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## Long, Long Ago

Pliocene Verde Valley: A much more 'verde' place



The tusks of a stegomastodon discovered on a ridge overlooking the Phoenix Cement Plant, were eight feet long. The fossils were excavated from a clay bed in the Verde Formation, which was exposed by the removal of overlying red siltstone and white limestone layers. Found along with the tusks were teeth and a vertebra. <BR> Photos courtesy Dale Nations

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What Dale Nations and a colleague discovered above the Clarkdale cement plant 27 years ago remains the biggest clue yet uncovered in the Verde Valley's oldest mystery.

What did the Verde Valley look like a few million years ago, long before it felt the footprint of man?

Nations had come here several times during his 30-plus years as a geologist working and teaching at [Northern Arizona University](#).

Drawn to the valley's signature layer of white rock, the deposits of sandstone, mudstone, limestone, conglomerates and evaporites known as the Verde Formation, he had become a preeminent expert on the story the rocks told.

He knew what to look for and what to expect.

For instance he knew it was not unusual to find fossilized remains of fresh water gastropods, mollusks, snails and plant life.

But he was also aware of evidence that larger animals, prehistoric vertebrates, had also made the Verde Valley home.

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In 1923, geologist Olaf Jenkins gave the formation its name and at the same time surmised that he was looking at the sediments of an ancient freshwater lakebed extending from approximately 10 miles northwest of Clarkdale to 10 miles southeast of Camp Verde.



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In late 1980, Nations was on a ridge north of the Phoenix Cement plant with a group of Northern Arizona University students studying rocks and fossils of the Verde Formation

Nations was scraping around when he spotted something unusual, small pieces of ivory, bones and teeth that indicated the presence of vertebrate animals.

A few days later, at Nations' request, NAU paleontologist Larry Agenbroad, a specialist on fossil mammals and mastodons, arrived to have a closer look.

As Agenbroad remembers the story, it was noontime and he and Nations were eating sandwiches. Agenbroad was wandering about as he ate when he spotted another small scattering of ivory, "about the size of a teacup."

He began probing around. Soon he could feel what he believed was a tusk. Lacking the tools for the job, the two called it a day.

The next day they returned and began excavating whatever was preserved in the greenish clay deposits. By the time they had called it a day again, they had unearthed three teeth, two tusks, a jawbone and a vertebra of a Stegomastodon, an ancient ancestor of the modern day elephant.

The dimensions of the Clarkdale tusks were sent to the American Museum of Natural History and used to produce a life-size model of the Stegomastodon.

The three teeth, two eight-foot-long tusks, jawbone and vertebra went to NAU.

Fully grown, a Stegomastodon weighed about six tons and stood almost nine feet tall. It is believed that the one in Clarkdale died on the shore of ancient Verde Lake, about

2.5 to 3 million years ago.

In spite of its uncertain age, one thing is undisputed - the Verde Valley it died in was far different from the Verde Valley it was unearthed in.

Some of the valley's characteristic landscape would look familiar. Some would not. The flora and the fauna would have been totally alien and the weather both moister and milder.

The Sedona red rocks, the remains of a retreating Colorado Plateau were where they are today, although much of the iron-laden sandstone, including the site of present-day Sedona, was underwater.

The Black Hills formed the lake's southwest edge and the Mogollon Rim rose along its northeast edge. At times the lake water lapped up to within 100 feet of where Jerome is now perched.

In the days when the Clarkdale stegomastodon walked the earth, the Verde Valley was, according to NAU paleontologist Jim Meade, a much more temperate environment.

"The Pliocene Verde Valley (5.3 to 1.8 million years ago) was much more verde (green) than it is today," Mead said.

He describes a climate with more available moisture, almost frost-free, where the temperatures are not as hot or as cold as they are today.

"The reconstruction we get from fossils indicates it was a wide and lush green valley. It had more waterside environments with marshes and grasslands, and a broader riparian corridor than what exists today," Mead said.

Although many geologists point to a large lake, Meade believes that may be a misleading description.

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"We shouldn't picture one big lake, no Lake Michigan," he said. "It was a complex area, perhaps a series of lakes or ponds with a marshy river connecting them."

According to Sedona geologist Wayne Ranney, Verde Lake, or lakes as the case may be, was prone to drying up on occasion.

Indicators of that assumption include multiple shoreline deposits, volcanic intrusions into and on the lake sediments, mud cracks and the presence of such evaporite minerals as salt and gypsum.

Verde Lake(s) existed between 7.5 and 2.5 million years ago, according to Ranney. Whatever its exact description was, there is little doubt there was more water here then than today, and that the water attracted a variety of animal life.

The list of large animals, mega-fauna as the scientists call them, that either passed through or made a home here include relatives of the modern day mountain lion, camel, elephant, tapir and horse,

The first evidence that vertebrate animals once inhabited the ancient Verde was discovered by Henry Harlow Nininger, a biologist, entomologist and famous meteor hunter who located (and eventually carted off) the tracks of a large cat found in Bee Canyon south of Cornville.

Nininger's collection of footprints from the valley is reported to have included bear, camel, elephant and "a split-hoofed creature the size of a goat."

In spite of the abundance of footprints, it wasn't until 1962 that any vertebrate fossils were unearthed.

Several digs have since produced parts and pieces of primitive horses, turtles, mammoths and a stegomastodon. Most of the mega fauna remains were reportedly found in and around the Clarkdale cement plant.

Fossil bone fragments and teeth from rats, bats, mice and marmots have also been sifted out in various locations of the Verde Formation.

Meade cautions that what is described as a camel was not a modern day camel, as is the case also with the horses and the elephants.

"It's kind of like you start with a car and later on you have a truck. These animals were the hybrids, like an SUV," Meade said. "We had some very cool fauna in those days."

To Mead, the Verde Formation remains a museum, well worth examining and preserving.

"The Verde is an incredibly important library and museum," Mead said. "The sediments are a repository. Once we rip it all up, it's gone."

"We need to realize it's our natural history. It's all right there and it has an incredible story to tell."

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