New ornithomimosaur from Arkansas described

March 28 2018, by Sarah Gibson

Holotype cast of Arkansaurus fridayi, pictured in front of the Broadway Bridge, Little Rock, Arkansas. Credit: R. Hunt-Foster, used with permission

Last week, a new species of dinosaur was described in the *Journal of Vertebrate Paleontology*. The dinosaur, Arkansaurus fridayi, is an ornithomimosaur the Early Cretaceous of Arkansas, and represents the first dinosaur to be described from that state. In fact, it's now be honored as the State Dinosaur of Arkansas. And although the paper itself is not Open Access, the data is Open Access and can be found online at MorphoSource.

The specimen of Arkansaurus was discovered over four decades ago, and I sensed an interesting story behind this discovery. So I asked lead author ReBecca Hunt-Foster, a paleontologist for the Bureau of Land Management, a few questions regarding this dinosaur decades in the making.

The specimen was discovered quite a while ago. I'm guessing there's a unique story behind the journey of this specimen, would you care to elaborate?

The fossils were discovered in 1972 by Mr. Joe B. Friday on his land near Locksburg, Arkansas, following an earthmoving project. Mr. Friday showed the fossils to Doy Zachary, then a student at the University of Arkansas (and now geology professor emeritus at the University of Arkansas), who then showed them to Dr. James Quinn [posthumous second author]. Mr. Friday donated the fossils to the University of Arkansas, and the fossils are named also in his honor and in honor of the state in which they were discovered – "Arkansaurus fridayi", a name first unofficially proposed by Quinn.

In 1973, the remains were initially described by Quinn at the South-Central Section meeting of the Geological Society of America in Little Rock, Arkansas. Dr. Quinn's tragic and untimely death in 1977 left the fossils without an official scientific description. The fossils waited in the collections at the University of Arkansas museum until I first began working on the project as an undergraduate in the geology department at the University of Arkansas in 2002. Forty-five years after Quinn began his research, I gave a presentation on the remains at the recent 2018 South-Central Geological Society of America meeting in Little Rock.

When I first began my work in the early 2000's there was little in the way of published research for me to compare the Arkansaurus specimen

too. I completed my initial research in 2003, and came back to the project in 2016, when I reexamined the fossils and was able to compare them the additional new fossils that had been described in the scientific literature. This allowed me to do a more complete description of the remains. The fossilized remains were also recognized by the State of Arkansas in 2017 as the official State Dinosaur of Arkansas.

The specimen was found on Mr. Friday's private land, and you've honored him with the specific epithet fridayi. Was there an effort to find any other material in the area or in the same formation elsewhere? Were any other fossils from other organisms found alongside this specimen?

Around 2002 I visited Mr. Friday with my mentor, Dr. Leo Carson Davis, and he took us to the site where the fossils were discovered. Mr. Friday had searched since the initial discovery for additional bones. Only weathered and rounded fragments had been discovered, and were given to me in 2002 to work with, although no additional data was gained from them. No other fossils were recovered from the original discovery site itself.

Arkansaurus, along with Nedcolbertia, now represent some of the oldest remains of ornithomimosaurs in North America. How is this discovery changing our global understanding of the biogeography and evolutionary history of ornithomimosaurs?

Paleontologists have recently found other animals, such as the sauropod dinosaur Mierasaurus, that lived alongside Nedcolbertia, in the Cedar Mountain Formation of Eastern Utah. These dinosaurs have ancestors that suggest they originated in Europe, rather than from the North

American Jurassic sauropod lineages, and immigrated to North America across a European land bridge during a time of lower sea levels during the Early Cretaceous, as the two continents began to move away from one another. It is reasonable to hypothesize that North American ornithomimids also immigrated during this time, and spread across North America during this time. There were no large geographical boundaries to keep them from moving back and forth, and the Skull Creek Seaway had not yet descended entirely from the north, which later bisects the continent into Laramidia to the west and Appalachia to the east. Arkansaurus helps us fill in the ornithomimid family tree, especially in North America, as most of the specimens known from North America are only known from the Late Cretaceous. I am also currently studying ornithomimosaur specimens collected from the Arundel Clay of Maryland and the Cloverly Formation of Wyoming, which are also Early Cretaceous in age, to compare to Arkansaurus and Nedcolbertia, and we presented our early findings at the Society of Vertebrate Paleontology meeting in 2017.

Ornithomimid fossils are often usually identifiable by their necks and heads, and aren't often recognized by their feet. What is it about this specimen that gave it away as an orninthomimid?

I started with the metatarsals. I first started by comparing them to other known forms from North America, including Nedcolbertia and Ornithomimus velox. From there I continued to look into the published descriptions of other known ornithomimosaurs, and was surprised at the volume of material that has been published since 2003, as well as the variety and inconstancies seen in the metatarsals across geologic time. Some of these inconsistencies might become more clear as geologic dating methods are improved, when additional and more complete specimens are discovered, and when existing undescribed specimens are

published on (there are quite a few from the Early Cretaceous globally we are still waiting on.). The metatarsals I found to be the more diagnostic elements, and are more similar to what we see in the Arundel Clay material and in Nedcolbertia, than to any other ornithomimosaurs.

Let's talk artwork. You commissioned Brian Engh for the fantastic reconstructions of Arkansaurus, and we've featured Brian here at PLOS Paleo before. How did you guide him towards the look of the animal, as well as its environment?

I love working with Brian. He puts a TON of research into his pieces, and ask amazing questions, which I really appreciate. I gave Brian information on similar ornithomimosaurs, and some information on soft tissue has been published, so there was at least some information to help him get started. After that, I let Brian do what he does—a ton of additional research as well as observing modern animals—and then we work to tweak any of the fine features. You can check out more about his art process for the Arkansaurus pieces here: http://dontmesswithdinosaurs.com/?p=2087

Arkansaurusis named after the state of Arkansas, where this dinosaur was discovered. But Arkansas isn't usually renown for their dinosaur discoveries, making this a pretty special find. Do you have plans to further explore this area for more dinosaur or other fossil material?

Yes. I am working with Celina Suarez, Joseph Fredrickson, Rich Cifelli, Jeff Pittman, Kristy Morgan, Mason Frucci and Randy Nydam to study some fossils that were discovered from a different site in the Trinity Formation within the same county by Jeff Pittman in the 1990s. These

remains include theropod, sauropod and ankylosaur dinosaurs, along with crocodiles, turtles, a lizard, a mammal and a bird. Celina and I have plans to revisit this discovery site, and hopefully a few other exposures to search for additional material.

Anything else you'd like to share?

Dinosaur fossils are so rare from Arkansas, and other surrounding states like Louisiana, Oklahoma and Alabama, that it is really great when we are contacted by local members of the community who may have potentially discovered fossils. There is often the misconception that people are not allowed to have these remains or that they will be "taken away" from them. This is not true. As long as the remains were collected legally from your private land, you have the right to collect and keep these fossils. Due to the rarity of these types of fossils, it is wonderful when people reach out to us, and ask us to identify fossils for them, donate them so they can be studied, or can help us locate additional remains. The public really are our eyes on the ground, and paleontologists can not visit every outcrop. In our case with Arkansaurus, Mr. Friday was kind enough to donate the specimens to the University of Arkansas, where they have been carefully stored and are available for paleontologists to study. I was happy that we could officially name these remains in his honor, and I am forever indebted to the Friday family for their important contribution to paleontology.

More information: ReBecca K. Hunt et al. A new ornithomimosaur from the Lower Cretaceous Trinity Group of Arkansas, *Journal of Vertebrate Paleontology* (2018). DOI: 10.1080/02724634.2017.1421209

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