

Dinosaurs in the dunes

DAVID FASTOVSKY, 57 | Paleontologist

A baby turtle or crocodile is on its own after hatching from its egg. Scientists used to think the same about prehistoric reptiles, a.k.a. dinosaurs. Not anymore. The discovery of a 70 million-year-old nest of 15 *Protoceratops andrewsi* in Mongolia adds to the growing evidence that dinosaurs cared for their young. University of Rhode Island paleontologist David Fastovsky was on the desert expedition that discovered the 2.3-foot diameter nest in the mid-'90s. During a trip back to Mongolia in 2009, he gained access to the nest at the Mongolian Academy of Sciences and wrote a paper on the find published last November in the *Journal of Paleontology* and then reported around the world. Chairman of URI's Department of Geosciences, Fastovsky is a leading expert on the causes of the mass extinction of the dinosaurs. **BY BRE EATON**

How did you find this rare nest of baby dinosaurs?

I was on the expedition in Mongolia, but I'm not the one who actually found it. Dr. Pagmin Narmandakh, a Mongolian paleontologist actually found it. I would rank her among the top 10 fossil finders in the world. She has the eye. We were all out there and she went out and found it, whereas we probably walked by it six times. We were in the center of the Gobi Desert, just north of the Chinese-Mongolian border — a place that takes three days by four-wheel drive to get to. It's a very remote place, known since the 1920s to be rich in fossils because of a man named Roy Chapman Andrews, who is plausibly rumored to be the model for Indiana Jones. He made fabulous collections from there for the American Natural History Museum in New York. He wrote a book called "All About Dinosaurs," which I read when I was a little boy and that got me into dinosaurs.

I'm imagining you trudging through sand dunes.

That's it exactly, and you're

looking for fossils poking out. She found a nest with 15 babies in it.

What part did you play in the expedition?

I ended up writing the formal description and interpretation of the fossil. Basically, I described the specimen, and at the same time I suggested that the specimen implies that there was some care at the nest of these animals, much like one sees in modern birds. I believe the fossil also records the last bug-eyed, terrified seconds of their little lives because almost certainly they were buried by shifting sands during a sandstorm, snuffed out until Narmandakh came and found them, some 75 million years after.

How often are you able to go on expeditions?

My work always involves fieldwork, usually 4-6 weeks per year. Most of that is spent in pretty remote places, and often involves camping and living out of a tent and sleeping bag. My work doesn't exclusively involve finding fossils. I spend a lot of time trying to understand what the place was like in which the fossils are found and how the fossils came to be there. That kind of work — sedimentology — is what allowed us to understand how the last few seconds of the babies' lives went.

Why did dinosaurs become extinct?

The best explanation we have today is that non-bird dinosaurs went extinct because a 10-kilometer asteroid smashed into the Earth 65 million years ago. There's an appropriately large impact crater, the Chicxulub, in the Yucatan peninsula. The simplest idea is that the asteroid blocked out the sunlight.

First, you lose photosynthesis, you lose the primary producers and then you have a chain going through the ecosystem. You lose one thing after the next.

How do you stay ahead in a field that studies mysteries of the past?

You're a scientist, so you have questions — I pursue the direction that my scientific questions lead me in. One of those is understanding when and how dinosaurs first appeared and how they evolved in the early stages during their time on earth. My colleagues and I were the first to demonstrate that dinosaurs went extinct abruptly. That was the first time that dinosaur extinction could be shown to be compatible with what you would expect if an asteroid hit the Earth and killed them — the extinction was in fact catastrophic and not gradual. And then the other question is how the "non-bird" dinosaurs went extinct. We use that expression because most paleontologists are pretty confident that birds are living dinosaurs.

Really?

There's very little doubt in that. There are some anatomical characteristics that all dinosaurs uniquely have, just as there are characteristics that make human beings human beings and not something else. Most paleontologists would now say that it is no more radical to call a bird a dinosaur than it is to call a human a mammal.

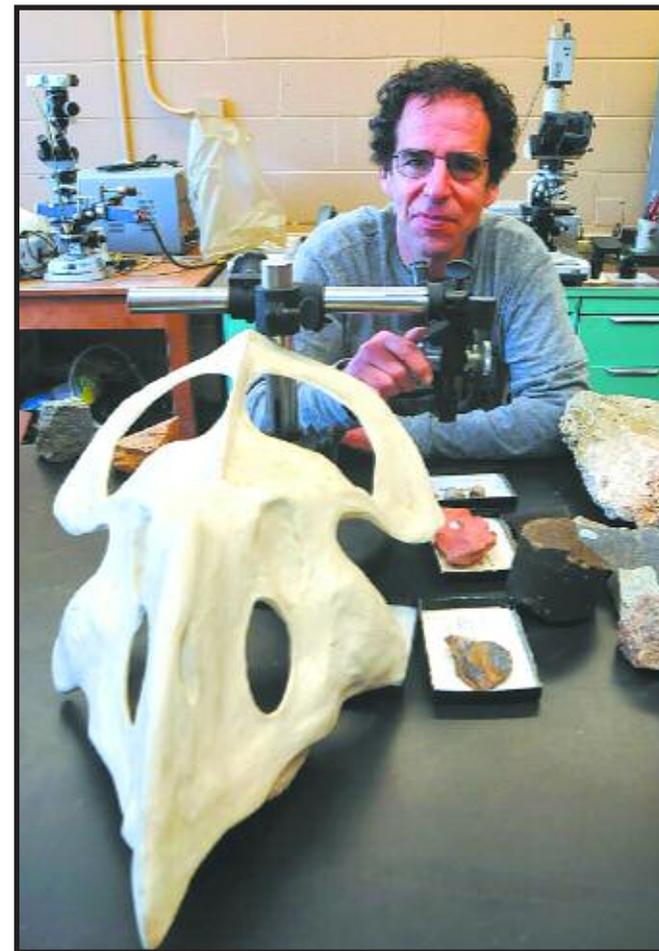
Have you always loved dinosaurs?

Yeah, I have. However, there was a point in my life when I kind of forgot about them for a while. I didn't think I would be able to get a career out of

them, until one day I thought "why not?" Then they came back in a rush. I'd kept coming back to them thinking, "What I'd really like to do is be a paleontologist." Then, "Nobody does that!" Then one day I thought, "I should look into whether or not people actually do it before I discount it." And they did do it, they just didn't do it where I was, that's all. I had started graduate school in biochemistry and I went to my adviser and said, "Guess what? I was only kidding. I really want to be a paleontologist." He was gracious enough to support that, which if you think about it, it's actually remarkable because he'd invested money in me at that point and he actually wrote me a letter of recommendation for graduate studies in paleontology. He was probably trying to get rid of me. Move this boy along! (*Laughs.*)

What did you have to do to break into this field?

There was an article in "Scientific American" called "Dinosaurs Renaissance" by a guy name Bob Bakker, a paleontologist. So I wrote to every person that was mentioned in that article — "Hi. I want to study dinosaurs!" And nowadays saying that would be the kiss of death. It shows that you don't know anything about paleontology. The letter was exactly right; it really reflected the state of my mind. But surprisingly the people I wrote were very gracious and everyone except one wrote back to me. They said apply to graduate school. And that's what I did. I got my master's at Berkeley, and I got my Ph.D. at the University of Wisconsin. At Wisconsin I shut down my paleontology studies for four years while I studied sedimentary geology. But then when I was trained in sedi-



He digs it. Professor David Fastovsky, chairman of the University of Rhode Island Department of Geosciences, is pictured in his lab with a cast of an adult *Protoceratops*' skull. *Protoceratops* grew to about 6 feet long. PHOTO BY MICHAEL DERR



Dinosaur Jr. The 70 million-year-old nest shows at least 15 young *Protoceratops*, including 10 fully intact skeletons. The dinosaurs were believed to have been buried alive in a sandstorm. PHOTO BY K.H. TSOGTBAATAR

mentary geology I could come back to paleo and ask the questions from a geological perspective, which was the point of going to Wisconsin.

What about studying dinosaurs has captivated you for so long?

I'm not wedded to dinosaurs per se. Fossils are just physically beautiful things to look at, and I love thinking about ancient things and re-imagining worlds that are no longer available to us. I like seeing how life has solved problems in different ways from the way that it solves them now. One thing I might point out is that

the Earth has flirted with global warming in the past, several times. So if you want to know how the modern ecosystem will react to this crisis — the kind of global warming we see now — you can look in the past and see how past ecosystems have reacted.

What do you think?

Of course there's nothing constant on Earth besides change. We certainly won't destroy the ecosystem, but we will destroy the one that we know. It will change. What you can do is try to take the human part of the change out of the equation.

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