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Valentines

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Edited by
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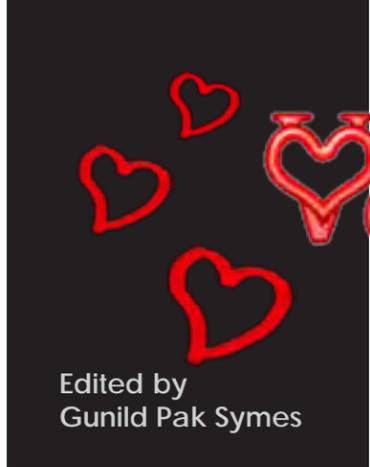
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Biologist, rebreather diver, inventor of Pyle Stops or... database manager

X-RAY MAG catches up with the ever-inventive and contemplative pioneer, Richard Pyle, to find out what makes him tick, insights into his theories, and the stories behind his accomplishments.



Who is Richard Pyle really? A biologist or a rebreather diver?

Excellent question, many people have asked me that. I am definitely a biologist. My whole life I have been interested in fishes, and I don't know why but it always has been that way. I've had an aquarium since I was a little kid, so fishes have always come first. Scuba diving was a tool to get access to fishes. The most exciting part for me is finding new things that nobody ever found before, and I quickly learned that the only way I could go where my Ph.D advisor P.H.Randall hadn't already found a fish was—and he has been all over the world other than down—so I got into deep diving to try to get into a new place and find new kinds of new fishes nobody found before. There is a lot of history there, but I started off with regular scuba, going deeper and deeper and deeper. And I found out the hard way what the problems were. I got a bad case of the bends—you can read

all about it on my website—and then decided not to give up on deep diving but to learn to do it properly. That led me to Bill Stone. I read his article about trimix diving—this was before technical diving became a common term—in 1987. (See Interview with Bill Stone in X-RAY MAG #15). So, I wrote him a little letter and I asked, "How do you do this?" And he then wrote me back and told me, "We do it this way..." So, I learned how to do trimix diving from Bill Stone, and through him, I also learned about rebreathers, as he was already building rebreathers at that time. So, I got into rebreathers through fishes, and if I had to give one of them up, I would give up rebreathers before fishes.

I am definitely a biologist first and a rebreather diver second. But I will say that I get almost as much enjoyment out of thinking about the technical aspects of the diving. I enjoy thinking about rebreathers and technical diving almost as much as thinking about fishes, so every day I change

hats. I have my fish hat and my rebreather hat. They are two very different things to think about, as the topics are very different. I enjoy being able to think about them both.

The reason I ask is that you seem to have not just one, but two claims to fame.

It is actually more, as I have four worlds that I move in—and my family is my fifth world. The four worlds that I travel in are: The saltwater aquarium world—I am actually more known to people in the saltwater aquarium world than any of the other worlds—and I always get invited to give keynote presentations at aquarium meetings, but generally, I have been too busy to do that. The second world is the fish world where I know a lot of people and then, of course, the rebreather and tech world. But there is a completely different world from which I get my pay check, and that is for programming databases. Most of my travelling goes to

A talk with Richard Pyle

What is the "Twilight Zone"?

In this context, the coral-reef Twilight Zone is roughly defined as coral-reef habitat at depths between about 200 feet (60 meters) and 500 feet (150 meters).

The upper limit represents the approximate maximum depth to which stony corals tend to dominate the reef structure, and the lower limit represents the maximum depth at which significant photosynthesis occurs (the maximum depth to which the living coral reef extends).

The reason the coral-reef Twilight Zone is shallower than the open-ocean Twilight Zone stems mostly from the difference in water clarity between the two habitats.

In the open ocean, the crystal-clear water allows sunlight to penetrate considerably deeper than around coral reefs, where the water is often teeming with plankton.

Therefore, the biologically important transition zone between light and dark exists at somewhat shallower depths around coral reefs. ■

Divers on scuba have mostly explored reefs down to 60m

The "Twilight Zone"

We may know more about the ocean floor than we know about the coral-reef Twilight Zone

Submersibles have mostly explored depths below 150m

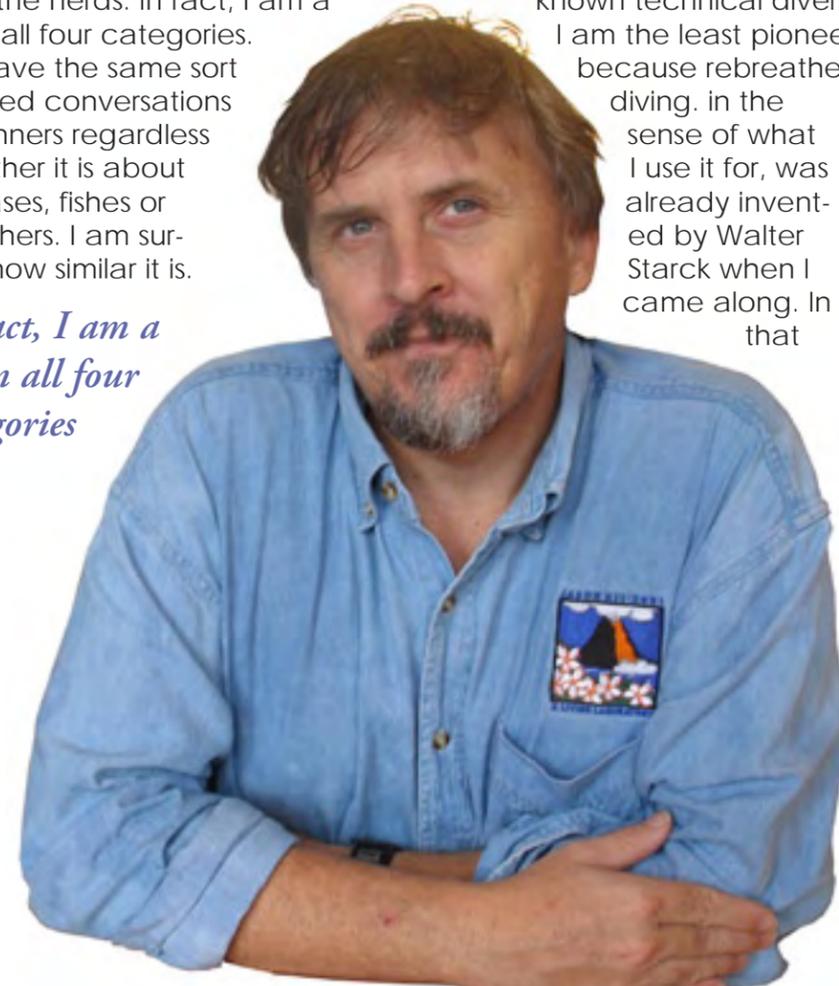


meetings to discuss standards for computer databases, so we can exchange data about biological diversity from different computers around the world. I am changing between all these hats all the time and between all these different groups of people. A lot of times, I joke about...you know what a nerd or geek is, someone who is too much into something ... I have found that in those worlds there are geeks in every one of them. Some are science nerds about the fish, and some are dive nerds.

There are different sorts of geniuses?

The funny thing is that across the topics, they all have the same characteristics, and I am one of the nerds. In fact, I am a nerd in all four categories. I can have the same sort of excited conversations over dinners regardless of whether it is about databases, fishes or rebreathers. I am surprised how similar it is.

In fact, I am a nerd in all four categories

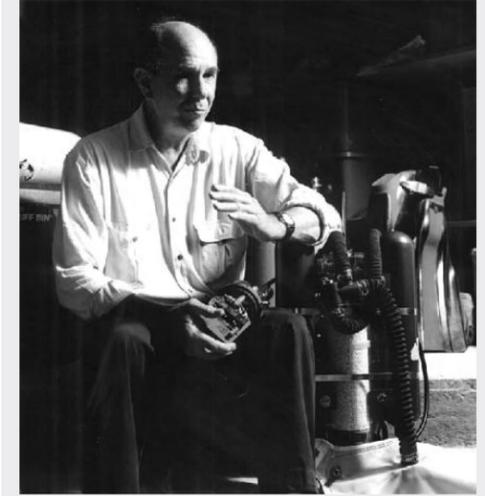


Richard Pyle

But you are the one that is widely credited with coining the term—or in some way being synonymous with—"The Twilight Zone"

It actually started out with Walter Starck who I think got credit for recognizing that this depth zone, however we want to define it, say from 50 to 150 meters, is awaiting to be explored. (Scubadivers can rarely go beyond 40m and submersibles rarely operate shallower than 150m – ed.). Walter Starck, aside from his fame as a photographer, his most significant contribution was to build the very first electronically controlled rebreather, the Electrolung. He invented this rebreather to do what I do, to find new fishes on the deeper coral reefs but this was back in the 1960's. Of all the

known technical divers, I am the least pioneer because rebreather diving, in the sense of what I use it for, was already invented by Walter Starck when I came along. In that



Dr. Walter Starck is one of the pioneers in the scientific investigation of coral reefs. He grew up in the Florida Keys and received a PhD in marine science from the University of Miami in 1964. He has over 40 years worldwide experience in reef studies, and his work has encompassed the discovery of much of the basic nature of reef biology. In this process, over 100 species of fishes, which were new to science, were found as well as numerous corals, shells, crustaceans and other new discoveries.

In the early 1960s, he began the first extensive exploration of coral reefs at night.

In conjunction with this work, he was among the first to adapt and use SLR cameras and electronic flash underwater. This, in turn, enabled the first underwater macro photography. In 1964, he developed the optical dome port now used universally for wide-angle underwater photography.

In 1968, he developed the Electrolung—the first electronically regulated, closed circuit, mixed gas scuba. With the Electrolung, Dr Starck began exploring the deep reefs beyond the frontiers of compressed air diving, and many exciting new discoveries resulted. ■

SOURCE: WWW.GOLDENDOLPHIN.COM

Bio

Dr. Richard Pyle was born and raised in Hawaii, where he caught an interest for fish from a very early age. He set up his first aquarium when he was five years old, and started scuba diving when he was 13. By the age of 19, he lived in Palau where his passion for discovering new fishes lured him into deep water, resulting in a crippling case of decompression sickness while diving with world-renown ichthyologist John "Jack" Randall. Jack then offered him a job in the fish collection of the Bernice P. Bishop Museum in Honolulu, where Richard continues to work.

Determined to continue exploring the coral reef "Twilight Zone" in a safe and responsible way, Pyle was among the pioneers of modern Technical Diving in the late 1980s. In 1994, he was a test-diver for the prototype Cis-Lunar MK-4 closed-circuit rebreather, and travelled the Pacific in search of new species of fishes on deep coral reefs—which he and his colleagues are discovering at a rate of 11 new species per hour of bottom time. Recently, he has acted as consultant for Poseidon in developing the new Cis-Lunar Mk VI, which will be marketed in 2008.

Richard has authored over a hundred scientific, technical and popular articles and has been featured in dozens of documentary films (including the IMAX film, *Coral-Reef Adventure*). He was a founding member of the Board of Directors for the Association for Marine Exploration—a non-profit organization dedicated to conducting innovative scientific exploration using advanced diving equipment and techniques. In 2004, he was selected by Esquire magazine for the "Best and Brightest" issue, and was also recipient of the "Genius Award" from General Electric which helped support his research. In 2005, he was awarded the NOGI award—coincidentally, simultaneously with another X-RAY MAG interviewee, Bob Evans.

■ SOURCES: BISHOP MUSEUM

respect, I am just a late comer. There was also another guy, Pat Colin, who was a bit later than Walter Starck and was also inspired by him. He also built his own rebreather to go down to the deep reef zones, so I am not the first, by a long shot.

But I seem to be the lucky one who was around when technology was finally ready to do this. Walter invented his own technology, but at that time, they even had to make their own oxygen sensors. They built them themselves from scratch, whereas, I can just go order them from Teledyne or whoever. I was lucky in being 20 or 30 years later, because now I have access to technology that they didn't. I don't think that I was the first person to use the term "Twilight Zone" either. Walter Starck wrote an article, I think it was in 1972, in National Geographic where

I was lucky in being 20 or 30 years later because now I have access to technology that they didn't.

he used the phrase about all the discoveries awaiting to be done in the twilight zone. He was probably the first, and then I started applying that term, and then I started talking about it. But then biologists got angry with me, because that term already applies to something in the middle of the ocean, about a 1000 meters deep, and in the cave world, it means something else. So, it is a little overused. I then started calling it deep coral reefs, but then they discovered these coral reefs a 1000m deep. So, now I don't know what to call that zone that I am working in. It is the "coral twilight zone" or what? I don't know, but that is the area that I am interested in.

But what is so special about this zone in a biological sense?

Two things are special about

it. One, is that we know so little about it, about the species and about the interactions that go on there. The other thing is that it is a transition zone. One environment where the coral reef meets another environment, the open ocean, and this zone is the bridge between the two, and very interesting things happen.

While you may think that it is a mix of species from above and from below, it is actually a completely new set of species.

The coral reef is clear, obviously a sunlight driven ecosystem where the energy comes from the sun and is passed on through the algae, into herbivores, etc. But once you get below the light zone, you only find scavengers and carnivores that rely on energy from elsewhere.

But my zone represents that area where one system transforms into the other. And one of the things that is most surprising that we have found is that while you may think that it is a mix of species from above and from below, it is actually a completely new set of species. This zone is unique at the species level, and there are lots of new species there. But every species we find is somehow related to the shallow reefs rather than the deep ocean. The big question we had in the beginning is whether the zone was mostly like the shallow ecosystems or the deeper ones, and it is definitely mostly like the shallower systems, except that we almost

Deep Stops = Pyle Stops

Deep stops seems to be the latest buzz-word when it comes to promoting the latest models of dive computers. Deep stops allow you to complete your safety stops at depth. The amount of stops needed, as well as the depth at which they are required, depends on the maximum depth reached during the dive.

But Deep Stops are not all that new and were in fact discovered by Richard Pyle by coincidence—hence the alias *Pyle Stops*—as he started noticing that he was much less fatigued after deep dives if he had taken some breaks in the decent.

A "Pyle stop" is an additional short deep-water stop, which is increasingly used in deep diving. Typically, a Pyle stop is two minutes long, and at the depth where the pressure change halves on an ascent from the bottom to a shallow water decompression stop. For example, on an ascent from a maximum depth of 60 metres 7 bar to a decompression stop at 20 metres 3 bar, the Pyle stop would take place at the halfway pressure, which is 5 bar at 40 metres.



This is an excerpt from an article Richard Pyle wrote 10 years ago:

Back before the concept of "technical diving" existed, I used to do more dives to depths of 180-220 feet than I care to remember. Because of the tremendous sample size of dives, I eventually began to notice a few patterns. Quite frequently after these dives, I would feel some level of fatigue or malaise. It was clear that these post-dive symptoms had more to do with inert-gas loading than with physical exertion or thermal exposure, because the symptoms would generally be much more severe after spending less than an hour in the water for a 200-foot dive than they would after spending four to six hours at much shallower depths.

The interesting thing was that these symptoms were not terribly consistent. Sometimes I hardly felt any symptoms at all.

At other times, I would be so sleepy after a dive that I would find it difficult to stay awake on the drive home. I tried to correlate the severity of the symptoms with a wide variety of factors, such ▶

Modern dive computers now incorporate Deep Stops in their decompression models. Suunto (D6 is shown) is one of the most prominent proponents

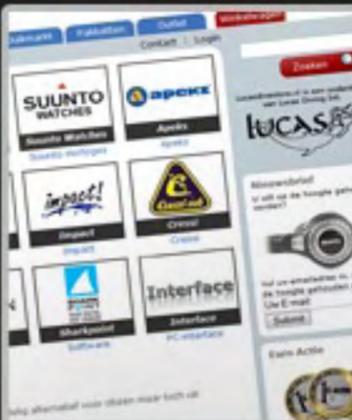
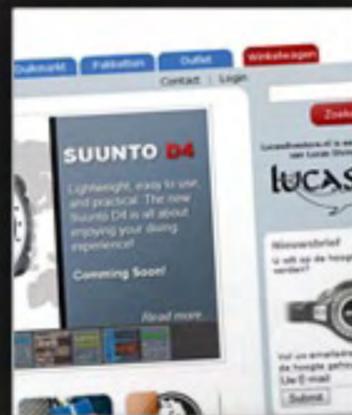




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The interesting thing was that these symptoms were not terribly consistent. Sometimes I hardly felt any symptoms at all.

only found new species. Not all was new, but many. What is interesting from an ecological perspective is the transition from one habitat to another and, from a species viewpoint, the fact that everything within the zone is unique.

Is it just the species' composition?

It is a bit of both. In fact, you find hardly any herbivores down there, which makes sense as there are not many algae down there. You find a lot of omnivores, wrasses for example, fishes that will eat almost everything, and there are a lot of those. You'll find planktivores, fish that eat plankton, like damselfishes and anthias, for example. The fishes you find there are the ones most adapted to just surviving. So, it is a little of both.

Do you have any pet theories?

I have one that we stumbled upon. It is possibly a little complicated to communicate, but I give it a try. I don't know if you know that in the tropical Pacific, the most diversity you'll find is in the western parts, around Indonesia. And as you move away from there, there are less and less species. And this holds true for fishes, crabs and corals and what not. Whatever you look at, the pattern is the same. So, for example, in the Indonesia-Philippines region, you have about 2500 species of coral reef fishes. In Palau, you have about 1500. In Fiji, you have around 1000, and Hawaii about 500. In Easter Island, they have about 100... so, fewer and species as you go. And this pattern is so consistent among all these organisms. There is a lot of scientific discussion going on about what causes that pattern, and there are two main ideas. One, is that species evolved along the periphery of the Pacific and accumulated in this area as they, over time, migrated and that is why you, in this area, have this mixing of species from all over the place. That is why there are so many here.

Richard Pyle

as the magnitude of the exposure, the amount of extra time I spent on the ten-foot decompression stop, the strength of the current, the clarity of the water, the water temperature, how much sleep I had the night before, the level of dehydration...you name it...but none of these obvious factors seemed to have anything to do with it. Finally, I figured out what it was—fish! Yup, that's right... On dives when I collected fish, I had hardly any post-dive

Finally I figured out what it was—fish!

Yup, that's right... On dives when I collected fish, I had hardly any post-dive fatigue.

fatigue. On dives when I did not catch anything, the symptoms would tend to be quite strong. I was actually quite amazed by how consistent this correlation was.

The problem, though, was that it didn't make any sense. Why would these symptoms have anything to do with catching fish? In fact, I would expect more severe symptoms after fish-collecting dives because my level of exertion while on the bottom during those dives tended to be greater (chasing fish isn't always easy).

There was one other difference, though. You see, most fishes have a gas-filled internal organ called a

"swimbladder"—basically a fish buoyancy compensator. If a fish is brought straight to the surface from 200 feet, its swimbladder would expand to about seven times its original size and crush the other organs. Because I generally wanted to keep the fishes I collected alive, I would need to stop at some point during the ascent and temporarily insert a hypodermic needle into their swimbladders, venting off the excess gas.

Typically, the depth at which I needed to do this was much deeper than my first required decompression stop. For example, on an average 200-foot dive, my first decompression stop would usually be somewhere in the neighborhood of 50 feet, but the depth I needed to stop for the fish would be around 125 feet.▶

Not being a person who enjoyed confrontation, I kept quiet about my practice of including these “deep decompression stops”.

The other theory is that species evolve in a hotspot—in the middle and radiate outward. And the farther you get from that hotspot, the fewer species you find because of the distance. Both of these mechanisms, which the scientific community are arguing about all the time, are operating at evolutionary timescales—in other words, at least hundreds of thousands or millions of years. So, they are thinking of it in terms of biology.

But we found cue patterns that we didn't expect on deep coral reefs as compared to shallow reefs. The first pattern we found is that there is a higher rate of endemism here. So, if you go to a particular island and go down deep, you'll find that 70 percent of the species are only found at that island. On the other hand, if you go shallow, perhaps only ten percent of the species are endemic. The deeper you go, the more unique the species are to that one island, which is strange, and we did not know why this would be. The second pattern is, if you go to say Fiji and

Endemism is the ecological state of being unique to a place. Endemic species are not naturally found elsewhere. The place must be a discrete geographical unit, such as an island, habitat type, or other defined area or zone.

dive in 15m and then looked at Cook island also at 15m, the difference is huge. Fiji has thousands of species, Cook island a few hundred. It is a completely different diversity. But if you go down to 100m instead, then the islands look comparable. There is no more diversity in one place than in the other. So, this pattern of high diversity versus low diversity seems to only apply in the shallow areas.



NASA Astronaut image of Astove Island (Aldabra Group, Seychelles) in the Indian Ocean

So, it is almost like the ocean is layered?

Yes, so it appears. And that makes you think, what is it about the deep reef fishes that 1) makes them unique to each island and 2) makes them no more diverse in the Western Pacific than in the Eastern Pacific? We started the deep reef stuff in the Cook islands—which is low diversity—and we found all these new species and thought, “Wow! If we go over to the Western Pacific where the diversity is higher, we are going to find five times as many new species down deep

because it is more diverse.” But once we got there, we did find new species but in no greater numbers than we found on Cook. We thought that this was strange, and it was perhaps because we were just not in the right place. But as we went on to visit more and more locations, we found that the emerging pattern was the same—new species, but not a greater number of new species over there than here.

So, here is my pet theory about this: It occurred to me that the sea level goes up and down every hundred thousand years with the cycles of ice ages and glaciation. How much does it go up and down? About a hundred meters. Where is the break between shallow and deep reef fishes? About a hundred meters.

What I think happens is that every hundred thousand years, the sea level drops, and the species of the shallow reefs die out because all the shallow habitats, the

lagoons, the fringing reefs, all of that disappears. Because when you look at an atoll, they come up straight to the surface and are flat on the top. And if you dropped the sea level a hundred meters the island just sticks out of the water it just doesn't erode away. So, when the sea level is high like it is now, you have a lagoon and all of these habitats up shallow. When the sea level then drops again, these habitats dry out, and all the species on the oceanic island's shallow reefs may die out. But if you go to the Western Pacific, which lies on the continental shelf, a shallow

So, whenever I collected fish, my ascent profile would include an extra 2-3 minute stop much deeper than my first “required” decompression stop. Unfortunately, this didn't make any sense either. When you think only in terms of dissolved gas tensions in blood and tissues (as virtually all decompression algorithms in use today do), you would expect more decompression problems with the included deep stops because more time is spent at a greater depth.

As someone who tends to have more faith in what actually happens in the real world than what should happen according to the theoretical world, I decided to start including the deep stops on all of my decompression dives, whether or not I collected fish. Guess what? My symptoms of fatigue virtually disappeared altogether! It was nothing short of amazing! I mean I actually started getting some work done during the afternoons and evenings of days when I did a morning deep dive.

I started telling people about my amazing discovery, but was invariably met with skepticism, and sometimes stern lectures from “experts” about how this must be wrong. “Obviously,” they would tell me, “you should get out of deep water as quickly as possible to minimize additional gas loading.” Not being a person who enjoyed confrontation, I kept quiet about my practice of including these “deep decompression stops”.

As the years passed, I became more and more convinced of the value of these deep stops for reducing the probability of decompression sickness (DCS). In all cases where I had some sort of



Technical Diver doing a deep decompression stop

post-dive symptoms, ranging from fatigue to shoulder pain to quadriplegia in one case, it was on a dive where I omitted the deep decompression stops.

Here is my method for incorporating deep safety stops:

- 1) Calculate a decompression profile for the dive you wish to do, using whatever software you normally use.
- 2) Take the distance between the bottom portion of the dive (at the time you begin your ascent) and the first “required” decompression stop, and find the midpoint. You can use the ambient pressure midpoint if you want, but for most dives in the “technical” diving range, the linear distance midpoint will be close enough and is easier to calculate. This depth will be your first deep safety stop, and the stop should be about 2-3 minutes in duration.
- 3) Re-calculate the decompression profile by including the deep safety stop in the profile (most software will allow for multi-level profile calculations).
- 4) If the distance between your first deep safety stop and your first “required” stop is greater than 30 feet, then add a second deep safety stop at the midpoint between the first deep safety stop and the first required stop.
- 5) Repeat as necessary until there are less than 30 feet between your last deep safety stop and the first required safety stop.

— Richard Pyle ■

GRAPHIC BASED ON PHOTO BY AARON P. - VIA FLICKR

profile



Depth profiles (left) over the Pacific show that the archipelagoes of Indonesia, Malaysia and Philippines sit on the shallower continental shelf. If compared to a chart of biodiversity (above) the high biodiversity on the shallow reefs correlates with these areas

plateau, you don't have all these islands just sticking up from the deep bottom. When the sea level drops here, all what happens is that you move the habitats down a slope, so you don't destroy them. Whereas, in the Eastern Pacific, they die. However, if you go down deep, the fishes are already living along a vertical habitat, the wall, so if the sea level changes the fishes just move up and down with it, nothing really changes. That means that the deep fishes don't get wiped out every hundred thousand years or so. If this model is true, the shallow reefs gets wiped clean every time the sea level goes through a cycle, except in the Western Pacific—where the deep fishes don't get wiped out. They survive for many hundreds of thousands of years or millions of years, and therefore, have the time to become unique new species, because they are isolated there.

The species in the shallows, on the other hand, are never there long enough to become new species. Instead, what happens when the water comes back, the shallow reefs are repopulated from the Western Pacific. So, the idea is, that it is not evolutionary time scales that creates this pattern, but ecological. You wipe it out, you fill it out, you re-populate it—over and over again. Down deep, it just goes up and down, up and down.

This hypothesis would be predict two things: One, that there are more endemic species on these islands because they would have more time to become endemic; and two, you wouldn't expect the same pattern in the east and the west. And what do we find? Exactly that pattern. So, it is a very complicated equation. I presented this idea at a meeting in Taiwan a couple of years ago,

which was full of these people arguing about the two theories, and amidst all their bickering, they all became quiet.

Can't this be settled somehow?

Yes, and it is going to be. The only way you settle it is to contrast the shallow reef fishes to the deep fishes. If there were no deep reef fishes, you couldn't settle it—even with DNA techniques. But since the deep fishes are higher endemics, and the shallower species are more connected to the Western Pacific, that means that they came from there—while the deeper ones have been there all the time. The shallow ones have been recolonising, whereas the deep ones were unique there. That is what we have a grant proposal submitted to do—to investigate this phenomenon. We just have to have more preliminary data to support to the applica-

tion. and I expect that there will be no problems, as the question is both exciting, interesting and important.

Well, I get excited and interested and ask myself, what I am doing on a dive magazine?

It all comes back to the nerd thing. You are also a biologist and understand. But usually, when I explain this to the dive nerds, they just go, "Uh... Okay—if you say so."

Richard Pyle

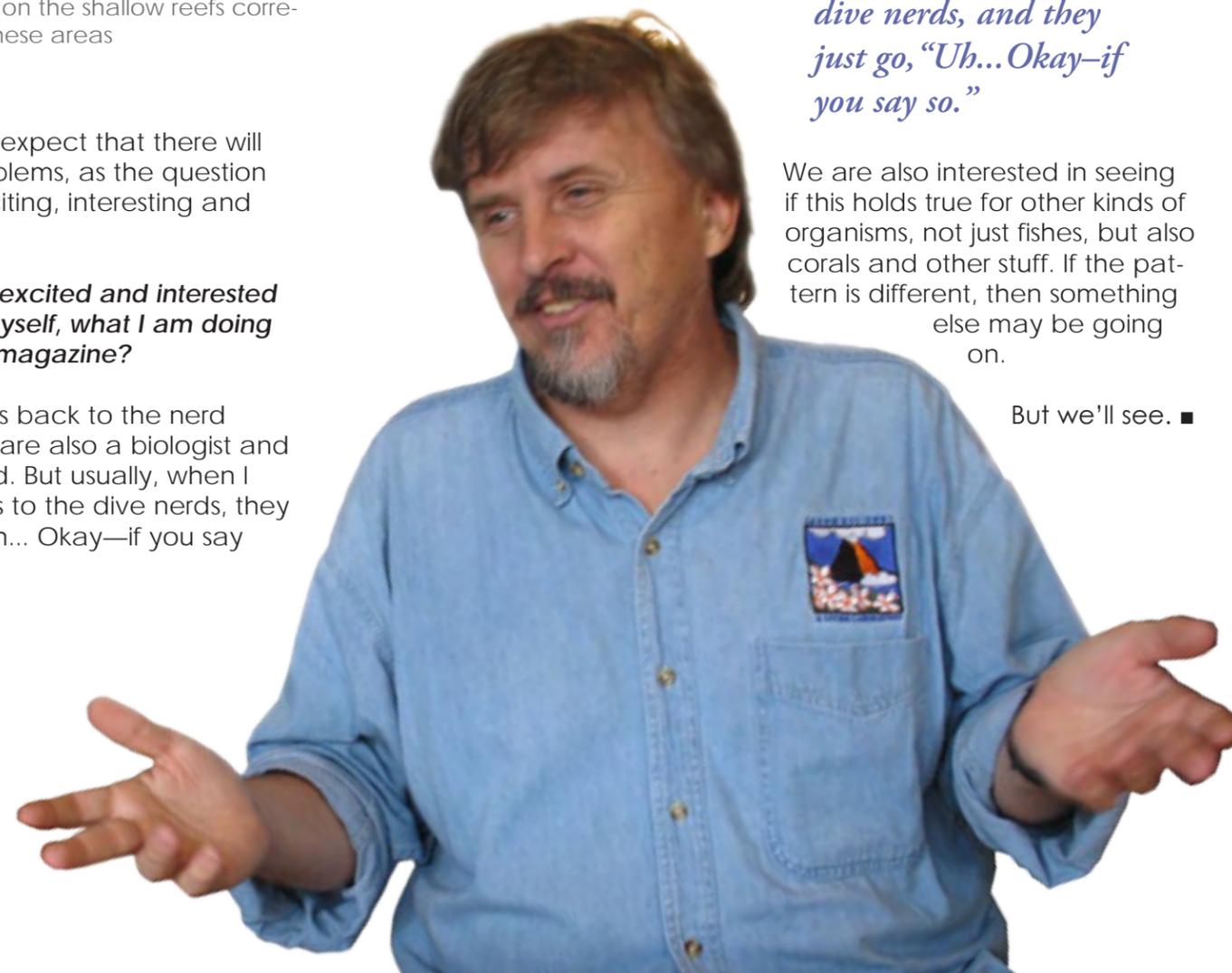
Richard Pyle was instrumental in developing the original Cis-Lunar CCR rebreathers into an useful tool for researchers in the 1980s. Two decades later, his experiences were put to use by Poseidon, who had acquired the Cis-Lunar brand, in developing the new CCR for sports-divers that is being launched on the worldwide market in 2008

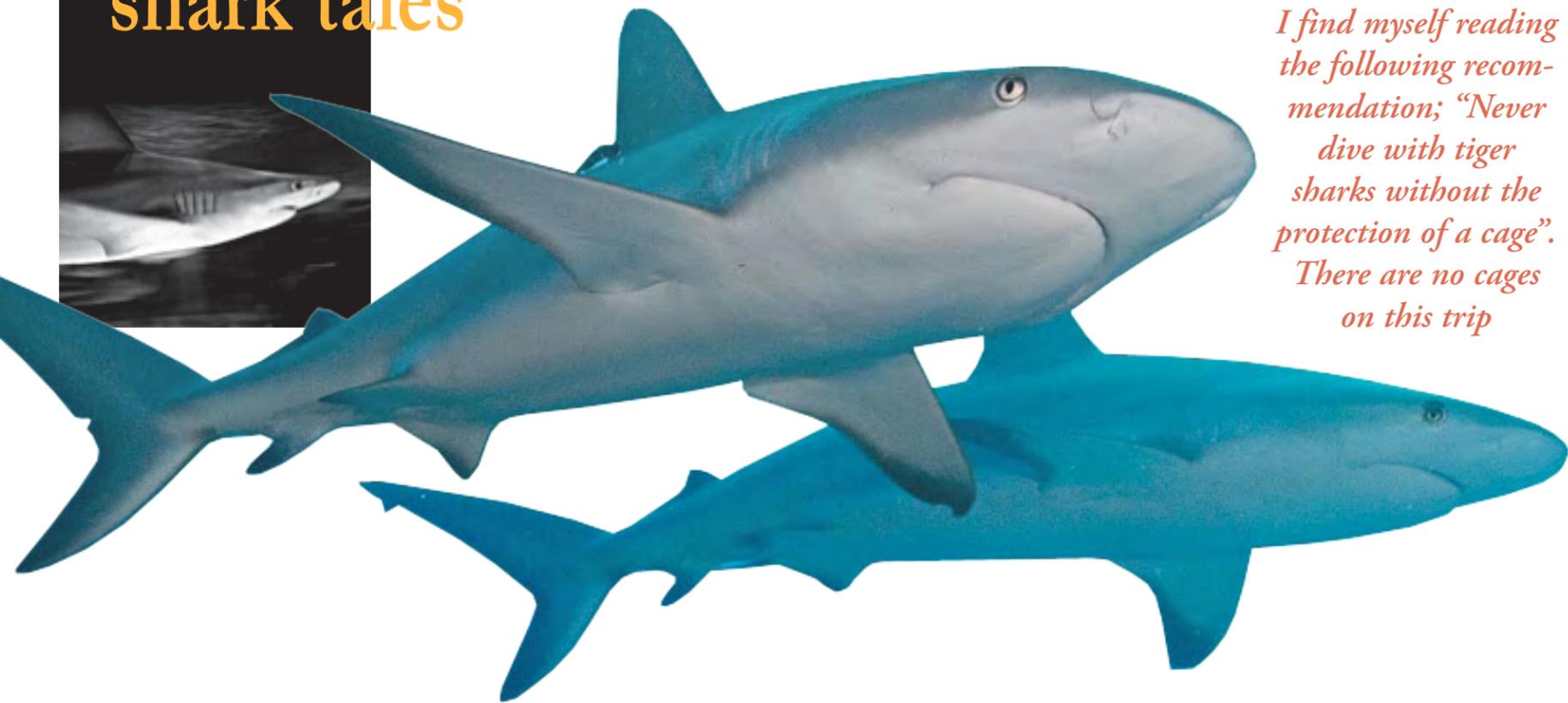


I explain this to the dive nerds, and they just go, "Uh... Okay—if you say so."

We are also interested in seeing if this holds true for other kinds of organisms, not just fishes, but also corals and other stuff. If the pattern is different, then something else may be going on.

But we'll see. ■





I find myself reading the following recommendation; “Never dive with tiger sharks without the protection of a cage”. There are no cages on this trip

Spring 2006, I was sitting behind my desk as I was surfing the internet. A review about a shark expedition in the Bahamas drew my attention. The pictures that accompanied the article were very impressive. I had always dreamt about diving amongst sharks. My enthusiasm took control over me, and ten minutes later, I had booked the trip.

That night I lied awake. *What had I done?* What would my impulsive act bring? I wondered what species of sharks I’d meet and whether the trip would be safe. I spent the rest of the week searching the internet for information. The main target of the expedition was spotting tiger sharks and great hammerhead sharks. I Googled the first species, the tiger sharks, and I found myself reading the following recommendation: “Never dive with tiger sharks without the protection of a cage.” There were no cages on this trip.

One year later, I was heading for the Bahamas from West Palm Beach, Florida, on the vessel *M/V Shearwater*. The expe-

dition was started, and I must admit that the word *expedition* was rightly chosen. The vessel was very small, and it took a lot of effort to get everyone with their luggage on board.

Because of the size of the vessel and its shallowness in the water, one felt every movement of the sea. The weather was bad, and we faced an impetuous night crossing. As I stood on the rear deck staring at the horizon, I felt sick. On top of that, I was pretty nervous for what the next week would bring. Was it wise of me to book this trip? Maybe I was just a bit tense because of the challenging week I was about to experience.



Shark expedition off the Bahamas **Lemon snapping**



Never look longer than 5 seconds through the viewfinder of your camera and immediately search the area in a 360 degree angle to be absolutely sure no Tiger shark is surprising you.



Sharks Tales

to hold the tube vertically in front of themselves.

Photographers could, of course, use their camera to protect themselves from curious Tiger sharks.

Finally, we received one very important instruction: never look longer than five seconds through the viewfinder of your camera and immediately search the area in a 360 degree angle to be absolutely sure no Tiger shark is surprising you.



According to Abernathy the present sharks in these waters are not dangerous to humans. There is one exception and that's the tiger shark. Whenever a tiger shark is near it's very important that the divers work together as a team

Tiger shark grabs camera

I was sitting on the vessel's diving platform for my first dive, and I could see lots of Caribbean reef sharks in the water beneath me. Before entering the water, I had to think twice.

During the dive Reef sharks were circling around the divers. They were making movements towards the so-called bait boxes —boxes with fish remains meant to attract the sharks.

I was beginning to deal with my fears and actually started enjoying diving among the sharks.

When the third dive was about to start, I was the first diver in the water. At first, I was a bit cautious, but then I let the sharks approach me at short range in order to take



Safety

After dealing with the formalities at the customs in West End, Jim Abernathy, owner of Abernathy's Scuba Adventures (JASA), provided us with a thorough briefing.

Jim informed us how to act as a group in the presence of sharks. "Safety first" was his statement, and anyone ignoring the safety rules would receive a warning. A second warning would mean immediate and absolute exclusion from the trip.

Our diving gear and its details were not allowed to be finished in bright colors. We were obliged to wear gloves because white hands can be mistaken for fish by sharks. A shark could "accidentally" bite a diver.

We were instructed to slide cautiously into the water and immediately descend to the bottom of the sea. Leaving the water should also be done quickly as the greatest danger for the diver is on the surface. Tiger sharks often attack

their prey, for example turtles, when breathing for air on the surface. For this reason, snorkeling was not an option this trip.

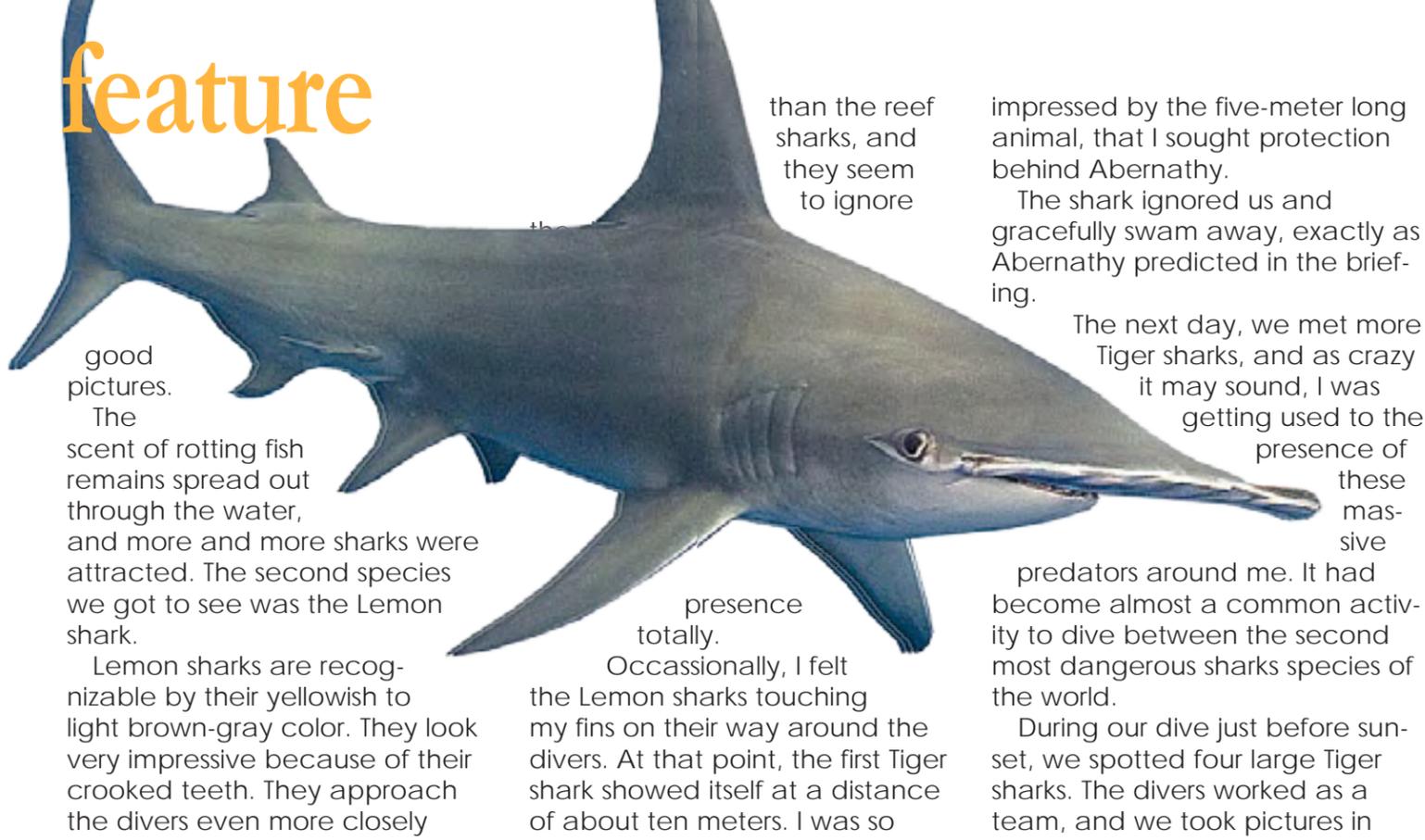
According to Abernathy, the sharks present in these waters were not dangerous to humans. There was one exception, and that was the tiger shark.

Whenever a tiger shark is near it's very important that the divers work together as a team. Divers should point out the shark to each other so that every diver could turn towards the direction of the predator.

Tiger sharks will approach anything they meet, and everything of interest to them would be investigated with their noses. When the shark realizes that the object is not edible, it will continue on its way.

A safety precaution is, therefore, to hold an object between yourself and the shark. Jim Abernathy provides everyone with a PVC tube about one meter in length. The divers are obliged





good pictures.

The scent of rotting fish remains spread out through the water, and more and more sharks were attracted. The second species we got to see was the Lemon shark.

Lemon sharks are recognizable by their yellowish to light brown-gray color. They look very impressive because of their crooked teeth. They approach the divers even more closely

than the reef sharks, and they seem to ignore

impressed by the five-meter long animal, that I sought protection behind Abernathy. The shark ignored us and gracefully swam away, exactly as Abernathy predicted in the briefing.

The next day, we met more Tiger sharks, and as crazy it may sound, I was getting used to the

presence of these massive

predators around me. It had become almost a common activity to dive between the second most dangerous sharks species of the world.

During our dive just before sunset, we spotted four large Tiger sharks. The divers worked as a team, and we took pictures in

presence totally.

Occasionally, I felt the Lemon sharks touching my fins on their way around the divers. At that point, the first Tiger shark showed itself at a distance of about ten meters. I was so

turns.

At a certain moment, one of the divers was approached by a shark from behind. The diver didn't see the shark, because he looked through his camera too long.

Abernathy took action. He pushed the shark away using his camera, but the shark was not amused. The shark opened its enormous mouth, grabbed the camera and aggressively swam away with it.

I felt very uncomfortable with the situation and again wondered why I was so keen on making this trip. Fortunately, the shark dropped the camera before disappearing into the depths of the sea.

"Are you crazy?"

Back on board, Abernathy asks whether anyone managed to take pictures of the frightening scene. "Are you crazy?" I asked the man.

But that night, I found out that one crazy person had taken pictures, and that crazy person happened to be me.

We talked a lot that night about what happened, and, more importantly, how a scene like that is to be prevented. I become more and more aware that we were dealing with lethal predators. I realized that one must not think lightly about it, and I felt forced to sharpen the safety precautions.

Supermodel

The next day, we dived at Tiger beach. According to its name, one would expect a beach, but there is none. During the expedition we only saw one island,

The shark opens its enormous mouth, grabs the camera and aggressively swims away with it. Fortunately the shark drops the camera before disappearing into the depth of the sea.



As crazy it may sound, I'm getting used to the presence of these massive predators around me



Do White Sharks Lurk In the Waters Around Britain?

A mutilated gray seal found washed up on a lifeboat slipway in Norfolk, England, may have been attacked by a great white shark.

Lifeboatman, Chris Taylor, who has a biology degree and studied sharks and found the seal's body in Sheringham, told BBC News that the wound to the seal bears all the hallmarks of a great white attack. "The bite measures over a foot (0.3m) across, so I don't know what else could have taken a chunk of this size. Seals hit by boat propellers have a zipper-like pattern across the top of the neck, because they don't swim upside down—but this seal was hit from below, which is how sharks attack their prey," he said.

Mr Taylor sent photographs of the carcass to Dr Ken Collins, of the National Oceanography Centre, Southampton, who confirmed that the injury is indeed consistent with the bite from a great white shark. ■

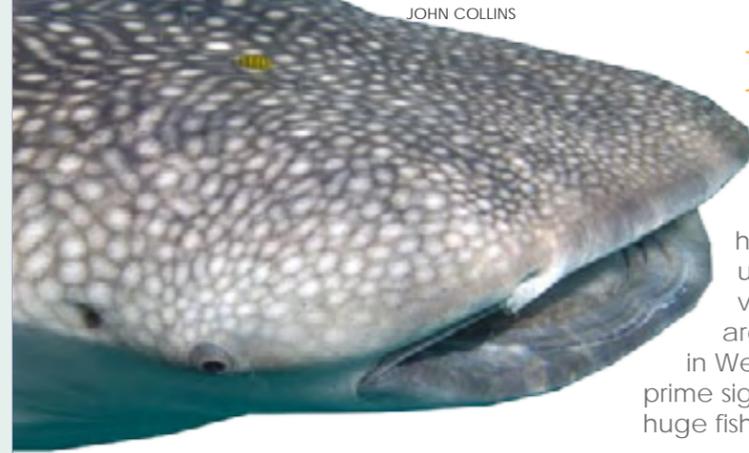
Great White Shark Tracked Over 3000km

A great white shark's record-breaking swim between New Zealand and Australia could be far more impressive than previously thought.

The 4.4m shark, nicknamed Kerri, started its journey at Stewart Island in March with an electronic tag attached to its dorsal fin. The tag recently showed up 3000km away, near the Great Barrier Reef. The journey is the longest ever recorded by a shark from New Zealand.

But Department of Conservation scientist Clinton Duffy said it could have been thousands of kilometres longer. "I would say it's unlikely it would have been a direct route with her being at large for nine months. She could have been all over the place."

Duffy said sharks were known to travel up to 1000km a week. ■



JOHN COLLINS

which was uninhabited. Sunbathing and relaxing under palm trees is not what this trip was about.

Tiger Beach is a dive spot with a shallow sandy bottom. Depending on the tide, we would dive to a depth of three to five meters. There are a huge amount of Tiger sharks in this spot, and we got to meet one of them—Emma, a six-meter long Tiger shark. She is called a supermodel because of her graceful movements in the water.

Lemon snapping

Between two dives, Abernathy suggests we'll go "lemon snapping". Ten surprised guests on board stare at the captain because no one knows the meaning of this word.

It turns out that the crew attracts the Lemon sharks with bait towards the rear end of the boat. The sharks will snap at the bait, and at that point, we get the opportunity to take pictures of the wide open mouths of the sharks. To do so we have to hold our cameras half under the surface and take shots at random hoping for the best.

Big bang

It was not so easy to take pictures on a rocking boat with snapping sharks at my feet. It certainly provided me with a lot of adrenalin, which was rushing through my veins!

But the activity was absolutely safe, according to the crew. At a certain moment, I heard a loud bang, and I real-

ized that a Lemon shark had bitten into the domeport of my underwater housing.

Fortunately, the domeport is made of an acrylic material. What remained was a big scratch mark—a souvenir—and an image I had always dreamed of taking.

During the last part of the expedition, we searched for the Great Hammerhead shark and the Bull shark. The Great

Hammerhead is a very shy animal, and it will not show itself easily to us.

End of the Map

We were heading for a place called, The End of the Map. Again, we dived a spot with a sandy bottom, but this time, we dived to a depth of 23 meters. Upon descending, we immediately spot the first Bull sharks. They can be recognized by their strong, muscular bodies.

Tiger sharks are not to be missed, and a large one was swimming right towards me. I could feel my heart pounding in my throat. The shark hit the port of my camera with his nose, and I made a turn following the movement of the shark.

I had to make three turns with the shark striking my camera with its nose before the shark continued on its way. Abernathy made clear that I acted in the right way.

No time to relax

I had no time to relax, because a bit after this adventure, I heard someone shouting through his regulator. I thought I could hear the word *Hammerhead*. When I turned around, I saw my first

Have we met before? You look familiar

Facial recognition software used in forensic science has now been put to use to identify individual whale sharks around Ningaloo Reef in Western Australia, a prime sighting area for these huge fish.

Using thousands of photos submitted by researchers and others, Bradley Norman of Murdoch University in Perth managed to adapt software originally developed for telescopes to recognize patterns of stars and other celestial objects to identify individual sharks.

In a paper to be published this month in the journal, *Ecological Applications*, the researchers report repeated sightings of many individual sharks from year to year, suggesting that the shark population, in that part of the ocean at least, is healthy. ■

Great Hammerhead ever!

This shark moved in a very different way than all the other sharks I had ever dived with. The movement started at the head and then the body followed. I was very impressed by this animal.

I had always wanted to see Great Hammerheads, and had never managed to actually see them. This moment made me a very happy diver!

Later that day, we balanced behind the boat for our safety stop, and three Hammerheads came to take a look at me and my buddy.

When holding your breath, they approach you at short range, but the slightest movement makes them disappear as quickly as they had arrived.

Because the sharks swim just under the surface, we needed not worry about our decompression time. We dived in two groups taking turns every two hours until dawn to enjoy as much as we could of these amazing and magnificent animals.

When dawn fell and it became too dark for shooting, we realized that this exciting and very special expedition had come to an end. ■

Counterfeit Shark Fins Start Hitting the Asian Markets

Wang Chia-chuan, a chef specializing in cooking shark fin soup and working for a restaurant in Taichung has warned consumers that many shark fins bought on Taiwan's market are fake and might pose a hazard to their health.

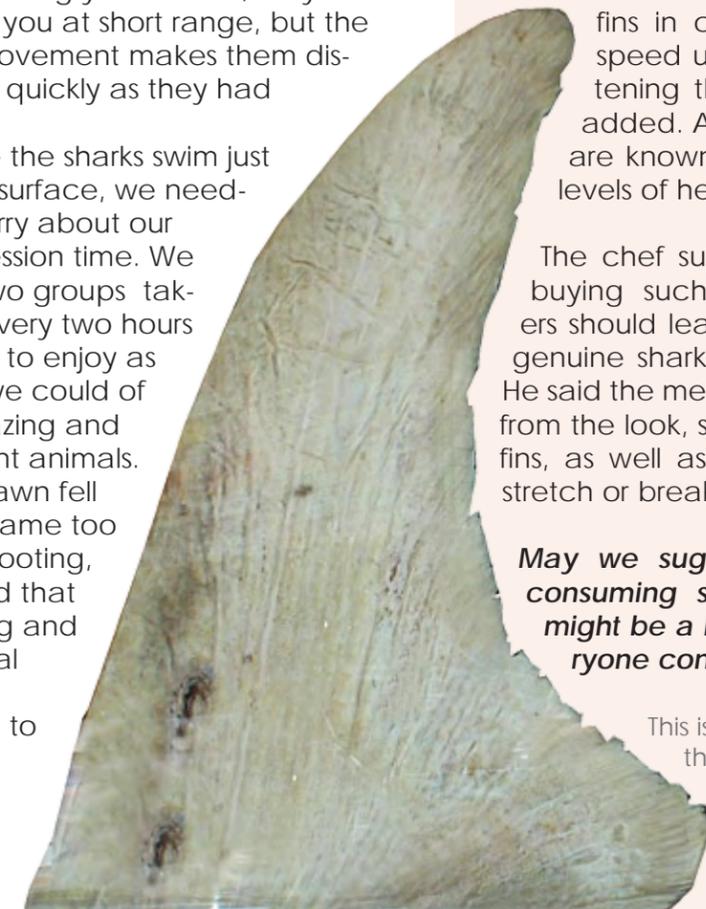
He said that many of the shark fins sold on Taiwan's market are actually made of a mixture of mung bean starch gel, fish skin and gelatin—a substance extracted from the boiled bones, skins and tendons of animals.

According to Wang, the manufacturers of these fake shark fins would use hydrogen peroxide solution to bleach their products to make them look like genuine shark fins, and that those who unknowingly consume the look-alike shark fins could be endangering their health. Even real shark fins are not all safe to consume, because some restaurants soak dried fins in chemical solutions to speed up the process of softening them for cooking, he added. Also shark fin products are known to have dangerous levels of heavy metals.

The chef suggested that before buying such products, consumers should learn how to distinguish genuine shark fins from fake ones. He said the method involves judging from the look, smell and taste of the fins, as well as using the fingers to stretch or break up the cartilage.

May we suggest that giving up consuming shark fins altogether might be a better option for everyone concerned? ■

This is, unfortunately, how the real product looks as seen on display at a high street restaurant in Bangkok



I had always wanted to see Great Hammerheads, and had never managed to actually see them. This moment made me a very happy diver!



Books Film DVDs

Edited by
Catherine GS Lim

**POINT & CLICK
ON BOLD LINKS**



How Do I Woo Thee? Let Me Count the Ways

It's been said many times that sex sells. Well, if that's the case, this book is bound to find its way into the bestseller lists in no time. After all, with a name like Kama SEAttra: Secrets of Sex in the Sea, what else would you expect?

In this new book, aquatic scientist Sheree Marris describes the mating behaviour of some marine creatures that can be intriguing, mysterious and oftentimes just plain weird. The females of some marine species tend to be the dominant partner, getting the males to bear the burden of pregnancy or become their permanent sex slave.

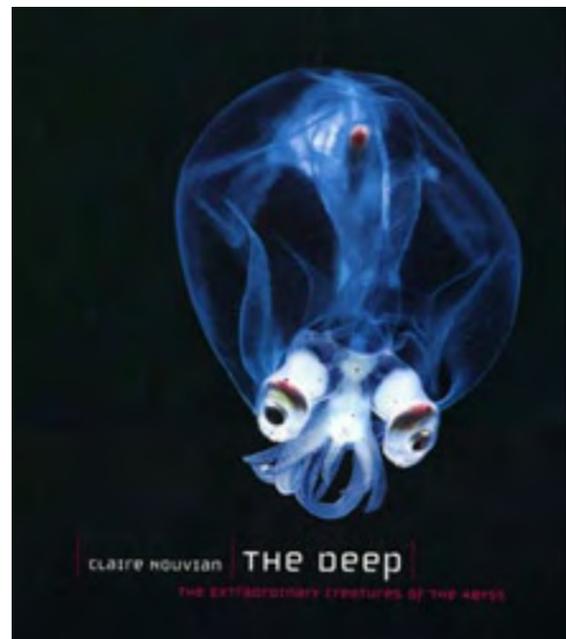
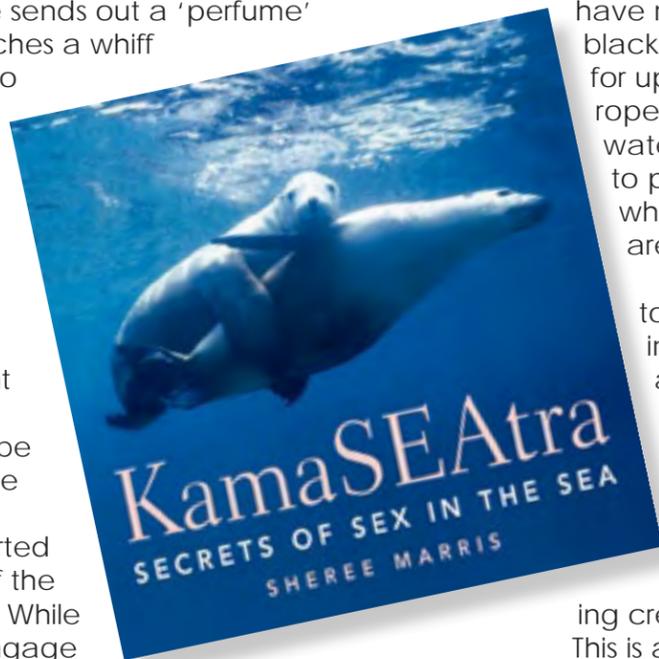
And then, there is the deep sea angler. When the female is in the mood for love, she sends out a 'perfume' into the water. Any male that catches a whiff goes into a mad frenzy, so much so that he bites onto her and never lets go. In time, he becomes fused into her body, and all that is left of the love-sick male is a pair of testicles.

Talk about giving up everything in the name of love....

Then there is the other side of the coin, in which female elephant seals choose the biggest males in the colony as their mates, only to be sometimes crushed to death by the heavier male during copulation.

In all, this book gives a light-hearted insight into the little-known facts of the amorous lives of marine creatures. While it entertains, it also manages to engage and educate anyone who picks up this book.

- ISBN: 9780330423687
- 128 pages
- Paperback
- Publisher: Pan Macmillan Australia



hope to venture. The deep ocean occupies 85% of the oceans, and is therefore the world's largest habitat. Yet, while many of us look towards outer space in the spirit of exploration, it is sobering to note that only 5% of the ocean floor has been properly mapped.

It was this fact that prompted journalist Claire Nouvian to embark on The Deep. There are more than 200 photographs in this book, some of which depict creatures that have never been photographed before. There is the black-eyed squid that carries its 2,000 eggs in a pouch for up to nine months, the siphonophore, a 40-metre rope-like superorganism that swims silently through the waters and the naked sea butterfly that uses hooks to pull sea snails out of their shells and swallows them whole. A few of the creatures featured in this book are unnamed, being still unknown to science.

Concise non-technical write-ups and essays by top marine biologists accompany the photos, giving background and explaining the behaviour and personality of these fascinating creatures. A depth chart, glossary, oceanic statistics and bibliography also provide useful information.

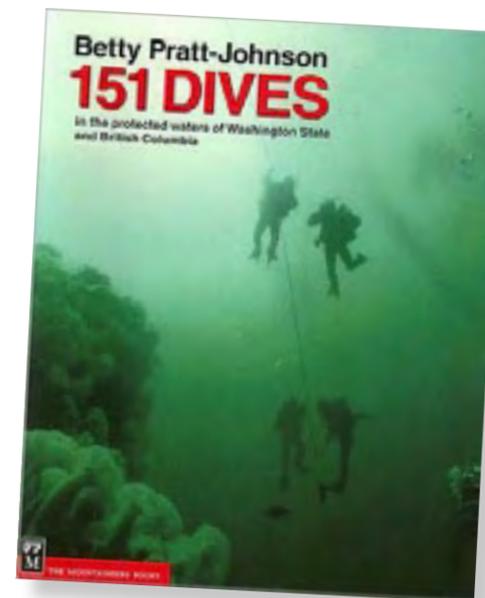
To call this a coffee-table book seems to diminish its contribution to marine science, both as an archive of deep-sea creatures, and also a beautiful treasury of the fascinating creatures that inhabit the depths of our oceans. This is a must-have on any nature lover's bookshelf, offering up endless opportunities to be awed by the variety of the creatures of the deep.

- ISBN: 978-0-226-59566-5
- Cloth
- 256 pages
- 220 color plates

Be Enchanted by the Creatures of the Deep

We forgive you if you had flipped through this book and wondered if the photos were actually meant for a sci-fi book. After all, with creatures like the glass-head grenadiers, spookfish and pigbutt worms, where else would you have found such intriguing weird creatures?

Well, the answer is simply: The depths of the oceans. Yes, we do share our world with such creatures, which dwell in places we could never



Where to Dive when in Washington or British Columbia

The title may be a mouthful, but don't let it deter you from picking up this book if you are headed for Washington State or British Columbia. 151 Dives in the Protected Waters of Washington State and British Columbia features some 151 recommended dives in the two areas. Writer Betty Pratt-Johnson has dived in all the locations featured in the book, so you can be sure that the information in the book is based on first-hand knowledge. Whether you are a diver or a snorkeller, this

book details what you can expect from each site, be it marine life, corals, marine parks, wrecks, etc. Other useful information include nautical charts, photographs, maps, GPS coordinates for the boat dive, as well as the contact details of dive shops, charter boats and marinas.

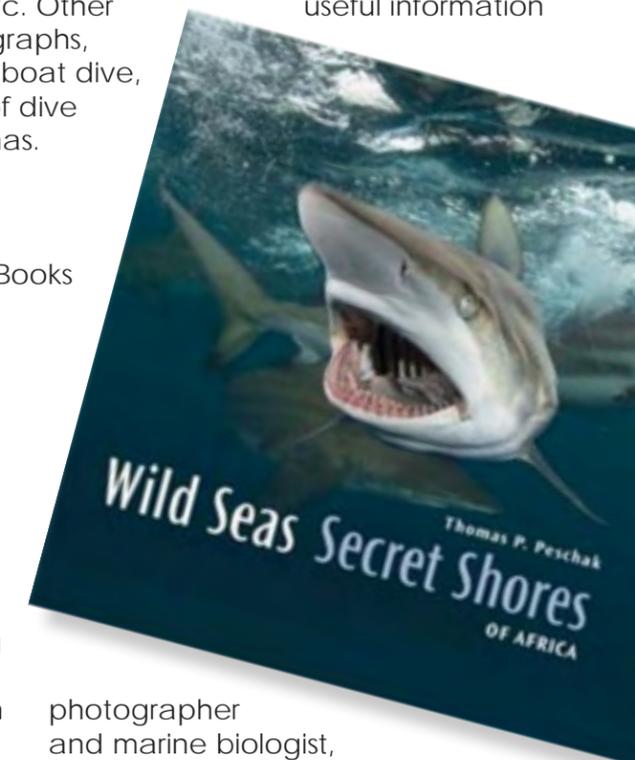
- ISBN: 978-1-59485-043-1
- 432 pages
- Paperback
- Publisher: The Mountaineers Books

Diving in Africa - Looking Beyond the Red Sea

Think Africa, and if you're like us, diving the Red Sea is one of the first things that come to mind. Well, this new book by Thomas P Peschak - Wild Seas, Secret Shores of Africa - is here to expand on this thought. You see, diving the African waters does not have to be limited to the region up north - have you ever thought about the marine environs in the other lesser-known African waters?

Flip through Peschak's book and be taken on a captivating photographic journey through the kelp forests and coral reefs (and more!) of southern and eastern Africa. His technical mastery with the camera enables every photo to tell a story, through characters as diverse as tiger sharks, whales, dolphins, jellyfish and starfish.

As an underwater



photographer and marine biologist, Peschak specialises in writing and photographing Africa's oceans. He is also a photojournalist for WWF-South Africa and Save our Seas Foundation. This is his third book focussing on Africa's marine environments and animals.

- ISBN: 9781770075900
- Hardcover
- 184 pages
- More than 145 photos
- Published: 2007-10-01
- Publisher: Struik Publishers

Books, Film, DVDs, CDs



Visit America's Marine Sanctuaries with the Cousteau Family

This book reads like a great adventure into the underwater realms of America, a journey the reader is privileged to share with members of the esteemed Cousteau family. It chronicles the

experiences of the Cousteau family as they explore the 13 American National Marine Sanctuaries and one Marine National Monument for a two-hour PBS television special. *America's Underwater Treasures* depicts the beauty and variety of marine environments in America's backyard. Readers can expect to venture into kelp forests, coral reefs and even historical shipwrecks.

In the words of co-author Jean-Michel Cousteau, "People around the world know the names Yellowstone, Yosemite or the Grand Canyon. But, few have ever heard of Cordell Bank, the Gulf of the Farallones, Gray's Reef or Flower Garden Bank."

In the process of doing the book, Cousteau's team had an adventure of their lives as they traversed thousands of miles from the Northeast to Key West to American Samoa. These protected waters turned out to be a microcosm of the world ocean, both in the variety of their ecosystems, marine life and the problems they face.

This book shows how the sanctuaries differ from one another, yet all require proper management to preserve their unique wonders that are frequently under attack from human intrusion. All copies of this limited edition title (only 1,000 copies have been printed) have been autographed by Jean-Michel Cousteau.

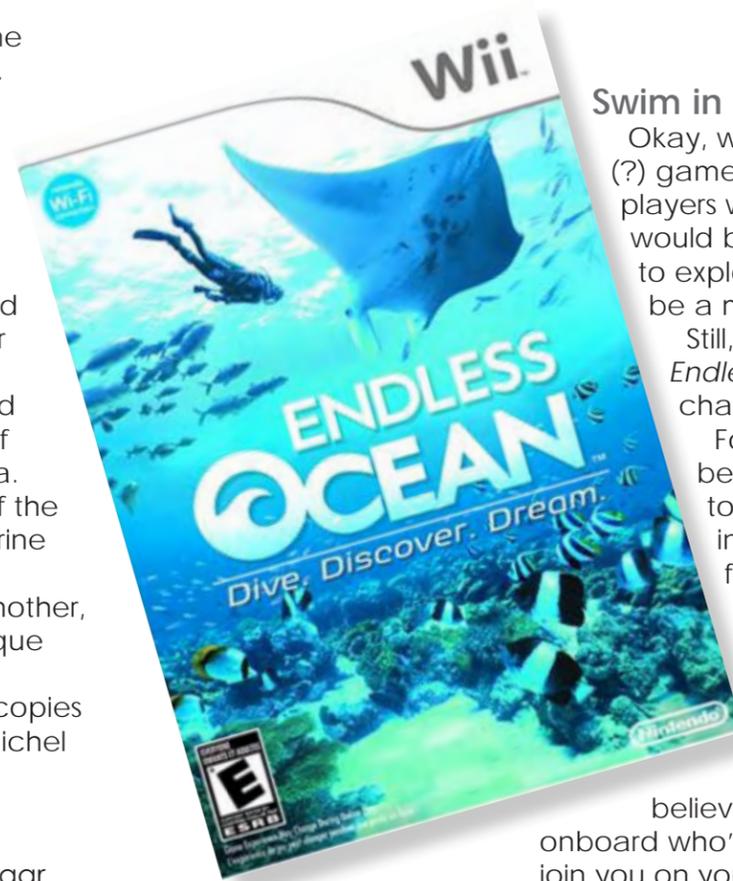
- Hardbound with dust jacket and slipcover
- More than 250 colour photographs by Carrie Vonderhaar
- Written by Jean-Michel Cousteau, President, Ocean Futures Society, and Julie Robinson
- Published by Ocean Futures Society

Learn about Decompression Illness to Prevent Decompression Illness

When it comes to decompression illness (DCI), ignorance is definitely not bliss. This becomes more relevant when one notes that DCI can even strike divers who follow proper diving procedures. So, to help divers learn more about DCI and what to do if they get it, DAN has come up with a new DVD, *I May Be Bent... Now What?*

This 40-minute programme highlights the symptoms of DCI, reiterating the fact that they may be similar to other health conditions. So it is important to be alert at all times and not succumb to self-denial, as this often leads to delays in seeking help, thus compromising the diver's treatment and long-term health.

Presented by DAN Medical Informational Specialist Marty McCafferty, the DVD is available free of charge to dive clubs and dive centres. It is perfect to be used as part of a dive training syllabus, or at your next dive meeting.



Swim in the Ocean Without Getting Wet

Okay, we admit being a little skeptical about this video (?) game. Before we got our hands on it, we were told that players would not be issued with any weapons, as there would be no bad guys to eliminate. All we had to do was to explore and enjoy the ride. There wasn't even going to be a mission, no damsels (or dashing Mr Right) to save.

Still, we gamely played the game, aptly called *Endless Ocean*, secretly expecting a whaling ship to charge in out of nowhere.

Fortunately, there was none. And we say fortunately because this game is soothing and idyllic. You get to swim around, explore the underwater realm, investigate shipwrecks, photograph marine life, feed the fishes, etc. Along the way, you learn about more about the fishes (there are some 150 varieties), and even get to befriend and train some dolphins.

For a break, dive up topside and plan your next dive. Like on a real dive trip, you can even watch the sunset, check your emails (make-believe ones, of course!) and even chat with a friend onboard who's a marine biologist. You can even get a friend to join you on your next dive, via Wii's WiFi Connection Service.

In all, this game is a welcome alternative to contemporary action-pack shoot-'em-up games. But play it at the end of a long day at the office, when you are in need of a little solitary R & R to calm those fazed nerves.

Learn Yoga to Dive Better

It's not every day that you come across fellow divers exerting themselves in yoga poses before they enter the water. Well, if Kimberlee Jensen Stedl and Todd Stedl, the writers of a new book *Yoga for Scuba Divers*, have anything to say about it, this scene may well become more common in the near future.

According to them, yoga can help divers improve their diving skills, and train up the muscles used during a dive. The poses and techniques featured in the book run the gauntlet from pre-dive warm-ups, general conditioning, post-dive recovery, pose positions, etc. The mental aspect is also covered, in the form of visualization techniques that divers can indulge in. A unique skill featured in the book is a special way of breathing that simulates the way one breathes from a regulator. This is especially useful for divers as it helps divers to learn to breathe calmly when underwater.

Writers Kimberlee Jensen Stedl and Todd Stedl are both certified divers, so don't worry about having to read a lot of metaphysical mambo-jambo in this book. What you'll get is solid and practical advice and instruction on how to incorporate yoga techniques into your dive routine, with the aim of achieving a more fulfilling and efficient dive experience.

- 128 pages
- Soft cover
- Publisher: 8th Element Yoga

Yoga for Scuba Divers



Practice on land to build strength, increase your air efficiency, and become a better diver

Kimberlee Jensen Stedl and Todd Stedl, Ph.D.