



Tiger Shark—rear curtain sync, Sea & Sea housing, D200 camera, 17-35 Nikon zoom lens at 35 end, YS300 and 120 flashguns on half power, 1/15th sec exposure, f22. Faster shutter speed produces less movement in subject and background

As underwater photographers we have a whole world ready made for these techniques. Like it or not, a picture can be given movement and exaggerated colour, turning it from an otherwise boring subject to something that is both vibrant and can truly be called ART. So, let us look at these three techniques and how we can apply them underwater.

Panning

In its simplest form, panning is either when the photographer is stationary and the subject is moving, or both photographer and subject are moving at the same speed. Let's take the first one first.

Using a diver as a subject getting him to swim past you at a set distance is the easiest way to test and perfect this technique. The key to success is a fluid panning action, usually

from right to left and the correct shutter speed for the job. Using a D200 in a Sea & Sea housing with a 20mm lens set at f16 1/4th sec exposure, which makes the best use of available light, allow the diver to swim parallel in front of you. Then, start moving the camera to match the speed of the swimming diver. Before he is directly in front of you, when the panning speed of the camera and swimming diver match, gently press the shutter.

It is important that the panning action starts before and carries on after the shutter has been pressed to create fluidity in movement. It needs practice to achieve. It is also important to bracket the exposure to see which shutter speed f stop combination gives the most artistic result. In this instance, I would also use f11 at 1/8th sec and f22 at 1/2 sec.

What you will end up with is a photograph of a diver, his torso frozen, limbs moving and a blurred background, giving exaggerated motion to the subject. This can easily be practiced in your local swimming pool.

The second technique is when the photographer and subject are moving at the same speed and can be applied simply when swimming down a reef knowing that you have a good chance that you will come across certain subjects. The important thing to remember in this situation is that the intent is there, and your camera set up must be ready if the opportunity arises.

There is a reef in Indonesia where I come across hawksbill turtles frequently. My D200 is set at around f16 at 1/4 sec exposure (dependent on the ambient light reading), so when the turtle

Special Techniques

*Panning,
Zooming &
Rear Curtain Sync*

Text and photos by Tony White

These are special in camera photographic techniques that have long been used for many years by both professional and amateur land photographers to add creativity to an otherwise boring shot. A stationary car can be made to look like it is travelling at 100 mph and people can be given movement whilst they are really standing still.



Lionfish—rear curtain sync, Sea & Sea housing, D200 camera, 17-35 Nikon zoom lens at 35 end, YS300 and 120 flashguns on half power, 1/2 sec exposure, f22. Slower shutter speed produces more exaggerated movement in subject and background



photo & video

Sting Ray—Zooming, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, available light, 1/2 sec exposure, f22. Exaggerated movement due to long shutter speed zooming from 17mm through to 35mm

swims off the reef into the blue, I am ready matching my speed, hopefully, to that of the turtle. I position myself over the top of him and press the shutter, which freezes his image but allows the background to blur, again, giving an impression of great speed.

The key to success in this situation is matching your finning speed to that of the subject. When these match, the chance of success greatly increases.

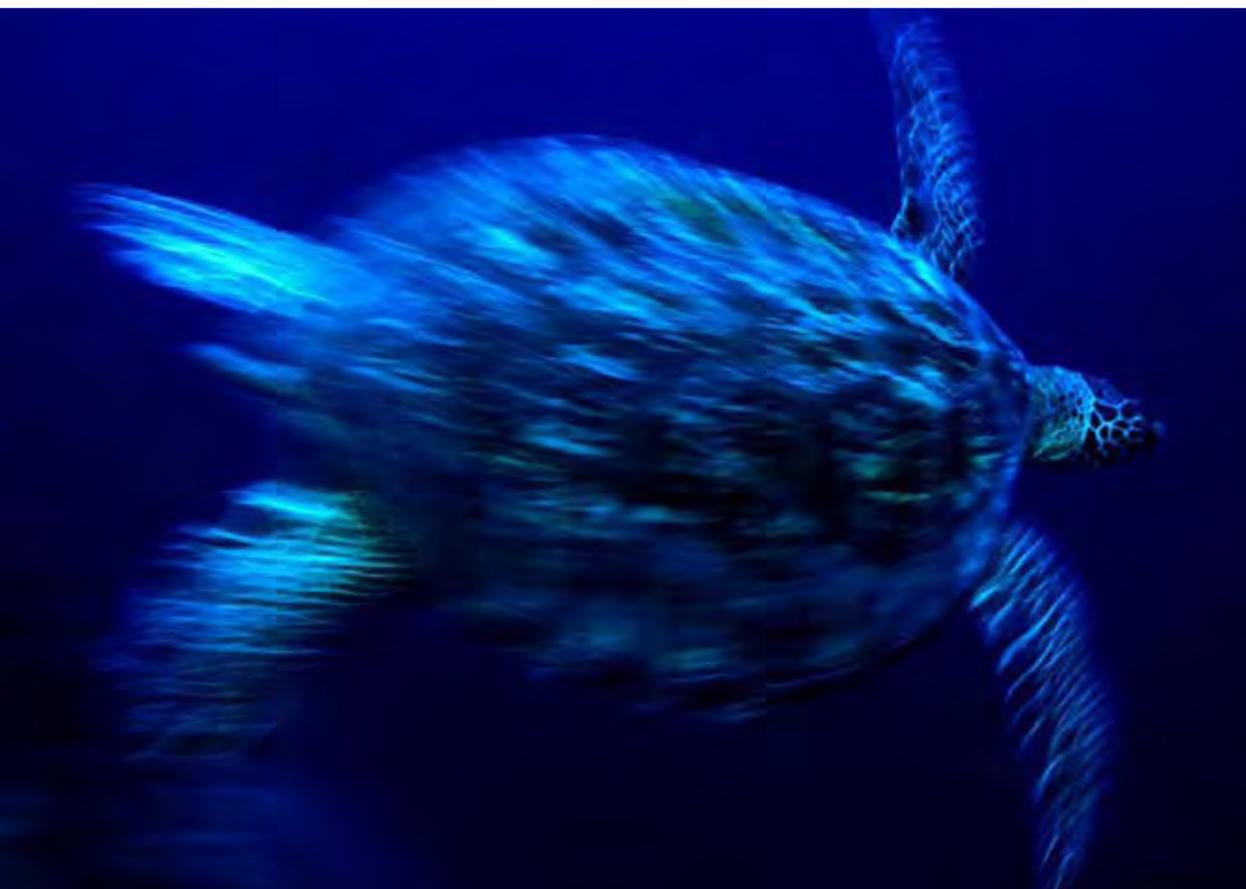
Rear Curtain Sync

When we take a photograph with flash in its normal mode, the flash fires as soon as the shutter is activated. In other words, at the very start of the exposure. When we put the flash mode to rear curtain sync, the opposite happens. The flash fires at

the end of the exposure. So if we had an exposure of 1/2 a second, the flash will not go off until the very end of the 1/2 second.

Once again, we are going to use rear curtain sync in conjunction with long exposures to create an exaggerated sense of movement, and when the flash goes off at the end of the exposure, it will freeze and add colour to the picture.

The reason for using rear curtain sync is that the long exposure will record lines of movement which can be very haphazard and jumbled. But when the flash fires, it records the final image on top of all the movement giving a sharp picture of the subject. If, for instance, we did exactly the same thing but using normal flash mode instead of rear curtain sync, then we would have a final picture of the



subject covered with movement from the rest of the exposure, which would make it very indistinct.

Again, practice this in the pool. I have been using wooden coloured fish, which are always on the move and give a good representation of the final image one could achieve in open water. Using a D200 in a Sea & Sea housing with twin strobes set to manual full power main light YS300 fill light YS120, in open water, I pick a subject not too small which is not likely to dart around too much. Lionfish have worked well for me in the past as a starting point. I take an

ambient light reading with emphasis on a long shutter speed. I recommend bracketing around a 1/4 of a second. I set the flash mode to rear curtain sync, compose my photograph and fire.

Head shots sometimes give an indistinct end result, whereas a side view, I feel, gives a recognisable sense of the animal. With distinct lines of movement, it can enhance the colour of the background, so choose one with saturated colours. Obviously, the shutter speed is key to the final image—1/2 a second and longer will give an image with very distorted movement and not so sharp an end

Hawksbill Turtle—Panning with rear curtain sync, Sea & Sea housing, D200 camera, 20mm Nikon lens, YS300 flashgun on full power, 1/15th sec exposure, f22. Background movement evident, only flipper movement showing on turtle

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Diver in wreck doorway—Zooming, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, available light, 1/2 sec exposure, f22. Subject static housing on tripod for stability shows speed lines focusing on divers head in centre of frame



result, whereas a shorter shutter speed of say 1/15th a second, will give slight movement around the fin areas and a very sharp final image. It's all a case of what you like, but again this technique adds impact and drama to many photographs.

Note: When the two techniques above have been practiced, for the more adventurous, try combining them both in the same shot. The panning will give lateral speed lines, and the rear curtain sync will give a sharper more colour saturated final picture—again, practice achieves results.

Zooming

This is exactly what the heading says. Using a zoom lens, we can use a technique to make static subjects look like they are travelling at very high speed. I liken it to watching the Starship Enterprise on Star trek just as it is going into light speed because those flowing lines around the spaceship are the exact results you will get when you use this way of taking a photograph.

Typical subjects are wrecks, highly coloured soft corals, and divers in a stationery position. This may sound complicated but it

isn't. You will get the best results by using a lightweight tripod weighted down with some lead. But if this is too much, then excellent results can be achieved by anchoring yourself in a steady position before shooting. Again, practice this technique in the pool before shooting in open water.

Fluidity of movement again is a key to success. So, in open water using a D200 with a Nikon 17 to 35mm zoom lens in a Sea & Sea housing attached to a lightweight tripod, choose a likely subject—perhaps a diver in the doorway of a wreck. Set-up the tripod at a distance far enough away so that when you zoom on the focal point it stays within the picture area. Take an ambient light reading again with emphasis on a long shutter speed. I find between 1/4 and 1/2 a second gives good results. Starting at the 17mm end of the lense practice zooming through to the 35mm end.

This is where the fluidity comes in again, the zooming must be a constant speed. When you are ready to take your shot, start zooming first, then fire the shutter and continue zooming after the exposure has been taken. This will give a constant image with no

Special FX

Leather Coral—Zooming and rear curtain sync, Sea & Sea housing, D200 camera, 17 to 35mm Nikon zoom lens, YS300 and 120 on half power, 1/4 sec exposure, f22. Static subject no tripod hand held flash has given hint of colour in foreground

jerkiness to be seen.

Again, bracket the exposure. In this case, I would bracket around 1/4 second using 1/8th and 1/2 second with the appropriate f stop. The speed of the zooming will obviously give different results—faster, a more distorted image with longer speed lines—slower, a more distinct image with shorter lines.

Obviously, if you are deeper than 10-15 metres, then the final image will be very desaturated in colour. So, once practiced, this technique can again be combined with rear curtain sync. You will get all the speed lines but a more distinct sharper image with good colour saturation.

Conclusion

I have tried to keep the explanations of how these three techniques work as practical as possible with the intention of allowing photographers the opportunities to get in the water and experiment without too much technical jargon, which can sometimes be confusing. I hope this intent has worked, and in some of you, it will lead to a more creative way of thinking and a greater awareness, which will eventually lead to a form of underwater photography leaning very much towards artistry. If I have not achieved this aim with my explanations, please do contact me, as I will always endeavour to help where I can. E-mail me at seafdreams@btinternet.com ■



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Zillion

VIA WETPIXEL – Zillions Canon 5D Mk II housing features both optical and wired (optional) bulkheads for strobe sync. The housing is made of ABS plastic and has a suggested retail price of around \$2,870. At the moment, the only way to get the Zillion housing outside of Japan, Korea and Thailand is by contacting Aquaforum.



Leo

The Leo housing from Italian Easydive was designed to be compatible with every digital reflex camera available on the market. Easydive designed, produced and patented USB FotoControl, an electronic push-button panel that the manufacturer states is a revolution in underwater photography. This panel can remotely select all reflex camera controls. This feature makes Leo housing universal and unparalleled. The standard version designed by Easydive includes a LEO housing equipped with USB FotoControl push-button panel to select the following controls: time + / -, diaphragm + / -, preliminary shutter release, shutter release, Iso + / -, mode switch, exposure meter. Furthermore an additional push-button panel with customized programs can be installed on request. www.easydive.eu

Remora

Fantasea Remora Flash features four different pre-flash settings, to cover the needs of all compact digital cameras in the market, including Nikon, Canon, Sony, Olympus, Fuji, Kodak, Panasonic and more. The flash features a guide number of 20, and therefore is compatible for both macro and wide angle shots. The power output can be manually adjusted to provide the most accurate amount of light in all conditions, and a short recycle time ensures quick responsiveness, even when using the maximum power output. fantasea.com



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Reconnect

This Digital Adapter from German Heinrich Weikamp enables you to use your old "non-digital" underwater strobe with a connector-less digital camera. www.heinrichsweikamp.net

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Unique Dive Site
Crystal River
Kings Bay, Florida

*Close encounters of the third kind
with a 2000 pound kitten*





"Meoww"

Crystal River

ant of the Vikings, who crossed the Atlantic in open boats, was a woos. I just don't like to be cold all right? And neither do the manatees, it seems, which is why they congregate in this relatively small area of Kings Bay each year.

Kings Bay, which is approximately two miles in diameter or 600 acres, is home to the largest concentration of manatees in the world. The inlet is a bit warmer than the surrounding seas, and despite their generous layer of blubber, the water temperature in the spring-fed rivers, which ranges from 20-22°C (68-72°F), makes for a somewhat cosier place to over-winter than the open coastline.

"Hello there"

Before we entered the water, our dive guide warned us of the state's policy against harassment of the animals—as with all wildlife, one cannot catch or feed animals, but also one cannot pursue them, ride them or otherwise harass them. However, we were told, if a manatee came up to us on its own accord, it may want a scratch on the head or belly, which we could do with only one hand at a time.

At first, I saw nothing in the murky waters but then I noticed a blimp-shaped silhouette to my right. It was an approaching manatee all right, and it had spotted me. He got closer and closer ... and closer ... until the giant creature just bumped right into me, albeit gently. Once I got over my shock over such an unabashed direct approach of making my acquaintance—no introductions necessary, it seems—I reached out and scratched the cuddly creature right on its coarse head, which immediately produced what I interpreted as an ecstatic expression—or so I imagined.

The manatees are not exactly the prettiest creatures on the planet. They are grey and wrinkly and have coarse skin that is sometimes infested with

Text and photos by Peter Symes

I once had a cat that approached me exactly like that. Coming right at me, top of the head first until ... bump ... "scratch me!" It then slowly rolled over onto its back to blissfully enjoy a good belly-rub.

Only this 'kitty' was a 2000-pounder, with flippers instead of paws, but still, unmistakably cute and cuddly.

A close encounter with the docile manatee leaves no one untouched. These gentle giants seem friendly and curious, as they seek out close contact with humans.

At first, I did not know what to expect. This wee grey November morning in northern Florida seemed a far cry from the archetypical tourist imagery of a tropical paradise. There were palm trees alright, but it was a bit nippy and windy, and that water seemed a bit turbid. As I quietly entered the water—in order not to frighten any manatees—and the cool water started seeping into my wetsuit, I longed for my drysuit and woollies.

Okay, so this undersigned descend-

"So who are you then?"





algae. And their eyes are like those on a potato—not exactly winners of a beauty contest. Yet, it is hard not to become enchanted with them, as they come across as being very peaceful, docile and social... and they move with much grace.

Mermaid Myth

Manatees belong to the mammalian order called *Sirenia*. The word *siren* comes from the ancient Greeks who had a fable about beautiful girls that lived in the sea, called *sirens*, whom we have come to know as mermaids—creatures that were half girl and half fish. These girls sang very beautiful songs that would put sailors in a trance. Hypnotized by these songs, the sailors would run their ships onto rocks and sink.

For a long time it was common belief that these beautiful and strange creatures were real. The

songs heard by sailors were probably whale songs. But what about the eye-reports? What the sailors saw were not really mermaids, naturally, but manatees.

Manatees do not stick their heads out of the water to breathe. Looking down at these creatures under the water, people could only see some strangely shaped creature swimming by. The front half of this creature had a head and arm-like flippers and the back half had a tail like a fish. It didn't require much of a vivid imagination to connect the dots—it had to be a mermaid.

“Scratchy”

After spending the better part of an hour in the middle of Kings Bay with “Scratchy”—the nickname we gave to our newfound itchy and affectionate manatee friend—the coolness of the water finally had the better of us,

and we retreated back onto the dive boat for a much welcomed hot cup of coffee.

During this little break, we were taken to another nearby canal where the water was much clearer, and through a narrow passage under the trees—too narrow for any boat to pass—we could swim into that appeared to be another little maze of smaller channels.

The clear water in here had a beautiful deep blue hue, as we swam inwards. At first, there were no other creatures around, but then, I turned around to see a mother and a calf catching up with us from behind. They swam right by us, as if we weren't even there. They seemed determined to get somewhere specific right away. The young one was sticking very close by its mother's side.

Coming around the next corner, we found the pair just relaxing in

Is this the real mermaid? TOP LEFT: Kodak moment with manatee





encourage a “look, but don’t touch” policy. But local conservationists of ManateeProtection.com are pushing for more enforcement, stating on their website:

“The reality is that there are already a number of tame manatees in the area and contact will continue. It should not be reinforced and new animals should not be conditioned to accept a human presence without caution. As custodians for the manatee in Citrus County, the USFWS must assure their long term health and safety by limiting physical contact through some form of no touch rule.”

Opponents of the policy, mainly dive operators, say they would lose up to 30 percent of their business, if they did not let their customers touch the manatees. But new tours are already being developed where education through observation only is the emphasis. ■

Crystal River, Florida

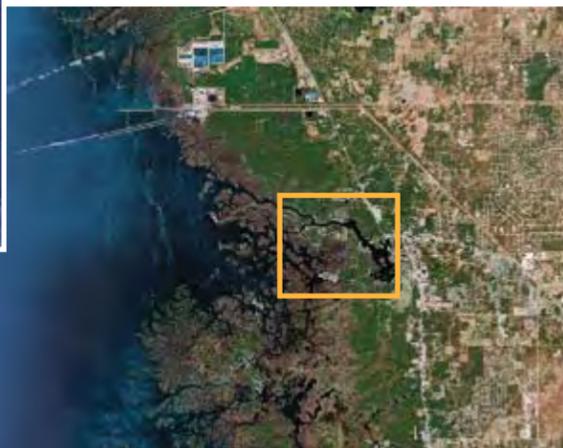
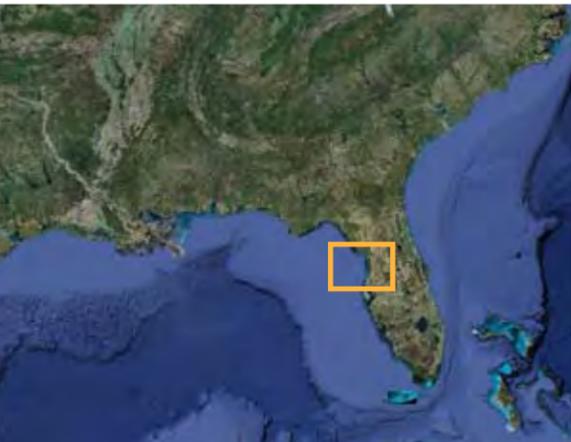
Crystal River is both a river and a city with a population of 3,600 in Citrus County at the heart of the Nature Coast of Florida, United States. The city was incorporated in 1903 and is the self-proclaimed “Home of the Manatee”. The City is situated around Kings Bay, which is spring-fed so keeps a constant temperature year-round. Kings Bay is home to nearly 400 manatees during the winter and is one of the few places where people can interact with them in their natural habitat. Crystal River Preserve State Park is located nearby, and Crystal River Archaeological State Park is located in the city’s northwest side. ■

what looked like a little lake at the end of the maze. The young one looked as if it was given permission to go out

the mother and the calf. It may not be an aggressive species, but you should never underestimate parental instincts. At least I didn’t want to stress any of them, so I kept my respectful distance.

It is against the law to harass or pursue the manatees in any way. So, if they are sleeping or eating on the bottom, they should be left alone.

federal level, but were downgraded to “threatened” at the state level in 2006. However, there are continued reports of tourists harassing the animals and boat collisions maiming a significant number of manatees each year. According to ManateeProtection.com, a “no touch” policy is needed to ensure the protection of the manatees in Crystal River. The group of local conservationists is appealing to the United States Fish and Wildlife Service (USFWS) to consider and implement such a policy. The existing guidelines of the state Fish and Wildlife Service



and play, because it was frolicking around and curiously investigating different matters on its own, while the mother was keeping a watchful eye out for the youngster. While manatees are friendly creatures I didn’t feel like approaching the young one and coming in between

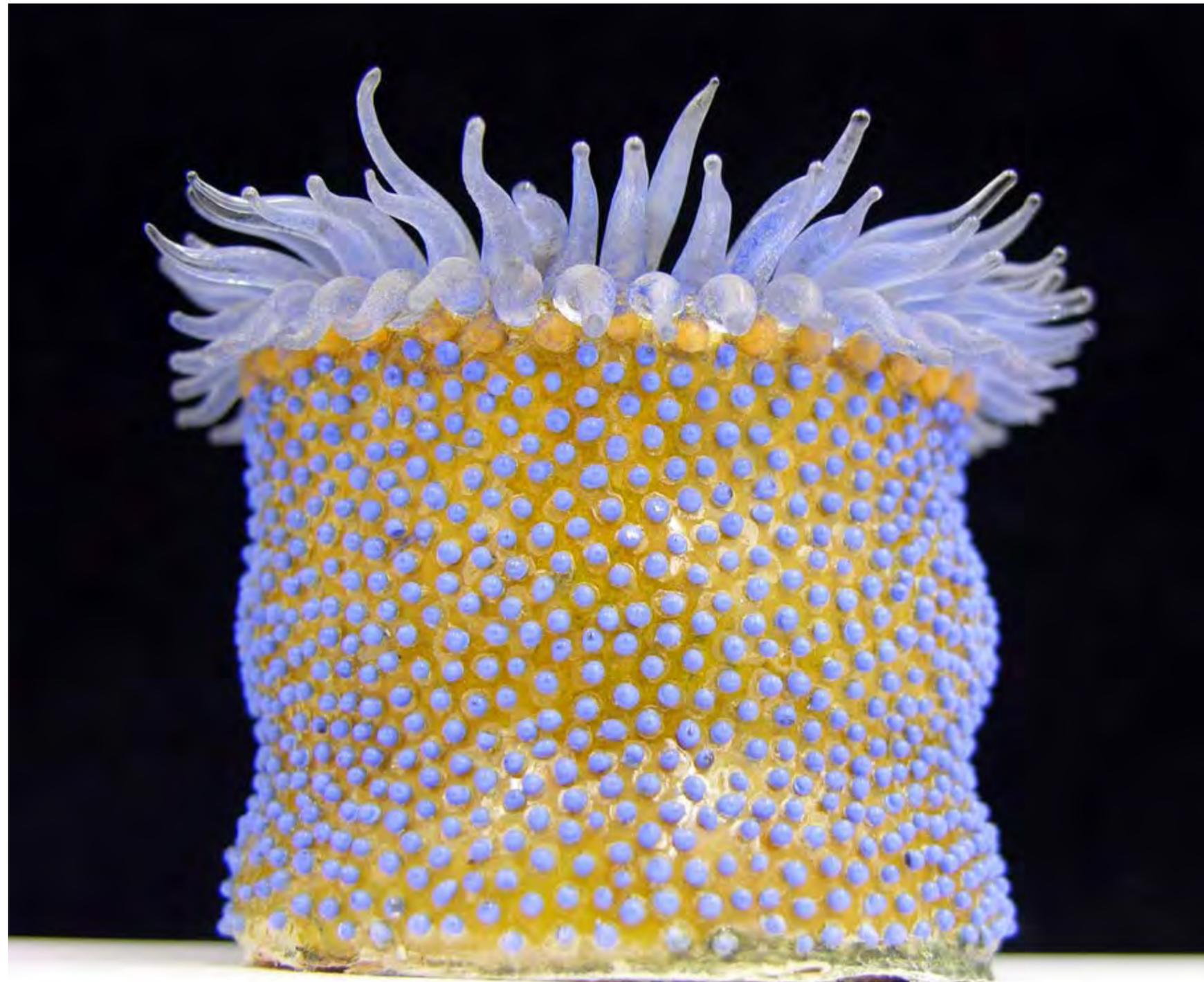
Controversy

Manatees are still classified as an “endangered” species on the

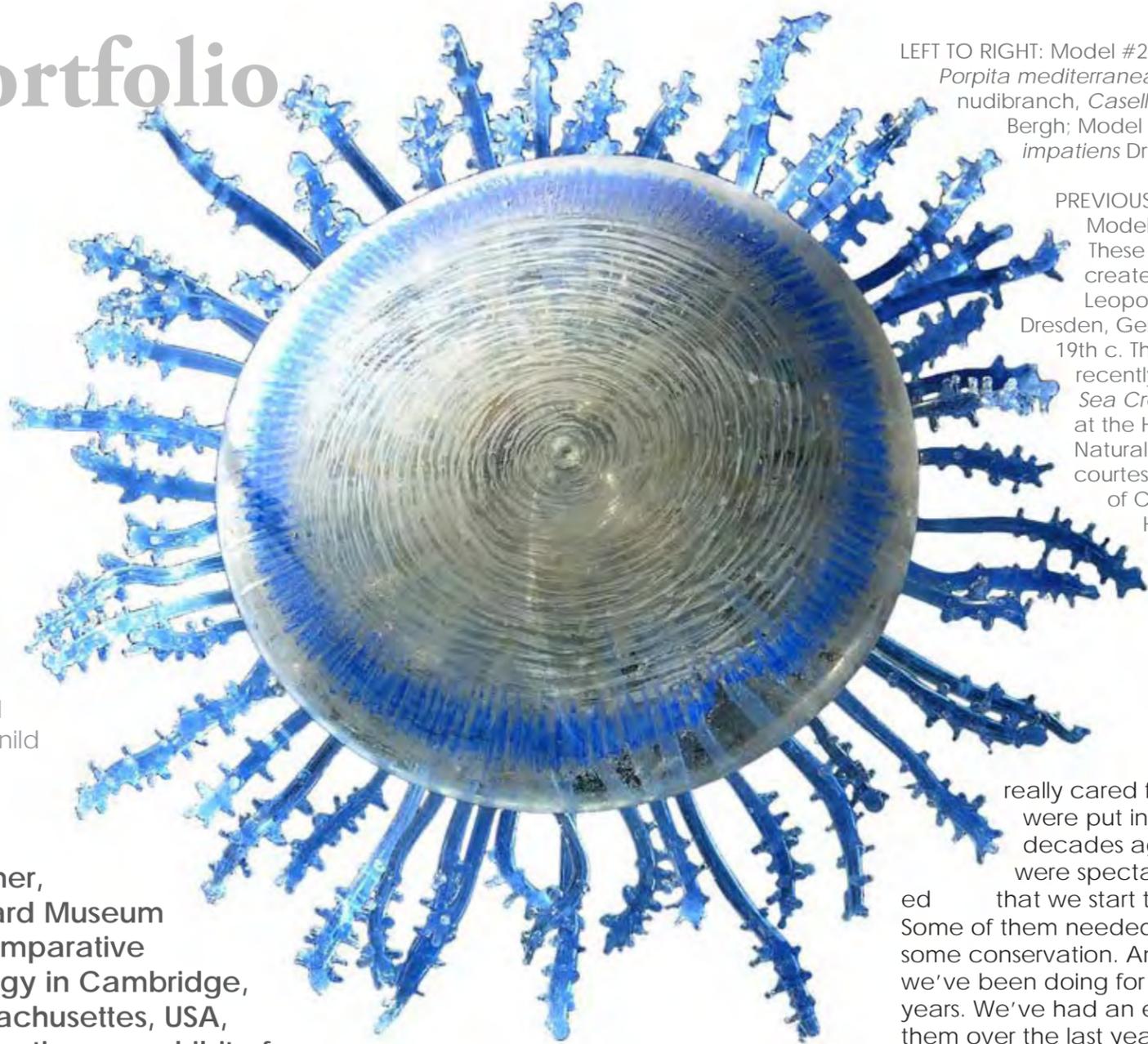


It is against the law to pursue the manatees in any way. So if they are sleeping or eating on the bottom, they should be left alone. This cousin resting on the riverbed seemed sound asleep

BLASCKA



P O R T F O L I O



LEFT TO RIGHT: Model #216, sea jelly *Porpita mediterranea*; Model #378 nudibranch, *Casella philippinensis* Bergh; Model #91.3 *Sagartia impatiens* Drayton, Gosse.

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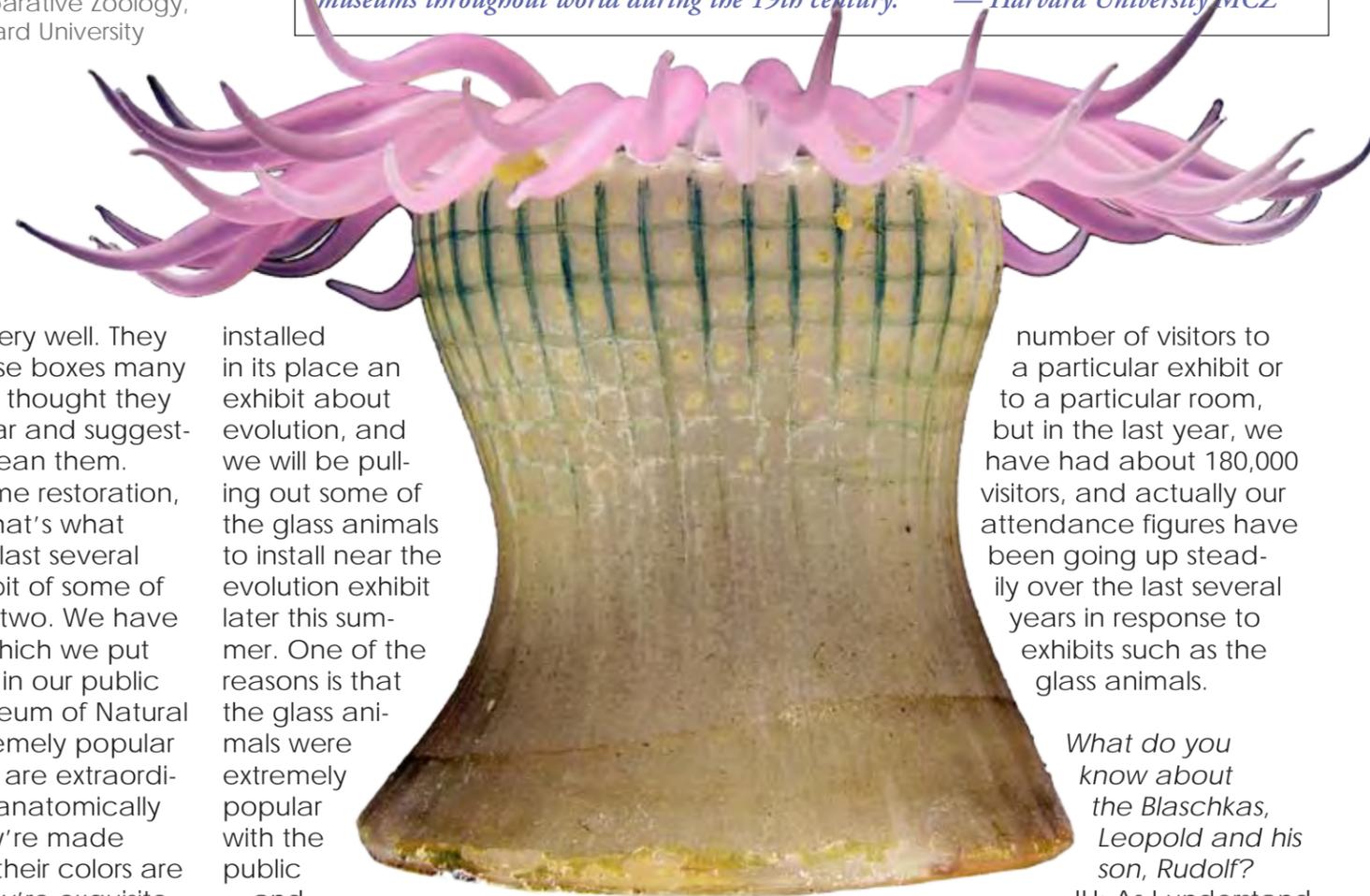
Model #81, Anemone
These glass models were created by Rudolph and Leopold Blaschka near Dresden, Germany, in the late 19th c. The models were recently displayed in the *Sea Creatures in Glass* exhibit at the Harvard Museum of Natural History. Photos courtesy of the Museum of Comparative Zoology, Harvard University



Blaschka

Leopold (left) and his son Rudolf Blaschka (right), about 1895. Image courtesy of the Botanical Museum, Harvard University, Cambridge, Massachusetts, USA

Many years before they were commissioned by Harvard University to make the “Glass Flowers,” father and son artists Leopold and Rudolph Blaschka meticulously shaped glass and wire into lifelike models of marine animals. Renowned for their beauty and exacting detail, the Blaschka marine invertebrate models were commissioned by universities and museums throughout world during the 19th century. — Harvard University MCZ



Text edited by Gunild Symes

This summer, Harvard Museum of Comparative Zoology in Cambridge, Massachusetts, USA, is mounting an exhibit of glass models of marine invertebrates made by the 17th century German master glassblowers, Leopold and Rudolf Blaschka of Dresden. Professor James Hankin is an evolutionary biologist and the director of the museum. He talked to *X-RAY MAG* about the exhibit and the Blaschka glass works.

JH: When I became director a few years ago, I requested a tour of all our collections. We have vast collections here. It's literally millions, more than 20 million

specimens of one sort or another. And in the course of receiving a tour of our invertebrate animal collections, I was shown several shoe boxes and other small boxes of glass animals, which were absolutely remarkable. I had not known that we even had these things. I knew that we had glass flowers—Harvard has a famous collection of glass flowers made by the Blaschka father and son team—but I had not known that they, at one time in their careers, had made glass invertebrate animals. And these were tucked away and not

really cared for very well. They were put in these boxes many decades ago. I thought they were spectacular and suggested that we start to clean them. Some of them needed some restoration, some conservation. And that's what we've been doing for the last several years. We've had an exhibit of some of them over the last year or two. We have about 450 specimens of which we put on exhibit around 30 or 35 in our public museum, the Harvard Museum of Natural History. And it was an extremely popular exhibit. I mean, they really are extraordinary specimens. They are anatomically correct, if you will; they're made exactly to life; their colors are accurate. They're exquisite.

That was in our temporary exhibit gallery. We had to remove that exhibit, but we just

installed in its place an exhibit about evolution, and we will be pulling out some of the glass animals to install near the evolution exhibit later this summer. One of the reasons is that the glass animals were extremely popular with the public and

many people were very, very disappointed when we took them away. So, by popular demand, we are bringing some back.

How many visitors did you have to that exhibit?

JH: We don't track the

number of visitors to a particular exhibit or to a particular room, but in the last year, we have had about 180,000 visitors, and actually our attendance figures have been going up steadily over the last several years in response to exhibits such as the glass animals.

What do you know about the Blaschkas, Leopold and his son, Rudolf?

JH: As I understand

it, they came from a long and distinguished family of glassblowers in Dresden, Germany, beginning in the 15th century. By the late 19th century, it was the adult male in the family, Leopold, who was continuing the tradition, and he and his wife had a son, Rudolf, who basically adopted the same traditions of the family. They really had brought the craft

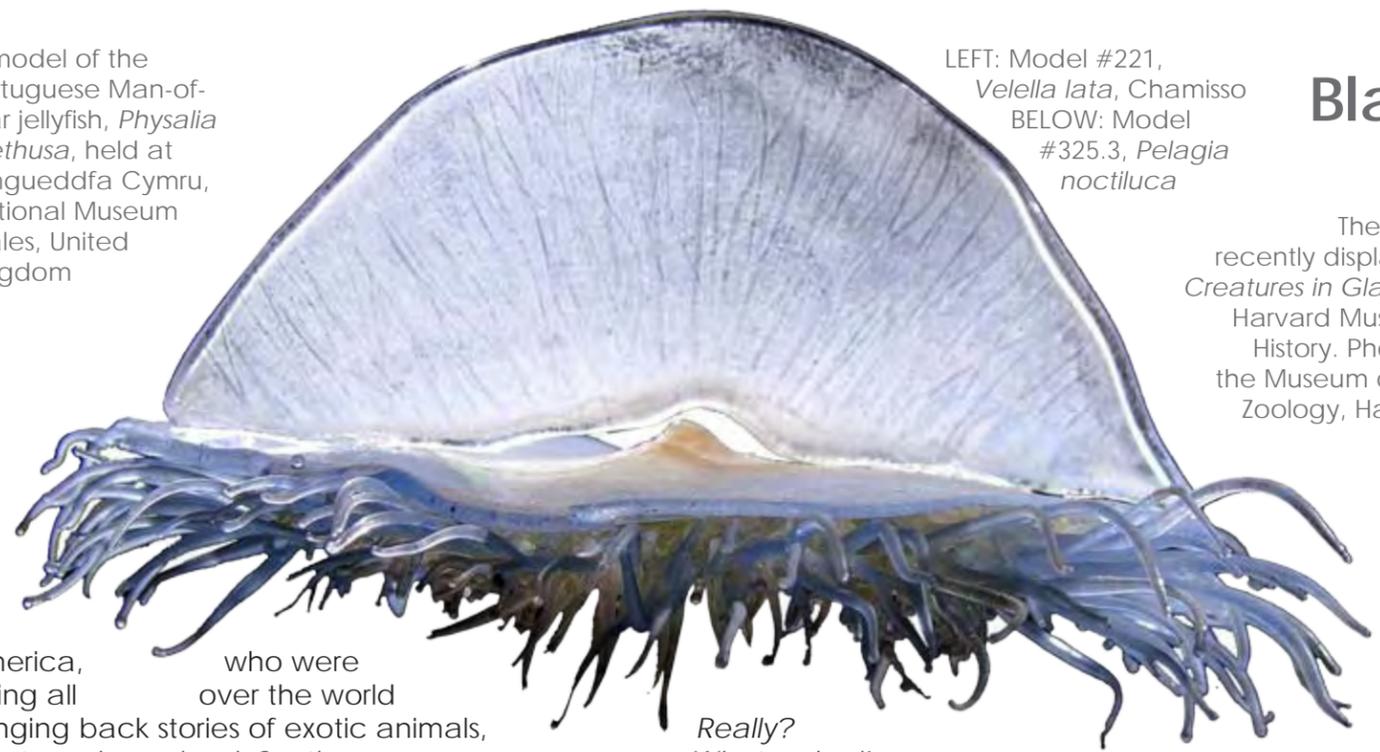




Chrysaora hysoscella. jellyfish model held at the Muséum de Genève. Photo by Philippe Wagneur



A model of the Portuguese Man-of-War jellyfish, *Physalia arethusa*, held at Amgueddfa Cymru, National Museum Wales, United Kingdom



LEFT: Model #221, *Velella lata*, Chamisso
BELOW: Model #325.3, *Pelagia noctiluca*

These models were recently displayed in the *Sea Creatures in Glass* exhibit at the Harvard Museum of Natural History. Photos courtesy of the Museum of Comparative Zoology, Harvard University

America, who were going all over the world bringing back stories of exotic animals, plants and new land. So, there was tremendous public interest in natural history and discovery. As a result, there was a large interest in these models. Of course, we are talking about a time when photography was just in its beginnings; there was just black and white photography. There was no color photography, no video, no ways to depict to people the vivid colors and shapes of animals and certainly not ones that were found in the ocean in the water.

Really?
What a deal!

JH: Yes. So, at that point, the Blaschkas stopped making glass animals. This was a family that was buying these glass flowers for our botanical museum. I guess, they didn't have any interest in glass animals. So, the Blaschkas, from that day forward, made only glass flowers, and they made, literally, thousands of them. We have them here—between 4,000-5,000 glass flowers.

As a result, the glass animals were no longer made. There were some large collections of them in Dresden, as I understand it; there is our collection here; Cornell University in New York State has some more; there's another collection of them in the Natural History Museum in London; and let's see, I think, in Scotland there's also another collection of them. Unfortunately and tragically, the collection in Dresden was lost in the bombing during World War II.

Yet, there are still additional models here and there. You read stories every once in a while where there are people who discover them. There was one that came to my attention a couple of years ago. A university, I think it was the University of Wisconsin in the Midwest of the United States — somebody in the museum saw a box underneath a cabinet on the floor and pulled this box out,

of glassblowing to a real art, to a level of achievement and accomplishment, which, I think is safe to say, is no longer available today... really glassblowing perfection.

At that time, they had to do this for a living. They made among other things glass eyes for blind people. I mean, they had to do whatever they could to make a living blowing glass. I think it was the son, Rudolf, who had an interest in natural history. He started making these glass animal models, or suggested that they make these glass animal models, which they did, and they used to sell them through biological catalogs. Remember, this is a time in the last half of the 19th century after Darwin had published, *The Origin of Species*, and there were all kinds of other discoverers from Germany, other European countries, and North

So, these models were as good as it got in those days. They were also used as teaching tools. So, biology classes, mostly in universities, I suppose, would purchase these models as teaching aides. They were sold that way by mail order in catalogs around the world.

At some point—I'm not exactly sure how this happened—people here at Harvard suggested that the Blaschkas start making flowers, which they did, and they also were exquisite. They were just spectacular. But at that point, a wealthy family in Boston, who were associated with Harvard, made the Blaschka father and son team an offer they could not refuse, which was, if they would only make flowers, glass flowers, and only make them for Harvard University, this family in Boston would take care of them financially for the rest of their lives.

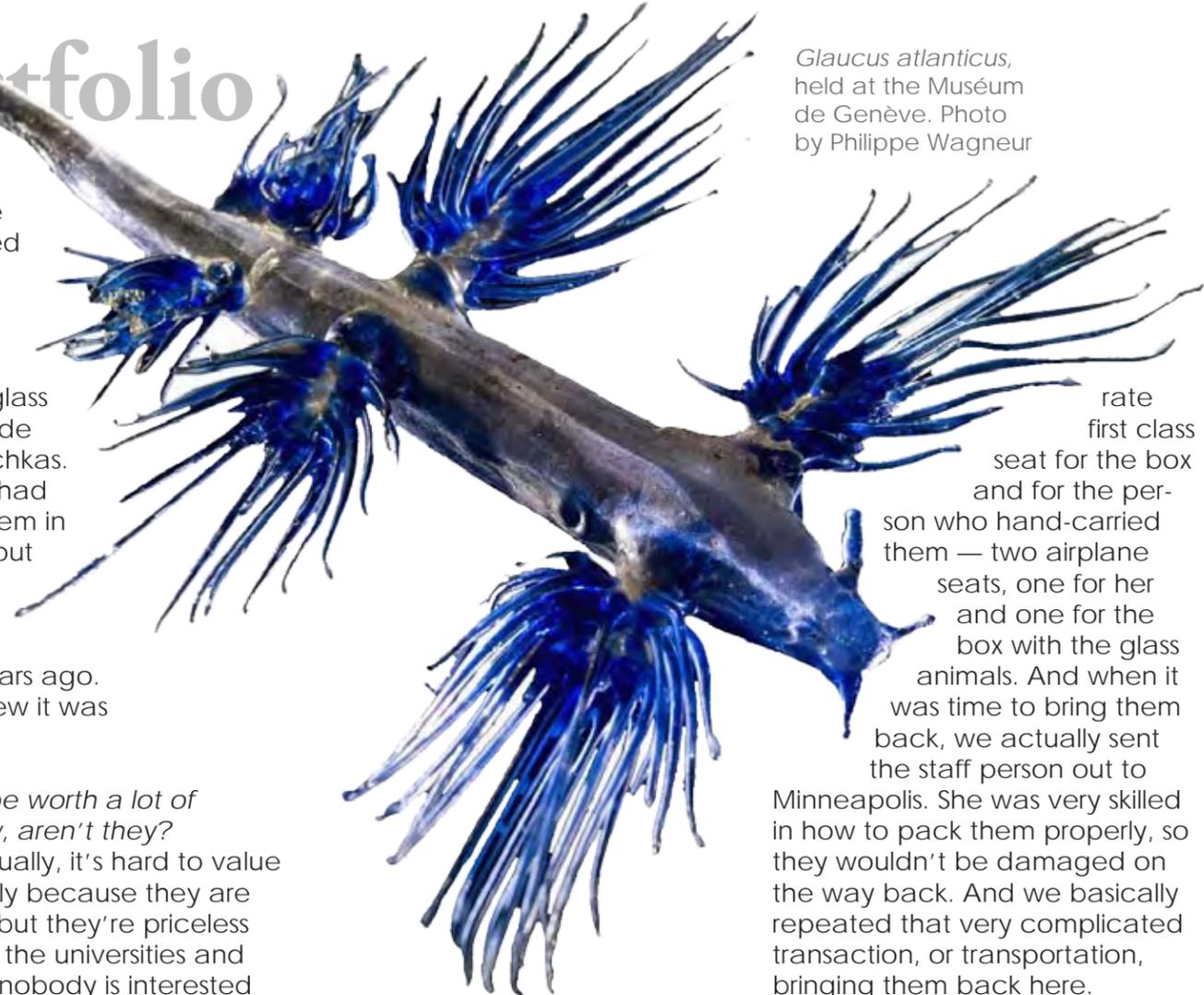


blew off the dust, opened it up, and there were these glass models. They were glass animals made by the Blaschkas. Somebody had just stuck them in a box and put them under a cabinet, say, a hundred years ago. Nobody knew it was there.

They must be worth a lot of money now, aren't they?
 JH: Yes, actually, it's hard to value them, literally because they are never sold, but they're priceless artifacts. All the universities and museums... nobody is interested in selling them. So, as a result, it is hard to put an actual price on them. They're priceless. They're invaluable. But we do have, well, I don't know what we do for insurance purposes, but we do declare them. But I don't know what price is put on them. I honestly don't.

We're also extremely careful with them, as you can imagine, because they're glass. They're very delicate. By and large, we don't let them out of this building. We did agree, a few years ago, to release about 20 or 25 models – those

Glaucus atlanticus, held at the Muséum de Genève. Photo by Philippe Wagneur



rate first class seat for the box and for the person who hand-carried them — two airplane seats, one for her and one for the box with the glass animals. And when it was time to bring them back, we actually sent the staff person out to Minneapolis. She was very skilled in how to pack them properly, so they wouldn't be damaged on the way back. And we basically repeated that very complicated transaction, or transportation, bringing them back here.

As a biologist and an expert, how do you rate the educational value of the glass models made by the Blaschkas?

JH: Oh, they're remarkable! They're one of a kind. They are interesting teaching tools in several respects. In their day, they were the most modern, up-to-date way to display biological diversity. Remember, all of them are marine invertebrates, so they are found underwater often on the ocean bottom, and they were the only means of conveying to the general public and all the students, what

the animals looked like, their variation. In fact, we do have a few specimens that are of kinds of species that are soft-bodied — that when you bring them up out of the ocean, and certainly when they die, they lose their color and they lose their shape, and when you preserve them in fixative, they just don't look anything like what they really look like in life.

Yes, and how did the Blaschkas know what the animals looked like?

JH: As far as the plants go, people would send them live plants and seeds for them to plant there, and they would take notes to themselves about the colors. To be honest with you, I don't know how they knew. I don't know the extent to which they did their own observations, whether they went out on ships. It was not uncommon in the 19th

century when

explorations would head out to different parts of the world. They would bring along illustrators.

We mounted some expeditions from the 19th century, including to South America and the Amazon, and, literally, you would read these accounts where the illustrator would be up on deck, and as the workers would bring up all these... this mess up and dump the fish on the deck of the ship, the illustrator would be madly rushing through it, doing a quick sketch of what the animal looked like; wouldn't have time to do the detailed color, but would make notes about the different colors on the parts of the fish. So, maybe a similar kind of activity occurred,

although you don't read too much about it, and the Blaschkas certainly didn't make any extensive travels of this nature.

Did they have apprentices or assistants working with them?

JH: From what we know, they had a system. But they did the glassblowing themselves. In fact, when Rudolf, the son, finally died—he stopped doing the glassblowing shortly before he died—Harvard made arrangements for them, the surviving family members, to send here, (the Blaschkas') tools and their work bench. We had them on display for many years. It was remarkable, because

you look at it, and what you're talking



Model #167.2, *Obelia dichotoma* L. and octopus (far left). These models are two of the 419 Blaschka models held by the Harvard Museum of Natural History. Photos courtesy of the Museum of Comparative Zoology, Harvard University



Some of the many glass models of marine invertebrates created by Rudolph and Leopold Blaschka near Dresden, Germany in the late 19th century. This shows one of many drawers in the Museum of Comparative Zoology, where the marine models have been stored for over a century. A small exhibit of some of the University's 419 models, some of which have never before been seen by the public, will soon go on display at the Harvard Museum of Natural History in Cambridge, MA. Photo Credit: Museum of Comparative Zoology, Harvard University

about is just a wooden bench with a bellows underneath that produced the fire, there was an alcohol burning lamp and a few tweezers, and that was it!

Speaking as an expert in the field, what role do the Blaschkas' glass invertebrates play in the museum's exhibit on evolution?

JH: We've included them partly because Harvard is a historically rich university—as you can imagine, it's been around for so long. But particularly in evolutionary biology, we have been studying evolutionary biology, and to some extent, leading the field in evolutionary biology for more than 100 years. People like Ernst W. Mayr (evolutionary biologist

from Germany, 1904-2005), Edward O. Wilson (Harvard biologist, 1929-present), Steven Jay Gould (American paleontologist, evolutionary biologist and science historian, 1941-2002)—these men were all curators here in the Museum of Comparative Zoology. So, we are very proud of our past and our traditions, and what has happened here, and all

Blaschka

of our collections. We were in business, if you will, during this great age of exploration in the 19th century. So, we have vast collections, which were accumulated for scientific research purposes, and the glass animals, while they were obtained mostly for exhibit purposes or teaching purposes, are part of these collections. They are just part of this very rich repository of material from the 19th century and are still considered very important today. It's a means for us in educating people about the history of evolutionary biology, frankly.

How ideal that Harvard was participating during that very exciting era of discovery and the time of Darwin...

JH: Yes, and the great irony, of course, is that while we are, if you will, devout champions of evolutionary biology and Darwin (today), the man who founded the Harvard Museum of Comparative Zoology in 1859, Louis Agassiz (paleontologist, glaciologist and geologist from Switzerland, 1807-1873), was a fierce opponent of Darwin's and a denier of evolution. So, Louis Agassiz—I'm sure if he were alive today—would just be disgusted with what's happened to his museum!

MCZ museum director, Dr James Hanken, is an evolutionary biologist at Harvard University and is a specialist in amphibians, frogs and salamanders. He does both anatomical studies and molecular studies, but also describes new species, conducting field work in different parts of the world where amphibians are not well known, or haven't been well-studied—where he and his colleagues believe there are many undescribed species. They have discovered many new species of amphibians, frogs and salamanders. They name them and study their evolution and variation.

For more information, visit the websites of the museums at Harvard University below: The Museum of Comparative Zoology www.mcz.harvard.edu/index.html Harvard Museum of Natural History www.hmnh.harvard.edu ■

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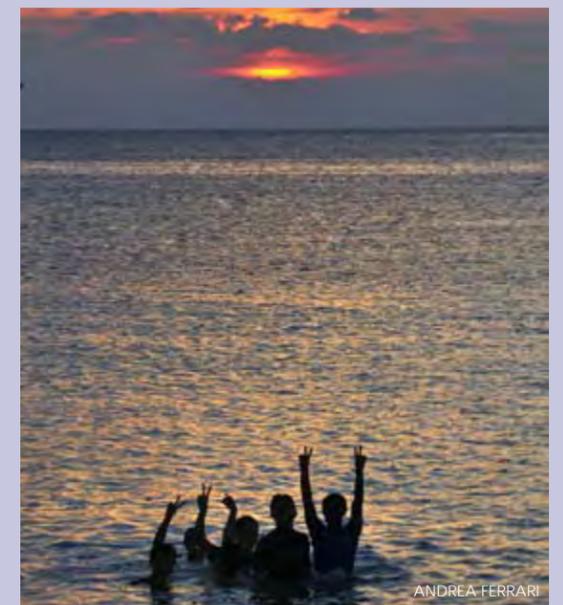
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