

Young Divers :: "Good Diver"? II :: Fish Intelligence :: Orda Cave :: Noriko Kuresumi Portfolio



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Philippines
Puerto Galera

Tech
Lake Baikal

East Sea
Black Water

Competition
Scubatlion

Vladivostok
Seal Rescue

UW Photo
Abstractions

Sharks of
Protea Banks

ICE DIVING IN THE
White Sea

COVER PHOTO BY ANDREY GORBUNOV

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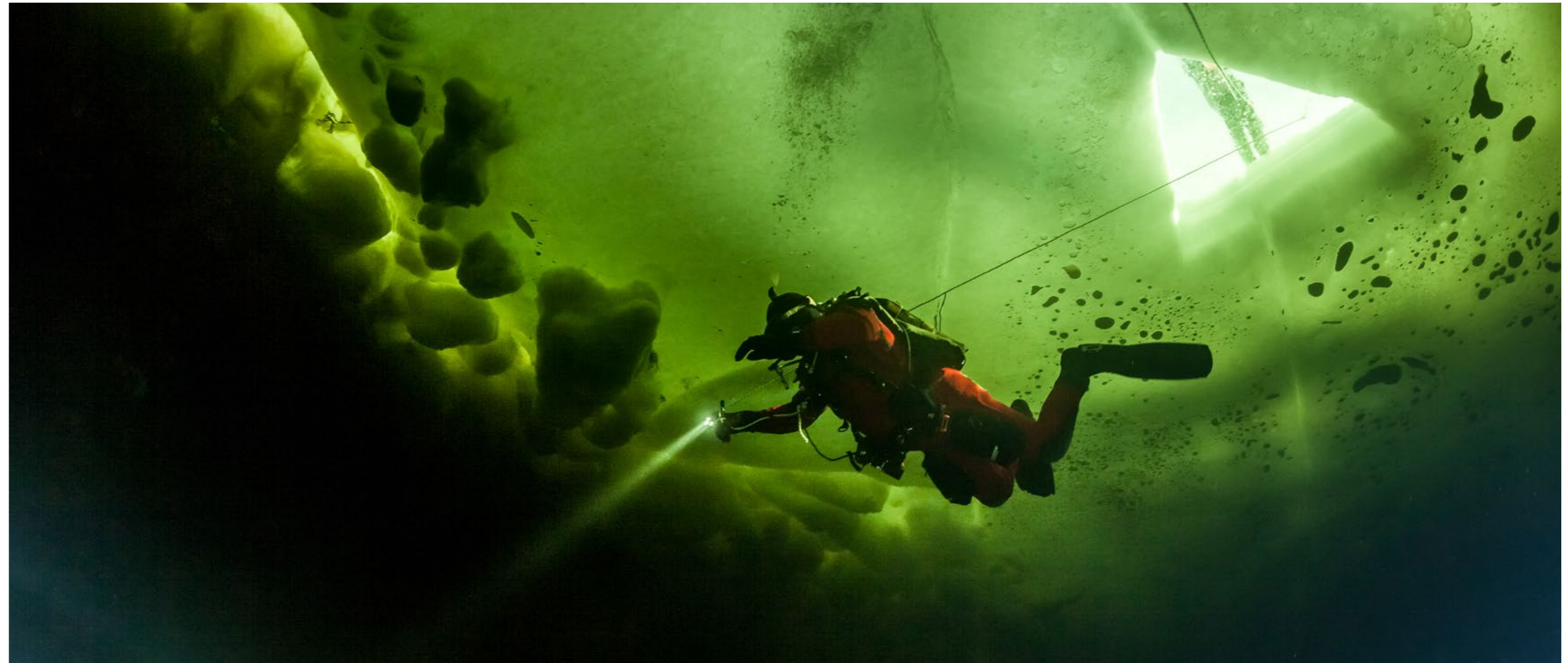
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Photo by Andrey Gorbunov

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Risk Threshold

I have long taken an interest in accidents and mishaps—not in any of the morbid details, but in the analysis of what went wrong as well as any insights gained that could be put to use in hopefully preventing the same sort of accident from happening again. I study the findings of examiners in order to understand what may be learned from incidents to make diving even safer for the rest of us.

The examiners' recommendations can often be implemented directly. Sometimes equipment can be bettered or practices and teachings improved. Or something new can be learned about how the human mind interacts with technology or tends to react in various scenarios—in particular, when people are under stress and coping with danger.

This week, the late Canadian filmmaker and conservationist Rob Stewart's *Sharkwater Extinction* premiered in movie theatres across his native Canada. Meanwhile, a documentary looking into his untimely death in early 2017 while filming off Florida on this new film is also about to air shortly. The loss of Stewart still makes me sad and pensive. He was a fine ambassador for the environmental cause and sorely missed

on several levels. That is probably why I have often reflected upon, and discussed, this particular incident.

Diving is generally quite safe. It is a life-enhancing activity that brings us joy and good experiences. But diving spans a wide spectrum of activities, and some of them carry far greater risks than others.

On one hand, children aged eight and above can participate in, for instance, the PADI Bubblemaker Program and discover the exciting world of scuba diving. On the opposite end of the spectrum, we have technical diving, and on the extreme end, cave diving, which is said to be one of the riskiest endeavours one can undertake.

Now, in this magazine, we have covered a lot of stories in both technical diving and cave diving, a photo of which is even adorning the cover of this issue. That does not mean it is for everybody, which I trust everybody understands. But everybody can learn from the techniques and procedures of technical and cave diving, which are mostly pioneered, tried and tested, then refined in these fields.

These improvements and insights ultimately trickle down and benefit all divers. For instance, I use technical diving principles and techniques also for more straightforward photo-shoots on a reef, as I find I will have better coping skills and a redundancy in my equipment setup upon which I can rely. As a result, I feel more relaxed, and I am able to enjoy the dive even more.

I am attracted to caves—just look at those stunning cave images in Andrey Gorbunov's article, "The Prometheus Project," about Russia's Orda Cave in this issue. But, personally, I have decided not to pursue becoming a cave diver because it would surpass my chosen threshold of acceptable risk.

I care more about my family and need to be around in one piece. On an aside, that is not to imply that deep technical divers and cavers are unsafe or irresponsible. On the contrary, I find them to be among the most safety-conscientious planners around, and that mentality is something we can and should always apply even on the shallowest of easy reef dives.

— Peter Symes
 Publisher & Editor-in-Chief



News edited
by Peter Symes

NEWS

from the deep



CHRIS HOARE / FLICKR / CC BY 2.0

New Caledonia Reef

The Pacific island nation of New Caledonia recently announced increased protection measures for the coral ecosystems off its coast. The decree to safeguard 28,000 sq km of the island's waters within four marine protected areas will see full protection granted to a number of the island's isolated reefs including Astrolabe, Pétrie, Chesterfield, Bellona, and Entrecasteaux.

The newly protected reefs are

located in the Natural Park of the Coral Sea of New Caledonia, one of the largest protected areas on the planet, spanning 1.3 million sq km. According to the International Union for the Conservation of Nature (IUCN), the park is home to more than 4,500 sq km of fishery-supporting coral reefs, the deepest site in France, 25 species of marine mammals, 48 shark species, 19 species of nesting birds and five species of marine turtles.



NEW CALEDONIA TOURISM / FLICKR / CC BY 2.0

Promotional image

Pacific Oceanscape

Plans to create the park were first announced at the Pacific Island Forum in 2012, when the New Caledonia government offered its first official commitment to the Pacific Oceanscape a collaborative management of nearly 40 million sq km or about 10 percent of the world's total ocean surface.

Largest wilderness reserve

Philippe Germain, a French politician who currently serves as President of the Government of New Caledonia said that the decision means that New Caledonia will have the largest wilderness reserve in the world. Essential to people, biodiversity and climate resilience, the park's ecosystems generate around 2,500-3,000 tons of fish each year, providing food to New Caledonia's quarter of a million people, and are an economic driver for the territory's sustainable

economy.

With a length of 1,500km, the reef systems of New Caledonia are considered to be the second largest in the world (after the Great Barrier Reef of Australia, which is the longest continuous barrier reef in the world); and its lagoon is the largest in the world, with an area of 24,000 sq km.

Reefs in good health

Most of the reefs are generally thought to be in good health. The reef encloses a lagoon of 24,000 sq km (9,300 sq mi), which has an average depth of 25m (82ft). The reefs lie up to 30km (19mi) from the shore, but extend almost 200km (120 mi) to the Entrecasteaux reefs in the northwest. This ecosystem hosts, along with Fiji, the world's most diverse concentration of reef structures—146 types, based on a global classification system—and they equal, or even surpass, the much larger Great Barrier Reef in coral and fish diversity. ■

SOURCES: WWF, ECOWATCH

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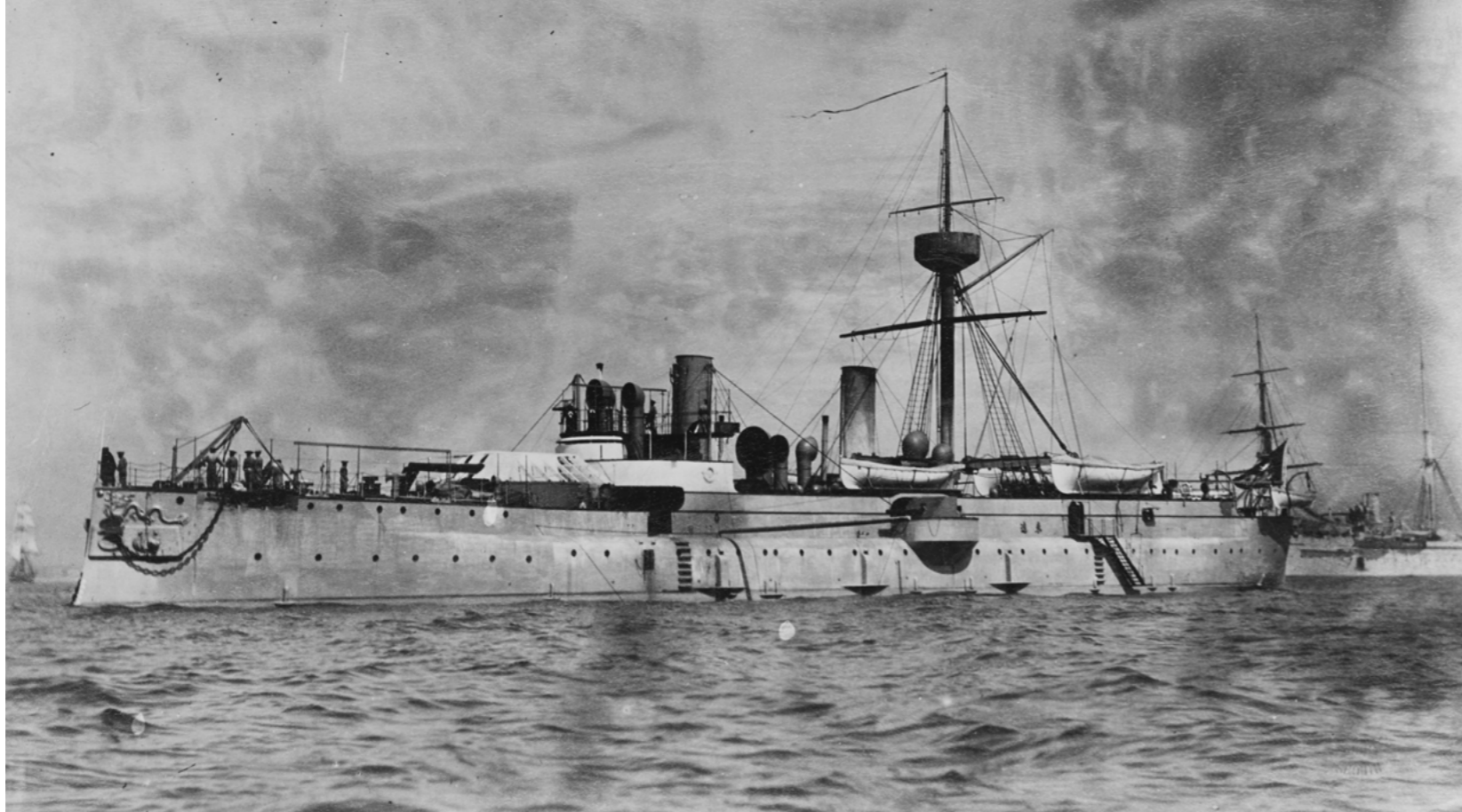
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New Caledonia establishes vast marine protected areas



Chinese armoured cruiser *Jingyuan* (*King Yuan*), 1885-1894. Built in 1887 in Germany with many cutting-edge technologies, it was considered a state-of-the-art warship.



MIKASA MEMORIAL MUSEUM

Wreckage of Chinese warship *Jingyuan* discovered after 100 years

It is now confirmed that a shipwreck found in waters off the coast of northeastern China's Liaoning province is indeed that of a legendary cruiser sunk during a battle in 1894 during the First Sino-Japanese War (1894-95).

The *Jingyuan* was sunk with three other warships during the first China-Japanese War in September 1894. When it was built by German shipmakers in 1887, it was considered a state-of-the-art warship. The armoured cruiser was 82m long and had a displacement of 2,900 tonnes.

The discovery is of great significance for the research of China's

modern history, development of the Chinese Navy, and provides valuable materials for the research of warship history.

Positive ID

On Friday, the China's National Cultural Heritage Administration said research carried out since July had confirmed the ship lies only 12m below the sea's surface near the Dalian coast. After careful sand excavation, divers went ahead with an inspection of its interior. The discovery of key evidence earlier this month proved to be a breakthrough in their attempts to identify the vessel.

On 15 September, researchers found the most important piece of evidence: two gold-gilded wooden characters from a plaque hanging on the side

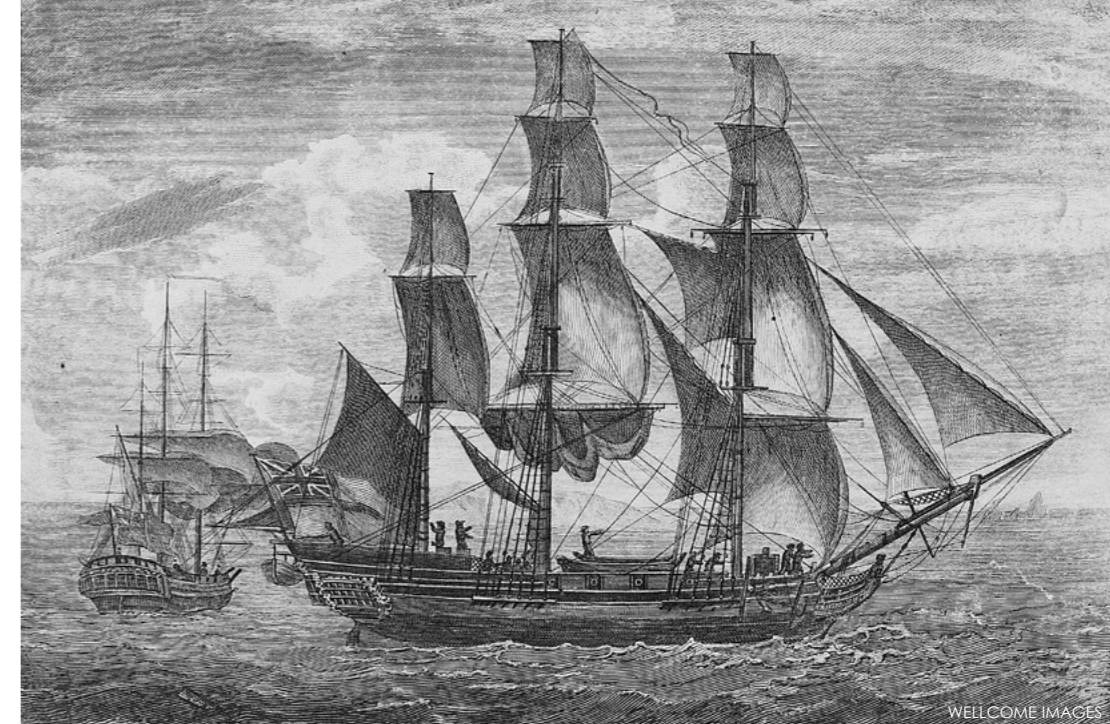
of the ship. They matched the plaque to old photographs of the vessel. These two Chinese characters, "jing" and "yuan" found on a plate of the vessel, allowed the team to confirm that it was the wreck of the *Jingyuan*.

"We were running against the clock to identify the wreck because the anniversary of the Battle of the Yalu River was approaching," said Jiang Bo, an archaeologist at the National Center of Underwater Cultural Heritage who led the research. He said historical files, eyewitness accounts and an old photograph taken by a Japanese sailor before the *Jingyuan* sank were used to identify the location of the wreck.

Time capsule

Jiang told *China Daily* the wreck has been well preserved because it turned upside down when it reached the seabed, leaving most of its upper deck buried in sand. Additionally, the team salvaged over 500 items from the wreck over the last two months, including parts of the warship's structure, weaponry, equipment as well as some tools. "Many windows even remain unbroken," Jiang said. "It's like a time capsule sealing history inside."

Blueprints from Germany were used as a reference for the studies, but Jiang said some of the ship's features were not included in the original designs, indicating that adjustments were made to prepare the ship for battle. ■
SOURCE: CHINA DAILY



Portrait of Captain Cook setting out on his voyage. In April 1770, *Endeavour* became the first ship to reach the eastern coast of Australia.

Wreck of James Cook's HMS *Endeavour* (almost) located

Researchers in Rhode Island have narrowed a decades-long search for Captain James Cook's HMS *Endeavour* to "one or two archaeological sites".

HMS Endeavour was a British Royal Navy research vessel that Lieutenant James Cook commanded to Australia and New Zealand on his first voyage of discovery from 1768 to 1771.

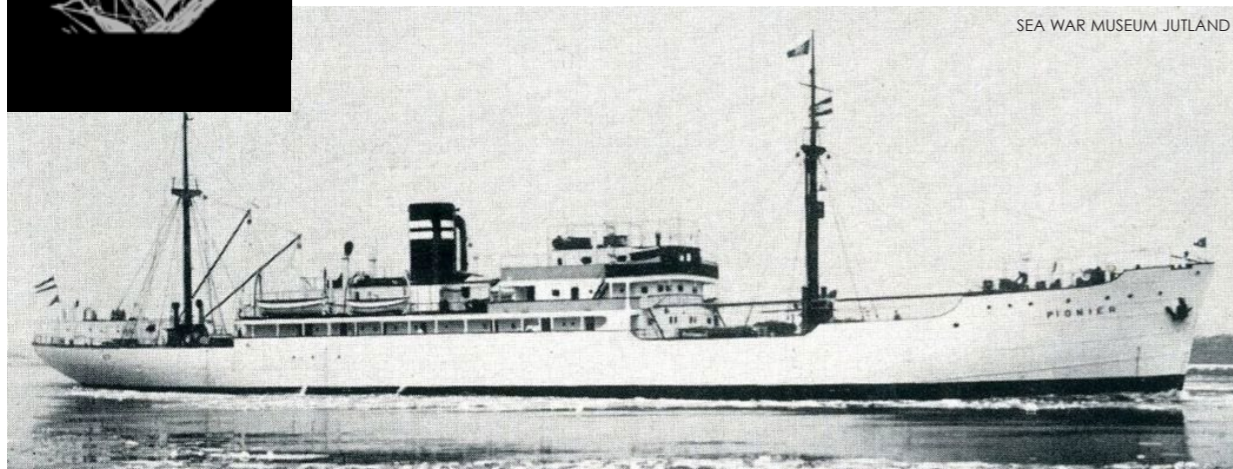
Endeavour was largely forgotten after her epic voyage and spent the next three years sailing to and from the Falkland Islands. She was sold into private hands in 1775 and later renamed as *Lord Sandwich*; she was hired as a British troop transport during the American War of Independence. In August 1778, she was scuttled off Rhode Island by the British Navy with 12 other ships to form

a blockade of the Narragansett Bay, but no one was sure where.

Following a 25-year archaeological study of the area, the search has been narrowed to just "one or two" sites.

Once records of the transport ships—including the former *Endeavour*—were discovered the 1990s, archaeologists began whittling the number of prospective wreck sites down from 13 to a handful, and now finally to one or two. The most promising site is located in an area just off the Goat Island shore, near Gurneys Resort, the Rhode Island Marine Archaeology Project (RIMAP) said. Experts are now hopeful it will be definitively identified by 2020.

RIMAP, which has been working with the Australian National Maritime Museum (ANMM), said it would release a "3-D photogrammetric image of a promising site". ■



SEA WAR MUSEUM JUTLAND

The wreck of M/S *Pionier* has been located at a depth of 177m, and a significant distance farther east than previously believed.

German WWII troop transport located in Skagerrak

The wreckage of the German transport vessel *M/S Pionier*, which was sunk on 2 September 1940, has been found in the Skagerrak—the body of water between Norway and Denmark—after a long search conducted by the Sea War Museum Jutland in Thyborøn, Denmark.

Sea War Museum Jutland director, Gert Norman Andersen, expressed his delight at the long-awaited discovery. “For us, this is one of the better-known shipwrecks, and there has been a lot of mystery about it. So, it’s great news that we can now say where it is,” he said.

Searched for decades

The ship was one of the most highly sought-after wrecks in the region, with divers and wreck hunters having meticulously searched for it for several decades but always in the wrong places. The Sea War Museum Jutland found

Pionier 15 nautical miles from Skagen (the northern tip of Denmark) at the position 057° 58.368' N, 010° 51.551' E, which is considerably farther east than previously assumed.

The ship was on its way from Frederikshavn in Denmark to Frederikstad in Norway with 823 men and women on board, including the crew, when north of Skagen, it was hit by a violent explosion and quickly sank with the loss of 338 lives.

The British claimed it was a torpedo from the submarine *HMS Sturgeon* that sent *Pioneer* to the bottom of the sea, but at the time, it was persistently denied by German propaganda. It was argued that the ship hit a mine, became victim of sabotage, or suffered a boiler explosion.

“Our scanning of the wreck supports the British reports,” said Andersen. “The aft part of the ship is missing, and everything indicates that the ship was torn apart by a torpedo. The aft part sank in all probability immediately, while the forward part drifted farther east, before it sank.” ■ SOURCE: SEA WAR MUSEUM JUTLAND

Slave ships found

A team of Danish and US archaeologists have identified the wrecks of two Danish slave ships, *Christianus Quintus* and *Fridericus Quartus*, which sank in the Caribbean in 1710.

The wrecks were already discovered in the 1970s off Costa Rica, but until now, it has not been possible to ascertain their identity. A cargo of almost 40,000 Danish bricks, which matched historical documents, was a strong indication that the ships hailed from Denmark. The two ships are considerably broken down, and a huge coral reef is growing on the wrecks. Nonetheless, the wrecks are still visible on the seabed, including canon, a large anchor and the massive pile of bricks.



Model of *Christianus Quintus*, built at Copenhagen 1692, a Danish East India Merchantman ship

WIKIMEDIA COMMONS / PUBLIC DOMAIN

Canada announces details of multi-year investigation of Franklin wrecks

Parks Canada and Inuit will work collaboratively to explore, study and protect the Franklin wrecks. This investigation will be one of the largest and most complex underwater archaeological undertakings in Canadian history.

After Sir John Franklin and his crew went missing while searching for a Northwest Passage in the 1840s, Inuit shared stories and knowledge that helped the world better understand the Arctic and the fate of the Franklin ships and their crews. That same profound knowledge of history and the natural world—or InuitBQaujimajatuqangit—combined with western science and the perseverance of a broad group of partners, led by Parks Canada and involving Inuit and the Government of Nunavut among

many others, led to the discovery of the wreck of *HMS Erebus* in 2014 and then *HMS Terror* in 2016.

These storied ships of the Franklin Expedition now comprise the Wrecks

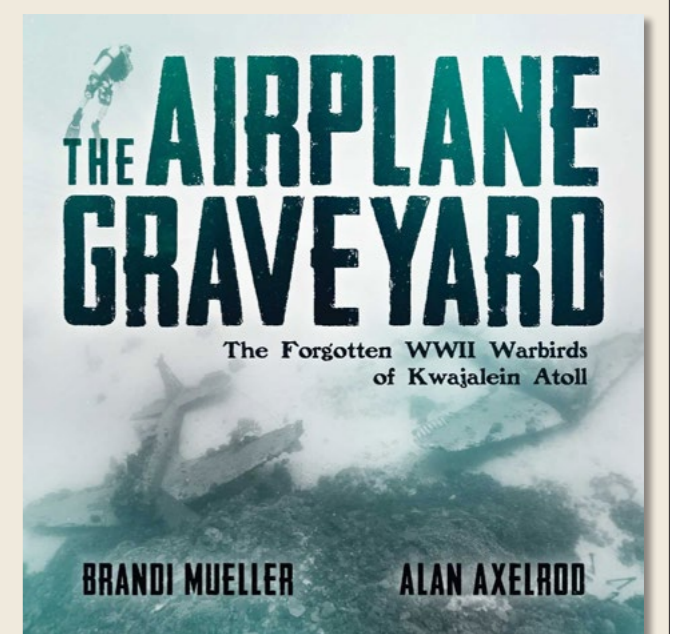
of *HMS Erebus* and *HMS Terror* National Historic Site—the first national historic site in Nunavut cooperatively managed with Inuit. ■ SOURCE: PR NEWswire



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Edited by
Peter Symes

Booking portals are *not* finding you cheapest fares—as they claim



How come a plane ticket costs €350 (US\$400) on one booking engine but the precisely same departure only costs €200 (US\$225) on a different site?

A consumer report on Danish television checked how a number of prevailing booking portals listed various common flights in Europe and found that the pricing was all over the place, and often significantly more expensive than booking directly with the airline. As many of these portals have actively marketed themselves as finding the cheapest option, the programme caused many to change their marketing pitch because it was making untrue claims, which is

unlawful.

So what is going on with booking portals (or engines, as they are also called)? As they need revenue to exist, there must obviously be some commission involved, right? One would think that the airlines are just giving the booking engine a sales commission, or cut, for

referring customers and saving them the costs. That would be a reasonable assumption, and that the booking engines merely compete by being efficient.

Not quite so. Apparently, the consumer report found that the booking engines are quite selective and present offers biased towards what will provide the portal with the biggest earnings, and not what the cheapest offers are, as their marketing statements claim.

It is not the first time the booking engines have been shown to have questionable practices. The European Commission and EU consumer protection authorities launched a coordinated screening of 352 price comparison and travel booking websites across the

EU in October 2016. They found that prices were not reliable on 235 websites—two-thirds of the sites checked.

The screening revealed a series of irregularities in online comparison tools. The main irregularities related to the price and the way it was calculated and presented:

- In 32.1% of cases, the price on the page of the comparison list was not the same as the price ultimately displayed in the booking page.
- On 30.1% of the websites, the total price (inclusive of taxes) or the way this was calculated was not clear.
- 20.7% of the websites presented special prices, which were not then available as advertised through the actual booking page.
- 25.9% of the websites gave the impression that certain offers were scarce (e.g. "only 2 left," "only available today") without specifying that this scarcity applied strictly to their own website.

Authorities have asked the websites concerned to bring their practices in line with EU consumer

Boracay to reopen

Boracay is to reopen on 26 October after being closed for rehabilitation since April, following a visit to the island by President Rodrigo Duterte who was reportedly outraged by "environmental violations."

After an initial six-month clean up, government officials have confirmed Boracay will have a "soft opening," with only certain hotels allowed to operate, offering around 5,000 beds in total.

Boracay, located off the northern tip of the central island of Panay, is famed for its sugary white sands, turquoise waters, lively nightlife and abundant water sports, which attracted nearly two million domestic and foreign visitors last year.

Limiting no. of visitors

Going forward, the number of visitors will be limited—with just 19,000 holidaymakers allowed on the island on any given day and workers capped at 15,000 daily.

According to the undersecretary at the Department of

Environment and Natural Resources Sherwin Rigor, only half of the island's 12,000 existing hotel rooms will also be allowed to open each day, to ensure the number of guests on the tiny four-square-mile island is below its "carrying capacity" of 55,000. Rigor added that authorities would ban beachfront parties, and activities such as eating, smoking and drinking there.

The aim is to make the island, which previously attracted two million visitors a year, more appealing to families and couples rather than hard partiers.

The Philippine National Police stated it is ready for the reopening of the island and is implementing the municipal ordinances on proper waste management. Read more at philstar.com. ■



Cave diver in Orda Cave in the Ural Mountains of Russia

Text by Klim Kolosov. Photos by Andrey Bizyukin, Andrey Gorbunov, Aleksei Kondratuk. Edited by Catherine GS Lim & G Symes

For us survivors of the Perestroika, there are still some nice things we recall from the nostalgic Soviet past—one of these being, of course, the endless Cousteau series, run and rerun so many times on black-and-white television. The skinny Frenchman, with the (supposedly) red beanie, introduced an entire generation (or two) to the mysterious underwater world, full of beauties and beasts. But getting there was something beyond any of our dreams—the gap was just too deep.

Even the terms “scuba” and “diving” had never been mentioned in the Russian voiceovers for the series, as these terms were adopted later in the ‘90s, after the sudden death of both the USSR and of Cousteau. Yes, he is said to have visited the Soviet Union once. Reportedly, his Zodiac ended up being hijacked somewhere in the Volga Delta.

Well, that’s water under the bridge now. Today’s Russian diver is a well-known character, sometimes controversial. But let’s leave the controversy aside for the moment, as it may be worth a separate article in itself, with international (albeit anonymous) testimonials. The subject of this essay is focused on two simple questions—where and how do Russians dive when not traveling abroad; and how far are foreigners allowed to go with their Russian dive buddies? Let’s talk about the destinations, seasons and bodies of water, how to get there and what’s the big deal about them—busting some myths along the way. And let’s start with a list of the top five.

Dive Like a Russian

— *Busted Myths & Concrete Facts About How & Where They Do It*

ANDREY GORBUNOV



ANDREY BIZYUKIN

Diving in Lake Baikal (left) and with giant octopus in the Russian Far East (below)

Russian Diving

wish list from their fellow divers.

A typical dive club has a couple dozen active members and makes four to five dive trips a year, aside from diving local bodies of water and house reefs. A fact worth mentioning is that this dive club format is customary not just in Russia but also in the adjacent ex-USSR countries, including Belarus, Kazakhstan, Azerbaijan and the Baltics, where many Russian-speaking divers live.

3. Wrecks

Artificial wrecks, or wrecks-to-reefs, are not so prevalent in Russian waters, though numerous commercial and marine vessels await scuttling in hidden coves, as clearly evidenced by Google

satellite photos. So, shipwrecks are limited to those that are casualties of war and extreme weather. Well, a local dive club did try to scuttle a decommissioned trolleybus in a nearby pond, but they were caught in action and fined by the police.

The Baltic Sea preserves sunken vessels quite well due to low salinity. It is a seemingly bottomless graveyard for artifacts not only from both World Wars but also from earlier eras, including wooden sailing ships loaded with champagne. With new sectors being legally opened for exploration, advanced scanning techniques provide new discoveries every year—mostly U-boats lost in action and missing ever since.

It is indeed cold and dark and muddy down there, and this kind of exploration is only possible via expedition with special permits. Nevertheless, for wreck addicts, it's worth the effort. There are some even deeper and spooky wrecks of the same technical type to explore in the Black Sea; most of them imply operation from Crimea.

There are some diveable cold-water wrecks with some exploration potential in the Barents Sea, in the far northwest of Russia, a few miles from the Norwegian border. In Liinakhamari, there has been a quick development of dive centers with dive boats. Wrecks are not the only feature here, as the Barents Sea is full of

1. Ice

The primitive understanding of Russia is that it is "oh soooo big and soooo cold." Well, it is a huge chunk of Eurasia, stretched over 11 time zones, more than twice the size of the continental United States, though there are no warm seas around it. Manhattan lies farther south than the southernmost tip of Russia. St. Petersburg is farther north than the Alaska Panhandle, and Moscow is farther north than Edmonton in Alberta, Canada. Sochi, a popular resort area on the Black Sea coast, is as far north as Toronto, and only suited for the Winter Olympics. This means that there is almost no warm coastal strip, rather, the contrary. And, logically, the Russians manage with what they have, and in so doing, have developed the most advanced ice diving protocols.

There are two areas where this extreme and elite kind of diving

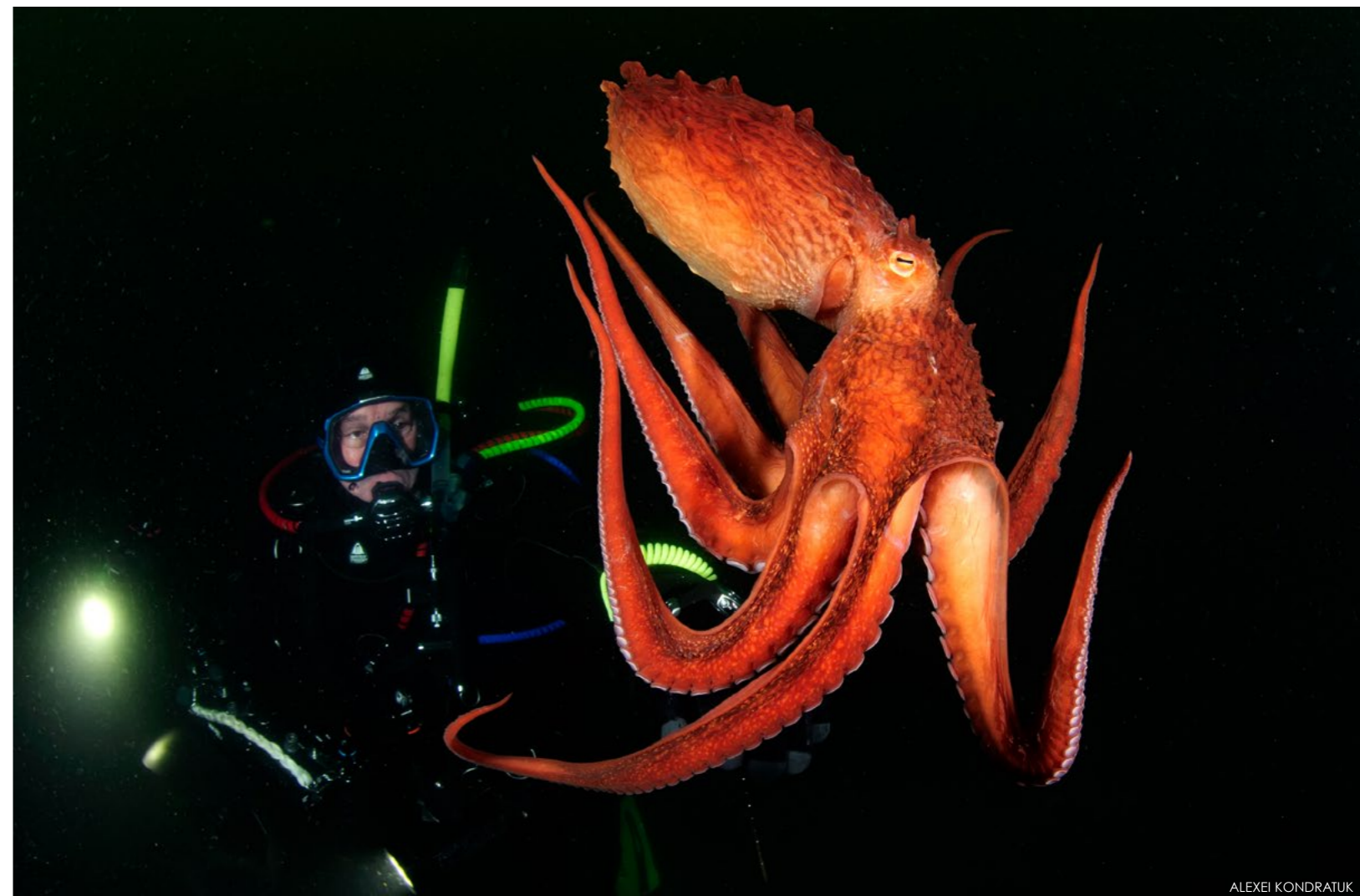
makes its home. The first is the White Sea in the northwestern region of the European side of the country. With the sea firmly frozen from November to March, compact dive teams ride snowmobiles towing equipment across the ice to quite a variety of nice spots. Triangular holes are bored in the ice, becoming portals to the upside-down universe underneath. The absolute highlight of this area is the multi-coloured, sun-lit ice boulders in the so-called Biofilters Bay, which can only be seen from below.

The second location for ice diving is Lake Baikal, the deepest freshwater body on the planet, containing more water than all the Great Lakes in North America put together. Freezing over in January, the ice grows one meter thick by March. The mode of transport invented and implemented by a local dive center is a jeep convoy slowly traveling

on the ice from spot to spot. Diving holes are carved out of the ice with a chainsaw and then reused *à propos* dive, for the ultimate refreshing plunge after warming-up in the mobile sled-mounted saunas. Unexpected bonus features include ice skating on an endless pitch and watching the ice crack at night.

2. Dive Clubs

In the big picture, the Russian dive market is in no way shaped by the regular old-school incorporated tour operators but rather by dive clubs. This type of dive club comprises a group of active divers led by a charismatic person, the so-called dive leader who plays the instructor, the retailer and the tour manager, all-in-one. These dive leaders are the *crème de la crème* of the dive scene—it's them who go shopping for group trips at international expos, with a budget-backed



ALEXEI KONDRATUK

vibrant Arctic flora and fauna.

There are a variety of wrecks in the much warmer waters around Vladivostok in the Far East, in southeastern corner of Russia bordering North Korea by land and Japan by sea. Military wrecks in the Kuril Islands in the Pacific remain unexplored since WWII.

4. Big creatures

The Soviet Union ceased industrial whaling 30 years ago. Today, only a minimal exception to the ban is made for the native folks of Chukotka in keeping with their traditional hunting rituals. Humpbacks are sighted along the coast and bays of Kamchatka and the Kuril Islands, along with killer whales, porpoises and other cetaceans. Recent exploration trips undertaken by Mike Korostelev, an internationally renowned wildlife photographer who produced underwater shots of salmon-hunting brown bears on Kamchatka, give proof of close encounters with bowheads in the nearly inaccessible Shantar Archipelago in the Sea of Okhotsk. These areas can only be accessed via expedition, with no guarantee of a sighting, but this only means there are still things yet to explore.

In English, the white whale is confusingly called a beluga, which is the proper Russian name for the big Caspian sturgeon.

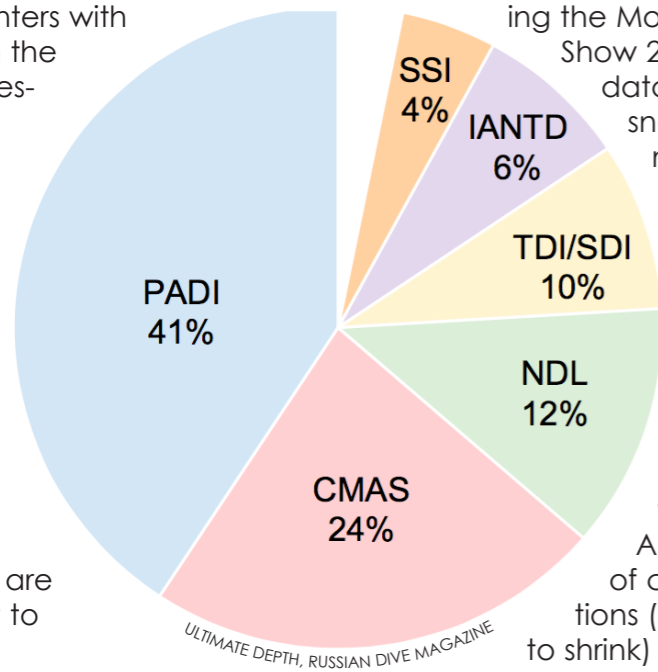
Beluga whales are abundant in the White Sea, and a dive center has been recently set up on the infamous Solovki Islands, focusing only on beluga watching.

Perhaps the most exclusive experience a diver can have in the far-eastern area of Vladivostok is an encounter with the giant octopus, *Enteroctopus dofleini*, in the coastal waters of the East Sea (Sea of Japan), which, incidentally, is called the Whale Sea by the Chinese.

5. Training agencies

Both the big ones and the young but dynamic ones have found their way to the promising Russian market. The big picture here differs from what is known about the American market. No reliable numbers are available from the head offices and representatives. To fill this lack of information, *Ultimate Depth* attempted a survey of 528-plus registered dive instructors and those attending the Moscow Dive Show 2017. These data are only a snapshot but may give an idea.

Yes, PADI is clearly the king of the hill, with roughly two-thirds of all certifications (trended to shrink) are from CMAS, which is almost invisible in the United States, while the acting president of CMAS is the Russian, Anna Arzhanova. The



Ice diving at Belushya Rock, White Sea (right); Pie chart of dive certifications in Russia by agency (below)

real surprise is the agency in second place: NDL, the National Dive League—a Russian training and certification agency established in the early 2000s—which is gaining more and more ground.

Of course, all international dive certificates are recognised by Russian dive centers—though a check dive to prove one's skills is best not to avoid, especially in cold water.

6. Caves

Caves are perhaps Russia's least known area of exploration—the unsung hero of the Russian dive scene. One brand name has made it to the very top of international ratings: the Orda cave, or, in full, Ordinskaya Peschera, in the region of Perm, in the middle of the Ural Mountains. Orda is on record as the biggest of its kind, with clear ice-cold water and miles of well-mapped halls. Among the high-profile guests of Orda Cave are cave diving gurus Martin Farr, Lamar Hires, Jill Heinerth and deep diving record-holder Pascal Bernabé.

7. Tech

Beside cave diving and wreck diving, there are nice playgrounds for technical diving in its purest form: going as deep as it gets. The Russian speciality is freshwater technical diving. And it's, well, cold of course.

Lake Baikal has already been mentioned for ice diving, but

it also has a strong tradition for technical cold-water diving. Tatiana Oparina recently set a deep and cold record with a 160m open-circuit solo dive.

Another highlight is the Lower Blue Lake in the Northern Caucasus, 279m deep, with a newly opened dive center for advanced technical diving.

Do Russian technical divers use rebreathers? Yes, and furthermore, they improve and sophisticate them. Just to mention one, Sergei Baykov built a fully functional sidemount rebreather with original titanium parts. A couple of years ago, Baykov, together with two other technical divers, ventured a 10km eight-hour

rebreather dive along the coast of Dahab; it may be yet another unregistered world record.

8. Liveaboards

For liveaboard operations, Russian slang has adopted the term "safari," which has been in use without any problems until Aggressor Fleet opened a branch of on-shore safari lodgings, returning the term to its original meaning.

Regular liveaboard trips are run on Lake Baikal between early May and late December. The vessels chartered by local dive operators are safe but may be compromised in comfort, which, in turn, is part of the experience. Underwater landscapes are domi-

nated by tubular sponges and rock formations.

There is an emerging liveaboard operation based in Petropavlovsk-Kamchatsky, which covers Kamchatka, the Kuril Islands and the Commander Islands. The safari season is extremely short here, from mid-July to mid-September, but the experience is high in exploratory value and absolutely pays off, including uninhabited volcanic islands, kelp forests, whale watching, bird colonies and intense macro life.

9. Moscow Dive Show

The signature event of any mature market is its own industry expo, and there is one in the



ANDREY BIZYUKIN



ANDREY BIZYUKIN

Ice diving ops on Lake Baikal use snowmobiles with trailers to transport divers, warming huts and equipment from site to site

Russian diving scene. The annual Moscow Dive Show was launched from scratch after the sudden discontinuation of the good old Golden Dolphin dive expo. It will kick-off its 4th edition on 31 January 2019, just a week after the Boot Show in Düsseldorf. The dates were picked on purpose in order to help facilitate participation by overseas exhibitors who have already made their way to Europe, as Moscow is just 3.5 hours from Düsseldorf, with several daily flights available.

The original concept of the Moscow Dive Show was to bring underwater folks together and get them to interact in order to foster new momentum in the industry. Now the underwater part of the show is more or less established, and the expo is expanding towards other water sports and recreation. Board riding of every kind, yachting by sail or motor, water tourism, kayaking and every sort of beach and seaside recreation finds its place at the show. Düsseldorf's Boot Show was a great example to follow.

In brief, the facts and figures of the 2018 event were quite impres-

sive: 200+ exhibitors from 20+ countries covering 10,000 sqm in three halls, and 20,000 visitors in four days, including 1,000+ dive pros, and a long list of side events and presentations. Evidence of the quality of the Moscow Dive Show is the fact that governmental tourism authorities from several important destinations use the expo to display their wares. In addition to these numerous national tourism boards, there are major distributors, manufacturers, retailers, training and certification agencies, dive resorts and liveboard operations. Notably growing is the Russian fraction of the manufacturing sector.

The show is seen as the ultimate place where dive leaders all over Russia and adjacent ex-USSR countries can come to shop dive travel to fill their tour calendars. In terms of retail sales, it is a huge sales opportunity with one-off specials and a presentation stage for new products and new approaches. For instance, the old-school shops are being more and more replaced with online e-commerce, and this trend is fully reflected in the exhibitors list.

10. Seasons

Okay, admittedly, Russia is cold and big. Standing up to its name, the Moscow Dive Show is scheduled for early February (31 Jan - 3 Feb 2019) just to symbolically mark the zero-degree point on the calendar. During the dive show, or immediately after, ice diving can be tried just outside Moscow. From February to April, it is ice jeep safari season on Lake Baikal. December to March is ice diving time on the White Sea. In May, liveaboard trips commence on Lake Baikal and last until December. From June to September, the Barents Sea is at its best at Liinakhamari. July, August and early September is optimal for liveaboard trips in Kamchatka and beyond. August to September is the peak season in the Far East around Vladivostok on the East Sea. And Orda Cave is accessible all year round. There's enough diving here to fill the calendar for a full year. ■

Klim Kolosov is the editor of the premier Russian dive magazine, Ultimate Depth.

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Ice Diving in the

White Sea

Text and photos by Andrey Bizyukin
Edited by Catherine GS Lim & G Symes





White Sea

Diver at Biofilters Bay (above); Diver greets tiny sea angel (right)

Not many divers like to dive in cold water, especially under ice. A possible reason for this may be that they do not know about the new, modern, comfortable equipment for this kind of diving—equipment which can turn these extreme dives into a curious and fascinating vacation. Today's new drysuits, toasty warm undergarments, suit heaters made of modern materials, dry gloves and cold-water regulators, together with proper and well-organized dive procedures, allow one to enjoy diving under the ice more comfortably, spurring many to look for new underwater adventures in the ice-covered places of the world.

I was told all this by an old friend (and expert diver) because he was keen to entice me (just recently returned from a dive trip in the tropics) to take part in a dubious expedition somewhere far to the north and under the ice. But at the time, it seemed to me to be an extreme adventure, so I had some doubts.

Winter is long here, and I had already had my fill of warm water and colorful fish, so I listened to his authoritative comments and expert opinions and decided to test myself once again.

Choosing a location

Lake or sea? How does one choose the right place for ice diving? A worthy question. I had a little experience diving under the ice with some friends in a nearby frozen pond, but it did not give me much joy. There was a muddy bottom, a ceiling of flat ice above, a rusty car below and a view back to an ice hole. There was absolutely nothing to admire, so it only took 10 minutes of diving for me to get bored and return back to the surface. But my



dive equipment worked perfectly; I did not freeze in the usual drysuit. However, now I wanted to experience something very special—really fascinating.

So where can one find the maximum quantity of ice? At the Poles of the planet, of course. So, I thought, maybe I should not limit my flights of fancy and just go diving at the nearest pole—the North Pole! It sounded much more exciting and tempting than winter diving in the local lakes. Then, I started to study this question, and I realized that my way to another really fascinating under-ice world was to



Diver under ice hummocks (above); Sunset over White Sea (top right). PREVIOUS PAGE: Diver at Rocky Forehead





Diver under hummocky ice (above); The White Sea has thickets of kelp in which many critters live (left)

Ocean began flooding in.

The maximum depth of the White Sea is 347m, with an average depth of 67m. Vis-

ibility under the ice reaches 20 to 30m. The sea is famous for its biodiversity. It is full of life, even in winter. It has thickets of kelp with lots of animals living in it, including various fishes, starfishes and sea hedgehogs, crabs, jellyfishes, bright sea anemones and soft corals, sponges, hermit crabs, shrimps, cods, catfishes and seals.

diver one specific unique sea—the White Sea.

The White Sea

It is very likely that people called this sea the White Sea because it is the only sea which, for most of the year, is covered with ice. It is located near the Polar Circle, north of Russia. Once upon a time, it was a large glacial lake, but then the level of the world's oceans rose, and the saltwater of the Arctic

ibility under the ice reaches 20 to 30m. The sea is famous for its biodiversity. It is full of life, even in winter. It has thickets of kelp with lots of animals living in it, including various fishes, starfishes and sea hedgehogs, crabs, jellyfishes, bright sea anemones and soft corals, sponges, hermit crabs, shrimps, cods, catfishes and seals.

Daily two-meter-high tides break down thick ice and create massive bands of coastal hummocks,

On the Polar Circle

To fulfill the dream of diving in the White Sea with my passion for adventure (more than captivity), I had to travel 28 hours by train from Moscow to get to the quiet, snow-covered station at Chupa and then drive another hour by car on a wintery road through thick virgin forest to the village of Nilmoguba. Here, I found a unique dive center with 20 years of experience in the organization of ice



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White Sea



Scenes from the village of Nilmoguba (above and left)



thermal insulation material—these are the warmest undergarments on the market made of a thick, power-stretch material— which I wore under a drysuit; plus, dry gloves and cold-water regulators.

On the morning of my first day in Nilmoguba, I had breakfast in this distant place—a corner of the world completely over-

looked by average divers—located in a dense coniferous forest on the shining shores of the White Sea. I was pleasantly surprised when I heard multi-lingual conversations and saw a lot of enthusiastic ice divers from many parts of the world. This was more like an international symposium—a practical

seminar for foreign participants and experts in ice diving—taking place in the snow and ice of the Russian Arctic North. They were passionate people, and they spoke different languages, but they talked about the same things: the features, dangers, problems and benefits of ice diving; how to act in extreme situations and the possible ways to avoid them; about proper equipment; overcooling and overheating; about orientation under the ice; about the beauty and uniqueness of the under-ice world. It was

diving.

Ice divers from all over the world meet in this place on the White Sea during the season when the sea ice is solid from February to April. They study and train here to prepare to dive in the coldest places on the planet, including the North Pole. So, it is interesting to be here to test oneself, one's equipment and underwater camera, while at the same time being able to meet and talk with real-life professionals and experts in cold-water diving.

Outside on the road, there was a ringing frost, at -20°C (-4°F). I brought with me a set of modern winter undergarments made with PrimaLoft synthetic microfiber

looked by average divers—located in a dense coniferous forest on the shining shores of the White Sea. I was pleasantly surprised when I heard multi-lingual conversations and saw a lot of enthusiastic ice divers from many parts of the world. This was more like an international symposium—a practical



Dive center staff make the ice holes for ice diving



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PHOTO BY Rodrigo Friscione

White Sea



Divers can rest between dives at mobile ice camps with heated huts transported to dive sites by snowmobile; Teams comprise two ice divers and a surface support person (right)

very interesting listening to everyone. I immediately realized that I had not been mistaken in coming here; I felt I was in the right place at the right time.

Rules of White Sea diving

The pre-dive briefing was an important and significant stage in the preparation for a dive in the White Sea. Dive guides talked about the safety rules and the specifics of using regulators and equipment for a dive in saltwater with a temperature of -2°C (28°F). For all recreational divers, only no-decompression dives were recommended here, with a maximum depth 20m and a dive time up to one hour. As a result of many years of experience,

several simple rules have been formulated by the dive center here, making ice diving available to most people and turning ice diving from an extreme type of diving into a mainstream one.

Safety line, teams and signals

During the two dives of the day, divers descended in pairs, fastened to one safety line by carabiners, at an accessible and convenient distance from one another (approximately every 2.5 to 3m). This distance left enough freedom of movement for each of pair of divers. A pair of divers under the ice are like cave divers in an underwater cave; they can always share air with each other. So, in the company



of one's buddy, it is not only more fun, but it is also a lot safer.

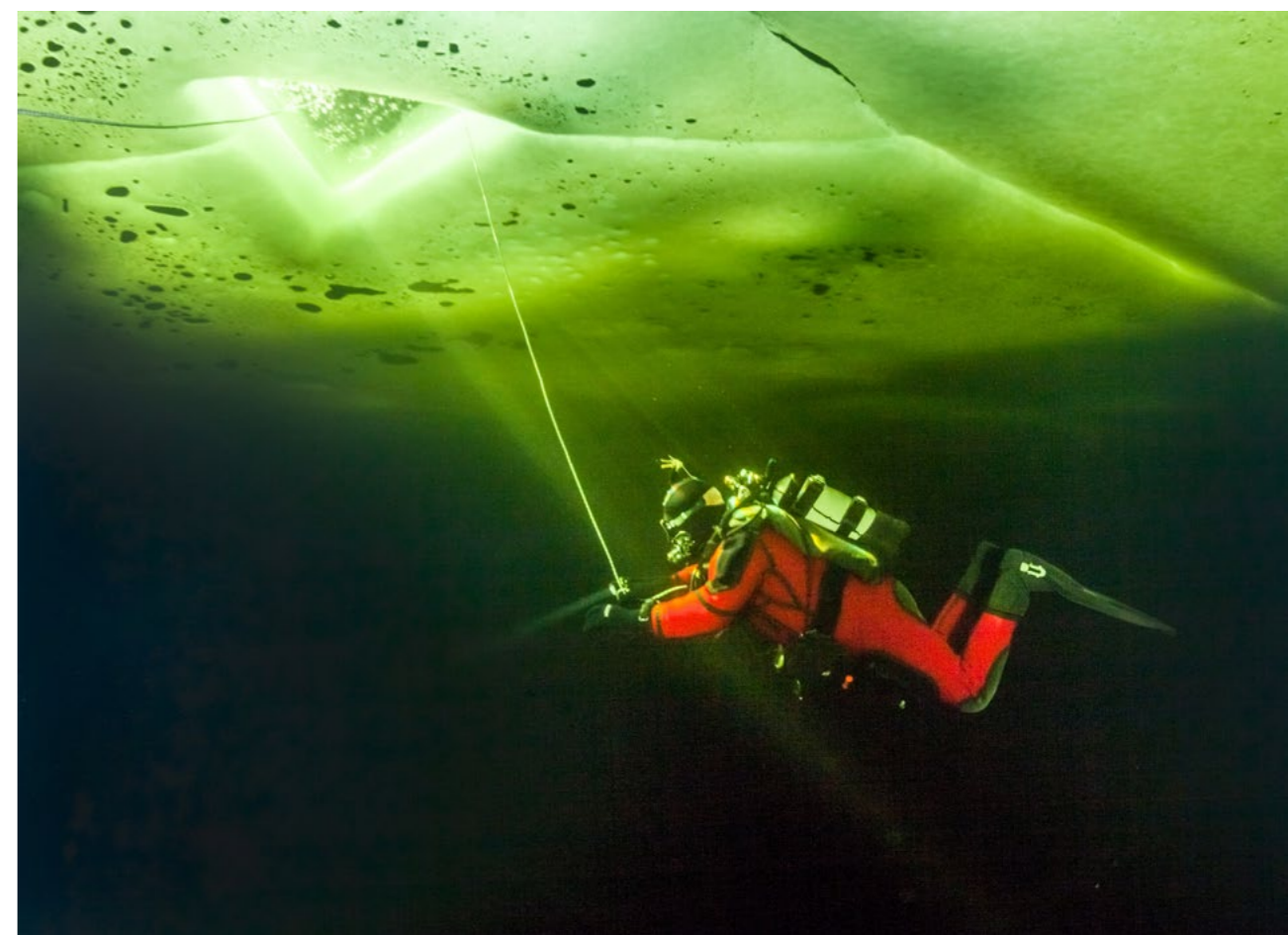
Safety line. The correct safety line to use is a safety rope 40m long and 8mm thick, with neutral buoyancy so that it does not sink or float. It should not cling to hummocky ice or damage the underwater landscape, and it should let you confidently transmit signals through the entire length of the line.

Sea ice is uneven, so you need a rope that is guaranteed not to cling to the surface of the ice. The length of the rope is determined by the distance an average prepared diver can freedive, swimming while breath-holding, in the event of an emergency.

Teams. In each team, there is a Diver #1 and a Diver #2 and a



View from below the ice, through crystal clear water



In ice diving teams, divers communicate with a support person at the surface (left) using specific signals, or tugs, on a safety rope (above and lower right); Snowmobiles transport divers and gear to sites (top right)

signals, or tugs, on the safety rope.

Diver #2 also holds the safety line in his or her hand but communicates via tug signals and hand signals only with his or her dive buddy (Diver #1).

The support person on the surface stays near the ice hole and always holds the rope in his or her hands, never leaving it and always paying attention so as not to miss any tug signals on the rope from Diver #1 underwater.

Signals. One, two or three tugs are the main signals in ice diving communications. Every 3 to 5 minutes, the support person on the surface checks and collects any slack on the rope and sends signals to the divers. The time interval between

a signal-tug-question and a signal-tug-response is 2 seconds (with a repeat of the signal-tug-question after 5 seconds). Signals have only two meanings: "Pull me out of the ice hole," or "Do not pull me out."

One tug of the safety line is a test of the connection and the question-answer timing, to see if everything is okay and understood. If there is no answer, a support person waits for 5 seconds and repeats the question. If there is no answer from the diver underwater, the support person once again repeats the question after 5 seconds. After three repetitions without an answer, the support person pulls out the divers, bringing them to the surface.

Two tugs on the line is the signal-request to check air pressure in

the diver's tank. This is a typical signal used mostly for beginners in the Ice Diver course.

Three tugs is the signal to exit to the surface in normal mode.

Four tugs or more is the signal for an emergency exit to the surface (in the case of ice movement or other emergencies).

Configuration of equipment

For ice dives, one uses an air cylinder equipped with a double valve, and two independent cold-water regulators are screwed into the cylinder valves. One of the

regulators has a standard hose, and the second one has a long hose. Each regulator has its own inflator, or drysuit hose, and a gauge.

During the first dive, my cold-water regulators with factory settings were frozen in 15 minutes (they

went into free-flow). So, I followed the advice of the experts at the dive center and set the intermediate pressure in the first stage of my regulators to 8 bars. Only after that did my regulators stop freezing, allowing me to complete hourly dives in icy waters.



support person at the surface.

Diver #1 always holds the safety line in his or her hand, controlling it and communicating with the surface support person on the edge of the ice hole with



Diver and plumrose anemone at Belushya Rock dive site (left); Hummocky ice sparkle in bright sunlight on the White Sea (below); Diver and fronds of kelp, or brown algae, at Miracle Stone dive site (bottom right); Surface support person at ice hole assists ice diving team (lower left)

White Sea



"check stop" procedure. Keeping neutral buoyancy, the pair of diving buddies holds their position under the ice opposite one another. One of the divers signals to the buddy that he or she is out of air. The buddy diver, or rescue diver, takes his or her reserve regulator with the long hose and passes it to the diver out of air.

The out-of-air buddy diver takes this long-hose reserve regulator, places it in his or her mouth and takes three full deep breathes. The buddy diver checks the working order of the reserve regulator, and if it works, the buddy diver gives the hand signal for "OK" to the rescue diver. Then the buddy diver

Statistical research was done at the dive center, investigating what kind of equipment and what type of safety procedures divers choose for ice diving. And the research showed that a significant majority of divers preferred the dive procedure in which two buddies used one safety rope, with each diver using an air cylinder with double valves and two regulators.

"Check stop" procedure

One of the most important rules at the dive center involves what is called a "check stop." Every diver is required to undergo this procedure at the beginning of each dive. To do this, you go under the edge of the ice hole with your dive buddy and remain in position with positive buoyancy, about one head-span from the ice and one arm's length from one another. We hold here, very close to the

edge of the ice hole, so we can quickly pull ourselves back out of the water and onto the surface of the ice at any time, in case there is a problem.

Then, we take three full deep breaths from the main regulator, we check the air pressure on our gauges, and we check that the arrows on the gauges do not move. Then, we each find our second reserve regulator, take it in one hand, and only then do we exchange it with the main regulator. We again take three full deep breaths from the reserve regulator, checking the air reserve on the gauge, and that the arrows on the gauge do not move. After verifying that both regulators are in good working order, we return them to their original positions. We then check all our other items of gear: the buckles on our fins, our masks, weight belts, inflators, etc.



"Experienced diver" test

This is a test to check one's ability to share air. All ice diving buddies are required to do it at the beginning of each dive, after the





Diver at Biofilters Bay (left); Numerous nudibranchs on brown algae (below); Diver between rocky substrate and hummocky ice (bottom right); Diver in underwater layer of hydrogen sulphide (lower left)

White Sea

gives it back to the rescue diver and goes back to breathing from his or her own main regulator. After that, the pair of divers repeats this procedure in the reverse order. Now the former rescue diver shows that he or she is out of air and receives a long-hose reserve regulator from the buddy diver.

The former rescue diver also does three full deep breaths on the reserve regulator, checking that the regulator is working normally, gives the "OK" hand signal and returns the reserve regulator back to the buddy. Now the two-diver team can be sure that, in the case that one of their regulators freezes (or goes into free-flow), they can use one of their spare reserve regulators. Because they are now ready to use the spare regulator, it means that they will have enough time to safely return to the surface.

Ice diving wisdom
With the dive center's long experience in ice diving, they have



found that two cylinders with four regulators for two people provides the maximum safety in the presence of agreements between the divers. Working with valves is excluded here, with the exception of solo diving.

Buddy-diving under the ice is possible and safe only if the divers have a mutual understanding, get

ready to follow the same safety procedures, think in the same way, and are ready to help each other in all situations. It is for these reasons that the "experienced diver" test was formulated and instituted.

The aims of the safety procedures prior to an ice dive are two-prong. First, the "check stop"

checks the interaction and mutual understanding between the divers and the support person at the surface of the ice hole. Second, the "experienced diver" test checks the interaction of the two divers with each other and with the support staff at the surface.

Each year, several dozen people attend their first training course in buddy ice diving. They all have to do three dives in three different ways. First, each has to do a dive with an instructor on the same safety rope. Second, each has to do a dive with a buddy

diver who is Diver #1. And third, each has to do a dive with the buddy who is Diver #2.

All students have to practice how to exchange a main and reserve regulator and how to share air with a buddy. Repeating these procedures regularly gives divers mental confidence and increases the level of personal experience for all ice divers. They become confident in ice diving safety procedures and can then more safely focus their attention on the beauty of the world under the ice, ready to perform various creative tasks such as underwater photography.

Instituting these safety procedures has had a very positive





Stones Garden and Miracle Stone dive sites are found at Krestovy Island (above); Diver at Biofilters Bay (top right); When water temperature in the White Sea drops to -5°C (23°F), highly concentrated saline solution can start to drip from the tip of a supercooled icicle dubbed the “ice finger of death,” as everything it touches turns to ice (right)

effect. The number of emergency situations and emergency exits from under the ice has decreased to one to two events per season.

Ice hole

What size should an ice hole be? This depends on the number of divers placed at one time on the surface of the water. The largest ice hole made here was for 12 divers; it was a New Year’s dive. Every year, millions of people on New Year’s Eve gather around festive tables to celebrate, but locals here could say that at least one of these festive tables is always set on the bottom of the White Sea!

Ice diving operation

A mobile ice camp provides comfort and convenience to ice divers at a multitude of dive sites on the ice-covered sea. Warm mobile huts with heated toilets can be moved across the ice from one dive site to another. Divers store their equipment and change their

clothes in these warm huts. After a day of diving, divers can leave their wetsuits, undergarments, BCDs and regulators in the warm huts to dry out completely overnight. This season, there were 12 mobile warm huts on the ice.

Ice dive sites

In the vicinity of the village of Nilmoguba, there are 29 dive sites. Snowmobiles and sledges loaded with divers and diving equipment are the main transport here. For a short diving week, we managed to dive a few of these sites. They were interesting and varied in their underwater landscapes.

Yellowish-green ice with strips of hummocks—this is a typical picture of the subglacial world of the White Sea. Huge ice blocks float and descend on tidal currents, creating unique, ever-changing piles of coastal granite boulders.

Here, under the ice, you can



find icicles shaped similarly to cave stalactites. It is the freezing zone of concentrated saline solution—the place where the water temperature drops to -5°C (23°F). When at such a low temperature, highly concentrated saline solution begins to drain from the tip of a supercooled icicle. Then, everything it touches turns into ice, so it is called the “ice finger of death.”



White Sea



Stones Garden and Miracle Stone are dive sites near Krestovy Island, places for shallow diving under the ice in crystal-clear water



Diver and fronds of kelp, or brown algae, at Miracle Stone (above); Between dives, divers can warm up in the heated hut (left) of the mobile dive camp.





White Sea

Diver under hummocky ice at Rocky Forehead dive site (above); Divers Base at Kasyan Island (top right)

along the sea bottom, which is overgrown with thick, bright and plump thickets of sea algae, or kelp. This is a great place to start diving, test equipment and drill buddy skills. Easily accessible, it is just 15 minutes away by snowmobile. There are a lot of subjects for under-ice macro photography, so enthusiastic underwater photographers spend several hours per day on ice dives here.

Biofilters Bay is a dive site near a high cliff that is shaped like a mammoth. It is known to many underwater photographers for its picturesque ice hummocks. It was here, under the ice, that I saw my first small icicles, or “fingers of death.” There are shallow depths here only in winter time, and just under the ice, it is possible to see an unusually dense layer of hydrogen sulphide accumulate. It is so thick

and muddy that it completely hides a diver submerging into it. It is a very interesting subject for enthusiasts of ice diving photography at a site with easy access, located just 30 minutes from the dive center.

Kasyan Island

To get to the dive sites Belushya Rock, Ludushka and Rocky Forehead near Kasyan Island, we had to travel by snowmobile about an hour along an endless icy vastness. When we got to the place, it was pretty covered in snow. The fun of the trek warmed us, and we thawed in the warm huts, donned our drysuits and went diving.

Belushya Rock was a five-meter-high underwater rocky ledge rising from a flat sea bottom almost to the surface of the

ice. The top of it was covered with dense thickets of kelp, and the vertical wall was a garden—it is probably more correct to say it was a flower bed, with bright fluffy actiniums.

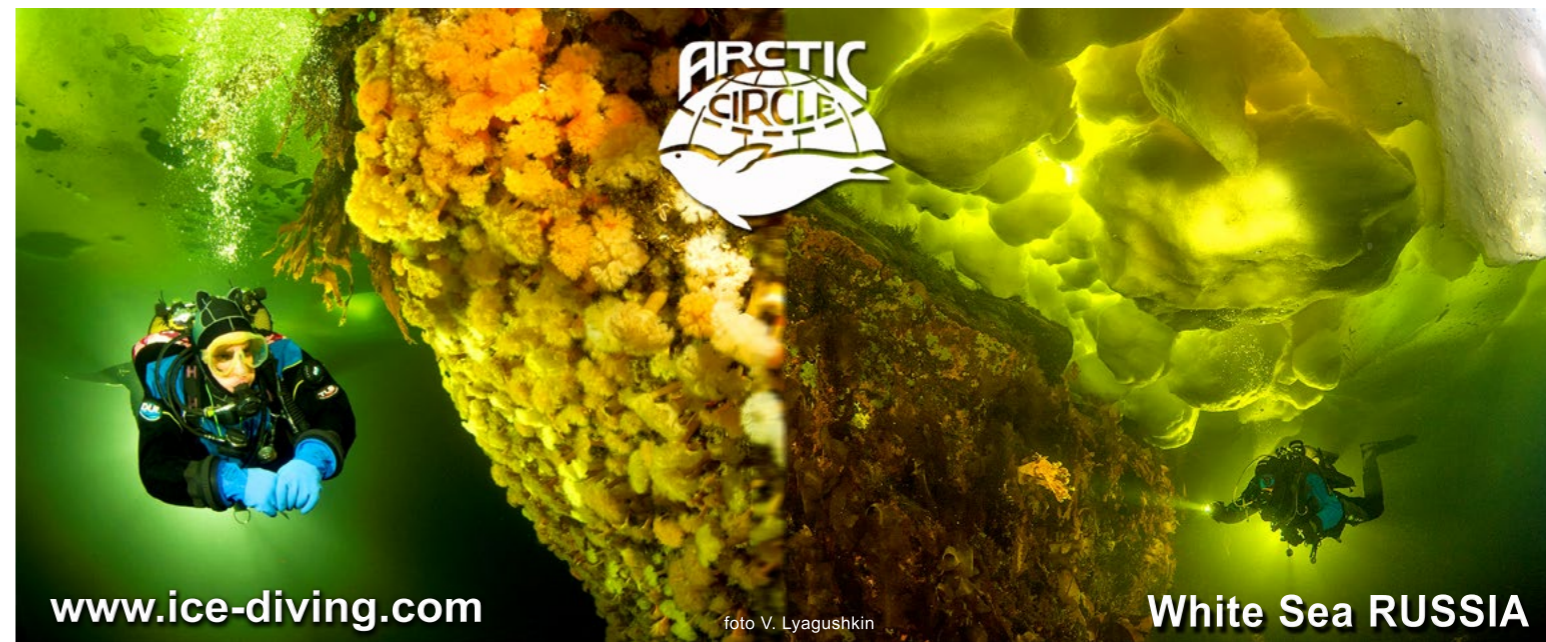
Rocky Forehead and Ludushka dive sites are located a hundred meters from the flowerbed with the sea anemones. During high tide, we dived and took photographs here among the largest underwater hummocks that I have ever seen. The ice hummocks looked particularly picturesque with the frosty sunny day.

On the way back from Kasyan Island, we were caught in a snowstorm. Thankfully, our guides knew the road well. That’s why we did not get lost along the way through the boundless snowy expanse, and we even took the time to take pictures of the winter sunset over



Diver and plumrose anemone at Belushya Rock





www.ice-diving.com

foto V. Lyagushkin

White Sea RUSSIA



Diver in underwater layer of hydrogen sulphide (left); Diver under hummocky ice at Ludushka dive site (top left)

season in 2018, 147 divers dived in the White Sea at Nilmaguba. The divers came from England, Ireland, China, Taiwan, Hong Kong, Mexico, India, Holland, Austria, Germany, France, Israel, Phil-

ippines, Belgium, Ukraine and Russia. The guests made a total of 1,036 dives, which were coordinated by 14 instructors and four divemasters, who also dived 637 times. Training dives under the ice numbered 171, and 55 new Ice Diver certifications were made. The ice diving season of 2018 was very intense and active, and there was not a single real emergency situation. ■

the White Sea, which was amazingly colorful.

Safety improvements and track record

About 2,000 ice dives per season are made at the Polar Circle Dive Center. Since 1998, the safe, comfortable and enjoyable method of ice diving has been tested and improved here. In the period from 2002 to 2008, ice diving methods for two ice divers, which use only one safety rope, were tested and adopted here. And this method is now recognized as the safest one.

The partnership system (with no more than two divers on one safety rope) was formulated over the next ten years of diving. Prior to the year 2000, when some accidents happened, it was about 1% of the average quantity of dives. They were mostly equipment failures and emergencies causing a dive to be

aborted. But with the start of the new partnership system, the frequency of emergencies dropped to one aborted dive per 3,000 to 4,000 dives.

Exceptionally, the White Sea dive experiences allowed instructors of the dive center to organize successful ice diving expeditions to the North Pole, and on the basis of the recommendations developed here, to dive to a depth of 100m under the ice in

the White Sea in a water temperature of -2°C (28°F), and make the world's only apnea dive (freedive) under the ice to a depth of 65m at the North Pole.

As I returned to Moscow, I reminisced joyfully on my experience at the White Sea. I felt enlightened and cleansed by the whiteness of the Russian North. I learned that over the past two-month ice diving



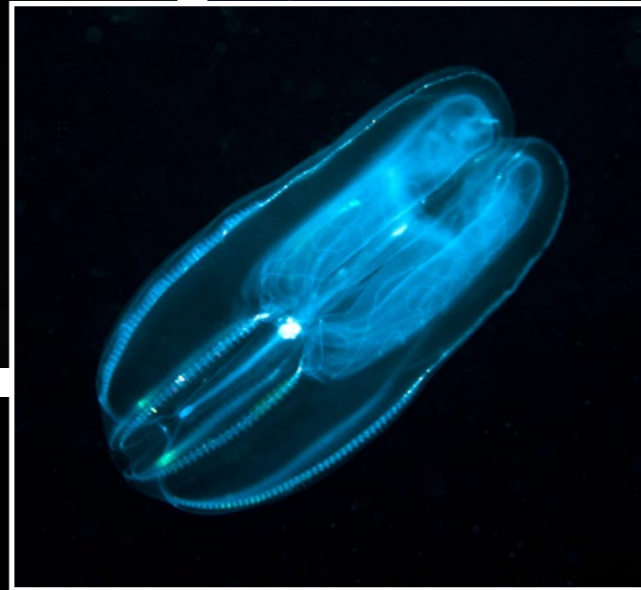
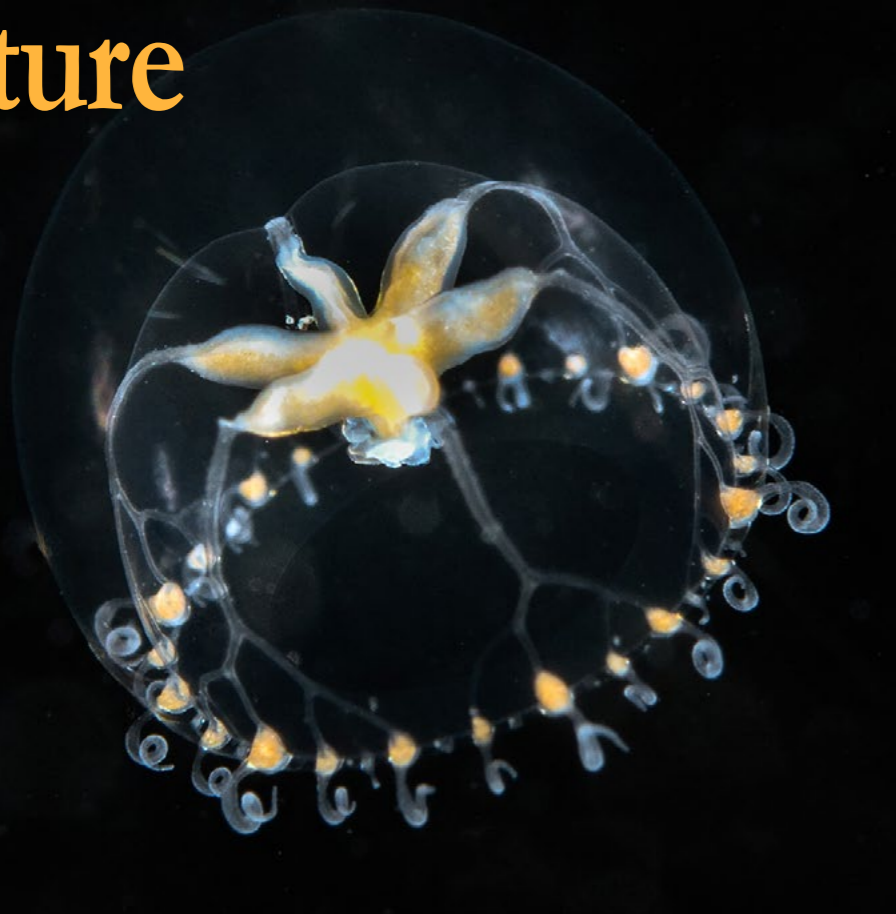
Location of Nilmoguba on map of the White Sea in Russia



Black Water Diving in the

East Sea

Text and photos by Aleksei Kondratuk
Edited by Catherine GS Lim & G Symes



Many want to feel what it is like to fly in the cosmos—how one's body levitates in dark space. Personally, I have never been in space, but I have found this feeling on night dives.

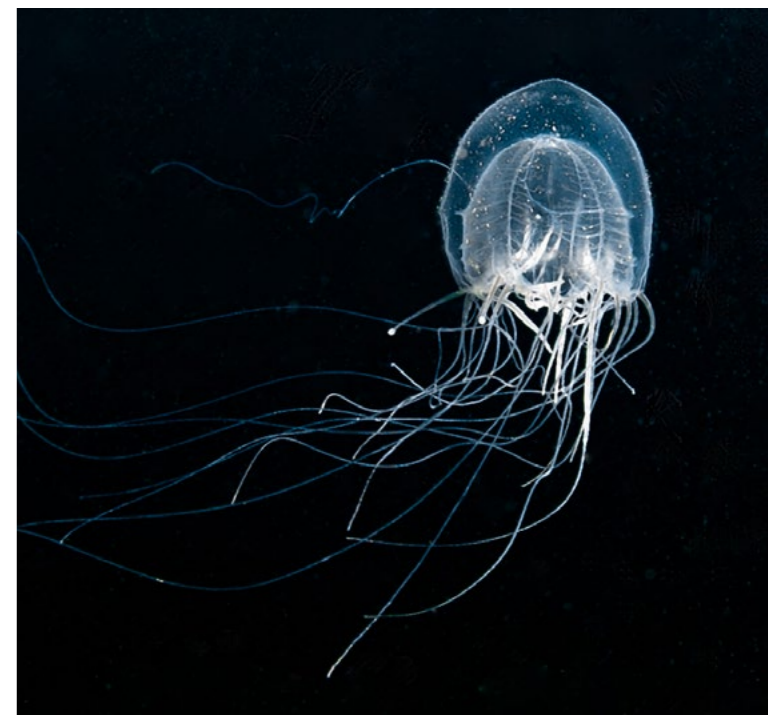
Some people say that open water is an extreme environment, so what would be a good reason to enter it at night? I say that night dives allow divers not only to feel like cosmonauts, but they can also explore a different underwater world. There are thousands of creatures in the ocean that hide during the day and are active at night. So, when the darkness

comes, the show begins.

In the Russian Far East, I have spent a lot of time in dark water with my camera, searching for new inhabitants in my native East Sea. The more I found, the more I wanted to find more. Each night dive became, for me, a kind of little expedition. Each time, I found something new. It could be a creature that I had not seen before, or a relationship between creatures that showed a different side to them.

Critters of the dark

So, what kind of creatures can we see in black water? First, there are the night hunters like crustaceans, fishes and cephalopods. As an underwater naturalist, I have my own



Poacher fish, *Agonomalus proboscoidalis* (above); *Proboscoidactyla* sp. jellyfish (top left); Comb jelly, *Bolinopsis mikado* (center); Diver on black water dive under ice in the East Sea (top right); *Polyochris* jelly (right). PREVIOUS PAGE: Colony of salps on black water dive



Skeleton shrimp (above); Mantis shrimp, *Oratosquilla oratoria* (left and lower left)

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wish list—a list of all the animals that I want to capture with my camera.

Mantis shrimp. For two years, the *Oratosquilla oratoria* was a "wanted" critter on my wish list. What a surprise it was when I found it on a night dive at a depth of five meters in the house reef of my dive center. This shrimp is a kind of "uni-

versal soldier." These unusual crustaceans lead a secretive life, and hide in deep burrows. In addition, they have the most perfect vision on the planet. Their faceted eyes are able to distinguish not only polarized light, but they can also see things in the infrared and ultraviolet spectrum. Therefore, the slightest movement of a diver does not go unnoticed

by them.

In addition to their excellent vision, nature also awarded them with a powerful weapon: claws. A mantis shrimp can break the large shells of bivalve mollusks without much difficulty. After all, the shot of its claw is similar to a shot from a 22-caliber pistol. These weapons of the mantis shrimp work like a spring; muscle contractions accumulate huge energy in the curved saddle-shaped grooves of its claw. Then the shrimp clicks the claw underneath itself.

Similar to the principle of the crossbow in which the bowstring is stretched and snapped into the trigger, and then,

when pressed, is released, producing a shot, so does the mantis shrimp strike its prey as it releases the latch and its claw shoots out at a speed

of 80km/h (~50mph), with the impact force reaching 150kg (330lbs). Believe me, this is very tangible; I managed to test its strike on my finger.



Cuthonella soboli nudibranch

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Compass jelly; Sea spider, *Nymphon grossipes* attacking a hydroid jelly (left); Hydromedusae jellyfish, *Bougainvillia superciliaris* (below)

bodies. Such reflections help me to find new species of jellyfish for my photo collection. Almost all of them are transparent and small in size—about 4mm.

In the cold waters of March (around -1°C or 30°F), I found a hydromedusae jellyfish, *Bougainvillia superciliaris*. At the same time, I found another tiny crea-

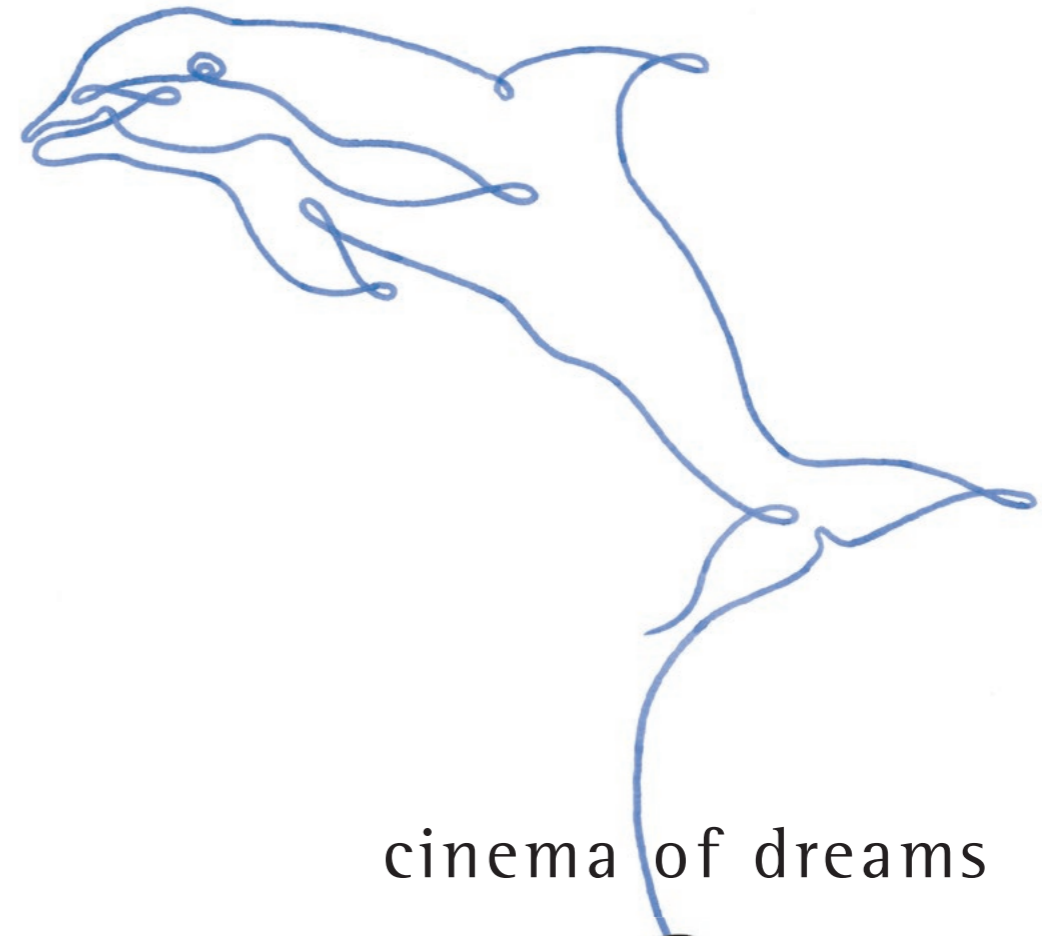
ture—the sea spider, *Nymphon grossipes*. And during the next night dive, I captured the relationship between these two species. Sea spiders



Plankton and jellies. Diving in black water is a great opportunity for shooting tiny plankton species and jellyfish. This is because the light of one's torch is reflected off their

ture—the sea spider, *Nymphon grossipes*. And during the next night dive, I captured the relationship between these two species. Sea spiders

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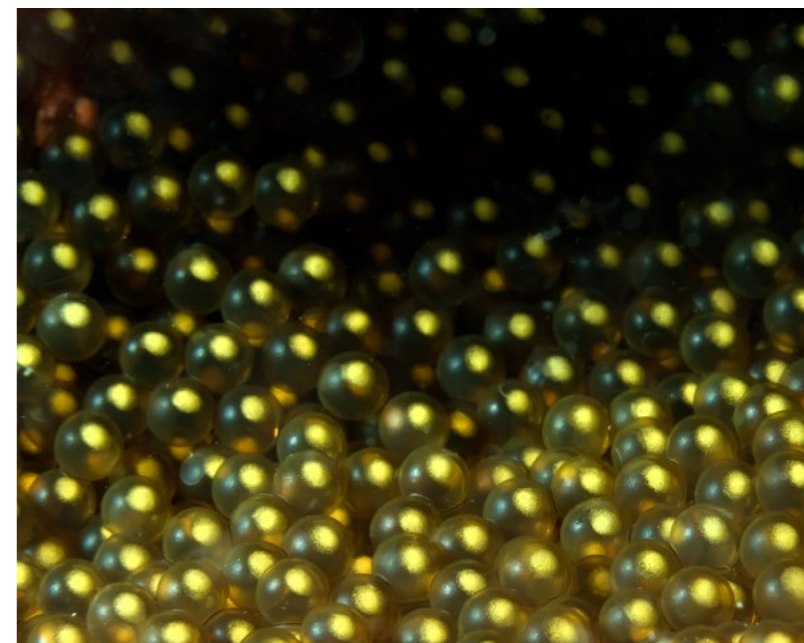
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Korean rockfish, *Sebastes schlegeli* (above); Sea raven (top right); Cyanea jellyfish (right)



TOP RIGHT TO BOTTOM RIGHT: Lion's mane jellyfish; Eggs of Alaska greenfish; *Dirona pellucida* nudibranch

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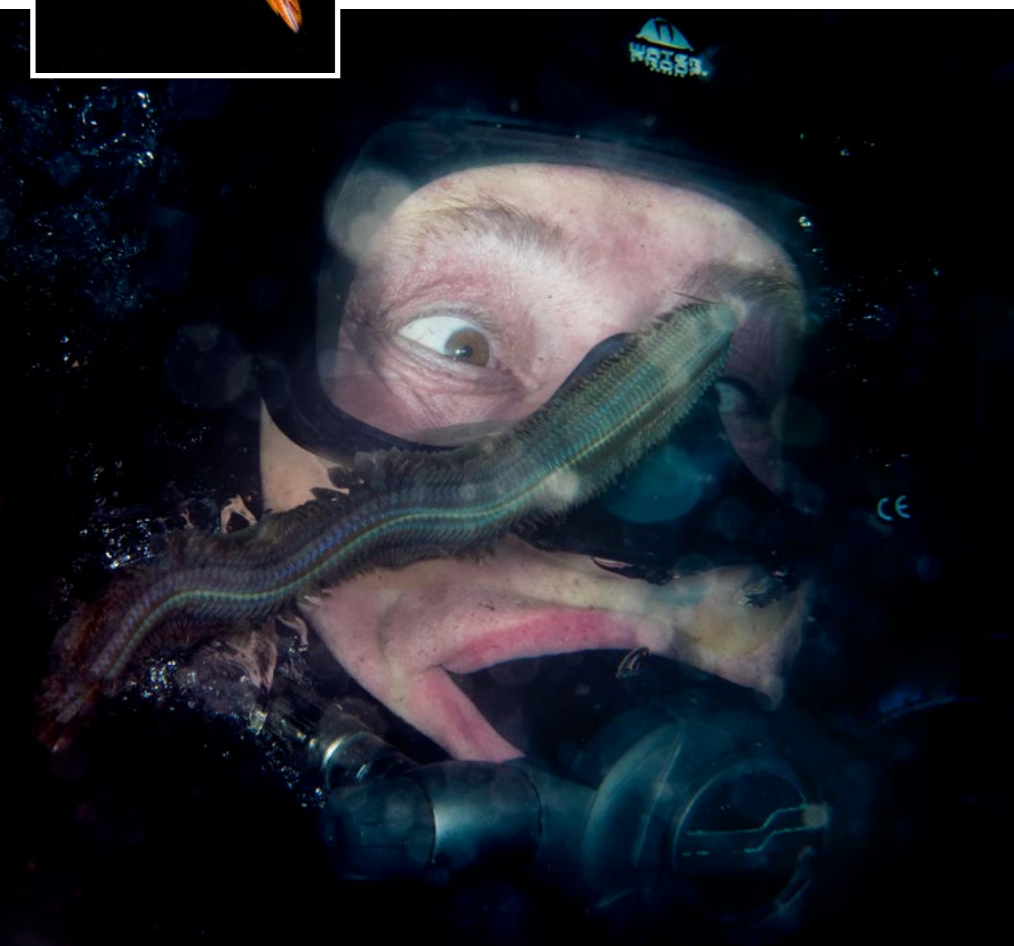


Planning your night dives

Equipment. First, pay attention to your equipment. You should bring at least two fully charged underwater torches with you. I recommend you use torches with a wide beam, so you won't miss anything!

Dive site. Choose dive sites that you know well. Believe me, they will be different at night. But in case you get lost, you will be able to find your way back, since you are already familiar with the site.

Communication. Discuss hand signals with your buddy on shore before the dive; it will make your underwater conversation easier. Remember that both of you will be in the dark, so try to explain yourself with only one hand, because your other hand will be holding your camera flash.



CLOCKWISE FROM FAR LEFT: Squid; Giant octopus; Crystal jelly; Okhotsk isopod crustaceans, *Idotea sp.*; *Flabellina nobilis* nudibranch; Sculpin; Japanese rim flatworm (above)

If you choose a shallow dive site, you can go up at any time to find the light of your buddy's torch at the surface. But if you choose a deep dive site, try turning off your torch to find the light of your buddy's torch, in case you lose sight of him or her.

Time of day. The best time to get in the water is at sunset. There is still enough light at the surface to check your equipment, but the water is already dark by that time.

Stay calm. Another thing: You should keep calm and forget your fears during night dives. If you let it, your imagination can conjure up all kinds of horrific thoughts when you see something strange underwater. I remember on one scary dive, a big green worm appeared in front of the mask of my buddy, and in the

next moment, we saw a buoy covered with algae—it looked like a dead man. Remember the golden rule of every diver: "STOP. THINK. ACT."

Shooting tips

Macro. Shooting macro in black water is a good experience for underwater photographers. It is rather difficult to catch a small creature in the frame. Camera lenses will try to focus on the tiny creature and move forward and backward all the time. Use a focus light. Look at the viewfinder



and move the camera towards the object. When it comes into focus, push the shutter. If this does not help, do the same thing again, but click the shutter with the auto exposure lock (AEL) button.

Stay calm even if a green worm swims across your mask

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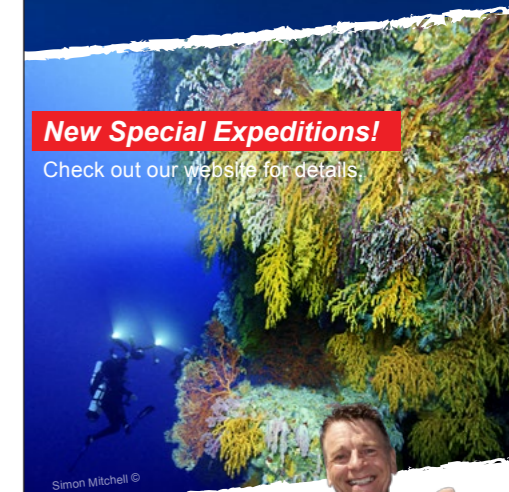
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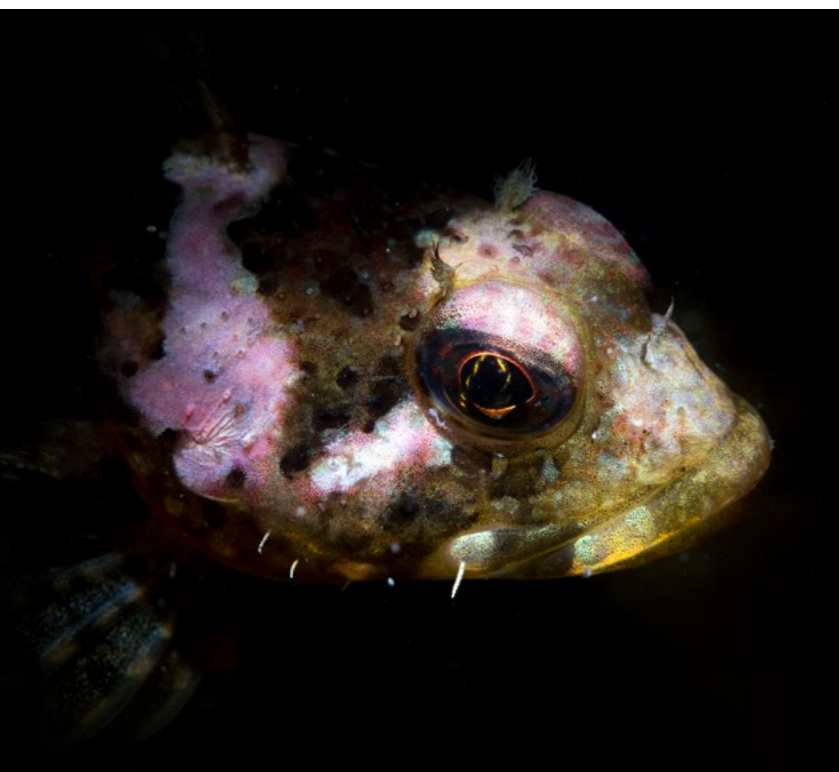
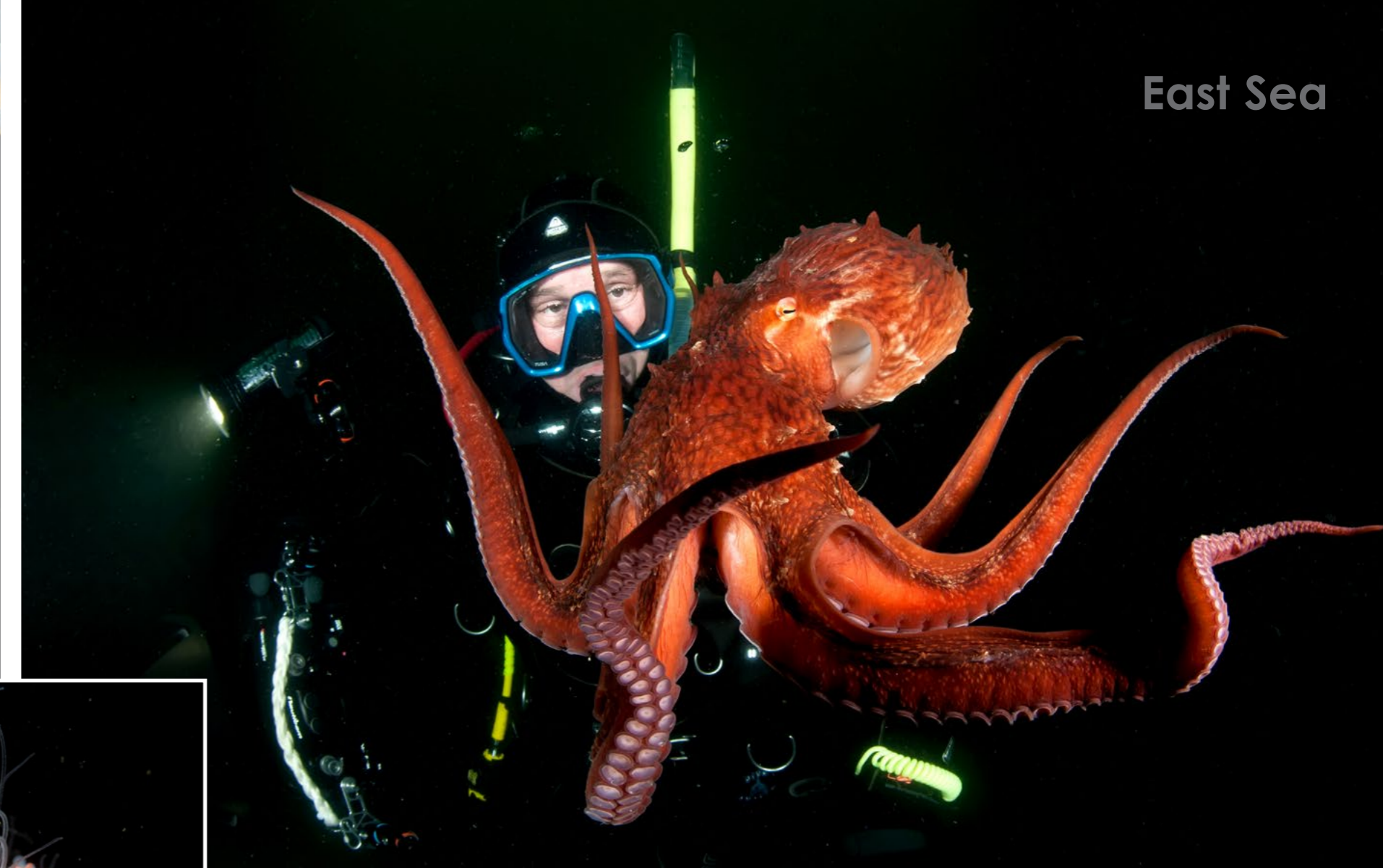
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Close-up of sculpin

Strobes. If you use a TTL converter with powerful torches at night, your pictures will be underexposed. The camera sensor will see the picture in good light conditions and will send a low-light impulse to the strobes. In this case, it is better to use your strobes in manual mode.

Wide-angle. Shooting wide-angle in black water is a good experience too—especially when you find an interesting animal like a giant octopus. On one occasion, my

identify what sort of bubble-making creatures we were. The session with the octopus was marvelous.

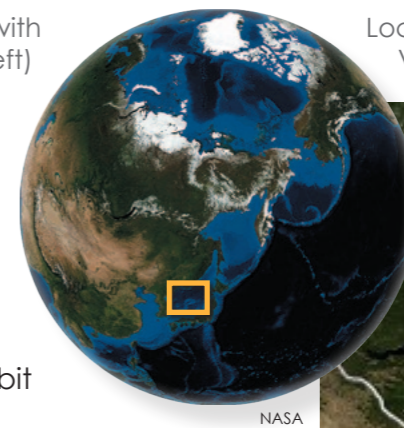
Lighting angles. Sometimes I place my strobes behind the subject. This adds creativity to a picture, especially when the subject is transparent, such as big jellyfish or comb jellies.

Flabellina sp. nudibranch (top left); Diver with giant octopus (above); Stalked hydroid (left)

buddy and I did a rather deep night dive. It was about 110ft deep. At that depth, we found a huge and very friendly giant octopus. It came out of the rocks, trying to

Try to use your imagination. Don't be afraid to use different photography techniques. All that you need is practice and a bit of luck. ■

Aleksei Kondratuk is an underwater photographer and naturalist born and raised in Vladivostok, on the shores of the East Sea, in the Russian Far East. After specializing in economics and mathematics, he became a divemaster and began photographing the underwater world. Visit: uwvision.com.



Location of East Sea on global map (left) and Vladivostok on map of Russian Far East





tech talk

During the 10-day annual technical dive camp held in June, divers descend into the abyss of Lake Baikal in Russia

Text and photos by Andrey Bizyukin
Edited by Catherine GS Lim
& G Symes

Lake Baikal is the deepest lake on the planet, with a volume of around 23,615 cubic kilometers of fresh drinking water. Each year, Lake Baikal is visited by many tourists, including recreational divers, underwater photographers and scientists who dive in the coastal waters of the lake. But when it comes to deep-water technical diving in Lake Baikal, few have heard of it, probably because these divers tend to be taciturn in nature. As a technical diving instructor, I became interested in visiting Lake Baikal in order to meet, talk and dive with the most experienced divers of this region, and to discover what there was to find in the depths of this distant, mysterious lake.



Lake Baikal

Technical Diving in the Deepest Lake on Earth

BACKGROUND IMAGE: PIXABAY

In Irkutsk, the nearest city to Lake Baikal, there are four dive centers and about 200 active divers. Having carefully studied the information about them, I learned that Dive Center Sval is one of the oldest

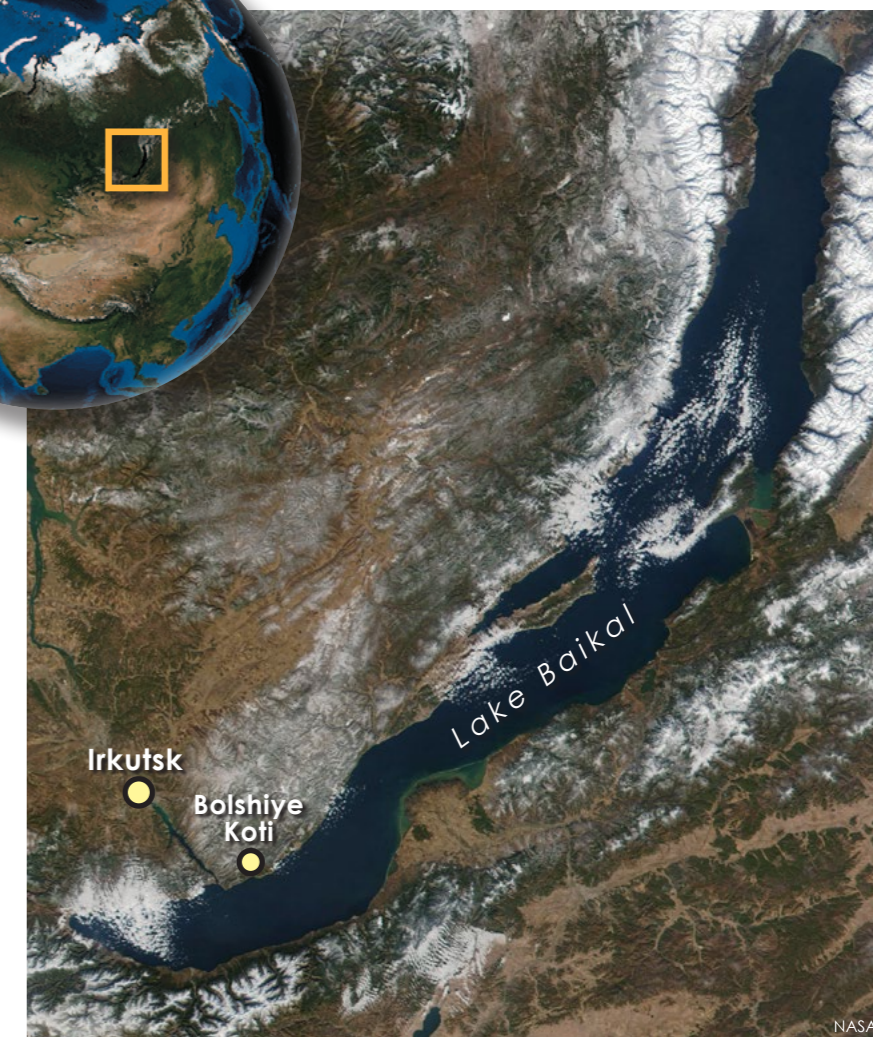
in the city. In the first ten days of June, this dive center organizes a dive camp on the shores of Lake Baikal, which has become an annual tradition. The center's slogan is: "Territory of serious diving." Their

motto intrigued me, so I decided to visit the dive center.

The flight to Irkutsk took only five and a half hours. Additional luggage fees for my bags with dive gear was US\$35. It was a

one-hour taxi ride from the airport to the Lake Baikal area, some 70km away, and then another 30 minutes by high speed ferry (US\$6) to a village named Bolshiye Koty (which means "Big Cats").





Location of Lake Baikal on global map (inset) and location of Irkutsk and Bolshei Koti on satellite map of Lake Baikal



people, but they are actually quite friendly and

are happy to talk to visitors. They are descendants of gold miners, intellectuals and exiles. There is also a shop and a library in town. The real riot of spring comes to Bolshiye Koty at the beginning of June, bringing with it lots of bright sunlight, beautiful weather and warmth, as well as flowers flowering everywhere.

On the pier of Bolshiye Koty, I was met by Andrey Dimitrevich, who heads Dive Center Sval. A professional diver and IANTD/TDI technical diving instructor with over 30 years of diving experience, he is the director of the dive camp in Bolshiye

comprises a unique forest—Baikal Taiga. There are no roads here. You can only get to the area via quad bike along the lake shore, by ferry, or over the ice on the lake in wintertime. About 100 people live in the village year-round. Others come to the village just during the summertime. Upon first glance, the locals look like hard

Bolshiye Koty is known as a mid-19th century gold-mining town. It is found in a very clean, pristine area; indeed, it is the location of Baikal National Park, which

THIS PAGE: Scenes from Lake Baikal; Bolshiye Koty village (top right)





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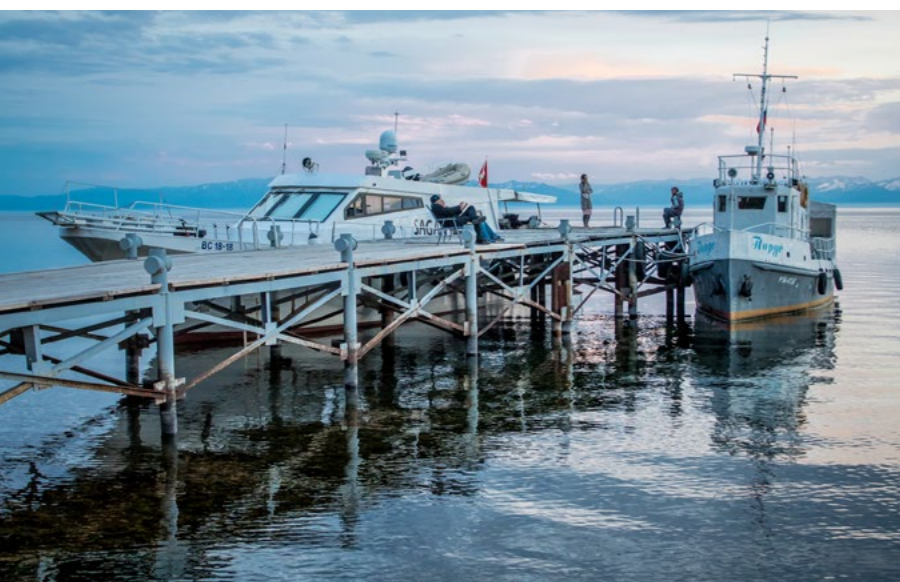
**ANDREY DIMITREVICH
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Koty. He said that it is here that around 45 divers from different locations have come each year since 2000 to take part in the dive camp. Their goals focus on recreational and technical diving, diving equipment testing, skills development, communication and ex-

change, sharing their experiences within each of these aspects of diving.

During the dive camp, one can receive training in beginner to advanced levels of diving, from Open Water certification to deep-water trimix and rebreather courses. Life in the camp

is subject to a daily rhythm to which one must adjust. There is a common kitchen for meals, a common briefing, dive instruction, preparation of equipment, technical and rebreather dives. Here, you can dive into what interests you most.

The dates of the dive camp were not chosen by chance. The best time to dive here is 10 days starting from the first weekend of June. Immediately after the ice melts in May, the waters in Lake Baikal become very cold and very muddy. Then, the ice-cold meltwater begins to sink to the depths of the lake, while clear and not-as-cold water rises to the surface of the lake. The water in the lake gradually clears, and visibility can reach 30 to 40m, until the middle of June. Also, in



View over dive camp staging area (above) with a tent for briefings (top left) and rows of tables (top right) providing a comfortable space to prepare gear; Dive boats are moored at the dive camp pier (left)



Diver in underwater canyon (left); Diver at point where the tectonic plates of the Asian continent meet (right); Diver at steep drop-off (below)



Lake Baikal



Along the narrow coastal strip, the lake bottom is covered with picturesque green sponges that look like succulent underwater cacti (left and above)

June, there is little wind, so the lake is calm and conducive for diving.

Baikal's underwater world

So, what is it like underwater in Lake Baikal? Well, essentially, it is a giant crack between the tectonic plates of the Asian continent—a crack with a depth of 1,642m,

filled with water. The underwater landscape in the Bolshiye Koty area makes it easy for divers to descend to deeper depths near to shore, and then upon ascent, take decompression stops along its steep vertical walls. Nine con-

venient dive sites are scattered for several kilometers along the shore of the lake. You can dive from the shore or from a boat. The choice of dive site depends on weather, wind direction and the waves on the lake.

There is a narrow coastal strip along the lake bottom covered with picturesque green sponges, which look like plump underwater cacti from the desert,

abruptly breaking into the darkness of the abyss. Then there are canyons, steep vertical walls, steeply inclined underwater tunnels and grottoes or caves. The lake bottom's topography is also dotted with detached rocks and boulders.

Technical diving

Every year, more and more divers are interested in doing



Divers descend into the abyss of Lake Baikal (above and left); Team of divers at decompression stop (right) and doing technical dive drills (bottom right)



technical dives and deep-water decompression dives using gas mixtures. Lake Baikal is a good choice for the technical diver. Here, you can test yourself, your equipment, new methods of diving and explore the underwater world of the deepest lake on Earth.

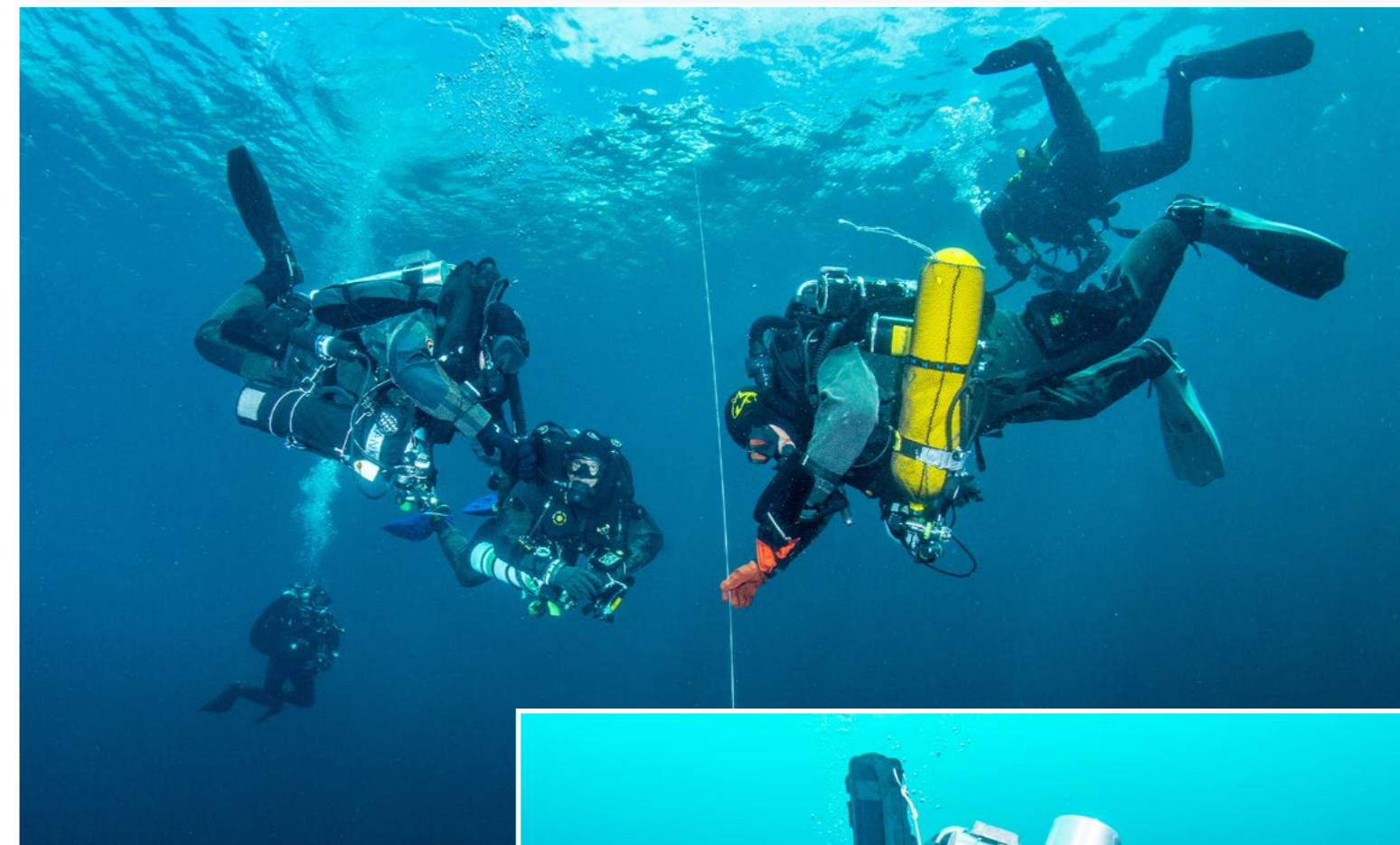
As a connoisseur of Lake Baikal, Dimitrevich believes that divers who are drawn to taking risks should not engage in technical diving here. Lake Baikal is a place for divers who do not take risks; it is not a place for extreme divers. Technical diving in Lake Baikal requires cool level-headed thinking, meticulous calculation, and careful planning of dives. There's no room for bravado.

Special requirements

In the warmest season (from August to September) at a depth of 30m, water temperatures are around 10°C, and at depth, are reduced to 4°C. During other times of the year, the water is even colder. In winter-time, the water temperature is zero degrees; and in the summer, one must adjust to an average water temperature of 4°C. So, in order to endure one to two hours of decompression time, you will need to use a drysuit, warm undergarments and electric heating, and to inflate your suit with argon. In cold water, a battery can discharge quickly and electric heating will stop working, so your drysuit should be large enough for you to be able to wear a second

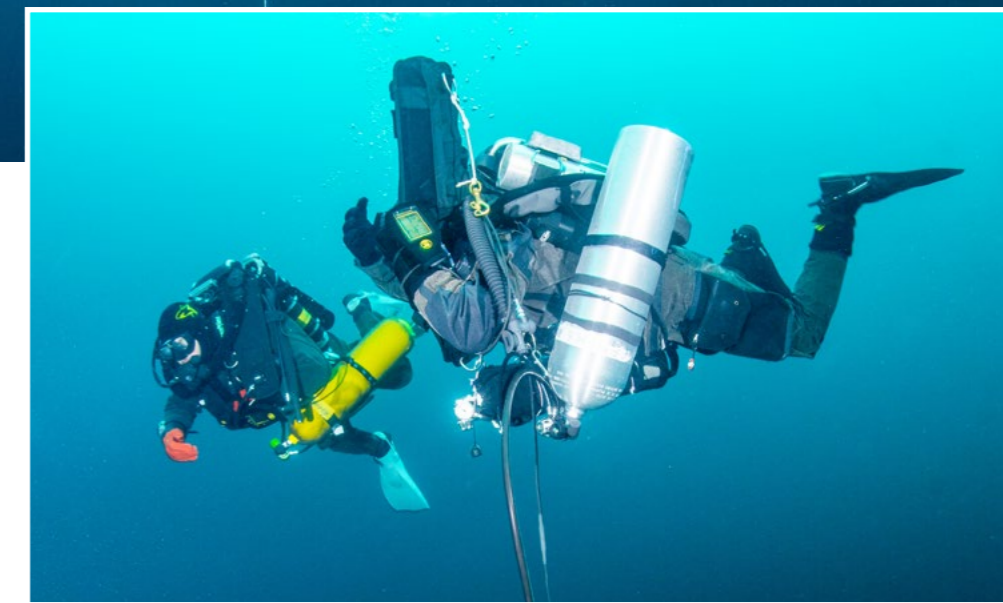
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Deep diving on Lake Baikal pushes the limits of equipment capabilities. Dive regulators should be frost protected, cold-water models adapted to cold-water diving. Inflators of BCDs should be serviced to withstand freezing. To avoid ice formation, all equipment must be dry before diving in sub-zero air temperatures.





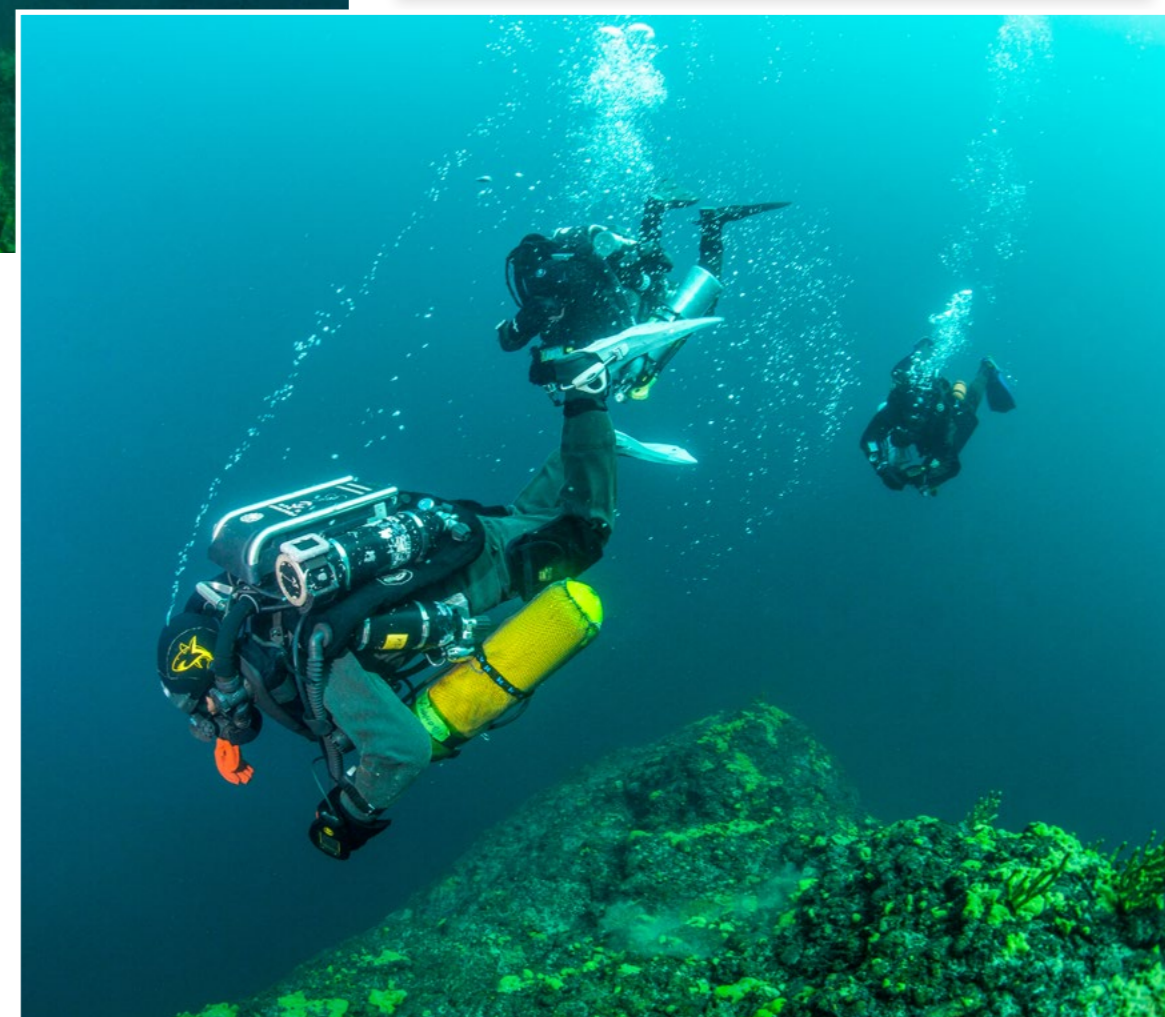
Rebreathers

The use of closed circuit rebreathers offers great advantages. Rebreathers provide divers with a large supply of breathing mixture for long decompression dives, and breathing warm gas warms the diver, providing added comfort. The future of deep, long and safe dives at Lake Baikal definitely belongs to rebreathers.

Currently, the most popular rebreather here is the Poseidon MK6. Poseidon offers unique dive training with their rebreather units, so even a beginner in an Open Water course can be trained on a rebreather—everyone likes this idea. During the dive camp at Lake Baikal, you can take any dive course with a Poseidon rebreather, from the beginner level to the hypo-trimix level (with “black bat-

tery” dongle or key) to a depth of 100+ meters. Hundreds of divers have been trained at Lake Baikal, and now they dive here in accordance with international standards set by training agencies such as PADI, IANTD, TDI, SSI and CMAS.

I asked Dimitrevich why the dive center has so much Poseidon equipment. He told me that in their search for the most reliable equipment, the dive center chose the brand through trial and error. They tested a lot of different regulators by diving to depth with them and waiting for the regulator to freeze and go into “free flow.” Almost all the regulators they tested froze sooner or later, except for one—the Poseidon Jet Stream regulator, even in wintertime and under the ice. Therefore, divers on Lake Baikal prefer regulators by Poseidon, so



THIS PAGE: Rebreather divers dive in teams of two (above and top left); Rebreather divers execute decompression procedures (right)



they can forget those extra thermoses of hot water brought along to defrost frozen regulators.

Diving to the Cross
One day during the dive camp, we dived the site named The Cross. Here, there is a huge Orthodox cross made of Siberian larch, set underwater on top of a free-standing rock at a depth of 15m, about 300m from shore. This cross was put here by divers in memory of Andrew Serov, the founder of Dive Center Sval.

The first group of rebreather divers to dive the site placed a buoy on the top of some rock

and descended to a depth of 60m. After them, we jumped into the water, swam to the buoy and started to descend. The visibility of the water was fantastic! Two rocky peaks rising from the depths of the lake were visible in the crystal-clear, blue water. On top of one of them stood a wooden cross. The first group of divers was already moving around it.

The scene was absolutely beautiful. I have never dived in such a magnificent underwater temple before. We descended down to the level of the rocks to have a look at the cross, read the words of remembrance on the memorial

and go deeper into the crevice. The narrow gap between the rocks was somewhat similar to the entrance to an underwater cave. It was narrow and dark.

I moved around the rock clockwise, swam out to open water, raised my eyes to the surface and froze with awe. Everything could be seen in one glance. Our boats floated above us on the water's surface and the next group of divers was descending directly to the cross. The water visibility was so good that I could distinguish even the smallest elements of their dive equipment. I took pictures, checked my gas pressure and

saw that it was time to ascend. On the way to the surface, I took photos of the divers on their de-

compression stop. Once again, I admired the beauty of this spiritual dive site and rose to the surface.

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Divers at The Cross dive site where a memorial for the founder of Dive Center Sval, Andrew Serov, has been placed at a depth of 15m, with a huge Orthodox cross made of Siberian larch (left and lower left); Divers at a dive site with a garden of old anchors (right)



Mare and more women are participating in the technical diving camp (above and left); The next generation is already enthusiastic (lower left); The entire ensemble of participants and staff pose for a group photo (below).

There is something mythical, fabulous and mysterious here. Locals believe that all the spirits of the world live in the abyss of Lake Baikal. They believe it can make strong people even stronger, but weak

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What people are saying
Technical diving, especially in cold water, was once an activity taken up primarily by men; but here in the camp, I met many women. One of them, Galina, a diver from Kamchatka and a mother of three children, was a rebreather diver and a cave diver. It was her third time participating in the dive camp, and she dived together with her husband. She said that she believes that diving with a rebreather is much easier for women than diving with a heavy twinset on one's back. There are no noisy bubbles, breathing warm air keeps her warm, and she is not tired after diving with a rebreather, she said. With a rebreather, her diving became much more comfortable. Galina said she likes technical diving. She likes the lake.

The abyss beckons her, and she likes to dive deep. She also likes the underwater canyons, green sponges and little fishes. Of course, there are more male divers in the camp, she said, but all the participants are very friendly to one another. And she dreams of having special women's equipment one day!
Dmitry, a divemaster from Irkutsk, told me what Siberian divers think about Lake Baikal. He said Lake Baikal is like a character in a Siberian folk tale—the sun in the morning and a storm in the evening! It is not necessary to dive deep in Lake Baikal. A depth of 25 to 30m is enough to understand the delicate ecology of the lake, to see its green sponges, to pass through its thermoclines, to dive into its darkness and look into the eyes of the abyss.





tech talk

Underwater photographers find lots of interesting subjects and strange topography to shoot under the waves of Lake Baikal

people, it may break. Lake Baikal seems a place of bottomless depths, scale and colors. One feels like a drop of water here, in the deepest lake of the world. Baikal is harsh. Local divers treat it like a living creature. The lake requires respect. It expects concentration from divers, responsibility for themselves and for their buddies. Only then is the lake ready to reveal the beauty in its depths.



The dive camp in Bolshiye Koty is a great place for exchange between divers, from those new to diving to experienced divers and instructors. Some divers do their training here, and the day after, make decompression dives to a depth of 60m; some take photographs of the lake's underwater landscapes; and some come here just to start learning to dive—but all like it. The number of divers participating is steadily increasing. Every year, it is necessary for the organizers to bring more and more gases, cylinders, compressors and additional boats.

Afterthoughts

A week of unforgettable dives here felt like it flew by in an hour. I was already on my way back home, but on the plane, I wanted to go back, drive along the perimeter of Lake Baikal again, and dive in new and different parts of this magical lake. On my bucket list, Baikal is one of the top five dive sites in the world. Therefore, every self-respecting diver should want to dive at least once in Lake Baikal. ■

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tech talk

Cave diver with underwater scooter in Orda Cave, a gypsum labyrinth located deep in Kazakovskaya Mountain in Perm, Ural, Russia

Text and photos
by Andrey Gorbunov

Prometheus is an underwater photography and videography project by the Orda Cave Underwater Speleology Center. The center is looking into the use of the latest technology in dive lamps to illuminate huge caves for photography, where flash has previously been used.

Orda (Ordinskaya) Cave system is a horizontal gypsum labyrinth located deep within Kazakovskaya Mountain (in Perm, Ural). The largest part of the cave labyrinth is filled with very heavily mineralized water, and the total length of its underwater galleries is about 5km.

What makes the cave unique for photo and video photography is the white color of the gypsum. White gypsum rocks do not absorb light like dark rocks in other caves do, but reflects it, thereby filling photographs with a light of greater intensity. Here, one can find great water visibility year-round, providing a wide range of opportunities for testing vari-



The Prometheus Project

— *Lighting Up Orda Cave*



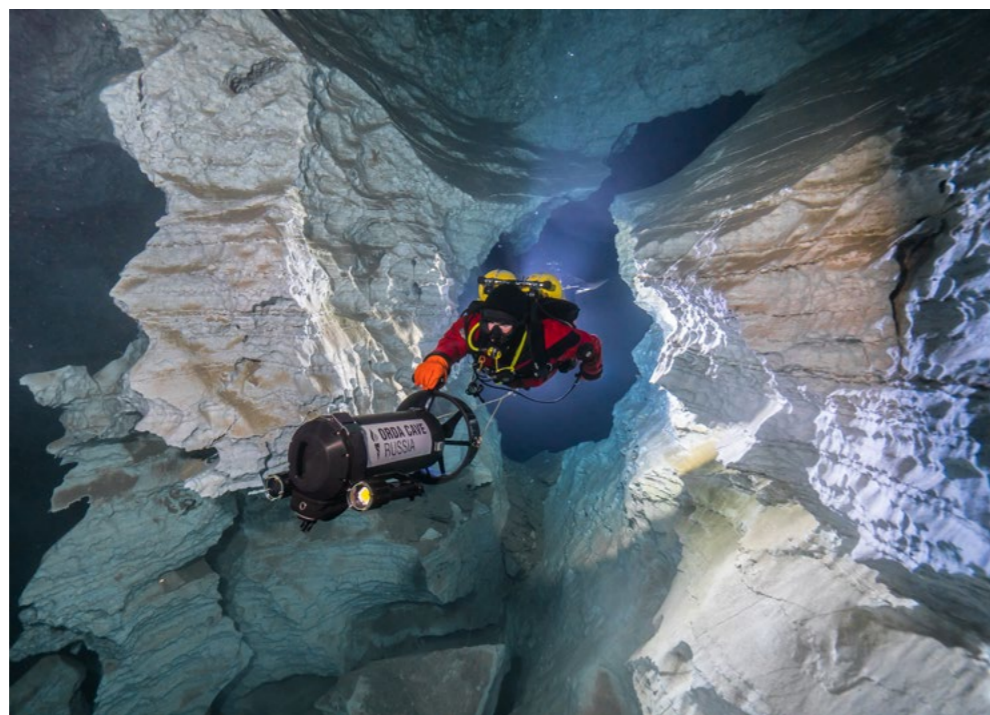


ous methods of photo and video shooting.

Project development

The project idea evolved out of the center's lengthy experience in shooting stills and video in the cold underwater caves of Russia. Fundamentally, the aim of the project is to support a team of experienced and specifically trained cave divers taking new, high quality shots in the underwater cave, using a lot of powerful modern underwater lighting equipment. The name of the project was inspired by the ancient Greek legend of Prometheus, the divine being who gave fire and knowledge to humanity.

The project has developed into a single entity out of many facets. Complex experi-



ments have been made, with various ideas and methods of cave diving. Having made hundreds of dives in the cave, we were able to



THIS PAGE: Photographs taken as part of the Prometheus Project by the Orda Cave Underwater Speleology Center in Russia



project, we proudly present the natural phenomenon that is Russia's Orda Cave to a wider audience beyond the cave diving and speleology worlds. At the moment, speleologists are interested in our staff, as our photos have been very useful and informative for scientific purposes.

If you are an experienced cave diver and are interested in joining the project, you are welcome to contact us. To learn more, visit: ordacave.com. ■

Andrey Gorbunov is the director of the Orda Cave

see and examine in detail all the different sides of the cave and admire its splendor.

Reaching outward

Through the photographs and videos of the

Underwater Speleology Center. As an award-winner of the Russian Geographical Society, he is an honored coach of underwater sports and a contributing cave diver and underwater photographer of the Prometheus Project.

THIS PAGE: Special lighting is used to bounce off Orda Cave's white gypsum, which reflects more light than other cave's dark rocks.



Cylinder Safety

Sponsored content by DAN

There are certain things in diving we tend to take for granted. Among them is the scuba cylinder. Cylinders are the lifeline of our sport, but they have become so steadfastly reliable that the community has come to expect them to be totally safe, sometimes at significant risk to customers and dive professionals alike. You rely on your cylinders for enjoyment, and safety – do you know how to keep them safe?

Standards

Cylinders in the United States are regulated by federal law, although state and local regulations may also apply. The majority of these laws and regulations, from organizations like the Compressed Gas Association (CGA), call for cylinders to be authorized for use only when inspected and tested to standards by a formally trained and certified individual. These regulations may seem overbearing at times, but they exist for good reason: A single aluminum 80-cubic-foot cylinder has approximately 1.3 million foot-pounds of potential energy (1 foot-pound is the

amount of energy applied to 1 pound to move it 1 foot), and we as divers routinely expose them to salt water, high temperatures and rough treatment without a second thought.

It is a testament to the manufacturers that scuba cylinders we use last as long as they do and fail so rarely. Excellent technology can only get us so far, however. It is up to us as dive professionals to determine the safety of the cylinders that we use, fill and provide to our customers and students. Any cylinder that contains more than 40 PSI is considered high pressure under Occupational Safety and Health Administration (OSHA) guidelines and thus requires a hydrostatic test every

five years and a yearly visual inspection. There has been some consternation over the source of the annual inspection for scuba cylinders, and while it is true that federal law does not explicitly dictate annual cylinder inspection, CGA guidelines require them and set a reasonable standard for enforcement in case of incident.



Testing our tanks

While it is easy to pay lip service to cylinder safety, it can be difficult to maintain a large fleet of rental tanks, or verify the safety of a tank that is brought to our compressor station for the first time, particularly with the demands of a busy season or a line of customers. Before you touch a cylinder, do a quick check for hydro and visual dates and any signs of damage. Dings, dents, deep scratches, signs of rust and pitting are all reasons to inspect a tank further before filling or reject it entirely. Listen for noises when cylinders are lifted or transported — a metallic rattle or rolling noise is often indicative of a valve stem that has backed out of a valve, and sloshing indicates the presence of water (and most likely corrosion along with it) inside a cylinder.

Speaking of corrosion, it is important to note that the days of water-cooled fill stations are over. Current recommendations opt for dry filling to avoid introducing water to cylinders through the valves and because the benefits of water cooling can be negated with a few extra seconds at a fill panel and some good ventilation. A single DIN valve face filled with water can introduce up to a teaspoon of water to a tank, which is enough to cause a steel cylinder left on its side to fail a hydro after just a year in the right conditions. Avoid introducing any water into cylinders at your fill station by blowing out valve faces before filling and keeping tanks out of the water until they are ready to be used.

Even if a cylinder has no apparent corrosion and makes no noises, give it a solid whack with

a wooden mallet (or something similar that will not damage the tank face) approximately halfway down the cylinder before filling it. This is called a hammer test, and it is one way to quickly determine if there is anything seriously wrong with the cylinder walls just before filling. A solid bell-like tone indicates uniform wall thickness and most likely a healthy cylinder, while a change in pitch from the norm or from place to place around the circumference of the tank can indicate interior corrosion and reduced wall thickness. If this technique is new to you, it may take a while to get the hang of it, but it is a tried and true safety check to identify a tank that warrants a closer look. ■

For more information on cylinder care and safety, visit: DAN.org.



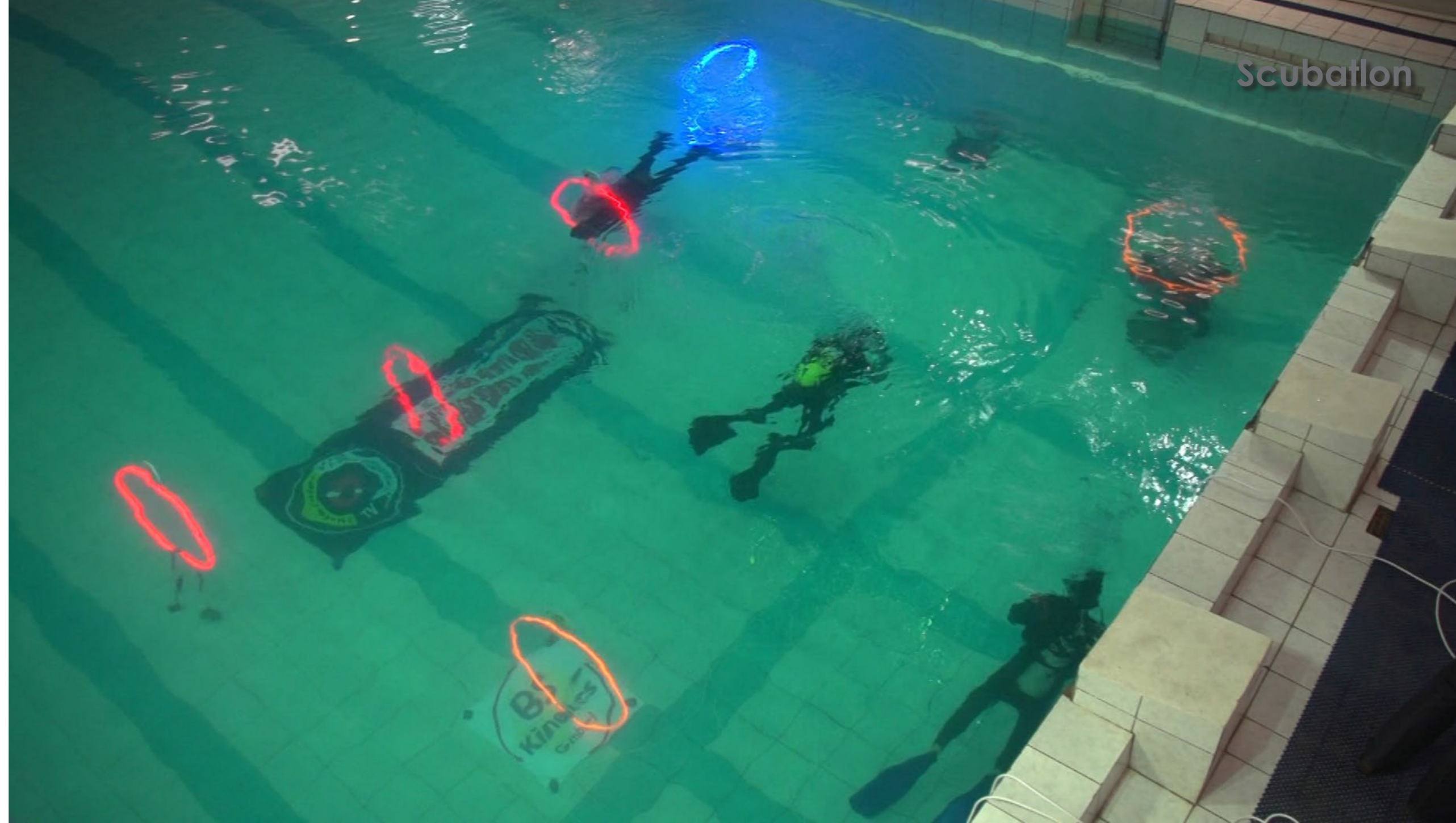


Scubatlorn

Environmental Protection as a Sport

Text and photos by Andrey Alexandrov

Over the last half century, scuba diving—which was, in its earlier days, reserved for the elite, brave and courageous—has become a mainstream sport for the masses. On the one hand, this is very good. Millions of people get to see with their own eyes how diverse and exciting the underwater world is. On the other hand, diving can cause serious damage to coral reefs, which are rich in biodiversity, but extremely vulnerable to human impact. In a response to the dive community's demand for more protection of the reefs and the underwater realm, a group of divers came up with the idea of Scubatlon—a tournament in traditional recreational diving with a conservation bent.



Scubatlon



Author with science fiction writer Arthur C. Clarke

How it all started

"We are not making enough money from our dive center, but we enjoy it immensely," said science fiction writer Arthur C. Clarke sitting in his wheelchair. The rustling of palm trees and the ocean waves could be heard just outside. At his home in Colombo, Sri Lanka, I met with Clarke while shooting a documentary about his work in science fiction.

Just prior to that, we had been talking for a long time about the future of humankind and civilization on Earth. But after hearing his words about diving, I saw in front of me not just the great master of science fiction,

but a quite down-to-earth person.

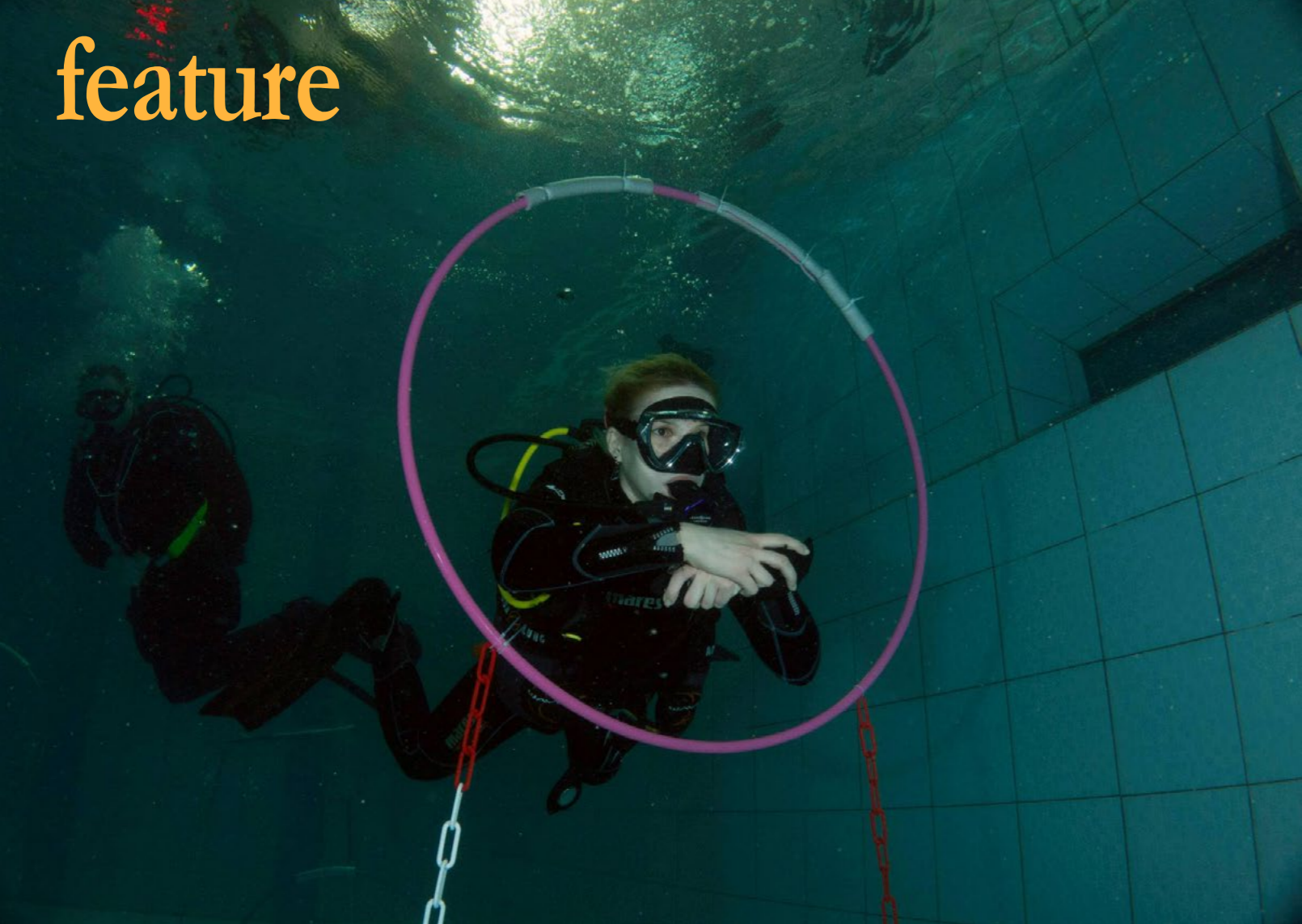
The problems of my dive center in Moscow, which at that moment had existed for about 15 years, were very much the same as what Clarke was describing. The flow of tourists was growing steadily, but people's attitudes towards the ocean were changing at a much slower pace than the disappearance of coral reefs. The ocean is huge, but as it turns out, the places that are interesting and accessible to divers are not so numerous. Over the last couple of decades, the reefs in the Red Sea, for example, have been practically trampled down.

The project

The idea of Scubatlon was not to invent artificial tournaments, but to introduce elements of competition into traditional recreational diving. This is actually how the name for the event was created; it consists of two words: *scuba*, and a variant of the Ancient Greek word *athlon*, *áthion* or *atlon*, meaning *competition* or *contest*. It was my opinion that the most euphonic combination of these terms was Scubatlon.

Little had to be devised for the project itself. It was born organically, combining demand and opportunities to meet that

demand. It was a response to the demand for nature protection, which had developed in the dive community. When creating my first films about the underwater world, I wanted to include an epigraph: "Look and never dive." However, one cannot achieve much with bans. We had to look for more realistic solutions. The start of the Scubatlon project helped me to get a load off my mind. The new slogan was "Environmental Protection as a Sport." Rather than making up competitions for divers, we created a sports discipline to help develop safe diving.



Buoyancy is key

There are a lot of courses available at dive centers to help improve one's buoyancy. The problem was that they were a trifle boring. The course results were not immediately visible—maybe that was why they were not very popular. With Scubatlon, the situation was precisely the opposite. Not only do you acquire buoyancy skills while preparing for the contests, but you are also improving them at the same time.

Location

The second problem was a geographical one. Nowadays, there is no sea in Moscow. Two hundred million years ago, there was one, but it no longer exists. Rather, it is

still there, but deep underground. Well, try and explain this to the people who want to dive *right now*. A swimming pool, in its traditional form, is a very poor substitute to the sea. Staring at the patterns on the swimming pool walls is not as exciting as communication with live creatures in nature. Certainly, dive club events can be organized with some artificial activities in the swimming pool, but this is not very entertaining.

Having realized these problems, we tried to resolve them. One of the tasks was to teach divers good manners, and in such a way that the process was interesting to participants and the result was evident. By combining training and games, Scubatlon became an

obvious response to the demand for more protection of the reefs. It was a game with a practical result. In scuba diving courses, we teach people to dive nicely, to manage air consumption and not to brush against anything when diving. The contests were aimed at developing these skills.

Traditionally, the contests are held at night. That is why the name of our event is Scubatlon Night. This is a so-called tribute to tradition.

Combining traditions

In addition to an underground sea, Moscow has other remarkable phenomena. For example, there is a custom here to celebrate the Old New Year (or Orthodox

THIS PAGE: Learning proper buoyancy skills in order to protect coral reefs is a key motivation and goal driving the development of the Scubatlon competition; The glowing obstacle course rings were tested on sharks first (bottom right), which passed with flying colors, and then on beginner-level divers, who ended up damaging the expensive rings. So, the glowing rings were then used only with advanced divers, and metal rings were used with beginners.



Returning students

The first Scubatlon contest was held by our dive club in 2005, the same year the Scubatlon Association was created. I was the Association President. By that time, our dive club had already existed for more than 20 years. Over this period of time, some of our students, who had completed the training and traveled to the sea, returned to us with a request to teach them to "dive correctly." We all knew the problems that recently certified open water divers caused on

the coral reefs. They were the ones who damaged the reef most during their first dives.

And the remarkable thing was that many of these students came back to us, having felt the responsibility for the reef and its inhabitants. The situation with this group of divers was quite clear. If there was a will, there would be a way to teach them.

The other group of open water

divers believed that they dived just fine, proudly displaying their certificates, and had no interest in learning how to dive in a nice fashion. Or, rather, the thought just did not cross their minds.

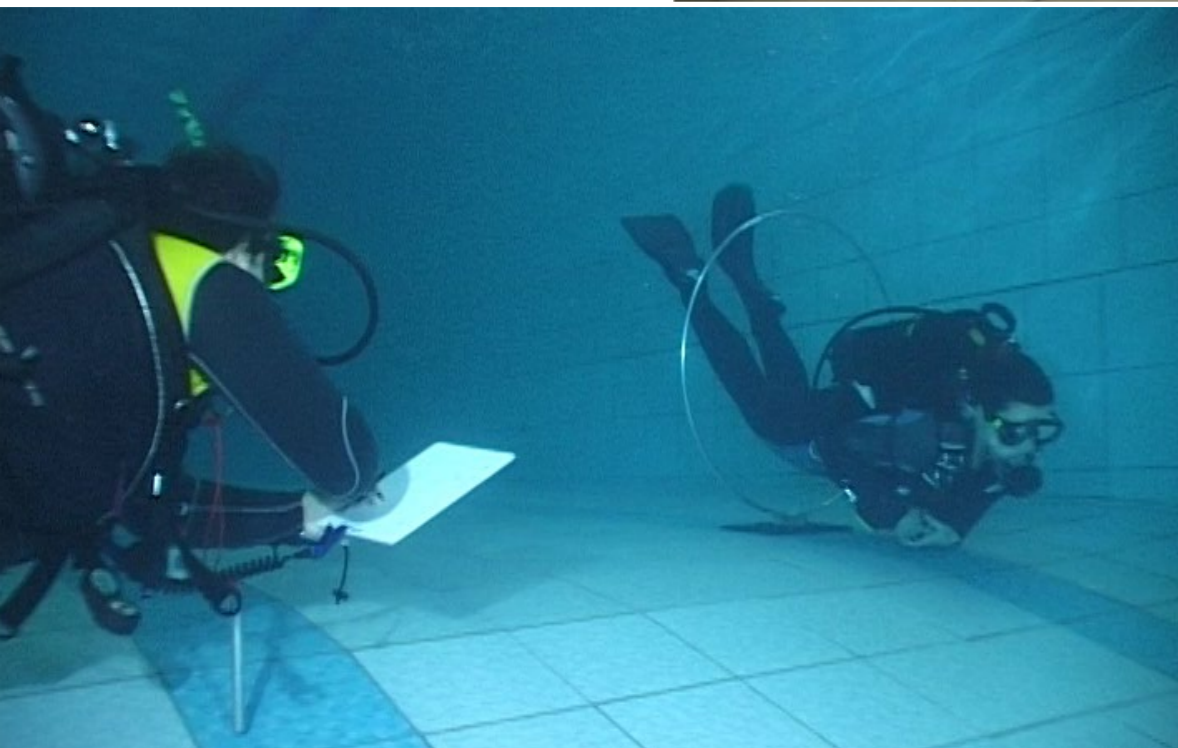


New Year) on the nights of the 13th and the 14th of January. This is hard to understand at first glance, but there is a logical explanation to it. The church in Russia lives by the Julian calendar; it is called the Orthodox Church for a reason. The state, however, follows the Gregorian calendar.

So, everybody is happy about an extra holiday, and divers in Russia found a very good application for it. Many Russian dive centers have a tradition of seeing in the Old New Year—underwater. Considering the not-so-long history of scuba diving, this event has already turned into a “beautiful old custom.”

Due to its age, our dive club was one of the founders of the Old New Year tradition. The event went as follows. At ten o'clock in the evening, the pool closed for the visitors, and a variety of contests and relay races started underwater. We saw that all we had to do was just to replace these activities with our Scubation competitions.

But traditions are strong. The culmination of the celebration had been to welcome the Old New Year underwater



with champagne. This moment threatened to divide the competition into two unequal parts. But the issue was resolved by the competition itself. In the heat of all the activities underwater, nobody noticed the start of the Old New Year.

Requirements and conditions

In the beginning, there were no limits. Divers holding beginner level certificates of any generally accepted diver training system were admitted to the starting level contests. The requirements of the competition were most-closely related to “combat” restrictions (practical skills). There was a minimum

of “academic” restrictions (theory).

The participants swam the obstacle course with the equipment they used for open water diving. One could argue, which is better: BCD or wing? Lately, the argument also includes sidemount. Each diver selects what he or she considers is better. Everybody must comply with the following principles: personal safety, convenience and no damage to the environment. There was no need to buy special equipment for the contest. All gear and special options used for improving your streamlining and buoyance on the competition track would come in handy during



The challenge tests divers' management of air consumption and buoyancy skills.

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- NAUI Annual General Membership Meeting**
• Thur., Nov. 15, 4:00 - 4:45 p.m., Las Vegas Convention Center, Room: N243
- NAUI Member Update**
• Fri., Nov. 16, 10:00 - 10:45 a.m., Las Vegas Convention Center, Room: N241
- NAUI Standards & Policies Update**
• Thur., Nov. 15, 12:00 - 12:45 p.m.,
• Sat., Nov. 17, 4:00 - 4:45 p.m., Las Vegas Convention Center, Room: N241

Reception & Ceremony

- NAUI Awards Ceremony**
• Thur., Nov. 15, 3:00 - 3:45 p.m., Las Vegas Convention Center, Room: N243
- NAUI Member Reception**
• Thur., Nov. 15, 6:00 - 9:00 p.m., Las Vegas National Golf Club

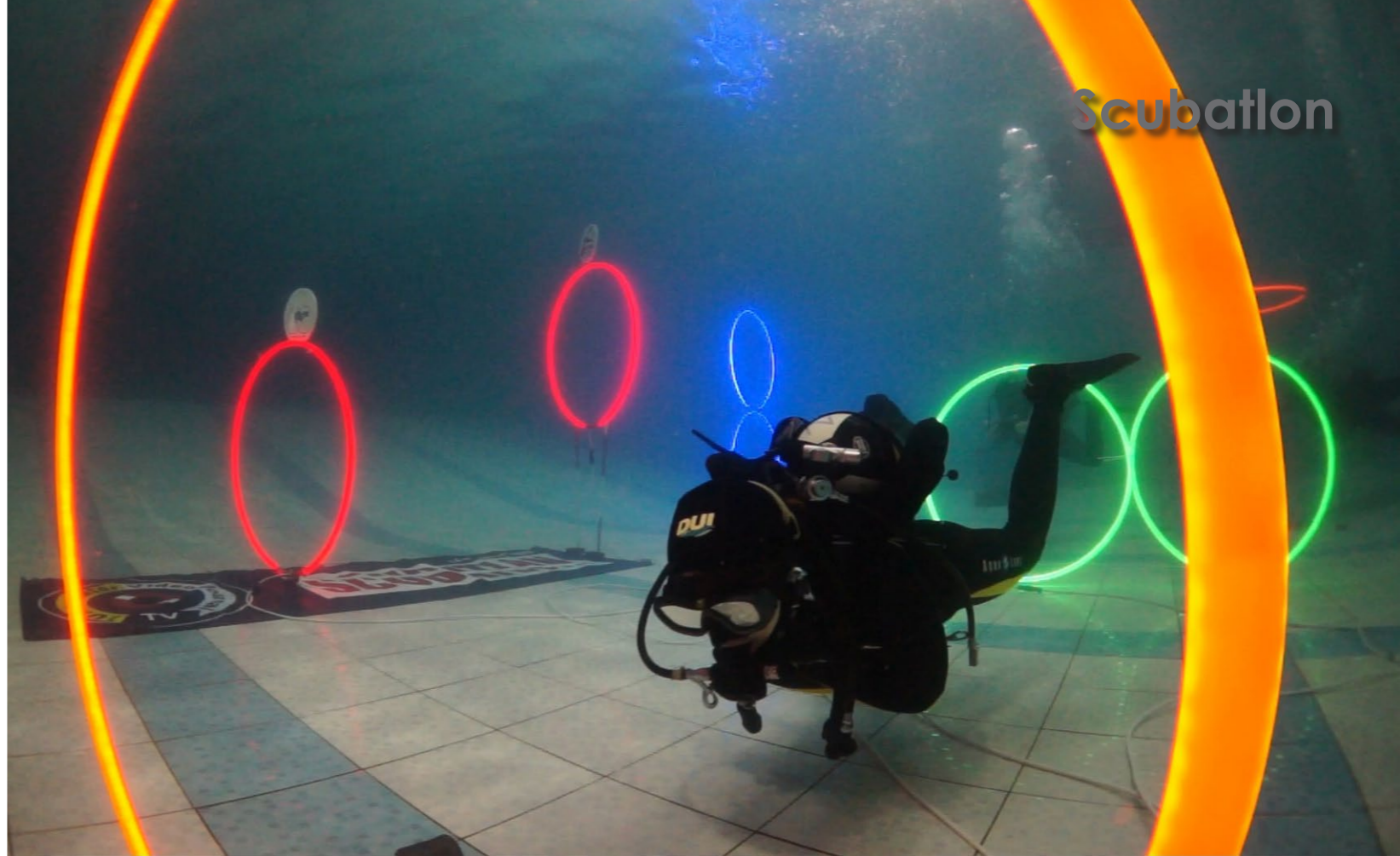
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Obstacle courses vary with increasing levels of difficulty.

exception was the 11.3-liter aluminum tank, as its dimensions were close enough to the 12 liter steel tank.

Response and improvements

Of course, we were very nervous before the first competition. We could not predict the response of divers accustomed to open water. There were some doubters who spoke out quite harshly against our initiative. But critics will be critics, it is

and constitution. We managed to resolve this problem by placing the obstacles in the obstacle course at an angle to each other and at different heights. It then became possible to pass the track only by using a helicopter turn and by altering buoyancy.

We also had to simplify the track a little. For example, the obstacle consisting of two rings lying horizontally, one over the other, turned out to be too complicated for divers at the beginner level. So, we used only one ring. However, there were expert divers who managed to pass the whole line of obstacles with twin tanks.

the recreational diving obstacle course.

Any configuration was allowed, including wetsuits or drysuits. The mandatory conditions included an octopus, an analog pressure gauge on a console, and tank capacity no less than 12 liters. The

always easier to criticize.

As it turned out, our fears were unfounded. The first competition was a great success. But with the first admirers of the event appeared the first problems. Suddenly, we discovered that all the participants were different in height

The track time of each participant was fixed. The more participants, the more time it took. The competition became a night-long event. In order to improve the pass-through capacity, we made two parallel obstacle courses. This solved one problem and added



another. Now we had two participants in the water diving at the same time, so we had to add a judge and an assistant judge who could restore the course after negligent divers disrupted obstacles.

Our varied depth pool, which had a 10x12m deep section, started to look like a marine mammal pen. In addition to passing through the obstacle course, being mindful of its restoration and achieving the best result assessment, divers all also had to stay clear of each other. The underwater scene became lively and much more fun.

Special effects

However, the underwater landscape was a bit gloomy due to the aluminum rings and standard lighting of the swimming pool. We wanted to make the action in the pool look more like a stage show, so we got the idea of using glowing rings.

At first, the task was easy. But the rings had to be light, strong, have positive buoyancy in fresh water, keep their shape at depth without deforming, and on top

of it all, they had to glow and not cost as much as a spaceship. The process turned out to be labor-intensive and expensive.

The first testers of the glowing rings were sharks in the sea. No issues with them. But it did not go so well with actual divers.

It turned out that the glowing rings were quite vulnerable to some of these "fin-footed mammals." Since we admitted everyone in our contests, irregardless of their skill level, the first obstacle course of rings was destroyed.

The problem was resolved by dividing the participants into groups. The contests with an obstacle course comprising metal rings were open to everyone holding a dive certificate. The glowing-ring obstacle course was limited to only those who had passed the Scubatlon Scuba Master special training course.

Scubatlon Scuba Master course

In addition to buoyancy training, this course also prepared students for the contest. Following the already established syllabus, we included elements of

the games in the training. Each lesson ended with working on how to pass one of the obstacles in the Scubatlon obstacle course.

This was a very important moment for students, as they could see the results immediately. The students then became more motivated to take part in the contest and compare their skills with those of others. One can make hundreds of dives and collect a stack of plastic cards, but the objective indicator of the skill to dive expertly and safely for the environment is easily tested by the Scubatlon obstacle course, where all the participants are on equal footing.

I would like to note that the Scubatlon Association, as a matter of principle,



In order to improve pass-through capacity, two parallel obstacles courses were instituted and additional judges were added to reposition rings bumped off course by participants.

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does not conduct beginner level dive training, as this process is already well organized. Our training is for certified divers. We accept the certificates of any generally accepted training system, beginning with Open Water Diver or One-Star Diver level, or other similar certifications.

Expansion and development

A big surprise was that Scubatlon, which started as an internal club entertainment event, quickly developed into something bigger. The idea was taken up by other dive clubs. They started holding their own internal contests and regular training sessions. Step by step, the competitions be-

tween dive clubs developed into the Scubatlon Cup. Now, various dive clubs send their teams to the Scubatlon Cup stages.

A "side effect" of all these training sessions and contests is a continuous improvement in divers' buoyancy skills. As of today, there are now several levels of difficulty in the obstacle courses designed for different levels of participants.

Since 2015, the tournament is held in five stages over a year. At each stage, there is a winner. The results of the five stages determines the Cup finalists. The competitions are held as individual and all-around team events. The Cup itself is a perpet-

THIS PAGE: With the surprising popularity of the contest, it has expanded to an international tournament, with contests taking place in the Mediterranean and Red Sea.

ual trophy and has been passed on to the winning dive clubs since 2017.

Dive equipment manufacturers have also gotten caught up in the idea. Winners now receive awards at the Cup stages and at the regular contests. At the Cup stages, the awards are presented by TUSA. The Cup finalists get the Aqua Lung awards, and the winner receives a regulator from LEGEND.

These days, Scubatlon steps out far beyond Moscow's city limits. In Russia, the contests are also held in the Urals and in the Far East.

Online training & workshops

To prepare instructors and judges, we use online training in addition to workshops. The online training experience has proved to be very useful for international certification. A Scubatlon Scuba Master



Open water contests

Naturally, from the very first days of development, we were tempted to hold the contest in open water. A pool is the least-evil solution, but we had to try. First, we set up the glowing obstacle course in Hurghada. We held a contest at the Dahab lighthouse.

The main problem with contests in open water is the currents. In Hurghada, we found a suitable place—a closed space without currents, with depths of six to seven meters. We set up the obstacle course... and the first one to get in there was a sea turtle. Looks like animals like the idea too!

We also organized the contests in the Mediterranean Sea in Turkey. Now, having gained some experience, we are preparing to hold the Scubatlon Cup competitions in open water. We hope this movement will continue to expand, and we look forward to meeting you at the competitions. ■

For more information, visit: scubatlon.com/en/

instructor is qualified to teach a relevant course and judge the contests. A judge, respectively, is authorized to assist the instructor when training and to judge the contests.

To be certified as a Scubatlon instructor, one needs to have an instructor certificate from one of the generally accepted dive

training agencies. Similarly, a judge should be certified as a Divemaster or Three-Star Diver, or hold a similar certification at the corresponding skill level. Since the project is still developing, we offer some free instructor and judge certificates for new regions and countries.



marine mammals



Adult larga seal in its natural habitat near Vladivostok, Russia

Text by Eugeny Polukhin
Edited by Catherine GS Lim
and G Symes
Photos by Igor Egorov, Eugenia Mironetz, Dmitry Rudas, Jury Smituk, with additional photos by Andrey Bizyukin.

The larga is the spotted seal (*Phoca largha*) that lives in the North Pacific Ocean along the coasts of South Korea to Chukotka in Russia, and from Alaska to California in the United States. These seals choose coastal rocks in shallow bays for their rookeries. In winter time, larga seals spend a lot of time on ice near ice holes, or on floating ice floes along the coast. These seals feed on fishes, octopuses and shellfishes.



DMITRY RUDAS

Seal Rescue *In the Russian Far East*

Seals pups are born in February to March when local sea bays are still covered by ice. Seal pups have white fur; hence, local people in Russia call them “beliek,” which means “white puppy.” After giving

birth, the mother stays and feeds her pup milk for only seven to ten days. Afterwards, she leaves the pup in order to go hunting. Fledgling young pups remain alone for a long time. During this period, they

do not yet know how to hunt, so they can starve, lose weight and some may even die.

Human presence and shipping activities also have an effect on the survival of the seal pups.

Sometimes inexperienced pups appear in the waters of seaports. If they get trapped in black oil slicks, they will get serious poisoning. In these situations, it is a matter of life and death for the seal

pup, as in 99 percent of cases, they will die. This is natural selection. In nature, not all will survive. Then again, people can step in to help save the babies!

The first time I saw a larga seal





ANDREY BIZYUKIN

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EUGENIA MIRONETZ

Larga seals have rookeries on the rocky shores of islands near Vladivostok, Russia

Larga seals of the North Pacific can be found along the coasts from South Korea to Chukotka in Russia, and from Alaska to California in the United States.

was on the coast of the nearby marine reserve, 400km to the north of the city of Vladivostok (in the Far East region of Russia), where I live. I wanted to see these elegant animals underwater, to dive with them and to take photographs of them. Around Vladivostok, there are several rookeries of seals. In winter time, when all the local bays are covered with ice, I would even see seals in the area of the city.

The first rescue

I found my first wounded seal puppy on Russky Island. As I remember it now, his front fin was injured, and he was infected with worms and parasites. I felt very sorry for him. I wanted the pup to survive, so I tried to help the baby seal as much as I could.

I learned that in Vladivostok, there is a rehabilitation center that specializes in the care and treatment of injured seals. So, I got a car and a boat, and I brought the wounded seal pup to the seal rescue center. At the time of his treatment, the pup was given the name Russik. He recovered, and in early summer, he



JURY SMITUK

Larga seal pup




EUGENIA MIRONETZ



EUGENIA MIRONETZ


Larga pups are vulnerable when their mothers depart after feeding them to go hunting.



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EUGENIA MIRONETZ

was released back into the sea. The story appeared in the local press.

In the following years, I inspected beaches near Vladivostok and on Russky Island in hope of finding and helping small wounded pups. On 30 March 2015, I found my next baby seal! The little cub was clean, beautiful, and at first glance, did not look like a sick or injured animal. But I already knew that if a baby seal lets a person near it, then something is wrong. It was a young female pup. Again, I felt had to save the pup and take her to the rehabilitation center. The cub was given the name Eugenie.

Volunteering

After this experience, I realized that I should become a volunteer saving seal pups. In my volunteer activity, I joined forces with Lora Bolivian, the founder of the rehabilitation center, "Seal." This rehabilitation center specializes in the treatment and feeding of larga seal pups and striped seal (or ribbon seal, *Histiophoca fasciata*) pups, and their adaptation back into the wild.

Lora, who is a writer, journalist and artist, is the director and founder of the first Russian rehabilitation center for seals. She is a woman who has devoted her

life to saving seals. I communicated a lot with Lora and came to visit my rescued baby seal quite often.

To help more larga seal cubs, we decided to share our activities with other divers. We needed more helpers, caring people who would be happy to save sick or injured seal pups. I began to invite friends, divers who wanted to help us release rescued cubs back into the sea. Today, it has become our good diving tradition. Many caring people join us for these rescue and release activities. Every year, we manage to help more and more pups.




IGOR EGOROV




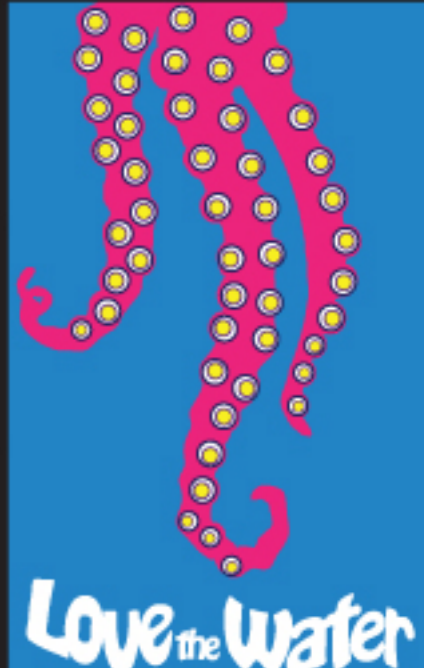
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On islands near Vladivostok, there are several seal rookeries. In wintertime, when all the local bays are covered with ice, one can even see seals in the area of the city.



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Love the Water

EUGENIA MIRONETZ



Larga seal pup recovers in the nursery at the Seal Rehabilitation Center in Vladivostok

Rehab center staff bring rehabilitated seal pups to local islands for their release (above); The delicate procedure for feeding a sick, exhausted seal pup at the rehab center (right)

The right to survive

The larga seal is one of the emblems of our seaside diving community. Hundreds of divers meet up with these fun animals underwater. Sometimes the seals are not afraid of the divers and let them come close. They can bite your fins and even give you a chance to touch them underwater. I love to dive with seals; this is one of the main pleasures in my diving life. For any pleasure, you need to pay something, and the saving of seal pups is such a small fee for the huge enjoyment I get from interacting with them.

In nature, it is not certain whether these weak puppies would die or survive. But for us volunteers, with Lora and our diving friends, this is not left to chance. Every animal—even if nature

has decided that it must die—has the right to a chance for survival. And here, in Vladivostok, we are doing what we can to save every one of them.

Individuals and personalities

I remember every seal puppy that I found and brought to the rehabilitation center: Rusik, with a broken fin; Gosha, with torn claws; the baby girl seal Eugenia, with inflammation throughout her whole body; two lost cubs of striped seal; ribbon seals, Alexandra and Alexandra Vladimirovna, who were found soiled from head to toe in their own feces; the goner Barbara—8kg of bones and fuel oil; the puppy Flint, with pneumonia; Katta, who was beaten with stones (she did



Nature inspectors and support divers assist in the release of seals.



marine mammals



Adult larga seal in its natural habitat near Vladivostok (left); Release of a seal pup from a RIB (right); First sniff of freedom (below); First swim back into nature (lower right); Eugeny Polukhin (in blue) and rehab center staff member release two larga seal pups back into the wild (far lower left)



Lora Beloivan and volunteers get ready to release seal pups (left)

car over 1,000km to the rehab center, and one was rescued by someone hiking on coastal cliffs. We are happy that most of our pups have been saved and are alive and well.

Now you have an opportunity to dive with them in the open sea. It is almost impossible to recognize our rescued seals underwater, but sometimes I think it is exactly our wards that come to us in close proximity. I want to believe that they are our rescued pups, now grown to adulthood, coming to us to say hello as if we are old friends. ■

Anyone interested in participating in the rescue of baby seals who wants to join a diverse group of volunteers, please contact Evgeny Polukhin and Laura Beloivan (Tel +7 924 241 0788 or email: evzoni@mail.ru).



Location of East Sea on global map (left) and Vladivostok on map of Russian Far East



Support divers ensure the safety of a larga seal pup just released back into the wild.

not survive); Ulysses the puppy; quiet Valeria; Rambo, who was not willing to give up; stinky Alexandra Alexandrovna; stout Alex; narcissus Jack Sparrow; aggressive Vovan; Irina, the hero puppy; and the baby seal without a name who did not survive.

Some of the wounded and sick seal babies we took from ice floes, one was driven by



Puerto Galera

Text and photos
by Walt Stearns

— *Dazzling Diving in the Philippines*



Puerto Galera

I have spent decades covering the Caribbean for major dive magazines. But when it is time for a personal trip, I usually set my sights farther from home. One destination that has become a personal favorite over the last ten years is the Philippines. The waters of this island nation lie within the “Coral Triangle,” a region recognized as having one of the most biodiverse marine ecosystems on the planet.

Divers visiting the Philippines enjoy a rich variety of underwater landscapes and bountiful marine life, and can

choose from a number of resorts that provide excellent service at a reasonable price. A good example is the Atlantis Dive Resort in Puerto Galera.

First impressions

The town of Puerto Galera lies on the northern tip of the island of Mindoro. Travelers arriving at Manila’s international airport take a 65-mile van ride to the town of Batangas, then a ferry trip to Sabang Beach, which is the coastal resort area on the northern end of Puerto Galera.

With numerous dive resorts and shops offering diving services at relatively inexpensive rates, Sabang Beach is



certainly a place where divers will feel at home. There are also numerous restaurants and clubs offering a range of dining options and lively nightlife. These added draws sweeten the pot, but it is the quality of the reefs that really explains the area’s popularity with divers,



CLOCKWISE FROM TOP LEFT: Coleman’s shrimp in fire urchin; School of bigeye, anthias, chromis and sweeper; Peacock mantis shrimp; Flatworm. PREVIOUS PAGE: School of anthias over coral garden



Puerto Galera

local restaurant and bar occupy the other side facing the beach.

This may seem a bit strange to first-time visitors, but there is no security issue, as non-guests know not to venture off the path into the resort's property uninvited, and the resort itself has both security cameras and personnel watching everything day and night. While the resort's restaurant does not offer a scenic ocean view, the ambiance is still pretty nice as the dining area sits beneath a giant open-air thatch roof overlooking the resort's large freshwater pool. The resort's kitchen uses fresh local fruits and meats to create a range of local and international dishes that change on a daily basis.

Amenities

Like a growing number of full-service dive resorts in the region, Atlantis offers a full-service spa overlooking the pool opposite the restaurant. After 27-plus hours of travel and transfers, a 90-minute deep tissue massage was just the

who come from around Southeast Asia, North America and beyond.

Due to the large tidal flats that front most of Sabang Beach, the near-shore depths are too shallow for anything larger than a skiff to approach the Atlantis Resort proper. On arrival, you will disembark 100 yards to the left of the resort's entrance and take a short stroll along the waterfront. Don't worry, all of your luggage is taken care of, and brought to the resort right after you.

From the beach, it is hard to get a feel for the layout of the Atlantis Resort property. At the beachside entrance, the resort's bar and the dive staging area sit sandwiched between a local restaurant and bar on one side, and another dive operation on the other, concealing what lies within.

Once you are beyond the beachside entrance, you will discover the resort is actually quite at-

tractive and surprisingly larger than your first impression would have allowed. In all, the property encompasses 40 guest rooms and suites around a centrally located restaurant and a large freshwater pool. The grounds include a boutique, full service spa, and a dive center with retail space, classroom and camera room. To accomplish this centralized layout, the resort is very cleverly built in a long rectangular formation that extends part way up the hillside overlooking Sabang Beach.

Here is where I should mention an interesting quirk in the relation between Atlantis Dive Resort and the town of Sabang. There are few motorized vehicles in or around town. Instead, everyone gets around on foot. One of the public walkways runs right through the resort, separating

the dive staging area and beach bar from the resort's dive shop and the guests' gear storage area. The resort's own restaurant sits to one side of the public walkway while a



The Seaview Suite, or "Flintstone Room" (above); Restaurant view at Atlantis (top left)



reservations@atlantishotel.com
WWW.ATLANTISHOTEL.COM



Moored in the bay are traditional banca boats used to transport divers to sites; Large camera room (right)

ticket in getting the kinks that comes with prolonged air travel ironed out, leaving me feeling more ready to hit the reefs.

All guest rooms have air conditioning and include en-suite private bath and shower facilities with hot water provided by a solar heating system. The deluxe suite I booked came with one full and one twin-size bed, a large flat screen LCD TV with movie and sports channels and a DVD player, a refrigerator, a coffee/tea maker, a fully stocked mini bar, and even a supply of emergency toiletries (toothbrush, toothpaste and shaving kit). Even the least expensive rooms in the resort, which are located on the second floor above the dive staging area, provide wireless Internet access and in-room safety deposit boxes.

Management at the resort ad-



vises that you should not drink the water from the tap in the rooms. Thus, your options include the bottled water in the room or the water available in the restaurant, as well as at the bar and dive shop, which are all completely safe.

One of the resort's roomier

dwellings, particularly for families with small kids is the Seaview Suite, which is located above the dive center on the third floor. The suite's nickname, the Flintstone Room, comes from the stone-pattern stucco walls and the tree trunk running from floor to ceiling, which

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Puerto Galera



CLOCKWISE FROM TOP LEFT: School of anthias on reef covered in soft corals; Tiny cuttlefish under crinoid; Diver and large dome of hard coral; *Jorunna funebris* nudibranch



serves as the ladder for the bunk beds adjacent to the room's one queen bed. Additionally, this suite has a large terrace overlooking the beach and ocean.

Dive center

Atlantis' dive center is split into two

areas. On the landward side are storage facilities and a rinse area with four tanks—one just for cameras—along with freshwater showers, cubbyholes for stowing masks, fins and dive lights, and a large drying room for hanging wetsuits, BCDs and regulators. The other side of the center faces the beach and comprises a large staging area where divers secure the tanks they need from the large selection of aluminum

80s with air or 32-percent nitrox. Once your tank, BCD and regulator are assembled, the staff then carries it down to the beach and into the skiffs.

The Atlantis' camera room is first class, with solid, spacious worktables covered with rubber matting—a feature I prefer

over moisture-absorbing carpet. Underneath the tables are shelves for storing equipment and multiple sets of power outlets in both 220 and 110 volts, which accept both standard US and European plugs, plus two air-gun systems to blow away water from recesses in equipment. The room is climate controlled, so working conditions are comfortable, and the air has lower humidity.

Diving

The daily dive schedule usually involves a series of single dives set around 8 to 9 a.m., 11 a.m., 2 p.m. and 4 p.m., with trips back to the resort after each to change out the tanks. This is because the majority of the diving in the Puerto Galera/Sabang Beach area is no farther than a 20-minute ride from Atlantis'



My first dive at Atlantis was at a site named Monkey Beach, which is an eight-minute boat ride to the east of the resort. This site proved to be indicative of the general bottom topography of the area, with the reefs starting near the shoreline and following either a steep slope or a series of step-like ledges down to depths between 70 and 105ft (21–32m), then

strong, turning dives into drifts. Underwater visibility was more than adequate, varying between 50 to 60ft (15–18m) from what I gathered from the dive guides, and what you should typically expect around Sabang Beach. The water temperature in March was around 76 to 77°F (24–25°C). The diving here is not about how far you can see, but what you can find in the spaces you cover.

This region of the Philippines is a macro photographer's paradise, with an endless supply of subject matter from the small and colorful such as nudibranchs, peacock mantis shrimp and mandarin-fish, to the fantastically cryptic like robust ghost pipefish, pygmy seahorses and dragon seamoths. As should be expected, the dive guides know their way around all the dive sites, and they are quite helpful and accomplished hunters when it comes to finding small critters.

Other than the occasional sea turtle, do not expect to see any large pelag-

beachhead, and several are less than five minutes away. The resort maintains a fleet of 18-foot skiffs, which typically carry no more than six divers, plus a dive guide and driver.

The skiffs have neither sun protection nor tank holders. So, my recommendation here is to pack a hat, and to be a bit more diligent with your camera setups, since both dive gear and camera equipment are placed on the floor of the skiff.

terminating into a semi-flat sand and rubble floor.

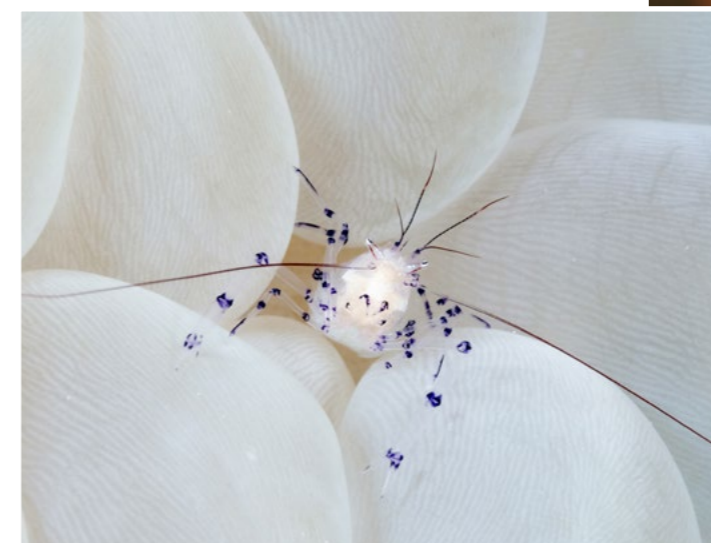
At the start of the dive, there was no noticeable current, but water flow picked up during the second half of the dive. Currents around this region of the Philippines are tidal in origin, ebbing and flowing throughout the day, and changing direction from one side to the other during each high and low cycle. At some spots, the current can get quite



CLOCKWISE FROM TOP LEFT: Harlequin crab; Peacock mantis shrimp; Soft coral crab; Ormate ghost pipefish



CLOCKWISE FROM LEFT: School of anthias on reef; Commensal shrimp; Whip coral spider crab; *Thecacera picta* nudibranch; Bubble coral shrimp; *Halgerda* sp. nudibranch



destinations closer to home, but when you factor in the quality of the marine environment, the excellent service and the relative cost-per-dive, a trip to Atlantis Dive Resort starts to look pretty good. ■

For more information regarding bookings, and what you need to bring, visit Atlantis Dive Resorts at: **Atlantishotel.com**.

Walt Stearns is a widely published dive writer, underwater photographer, scuba instructor, certified cave and rebreather diver, and an SSI Platinum Pro5000 member based in the US state of Florida. He is the founder and publisher of the *Underwater Journal*. For more information, visit: **WaltStearns.com**.

Verde Island

What I would consider the most memorable adventure provided by Atlantis' Puerto Galera Resort was the three-tank dive adventure to neighboring Verde Island.

For this all-day trip, divers are loaded onto a 50-foot banca-designed dive boat for an 8 am departure across the Verde passage, which separates Puerto Galera from Batangas. The trip to Verde Island takes approximately an hour and a half. Once there, the schedule is two dives, followed by a trip to shore for lunch, where the staff puts together a pretty amazing lunch buffet. After an hour on the beach, it is time for the third dive, and the return ride to the resort, with time to relax before dinner.

Verde offers three very interesting and beautiful sites: Coral Gardens, Washing Machine and Drop off. Our first dive was made at Drop Off, as the tides were in our favor at that time. This site turned

out to be my personal favorite, offering excellent underwater visibility, interesting topography and a tremendous variety of fish and coral. The site is a huge, broad-based pinnacle that just breaks the surface, with one side dropping sharply down a couple hundred feet, while the other side takes a more gradual downward profile, terminating at a broad plateau 40ft (12m) deep, running back towards Verde Island. When the tide approaches its zenith, the currents can really sweep the steeper side of the pinnacle, making it a challenge to stay in one spot. But watching the banquet of small fish, corals and crinoids compete for space makes the effort worth it.

Final thoughts

Overall, my experience at Atlantis' Puerto Galera Resort was quite good. The staff

was very friendly, helpful and accommodating. Rooms at the resort are spacious and clean, with plenty of shelf space. The resort's dining fare was tasty, with made-to-order breakfast, and the lunch and dinner menu varied enough to keep things interesting. The soups were especially savory.

Would I return? Absolutely! The plane rides may be longer than to Caribbean



ics around Sabang Beach. The place for wide-angle photography is Verde Island, which I will get to in a moment. Two of my favorite sites around Sabang Beach were Boulders, a steeply sloping reef comprised of huge boulders covered in corals, and Giant Clams, which is named for a nearby giant clam farm. This site is located within a protected bay and features a shallow area adjacent to a gentle slope that is ideal for true muck diving.

fact file



Philippines



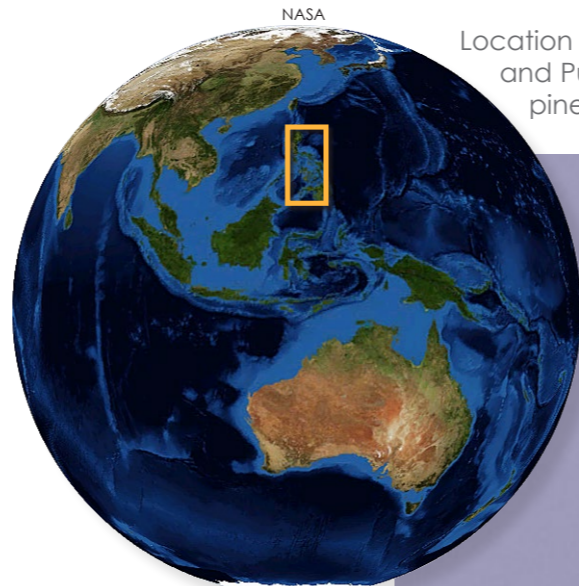
SOURCES: ATLANTISHOTEL.COM, CIA.GOV, CDC.GOV, STATE.TRAVEL.US, WIKIPEDIA.ORG, XE.COM

History The Philippines have been inhabited for tens of thousands of years but it was not until 1543 that the country was named Las Islas Filipinas in honor of King Phillip II of Spain by the explorer Ruy Lopez de Villalobos. The islands were colonized and remained part of the Spanish empire for more than 300 years. Following the Spanish-American war in 1898, the Philippines were relinquished to the United States and in 1935 became a self-governing commonwealth. During World War II, the islands fell under Japanese control but on 4 July 1946, after the United States helped the Filipino people reclaim control, the Republic of the Philippines was granted its independence. Numerous presidents and varying degrees of political and economic stability have followed, but the country remains independent to this day. The Philippines are a founding member of the United Nations and the World Trade Organization, and their current President, Rodrigo Duterte, was elected in May 2016. Government: presidential republic. Capital: Manila

Geography The Philippines are located east of Vietnam in Southeast Asia, between the Philippine Sea and the South

China Sea. The country consists of an archipelago of 7,107 islands, spread out over nearly 300,000 square kilometers. The terrain consists of volcanic mountains and coastal lowlands, ranging from sea level to the highest peak, Mount Apo, at 2,954m. The Philippines are situated at the northern tip of the coral triangle, the epicenter for global marine biodiversity. Coastline: 36,289km. Terrain consists primarily of mountains with coastal lowlands varying from narrow to extensive. Natural hazards include typhoons, landslides, volcanoes, earthquakes and tsunamis.

Climate The climate in the Philippines is tropical, and the heat and humidity is greatly influenced by the Amihan ("dry" northeast monsoon that typically blows mid-November to April) and the Habagat ("wet" southwest monsoon in May to October). The monsoons roughly create three seasons: the hot, dry summer from March to May; the rainy season from June to November; and the cool dry season from December to February. The air temperature averages 80°F (27°C) and ranges between 70-90°F (21-32°C) depending on the season and location. Water temperatures fluctuate between 78-84°F (26-29°C).



Location of the Philippines on global map and Puerto Galera on map of the Philippines (below); Soft coral crab (right)



Environmental issues

Challenges include air and water pollution in major urban areas, deforestation in watershed areas, soil erosion, degradation of coral reefs, and pollution of coastal mangroves, which are important breeding grounds for fish.

Economy The Philippines boasts an emerging economy, as it transitions from agriculture to the service and manufacturing industries. Primary exports include semiconductors and electronic products, transport equipment, copper, petroleum, coconut oil, fruits and garments. Roughly 47% of the population is employed in the service industry, which accounts for 56% of the country's GDP.

Currency Philippine Peso (PHP) Currency may be exchanged at the Manila airport, local banks and resorts. Credit cards are widely accepted at tourist destinations. Exchange rates: 1USD=54.08PHP; 1EUR=62.65PHP; 1GBP=71.47PHP; 1AUD=38.49PHP; 1SGD=39.26PHP

Population The official population of the Philippines is 102,624,209 (July 2016 est.), with over 12 million living in the capital city of Manila. Ethnic groups: Tagalog 28.1%, Cebuano 13.1%, Ilocano 9%, Bisaya/Binisaya 7.6%, Hiligaynon

Ilonggo 7.5%, Bikol 6%, Waray 3.4% (2000 census). Religions: Catholic 82.9%, Muslim 5%, Evangelical 2.8%, Iglesia ni Kristo 2.3%, other Christian 4.5% (2000 census). Internet users: 56,956,436, or 55.5% (July 2016 est.)

Language The official language is Filipino, with eight major dialects, but English is widely spoken at most resorts.

Voltage The voltage in the Philippines is 220/240 AC at 50 cycles and several socket types are utilized. An international multi-prong adaptor is recommended.

cards for staff tips. If you should need additional cash, there is an ATM machine a short walk into town, provided you are okay with it being dispensed in local Philippine currency.

Transportation The gateway into the Philippines is through Ninoy Aquino International Airport (MNL) in Manila. Most international flights into Manila arrive between 9:00 pm and 3:00 am. As part of their services, Atlantis Dive Resort can coordinate an overnight stay in Manila among the better hotels, and they also provide door-to-door transportation services to the resort.



Cuisine Philippine cuisine has a mixture of influences from Hispanic, Chinese, American and other Asian cultures. The food tends to have full-bodied flavors but is not as spicy as that of neighboring countries. Rice, fish, coconut, mangoes and plantains are staple ingredients. Filipinos do not eat with chopsticks but prefer western cutlery or the traditional method of eating with a just-washed right hand.

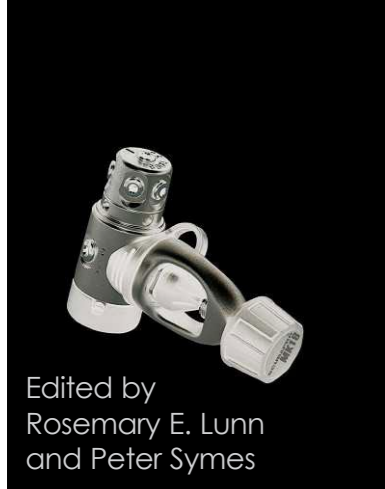
Tipping The resort does not take credit

Travel/Visa A valid passport with at least six months left before its expiration date along return ticket is required for the entry into the Philippines. US and European nationals automatically receive a 21-day tourist visas on arrival. Guests staying longer, or those with passports of another nationality, will need to either contact the resort or see: immigration.gov.ph.

Health & Security Mosquito-borne illnesses are a problem, and there are cases of malaria, dengue and Zika. Avoid mosquito bites by using mosquito repellent and covering up during times when mosquitoes are out. Water- and food-borne illnesses can also be a problem, so be sure to drink only bottled or filtered water, and only eat food that is cooked thoroughly. Check with your state department for current travel advisories before your trip.

Decompression chambers Chambers can be found on various islands across the country, in cities such as Manila, Cebu, Batangas City, Cavite, Makati City, Quezon City and Subic.

Websites
Philippines Tourism
experiencephilippines.org



Edited by
Rosemary E. Lunn
and Peter Symes

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Equipment

KUBI Twin cylinder bag

Peter Kubicka is an ardent cave diving explorer who likes to explore sites that involve a 5km hike up into the mountains. Just how do you comfortably lug a set of doubles across, up and down this kind of terrain? Kubicka's solution was to design a tackle sack with strong shoulder straps so that he could keep his hands free. This thoroughly field-tested bag is manufactured from a strong, durable, waterproof material that is capable of carrying an 11 lt (80 cu ft) twinset. The bag's wide mouth is fastened by an adjustable cord. The bag has six handles that make it easier to haul and wrangle the bag through a cave system, and up and down pitches. Kubistore.com



Whiteshark Mix

Whiteshark Mix is a compact underwater scooter equipped with double propellers. The symmetrical design provides balance and agility in the water, and lightweight portability on land. Small and weighing only about 3kg, it is capable of a speed of 3.4 mph and operates at a maximum depth of 40m (130ft). Powered by a sealed and rechargeable 11,000mAh battery, with a runtime of up to 30 minutes with normal usage. Comes with a removable floater for either positive or neutral buoyancy, waterproof construction with protective covers to prevent fingers from accidental injury. Subblue.com



Apeks Long Hose Retainer

One "problem" when diving the Hogarthian configuration is that the long hose can end up flapping about if it is not secured. Apeks manufactures a Delrin hose retainer that can be slid onto any standard 2" webbing. The idea is that divers loop their long hose under this retainer to help control the long hose. This hose retainer can be dived with both single and twin or double tank configurations and Apeks states it is "both sleek and durable". Apeksgiving.com

Lamprey

Darkwater Vision manufactures equipment that allows divers to "see" in zero visibility in real time. Their latest product—the monocular Lamprey—will be showcased at EUROTEK.2018. The system has been specifically developed to fit both commercial diving helmets, i.e. Kirby Morgan, and full face masks. Because the monocular is a single lens, it gives divers maximum flexibility over their vision. The diver can use one eye for normal, everyday vision, whilst the other eye utilises Darkwater Vision technology to "see" through black water. "Topside" has not been forgotten because personnel on the surface can view and record underwater footage in real time. The monocular Lamprey weighs in at 1.8kg (4 lb) topside and 0.8kg (1.8 lbs) in-water. Darkwatervision.com



Waterproof D7x

Waterproof has constructed its D7X drysuit from Nylotech. A new strong, yet soft fabric that is abrasion proof. (It has actually been tested using the Martindale Method with 200,000 rubs). This means that the suit has a slimmer cut and is less bulky than the D7 Pro. The long zip is curved to enable better upper body movement. This, along with the telescoping torso, should mean it is a fairly easy suit to don on and off. The butt area is embossed with polyurethane to provide abrasion protection and a non-slip grip. Other features include braces, Kevlar-reinforced kneepads and a zip cover. The suit is fitted with the SI Tech QCS Ring System. Waterproof.eu



AV1 update

The feature-packed AV1 supports air, nitrox, trimix and heliox, can be used both with open and closed circuit, and can be switched between OC and CCR during a dive. Gas mixes can also be added or changed while underwater. The AV1 comes in two variants: without (AV1) or with (AV1f) a Fischer-connector, which can connect up to three oxygen cells. The AV1f version has a built-in audible alarm and an interface to control the HUD. The controller can work with solenoids of most current rebreathers. Firmware is upgraded via USB. av-uwf.com





The Shearwater Teric, a watch-styled dive computer

Putting the Shearwater Teric through the paces

Text by Michael Menduno

Dive computing veteran Shearwater Research has come up with a real winner with their new watch-styled dive computer Teric. Named after Pterodactyl or Pteric (a flying dinosaur from the Late Jurassic), the “P” is silent. It’s the perfect device to pair with your Shearwater Perdix or other dive computer (DC) for tekkie redundancy, or to use all by itself.

Note that Shearwater’s last two DCs were named after birds.

The powerful little computer offers a full range of diving modes:

Open Circuit (OC) Rec, OC Tech, Closed Circuit Rebreather (CCR), Gauge, and—yes, hold your breath—freediving. In fact, about the only thing it is missing for aquaphiliacs is a swimming mode. However, Shearwater’s marketing maven Gabriel Pineda told me that a swimming mode was a distinct future possibility, given that it is just a matter of software.

I originally acquired the Teric for a freediving class, where it performed brilliantly (I, on the other hand, still needed work on my Frenzel—hint: It replaces Valsalva when you are upside down holding your breath). So, I was excited to put it to work on a technical dive for the first time last week. It did not disappoint.

The display is bright and highly visible, thanks to the new active matrix organic light-emitting diode (AMOLED) technology—the same used in the new Samsung and Google phones (the Perdix uses an older color LED display technology, as does the new iPhone XS Max). I could read it clearly without my prescription mask.

The four-button interface is a snap—totally intuitive. And it has all the features of its bigger Shearwater predecessors: Bluetooth, cloud, air integration (AI), digital compass, stopwatch, easy underwater gas switching, and changeable watch faces. What’s more, the watchband extender makes it easy to go from the office ladder to the swim step with aplomb. Think Perdix in a very small package.

For tekkies, and likely reccies too, Teric is a no-brainer. But I suspect that Shearwater will begin making a big splash in breath-hold computing, which is currently dominated by companies like Suunto and Oceanic, though Garmin is generating substantial buzz with its Descent Mk1 all-in-one dive computer.

Word is that the diminutive computer has even garnered attention from the judges at the International Association for the Development of Apnea (AIDA), one of the international federations that oversees freediving competitions.

Here’s why: The freediving Teric offers the necessary high-resolution sampling rate (4x/sec); time and depth haptic and audio alarms—so you know when to take that mouth fill and/or when to reach for the plate; and a brightly lit display with all the right information: last dive, max depth, surface interval, ascent and descent rates.

Can a “technical” freediving (i.e. mixed gas) freediving mode be far behind? Watch this space! ■



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SATURDAY 1st DECEMBER 2018

SUNDAY 2nd DECEMBER 2018

TIME	THE HOUSE	THE STUDIO	THE DOOR	THE SUITES
08:00	EUROTEK 2018 - Registration and Exhibition Opens			
09:20	EUROTEK TEAM - Opening Address			
09:30	RICHIE KOHLER Monsters of the Abyss The famous 'Shadow Diver' on legendary sea monsters and the identification of UB-85 sunk off Scotland.	PROF TINO BALESTRA Narcosis & Preconditioning in Diving: Latest Research Discover the latest DAN research into narcosis and the factors that predispose its onset.	EMILY TURTON Scapa 100 A digital tour of the German High Seas Fleet sunk 100 years ago in the Orkney Islands. <i>Sponsored by BSAC</i>	MARTIN PARKER Staying in the loop What lessons have - and, more importantly, haven't - been learnt in the CCR industry.
10:30	BREAK			
11:00	DR TIMMY GAMBIN The Phoenician wreck project Deep archaeological discoveries and the oldest known shipwreck in the Mediterranean.	JP IMBERT Changing concepts in decompression Solving the mystery of pre-existing micro gas pockets in decompression.	CRAIG CHALLEN New Zealand's Pearce Resurgence The complete exploration story of New Zealand's signature cave pushed on the last expedition to a depth of 230m.	JASON BROWN Getting the shot - Advanced Lighting Techniques Master off-camera lighting in challenging conditions, working with models and how to get published.
12:00	BREAK			
12:30	KRZYSZTOF STARNAWSKI Deep Cave Exploration Extreme cave diving and the technology barriers to overcome the frontier of cave exploration.	IMMI WALLEN The Soviet Dunkirk Exploring, documenting and researching the Tallinn evacuation shipwrecks of the Baltic sea.	DR DOUG EBERSOLE Immersion Pulmonary Oedema Understanding this poorly understood and potentially fatal condition. <i>Sponsored by KISS</i>	KEVIN GURR Rebreather Canisters A review of naval and other research on rebreather canister design and limitations.
13:30	LUNCH - Collect your pre-booked lunch from the Marmalade Bar @ The REP			
14:30	PROF SIMON MITCHELL Hypoxia: Insights into a silent killer How hypoxia can occur in diving, and how failure to recognize its onset is common.	PHIL SHORT An American Legend: The Tulsamerican project The excavation of the WW2 Liberator aircraft Tulsamerican sunk off the coast of Croatia.	SIMON MILLS Exploring Britannic The iconic wreck - then, now and forward into the future, the owner tells all.	NICK JEWSON & TOM HUGHES Breaking Down Boundaries Wheelchair user Tom Hughes recounts the challenges he faced to become a tech diver.
15:30	BREAK			
16:00	RICK STANTON & DR RICHARD HARRIS Thailand Cave Rescue The truth behind the Thailand cave rescue. Followed by an interactive Q&A session with the core dive team on stage. <i>Sponsored by O'THREE.</i>	CLOSED for Thailand Cave Rescue presentation		
17:30	CONFERENCE CLOSES			
19:15	EUROTEK 2018 Christmas Drinks Reception - The Library of Birmingham (TICKET ONLY)			
20:15	EUROTEK 2018 Christmas Party - Book Rotunda & Baskerville Corner, The Library of Birmingham (TICKET ONLY)			

TIME	THE HOUSE	THE STUDIO	THE DOOR	THE SUITES
08:00	EUROTEK 2018 - Registration and Exhibition Opens			
09:30	STRATIS KAS Professional diving film productions Balancing efficiency and safety in professional diving film productions, how to 'bring home' the best results.	ALEX SANTOS The most painful recovery The challenges and harrowing experiences of removing drowned victims from deep inside maritime disasters.	STEFAN PANIS Wrecks of the Dover Straits Exploring, documenting and researching the forgotten shipwrecks of the Dover Straits.	DR DOUG EBERSOLE Cardiac issues in diving Strategies on how to avoid developing coronary artery disease for divers. <i>Sponsored by KISS</i>
10:30	BREAK			
11:00	EMILY TURTON HMS Hampshire & Vanguard Documenting Orkney's WW1 sunken war graves 100 years on. <i>Sponsored by BSAC</i>	ARMANDO RIBEIRO Portugal's underwater caves A journey of discovery into Portugal's spectacular caves where more discoveries await.	TOMASZ STACHURA Discovery of HMS Narwhal Searching for the legendary Polish Eagle, the British sub HMS Narwhal is discovered.	DR CRAIG HOLDSTOCK Diving Emergencies What happens when you call the National Diving Accident helpline and how to avoid it.
12:00	BREAK			
12:30	ANDY TORBET Technical Diving on TV The popular British TV presenter and all round tech diver talks about deep diving and filming for television. <i>Sponsored by Apeks</i>	CHRIS JEWELL Diving inside a mountain The story of the recent Peña Colorado cave diving expedition in Mexico.	VIC VERLINDEN The Blue Lagoon Experience Mine exploration across Europe. Discover the beauty of Malogne, Jozef opal and Kobania.	LEIGH BISHOP Expedition Diving Permits, logistics, SOPs, planning and safety issues of a wreck diving expedition from start to finish.
13:30	LUNCH - Collect your pre-booked lunch from the Marmalade Bar @ The REP			
14:45	LUIGI CASATI Cave Exploration in Croatia Join the legendary Italian cave diver as he talks about his favorite and most recent cave diving explorations.	DR TIMMY GAMBIN Malta's underwater cultural Heritage An exclusive look at spectacular new Maltese sites that will soon welcome technical divers.	SABINE KERKAU When Past meets Future Baltic Sea Heritage Rescue Project. Wreck & environmental project in Lithuania.	GARETH LOCK The Divers Dilemma Managing the balance between risk, reward and the external pressures divers face.
15:45	BREAK - Last chance to collect or buy your EUROTEK 2018 merchandise			
16:15	PROF SIMON MITCHELL Temp sticks under the spotlight Discussion of the current state of CO2 monitoring in rebreathers and how it can affect you.	MARTYN FARR Who are the REAL explorers? An entertaining and informative look back at the cave explorers who have shaped the sport.	EDOARDO PAVIA The Battle of Lissa The exploration of the deep 115m wrecks Palestro & SMS Radetzky off Croatia.	MARTIN STANTON CCR CE Testing: Accurate PO₂ control and WOB reductions How CE testing can contribute towards better CCR design and performance.
17:15	EUROTEK TEAM - Closing Address			
17:30	CONFERENCE CLOSES			



Text by Simon Pridmore
Photos by Andrey Bizyukin

You are chatting with a diving friend and the conversation turns to mutual acquaintances. “Do you know Bob and Carol?” your friend asks. “Oh yes, good divers!” you reply. We will usually refer to someone as a good diver when they are not around. We will rarely say it to their face. And it is something that we all rather hope people say about us behind our backs. The politically correct response when someone says “so-and-so is a good diver” is to nod sagely in agreement, rather than object. But what does it mean? What are the qualities that make someone a good diver?

This is the second of two articles designed to provoke discussion on the topic. In the first article in the previous issue of *X-Ray Mag*, I covered some of the more obvious characteristics. Here are a few more.



What Does It Take to Be
A “Good Diver”?
— Part Two

A good diver Doesn't believe their own propaganda
People are very willing to create heroes and many need someone to follow. If you have been diving for a while, this could be you. After all, it is relatively easy

to build a legend in this small world we operate in just by living long enough or being particularly adept at using social media. And this is fine. However, while the people who respect you and dive with you may think you are infallible and

capable of extraordinary feats, their faith alone does not make you super-human. It is easy to fall into the trap of feeling that you have to live up to perceptions and undertake dives that you are not really comfortable with. Good

divers understand this and are alert to the dangers.

Knows when to break the chain
Good divers are also aware of a phenomenon known as the “incident pit.”





for any reason without having to explain themselves to anyone. When one member of a dive team gives the "up" signal or "turn" signal, the rest of the team acknowledges and complies immediately, no questions asked, either at the time or subsequently.

It does not matter if the threat to safety was real or simply imagined. For example, a diver may abort a dive simply as a result of misreading his or her contents gauge. The thinking is that if one member of the team believes there is a safety risk, then that belief in itself is enough to put the team in danger if the dive continues.

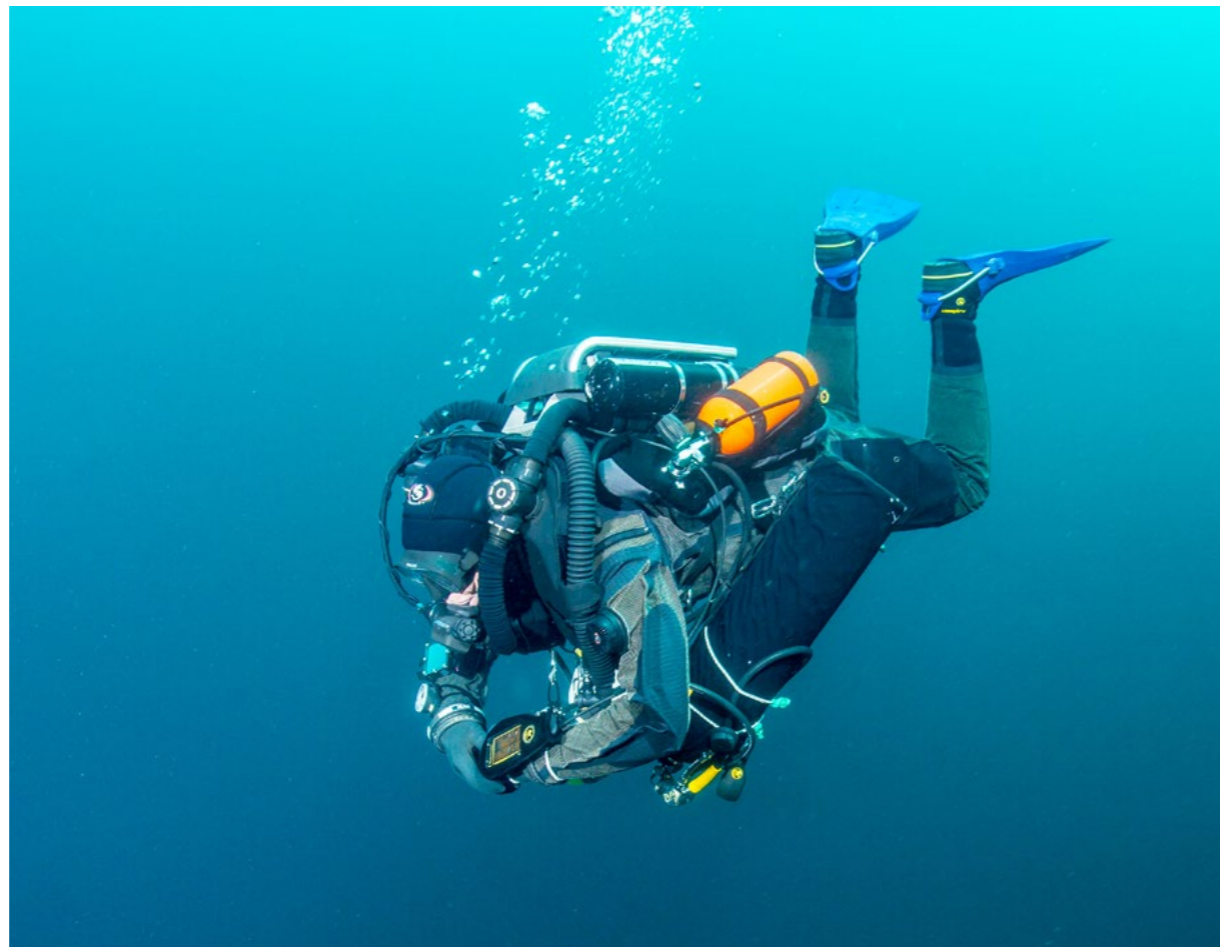
Stays in dive-shape

Good divers know that the more frequently they dive, the

Most accidents are an accumulation of events that, if unchecked, can take a diver into an increasingly unmanageable situation. This is the incident pit. Once you are in it, it is often too late.

The chain of events leading up to the accident can sometimes only be visible afterwards—but not always. Good divers are always alert for apparently minor events that might lead to more serious situations and have the presence of mind to pause when they perceive an incipient emergency. They then decide quickly if the apparent threat may be genuine and, if so, they have the discipline and courage to break the chain, call the dive team together and abort the dive, to live to do it again another day. They do this even though they know this may lead to criticism from others in the dive team, especially if it turns out, after the fact, that there was no significant threat.

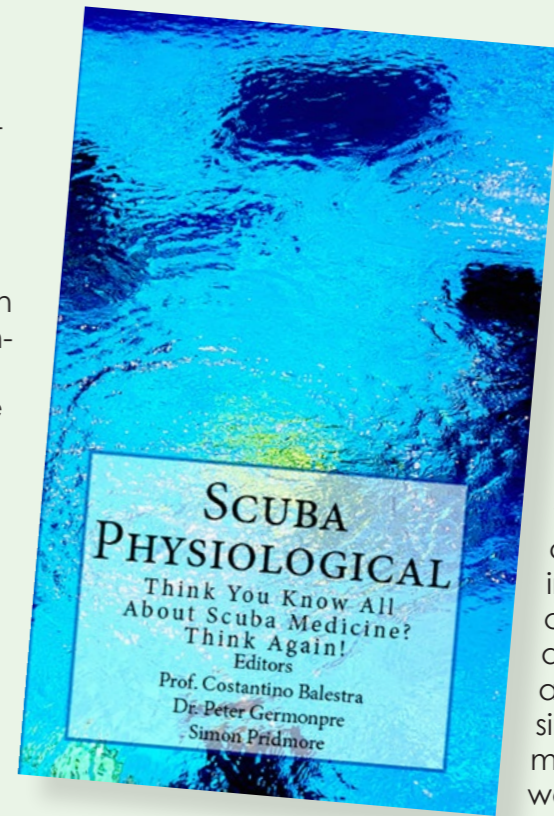
Cave divers have a useful rule designed to eliminate fear of recrimination and it saves lives. This rule is that any diver can abort any dive at any time



A New Book for Scuba Divers!

If you are a diver, much of what you learnt about topics such as decompression sickness and narcosis in your scuba diving class is over-simplified and some of it is just plain wrong, as diver training agency texts have not kept pace with the science. Despite 170 years of research, the nature of decompression sickness and decompression stress remains unknown. Great advances have been made to make diving safer, but there are still glaring gaps in our knowledge. *Scuba Physiological* provides us with a good summary of what we know, a glimpse of where current science is taking us, and some good tips to make us all safer divers now.

The chapters in *Scuba Physiological* were originally written by scientists in



the field of decompression research as part of a three-year project called PHYPODE (Physiology of Decompression). Simon Pridmore is not an expert on diving medicine but, when he came across the material, he knew that many people in scuba diving beyond the scientific community would be interested in it. So, he contacted the original authors and proposed an abridged, edited, simplified and re-formatted e-book, which would make the information more accessible general population of divers. They thought it was a great idea and *Scuba Physiological* is the result.

Scuba Physiological: Think You Know All About Scuba Medicine? Think Again! by Simon Pridmore is available on: **Amazon.com.**

more in tune they are with their equipment, their skills and the diving environment. Someone who is operating well within their comfort zone is much more relaxed, confident and able to deal with any curveballs that the gremlins of the sea may throw his or her way. An easy way to stay dive-fit is to join a club or a local dive centre, which keeps divers active year-round by organising pool sessions or beach dives. These are often no-pressure, low-cost occasions in which divers can hone their skills and improve. There will often be more experienced divers and professionals around to answer questions. Sometimes, of course, the advice may be forthcoming whether you have asked for it or not! It is almost always well-intentioned though.

Practises defensive diving

An ability to anticipate problems before they occur is something all divers should be taught right from the beginning. Some call this defensive diving. Technical divers refer to it as adopting a "what if" approach.

Good divers will consider all the problems that might occur on a dive and ensure they know in advance exactly how they will deal with any emergency that occurs. If something goes wrong, they will therefore be able to react quickly, correctly and with the minimum of fuss.

Comes back slowly

A disproportionate number of accidents occur in respect of divers who have taken a few years away from the sport and then try to come back at the same level



opinion



Good Diver

thoughts that cross my mind when I hear someone praised as being a "good diver." It's quite an accolade!

Simon Pridmore is the author of the international bestsellers, *Scuba Confidential: An Insider's Guide to Becoming a Better Diver*, *Scuba Professional: Insights into Sport Diver Training & Operations* and *Scuba Fundamental: Start Diving the Right Way*. He is also the co-author of *Diving & Snorkeling guides to Bali and Raja Ampat & Northeast Indonesia* and a new adventure travelogue called *Under the Flight Path*. He recently published two new books, *Scuba Physiological: Think you Know All About Scuba Medicine? Think Again!* and *Dining with Divers: Tales from the Kitchen Table*. For more information, see his website at: SimonPridmore.com.

of diving they were at before the break. When you are diving regularly and frequently, good diving behaviour is automatic and correct responses are instinctive. However, these habits often fall away when you have not been in the water for a while.

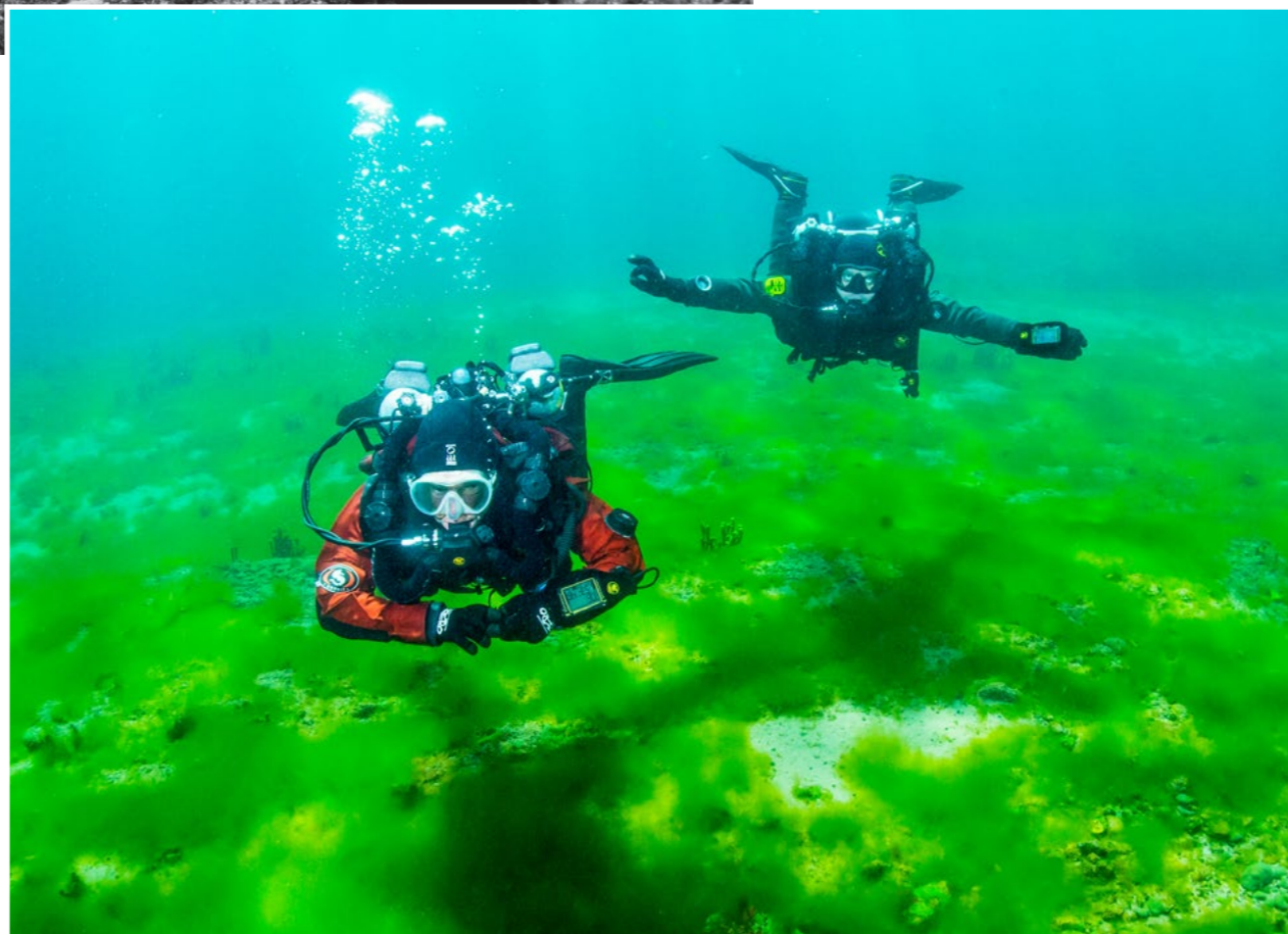
Good divers, when coming back to the sport, will reacclimatise slowly. They may spend time with an instructor or an experienced friend to go through skills in a pool or shallow water before embarking on a few easy dives first. Every diver returning from a break in diving will benefit from an hour or two spent with another, more current, diver to help them with skills, remind them of techniques they might have forgotten, review their posture in the water and correct any lapses in their finning technique. Come to think

of it, we could all probably use a little of that sort of thing from time to time, even if we are not returning to the sport after a break.

Guards against overconfidence

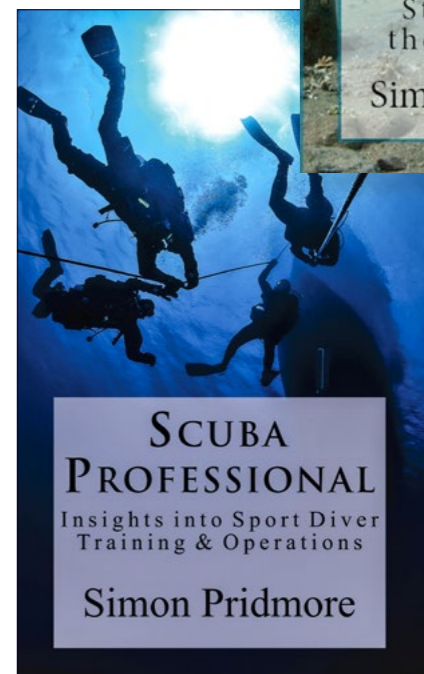
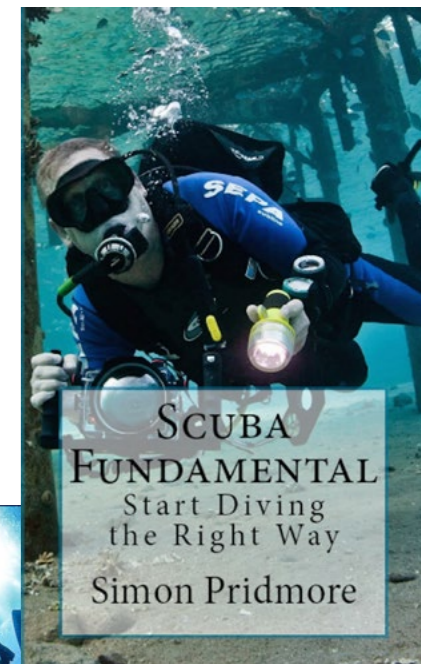
This final point goes back to the dangers of complacency I mentioned in the first part of this article in the previous issue. Tragedy does not only strike new divers, experienced divers also die each year, often through overconfidence. Familiarity with the sport can misguide some into thinking that somehow the laws of physics do not apply to them anymore and that they can cut corners and ignore the rules that they preach faithfully to others. Good divers are always on guard for signs of overconfidence in themselves and others they dive with.

So, these are some of the

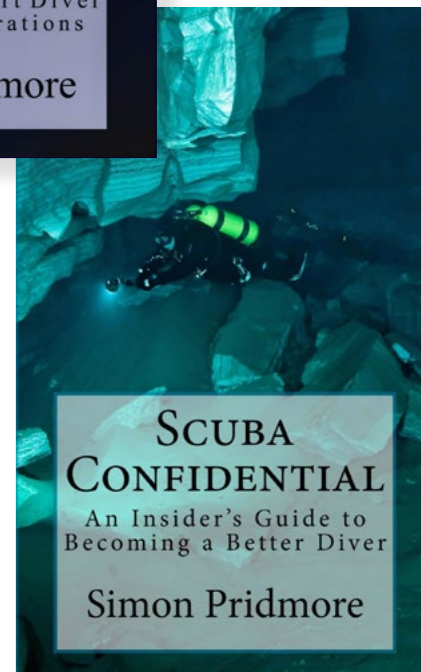


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simonpridmore.com



Young Divers

Text and photos by Marco Daturi
Edited by Catherine GS Lim & G Symes



We are all born under the sun, and for the first year, we are perfectly at ease underwater. In the first months, we keep our eyes and mouths open without any problems, even underwater, thanks to the closure of the glottis that prevents us from drowning. After the first 10 to 12 months, however, we lose this superpower, and to go underwater, we have to organize well!

Diving is fantastic but also expensive and tiring. Perhaps this is the reason why the numbers of young people taking up diving seems to be decreasing in recent years. I think about the flurry of activity

every time I have to prepare the equipment for myself, my wife Francesca, and now also for Lupo, our eight-year-old son.

Lupo has followed us on all our journeys since birth. At five months old, he was with us at Camel Dive Club & Hotel in Sharm el-Sheikh, Egypt. Since then, seeing air cylinders and dive equipment has been a normal thing for him. Then, he started to try them on a bit for fun, and eventually, he wanted to try diving five years later. Now, with his little 5-liter tank, which he can comfortably carry on his back, he dives a little bit "everywhere"—only at very limited depths, of course.

His enthusiasm repays us for all the effort of getting him equipped. But the most exciting thing to see is the relationship he has developed with the underwater world. Using all his five senses, he has gained a much deeper appreciation

for nature and the Earth. He is attentive and obedient, and scrupulously performs the exercises, giving me full confidence in his safety underwater, even while I am aware that he is no longer in an environment that is natural for people. When he looks at me with his radiant and excited eyes, I am repaid for everything. If, for us adults, seeing an octopus is beautiful, for him, it is a new adventure, with exaltation when the octopus sprays its ink to get away.

The movements of children underwater are fluid and natural, much more loose than those of adults. Kids' amazement is as great for a sea urchin as it is for a manta ray or a chestnut tree. The absence of gravity, or weightlessness, is a new discovery that makes kids feel a bit like "superheroes." And so, Lupo strikes a thousand different action-figure poses in



Marco Daturi's son, Lupo, getting ready for a dive (above) and in the pool as an infant (top left)



THIS PAGE: Marco with eight-year-old son, Lupo, enjoy diving together

Young Divers

Lupo: The whale shark and manta rays.

Marco: Would you like to visit a shipwreck?

Lupo: A lot, but I cannot go because nobody will let me do it...

Marco: What would you like to say to your dive friends?

Lupo: Recommend your favorite dives to me, because I want to do them all!

Benefits

Why does diving do

something more for our children than football or other sports? Children who practicediving develop greater resilience and dynamic skills than their peers who do not. While we wait for science to prove this one day (hopefully), we can observe it every day in people who dive—they are more enterprising, autonomous, organized and better able to adapt to situations, despite risks and adversities. This does not mean that they can still play football and practice other sports.

Just like the grown-ups, young divers have a lot of equipment they need to take care of, and so many important rules to learn and respect. For kids too, diving means overcoming many fears and chal-

front of my camera, floating in the blue without any discomfort.

Not all children are interested in getting into the water, which is a pity because even their parents are missing something unique.

The approach to diving for children must be a gradual and natural one, without excessive pressure to prevent young people from getting turned off by this activity—the opposite of the desired effect. Swimming is certainly useful for improving the aquatic skills of young people and can easily be practiced all year round. Basic knowledge of marine biology can be imparted at every opportunity to direct young people towards a love and respect for nature.

Generation Z is ready to dive—it's up to us adults to help make their first dives a success!

Interview with Lupo Daturi, my eight-year-old son

I am lucky to have a sporty and

very active son who follows me in many things. Among these are my forays into the underwater realm, despite his young age. His entry into diving was not a difficult stretch, but a natural step after watching me and other adults diving. Needless to say, we never take any risks with Lupo; we stop at safe quotas in terms of depth and duration, and we are always very close in proximity with him.

Marco: Lupo, do you like going underwater?

Lupo: A lot.

Marco: What do you like most?

Lupo: I always like to see different things—things that are never seen on the surface.

Marco: And what do you like least?

Lupo: Having a tank with little air!

Marco: Are you afraid underwater?

Lupo: Not at all.

Marco: Where would you like to go diving?

Lupo: I would like to return to the Maldives and also to Sharm.

Marco: Your most beautiful dive?

Lupo: Portiglione, Levanto—40 minutes of diving with lots of fish.

Marco: Do you like to keep your logbook?

Lupo: Yes, because then I remember all the dives.

Marco: What was the most beautiful fish you have seen underwater?



lenges within an environment that is unnatural for human beings—at least until we humans learn to breathe water. There are few other sports in which contact with nature is so total; when underwater, the scenery changes and you enter a new world to explore.

10 good reasons why children should dive

Sub-aqua children learn:

1. to respect the rules
2. to be autonomous while with others
3. to organize and plan well
4. to manage and overcome their fears
5. to overcome challenges
6. to love and respect nature

7. to take care of their partners
8. to keep their equipment in order
9. to have fun at sea and in company
10. to stay in a group

Diving equipment for kids

Nowadays, almost all the major manufacturers of dive equipment have developed individual products, and in some cases, a complete line for children. While very similar to that of adults, this equipment differs in the details, from small mouthpieces to greater simplicity of use in the BCDs.

Recently, we had the opportunity to test the Rebel line by Scubapro, specially designed for young people. What was very

Lupo's parents never take any risks with him, always staying very close to him and always stopping at safe quotas in terms of depth and duration.

interesting about the Scubapro Rebel was its flexibility, thanks to additional fittings and clips in different positions, which allowed you to have different sizes, and therefore, one could keep the product for several years while accommodating growth spurts in kids. Even the 5mm Rebel wetsuit by Scubapro has innovative features, which make it easier to don using zippers at ankles and neck, in addition to the back zip.

Dive training for kids

To start well, it is important to find a good instructor who teaches kids to love diving, entertaining them but also paying the utmost attention to safety, helping children overcome the difficulties of the sport.

Young Divers



Interview with Massimo Zarafa, PADI Regional Manager

— professional diver and pillar of the PADI community in Italy

Marco: Ciao Massimo. At what age did you approach scuba diving?

Massimo: At the age of 12, I obtained my first certification—PADI Junior Open Water Diver. I was swimming at a competitive level, and my father, Enzo, was one of the first PADI dive instructors in Italy. So, given this situation, it was inevitable that I would become passionate about diving! At the time, it was very rare to see children going underwater (we are talking about 1982). But today, it is quite another thing. Luckily, the culture has changed dramatically, and there are PADI programs to bring young people closer to diving.

The general feeling is that there are few young divers, that scuba diving is more a sport for

“adults.” Is this true? In reality, it is absolutely not an activity only for adults. Indeed, the fact is that there are now many dive centers and therefore job opportunities in Italy, and throughout the world; I

would say that diving is really for everyone. Sometimes, you can find yourself in groups or clubs where the average age is higher than in other sports and recreational activities. In these cases, it



PADI Regional Manager, Massimo Zarafa





Kids find fascination in both big and small critters, revel in the weightless environment and learn how to manage their air and their gear.

Young Divers

Massimo: Approaching students from all schools, as PADI has been doing for years and not only in Italy. Beyond that, raising awareness among young people to become divers, to have fun but also to feel what it is like to be a sort of "PADI ambassador for the protection of the oceans."

Marco: Tell us your message to the Z generation (born 1996–2010)!

Massimo: To Generation Z, I say: We must save the world from plastic and all the worst forms

of pollution. But first of all, we must understand more deeply what the sea is and what lives there, and what we absolutely need to do to protect it.

Moreover, it is not easy to find a job these days. Diving offers many possibilities in Italy, and throughout the world. If one considers all this, starting a PADI course is a must for those who wish to pursue their passion, environmental awareness, and job opportunities. And then do as my children have: One already has a PADI Junior Open Water Diver certification and the other is already a PADI Rescue Diver. The underwater world needs you, and you will see that you will then need to dive all the time! ■

means that we have not been good enough in conveying to the young, the feelings that a diver can experience underwater, and the fact that we can turn a passion into the most beautiful profession in the world.

Marco: If there has been a decline, is PADI coming back to focusing on training young divers?

Massimo: I would say yes. At PADI, we carry out various initiatives to bring young people closer to diving. For example, the Amare School Project, which was created together with Project AWARE and which is recognized by MIUR (Ministry of Education, University and Research), has led us to conducting economics lessons related to the environment at Italian universities.

Marco: What programs does PADI have for children?



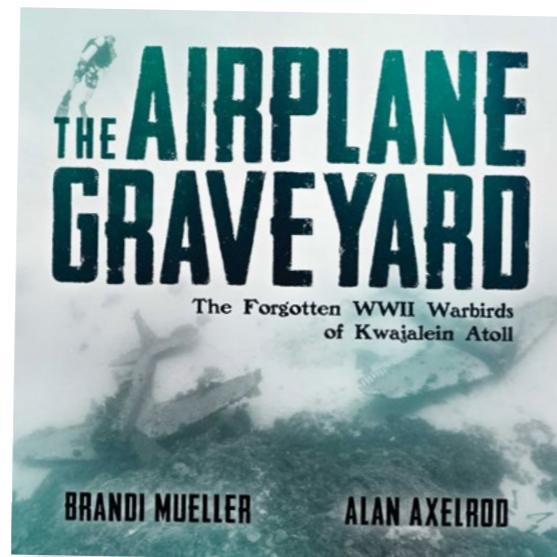
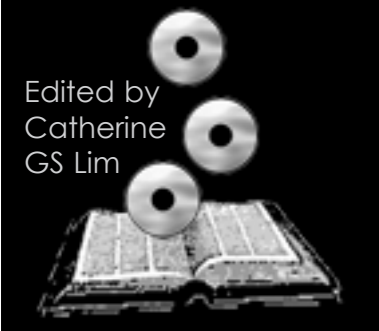
Massimo: We have the PADI Bubblemaker program, which allows children as young as eight years old to start "to make bubbles" in the pool. Then, for children 10 years old and up, it is possible to access the PADI Discover Scuba Diving program (which is a mini-course without certification) or

the Junior Scuba Diver and Junior Open Water Diver courses (entry-level diver certifications that allow children limited diving if accompanied by a PADI professional or certified guardian).

Marco: The secret to passionate young divers?



Edited by
Catherine
GS Lim

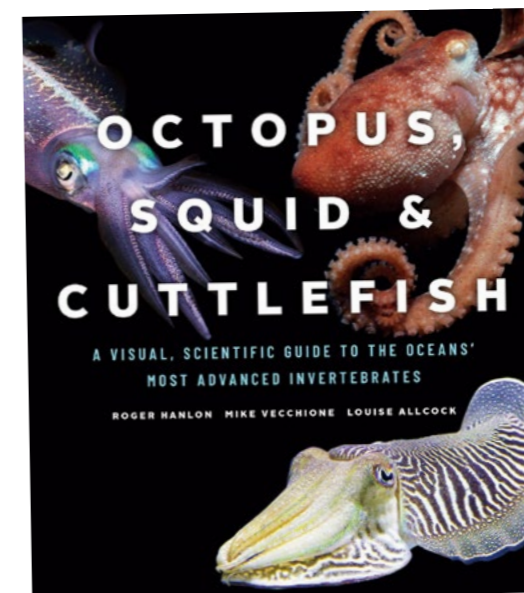


Wrecks

The Airplane Graveyard: The Forgotten WWII Warbirds of Kwajalein Atoll, by Brandi Mueller and Alan Axelrod.

Today, about 150 American planes lie at the bottom of Kwajalein Atoll lagoon, encrusted in coral; their quiet presence a far cry from the battles they took part in during World War II. Most of the world has forgotten about them, but no longer. In this book, underwater photographer Brandi Mueller, together with military historian Alex Alexrod, brings to light the heroic stories behind these fallen aircraft, together with rare photographs that have never been published in book form before.

Hardcover: 176 pages
Publisher: Permuted Press
Date: 27 November 2018
ISBN-10: 1682617718
ISBN-13: 978-1682617717



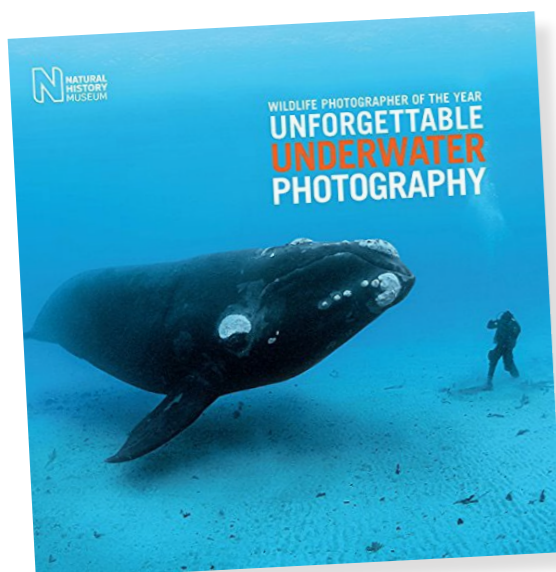
Cephalopods

Octopus, Squid, and Cuttlefish: A Visual, Scientific Guide to the Oceans' Most Advanced Invertebrates, by Roger Hanlon, Mike Vecchione and Louise Allcock.

From shooting ink or changing colours to evade predators to their extraordinary intellect and curious appearance, the octopus, squid and cuttlefish are as fascinating as they are weird. This illustrated guide promises hours of captivated reading while providing an insight into

the world of these mysterious marine invertebrates. You can also learn about their evolution, anatomy, life history, behaviour and relationships in this book.

Hardcover: 224 pages
Publisher: University of Chicago Press
Date: 24 September 2018
ISBN-10: 022645956X
ISBN-13: 978-0226459561



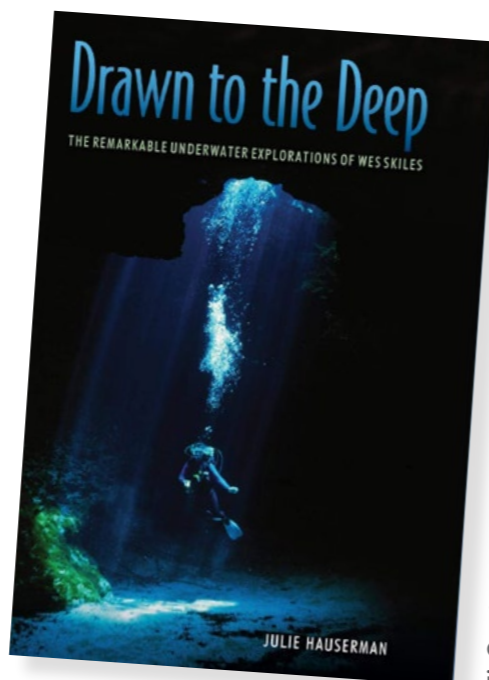
Underwater Photography

Wildlife Photographer of the Year: Unforgettable Underwater Photography, edited by Rosamund Kidman Cox.

If you dive with a camera in hand, here is a book to add to your collection. It contains images from past

decades celebrated by the prestigious Wildlife Photographer of the Year competition, organised by the Natural History Museum, London. Prepare to be awed by exceptional images of marine animals taken by more than 50 world-renowned underwater photographers. Included are write-ups describing how the photographs were taken and the behaviour depicted by the images.

Hardcover: 160 pages
Publisher: Natural History Museum, London
Date: 1 September 2018
ISBN-10: 0565094564
ISBN-13: 978-0565094560



Biography

Drawn to the Deep: The Remarkable Underwater Explorations of Wes Skiles, by Julie Hauserman.

Drawn to the water as a child, Wes Skiles used his passion for diving and his photography skills to open our eyes to the hidden beauty and unprecedented perspectives of the oceans. He was also an explorer, and an activist for Florida's freshwater springs and their conservation. This book describes his many achievements and exploits—through interviews with his family and friends, as well as insights from his own journals—piecing together the story of this extraordinary adventurer.

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NIGEL MARSH PHOTOGRAPHY

Nigel Marsh is an Australian photojournalist, underwater photographer and author. Working with New Holland Publishers, Nigel has produced a number of guide books for divers and snorkellers, and also a series of children's books with marine related themes.

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Text by Ila France Porcher
Illustration by Peter Symes

Fish reveal such complex thinking in their daily lives that they could not possibly be as simple-minded as fishermen claim. They are capable of all the types of cognition found in primates (with the sole exception of the ability to imitate), and now an international team of scientists has established that the cleaner wrasse is one of the few animals able to pass the mirror self-recognition test (MSR), also called the “mark test.”¹

The MSR has been the classic test for self-awareness since it was developed by Gordon Gallup in the 1970s in his work on chimpanzees. In the years since, only monkeys, elephants, dolphins, magpies, and quite recently ants, have succeeded in passing it. As the animal looks into the mirror, recognises its reflection, begins to study

it, and finally uses the mirror for grooming, scientists believe that it is showing awareness of itself as being an individual that is separate from others—it is self-aware.

In the experiment, the wrasses were shown a mirror for a few days. At first, they treated their reflection as if it were another individual, which is a common

reaction when any animal first looks into a mirror. As time passed, their behaviour changed as they began to show interest in looking at their reflections. When a blob of

coloured gel was placed on their faces, nearly all the wrasses tried to rub it off against the substrate, thus indicating that they were aware that it was their own selves

that were reflected in the mirror. This is a major step in the recognition of fish being conscious in their own way. Self-awareness in fish has already been indicated by



The Remarkable Intelligence of Fish



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Close-up of the diminutive cleaner wrasse (left); Cleaner wrasse cleaning moray eel (below)

Fish Intelligence

Cleaners will behave altruistically toward their clients if they are being watched by potential new clients—but only those who could visit another cleaning station. Since clients will emulate the behaviour of the former client, the sight of it being treated very well by the cleaner is more likely to convince the potential client to come for servicing than seeing it being chased. This tactic suggests a short-term image, or social prestige, that determines the fish's success in attracting new clients.

Such complex social behaviour, including cheating, reconciliation, altruism, species recognition, individual recognition, punishment, social prestige and bookkeep-

ing, which is displayed by full-time cleaners 50 to 100 times per day, is considered to indicate consciousness when found in primates.

Another illustration of interspecies social judgment in fish is predator inspection, seen at times when a school of fish is confronted by a possible predator. Different individuals will take turns leading a partner, or a small group of other fish, away from the school to take a closer look at it. Fish who do not take their turn cooperatively, to take the lead in the dangerous situation, will not be trusted by the others in the future. In other words, the fishes make an evaluation of the behaviour of another individual, remember it, and take it into

account in future decisions.

A similar example is given by Siamese fighting fish, which have been seen to assess their place in the social hierarchy by watching other fish competing. Also, female guppies will switch mates based on their assessment of competition between other males.

Cooperative hunting

Cooperative hunting was thought to be unique to humans until it was also seen in dolphins. Redouan Bshary described seeing cooperative hunting between Red Sea coral groupers and lunartail groupers, and Javanese moray eels.

A grouper would approach one of the huge eels where it rested

other facets of their behaviour. The cichlid recognises its own odour as being different and preferable to the odour of other cichlids, including other family members, indicating self-awareness in terms of chemical information.

The tendency to hide at the approach of danger is also considered an indication that the animal is aware of being present and observable, and therefore self-aware. Many fish react to the approach of a diver by hiding. They will also vocalise when threatened.

Inter-species cooperation

Cooperation between species is rare in mammals but seen in fish in a variety of ways. The actions of cleaner fish present one of the most interesting examples. Recognition of others as individuals has long been established in many varieties of fish, both visually and acoustically, and it forms the first

step towards the complex social lives in which cognition is most evident.

However, the abilities of cleaner fish go far beyond the simple recognition of other individuals. They demonstrate remarkable social skills in the way they interact with their clients. Full-time cleaners may have as many as 2,300 interactions per day with clients belonging to 100 different species.

Cleaners remove the dead skin and ectoparasites from their clients in return for a meal. They come from many different fish families and depend on cleaning for their diet to varying degrees.

They have their clients categorised as those who only come to their local cleaner, and those whose home ranges include the territories of other cleaners. For the latter, they have competition, so they give them priority over those clients who have no choice of cleaner.

Cleaners sometimes “cheat” by feeding off the client's healthy flesh as well as doing the usual cleaning job. The clients with no choice of cleaner will punish it by aggressively chasing it, and even inflicting a bite or two. But these clients have been seen to benefit in the future, because the cleaner fish would give them, but not others who visited in the meantime, a better-than-average cleaning service on the next visit.

At times, cleaners will hover above the client and touch it with their fins in an effort to influence its decision to come for a cleaning. This touching tactic is also used to try to reconcile with a client whom they have cheated as described above. Cleaners even exploit the presence of a third party in an attempt to make aggressive clients stop chasing them by going to a nearby predator and caressing it, so that the client dares not continue the chase.



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ecology

in its coral grotto. Then, the fish would shake its body in an exaggerated way in front of it and often, in response, the eel would leave its retreat. Then, fish and eel would go looking for prey, at times swimming so close together that they touched along their sides. The eel would insinuate itself through the cavities and tunnels of the coral structures while the grouper waited for escaping fish.

Tool use

With the exception of humans, fish are more skilful than primates at nest building. At least 9,000 fish species build some sort of nest, either for egg laying or for protection.

The male minnow *Exoglossum*

selects more than 300 stones, all of the same size, from over five metres away, to build a spawning mound 35cm wide and 10cm high. Another fish builds dome-shaped nests from 10,000 pebbles.

The yellowhead jawfish, *Opistognathus aurifrons*, collects stones of various sizes to build a wall, leaving a hole just big enough to pass through. This involves repeated rearrangement of the stones. In between, the fish searches for new stones that might better fit the available space than the ones it has already collected, using flexible behaviour depending on the circumstances.

Another example showing sur-

In the methods they use to feed on sea urchins, triggerfish may display behaviors indicative of social learning.

prising flexibility of behaviour is the ability of the male tenspine stickleback, *Pygosteus pungitius*, to build his nest around the eggs already laid by the female, though he usually builds the nest first. Great care is required, and a different technique has to be used to avoid damaging the eggs. Since those eggs do hatch, the males achieve their goal in protecting the eggs.

Some species of wrasse have been seen using rocks to crush sea urchins to get at the meat inside.

The eating of sea urchins

The delicacy with which fish approach the problem of eating sea urchins is another way they show their sensitivity to pain, as well as inventiveness.

A bird specialist, Dr Ross Perry, in Australia, sent in the following story:

"I have befriended a wild Eastern Blue Gropser, *Achoerodus viridis*, that has a passion for sea urchins, the big ones with long sharp dark purplish red spines. She is very selective in how she approaches the sea urchin before striking it repeatedly to crack it open and suck out the contents. Gropers have big fleshy lips and tiny teeth. She prefers me to uncover the underside of the urchin and to hold as many spines back out of the way as practical



Fish Intelligence

BERNARD SPRAGG.NZ / FLICKR / PUBLIC DOMAIN

before striking. Even so a large spine broke off in her lip that fortunately left enough sticking out for me to cuddle her on her return, so I could grasp the spine with finger and thumb and pull it out. This has transformed my thinking about fish as sentient beings."

Triggerfish, *Balistidae*, also often feed on sea urchins. Usually, they try to "blow" them onto their side to get access to the unprotected body parts underneath. Hans Fricke observed at Eilat, Israel, how five different individual triggerfish successfully hunted sea urchins by first biting off the spines, which allowed them to grab the urchin and take it to the surface. Then, they fed on the unprotected parts underneath while the urchin slowly sank. In spite of decades of observations, Fricke never saw this behaviour anywhere else

and concluded that it was the result of social learning.

Social learning

Social learning involves individual animals learning from each other, as in the example of triggerfish finding a new way to eat sea urchins and copying each other, as described above. In this way, culture can develop in isolated groups.

Migrations are also passed on through social learning. For example, the surgeonfish, *Acanthurus nigrofuscus*, spawns each year at the same time. Night after night, the small black fish leave their territories all over the lagoon and travel in single file through the coral to their traditional spawning grounds on the lagoon's border.

They use the same paths each night at precisely the same time, half an hour before sunset, to go to the only place along the bor-

der where the outflowing current is exactly balanced by the incoming surge. As a result, the huge cloud of spawn that they left in the gathering night stays in place, held there by the opposing forces of the sea. Each new generation of fish learns the details of the nightly migration from its elders.

Cognitive maps

Intertidal gobies, *Gobius soporator*, live in tide pools, and during low tide, they can jump from one to another, without being able to see their target pool at the beginning of the jump. Experimentation has shown that the fish memorised the lay of the land around the home pool by swimming over it when the tide was in. So, when the outgoing tide left them only a labyrinth of pools, they had to refer to a three-dimensional memory to navigate. Further experimentation showed that when the



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The yellowhead jawfish builds its nest by collecting stones of various sizes to create a wall.

fish were displaced, they rapidly returned home, which indicated superior skills involving navigation and orientation.

The fish brain

Though they do have a much simpler neural system than humans, all teleost fishes have elaborate forebrains and the degree of forebrain development has been correlated with social behaviour and communication abilities, which are known to be integrated with cognition. Triggerfish, for example, have a relatively larger telencephalon—the front part of the forebrain—than most other families of fish, due to their advanced foraging techniques.

Fish continue to develop neurons

throughout their lives and do so at a faster rate when confronted with a stimulating environment, indicating a link between experience and neural development.

From fish to man, the brain has the same structures, arranged in the same way, with the exception only of the neocortex, which developed in mammals. Neurological studies have shown that the newly evolved neocortex of mammals took over certain higher functions, which were already present in fish, amphibians, reptiles and birds.

It is well established that birds feel pain and have advanced cognitive abilities. Some species have better long-term memories than humans, and others far exceed us in visual recognition. Yet, like

THIS PAGE: Discus cichlids. Individual cichlids recognise their own odours as being unique and preferable to that of other cichlids, including members of their own families, which indicates self-awareness involving chemical information.

fish, their little pea-brains lack a neocortex. The miniaturisation of the animal does not affect mental capability.

Birds provide proof that higher mental capabilities can be found in a brain that is wired differently than ours. Dolphins, too, show high cognitive capabilities, but their brains have a different form than primate brains, though both are mammals. There are people in which the expanded neocortex failed to develop, but who have normal psychology and IQs. So even in humans, it appears that the neocortex is not necessary for consciousness.

Zoologist Donald R. Griffin theorised that the expanded human neocortex is the result of the evolution of our powerful subconscious mind, rather than qualities,

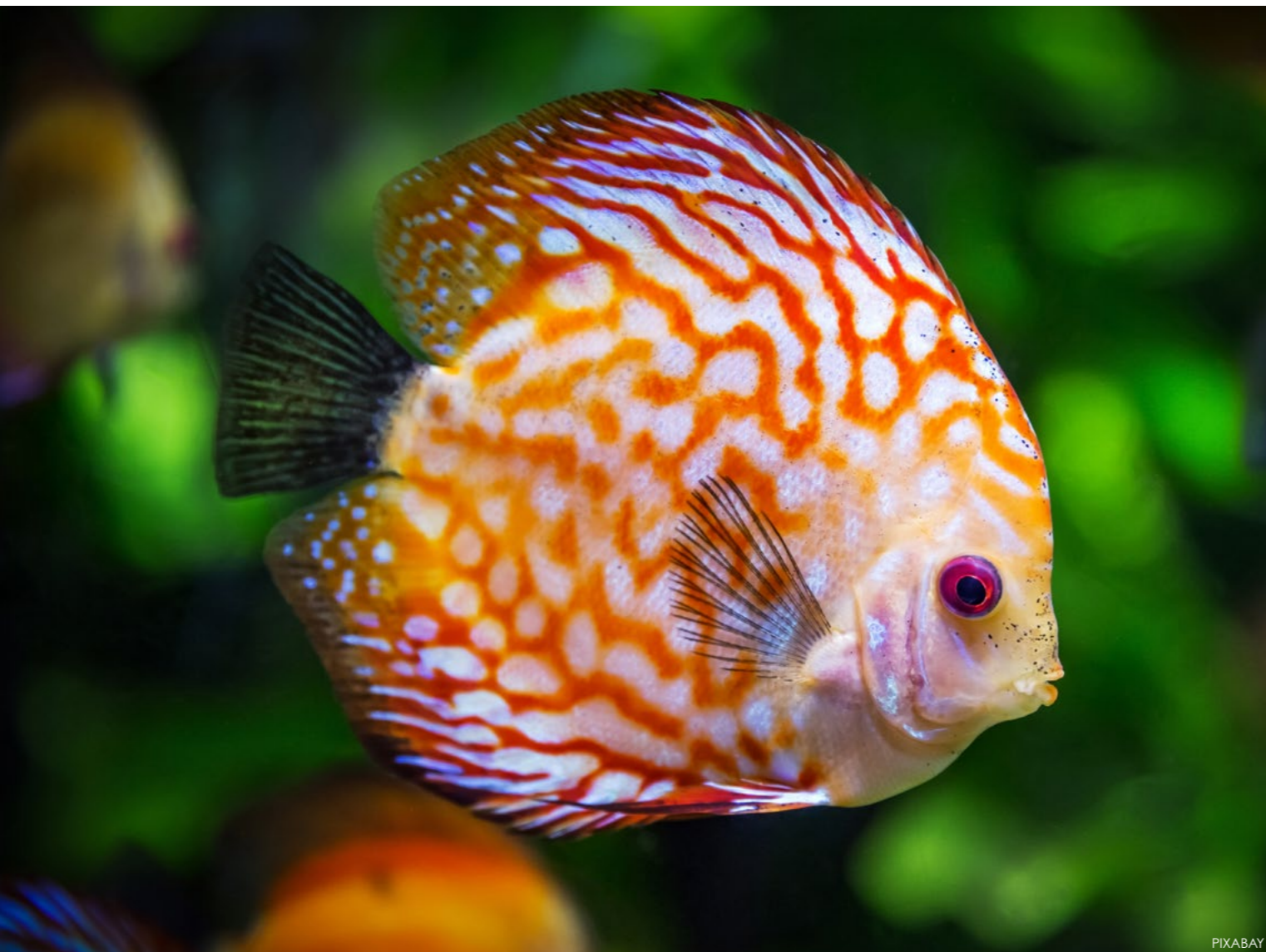
such as consciousness, that are unique to humans only. There is overwhelming evidence that all species evolved together, making it impossible for any new quality to appear in only one of them. And no brain is simple, as anyone who has observed the activities of a spider will appreciate.

Fishermen's arguments

In spite of such evidence, fishermen will continue to argue against the sentience of fish, citing such things as the way a fish will bite a baited hook a second time, after being unhooked and thrown back into the sea. But, while it may be obvious to the fisherman what he is doing, how could it be obvious to the fish? These men assume that the fish understands much more than it possibly could about its situation. It



Fish Intelligence



could have no basis among its experiences in life for understanding the fisherman's practice of deception and the possibility that there is a hook hidden in the bit of food it has found.

It can see no dangerous predator underwater, so how could it imagine that above the surface a man is waiting, hoping to trick and kill it? Even a human in such a situation, walking by the sea pursuing his own affairs, would never suspect that there could be a creature waiting for him beneath the surface with a plan to trap and kill him. A fish that has already bitten a bit of food with a hook in it, has no reason to assume that the next piece of food it finds will also hide a hook.

Consciousness

Consciousness remains a mystery. Though the sensory systems of fish vary depending on species and habitat, in general, they are as good as, or superior to, ours. Mental abilities have evolved in concert with the senses, and fish present a rich fabric of life that networks throughout the waters of the

world, its individuals behaving rationally, each in its own habitat and circumstances, each in the pursuit of its life.

There is no basis for denying sentience to them. With the source and nature of consciousness unknown to science, no scientific reason exists for denying it to these fascinating marine animals. ■

Illa France Porcher, author of The Shark Sessions and The True Nature of Sharks, is an ethologist who focused on the study of reef sharks after she moved to Tahiti in 1995. Her observations, which are the first of their kind, have yielded valuable details about their lives, including their reproductive cycle, social biology, population structure, daily behaviour patterns, roaming tendencies and cognitive abilities.

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¹ KOHDA, M, ET AL. CLEANER WRASSE PASS THE MARK TEST. *PLOS BIOLOGY*. [HTTPS://WWW.BIORXIV.ORG/CONTENT/BIORXIV/EARLY/2018/08/21/397067.FULL.PDF](https://www.biorxiv.org/content/biorxiv/early/2018/08/21/397067.full.pdf)





Oceanic blacktip sharks are one of seven species of sharks that can be found at Protea Banks in South Africa.

Text by Don Silcock
Photos by Don Silcock
and Filippo Bhorgi

The Protea Banks enjoys a reputation as one of the best places in South Africa to dive with sharks, and depending on the time of year, you can see up to seven different varieties, including ragged-tooth sharks, oceanic blacktip sharks, bull sharks, tiger sharks and three varieties of hammerhead sharks—scalloped, smooth and great hammerhead sharks. Often, these varieties are in large, if not astonishing, numbers.

There is a reason for the abundant life in the region. Often described as the African equivalent of the Gulf Stream and as one of the world's most powerful oceanic currents—one that moves almost

70 million tons of water a second—the Agulhas Current forms to the southwest of the huge island of Madagascar, when the powerful Mozambique Current

merges with the equally strong East Madagascar Current. From that tumultuous beginning, the Agulhas runs straight down the 2,000km long eastern coast of

South Africa at surface speeds of up to 8m an hour, bringing with it warm Indian Ocean water rich with nutrients.

Where those waters touch off-

shore reef systems along the edge of the narrow South African continental shelf, they are the catalyst and lifeblood for some incredible ecosystems. And one of the very

richest of those ecosystems is the Protea Banks.

The Protea Banks

Located some 8m offshore from

Sharks of **Protea Banks** *in South Africa*

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Typical beach launch of dive boat, with divers assisting (above); Aerial view of the resort town of Margate located on the coast of the KwaZulu-Natal province in South Africa (right)

the seaside town of Margate in the KwaZulu-Natal province, the Protea Banks is a large submerged shoal, about 800m wide and 6km long. The average depth is around 30m, but some key locations are much deeper, so bottom times, air consumption and decompression limits are hardly abstract issues when diving there.

The shoal rises up from the short but sloping South African continental shelf just before it plunges down into the 3,500m deep Natal Valley, creating an almost perfect aggregation point for the rich

marine life of the east coast.

It really is quite a place, but it must be said that it is adventurous diving in often quite challenging conditions—because what the Agulhas Current gives, it can also take away!

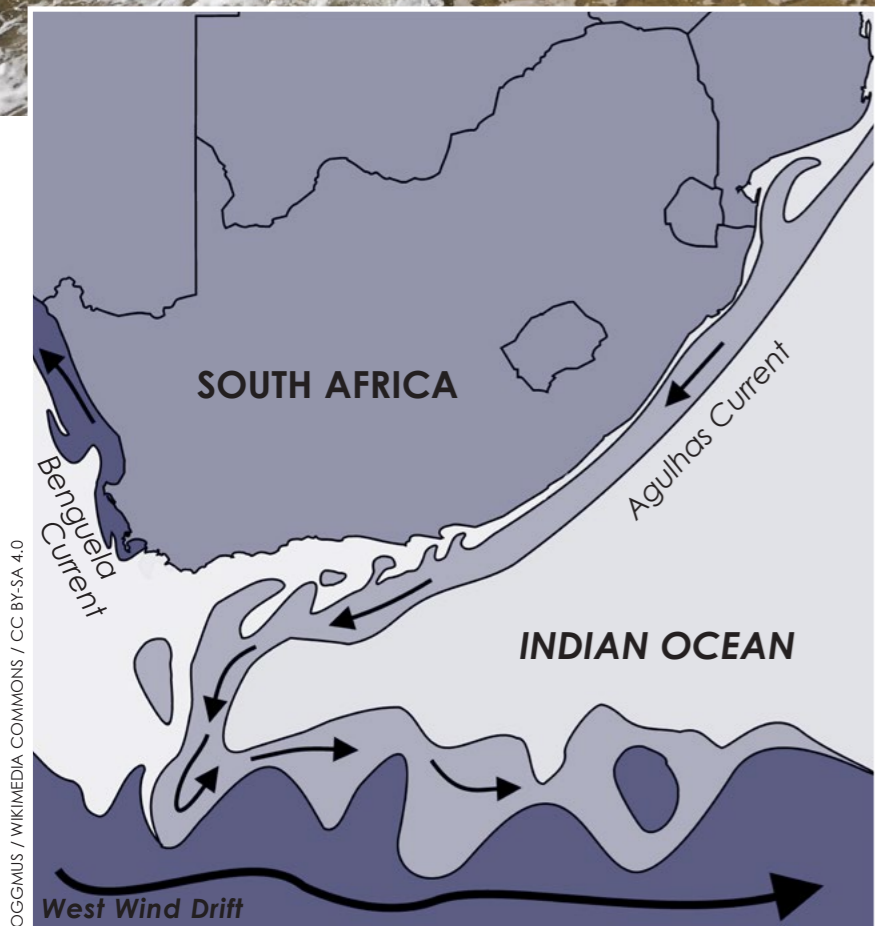
Sharks of the Protea Banks

Where the huge flow of water that is the Agulhas Current encounters shoals like the Protea Banks and nearby Aliwal, it produces complex eddies and

upwellings, rich with nutrients from the deep waters to the east. Adding to the already fertile brew coming down from the north and creating the perfect conditions for the spawning grounds and nurseries for fish.

Thus, the foundation for the pyramid of marine life is created and towards its

apex are the sharks of the Protea Banks. There are so many of them that virtually every dive is a shark dive, but the encounters vary in nature from random sightings to intense, in-your-face interactions on the baited dives. But all are in open water—there are no cages here.



Map of the Agulhas and Benguela Currents around South Africa

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shark tales



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Oceanic blacktip sharks

Oceanic blacktip sharks (*Carcharhinus limbatus*)—not to be confused with the smaller blacktip reef variety—are by far the most common sharks of the Protea Banks. Although not a true pelagic shark like the oceanic whitetip shark, they spend a great deal of time hunting in the waters in and around the Protea Banks and often appear both during ascents to the surface and at the safety stops.

Stout, medium-sized sharks that grow to about 2.5m in length, oceanic blacktip sharks have a distinctive light band on their flanks that stands out against their bronze coloration and light underbelly, making them easy to identify. They typically feed on smaller sharks, rays, cuttlefish, lobster and bottom-

dwelling fish, but are infamous for stealing fishermen's catch and so are not exactly popular among the fishing community of Margate.

In general, they show very little aggression and seem wary of divers. But they are easily enticed by baiting and are the main attraction for the regular baited dives on the Protea Banks. In the presence of food, they are much less cautious and can become quite "sporty" around the bait box. Obviously, greater care needs to be taken at such times, but it makes for some great photo opportunities when they do come in really close!

Ragged-tooth sharks

Known as grey nurse sharks in Australia and sand tiger sharks in the United States, the *Carcharias*



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Oceanic blacktip sharks with divers (above and right); Oceanic blacktip shark with remoras (top left)

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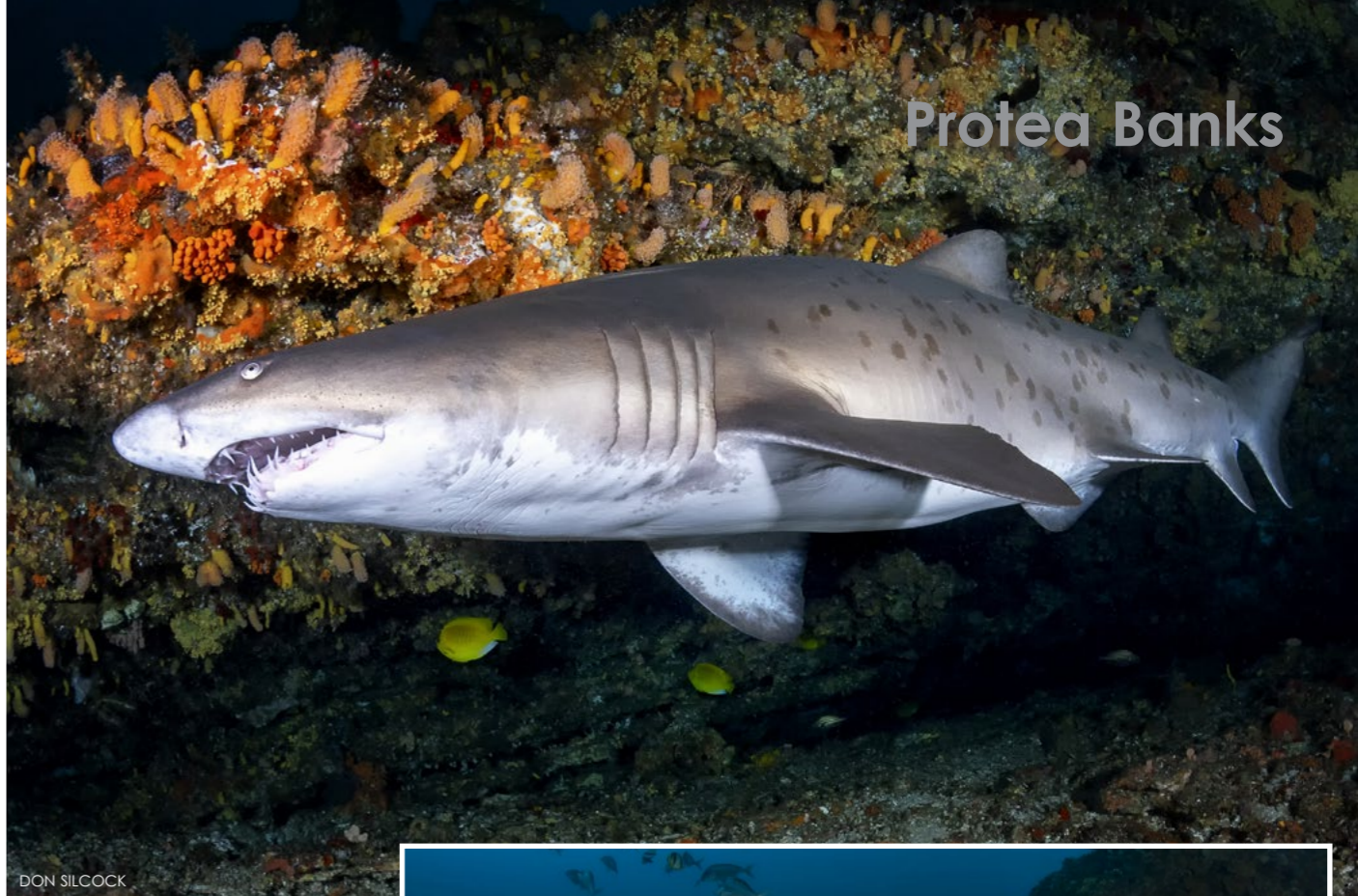
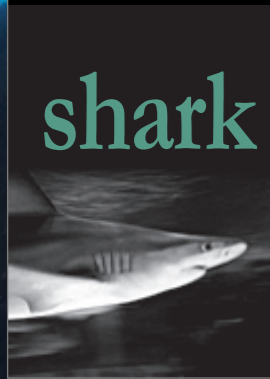
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THIS PAGE: Ragged-tooth sharks, or "raggies" as they are called in South Africa, gather in the main cave at Northern Pinnacle; One has a hook with fishing line caught in its mouth (right)



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taurus or "raggies," as they are called in South Africa, are also a regular feature of winter months at the Protea Banks. They gather there as part of their mating process, with the first males arriving around the end of April, and numbers steadily increasing through May and into June when the female raggies also appear—having migrated up from the Cape area. At its peak from mid-June to the end of July, there are literally hundreds of ragged-tooth sharks patrolling the Protea Banks.

Although primarily a bottom-dwelling shark, raggies can be encountered in mid-water and are said to steal fishermen's catches—just like oceanic blacktip sharks. They are also known to surface and gulp air into their stomachs, which they use as a pseudo-swim bladder to control buoyancy when hunting—a technique that allows them

to hover and approach their prey with great stealth.

Raggies are quite large sharks that grow to well over 3m in length and are equipped with an impressive set of teeth, which are small(ish), needle-like and evolved to pierce, secure and hold rather than sever. They also have very powerful jaws that allow them to seize and hold on to their catch, which is then swallowed whole.

They hunt mainly at night, which means they are at their most active when we have no way of observing them. Instead, we encounter them during the day when they like to hang out in gutters, caves and overhangs to

shelter from prevailing currents and potential predators.

Observed this way, they seem completely docile and almost kind of dumb as they patrol slowly round and round in an apparently aimless fashion. But the reality is they are resting and have slowed their metabolism right down to conserve energy—basically, they are almost sleep-walking, or should that be sleep-swimming?

The best place to see the raggies at the Protea Banks are the two caves



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Divers with bull shark, or "Zombie," as it is called in South Africa (left and below); View of bull shark from above (bottom left)

tually all year round, they are most common from November through to July. They take their name from Africa's fourth largest river, the Zambezi, where they have been seen over 1,000 miles from the coast. Bull sharks (*Carcharhinus leucas*)—their name in the rest of the world—are the only species of saltwater shark that can exist for long periods in freshwater.

Zambies are large and robust-bodied sharks with distinctive broad, flat snouts; and their overall appearance, together with their small eyes and general demeanor, is why they are called "bulls" elsewhere. Their average

length is around 2.3m, but larger ones are not uncommon and the biggest captured was a 4m long female. Zambezi sharks are rated as the third most dangerous shark in Southern Africa, and as in other parts of the world, are thought to be responsible for most shallow-water attacks on swimmers and bathers.

At the Protea Banks, encounters with Zambies come in two flavours. First, there are the random ones on both the Northern and Southern Pinnacles. These are quite common but rarely are they close encounters as the area is rich in tuna and the sharks seem

Protea Banks

well fed—so they have no reason to come and check you out other than their curiosity.

The second type of encounter is on the baited dives where it is normal for five to 10 Zambies to gather some 15m below the bait box at a depth of around 25m. Often, they stay there, and if you go down to get closer, so do they. Before you know it, 40m is approaching!

But occasionally, they will come up, at which point the oceanic blacktip sharks will quickly fade into the background and then the show belongs to the Zambies. They really are an impressive, if

on the Northern Pinnacle. Referred to as the "first or main cave" and the "second cave," both have large openings, which makes entry and exit easy and safe. But they are deep at around 30m at the entrance and 35m in the cave, so bottom times are quite limited.

Spending time in those caves with the raggies is a really intriguing experience as space is somewhat limited, and they are, after all, quite large animals. But they seem to simply ignore and avoid you, so the best technique is to try and position yourself in a spot where they will pass by—but allow them to come to you, as chasing them just does not work. Time in the caves is the key, but it is limited because of the depth, so a degree of luck is involved in hoping that a raggie or two will get used to you and come in really close.

Zambezi (bull) sharks

"Zambies," as they are known in South Africa, are also a regular feature of the Protea Banks. While they can be seen vir-



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THIS PAGE: Tiger sharks can grow to an average length of 4m or longer. With an impressive girth, they radiate power and strength as only apex predators can.

Protea Banks

specifically targeted. But because their jaws are so powerful, the end result is deadly.

As with the Zambezi sharks, in-water encounters with tiger sharks at the Protea Banks come in two distinct flavours: random ones at the bottom during the dive, and on the baited dives. The random encounters are exactly that, and their intensity is entirely at the discretion of the tiger sharks. They may come in close and check you out or simply ignore you. It is up to them, but typically, they will give you at least a cursory inspection, particularly so on the Northern Pinnacle as that seems to be a favourite spot for them.

On the baited dives, they are attracted by the scent of the bait box and patrol around it as if trying

to understand the source. They will often wander off and disappear into the blue in one direction and then reappear later from the opposite direction, having checked out what is happening in the broader area. This behaviour aligns with their position in the marine food chain as truly apex predators and compares interestingly with that of the blacktip sharks, which seem totally focused on the bait box and only that.

The tiger sharks have a formidable presence, exuding total confidence and mastery of their surrounding environment. Eyeball-to-eyeball encounters with them on the baited dives are incredible and an experience that will stay with you for many years.



FILIPPO BHORGI

somewhat intimidating, shark, which shows no fear or hesitation when they do come close. The encounter is clearly being conducted on their terms—very exciting stuff!

Tiger sharks

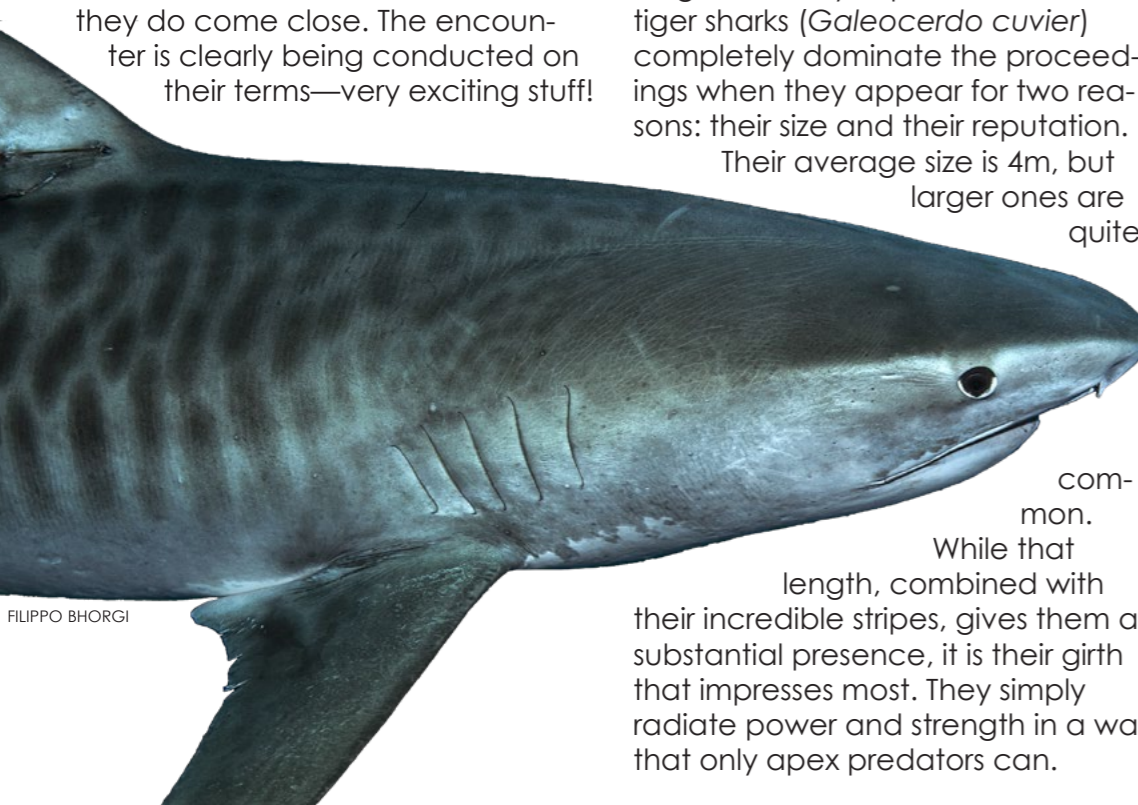
Large and very impressive animals, tiger sharks (*Galeocerdo cuvier*) completely dominate the proceedings when they appear for two reasons: their size and their reputation.

Their average size is 4m, but larger ones are quite

Combine that significant presence with their reputation as the second most dangerous shark in South Africa, and it is easy to understand why tiger sharks command so much respect. The Protea Banks is thought to be a breeding and birthing area for tiger sharks. The main season to see them is from late February through to early June, but sightings all year round are possible.

Tiger sharks typically feed on fish and other sharks but are also well known for attacking turtles on the surface. Their large, extremely powerful jaws are able to bite right through those tough shells.

It is their tendency for the stealthy but devastatingly destructive attacks from below that has probably earned tiger sharks their fearful reputation in South Africa. Such attacks on humans are more than likely mistaken identity, as opposed to



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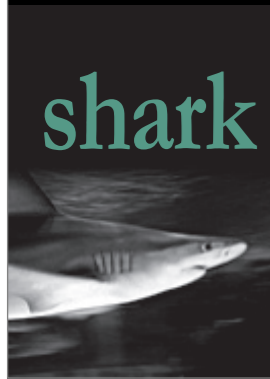
common.

While that length, combined with their incredible stripes, gives them a substantial presence, it is their girth that impresses most. They simply radiate power and strength in a way that only apex predators can.



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Divers in a RIB heading to a dive site (right); School of hammerhead sharks (far right); Divers descending at Northern Pinnacle (below)



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Hammerhead sharks

The Protea Banks also plays host to scalloped hammerhead (*Sphyrna lewini*) and great hammerhead (*Sphyrna mokarran*) sharks at various times of the year, although encounters with them are rarely the close, in-your-face ones. The scalloped hammerhead sharks gather

in huge schools that number in the hundreds, sometimes several hundred, from late October through to early May as part of their annual migration. But these notoriously shy animals are almost impossible to get close to.

Instead, you will see them in the distance, where they appear as almost a



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moving wall of large animals. Other times, they will pass below you during ascents to the surface or on the safety stops—but again, while tantalizingly close, they are almost impossible to photograph. Interestingly, when really large aggregations of scalloped hammerheads are seen on the Protea Banks, it is believed they are exfoliating by rubbing up against one another as a great deal of slime is always present in the water.

Great hammerheads are also present around the same time but are most common during the months of March and April. Typically solitary animals that are usually quite shy around divers, they can often be seen

cruising along the bottom, scanning the reef floor for prey with their unique hammer-shaped heads. And, if you are lucky, they may be encountered (usually briefly) in mid-water, during the staged ascents to the surface.

Significant animals with an incredible presence because of their uniquely shaped and highly sensitive head, they sashay through the water towards you with total confidence. Anecdotally, it seems that the higher the number of great hammerhead sharks there are in the vicinity, the significantly lower the number of scalloped hammerheads there are.

Diving the Protea Banks

There are basically two areas where recreational diving can be done with safety at the Protea Banks—the Northern and

the Southern Pinnacles. As their names suggest, these are the highest peaks (and therefore the shallowest parts) of the large submerged shoal that forms the Protea Banks. However, even then, the minimum depth is around 30m, and some of the best things to see are at 36m.

The laws of physics are just that—laws. So, the huge volume of water that forms the Agulhas Current gathers speed as it passes over those pinnacles, which means one thing—increased water velocity and stronger currents. Diving in strong currents, in deep waters and in an offshore area—where the next landfall is Antarctica—is not something to consider lightly. If ever there was a place to listen carefully to the dive briefing and follow instructions, the Protea Banks is it.

The Southern Pinnacles are where you will do your first dive. Of the two pinna-



DON SILCOCK

cles, it is the safer and easier one to dive—so think of it as a check-out dive. Unlike the Northern Pinnacle, where there is a very specific location from which to start, the Southern Pinnacle is more of a straightforward drift dive. There is a well-established main route that takes in the best spots along the way. But there are a variety of things to see in general, as you drift along in the current, and sticking to that main route is not as important as it is on the Northern Pinnacle.

The Northern Pinnacle is the main and most adventurous part of the Protea Banks. In terms of both your diving and listening skills, it is where the rubber meets the road. The starting point is the first or main cave which, compared to the overall area of the pinnacle, is quite small. And, as the boat will be drifting along in currents that can reach 8km/hour, it is not the easiest place to find.

The key elements of success to

getting onto the first cave is ensuring the boat gets to exactly the right position, which is done using GPS to establish location and the strength of the current—followed by a rapid negative entry and an equally fast descent, while not losing sight of the divemaster and surface marker buoy. All of this is carefully explained at the comprehensive pre-launch briefing and then reinforced on arrival—hence, the listening skills. The diving skills come into play once in the water, but if you have listened, it will all go to plan.

Dive operators

There are two well-established



DON SILCOCK

Shelly Beach-based dive operators who specialise in diving the Protea Banks: African Dive Adventures (afridive.com), run by Roland and Beulah Mauz; and Aqua Planet (aquaplanet.co.za), run by Kym Pollard. All my experience of diving the Protea Banks has been with African Dive Adventures, and I have nothing but praise for the way they conduct their operation.



DON SILCOCK

Roland and Beulah have been diving the Protea Banks for over 20 years and know it better than anybody else. It is not easy taking people out to dive safely in deep water, with strong currents and lots of sharks. But they have refined their operation, together with all the behind-the-scenes logistics that support it, extremely well.

Concluding thoughts

The “Rainbow Nation” of South Africa is an incredibly diverse and interesting country with much to see and do on land. It also offers some tremendous diving that varies from the semi-tropical reefs of Sodwana Bay near the Mozambique border in the northeast to the great white shark cage diving around Cape Town. In between those extremes

Protea Banks

is the rich marine ecosystem of the Protea Banks and its remarkable shark population.

However, it has to be said that diving the Protea Banks is not for everyone. The conditions can be downright challenging, and you really do need to be a competent diver to make the most of what there is to see there. But by accepting those challenges and preparing properly, you will be richly rewarded with some exceptional encounters and truly adventurous diving. ■

Asia correspondent Don Silcock is based in Bali, Indonesia. For extensive location guides, articles and images on some of the best diving locations in the Indo-Pacific region, visit his website at: Indopacificimages.com.



DON SILCOCK

CLOCKWISE FROM TOP LEFT: Underwater photographer with oceanic blacktip shark; Divemaster at Main Cave entrance at Northern Pinnacle; Bull shark with remoras; Dive boat picking up divers after a dive



shark tales

Edited by
Scott Bennett



SCOTT BENNETT

White sharks' annual migration has baffled scientists for years, not just because it takes the sharks a month to get there but does not seem to possess food to support their diets.

Why do white sharks congregate in a remote patch of the Pacific?

Each year, hundreds of great white sharks from California and Mexico journey to a far-flung stretch of the Pacific Ocean dubbed the "White Shark Café," situated between Mexico's Baja California and Hawaii. This annual migration has baffled scientists for years, not just because it takes the sharks a month to get there but does not seem to possess food to support their diets.

spring and most of the summer in a patch of open ocean about the size of Colorado. She named it the White Shark Café, even though she wasn't sure whether the sharks went there for food or sex.

Tagged and tracked

Acoustic tags were attached to 36 local sharks, as well as satellite monitoring tags with locator beacons that were designed to pop off and float to the surface. Researchers then organized the month-long expedition in April 2018 on the research vessel *Falkor* to track down the tags. Data was obtained from 10 of the 22 tags that floated to the surface in what Block described as a "white shark treasure hunt".

Teeming with squid

Researchers discovered the area to be teeming with squid and small fish in a deep-water expanse known as "mid-water," positioned just above the deepest areas of the sea where there is complete darkness. They discovered the animals engaged

in "bounce dives" down to 1,400ft below the surface during the day and 650ft at night.

"The story of the white shark tells you that this area is vitally important in ways we never knew about," said Salvador Jorgensen, a research scientist at the Monterey Bay Aquarium. "They are telling us this incredible story about the mid-water, and there is this whole secret life that we need to know about . . . What we've learned through the progression of our research is that this mid-water layer is extremely important for white sharks," he added.

Researchers will not know whether the sharks were feeding, mating or doing both until the analyses are completed. "We now have a gold mine of data. We have doubled the current 20-year data set on white shark diving behaviors and environmental preferences in just three weeks," said Block. "It would help us better understand the persistence of this unique environment and why it attracts such large predators" ■

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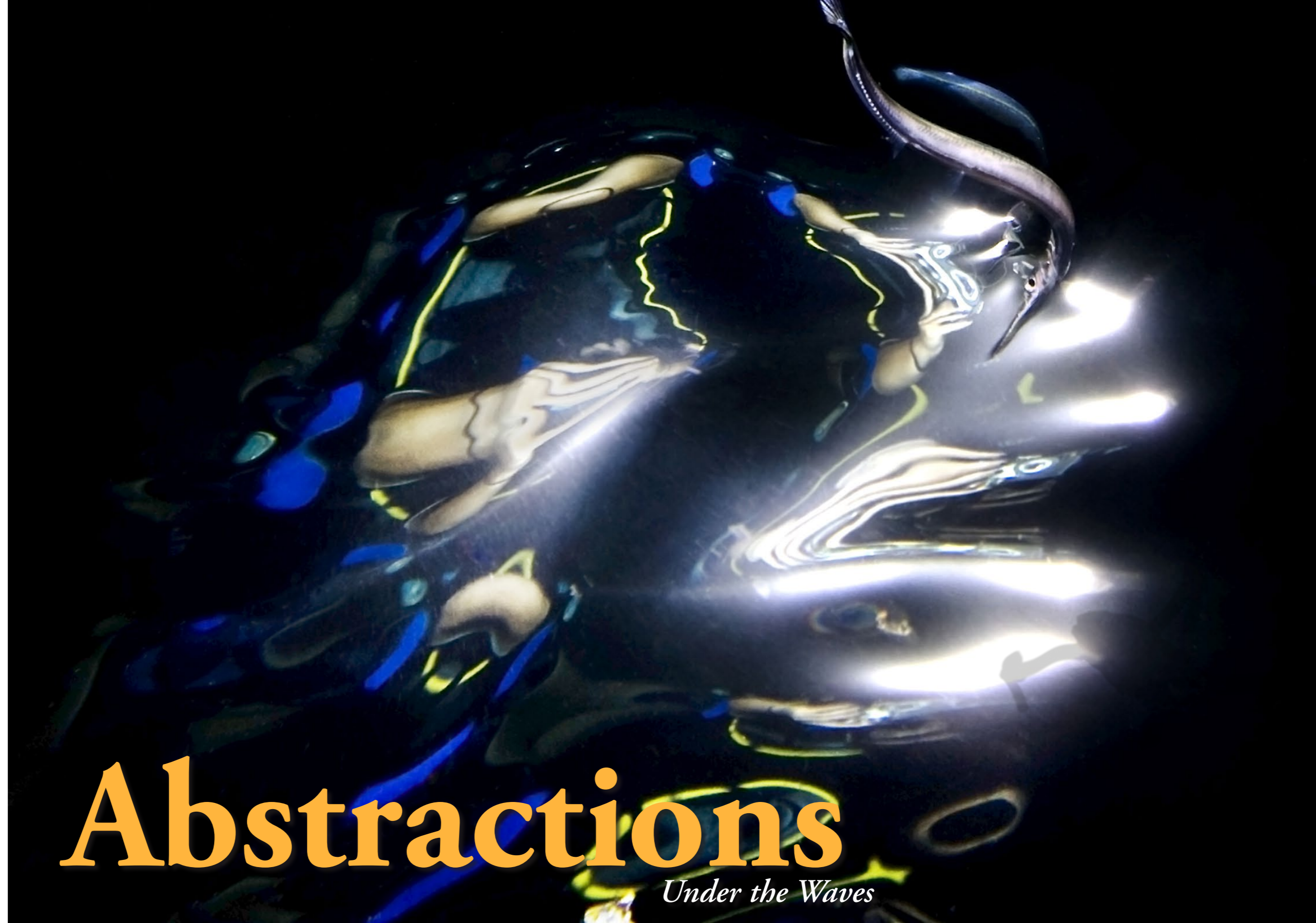




A sort of “half abstract,” as some with eagle eyes might see what this scene is about. Yet, it leaves room for many different interpretations and impressions.

Text and photos by Rico Besserdich

Abstract underwater photography—some may whisper, oh that’s “art”; others may shout, it’s “foolish and completely pointless!” while mourning the downfall of “real” photography. Some may stare at abstract images, unable to understand what they are seeing, because the perceived image does not match their expectations. And then, there are some who see their imaginations and senses boosted, eyes switching to “super-boost mode”—a fireworks of new synapses stimulating their brains, music starts playing and some might even hear luring voices whispering to them. But whether it is a lack of understanding (leading even to anger) or a refreshing fireworks of synapses, it all starts with one simple question: “What is it?”



Abstractions

Under the Waves

Ladies and gentlemen, welcome to the mysterious and challenging world of abstract photography. Yes, it works underwater, too. Many very clever people have worked

hard to formulate a one-size-fits-all definition of abstract photography. Hence, several slightly different definitions do exist—none of them wrong, but also, none of them covers it all.

Without being too scientific, photographer and professor of psychology John Suler nailed it down to a few understandable words:

“An abstract photograph draws away from that which is realistic or literal. It draws away from natural appearances and recognizable subjects in the actual world. Some people even say it departs



photo & video



To isolate specific parts of an object always works well in abstract photography, underwater and above (right); The dynamic of water expressed in an abstract way (left)—strong contrasts work well.

from true meaning, existence, and reality itself. It stands apart from the concrete whole with its purpose instead depending on conceptual meaning and intrinsic form . . . Here's the acid test: If you look at a photo and there's a voice inside you that says 'What is it?' Well, there you go. It's an abstract photograph." [Source: *Photographic Psychology: Image and Psyche*, Prof. John Suler, True Center Publishing, 2013]

It is in the nature of photography itself that many photographers—underwater and above—love to stick to "rules." Some of those are defined by technical aspects such as camera and strobe settings and optics. Others are defined by dogmas, which have turned into "laws" just because enough people have repeatedly used them endlessly over the decades. There is nothing wrong with that, but let's entertain the thought that photography works on many different levels and dimensions, many of them yet to be discovered. There is never a 100 percent clear "right" or "wrong."



This, however, is no invitation to mess up your shots and claim them to be "abstract art" later on, waiting for MoMA (Museum of Modern Art, in New York City) to pay you a fortune for it. In a way, abstract photography (whether one likes it or not) requires mastery and a profound knowledge of photography.

But most of all, it requires something money can't buy: the ability of the photographer to dive down deep into the essence of a subject in order to photograph and turn it all into something new. Something that (if we are lucky) turns on the music and alters the "what is it" question into a steady stream of new impressions and thoughts. Available technology

such as cameras, lenses and image-editing software do, of course, come in handy, but they are still unable to compete with the eyes and mind of a creative and thoughtful photographer. This means: Don't mind your photo gear too much. It's just fine and will do the job.

Definitions

To help us understand abstract photography a bit better, let's see Wikipedia's definition of it, and let's add a few "translations."

"Abstract photography, sometimes called non-objective, experimental, conceptual or concrete photography, is a means of depicting a visual

image that does not have an immediate association with the object world and that has been created through the use of photographic equipment, processes or materials." (Source: https://en.wikipedia.org/wiki/Abstract_photography)

The bad news: Your collection of "eyes of fish" cannot be called abstract photography, as it is clear to viewers that those images display eyes of fish. It means that an immediate association with the subject exists, which can be interpreted as contrary to the definition of abstract photography.

But at least we are still allowed to use our cameras, and digital post-production is a nice tool in the



photo & video

Another example of "isolation" (right); One does not always need a shark to express "speed" in an abstract photograph (lower right); Different angles and an intentional alteration of the depth of field can turn a common photographic subject into something new (below)

creation of abstract photography. In the days of analog photography, and later in printing, much could be done by changing or altering the materials (such as paper type).

Wikipedia goes on to state:

"An abstract photograph may isolate a fragment of a natural scene in order to remove its inherent context from the viewer, it may be purposely staged to create a seemingly unreal appearance from real objects, or it may involve the use of color, light, shadow, texture, shape and/or form to convey a feeling, sensation or impression."

The good news: We can isolate fragments of our photo subjects underwater, not to answer the question "what is it?" but to let our viewers come to their own impressions, develop feelings, or hear luring whispers or music. Isolation of specific fragments of a subject works well in abstract underwater photography, and in any case of doubt, "unreal" images make viewers take a closer look at our images. We do not want people to spend just two seconds looking at our images, hit the "Like" button, and then leave. We, of course, want them



to look longer, think a bit deeper, reflect... and turn the music on.

Lastly, Wikipedia states:

"The image may be produced using traditional photographic equipment like a

camera, darkroom or computer, or it may be created without using a camera by directly manipulating film, paper or other photographic media, including digital presentations."

Sounds almost like unlimited freedom, doesn't it? At least, as long as you are not about to enter underwater photography contests. While I prefer to create abstract images with a camera only or in-camera (call me a purist!) and post-production—in this case, it is better to say that "digital image manipulation" is considered a "legal" tool in creating abstract images.

Analog photographers can have lots of fun in the darkroom experimenting

with acids, proteins or even urine (oh yes, that's been done already!) on their films and papers. Those who now trust in digital image sensors might prefer image-editing software, as it is well known that digital camera sensors do not act well with proteins... or "worse things."

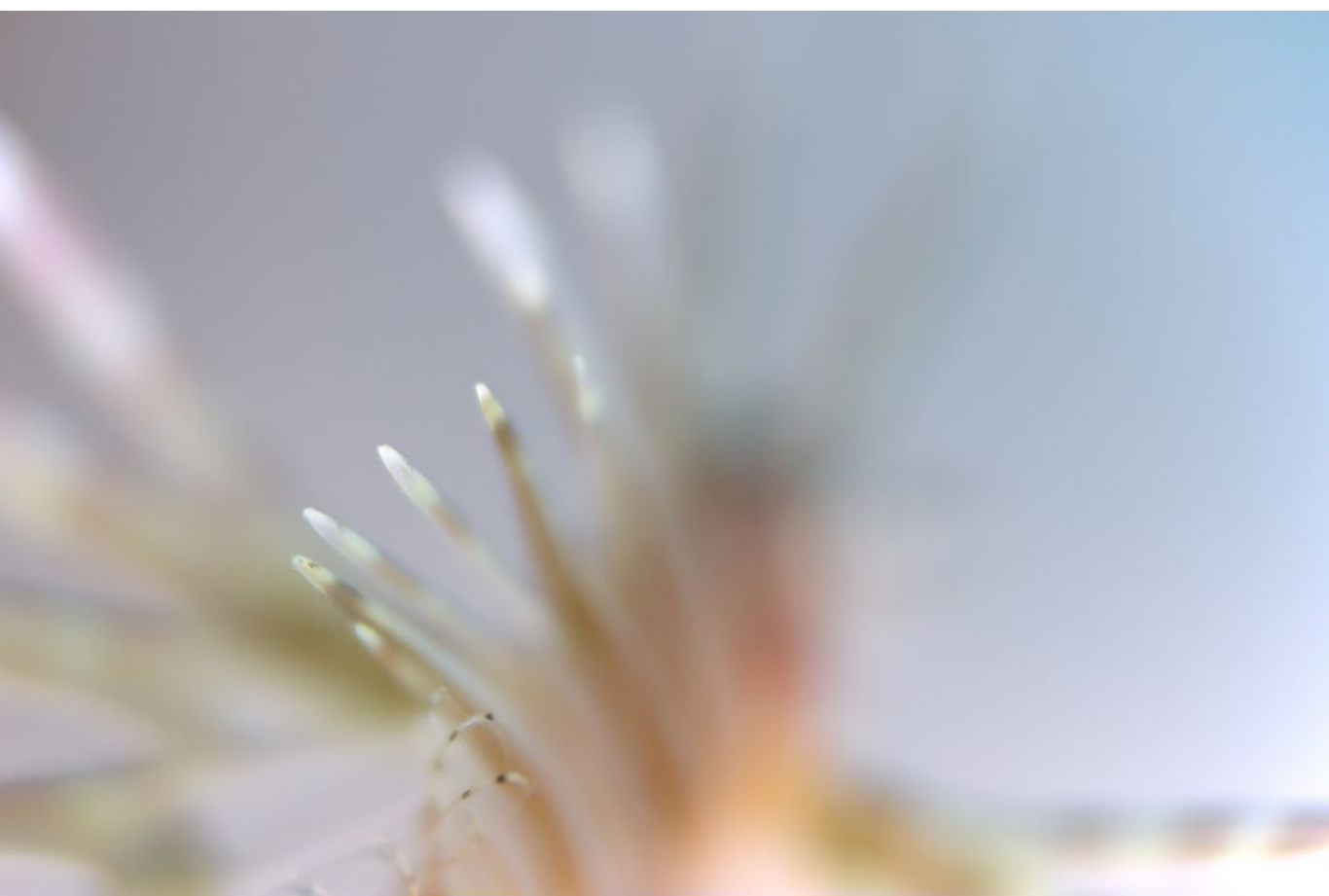
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The “spinning” technique is an interesting tool in creating abstract photographs of common subjects (right); Abstract, minimalistic... and blue (below)

Let's summarize

Abstract photography:

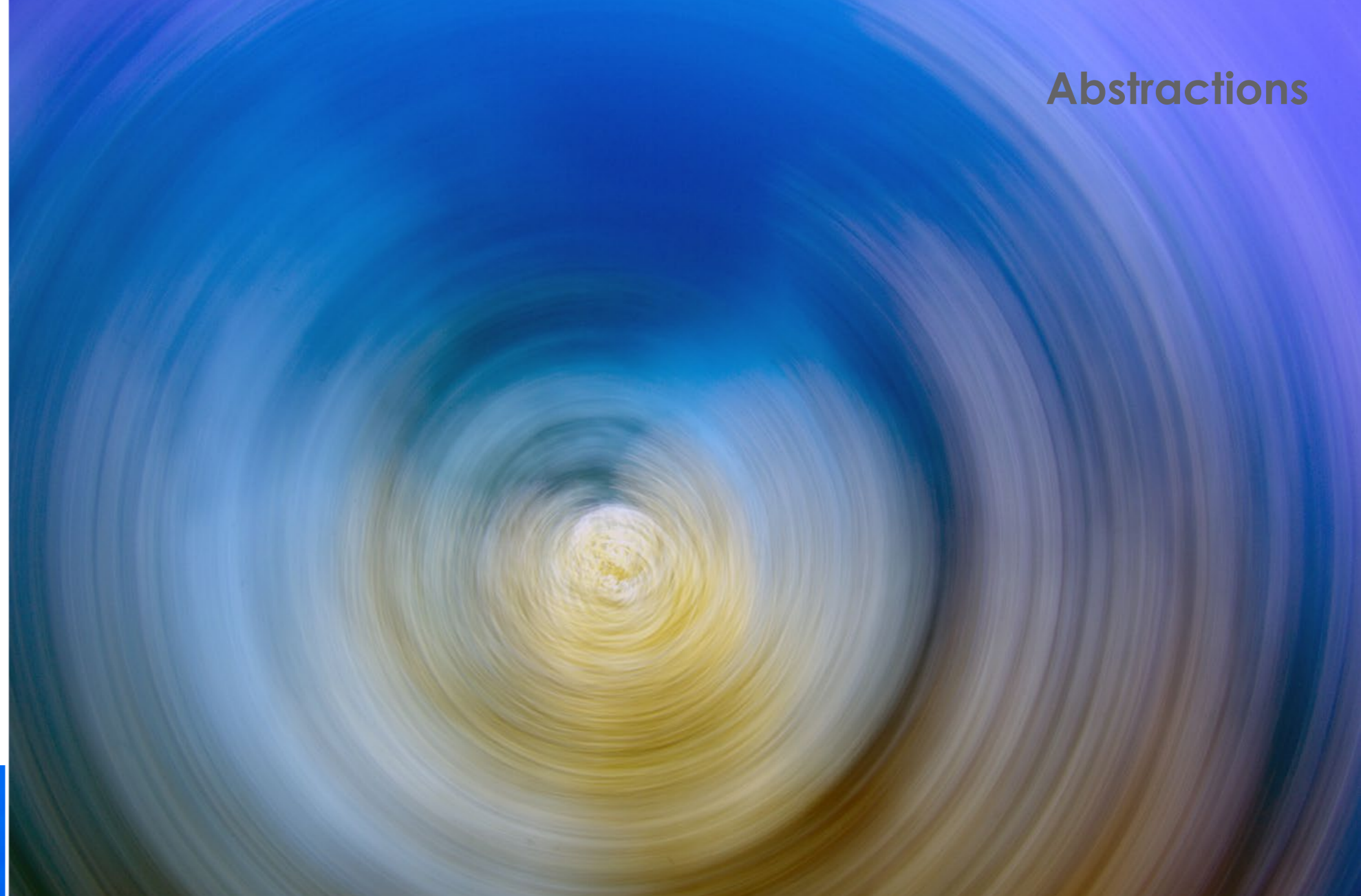
- Is non-objective, with no immediate association with the subject. The subject is secondary.
- Makes beholders think and reflect (“what is it?”), allowing them to develop their own impressions and feelings.
- Understands the real essence of a subject, digging deep, thinking deep.
- Plays with patterns, textures, color variations, tonal variations, curves, shapes and geometry, blurring, angles and

focus to create special abstract images.

- Is brave, playful and experimental. *Let the music play!*

By the way, abstract photography is not new at all. The first abstract photograph was created in the year 1842 by John William Draper. His works did not make it into the Museum of Modern Art but into the Smithsonian—that's also quite something.

Looking at all the factors that can make a photograph an abstract one, we can now agree that there is a lot of potential for shooting abstract un-



derwater images.

A photo dive with the aim of bringing some interesting abstract shots back home requires a different way of seeing things during that dive. It also requires one to forget (for the moment) some “rules” of classical underwater photography.

I need to add that when it comes to abstract photography, there simply is no “middle” ground: Some people love it and some people hate it. It is a question of personal taste and preferences, but the attempt to open our eyes and senses to abstract imagery sharpens the photographic eye and stimulates our creativity. Suddenly, very common or even “boring” subjects offer

new photographic potential. We only need two things: the eyes to see it, and the will to express something different.

Time for a warm-up!

The good news first: Almost any camera can do it. Compact cameras, DSLRs, mirrorless cameras—they all are generally suitable for abstract photography. The same is true for lenses. Prime lenses (with fixed focal length), zoom lenses, wide-angle, fisheye or macro lenses—they all work.

In abstract photography, there is no need to be too scientific or even picky about technology. But it still helps to know how to use the technology available to you. The journey to abstract photography is a journey into your inner self, your imagination, creativity, and most of all,

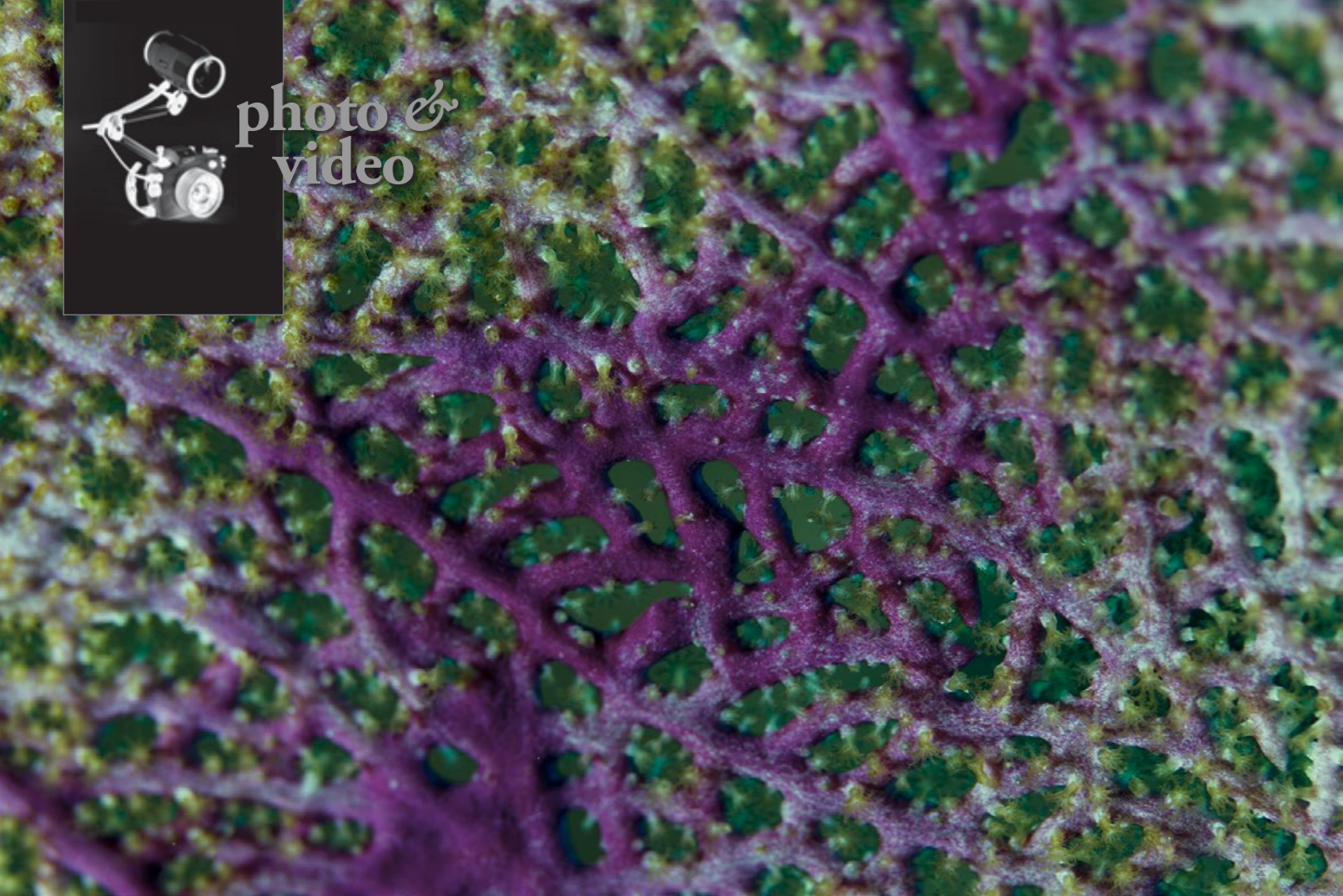
your ability to think deeper, uncovering the heart and soul—the very essence—of the subject in your photograph.

So, instead of talking about camera models, settings, lenses and stuff, let's activate some new synapses. Before we shoot, we think. Let's try a mentally abstract approach to a popular underwater photography subject—the shark.

Now, when thinking about sharks, what comes to mind? Perhaps elegance, beauty, speed, evolution, grey color, big teeth, rough skin? Anything else? Just take your time and think about what makes a shark, a shark. Write down a few short words or characteristics. There is no need for a complete list. What is important is your very own thoughts and impressions.



photo & video



While scuba divers might have a clue as to what this subject is, everyone else might ask the “what is it?” question (left); Tree of Life—is it a plant, a tunnel system of diligent ants, or a very close look at a coral? Who cares? In an abstract photograph, viewers can see whatever they like (below).

Abstractions

photography. But don't go shooting nudibranchs for a magazine article and deliver images in which no one can spot a nudibranch. That wouldn't do you any good.

However, if you feel like you now have more than enough nudibranch pictures in your archive, but your preferred dive spots have nothing else to offer (except nudis), you perhaps might like to give abstract photography a try. It works perfectly with common subjects, and after all, it is always a good idea to be brave and try something new.

What works well in abstract underwater photography?

Patterns

Any kind of decorative motifs such as color patterns of fishes, corals, sun-ray reflections on the sandy seabed or even different blue tones in open water.

Textures

Anything that gives one the feeling that one is “touching it.” This could be the rough metal on wrecks, stones and rocks, skin details on a shark, the surface of a jellyfish or fish scales.

Color variations

Anything that comes with at least two colors could work. The “abstraction” here comes from the interplay of colors. All blue and red hues work fabulously. Green and yellow hues can work as well, as long as they are bright and not dark.

Tonal variations

Variations of color tones (different tones of one and the same color) and also black and white elements have great “abstract potential.” Tones of blue (or green) water, or the interplay of light and

However, please exclude thoughts like:

- expensive
- needs a wide-angle lens
- no holidays left
- scuba regulator needs to get serviced first
- needs a better camera

These thoughts are not helpful at all during this little creative brainstorming.

Pick one of the characteristics you have listed. Incidentally, I have picked “speed.” Now comes the question: How does one express speed (of a shark) in an abstract photograph? I have to confess, my pick was actually not that incidental.

Most likely, your spiritual and creative mind has now connected itself with your “analytical” and technical mind. Is your mind whispering phrases like “slow shut-

ter speed,” “slow sync flash,” or “pan”? That's all right, you have incidentally just solved the task of finding a suitable photography technique. Easy thing, that was—leaving us more time for shooting.

Now, what is left to do is to go diving, find a shark and shoot images. Not everything can be planned or even staged in abstract photography. Sometimes (oftentimes, actually) things just happen, and sometimes, there is no shark to be found. But that does not matter so much. What matters is how you are now observing the world around you with different eyes.

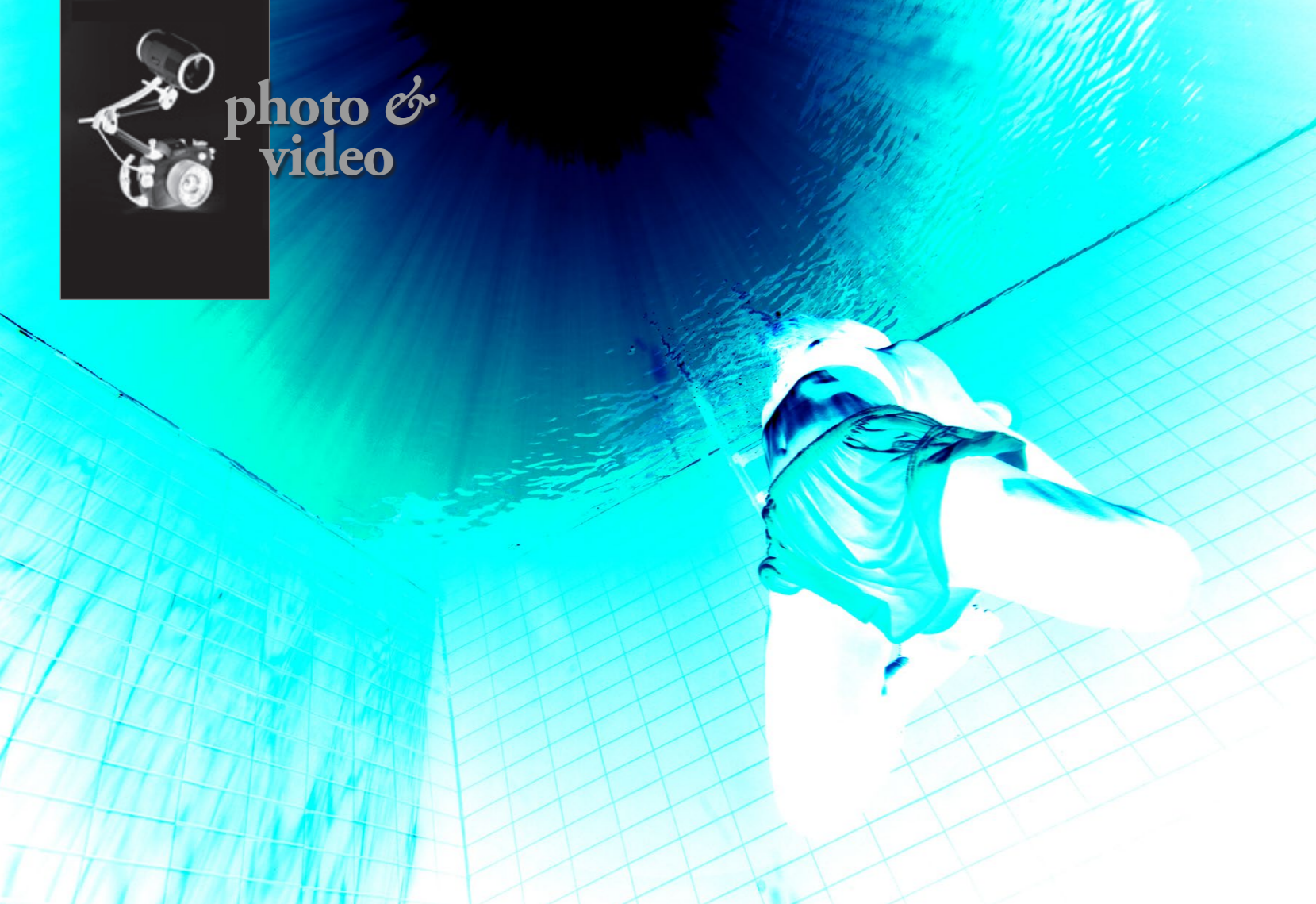
Even in waters where there is not much to see and nothing swims, floats or crawls around, you still have the element of the water itself. Seen with the eyes of an abstract photographer, water is very photogenic and the possibilities are endless.

Seen from a more psychological perspective, abstract photography often works with something I now like to call “provocation.” And this is why: Whenever a human looks at an image, the brain automatically compares the perceived with formerly stored perceptions and knowledge.

If there is a match in the database (the brain), everything is fine. But if there is no match, the brain feels “provoked” (and hopefully stimulated), the finger moves away from the “Like” button, and brain cells on holiday are called back to attend an immediate emergency think tank. The human begins to think and reflect about the perceived. “What is it?” is just the first step. Now, try not to think about a pink shark.

Abstract photography is in a class of its own, and is certainly not meant to replace any other general themes or categories of





shadow on wrecks, are both good subjects with which to start.

Curves, shape and geometry

In simple words, it's about how things, or subjects, are formed or shaped. Subjects can include corals, fish fins, special underwater landscapes, wrecks (in total or only parts of them) and silhouettes of all kinds... as long as they are interesting-looking. Beware: If one can easily identify the subject, it ain't an abstract photograph.

Blur

Unsharpness—but created with intention! Motion blur, bokeh effect, panning, spinning or zooming—there are lots of ways to create an abstract shot based on, or working with, blur. This works with almost anything you can find underwater!

Angles

Unique, or even uncommon, angles or points of view can result in interesting abstract photographs. One hundred percent permission to break "classical" rules granted! From below, from behind or even diagonally... any way you like it.

Focus and depth of field

To set the focus at unusual points on a subject can create interesting abstract shots. Decrease the depth of field intentionally and suddenly see the very same subject in a more "abstract way."

Is abstract photography considered contemporary art, fine art or not art at all? It doesn't really matter. What matters is opening our eyes to new visions and ideas of photography, and always staying open to something new. What

is important is (as always) that you enjoy taking images underwater and that you like your photographs—even the abstract ones.

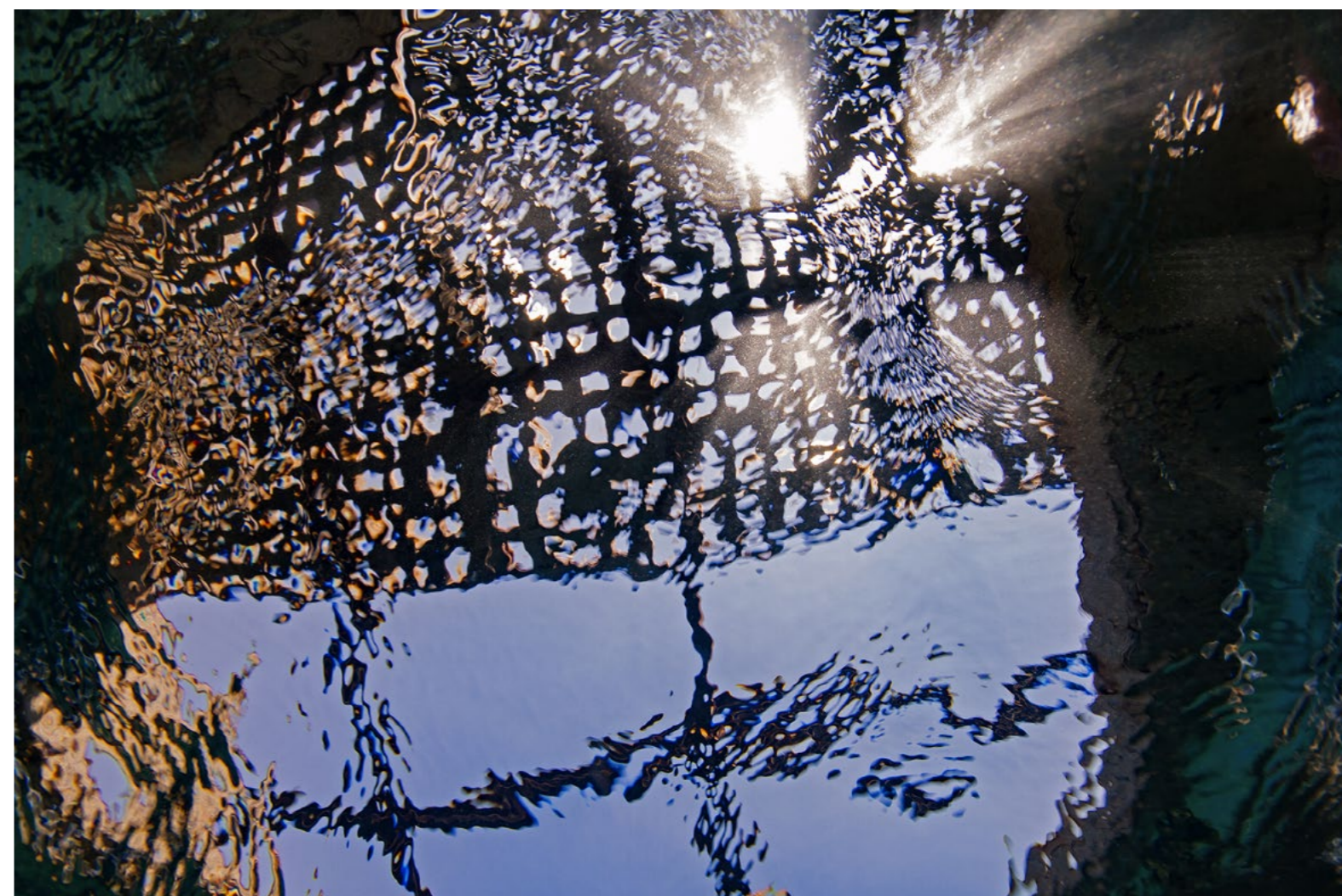
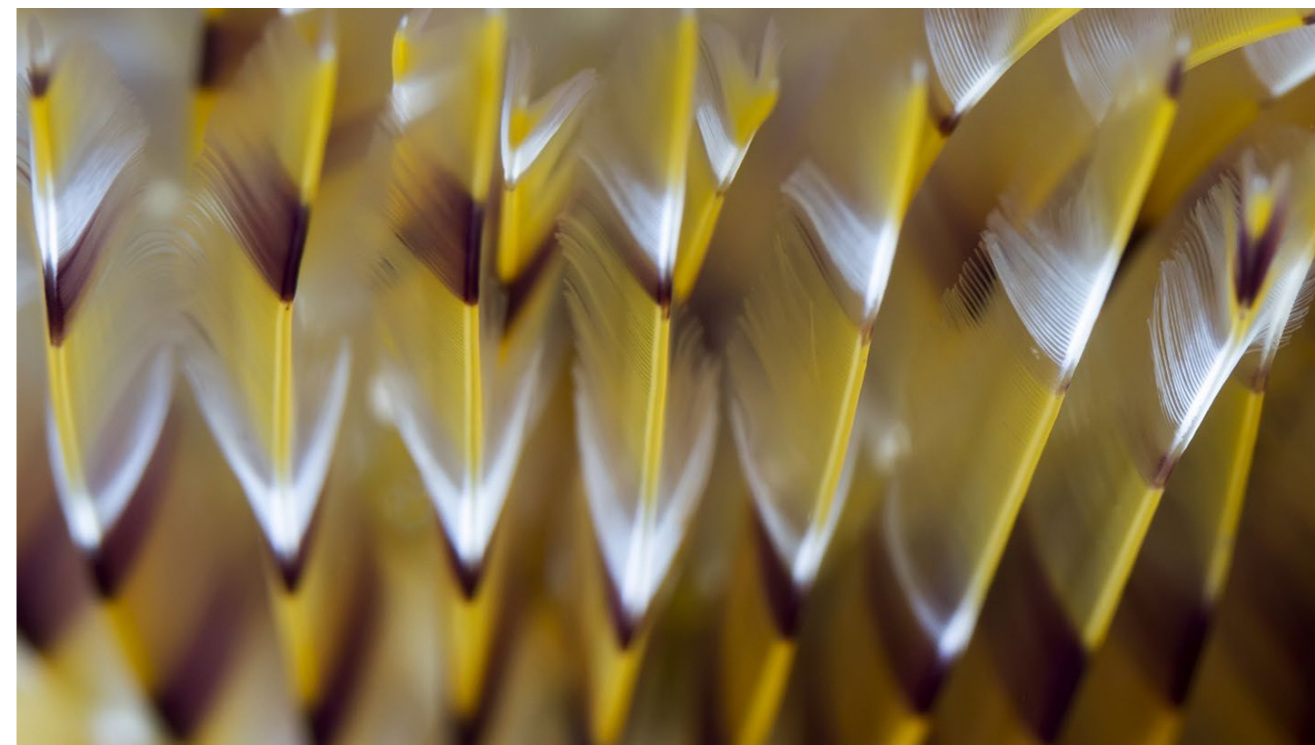
One last tip: A "serious" abstract photographer never reveals what the original subject of the abstract image is. Help your viewers use their brains, allow them the freedom of impression and keep your own freedom of expression.

Now, let the music play and never forget: "There is no must in art because art is free." — Wassily Kandinsky ■

*Rico Besserlich is a widely published German photographer, journalist and artist based in Turkey. For more information, visit: **Maviphoto.com**. To see his latest book, visit: **Songofsilence.com**.*

Doing crazy things in image-editing might result in an abstract image. But I personally find it painful to ruin my image like this. Please don't ask me to do it a second time (left); Again, isolation of specific parts (or colors) of an object come in handy for shooting things the abstract way (below).

Abstractions



And if there is nothing swimming or crawling around to photograph, we always have the water itself to shoot.





photo & video



Vuze XR

Available in black or white, the unique dual-camera design of the Vuze

XR Camera seamlessly combines two advanced capture systems into one pocketable device. Portable and simple to use, the camera gives everyone the power and convenience to record and live stream, or share, from their mobile phone or computer. The Vuze XR Camera is aimed at both consumers and prosumers, and enables users to easily create and share experiences in both 5.7K 360° (2D) or VR180 (3D) formats. The camera includes a mobile app for iOS and Android, and desktop editing software for Mac and Windows. The software supports basic and advanced editing and stitching functions for VR180 and 360° content, including live streaming in both VR180 and 360°, as well as sharing directly to social media channels. Tripod and underwater cases are for 360° and VR180 are accessories. **Vuze.camera**

From macro to wide
Nauticam's new MWL-1 is a game-changing wet-mount lens. Ultra wide-angle and macro perspectives are now available on the same dive—even with full frame DSLR systems. The Nauticam MWL-1 is a wet-mounted ultra-wide lens designed to be used with a 60mm full-frame equivalent macro lens that results in an ultra-wide 150° field of view. The MWL-1 can focus from the lens' front element to infinity. The MWL-1 excels at smaller apertures, and full-frame shooters will get optimal results at F16 or higher. The lens is depth rated to 100m and weighs 1.20kg in air and 0.58kg in water. **Nauticam.com**



Camera or dive light?

We have often bemoaned the dearth of innovation, but the Tovatec Mera appears to be one of those bright ideas (pardon the pun) about which one cannot help thinking why hasn't this been thought of before. The Mera combines a 1000 lumen primary dive light with a high definition camera capable of recording 1080p video. Whatever the light is pointed at gets recorded by the camera when it is switched on. Burn time with both the light on and the camera recording is 1.5hrs. It can be operated with one hand using three buttons. One turns light on/off, another takes still photos, and the third stops and starts the video. The light glows blue to let you know it is ready to record, and glows red when it is recording video. Depth rated to 60m. The product is available 1 November 2018. **Tovatec.com**



Spherical video

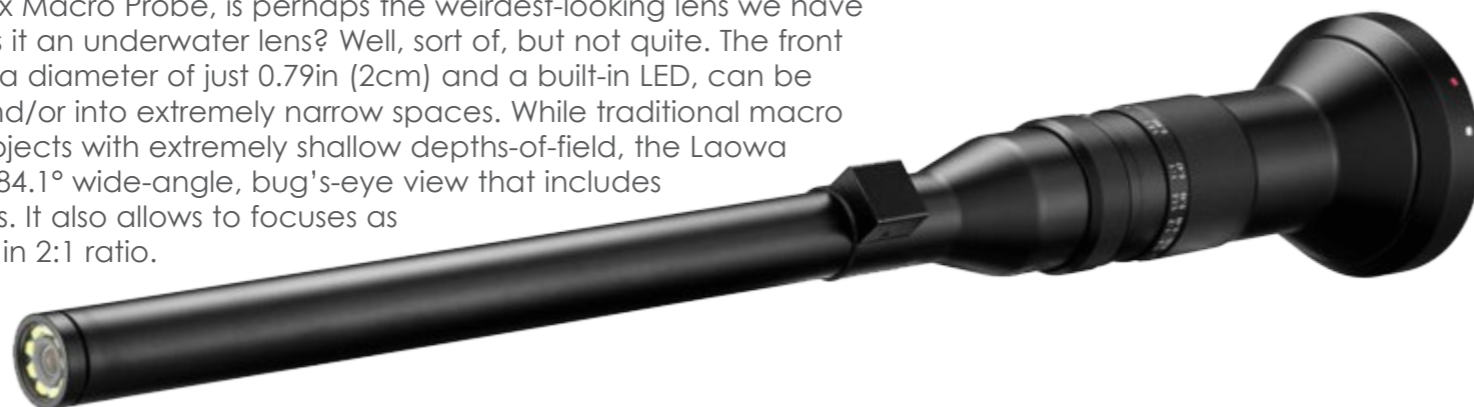
The Garmin VIRB 360 is a rugged waterproof camera capable of capturing fully spherical video in up to 5.7K/30fps resolution with 360-degree audio, and it includes built-in GPS. With one-click 4K spherical stabilization for smooth and steady footage, it eliminates, or greatly reduces, the lengthy editing process—no matter how rough the adventure. With in-camera stitching, videos are immediately viewable and sharable with the free, easy-to-use VIRB Mobile app or VIRB Edit desktop software. You can even instantly live stream to YouTube or Facebook. VIRB is compatible with many other Garmin devices, mounts and more. **Garmin.com**



Weird or what?

The Laowa 24mm f/14 2x Macro Probe, is perhaps the weirdest-looking lens we have ever laid our eyes on. Is it an underwater lens? Well, sort of, but not quite. The front of the lens, which has a diameter of just 0.79in (2cm) and a built-in LED, can be inserted into water and/or into extremely narrow spaces. While traditional macro lenses isolate tiny subjects with extremely shallow depths-of-field, the Laowa 24mm captures an 84.1° wide-angle, bug's-eye view that includes background details. It also allows to focuses as close as 2cm and in 2:1 ratio.

Venuslens.net



Noriko Kuresumi



P O R T F O L I O



No. 53 (above) and No. 41 (previous page) from the *Sea of Memory* series of ceramic sculptures by Noriko Kuresumi

Text edited by Gunild Symes
All artwork by Noriko Kuresumi
Photos by Shin Ono

Noriko Kuresumi is a Japanese artist based in New York City who creates ceramic sculptures with exquisite, sensual forms inspired by the harmony and balance of the ocean. *X-Ray Mag* interviewed the artist to learn more about her artwork, creative process and perspectives on art and nature.

X-RAY MAG: Tell us about yourself, your background and how you became an artist. From whom or what do you gain inspiration for your art and artistic process?

NK: My background is in painting, but I never studied at an art school. I taught myself both two-dimensional (painting) and three-dimensional (sculpture) art forms. I rely on my own hard work to learn and improve my artwork. I am convinced that I have a "work dependence syndrome" and create my work incessantly, as if I am going mad.

To improve the quality of my artwork, I submitted my work to numerous art competitions. By exposing

my work to the public, I learned a lot and grew in skill. Every time I won a prize, I felt I was getting a little closer to the art scene.

When I was a teenager, I read a book by G.I. Gurdjieff. After reading it, I began to be conscious of my own thinking. The encounter with this book shook me and woke me up from my slumber. Being awakened by this book was very important in inspiring me to become, and continue to be, an artist.

I live in a big city, so I cherish the times I am able to be in the midst of nature. Sometimes I surround myself with nature to relax, and I treasure the times when I feel I am one with nature. After my daily meditation

Close-up detail of *Sea of Memory* No. 23 ceramic sculpture by Noriko Kuresumi



No. 30 (top left), No. 50 (above), No. 54 (left), and close-up detail of No. 4 (right) from the *Sea of Memory* series of ceramic sculptures by Noriko Kuresumi

every morning, I have a positive inner conversation with myself. This might be making me receptive for inspiration, but I really don't know for sure where my inspirations come from.

I would like to think my inspirations come from the Moon. While I am creating my work, I am engulfed by inspiration.

X-RAY MAG: Why sea forms in porcelain? How did you come to these themes and how did you develop your style of sculpture?

NK: I was drawn to porcelain clay because of its feminine elegance and



portfolio

No. 51 (below), No. 49 (right), No. 47 (lower right), and No. 20 (bottom left) from the *Sea of Memory* series of ceramic sculptures by Noriko Kuresumi

Noriko Kuresumi

expressive qualities. My sculptures are carefully hand built, reflecting my passion for organic line and contrasting textures. The possibilities of the porcelain clay body continue to inspire me every day.

I have been interested in the influence of the Moon over Earth. I have not learned to scuba dive, but I love to watch the ocean—just being there and absorbing feelings from it.

I want to create work that can reflect my feelings towards the ocean, not just the ocean itself. What I feel about the ocean is that the sea is the origin of life. All lives are connected and support



each other. The way I create my work is by imagining the source of harmony and balance in the ocean.

X-RAY MAG: What is your artistic method or creative process?

It might be hard to believe, but I am all thumbs. Yet, my clumsiness became my weapon in striving for perfection. Without having an adventurous or experimental spirit, I learn a lot by failures. Failures bring eventual success!

NK: My creative method is hand building. It involves making organic lines and shapes.

It is not possible for me to draw my finished work in a sketchbook before I start working. It is because I create my work in an ongoing improvisation, like a jazz musician improvising while he is playing his music. My creation is totally guided by the senses and by my feelings; therefore, I am continually communicating viscerally, instinctively and intuitively with inspirations.

The Japanese character for the word "sea" has the character for "mother" in it. The elements in seawater and in amniotic fluid are similar. The Ocean is the mother of the Earth.

In my creative process for my series of sculptures with the theme, "Sea of Memory," I imagine being assimilating into saltwater, floating and resound-





Noriko Kuresumi

Close-up details of No. 32 (far left), No. 26 (left), No. 48 (below) and No. 32 (bottom left) from the *Sea of Memory* series of ceramic sculptures by Noriko Kuresumi

living creatures are connected and exist in harmony on Earth. If we lose one of these segments on Earth, the entire balance and harmony would crumble.

X-RAY MAG: What is the message or experience you want viewers of your artwork to have or understand?

ing with the rhythm of the tides coming and going. The spring tide caused by the moon's gravitational pull is the source of life. I create, guided by images of the organic forms under the sea.

X-RAY MAG: What are your thoughts on ocean conservation and coral reef management, and how does your artwork relate to these issues?

NK: It is very good to know that Starbucks and McDonald's have decided to stop using plastic straws. It is a small step to stop plastic garbage polluting the oceans, but it is a great start.

And we, as individuals, have to be conscious and take responsibility not to pollute the Earth such as by choosing non-polluting detergents, removing garbage from places where we enjoy nature, and sorting out garbage accordingly.

The Earth is living—the forests, rivers, lakes and oceans. Natural environments and all





Detail of *Sea of Memory No. 33* ceramic sculpture by Noriko Kuresumi

NK: It only happens when audiences experience some feeling inside of them while viewing my work.

If my art works are able to knock on the door and open some sensibility in my audiences, I would be very happy.

X-RAY MAG: What are the challenges and/or benefits of being an artist in the world today?

NK: For me, art is a quest for the source of life. Who am I? Where do I come from? How do humans become human? My quest is expressed by a combination of words, beauty, balance and harmony.

Every time I discover, seeing differently from what I did previously during my quest, I find a new, elevated

passion to develop myself further. The quest is my source of spring and fire in my life. My endless quest is my advantage—to reach my ultimate goal of beauty, balance and harmony in my work.

X-RAY MAG: How do viewers, adults and kids respond to your works? What feedback or insights have you gained from the process of showing your work to various audiences?

NK: Many children try to touch my work with their index fingers. I realized that when I was young, my index finger expressed my curiosity as well. I always learn from little audiences. They point out things that adults do not notice.

X-RAY MAG: What are your upcoming projects, art courses or events?

NK: I have had solo shows several times for my paintings; and my sculptures have been exhibited numerous times, all over the country, but never in a solo show. I hope to have a solo show for my sculptures in the near future—although, at this time, there is no definite plan for one yet.

X-RAY MAG: Is there anything else you would like to tell our readers about yourself and your artwork?

NK: Thank you for reading my interview to the end. If you want to know more about me and my artwork, please go to my website: NorikoKuresumi.com. ■

Sea Creature No. 1 ceramic sculpture by Noriko Kuresumi