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The Arnold Sentinel

CUSTER COUNTY, ARNOLD, NEBRASKA 69120

(USPS 032480)

THURSDAY, JANUARY 7, 2016

VOLUME 99, NUMBER 29



Jeremy McMullin, assistant to State Highway Paleontologist Shane Tucker, brushes dirt from the vertebrae of a *Bison antiquus* in a dig east of Arnold before enclosing the remains in a plaster field jacket for transport to UNL's lab. To the lower left is an upper arm bone (humerus). (Courtesy photo)



The skull and lower jaw bone from the fossil species *Bison antiquus* is photographed by Nebraska Highway Paleontologist Shane Tucker before being moved to a lab at the University of Nebraska at Lincoln.

Ice Age Fossil Discovered During Arnold East Highway Project

Bison antiquus, sometimes called the "ancient bison," was the most common large herbivore of the North American continent for over ten thousand years, and is a direct ancestor of the living American bison. A few weeks ago, Nebraska State Highway Paleontologist Shane Tucker removed specimens of one of these ice-age mammals from an excavation site near Arnold. Placing the specimens in field jackets for loading and transport to the University of Nebraska at Lincoln's lab culminated nearly eight months of site work for Tucker. The removal caused some people to delay their travel on Highway 92 to witness the preservation of Nebraska's prehistoric past brought about by legislation enacted in 1959.

Tucker actively monitors approximately 150 highway construction projects that have potential to uncover fossil resources each summer. The first bones of the large *Bison antiquus* were revealed at the Arnold East Highway Project in May of 2015.

"Most of the construction excavation is covered quickly so

as not to erode, so to find anything on the day that you arrive is pretty rare," said Tucker. "Throw into that how rare it is to find a fossil and the chances are very minute."

Tucker explained that the *Bison antiquus* found at this location is from the Pleistocene Epoch of geologic time, and was probably buried within the Peoria Loess, dating it anywhere from 12,000 to 23,000 years old, but it could be as old as 40,000 years. The area south of the Sandhills has very thick deposits of loess which is silt size particles that blow downward of the actively migrating sand dunes. Since the particles are so small, they get blown up into the higher level winds and deposited many tens to hundreds of miles downwind. Therefore, loess is more or less a dust accumulation. If bones aren't buried within a relatively short period of time, they will break down due to freeze/thaw or wet/dry conditions.

"It is very similar to a cow that dies in the pasture. Within a couple of years you have just little bone chips lying on the ground," he said, "so we know

that this animal was buried fairly quickly because the bones are in good shape."

He went on to explain that most of the "rock" layers in this area were deposited within the last 40,000 years, but there are a few areas with a red-brown silt that is approximately 140,000 years old. There could be volcanic ash that is 600,000 years old, as he has heard that people mined volcanic ash in this area in the early to mid 1900s.

Bison antiquus was taller, had larger bones and horns and was 15 to 25 percent larger overall than modern bison. It reached up to 7.5 foot tall and 15 foot long, with a weight of 3,500 pounds. Tucker said the distance between the horn cores on this specimen is roughly 28" but there is some damage to them. Typically, the distance between the horns is roughly 36". Part of the spine was also found.

Tucker said it is typical to find Ice Age animals in this area. Bison are probably the most common to find, as well as mammoths, camels and horses. There are far more microfossils,

including ground squirrels and gophers, that typically die in their burrows and are buried when the tunnels collapse.

"Fossils are extremely rare," he said. "We estimate that far less than one percent of all the bones from all of the animals that have lived in the geologic past become a fossil. Most deteriorate prior to burial. There are lots of factors acting against the bone in its chances to become a fossil."

Bones are extremely fragile and typically have cracks in them, so they can't be lifted out of the ground without risking damage. After mapping all of the bones into a grid, Tucker and his student assistant covered the bones with plaster and burlap for transport to the lab. "Site documentation is the most important part of the fossil collection process," he said. "Once in the lab, we will uncover the bones using scalpels and brushes and stabilize the bones for research."

The fossil preparation process may take several weeks to months, dependent upon the condition of the bones. Eventually, the fossil will be housed in the University of Nebraska State Museum's paleontology collection. It will be available for researchers around the world to measure and include in their studies.

The Nebraska Highway Paleontology Program is a cooperative effort between the Nebraska Department of Roads and the University of Nebraska State Museum. The program was started in October 1960 and was the first of its kind in the nation. The goal of the program is to collect fossils that are threatened by highway construction and add to our knowledge of Nebraska's geologic past. More than 250,000 specimens have been collected from highway projects throughout the state, including many species new to science. Typically, less than 1 percent of the annual highway projects produce fossils. In the past 50 years, more than 200,000 specimens including the remains of a rhinoceros, long-jawed elephant, giant land tortoise, large carnivore and sea lizard have been curated into the museum's permanent research collection.

Tucker, who has been part of the program for 15 years, said he thinks that he has found bones on five or six projects in 2015, which is pretty good. Several of these will be further excavated into the fall of 2016. Four of the projects have bones from the Ice Age. These are mostly gopher and ground squirrel skeletons, but there was a partial mammoth tusk on one of the projects. The other sites are approximately 13 million years old, and he found a camel partial skeleton that is roughly the size of a llama.

Sites are prioritized and can be hundreds of miles apart. Tucker and his assistant work tirelessly in all weather conditions to preserve Nebraska's prehistoric past. He will set up a talk next summer in Arnold to give more details about the discovery of the bison. The find will be part of NET special possibly airing in April of 2016.

For more information on the program and other finds, go to: <http://www.nebraskalife.com/Santees-Mesozoic-Mystery/> (March 2015 issue of Nebraska Land Magazine - Roadside).

Long-time Fire Chief Robbi Smith Passes Helmet On

Robbi Smith (pictured, left) handed over the Fire Chief helmet to Eric Nelson (pictured, right) last week, after serving as leader of the Arnold Volunteer Fire Department for the past 14 years. Robbi, who has served on the department for a total of 37 years, is the second oldest member of the department next to Dell Cerny, and said he will still be active, but is looking forward to being one of the "old duffers."

"I'm proud of the organization and the equipment that we have put together over the past 30 to 40 years," said Robbi. "I appreciate Eric stepping up to take the position. It's not an easy job, but it is rewarding. It feels good to give back to the community when they need us. I have always said I'd hate to call 911 and no one comes."

Eric, who joined the department in February of 2001, was officially elected Fire Chief in November. He has served as captain and training officer, and said he is excited to take on the responsibility of chief.

As leader of the 28-member department, he will attend mutual aid meetings, issue burn permits and answer to the Rural Fire District and Board.

Eric said he can be reached at 308-520-2391 to issue burn permits.

