

= Hypsibema missouriensis =

Hypsibema missouriensis (pronounced / ˈhɪpsɪˈbiːmə mɪˈzʊəriˈnsɪs / ; originally Neosaurus missouriensis , first renamed to Parrosaurus missouriensis , also spelled Hypsibema missouriense) is a species of plant-eating dinosaur in the genus Hypsibema , and the state dinosaur of the U.S. state Missouri . One of the few official state dinosaurs , bones of the species were discovered in 1942 , at what later became known as the Chronister Dinosaur Site near Glen Allen , Missouri . The remains of Hypsibema missouriensis at the site , which marked the first known discovery of dinosaur remains in Missouri , are the only ones to have ever been found . Although first thought to be a sauropod , later study determined that it was a hadrosaur , or " duck-billed " dinosaur , whose snouts bear likeness to ducks ' bills . Some of the species ' bones found at the Chronister Dinosaur Site are housed in Washington , D.C. ' s Smithsonian Institution .

= = Characteristics = =

The species is estimated to have had around 1 @, @ 000 small teeth , weighed 3 ? 4 short tons (2 @. @ 7 ? 3 @. @ 6 t) (or around as much as an elephant today) , stood 10 feet (3 @. @ 0 m) tall at its back , and stretched about 30 ? 35 feet (9 @. @ 1 ? 10 @. @ 7 m) from head to tail . H. missouriensis lived in what is now southeast Missouri during the Campanian age of the Late Cretaceous period . It was not a carnivorous species , its teeth were more serrated than other hadrosaurs , an indicator that the vegetation of Missouri at the time was very coarse or tough .

Paleontologist Charles Whitney Gilmore and geologist Dan R. Stewart described the caudal vertebrae retrieved from Missouri in a 1945 Journal of Paleontology report , writing , " Caudal vertebrae amphicoelus ; centra longer than wide ; ends having concave central areas decorated with radiating ridges and depressions surrounded by a flattened peripheral border ; chevron facets only on posterior ends . " Of the thirteen adult tail bones , twelve appeared to be consecutive , and the smallest centrum was 69 millimetres (2 @. @ 7 in) long .

= = Discovery = =

Remains of Hypsibema missouriensis were first discovered in Bollinger County , Missouri by members of the Chronister family while they were digging a cistern , and were subsequently collected by Stewart , later nicknamed " Dinosaur Dan . " In 1942 , Stewart , of the Missouri Geological Survey , had been examining clay near Glen Allen when he came upon a boy who led him to the family at work digging . According to Stewart , property owner Lulu Chronister had found several " unusual " bones while digging and had saved them . They had been found about 8 feet (2 @. @ 4 m) deep in the Chronisters ' well , which had an overall depth of 24 feet (7 @. @ 3 m) , " imbedded in a black plastic clay . " Stewart reported his discovery to the Smithsonian Institution , which bought the remains ? thirteen vertebrae of a dinosaur ' s tail ? from Chronister for US \$ 50 , which was later used to purchase a cow . Two other bones , of unknown type , were also recovered from the site , while one additional vertebrae had been given by Lulu Chronister to a friend . At the Smithsonian , the bones were analyzed but the species from which they originated was incorrectly identified .

The site where the bones were found was largely untouched by paleontologists until around 1990 , when excavations restarted . Remains of other dinosaurs , fish , turtles , and plants have also been found , including teeth belonging to a member of the Tyrannosauroidae . Other parts of H. missouriensis , including dental remains and part of a jaw , have also been found . The variety of faunal remnants found at the Chronister site suggest that a large body of water once existed close to the area .

= = = Geology of dig site = = =

Guy Darrough , a paleontologist from St. Louis , Missouri currently working at the dig site , said it

was " pretty much a miracle " that dinosaur bones were found in Missouri , because the state 's soft soil has resulted in the deterioration of most prehistoric remains . However , some of the remains found have been damaged by erosion and other processes . While much of Missouri lies upon rocks from the Paleozoic or Precambrian eras , the Chronister site is situated over Mesozoic rock . Stewart , who found the bones after being assigned to study the origins of clay in the southeastern portion of the Ozarks , was able to conclude that part of the region lies upon deposits from the Upper Cretaceous period , although much of the sediment from that time period has eroded away .

The Chronister family dug the well (which they ultimately abandoned after it was unable to provide enough water) just southwest of their farmhouse , atop a body of limestone . The farmhouse was located near the bottom of a steep valley , sitting atop the remains of a terrace . The layer of clay in which the bones were found was described by Stewart as being 9 feet (2 @. @ 7 m) thick , situated below 7 feet (2 @. @ 1 m) of yellow @- @ brown clay and gravel at the surface , and above a dense mass of limestone .

The Chronister dig site is located atop the Ripley Formation . The land around the Chronister home and dig site sits atop sandstone from the Lower Ordovician Period or Canadian Epoch . It is located in a section of the Ozarks affected by erosion and filled with chert and sandstone debris . In addition , the region has been impacted by frequent faulting , leading to the combination of rocks from different geologic periods . As a result , it is difficult to create an accurate geologic map of the area .

= = Identification = = =

Gilmore , at the Smithsonian , along with Stewart , first described the species as a sauropod in the January 1945 issue of the Journal of Paleontology , a classification made in error and without positive evidence . Gilmore only deemed the species a sauropod by process of elimination ; when he was left with the possibilities of Hadrosauridae and Sauropoda , he dismissed the former , saying , " The more elongate centra of the Chronister specimen , with the possible exception of *Hypsibema crassicauda* Cope , and the presence of chevron facets only on the posterior end appear sufficient to show that these vertebral centra do not pertain to a member of the Hadrosauridae . "

The species , first called *Neosaurus missouriensis* , was renamed to *Parrosaurus missouriensis* later that year by Gilmore and Stewart because the name " *Neosaurus* " was preoccupied . However , Gilmore died soon after , and the bones were left untouched for several decades .

Parrosaurus missouriensis was once again moved in 1979 , to the genus *Hypsibema* , this time by Donald Baird and John R. Horner . In the late 1970s , Bruce L. Stinchcomb , a geologist , traveled to the Chronister site after reading about Gilmore 's report in the 1950s . He was able to purchase the property from a member of the Chronister family , and in the 1980s , test excavations were performed by Stinchcomb , David Parris , and Barbara Grandstaff , leading them to conclude that *H. missouriensis* was actually a hadrosaur rather than a sauropod . Thomas Holtz has suggested reverting to *Parrosaurus* for this species .

= = State dinosaur designation = =

On January 21 , 2004 , a bill was introduced in the Missouri House of Representatives by State Representatives Rod Jetton and Jason Crowell . Jetton had originally proposed the hadrosaur as the state dinosaur , but was not specific enough , so the House Conservation and Natural Resources Committee settled on *Hypsibema missouriensis* . The bill was then sent to the 92nd Missouri General Assembly . It passed the Missouri House of Representatives on March 8 , 2004 with a vote of 147 ? 4 , the Missouri Senate on May 14 , 2004 with a vote of 34 ? 0 , and was approved by then @- @ governor Bob Holden on July 9 , 2004 . The bill , House Bill 1209 , went into effect August 28 , 2004 . Missouri became the sixth U.S. state to have designated an official state dinosaur , following Colorado , Maryland , New Jersey , Texas , and Wyoming , as well as the District of Columbia .

= = Local impact = =

In 2005 , representatives from Bollinger County businesses and local government officials met in an effort to generate more revenue , and came up with a dinosaur @-@ centered tourism campaign . Some businesses contributed to the creation of a billboard along Interstate 55 that would advertise , " Bollinger County , Home of the Missouri Dinosaur . " The Bollinger County Museum of Natural History , which displays some of the bones found , has said their exhibit on the species has attracted tourists from other parts of the United States , and the museum says the designation of H. missouriensis as the state dinosaur resulted in a tripling of visitors .

In March 2008 , construction on a full @-@ size model of a H. missouriensis was completed and placed on display at the museum . Jetton , then Speaker of the Missouri House of Representatives , sponsored a dinner event for state legislators to celebrate the completion of the exhibit on March 7 , 2008 . The two @-@ year project was directed by Darrough , who was also in charge of excavations at the Chronister excavation site , and is the only permanent museum exhibit to feature the species . At the opening of the exhibit , Jetton mentioned that he hoped the dig site would become part of a state park one day . Currently , excavation is being conducted by the Missouri Ozark Dinosaur Project . The site has been covered to prevent water from flowing over dig material . The Chronister dig site near Glen Allen , currently under private ownership by Stinchcomb , is the only location in Missouri where dinosaur bones have been found .