

## I The Discovery

It happened in 1858 in a sleepy farm town in southern New Jersey. Haddonfield, in Camden County, was an old Quaker settlement and the scene of several skirmishes during the Revolutionary War. Southern New Jersey towns were then popular as vacation areas for wealthy people from Philadelphia seeking to escape the summer heat. In the autumn of 1858, William Parker Foulke was one such gentleman staying in Haddonfield. He was a friend of John Hopkins, a descendant of the original founding family of Haddonfield, and owner of one of the area's largest farms. Hopkins told Foulke, who was interested in science and natural history, of an unusual discovery on his farm twenty years earlier. While digging marl, a kind of clay that contains fossil seashells, he came across very large bones which he supposed were vertebrae, or backbones. Visitors came to see the bones, and Mr. Hopkins let them carry away some of the vertebrae.

Foulke was very excited by this story. He was a member of the prestigious Academy of Natural Sciences of Philadelphia, and so he knew that many fossil bones had been found in the marl pits of southern New Jersey. He asked Mr. Hopkins' permission to dig for more bones around the old pit. Hopkins gave him permission and helped by showing Foulke the location of the old marl pit.

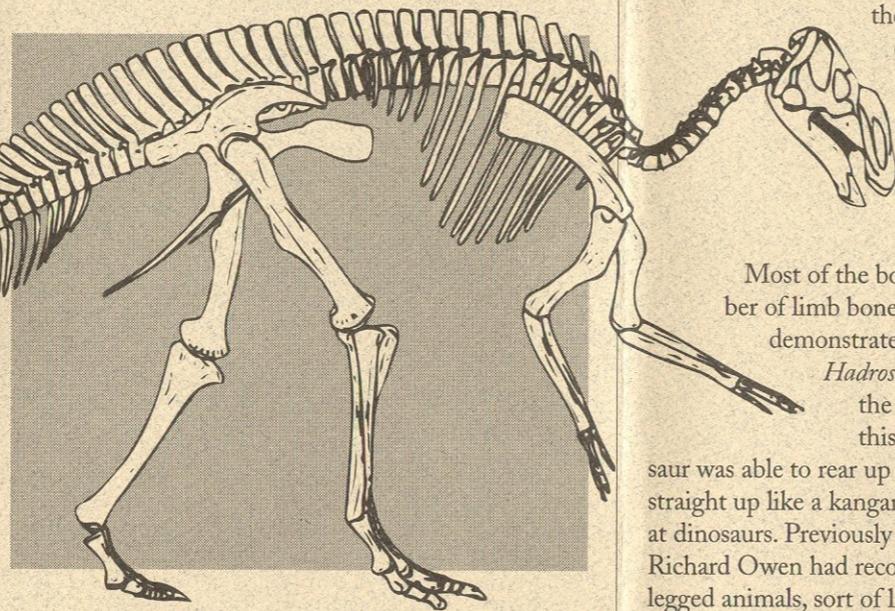
By this time, the old excavation was filled in and grown over, so Foulke assembled a team of marl diggers to help him. Marl mining was a common practice in New Jersey where marl was used as fertilizer. Setting to work at the site of the pit, they dug about ten feet down through thick dark clay (the Woodbury Clay) before hitting a layer of fossil seashells containing a bunch of dark, heavy bones. They had hit pay dirt!

The team carefully dug out the fragile fossil bones drawing sketches of their position in the clay and taking measurements of them in case they broke when taken out. The bones were wrapped in cloth and carried up to a cart filled with hay, then transported a short dis-

tance to the house where Foulke was staying.

Foulke realized the importance of the discovery and decided to bring in professional help (this is always a wise decision when dealing with large, fragile and rare fossil bones). He contacted Dr. Joseph Leidy, an anatomist at the University of Pennsylvania and curator at the Academy of Natural Sciences.

Dr. Leidy brought with him Isaac Lea, a specialist in fossil seashells. Together, this team mapped the area, identified many of the shells found with the bones, and determined that the bones were scientifically valuable and the digging



should continue. The excavation was expanded, and the workers dug marl throughout the month of October 1858, sieving the clay and finding bits of bone and teeth. But no more large bones appeared, and the digging stopped.

### “Foulke’s Bulky Lizard”

In December 1858, Foulke and Dr. Leidy reported on their work to the assembled members of the Academy of Natural Sciences in Philadelphia. Leidy, in his formal description of the bones, identified them as belonging to a “huge herbivorous saurian” related to the extinct *Iguanodon* of England. He went on to name

this animal *Hadrosaurus foulkii* which in Latin means “Foulke’s bulky lizard.” *Hadrosaurus* is now grouped with the duckbilled dinosaurs.

*Iguanodon*, known from bits and pieces of bones discovered in the south of England, had been assigned (along with some other fragmentary remains) to the group called the Dinosauria by Richard Owen in 1841. The important thing about *Hadrosaurus foulkii* was that it was the most complete dinosaur skeleton unearthed anywhere in the world up to that time. A few teeth had been brought back from the Dakota Territory and described by Leidy in 1856, and the European bones were not enough for a skeleton to be put together. But in the specimen from Haddonfield, Leidy had some forty-nine bones and teeth, enough to make some interesting conclusions about *Hadrosaurus*.

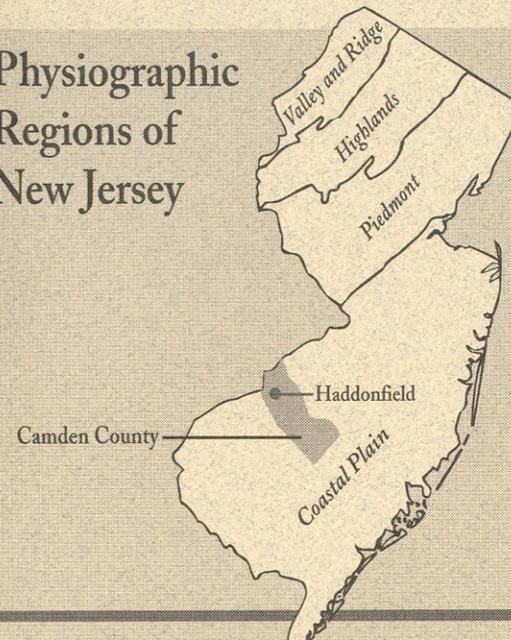
Most of the bones were vertebrae, but a number of limb bones were found as well. Leidy demonstrated that the arm bones of

*Hadrosaurus* were much shorter than the leg bones of the animal. From this, he concluded that this dinosaur was able to rear up on its hind legs and stand straight up like a kangaroo. This was a new way to look at dinosaurs. Previously (for an exhibition in London), Richard Owen had reconstructed dinosaurs as four-legged animals, sort of like giant reptilian elephants. His models, made by the English artist Benjamin Waterhouse Hawkins, were the accepted way to picture dinosaurs until Leidy’s description of *Hadrosaurus foulkii*. Today, we are used to thinking of some dinosaurs as going about standing on their hind legs, but it was a very new idea in 1858.

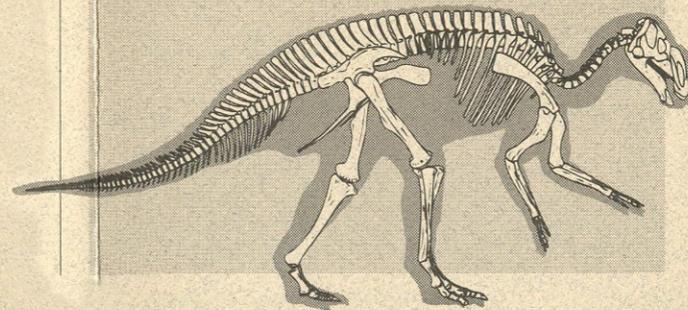
### The First Mounted Dinosaur

While Owen and Hawkins had produced life-like, sculpted models of dinosaurs in England, there were no skeletons of dinosaurs mounted in museum displays anywhere in the world. Here, too, *Hadrosaurus foulkii* was the first. Hawkins came to America in 1858 to lec-

## Physiographic Regions of New Jersey



Many people believe that you must go to a place far away - like the deserts of the American Southwest or Outer Mongolia - to find dinosaur fossils. But did you know that the first dinosaur skeleton found anywhere in the world was found in Haddonfield in the Coastal Plain of New Jersey?



ture on natural history and the arts. He took up residence in Philadelphia and convinced the Academy of Natural Sciences, and especially Leidy, to let him study the bones of *Hadrosaurus*. In November 1868, Hawkins presented the Academy with a mounted skeleton made from casts he had made of the bones of *Hadrosaurus*, filling in the parts that were missing (like the skull, which was not found).

Thus, Foulke's bulky lizard became the first mounted dinosaur skeleton displayed anywhere in the world - another scientific first for New Jersey's state dinosaur! Hawkins made skeletal casts of *Hadrosaurus* for Princeton University, the Smithsonian Institution and the Royal Scottish Museum in Edinburgh (the first time a dinosaur skeleton was to be displayed in Europe).

Moreover, *Hadrosaurus* became an important part of the debates over evolution, the idea that animals and plants change over long periods of time. Other anatomists noticed that the New Jersey dinosaur skeleton showed some curious resemblances to the skeletons of modern birds. This led Thomas Huxley, famed defender of Darwin, to argue that birds had descended from dinosaurs, an idea that many modern paleontologists still support.

What was *Hadrosaurus* like in life? Leidy estimated that it was about twenty five feet long, probably weighed 7 to 8 tons and stood about 10 feet tall. Today, we think *Hadrosaurus* stood on its hind feet when running, but used its front feet to support its head while grazing. Its abundant blunt teeth confirm that *Hadrosaurus* was a vegetarian, a peaceful plant eater that could chew tough-stemmed twigs and leaves. *Hadrosaurus* lived about 80 million years ago, late in the Cretaceous Period. It probably roamed the forests and swamps along rivers and bays near the sea coast; this explains why its bones are found in ancient marine deposits with fossil seashells.

## New Jersey's "State Dinosaur"

*Hadrosaurus foulkii* became the official State Dinosaur of New Jersey in 1991 after years of hard work by a teacher, Joyce Berry, and her fourth grade classes at Strawbridge Elementary School in Haddon Township. As a result of their efforts, New Jersey has a truly unique symbol of its prehistoric past.

Although no more dinosaur fossils have been found at the original site in Haddonfield, we are still finding bones of *Hadrosaurus* in New Jersey today. Scientists of the New Jersey State Museum actively collect dinosaur and other fossil bones from the Garden State. *Hadrosaurus* was widespread in the Late Cretaceous Period, toward the end of the age of dinosaurs, and we find its bones in other states such as North Carolina, Missouri and South Dakota. If you find large bones in the ground that are dark and feel heavy, call the State Museum's Natural History Bureau for help - because dinosaurs can be found in your own backyard!

*Written by William B. Gallagher, Ph.D., N.J. State Museum; reviewed by the Natural History Bureau, N.J. State Museum; edited and reviewed by the Department of Environmental Protection, New Jersey Geological Survey.*

**You can see dinosaur skeletons (including *Hadrosaurus*) and other fossils found in New Jersey at the ...**

### New Jersey State Museum

#### General Information

The Museum is located at 205 West State Street in the Capitol Complex in Trenton, and is open Tuesday through Saturday from 9 a.m. to 4:45 p.m., and Sunday from noon to 5 p.m. It is closed on Mondays and State Holidays. Admission to the Museum and most of its educational programs is free. There is a nominal fee for planetarium programs. Please telephone: Recorded: (609) 292-6464 (24 hours a day) General: (609) 292-6308 (weekdays 8:30 a.m. to 4:30 p.m.)

#### Museum Shop

The Museum Shop is open Tuesday through Saturday, 10 a.m. to 4:15 p.m., and Sunday from noon to 4:30 p.m.

#### Friends of the New Jersey State Museum

Membership in the Friends helps provide the Museum with program support and much-needed acquisition funds. Benefits of membership include *The Quarterly Calendar*, discounts in the Museum Shop, travel opportunities and more. To join the Friends, call (609) 394-5310.

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State of New Jersey

Department of Environmental Protection

Policy and Planning

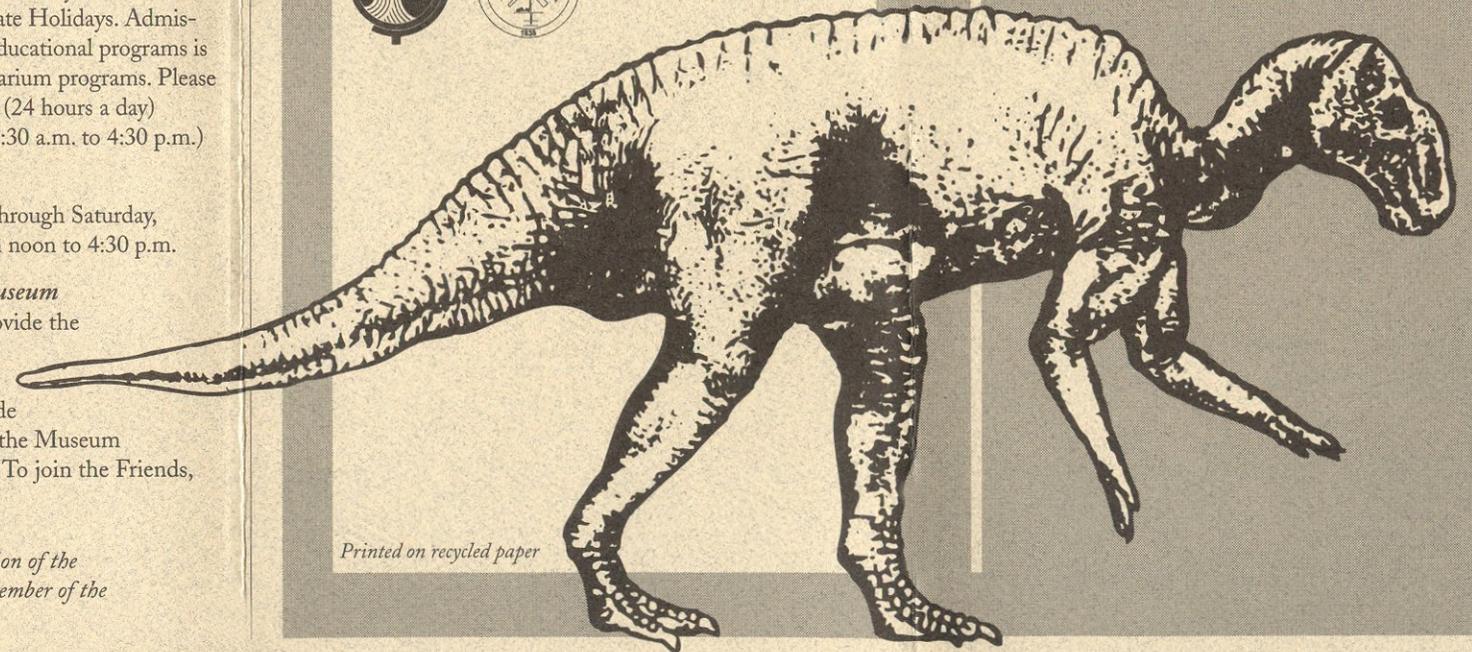
Division of Science and Research

A price list of New Jersey maps, aerial photographs, and reports on geology and ground water is available on request. Write or call:

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New Jersey Geological Survey personnel are available to answer questions on New Jersey geology, mineral resources, ground water and related topics. Write to:

NJ Department of Environmental Protection  
NJ Geological Survey  
CN-427, Trenton, NJ 08625-0427  
Phone (609) 292-1185.



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## New Jersey's State Dinosaur: *Hadrosaurus foulkii*

A duckbilled dinosaur,  
*Hadrosaurus foulkii*  
roamed the forests  
and swamps along  
the bays of  
New Jersey's  
ancient seacoast.