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## Sea Butterflies (Pteropods) Podcast and Scientist Interview

*Limacina limacina; Limacina helicina; Clione limacina*

In the ocean, a drama is playing out between two marine mollusks: sea butterflies--tiny swimming snails the size of a grain of sand (also known as Pteropods)—and the larger sea angel that preys on them. But it's another drama, one on a global scale, that concerns marine biologist Gareth Lawson and sculptor Cornelia Kavanagh: the changing chemistry of our warming oceans. The scientist and artist are collaborating to bring that story to a wider audience in the hope of rewriting the ending.

### Transcript

**Ari:** From the Encyclopedia of Life, this is One Species at a Time. I'm Ari Daniel Shapiro.

**Lawson:** It helps if you have very good vision, which I do not!

**Ari:** Gareth Lawson makes his living studying and appreciating things invisible to the naked eye. He's a biologist at the Woods Hole Oceanographic Institution, and he's staring at a personal favorite – a marine snail, about the size of a grain of sand, called a pteropod.

**Lawson:** So what makes it beautiful, you know? It's very hard to put your finger on it. I guess we know beauty when we see it, right?

**Ari:** Take the Arctic pteropod *Limacina helicina*. Its tiny shell is like a delicate swirl of glass.

**Lawson:** Imagine a terrestrial snail – so you usually see the animal sticking its foot out, which is this sort of slimy structure, like on a slug. So in the pteropod, that foot has a heart-shape. They use in a flapping motion to propel themselves through the water that makes them look much like a butterfly in flight.

**Ari:** It's why these microscopic pteropods are also called "sea butterflies."

**Kavanagh:** When I found the sea butterfly, that was it. It was so beautiful. It's poetry – it's like ballet.

**Ari:** Cornelia Kavanagh is a sculptor. She stands proudly at the entrance of her most recent exhibit in New York City. It's called "The Pteropod Project," and it's a collaboration... between Gareth Lawson who provided the science explanations lining the walls, and Kavanagh who made the couple dozen sculptures in here. Both Lawson and Kavanagh are inspired by the beauty of the things we can't see.

**Kavanagh:** So you walk in and you see the *Limacina helicina*.

**Ari:** Kavanagh's version of the pteropod is giant – hundreds or thousands of times bigger than an actual pteropod. It's made from foam that's painted silver, and it stands about 4 feet tall on a pedestal that makes you look up. Its spiraled body bursts upward into a pair of butterfly wings – two thick paddles. A cavity punctures the spiral.

**Kavanagh:** It gives you a sense where light plays through it. And you get some of the luminosity.

**Ari:** Kavanagh leads me across the gallery to a silver, orange and purple sculpture of a different kind of pteropod. It's like a giant...slug with wings. There's no shell.

**Ari:** What is this?

**Kavanagh:** Well, this is the beast of all time – this is *Clione limacina*. And their basic diet consists of my beautiful *retroversas* and the *helicinas*.

**Ari:** The rest of the things on display in the gallery.

**Kavanagh:** Yeah, yeah. They eat the whole animal – they suck it right out, and leave the shells. I got very mad at him, and so I made him as ugly as I could. I know Gareth likes him. I just think he's beastly.

**Lawson:** I don't really mind when my study species are eaten. That's part of the food web, and that's part of the role they're supposed to play.

**Ari:** *Clione limacina* – which also goes by the name "sea angel" – feeds exclusively on the shelled pteropods. In fact, many marine animals eat shelled pteropods – fish, seabirds, even whales. It's why Lawson studies them – they're an integral part of the food web, and they're in danger...because the chemistry of the world's oceans is changing.

**Lawson:** The atmosphere has been accumulating carbon dioxide due to the burning of fossil fuels. And a large fraction of that carbon dioxide is actually dissolving into the ocean. One of the consequences is the ocean is becoming more acidic.

**Ari:** The increasing acidity means it's harder for pteropods to make their glassy shells. And it's likely to get even worse.

**Lawson:** The prediction is the entire water column will be corrosive to the pteropod shell.

**Ari:** Meaning that the shells might dissolve away, killing the pteropods and rattling the food web. Without their sole food source, the predatory *Clione limacina* would disappear as well.

**Kavanagh:** While we're standing here, we're in the corner of the dying pteropods.

**Ari:** Cornelia Kavanagh points out a series of smaller sculptures of Limacina retroversa, made out of aluminum.

**Kavanagh:** They're limping down to the bottom of the sea.

**Ari:** Some of them are tilted to one side, their wings drooping. One of the shells is pierced through with holes, as though it's being ripped apart by acid.

**Kavanagh:** As an artist, I feel that it's my job to make my work talk in some way other than just promote beauty. Look what's happening to these beautiful micro-organisms. Fact of the matter is, they're invisible to the naked eye. So how many people even know, and how many people are gonna care?

**Lawson:** So we don't know what's gonna come with ocean acidification. Cornelia – she's, through her medium – sculpture – imagining one possible way that they might respond. And that question of how are the pteropods gonna respond is exactly what we're doing through science. We're both trying to tackle the same problem through completely different media.

**Ari:** Before we leave, Kavanagh takes me over to the visitor book near the door. She reads me a couple of comments that were left for her.

**Kavanagh:** "Amazing confluence of art and science." "Beautiful to see the..." What does that say?

**Ari:** "Enlarged."

**Kavanagh:** ...forms of these. So –"

**Ari:** "Tiny."

**Kavanagh:** "But so important creatures. Good for them! Ok, they got it! No idea who they are. That's what I mean! That means you're touching people – that's all you want."

**Ari:** Our series, One Species at a Time, is produced by Atlantic Public Media in Woods Hole, Massachusetts. I'm Ari Daniel Shapiro.

## Meet the Scientist

Meet biologist Gareth Lawson, who was featured in the Sea Butterflies podcast:



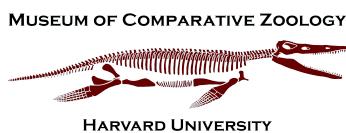
**Where do you work?** In the Biology Department at the Woods Hole Oceanographic Institution, Woods Hole, MA. USA.

**What do you study?** I study the ecology of marine zooplankton and fish.

**What are titles you would give yourself?** Biological Oceanographer, Teacher, Father.

**What do you like to do when you are not working?** Hang out with my wife and kids.

**What do you like most about science?** The sense of excitement in learning new things about marine ecosystems and the adventure of ocean-going.



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