

Tapescript

The incredible world of animal perception, and what it can teach us (Interview with Ed Yong)

(I=Interviewer; EY=Ed Yong)

I: I'd love to talk to you about some of the stimuli that we don't seem to perceive. Ed, I mean, maybe let's start with electric fields. What animals can sense them and how are they doing that?

EY: So, sharks can sense electric fields and rays do as well. Platypus can sense electric fields. A lot of these animals are picking up on the very, very faint electric fields that all living things naturally give off in the water. So, most animals that can sense electric fields are aquatic. The most incredible examples of this sense, though, come from electric fish. So, fish that can produce their own electric fields and then sense them. This incredible ability allows them to navigate through water that can often be too murky to see in. They can sense the way their own self-produced field is warped and distorted by objects around them, whether that's insulating objects like a rock or conducting objects like other animals or plants. They can even communicate with each other using electricity. So, they can send out electric fields. They can pulse those fields. If you go to places like the Amazon or some rivers in Africa and dip an electrode in the water connected to a speaker, you'll hear the buzz of all of these electric fish, which are often pretty common in these electric choruses that are filling the rivers of the world that we otherwise wouldn't be able to perceive.

I: And what about magnetic fields? I mean, plenty of animals migrate around the world and find their way back to a particular beach or tree or roof to make a nest, for example. I mean, there's long been this idea that some of them are tapping into magnetic field. Tell me a bit more about where research is out on that.

EY: So, this sense was only discovered in the 50s and 60s. Migrating songbirds, Robins, were the first example, but we now know that many, many songbirds have

this skill. Sea turtles have it, maybe great whales have it. And it's incredible to me because, you know, I can't sense the magnetic field of the earth. I need to use a compass. But many animals turn out to have these inbuilt and living compasses bodies. So, a sea turtle that hatches off the coast of Florida on the east coast of the US will make a clockwise loop of the Atlantic over 10 years, swimming past the coast of Portugal and then down again. Now, if you take that baby turtle and put it in a lab and expose it to an artificial magnetic field that mimics what it might experience at different points on that journey, it will orient itself to swim in exactly the right direction, as if it was, for example, off the coast of Portugal. And it will do that despite never having been in the water before. This sense is very mysterious still. It is the only sense we know of, for which we don't know the receptor. So, what are the kinds of cells that pick up the Earth's magnetic field? And while there are many furiously competing ideas about how it works, none of them are set in stone yet.