



Dinosaur Track Found in Denali



The first evidence of dinosaurs found in Denali is a track cast of a theropod.

Denali is a great paleontological candy store.

—Dr. Anthony Fiorillo

A three-toed dinosaur track was discovered near Igloo Creek about 35 miles west of the park entrance on June 27, 2005. The roughly 70-million year-old fossil is the first evidence of dinosaurs found in Denali and Interior Alaska.

The discovery

The dinosaur track was found during a geology field camp at the park. The University of Alaska Fairbanks Department of Geology and Geophysics provides field mapping experiences to students at several locations including Denali. Small groups composed of an instructor and several students work in different study areas each day. On this particular day, Dr. Paul McCarthy, Associate Professor of Geology, casually rested his hand on an outcrop of the Cantwell Formation not far from the Denali Park Road at Igloo Creek. He was explaining to students Susi Tomsich and Jeremiah Drewel that this type of Cretaceous sedimentary rock commonly preserves dinosaur tracks and that they should be alert for them. Almost as if it was staged, Tomsich immediately spied the dinosaur track not far from McCarthy's gesturing hand and asked, "Like this one?"

The fossil and the dinosaur

The dinosaur fossil is a cast, i.e., a bump on the rock, not an indentation. The dinosaur left its three-toed footprint in mud. Over time this depression was

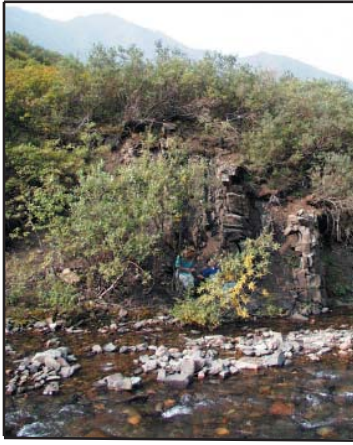
filled with sediments that solidified into rock. The mudstone weathered away and left the cast exposed.

The track cast is about nine inches from toe to heel and six inches wide. According to Dr. Anthony Fiorillo, Curator of Earth Sciences at the Dallas Museum of Natural History, who has been hunting dinosaur evidence at Denali for several years, the track is from a meat-eating dinosaur. This type of three-toed meat-eater is called a theropod. The details visible on the toes indicate that the track was made by the dinosaur's right (hind) foot. From the size of the track, Fiorillo estimated the creature was a modest size theropod around 10 feet long and might have weighed 100-200 lbs. This group of dinosaurs had small front "arms" and walked on their hind legs. Based on the age of fossil pollen in the rock "soil", the dinosaur track is 65 to 70 million years old.

Field examination of the track

Fiorillo traveled to Denali in August 2005 to document the dinosaur fossil on site and to advise park managers on how to safely remove the block with the track to protect the fossil from erosion or other damage.

Accompanying Fiorillo out the Park Road were Brent Breithaupt of the University of Wyoming Geological Museum and park geologist Phil Brease. On arrival



The dinosaur track was found in an outcrop of the Cantwell Formation near Igloo Creek (top photo and see red dot on map). The Cantwell Formation (green shading on map) is scattered across Denali's east end and is likely to harbor additional dinosaur fossils.

at the site, Fiorillo and Breithaupt bolted from the vehicle and slogged across Igloo Creek for their first look. Then followed meticulous notetaking, measurements, and photography. Lying awkwardly on the rocky slope, Breithaupt carefully measured all the track's digits. Before photographing the track from all angles, he stuck black and white rulers to the rock around the fossil with sticky wads. This approach will yield three-dimensional computer-generated images that are used to analyze and compare this track to similar ones.

Fiorillo covered the track cast with a bright pink quick-setting latex compound to create a mold and duplicate the track to use for further study. Fiorillo was hopeful that more tracks could be found in the adjacent rock faces to establish an estimate of stride length. However, no other fossils were found in the immediate vicinity.

The rocks above the one with the fossil were removed, allowing the field crew to haul the block on a pull sled to the nearby vehicle. The fossil is now displayed in the Murie Science and Learning Center.

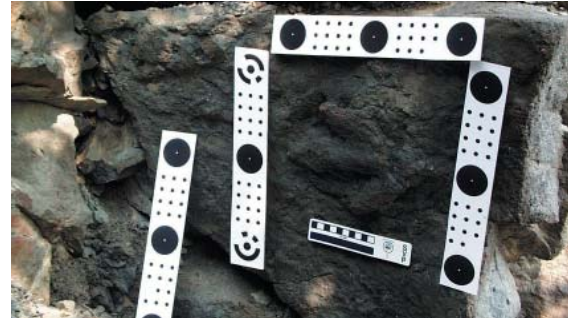
Significance of the find

"It's not necessarily the track itself that's significant," said Fiorillo. "It's where it is that got us excited." For years, Fiorillo has studied evidence of "polar dinosaurs" along the Colville River on Alaska's North Slope. Those dinosaurs were probably year-round residents. Fossil remains of dinosaurs have also been found at Aniakchak National Monument in southwest Alaska. The fossil track at Denali is the first evidence of dinosaurs found in Interior Alaska. Fiorillo believes that all of the eight dinosaur species found thus far in Alaska migrated from Asia across the Bering Land Bridge and were adapted to winter cold and twilight.

Fiorillo has persistently advocated the search for dinosaur remains in the Cantwell Formation due to its age (Cretaceous) and geological properties (sedimentary rock). The discovery of a track in this formation provides confirmation and inspiration for ongoing paleontological efforts. Fiorillo refers to Denali as the "great paleontological candy store."

Additional searches for dinosaurs at Denali

Following documentation of the track, Fiorillo continued his dinosaur search in Denali on Double Mountain. Fiorillo, Brease, and a field crew explored two ridge-crest sites with slabs or blocks of shales, mudstones, and some coarse sandstones that could be scrutinized for fossils. At the first site, the fossil seekers found no dinosaurs, but did find a possible "windrose" (circular impression produced as a stem circled in the wind), a ridged stem with paired bean-sized nodules (perhaps *Equisetum*, known as horsetail), and plant debris including leaves and stems. The second site contained another dinosaur footprint—a theropod track similar in size to the one at Igloo. While broken at the "toe", the new find contains impressions of the foot pads.



Researchers measure and record the track's digits (top) and stage the fossil for photography (center). Dr. Fiorillo prepares a latex mold of the fossil (bottom).

Other discoveries at the second site were bird tracks on buff-colored mudstone that may have once been a shoreline or an ephemeral pond. What were first thought to be raindrop impressions are now believed to be dimples made by birds as they probed for food.

The paleontological search is supported through the National Park Service Challenge Cost Share Program. This program facilitates partnerships with other organizations and neighboring communities. The NPS has partnered with the Dallas Museum of Natural History and University of Alaska Fairbanks Department of Geology and Geophysics for continued investigations.

For more information

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