Edited by Gunild Symes

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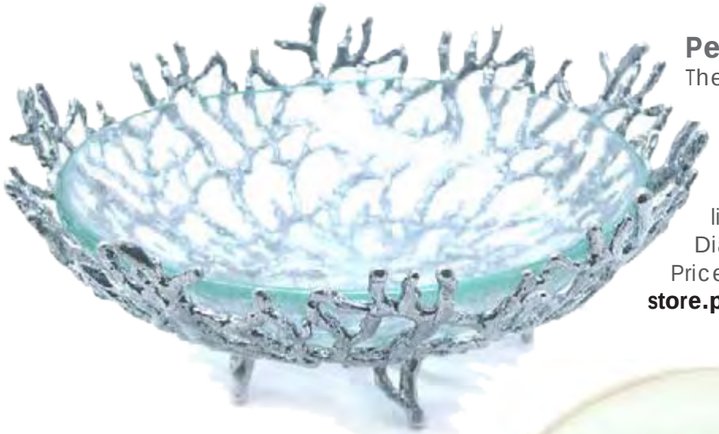
POINT & CLICK ON BOLD LINKS

Ocean Arts Emporium

Exquisite Gifts & Decor



Pewter Coral Bowl

The forms of reef coral inspired this decorative artistic bowl cast in pewter with a clear glass liner. Color: silver. Diameter: 9". Price: US$195.00
store.plantationdesign.com

Large Hermit Crab

This whimsical glass sculpture of a hermit crab was created by Joe Peters of western Massachusetts who states on his webpage: "After living and scuba diving in areas of Central America, I gained an appreciation for underwater plant and amphibian life. I have tried to integrate these elements into my handblown glasswork by utilizing a technique called torchwork otherwise known as lampworking or flame-working."

Available at Objects of Envy. Size: 5.25"H x 5.25"L x 4.75"D. Price: US$615.00
www.objectsofenvy.com

Sea Kelp Glass Sculpture

This elegant handblown glass sculpture from Plantaton Home Accessories in Los Angeles, USA, captures the beauty and natural movement of sea kelp under the waves. Color: green glass on black stand. Size: 15 x 12 x 4 inches. Price: US$1,375.00.
store.plantationdesign.com

Glass Octopus

A festive and colorful glass representation of one of the ocean's most mysterious creatures, this octopus sculpture from Plantation Home Accessories in California takes an entire day for an artist to hand sculpt, arranging each slithering arm and suction cup. Available in orange, ruby red, blue, brown, and black with blue glass. Size: 10-12 x 4-5 x 4-5 inches. Price: US$395.00
store.plantationdesign.com

School of Fish with Moon Jellyfish Sculpture

Master artisan and scuba diver, Chris Heilman, captures reef life inside glass paperweights so beautifully that one of his sculptures was presented to the late Jacques-Yves Cousteau. Price: US$565.00.
www.objectsofenvy.com

Green Crab

This colorful glass sculpture of a crab was created by American diver and artist Joe Peters. It is available at Objects of Envy for US$265.00. Size: 2 x 3.5 x 3 inches. **www.objectsofenvy.com**
Also available from the artist are unique glass sculptures of deep sea angler fish, tropical fishes, leafy seadragons, octopus, lobsters, crabs, dragonflies, curious insects, frogs and camelions.
www.joepetersglass.com

Octopus & Starfish Pendants

A beautifully detailed Octopus pendant created by Iris Jewelry Design in Los Angeles, California, USA, swings from a 16-inch hand-oxidized necklace chain. The pendant measures 1.5 x 1 inches. Made of sterling silver. Price: US$27.00. Coordinating octopus earrings also available. **www.etsy.com**

A starfish pendant made of sterling silver measures 1.5 x 1.375 inches and dangles from a 16-inch sterling silver rolo chain that has been plated with rhodium for a lightly oxidized finish. Price: US$28.00. Starfish earrings also available. **www.etsy.com**

Coral Reef Ring

This ring by Cholula Jewelry in Minnesota, USA, was carved out of wax and then cast in sterling silver. The delicate pattern of tiny holes is like the surface of reef coral found in the sea. The ring, while delicate, has a nice weight to it, and the texture feels good when running your finger over it. Ring is between a size 5.25 and 5.5, not resizable. It has been tumbled to a shiny shiny finish but a satin finish can also be made on request. Price: US$82.00.
www.etsy.com

Murano Glass Manta Ray Calcedonio Sculpture

Created by Oscar Zanetti, a glass master of the island of Murano, Venice, Italy. this exquisite glass sculpture of two graceful manta rays shows Zanetti's mastery of expressing the shapeable world, encompassing light and color, through glass. Measures 24 x 29 x 21 inches. Price: US$4,950.00. **www.objectsofenvy.com**

Deep Marine Hoodies

Squid Ink Hoodie (above) created by Black Bird Tees in Seattle, WA, USA, features a jet black design on American Apparel fleece hoodies in asphalt gray, unisex sizes XS-XL. Gals should go one size smaller than usual for desired fit. Price: US$38.00. **www.etsy.com**

Keep Your Distance Hoodie (right) features a hand illustrated design in black and white ink on American Apparel fitted hoodies in asphalt gray. Only available in a girly style hoodie, sizes S-XL. Price: US$29.00.
www.etsy.com

Whale-watching generates billions in revenue

According to a report released at a recent International Whaling Commission (IWC) meeting, whale watching generates far more money than whale hunting.

Worldwide, whale tourism now generates about €2.5 billion annually. The report was commissioned by IFAW, the International Fund for Animal Welfare, who argue that whaling countries would gain from a switch to whale watching. The report, which was compiled by the Australian organisation Economists at Large, found that income from whale watching had doubled over the last decade, with the fastest growth seen in Asia. In 2008,13 million people went to sea to watch cetaceans in 119 countries, concluded the report. ■

Thieving Sperm Whales Caught on Video

Underwater videos have revealed how sperm whales steal cod from fishing lines off Alaska. At depths of 100 meters (328 feet) the whales were filmed plucking the fishing line at one end to free the tasty black cod at the other

Narwhal teeth are really sensors

It took a dentist to solve the riddle of the longest tooth in the natural world—the unicorn-like tusk of the Narwhal whale. Harvard dentist and National Geographic grantee Dr Martin Nweeia discovered the function of the narwhal whale's unicorn-like tusk.

The narwhal uses its impressive tusk to measure changes in its environment. According to Dr Nweeia, it seems the tusk has hydrodynamic-sensing capabilities. Nweeia's team found that the narwhal tusk is like a membrane with an extremely sensitive surface. It has ten million nerve connections to the outer surface that would be capable of detecting changes in water temperature, pressure and salinity.

"There is no comparison in nature and certainly none more unique in tooth form, expression, and functional adaptation," Harvard said in a statement.

"Why would a tusk break the rules of normal development by expressing millions of sensory pathways that connect its nervous system to the frigid arctic environment?" Nweeia asked. "Such a finding is startling and indeed surprised all of us who discovered it."

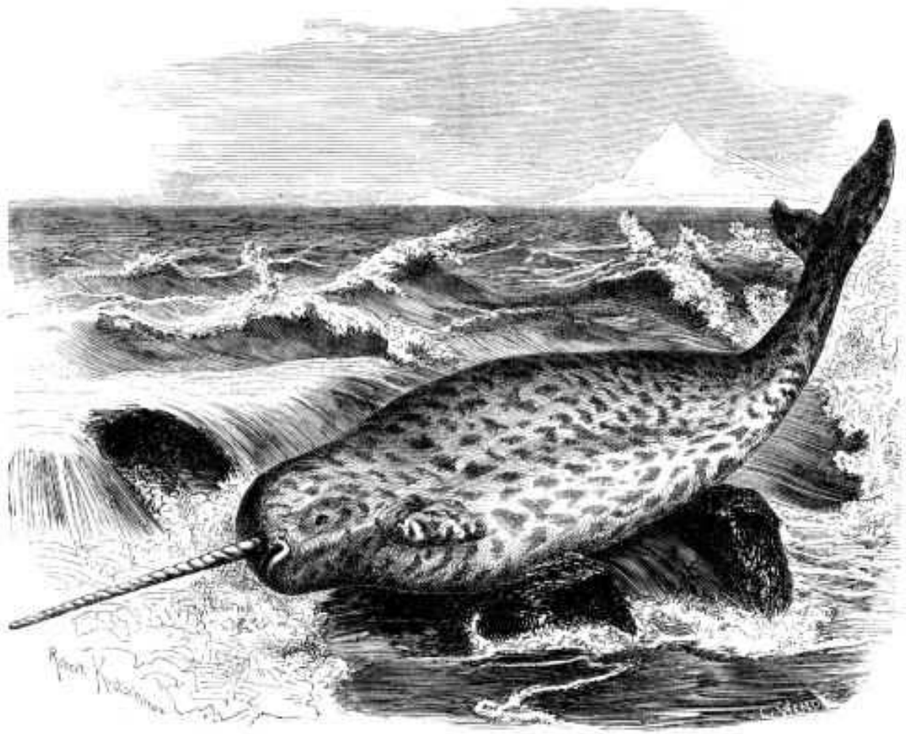
Left front tooth

Males have the characteristic left front tooth extending approximately eight feet and variable depending on the whale and the age. The right tooth remains embedded in the skull and measure roughly one foot.

About one in 500 males has two tusks, which occurs when the right incisor, also grows out. A female narwhal may also produce a tusk, but this occurs rarely, and there is a single recorded case of a female with dual tusks.

Ivory

Throughout history, the narwhal tooth has inspired legend and lore. So prized was the fabled tooth of the unicorn that Queen Elizabeth in the 16th century paid 10,000 pounds for one, equivalent to the cost of an entire castle. ■



The narwhal tusk is like a membrane with an extremely sensitive surface.

Peace talks on whales and whaling are to continue

Delegates to the International Whaling Commission (IWC) annual meeting have agreed to extending reform talks that began a year ago in an attempt to heal the deep and long standing rift between pro- and anti-whaling countries.

With attempts to end hunting in Iceland, Japan and Norway showing little signs of success, anti-whaling countries led by the United States embarked last year on talks with Japan and its pro-hunting allies aimed at finding a compromise that everyone could live with.

For the anti-whaling side, potential gains include a possible reduction in the total number of whales being killed each year, greater oversight of hunting, and reform of the IWC's scientific whaling clause under which any country can set its own catch quotas irrespective of the 1982 global moratorium on commercial hunting.

Whaling nations, particularly Japan, see political benefits in making a deal that would reduce the barrage of criticism they receive from whaling's opponents. Japan also wants to secure quasi-commercial quotas for four coastal communities with a history of whaling. ■

Blue Whales reestablish past migration patterns

Scientists have documented the first known migration of blue whales from the coast of California to areas off British Columbia and the Gulf of Alaska since the end of commercial whaling in 1965.

U.S. and Canadian researchers identified 15 separate cases where blue whales were seen off British Columbia and the Gulf of Alaska. Four of the whales were identified as animals previously observed off the coast of California, suggesting a re-establishment of a historical migration pattern.

Researchers made this identification by comparing photographs of blue whales taken in the north Pacific Ocean since 1997 with a library of nearly 2,000 photographs of blue whales off the West Coast. A positive match was determined based on pigmentation patterns in skin color and shape of the dorsal fin.

Formerly large populations of blue whales in the north Pacific never rebounded after commercial whaling ended, while those animals off southern California have apparently fared much better.

Scientists are still not certain exactly why blue whales are now beginning to migrate from southern California to the north Pacific Ocean, although changing ocean conditions may have shifted their primary food source of krill further north. ■

Blue whales were severely depleted by commercial whaling activities during the early 1900's in the north Pacific and along the West Coast as far south as Baja California

"The North Atlantic right whale is an icon for protecting and restoring valuable ocean resources which is a priority for NOAA,"

Jane Lubchenco,
NOAA administrator.

The right whales recorded could have migrated from the western North Atlantic right whale population, which is estimated at between 300 and 400 animals. But of the two right whales sighted in the last 50 years on the Cape Farewell Ground, one had only rarely been seen with the western population, and the other had never been seen in the area. The recordings in the Cape Farewell Ground raise the possibility that the eastern North Atlantic right whale population may still exist

NOAA discover a population of endangered North Atlantic Right Whales off Greenland

A team of scientists have recorded the distinctive calls of endangered North Atlantic right whales in an area where it was believed that the historic resident population was hunted to extinction in the early 20th century. Besides providing a better understanding of the whales, the discovery has implications for future shipping in the region.

Scientists from NOAA's Pacific Marine Environmental Laboratory, NOAA's National Marine Mammal Laboratory, and Oregon State University deployed "listening" hydrophones to continuously record sounds for a year in the Cape Farewell Ground—an area off the southern tip of Greenland. In July 2007, the team deployed five stationary hydrophones between 200 to 400 miles off the coast of Greenland. After collecting them in July 2008, the team sorted through the year's worth of recorded sound on each device to find evidence of right whales. Using automated detection software to search for a particular right whale sound —an "up" call—and after months of sifting through false positives, they identified more than 2,000 real whale calls. All of the calls occurred between July and December, with evidence between July and September of a north-south migration covering thousands of miles. ■

media

Books & DVDs

Edited by Catherine GS Lim

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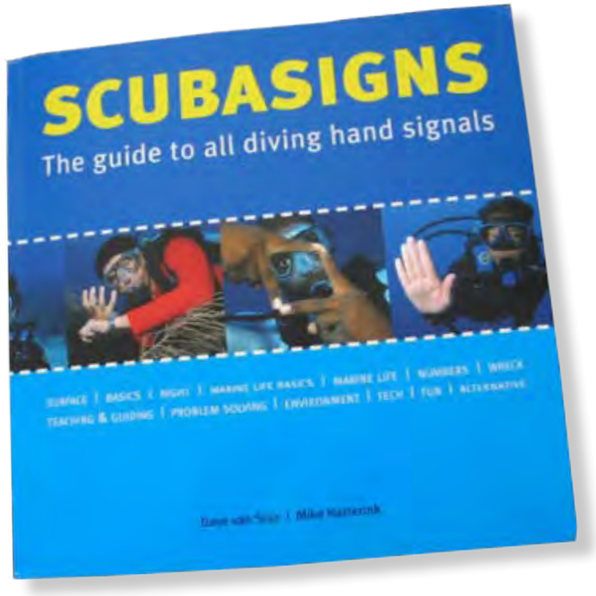


Scubasigns

Would you believe that there are nearly 500 hand signals that divers can use to communicate with one another while underwater? This book showcases them using large colour photos that are limited to two to three per page, with a short description of their meaning. The hand signals vary in their purpose, from instructional to functional, recreational to just plain fun. Users can use hand signals to call their buddy's attention to a cave or drop-off, to tell them if you're feeling cold, or even if you happen to spot a stonefish or scopionfish. Research for this book took several years, with the hand signals hailing from various parts of the world. While it is not mandatory to learn all the hand signals found in this book, doing so would definitely make your dives more interesting and safer. 288 pages, ISBN 9789090241654.

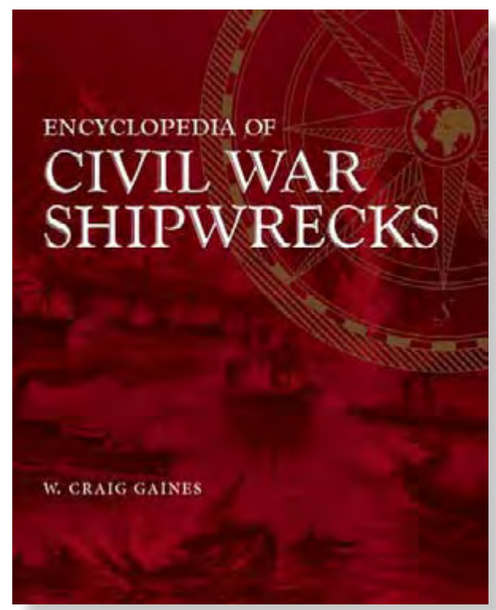
Seahorses and Their Relatives

By Rudie H Kuiter, 2009, ISBN 0977537211.
This item is about pipefishes, flutemouths, trumpetfishes and bellowfishes. No, we're not talking about the latest Pixar animated movie. Rather, these creatures are part of a group of animal species called syngnathids. This group includes the familiar seahorse and the bizarre-looking seadragon. This revised edition (previously *Seahorses, Pipefishes and Their Relatives*) includes a number of newly discovered species, more than 100 new pages, about 1,200 colour photos as well as chapters on studying and keeping seahorses.

The Diversity of Fishes
— Biology, Evolution and Ecology

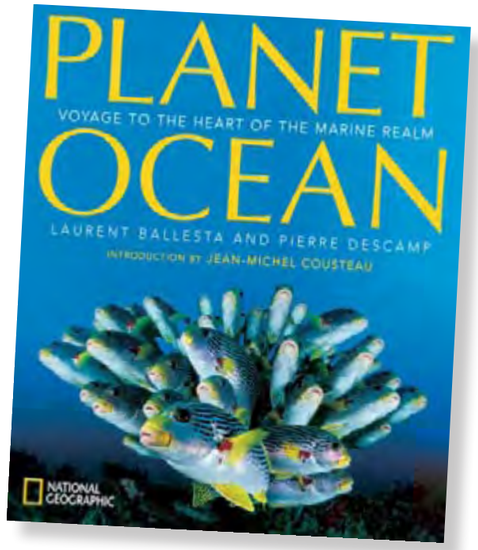
By Gene S Helfman, Bruce B Collette, Douglas E Facey and Brian W Bowen, 2nd edition, 2009, ISBN-13 9781405124942.

If ichthyology is your cup of tea, chances are you would have studied (or at least reviewed) the first edition of this book. Now, the second edition has been published, and it promises to be packed with the latest updates on the subject. Every chapter has been revised to reflect developments in the field, with an additional chapter on genetics and the molecular ecology of fishes thrown in to enhance understanding. Despite its technical nature, the text is highly readable (with hundreds of illustrations thrown in for good measure), covering topics such as anatomy, physiology, ecology and behaviour.



Civil War Shipwrecks

The Encyclopedia of Civil War Shipwrecks by W. Craig Gaines aims to be a one-stop reference source for information on the famous and obscure ships lost in America's bloodiest war. There is a lot of good information in this book. However, as one reviewer, Scott Boyd writing in Fredericksburg.com points out in his in-depth going review, there are also a lot of problems: factual errors, misspelled place names, referring to places by the wrong name and omitting information that could have clarified statements that otherwise seem unusual. The conclusion "in its current form will not live up to the publisher's claim on the rear dust-jacket flap that it is 'an essential reference work' unless it is extensively re-edited and fact-checked." Review: **Shipwreck Book Sinks**



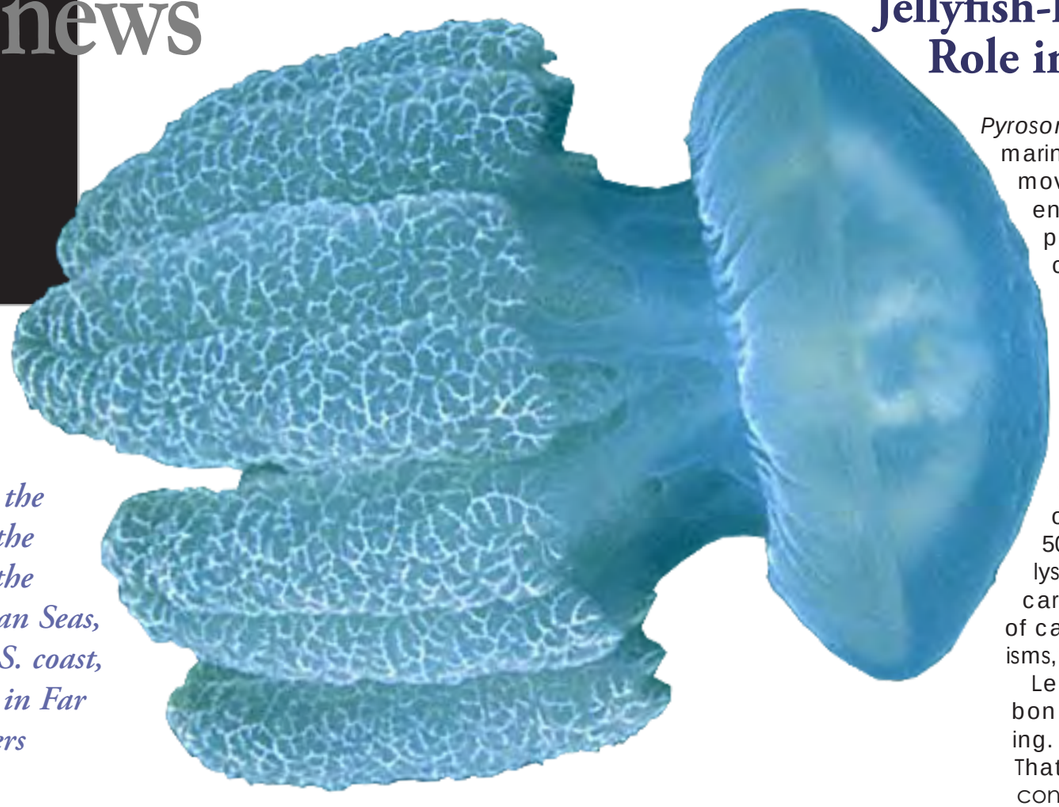
Planet Ocean
– Voyage to the Heart of the Marine Realm

By Laurent Ballesta and Pierre Descamp, 2007, hardcover, 368 pages, ISBN-13 978-1426201868.

Judging from its cover photo of yellowbanded sweetlips swimming outwards in a unique formation, this book promises to be an exceptional collection. It contains 400 colour photographs of marine animals and plants, as seen through the lens of acclaimed photographer Laurent Ballesta. Twenty-five essays give interesting information and analytical insight to the images, aiding the land-stranded reader to momentarily experience the wonders of the underwater world. With an introduction by Jean-Michel Cousteau, it promises to be more than just another coffee table book.

jelly news

Edited by
Bonnie McKenna



In recent years, jellyfish blooms have been recorded in the Mediterranean, the Gulf of Mexico, the Black and Caspian Seas, the Northeast U.S. coast, and particularly in Far East coastal waters

Jellyfish-like Creatures May Play Major Role in the Ocean Carbon Cycle

Pyrosoma atlanticum are semi-transparent, barrel-shaped marine animals, about the size of a human thumb. They move through the water by drawing water in the front end and propelling it out the rear in a sort of jet propulsion. They belong to the group of thaliacean and consist of gelatinous substance like jellyfish. Swarming by millions in 'hot spots' and also dying by millions like salps. *Pyrosoma atlanticum* may be transporting tons of carbon per year from the ocean surface to the deep sea.

In May 2006 off Ivory Coast (West Africa), Mario Lebrato and Daniel Jones of the National Oceanography Centre in Southampton, England, discovered thousands of moribund thaliacean carcasses on the seafloor, the majority in depths of more than 500 metres in the continental slope. When they analysed dried samples, they were surprised: "A third of the carcasses consists of carbon. This is the highest proportion of carbon that has been measured in gelatinous organisms," states Mario Lebrato.

Lebrato and Jones explain the high proportion of carbon and the density of the creatures with their fast sinking. „They don't have the time to rot in the water column. That's why they reach the seafloor nearly in their original condition, including the carbon inside." ■

Dead bodies (these below are alive) of the marine organism *Pyrosoma atlanticum* may be transporting much more carbon to the seafloor than phytoplankton or other jellyfish-like creatures

Jellyfish 'Joyrides' a threat to the oceans

New evidence indicates that jellyfish blooms are associated with over-fishing and excess nutrients from fertilisers and sewage.

Dense jellyfish aggregations can be a natural feature of healthy ocean ecosystems, but a clear picture is now emerging of more severe and frequent jellyfish outbreaks worldwide,

"Fish normally keep jellyfish in check through competition and predation but overfishing can destroy that balance. For example, off Namibia, intense fishing has decimated sardine stocks and jellyfish have replaced them as the dominant species," says University of Queensland scientist, Dr Anthony Richardson.

Climate change may favour some jellyfish species by increasing the availability of flagellates in surface waters—a key jellyfish food source. Warmer oceans could also extend the distribution of many jellyfish species.

"Mounting evidence suggests that open-ocean ecosystems can flip from being dominated by fish, to being dominated by jellyfish," Dr Richardson says. "This would have lasting ecological, economic and social consequences. We need to start managing the marine environment in a holistic and precautionary way to prevent more examples of what could be termed a *jellyfish joyride*." ■

Jellyfish, they're weird, they're squishy, but oh so fascinating

Text and photos by Bonnie McKenna

The moon jelly is able to survive across different climactic conditions

PETER SYMES

"Jellies are so different, that is why people are fascinated by them. They are a contradiction, they are delicate yet can survive in the worst conditions," said Sharyl M.G. Crossley, senior aquarist and jellyfish expert for the Tennessee Aquarium in Chattanooga, TN. "They are important predators as well as prey."

Jellyfish can be as small as a peanut or as large as three meters in diameter and 40 meters long. Most cause an irritable sting if the tentacles are touched and one, the smallest one, *Chironex fleckeri*, the sea wasp or box jelly is considered deadly.

Ancient

The jellyfish is one of the oldest living creatures in the world. Jellyfish have existed on the face of this planet for over 650 million years. They have existed since before the dinosaurs and have survived long after the dinosaurs and million other species have gone extinct.

Jellyfish are amongst the most spectacular marine species in the world. They can be found in all the seas and oceans of the world at every level of the water. Jellyfish are known to exist in the coldest waters of the arctic and Antarctic oceans to warm tropical seas. Very few species, like the moon jelly, are able to survive across different climactic conditions, but most species can only be found in specific locations under specific conditions.

Jellyfish are squishy animals because they are composed of approximately 95 percent water. True jellyfish belong to the Phylum Cnidaria along with corals and sea anemones.

Other jellyfish-like critters include sea butterflies, sea elephants and pelagic tunicates such as scalps, doloilids and pyrosomes. The characteristic that unites all these unrelated animals is their delicate gelatinous tissue.

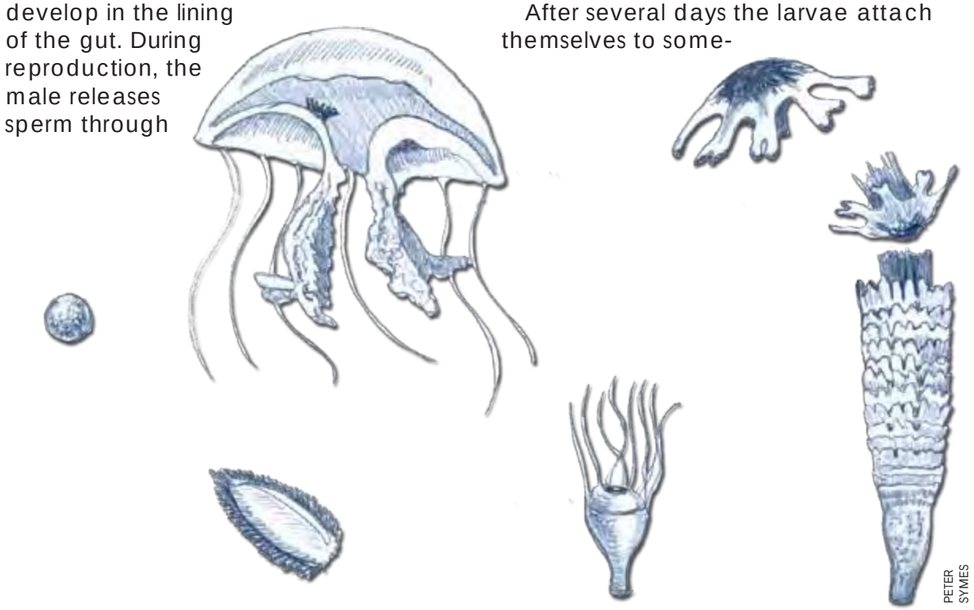
Life Cycle

The life cycle of a typical jellyfish is complex and involves an alteration of generations in which the animal passes through two different body forms.

The familiar form of the jellyfish is the medusa; the smaller polyp form is restricted to the larval stage. Jellyfish reproduce sexually and individuals are either male or female. The reproductive organs develop in the lining of the gut. During reproduction, the male releases sperm through its mouth into the water column. Some of the sperm are swept into the mouth of the female, where fertilization occurs.

Embryonic development begins either inside the female or in brood pouches along the oral arms. Small larvae (planulae) leave the mouth or brood pouches and enter the water column.

After several days the larvae attach themselves to some-



PETER SYMES

thing firm on the sea floor (rocks, shells, piers, boats, etc.) and gradually transform into flower-like polyps (scyphistoma). Polyps can multiply by producing buds or cysts that separate from the first polyp and develop into new polyps.

"A colony of polyps can reproduce asexually and give rise to other polyps and this stage, can in theory, go on indefinitely," said Crossley.

When conditions are right, fully developed polyps eventually produce a larval stage (the strobila), which resembles a stack of saucers. Each saucer develops into a tiny jellyfish (ephyra stage), which separates itself from the stack and becomes free swimming. In a few weeks, the ephydra will grow into an adult jellyfish, the medusa, thus completing the life cycle.

Locomotion

Jellyfish drift with the ocean's currents, but they can swim to move short distances or redirect themselves. They float in the waters and get carried about in the tides and currents of the water.

They move by contracting muscles in their bell forcing water out to propel them in the opposite direction. The pulsating rhythm allows the jelly to regulate its vertical movement. Because jellyfish are sensitive to light, this vertical movement can be important.

Some jellyfish, like the sea wasp, descend to the ocean floor or deeper water during midday to avoid the bright sunlight then surface during early morning, late afternoon and evening.

Eyes, mouth and stomach

Most jellyfish do not have eyes. Jellies rely on small sensory structures call rhopalia located around the edge of the bell. Within the rhopalia may be ocelli to sense light and stratoliths to sense gravity. Box jellies have the most complex ocelli resembling the image-forming eye of squid and vertebrates and they are able to distinguish between potential prey and non-prey.

As jellies float through the ocean they use their tentacles to snag prey. After the food has been immobilized it is passed up to the mouth. The mouth is located in the center of the underside of the bell.

jellyfish are sensitive to light

Venom apparatus

Jellyfish are equipped with specialized venom apparatus called cnidoblasts used for feeding and defense. A container inside the cnidoblast, the nematocyst, contains the stinging device. The structure of the stinging device varies with the species, but it generally consists of a hollow coiled threat with barbs lining its length. Nematocysts are concentrated on the tentacles or oral arms. A single tentacle contains thousands of nematocysts, which are activated when the tentacles make contact with an object. Pressure within the nematocyst causes the thread to uncoil acting as a harpoon, firing into the prey and injecting toxins.

Stings usually paralyze or kill small creatures, but some jellyfish are harmful to humans. Jellyfish do not attack humans, but when humans come into contact with the jellyfish tentacles, they can be stung. The severity of the sting depends on the species of jelly and the sensitivity of the victim.

A colony of polyps can reproduce asexually and give rise to other polyps and this stage, can in theory, go on indefinitely,

Dangerous jellyfish

Although most jellyfish can sting they are completely harmless to human. Only some jellyfish are capable of causing harm to humans, and it is important to identify them, so that they can be avoided. Here are some of the most dangerous jellyfish in the world:

- ***Chironex fleckeri*** (commonly known as the box jellyfish, marine stinger or sea wasp) is also from the species of Cubozoa. This species of jellyfish is amongst the most dangerous to humans. The tentacles of *Chironex fleckeri* are covered with a very high density of venom containing nematocysts, and their venom itself is also very powerful. A sting from a *Chironex fleckeri* can be excruciatingly painful and will result in death. In fact, a *Chironex fleckeri* sting can kill 60 humans in a span of only three minutes! It is important to remember that box jellyfish are actually an entire subspecies of jellyfish, of which *Chironex fleckeri* is only one species. Not all species of box jellyfish are dangerous to humans.

WIKIPEDIA / PUBLIC DOMAIN

Chironex Fleckeri

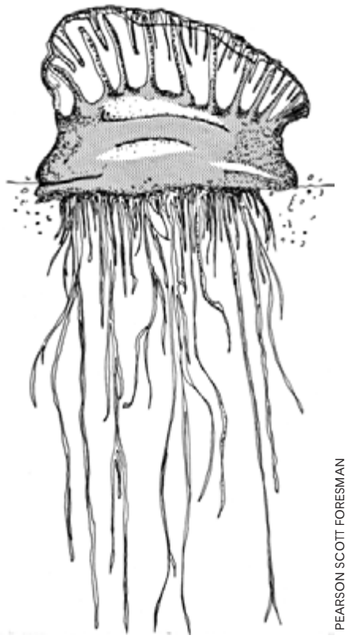
- ***Carukia barnesi*** (commonly known as Irukandji jellyfish) are classified as Cubozoans. This species of jellyfish is extremely poisonous. Symptoms of an Irukandji sting including nausea, vomiting, cramps, high blood pressure, etc. The sting itself only causes mild discomfort, but the venom is slow-acting and severe symptoms surface only after a few minutes of the sting. There is no known antidote to the venom of Irukandji venom. In most cases, victims have to be hospitalized and in rare cases, people are known to have died from Irukandji stings.

CREATION WIKI / CREATIVE COMMONS

Irukandji Jellyfish

To some, jellyfish may appear to have no apparent value, but in fact, they are a very important part of the marine food chain.

- ***Physalia physali*** (commonly known as Portuguese Man O' War, blue bubble, blue bottle, man-of-war): This species is wrongly considered to be a jellyfish, it is not even a single organism. It is, in fact, a colony of four highly specialized polyps. These polyps are all attached to each other and serve different functions similar to different parts of a single body. They cannot survive independently, only as an integrated whole. A man-of-war sting can be extremely painful to humans and may leave red welts where the tentacles have made contact with skin. The sting can also lead to fever, shock, heart and lung problems, and in rare cases, even death. Victims will require hospitalization to complete treat the symptoms of a man-of war sting.



PEARSON SCOTT FORESMAN

Portuguese Man O' War,

- ***Chrysaora quinquecirrha*** (commonly known as Sea Nettle): This species of jellyfish is reddish-brown in color, has a saucer-like shape, has four oral arms and long tentacles and is usually 6 to 8 inches in size. A single sting from the sea nettle usually causes only mild prickly sensation or mild burning. However, like most jellyfish, they travel in shoals and multiple stings from sea nettle can cause serious harm to humans.

ANASTASIA SHESTERININA - CREATIVE COMMONS

Sea Nettle

Not jellyfish

Comb jellies, Ctenophora, are not 'true jellyfish because they lack stinging cells. Their most distinctive feature is the "combs", groups of cilia that they use for swimming, and they are the largest animals that swim by means of cilia

NOAA PHOTO GALLERY

Comb jellies ae not cnidarians

Value

To some, jellyfish may appear to have no apparent value, but in fact, they are a very important part of the marine food chain. Jellyfish are carnivorous, feeding mostly on a variety of zooplankton, comb jellies and occasionally other jellyfish. Larger species are capable of capturing and devouring large marine organisms. Jellyfish are preyed upon my turtles, spadefish, sunfish and other marine organisms.

Culinary delicacies

Some species, such as the mushroom and cannonball jellyfish are considered a delicacy. Pickled or semi-dried mushroom jellies are consumed in large quantities in Asia where they are part of a multi-million dollar seafood industry.

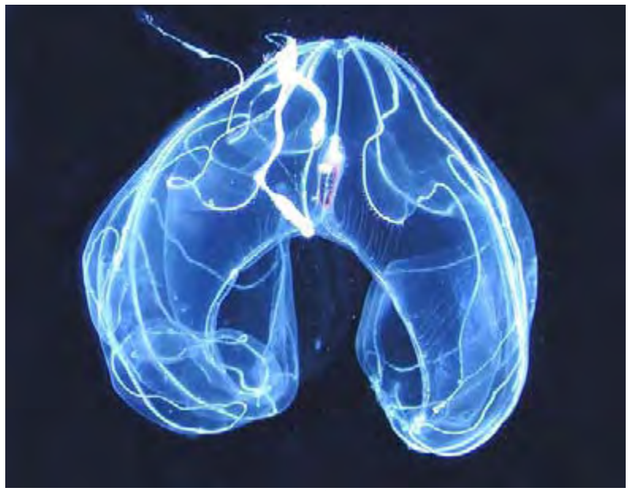
Jellyfish strips with soy sauce, sesame oil, and chili sauce

Ctenophora

Ctenophores are jellyfish-like animals commonly called "comb jellies", "sea gooseberries", "sea walnuts", or "Venus' girdles." Comb jellies are voracious marine predators, feeding mostly on plankton.

Like cnidarians, their bodies consist of a mass of jelly with one layer of cells on the outside and another lining the internal cavity. In ctenophores these layers are two cells deep while those in cnidarians are only one cell deep.

Ctenophores also resemble cnidarians in having a decentralized nerve net rather than a brain WIKIPEDIA



A ctenophore, *Bathocyroe fosteri*

Glowing in the dark

Certain species of jellyfish glow in the dark. The *Aequorea Victoria*, found in the north Pacific, emits a bioluminescent glow to startle predators. The green florescent protein, or GFP, of this jellyfish is considered as an excellent gene marker. Molecular biologists have been able to splice the gene into different genes of a number of proteins to produce luminous proteins that can easily be switched-on when exposed to blue light. Researchers are able to observe how certain genes act in living cells. GFP has been used in dozens of applications from searching for a cure for deafness to

Aequorea victoria, also sometimes called the crystal jelly, is a bioluminescent hydrozoan jellyfish

Jellyfish

develop treatments for catastrophic illnesses.

Swarms

Currently, a lot of attention is being paid to jellyfish blooms, actually swarms that are causing havoc in many areas of the world. A large number of jellyfish swarms have suddenly appeared in and around tourist and fishing destinations around the world. The number of jellyfish stings reported every year is rising dramatically, doubling and tripling in the case of some regions.

"Jellyfish are proliferating," said Crossley, "and there are a number of theories. Fertilizers and effluent from agriculture, human habitation, sea farms and over fishing can result in a reduction in the number of predators and deplete the oxygen in the water creating dead zones where jellyfish can thrive."

It is theorized too, that a reduction in rainfall near coastlines is causing an increase in the salinity of water, another favorable factor for jellyfish reproduction. When jellyfish are threatened, they tend to release a number of polyps into the water. These polyps quickly develop into jellyfish and form new swarms.

Jellyfish are also known to swim in swarms in natural conditions. This is because they do not have very specialized reproductive systems and the male jellyfish releases sperm in the water. To facilitate the fertilization process, jellyfish usually swim in close proximity to each other. "Invasive species, such as the spotted jellies from Australia, now found in the Gulf of Mexico are another reason why more jellies are being spotted," commented Crossley.

It is important to remember that jellyfish do not attack human beings. They do not have a brain and except for a very few, they cannot control their movement. Instead of a brain, jellyfish possess an elementary nervous system, or nerve net, which consists of receptors capable of detecting light, odor and other stimuli and coordinating appropriate responses.

Jellyfish get a bad rap, but they are important to our ecosystem

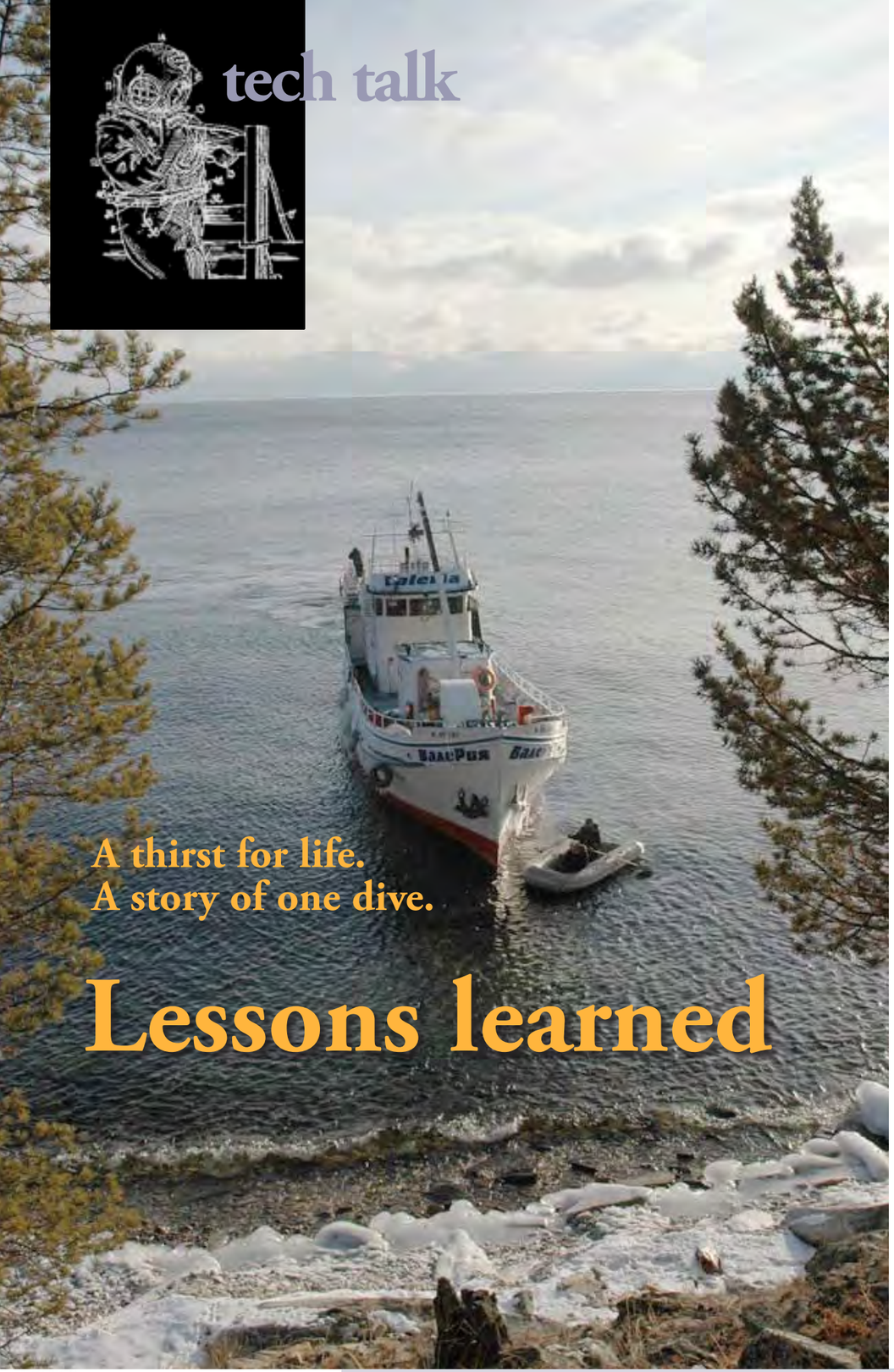
The abundance of jellyfish in and near our coastlines could be caused by global warming and the jellyfish are just as much impacted as the human race. However, jellyfish have existed on the surface of the earth for more than 650 million years and is known to survive in damaged environments, and that is what it is doing right now.

"Jellyfish get a bad rap, but they are important to our ecosystem," Crossley said.

For more information, go to **www.jellyfishfacts.net**

Jellyfish swarms video ▶ YouTube

MONTY GRAHAM, DAUPHIN ISLAND SEA LAB



A thirst for life.
A story of one dive.

Lessons learned

Text and photos
courtesy of Gennady Misan

Not all technical dives end up successfully; unforeseen circumstances often make an elaborate dive plan go completely wrong. What will a person do when it's a question of life or death? Give it all up and submit, or fight until the end, trying to find the way out? On January 9th, Gennady Misan had a 155m dive that could have ended tragically, but due to accurate work of the diver and the support team, we can learn all the details not from a police record, but from the diver's own words.

Deep diving in Lake Baikal

Reaching 1,642 meters at its deepest point, Lake Baikal, located in southern Siberia in Russia, is the deepest and largest freshwater lake by volume in the world. A typical dive site on Baikal is a shallow shelf, 10-200m long, turning into a vertical wall. There are only six sheer walls reaching more than 100-120m into the deep.

Usually, in order to be guaranteed a descent of more than 100m, you have to stand on the edge of a drop-off, move along the surface until the wall is out of sight, and then continue for another 30-40m. In other words, the descent always takes place in open water, with no markers, and from 110m (even at 50m, if the visibility is bad) —in complete darkness. Ascent will usually take place by following the seabed to the slope, then go up along the wall.

Freedom and beauty

I don't like diving with guidelines (lifelines) and don't practice it. The fall is just a few minutes, and after that, an hour and a half long decompression in deep blue. That's really something special!

Those who have dived on Baikal will understand. Free fall and surfacing allows you to enjoy the incredible beauty of nature when you look up and down from 100m and see picturesque canyons, mountain ranges, grottos. The stark beauty of the lake captures you.

Water temperature in depths of over 60m is never more than 4°C (39° F). On the surface, it depends on the season. In December through January, it's 1°C to 2°C. The thing is that the temperature is the same in all depths available to Trimix divers at this time.

Planned the whole thing

Why did I plan on diving in January? The answer is simple. Such dives need pro-

CONTRIBUTING EXPERT ON THIS STORY
Gennady Misan— instructor-trainer IANTD, Advanced Trimix instructor TDI, instructor CMAS3*; professional diver since 1988; completed more than 8000 dives, most of them on Baikal. Personal achievements: Russian record in cold water diving - 154m (December 2005), 85m night dive (2006, New Year)

Not all technical dives end up successfully; unforeseen circumstances often make an elaborate dive plan go completely wrong.

found self-preparation and well-trained buddys. It's not a "*why-don't-I-do-it-today*?" thing when you wake up in the morning, decide to go to the dive centre, put the equipment into the van, drive one hour, and you're there. Preparation kept me busy the whole summer and autumn.

Perhaps I was wrong

I'd done my previous 154m dive solo. There was only safety equipment on the surface, and in the middle of the dive, a support diver came down to me to see if everything was going well.

With other 100-140m dives, I only had safety equipment on the surface (except those connected with courses and deep-water support).

I'm not sure I was right then. The shoulder of a buddy is a great emotional support and a real help. Now, I don't dive deep alone.

In September, Andrei Slepnev and I began preparing for deep dives. Andrei had been doing Trimix diving for quite a while, passing the IDC qualifications for technical instructor.

We needed training to prepare for diving in complete darkness, especially in two's. We'd been doing this for a few months interrupted by routine work at the dive club. In December, we made four 55-60m ER dives; 70-90m trimix dives; and on January 3rd, a 100-meter dive.

Malfunction of equipment included only Andrei's Legend, which froze when going into the water (70m dive). The regulator underwent technical service, and the following dives were successful. My equipment never failed.

Exploring the rich green underworld of Lake Baikal

TECHNICAL SPECS OF DIVE

SUPPORTS: Andrei Mourzin (CMAS 3*, EAN IANTD), Tatyana Oparina (ATD TDI, Advanced EAN Instructor IANTD), Sergey Polovnikov (a diver).

GASES: TM 8/67 (double tank 12*2), TM 14/50 (deco 12l, alum.), TM 32/20, EAN 60 (I use the same gas to inflate my dry suit), O_2 Aboard is spare oxygen and EAN50 in case we lose deco gas.

EQUIPMENT
Suit: HD Pro Dry Trilam Bare and dry gloves
Undergarment: warm woolen underwear and Weezle Extreme+
Computers: VR 3
Torch:Metal Sub 50 plau a spare one, Lola.
Oxygen regulators: Apex ATX 50
Main regulator: Apex TX 100 (connected to the right inflator)
Spare regulator: Apex ATX 50 (on the left inflator)
Wing: Dive Rite Dual Rec with DIR mount, steel back. (I always use the wing as a mount only and as a spare system for buoyancy, Inflating only the dry suit.)

Gennady Misan in his 'Sunday outfit'

160 meter dive

A 160m dive was planned for January 9th. My buddy was Andrei Slepnev (ATMX TDI). It was a great experience diving on Baikal.

Dive site "Baranchiki"

One of vertical walls descended more than 120m. Approximate visibility was 50m (when I had dived there ten days earlier). The water was nearly frozen; sludge ice ran all along the Circum-Baikal Railway.

The plan. The dive boat came to the edge of the drop-off. There have been many dives taking place here before. The wall is about 30m away from the shore.

Andrei and I went into the water and moved away from the wall along the surface. The sheer wall was in sight. We descened together to 100m where Andrei would stay. His bottom time would be ten minutes. His other task was to keep spare decompression

Talk about freezing temperatures! Air tanks covered in ice lay on deck

gasses.

Leaving Andrei I kept descending until I reached 160 meters. I spent one minute on the bottom and started my ascent. At 100m, I met Andrei again, and we ascended to surface together, moving slightly to the right.

At 16 meters, where there is a gas shift to EAN60, we met the first support team member; if needed, we would give him the used travel gas. He supported us up to the 6m stop. At 6m, we met with the second support member. He was there to monitor how we felt and keep and eye out.

The total time of the dive was 98 minutes.

Support team

The support member on the surface has the responsibility of supervising the entire dive. In case a buoy appears or any unplanned situation occurs, he must send a boat and help get divers back on board. There were two other groups of sport divers on board who dived on their own.

What happened

January 9th, 10 am, our live-aboard headed for the dive site. It was cloudy, relatively warm (-8°C), and Baikal was calm. We came across some smaller isolated ice floes. Water temperature was at the freezing point.

While under way, we were kitting up in a warm lounge, checking everything one more time, and running over the diveplan.

We reached "Baranchiki" at around noon where we anchored without any problems. Visibility was zero. We couldn't see the edge of the drop-off but the echo sounder indicated a depth of 70m.

I went into the water. Meanwhile Andrei had problems with his equipment which delayed him. The edge of the drop-off was all a blur, which meant visibility was no more than 20m. I decided not to wait for Andrei, and having co-ordinated with the support stand-by, I commenced my descent.

I realized that through a spare regulator, at a great speed, my bottom trimix was getting away!

1st minute. Everything was going according to the plan. At 20m, I switched over to the bottom mix. I couldn't see the wall.

3rd minute. At about 80m, there was no daylight left, and I could only see by torch lights. I was outstripping Andrei a lot and hoped he was descending not too far from me. I reached 100m and descended further. No wall was seen. I turned around to look for the wall in the torchlight.

4th minute. 130m. There was the wall, five meters away. I pointed my torch downward along the wall which just seemed to disappear into the abyss. I started to slow my descent.

5th minute. 150m. I was descending slowly. The wall was still five meters away but the bottom wasn't visible yet. Somewhere from underneath me, I caught a glimpse of escaping air. I stopped at once and began surfacing. The depth was 155m. I couldn't understand where it was coming from—some stage tank? The current of gas became very powerful, and I realized that through a spare regulator my bottom trimix was bleeding away — and fast!

A couple of seconds later I started to rise. Subconsciously, I realized that it was probably the left inflator; I automatically turned off the valve and did my best to vent. Simulaneously, between the four stage tanks I was carrying, I found the one with the gas I needed.

7th minute. Depth 125m. I have managed to shut down the valve but it

Heading out towards the drop-off

seemed that all the bottom gas was gone. Finally I found the correct regulator. I hectically switched it over—*what if I mixed up the gases*? The regulator started to free-flow but I didn't pay attention. Now I had a far more serious problem in getting the ascent under control. I couldn't see the wall, so I started surfacing in open water.

While switching over to the travel gas, I lost the venting valve on my dry suit. I was trying to vent the suit and the wing simultaneously. The valve was completely, but it couldn't cope with volumes of expanding air wanting to escape

Run-away ascent

8th-9th minutes. I shot straight up, while trying to stop. It was completely dark around me. At some point, I must have fainted. I couldn't see anything, everything was hazy.

10th minute. I wondered how I managed to come around and keep fighting for life. 35m. It turned out that apparently I have managed to switch over to Trimix 32/20, and it also was at a freezing point. My ascent slowed down.

At 28m, I finally managed to stop. Exhausted, out of breath... Fits of suffocation. There wasn't enough air. I still felt dizzy. I assumed that I got a respiratory form of DCS.

Assessing the situation

There was a wall of small bubbles in front of me coming from the deep. I assessed the situation: Bottom gas was spent; travel 32/20 was nearly spent. There was Trimix 14/50, half of EAN60 and pure oxygen left. I felt awful. I didn't want to go deep down and cover the missed stops.

After the assessment of the speed of coming up and its consequences, I decided to switch over to pure oxygen and go for my ascent. I tried to figure out where the drop-off was and started moving in that supposed direction.

Should have's

I should have ascended to where I had switched over to EAN60, then moved on and switched over to pure oxygen. But I thought that in my situation the sooner I started

At 28m, I finally managed to stop. Exhausted, out of breath... Fits of suffocation. There wasn't enough air. I still felt dizzy.

I tried to figure out where the drop-off was and started moving in its supposed direction.

Cruising through ice pack on Lake Baikal

breathing oxygen, the better. The tank had no nitrogen, so it was supposed to lessen the degree of DCS, which meant to kill me as soon as I surfaced.

After a couple of minutes of breathing oxygen, moving towards the drop-off and coming up, there were no changes in the way I felt—it didn't get worse. I kept on ascending. After four minutes, I appeared on the surface and saw the drop-off. I gave a signal for help and tried to go down again—at least to 3 or 4 meters; I thought I should have decompressed at that depth. After giving it a try, I realized that, physically, it was out of the question.

17th minute. On the surface, I looked around, searching for the boat. It was about 70m away from me. I started waving and calling for help. Fits of suffocation came back, I couldn't feel my legs. I tried relaxing while waiting for help. I was breathing oxygen all the time.

Stand-by's

The hose had burst on the boat; it was impossible to use it. It was then decided to send for the ship *Valeria*, which was moored. However, just five minutes earlier, the recreational divers had gone into the water. In order not to go over their heads when leaving, it was decided to send one of the stand-by's to fetch them.

It took no more than two minutes, since the stand-by was already ready to get into the water. The divers were found by their bubbles and were ushered onto the shore.

The ship headed for me. Twenty minutes after surfacing, help arrived in the form of my buddy who, when realizing that everything had gone wrong, had decompressed as soon as he could and came up to the surface. And help was also provided by the *Valeria* crew. I wasn't able to take off the equipment and get aboard myself, besides, it was better not to move at all. My buddy helped me with the equipment; the *Valeria* crew—in icy water up to their knees—were trying to help Andrei.

Finally, I was lifted up, taken to the cabin, released of the equipment, and given pure oxygen. I'm very grateful to the crew and my buddy for their professionalism and cooperation.

People usually die of severe DCS in such a situation. I survived.

Post decompression

My symptoms included numb legs and a feeling that they'd been whipped by nettles. It finally dawned on me that I was truly saved and safe. People usually die of extensive DCS in such a situation. I survived.

On board, I continued to breath pure oxygen continuously. An immediate call was placed to the pressure chamber of МЧС (Nicola settlement) and the boat headed for Listvyanka.

On my way, I drank about two litres of water. The feeling of suffocation was gone, and I could feel my legs again. Sensitivity to cold appeared. Even a slight temperature fluctuation—like the opening and closing of a cabin door—felt like a burn.

About an hour after getting aboard, I felt extremely tired. Though I didn't feel like sleeping. I didn't observe any other symptoms like aching joints, rash, paralysis, shiver, fever, etc.

When we arrived in Listvyanka, I felt fine, although very tired. We drove to МЧС. It had been three hours since I surfaced. As I felt all right, I didn't feel like undergoing any treatment.

Better be safe than sorry

At the time, the symptoms were exhaustion and a creepy feeling in my legs. It was agreed upon that I would undergo a preventive 30m recompression in the pressure chamber, with one hour exposure and the following two hours decom-

Gennady Misan preparing his equipnment

pression.

At a pressure of 4 bar, the creepiness in my legs was gone, but by 18m, the sensation returned, albeit to a lesser degree. The treatment schedule remained unchanged, however.

After the pressure chamber, I went home and kept on breathing pure oxygen. Around 11pm, the back surface of my thighs and calves got numb. Sensitivity to cold increased. Slight local massage gave some temporary relief. As I could stay physically active, no measures were taken.

On January 10th, I slept all day, but exhaustion went away by the evening. I didn't breathe oxygen that day. The numbness remained.

January 11th was a regular work day. My muscles were numb, but this didn't affect physical activity.

Serious DCS

These kinds of symptoms—suffocation, numbness, weakness—are signs of a serious form of DCS

affecting the central nervous system. The lung form of DCS (that started when I was still underwater) takes place in only two percent of cases. Also, it is a rare thing when all the aforementioned symptoms aren't accompanied by any others.

On January 12th, at 11am, I had a 40-minute long session in the oxygen pressure chamber, at a pressure of 1.8 bar. After that, the numbness decreased. On the same day, a diving expert of МЧС, Valery Chernikh, phoned Boris Nikolayevich Pavlov. Based on the symptoms, I was considered to have a serious form of DCS. A second regime of medical recompression was recommended. Personally, I thought that I didn't have DCS, but just the remaining signs connected with the trauma of soft tissue.

On January 13th, at 11am, there was one more session of oxygen therapy (2 hours at 2 bar). At 8pm, I stopped arguing with my wife and МЧС experts, and went to the МЧС pressure centre. At 11pm, they started medical recompression in the pressure chamber. At 70m, all my symptoms disappeared, but after coming up to 38m, they returned. After consulting the МЧС experts by phone, we moved on to the third regime of recompression. My total time in the pressure chamber was 60 hours and 45 minutes.

After all I completed this program, DCS was completely eliminated. Symptoms connected with the trauma of soft tissues lingered on though. Further treatment included vitamins.

Analyzing what happened

This dive should have been cancelled at the beginning when my buddy was delayed by equipment problems. A version of Murphy's

I didn't do what I always mention at all technical courses: Stop diving if something goes wrong

Lake Baikal is stunning and has an unique beauty

Law says: "If a few misfortunes are to happen, they happen in the most unfavorable order." Thus, in diving we can say, "The greater the preparation for an extreme dive, the less chance it will be aborted, even if it turns out to be a failure."

My total time in the pressure chamber was 60 hours and 45 minutes.

This time, I didn't do what I always mention at all technical courses: Stop diving if something goes wrong.

MI didn't wait for my buddy, and though there was nothing he could really do to help me in that situation, I started diving anyway. Regardless, this dive happened the way it happened. It was unique in its own way—unique in the fact that the diver survived and is quite well.

The reasons why I am still around:

- The dive was short, and there wasn't great saturation.
- I breathed pure oxygen from 28m and continued to do so on the surface until my dive buddy and the *Valeria* crew arrived.
- Although I refused to go deep again to cover the missed stops, it was quite possible that the gases were enough, and they might as well have been brought by support divers on stand-by.
- Professionalism of the dive buddy and the *Valeria* crew in taking off the equipment and getting me onboard, resulted in absolutely no physical work on the my part.
- I continuously breathed pure oxygen on board.
- What is important is that despite a near tragedy, Ididn't lose my sense of self-control and didn't fuss about, or panic.

The issues to mention about this dive are:

- You shouldn't make experimental dives when the water is about to freeze—my second regulator just froze in the very cold water under great pressure, even without being breathed from.
- The dive buddy, a good security team, an understanding ship crew and good ship. They're more than 50 percent of success. I made the mistake of having starting the dive on my own, but my dive buddy, the support divers on stand-by and the crew helped me finish it more or less safely.

There is always a chance to survive. Only those who think and prepare have it. You mustn't give up, you must fight. But you must fight right. Very often concentrated, persistent, unthinking self-rescuing actions lead to death.

Further plans

Baikal is covered with ice during the winter. Deep dives are closed until May. Before, we made trimix dives in port Baikal where it is deep and the water is open even in severe frost. But aforementioned story shows that deep dives at temperature of freezing are too dangerous. Deep diving has been planned in April, in Palau. In May – deep sunken ships in the Baltic. In the end of May, we start Baikal deep water training and will practice diving with buddys. 60-80-100-110-120-130. After that... There is an idea to make a 160m dive in two or in three, and exactly on Circum – Baikal Railway where the bottom can offer you so many interesting things. ■

There is always a chance to survive.