BIOLOGY

ALLIGATOR FEELINGS BY MARIANA RELÓS

You're in a Florida swamp. It's pitch black. You can see nothing, but you know alligators are close by. So whatever you do, stay absolutely still.

Even in total darkness alligators can sense their victims. 'Gators have a couple of thousand small, black, dome-shaped dots on their faces that can detect ripples caused by a single falling drop of water. Hungry alligators use these pressure receptors to detect prey.

Alligator expert Dr. Daphne Soares, at the University of Maryland, studied the dotted tissue on the alligator's face. She discovered that the dots connect to the trigeminal nerve. This is the thickest of the cranial nerves of the alligator. This exciting discovery meant that the dots were an important sensor of some kind. A sensor for what?

She tried electrical currents, lights, and even stinky things, but nothing activated the dot-sensors. Then one day, Dr. Soares dropped something in the tank. When she reached for the object—creating ripples in the water—the dot-sensors fired up nerve impulses. After a series of experiments, the scientist determined that the receptors responded only to the pressure of ripples in the water.

Next, Dr. Soares wanted to know if the alligators had any use for these pressure receptors. She placed a young alligator in a tank of water. She blocked the animal's ears with Vaseline, so it couldn't hear, and turned out the lights, so it couldn't see. Using infrared light, Dr. Soares saw that even though the 'gator couldn't hear, see, or smell when one drop of water fell in the tank, the animal went and bit it! When Dr. Soares covered the dots on the alligator's face, the 'gator did not respond at all.

Courtesy Adam Britton

Don't get too close, it will bite. The bumps on an alligator's face allow it to sense the movement of other creatures in the water.

Dr. Soares also found out why alligators always stalk their victims in a half submerged position. The pressure receptors are useless when the animal is either completely underwater or completely outside the water. Crikey!

Corbis

A EUREKA MOMENT

One day, Dr. Soares was sitting on an alligator's back. (She was in a swamp and the alligator was tied up, ready for transport back to the lab.) As she looked at the alligator's face, she wondered, what are those little spots for?

After she determined the dots were sensors, it was an accident that steered the rest of the research. "I had dropped something in the tank and as I reached for it, I created surface waves with my hand," Dr. Soares says. "Very funny how you learn things. First I didn't believe it and had to do it a few times to make sure."

Then she designed all the experiments to make sure she was right—ripples on the water tell the 'gator to go chomp, chomp, chomp!

ARCHAEOLOGY

ANCIENT BEACH BUDDIES BY FIONA BAYROCK

So—you're at the beach, and a long-tailed pill bug the size of a lobster crawls out of the sea and ambles past you across the sand. Possible? Not! Phew. We-l-l-l, at least not *today*.

But Dr. Robert MacNaughton, a geologist with the Geological Survey of Canada, and his colleagues think fossil trackways discovered in a sandstone quarry near Kingston, Ontario show that animals like this did walk on land some 500 million years ago. They were probably arthropods called euthycarcinoids, extinct relatives of centipedes and millipedes. If he's right, it means animals first ventured out of the sea onto land a lot earlier than we thought—about 40 million years earlier.

Courtesy Dr. Robert MacNaughton (2)

In the 1980s, scientists thought the tracks must have been made underwater because, as far as they knew, animals existed only in the ocean 500 million years ago. "As scientists, we can only work with the data available to us," said Dr. MacNaughton. "However, in 20 years, nobody has ever found direct evidence that these tracks were produced underwater." Recently, he and his colleagues challenged the old model. What if these tracks *were* made on land?

Studying the trackways in detail, they found that the sandstone beds were layered and rippled in patterns like those made by wind, not water. The tracks held clues, too. The footprints are fairly deep, which means the animals probably weren't buoyed up by water, notes Dr. MacNaughton, "and in some of the tracks the animals pushed up mounds of sand behind their footprints, which only happens on dry land."

So why would these animals come onto land, even before most land plants existed? Perhaps to mate or lay eggs, shed exoskeletons (hard shells) in safety, or find food. Whatever the reason, it was temporary. "We can model the way that the animals walked, and they walked like animals that were best adapted for living underwater," said Dr. MacNaughton. Adapting to life on land would take millions more years. Changing our understanding of life's history—as simple as a walk on the beach!

ASTRONOMY

BEYOND PLUTO BY JUDE ISABELLA

The last big thing found in the solar system—72 years ago—was Pluto. Now the ninth planet has company.

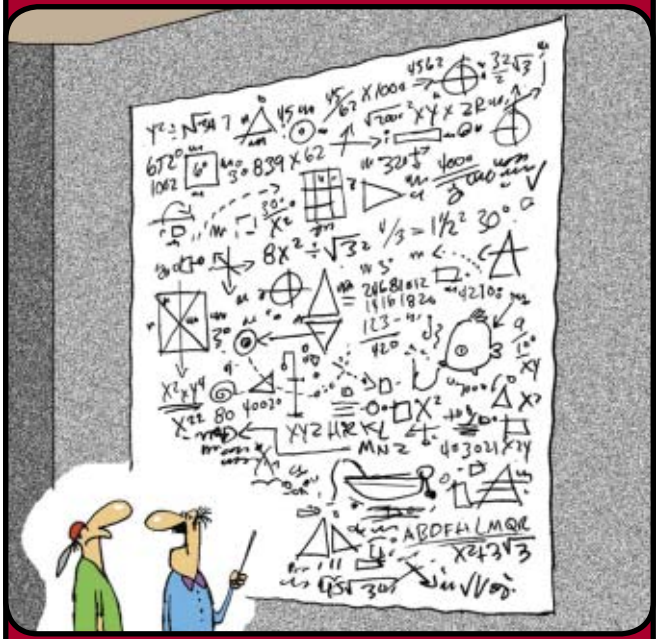
NASA and G. Bacon (STScI); NASA and M. Brown (Caltech)

Left, an artist's concept of what Quaoar might look like. Below, what Hubble actually saw.

Using the Hubble Space Telescope, scientists have measured an icy world more than 1.5 billion kilometres beyond Pluto—called Quaoar (pronounced kwa-whar). At 1280 kilometres wide, Quaoar is bigger than the 50,000 identified asteroids put together, or, half the size of Pluto.

Quaoar orbits the Sun every 288 years and, like Pluto, resides in the Kuiper Belt. Astronomers wonder if even bigger objects orbit out there. So, uh, Pluto, are you a planet or a pretender?

Science Sillies by Jerry King



"And that, in simple terms, is how I feel about your term paper on neutron stars. Any questions?"