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FIRST IN

STEVE WEINMAN, EDITOR

FOR THE PAST 15 MONTHS or so it's become a mantra that we should all "follow the science". Science has been a useful prop for politicians keen to deflect blame for unpopular decisions, though it won't have escaped anyone's notice that they follow it slavishly when it suits them but are perfectly happy to set it aside when it doesn't.

Science is often referred to as if it's holy writ, tablets of wisdom passed down from the mountain which we would be wise to use for guidance.

But another thing I've noticed during the coronavirus pandemic is how often scientists themselves have been keen to remind us that the building blocks of science are constantly shifting. "Data, not dates" is all very well, but only so long as that data remains reliable.

An illustration of this comes with the strange case of the coelacanth. This is a prehistoric, deep-living fish that is highly unlikely to trouble any of us divers by swimming in front of our cameras – it probably won't.

I did see one once, but it had been stuffed and mounted in a tank in the middle of Comoros island's only dive-centre. I was impressed by its size – they can grow as big as us – and by its uncompromising ugliness.

This was a creature that had originated 400 million years ago, but until six decades before I saw that specimen it was known only from fossils and had been thought long extinct. Then in 1938 one turned up in a fishing net further south in the Indian Ocean.

I was struck by that stuffed coelacanth and later read up on the species. The odd thing was that although it was slow-moving it was apparently very fast-growing. Scientists had studied its scales, which carry growth-rings like those of a tree, and concluded that it managed to reach its considerable bulk even though it had a life expectancy of only about 20 years. Scientists had spoken, and it was so.

ONLY THIS MONTH have French researchers who questioned this conclusion published a paper that shows that, far from being one of the fastest-growing fish in the sea, it is in fact the polar opposite.

The scientists found 27 dead specimens at various stages of development at the French National Museum of Natural History, and applied the sort of polarised-light microscopy and scale-interpretation techniques that are routinely used to age commercial fish nowadays.

And they found five previously unsuspected mini annual growth-rings for each of the larger ones noted before. Which meant that coelacanths can live to be 100 and are among the longest-lived of all fish, closer to deep-sea sharks. Not only that, but they don't even mature until they're about 55, and their pregnancies last five years!

This is not to attack scientists, of course, only to underline what they want non-scientists like me to understand – that science is only as good as the latest research and tools allow it to be. It's all about constant questioning of past assumptions.

The UK government has now reached the point where it has more or less dropped any pretence of following the science – the course has been set for our "new normal". Some scientists agree with the move, many don't – and the coelacanth indicates why that is.

DIVER

the magazine that's straight down the line…

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CONTENTS

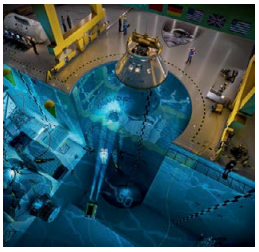
FEATURES

COVER IMAGE: 2021 UNWOD Digital Ocean Photo Art winner, by Francisco Sedano

DIVER Britain's best-selling diving magazine

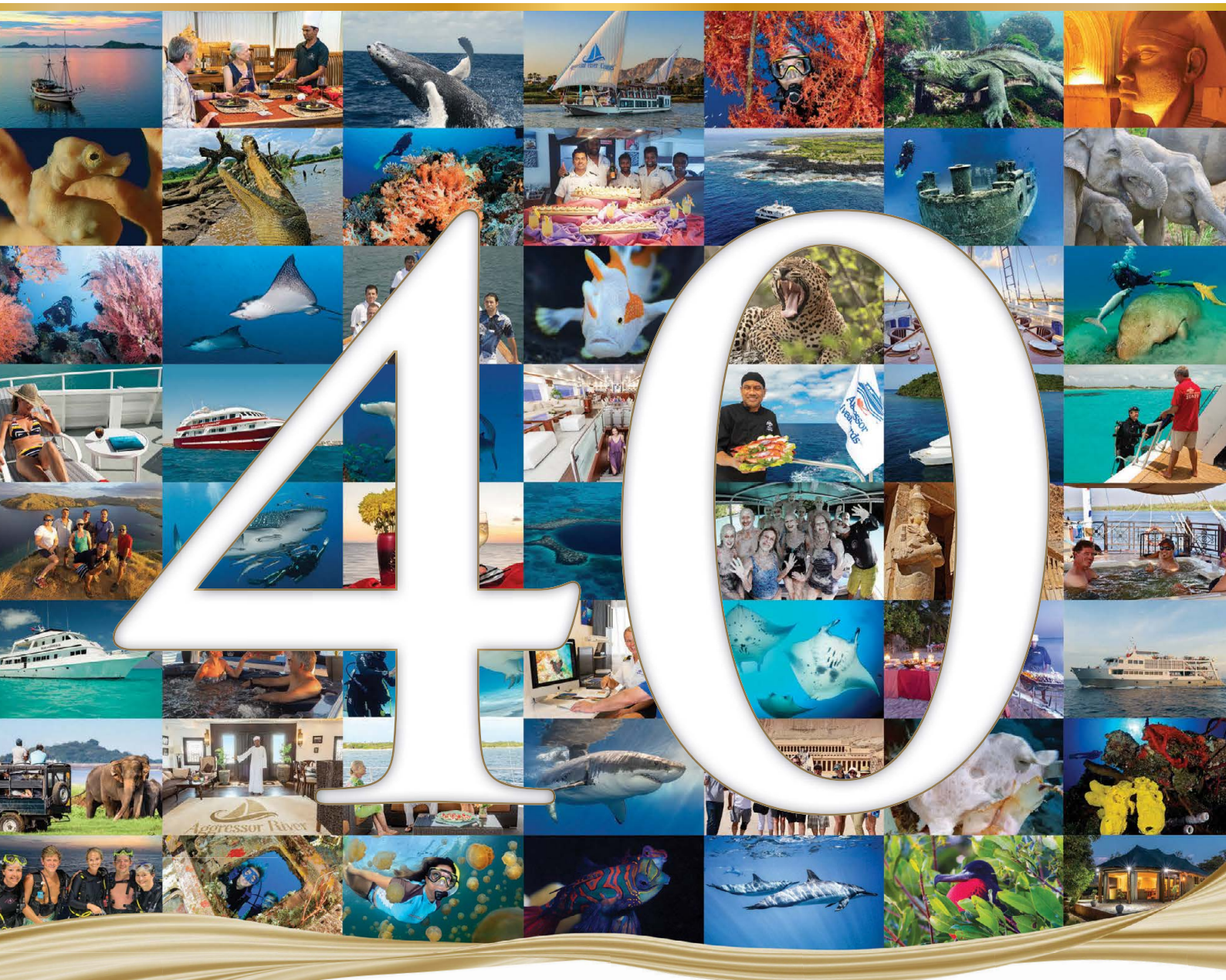
CONTENTS

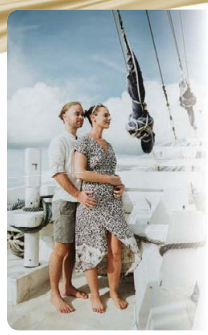
REGULARS



PLUS

LIVEABOARD YACHT DIVING LUXURY RIVER CRUISES EXOTIC WILDLIFE SAFARIS





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Divers crack two U-boat puzzles

A WORLD WAR ONE U-boat wreck off the Lizard in Cornwall has been visited by technical divers who were able to positively identify it as *U-95*.

The group were diving down to 75m with Mark Millburn's Atlantic Scuba from dive-boat *Moonshadow*.

US-based historian Michael Lowery, who runs the uboat.net website, had asked diver Steve Mortimer in 2019 if the site could be investigated to identify the U-boat and determine how it came to sink.

The two had co-operated the previous year to find the prototype Royal Navy submarine *D1*, recently protected as reported in **DIVER** (*News*, July), off Dartmouth.

The mystery Lizard U-boat had first been dived in 2004 and again in 2006. The Royal Navy had recorded it as *U-93* while a sister-sub sunk off France's Brittany coast had been identified by divers as *U-95* – but doubts remained.

By scrubbing a propeller, Mortimer and his team were able to reveal its date markings and conclude that the submarine was *U-95* – meaning that the Brittany wreck had to be *U-93*.

U-95 had been launched in January 1917, and the date stamp indicated, unexpectedly, that the propellers had not been fitted until after the launch.

British merchant steamer *Breaneill* had claimed to have rammed *U-95* in the area on 7 January, 1918, but the fact that there was also a minefield nearby had cast doubt on that claim until the recent dive.

It also vindicates British submarine expert Innes McCartney's claim in 2006 that the wreck he had dived off Cornwall was probably *U-95*.

The divers noted damage to the port side and open hatches in the conning-tower and engine-room.

This suggested that ramming while at the surface was the likely cause of the sinking, though the evidence was not conclusive.

The dive-team also included Rick Ayrton, Fran Hockley, Craig Holdstock, Jacob Mackenzie, Barbara Mortimer, Dom Robinson and Tim Wallis.

Michael Lowery has also played his part in another recent deep diving operation – at the opposite end of the UK.

For more than a century the wrong German WW1 submarine was blamed for the sinking of cargo ship the *Ruby* in the Orkneys.

Questioning previous assumptions has now led divers to track down the long-lost wreck of the victim.

Bertrand Taylor and Keith Rendall of Stromness-based Sula Diving were first to dive the 50m-deep wreck of the *Ruby* on 8 June – but it was detective work over some two decades by well-known wreck-researcher and Sula owner Kevin Heath that had finally revealed its location.

The small vessel, built in 1882, was heading along a supposedly mine-swept channel from Leith to Kirkwall on 29 March, 1917.

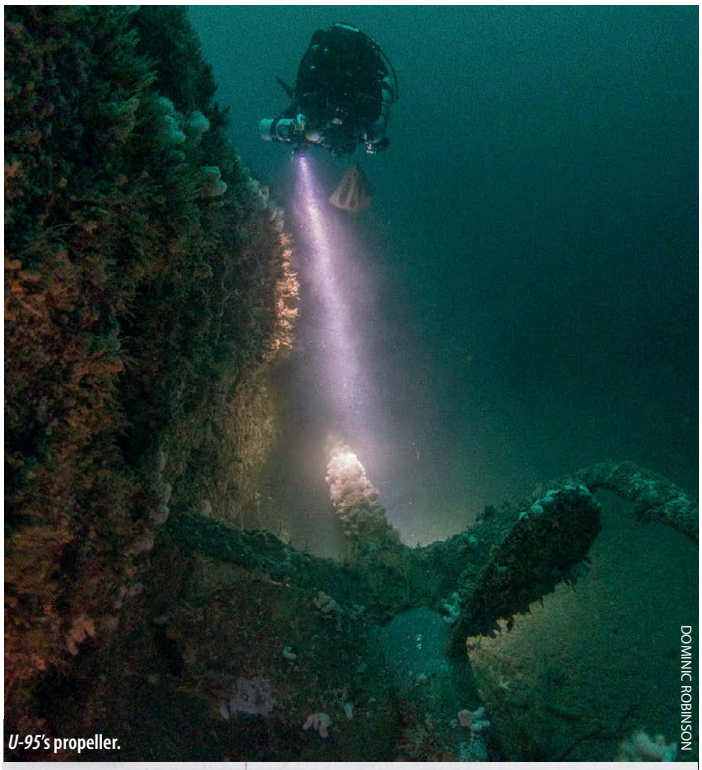
About two miles south of the island of Auskerry she struck a mine and sank. Only one of the seven crew, an unnamed deckhand, survived.

The breakthrough came as a result of Heath's discovery in late 2019 of another WW1 victim, sunk three weeks before the *Ruby*.

This was HMS *Albacore*, on which 18 men had died. The destroyer's bow was found to have struck a mine laid by *UC-55*, rather than *UC-44* as previously believed.

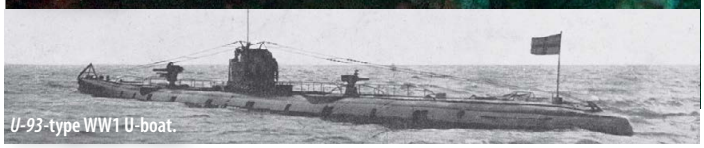
The realisation that a previously unsuspected submarine had been responsible led Heath, working with Lowrey and another submarine expert, Simon Schnetzke, to rethink the case of the *Ruby*.

The cargo ship had been thought to have sunk in an area called Shapinsay String, but trawling the archives suggested that *UC-42* had



U-95's propeller.

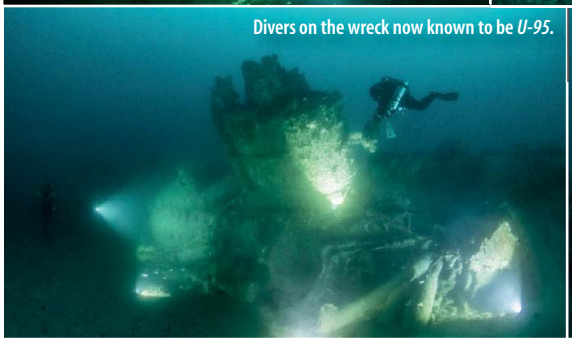
DOMINIC ROBINSON



U-93-type WW1 U-boat.

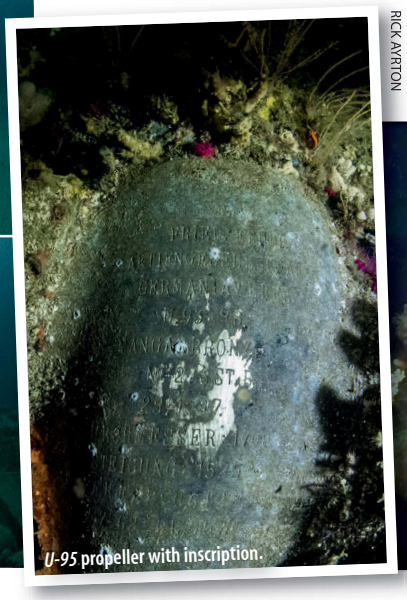
TOM WALLIS

RICK AYRTON



Divers on the wreck now known to be *U-95*.

RICK AYRTON



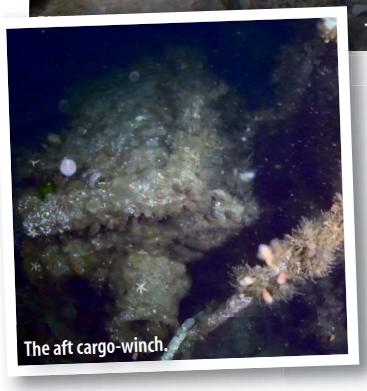
U-95 propeller with inscription.

RICK AYRTON

The wreck of WW1 mine victim the *Ruby*.

SULA DIVING

The *Ruby* was carrying cement sacks and jam-jars.



The aft cargo-winch.

SULA DIVING

likely laid the mine responsible.

Only five miles away when the *Ruby* was hit, the U-boat's crew had actually logged the explosion.

Heath told the *Press and Journal* that once he had narrowed down likely locations it had taken no more than three hours to find the *Ruby*.

The wreck lay upright with the hull collapsed and the bow badly damaged.

The divers could see the propeller, rudder-post and propshaft at the stern, with the inverted steam-driven cargo-winch lying across the shaft at the forward end of the empty aft hold.

The upright two-cylinder compound engine and single boiler could be seen further forward, and in the forward hold were bags of cement and empty jars, possibly for jam or marmalade, as well as remains of the winch.

The forward section was badly damaged but the mast was visible. Look out for a feature on the finding of the *Ruby* in **DIVER** soon. ■

The *Ruby*'s boiler with tubes exposed.

Porthole on the *Ruby*.

SULA DIVING

WRECK-DIVING PIONEERS CELEBRATED IN CORNWALL

Pictured from left: Rex Cowan, Peter McBride, Bridget Larn, Nick Rule, Alex Cowan (Rex's daughter) and Richard Larn.

MIKE DAVEY PHOTOGRAPHY

SIX GROUND-BREAKING shipwreck-hunters are being celebrated in a new feature at the Shipwreck Treasure Museum in the port of Charlestown in Cornwall.

The undersea explorers represented in the Pioneers Gallery began locating and salvaging the contents of wrecks in earnest in the 1960s, says the museum, providing "an incredible insight into the past".

Four of the six pioneers, Richard Larn OBE, his wife Bridget Larn, Peter McBride and Rex Cowan, attended the official opening of the display that celebrates their exploits. Both Larn and Cowan are long-time **DIVER** shipwreck consultants.

The Larns established the museum in 1976 and ran it until 1998. Regarded as among Britain's leading historic shipwreck experts, they have written more than 65 books on the subject.

Diving enthusiast McBride met Richard Larn while posted at RNAS Culdrose and became hooked on shipwreck-hunting.

One of his notable discoveries came in 1969 with the *Santo Christo de Costello*, a Genoese merchant vessel driven ashore near Mullion Cove in a storm on its maiden voyage from Amsterdam to Genoa in 1667.

Swapping a career in law for treasure-hunting in the 1960s, Cowan sought the hardest-to-find wrecks.

He worked alongside his late wife Zélide, who was also an expert on the history of diving and wrecks.

One of their substantial recoveries came after a meticulous three-year search in 1971 for the *Hollandia*, a Dutch East Indian Company ship that sank off the Isles of Scilly in 1743.

Highly regarded archaeologist Dr Margaret Rule CBE, who died in 2015, led the project to salvage the Tudor warship *Mary Rose*. Her son Nick represented her at the opening.

Since 2016 the Shipwreck Treasure Museum has been owned by Sir Tim Smit, co-founder of the Eden Project and Lost Gardens of Heligan and an avid archaeologist and wreck-diver.

The collection includes more than 8000 items recovered from more than 150 shipwrecks, with the earliest recoveries from a Phoenician wreck dating back to around 500 BC.

The museum was named Small Visitor Attraction of the Year at the Cornwall Tourism Awards 20/21 and won a bronze award in the same category in this year's South West Tourism Awards.

"The museum is home to Europe's largest private collection of shipwreck artefacts, and for more than 40 years the thousands of items on display have provided an incredible window to the past for our visitors," said the museum's Lynné Raubenheimer.

"However, the new Pioneers Gallery focuses for the first time on these six daring men and women who broke new ground in underwater archaeology and exploration, painstakingly hunting down centuries-old shipwrecks and risking their lives to liberate their secrets."

The museum is open daily from 10-5, with pre-booking of timed entry tickets recommended. ■

Four divers lose their lives around UK in June

FOUR SCUBA-DIVERS died in the sea around the UK in June – two in the northern isles and two at the other end of the country.

A technical diver died during a deep wreck-dive 45 miles south-west of the Isles of Scilly on 8 June.

The diver was part of a group diving from a French catamaran. The Newquay Coastguard search and rescue helicopter took off at around 6.30pm but the paramedic aboard confirmed the death.

Devon & Cornwall Police said that there were no suspicious circumstances but that an inquest was likely to be held.

On 14 June a man got into difficulties in the sea between Lerwick and the island of Bressay in Shetland.

The incident prompted the crew of Orkney-registered diving liveaboard *Valhalla* to call the emergency services at around 4.30pm.

A Coastguard helicopter from Sumburgh on exercise in the area arrived and winched aboard the man, a 68-year-old from Northamptonshire.

He was taken to Gilbert Bain Hospital in Shetland, where he was later reported to have died.

The *Valhalla* meanwhile returned to Lerwick, where the local Coastguard rescue team transferred the second diver, a 52-year-old man, to the Scottish Ambulance Service.

He was taken to the same hospital and later discharged. The pair were said to have been diving the wreck of fishing-boat the *Fraoch Bain*.

Three days later a major search was launched for a male diver missing two miles south of Falmouth in Cornwall.

Ben Snape, 39, from Leek in Staffordshire, failed to resurface from a wreck-dive at around mid-day on 17 June. Described as an experienced diver, he had been diving a site off Pendennis Point.

A search of Falmouth Bay was co-ordinated by Falmouth Coastguard. Its SAR helicopter and fixed-wing aircraft were joined by a Royal Navy helicopter on exercise in the area and the two Falmouth lifeboats, with fishing and recreational vessels also taking part.

The operation continued for some days before being called off. Snape's body was recovered by police-divers the following week.

Devon & Cornwall Police said that the death was not being treated as suspicious and a report was being prepared for the coroner.

Diver David Pleace, 57, from Derby, was reported missing in the Scapa Flow area of Orkney shortly before 3pm on 27 June. A search was launched around the small islands Barrel of Butter and Cava.

The Coastguard helicopter, Stromness, Longhope and Thurso lifeboats and local boats took part in the operation, which continued until 2am the following morning and resumed in daylight.

It was called off in the afternoon when Pleace's body was recovered.

Another diver had to be airlifted to a hyperbaric facility following a boat-dive in the Channel off Torquay on 5 June. Diagnosed as suffering from decompression illness, the casualty was described as "seriously ill".

The incident occurred in the afternoon during a dive between Anstey's Cove and Babbacombe beach. Torbay and Plymouth Coastguard Rescue Teams, the Coastguard SAR helicopter from Newquay, Teignmouth RNLI lifeboat and South West Ambulance Service responded to a call at around 2pm.

The diver was treated by paramedics at the scene before being transferred to Derriford Hospital in Plymouth. His condition is not known.

MARITIME & COASTGUARD AGENCY

Coastguard control room.

MARITIME & COASTGUARD AGENCY

✹ *On 15 June 50-year-old Barry Beckett died in the USA after diving on the well-known Vandenberg missile-tracker wreck off the Florida Keys.*

Out with Southpoint Divers of Key West, he had returned to its boat Phoenix after his dive but died once back aboard. ■

Maldives trip for tireless doc

THE LAST OF Emperor Divers' eight Covid Diver Heroes has been named as 38-year-old doctor KK Tan from Malaysia, and he wins a free week on a liveaboard.

"There will be no greater reward for this selfless cousin of mine than to win a liveaboard trip to the Maldives, where he can find solace in scuba-diving, the holiday activity he enjoys most," said his cousin Alex Chan in his nomination statement.

"I have not seen him physically for more than a year, nor did his parents because he has isolated himself for fears of inadvertently bringing the virus home," said Chan, explaining that Kuala Lumpur-based Dr Tan had been tireless in supporting frontline staff throughout the coronavirus pandemic.

"By day, he takes up the administrative role to procure quality medical equipment and ensure proper distribution to health facilities throughout the country – an uphill task in view of the rising number of cases in my country," he went on. "By night, he would return to his former hospital to help out with the outpatient cases there.

"If not working on weekends, he would visit a couple of old folks' home to provide encouragement and free medical consultations, as well as delivering medications where able."

Chan said that his cousin would tell him: "Since I can't go diving in the sea, I might as well dive in the sea of Covid-19. There are many beautiful things to see here too."

And later, on hearing that he had won the Emperor prize, Dr Tan was ecstatic, he said.

"I'm sure it will be a beautiful light for him at the end of the tunnel."

The eight winners will be taking their diving holidays, four in the Maldives and four in the Red Sea, once they are able to take the time off and can travel overseas. ■

DIVER'S TOO-CLOSE WHALE ENCOUNTER...

A US SCUBA-DIVER spent what must have seemed the longest half-minute of his life inside a whale's mouth on the morning of 11 June.

Commercial fisherman Michael Packàrd, 56, escaped with severe bruising, especially to his legs, after being accidentally engulfed by the feeding humpback off Cape Cod, Massachusetts.

"I was lobster-diving and a humpback whale tried to eat me," the former abalone diver wrote on a community Facebook page. "I was in his closed mouth for about 30 to 40 seconds before he rose to the surface and spit me out. I am very bruised up but have no broken bones."

Michael Packàrd with his sons.

According to the *Cape Cod Times*, the incident happened just before 8am, with Packàrd already on the second dive of the day from his boat the *Ja'n J*.

He was about 14m deep above the sandy seabed off Herring Cove Beach, in 6m visibility and surrounded by fish. Above him was a fleet of boats fishing for striped bass.

Suddenly feeling a "huge shove", he at first feared that he was the victim of one of the great white sharks commonly found in the area, but felt no pain, only darkness descending.

"I could sense I was moving, and I could feel the whale squeezing with the muscles in his mouth," Packàrd told the paper. "I was completely inside; it was completely black.

"I thought to myself 'there's no way I'm getting out of here. I'm done, I'm dead'. All I could think of was my boys – they're 12 and 15 years old."

Struggling to free himself, he said he lost but then recovered his regulator mouthpiece. He could feel the whale shaking its head in apparent discomfort before it eventually surfaced.

"I saw light, and he started throwing his head side to side, and the next thing I knew I was outside," said Packàrd.

His crewman Josiah Mayo saw the whale come up, thinking at first that it was a great white before it hurled Packàrd out into the sea.

Mayo, the son of a cetacean expert at the nearby Centre for Coastal Studies, later described the whale as medium-sized, and said it was probably feeding on sand lance, the eel-like fish abundant in the area.

Ingesting a diver would certainly have been accidental and swallowing him would have been physically impossible, with such incidents vanishingly rare outside the pages of the Bible.

Mayo recovered Packàrd onto the boat, called the emergency services and took him back to Provincetown.

He was taken to hospital but discharged that afternoon. ■

SUSANNE STEEN

Humpback whale rises to the surface.

...while shark activist survives 'gator head-bite

ANOTHER US DIVER has blamed himself after an alligator bite left him with a fractured skull.

Jeffrey Heim, a 25-year-old fitness instructor from Tampa, was looking for fossilised megalodon shark teeth for use as jewellery. He was freediving in the Myakka River near Venice on Florida's Gulf Coast on 30 May.

Soon after entering the water, Heim surfaced and "I thought I'd got hit by a propeller – it hit me so fast. It felt like a boat going 50mph," he told ABC Action News.

"I realised I was inside its mouth, and if the alligator hadn't decided to let me go on its own, there was nothing I could have done to fight it. Because of the bite force on those animals, he could have got me anywhere else and I would have died."

He saw the alligator about a metre ahead of him. "I just learned from dealing with sharks that you don't want to act like prey, so you don't want to move too fast. So I started slowly moving away."

Jeffrey Heim: 'Nothing I could have done.'

Bystanders alerted emergency services and an ambulance took Heim to hospital, where he was found to have a minor skull fracture and given 34 stitches.

Discharged the following day, he has since been back to the dive-site, where his head-worn GoPro with footage of the attack was recovered. Florida Fish & Wildlife later removed a 2m alligator from the same stretch of river, with Heim urging that it be kept alive.

"It was most likely just a mother following her instincts... a female protecting her eggs," he said.

He admitted that with years of scuba and freediving experience under his belt he should have known better than to dive during alligator mating season.

In May and June they tend to be more active and aggressive.

An anti-shark-finning and sustainable-fishing activist, Heim has a company called SHRKco, dedicated to turning prehistoric shark teeth into jewellery, with 10% of proceeds donated to marine-conservation charities.

With the tagline "Help Extinct Sharks Save Live Sharks", he hopes to turn the project into a full-time occupation. ■

Divers respond to big clean-up call

AN EIGHT-DAY volunteer clean-up operation on the Greek island of Ithaca is claimed to have been not only the biggest in the history of marine conservation organisations Healthy Seas and Ghost Diving but one of the most ambitious anywhere in the world.

The project involved removal of 76 tonnes of debris by a team of 45 mostly volunteers – including 20 scuba-divers.

Ithaca, known as the home of Odysseus in Greek mythology, lies off Kefalonia and was said to have suffered serious pollution from a fish-farm abandoned nine years ago.

Local diver and environmentalist George Lilas ignited the project when he shared photos of the site "wreaking environmental havoc", according to Healthy Seas.

The fish-farm operator had gone bankrupt in 2012 and left behind the cages and other equipment. A storm last September had dispersed tonnes of plastic pipes, fishing-nets, nylon ropes, concrete blocks, plastic buoys and rusty metal fragments, all of which debris was left either drifting or lying on the seabed and beaches.

The clean-up, which took six months to plan, was co-ordinated by Healthy Seas with ghostnet-removers Ghost Diving and sustainable-fishing start-up Enaleia. It began on World Oceans Day and ran through to 16 June.

Fourteen international Ghost Diving technical divers worked to remove the sunken debris, while local divers provided support and lifted smaller items.

The heaviest metal structures were removed by commercial divers and a working barge.

The divers and the beach-cleaners, who at times found themselves knee-deep in polystyrene foam beads from the farm's floats, together recovered 5 tonnes of nets, 32 tonnes of metal and 39 tonnes of plastics, including 150 bags of the plastics pellets.

"After shovelling the polystyrene foam beads into plastic bags for five days we realised that we needed another solution to leave the beach as clean as possible," said Healthy Seas director Veronika Mikos. "Thankfully we found an industrial vacuum-cleaner, which we refitted using a volunteer's mesh bag as a filter.

"Locals were waiting for many years for someone to do something about this environmental catastrophe," she said. "There is now a shocking difference when you look at the bay and you can't help but be emotionally affected by it. This, together with the warm greetings we received from the locals, is our great reward."

Healthy Seas hosted a public event to keep local people informed about the project and 75 children took part in educational activities to raise awareness of ghost-fishing. Seabed surveys were carried out to record and assess the interaction of the debris with the marine environment.

The materials recovered from the sea, coastline and four beaches on the south-west coast are set to be recycled into new products. Nets will be regenerated into Econyl yarn used to make clothing and carpets or upcycled into hand-made products. ■

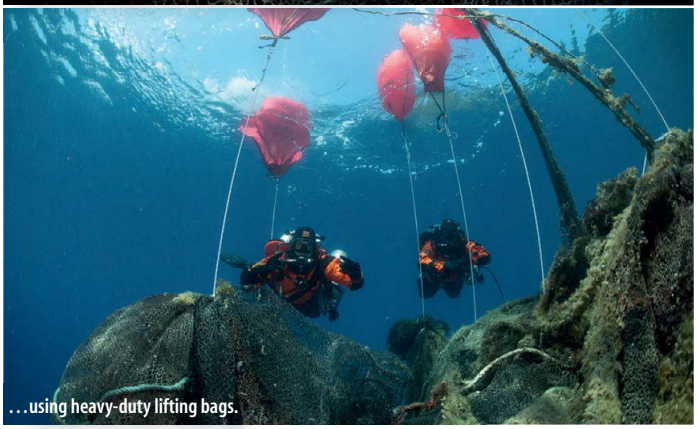
Before and after: the fish-farm site.

GEORGE LILAS / ODYSSEY

MARK STAP / GHOST DIVING

Ghost Divers volunteers tackled the abandoned nets…

IMAD FARHAT / GHOST DIVERS



…using heavy-duty lifting bags.

COR KUYVENHOVEN / HEALTHY SEAS

Divers on the beach.

VERONIKA MIKOS / HEALTHY SEAS

Debris on the seabed.

COR KUYVENHOVEN / HEALTHY SEAS

Plastic pellets on the beach.

PADI DIVERS SET TO HELP TO INTERCEPT PLASTICS

ENVIRONMENTAL BODY The Ocean Cleanup has linked up with PADI and the new PADI AWARE Foundation in a bid to tackle ocean plastics pollution on a wide scale.

The three organisations want to involve divers in what PADI calls "one of the most ambitious citizen-science projects ever taken on by the dive community".

The Ocean Cleanup made news headlines when it was founded by then-18-year-old inventor Boyan Slat in the Netherlands in 2013. It now employs almost100 engineers and researchers engaged in a two-pronged assault on plastics pollution.

Its initial plan was to develop large-scale technological systems able to compact and collect plastics already accumulated in the ocean, recycling this material into durable products to fund continuing operations.


The Ocean Cleanup's Interceptors.

THE OCEAN CLEANUP

In 2019, the organisation launched the other half of its strategy with its Interceptors, aiming to use these to extract 80% of surface plastics from the world's 1000 most polluting rivers before it could even reach the ocean.

"We're excited to be working together with the world's leading diving organisation," said Dan Leahy, The Ocean Cleanup's chief development officer.

"Their passion for clean oceans creates a natural fit between our organisations, and I'm delighted we can scale our data and research capability through their dedicated community of divers."


The Ocean Cleanup's open-sea plastics collection system.

THE OCEAN CLEANUP

The idea is for PADI's network of dive-centres, dive professionals and recreational divers to drive the joint citizen-science effort through surface and underwater surveys near the Interceptors and at surrounding oceanic dive-sites.

Data collected on the amount and type of waterborne plastics found will help to inform governments in evolving waste-management policies, says PADI. A pilot project is set to take place in Malaysia later this year with an Interceptor in the Klang river.

PADI divers in the region will collect data through regular river, ocean surface and Dive Against Debris seabed surveys. Similar action in areas of Indonesia, the Dominican Republic, Vietnam, the USA, Jamaica and Thailand is expected to follow suit if the pilot project is successful.


The inventive Boylan Slat.

THE OCEAN CLEANUP

Formation of the PADI AWARE Foundation was announced on World Oceans Day on 8 June, and its Community Grant is expected to provide resources to participating PADI dive-centres and resorts.

The independent non-profit charity is "dedicated to driving local action for global ocean conservation", says the training agency, supporting its goal to create a billion "PADI Torchbearers" to explore and protect the ocean.

"The new foundation will build citizen-led conservation and activism programmes, as well as expand current ones, to address key ocean threats, such as marine debris, climate change, marine habitat loss and vulnerable species protection across the planet," says PADI.

It has set up a Conservation Activities Locator to help both divers and non-divers to find and engage in ocean-conservation activities, events and courses, padi.com

Ghost Fishing nets plastics award

GHOST FISHING UK has received the Best Plastic Campaign prize at the second Plastic Free Awards 2021 for the work of its volunteer divers in cleaning up fishing gear lost at sea.

The awards were set up by Surfers Against Sewage and the Iceland Foods Charitable Foundation to recognise the achievements of bodies battling plastics pollution in the UK. Shortlisted nominees in 12 categories are selected by a panel of experts.

Ghost Fishing UK puts scuba-divers regarded as suitable candidates through an intensive three-day course to prepare them for the often-arduous task of removing and recovering ghost nets and line. Materials recovered are later recycled into consumer items such as plant-pots.

A number of Ghost Fishing divers missed the live virtual awards ceremony because they were aboard *Channel Diver* in Brighton, completing a project to remove a large net from the wreck of the WW1 armed merchant wreck *Cairndhu*.

A skipper in the area had unexpectedly offered them the use of his trawler to recover the net.

Among the *Cairndhu* volunteers was the charity's chair Rich Walker.

"To actually win this award means more to me than you can imagine," he said. "I want to thank each and every one of the Ghost Fishing UK team, and all of our supporters.

"They are all a key part of the job to reduce our dependence on plastics and preventing it from getting into our beautiful oceans."


Ghost Fishing divers at work on the *Cairndhu*.

RICH WALKER / GHOST FISHING UK

Lost fishing-gear can be reported at ghostfishing.co.uk/report.

In May the organisation recovered 200kg of ghost-gear from the seabed off Brighton as part of the Wild Coast Sussex project, as reported in **DIVER** last month.

Sussex was also the scene for a recent coastal clean-up as a reported 40 years' worth of rubbish was removed for disposal from inaccessible rocks below Beachy Head by members of the East Sussex Maritime Volunteer Service, using the vessel *East Sussex 1*.

UK dive-team find 12th-century White Ship

THE TIMBER LONGBOAT known as the White Ship sank off Normandy 900 years ago, drowning the heir to the English throne and hundreds of nobles.

Divers who had been hoping to locate the wreck have now reported finding far more than the scattered iron nails or rivets they had hoped for.

Exploring the 10m-deep suspected wreck-site in strong currents on 8 June, they found what could turn out to be "a significant section" of the 40m hull, according to expedition leader Roger Michel, executive director of the Institute for Digital Archaeology (IDA).

Michel told the *Daily Telegraph* that historian and expedition supporter Charles, the 9th Earl Spencer, had calculated how long the ship must have rested on the submerged Quilleboeuf Rock before sinking. Based on this information, the team had analysed local currents to work out the location of the debris field.

Giles Richardson and Holger Shuhmann carried out a one-hour dive, restricting themselves to photographing the site because they lacked permission to remove finds.

"The divers found a section of the hull built from exactly the materials we were looking for – iron and bronze, wooden nails and so on – exactly where we thought we would find them," said Michel.

He reported that the section was at least 4m long, though more was thought to be concealed by a boulder.

The White Ship author Earl Spencer (*left*) and Roger Michel on the dive-boat.

"We can see that it has the correct design features for a ship of this age, and there are no other recorded shipwrecks in the area," he said.

Earl Spencer had been hoping to take part in the dive until a frozen shoulder ruled this out.

Originally planned for last December, the dive had been called off at that time because of the weather. His book *The White Ship* came out in paperback two days after the discovery was reported.

Resembling a Viking longship, the White Ship was one of the biggest such vessels ever constructed at the time.

It was clinker-built, meaning that the oak hull planks overlapped each other, and propelled by 50 oarsmen.

The ship was only a mile out from the port of Barfleur at around midnight on 25 November, 1120, when it struck the rocks at full speed.

Aboard were 300 people including many members of the Anglo-Norman nobility, celebrating victory after four years of war against the French with copious amounts of wine.

They were eager to race King Henry I, who had already departed on his own ship, back to Southampton.

All but one of those aboard died, including the king's only male heir 17-year-old William Aetheling and his sister Matilda la Perche.

The sole survivor was a French butcher who had boarded only to try to recover debts, and lived to provide an eye-witness account.

The sinking affected the course of English history. Henry was the son of William the Conqueror, and civil war broke out after his death between his appointed successor, another daughter also named Matilda, and his nephew Stephen of Blois.

This conflict, "the Anarchy", went on for 20 years until Matilda's son took the throne in 1135 as Henry II.

ISLE OF WIGHT SHIPWRECK CENTRE & MARITIME MUSEUM REOPENS

THE ISLE OF WIGHT'S Shipwreck Centre & Maritime Museum, founded by local wreck-diver Martin Woodward in the 1960s and located in Arreton, has reopened.

It says it has one of the largest collections of its kind in the UK, including artefacts recovered from galleons, steamships and wartime vessels, plus antique diving equipment, ship models, prehistory in the Solent and more. It's open every day until the end of October from 10-5, coronavirus restrictions allowing, and an adult ticket costs £6, museum.maritimearchaeologytrust.org

From Egypt to Hadrian's Wall

A GROUP OF British forces veterans attached to the Deptherapy charity were set to embark on a 40-mile hike along Hadrian's Wall in the north of England in July – to raise funds for out-of-work staff at Egyptian dive-resort Roots Red Sea.

The El Quseir centre has been closed since the start of the Covid-19 pandemic, and with Egypt currently Red-Listed for UK travellers is said to be unlikely to re-open in the near future.

Deptherapy describes Roots as its "home from home" in Egypt, having used it pre-pandemic for most of its overseas training courses. The charity seeks to rehabilitate armed service personnel and veterans who have suffered life-changing mental and/or physical challenges, through its scuba programmes.

Roots' UK owners Steve & Clare Rattle have been supporting the dive-centre's 16 staff and their families but face an uncertain future, according to Deptherapy.

"We're hoping to raise £3000 for the staff at Roots to support their families due to hardship caused by the pandemic," said Deptherapy divemaster and former Scots Guard Tom Oates.

"We view the staff at Roots as part of our extended families. They have become close friends. The welcome, service and care we are shown is unbelievable but now it is our turn to give something back."

Steve Rattle himself ws organising the trek from 12-16 July, heading west along a section of the Roman wall between Heddon-on-the-Wall in Northumberland and Lanercost in Cumbria.

A fund-raising site was set up at justgiving.com

Spiny pay-off from seagrass project

OCEAN CONSERVATION TRUST

The spiny seahorse in seagrass in Plymouth Sound.

A RARE SIGHTING off Cornwall in the form of a long-snouted seahorse has been reported by a marine-biologist scuba-diver working on the seagrass restoration project in Plymouth Sound.

Mark Parry, development officer of the Ocean Conservation Trust (OCT), came up with underwater video footage showing the long-snouted or spiny seahorse (*Hippocampus guttulatus*) in the seagrass.

The species was once common along the South Coast but largely disappeared with the destruction of the seagrass meadows that provided it with a nursery habitat.

Today the seahorses are known to exist only in isolated spots such as Studland Bay in Dorset, along with the short-snouted seahorse (*Hippocampus hippocampus*), the only other British species.

According to the Seahorse Trust, seahorses can also be found along the UK's west coast and all around Ireland, with some sightings on the UK east coast.

Parry told the *Independent* that he had never before seen a seahorse in the wild in the seven years that he had been diving in seagrass areas in the UK.

Work began on England's biggest seagrass-planting programme in Plymouth Sound National Marine Park in late April.

The OCT has been leading the LIFE Recreation ReMEDIES project, through which a team of diving volunteers are helping to plant 16,000 seagrass seed bags and 2200 seedling bags as a boost for the marine environment.

The four-year project aims to plant four hectares of seagrass meadows in Plymouth and another four in the Solent Maritime Special Area of Conservation.

"It is estimated that the UK may have lost up to 92% of its seagrass," says the OCT.

"Factors including wasting disease, pollution and physical disturbance have been identified as contributing causes."

The beds are expected to host juvenile fish and protected creatures such as seahorses and stalked jellyfish while stabilising the seabed, cleaning seawater and capturing significant amounts of atmospheric carbon.

WEAPONS FINDS PUNCTUATE SAR TRAINING

A TEAM OF IRISH club-divers who train to search the River Shannon for missing persons have been attracting attention – because they keep surfacing with ancient weaponry and other artefacts they have come across by chance.

Shannonside Sub Aqua Club, based in Banagher, Co Offaly, forms part of Ireland's Search & Recovery system. Its Offaly SAR team comprises some 10 members who train regularly in the silty river, with a beat ranging as far north as Athlone in Co Westmeath and south to Portumna in Co Galway.

And the training has made the divers sharp-eyed, despite the often-murky conditions. Finds over the past 18 months, as related to the *Offaly Express*, include weapons ranging over thousands of years.

The divers have found three Bronze Age spears and another thought to be 800-1000 years old, a 6000-year old polished Stone Age axe, six medieval swords, three Irish battle-axes, a 13th-16th century Gallowglass helmet, shields and 18th century muskets and pistols.

The divers' discoveries are passed on to Dublin's National Museum of Ireland for conservation, although five log-boats – canoes used by Stone Age hunter-gatherers – have been left in the river pending expert examination.

The club's SAR activities are carried out in co-ordination with the Irish Coast Guard and police.

SHANNONSIDE SAC

BDMLR swim to save seals

BRITISH DIVERS Marine Life Rescue has raised £30,000 in a sponsored sea-swim in Cornwall to equip a new hospital for young seals.

BDMLR volunteers and supporters covered the 28km distance from Truro down the Fal estuary to Falmouth on 28 May. The swim was said to represent 200m for each of the near-record 139 seal pups admitted to the BDMLR's existing facility last winter.

Though often in the headlines with high-profile whale or dolphin rescues, around 90% of the charity's calls are to sick, injured or malnourished seal pups.

This often results from human disturbance to the mothers, fishing-net entanglement or the growing number of winter storms in the UK associated with climate change.

BDMLR says problems caused by the Covid pandemic have brought the lack of capacity at its existing seal-up hospital to a critical point. Over the past 10 years that facility has provided emergency care for some 550 pups.

The new purpose-built hospital will also be located in mid-Cornwall, but the BDMLR wants it to have twice the capacity, to be better-equipped and to provide a training facility for its volunteer Marine Mammal Medics.

The hospital will care for pups until they are healthy enough to be transferred to rehabilitation centres such as Cornwall Seal Sanctuary in Gweek or an RSPCA unit, where they can be prepared for a return to the sea.

By March this year the BDMLR had already raised an initial target of £30,000 for the seal-pup hospital through crowdfunding, but has gone on to raise extra funds for more sophisticated equipment in the form of blood-analysis machines, which allow vets to diagnose problems faster.

The site has so far raised more than £37,000. A short video about the seal hospital fund-raising can be seen on YouTube.

BDMLR seal-pup rescue.

BDMLR

Divers put Singapore on wreck map

SINGAPORE HAS A long tradition as an east-west trading hub – but without having any historical shipwreck sites.

Now a report on the excavation of two adjacent wrecks has changed this, with one of the ships found to date back 650 years or more.

At the end of 2014 a barge ran aground off the city-state's eastern-most island Pedra Branca, where the Singapore Strait meets the South China Sea. It was while clearing debris from the rocky seabed about 100m north-west of the island that commercial divers came across remains of Chinese ceramics.

Plates they brought up resembled those that were being found during a highly publicised excavation on land at the time, so the divers informed the authorities. In 2016 Singapore's National Heritage Board (NHB) commissioned ISEAS-Yusof Ishak Institute's archaeology unit to survey and excavate the site.

The work continued until 2019, when widening seabed surveys led to the discovery of a second shipwreck about 300m east of Pedra Branca.

Diving on this wreck was only recently completed, and the findings were announced on 16 June.

13th/14th-century Yuan dynasty porcelain.

The archaeologists' research shows that the two ships sank centuries apart. Blue and white ceramics and celadon greenware found on what was called Shipwreck 1 dated from the time of the Chinese Yuan dynasty (1271-1368), when Singapore was known as Temasek.

Shipwreck 2 turned out to be a much later merchant vessel identified as the *Shah Munchah*, which sank in 1796 while returning from China to India, where she had been built.

Artefacts recovered from this wreck include a diverse range of Chinese ceramics as well as copper-alloy, glass and agate objects. The archaeologists also found four anchors up to 5m long and weighing 2.5 tonnes, and nine cannon of the sort mounted on East India Company vessels in the 18th and early 19th centuries.

The dive-sites are the first historic wrecks found off Singapore.

ISEAS-YUSOF ISHAK INSTITUTE

Raising a cannon from the *Shah Munchah*.

"Remarkably, the first ancient shipwreck found in Singapore waters seems to be contemporary with 14th century Temasek," said Dr Michael Flecker, project director of Maritime Archaeology Projects at ISEAS.

"Apart from a large cargo of Longquan greenware and other ceramics, she carried more Yuan dynasty blue-and-white porcelain than any other documented shipwreck in the world.

"Many of the pieces are rare, and one is believed to be unique."

Of the *Shah Munchah*, he said: "Much of her Chinese cargo would have been trans-shipped in India for the onward voyage to Britain. Had she survived another 23 years, she would almost certainly have called at the re-established port of Singapore.

"Her incredibly diverse cargo provides great insights into the type of goods that would have been exchanged and purchased by the new inhabitants of this fledgling city."

Retrieved artefacts are being conserved, researched and documented with a view to being exhibited by the NHB next year.

UNIVERSITY OF CYPRUS

this month DIVER likes...

Dive & Dig This five-part podcast from the Honor Frost Foundation celebrates advances in underwater archaeology with Bettany Hughes, Lucy Blue and guests such as Timmy Gambin and Philippe Cousteau, and is worth a listen – find it at audioboom.com/channels/5052122

Bamboo Sharks Conservationists in Thailand are now breeding and releasing onto artificial reefs baby bamboo sharks – a tiny species that's "Near Threatened" as it appeals to aquarists and "exotic diners".

Sea Threads "Life-Preserver" sweatshirts, each made from what's said to be a pound of 100%-ocean-reclaimed plastics, are on sale from this Florida-based, Kickstarter-funded startup, seathreads.co

No-Ice Freeze Good eco-news? The Central Arctic Fishing Moratorium comes into effect after years of wrangling and should stop all commercial fishing in the area for at least 16 years. Until recently the Central Arctic Ocean was of course covered in ice.

Clockwise from left: From *Shah Munchah*, figurine of a Chinese couple; dog; bronze mortar; horse & rider; glass stopper; copper-alloy bracelet; betelnut cutter.

ISEAS-YUSOF ISHAK INSTITUTE

OLEVY

DIVERS INVITED TO EXPLORE ANCIENT PORT

Gold coins retrieved from Caesarea Maritima.

ISRAEL HAS OPENED its first underwater national park – and appears to have a more relaxed attitude to scuba-diving on archaeological remains than some other countries.

Israel Antiquities Authority's marine-archaeology unit hopes that visiting divers will help it to make further archaeological discoveries at the ancient Mediterranean site, according to a report in the *Times of Israel*.

The park now covers the submerged port of Caesarea Maritima, built and opened in 22 BC by the infamous King Herod, who ruled Judaea as a client monarch of the Roman Empire.

It was the largest artificial harbour ever to have been built in open sea rather than in a sheltered bay, but it had fallen into disuse within a century, and by 300 AD had collapsed, possibly as the result of a tsunami.

The rest of the city survived as a centre of Christianity but was destroyed during the Muslim conquest in the 7th century. A Roman amphitheatre, parts of a hippodrome and a palace survive.

The submerged areas cover some 20 hectares and have now been included in the existing Caesarea national park.

The archaeologists hope that additional exploration by visiting divers will complement discoveries made by local divers and enable breakthroughs to be made.

Six years ago a large number of 11th-century gold coins were discovered by divers at the site, and a merchant vessel still containing cargo has also been found there, according to the archaeologists. Earlier this year storms revealed previously unknown timber structures from the port.

Much of the remains are said to be coated in silt and algae, although the site is described as offering "rich marine life".

It is located just north of Hadera, where dusky and sandbar sharks can be seen in the winter months, as previously reported in DIVER.

ROBERT ALVARADO / PIXABAY

Modern Caesarea.

FREDA'S DIVER DISHES

The recipe below has become my new favourite sandwich-filler. Putting dulse in the mix adds protein, fibre and vitamin B12. Dulse is a nutrient-rich red algae, and you will see it regularly on your scenic dives. Harvest it by cutting up to two-thirds with a sharp pair of scissors, leaving the holdfast to grow back. Remember: you need only a little.

With summer in full swing, this is a dish that goes with all barbecue food. Your family and friends will love it. Try it also on the side with freshly caught mackerel. Food for the gods!

(Antipasta) Peppers with Sundried Tomatoes & Dulse Seaweed

Ingredients

3 peppers – red, yellow and orange; olive oil; sea salt & black pepper; 2 tsp dried basil; 2 tsp dried oregano; 1 jar drained sundried tomatoes; 20 small capers; 5g dulse seaweed

Method

Cut the peppers into thick slices and toss with olive oil in a non-stick ovenproof dish along with your herbs, salt & pepper.

Place in a heated oven at 180°C for about 25 minutes until soft and a bit crispy around the edges.

Put your dulse into a small dish, cover with just-boiled water and leave for 5 minutes. Drain and set aside.

Once the peppers are roasted add the dulse, capers and sundried tomatoes and mix together. Allow to cool completely, then tip into a large jam jar and refrigerate ready for use.

Top Tip

Whenever I get the chance I forage for wild dulse, but I always have a pack of dried dulse in the cupboard. You can buy this online from the Cornish Seaweed Company. If you don't have dulse, you can use fresh basil leaves instead. It's quite delicious too.

✷ Freda Wright is a diver and chef on British diving liveaboard mv *Salutay*. Find more of her recipes in the book *40 Dives 40 Dishes*. It costs £16 plus £1.95 postage. £1 from every sale goes to Oceans Plastics Greenpeace, salutay.co.uk

WHALE THAT KEPT COMING BACK

A SPERM WHALE dubbed 19 has been observed in the mid-Atlantic Azores archipelago 34 years after having been given the name – which, according to wildlife conservation charity Biosphere Expeditions, sets an observation record for the Atlantic and possibly the world.

19 was first identified on research expeditions in the Azores in 1987. Sperm whale tails' distinctive flukes make individuals recorded on a dataset easy to identify.

The whale was spotted again with several calves over the years. Now, after a five-year hiatus, she has been seen in the same part of the Atlantic by cetacean scientist Lisa Steiner of Whale Watch Azores.

The sightings over the years were reported by both scientists and citizen-scientists. "Personal stories are much more interesting to the general public than generalisations, leading to increased interest and support," says Steiner.

"That support is priceless when protections for animals are being considered."

NASA calls on divers' coral data

KSLOF

IT'S A SHOCKING statistic – Earth has lost more than half of its coral reefs over the past 40 years.

The rest could be gone by 2099 if conservationists prove unable to reverse the decline, but they need an accurate means of mapping their progress.

The Khaled bin Sultan Living Oceans Foundation (KSLOF)'s 10-year Global Reef Expedition was, it says, one of the biggest coral surveys ever carried out, with much of the work done by scuba-divers. Now their painstakingly gathered high-resolution data is set to be put to work through a new partnership.

The US-based environmental organisation says it is passing the entire dataset to NASA's Ames Research Centre in California's Silicon Valley to expand its coral-mapping capabilities.

The aim is to boost NASA's project to map the entire world's coral reefs so that all future changes can be tracked over time. KSLOF's data will be used with NASA's NeMO-Net neural network, which can classify recorded corals, and the Pleiades super-computer that powers it.

Meanwhile NASA's FluidCam, a new remote sensing instrument that can see under water without distortion, will allow reefs to be surveyed from drones and aircraft at the centimetre scale and in 3D.

"With this combination of tools and information, NeMO-Net's maps will become more accurate, giving researchers and environmental managers better information about what's happening to coral reefs and how to protect them at a time when they are experiencing unprecedented anthropogenic pressures," said KSLOF.

The Global Reef Expedition involved hundreds of scientists spending tens of thousands of hours under water surveying coral reefs in the Atlantic, Pacific and Indian Ocean/Red Sea. Detailed maps of about a fifth of the world's coral-reef habitats were the result.

"This is a game-changer," said KSLOF's chief scientist Sam Purkis. "NASA's new imaging technologies and super-computers dramatically change the landscape of what is possible in terms of mapping coral reefs." NASA has also been acquiring data through the tens of thousands of citizen-scientists around the world who play the interactive NeMO-Net video game.

Players identify and classify corals from 3D imagery of the reefs, using a free app, which is downloadable from nemonet.info

"At the moment, the only way to see how reefs are changing over time is through scuba-divers, which is expensive, time-consuming and can be dangerous and subject to bias," said Purkis.

"With this data in NASA's hands, now suddenly you don't have to go into the field – you can map coral reefs from space. What an uplift to conservation that becomes!"

PRINT COMPETITION IS BACK AT THE NEXT NEC DIVE SHOW

JENNY STOCK

Overall runner-up print in 2019, by Jenny Stock.

AFTER A YEAR OUT because of the coronavirus pandemic the BSoUP / **DIVER** Annual Print Competition is set to return at the upcoming Dive 2021 show.

Once again the British Society of Underwater Photographers has teamed up with **DIVER** to stage this major contest at the Dive Show at the NEC, Birmingham on 30/31 October.

Only digital entries are required, because the organisers will print their short-listed selection of images at A3 size to display for judging by Dive Show visitors.

Divers can enter up to four images in the Overseas and British categories – though no more than two per category. Entries must not have come first, second or third in any national or international competition.

There is also a Newcomers category to help BSoUP identify and encourage fresh talent.

This is reserved for divers who have been underwater photographers for fewer than three years. They cannot have previously received so much as an honourable mention, let alone a place, in any national, international or other significant online or print competition.

Visitors vote for their favourite images in both the Overseas and British categories, and those winners and the Best Newcomer receive trophies.

The best of show is selected by an independent panel of judges and receives the Overall Winner's trophy.

Entries can be portrait or landscape format but must fit within a 420 x 297mm window (4724 x 3508 pixels at 300dpi) to leave space for a border and caption. Maximum file size is 4MB.

As with all BSoUP competitions, copyright remains with the photographer, though BSoUP and **DIVER** reserve the right to display images in the context of the competition.

Winners will be announced live at the BSoUP online meeting after the event, to which entrants will be invited, and their images published on the society's Facebook page and in **DIVER**.

Entry fees to cover printing costs are £15 (£10 for BSoUP members), and the closing date is 19 September. Go to bsoup.org.uk/competitions

Ancient trees puzzle divers

BALD CYPRESS trees became established in swampland in what is now the northern Gulf of Mexico during the last Ice Age, before an unknown cataclysmic event buried the ancient forests.

Now scuba-divers have been recovering the trees from sediment beneath the Gulf waters – and finding it smelling as fragrant as when it was buried in the Pleistocene era.

In 2004 Hurricane Ivan cut across the region and exposed the ancient forest, say researchers at Louisiana State University (LSU).

They dived to find the tree stumps at depths of around 18m, eight miles off the Alabama coast. "We were surprised to find this cypress wood intact, because wood normally decomposes in the ocean from shipworms and bacteria," said marine geologist and paleoclimatologist associate professor Kristine DeLong of the LSU's Department of Geography & Anthropology.

Her grandfather had logged cypress trees in Florida and she reported that the exhumed wood "smells like freshly cut cypress".

Bald cypress (*Taxodium distichum*) is established throughout the south-eastern USA and was highly prized in the 19th century for its resistance to decomposition, water rot and insects. The species is now protected.

DeLong and her team began diving the site in 2013 and recovered the first cypress specimens for analysis. These proved too old for radiocarbon-dating, but using other methods it was established that the forest had originated in the early part of the last Ice Age, 42-74,000 years ago.

Bald cypress tree. BATSV

The divers went on to collect sediment cores from the area. They found sand and seashells in the upper layers but also organic peat with roots and leaves towards the bottom of the tubes.

"As a marine geologist, we don't see this type of sediment," said DeLong. "What was interesting was finding seeds from St John's wort, button bush and rose mallow, which are native plants we can find on land today."

The team has been collaborating with terrestrial tree and plant experts but remain puzzled by the survival of the specimens, even though the low oxygen content in swamp waters might have been expected to halt their decomposition.

One theory is that the sea level rose suddenly, with the flood plain burying the cypress forest. Another is that a melting ice-sheet caused a sudden influx of water in the Mississippi and other nearby rivers that pushed sediment over the trees.

From 18,000 years ago as the ice melted sea levels would have risen and further flooded the area.

The researchers believe there could be other ancient cypress forests submerged along the Gulf Coast.

Their findings were published recently in the journal *BOREAS*.

A diver inspects ancient cypress remains.

The timber 'smells like freshly cut cypress'. LSU

Great white sharks are doing well off California. ELIAS LEVY

California's great white shark population boosted

DIVERS ASSOCIATE great white shark encounters with northern Mexico and southern California, but numbers of the sharks spotted in the north of the state have risen by more than a third over the past decade, according to a recently published study.

Researchers monitoring the "Red Triangle" population located between Monterey Bay, the Farallon Islands and Bodega Bay say that the increase of as much as 35% indicates gradual improvements in Pacific Ocean conditions.

Between 218 and 313 adult and sub-adults are estimated to be based in the area. Sub-adults are immature sharks but big enough to eat large marine mammals.

"A healthy population of white sharks means there are healthy populations of the sea-lions and elephant seals they eat," Montana State University marine ecologist Paul Kanive, the study's lead author, told the *San Jose Mercury News*.

"And that means that the lower levels on the food-chain, like fish, are healthy enough to support the marine mammals."

The shark population is however unevenly balanced between the sexes, with 60% being male.

Researchers at Stanford University and Monterey Bay Aquarium tag and track the sharks electronically and have collaborated with other scientists to photograph individuals from above and below the surface and compile a database.

The latest study, which began in 2011, is based on more than 2500 hours of baiting the water from boats and capturing 1500-plus photographs focusing on the sharks' distinctive dorsal fins.

The previous study, published in 2011, had provided an estimated population range of 130-275 sharks.

The hike in numbers is attributed to the 1972 Marine Mammal Protection Act, which ended the hunting of shark prey such as seals and sea-lions; and two state laws, the first in 1990 ending gillnet fishing and the second in 1994 outlawing the killing of great white sharks within three miles of the coast.

Great whites stay in the Red Triangle between September and February, but then become vulnerable to fisheries when they make the 3000-mile round trip to the "Shark Cafe," area between Hawaii and Mexico, probably to mate. The study is published in *Biological Conservation*.

In February this year Monterey Bay Aquarium reported that increasing numbers of the juvenile white sharks that are usually found further south were turning up in the Red Triangle.

The tagging data obtained over the past 20 years indicated that climate change was altering the sharks' behaviour, forcing them to move to cooler water.

Recent temperature extremes – Monterey Bay seawater heated to as much as 21°C against an average of 13°C last summer – had been accompanied by unprecedented numbers of juveniles, and a related fall in populations of their prey such as salmon and sea-otters.

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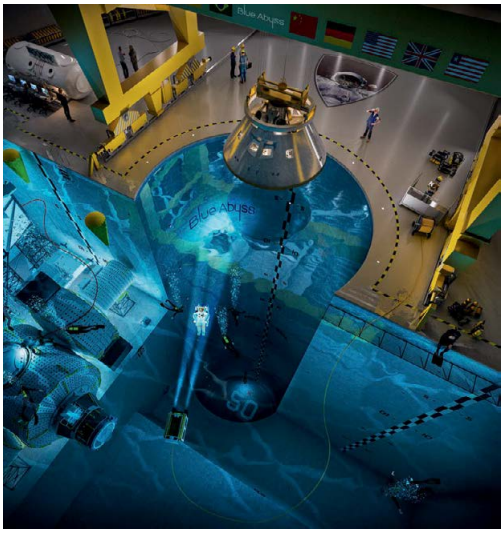
HOLE LOTTA AMBITION

It's the Great British Hole that keeps moving about but never seems to get dug. In 2015 ex-military IT consultant and dive-instructor John Vickers announced his ambitious plan to build the world's largest, deepest indoor dive-centre – in the UK.

We've seen deep pools for divers abroad: Nemo 33 in Belgium, Y-40 in Italy and the 45m Deepspot in Poland.

Puddles, compared to the projected Blue Abyss, at 50m deep, 2000sq m at the surface and with a 42,000cu m volume.

The University of Essex in Colchester, near Vickers' base, was originally to provide the location. His crowdfunding campaign raised £13,578 – a modest start.



BLUE ABYSS

Four years on, it was announced that Merseyside docklands would now be home for Blue Abyss. Planning approval was imminent and Andy Torbet was on board as diving consultant.

Not sure what happened, but CEO Vickers recently announced that the now-£165 million facility is to be built at Cornwall Airport, Newquay, designed by Gherkin architect Robin Partington, and with astronaut Tim Peake waving the flags.

With a "substantial international equity fund" to hand, if planning permission is granted and our government agrees to underwrite the venture it could be open as soon as 2023.

Cornwall is "not the first location we have considered" but it "fits Blue Abyss like a glove" says the CEO, dismissing previous rejections as being for "petty reasons".

Passionate about "connecting our marine evolutionary heritage and future space exploration", Vickers aims to open his Abyss for testing of underwater technology and training of astronauts.

It will also cater for recreational diver training, we think, though that's unlikely to be seen as the big money-spinner. Looking forward to seeing that first sod dug.

Tickled to death

A TikTok "funny video" that reached 100 million people with time on their hands showed a baby sting ray lying on its back on a boat-deck having its tummy rubbed.

It was loving it, curling its little wings and smiling adorably. Bless.

The person who posted this and added baby laughter over the top would have known, but perhaps not all TikTok users realise, that a ray's eye-like nostrils and upcurved mouth are not a smiley face, any more than a dolphin's habitual expression indicates never-ending joy.

Of course, what that little ray was actually doing was suffocating.

It's always feeding time at TikTok.

Majestic gesture

Have I got this right? The gist of headlines in June was that the seabed off the West Sussex coast was set to be "leased from the Queen" by Adur and Worthing councils, which were looking to protect and restore its marine habitats.

If the plan worked, it could be extended throughout the county to create a Sussex Bay marine park. Sounds like a great idea.

Her Majesty isn't sealing the deal in person, of course. The Crown Estate "manages" the whole royal seabed within the 12-mile limit on her behalf, so it will graciously consider allowing local councils, most of which were already financially strapped well before the coronavirus pandemic, to invest in putting right the damage that has been done on its watch.

Its right royal management has included allowing trawlers to drag their nets through the once-flourishing kelp forest that not only locked up damaging carbon but hosted seahorses, cuttlefish, crustaceans and many prized fish.

It managed its responsibilities so well that 90% of that habitat has now been destroyed. I salute the councils for taking this initiative, but just wonder how much, after years of ruling the Sussex waves, the Crown stands to make on the deal.

Ruling the waves

Despite all its years of outstanding multi-media endeavour, I'll admit that my first thought when I hear the words "National Geographic" is still of well-thumbed yellow magazines in dental waiting rooms.

I knew it was influential but I had no idea that it was within the National Geographic Society's gift to decide how many oceans we have. Apparently it is.

On World Oceans Day (8 June) the NGS pronounced that because the Southern Ocean around Antarctica has its own circling currents and thus "ecological separation", it has accepted it as being a fully fledged ocean in its own right.

This brings the total with the Atlantic, Pacific, Indian and Arctic to five. The mighty map-maker has spoken, and we bow to its authority. Though I still quite like that old "one ocean" concept.

Bobtails in space

C FRAZEE & M MCFALL-NGAI

I've encountered multi-coloured bobtail squid on Indo-Pacific night-dives and, tiny and beautifully marked as they are, they never fail to charm.

And now they've gone into space: 128 *Euprymna scolopes* babies – so even smaller than usual at about 3mm initially – on the International Space Station.

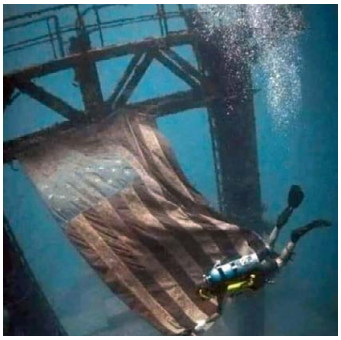
Bobtails glow in the dark thanks to their bioluminescent bacteria, but they aren't born with it; they acquire it from the ocean. On the ISS, the crew will introduce the bacteria to the squid to find out which genes they use in this process.

Why? They want to know how human gut and immune-system microbiomes will cope when we head out to colonise deep space with our intrepid captains Bezos, Branson and Musk. Go bobtails.

Flagging fakery

Wreck experts were surprised to see images on social media purporting to show divers attaching an American flag to the USS *Arizona* battleship to commemorate the Pearl Harbor attack that brought the States into WW2.

The text claimed that the flag was replaced every three years, but the



National Park Service hotly denied the story and said the footage was not taken at the Pearl Harbor Memorial in May.

In fact it came from Florida Keys diver favourite the USNS *Gen Hoyt S Vandenberg*. The troop-carrier was sunk in 2009 and divers placed a repurposed 9/11 memorial flag on it five years later, where it has provided oft-taken photo opportunities.

Well, one warship wreck and one Stars & Stripes look much like another, don't they?

Oldest sharkbites

The bones of a man believed to be the world's oldest-known shark victim show signs of nearly 800 bite-wounds.

The attack occurred 3000-plus years ago in Japan's Seto Inland Sea. None of the deep, serrated injuries to arms, legs, chest and abdomen showed any signs of healing, so they came in the last moments of the man now known as Tsukumo No 24.

The skeleton was found in a coastal burial site a century ago, the left hand and right leg missing, and the left leg inverted on top of the body. But only now have Oxford archaeologists J Alyssa White and Rick Schulting been able to explain that the man had probably been fishing or shellfish-diving with others when he was attacked, because his body must have been recovered relatively quickly.

The marks suggest that either a tiger or great white shark was responsible. But I was pleased that J and Rick put the attack in sensible context: "Humans have a long, shared history with sharks, and this is one of the relatively rare instances when humans were on their menu and not the reverse," they say. Quite so.

TO BE BASED AT SEA OR ON LAND?

TCI TWO WAYS

RICHARD CONDLYFFE chooses the liveaboard route to explore the Turks & Caicos Islands – after which we look at a shore-based alternative

AS WITH MANY PEOPLE, 2020 forced me to think differently about my short-term diving options, and to incorporate more local diving. But as the year progressed my attention turned to those countries that were starting to open up, and with which restrictions and stipulations

Was Covid testing required for entry? Was quarantine required on arrival or return? From which countries of origin was travel permitted? Were convenient flights available? What was the local infection rate?

Turks & Caicos Islands turned out to be my lead option. I had never been there before, but I understood it to offer some of the Caribbean's best wall-diving and good opportunities for shark encounters.

Something else that made TCI appealing was the fact that a negative Covid PCR test was required with a sample taken within five days of arrival.

This gave a little more breathing space to get test results in time, versus the three days mandated by many countries.

Additionally, travel insurance that included coverage for possible Covid-related needs was mandatory.

There were good deals to be had, and the *Turks & Caicos Aggressor II*, running a rare 10-day trip, was the charter I chose. Flight options were limited, but being US-based I could use Delta or American.

Then, eight days before departure, I went online to check that I had selected my seats – and the alarm bells went off!

My flight from Delta's Atlanta hub to the island of Providenciales had been cancelled and I'd received no notification!

Thank goodness I'd gone online at that time, or I'd have gone to check in with no flight to board!

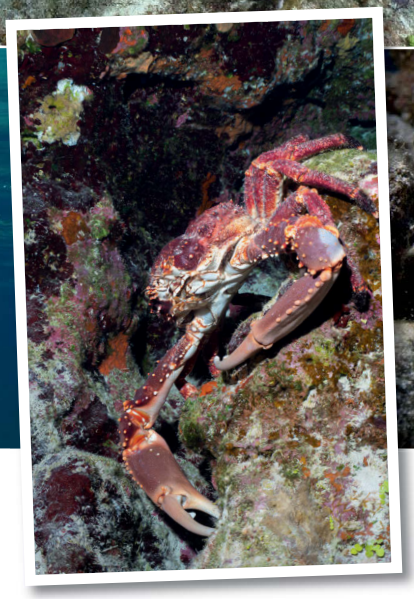
Fortunately, I was able to rebook on American Airlines. My lesson was that in these fluid times changes are frequent, and it's well worth keeping an active eye on that ever-changing environment!

Two days before my flight I uploaded my negative Covid test result and proof of insurance to the TCI government travel website and in an hour had received my authorisation to travel.

Armed with my hand sanitiser, a supply of face masks and a face-shield that I had procured for additional aircraft peace of mind, I was ready to go.

On entering the Provo customs hall my hands were sprayed with disinfectant. Everyone stood in the queue, socially

Pictured: Atlantic trumpetfish blending in.



distanced, for temperature-taking and immigration clearance. All very smooth and efficient.

Turks & Caicos is part of the British West Indies, located south-east of the Bahamas. Brilliant turquoise water surrounds its 40 islands.

Most of the dive-sites consist of a steep wall starting 12-18m deep, with ample exploration opportunities around sandy flats and coral-heads above the wall.

With multiple sites around multiple islands, our experienced liveaboard captain Amanda could select those that offered shelter from swells generated by a busy season of Atlantic tropical storms.

I boarded the *Turks & Caicos Aggressor II* and my bags were sprayed to sanitise them while I washed my hands at a sink set up outside.

On the yacht, hand-sanitising dispensers were located in many of the common areas as well as in guest-rooms. Social distancing and mask use were also encouraged.

At meal-times the crew all wore masks and food was plated by the crew in place of the usual self-service buffet.

Above, clockwise from top: Caribbean reef shark hunting at night; mottled jawfish resting his jaw before tending the next batch of eggs; channel clinging crab; green turtle dives back down to the reef.

Below: The popular Dome dive-site.

Diving got underway, with two days at Provo's north-west corner. With creatures on each dive ranging from the very small to the large there was plenty to satisfy both macro and wide-angle photographers.

The crew were patient and helpful with my pre-dive questions to determine lens selection, and with at least two dives at each site we had the opportunity to alternate between wide and macro.

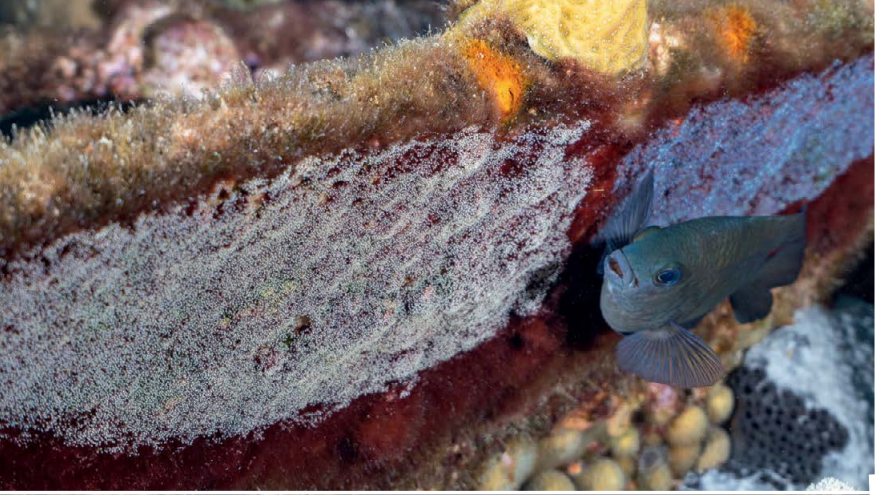
Caribbean reef sharks could be seen patrolling the colourful wall in their back-and-forth figure-of-eight pattern. Large channel clinging crabs hid under the wall's overhangs, waiting for night to fall.

Away from the wall, sandy flats were home to fields of garden eels, while fine rubble supported numerous yellowhead jawfish with holes to dance above and into which to quickly retreat when divers' bubbles came uncomfortably close.

MY FAVOURITE dive-site at North-west Point was the Dome. This man-made structure, now partially collapsed, was built for a 1990s French TV game show called *Le Tresor de Pago*.

One of the challenges meant freediving into the underwater dome, receiving air from a scuba tank and collecting pearls before returning to the surface.

The show was cancelled after several contestants sustained lung over-expansion injuries, leaving the dome



for divers to enjoy in perpetuity.

Significant coral growth adorns the dome and supports a great variety of life. A portion of the structure can be swum through. Highlights on afternoon dives included a damselfish fanning eggs painted across a section of the structure.

The strobe-positioning challenge created by a pea-sized juvenile trunkfish hiding deep in crevices between a series of orange tube sponges also occupied me for some time. At night the action changed. As soon as we descended to the Dome our lights attracted black jack that hoped they would help them in their hunting efforts.

Clockwise from top left: A longfin damselfish aerates a mosaic of eggs; juvenile trunkfish hides between tube sponges; orange ball corallimorph; a rare fingerprint cyphoma; also rare – a pink-circled simnia; spinyhead blenny; a longsnout seahorse.

Right: Nurse sharks hunt at French Cay.

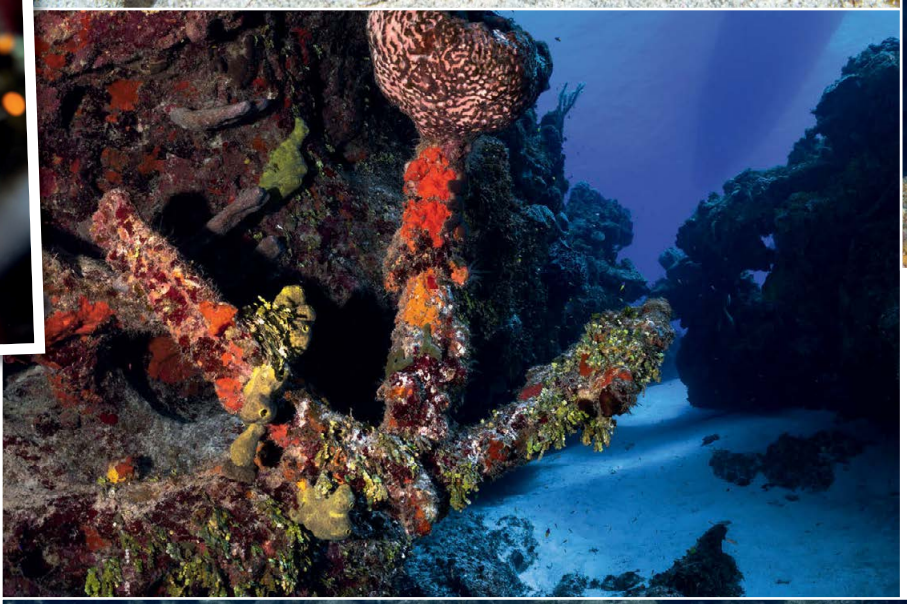
This meant I had to be careful not to hover my light on any exposed fish for too long and draw the hunters attention.

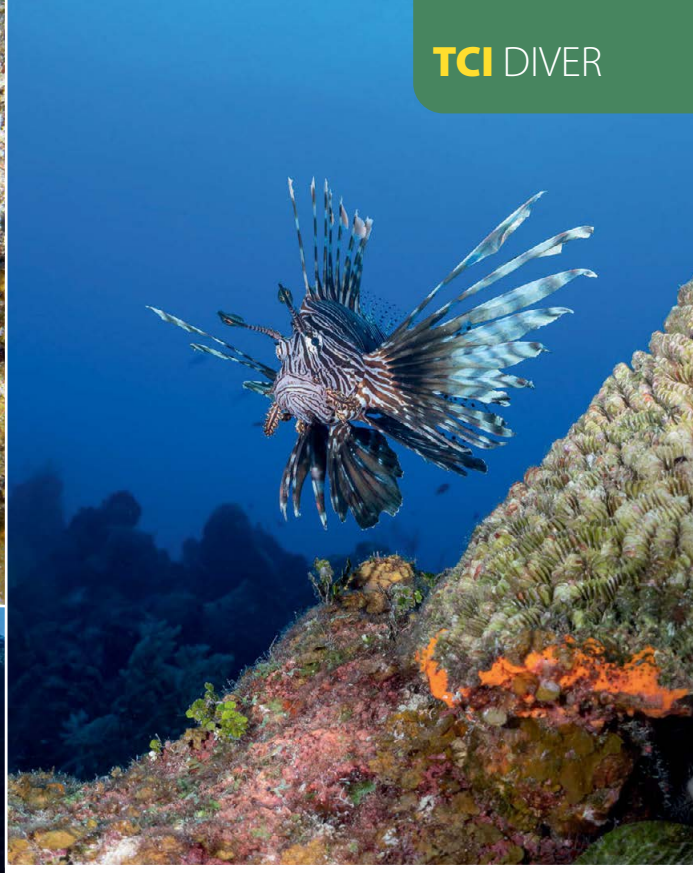
While scanning crannies with my light I came across a free-swimming spotted moray eel out to catch its dinner.

I followed it for a while and in the blink of an eye saw it grab an unaware goatfish.

With the goatfish only half-swallowed, in swooped a black jack to pull the fish from the jaws of the moray!

My first thought was to feel frustrated for the eel, but back on the boat I was reminded to spare a thought for the goatfish, which literally got eaten twice!





Clockwise from top left: Shortnose batfish; a lionfish hangs above the wall; eagle ray; coral-encrusted anchor thought to come from a centuries-old Spanish galleon.

WEST CAICOS was our next stop for three days. By now all the guests had settled into the Covid-era routines, which also included observing the crew measure nitrox levels and each guest then signing with his or her own pen.

West Caicos provided more impressive wall-dives as well as a great variety of creatures in and around sandy flats and coral heads.

The Boat Cove site yielded a variety of diverse colourful subjects. A tiny spinyhead blenny allowed me to clamp a super macro converter onto my port then be my model for a few minutes before tiring of my presence.

At night the relatively uncommon orange ball corallimorph extended its nearly transparent tentacles outwards, displaying its orange tips like bright lanterns.

At Elephant Ear Canyon, dive-guide Kelly celebrated excitedly after finding a shortnose batfish. I was happy to make my own contribution to the dive, looking up at just the right time to see a squadron of at least 20 eagle rays fly gracefully by.

I screamed as loud as I could through my regulator to alert the rest of the group. With a macro lens on my camera, all I could do was watch the spectacle in awe.

Ten seconds later, they were gone. 29°C water is very warm for eagle rays, and the guides had been surprised at the number of recent sightings. 2020!

The boat moved on to French Cay, renowned as a sharky destination and living up to the billing. The highlight site was certainly Rock 'n' Roll.

In daytime the wall provided diverse attractions, For me that included finding lionfish perched on top of a coral head, making for pleasing images against the ☛

blue backdrop. More eagle rays cruised past too – though only three this time!

At night the shark action began, with nurse sharks attracted by both our boat- and dive-lights. Nurses hunt by pushing their mouths, often very forcefully, into any spot where they think fish might be hiding, and using powerful suction to vacuum up whatever prey they find.

Before Covid lockdown the dive-guides were used to seeing nurse sharks only on these night dives, but recently several reef sharks had joined in – not to practise the same hunting technique, but likely excited by the action and to mop up any leftovers.

This made for great footage to be captured by the group and dive-guide / video-pro Sarah.

AN ADDITIONAL BENEFIT of this extended charter was the opportunity to explore some rarely visited dive-sites. At French Cay these were Jules Junction and Nightingale.

The added variety was engaging and created optimism of finding different critters. One such was a tiny elongated mollusc so slim that it appeared painted on to its host; the pink-circled simnia, spotted by eagle-eyed Kelly.

Ten days went by, seeming more like seven. After two final dives at Northwest Point on our way back to the Turtle Bay Marina home base, diving was complete and my first international trip of the Covid era was drawing to a close.

As well as the diving, I had enjoyed the escape from the daily news cycle.

The Turks & Caicos authorities, the airline and the Aggressor staff did everything they should and could to support a safe travel experience. I needed to be comfortable with the circumstances, and flexible with the potential for late changes to my plans. TCI proved an excellent all-round destination to which I would certainly return.

BEACH LAUNCH

Beaches / Sandals is more of a fun-for-all-the-family route to Caribbean diving – PENELOPE GRANYCOME sampled it just before the pandemic struck

DESCENDING INTO warm azure water, a hit of diving endorphins kicked in, fuelled by an exhilarating 50-minute boat-ride to West Caicos in the Caribbean sunshine.

Laughter rippled through the salty air as we prepped our gear and, as on the first dive of any trip, I experienced a slightly giddy out-of-body feeling.

I grinned into my regulator as reef sharks curiously approached. The water temperature was 28°C and it was pre-pandemic January 2020. The cold dark nights of London and a personally testing start to the year evaporated into the ocean along with my slow exhalations.

Looking back now, after collectively and individually facing some of the toughest months we've ever known, and our yearning to escape at odds with uncertainty about when and where that might be possible, I still describe the Turks & Caicos Islands as a world-class diving contender.

I stayed at Beaches Turks & Caicos Villages & Spa Resort on the north coast of Providenciales. Set in Grace Bay, 12 miles of sweeping white sand, it's a place to unwind and contemplate diving as you settle in, rum cocktail in hand.

Wall-dives are always a huge draw for me, having dived so many on the Red Sea's outer islands, and those in TCI are no exception. Covered in corals, sponges and gorgonians and dropping away to considerable depths below, they provide the chance of seeing bigger animals passing in the blue while being able to turn your head in towards the crustaceans and critters that populate rocky caves and coral gardens – a double treat.

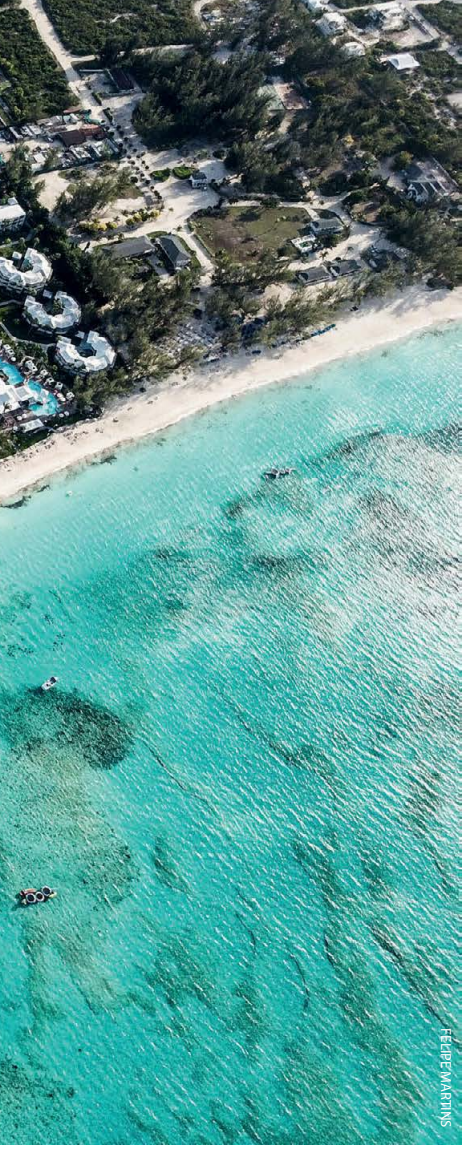
Our first two dives at West Caicos were packed with marine life: bold Caribbean reef sharks, a super-relaxed turtle, one huge lobster hiding away in his cave, scorpionfish and an eagle ray.

The plethora of sites here include such delightful names as Highway To Heaven, Elephant Ear and Mushroom, all ranked according to whether the diver is "novice", "advanced" or "master".

There are no dives directly from the resort. They are all accessed by Beaches' twin-diesel Newton dive-boats, which are comfortable and have 5m diving platforms. Fresh fruit, pastries and limitless water were welcome after dives,

Above: Beaches Turks & Caicos resort is set in Grace Bay, Provo.

Left: Nassau grouper.


FELIPE MARTINS

as was the provision of decent heads!

For certified divers, everything is included in the original resort booking. This means all dive-gear too, although I took my own, unable to be parted from it.

Only A-clamp tanks were available so I took along a yoke converter for my DIN regs. The Caribbean/Atlantic tends to follow US standards, with weights on the boats in imperial measures, and the dive-guides refer to depth in feet rather than metres, so you need to make a few mental adjustments.

OUR SECOND DIVE of the first day, at Driveway, saw one of our dive-guides spear a lionfish.

No friend to Caribbean waters and a menace as an invasive and voracious predator, lionfish harm reef systems by competing for space with overfished native stocks, and killing off vital species.

So nothing unusual about the lionfish-spearing these days, but we were gripped to watch as a reef shark swam up and seized the dead fish, chowing down with enthusiasm.

Unfortunately such zeal on the part of the sharks extends only to dead lionfish, because they're too lazy to bother hunting them while alive. They leave the hard work to the experienced dive-guides.

There is no deliberate shark-feeding to entice the sharks, but those in TCI seemed naturally inquisitive, approaching close whether a dead lionfish beckoned or not.


FELIPE MARTINS

Above: Grey reef shark.

Below: Penelope gets in the mood at the dive-centre.

Teaching sharks to eat live ones has been attempted, but so far to no avail!

Another lionfish that we watched speared ended up in the pan of one of the resort's leading chefs, to then melt on our tongues, its delicate flavour enhanced by a sublime buttery sauce. DIY catching or preparing of these venomous fish without experience is not recommended, because they require expertise in handling and removing the dangerous spine.

An accidental sting above or below water will be very painful, and while most people recover without complications, the worst-case scenario is anaphylactic shock and/or cardiac arrest.

Shark snacking included, this dive was a dream. We descended over a sandy area with scattered coral-heads leading into a sand-chute and passed down through the reef to a ledge at around 25-30m, where the wall drops vertically.

As with many sites at West Caicos, all along the wall divers find black coral and purple tube sponges. With gorgeous light catching the hypnotic sheen on the sharks' bodies as they glide past, and dark walls rising from the deep into the bluest blue, drama is guaranteed.

THE NEXT DAY brought further wall-dives at Northwest Point, at the Chimney and Eel Garden. I didn't want to get out!

My group consisted of experienced divers who could stay deeper for longer, but I found that depths and dive-times were generally conservative because of the numbers of new divers the resort trains.

This makes it a good place for experienced divers to consider if they want to introduce family or friends to diving. Beaches/Sandals offers several courses tailored to different levels of experience from the PADI dive-centre overlooking Grace Bay Beach.

E-learning carried out before travelling allows more time in the water and less in the classroom.

PADI's partnership with Sandals Resorts International began in 1997 and, across both Beaches and Sandals, it says the 100,000-plus certifications issued are "a monumental accomplishment".

Beaches' watersports manager Mark Healey told me of the centre's Green Star Award for dedication to conservation and described it as one of the top five dive operations in the Western Hemisphere.

No issue goes unresolved, he claimed, and I can testify to this, having rather foolishly locked myself out of my computer after my first 28m dive.

I had accidentally set it in Altitude mode and, although I knew I was safe, had strayed from its projected deco ceilings. It certainly let me know about

my transgression, but one of the pro guides kindly lent me his personal spare.

Heading back out to West Caicos, we were blessed with a humpback whale sighting.

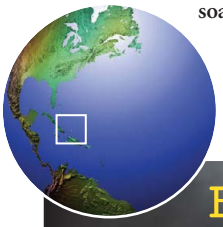
There was much excitement on the bridge and bow as we revelled in our luck.

Humpbacks migrate annually in the winter season from the northern Atlantic to warmer Caribbean waters to give birth and mate, and are often spotted in deep water in the Turks Island Passage near Grand Turk and Salt Cay.

ANOTHER RELAXING dive saw us drop to about 27m via a small crack and up a long wall before returning to the boat for refreshments and a surface interval being entertained by playful dolphins. Divers jumped back in to swim and dive with them in the extraordinarily blue water.

The diving is not particularly difficult, but the abundance and wide range of sites meant that they never felt limited.

It was good to be in the zone without the task-loading that can occur in cold UK waters or on more strenuous liveaboard trips – this is a place to let your skill-set kick in and simply soak up the relaxation.



Our last dive of the short trip, at a site called the Gully, was an exploration of a beautiful wall shallowing up to where a huge turtle and barracuda hung out, then a rainy boat passage back to relax before a fabulous night out at one of the glam restaurants.

The deal is that, whether newly certified or seasoned, guests can enjoy up to two free dives a day as part of a Sandals or Beaches holiday and any subsequent stays. Beaches also has two locations in Jamaica while Sandals, set up to offer 5*

Top and above: All the dive-sites are a boat-ride away from the resort.

pampering, provides diving on that island as well as in the Bahamas, Grenada, St Lucia, Barbados and Antigua.

With a lot of watersports options beside scuba, guests are invited to combine it with canoeing/kayaking, sailing, windsurfing, catamarans, waterskiing, paddle- or knee-boarding.

As with so many dive operators, throughout the Covid pandemic dive-staff across the resorts have been trained in the stringent safety and security protocols required to keep guests safe.

I was there just before all the sanitisation and social distancing procedures had to be imposed and felt the genuine cheer of everyone enjoying the diving and the array of restaurant choices and free bars!

With so many options amid all this wonderful Caribbean hospitality, I can't wait to dive there again.

FACTFILE

GETTING THERE ▸▸ BA operates flights from London Gatwick to Providenciales (PLS) twice a week. Several US-based carriers operate flights connecting through the US mainland.

DIVING & ACCOMMODATION ▸▸ *Turks and Caicos Aggressor II* operates mid-April to mid-January (from mid-Jan to mid-April it moves to Silver Bank near the Dominican Republic for humpback whale snorkelling, aggressor.com. Land-based operators such as Beaches Turks and Caicos Village & Spa provide diving options mainly around Provo and French Cay, beaches.co.uk

WHEN TO GO ▸▸ Year-round diving. Water temperature is 29°C in summer and 26°C in winter.

MONEY ▸▸ US dollar

HEALTH ▸▸ Hyperbaric chamber in Provo.

PRICES ▸▸ Return flights from London with Delta from £590. 2021 Aggressor rate for a 7-day charter is US $3195. In September 10-day charters are offered for the same price. Seven nights all-inclusive at Beaches TCI in a French Village luxury room king, including return flights and transfers, costs from £2695pp (price valid for travel on select dates between 1-20 May, 2022 if booked before 17 August, 2021).

VISITOR INFORMATION ▸▸ visittci.com

THE HAWAIIAN SNORKELLING DEATHS MYSTERY


JON ROIG

Detective work following a spate of peculiar fatalities in the Pacific off Hawaii suggests that a new risk-awareness – and getting the design of the humble snorkel tube spot-on – could be a matter of life or death. STEVE WEINMAN reports

"THE WATER WAS at high tide and choppy. About 50m offshore, I was struggling to catch my breath. I didn't think I could make it back, so held onto a post on the reef. I was unable to call out or wave.

"I started to swim back in. My arms were leaden; I couldn't freestyle. My arms were completely dead.

"At 10 metres from shore my heart was pounding in my ears so loudly it was deafening. I felt I was about to die.

"A wave pushed me to shore. A woman on the beach noticed my distress and called for help. The beach attendant applied oxygen, which revived me.

"When it was removed, I became unconscious. I was taken to the hospital."

We'll hear more from this experienced female snorkeller and strong swimmer later. She was one of the lucky ones.

After a time, the sheer numbers of people drowning while snorkelling off the beaches of Hawaii could no longer be dismissed as "just one of those things".

The circumstances of so many of these deaths – an apparently quiet surrender to the sea, often in calm, unthreatening, warm waters close to shore, soon after entry and with no hint of marine-life involvement – were distinctly odd.

In many cases the victims' demise would not have been noted immediately by onlookers. With no signs of distress, they would be found face-down at the surface, as if still snorkelling but hovering motionless to take in the view below.

Medical examination would show that they had drowned – but how could that have happened?

Many of the victims were middle-aged or elderly, defined as "over-50s". Often they were male, but not necessarily unfit.

Pre-existing age-related medical conditions might have explained some of the cases, but by no means all of them.

Another thing: the vast majority of the victims were visitors to Hawaii.

Islanders were inclined to put the high death-toll down to factors such as anxiety, panic, fatigue, inexperience or lack of familiarity with ocean conditions, equipment or technique. Yet in at least a quarter of the fatalities, the snorkellers had no shortage of experience.

The deaths also coincided with a trend towards use of full-face snorkelling masks, the sort that came in useful when repurposed during the Covid pandemic to help aspirate hospitalised patients.

As a result, in Hawaii these designs were soon being treated with suspicion.

Yet many of the victims had been using traditional snorkelling tubes or, perhaps, the novelty variants that have appeared over time as manufacturers jostle to gain a marketing edge.

Above: Snorkeller in Kona, Hawaii.

FIVE YEARS AGO, a local press report crystallised what was going on. Deaths among snorkelling tourists in Hawaii were 13 times the national average and 10 times those of residents, it stated.

But could the hardly-rocket-science skill of swimming while breathing through a tube really be so far beyond tourists?

Over the years Hawaiians must have grown wearily accustomed to reading news reports of individual snorkelling deaths, but looked at collectively the figures were stark. Between 2009 and 2018 there had been 206 snorkelling deaths – 189 of them tourists.

Compare that with the fatalities in ☛

that period of scuba-divers (28), freedivers (46) or swimmers (80).

In October 2017, at the behest of the state health department, a sub-committee was formed to address the growing public concern. This represented Hawaii's health, tourism and emergency services authorities and the state medical examiner's office, and it took a deep dive into the problem.

Pulmonologist Dr Philip Foti has been practising in Hawaii for more than 50 years. Appointed principal investigator, he and the rest of the team prepared a preliminary report called the *Snorkel Safety Study*. It was published, though the full report is still awaiting peer review.

The study makes compelling reading, because it points the finger of suspicion firmly at a condition not previously associated with snorkellers, and one that is contentious among scuba-divers – immersion pulmonary oedema or IPO, also known as "drowning from the inside".

Above, left to right: Principal investigator Dr Philip R Foti MD; project manager Carol Wilcox, herself a snorkel-drowning survivor.

Below: Snorkellers in Hawaii, one wearing a full-face mask.

IN THE REPORT IPO is referred to as ROPE – rapid onset pulmonary edema – or SIROPE (snorkelling-induced ROPE), but what we're talking about is essentially the same – infusion not of seawater but of bodily fluid into the lungs, reducing their capacity to deliver oxygen to the blood.

It's an insidious process. The report describes it as quick and quiet respiratory impairment that can be triggered by snorkelling.

In the UK IPOs have been linked with a number of unexplained scuba-diving deaths, and have become a bone of contention in insurance claims where the exact cause of a diver's death is disputed.

IPOs among scuba-divers have also been linked with over-hydration – again controversial for a sport in which good hydration is advocated as a primary precaution against decompression illness.

Although initially the compilers of the Hawaiian report could find only a single documented example of a suggested snorkelling IPO death (from 2017), they are now in no doubt that pulmonary oedema is the main explanation for the unacceptable numbers of snorkellers ending their days in the islands.

"This phenomenon, while identified in other activities such as scuba and swimming, has not before been associated with snorkelling, yet the evidence is indisputable," the study concludes. "It is borne out by physiology, case studies, medical records and first-hand accounts."

IT IS POSSIBLE for IPO victims to be rescued, if the typical sequence of symptoms is recognised early enough.

These progress through sudden shortness of breath through weakness, loss of strength, confusion/sense of doom and unconsciousness to death.

Dr Foti and his colleagues heard first-hand about the experiences of a number of survivors who had been rescued or, realising their predicament, had managed to self-rescue. By March this year there had been 90 responses and they're still coming in and being considered.

Relevant was the fact that 75 of these snorkellers had been out of their depth when they got into difficulties, and 70% found themselves struggling within 20 minutes of starting their swim – making fatigue or cold less likely to be factors.

The report describes hypoxia induced by an IPO as "the cause of some, probably most, snorkel-related fatal and near-fatal drownings". But why should snorkellers be susceptible to this condition?

The team reckon two major factors are at work in tandem here: the act of lying horizontal in the water, so that the effect of water pressure exerted on the chest needs to be overcome in order to breathe; and resistance to inhalation created by breathing through a resistant narrow tube, which they say can result in "negative transthoracic pressure".

Lying prone redistributes intravascular blood, with 500-700ml accumulating in front of the heart and lungs and increasing ambient pressure, say the experts. And even using the least-resistant snorkels results in an additional 3-5cm of negative water pressure per breath.

Snorkels should in theory offer relatively minor additional resistance, but substantial increases in required negative pressures can occur without snorkellers realising it, especially if they start finning that bit harder.

FOR THE STUDY 49 snorkels – 16 simple tubes, 29 tubes with additional wet/dry apparatus and four full-face masks – were tested for resistance using an invention of Dr Foti's, a Snorkel Airway Resistance Analyser (SARA).

Generally, the simpler the snorkel design the less resistance it generated, and the more exertion on the snorkeller's part, the greater was the resistance.

The conclusion seems to be that snorkellers need to be selective when choosing a breathing device, just as scuba-divers need to take care when picking a regulator. However, as the researchers soon found, trying to determine the resistance of a product through a cursory visual inspection proved unreliable.

It could be the size of the tube at the narrowest point, at the bend near the mouthpiece or the design of a valve that caused the problem.

The study stressed that, based solely on these experiments, full-face snorkelling masks had no inherent advantage or disadvantage in terms of resistance.

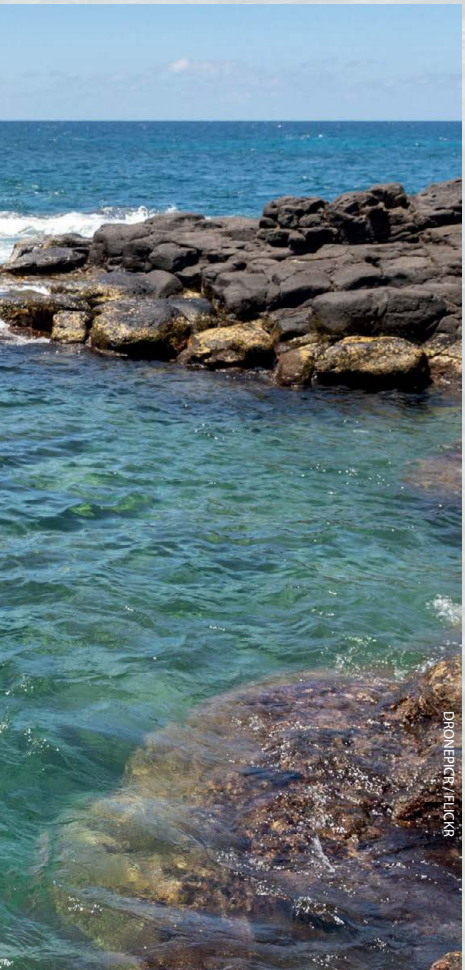
That wasn't to say they were off the hook. The researchers drew attention to other drawbacks inherent in full-face designs, and there would seem to be enough of these to make potential purchasers at least pause for thought.

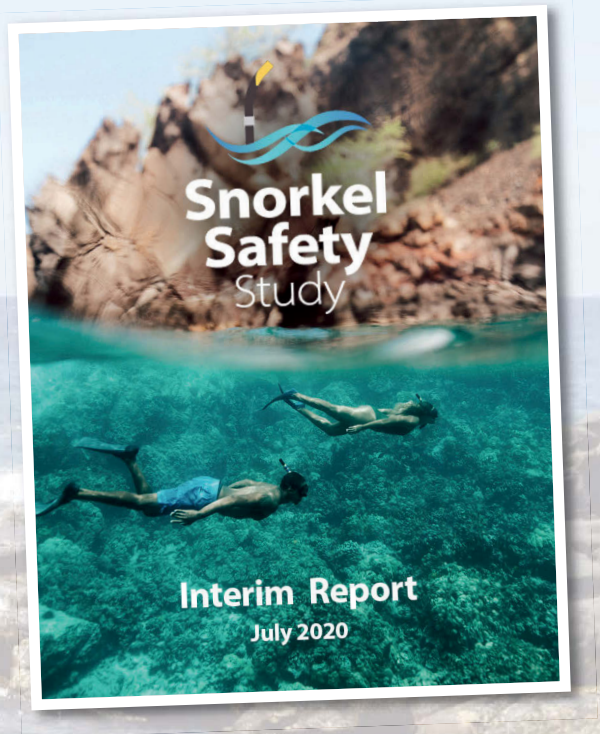
They couldn't be removed easily in an emergency, including those with "quick-release" features; the mouthpiece couldn't be spat out; water couldn't be cleared from the tube by blowing sharply; the user couldn't dive beneath the surface safely; and valve malfunction could lead to serious consequences for breathing.

Evidence of the supposed CO_2 accumulation that had previously been advanced as a possible explanation for at least some snorkel-related drownings could not be found in the tests.

But it's worth noting that of those survivors who contributed to the survey, no fewer than 38% had been using full-face masks – and 90% of them believed it had been a factor in their experience.

In the initial report, wet/dry snorkels were not singled out for any particular criticism. These have a float valve to seal the tube if it becomes submerged, so they're designed for people who might have trouble blowing water out of the tube, for whatever reason. But the valve could be a risk factor if it caused any constriction in the tube.





Above: The report that first drew attention to potential pitfalls for snorkellers.

The team reviewed coroners' reports on the snorkelling victims, and found that it was not possible to differentiate between drowning by aspiration of water and by IPO. In both cases the lungs ended up full of liquid, causing death by hypoxia.

But of 32 deaths closely analysed with all other factors taken into account, no fewer than 15 were judged to be "very likely" the result of hypoxia due to an IPO, and 14 considered as likely to be due to either cause.

The *post mortem* reports also indicated a promising avenue to explore further. They pointed to a "significant correlation" of the drownings with cardiac disease, in particular Left Ventricle End Diastolic Pressure (LVEDP), which is more common in older people. There are often no symptoms with this condition.

Among the survivors, of 31 respondents who had a pre-existing condition, 84% had high blood-pressure or heart issues.

SO THE PLOT thickens and leaves the question of why the preponderance of tourists among the victims – and why Hawaii? After all, it isn't the only part of the world where snorkellers take to the sea in numbers.

When I put this question to Dr Foti he came straight back with a slew of explanations. "We have too many tourists in the high-risk groups, and more tourists seem to snorkel in Hawaii than elsewhere," he told me.

Worryingly, he also pointed towards "poor record-keeping and data-storage in many of the other popular areas in the world – we've checked". Could it be that snorkelling deaths by IPO are more common around the globe than anyone had previously suspected?

Dr Foti added that by law Hawaii requires full *post mortem* examinations on all drownings, so that "data-collection is reasonably easy through the medical examiner's office".

Finally, he pointed to the fourth possible explanation for the proportion of deaths among tourists in his team's study – and this is another interesting one, for scuba-divers as well as snorkellers.

"Air travel is a hypothesis, but in my opinion likely to be a significant sub-clinically apparent risk factor," he told me.

By this he means that most tourists arriving in Hawaii, flying far out into the Pacific from North America or Asia, would recently have spent at least five hours at altitude.

The study concludes that this can be considered as a "feasible factor", because it could alter the permeability of the lung mechanisms that would normally block development of an IPO.

"It's our theory that the reason for the high level of visitor deaths in Hawaii is explained by recent prolonged air travel, which can establish a certain baseline of oedema," I was told by the study's project manager Carol Wilcox. She herself is a snorkel-drowning survivor – the one whose account introduced this article.

"Many tourists go snorkelling the same day, or within a day or two of arriving," she said. "Many of them, especially those from Asia, have been in the air upwards of nine hours. Many planes are pressurised at 8000ft-plus, although the newer planes are more like 6000.

"All that being said, we were unable to find the resources to test this theory."

WITH ALL THIS in mind, what should snorkellers do to protect themselves? Advice issued in the report includes taking a leaf out of the scuba playbook and never going it alone – fin with a buddy. You should choose snorkels carefully when buying or hiring, being especially careful to avoid any constrictions in the mouthpiece or bore.

Avoid snorkelling if there is any doubt about your cardiovascular health, and hold off for a few days after landing from a flight as a precaution.

And once you're in the sea, at the first sign of any unusual shortness of breath get yourself upright and leave the water as quickly as possible.

Asked to comment on the Snorkel Safety Study's interim report, Dr Doug Watts, medical director of DDRC Healthcare, pointed out that more data would be required to explain how the report's conclusions were reached when the study was peer-reviewed.

However, "the scale of the problem is

significant," he acknowledged. "Shocking numbers of visitors to Hawaii have died snorkelling."

He pointed out that the investigation has so far concentrated on snorkel resistance and product differences as highlighted by the SARA data.

"Most scuba-divers regard snorkelling as a benign activity and probably wouldn't consider that choice of snorkel has safety implications, which it may," he said. "The advice given about snorkel selection sounds good."

He also pointed out that pre-existing cardiovascular disease as a risk factor for IPO was something that snorkellers shared with scuba-divers – highlighting the value of a diving medical – and felt that the concept of changes in the lung occurring with altitude of cabin pressure might also be a factor relevant to scuba-divers, and should be further investigated.

Diving doctor Ian Sibley-Calder, DIVER's medical consultant, agreed with this.

"The mechanism of negative pressure rings true, and the theory of prolonged air travel giving rise to changes in permeability deserves further research, if it hasn't already been done," he said.

"The resistance in snorkels also needs looking at – maybe it's time for a more regulated production, in line with pressure measurements when looking at scuba second stages.

"The parallels with IPO in scuba are striking," said Dr Sibley-Calder. "It would have been interesting to look at incidences of hypertension in the deaths as well."

"There is obviously a massive problem, but to me the cause is still unclear," summed up Dr Watts. "As with all of these things, it's likely to be multifactorial."

It could be informative to carry out similar incidence studies in other parts of the world but, as he pointed out, the problem with such studies lies in obtaining reliable data on overall numbers of participants. "We might know the number of deaths but we can't work out the risk if we don't know the denominator – the number of divers."


PXHERE

Above: A snorkeller in Hawaii.

SUDDEN ONSET immersive pulmonary oedema in snorkellers may be as common, or more so, than accidental aspiration, concludes the preliminary *Snorkel Safety Study*.

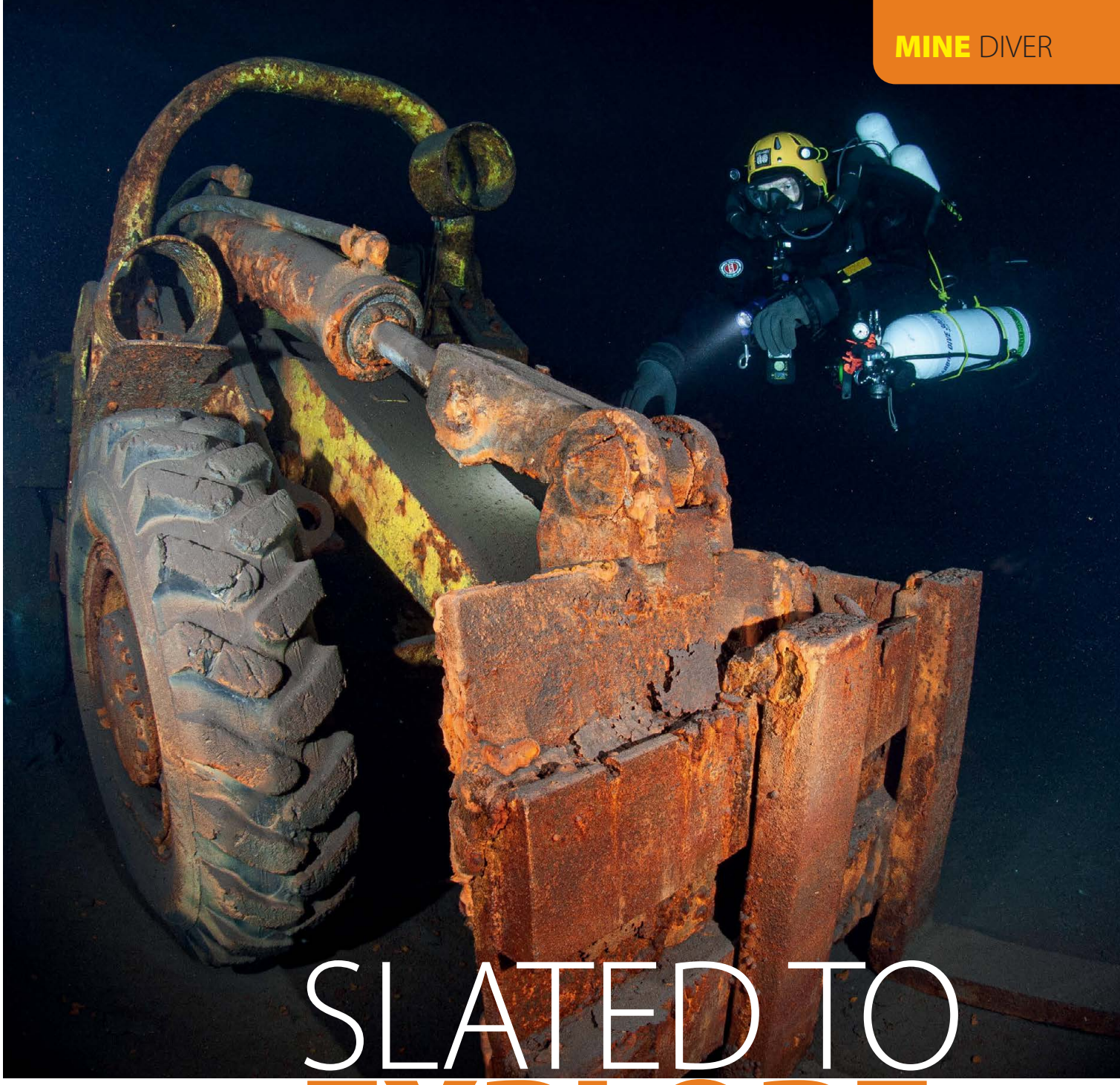
In which case we divers, who often also snorkel during surface intervals or on surface swims, including what can be high-speed encounters with manta rays or whale sharks, need to be aware that there are risks.

We should also recognise this on behalf of family-members or friends who go for the "softer option" on holiday.

Snorkelling is usually regarded as the "safer" alternative to scuba, so it would be a cruel twist if the act of breathing through a poorly designed tube proved riskier than previously suspected.

The bottom line is good news, however. If IPOs in snorkellers are accepted as a risk, it is at least one that, through product design and awareness, we can fix.

The Snorkel Safety Study findings are available for free download, and to extend their research the team would appreciate hearing from other snorkellers who have experienced any problems. Take the survey at **snorkelsafetystudy.com**



SLATED TO EXPLORE

Not for the first time, DIVER enters the fascinating netherworld of Felicitas, the flooded slate mine in the west of Germany. Our guide this time is KURT STORMS, who also took the striking photographs

AS OFTEN, I undertake the trip with my regular dive-buddy Willem Verrycken. Willem has booked in advance. Early in the morning we load the car and leave for Sauerland, a 3.5-hour drive away from where we're located in Belgium.

On arrival at the German mine we meet the manager, who tells us something about the place and what to expect.

Felicitas is located a couple of kilometres north-west of the spa resort Bad Fredeburg, which forms part of the town of Schmallenberg.

The mine opened in 1850, and was owned by the Hesse & Schneider company until 1990.

It was then sold to Magog, which these days has the only slate operation still running in North Rhine-Westphalia.

The mine was accessed via an inclined shaft 1300m long and a ventilation shaft, with two footbridges at depths of 32 and 46m. A cable-reel and trolley system was originally used to transport the stone along the inclined shaft directly into the splitting-house.

In later years diesel vehicles were used for this underground transport.

The mining took place in chambers about 15m long and 4-5m high. From the 1970s on it was mechanised, employing mobile saws and hydraulic splitters.

Above: Willem with a forklift truck.

ONCE WE HAVE set up our rebreathers, we put on our heated suits – the water inside Felicitas remains at a constant 9°C year round.

We make our way to the shaft and carry out our necessary checks. Unfortunately these don't include me remembering to switch my undersuit-heating on!

Willem is the first to go through the shaft, which is quite steep to a depth of ☛

30m. Because several divers have already entered the water before us, visibility is very poor here and we have to follow the line by touch.

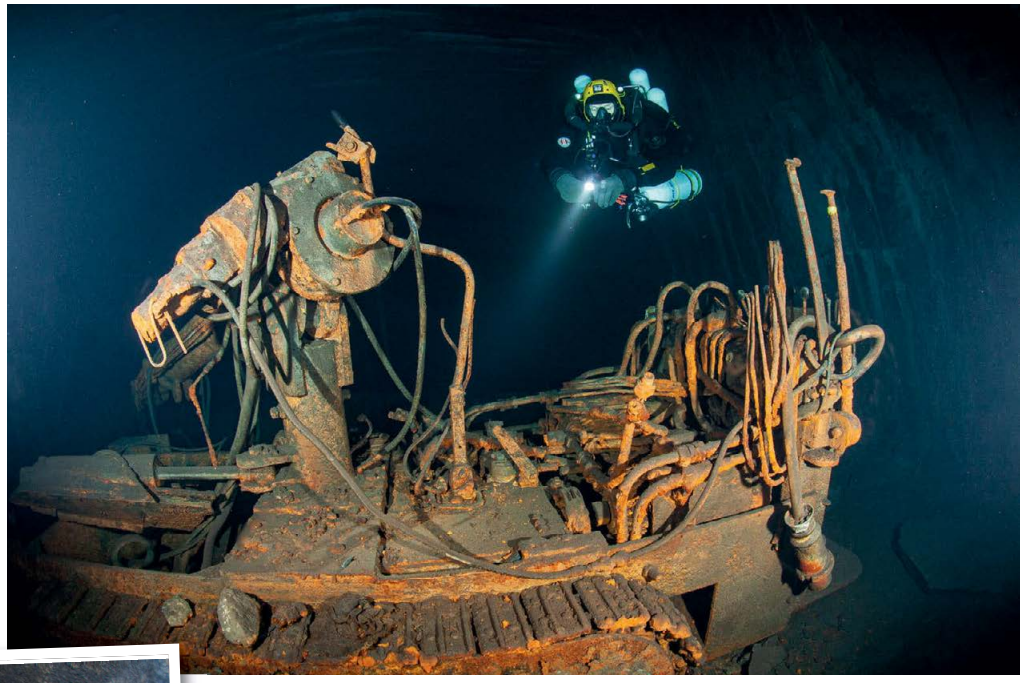
At depths of 12m and 20m we lay down the cylinders containing our deco gases.

We have used the extensive pre-dive briefing provided by Wolfgang to plan our dive. At 26m we reach a junction and turn left as previously agreed.

This is the newer part of the mine, where the slate was mined mechanically, probably to protect the miners.

Further on, assorted machines start to loom out of the darkness. They have been left in place because it would have been too expensive and time-consuming to dismantle them.

We see an excavator, and a large forklift truck in pristine condition. Willem poses for pictures beside the machinery.



WE FIN FURTHER down the corridor, and notice a beautiful large saw blade on the floor. The corridor is supported by iron profiles and plates, and as a result loose rust swirls down on us at regular intervals.

The main corridor is beautiful, and branching off it are many side-corridors, which we enter by making a jump-line.

After 35 minutes we return and carry out our obligatory decompression stops in the shaft. I'm feeling chilly.

During our two-hour surface interval, we enjoy our free coffees and Wolfgang goes deeper into the story of the mine.

We discover that the part that we have just dived was still in use up to 1994. The corridor to the right, which we are going to dive later, is the old section, where the slate was mined from 1850 onwards.

It was worked by hand and extracted with the help of dynamite.

In the afternoon, we leave for our dive in this older section, and I make a point of remembering to connect my heated undersuit this time round.

'I MAKE A POINT OF REMEMBERING TO CONNECT MY HEATED UNDERSUIT THIS TIME'

We go back down along the main shaft, where our bail-out gases are still lying around, and quickly check them before continuing, turning off to the right.

It is immediately clear how much narrower the corridors are here. This is a totally different mine to the one we explored this morning. The walls appear, and some of them are slate.

Along the way, we come across pipes that were laid for pumping water out of the mine. We come across items like old discarded bottles, and keep stopping for photos.

Further along the corridor we come to a beautiful door, which lies ajar. This was the storage room for the dynamite. We take a look inside, but find it empty.

Then we reach a junction and take the right fork, beyond which the corridor becomes slightly narrower.

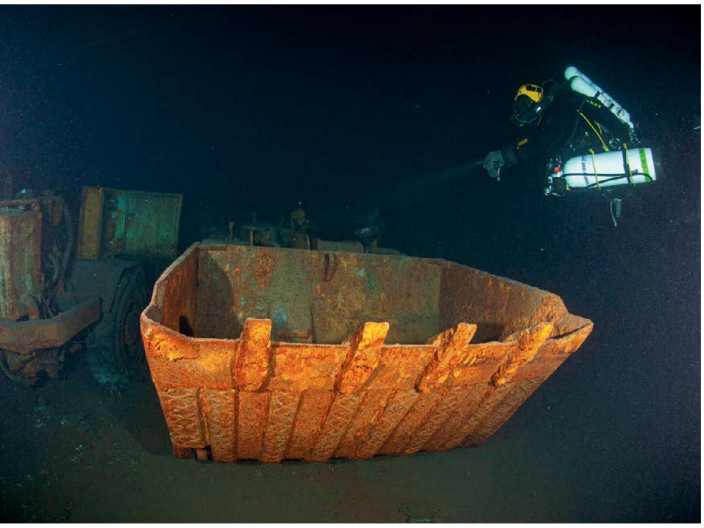
WE COME ACROSS an opening in the wall, where I shoot more pictures, but time is passing faster than we would have liked. We have time to stop to examine an old electricity cabinet before turning round and settling to do our deco.

As happy as two children, we emerge from the water with big smiles and immediately start analysing our dive.

Our conclusion? Simple – we have to come back here.

Opposite page, from top: Drilling machinery; setting up the cylinders; in the doorway to the old section of the mine.

This page, clockwise from above: Sawing machinery – and boots; fuse-box; the door to the explosives store; bulldozer in the new section.

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CR WET 'N' DRY

Well, more damp than bone-dry, as BRANDI MUELLER adds time with the wildlife of the rainforest to days spent diving on Costa Rica's spectacular Pacific coast

OFTEN THE DILEMMA of the diver is based on obsession with diving. I fall into this category while planning adventures to far-flung locations. Diving becomes my sole purpose and sometimes I forget about the magic that can be found above water.

A land tour might be done on the last day before flying, but rarely do I find myself on trips with an equal balance of aqua and terra.

It can also be hard to co-ordinate everything into one trip. The planning can be a nightmare: what's worth seeing, what isn't? How long does it really take to get from A to B (and C, D and E)?

How does one reach all the important places without being gone for months? And what do I do with all my luggage?

Enter Bill Beard's Costa Rica. The opportunity of seeing the best of everything Costa Rica offered above and below intrigued me.

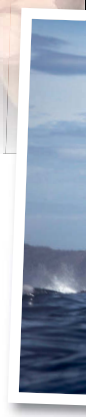
Someone else was going to plan a multi-activity trip for me? Yes, please!

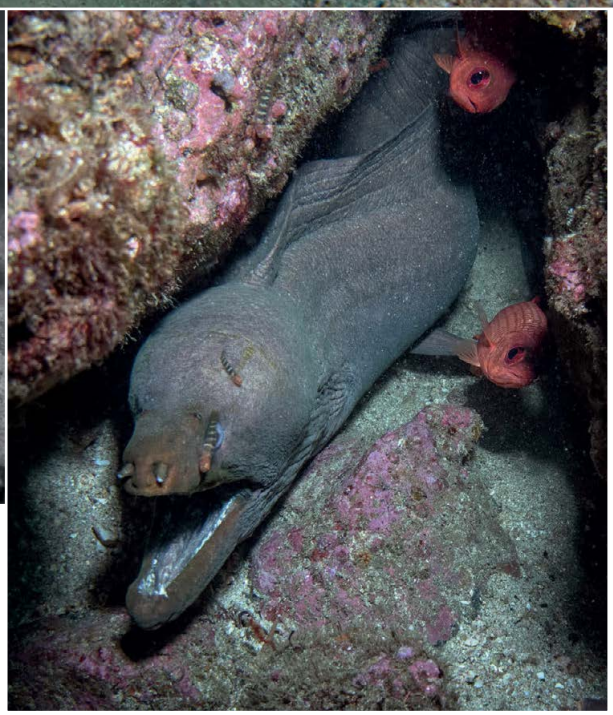
Bill Beard was one of the first scuba-divers in Costa Rica, developing the industry there from 50 years ago. After a few emails I was sent an itinerary that of course began with diving but took in zip-lining, canopy walks, bird-watching (I desperately wanted to see a quetzal), waterfalls and more, all in nine days.

It was ambitious, and I could never have planned all that with my limited knowledge of the country.

It has both Pacific and Caribbean coasts, though heading east to the latter coast would not form part of this particular trip.

I started out on a sunny morning, admiring birds and roadside strawberry





stands as the car twisted and turned on an easy tour to Volcan Poas and a waterfall, just outside San Jose.

Next morning Jose, my driver, arrived to take me to the Guanacaste province on the Pacific Coast to dive. At one point he asked if I was in a hurry (I wasn't) and he pulled over to show me a tree filled with macaws. We saw both the scarlet and the great green varieties found in the country.

I settled into my beautiful room high on a cliff overlooking the Papagayo peninsula, with floor-to-ceiling windows.

I was setting up my camera gear when I saw an animal walk onto my terrace and sit down on the step. It was a raccoon, making itself comfortable.

That evening I saw monkeys playing in a tree near one of the pools and some other guests told me about an owl that a security guard had shown them near the entrance. No need even to leave the resort to see the wildlife!

NEXT DAY WE SET OUT on calm seas to some nearby islands. It was easy to see how Monkey Head Rock got its name. Both dives were to 20-25m over sloping rocks from the islands onto garden eel-covered sand.

Among the eels, many sting rays searched for molluscs by stirring up the sand. Fish followed the sand cloud in hopes of morsels, and among them were numbers of pufferfish of a sort I've never seen before. In the rocks were multiple eel species, and around one corner we came across some seven whitetip reef sharks lying in the sand.

Usually taking photos of pufferfish and sharks gives me all the adrenaline I need, but after diving I headed out to fly through the rainforest canopy with wild monkeys on zip-lines. I traded my dive-gear for a helmet, harness and leather gloves and had an incredible time. I was exhausted by the end of the day but looking forward to the next.

Above, clockwise from top: Sting ray and friends, which included many pufferfish; moray eel with cleanerfish; seven whitetip reef sharks.

Below left: Monkey Island.

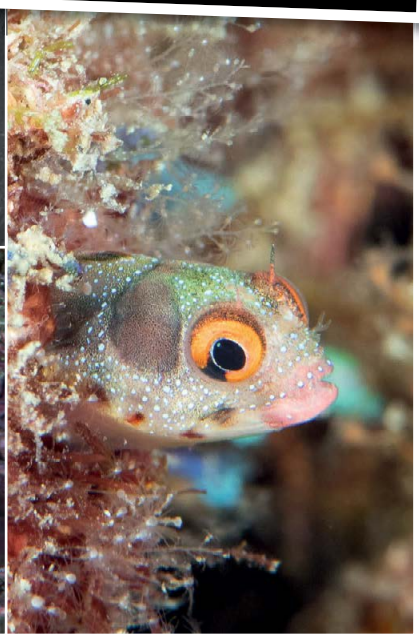
Opposite page: Dive-boat headed for Bat Island with Rocket Frog Divers.

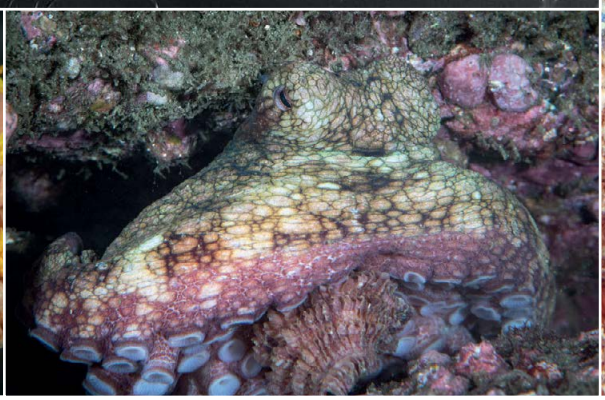
The calm winds had vanished as we headed out to Bat Island in Rocket Frog Divers' super-fast but comfortable inflatable. The 30-mile trip usually takes an hour or so, but after two hours we still hadn't arrived. The dive-guide considered calling the trip as the driver paused to check an engine, but then the wind magically died down.

Change of plans: they decided to take us to Black Rock (usually the second dive) and we jumped in on the mostly submerged rock.

It was a little calmer under water but a major swell was still moving us back and forth, albeit among massive schools of fish that would envelop our group before disappearing to make way for another.

A school of jack so thick we couldn't see through them showed up, as did





Pacific creole wrasse and others. Six or seven intermediate-stage pompano came into the mix, with little yellow barberfish coming up to clean them. There were also lots of king angelfish, suggesting that this was a popular cleaning site.

We surfaced to find the weather drastically improved. We made it to Bat Island, but there was still a swell and conditions under water weren't ideal.

We did at least see two bull sharks (though too far off for good photos.)

The swell likely contributed to the low visibility, and from what I was told we had been unlucky. Mantas, eagle rays, bull sharks and even the occasional whale shark might well have been there but, if they were, we couldn't see them.

THE SITES WERE CLEARLY amazing, however, with those huge, healthy schools and plenty of cleaning behaviour. The power of the swell was awe-inspiring. When a set came in the ocean grew dark and the white water churned the surface above us like angry storm clouds.

On my third morning of diving I shot macro, because there was plenty of small life among the rocks, corals and crevices.

Within moments of descending, our guide had found a seahorse, and there were several octopuses, blennies of all shapes, sizes and colours and more pufferfish, too – I've never seen so many in one place before!

Above, clockwise from top left: Diver with so many jack!; pufferfish; blenny; octopus; tubastrea corals

Below: Diver with barberfish.

There were more sting rays in the sand (too big for my camera) but also the smaller yellow sting rays, so I managed a few shots.

The next morning, much as I would have liked to dive more, I headed inland to the Monteverde Cloud Forest. On the drive Jose and I talked Covid and how Costa Rica had fared in the pandemic.

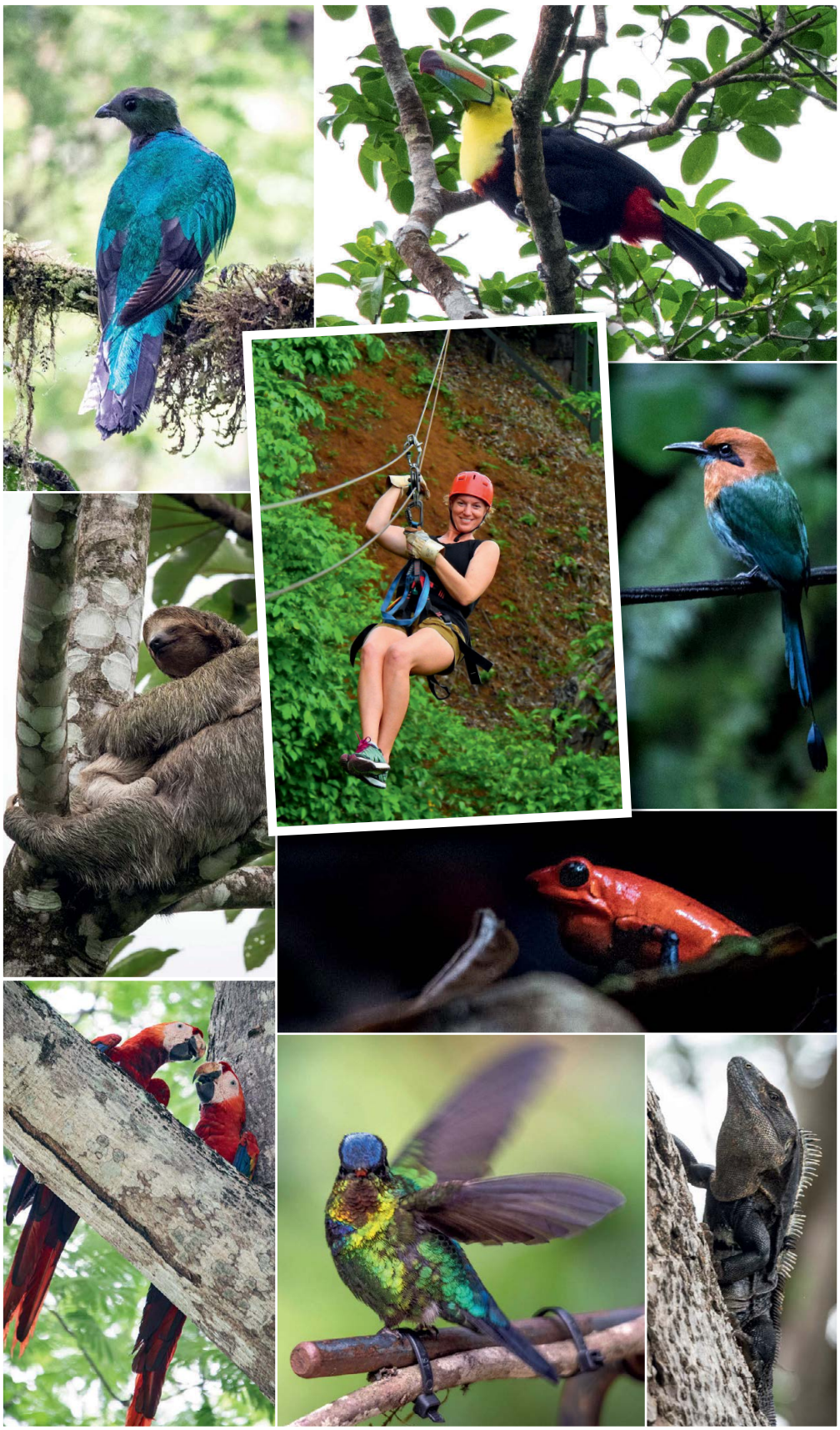
Tourism contributes at least 5% of the country's GDP and, when indirect employment is included, an estimated 28% of jobs. Normally 1.7 million tourists visit annually, but with complete closure between March and November last year so many incomes were lost. The return of tourists had been slow.

Costa Rica is a country that decided long ago to get rid of its military and instead invest in *pura vida* (pure life).

At the forefront of renewable energy, it runs almost entirely on solar, wind, hydro-electric and geothermal energy. Around 28% of the land has been protected too, about 12% of it in national parks.

After dropping my luggage at the adorable Hotel Poco a Poco I was picked up for a tour of hanging bridges built in and above the forest canopy. Not quite the adrenaline rush of zip-lining (though you can do that too) but walking through the misty cloud forest felt magical.

I also spent time in the "Hummingbird Gardens", trying desperately to capture



photos of the fast-moving birds.

The amazing Vanessa at Bill Beard's was a huge asset throughout the trip. It was quetzal mating season and after I had mentioned to her how much I had long wanted to see this bird she must have contacted the forest-hike guide, because he mentioned that we might have a better chance in the Santa Elena reserve than in nearby Monteverde.

So we changed plans and I felt as if I had my own local best friend/travel director making things happen.

It had all been arranged while I was at lunch sipping local organic coffee and eating mouthwatering chocolate zucchini cake at Poco a Poco (if you go, don't miss the cake!)

Centre: Brandi samples zip-lining in the rainforest.

Clockwise from top left: The elusive quetzal, a female; toucan; motmot, poison frog; iguana. hummingbird; scarlet macaws; sloth with its baby.

The Santa Elena park ranger told us of a quetzal nest quite close by but off the main trail, and agreed to take us.

I followed them into the cloud forest (an area with no trails) and noticed my guide stopping and looking around both up and down at the forest floor.

The looking up might have been for birds, but it crossed my mind (and increased my heart-rate) that perhaps he was also looking out for snakes.

My previous night's visit to the Reptile Gardens came flashing back. There are 23 species of venomous snakes in Costa Rica and many species of arboreal snakes that wait to fall down on you from their trees.

And let's not forget the *fer de lance*, which gives no warning before biting you.

I started looking down (and up) where I was about to step as well.

UNFORTUNATELY THE quetzal was not home, so we headed to the real trail. We did see a bell bird and a leaf-thrower, which my guide told me was top of the birders' list (it looked like a boring brown bird to me but, adorably, it was throwing leaves around).

Before leaving, we checked the quetzal nest again. Without much hope we stared at a hole in the tree – I didn't even have my camera ready and was also looking around for snakes.

Then I glanced up and saw the female sticking her head out of the hole! She looked around for a few seconds and flew out, perching on a nearby tree just long enough for me to grab a few photos.

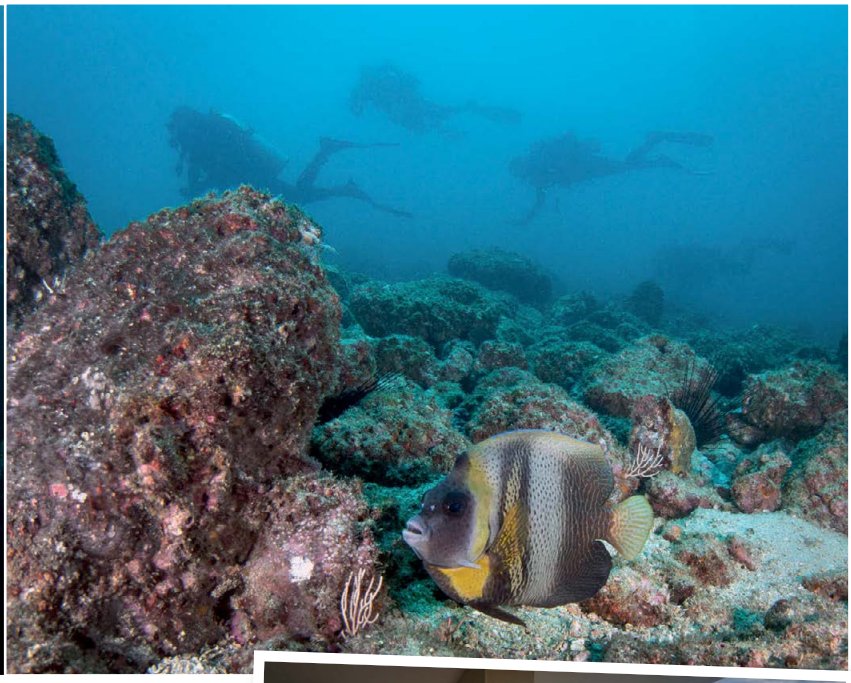
Bird photography strikes me as a lot like underwater photography, always leaving you wanting more. Now I want to see a male.

Gear retrieved from the hotel, I headed to La Fortuna at the base of the Arenal volcano. It's possible to drive around the volcano's base, but faster to take a boat across Lake Arenal.

Ready to relax after the transfer and my morning of cloud-forest hiking, I headed to Tabacon Hot Springs to soak in waterfalls heated by a geothermal river flowing from the volcano. The sun was setting and after an excellent dinner I spent the evening lounging in pools of varying temperatures and water flows.

I took in the peaceful sounds of the forest while imagining myself soaking in life-enhancing mystical waters that would reduce wrinkles and increase my lifespan

The next morning brought another forest walk with hanging bridges around the base of Arenal, which is at a lower altitude than Monteverde and hosts different birds and animals. On our ride there my guide found a sloth with a baby in its arms on the side of the road!



Clockwise from top left: Bluefin trevally; Cortez angelfish; view from the Occidental Papagayo.

He burst my bubble by telling me that the water at Tabacon is simply rainfall filtered through the hot volcanic rocks, so forget the mystical healing properties. I was still hoping it reduced wrinkles.

In the park we saw toucans, another sloth and poison-dart frogs before making the 500-step hike to La Fortuna waterfall.

We finished the morning with lunch at Dona Mara's house and she taught me how to make *tortillas* (so if anyone wants to come and see all my bird photos, I can now serve up homemade *tortillas*!).

What a great way to travel for those emerging from their Covid cocoons but not ready to join a large group or lots of strangers yet. Bill Beard's can arrange trips for one or for groups of any size, and the private transport gave me peace of mind about my luggage.

ON MY LAST MORNING at Arenal, I sipped Costa Rican coffee in a rocking chair on my patio and had it been clear I would have enjoyed an unobstructed view of the volcano, but it was hidden in clouds.

I opened a magazine I had been carrying around all trip. I wasn't three pages in before I heard a buzzing, like a small helicopter or large wasp near my ear. It was a hummingbird drinking its morning coffee (nectar) from the flowers growing around my room.

Then I realised it was not one but at least four birds, flitting about so quickly that they almost disappeared from view, only to reappear while pausing to drink.

I watched as I finished my coffee, listening to the sounds of other birds and bugs and reptiles that call this magical place home. I could read the magazine on the flight home.

Bill Beard's can arrange trips to dive both sides but they told me that the Caribbean side isn't very good and the weather often not ideal, so they don't seem to encourage it.

But I still think that would make a great sales pitch: "Dive two oceans in one trip!"

Everyone also went on and on about how great the diving is in July/August and that they commonly end up having underwater encounters with humpbacks.

I had no idea that humpbacks gave birth off Costa Rica, and I would love to document that too. I feel as if no one really talks about the diving in Costa Rica other than Cocos. It was cool to see.

FACTFILE

GETTING THERE ▸▸ There are many options for flights from the UK, transiting through other European cities, the USA or Mexico. Bill Beard's can arrange transfer for flights arriving in San Jose (SJO) or Liberia (LIR).

DIVING, TOURS & ACCOMMODATION ▸▸ Bill Beard's Costa Rica, billbeardcostarica.com

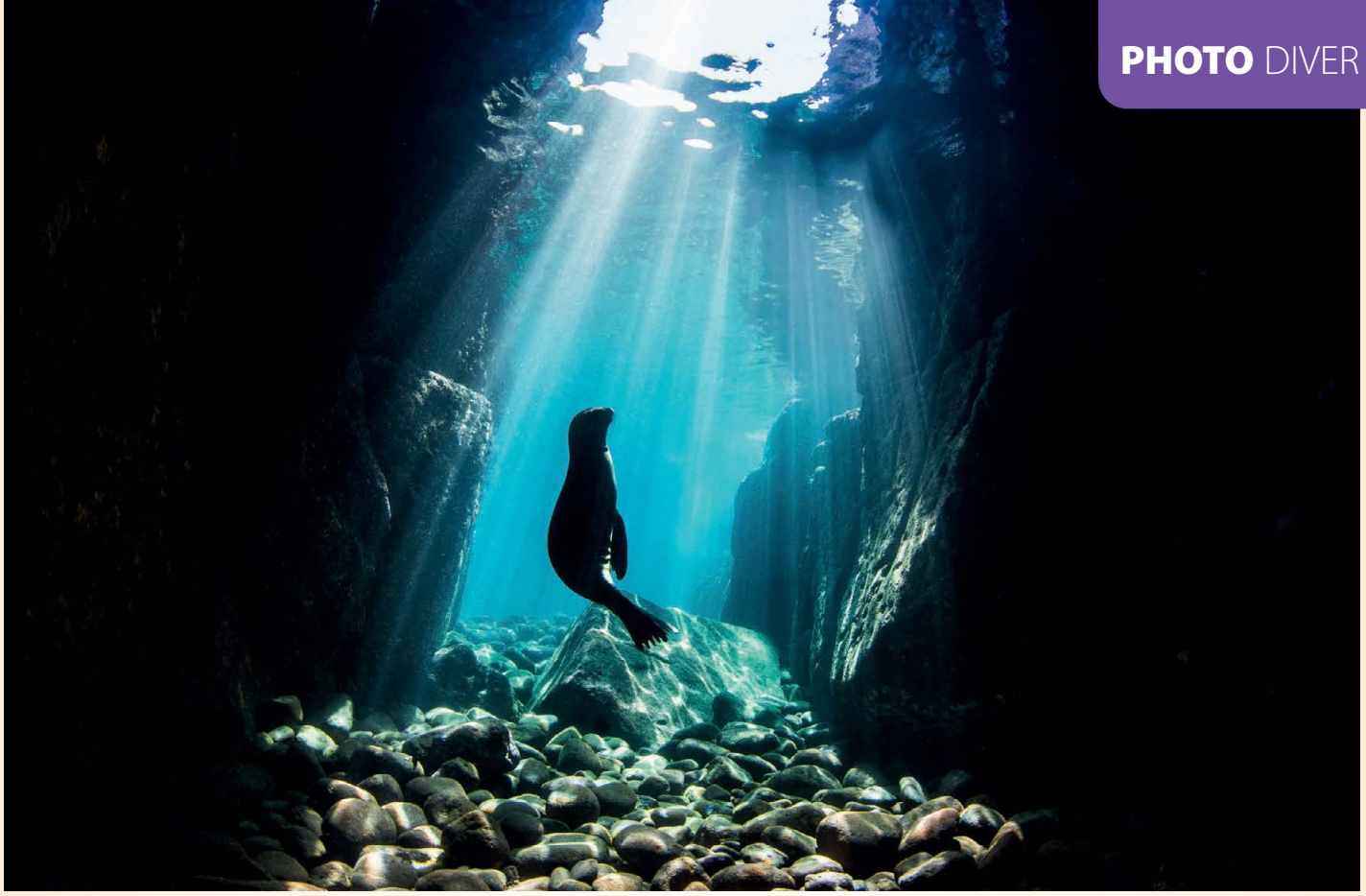
WHEN TO GO ▸▸ Year round. During rainy season (May-November) water temperatures are 25-29°C; in dry season (December-April) they're 20-25°C. The rainy season attracts bull sharks to Bat Island, large schools of fish and rays, and usually has better visibility, though it can vary from day to day. Humpback whale migration is July-September.

MONEY ▸▸ Costa Rican colon, but US dollars accepted almost everywhere.

HEALTH ▸▸ International travellers must obtain a health pass 72 hours before arrival. This documents mandatory travel insurance covering quarantine and medical expenses due to contracting Covid-19. No test before arrival is required. Tap water is generally safe to drink. Malaria and dengue risks are low but avoid mosquito bites. Hyperbaric chamber in San Jose.

PRICES ▸▸ Return flights from UK from £440. Ten-day trips start at £985pp, including transfers, accommodation, diving and tours.

VISITOR INFORMATION visitcostarica.com

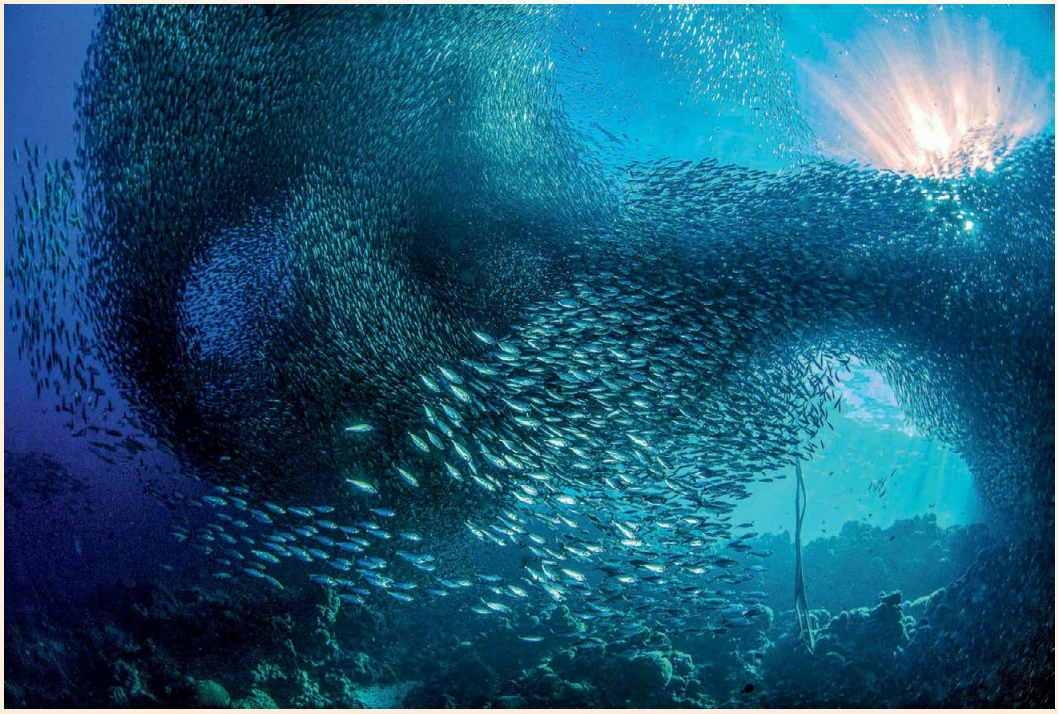


WORLD OCEANS DAY
PHOTO COMPETITION

ON 8 JUNE United Nations World Oceans Day took place, including among its hours of activities, virtual and real, the results of the photo competition organised as part of the annual event. The competition was judged by Jennifer Hayes, Julian Lennon, Joakim Odelberg, Ipah Uid Lynn and Michel Strogoff.

Curated again by underwater photographer Ellen Cuylaerts, it was hosted by DivePhotoGuide and supported by Blancpain Ocean Commitment.

The winners and runners-up in each of the six categories can be seen here and on the following pages…



Underwater Seascapes

WINNER **Nur Tucker, UK** (above)
"I spent a week in Los Islotes [La Paz, Mexico] photographing lively and playful sea lions. This shot, which is taken in natural light, shows a pup playing in a cave."

RUNNER-UP
Marchione Giacome, Italy (left)
"The reefs of Moalboal [Cebu, Philippines] are inhabited by thousands of sardines that form immense shoals, large enough to obscure the sun, much like clouds during a thunderstorm.

"This impressive spectacle offered by Mother Nature leaves the observer speechless."

The Ocean: Life & Livelihoods

WINNER

Renee Capozzola, USA (left)

"At Adonara Island, Flores in Indonesia, two local fishermen paddle in a traditional canoe along a shallow coral reef looking for a good place to put down their lines.

"They are practising handline fishing, a type of sustainable fishing without poles or nets."

RUNNER-UP

Jacopo Brunetti, Italy (below)

"A striped marlin chases sardines during their annual migration at Puerto San Carlos, Magdalena Bay, Baja California Sur, Mexico"

Above Water Seascapes

WINNER

Pawel Zygmunt, Poland (below)

"Visiting epic Kallur cliff on Kalsoy Island in the Faroe Islands is always a great experience. This time, I had a bit of snow on the hills and the weather was very challenging.

"On the way up, I was bombed by a hailstorm and pushed around by the strong wind. I was lucky to get to the lighthouse on time and hide behind it. I wasn't sure if I'd be able to fully experience this place but the wind dropped a bit and I was more or less safe.

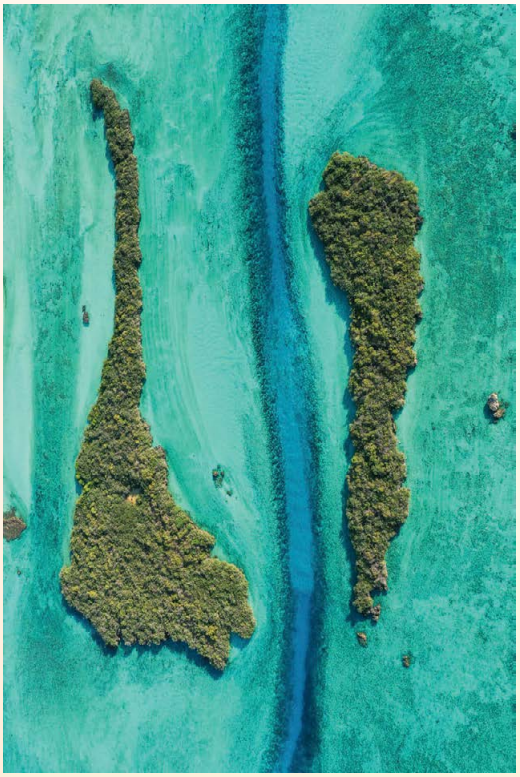
"I took a few shots from the usual spots and then flew my drone, which wasn't easy in the wind and to be honest a bit risky.

"I managed to capture Kalsoy Island from a slightly different perspective. In the background are the islands of Kunoy and Vidoy."

RUNNER-UP **Christophe Mason-Parker, UK** (right)

"An aerial view of Passe Dubois, bisecting the islets of Ilot Emili and Ilot Yangue, part of the west channels of the Aldabra Atoll.

"The channel is one of many that combine to fill and drain the vast lagoon of the UNESCO World Heritage Site in the Seychelles."



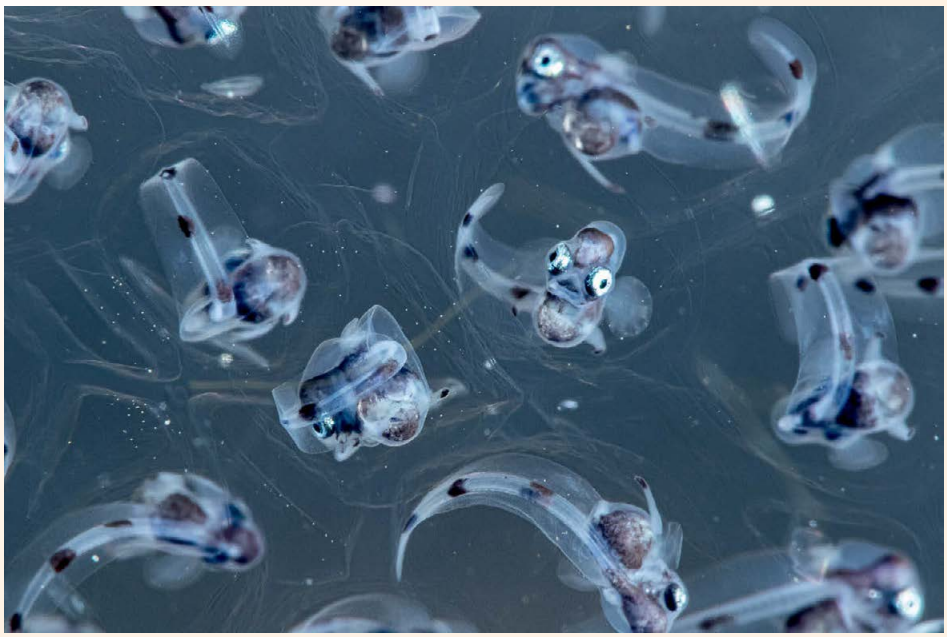
Digital Ocean Photo Art

WINNER **Francisco Sedano, Spain** (left)
"In the famous Disney movie *Aladdin*, the Cave of Wonders is a hidden cavern filled with all sort of riches and magical artefacts that are guarded by a lion's head. This work is similar, but the cave is guarded by a moray eel and filled with precious species.

"The capacity of underwater caves to harbour rich communities has granted them an important status as biodiversity reservoirs. This has been recognised by the EU, which considers marine caves as priority habitats requiring protection. The work is a composite of three images taken in the Mediterranean Sea."

RUNNER-UP
Brett Stanley, Australia (above)
"A conceptual look at the blindness consumers have when it comes to plastics, and their effect on the oceans – blindly buying goods and wish-cycling them in the hopes of allaying their own guilt.

"The concept model was Christine Ren and the location San Francisco."



Faces of the Sea

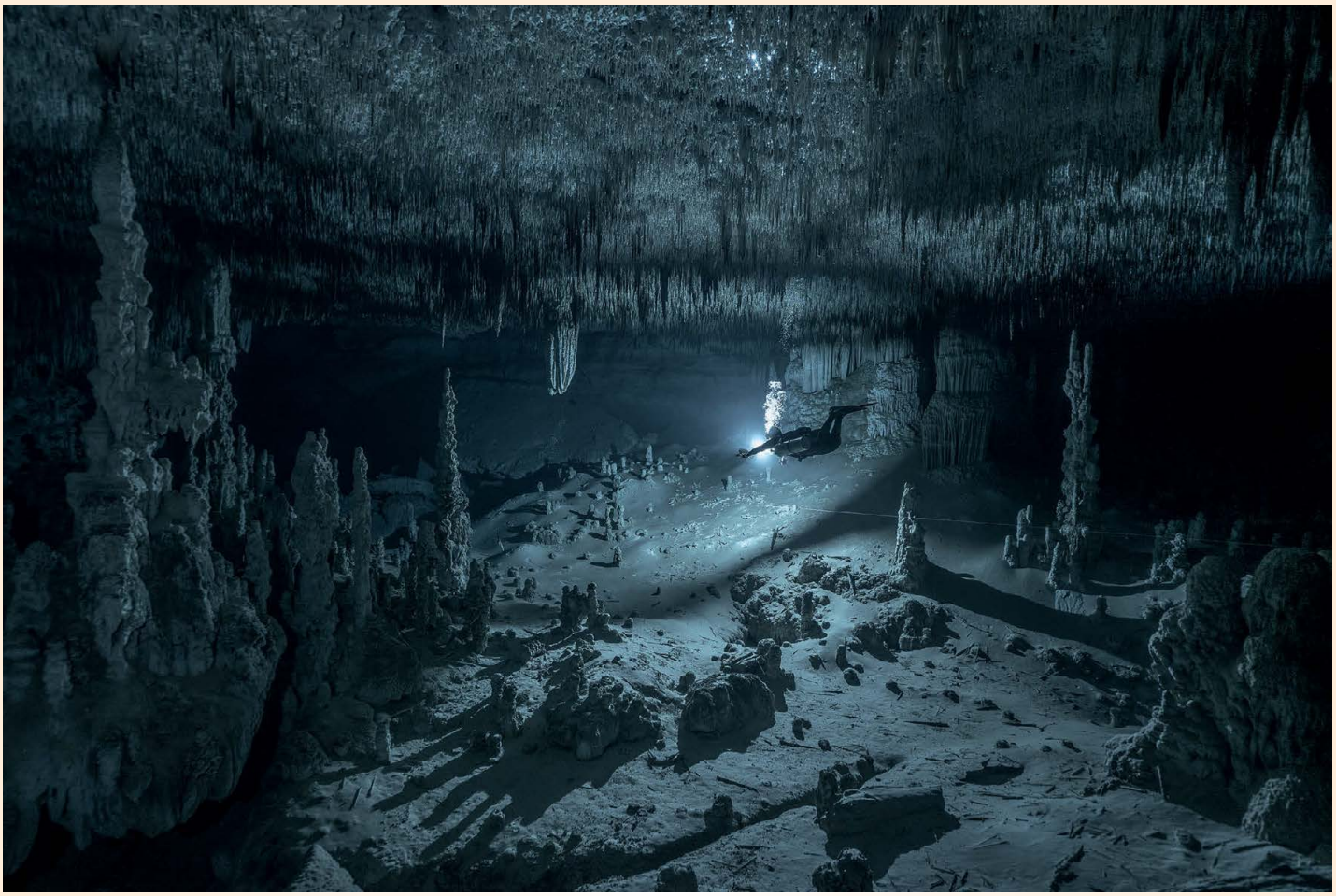
WINNER **Sayaka Ichinoseki, Japan** (above)
"A 2sq m veil of eggs, each about 2mm in size, just prior to hatching. The eggs were very tiny and immature, so I can't say for sure, but they are most likely those of yellow goosefish.

"The babies rotated inside the eggs as the veil rippled in the current." Location: Hokkaido.

RUNNER-UP **Sam Briggs, USA** (right)
"A curious little *Ampithoe lacertosa* amphipod stares out from its tube-dwelling constructed of folded sea lettuce and amphipod silk.

"Over the years, I have found some of the biggest personalities come in the smallest of packages.

"I love charismatic megafauna as much as the next person, but there is just something about the little creatures of the sea that really captivate me." Location: Bodega Bay, California.



Oceanic Discoveries

WINNER Tom St George, UK (above)
"A cave-diver glides effortlessly through a beautifully decorated underground chamber in Sistema Aktun Hu, Tulum, Mexico. The underwater cave systems of the Yucatan Peninsula are renowned for their incredible beauty and crystal-clear waters.

"These underground rivers that wind their way to the ocean are facing increasing pressure from pollution and the over-extraction of water."

RUNNER-UP
Hannes Klostermann, Germany (left)
"A school of skipjack tuna preys on a sardine baitball in Magdalena Bay, Baja California Sur, Mexico. Because of the relatively large size of the prey, the tuna end up ripping apart any sardines they catch, with multiple individuals each taking a chunk.

"This image also shows the skipjack's vertical stripes, which are visible only while hunting."

Find all winning entries from this and previous World Oceans Day photo competitions at unworldoceansday.org/photos. The contests have been hosted since their inception in 2014 by DPG (DivePhotoGuide.com). Entry for the next event is set to start from early March 2022.

breakthrough biology

AQQA ROSING-ASVID

USA

WHALES SHAKE UP QUAKE RESEARCH

SEISMOLOGISTS HAVE turned to the singing of fin whales to learn more about what goes on beneath the Earth's crust.

Fin-whale calls are among the ocean's most far-reaching signals, and US scientists say they can harness them to determine the thickness and movement of deep sediment and solid rock layers.

The experts who made the breakthrough are based at Oregon State University's College of Earth, Ocean & Atmospheric Sciences on the north-eastern Pacific coast.

"People in the past have used whale calls to track whales and study whale behaviour," said Prof John Nabelek, co-author of their study, published in *Science*. "We thought maybe we can study the Earth using those calls.

"What we discovered is that whale calls may serve as a complement to traditional passive seismic research methods. This expands the use of data that is already being collected.

"It shows that these animal vocalisations are useful not just for understanding the animals, but also understanding their environment."

Nabelek and lead author Vaclav M Kuna had been studying earthquakes using a network of 54 seismometers placed along a seabed faultline 100 miles or more off Oregon's coastline.

They realised that the strong signals they were picking up corresponded to the presence of whales in the area.

"After each whale call, if you look closely at the seismometer data there is a response from the Earth," said Nabelek.

Above right: Happy to help – a fin-whale.

Although the vocalisations bounced between the sea's surface and the seabed, part of their energy was also being transmitted through the ground as a seismic wave.

Using a series of whale songs recorded by three seismometers, the researchers were able both to pinpoint the whales' location and create images of the Earth's crust layers from the vibrations.

They are now using the information to find out more about the physics of earthquakes, including the relationship between sediment thickness and velocity.

Until now such work was carried out using air guns, which provide higher-resolution images but make the process both expensive and invasive.

Using whale song is "useful for investigating the Earth's oceanic crust where standard science survey methods are not available", said Prof Nabalek.

JAPAN

Swimming in circles – but why?

SWIMMING IN CIRCLES is something that not only sharks but turtles, penguins, whales, seals and many other marine mammals do – and researchers have been trying to work out why.

Current technology makes it possible to track precisely the movements of marine megafauna in three dimensions, and an international team led by Tomoko Narazaki of the University of Tokyo have been using this biologging approach in a bid to solve the circling conundrum.

"We've found that a wide variety of marine megafauna showed similar circling behaviour, in which animals circled consecutively at a relatively constant speed more than twice," says Narazaki, who works in the university's Atmosphere & Ocean Research Institute.

She explained that she had first observed the behaviour in nesting green turtles, after displacing them from one place to another in an experiment to study their navigational abilities.

"I doubted my eyes when I first saw the data because the turtle circles so constantly, just like a machine!" said Narazaki. "When I got back in my lab, I reported this interesting discovery to my colleagues, who use the same 3D data-loggers to study a wide range of marine megafauna taxa."

The realisation that various species of marine animals exhibited much the same movements was surprising, if only because circling is such an inefficient way to move, compared with swimming in a straight line.

Some of the circling was recorded in foraging areas, suggesting that it might help the animal to find food.

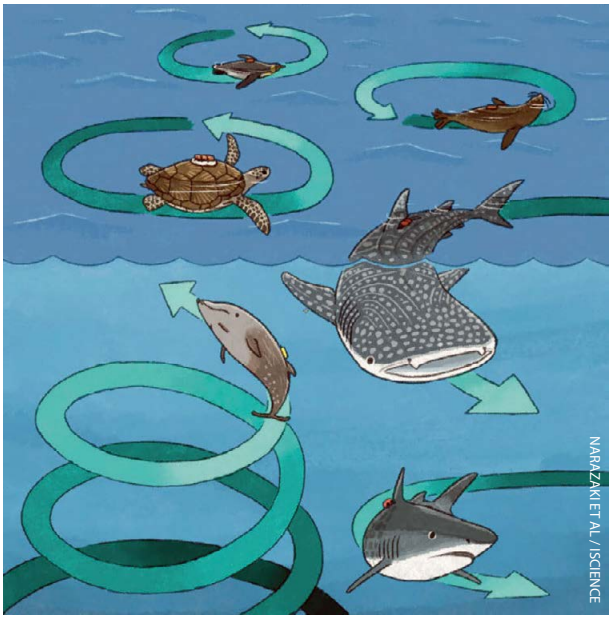
This appeared to be the case when 272 circling events were observed in four tiger sharks tagged off Hawaii. However, fur seals, which feed primarily at night, were found to circle mainly during the day.

A male tiger shark was seen circling to approach a female in an apparent mating ritual, while the evidence in sea turtles suggested that their circling might be connected to navigation.

"What surprised me most was that homing turtles undertake circling behaviour at seemingly navigationally important locations, such as just before the final approach to their goal," said Narazaki.

Such behaviour led the scientists to theorise that circling helps the animals to detect the Earth's magnetic field to help them navigate, perhaps in a similar way to how submarines are required to circle during geomagnetic observations.

It seems possible that the circling serves more than one purpose, however, and the team now want to find ways to examine animal movements in relation to their internal state and environmental conditions. Their study is published in the journal *iScience*.



NARAZAKI ET AL / ISCIENCE

Above: Circling behaviour of various marine megafauna.

Below: Octopuses are intelligent – who assumed that they don't feel pain?

USA

Isn't it time to consider octo feelings?

INVERTEBRATES SUCH AS cephalopods – octopuses, squid and cuttlefish – are not only diver favourites when encountered under water but are widely used in scientific research. This has supposedly been based on the belief that they are incapable of experiencing pain, distress or other negative states, as vertebrate animals do.

The Crook Lab, run by neurobiologist Robyn Crook at California's San Francisco State University, has been working to challenge what the scientists believe to be a historic misconception – and now claims to have achieved its objective.

The problem had been in demonstrating that behavioural responses to pain or discomfort were emotional rather than instinctive physical reflexes.

Now an experiment has revealed that an octopus reacts in exactly the same way to a painful stimulus as a laboratory rodent would, even though its complex nervous system is completely different.

After a single training session in a three-chambered box, octopuses given a painful injection of acetic acid in one arm showed clear avoidance of the chamber in which they were given the shot.

Others injected with harmless saline showed no such preference.

When the octopuses that had received the painful injection were immediately given a pain-killing shot, they showed a preference for the chamber in which the analgesic had been administered. Those given saline only again showed no preference.

Every octopus injected with the acid reacted by removing a small area of skin at the injection site with its beak.

The findings matched those with vertebrates. The acid injection had produced a centralised response in each octopus, and the scientific team described this as "the first conclusive evidence for this capacity in any invertebrate".

Their hope is that the finding will lead to more humane treatment of cephalopods "in whichever context they encounter humans – in research labs but also in zoos, aquariums and in fisheries".

"Our goal with this study was to move the question of invertebrate pain beyond reasonable doubt, so that efforts to better regulate their humane use can proceed with a strong evidentiary foundation that, until now, has been lacking." The Crook Lab study is published in *iScience*.

NEW ZEALAND

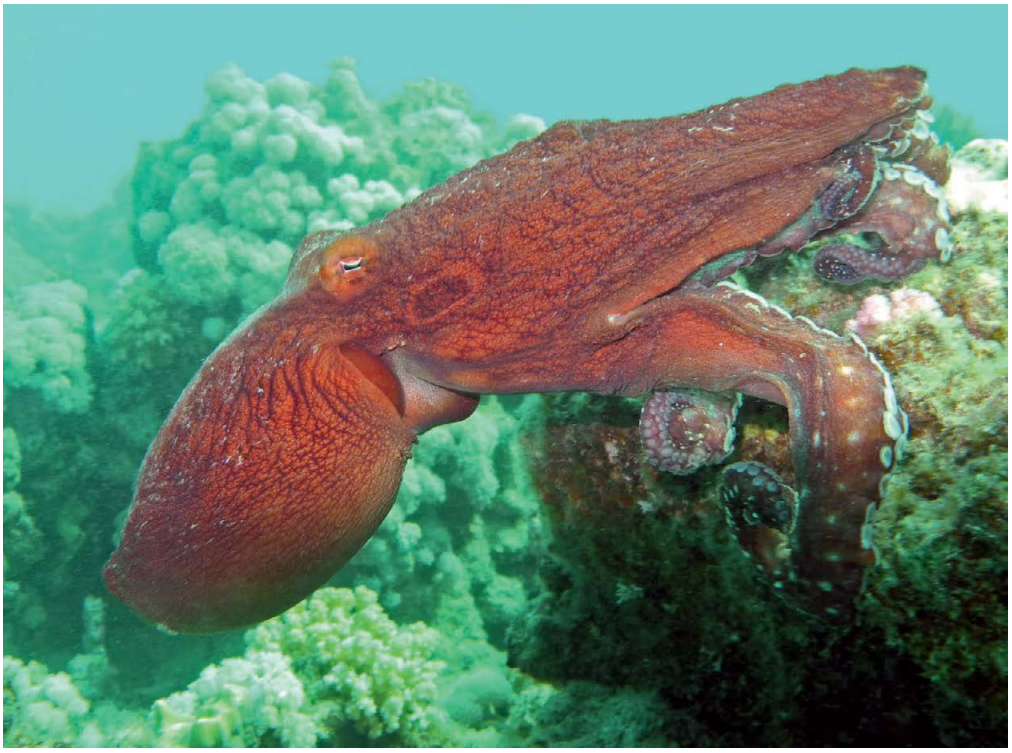
Biggest glow-in-the-dark shark found

THREE SPECIES of deep-dwelling shark have been shown to glow blue in the dark, with one, the kitefin shark that grows up to 1.8m long, now recognised as the world's largest-known bioluminescent shark.

Along with the blackbelly and southern lantern sharks, the kitefin lives in the relative darkness of the Mesopelagic or Twilight Zone, at depths between 200 and 1000m.

Bioluminescence is reckoned to be used by more than 90% of animals at these depths to lure prey or mates, facilitate schooling or as camouflage, but it has only rarely been documented among sharks before.

The research was carried out by



STEVE WEINMAN

marine biologists Jerome Mallefet and Laurent Duchatelet of Belgium's Université catholique de Louvain, and Darren Stevens of New Zealand's National Institute of Water & Atmospheric Research (NIWA).

Thirteen kitefin sharks (*Dalatias licha*), seven of the smaller blackbelly lantern sharks (*Etmopterus lucifer*, growing up to 47cm long) and four southern lantern sharks (*Etmopterus granulosus*, 60cm) were examined, having been caught during a NIWA survey trawl in January 2020.

Light-emitting photophores were found in their skin, and the scientists concluded that unlike other bioluminescent animals the sharks were using hormones to control their light emissions.

Melatonin triggered the glow, which was stimulated by alpha-melanocyte before adrenocorticotropic hormones were employed to shut it down.

Although bioluminescence was noted on the kitefin shark's second dorsal fin, it was mainly concentrated on the undersides of all the sharks.

This led the researchers to suspect that it had evolved as a mechanism for concealing their presence from prey fish below them.

With a certain amount of light penetrating the Twilight Zone from above, the gentle blue glow would act as "counterillumination", preventing the sharks from standing out to fish below as shadows against the sky.

The research is published in *Frontiers in Marine Science*.

A clue to the reason for the kitefin shark's dorsal glow could come from a 2013 Université catholique de Louvain study of another small Mesopelagic dweller, the velvet belly lantern shark (*Etmopterus spinax*, 60cm), found in the Atlantic and Mediterranean.

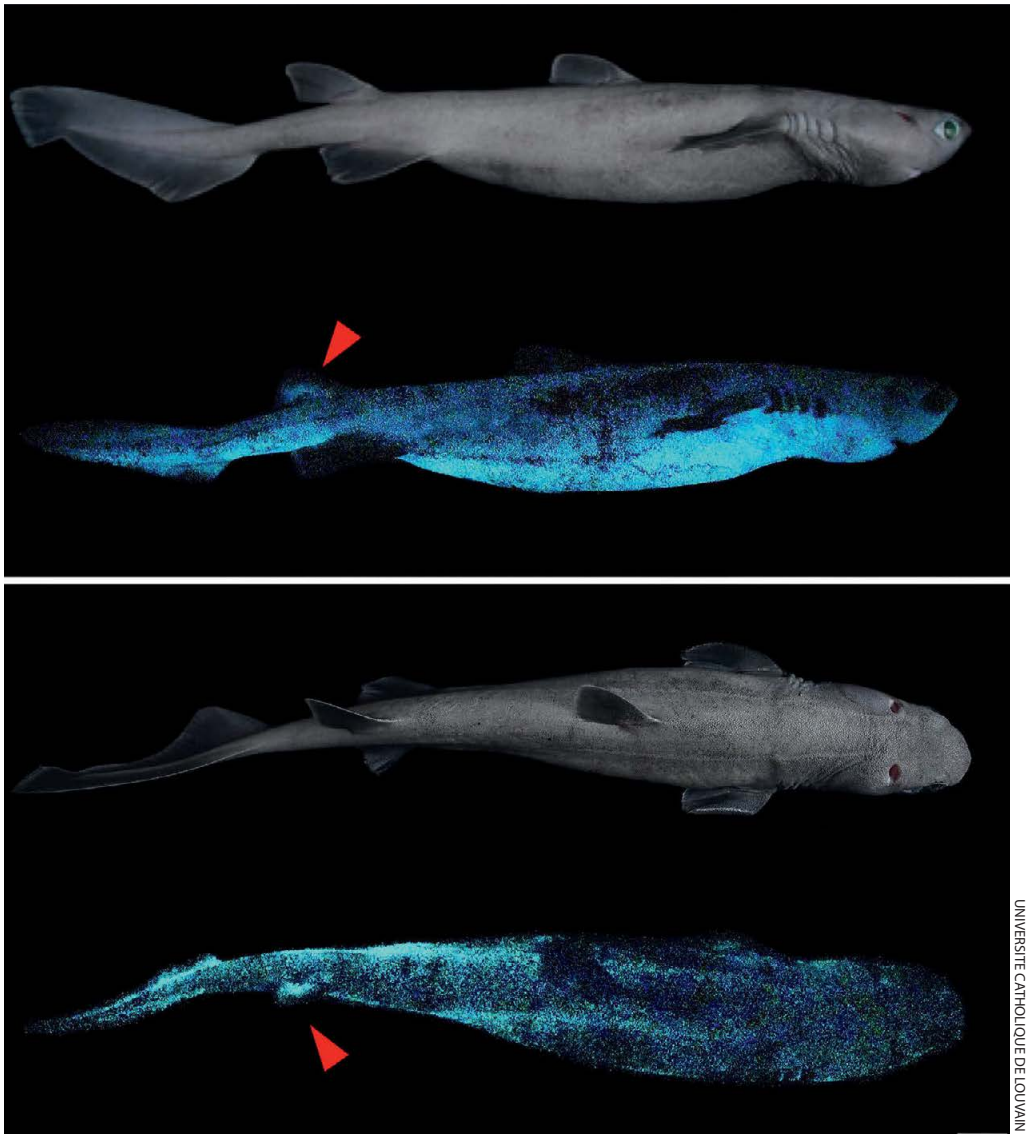
Like the New Zealand sharks, this species has photophores on its underside, thought to help to camouflage it from prey fish below.

However, it also has two bioluminescent spines, one in front of each dorsal fin, with two rows of photophores just behind them.

The photophores illuminate the spine like "light sabres", according to lead author Dr Julien Claes, who concluded that the device was used to warn off predators without alerting prey below.

Modelling showed that predators several metres away would be able to see the spines. Dr Claes noted that it was unusual to find an animal using light to simultaneously hide and advertise its presence.

His study is published in *Nature: Scientific Reports*.



UNIVERSITE CATHOLIQUE DE LOUVAIN

Above: Lateral and dorsal luminescence (*arrowed*) in a deep-dwelling kitefin shark.

CANADA

SOS: Save our sawfish

SCUBA-DIVERS RARELY get to see sawfish – which is hardly surprising, because the rays have disappeared from half the world's coastal waters and now face extinction unless urgent action is taken, according to researchers at Simon Fraser University (SFU) in Canada.

Classed among the world's most threatened marine-fish families, three of the five known species of sawfish are rated Critically Endangered on the IUCN Red List of Threatened Species, with the other two Endangered.

Sawfish are now presumed extinct from just over half of the 90 countries where they were once found – in 18 countries at least one species is missing, and in 28 others two species have vanished.

Also known as carpenter sharks, the sawfish can grow to more than 7m in length. Their fins are among the most prized in the global shark-fin trade, while the sharp teeth on their extended noses, or *rostra*, are easily caught in fishing nets and are sold for novelty, medicine and as cockfighting spurs.

SFU researchers Helen Yan and Nick Dulvy conclude in a new study that complete extinction is possible if nothing is done to curb overfishing and to protect threatened sawfish habitats, such as mangroves.

"We are documenting the first cases of a wide-ranging marine fish being driven to local extinction by overfishing," says Dulvy. "We've known for a while that the dramatic expansion of fishing is the primary threat to ocean biodiversity, but robust population assessment is difficult for low-priority fishes whose catches have been poorly monitored over time.

"With this study, we tackle a fundamental challenge for tracking biodiversity change: discerning severe population declines from local extinction."

The researchers recommend that international conservation efforts should focus on eight countries in which they

DAVID WACKENFELT

might still prove effective: Brazil, Columbia, Cuba, Madagascar, Mexico, Panama, Sri Lanka and Tanzania. Australia and the USA, where some sawfish are still present and some protection measures are in place, should be considered "lifeboat" nations.

"While the situation is dire, we hope to offset the bad news by highlighting our informed identification of these priority nations with hope for saving sawfish in their waters," says Yan.

"It's actually still possible to restore sawfish to more than 70 per cent of their historical range – if we act now." The research is published in *Science Advances*.

SEYCHELLES

Shark rivals adopt social distancing

TWO SPECIES OF SHARK with similar diets and behaviour patterns might be expected to be bitter rivals, but sicklefin lemon and blacktip reef sharks populating a Seychelles atoll have worked out a timetable that allows them to co-exist peacefully, according to a new study by an international scientific team.

"What's exciting about this research is that it shows us how these species have adapted to exist together in a really confined space, essentially through social distancing, without outcompeting each other," says Dr James Lea, the Save Our Seas Foundation CEO who led the study.

"It's a powerful example of how animals carve out specific niches, enabling them to function together within an ecosystem."

The research was carried out by the SOSF's D'Arros Research Centre at St Joseph Atoll, which describes it as an exceptional habitat in the Seychelles' Amirante islands that provides a vital environment for endangered shark, ray, turtle and seabird species.

The Seychelles government declared it part of a Marine Protected Area a year ago, and the SOSF says that its research was key to that decision.

Both the blacktip and lemon sharks hunt for bony fish, crustaceans, molluscs and rays, but they thrive in harmony at St Joseph by giving one another space, say the researchers, who collected data on their movements through a network of 88 acoustic receivers placed around the atoll.

Both species range across the entire atoll but arrange to be in the same place for no more than 25% of their time. Even on the sand flats, where the sharks come at high tide to forage for food and find safety from larger predators, their overlap is only about 35%.

The sharks return to deeper waters of the lagoon when the tide retreats.

Similar behaviour has been seen in land animals such as big cats and wild dogs, says the SOSF.

They share hunting space by minimising competition with one another, using the same habitat but at different times of day.

"Over thousands of years, these animals have found ways to exist together under present environmental conditions," said Dr Lea of the sharks, but he expressed concern that climate change could yet upset the arrangement.

"Given the narrow tidal range at St Joseph, we have to ask ourselves what would happen if a small increase in sea level made the sand-flats habitat available at all tides. How would this affect the finely tuned ecological balance of the animals that have learned to thrive here?'

Over the past 17 years, the SOSF has supported some 340 projects worldwide in support of its pledge to protect populations of sharks, rays and skates.

The report is published in *Frontiers in Marine Science*.

Above: Largetooth sawfish, *Pristis pristis*.

Below left: Blacktip reef shark in St Joseph Atoll, Seychelles.

Below: James Lea implants a transmitter in one of the sicklefin lemon sharks.

RAINER VON BRANDIS / SOSF

CLARE DALY / SOSF

MARSUPIUM PHOTOGRAPHY

DR BRYCE STEWART / UNIVERSITY OF YORK

UK

Heavy metal threat to shellfish

METAL POLLUTION from historic mining is weakening scallop shells and threatening marine ecosystems off the Isle of Man, according to a study by the University of York.

It suggests that contamination of seabed sediments with zinc, lead and copper from mining operations that peaked in the mid-19th century is making the shells of king scallops significantly thinner and more brittle.

This leaves the shellfish more vulnerable to being crushed by crab and lobster claws. The findings were surprising given that the last major Isle of Man mine closed 112 years ago.

The researchers compared scallops collected from six Irish Sea areas around the Isle of Man over 13 years.

Their shells grew and showed normal strength except in one area known to be contaminated with metal pollution, off the east-coast village of Laxey. Scallop-shells there proved to be significantly weakened, and lethal damage rates were twice as high as in uncontaminated areas.

Metal contamination is common in many of the world's coastal areas, say the researchers, concerned that other marine molluscs such as mussels, oysters and clams, which together provide more than 25% of the world's seafood, could be similarly affected.

Scallop-shell damage was found even in areas with contamination levels currently considered acceptable, they say, arguing that those levels should now be revised.

"The effects we observed are likely to be amplified in the future by ongoing human activities and climate change," said Dr Bryce Stewart, lead author of the study published in *Science Direct*.

Top: Healthy queen scallop in Scottish waters.

Above: A metal-damaged scallop.

Below right: A blue whale's spectacular dive.

USA

Blue whales are too busy eating to sing

BLUE WHALES, the biggest animals on the planet, switch from overnight singing to daytime vocalisations every year as they start to migrate – and now US scientists have worked out why.

The whales head from north-east Pacific feeding grounds to breeding grounds off Central America – one of the world's longest migrations at 4000 miles.

The researchers say the whales spend so much of the day feeding to bulk up for their migration that they have to reserve their singing for night-time – and on departure resume singing during the day.

Scientists have always found whale song difficult to decode, but in 2015 Stanford University's Hopkins Marine Station began a collaboration with Monterey Bay Aquarium Research Institute (MBARI) to record blue whales singing both solo and in chorus in their feeding grounds.

They used 15 individual tags and a hydrophone planted 900m deep 18 miles off Monterey in California.

The hydrophone was powered by, and communicated with, MBARI's MARS undersea observatory.

Focusing on the whale-song wavelengths in the two terabytes of data produced each month by this instrument, the researchers found that each summer the singing occurred mainly at night and grew louder, peaking around October and November.

After this it became more of a daytime activity, as the whales began to depart for warmer waters.

The tags used accelerometers to monitor vibrations and integrated hydrophones to listen to the individual's singing. "We decided to compare daytime and night-time song patterns from month to month, and there, in the divergence and convergence of two lines, was this beautiful signal that neither of us really expected," said MBARI biological oceanographer John Ryan, senior author of a study published in *Current Biology*.

"In the hydrophone data, we saw really strong patterns over this enormous spatial domain," said biologist William Oestreich from Stanford.

"When we saw the exact same pattern on individual animals, we realised that what we'd been measuring over hundreds of kilometres is actually a real behavioural signal – and one that represents the behaviour of many different whales.

"As an ecologist, it's very exciting to observe so many whales simultaneously using one instrument."

Now the scientists hope to find out how the whales are responding to changes in the ecosystem and their food supply, and to help prevent ship-strikes by predicting their movements.

Oestreich also wants to determine whether lone whales rely on song cues from other whales to decide when to stop feeding and head south.

"Blue whales exist at incredibly low densities with enormous distances between them but, clearly, are sharing information in some way," he said.

"Trying to understand that information-sharing is one motivation, but also potentially using that signalling as a means to study them is another exciting possibility."

GREGORY SMITH

COCOONED IN RAA

Raa Atoll sits right on the wild frontier of the north-western Maldives, says DANIEL BRINCKMANN. Far away from any other dive operations, adventurous souls discover enormous numbers of fish, colourful diverse reefs and a generous measure of luxury

IT'S A GIANT'S PLAYGROUND destined to be etched into visitors' minds forever. Several baitballs made up of millions of anchovies race over huge boulders and black corals like silvery cascades, rendering dive-buddies invisible until only the camera flashes reveal their location.

The anchovies appear to want to play "Sardine Run" with the large trevallies that are already on their game as we look for shelter from the current on the leeward side.

Hovering close to the peaks and valleys, a giant cone ahead of us makes an excellent viewpoint for schools of bannerfish and rainbow runners and a solitary grey reef shark, all navigating the fish soup.

With my needle now long past the 50-bar mark, I'm finding it difficult to break away from the dazzling reefscape for my safety stop, to leave behind the dense schools of anthias, encrusted sponges, small shrimps and general diversity that could be taken straight from Komodo's Batu Bolong. Aren't Maldivian shallow reefs supposed to be barren ever since coral-bleaching began?

"No, not at all, it just depends where you go and especially if you know where to go," DivePoint manager Miranda Pontiglioni says in her charming Italian accent.

"Actually, this was a rather average dive for Reethi Thila on a day with good current."

The half-hour drive back to the island takes place amid discussions about the structural changes tourism has undergone in the Maldives.

Old hands have been quick to complain that true "diver islands" have become a rare species as all the wellness oases take over.

So what if a 5* domicile with Italian chic goes hand in hand with what is virtually an entire atoll that has yet to be explored under water?

What if you are being served champagne on the beach and still warmly welcomed even if you happen to be the only diver on the island at the time, with a boat to yourself, no compromises when it comes to dive-sites and all this with no surcharge?

The idea that real luxury and first-class diving do not exclude but rather complement each other might raise some eyebrows among the know-it-all-done-it-alls, but Marcus Hauck, chairman of the board for DivePoint centres, who is on-site for an inspection, sees this as perfectly possible.

He was already in the Maldives back in the pre-air-conditioning days, when a diving holiday meant a steady diet of tuna and rice and, often enough, a peculiar oily scent to the air in your cylinders.

When the dive-sites in the atoll were discovered, it was love at first sight for him.

"I know it's hard to believe, but due to our isolated location on the western outer reef, we never meet other divers at the 20 spots in our immediate range," he tells me.

"No doubt, one day people from liveaboards or other island-resorts will be diving the channel entrances and first-class *thilas* that we discovered, but we still have long-distance sites on the steep eastern side of the atoll with hammerhead sharks and huge feeding aggregations of manta rays we can reach by speedboat with only one

Above: The coral reefs in Raa make for a colourful spectacle

Below: Eagle rays.

day's notice. Also, our guests can easily combine trips to eight islands with DivePoint centres, including our newest addition on tiger shark island Fuvahmulah."

BEFORE WE COULD dig deeper into benefit programmes for repeaters, the captain yelled those magical words: "Dolphins in front!"

And just when everybody had their underwater cameras, drones and long lenses ready, the dolphins turned out to be pilot whales, popping up in small pods scattered all the way to the horizon.

The eventual encounter with the travelling mammals lasted only for a few seconds – just time for snaps.

One more species ticked off, thanks to the precise directions given by the crew as we scanned the blue around us.

Back on the jetty of the 400m-long gem called Uthurumaafaru, which also goes by the less tongue-twisting name You & Me, watersports-centre crew are already launching catamarans for guests anticipating their first whale sightings.

There's just enough time for a fist-bump with manager Ahmed: "They're only rare to people who spend a week out here – we see them all the time off the outer reef," he says, running for the shore, "but thanks guys for the heads-up, and yes, mate, check the channel in front of the island – plenty of mantas feeding and spinning!"

The winged plankton-feeders will have to wait a bit. Holiday for journalists starts only after dusk, when photos have been sorted out and Teppanyaki lobster and *sashimi* await.

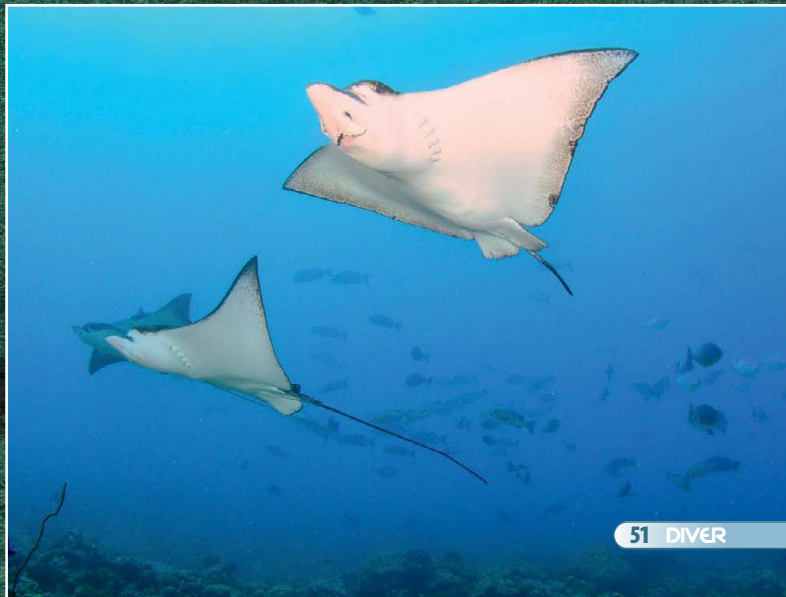
Opened only in 2019 by Cocoon, You & Me is intended as a dream destination for lovers, honeymooners and friends. This "adults-only" island offers butler service in every category, a private dining platform on the waves to which couples have to be rowed, a Veuve Clicquot-licensed wine and champagne vault, an Elizabeth Arden spa on a private jetty and four restaurants with live cooking for a daily "dine around" choice.

The Italian management doesn't compromise when it comes to charcoal ovens – Neapolitan it is.

Perhaps more important than all the luxury trappings is that You & Me is a masterclass in landscaping.

The architects used the limited space beyond the vast beach in a smart way. Rather than cram bungalows onto the average-size island, only 10 of 109 villas are on the beach.

The rest are spacious water bungalows on two jetties. The walk through lush vegetation to the front desk takes 10 to 15 minutes, but the ever-present golf-carts are usually ready to pick up hitch-hikers



Clockwise from pictured: Pilot whales; manta rays, endless humpback red snapper; bannerfish school; batfish; leaving the *dhoni*; whitetip reef shark; moray eels.

heading for the dive-centre.

Located on the landing jetty used by seaplanes, speedboats and *dhoni*s, the facility offers all the standards such as SSI e-learning, nitrox and try-out dives, and follows a routine of two-tank dives in the morning, customised day-trips with three dives, night dives on request and an afternoon dive at the Sandbank.

"The place is only five minutes away and has some nice schools of snapper and the occasional guitar ray, just as there are nice coral formations and resident eagle rays inside the lagoon, but I wouldn't call it a house reef," admits dive-centre manager Miranda.

"But this might change, because the resort management might soon allow diving in the vicinity of the underwater restaurant."

Sorry, must be my diver's ear… did you say underwater restaurant?

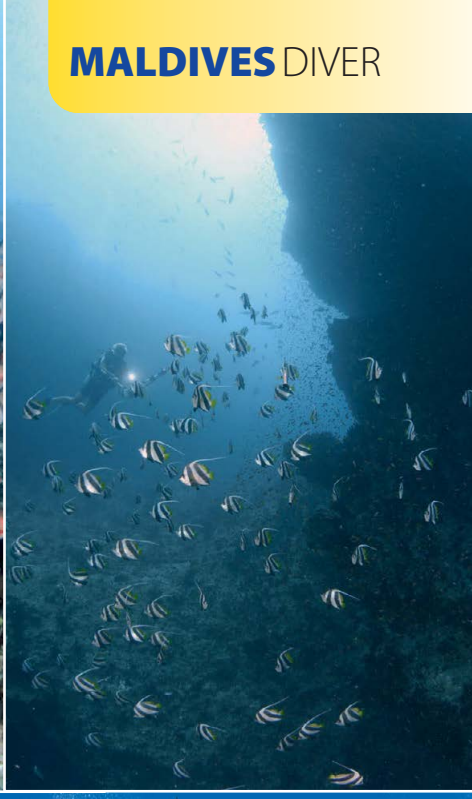
The fully submerged H2O establishment was designed by the renowned Daniele Lago and built in Sri Lanka. The two-storey building was submerged about 350m off the island in a section of seabed harbouring the most marine life.

You can use a lift or spiral staircase from the water bungalow-style welcome area and kitchen to access the almost 360°-spanning panoramic windows, set 6m deep.

The mood in this artificial-twilight zone is mesmerising, even for seasoned divers.

There are now at least six underwater restaurants in the Maldives, so Cocoon's You & Me was keen to take the concept further and brought in a Michelin-starred chef, Andrea Berton, in March.

The *haute cuisine* experience below the waves goes hand in hand with views of a scuttled timber wreck, a coral nursery and schools of surgeonfish and trevallies attracted by the construction in the sand.



Surprisingly, within an hour below the waves several juvenile reef sharks, a fat lemon shark, a nurse shark, several juvenile grey reef sharks and a feathertail sting ray all show up.

No bait is involved, and the restaurant's drainage pipes on the seabed lead straight back to the island. Why even bother to get wet?

Perhaps Maafaru North is the best answer to that question.

On the way to the western outer reef we pass the almost deserted fishermen's island Kandholhudhoo.

Its mosques and multi-storey houses were reduced to rubble by 2004's tsunami and it now resembles a *Mad Max* movie set. Other islands around it were barely affected.

"We have staff-members who are from the island," says Marcus.

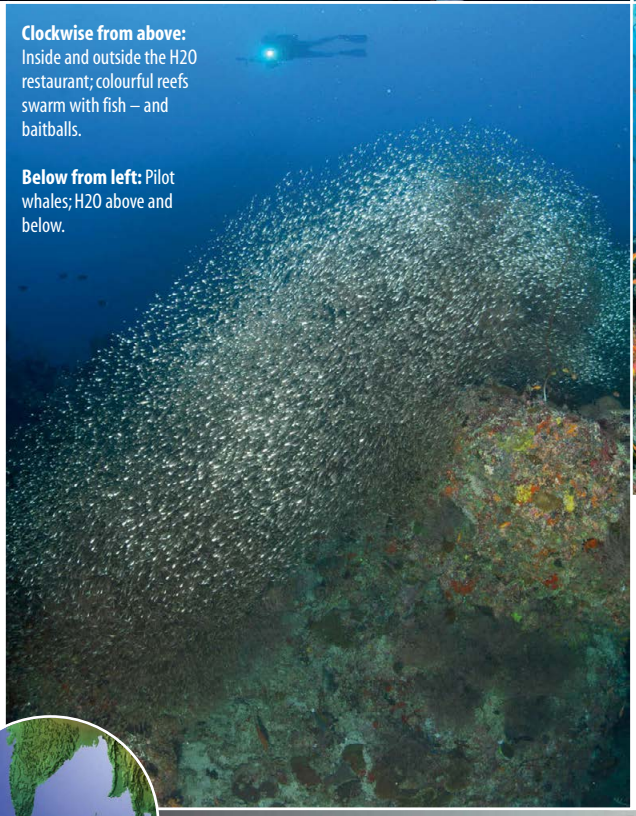
"The fishermen were already out at sea and didn't notice the wave – it's nothing short of a miracle that nobody died."

Glad to leave this eerie scene behind us, we jump into the blue and get swept right into the draughty channel mouth, which has nothing in common with the rainbow-coloured soft corals of the previous day.

WHAT THE BARREN seascape misses out on it easily makes up for with armadas of several thousand snappers and fusiliers, squadrons of eagle rays coming up close, Napoleon wrasse and at least three manta rays, which arrive at the cleaning station one after another.

It's exactly the way they are supposed to appear between December and the end of April.

The next drift at Fuggiri Corner is not far behind in quality either, with more eagle rays, a small giant grouper and a horizon full of snapper that somehow know how to evade the classic shot, just like the shy grey suits in the distance.



Clockwise from above: Inside and outside the H2O restaurant; colourful reefs swarm with fish – and baitballs.

Below from left: Pilot whales; H2O above and below.

"It's not so much about the big names – the shark madness or the whale shark guarantees – over here in Raa Atoll," says Marcus, and suddenly gleams with excitement.

"They do all live here and can be seen, but what strikes me most is the sheer amount of fishes, the biodiversity, the soft coral, the full package – you just feel the area has not been dived a lot at all."

This even seems to go for the Sandbar in front of the island. It's already bad enough that the bottlenose dolphins accompanying us on our way back this time would not stay for an underwater photo session, but Miranda takes the cake: "Daniel, you've just missed the guitar ray, what a shame!"

Ultimately there is neither rhyme nor reason when it comes to such encounters in virgin territory.

Perhaps it is only Neptune's way of reminding us that it's finally time to just lean back and remember that such a resort is supposed to be a carefree environment, even when you're on a four-day mission.

After all it is all about the bubbles – and the ones in the champagne glass might count, too!

FACTFILE

GETTING THERE ▸▸ Direct flight from the UK to Male (MLE). You & Me staff meet passengers at the airport. Short bus ride to seaplane terminal (45min direct flight) or walk to the domestic airport for connection to Ifuru (30min flight) plus 20min speedboat ride to You & Me.

DIVING & ACCOMMODATION ▸▸ DivePoint Maldives, divepoint-maldives.com. You & Me, youandmemaldives.com

WHEN TO GO ▸▸ Year round. Mantas from December to April/May.

MONEY ▸▸ US dollar, euro, sterling, credit cards.

HEALTH ▸▸ Nearest hyperbaric chamber is in Kuredu.

PRICES ▸▸ Dive Worldwide can offer a package from £3795pp, including return flights with Emirates from London, seaplane transfers, seven nights' full board in a Manta Villa and 10 boat dives. It's based on travel up to the end of October, so includes a 30% accommodation saving and upgrade to full board.

VISITOR INFORMATION ▸▸ visitmaldives.com

Free and squeezy

LOUISE TREWAVAS

FREEDIVING – IT'S BASICALLY SNORKELLING with good PR. It involves holding your breath, often to the point of semi-suffocation. What's so free about that?

It wasn't a question I'd often asked myself until I turned up for a shore-dive with an empty cylinder and a handful of misplaced optimism. The urge to submerge is still strong, even when everyone with a working compressor has shut up shop.

Scuba relies on the services of dive-shops and centres to provide you with something to breathe. Freediving has no such complication. As long as you have a mask and fins you can freedive. Game on!

The water temperature is a frisky 13°C, and I'm here with my drysuit. What could possibly go wrong?

"Tell me you're not going snorkelling," scoffs my companion as I start to push my feet into the boots of my drysuit.

Well, technically no, because I don't have a snorkel. But I haven't come on a three-hour drive from London only to return without getting wet.

A snorkel is unnecessary clutter as far as I'm concerned. When attached to your mask-strap it's the diving equivalent of a trip hazard.

A snorkel stuffed down a knife-strap on your calf is invariably forgotten about. Until you're back on the boat. Where you don't need it.

A boat to jump off would come in handy right now. I shuffle down the stony slope of the beach and wade out through the waves to pull on my fins. This is so much easier without the weight of scuba-gear.

I fin away from the shore. Bobbing on the surface like a cork, I'm determined to visit the seabed. It must be down there somewhere. Vis isn't great.

As soon as I duck-dive I feel the air in my suit migrating from my shoulders to my boots. My fins are in danger of popping off as I thrash and fight my way under water.

The seabed is literally in my face. I can practically stand up here.

EMBARRASSED, I POP to the surface and hug myself fiercely to expel air from my suit as I fin further out to deeper water. My companion (shore cover) is shaking her head at my persistent foolishness.

Better not take too big a breath in… After another fight to leave the surface it's barely five seconds to meet the seabed at around 6m. I have struggled to clear my ears and use up the last bit of breath to prevent my mask gouging a groove into my face.

My suit is shrink-wrapped tight; the zip is crucifying my shoulders. I can barely move my arms.

I take a quick look around as water seeps down my neck-seal. Pebbles, two shells, a rock. Needing to breathe, I rocket to the surface.

My dive-computer squeaks in dismay. Forgot to put it into Freedive mode. Forgot I even had a Freedive mode!

Determined that this shouldn't be completely pointless, I try again. And again. Max depth 6.8m, max dive-time 32 seconds. All for a glimpse of seabed.

So I'm definitely a rubbish freediver. To me there's no such thing as a free dive. Even the crease marks in the skin on my shoulders were paid for in pain.

Just charge me and let me breathe. Every time.

This Red Sea wreck can be a great dive – but that depends on how you feel about diving on a tomb, says PAUL GRAHAM. Photos by ABDO ELHABASHY

SALEM EXPRESS

THE RED SEA'S abundance of marine life attracts divers from all over the world, but it is the shipwrecks that are Egypt's hidden treasures.

One such is the former passenger ferry *Salem Express*, which rests 32m down on the Hyndman reef just off the coast near Port Safaga, south Hurghada.

The 100m vessel was never a stranger to mishaps but its career ended in disaster. Built in 1964, it had suffered engine fires and collisions and ran aground in 1980.

But 30 years ago, shortly after midnight on 15 December, 1991, the ferry hit the reef and sank to its final resting place.

She had been returning from Jeddah in Saudi Arabia, packed with vehicles and passengers returning from their pilgrimage to the holy city of Mecca, when stormy weather caused the captain to deviate from his planned route.

The reef ripped a hole in the starboard bow and knocked open the bow door, allowing seawater to engulf the car-deck.

There was no chance of surviving the flood and the ship sank in only 20 minutes. The *Salem Express* now lies on its starboard side on the seabed.

Official records state that 180 of the 644 passengers survived, but only 117 bodies were ever recovered. The Egyptian navy headed the rescue mission with the aid of local dive-professionals and leisure divers from the Hurghada area.

Entryways into the ship have since been welded shut to prevent the remaining bodies from being disturbed.

The numbers both of passengers aboard and those drowned are still disputed to this day.

WHEN DIVING this wreck, awareness of its tragic history is paramount, because the decision to descend is a moral one.

The presence of bodies can prey on some minds, though be reassured, you won't encounter any during an exploration.

To get the best from your dive, descend on a shotline to allow time to take in the magnificent scale of the Salem Express while preserving precious air.

The clear waters allow you to see the vessel as soon as you submerge below the surface. At around 10-12m, you reach the port side.

Start with the exterior, because you'll want to make your deepest dive first.

Descending at the stern you'll see the two large propellers with intact blades at 15-20m. Currents are mild, so take your time to absorb all of the intricate details. It's also possible to swim under the stern from the keel to the rear deck.

At the deepest part of your dive (30m) as you follow the seabed, you can view the lifeboats on the deck side.

You'll note that there is less capacity on these vessels than there would have been for the number of passengers on the ship.

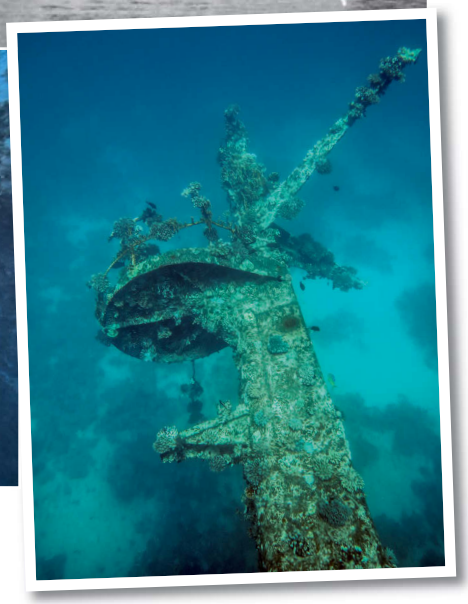
Next you navigate to the smokestacks, which bear the ship's emblem – a large wreath with an S in the centre.

The bridge is a semi-circular structure raised from the main deck. Many of the glass windows are gone and the controls are easily visible.

The restaurant, bridge and upper decks lie perpendicular to the seabed and are accessible but can be disorienting.

As you reach the bow it hits you that the door is wide open. The ramp inside is still upright, which in itself would make an entry or exit there impossible.

At the seabed on the starboard side the extent of the collision damage is clearly visible. It's possible to move in and around the point of impact, but great care must be taken.



Above, clockwise from top: The *Salem Express* in the late 1960s when she was called the *Fred Scamaroni*; mast; lifeboats.

Below: Diving on the stern of the *Salem Express*.

ON ASCENT, MOVE to the top of the wreck, where the immense port side stretches out before you. The upper portholes and side-railing are obvious, and resemble a runway strip.

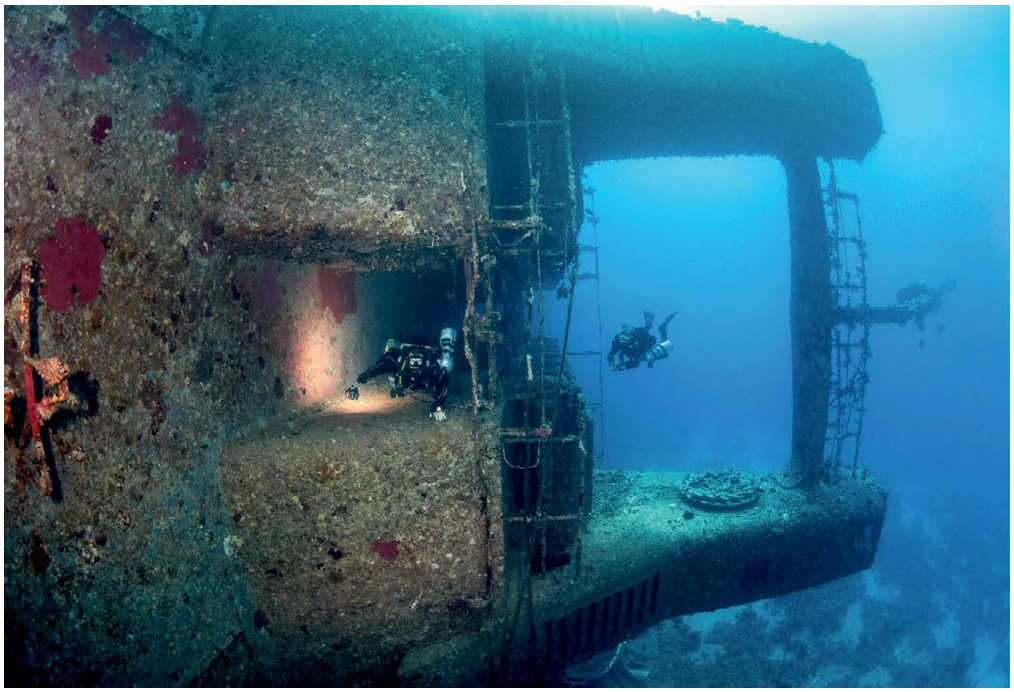
Through the portholes cabins are visible, with beds and fitted wardrobes. This is a good place to end your first dive and just observe the hatch where you will penetrate the wreck on your second dive.

Dive two is the one on which butterflies might put in an appearance. Entering a wreck of this size can be daunting, particularly when there is no natural light and swim-space is limited.

Being an experienced diver with good buoyancy skills is a must for penetrating this wreck, and having a knowledgeable guide is highly recommended.

Their valuable insight will be vital to keeping you safe as you navigate through this eerie wreck.

The hatch is on the port side towards the stern. Entry is via a vertical shaft and from this point there is no natural light so a good torch is a must. The best advice is to take your time. Allow yourself to adjust to your new darkened environment, which in turn helps you to control your breathing and buoyancy.



There are three main corridors within the vessel and they run from one end of the ship to the other.

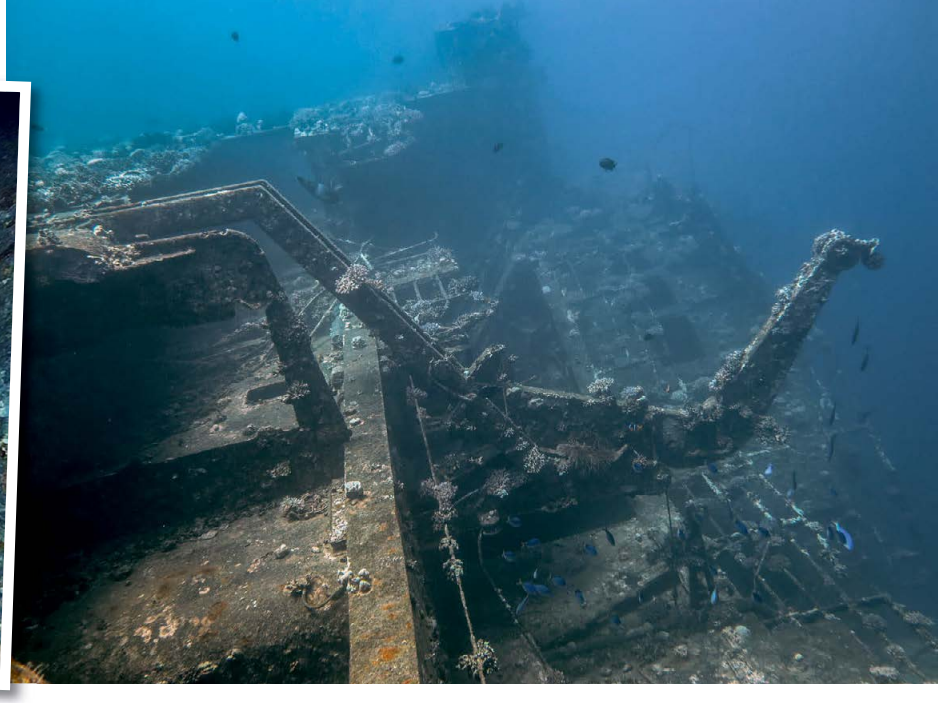
When upright these would have been side by side, but due to the wreck's perpendicular position the portside corridor is at 15m, above the centre corridor at 21m and the starboard side corridor down at 27m.

In these corridors are a plethora of recognisable items such as luggage, personal belongings, furniture, bicycles and a pram. Most are intact.

All three corridors lead to a large stern compartment where an Isuzu truck, wheelbarrows, bails of cloth and dozens of other personal effects lie heaped by gravity on the starboard side.

Even with perfect buoyancy your air bubbles will disturb the red sediment suspended in the water.

Moving down the corridors towards



the bow you can see a Toyota estate car that has shunted forward and nosed under the rear of a Nissan, likely a result of the impact with Hyndman reef.

Right at the front of the bow compartment you'll see a digger.

On the cargo deck you encounter cars, motorcycles and lorries. There is more space to manoeuvre here, but you still want to keep movement to a minimum to be kind to your dive-buddies and help to maintain visibility.

As you begin to exit, in the distance you begin to discern the bright blue of the Red Sea. The small amount of light entering the wreck can make for some awesome photographs. The light increases in size until you reach the outer door.

On exit, again allow your eyes to readjust while you take in what you have just experienced.

With the top of the wreck at 10-12m and the maximum 28-30m divers can expect a long dive, with most of it spent in the shallower areas. Often maximum dive-time is dictated by the guide and how good your air consumption is.

SAFETY-STOPS CAN be completed either on the shotline or hovering nearby, because currents are usually very mild. That allows you to take in the entire wreck one last time before surfacing.

It might have been sunk for the past 30 years but marine life has yet to fully colonise the wreck, though there are some corals and aquatic life in the area. This is not one for those who value wrecks mainly as artificial reefs.

Despite that, the *Salem Express* is a gift for photographers or videographers. The clear water allows the sunlight to penetrate deep below the surface and illuminate the exquisite external structures.

Inside, even with a basic light source such as a torch, it's possible to capture many interesting shots.

Egypt's year-round sun means that you can dive the *Salem Express* at any time of the year. Water temperature is a tepid 22°C, even in December, and most of the reputable dive operators in Hurghada, Makadi Bay, Safaga and Marsa Alam offer trips, though if there are strong winds you might find your trip delayed.

Because of the location of the wreck and shallow reefs below the surface, navigating to the site can be challenging in rough seas, in which case your dive could be rescheduled for a calmer day.

This is both a mesmerising and memorable wreck to dive. The main questions you need to ask yourself are: Do I have the relevant experience and skill, and am I comfortable diving here, knowing this wreck's history?"

Above, from left: Vehicle on the car-deck; lifeboat davit towards the bow.

Right: The control deck.

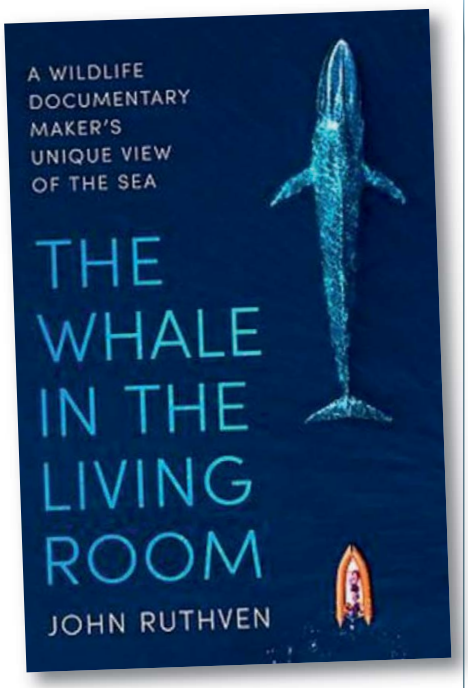
Left: Coral growth on the port railings.

Below: The port side.

'THE CLEAR WATER ALLOWS THE SUNLIGHT TO PENETRATE DEEP BELOW THE SURFACE'

COLOURS OF SUCCESS

The Whale in the Living Room, by John Ruthven



IN A MONTH packed with excellent new diving-related books, but most of them to file under "reference", this one stands out as my favourite read.

John Ruthven is a diver and wildlife documentary producer, the only one to have worked on both *Blue Planet* and *Blue Planet II*, and responsible for some highly memorable sequences.

He wrote and produced that BAFTA award-winning must-see TV moment of the whale mother with her dead calf that raised questions in the Commons the next day, and helped to shift public awareness of plastics pollution at sea.

He has made some 50 films for the BBC, Discovery (Shark Week), NatGeo and PBS, and won an Emmy in 2015 for producing and directing *Mysteries of the Coral Canyon*, set in Fakarava Atoll in French Polynesia.

Ruthven has a lot to say about marine life and the art of filming it as reflected through his experiences, and he says it in an engaging manner that wafts you pleasurably through the pages like a warm current.

My favourite chapters are those in which he slips and slides freely from one subject to another.

They put me in mind of those dives where you're constantly diverted by competing attractions, maybe critters, a small wreck or the behaviour of other divers, before a giant ray suddenly makes an appearance. It's unplanned and unforgettable.

In the later chapters Ruthven tends to stick more closely to his theme, whether that's filming blue whales with David Attenborough or overcoming the risk of boring viewers with environmental messaging.

The writing is always colourful, and in fact colour is used to define the various environments Ruthven has recorded, from Orange Seas (coral reefs) to Green Planet (kelp forest), Brown Planet (coastal areas) and lots of open-water action in the Big Blue.

The book title of course reflects the film-maker's mission to convey the underwater world meaningfully via TV screens, and the author has played his part in raising the bar precariously high, especially as budgets dwindle.

I felt I had gained some insight into the challenges and headaches at all levels of organising expeditions – but thankfully with no hint of "diving for a living is tough, poor me".

John Ruthven might define his just-do-it approach as "pantser division" but he has had an outstanding career to date and I appreciate him stopping to share the highs and lows in this honest book – I hope you will too.

Robinson, ISBN: 9781472143501
Softback, 360pp, 15x23cm, £14.99
Kindle £7.99

HEAVY-HITTER FOR UK DIVING

Great British Marine Animals by Paul Naylor

DEVON-BASED Paul Naylor has made a notable contribution to British diving as marine biologist, ecologist, underwater photographer and writer – and a diver/snorkeller for almost half a century now.

When *Great British Marine Animals* first appeared it wasn't the heavy-weight this fourth edition is, but it was still dazzling to have so many high-quality photos and useful facts recorded between its covers.

That was 18 years ago – 235 pages and notably inexpensive at the time. It's up to a hefty 432 pages now, and still great value at £20.

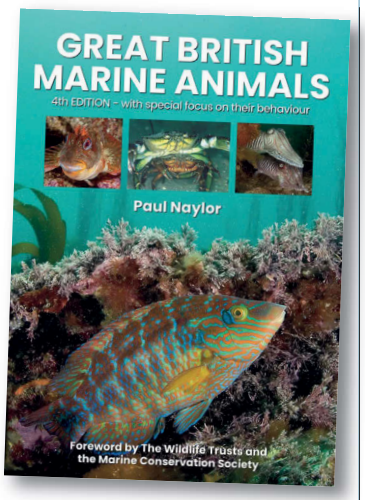
It's been 10 years since the last edition, and the cover of this new one tells us that it offers a special focus on the animals' behaviour. This means invaluable background for the underwater photographers who use these books not only to identify species but to find out how, when and where to find them.

The quality was always good, with glossy white paper and Naylor's photos used big enough to show the content to best effect. There are now 930 images, displaying 320 species.

That's 40 more than before, though Naylor is honest enough to describe even that as a "very small proportion" of the thousands of species in British seas. It should still be enough to meet most divers' requirements.

Sensibly a corkwing wrasse stars on the cover – it always pays to remind us how colourful British seas can be.

The book reflects all Naylor's recent research, including that he has been carrying out with tompot blennies in his home waters (he can now identify individuals by looks and personality!), and animals such as "decorator" spider crabs, more usually associated with Coral Triangle diving, sea-slugs, wrasse and cuttlefish.



The photographic straplines across the top of each spread make it very easy to navigate through the book, as does the bookmark cover.

It's a reference book, but when you have a moment just dip in at random for fascinating reflections of what British marine-life diving is all about.

Sound Diving Publications
ISBN: 9780952283171
Softback, 432pp, 17x24cm, £19.99

TOP 10 BEST-SELLING SCUBA-DIVING BOOKS

as listed by amazon.co.uk (25 June, 2021)

1. **100 Dives of a Lifetime: World's Ultimate Underwater Destinations,** by Carrie Miller & Brian Skerry
2. **Scuba Diving Hand Signals: Pocket Companion for Recreational Scuba Divers,** by Lars Behnke
3. **Scuba Confidential: An Insider's Guide to Becoming a Better Diver,** by Simon Pridmore
4. **Scuba Fundamental: Start Diving the Right Way,** by Simon Pridmore
5. **Sport Diving,** by BSAC
6. **Animal Explorers: Toby the Deep-Sea Diver,** by Sharon Rentta
7. **Scuba Confidential: An Insider's Guide to Becoming a Better Diver (audiobook),** by Simon Pridmore
8. **Deco for Divers: A Diver's Guide to Decompression Theory and Physiology,** by Mark Powell
9. **The Forgotten Shipwreck, Solving the Mystery of the Darlwyne,** by Nick Lyon
10. **Fifty Places to Dive Before You Die,** by Chris Santella

KEEPING UP WITH SHARKS

Sharks of the World: A Complete Guide by David A Ebert, Marc Dando & Sarah Fowler

THERE ARE TIMES when you might not *need* a particular print book but still have an overwhelming desire to possess it.

This is the case for me with *Sharks of the World* which, like the animals inside, is an object of beauty.

It's such appeal that keeps print going. This is a big blue slab of a book with a handsome tiger shark demanding your attention, and if you appreciate fine book design and typography, each spread is a joy.

There is a huge amount of reading to be done should you be seeking a full shark education rather than just a reference book, and while the type might be small there is so much packed into these 600 pages.

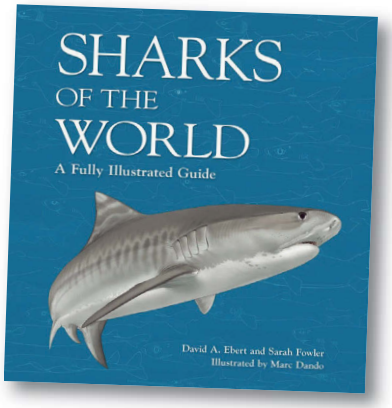
Delicate illustrations by the master in this field, Marc Dando, are the icing on the cake. There are a number of good photographs too.

I'll just put the book into context because, as with the new *Great British Marine Animals*, it is building on earlier successes.

Field Guide to the Sharks of the World came first in 2005, covering 400 named species. *Sharks of the World* made its debut in 2013, and now this second edition arrives with another 51 species to bring the total to 536.

In the process much scientific confusion over species definition has been cleared up, say the authors.

I was surprised to learn that nearly 40% of all new species of sharks, rays and their relatives have been named in the past 50 years, but that's the



power of DNA analysis for you. More than 120 of the sharks in this book have been named since the original field guide came out.

As the cover claims, this is indeed "A Complete Guide" although, as the authors admit, probably not for long.

For each species there are line drawings of head and profile, those full-body illustrations, tooth diagrams and colour distribution maps, along with data on ID, dimensions, habitat, behaviour, biology and, invariably depressingly, IUCN Red List status.

Dando and Fowler were involved from 2005 but Ebert was the student of the original co-author Leonard Compagno, which is neat continuity.

They have all done an amazing job – the only problem being that this definitive book is far too beautiful to take near the sea.

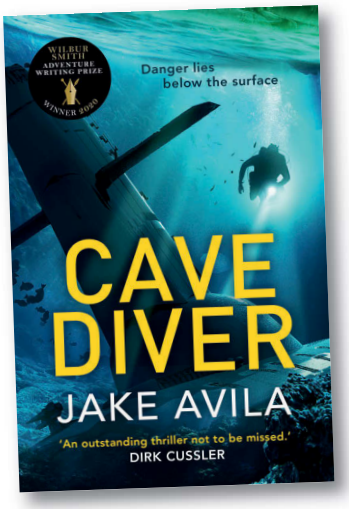
Princeton University Press
ISBN: 9780691205991
Hardback, 608pp, 22x23cm, £42
Kindle £29.31

TRICKY PASSAGES

Cave Diver, by Jake Avila

THIS NEW THRILLER arrives awash with rave reviews from the likes of masters of the genre Dirk Cussler and Wilbur Smith.

The work of US writer and former English teacher Jake Avila is certainly well-constructed and expertly paced, and the action is nothing short of brutal, with a death-toll that rapidly spirals out of control as wave on wave of sadistic villains are given free rein to indulge their peculiar tastes.



And although the plot revolves around that whiskery staple of diving novels, Nazi gold on a lost submarine, it does have the twist that the sub is Japanese and jammed into a flooded cave in remote Papuan jungle.

My problem was that I found a lot of the dramatic setpieces difficult to follow, particularly those under water, and I blamed myself for not caring enough about the characters to keep going back to work out exactly what was going on.

I'd rather go with the flow than have to do homework. But that could be me – you might breeze through it.

Our hero Rob Nash is haunted by the lonely death of his wife. She, like him, was a cave-diver and he now faces a bit of an existential crisis.

Hard-bitten pilot Frank Douglas drags Nash along as a fellow hired hand on what purports to be a filming expedition but transparently isn't.

Nash soon has little time to wrestle with his personal demons as he meets glamorous doctor Mia Carter and together they face the greatest challenge of their lives… etc.

There is a fair amount of frenzied diving action – free, open-circuit and rebreather – which seemed to make sense as far as I could follow the narrative. Avila can certainly write, but I'm afraid this was one of those books where I reached the end with more relief than satisfaction.

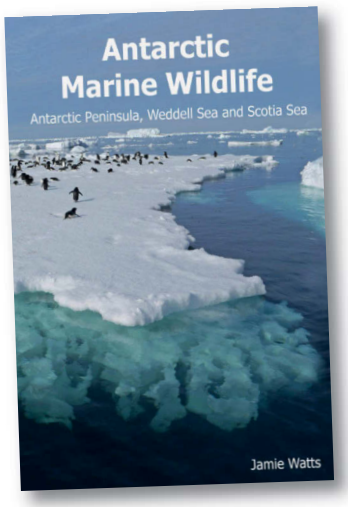
That said, I see that the author is now writing a multi-book saga on the fall of civilisation, and the flair he shows in *Cave Diver* would probably be enough for me to give it a go.

Zaffre, ISBN: 9781838775360
Softback, 400pp, 13x20cm, £8.99
Kindle £4.79

DEEP SOUTH ANIMAL LIFE

Antarctic Marine Wildlife: Antarctic Peninsula, Weddell Sea and Scotia Sea, by Jamie Watts

I KNOW THAT most of us are no more likely to dive in Antarctica than to penetrate the furthest reaches of Pozo Azul, but you never know.



Those fortunate enough to get the chance, or who just want to learn about life in the planet's southern reaches by proxy, should know that Jamie Watts is an eminent marine ecologist and a fine writer.

He has produced many marine-life articles for **DIVER** over the years, always making sure to approach his subject from a diver's perspective. He also writes evocative blogs from wherever he finds himself, showing how driven he is to share wonders he witnesses.

And he has dived all over the world. He started as a fisheries scientist with the British Antarctic Survey in 2004 and 16 years later reckoned he had logged more than 430,000 nautical miles on 249 expeditionary voyages – half of them to Antarctica. He knows his stuff.

This book is based on the premise that the entire Antarctic food-chain is based on sea-life so, after rounding up the areas, he works his way up that chain, starting with plankton.

He continues with seaweeds and invertebrates attached to walls, reefs and seabed before moving on to mobile invertebrates and fishes.

Then it's the turn of the marine mammals from seals to whales, and finally penguins and other seabirds dependent on the sea for sustenance. There's a useful wildlife calendar too.

This is a working field guide, not a coffee-table book, so it's functional in design, though with its soft cover could get dog-eared fairly quickly if it gets used as much as I suspect it will.

The matt paper stock can't get the best out of all the photos, which come from a wide variety of sources, but it does a pretty good job.

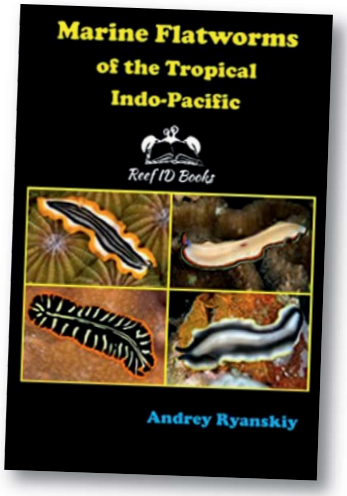
The generally impressive collection of images is accompanied by concise, non-technical explanations of each animal or group of animals.

This isn't a comprehensive ID book but it puts everything neatly in its place. If you're lucky enough to be mugging up for a trip to the far south I'm sure you would enjoy reading it from cover to cover. Good job.

Jamie Watts
ISBN: 97987355285623
Softback, 328pp, 14x23cm, £44.99
Kindle £21.81

FLAT AND FULL

Marine Flatworms of the Tropical Indo-Pacific by Andrey Ryanskiy



THESE "CRITTER ACADEMY" Indo-Pacific marine-life ID books come out at regular intervals, the most recent in the series being *Living Seashells* at the end of last year.

The formula is well-established now – very basic, especially in terms of text and design, but taking in a lot of species, these guides are ideal for underwater photographers who can't rest until every critter they have captured is accurately captioned.

There are more than 580 *Polycladida* species in here, including many that Ryanskiy says have not previously featured in field guides.

They are illustrated in some 1300 photos – with up to a dozen shots devoted to certain species where there might be confusing colour variations, a common ID problem.

Flatworms complements the earlier *Nudibranchs* guide, and the only question is whether you prefer your critter guide on paper or digital.

Either way, it should work whether you're diving the Coral Triangle, the Red Sea, South Africa or Hawaii, and if it doesn't, you've probably just found yourself a new flatworm.

Reef ID Books,
ISBN: 9785604204979
Softback, 138pp, 16x23cm, £22.99
Kindle £13.52

Reviews by Steve Weinman

Two seasons from Four Seasons

The liveaboard *Four Seasons Explorer* has returned to the Maldives. The 11-cabin, three-deck catamaran is offering two seasonal cruise options: "Summer of Mantas" until the end of October and then until the end of April 2022 "Winter of Wonders".

The summer itinerary offers all-inclusive three-, four- or seven-night itineraries that follow manta "oceanic ballerinas" and whale sharks through the Baa Atoll UNESCO Biosphere Reserve and into the plankton-rich waters of Rasdhoo and North and South Ari Atolls, with experts from the Manta Trust aboard. These trips depart from the Four Seasons resort at Landaa Giraavaru.

The winter trips have itineraries of the same lengths covering "endless bucket-list encounters across five atolls", but run between Landaa Giraavaru and the Four Seasons resort at Kuda Huraa.

KEN SEET

Four Seasons Explorer is described as "a floating 5* PADI dive centre". Lead-in rate for a four-night cruise is US $3800pp plus taxes (two sharing), including transfers, dive gear, other watersports from windsurfing to water-skiing and presentations from a resident marine biologist.

Book a cruise with a minimum three-night stay at either resort and you receive complimentary half-board for two at the resort through to 20 December 2021. B&B rates at Kuda Huraa start at $1100 plus taxes a night and at Landaa $1350.

▸▸ fourseasons.com/maldivesfse

KEEPING TRACK AT FUVAHMULAH

Fuvahmulah is the much-talked-about Maldives hotspot that includes the Tiger Zoo dive-site and offers tiger and thresher shark diving from the eighth DivePoint Maldives dive-centre, which is also the southernmost in the archipelago, almost on the Equator.

Unlike most resort islands 7000 Maldivians live on Fuvahmulah and are not separated from tourists.

There is jungle, two freshwater lakes and the island is not part of an atoll and has no shallow areas or lagoons – all very un-Maldives as we know it.

With strong currents in exposed locations the dive-centre, which opened only this April, decided that a diver-tracking system was a must.

"We are not just talking about safety, we really implement it", says manager Marcus Hauck. "Divers who are swept away here have just small chances to be found. That's the reason why it was totally clear to me to install ENOS from the beginning." The Electronic Rescue & Locating System is made by German company Seareq.

DANIEL BRINCKMANN

DivePoint has offers for stays at a choice of three guesthouses: Endhaa Divers, the Fuvahmulah Inn and the Veyli Residence.

Five nights' B&B at the latter, with internal flights, up to three boat-dives a day and taxes would cost US $1499pp (two sharing); 10 nights $2825 or a month $5800.

Seven to 12 dives cost $73pp each.

▸▸ divepoint-maldives.com, seareq.de

GO PLAY IN ICELAND

Iceland is green-listed, so this could be the time to tick the famed Silfra Fissure dive off your wishlist. A new low-cost icelandic airline called Play is now flying from London Stansted to Reykjavik – a rare example of an airline launching during the global pandemic.

One-way tickets start from £30, stresses the airline, so it's just a matter of working out the price of coming back. The airline has three Airbus A321neo aircraft that fly four times a week on Mondays, Thursdays, Fridays and Sundays.

▸▸ flyplay.com

WL Watch-listed (sudden change in classification possible)
NE No entry for most UK travellers
QE Quarantine on entry

Antigua (WL)
Australia (NE)
Balearic Islands (WL)
Barbados (WL)
Bermuda (WL)
British Virgin Islands (WL)
Cayman Islands (WL, NE)
Dominica (WL)
Gibraltar
Grenada (WL)
Iceland
Israel (WL)
Madeira (WL)
Malta
Montserrat (WL, NE)
New Zealand (NE)
St Helena (QE 10)
Turks & Caicos Islands (WL)

AMBER-LIT Aruba, Bahamas, Belize, Bonaire, St Eustatius & Saba, Canada, Croatia, Cuba, Curaçao, Cyprus, Denmark, Fiji, Finland, France, French Polynesia, Greece, Greenland, Honduras, Indonesia, Italy, Japan, Jordan, Madagascar, Malaysia, Marshall Islands, Mauritius, Mexico, Micronesia, New Caledonia, Palau, Papua New Guinea, Portugal & Azores, Réunion, Solomon Islands, Spain & Canary Islands, St Kitts & Nevis, St Lucia, St Vincent & Grenadines, Sweden, Taiwan, Thailand, Timor-Leste, USA

RED-LIT Bahrain, Cape Verde, Costa Rica, Dominican Republic, Egypt, Kenya, Maldives, Mozambique, Oman, Philippines, Seychelles, South Africa, Sudan, Tobago, Tunisia, Turkey, UAE

Blue Bahamas discounts

In late June blue o two was offering up to £1000 off a trip to the amber-listed Bahamas, so they might be gone by now but for what it's worth you could get a 10-night hammerhead and tiger shark experience starting on 20 September for £2333pp, with smaller discounts of £333 off a five-night Tiger Beach experience on 7 October (£1333) and £700 off seven-night Wrecks, Blue Holes & Sharks trip on 13 October (£1633). Get in touch to find out if they're still available!

▸▸ blueotwo.com

WELL AND TRULY TESTED

DPVs can be relatively inexpensive and lightweight nowadays – which leaves the question of whether you really need one for your style of diving. STEVE WARREN tests a Spanish contender

DPV
DIVERTUG DT COMBI SHORT / LONG

UNTIL JUST A FEW DECADES AGO diver propulsion vehicles, or scooters, were a rare sight. Known mainly through movies and TV shows, even entry-level DPVs were fiendishly expensive.

In 1992 I bought one that in today's terms cost £2500. I put it in the front of the dive shop where I was working. The requests to bring it to local dive-club pool nights flooded in, because it was an exotic piece of kit that people wanted to try.

For most leisure divers DPVs have limited value. Beyond its use as a marketing tool, I barely used mine in open water. I had turned to underwater photography and, because I wasn't into drive-by shootings, the fast speed and long range of my machine were the antithesis of taking pictures that depend on stealth and the pace of a rheumatoid tortoise. It also weighed 20kg.

It's different for tekkies. Technical diving has emerged largely from the development of equipment that permits longer, deeper dives, such as warmer suits, bigger cylinders and closed-circuit rebreathers.

With increasing depth, greater gas density and reduced exercise tolerances make breathing and swimming harder. DPVs are popular partly because they help to solve these constraints.

As a further benefit, lack of exertion greatly prolongs the sort of gas supply an open-circuit diver ploughs through on deep dives.

DPVs' speed enables divers to cover more ground within limited bottom times and explore further into caves, or survey new dive-sites. They are sometimes also deployed as camera platforms, used in scientific diving for mapping and by documentary film-crews for shooting in current or carrying overhead light-arrays.

Divertug is a Spanish brand aimed primarily at technical divers. There are three models and a long-range DPV in development. All are tow scooters, whereby you hang onto the back to get pulled along, rather than ride-ons that you straddle.

The newest machine, the mid-range DT Combi, is a lightweight, compact unit and about as travel-friendly as serious scooters get. Relatively low cost, it provides a decent time/distance/power ratio.

Gibraltar SAC, which has long supported **DIVER** Tests, has a cadre of technical divers. Its clubhouse lies close to the Atlantic and an impressive trail of deliberately sunk wrecks spread over several kilometres in the 10-30m range.

Scooters have radically changed how the club shore-dives. Of around a dozen members own, half are Divertugs. Made in Malaga, a two-hour drive away, this has helped them to win sales, because of ease of support and willingness to host local try-before-you-buy events.

GSAC committee officer, instructor and Divertug owner Robert Sherriff arranged for me to try the Combi.

The Design

The Combi branding relates to the unit's two interchangeable lithium power-packs, contained in one of the two nose cones that give the Combi its Short or Long suffix.

The common rear unit contains the brushed electric motor, which is two-speed, and, externally, the prop and shroud, single handle and run lever, on/off switch, indicator lights and charging port.

The handle can be partly folded down to minimise the footprint for stowage when space is tight, as on a small boat.

The polycarbonate body is depth-rated to 130m. Switching between the smaller and larger lithium 24V batteries does not increase speed but does extend run-time and range.

It also adds to the weight, and if that's one of your main criteria, perhaps for air transport, the 44cm Short comes in at 10.2kg plus charger.

Fully charged, Divertug claims around an hour's cruising at high speed and twice that at low. It calls this medium, running at 60% of full power.

On the Long 50cm version the weight goes up to 12.7kg ex-charger. More impressive is that DT reckons runtime shoots up to two hours at high speed and 3hr 25min at low.

This extra performance not only extends range but could ease juggling a day's repetitive diving without needing to recharge the unit or switch power-packs. This makes it an obvious contender for rentals at dive-centres and on liveaboards.

In Use

I did some six dives using the two Combi models, which were already charging in the clubhouse when I arrived. It takes four hours to fully charge the Short and seven for the Long.

Charging is through an external port with screw-on cap, or you can remove the front cowling. Robert prefers to charge this way so that he can check the seals and catch any slight leaks.

Gib water is silty and, as an underwater photographer, I'm very aware of the importance of O-ring care, so Robert's caution is justified in my eyes. In cleaner waters it's less of an issue.

Thick double O-rings seal the halves together. Divertug doesn't use latches to secure front and back – Instead, the flip-handle at the front of the nose is used as a key to screw the unit together.

With the front section sliding over the O-rings, there's a sporting chance that any missed hairs or particulate will be wiped off the seals.

The engine compartment is additionally sealed from the nose-cone. I'm not clear how much protection this provides should a flood occur. My experience of major leaks in polycarbonate

Top: **Battery installed.** *Above:* **External charging port.**

camera strobes and torches is that the batteries heat up and leak acid and often write off the equipment. However, slight leaks, caught early, are sometimes survivable. In the event of a fully flooded nose-cone, I would guess that you could recover the Combi with a DSMB.

My own DPV came with a brief manual with tips for safe use. It was enough. Today, there's a course and badge for everything, but piloting a scooter is very straight-forward.

The main risks are presented by speed. Uncontrolled fast descents and ascents can lead to squeezes, lung injuries and DCI, and in low vis it's also easy to get separated from your buddy. But let's not exaggerate the hazards.

Getting started began with clipping the rope towing bridle to my harness. Without a bridle, a tow-type DPV puts a lot of strain on your arms.

Ideally, you keep your body above the scooter, so water passing through the prop shroud isn't blocked as it exits.

With tow scooters you usually have to crook your elbows to hold this position and, as you tire and your arms stretch out, you end up slipping into the propwash, which reduces performance.

The bridle, once set up properly, holds you to the scooter to remove arm strain, and positions you correctly out of the slipstream.

The Divertugs as delivered are virtually neutral in fresh water and a little buoyant in salt water. My units were very slightly negative, probably because of the weight of the bridle and its humongous metal clip.

You can add internal weights to the Combi to adjust buoyancy and trim for salt water, the buoyancy of which varies by ocean. You might also want to do this if you've added buoyant accessories such as camera systems or lighting.

You also need to be neutrally trimmed and buoyant yourself to keep streamlined and maintain precise steering control.

If you aren't, you'll tend to compensate by pitching the nose up or down, which will impair steering and create drag. Bottom line: a DPV won't overcome poor buoyancy skills.

There is a large, plasticised, easily turned rotary on-off switch. This incorporates an LED display, providing battery status and flood and overheating warnings. When cruising, these lights are in your line of sight, so hard to miss.

The lights are colour-coded. Battery life is indicated by green from full to 60%, then orange down to 30%. Red kicks in below this.

A red and green light indicates 5% or less remaining power and warns you that the unit will shut down imminently to protect the battery.

Blue is a flood alarm. There's a red signal to indicate overheating as well, and this goes off once the machine cools to a safe temperature.

The trigger is really a lever and easily used with gloves on. Pull it up once and the Combi powers up to low speed. Pull it up again, and you go to high speed. A third pull switches the motor off.

Rotary on-off switch with inlaid LED and signals guide.

A twist of the lever locks the trigger at your set speed, so you don't have to hold it permanently to keep running. You can operate all the switch positions one-handed. It's magnetic, so there are no penetrations through the hull to service.

Moving

Squeeze the trigger and acceleration is near-instant. You steer using a combination of pointing the bow and using your fins as rudders.

You need only one hand to control the Combi, so the other is free for ear-clearing, adjusting buoyancy and signalling. Reading instruments might require you to pause if you have to push buttons to access menus. Divertug offers brackets for adding instruments to the handle to help you check depth and direction.

I didn't have the bracket but would probably mount a compass and one of my computers onto it and keep another on my wrist. This would allow me to check deco status easily while underway, while still having one computer attached to me in case the scooter and I became separated.

I had a gas-integrated computer with a sonar link I was also testing, and the Divertug motor didn't interfere with the signal at all.

Both versions of the Combi were very easy to manoeuvre. My own DPV had been fun to fly, its two grips making it easy to twist into barrel-rolls or send end-over-end into forward and backward somersaults, but I'm not sure such frivolity is encouraged by tekkies.

Robert's DT handle with bottom timer, compass, mirror and swivel light attached.

The bridle restricts gaming DPVs a bit, but I could fly the unit on its back, as you might to examine the roof of a cave. On my first dive I felt confident enough to steer it at high speed through a tight gap in some wreckage that left little space for error (or my head).

Later, I nosed it through a doorway, into a small bow cabin and out through another door without hitting anything, though at slow speed with some start/stopping of the throttle.

Speed

A number of factors influence how quickly a DPV will move you through the water. Design is a fixed value but the others are mainly variables, including opposing currents, which are common in Gib, and the diver's build, kit and streamlining.

I got a lesson in this on an early run with the Combi. I was wearing a recreational BC with single tank while Dennis Santos and Robert were using twin-sets and tech wings. I kept pulling ahead, either stopping my Combi momentarily to let them catch up or circling in a holding pattern.

This is the drawback of a two-speed machine compared to a DPV with more throttle settings or an adjustable-pitch prop that allows fine speed adjustment. However, when I too donned doubles and a wing, our speeds matched perfectly!

With much other kit to test, against a deadline constantly eroded by Gib's increasing Covid restrictions, I asked Dennis and Robert to check the Combi's performance for me later.

Over a measured 40m, encumbered by drysuits, twin-sets and the girth of easy living, they extrapolated that at low speed a Combi would cover 1km in around 27min on high speed and 38min on low.

I had no low-battery warnings on either Combi. Dennis thinks quoted run-times are conservative.

Snagging

Some tufts of seaweed, torn up by a recent storm, caught around the propeller. For good measure

the fronds had also snagged some ghost fishing-line. The Combi has a clutch mechanism to prevent motor damage if something impedes the prop, so I switched off the unit and quickly removed the propeller by hand – a design feature to allow you to clear entanglements under water.

You can imagine the problems a stalled scooter might cause for a diver caught out far into a cave system, but two minutes later I was back in action.

I didn't hit the line deliberately for this report; I just got lucky. Anyway, it proved that clearing the prop of entanglements is so straightforward that even I could do it.

GSAC members have found that the Divertugs' light weight renders them practical for shore-diving, even when entering and exiting the water might be tricky.

For instance, using the towing bridle we were able to pull the scooters up a vertical swimming ladder a metre or so to recover them onto a pier.

At other times we'd land on a small beach and have to walk the units 100m while wearing our twin-sets. I'm 5ft 8in and I could easily carry either unit by its nose-ring without the prop-shroud dragging on the ground.

Rec to Tech

Having said that DPVs are primarily tools for technical diving, smaller, lighter and lower-cost scooters such as the Combi overcome many of the barriers that deter recreational divers from owning them.

Whether such machines should be used by divers who are simply unfit is debatable, although an 80-year-old friend of mine whose legs were shot would have loved the independence a DPV would have gifted him on his final dive-trip.

The Combis, especially the Short, can also be regarded as more affordable than a basic underwater camera system.

A single Combi between a buddy-pair is a practical option for many types of dive, further cutting ownership costs.

I've ridden pillion on Divertugs and they are adept at pulling two divers quickly, even when both are wearing doubles.

For diving in high-current areas such as the Maldives the Combi has obvious attractions. I can also now see applications for underwater photography. I long to video on Gibraltar's wrecks and the speed with which they can be reached from shore using scooters offers far more time on site than swimming could.

For long-range diving, DPVs can allow you to do without a boat, dispensing with the need to find a skipper or having to stay on board after you've been in so that others can also dive.

Basic Safety

Technical divers will make contingency plans for scooter dives, ensuring that they have fall-back options so that a DPV failure won't be catastrophic.

Recreational divers operate in more forgiving circumstances, but some care is still required.

For casual beach-diving, you need to ensure that you can get back to shore if you have a battery or other malfunction. This is probably less of a concern if you are buddy-diving and both have scooters, because you can get a tow.

Otherwise, the rule is to remain within comfortable swimming distance of a usable exit, always remembering that it might be behind you and that you might have to swim against the tide.

When diving from a boat it might be sensible to tow a marker-buoy so that the crew know where you are.

Propeller with twist-off cap, making it easy to remove under water even with gloves, and shroud.

Conclusion

For towing heavily laden divers at depth, which is the technical market, the Combi should excel within its stated range limits. Divertug also markets the Combi as a back-up to get you home on those very long cave-dives where a failure of the primary scooter could be life-threatening.

For recreational diving, the Combi offers opportunities to explore more efficiently than when swimming.

Whether you would be permitted to range as far and wide as the Combi promises probably depends on your dive operator.

For private diving, that's not a problem and I can see the smaller size making Combis an asset to divers with their own boats, while the modest weight lends them to shore-diving remote beaches. Highly recommended. ■

SPECS

PRICE ›› **Short – 1662 euros. Long – 2162 euros, both plus shipping and taxes**
RUN-TIMES ›› **Short – High 60min, Low 120min. Long – High 120min, Low 205min**
BATTERY ›› **Spill-proof lithium 24V, Short – 300Wh, Long – 528Wh**
CHARGE TIME ›› **Short – 4hr, Long – 7hr**
WEIGHT ›› **Short – 10.2kg, Long – 12.7kg**
LENGTH ›› **Short – 44cm, Long – 49.5cm**
DEPTH LIMIT ›› **130m**
CONTACT ›› **divertug.com**

HOOD
SCUBAPRO EVERFLEX SEAL 5/3 WITHOUT BIB, WITH FACE-SEAL

UP TO 50% OF HEAT-LOSS can occur through your head. For divers in cold and temperate waters, that's a daunting statistic. Jump into water as "warm" as 14°C, common enough in the Mediterranean in winter, and your entire skull can become an ice-cream headache.

After a few hurtful minutes you'll feel fine, as your head warms up. What this means, of course, is that core heat is being drawn from your body via your head into the water.

Apart from being painful, cold is mentally and physically debilitating, distracting the diver and impairing decision-making as well as numbing hands, making emergency equipment-ditching extremely difficult or even impossible.

The Design

Scubapro offers a range of hoods to help delay chilling in cooler climes. My own hood, which came with my 10-year-old drysuit, was due for

replacement, and Vinnie Fitzgerald at Dive Charters in Gibraltar recommended the Scubapro Everflex Seal 5/3 Hood without bib and with face-seal.

The detailed description gives away the specs – it's a combination of 5 and 3mm neoprene with a face-seal. It has a short collar, while another version has a full bib.

The bib provides a yoke more appropriate to wetsuit divers, because it diverts cold water over your suit instead of down your neck.

The use of different thicknesses of neoprene is a useful compromise. The thicker 5mm provides more insulation but is less supple. It's perfect for covering the hard, non-moving parts of your skull.

But thinner neoprene can be more comfortable around your throat, where some people might feel that a hood is irritating and restrictive to breathing.

It also allows your jaw to move a little more freely if you feel you must talk incessantly…

In Use

The outer hood and much of the inner is double-lined. Out of the water, a wet hood-lining will encourage heat-loss, so you might want to switch it out for a beanie.

The nylon lining adds durability, however, and makes it easier to stitch the panels together.

A waterproof cup stitch is used, which requires both sides of the seam to be stitched, adding time and cost to manufacturing.

A sealed seam prevents flushing through the seams, which would speed heat-loss. To further prevent heat-loss, a smoothskin neoprene panel creates a face-seal. This is also used for the inner collar, helping it to mate to drysuit neck-seals.

Because mask-clearing or a leaky drysuit neck-seal can introduce air into the hood, it is perforated to vent air automatically.

To create, in effect, a one-way vent that leaks air out, but not water in, Scubapro uses a baffle. The hood has an inner panel with a set of holes into which air leaks, before flowing out through holes on the outside.

Finally, there is a tiny D-ring for snapping the hood onto a drysuit snap-hook.

Conclusion

The Everflex slips on really easily and can be pulled off one-handed once your dive is over. The short collar docked perfectly with my non-Scubapro drysuit.

Under water, you need to briefly pull the face-seal away from your cheeks to flood your outer ear canals. Any air that got into my hood vented without me noticing.

The face-seal didn't interfere with my mask. Apart from that, it's a very comfortable and – crucially – warm hood. Highly recommended. ■

SPECS

PRICE ›› **£41**
SIZES ›› **XS/S, S/M, M/L, L/XL, 2 XL**
CONTACT ›› **scubapro.com**

FOOTWEAR
SLIPFREE **SHOES**

DIVERS AND SNORKELLERS don't just spend a lot of time under water but also around it. When we are teaching or training, that can mean pool-sides, changing-rooms and showers. On location, we're likely to be walking on boat-decks, docksides and beaches.

Bare feet are vulnerable to picking up infections from other people, being burned on hot sand and decking and being injured from contact with sharp stones underfoot. Falling is an ever-present danger on wet floors.

Conventional neoprene reef shoes and hardsole boots have tended to be the go-to solution to these problems for divers but they can get sweaty when worn dry and squelchy when wet. Annoyingly, they can also take ages to dry out.

Slipfree Shoes are an alternative that's worth consideration. They came about after the inventors' kids kept hurting their feet at the beach or around the pool on holiday.

The slip-on design uses a sole constructed from 87% PVC and 13% cotton. The uppers are 91% Polyamide with 9% Elastane and, it's claimed, these provide a UPF (Ultraviolet Protection Factor) 50+ barrier against the sun.

According to the Skin Cancer Foundation, that stops 98% of harmful rays reaching your body.

The shoes squash flat, or a pair roll up smaller than a thick marker pen, so are easy to pack. You can machine-wash them.

And while the design and construction is serious, Slipfree Shoes have a fun twist. You can order the uppers with a huge range of graphics.

I chose great white sharks. I'm *Jaws* generation.

In Use

Charco Del Paolo on Lanzarote's north-eastern coast is my bolt-hole when I just want to chill and go snorkelling. It also provides excellent terrain for testing footgear and my pain threshold.

Charco is a seafront village with lots of privately owned apartments, many put out to rental. Mine had a shared pool, and its surrounding patio and my shower-room floor proved ideal for testing the non-slip capabilities of the sole – there is certainly dependable traction on wet surfaces.

To get to the sea you're walking over sand spiked by some quite thorny plants. Stepping on those really hurts!

Then it's down over steep and very uneven lava-hewn steps to the sea, where you climb aluminium ladders in and out of the water.

The Slipfrees protected my soles throughout all this trekking, though what they don't offer is much padding underneath for walking on stones or up front to protect toes when you kick a rock.

The white patches on my feet proved that the shoes do screen effectively against sunburn.

For swimming, the Slipfrees worked well. When I used them with open-back scuba fins, they proved very comfortable, preventing any chafing or fin-slippage.

When you remove your fins you do need to be careful that the shoes don't come off with them, but that's the same for many competitive neoprene moccasins as well.

Leave the Slipfrees soaking wet in direct sunlight on a warm day and they'll dry in an hour.

Conclusion

I liked the Slipfrees very much. Around pool decks and changing rooms they do reduce the risk of falls and eliminate catching infections. In warm water, you can use them under water with fins.

They are a useful choice for changing into from wet and clammy dive-boots between dives for more comfort and are perfect on boat-decks.

Weighing next to nothing, taking up little space and fast drying, and acceptable casual wear around resorts, Slipfree Shoes are a versatile and extremely travel-friendly piece of kit. They could do with more padding for rough surfaces but yes, they also come in black for tekkies. ■

SPECS

PRICE ›› **£19, children's sizes £15**
CONTACT ›› **slipfree.com**

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NEW BUT UNTESTED

The latest kit to hit the dive shops

Fourth Element 5mm Kevlar Hydrolock Glove ◂◂◂◂

For protecting your hands from cold and injury, the 4mm Kevlar reinforcement to palm, thumb and fingertips on this Hydrolock Glove is reckoned to be safer for ghost-net recovery or diving around wrecks. The 5mm upper is said to be supple for comfort and the glove is blind-stitched and has a smoothskin Hydrolock cuff to minimise flushing and keep you warm. They cost £65 a pair.

▸▸ **fourthelement.com**

TUSA Tropical Glove Polymesh ▸▸▸▸

On the other hand, this new product is designed to help you to avoid cuts and abrasions in warm waters, when exploring sunken ships or diving around stingers. Claimed to offer plenty of dexterity for operating cameras or pushing computer-buttons, these £25 gloves combine a durable synthetic suede palm with stretchy, close-fitting and a reportedly fast-drying Lycra body.

▸▸ **cpspartnership.co.uk**

Typhoon Seaford Drybag Set ◂◂◂◂

Typhoon has thoughtfully provided a three-piece dry-bag luggage set to help divers and others to keep wet and dry kit separate. A 2.5-, 5- and 10-litre capacity sack is included, each made from waterproof and heavy-duty polyurethane-coated nylon and equipped with a clip-together roll-top that doubles as a handle. The Seaford bags are colour-coded for easy identification and come with a draw-string holdall for storage. The price is £21.

▸▸ **typhoon-int.co.uk**

Finclip Bigfoot Extension ▾▾▾▾

Finclip, the innovative fin-retainer that replaces a conventional heel-strap with a step-in-and-out binding similar to a snow-ski, now works with larger feet, bulky dry boots and bigger fins, we're told. The Bigfoot extension plate enlarges the original Finclip at a cost of 26 euros. A set of the original Finclips now costs 69 euros.

▸▸ **finclip.co.uk**

AOI Q1 Ultra Compact Strobe ▾▾▾▾

New from Ocean Leisure Cameras is this budget (£299) strobe, which is claimed to be very user-friendly, having only two buttons and a knob providing full control. It promises 85° coverage, a guide number of 22, recycling time of under a second, built-in 700-lumen modelling light and a 60m depth rating.

▸▸ **oceanleisure.co.uk**

RAID 35.5L Case

This all-environment case could prove attractive to underwater photographers. The ABS case measures 52 x 44 x 24cm, which is within many airlines' carry-on concession dimensions, and has wheels and a pull-up handle for towing. Latches accept padlocks for security. Pick and pluck foam allows you to customise the internal layout around your kit, and of course it's waterproof for those dodgy small-boat transfers. The price is £109.

ndiver.com

Dark Tyde Leisure Wear

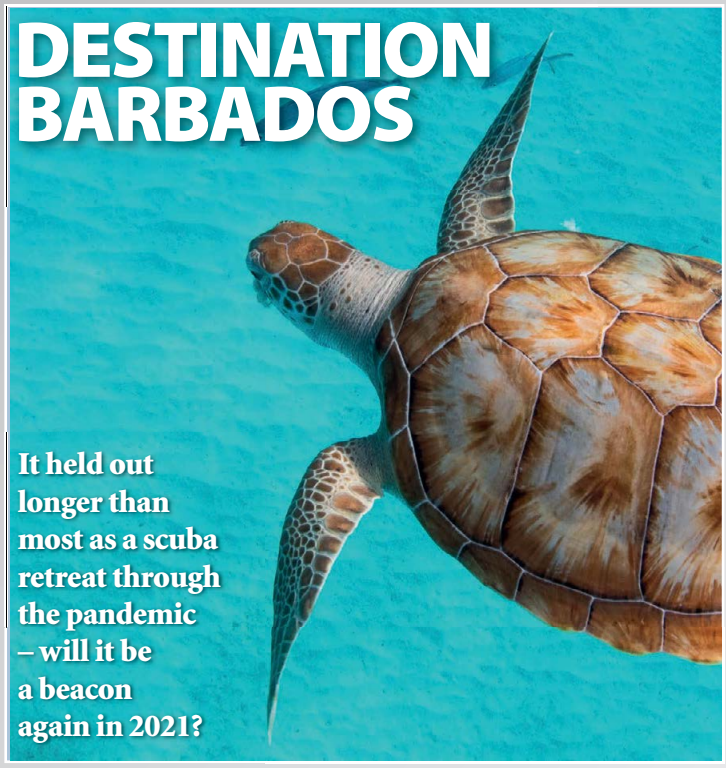
Dark Tyde is a new brand of diving-inspired leisurewear. It was devised by a group of British divers during lockdown and offers a wide choice of marine-themed shirts and hoodies for men, women and children. Dark Tyde claims to be big on sparing the environment too, with 100% organic cotton construction, eco-friendly inks and zero plastics packaging. Prices start from £16.

darktyde.com

INON Z-330 Mk2 Strobe

A newly designed dome-port is said to provide more even coverage than the Mk1 and is available as an upgrade for the earlier model. Other features include 110° wide-angle coverage, a high guide number of 33, manual and S-TTL automatic exposure and built-in modelling light, all priced at £700.

inonuk.com



CATHERINE HOLMES

NEXT ISSUE

The Tour Goes on
Delayed by Covid, our Euro-divers finally reach Malta

Key to the Loch
Tom the Transit heads for north-western Scotland

Scuba Settlers
First in a series about pioneers around the world

Freediving with a Camera
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Lymington - "Wight Spirit". Diving West Wight, East Dorset, English Channel. Beginners to technical and small groups. Electric lift. Easy access, easy parking. Owner/skipper Dave Wendes. Tel/Fax: (023) 8027 0390, e-mail: wightspirit@btinternet.com www.wightspirit.co.uk (70252)

Dive Littlehampton "Final Answer". Shallow to deep, we cater for all. Skipper and crew on board, availability 7 days a week. Maximum 10. Tel: (01243) 553977 or 07850 312068. Email: ourjoyboat@gmail.com www.ourjoy.co.uk (73415)

South West

Venture Dive Charters. For quality diving from Plymouth, visit: www.venturecharters.co.uk or Tel: 07948 525030. (73533)

Bovisand Lodge Estate, Plymouth. 4* Gold Award, self-catering holiday park, 2.5 miles from Mountbatten Diving Centre. Range of quality accommodations. Free parking for RIBs. Indoor heated pool. Weekend and part week bookings available. Tel: (01752) 403554 www.bovisand.com (71051)

DIVING MEDICALS

Diving Medicals - Nottingham. Sport Diving medicals: £55. HSE Commercial Diving medicals: £120. OGUK Offshore medicals: £110. HGV/PSV medicals £55. Student and Group discounts. Combine any two medicals and pay only £5 extra for the cheaper of the two. Tel: 07802 850084 for appointment. Email: mclamp@doctors.org.uk(70407)

HSE MEDICALS and phone advice – Poole

Dr Gerry Roberts and Dr Mark Bettley-Smith.
Tel: (01202) 741370

Diving Medicals - Midlands (Rugby) - HSE, Sports Medicals and advice at Midlands Diving Chamber. Tel: 01788 579555 www.midlandsdivingchamber.co.uk (72756)

CLUB NOTICES

FREE OF CHARGE. (Max 25 words). Non-commercial clubs, no sales.

Arnewood Divers, Christchurch - where diving is safe and fun from our own hard boat. Training from beginner to Instructor. Find us on Facebook or https://sites.google.com/view/adsac/home
Active and friendly BSAC club. All year diving in local lake. New and qualified divers of all agencies welcome. Own clubhouse with 7m RIB and compressor. For further information visit www.mksac.co.uk (64403)
Alfreton (Derbys) BSAC 302. Welcomes new members and qualified divers. A small but active club with own RIB, wreck diving a speciality. Contact Angela on 07866 799364. (68370)
Appledore Sub-Aqua Club (SAA 35) Friendly club welcomes experienced divers from all agencies . Regularly dives Lundy island , own hard boat / compressor . Contact Damian 07831 152021.
Banbury SAC. Friendly, active club with weekly meetings and training sessions, own boat, compressor and equipment. Welcome divers/non-divers. www.bansac.org or call 07787 097 289. (69308)
Birmingham Underwater Exploration Club. Friendly, active dive club. Weekly pool sessions. Regular trips. Own RIB based in south Devon. Training and equipment loan available to members. Tim 07775 580033.
Bracknell Sub Aqua Club welcomes new and experienced divers from all agencies. Meets poolside at Bracknell Sports Centre, Thursdays from 8.30pm. Diving, training and social calendar: www.bracknellscuba.org.uk or tel: 07951 855 725. (65792)
Braintree Riverside Sub Aqua Club based in Braintree, Essex. A friendly club, we welcome divers of all abilities and have an active diving and social programme. Come and join us! email: denise.f.wright2@btinternet.com www.braintreeriversidesac.co.uk (69397)
Bromley/Lewisham Active divers required. Full programme of hardboat diving throughout the year. Check out Nekton SAC www.nekton.org.uk or contact Jackie (01689) 850130. (68537)
Buckingham Dive Centre. A small friendly club welcoming all divers and those wanting to learn. We dive throughout the year and run trips in the UK and abroad. www.stowe subaqua.co.uk Tel: Roger 07802 765366. (69433)
Chelmsford and District SAC meet at 8pm every Friday at Riverside Pool. New and qualified divers are welcome. See our website for details: www.chelmsfordiveclub.co.uk (68620)
Cockleshell Divers, Portsmouth, Hants. Small, friendly club welcomes new and experienced divers from all agencies. Meets at Cockleshell Community Centre, Fridays at 8pm. Email: cockleshell.divers@aol.co.uk (64762)
Colchester Sub-Aqua Club welcomes experienced divers and beginners. Sub-Aqua Association training. Diving at home and abroad. Meets at Leisure World Friday evenings. Contact Tony (01787) 475803. (68263)
Chingford, London BSAC 365. Friendly and active club welcomes divers from all agencies and trainees. Meet Wednesday 8pm, Larkswood Leisure Centre E4 9EY. Information: www.dive365.co.uk Email: loughton divers365@gmail.com (69208)
Cotswold BSAC, a friendly club based at Brockworth Pool, Nr Cheltenham, Fridays 8pm. Regular inland diving and coast trips. Tel: 07711 312078. www.cotswoldbsac332.co.uk (68577)
Darlington Dolphins Sub Aqua Club, small friendly BSAC/PADI, open to new and experienced divers. Meet Friday night in Dolphin Centre at 8.30. Tel: 07773 075631 or email robkilday@hotmail.co.uk (72665)
Darwen SAC, in Lancashire, with an active diving programme. Own RIB. new members welcome regardless of agency/training. We provide BSAC training. Weekly pool sessions. www.darwensac.org.uk (69161)
Dream Divers. Very friendly dive club in Rotherham welcomes divers of any level/club. Meet at the Ring O Bells, Swinton, last Thursday of the month at 19.30. Email: info@dreamdiversltd.co.uk (69699)
Ealing SAC, BSAC 514. Friendly, active club, own RIBs; welcomes new and experienced divers. Meets Highgrove Pool, Eastcote, Tuesday nights 8.30pm. www.esac.org.uk (68413)
East Cheshire Sub Aqua. Macclesfield based BSAC club. Purpose-built clubhouse, bar, two RIBs, minibus, nitrox, compressor. Lower Bank Street, Macclesfield, SK11 7HL. Tel: 01625 502367. www.scubadivingmacclesfield.com (65609)
East Durham Divers SAA welcome new/experienced divers of any agency. Comprehensive facilities with own premises half a mile from the sea. Contact: John: 07857 174125. (68663)
East Lancs Diving Club based in Blackburn. Friendly, active club welcomes new members at all levels of diving from all organisations. Tel: 07784 828961 or email: ELDC@ hotmail.co.uk www.eastlancsdivers.co.uk (69411)
Eastbourne BSAC; RIB, Banked air (free) to 300bar, Nitrox, Trimix. Enjoy some of the best diving on the South Coast, all qualifications welcome. www.sovereigndivers.co.uk (65695)
Eastern Sub Aqua Club SAA 1073. We are a small friendly dive club and welcome new and experienced divers alike. We are situated north of Norwich for training. For more information please see out website: www.esacdivers.co.uk (65879)
Ellon Sub Aqua Club, Aberdeenshire, welcomes newcomers and experienced divers. We dive year round and meet on Thursday evenings. Contact www.ellonsubaquaclub.co.uk (65523)
Fife Scuba Divers Tel: 07575 372575. www.fifescubadivers.com. SAA Club No203. Meetings: Thu 19.30, 81 East Way, Hillend, KY11 9JF. Training Club, Crossovers welcome. (72380)
Flintshire Sub Aqua Club based in Holywell, Flintshire, welcomes new and experienced divers from all agencies. Full dive programme. Meet Wednesdays. See us at www.flintsac.co.uk or call 01352 731425. (64293)
Guildford BSAC 53. Welcomes new and qualified divers. Friendly, active club with 2 RIBs, compressor, Nitrox, meets Tuesday at clubhouse with bar. www.guildford-bsac.com or call 07787 141857.
Hartford Scuba BSAC 0522, based in Northwich, Cheshire. A friendly, active diving club. Compressor for air and Nitrox fills. RIB stored in Anglesey. www.hartfordscuba.co.uk (67287)
Hereford Sub Aqua Club, is looking for new members. Regular diving off the Pembrokeshire coast on own RIBs. Training and social nights. Contact: rusaqua@googlemail.com (69146)
HGSAC. South Manchester based friendly, non-political club welcomes newcomers and qualified divers. Lots of diving and social events. Family. Three RIBs and compressor. www.hgsac.com (68501)
High Wycombe SAC. Come and dive with us - all welcome. Active club with RIB on South coast. Contact Len: 07867 544 738. www.wycombesubaqua.com (69131)
HUGSAC - BSAC 380. Experienced club, based around Hertfordshire, with RIB on the South coast. Members dive with passion for all underwater exploration. All agencies welcome. www.hugsac.co.uk (63275)
Ifield Divers. Crawley-based club. Twin engine dive boat with stern lift in Brighton Marina.Training for novices, diving for the experienced - all qualifications welcome. www.ifield-divers.org.uk Email: info@ifield-divers.org.uk or tel: 01883 731532. (64514)
Ilkeston & Kimberley SAA 945, between Nottingham and Derby, welcomes beginners and experienced divers. We meet every Friday night at Kimberley Leisure Centre at 8.30pm. Contact through www.iksac.co.uk (68559)
K2 Divers, covering West Sussex/Surrey. A friendly BSAC club, but all qualifications welcome. Training in Crawley, boat at Littlehampton. Email: k2divers@yahoo.co.uk or tel: (01293) 612989. (68335)
Kingston BSAC, Surrey. Two RIBs , clubhouse and bar, active dive programme, two compressors, Nitrox, Trimix, full training offered at all levels. All very welcome. www.kingstonsac.org or tel: 07842 622193. (69176)
Lincoln - Imp Divers. Small, friendly, non-political diving club with our own RIB are looking to welcome new and

INSURANCE

experienced divers. Contact Richard: 07931 170205. (69383)

Lincoln and District BSAC. Active club with own RIB, compressor and other facilities. Regular trips and training. www.lincolndivingclub.co.uk (69336)

Lincs Divers BSAC 1940. Friendly, active dive club offering dive trips and training for new/experienced divers. Lincoln based. www.lincsdivers.co.uk

Llantrisant SAC, two RIBs, towing vehicle, welcomes new and experienced divers. Meet at Llantrisant Leisure Centre 8pm Mondays. Contact Phil: (01443) 227667. www.llantrisantdivers.com (68519)

Lutterworth Dive Club, active, social, friendly. Own RIB, regular trips. Welcomes qualified divers, any agency. Training at all levels. Most Tuesdays, Lutterworth Sports Centre. www.lsac.co.uk (70043)

Leeds based Rothwell & Stanley SAC welcomes new and experienced divers, full SAA training given. Purpose built clubhouse with bar, RIB, compressor. Meet Tuesday evenings: 07738 060567 kevin.oddy@talktalk.net

Mansfield and District Scuba Diving Club. www.scubamad.co.uk. Sub Aqua Association - club 942. 8 Beech Avenue, Mansfield, Notts. NG18 1EY. (71643)

Manta Divers. Norfolk wreck & reef diving. Small, friendly, experienced club. All agencies welcome. SAA training. www.mantadivers.org (64088)

Mercian Divers (BSAC 2463) Active & Friendly club. New, experienced & junior divers welcome. Own RIB. Based in Bromsgrove, West Midlands. Tel: 01905 773406 www.mercian-divers.org.uk (65391)

Merseydivers (BSAC 5) Friendly & active club with 2 RIBs & Compressor/Nitrox/Trimix. Meeting every Thursday 7pm till late. All divers welcome. www.merseydivers.com or call Steve on 07570 015685.

Merseyside training club, new and active divers from all agencies, weekly pool session. Own Rib towing vehicle Contact www.wapsac.org.uk or wapsacsac@gmail.com

Millennium Divers. Active, friendly club for all levels and certifications of diver, based in Portland, Dorset. UK diving and holidays. Club social nights www.millenniumdivers.org (68351)

Mole Valley Sub Aqua Club. Surrey based SDI club, own RIB, active diving UK & Abroad, training and social events. Trainees/crossovers welcome. Contact: 07410 949268 or email: info@mvsac.org.uk (68691)

Monastery Dive Club (Dunkerton Branch). New divers welcome to join our club. Trips to Plymouth and NDAC. GSOH is a must. South Wales area (Crosskeys, Risca.) Text: Flinty 07971 432803 or email: welshflinty@ hotmail.com (65305)

Nekton SAC. Based in Bromley, we are a friendly and active SAA Club that welcomes experienced and new divers alike. Info@nekton.org.uk or call Steve: 020 8467 4599.(68387)

Nemo Diving Club. Small friendly dive club offering dive trips and training for non/experienced divers in Retford and surrounding areas. Contact: www.nemodiver training.co.uk (69640)

North Wales Sub Aqua Club. Llandudno based and open to new and experienced divers. Fun, friendly and active SAA affiliated club. Training every weekend. www.nwsac.wales (70688)

North Glos BSAC 80. Friendly, active club welcomes new and experienced divers. Own boat and equipment with weekly pool sessions, Thursdays, 8.30pm at GL1 Gloucester, (Gloucester Leisure Centre). www.nglos.co.uk (68483)

Nuneaton. Marlin BSAC welcomes experienced divers to Pingles pool every Thursday. Active training, diving, social programme in a flourishing club with no politics allowed. www.marlinsac.com (69322)

Orkney SAC. Small, friendly active dive club, based in Kirkwall, welcomes divers of any level or club. Own RIB and compressor. Contact Craig: 07888 690 986 or email: craigbarclay31@hotmail.com (69735)

Plymouth Sound Dive Club welcomes qualified and experienced guest divers. See www.plymouthdivers. org.uk for more information/weekly club notices. Contact relevant dive manager or divingofficer@ plymouth divers.org.uk to join a dive. 72219)

Preston Divers SAA 30. The friendliest dive club. Come and meet us at Fulwood Leisure Centre, Preston on Monday nights between 8.00pm - 9.00pm. www. prestondivers.co.uk (64198)

Reading Diving Club. Experience the best of UK diving with a friendly and active club. All welcome. Tel: 01183 216310 or email: info@thedivingclub.co.uk www. thedivingclub.co.uk (69447)

Reading Sub-Aqua Club (BSAC 28). Active, friendly, based Palmer Park. Clubhouse, licenced bar, compressor, 2 RIBs. Club night Thurs, all grades/agencies. Training to Adv Diver +. rbsacinfo@gmail.com www.rbsac.org.uk Tel: Colin 07939 066524. (72402)

Richmond Sub-Aqua Club (Surrey) welcomes new and experienced divers. Very active diving, training and social calendar for about 100 members. Contact: contact.rsac@gmail.com, www.richmondsubaqua.club, 07843 959 775.

Robin Hood Dive Club. Yorkshire based and one of the most active in the country with a full 2019 calendar of trips. All agencies and grades welcome. No training or pool, just a growing bunch of regular divers. www. robinhooddiveclub.com or find us on Facebook. (59245)

Rochdale Sub-Aqua Club. Beginners and experienced divers welcome. Full training provided. Pool session every Wednesday. Club has two boats. More info at www.RochdaleDivers.co.uk or call Mick 07951 834 903. (65103)

Ruislip & Northwood BSAC. Friendly, active club, RIB, welcomes new and qualified divers. Meets Highgrove Pool Thursday nights 8.30pm. www.rnbsac.co.uk Tel: 07843 738 646 for details. (69469)

Scotland Plug Divers. Small, friendly dive club welcomes newly qualified and experienced divers to join us. Regular hardboat diving around Bass Rock/Firth of Forth/ Eyemouth and trips abroad. Tel George: 07793 018 540. Email: plugdivers@btinternet.com (64638)

Selby Aquanauts SAA 1117. Family friendly club, welcomes new and qualified divers. Regular trips UK & abroad. Meet every Thursday, Albion Vaults, Selby at 9pm. Contact Mark: 07831 295 655. (69261)

Sutton Coldfield SAC, friendly BSAC club, welcomes all divers from trainee to advanced. All agencies. Own RIBs and compressor. Meet every Wednesday, 8.15pm at Wyndley (3.4m pool). For free try dive call Alan: 07970 573638 or Mark: 07787 106191. (64974)

Sheffield BSAC36. Friendly, social and active dive club welcomes newcomers or qualified divers. Trips, socials, weekly pool and club/pub meetings, club RIB. See www.bsac36.org.uk (69191)

Slough 491 BSAC; small friendly club welcomes divers at all levels. Meet at Beechwood School Fridays 19.30. Diving holidays and South Coast. Email: malcolm@uv.net or tel: Tony (01344) 884 596. (69722)

SOS Divers (SAA 263), Stourport, Worcestershire. Founded 1979. Friendly family club welcomes qualified and trainee divers. Own RIB. Contact Althea by email: arannie123@outlook.com (57542)

South Coast Divers (SAA 1150) Portsmouth. A friendly and active club welcomes new and experienced divers from all agencies. Email: southcoastdivers@hotmail.co.uk or call Darren: 07449 794 804. (69224)

Totnes SAC (Devon). We are an active multi-agency club and welcome new members and qualified divers from all organisations. Two RIBs and own compressor/nitrox, plus club 4WD. Diving all round South Devon and Cornwall. Visit www.totnes-bsac.co.uk for details. (68319)

South Queensferry SAC, near Edinburgh. Two RIBs, gear for hire. Pool training during the Winter; trips & expeditions in the Summer. Pub meeting at Hawes Inn. Call Warren: 07980 981 380. www.sqsac.co.uk (64861)

Steyning Scuba Club, West Sussex. All divers welcome. Steyning Pool , Monday evenings at 8.30pm. Contact Andy Willett on 07786 243 763. www.seaurchin divers@hotmail.co.uk (63956)

The Bath Bubble Club SAA777 seeks new members. New and qualified divers of all agencies welcome. Weekly pool training, every Wednesday at 9pm, Culverhay Sport Centre, Rush Hill, Bath. Regular diving programme from club RIB. www.bathbubbleclubuk.co.uk (68434)

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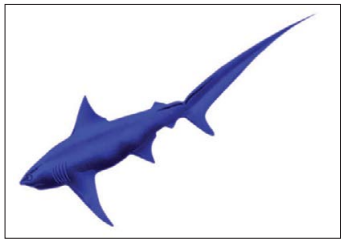

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ADVERTISERS' INDEX

DEEP BREATH

Instructor fail thyself – the myth of mastery

Sometimes, and for a variety of reasons, trainee divers get themselves certifications they don't really deserve. This can have consequences later. Shocked? Probably not. STEVE WARREN considers the problem

AMY'S LONG SCARLET fingernails dug like talons into my throat. Amy needed to demonstrate her mastery of rescue skills, including resuscitation, to become a certified diver. I was her pretend casualty.

Her attempt fell far short of a pass. But pass she did.

Amy was desperate to dive but she struggled through her training. Eventually the school's lead instructor had had enough. "I'm certifying her." he told me, "regardless."

I didn't object. I was young, starting out and lacked the confidence to speak up.

When I became a lead instructor, I certified two students I should not have done. On one occasion I ran out of time at an inland site and telescoped two dives' worth of skills into one.

On the second I passed a student who had failed his final theory exam by one question. I'm still ashamed.

Professional scuba instructors generally train, assess and certify their customers – for that is what a student is – without meaningful oversight.

If customers are not certified as entry-level divers, they cannot go on to pay for further courses, buy kit and ante up for holidays.

So the pressure is on to close the sale by giving customers what they want – a ticket to dive. And, of course, the customer is always right.

WHEN IT COMES to diving, this should not be the case. The instructor's default position should be one of tough love – holding students back, failing them or even telling them plainly that they are not suited to diving if they lack aptitude and cannot demonstrate mastery of both the theory and practical skills of scuba.

What is mastery? It's being able to understand and apply the theory and perform a dive skill adequately.

No more, no less. But instructors often seem willing to accept far less than mastery from their students.

Mastery is best proven by repetition. It confirms that the student didn't simply get through once on dumb luck.

In training, students typically build up a skill progressively. For example, before removing and replacing a mask, as would be necessary if another diver kicked it off, they first partially flood and clear their mask, then fully flood and clear it.

Only when they can do this do they remove and replace it in confined water.

Finally, they prove to themselves and their instructor that they can also do this in open water, which might be much colder, darker and saltier than the pool.

But they might be required to do this only once. Does that prove mastery?

Anyway, mastery can be fleeting. Skills are easily lost. It's divers' own fault if they let their skills slide, but what if they never mastered them in the first place,

because their instructor treated a fail as a pass? Would the students even know?

The controlled emergency swimming ascent is a good example of a core self-rescue technique that's tough to master.

I firmly believe that all divers should learn CESA, but it's difficult to evaluate whether a student has mastered it because repeating the ascent in open water from the required depth of 6-9m (I prefer 9) puts the instructor at risk of a bend.

The largest group I ever taught this was four. Typically, two students got the ascent right first go and two managed only a partial ascent, requiring a trip to the surface anyway for further advice before another try.

That meant me making at least six fast ascents in rapid succession, in addition to the other ascents required by the course.

Ideally, each student would have made a perfect CESA at least three times to prove mastery unambiguously.

But to do that you have to extend the course and increase fees.

A related problem is that even good instructors are encouraged to see skills as pass or fail. If you follow the book and a student cannot complete a skill, you should hold them back until they can.

I have done that several times, once against pressure from my employer. At least one, a student I had coached one-to-one in an unsuccessful bid to get her up to pass standard, was quickly certified after I left the school. I'd like to think that my successor was a more adept teacher, but that's not the feedback I heard.

TAKING THE PASS-OR-FAIL approach to skills-based certification led to a confrontation and a valuable lesson when I and a friend took instructor crossover training.

Our trainer gave us two students who he said were "completing entry-level training". He instructed us to take them on the two final dives of the course.

We were to evaluate them – they would be certified to dive on our say-so.

I was deeply unhappy about this situation. We had crossed a line from being paying students to acting as uninsured instructors, but we were not yet instructors for the agency.

However, we wanted our instructor tickets, so we went along with it.

Later, we were asked if the students had passed the skills. "Yes," we said. Without question, they had. The next question floored us: "Can they dive?"

"No," we were forced to admit.

"So, should they be certified?" The answer was also clearly no.

The skills we had checked, done on a platform, were not the problem. Buoyancy and finning around were. Because these skills came earlier and they had been judged as "mastered" by someone else who held our own certifications in his power, we buckled. More shame.

It turned out that the "students" were already qualified divers. But, smartly, they had recognised that they had been badly taught and had sought out retraining from a better instructor. We'd been set up.

A few months later, I joined a combined nitrox and semi-closed rebreather course.

One of the students struggled with the theory. According to the agency standards, however, he passed. He declined the certification. I was that student.

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