

Diving checklists

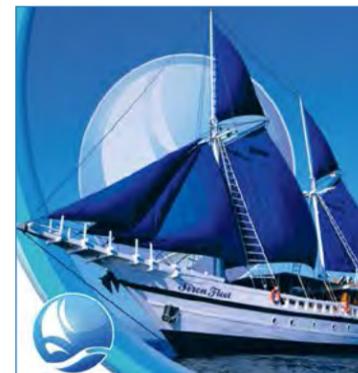
Many diver training organisations provide verbal checklists in their training manuals and try to instill the habits and cultures to use them effectively and regularly. Examples include BWRAF (BCD, Weights, Regulators, Air and Final Check), GUE EDGE (Goal, Unified team, Equipment, Environment, Decompression, Gases and Exposure) and BAR (Buoyancy, Air and Releases). The idea being that these are 'last ditch' checks completed just before the diver gets in the water and provide some assur-

ance that their equipment is ready for use and will provide them with a working gas supply and adequate buoyancy.

However, there is significant evidence that these checks are not completed regularly or effectively. The non-completion of checks happens at all levels of diving, from beginners in blue water holiday environments to technical OC and CCR divers with multiple stages.

The reason why they are not completed varies from relaxed or complacent attitudes to checks,

The non-completion of checks happens at all levels of diving, from beginners in blue water holiday environments to technical OC and CCR divers with multiple stages.



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Checks can ensure that the correct equipment is carried on the dive

Application to the real world

So how do we make checklists work in a sport or recreational environment when you don't have the same level of empowerment given to you by someone senior? Even more challenging, when you are just diving with a buddy or friend and not in a commercial environment with a formal hierarchical structure.

You achieve it by creating the norm that checks are done, and if they are not, questions are asked between buddies or team divers. This goes for instructors and divemasters; there should be no

By creating the 'normal' situation such that the divers are empowered to stop someone going diving with them if the gas isn't analysed, we have created a check that can be 'challenged and responded to'.

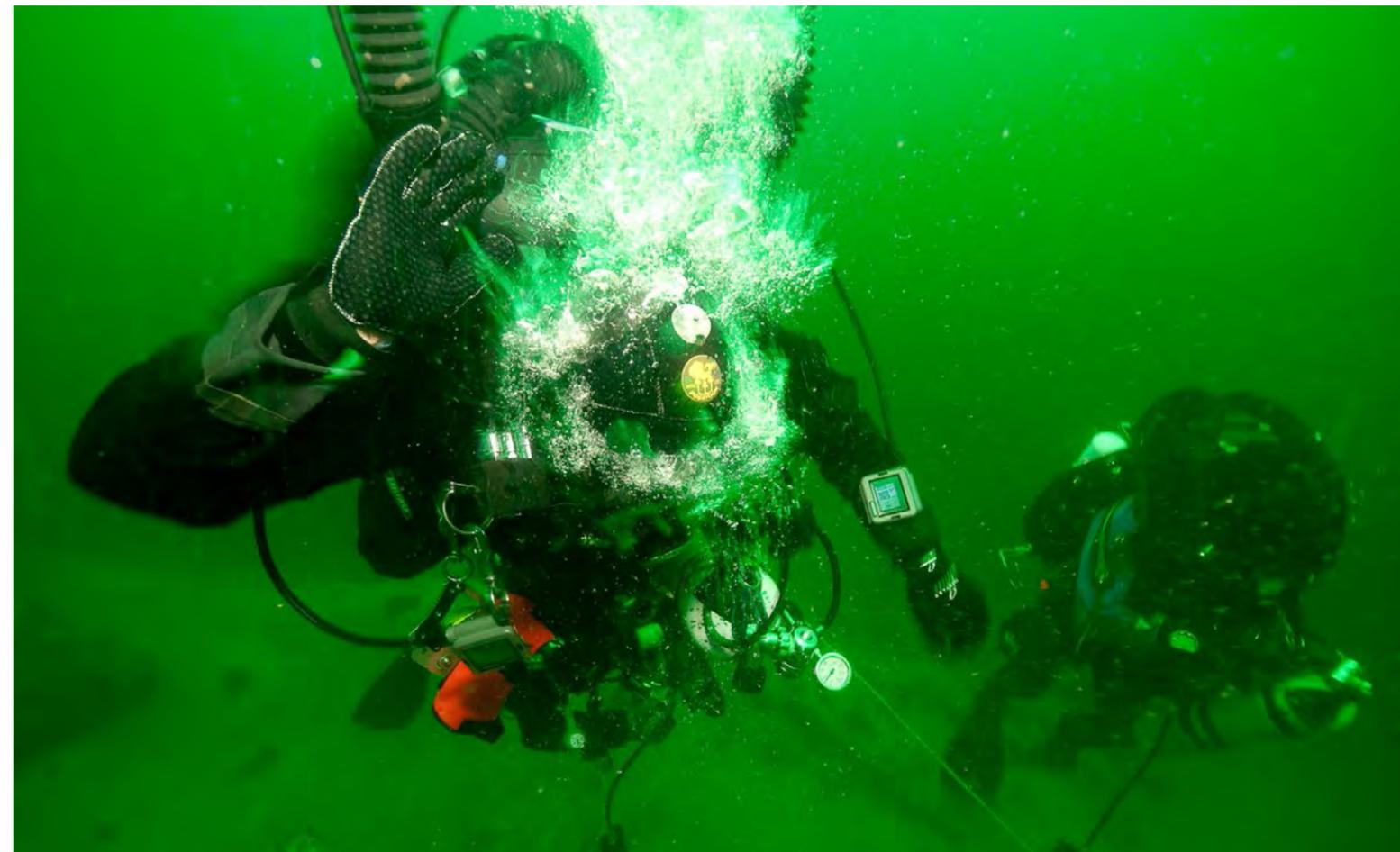
One of the processes described through all dive training covering nitrox or trimix is that all gas must be analysed to measure the oxygen content before getting in the water to reduce the probability of having an oxygen toxicity event. The analysis should be done on the day of the dive to ensure that there hasn't been a mix-up with bottles or regulators. If you have

shame or disagreement when someone asks for the checks to be demonstrated. Just because you are a divemaster or an instructor, it does not mean you won't make a mistake.

Checklists

the correct social or cultural environment, you can also say you are not getting in the water until your buddy's gas has been analysed correctly—after all, it is your gas too in the event of an emergency.

I have personally not gone diving with a very close buddy of mine until they have analysed the gas. I have also been two minutes from jumping off the boat and realised that the stage cylinder hadn't been analysed that day even though the regulator had not been removed. I could have jumped in and hoped it was okay, but hope has no place in diving especially when all it takes is the time to unscrew the DIN, put the analyser on, open the valve, read the display, put the



Failures normally follow a predefined process—a process which can be reinforced through checklist use

Project, which ran for five years and completed 9360 hours of in-water CCR diving with a small team of divers operating two Mk15 CCR units. Although there were a number of unit failures and problems detected on the surface, they never had one in-water failure of their CCR units despite the massive number of

hours of in-water time. This was down to following robust pre-dive checklists and procedures.

A final example is the GUE CCR Beta programme which has involved 50 instructors, instructor-trainers and experienced OC and pSCR divers developing the course material for the new GUE CCR Level 1 programme. In all,

the GUE divers had completed nearly 900 hours in water and never had one in-water failure despite a number of failures being detected on the surface, either during the assembly period or the pre-breathe. Again, these were all detected by rigidly following a checklist.



Really. There are no Dive Police out there!

small plastic checklists that can be clipped onto the unit or harness by a bolt-snap so that it is available to the diver at all times. However, there are examples of these checks not being completed because the diver has been rushed or has had inferred peer pressure to complete the task more quickly. It takes an alert buddy to make sure these checks are completed by watching them complete the check; sometimes this is impossible because they are on the other side of the boat facing the other way!

Whilst the majority of agencies now teach team-diving in-water, only a small number actively promote and teach pre-dive, in-water and post-dive team diving practises. This pre-dive team approach includes equipment configuration demonstration, access to emergency equipment and gas analy-

has a series of actions to be completed with initial blocks next to each one action to show that it has been completed once signed, on the other could be developed. This sticker is then attached to the unit or cylinders pre-dive in the same way that a gas analysis sticker is.

Completing such a checklist has the secondary effect of slowing down the checks which means divers need to be a little more prepared (which is no bad thing) but in some cases, e.g. hard-boat diving where it takes a few hours to travel to the dive site, it may not be possible to write on the sticker (but graphite pencils should work).

By initialling and signing the sticker in the relevant sections, another team member can quickly and easily check to be sure that their team member has

Some of the agencies have produced small plastic checklists that can be clipped onto the unit or harness by a bolt-snap so that it is available to the diver at all times. However, there are examples of these checks not being completed because the diver has been rushed or has had inferred peer pressure to complete the task more quickly.

completed their own checks correctly and that the unit is in a safe condition to dive. In the same way that a diver can stop the dive because there is no completed and signed gas analysis tape, they can do the same for the CCR pre-dive checklist. No completed and signed checklist, no dive. Simple.

This approach is the same as that used in surgical theatres; if the checklist has not

been completed then the procedure doesn't progress. The difficulty will be creating the environment whereby divers are happy to be challenged by their team mate or buddy when they are not necessarily close friends or even know each other; this is because there is no 'norm' at the moment.

Whilst it could be argued that less scrupulous divers could race through and scribble their initials to appear to get the checks done more quickly, there is

reg back on. So that is what I did. The gas was correct. I also had a word with my buddy about not checking my gas analysis!

By creating the 'normal' situation such that the divers are empowered to stop someone going diving with them if the gas isn't analysed, we have created a check that can be 'challenged and responded to'. So why not create a similar process for checklist use, especially CCR where there is a much greater risk of missing something due to the complexity of the equipment compared to OC? Maybe because there isn't the same level of dependency or reliance on other divers when undertaking CCR diving?

Same ocean diving is not an unknown configuration.

Checklists: What are they?

The following section deals primarily with CCR checklists because of the number of steps required to assemble and pre-dive check the units, but the basic premise is the same and could or should be applied to OC.

There are a number of options available to divers when it comes to checklists and their CCR units: build checklists, final pre-dive checklists, emergency checklists and post-dive breakdown checklists. Each checklist has a differing level of detail within the tasks at hand; no one

checklist can cover everything otherwise it becomes too unwieldy and will not be used.

What we need to do is create a simple pre-dive checklist which ensures that ALL of the basic life support capabilities are working in the CCR unit and that there is nothing likely to be lying dormant in the system that will impact the diver later in the dive. We also need to ensure that the other team members can see that the diver has undertaken and completed the checklist, in the same way that a properly completed gas analysis sticker shows that the gas has been analysed correctly and is current.

Some of the agencies have produced

sis markings which are checked by team mates prior to entering the water. If pre-dive checks can be completed in a challenge and response manner with verbal responses or demonstrated actions, why not consider the same process when looking at detailed checklists such as those found in CCR diving?

A potential approach could be the same as gas analysis tape which shows when the analysis took place, the actual gas analysis and the initials of the person who undertook the analysis. A checklist which is self adhesive on one side, and



an expected level of trust and professionalism from divers who undertake dives where CCR is required and therefore this shouldn't be much of an issue. It should also be recognised that it will take nearly as much effort to 'fake' the checklist as it does to undertake the activity properly so why not do it properly the first time?! This responsibility towards your teammate or buddy should be part of the mentality that goes with team-diving—working together for a safe outcome, not same ocean diving.

This suggestion may not be acceptable to those divers who undertake solo dives, but even if they don't have someone else

to check their checklist sticker for them, the use of a checklist will reduce the number of pre-dive issues if it is used properly.

The more technical solution to this is to include the checklist as part of the electronics in the system, e.g. Poseidon Mk VI and SE7EN, VR Sentinel and Hollis Explorer, which would prevent the unit from working (apart from immediate life support) if a checklist has not been completed. A criticism of some of these systems is the lack of reliability, which means the checklist system prevents the diver from diving due to a genuine system failure. Whilst this is a good thing as it fails safe, it can lead to divers shortcutting

Overhead diving introduces additional challenges which means checks are more important

CCR divers on a training course (below). A training course is the best place to develop and reinforce the mindset of checklists

the system to go diving if the system is not reliable.

Another criticism likely to be levelled at such a procedure is that it is taking away personal responsibility and that divers should be able to do everything themselves. In part, this is correct, but pilots are trained to undertake emergencies from memory and then follow up with checks because they may have missed something. Why not CCR checklists?

Application of checklists to the recreational diving community

The majority of this article has been about the use of formal, predominately written, checklists in technical diving. However, the most predominate type of diving is recreational, normally considered to be diving undertaken with no deco, single cylinder and shallower than 40m.

So how do we apply the same methodology and mindset to recreational diving? Easy. Just complete the checklists, albeit verbal ones, that have been taught in recreational diving courses. They are simple and easy to remember, they just need to be completed.

If your buddy, team member or instructor doesn't do a check, prompt them and say that you would like to complete



it, introducing humour if need be. The hard part is if they refuse to do the check. My bigger concern wouldn't be that they don't want to do a check, it would be more about what their attitude is to the rest of diving safety.

Summary

Whilst it is fantastic that all of the agencies and the CCR manufacturers have provided checklists for users, with the majority of unit checklists downloadable from <http://www.tdisdi.com/rebreather-checklist/>, providing checklists isn't enough. There needs to be a change in attitude to their introduction and usage.

This runs from the first dives when the OW instructor or dive-master completes their BAR or BWRAF checks, even when no students are watching, through to instructors and instructor trainers when undertaking fun dives;

this isn't about the Dive Police, but rather about demonstrating sound practices.

Unfortunately human nature means that we are more likely to copy someone's activities rather than listen to what they say and follow that, especially if that person is someone we look up to.

There is limited value in having a checklist to complete an activity if there is no way to make sure the checklist is actually completed e.g. verbal checks without independent monitoring. There is just too much scope for human variable performance to introduce errors, errors which may cost a diver his or her life.

The irony is that divers don't believe they make enough mistakes to warrant the use of a checklist, but how many of those errors or mistakes would have been picked up by using a checklist? Just think, how many

surgeons thought they didn't make a mistake before checklists were introduced? They are professionally trained and undertake these activities more regularly than you go diving and they still make mistakes.

Therefore whilst there is credible evidence that checklists can prevent a significant number of incidents from starting, developing and reaching fruition, the checklists themselves need to be properly used to be effective. □

Gareth Lock is an accomplished technical diver based in the United Kingdom. Currently serving in the Royal Air Force, Lock is undertaking a part-time PhD examining the role of human factors in scuba diving incidents. For more information, visit the Cognitas Incident Research & Management website at: Cognitasresearch.wordpress.com

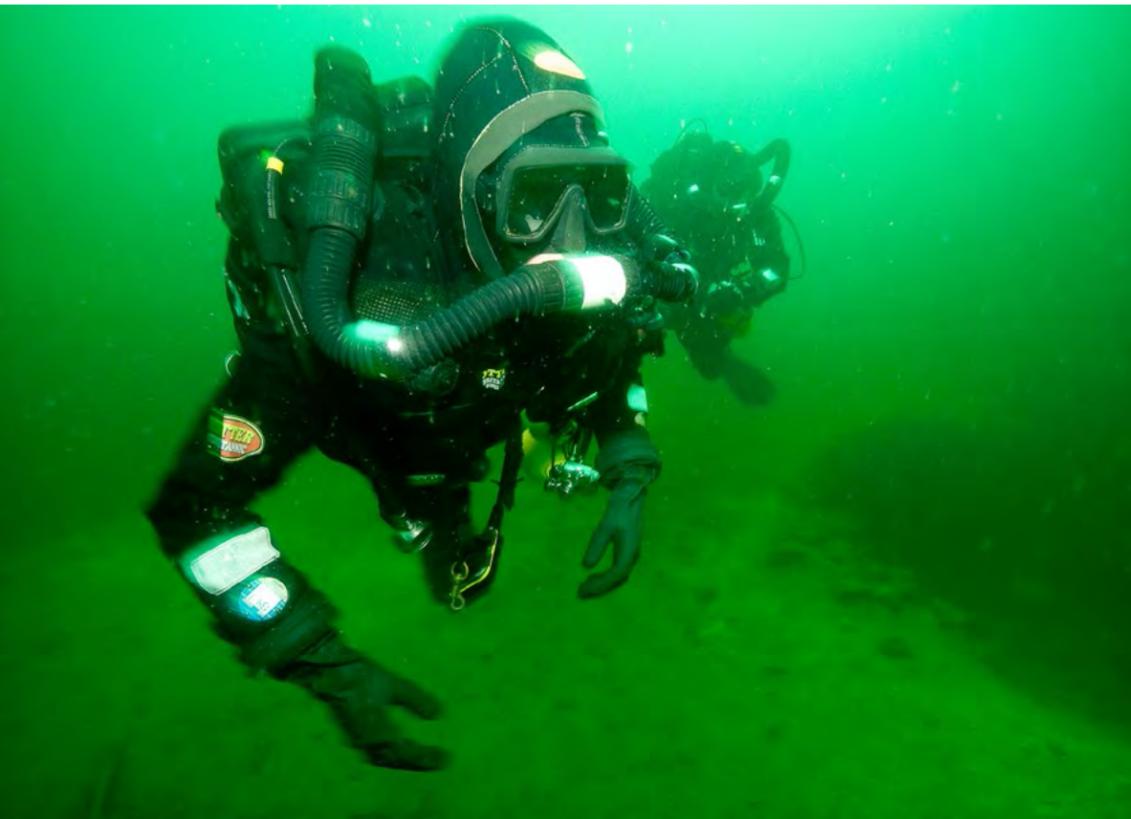




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Diver with large school of fish (right), Cebu, Philippines; Diver on coral outcrop (below), Eastern Sea, Korea

Underwater Modeling Tips



JU WON



KI JOON KIM

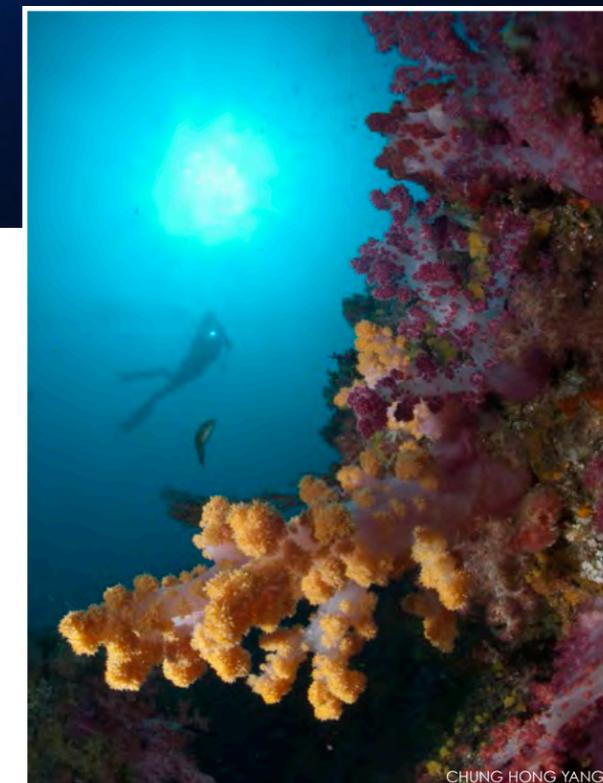
“What do you have to do?” It is the first question asked by most people when it comes to underwater modeling. As an underwater model, my answer is always the same: “I have to blend myself with the underwater environment to further enhance its beauty.”

Text by Lyn Boyun Chung
Photos by Sang Hak Choi, Ki Joon Kim, Jeong Kweon Park, Oh Yong Sung, Ju Won, Chung Hong Yang

Fifteen years ago in my country, underwater modeling was done primarily by fashion models or female divers in swimsuits. Often they were treated less than professionally, usually not paid, and in some cases, expected to provide sexual favors—and the resulting images were not as good as they could have been.

Attitudes needed to change. I wanted to improve conditions and see what women divers in scuba gear could do to improve underwater images. So I established a school for underwater modeling in Korea to give women divers new skills and professional opportunities in the diving industry.

In the beginning, there were complaints about paying underwater models. However, since then, there has been a gradual change in the understanding and appreciation of



CHUNG HONG YANG

Diver on reef, Jeju Island, Korea



photo & video

how models who are scuba divers can optimize an underwater image. They have become recognized as professionals and equals in the field and have even been given an award category at national underwater photography competitions for the past three years.

The technique

Underwater modeling can be divided into two major areas. The first is scuba



JEONG KWEON PARK

diving and the other is skin diving. When scuba diving, the model's primary objective is to make the subject of the photo appear beautiful and



JU WON

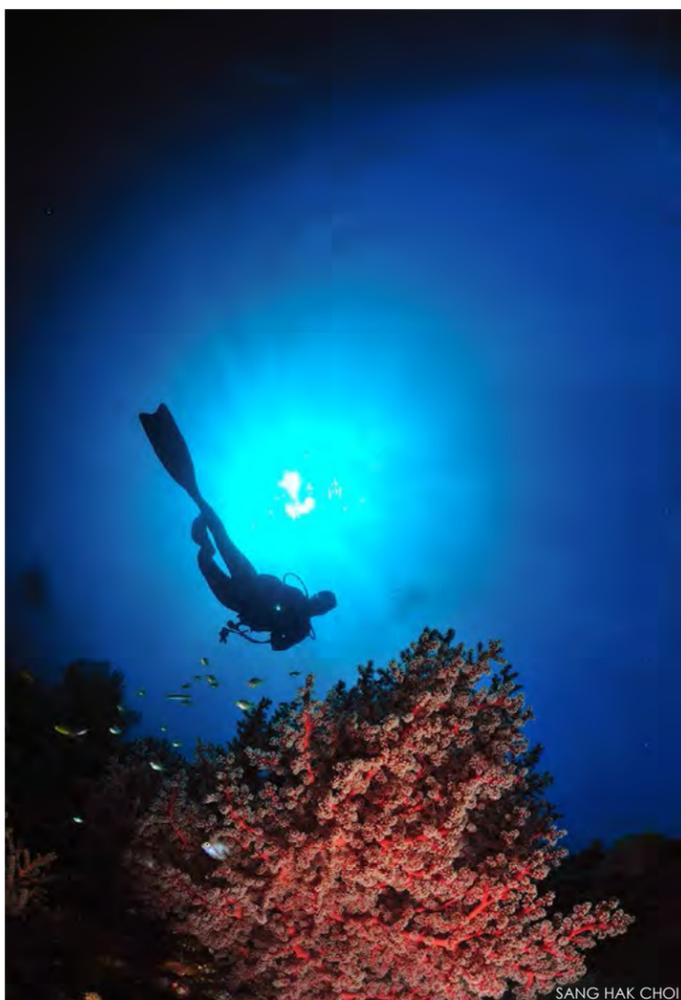
real from the camera's point of view. When skin diving, the model's primary objective is to blend in and project the aesthetics of her form into the water. The model becomes one with the underwater environment while enhancing it with the beauty of her form. Silhouette modeling is the most basic scuba diving modeling.

Understand the camera and the lens

When planning the silhouette scene, it is essential that you and the photographer work as one. To properly assist, the model has to understand how the photographer will take a photo and has to be able to visualize the framing that the photographer is planning.

The model has to know what camera is being used, the focal length of the lens, and what aperture will be selected. Cameras can be divided into two major types: those with full or cropped sensors. Depending on the sensor, it will affect the position the model will take in the framing.

If you don't understand the camera and think that just posing will work, you're not correct. With a cropped



SANG HAK CHOI

Modeling



JU WON

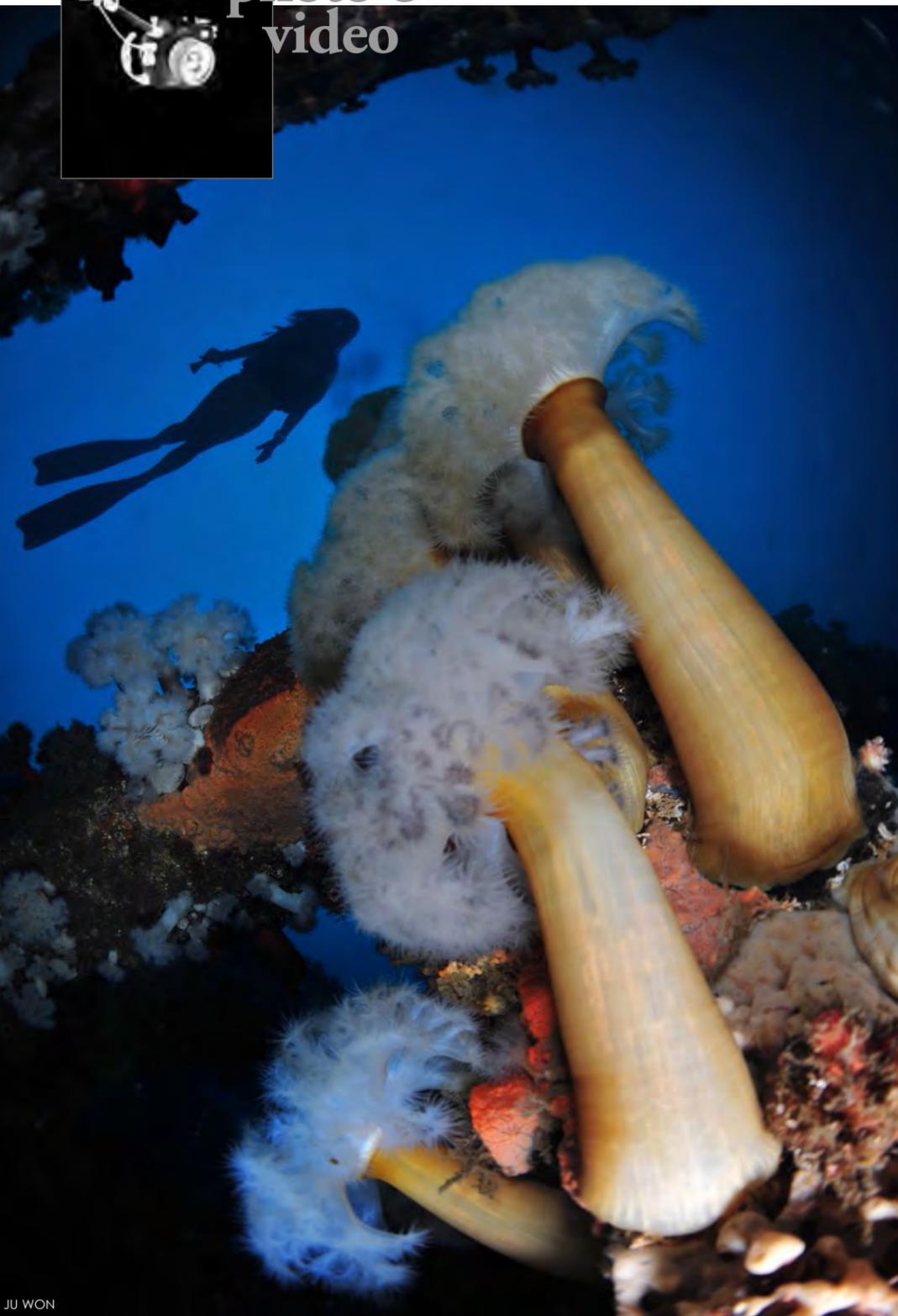
Diver and giant jellyfish (above), Eastern Sea, Korea; Diver and coral garden (top left), Jeju Island, Korea; Diver and soft corals (left), Raja Ampat, Indonesia; Diver with whip coral (far left)





photo & video

Diver with white-plumed anemone, Eastern Sea, Korea



JU WON

sensor, the model will be too close, filling the frame. With a full sensor, the model will be too small in the frame. Of course the photographer can signal to you how to position

yourself. However, you're wasting valuable time and not performing as a professional underwater model. The objective of a professional underwater model is to be in

Diver on reef (right) and in silhouette under the sun (below) Raja Ampat, Indonesia

the best position for the photographer to take one shot in the shortest time possible.

The position of the model also depends on the lens. Most are within the 10 to 16mm focal range. Depending on the angle of view and the characteristics of the lens, it is recommended that a photograph of the model be taken before the dive. This preliminary image helps to identify and analyze the particularities of the selected lens and options. In addition, another photograph should be taken after the underwater housing has been set in place. The image will identify any distortions or angle inflexions the framing will have in the final setup.

Fill empty space with the figure of the model

In silhouette poses, it's not pos-



OH YONG SUNG



OH YONG SUNG

sible to see the details of the model's face or the color of the suit. However, the model's figure can be clearly and precisely seen—every single curve! Therefore, if you pose with a relaxed and comfortable posture, as you would do during a normal dive, it will be very difficult to project a very simple and beautiful figure.

To achieve the desired pose, you need to simplify

your equipment. Lines, hoses, gauges, and other extremities should be secured to your side and not freely moving about. Your body position is critical. You can spread your arms. However, if you do feel confident with the natural expression, place your arms together neatly in front of your chest. Always keep your thighs together! From the knee to the calf, you have to bend slightly to give the impression that wearing your fins is very natural. Also, you can have one leg straight and the other slightly bent, while keeping

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Diver (right) and soft coral, Raja Ampat, Indonesia; Diver (lower right) with octopus, Eastern Sea, Korea; Diver (below) with coral encrusted wreck remains, Eastern Sea, Korea



JU WON



SANG HAK CHOI

Modeling

your toes pointed to straighten your fins. Again, always keep your thighs together! In the silhouette pose, you will appear very natural swimming with fins.

Another position is to keep your legs straight in a standing position. Although the pose lacks action, it can be used to emphasize the subject or scene underneath the model.

As a side note, the model should twist her waist a little to make her hips stand out. In this posture it is an advantage if the model is female.

Use an underwater lamp or torch

Preparation of the underwater lamp or torch is essential. When you choose a torch, it should not be too big or too bright—just adequate. It should cast a wide beam. This type of torch will make things easier and more visible. Having red or yellow color filters will bring out the originality of the photo.

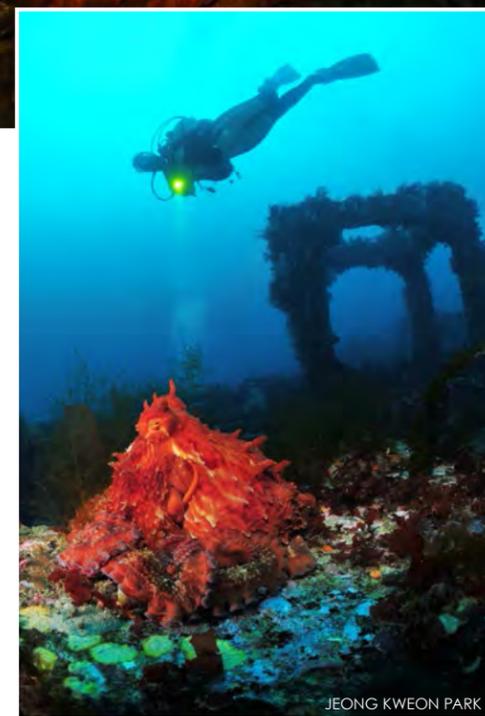
Additionally, the position in which the torch is held is important. If the position is too high, it may mostly capture the whole face. If the

position is too low, it may capture mostly the waist and hipline. Hence, it is best to hold the torch right below your chest.

The direction of the light is important, too. If illuminating directly into the lens, the light will be reflected and become too strong, burying the upper body with light. The direction of the light should be slightly tilted downward.

Express yourself freely as if you were dancing

How you're filling the empty space



JEONG KWEON PARK



photo & video

Diver and bright pink coral (right), Eastern Sea, Korea; Diver with sea fans (far right), Raja Ampat, Indonesia



SANG HAK CHOI

Diver and coral reef, Raja Ampat, Indonesia

is the model's role in creating the photograph. Once the distance from the lens and the location of the empty space is understood, your movement within it should be very free and fluid with the subject. You can pose in the same direction as the subject or pose in the opposite direction, creating a very dynamic shot. You can turn off the torch and naturally widen your hand movements to emphasize a feminine look. What is important is how well you want your pose to fit within the color and shape of the other subjects in the angle of the frame.

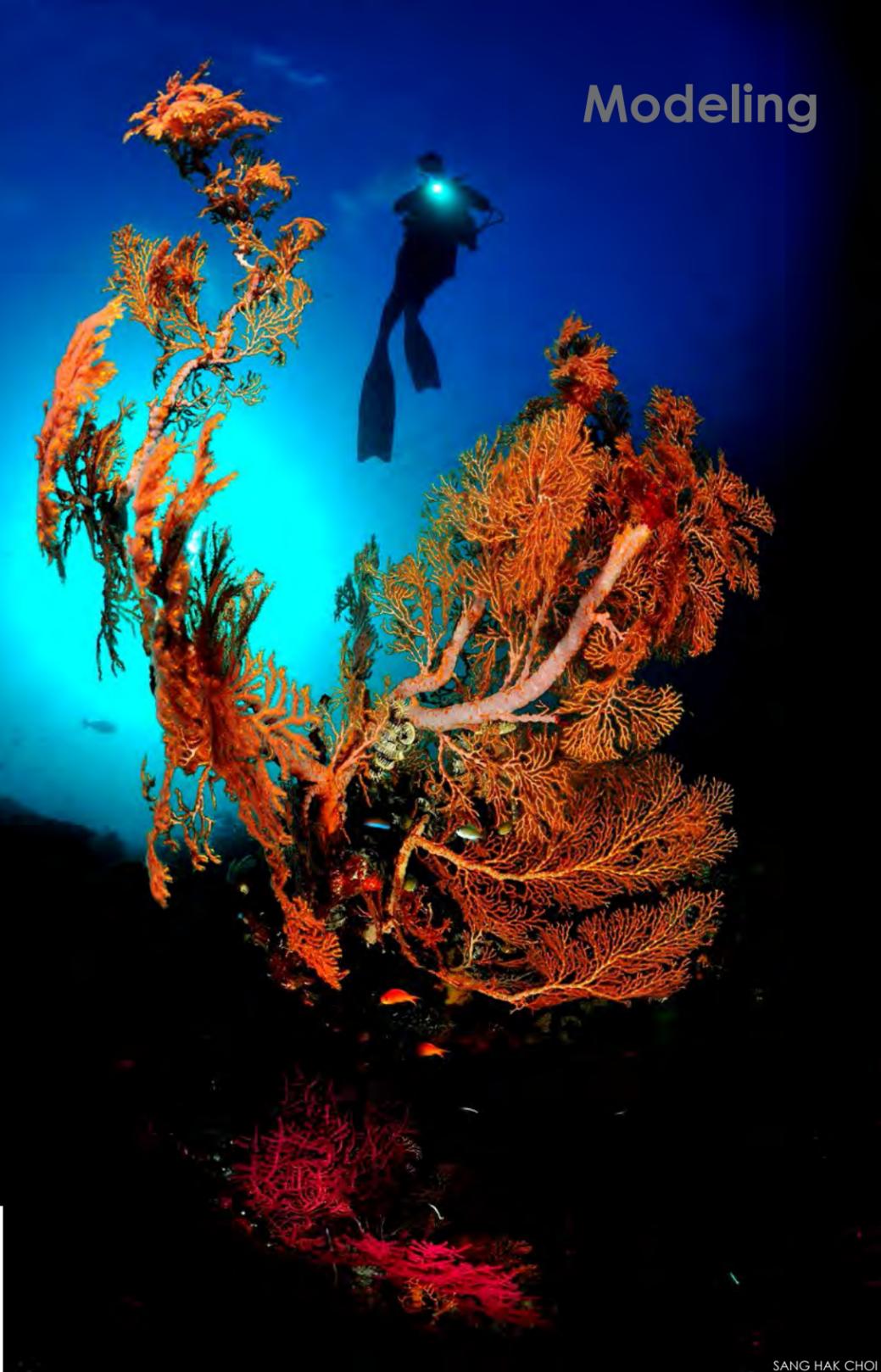
Although silhouette modeling is the most basic of underwater photography, appearing easy, it is how you express yourself that affects the beauty of the final shot. Women, especially, have beautiful figures. As a female diver, you can express your figure. If you are a female diver who loves the ocean, I highly recommend that you try modeling and feel what it is like to make the underwater environment more beautiful. □

Coming from an artistic background as a ceramicist and



JU WON

designer, Lyn Boyun Chung is an avid diver, dive instructor and underwater photographer based in Korea. She ran her own dive shop for 11 years and participated in several underwater photography competitions. At the time, she saw a need for professional models and established the Korea Underwater Model School in 2001. Since



SANG HAK CHOI

then many photographers have won grand prizes for their underwater images incorporating her as a model, and she has built the school up to ten professional members, hoping to give more women divers in

Korea the opportunity to become professionals working in the dive industry. To that end, she aims one day to establish a women's scuba diving association in Korea. For more information, email: yoonny73@hotmail.com

Author and model Lyn Boyun Chung





photo & video

Edited by Don Silcock

PRODUCT SHOTS COURTESY OF THE MANUFACTURERS

Nauticam NA-D4s Housing

Nauticam has announced the release of their new housing for the Nikon D4s top of the range DSLR. The release of the new housing coincides with Nauticam's new Nikon Flash Trigger that enables strobes to be triggered manually via fiber optic with the D4s, which does not have a pop-up flash. The NA-D4s housing is fitted with the necessary electronics for the Nauticam vacuum system and also features improved focus knobs with a higher gear ratio. The housing is available in two versions—one with two Nikonos bulkheads at MSRP of US\$5,100 or without the bulkheads at MSRP of \$5,000. The Nikon Flash Trigger has a MSRP of \$220. □



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Subal E-M1 Housing

The Austrian housing manufacturer Subal has released a new housing for the highly regarded Olympus OM-D E-M1 mirrorless camera. Subal's entry into the mirrorless housing market is a significant development, as it provides further evidence of the growth of these small but highly functional cameras with underwater photographers. The E-M1 is the flagship of the Olympus range and considered one of the best mirrorless cameras available, and Subal clearly sees it as worthy of their support with a premium housing. The Subal EM1 housing provides access to all of the key functions of the camera such as video, menu, white balance, ISO, exposure compensation, OK, multi function keys, Info, AFL and AEL. The housing is manufactured from a solid block of high grade seawater resistant aluminum, which is then anodized and put through a patented chemical hardening process, before a final three layer powder-coating. All control shafts and screws are made from high-alloy chrome-nickel steel to maximize their durability and the housing features Subal's Quick Lock closure system and uses the new T2 port system. The housing is available at a MSRP of US\$3,150. □

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Aditech Mangrove Video Light

Aditech has announced the release of their new Mangrove VC-3L6 video light. The new light features a 6750 lumen output at a color temperature of 5000°K and is powered by interchangeable Li Ion batteries. Aditech state that the light will run for 55 minutes at full power. The Mangrove VC-3L6 is available at a MSRP of US\$718. □



Sony

Sony has released the latest iteration of their top of the range RX100 compact camera. The new RX100 III is the third iteration of the highly regarded and successful RX series, which has also proved to be very popular with underwater



photographers. An indication of just how popular the RX100 has been is that the first and second iterations of it are still available, at a lower MSRP to the RX100 III. The new version has a large aperture F1.8-2.8, 24-70mm Zeiss lens, built in OLED viewfinder and Sony's BIONZ X processor, which is featured in several high-end Sony cameras such as the full-frame α7, α7R and α7S models. The camera uses the same high-resolution 20.1 MP BSI CMOS sensor as the existing RX100II model, but adds 5 axis image stabilization. The RX100 III retails at a MSRP of around US\$800. □

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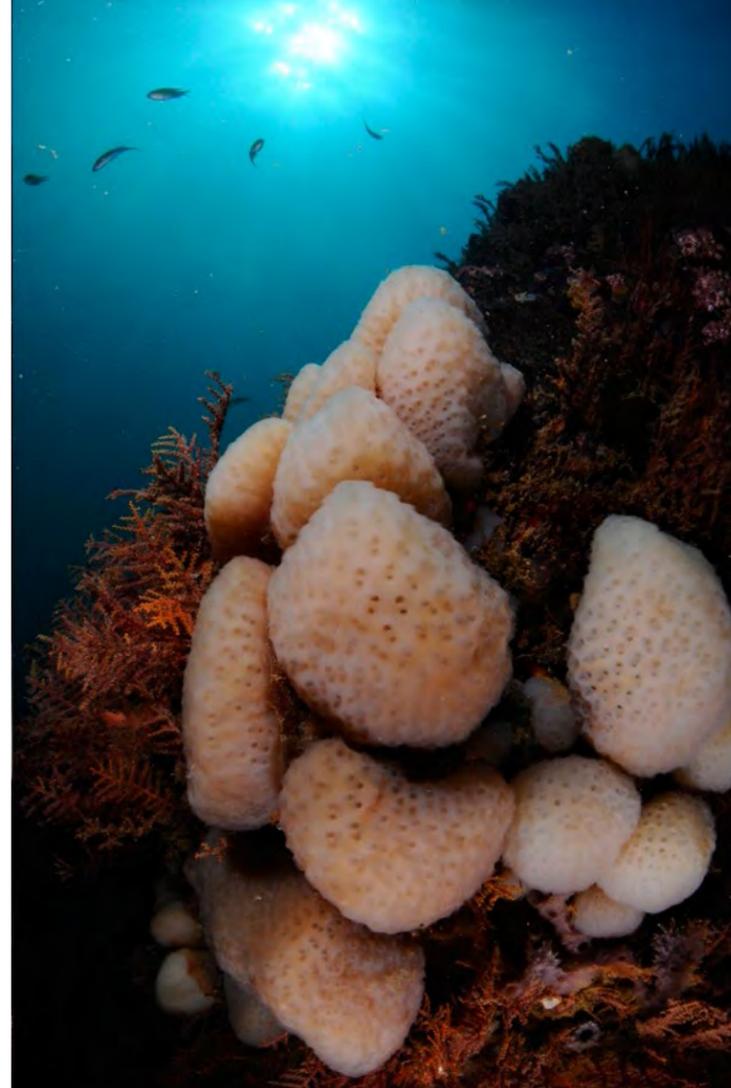
Nauticam NA-a6000 Housing

Nauticam has released its new housing for the Sony a6000 mirrorless camera. The NA-a6000 housing is designed for one-handed control of both the Sony a6000 camera's command dials plus the option of rear button AF actuation. The housing also has a redesigned and colored record button to activate the a6000's video capability. The NA-a6000 has a MSRP of US\$1,650. □

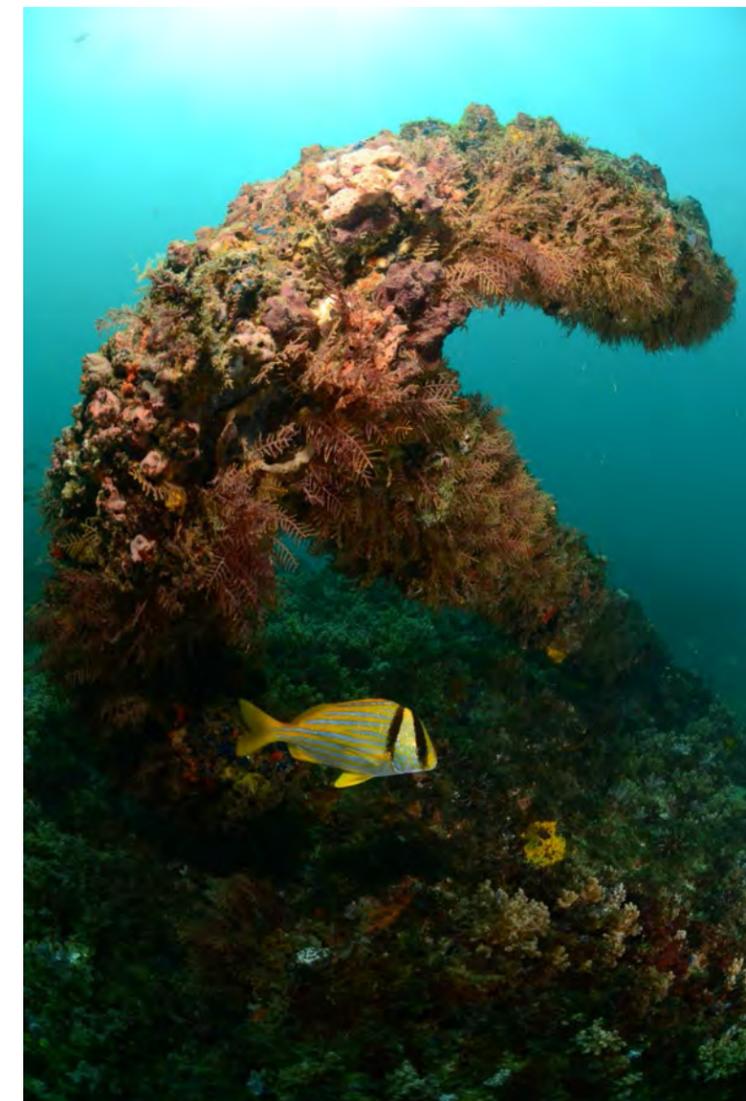


DivePhotoGuide.com





Environment Category: First Place, Alvaro Velloso (left); Second Place, Ulisses Turati (above); Third Place, Alexandre Ornellas (right)



Salvador hosts the Brazilian National Underwater Photography Competition

Text by Áthila Bertoncini and Maíra Borgonha

For the very first time, Salvador, the Brazilian capital of axé music (samba-reggae) and Trio Elétrico, was elected to host the country's largest underwater photography competition. On March 26-30, 36 participants—photographers, models and assistants—dived the waters known as the “Brazilian Caribbean”, searching for the best shots to please ten jurors representing five nationalities.

Similar to the other fascinating localities that have hosted previous national photo competitions such as Fernando de Noronha Island and the cities of Vitória, Cabo Frio and Arraial do Cabo, the dives in Salvador provided rich opportunities to photographers from all over Brazil to brilliantly capture its gorgeous diversity of life, highlighting the importance of preserving this marine heritage.

Besides the rich diversity found in Salvador waters, the choice of Salvador as the host city of the Brazilian Underwater Photography Competition represented a great challenge, as all the dives needed to strictly

follow the tide dynamics, which resulted in a variation of visibility quality as well as

The First Rogério Rupollo Prize of Underwater Photography went to author Áthila Bertoncini



photo & video

Environment With Model Category: First Place, Alvaro Velloso (right); Second Place, Marcelo Prim (below); Third Place, Fabio Freitas (bottom left)

Close-Up Category: First Place, Carlos Montechi (far right); Second Place, Marcelo Prim (center right); Third Place, Fabio Freitas (bottom right)



mal, showed up at the beach for the photographers who woke up early. Unfortunately it did not show up during the competition days, which were slated for innovations of the competition, such as apnea images.

Besides Porto da Barra, two shipwrecks served as competition areas, accessed by boat with Sharkdive and Bahia Scuba

The shipwrecks and shore dives provided unique opportunities to photographers resulting in high quality images, which can be observed in their portfolios and the medalists' images.

About the competition

The Brazilian Competition follows the CMAS Underwater Photography World Championship rules, while it showcases Brazilian representatives.

During the competition, each photographer is requested to present five images as follows: Environment, Environment With Model, Close-Up, Close-Up With a Theme (which was the color blue) and Fish.

Unique to the 2014 competition, a special prize was created—the First Rogério Rupollo Prize of Underwater Photography. This prize consisted of an image, obtained during the competition days and selected by each photographer, to be printed, exhibited and voted on by photographers, models and assistants, during the night of the prize ceremony.

This prize was a tribute to the memory of Rogério Rupollo, a great friend, passionate underwater photographer and marine life enthusiast who passed away last year. His wife, Denise Glaser Rupollo, daughter,

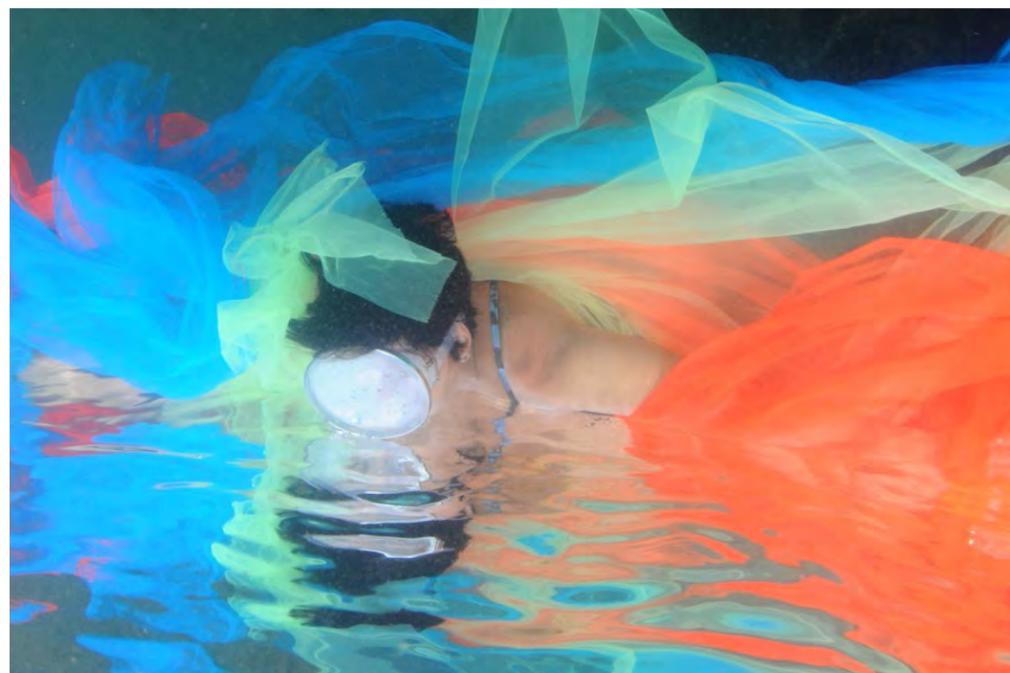


marine fauna.

Salvador is known for great dive sites, such as the *Cavo Artemidi* shipwreck, and the shallow reefs of Baía de Todos os Santos, particularly rich in coral cover. The diving site of Porto da Barra served as the headquarters of the event. The place offered calm waters for training dives, where it was just 20 paces to the beach from the Dive Bahia dive center, crossing a short avenue.

Located next to two of the city's postcard spots—Farol da Barra (or Santo Antônio Lighthouse) and Forte de Santa Maria, a white colonial fort built from 1614 on—Porto da Barra is blessed with some of Brazil's most dramatic, gorgeous scenery at its urban beach, with amazing sunsets.

The greatest surprise at Porto da Barra occurred two days before



the competition when an easy-going peixe-boi (or manatee, *Trichechus manatus*), the most endangered Brazilian marine mam-

dive centers. The *Germânia* and *Bretagne* shipwrecks sank close to each other in 1876 and 1903, respectively.

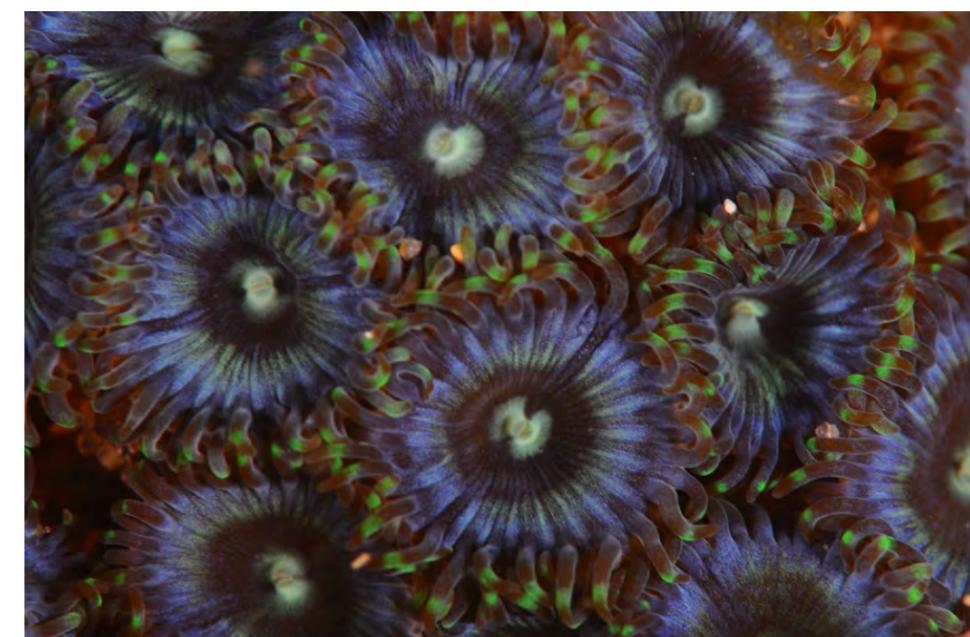
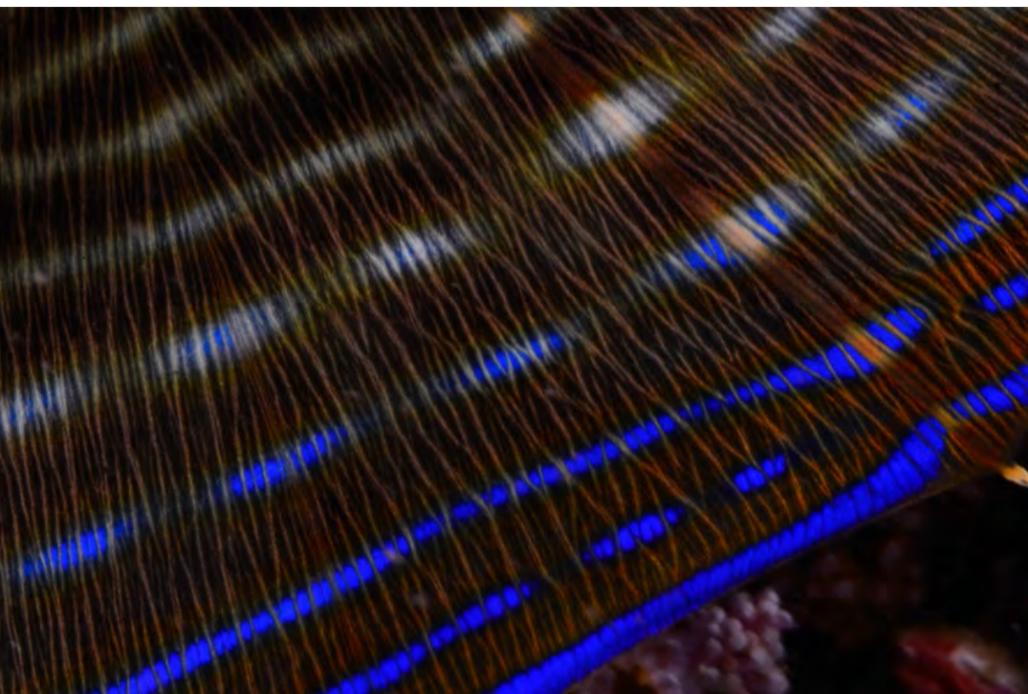
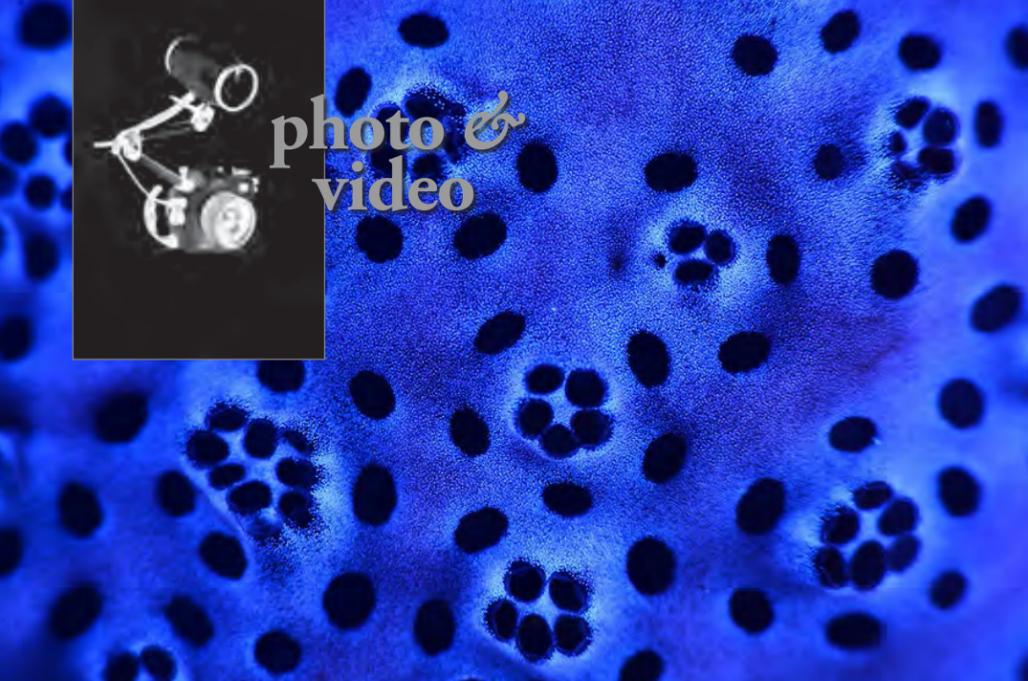




photo & video



ter Mel Rupollo Calixto, and grandson, little Jorge, were at the ceremony to receive the photographers' tribute and hand the special prize to the winner. Below are the winners lists.

Best of show

First Place: Álvaro Velloso
Second Place: Carlos Montechi
Third Place: Ulisses Turati

Environment Category
(and Environment With Model)

First Place: Álvaro Velloso
Second Place: Ulisses Turati
Third Place: Marcelo Prim

Close-Up Category
(and Close-Up With a Theme)
First Place: Carlos Montechi
Second Place: Álvaro Velloso
Third Place: Fábio Freitas

Fish Category
First Place: Ulisses Turati
Second Place: Edson Acioli
Third Place: Marcelo Prim



The Rogério Rupollo Prize
Áthila Bertoncini

The grand winner in Salvador 2014 was Alvaro Velloso, with his model, Carlos Saade. They will compose the Brazilian team with the 2013 winners (Áthila Bertoncini and his underwater model, Maíra Borgonha) to run the 15th CMAS Underwater Photography World Championship in the Netherlands during May 2015 (www.netherlands2015.com). Now it is time to start training for cold water dives. Netherlands, here we come!

Following tradition the Brazilian Underwater Photography Competition 2014 turned out to be an opportunity to meet some big names in Brazilian diving and underwater photography. This celebration of underwater images traditionally promotes moments of learning, exchanges

Close-Up With Theme (Blue) Category: First Place, Carlos Montechi (far left); Second Place, Álvaro Velloso (left); Third Place, Fernando Clark (lower left)
Fish Category: First Place, Ulisses Turati (right); Second Place, Edson Acioli (lower right); Third Place, Marcelo Prim (below)

on technical matters as well as opportunities to meet old friends and make new ones.

The complete ranking and portfolios can be viewed at the Brazilian National Confederation of Underwater Photography and Video website at: www.imagemsub.com.br

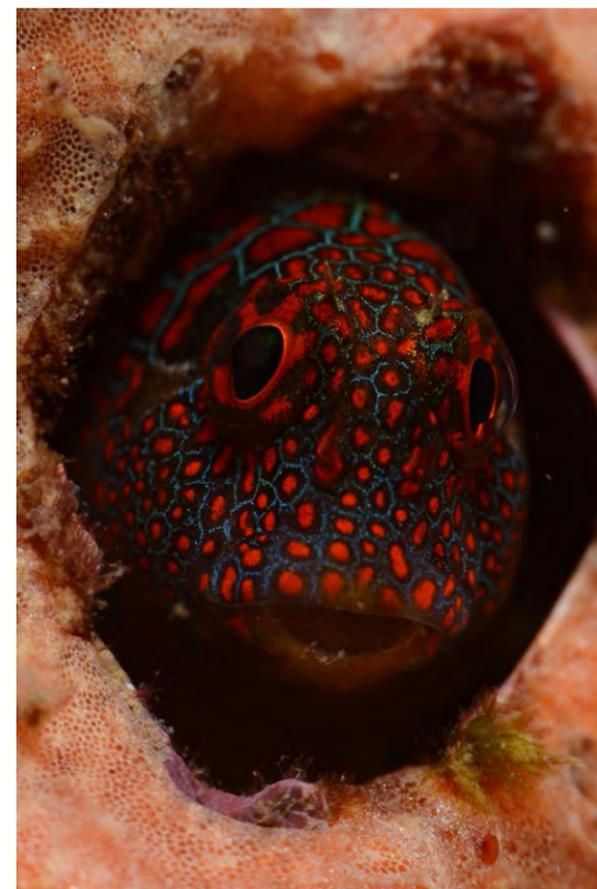
Acknowledgements
The Brazilian Underwater Photography Competition 2014 was promoted by



many people who believed in the project and dedicated their precious time to organize this successful event. Thanks go to FUNDIVE; Bahia Scuba and Dive Bahia; Grande Hotel da Barra; Scuba Lab; Centro de Mergulho

Ocean; the environmental projects Meros do Brasil, Coral Vivo and Garoupa; Andrômeda T-shirts; Etiketando do seu jeito; Revistas Mergulho and DiveMag; Clínica de Olhos Dr Waldemar Oliveira; and to Pleuston & Neuston Photo.

Oceanographers Áthila Bertoncini and Maíra Borgonha work on conservation projects in Brazil such as Projeto Meros do Brasil and Projeto Ilhas do Rio. Among their research tools are local ecological knowledge, scientific diving and underwater photography. Email: athilapeixe@gmail.com and eumaira@gmail.com. Or visit: www.athilapeixe.com



Marionette Taboniar



P O R T F O L I O

portfolio

Painting on plexiglass, the self-taught American artist **Marionette Taboniar** creates liquid worlds of tropical fish life and colorful reef scenes. **X-RAY MAG** interviewed the Michigan native who now lives and teaches at her studio on Kauai.

Humuhumu 4 (right) and Humuhumu 3 (previous page) by Marionette Taboniar
Reverse acrylics on plexiglass, 12 x12 inches.
Humuhumu is short for *humuhumunukunu -kuapua'a* which is the Hawaiian State fish. It translates to "fish with a nose like a pig"



Humuhumu 5, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches

Taboniar



Edited by Gunild Symes
Photos courtesy of
Marionette Tabonair

X-RAY MAG: Tell us about your background. How did you become an artist, and how did you develop your artistic method or process?

MT: I am mainly a self-taught artist, learning mostly through

workshops, reading books, and lots of practice. I studied pastel portrait painting with my neighbor when I was about 12 years old back in Michigan. That was really my first introduction to professional art and art materials. Before that, I was always drawing and painting with markers, crayons and poster paint. I took a few classes in art as electives while I was getting

my biochemistry degree from the University of Michigan. After I graduated, I worked for a chemical company for 14 years while doing my art part time. In 1992 I took my first vacation to the island of Kauai, Hawaii, and knew I would move there some day to pursue my art career full time. I just fell in love with the bright and bold tropical colors of the island both above and below





Humuhumu 6, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches

the water. In 1999 I opened a small studio in Michigan where I was more of a weekend artist while I was still working at my day job. This gave me the opportunity to discover that I loved to teach art, and then I put my plan into action to move to Kauai to teach art full time. I made the move in 2004 and haven't looked back. I now own and operate Painting

Paradise in the town of Waimea, Kauai, on the island's sunny west side. I create my art there as well as teach watercolors, acrylics, pastels, silk painting, encaustics, Chinese brush painting, mixed media and more. Through teaching almost every day, I have been able to develop my artistic process over these last ten years, and it has been a blast.

X-RAY MAG: What is your artistic mission or vision?

MT: With my art, I aim to capture the bright and beautiful colors of Kauai. Being in the middle of the ocean, the air is so clean here which makes the sky a really amazing shade of blue. Due to the daily trade wind showers, rainbows are a frequent

vision here as well as bright and warm sunlight. All of these things contribute to the bold, tropical colors seen in the landscapes, foliage and sea life of Kauai.

X-RAY MAG: What about the sea and its creatures inspires you?

MT: I love the fact that I am surrounded by the ocean. Anywhere you go on the island

of Kauai, you are only moments away from its beautiful and breathtaking seascapes. I love to park by the ocean and just watch the waves. You can sometimes see a turtle or tropical



Hawaiian Tropical Fish 3, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches



Taboniar

CLOCKWISE FROM ABOVE:: Honu, Honu 4, Honu 2, Honu 6, Honu 3, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches. Honu means sea turtle in the Hawaiian language

fish riding inside the wave itself. In the winter months, the enormous humpback whales come to mate and give birth in the warm waters of Hawaii. I never tire of seeing these amazing creatures jump out of the water as they breach. I can sit and watch them for hours.

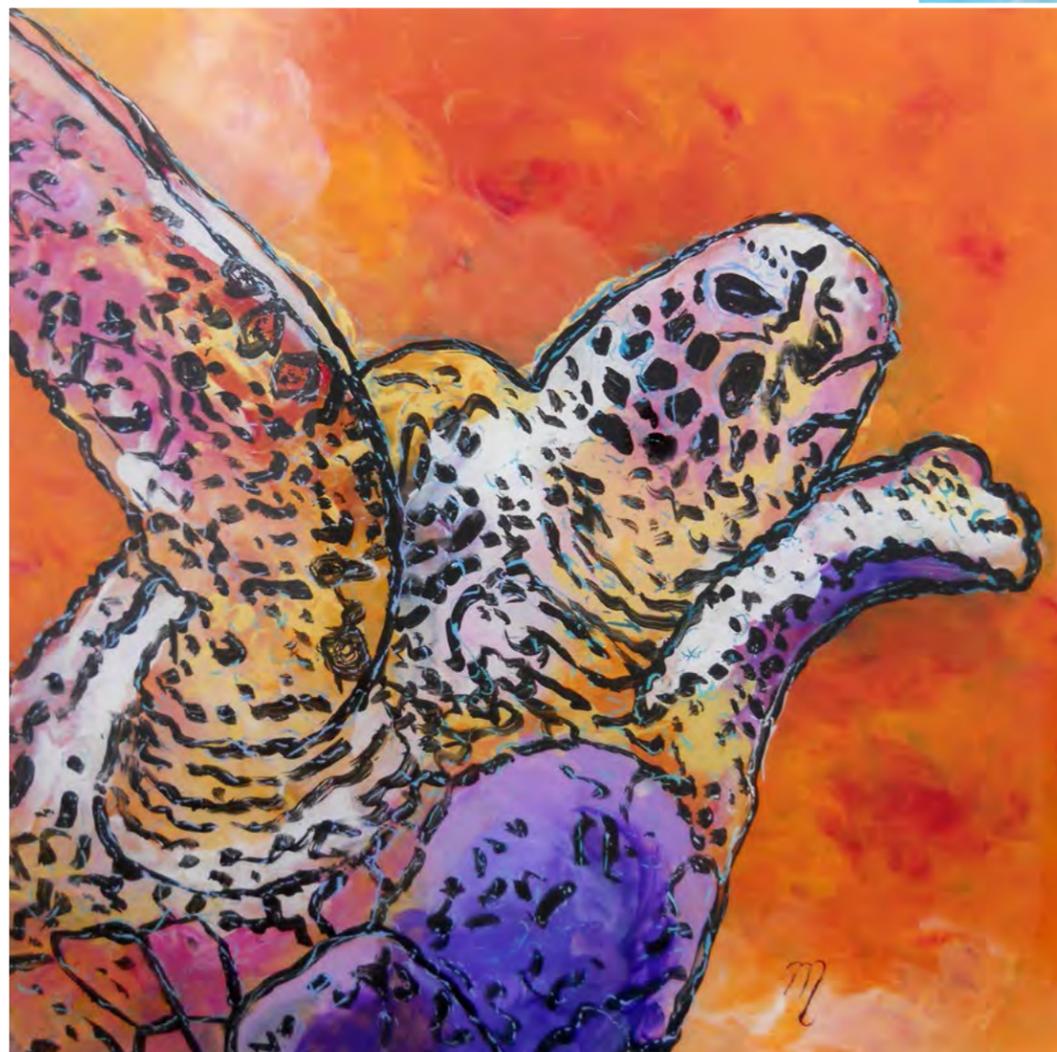
X-RAY MAG: Tell us about your experience in the underwater world, scuba diving or snorkling.

MT: I first learned to snorkel as a tourist on my many trips to the Hawaiian Islands before I moved here. On almost any boat trip, they will stop the catamaran and

you can jump into the ocean with your snorkel gear, look down into the water and see lots of colorful tropical fish, turtles and dolphins. It is a truly amazing experience and it's so easy.

X-RAY MAG: What are your favorite dive sites, underwater subjects, locations?

MT: On Kauai the best places to snorkel on the north shore are Tunnels Beach, where there are actual lava tubes under the water, and Ke'e Beach, which is protected by a reef, making it a wonderful place to snorkel



portfolio

and safely swim in the summer months. On the south shore, I like to snorkel at Lawai Beach, which is a small beach just steps away from a very nice reef. There I can

see lots of turtles, and the rare Hawaiian monk seal will make an appearance there now and then.

X-RAY MAG: How are your paintings made?

MT: In my recent series of underwater paintings, I use a



Hawaiian Tropical Fish 5, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches



Taboniar

Hawaiian Tropical Fish 4, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x12 inches

painting method called reverse acrylic painting on plexiglass. It's exactly what it sounds like. I paint with acrylics on the back of a piece of plexiglass. Because I'm painting on the back surface, the details have to be painted first, then you work towards the background. That's why it's called "reverse" painting. It sounds very challenging, but it's

actually quite easy once you know the process. After the first layer is painted, I often come back with a scratching tool to scratch in more detail and then fill that in with more paint. When I am almost finished, I actually paint the ocean by finger painting. I love the feel and effect of swirling around the paint with my hands. When you view

the painting, you are actually looking through the plexiglass at the subject. To me it reminds me of looking through the glass of an aquarium.

X-RAY MAG: Do you use underwater photography in your creative process and how is it incorporated in the art work?



Mermaids, by
Marionette Taboniar
Reverse acrylics on
plexiglass, 12 x12 inches

Taboniar

MT: I have found that in teaching art, you also teach people to relax and enjoy life. Art is a form of meditation, because while you are painting, you are basically thinking of nothing else... your problems and worries seem to vanish. You are literally living "in the moment". In today's world, we are constantly being bombarded by left brain activities, such as using a computer, cell phone, video games, etc. We need a little right brain creativity to keep us balanced. I encourage all of my students to do some kind of artistic activity at least once a week, if not once a day. It's good for your health and well being, plus it's just beautiful!

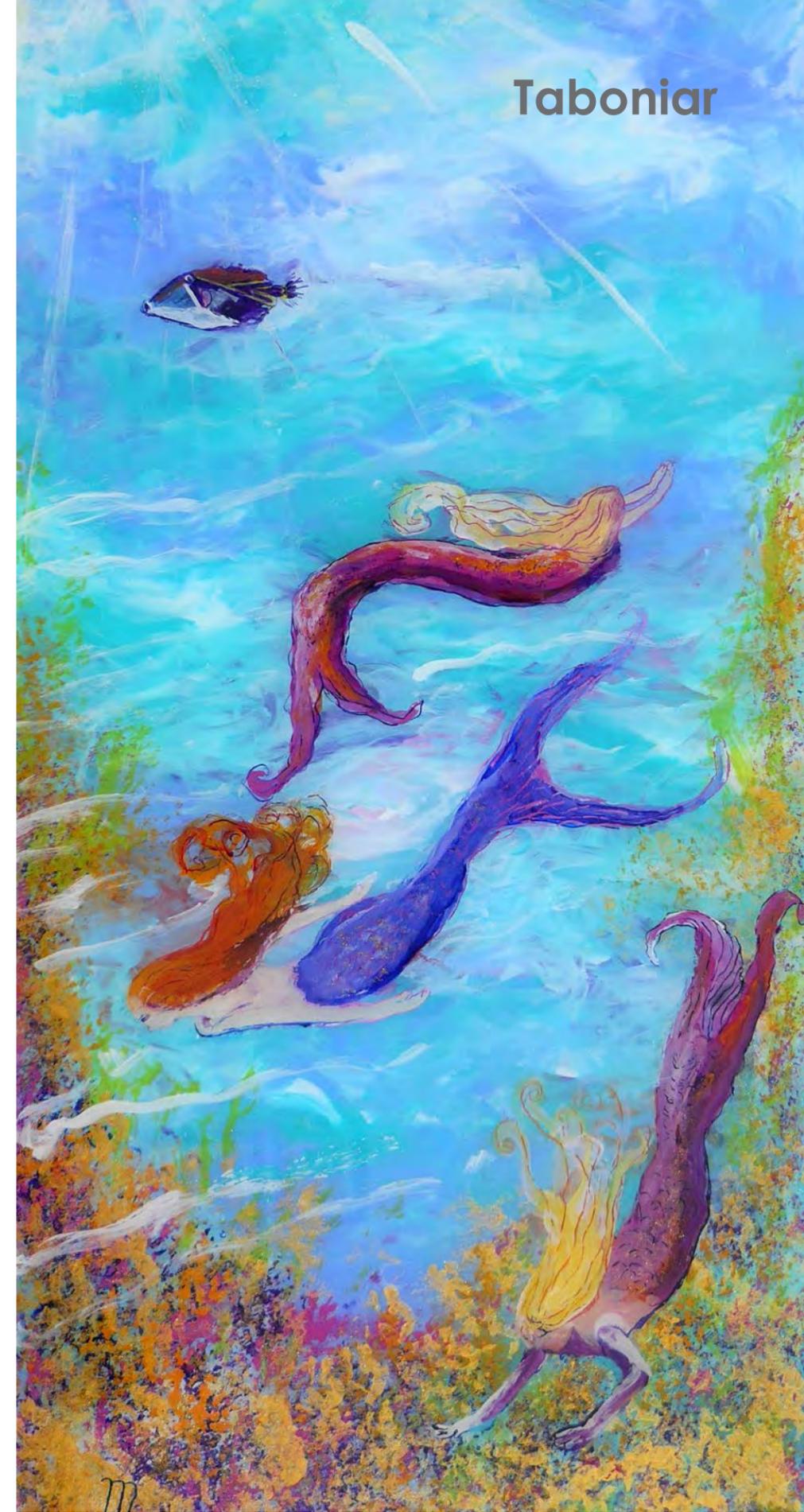
X-RAY MAG: What's new and what's next?

MT: My artwork recently appeared in the November 2013 issue of *The Artist's Magazine*, and last year I did a special commission painting for Victoria's Secret.

This summer I hope to finish putting together my next online class, *Painting Seascapes and Waves in Watercolor*. I have been practicing waves, lava rocks and water a lot recently and would love to pass this information on to my many students.

I currently have one online class available for purchase, *Painting Plumerias in Watercolor*. It is available as an instant download here: http://www.etsy.com/listing/110539880/instant-download-pdf-online-watercolor?ref=shop_home_active_1 and it is a work-at-your-own-pace class. □

For more information, visit the artist's website at www.kauai-artist.net. From there you can find more information about classes, purchasing art and links to the artist's YouTube page where she has several, free tutorials available.



Mermaids 2, by Marionette Taboniar. Reverse acrylics on plexiglass, 12 x 24 in.

MT: I have mainly used the disposable underwater cameras but am now looking to buy a nice underwater digital camera, after my friend let me borrow one last year. Most of my sea life paintings come from my imagination, especially when it comes to color. In my turtle paintings, I love to use a rainbow of colors, and my

mermaid paintings come strictly from my imagination.

X-RAY MAG: How does your art relate to conservation or environmental issues facing our oceans and reefs?

MT: My ocean art is used mainly to celebrate the beauty of

our ocean life. My paintings bring good memories to my art collectors of their trip to Kauai and the wonderful time they had snorkeling or scuba diving.

X-RAY MAG: Why do you think art is important? What are the challenges and benefits of being an artist today?