Fossils In North Dakota

FIND is a newsletter dedicated to helping young readers (in age or spirit) express their love of fossils and paleontology, and to help them learn more about the world under their feet. Each issue will be broken up into sections including Feature Fossils, Travel Destinations, Reader Art, Ask Mr. Lizard, and more!

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Next Issue: ????

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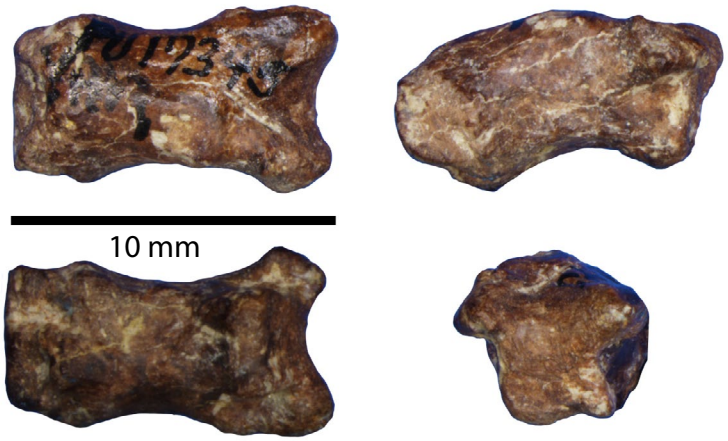
Feature Fossil: *Palaeanodon*

If you research "pangolins" - a quick Wikipedia search tells you they can be found in southern Asia, and in Africa south of the Sahara desert. There are extinct pangolin lineages as well - including one that used to live in North Dakota!

Don't worry if you've never heard of these "scaly anteaters" - not many people have. They are amazing mammals covered in thick scales made from keratin - the same material that makes up hair and fingernails. They are not actually related to anteaters, but they *are* insectivores that eat ants and termites. They have large claws on their front feet they can use to rip open termite mounds, or tear open ant-infested logs. Pangolins also resemble armadillos, but again they are not related. They display what we call **convergent evolution** - which is when two unrelated groups develop a similar trait. Like pterosaurs (reptiles) and bats (mammals) flying, or the marine ichthyosaurs (reptiles) having a very similar body shape to dolphins (mammals). Or even porcupines and cactus having pointy spines for protection!

The *Palaeanodon* material that was discovered in North Dakota was found in the late 1950s or early 1960s by Glenn Jepsen. *Palaeanodon* translates roughly from Greek to "Ancient toothless [animal]". It was found in the Golden Valley Formation of the Eocene - which is between 50-57 million years old. Younger than dinosaurs, but right in the middle of when mammals started getting *weird* and evolving to fit different habitat niches. Before you get too excited about visiting to see an awesome skeleton - there were only a couple of toe bones discovered, and both are currently in the Yale Peabody Museum (New Haven, CT). The discovery was long before there was a North Dakota Geological Survey Paleontology department, or a fossil display and collection in Bismarck.



Above: Metacarpal (hand-bone) PU 17345.

Sadly, living pangolins are one of the most trafficked mammals in the entire world, and are listed as **vulnerable** to **critically endangered** - about the same level as tigers and rhinos. They are hunted for their scales - the exact thing that is supposed to protect them from predators.

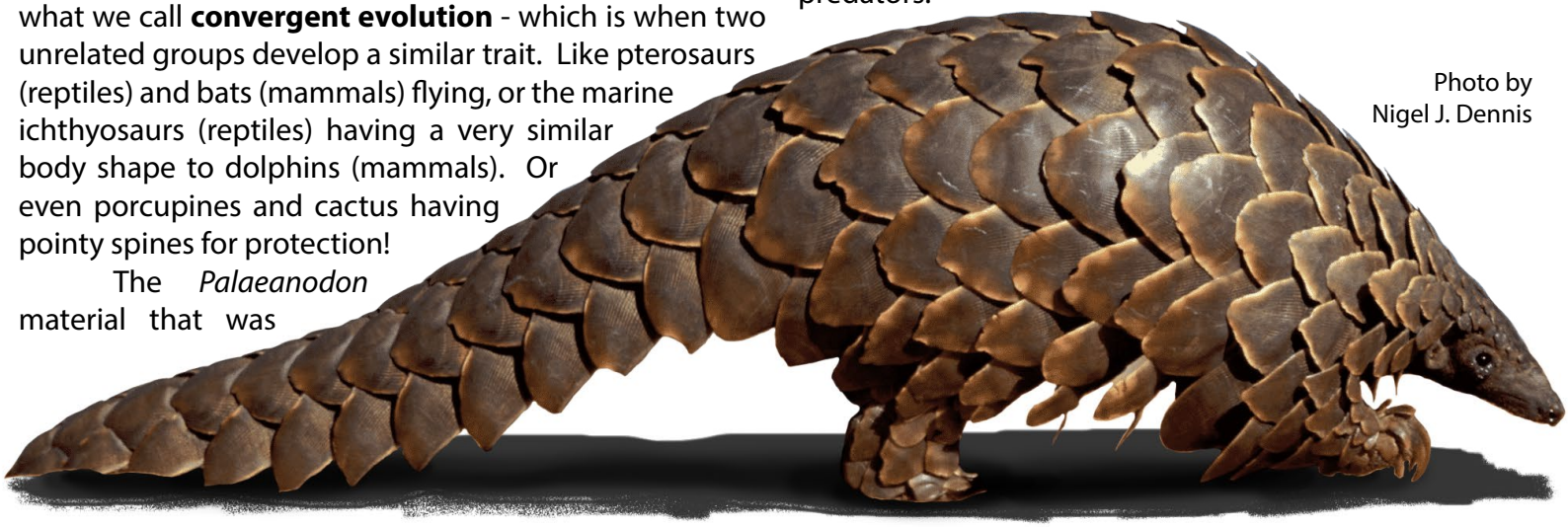


Photo by Nigel J. Dennis

V. I. P. (Very Important Paleontologist)
Becky Barnes

First off, it's strange writing about yourself, and difficult not to feel a bit weird. However since this is the last FIND I will be writing, I think it's fitting that I end with... me!

Chimera by Jacopo Ligozzi, 1590-1610.

I'd like to tell you a little story about a girl who loved monsters. When I was little I didn't know what dinosaurs were. It just wasn't something my family talked about much. I did know what dragons, gryphons, unicorns, chimera, rocs, phoenixes, pooka, and fae were however. My family loved (and still loves) stories. Fairy tales and fables, mythology from around the world - I soaked it all in.

Viking ship on display at the Hjemcomst.

When I was about five years old, my parents took me to the Hjemcomst center in Moorehead, MN - basically a smaller version of the Heritage Center filled with history and culture, that occasionally had traveling exhibits on display. That time around they had a "Dinomation" exhibit. Big robot dinosaurs with rubber skin, fog machines, recorded ROARS, and the smell of mechanical grease. I was in the middle of a great big room filled with dragons that my parents insisted were something called "dinosaurs." They convinced me that unlike my fairy tales - these creatures were *real*... and there were people who had jobs to dig up and study them.

That was it. I was hooked. For the next decade I collected books on paleontology, watched as many documentaries as I could, and was an avid library patron scouring the shelves for anything new. When I was about 10 years old, my mom bought a dig-out-the-dinosaur kit - you know the ones with plastic bones locked in clay... I cheated and dumped it in a bucket of water. Not the lesson in patience my parents were hoping to teach me. Shortly after we made a trip up to Duluth, MN, and while there visited the Agate City Rock Shop - it was a paleo-loving-kid's candy store! They had unprepared fish from the Green River Formation in Wyoming. My parents loaded up a basket full of them - I couldn't cheat on the fish! We made a fossil preparation station in my room, and for the next six years I taught myself how to carefully chip away the excess rock to expose the fossils beneath.

Jurassic Park came out in 1993 - but I was already hooked on prehistoric life. So while it didn't spark a new love of science, Laura Dern's portrayal of Ellie Sattler, a WOMAN, showed me that there was a place for me in paleontology too (even if all the paleontologists shown on TV or in magazines at the time were guys). My 7th grade science teacher, Mrs. Diane Allen, was such an important catalyst. Here she was, a woman in science that wasn't a movie character!

When I was 16, I had the wonderful opportunity to join a continuing education class through Concordia College, in Moorhead, MN. It was called "Concordia Communiversity: Digging Dinosaurs." There I met Dr. Ron Nellermoe, who would turn into a lifelong friend and mentor. His class taught fossil preparation working with dinosaurs, specifically *Edmontosaurus* and *Triceratops*, as well as field work excavating the fossils from South Dakota. I worked with Dr. Nellermoe my last couple years

Dr. Ron Nellermoe

of High School, through my Undergraduate years at Concordia working towards my Bachelor of Science in Biology where he was my Major Advisor.

After Concordia I continued my education at North Dakota State University in Fargo, ND, where I worked towards my Master of Science degree. Dr. Allan Ashworth (Geology) became my committee chair, and Dr. Will Bleier (Biology), Dr. Ron Nellermoe (Biology), and Dr. Rhonda Magel (Statistics) filled out the rest of my committee. I was able to continue working on the Concordia *Edmontosaurus* collection as my Thesis topic: The Hadrosaurid Genus *Edmontosaurus* From The Cretaceous Hell Creek Formation Of South Dakota. To sum up: I looked for dimorphism (physical differences between male and female dinosaurs) - which I could *see* in the bones, but couldn't prove it statistically. While doing this I stumbled across a happy little accident: the statistics work I was using was able to organize individual tail bones that started as a jumbled mess, into individual animals! And a BONUS bonus - the lined up bones also showed how the backbone and spines fused over time, beginning at the tip of the tail, and moving towards the body.

Above, Left to Right: Becky on her first dinosaur dig, in South Dakota - also known as the first and LAST time I wore shorts in the field. Assisting with plastering bones. Catching the local wildlife that accidentally fell into the quarry, and finding it a new safe home away from the screaming humans. Working on grid-mapping fossils in place. Becky in Wyoming, walking next to a dinosaur trackway.

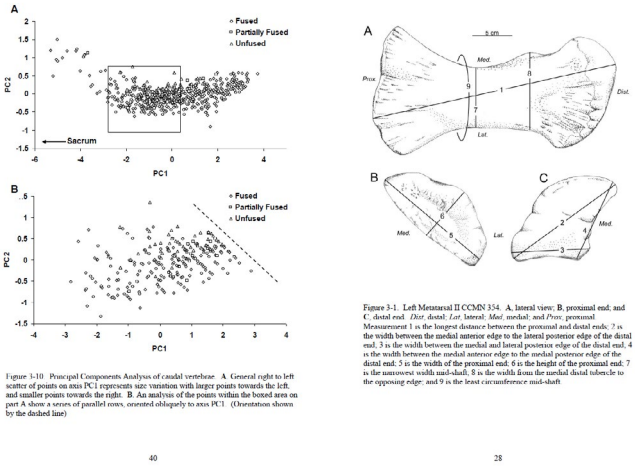


Figure 3-10. Principal Components Analysis of caudal vertebrae. A. General right to left scatter of points on axis PC1 represents size variation with larger points towards the left, and smaller points towards the right. B. An analysis of the points within the boxed area on part A show a series of parallel rows, oriented obliquely to axis PC1. (Orientation shown by the dashed line)

40

Figure 3-1. Left Metatarsal II CCMN 354. A, lateral view; B, proximal end; and C, distal end. *Dist*, distal; *Lat*, lateral; *Med*, medial; and *Prox*, proximal. Measurement 1 is the longest distance between the proximal and distal ends; 2 is the width between the medial anterior edge to the lateral posterior edge of the distal end; 3 is the width between the medial and lateral posterior edge of the distal end; 4 is the width between the medial anterior edge to the medial posterior edge of the distal end; 5 is the width of the proximal end; 6 is the height of the proximal end; 7 is the narrowest width mid-shaft; 8 is the width from the medial distal tubercle to the opposing edge; and 9 is the least circumference mid-shaft.

28

Above: Statistics program lining the tail bones up in order. Illustration of an *Edmontosaurus* foot bone, with diagram of what measurements were taken.

After graduating with my Masters degree, I continued teaching for a year (anatomy, physiology), until I saw a job opening occur in Bismarck, ND. I immediately applied - and was turned down. I was sad, but one "no" wasn't going to stop me. I was VERY confused a couple months later when another job opening occurred in Bismarck. Did the first person quit so soon? What was I getting myself into? I applied again, and was brought in for an interview! Turns out the first opening was for the Collections position that Jeff Person now holds, and the second one was for a Lab position. I was capable of doing the Collections work, but I knew I would enjoy the Lab work more. I like working with bones, putting the 3D puzzles back together again, and having the opportunity to play

with art on the side. The rest, as they say, is History! I've spent the last 17 years working with the ND Geological Survey, teaming up with the ND Heritage Center and State Museum, and spending time with all you awesome folks in the summer.

I am sad to be leaving all my friends and coworkers, people that have become my family. I am excited for what the future will bring - and while I may never have this same career, I hope everything I've learned and experienced along the way can help make whatever I do even more amazing.

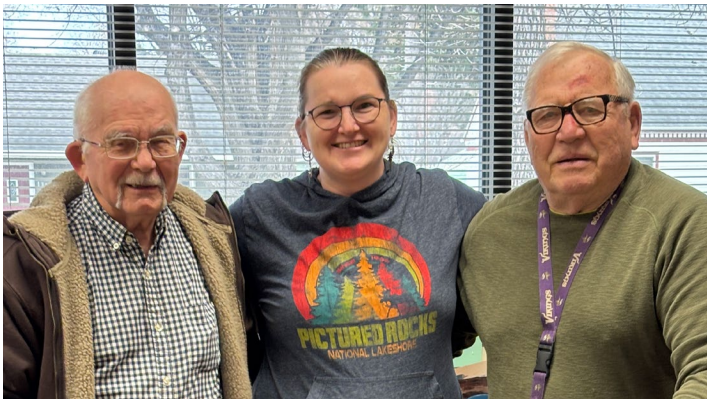
Above: Becky working at the Dickinson site.
Below: Becky painting the mural for the plesiosaur exhibit.

Above: Becky goofing off in the lab.
Below: Becky selfie with the Pembina Gorge participants.

Collections Moves!

This has been a very busy spring - more busy than usual. Paleo made a trip to Moorhead, MN to bring the remainder of the Concordia fossil collection back to Bismarck. The crew spent a couple days carefully packing, wrapping, and hauling bones, drawers, and cabinets into a moving truck, then hauling everything back to Bismarck where we did everything in reverse.

Above: One of the many drawers of bones - each carefully bubble-wrapped, then covered in plastic stretch-wrap, and finally wrapped into their drawers.
Below: Trissa Ford and Cathy Lash wrapping fossils, and Dr. Nellermoe looks on.



Above: Left to right, Don Olson, Becky Barnes, and Dr. Ron Nellermoe. Becky worked with Don and Ron since she was sixteen on the South Dakota and Wyoming fossil sites run by Concordia College, of Moorhead, MN.

NDGS Paleo was also tapped to move the remainder of the ND State University (Fargo) Geology department collections, and will need to assist with some of the University of ND (Grand Forks) collections as well. Just an absolutely crazy spring.

Above & Below: Clint Boyd, Jeff Person, Cathy Lash, and Trissa Ford work on bubble-wrapping and plastic-wrapping specimens and drawers.

Above: Close-up of the wrapping procedure.

Below: A successful adventure! The crew poses in front of one of two - yes TWO trucks filled with specimens and cabinets.

The hallway outside of Paleo, and the space inside Collections is getting filled with cabinets, rocks, minerals, and fossils!

Walhalla Library Addition

Early May, Dr. Clint Boyd made a trip up to Walhalla to install a 1/4 size Jormungandr mosasaur skeleton. The skeleton, a 3D print by Triebold Paleontology Inc., is based off of bones recovered from the Pembina Gorge State Park, west of Walhalla.