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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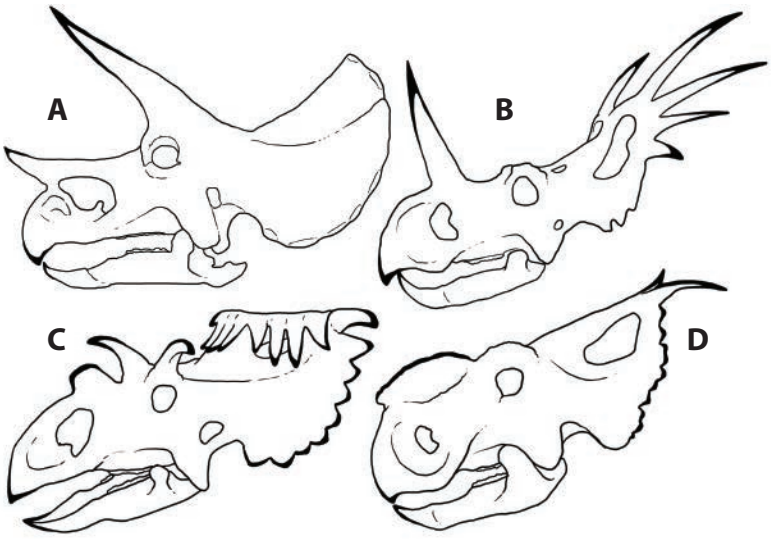
https://www.dmr.nd.gov/ndfossil/kids/

Feature Fossil: *Triceratops*

Triceratops (Greek, meaning three-horned-face) was one of the last dinosaurs to roam across the North Dakota landscape. It lived at the same time as *Tyrannosaurus* and *Edmontosaurus*, during the Cretaceous Period, 66 million years ago. Reaching lengths of 30 feet, it was a large herbivorous (plant-eating) dinosaur that walked on four legs, had a beak on the front of its face, a single horn above its nose, and one long horn above each eye. *Triceratops* (A) are from a family of dinosaurs called Ceratopsidae, or "ceratopsians." This encompasses a large number of horned and frilled animals such as *Styracosaurus* (B), *Kosmoceratops* (C), and *Pachyrhinosaurus* (D).



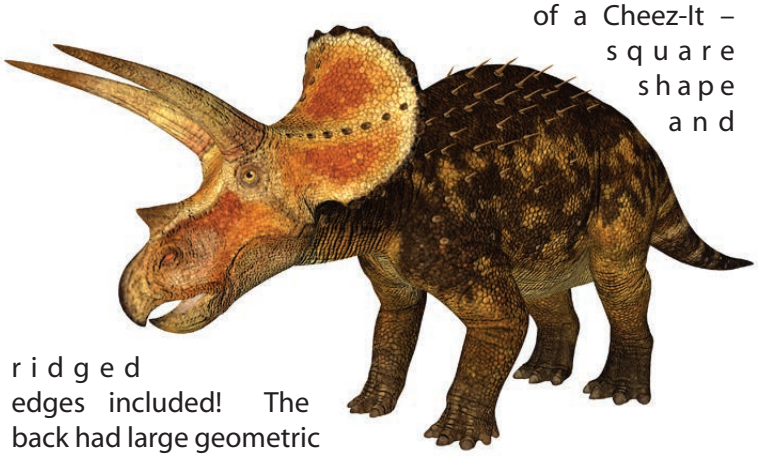
Along with *Edmontosaurus*, *Triceratops* could also be considered a "Cretaceous cow" – there were large numbers of these animals that roamed about in vast herds.

Piece of Triceratops
frill showing blood-vessel grooves

While there was no grass, their beaks and teeth were suited for slicing up whatever plants were available.

There is a constantly changing debate on the function of their horns and frill. If it was purely defense, why did so many other ceratopsians have flimsy frills or humble horns? Perhaps like birds, these animals could use their regalia for both defense and display. All along the surface of *Triceratops* frills are grooves where blood vessels once were, so some tissue that required nutrition was covering the surface. Maybe it was tough keratin (like your fingernails or hair)? Perhaps it was a tough hide that could change color? We don't really know. Either way, if you were another *Triceratops*, it was easy to pick out other dinosaurs like yourself. Or if you were a *Tyrannosaurus*, perhaps you might think twice before approaching such a prickly meal.

The color of *Triceratops* is still a mystery, but the skin is not. "Lane", a *Triceratops* on display at the Houston Museum of Natural Science in Texas, was originally found in Wyoming. It is special because it was found with vast patches of skin on it! The scales on the neck are reminiscent of a Cheez-It – square shape and ridged edges included! The back had large geometric scales interrupted by even larger volcano-looking scales. If it was anything like its relative *Psittacosaurus*, then those pointy scales could have been the base of quills or spikes. Quite different from the *Triceratops* I grew up with.



V.I.P (Very Important Paleontologist) Darrin Pagnac, SDSM&T, Rapid City, SD

My name is Darrin Pagnac and I work at the South Dakota School of Mines and Technology in Rapid City.

How old were you when decided to be a paleontologist?

I was in kindergarten, so about five.

Was there an event or experience that triggered your decision?

I saw a film strip on dinosaurs and was immediately hooked.

What plants or animals are your main study focus?

I primarily study mammals that lived about 15 million years ago, including dogs, camels, horses, and pronghorn antelope.

Do you have a favorite fossil plant / animal?

My favorite fossil mammal is the chalicothere *Moropus*. It is a weird, clawed herbivore related to rhinos and tapirs.

What do you like most about field work?

I'm in the outdoors surrounded by all the natural wonder that the world provides. New discoveries are literally only a step away.

What do you enjoy most about research?

I enjoy making new discoveries and communicating them to the public, especially to students.

Where in the world have you traveled looking for fossils?

I mostly work in the western United States in Wyoming, South Dakota, Nebraska, and California, but I've traveled as far as Taiwan looking for fossils.

How did you train to work in your profession?

I went to college at the University of North Dakota and got a degree in Geology. I then got a Master's degree at the South Dakota School of Mines and Technology and a Ph.D. at the University of California, Riverside.

Do you have any signature gear you wear or use?

I have a rock hammer I've used since I was an undergraduate in field camp. It's getting pretty worn out. I generally have a signature cap that I wear until I lose it or it literally falls apart.

What has been your most exciting discovery so far?

There have been a number of excellent discoveries. One that stands out is a small chunk of tooth that was discovered in 2006. While it isn't much to look at, it is the oldest record of a mastodon in the Great Plains.

Is there anything you don't like, or that frustrates you with paleontology or fossils?

I don't get to spend anywhere near as much time in the field as I like.

What advice would you give to aspiring paleontologists?

Be flexible. Chances are you will not get the exact job or opportunity that you are dreaming of in your career. Jump on the opportunities that you are given and turn them in to your dream.

Special Interest: 2016 Public Fossil Digs

Our summer fossil digs are just around the corner! This year we are returning to four sites that are open to the public. Why only four this year? Because we will also be working at a couple of research sites, as well as preparing some museum exhibits across the state – both of which are keeping us very busy. For more information on the digs, please visit https://www.dmr.nd.gov/ndfossil/digs/ So, which four made the cut? This year, we have:

Dickinson Area Dig, June 27-July 1:

Previously we called this the "Bismarck Area" dig, because we typically leave from and return to Bismarck each day. However, as most of our time is spent in the Dickinson area, we thought a name change would be appropriate. As with 2015, the areas we will be focusing on are 30-40 million-year-old mammal sites. If the weather does not cooperate, we will have spaces for people back in our paleontology lab in Bismarck to work on fossil preparation.

Fossil Digs Continued -

Whiskey Creek Dig, July 12-14:

If crocodiles came to eat in Medora, they died in Whiskey Creek. A little older than the Medora dig, this 60-65 million year old Bullion Creek Formation site was also very swamp-like. Each year we work to push the overburden back farther, and the fossils get better and better. Opposite to Medora, crocodiles are the most common creature found at this site, however other swamp creatures can be found as well.

Medora Dig, July 15-17:

After non-avian dinosaurs went extinct, crocodiles became the dominant predator in North Dakota, and the environment turned swampy. We imagine this site to have been a feeding ground for crocodiles. In Medora, we will be digging in Sentinel Butte Formation rocks, 55-60 million years old. This North Dakota everglades environment includes a variety of swamp denizens, including crocodiles, champsosaurs, giant salamanders, fish, clams, snails, birds, mammals, and more. The rugged badlands in the nearby Theodore Roosevelt National Park may also be a draw for those not interested in digging in the dirt.

Pembina Gorge Dig, August 10-13:

We will be returning once again to the beautifully scenic Pembina Gorge in our ongoing search for sea monsters. This Pierre Formation location, 80 million years old, holds some of the oldest surface rocks in North Dakota. This was a time when the state was covered with the Western Interior Seaway, and was home to great swimming reptiles called mosasaurs, giant squid, sea turtles, aquatic birds, large (and small) fish, snails, clams, and more. These past few years we have been slowly uncovering the partial skeleton of a mosasaur, and hope to find more. Last year during our search, we uncovered the skull of a second mosasaur

Reader Involvement:

This last month must have been Paleontology Month, and no one told me! We've had a number of calls for students to job shadow, paleo career interviews, and even occupational dress-up days. Below, one of our readers, Shane Q., decided that Paleontology was the way to go! We sent him packing with some goodies for show-and-tell. Go Science!

More Reader Involvement:

If you like reading the FIND, we want to hear from you! Send us an e-mail or snail-mail and tell us a little about yourself. We'll send you a special prize as a "thank you" for keeping an interest in science! What was your favorite issue so far? What are you interested in learning about in future issues?

Just Imagine...

The sun-warmed breeze brought with it the scent of morning dew, and freshly trampled vegetation. Spring had finally come to the forest, bringing with it much needed moisture. Flowers were blooming, awaiting their insect pollinators. A small herd of *Triceratops* moved along the side of the river – far enough out to keep their feet from sinking into the soft banks, where the *Edmontosaurus* wandered. The newest members of the herd milled about, never too far from the protective gaze of their parents. It would be a good year – the young were strong, the food was plentiful, and the weather mild. The herd matriarch prodded members along, as the bull *Triceratops* stood close by, his frill a mass of vibrant colors.