Dinosaurs at Luck*stone

GALLA

About 210 million years ago, the movement of continents stretched North America, opening a series of deep cracks across the Eastern United States and Central Virginia, called rift valleys. Rift valleys collected rain water and sediments forming broad, swampy plains.

It is in these valleys we find evidence that dinosaurs roamed Virginia.

Luck Stone's Culpeper quarry is home to an astonishing array of fossil footprints of dinosaurs

In 1989, workers at the Culpeper Stone Company guarry (now Luck Stone) near Stevensburg, Virginia unearthed an astonishing array of fossil footprints of dinosaurs and other reptiles. Covering six-acres of the quarry floor, these tracks were left in the mud at the edge of an ancient lake over 200 million years ago. As the lake dried, the hot sun slowly baked the tracks, preserving a chapter in the story of Virginia's dinosaurs.



aetosaur aeto · saur

Any of an order or suborder (Aetosauria) of extinct, chiefly herbivorous, armored reptiles that lived during the late Triassic period.

Resembling a short-nosed crocodile with heavy armadillo-like armor. This animal was approximately 16 feet in length and waddled slowly on all fours.

The Phytosaur was known to lurk near the edge of the water to prey on dinosaurs and other animals as they came to get a drink.

MEET OUR DINOSAURS

A small carnivorous theropod dinosaur of the genus Coelophysis of the Triassic period, having a long neck and a tail with an elongated snout.

This 6-foot-long dinosaur was fast and surefooted in the soft mud, where it likely hunted for lizards, fish, or small dinosaurs.



Armored, semi-aquatic reptile of the extinct order Phytosauria, of the Mesozoic Era, resembling the crocodile but unrelated, this animal has nostrils high on the snout.



WHAT FOOTPRINTS TELL US

grallator $gra \cdot luh \cdot tor$

An ichnogenus (form taxon based on footprints) which covers a common type of small, three-toed print made by a variety of bipedal theropod dinosaurs. *Grallator-type footprints* have been found in formations dating from the late Triassic through to the early Cretaceous periods.







Grallator Grallator parallelus tuberosus

Grallator tenuis



Kayentapus minor

hopii minusculus giganteus

The trackways indicate that they Walked upright on two feet

By measuring the size of the tracks and the distances between prints, scientists have been able to estimate the size, stride, and speed of the Virginia Theropods. The trackways indicate that they walked upright on two feet. The legs of the theropod were tucked in under the body, like those of mammals, allowing it to maintain a steady pace. Walking or jogging, the theropod was capable of moving at 9 to 10 miles per hour. Its 8–12 inch footprint shows three indentations with tiny lines that spread out from the tip, indicating the animal had claws.

Although the majority of the tracks were made by theropod dinosaurs. traces of two other large vertebrates

can be readily identified at the Culpeper quarry. Large scrape marks, reflecting the impression of four unequal digits, are usually attributed to Phytosaurs, a group of semi-aquatic, guadrupedal, crocodile-like reptiles which died out at the end of the Triassic period. The other distinct trackway also represents a quadruped. The toes of both the fore- and hindlimbs are mostly directed forward, but there is a broad separation of the left and right foot. Researchers believe it may represent the trail of an Aetosaur, a plant-eating animal characterized by a series of bony plates protecting the neck and back.

tracking dinosaurs at CULPEPER

The Culpeper Stone Quarry in Stevensburg, Virginia, opened in 1922 as a siltstone and shale guarry. Since that time, an estimated 20 million tons of stone have been removed. The guarried rock is used for gravel to be mixed into concrete or mixed with asphalt to pave roads. In the mid-1970s, over 1,000 dinosaur tracks were discovered at the quarry. Although they were the first tracks found, they were very poorly defined and difficult to evaluate. Since then, new tracks were discovered at Luck Stone's Culpeper quarry, 100 feet below the original find when a ramp was being built to access the next layer of the pit's rock bed.

A pump was brought in to drain the lower level, and as the discharged water cascaded over the level of rock containing the footprints, the tracks came into clear view! Fossil footprints of theropod dinosaurs

The quarry is now known to geologists and paleontologists throughout the world as the site of an exceptionally abundant number of dinosaur footprints. Over 2,000 individual dinosaur tracks form lines that crisscross, over a flat sixacre rock bed some 250 feet below the surface at the bottom of the quarry, making these tracks one of the most extensive discoveries of the late Triassic period. Scientists suspect a dinosaur like the Triassic theropod Coelophysis (formerly known as Syntarsus) is responsible for leaving the majority of the Culpeper tracks. Among the early dinosaurs, Coelophysis is also well-represented by fossils in East Africa and in Britain. Despite the distance between those sites today, 210 million years ago the continents were united as one supercontinent and these localities were much closer together than they are today. Over 2000 individual dinosaur tracks form lines that crisscross at the bottom of the quarry, making these tracks one of

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Information sourced from:

Jeanne Nicholson Siler, (1990, Nov 2) *Washington Post*. Retrieved from https://www.merriam-webster.com Jeff Hecht, (2006, Feb 25) *New Scientist*. Retrieved from https://www.merriamwebster.com Natural History Museum (2019, May 20) *Coelophysis*. Retrieved from https://www.nhm.ac.uk Virginia Museum of Natural History, Tracking Dinosaurs at Culpeper, Winter/Spring 1993 **Photos sourced from:** Alex Hastings, Fitzpatrick Chair of Paleontology, Science Museum of Minnesota