

NATIONAL HISTORIC LANDMARK NOMINATION

NPS Form 10-900

USDI/NPS NRHP Registration Form (Rev. 8-86)

OMB No. 1024-0018

HADROSAURUS FOULKII LEIDY SITE

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United States Department of the Interior, National Park Service

National Register of Historic Places Registration Form

1. NAME OF PROPERTY

Historic Name: *HADROSAURUS FOULKII LEIDY SITE*

Other Name/Site Number: N/A

2. LOCATION

Street & Number: Maple Avenue Not for publication: ___
 (0.4 mile north of Hopkins Pond, on the north bank of the small
 stream flowing through Camden County Park land, but within the boundaries
 of the Borough of Haddonfield, into Cooper River)

City/Town: Haddonfield Vicinity: ___

State: NJ County: Camden Code: 007 Zip Code: 08033

3. CLASSIFICATION

Ownership of Property Private: ___ Public-Local: ___ Public-State: <u>X</u> Public-Federal: ___	Category of Property Building(s): ___ District: ___ Site: <u>X</u> Structure: ___ Object: ___
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Number of Resources within Property Contributing <u>1</u> _____ <u>1</u>	Noncontributing _____ buildings _____ sites _____ structures _____ objects <u>0</u> Total
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Number of Contributing Resources Previously Listed in the National Register: 0

Name of Related Multiple Property Listing: N/A

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4. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this _____ nomination _____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property _____ meets _____ does not meet the National Register Criteria.

Signature of Certifying Official

Date

State or Federal Agency and Bureau

In my opinion, the property _____ meets _____ does not meet the National Register criteria.

Signature of Commenting or Other Official

Date

State or Federal Agency and Bureau

5. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:

- ____ Entered in the National Register _____
- ____ Determined eligible for the National Register _____
- ____ Determined not eligible for the National Register _____
- ____ Removed from the National Register _____
- ____ Other (explain): _____

Signature of Keeper

Date of Action

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6. FUNCTION OR USE

Historic: Landscape
Extraction

Sub: Unoccupied Land
Extractive Facility (Marl)

Current: Recreation & Culture
Vacant/Not in Use

Sub: Monument/Marker

7. DESCRIPTION

ARCHITECTURAL CLASSIFICATION: N/A

MATERIALS: N/A

Foundation:

Walls:

Roof:

Other:

Describe Present and Historic Physical Appearance.

The *Hadrosaurus foulkii* Leidy site is located in Haddonfield, New Jersey, on the north side of a small stream, sometimes referred to as "Hadrosaurus Run," approximately 100 yards from the commemorative park developed in 1984 by Haddonfield Boy Scout Troop 65. The dinosaur site is on the north side of Haddonfield, at the eastern end of Maple Avenue and approximately 0.4 mile north of Hopkins Pond. The location of the marl pit where the dinosaur bones were found in October 1858, was arrived at by carefully studying a very well executed map presented to the Academy of Natural Sciences of Philadelphia in December 1858, as part of the overall report covering the extraordinary discovery. Comparing that map with a 1907 map¹ and the latest USGS map (1984), combined with an onsite investigation by the author and Dr. William B. Gallagher of the New Jersey State Museum, places the site at approximately 330 feet up "Hadrosaurus Run" where there is a depression resembling what would have been a marl pit.

The site, presently heavily overgrown with trees and vines, does not appear to have been altered by the extensive reshaping of the terrain around two previously existing sewage disposal plants, the last one being removed in 1990.² There is considerable construction related debris, e.g., large blocks of concrete, which has been moved toward "Hadrosaurus Run." The debris and movement of earth have not encroached upon the site. On the terrace above the "Run", but not within the discovery site, are numerous reminders that the area was for many years a dumping ground for discarded household objects. The recently installed sewer connector was laid across vacant land upslope from the site. There is no indication that the immediate site of the marl pit has been built upon or extensively disturbed.³

Dr. Gallagher, being a geologist as well as a paleontologist, comments that this is "true marl in the English sense" in that it is a massive gray clay that has fossil shells and a lot of flecks of shiny silt size mica in it. While no dinosaur remains are visible, there are numerous sea shells, which are fossils because they have not been altered in 80 million years. Thus, one can see not only the marl that W. Parker Foulke dug, but the marl that had been created when the area was under the Atlantic Ocean where sediments, including samples of marine life, were being deposited. Geologists maintain that at the time of *Hadrosaurus foulkii* Leidy the coastline of the Atlantic Ocean extended in a line from near present day New York City to Trenton and Philadelphia. Thus, much of southern New Jersey was under water, with the depth of the ocean at present day Haddonfield being as much as 100 feet.⁴

The site is under the management of the Camden County Park Authority. Except for the Boy Scout commemorative park, the site is undeveloped. It has been featured, however, as a place of special interest to Boy Scouts, local school groups, and to individuals with

¹ G. M. Hopkins, *Atlas of the Vicinity of Camden, New Jersey, from Official Records, Private Plans and Actual Surveys* (Philadelphia, Pennsylvania: G. M. Hopkins Co., 1907).

² *Ibid.*; Interview with Ed Frazier, long-time resident of Haddonfield, February 3, 1993.

³ John W. Bond and William B. Gallagher, *Tour of Hadrosaurus foulkii Leidy site, Haddonfield, New Jersey, February 3, 1993.*

⁴ *Ibid.*; Academy of Natural Sciences of Philadelphia, *A Brief Notice of the Restored Skeleton of the Great Herbivorous Lizard Hadrosaurus, in the Museum of the Academy of Natural Sciences of Philadelphia* (Philadelphia, Pennsylvania: Academy of Natural Sciences of Philadelphia, 1868), p. 3. Benjamin Waterhouse Hawkins Album, Academy of Natural Sciences of Philadelphia.

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paleontological interests.

For many years the site, where in 1858 the most significant paleontological discovery of its time was made, went virtually unnoticed by the general public. That situation changed in 1984, however, when an aspiring Eagle Scout, Christopher Brees, chose to lead his troop in developing a small park to recognize the importance of the site. The scouts had completed their project by the end of May, with dedication coming on September 23, 1984.⁵ The miniature park, 50 feet by 25 feet, has as its centerpiece a slab of Stockton Arkose on which is mounted an interpretive bronze plaque and a small scale replica of the famous dinosaur.

Creation of the park has been helpful in raising the level of awareness of the importance of the site, as demonstrated by the campaign of elementary students at Strawbridge School in neighboring Westmont to have the Haddonfield dinosaur designated the state dinosaur. The persistence of the students and their teacher, Joyce Berry, culminated in the signing by Governor Jim Florio of a bill on June 13, 1991 making *Hadrosaurus foulkii* Leidy New Jersey's State Dinosaur. In the bill signing ceremony, Governor Florio announced: "This (dinosaur) is very important to all of us. It launched the whole modern science of paleontology."⁶

With the bones of *Hadrosaurus foulkii* Leidy being found in an area that was known to be under the Atlantic Ocean, one would tend to think that its usual habitat was the sea. It is generally accepted that *Hadrosaurus foulkii* Leidy was a terrestrial animal that could swim quite adequately, in fact to considerable distances away from shore. Even so, scientists believed that its remains ended up where they were found by the creature having died elsewhere and its body being washed out to sea at a time of flooding.⁷ Most paleontologists maintain that hadrosaurians commonly lived along ocean beaches, and river and lake margins, which often caused their remains to be found in deposits of marine origin.⁸

⁵ *Courier Post*, Cherry Hill, New Jersey, May 29, 1984; September 30, 1984.

⁶ *Philadelphia Inquirer*, Philadelphia, Pennsylvania, June 14, 1991.

⁷ Academy of Natural Sciences of Philadelphia, *Proceedings of the Academy of Natural Sciences of Philadelphia, December 14, 1858* (Philadelphia, Pennsylvania: Academy of Natural Sciences of Philadelphia, 1858), p. 217.

⁸ Edwin H. Colbert, "A Hadrosaurian Dinosaur from New Jersey," *Proceedings of the Academy of Natural Sciences of Philadelphia*, Vol. C. (Philadelphia, Pennsylvania: the Academy of Natural Sciences of Philadelphia, 1948), 26; John R. Horner and James Gorman, *Digging Dinosaurs* (New York, New York: Harper & Row, 1990), p. 72.

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8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties:

Nationally: X Statewide: ___ Locally: ___

Applicable National Register Criteria:

A X B ___ C ___ D ___

Criteria Considerations (Exceptions):

A ___ B ___ C ___ D ___ E ___ F ___ G ___

NHL Criteria: 1

NHL Theme(s): XIII. Science
C. Biological Sciences
3. Paleontology

Areas of Significance: Science

Period(s) of Significance: 1858

Significant Dates: 1858

Significant Person(s):

Cultural Affiliation: N/A

Architect/Builder: N/A

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.**SUMMARY**

Hadrosaurus foulkii Leidy, discovered by William Parker Foulke in a marl pit on a farm in Haddonfield, New Jersey in October 1858, was the first relatively complete dinosaur skeleton found in North America, and in fact, anywhere in the world.¹ A few dinosaur teeth had been found by Philadelphia geologist Ferdinand Hayden in 1856 in the Judith River formation in what is now Montana.² The discovery of *Hadrosaurus foulkii* Leidy and its presentation to the scientific world revolutionized the understanding of dinosaurs.³

Joseph Leidy, a professor of anatomy at the University of Pennsylvania and chairman of curators at the Academy of Natural Sciences of Philadelphia, examined the bones at the site and did an indepth professional study of them in his laboratory. As the preeminent American paleontologist at the time, Leidy described the skeleton scientifically and later, in the 1860's, supervised the reconstruction of the *Hadrosaurus* at the Academy of Natural Sciences of Philadelphia.⁴ On the basis of Leidy's comparative analysis of the length of the humerus (the upper arm) and the femur (the thigh bone), he concluded that *Hadrosaurus foulkii* walked around on its hind legs and stood basically upright. Leidy determined that since the femur was 40 per cent longer than the humerus, *Hadrosaurus*, in particular, could rear back and stand on its hind legs.⁵ This was contrary to the prevailing point of view put forth by Richard Owen, the first head of the British Museum of Natural History and regarded as the founder of the science of paleontology. In 1841 Owen had created the name Dinosauria, meaning "terrible lizard," to identify the fossils which had been discovered starting in the 1820's. On the basis of these fossils, Owen considered dinosaurs to have been large, lumbering, elephantine four-legged reptiles who moved around on all fours.⁶

When Benjamin Waterhouse Hawkins, under the supervision of Leidy, reconstructed *Hadrosaurus foulkii* Leidy in 1868, he mounted it so that it was reared back and standing on its hind feet in a kangaroo-like stance. Hawkins and Leidy used the living iguana as a model for the head because the hadrosaur's teeth resembled those of the ancient *Iguanodon* and those of the living iguana. Since the head was not found with the bones from the Haddonfield marl pit, Leidy and Hawkins assumed that the iguana was the more correct model to follow.⁷ Later discoveries confirmed much of what Leidy had said about hadrosaurians and the way he and Hawkins had reconstructed *Hadrosaurus foulkii* Leidy.

¹ William B. Gallagher, Public Lecture, New Jersey State Museum, Trenton, New Jersey, January 24, 1993.

² Horner, Gorman, *op. cit.*, p. 74; Richard C. Ryder, "Hawkins' Hadrosaurus: The Stereographic Record," *The Mosasaur, the Journal of the Delaware Valley Paleontological Society*, Vol. III, November, 1986, p. 169.

³ Donald Baird, Telephone Conversation with John W. Bond, March 3, 1993. Dr. Baird, now retired, formerly was the Director of the Museum of Natural History, Princeton University, Princeton, New Jersey.

⁴ Ryder, *op. cit.*, p. 170.

⁵ Academy of Natural Sciences of Philadelphia, *Proceedings 1858*, p. 217.

⁶ Gallagher, Public Lecture, January 24, 1993.

⁷ Ryder, *op. cit.*, p. 170.

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The exceptions were the head and the kangaroo-like stance.⁸ It would be established by subsequent paleontologists that *Hadrosaurus foulkii* Leidy was a duck-billed dinosaur, having a beak resembling that of a duck.⁹ Nevertheless, the reconstructed dinosaur, presented to the Academy of Natural Sciences of Philadelphia, became the first dinosaur to be reassembled and put on public display anywhere in the world.¹⁰

The reconstructed dinosaur was an immediate public success, drawing great crowds to the Academy to see this strange creature. Four full-scale reproductions of the Academy exhibit were made by Hawkins, greatly extending public awareness of the significance of the Haddonfield discovery.¹¹ The scientific world had already been made aware of *Hadrosaurus foulkii* Leidy through the writings of Leidy.

The discovery of *Hadrosaurus foulkii* Leidy came at a time when there were heated intellectual debates over Charles Darwin's recently expounded theory on evolution. When Leidy described the hip, leg, and ankle structure of *Hadrosaurus foulkii* Leidy as bearing a resemblance to the hip structure of modern birds, Darwin's principal supporter, Thomas Henry Huxley, quickly seized upon the information as supporting his postulation of an evolutionary relationship between dinosaurs and birds.¹² That view still holds among many scientists.¹³

The *Hadrosaurus foulkii* Leidy site is regarded as nationally significant from a natural history point of view as well as a historical one. In 1970 the site was evaluated by Dr. John H. Ostrom, Peabody Museum of Natural History, Yale University, as part of a study for the National Park Service on "Mesozoic Vertebrate Paleontological Sites for Possible Inclusion in the Registry of Natural Landmarks." Ostrom concluded that, "The Haddonfield site is one of great scientific and historical importance because it is the source of the first (reported) articulated dinosaurian remains found in the western hemisphere." His overall evaluation was:

⁸ Baird, Telephone Conversation with Bond, March 3, 1993.

⁹ Horner, Gorman, *op. cit.*, p. 72

¹⁰ Ryder, *op. cit.*, p. 169.

¹¹ Baird, Telephone Conversation with Bond, March 3, 1993.

¹² Gallagher, Public Lecture, January 24, 1993; J.P. Lesley, *Memoir of William Parker Foulke. Read before the American Philosophical Society, November 6, 1868. Proceedings of the American Philosophical Society* (Philadelphia, Pennsylvania: American Philosophical Society, 1869), p. 31.

¹³ Gallagher, Public Lecture, January 24, 1993; Rick Gore, "Dinosaurs," *National Geographic*, Vol. 183, No. 1, January, 1993, p. 10.

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This site, because of its historical prominence, is given the highest possible rating. Current intact (but modified) condition of the site would make inclusion of the site possible and local situation would seem to provide means for adequate protection. The site meets the National significance criteria and also that of a site of important scientific discovery. It is here classified as a Category 1 site.

Dr. Ostrom recommended the site be designated a Natural Landmark.¹⁴

HISTORY

The discovery of dinosaur bones on the farm of John E. Hopkins of Haddonfield, New Jersey, by W. Parker Foulke in October 1858, was reported by Foulke and Dr. Joseph Leidy to the members of the Academy of Natural Sciences of Philadelphia at its December 14, 1858 meeting.¹⁵

Foulke, a member of the Academy and a prominent Philadelphia attorney with a strong interest in paleontology,¹⁶ spent part of the summer and fall of 1858 in Haddonfield vacationing with his family. While visiting with John Hopkins, Foulke learned that 20 years earlier Hopkins and his marl diggers had discovered some large, heavy, black bones, most likely vertebrae of a large animal, in a marl pit located on Hopkins' farm. In 1838, marl was commonly used as an agricultural fertilizer.

In the process of extracting marl, Hopkins discovered the strange heavy bones. Not knowing what they were, he gave some to curious neighbors and kept a few for himself. By 1858, none of the bones found in 1838 could be located. Hopkins had not attributed any scientific association to the bones because he did not know of any bones of scientific value having been previously found in the area. When he told Foulke of what he had found earlier, the visiting attorney immediately became excited and asked permission to dig in the marl pit where the original bones had been discovered. Hopkins gave Foulke permission to reexamine the original marl pit, to dig anywhere on his farm, and to keep whatever he found. Taking into account the geological age of the area, Foulke strongly felt that additional exploration was warranted.¹⁷

While the 1838 pit had become overgrown with grass, shrubs, and small trees, with help from Hopkins and some of the marl workers who had been part of the 1838 dig, Foulke was able to locate the eastern side of the original pit after one day's work. Hopkins recalled that the 1838 bones were found more on the western side of the pit. Digging then shifted to that side. After removing about four feet of superficial fill the workmen came to the marl. Four additional feet of excavation brought them to a thin stratum of decomposed sea shells and about two feet below that, overlying and intermixed with another stratum of shells, the workmen came upon a pile of bones. The total depth from the surface to the level of the bones was between nine and ten feet. The depth of the ravine adjacent to the pit was

¹⁴ John H. Ostrom, "Report to the National Park Service on Mesozoic Vertebrate Paleontological Sites for Possible Inclusion in the Registry of Natural Landmarks" (New Haven, Connecticut: Peabody Museum of Natural History, Yale University, 1970), p. 85.

¹⁵ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, pp. 213-218.

¹⁶ Lesley, *op. cit.*, pp. 2, 29.

¹⁷ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, p. 213; Historical Society of Haddonfield, *op. cit.*, p. 263.

between 20 and 30 feet, much as it is today.¹⁸

Digging the marl was not easy because of the tenacious manner in which it stuck to digging implements and to the bones being removed. Great care had to be taken when removing the bones from the marl and from each other so as not to break them. Working with a small trowel and a knife, the excavation progressed slowly. Foulke was especially careful to conduct the excavation in a scientific manner. He made a sketch of the bones *in situ*, and some measurements were taken before they were removed in the event that some might fracture during the removal. Once removed each bone was separately wrapped in a coarse cloth, then laid upon a thick bed of straw in the bottom of a cart and moved about three quarters of a mile to the place where Foulke was temporarily living.

Realizing the spectacular nature of his discovery, Foulke wanted the expert evaluation of two of his colleagues at the Academy of Natural Sciences of Philadelphia. On October 5, 1858, Foulke wrote Dr. Leidy at the Academy:

I have made my digging and have taken out some splendid bones from the marl, but we are now at a stand, in relation to the probable place of the head. Can you come with the bearer who has a conveyance to bring you? I fear both water and the incursions of the neighbors who are roused on the subject. I send a note to Mr. (Isaac) Lea to ask him to look at the shells as we dig. The fruit is abundant and I wish the occasion to be secured for science.¹⁹

Leidy, a multi-talented scientist, and Mr. Lea, a specialist in sea shells, promptly visited the excavation.

Leidy had graduated from the University of Pennsylvania in 1844 with a degree in medicine. Soon he became the librarian and curator at the Academy of Natural Sciences of Philadelphia. At the time of Foulke's discovery, Leidy had also been appointed professor of anatomy at the University of Pennsylvania.²⁰ He had already established a formidable reputation as a paleontologist with his *Ancient Fauna of Nebraska* (1853) being the most important contribution to the subject of paleontology in America up to that time. Before

¹⁸ Academy of Natural Sciences of Philadelphia, *Proceedings*, 1858, p. 213.

¹⁹ W. Parker Foulke, Letter to Dr. Joseph Leidy, October 5, 1858. Leidy, Joseph, 1823-1891, Correspondence 1839-91, Coll. 1, Academy of Natural Sciences of Philadelphia.

²⁰ *Encyclopaedia Britannica*. (Chicago, London, Toronto: Encyclopaedia Britannica, Inc., 1955), Vol. 13, pp. 891-892.

Leidy's publication, there had been only a few scattered papers on paleontology in America. The discovery of fossil deposits in western states "offered him unparalleled opportunity to lay the foundation of American paleontology."²¹

Upon seeing the discovery site and examining the bones, sea shells, etc., Leidy and Lea felt that the scientific value of the fossils justified further exploration. Foulke kept the diggers working, weather permitting, for the rest of October.²² Even after the major collection of bones was removed, Foulke extended the excavation to a large area around the old pit and continued to break up and rake over the entire mass of marl removed from the pit. He had been encouraged to do so by accidentally finding another tooth near the surface of the marl which had been thrown out. That process brought the total number of teeth found to nine and added some fragments of jaw to the collection. After determining that there was little probability of finding anything else of value, the digging was stopped. On November 15, 1858, Foulke wrote to Dr. Leidy that he would be sending to him five boxes containing the fossil bones.²³

In addition to the bones, various specimens of shells were removed. The great tenacity of the clay and the extreme tenderness of the shells made it almost impossible to get out perfect specimens, and when they came under the action of the atmosphere they tended to crumble to pieces.²⁴ The fragments of fossilized wood were examined by a Dr. Hammond and determined to be coniferous, much like the pines growing in the area in 1858.

By far the most important discovery was the collection of large bones. Dr. Leidy described the bones in great detail, demonstrating his considerable expertise in anatomy as well as paleontology. The bones, he told his fellow Academy members, were those of a huge herbivorous Saurian.²⁵ The animal, he felt, was closely related to the great extinct *Iguanodon* found in the Wealden formation near London in the 1820's and Lower Greensand deposits of Europe.²⁶ Leidy determined, however, that the genus was different and for it he proposed the name of *Hadrosaurus*. Later in his presentation he expanded the name to

²¹ *Ibid.* All of the fossils of the Ferdinand V. Hayden expedition in the Rocky Mountains were given to Leidy to identify.

²² Academy of Natural Sciences of Philadelphia, *Proceedings, 1858.*, p. 214.

²³ W. Parker Foulke, Letter to Dr. Joseph Leidy, November 15, 1958, Leidy Collection, Academy of Natural Sciences of Philadelphia.

²⁴ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, p. 218.

²⁵ *Ibid.*, p. 215.

²⁶ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, p. 216; William B. Gallagher, *Dinosaurs—Creatures of Time*, *New Jersey State Bulletin # 14* (Trenton, New Jersey: New Jersey State Museum, 1991), p. 5; *Philadelphia Inquirer*, December 27, 1992.

Hadrosaurus foulkii, meaning "Foulke's bulky Lizard," in recognition of his friend who had found the bones. Today the bones are collectively known as *Hadrosaurus foulkii* Leidy, so as to recognize both the discoverer and the classifier of the ancient creature.²⁷

Leidy described the bones in the following manner:

Besides a number of small fragments, the bones consist of twenty-eight vertebrae, mostly with their processes broken away; a humerus, a radius and an ulna, complete; an ilium and a pubic bone, imperfect; a femur, a tibia and a fibula; two metatarsal bones and a first phalanx, complete. There are also in the collection nine teeth and a small fragment of the lower jaw. The bones are ebony black, from the infiltration of iron, and are exceedingly heavy. Their texture is firm and well preserved; and they are neither crushed nor water rolled.²⁸

Most of the specimens of teeth belonged to the lower jaw. When unworn and perfect, the teeth were about two inches long and resembled those of the *Iguanodon*. This comparison greatly influenced Leidy in projecting the probable appearance of the head of the Haddonfield dinosaur. He interpreted the sides and bottoms of the teeth as demonstrating that as one tooth wore out there was another one ready to take its place. After careful consideration, he believed that two of the teeth were from the upper jaw and that they exhibited the same successive characteristic.

Leidy went on to describe each of the bones in equal detail as he had provided for each tooth. After carefully measuring all aspects of each bone, he determined that there was a very great disproportion between the "fore and hinder extremities." The differences were so great that he was at first inclined to believe they belonged to different animals. He went on to conclude that "this great extinct herbivorous lizard may have been in the habit of browsing, sustaining itself kangaroo-like, in an erect position on its back extremities and tail."²⁹ The present interpretation of the stance of *Hadrosaurus foulkii* Leidy is that it did not stand like a kangaroo with its tail on the ground, but in a nearly horizontal position with the tail well off the ground.³⁰

²⁷ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, p. 218; William B. Gallagher, *Hadrosaurus foulkii, New Jersey State Dinosaur, New Jersey State Museum Science Notes # 16* (Trenton, New Jersey: New Jersey State Museum, 1991), p. 2.

²⁸ Academy of Natural Sciences of Philadelphia, *Proceedings, 1858*, p. 215.

²⁹ *Ibid.*, p. 217.

³⁰ Baird, Telephone conversation with Bond, March 3, 1993, and full scale reproduction of *Hadrosaurus foulkii* Leidy on display at the Academy of Natural Sciences of Philadelphia.

The total length of the animal was calculated by Leidy to be about 25 feet. This was arrived at by adding the length of the specimens of vertebrae in the collection, allowing for "separation by intervertebral fibro-cartilages and an addition of two and a half feet as an estimate of the length of the head."³¹

The report to the members of the Academy was essentially repeated by Leidy in an 1865 publication by Smithsonian Institution. That publication, *Smithsonian's Contributions to Knowledge*, #192, allowed Leidy to provide his fellow scientists with indepth information about *Hadrosaurus foulkii*.³² The Smithsonian publication included exceptionally detailed drawings of the individual bones, with precise measurements indicated. The drawings demonstrated Leidy's capabilities both as an anatomist and illustrator.

The next major event involving *Hadrosaurus foulkii* Leidy was its reconstruction in 1868 by Benjamin Waterhouse Hawkins under the general supervision of Leidy. Hawkins had made a considerable impression upon the artistic and scientific communities by his work in England as a talented painter, sculptor, and creator of life-sized replicas of dinosaurs for the Crystal Palace exhibition of 1854.

Hawkins arrived in New York in 1868 to begin a lecture series on natural history and the arts. Early on, he was approached by the Board of Commissioners of Central Park in New York City to recreate for the park a group of animals that would illustrate ancient animal forms of the American continent. To prepare for this project, though never started, he visited various museums to study their collections for representative specimens. It was at the Academy of Natural Sciences of Philadelphia that he found a rich storehouse of fossils of special value for the purpose of illustrating the gigantic forms of life that originally inhabited this continent.³³

Under the professional direction of Joseph Leidy of the Academy, Hawkins proceeded to reconstruct *Hadrosaurus foulkii* for exhibition at the Academy. After completing preliminary drawings, he began in September 1868, the work of moulding every individual fragment of the *Hadrosaurus*. This involved elaborate preparation of each fossil to protect its surface from the action of the plaster in the moulding operation.

The biggest challenge was to develop the head, considering that the head was the most conspicuous body part not found with the other bones. After considering what Hawkins had done with the Crystal Palace *Iguanodon* exhibit, Leidy concluded that the head of *Hadrosaurus foulkii* should be modeled after the *Iguanodon* and the living iguana. A scaled-up version of the living iguana was used as the primary model. On November 21, 1868, Hawkins presented to the Academy a completely reconstructed and mounted skeleton of *Hadrosaurus foulkii* which he had undertaken at his own expense.

The Academy acknowledged its appreciation for what Hawkins had done by presenting him with four resolutions on November 24, 1868. Representative of those resolutions was number three, which read in part:

Resolved, That the Academy fully appreciates the great value of the efforts he is making to popularize science.... They will tend to benefit the community

³¹ Academy of Natural Sciences of Philadelphia, *Proceedings*, 1858, p. 217.

³² Joseph Leidy, "Cretaceous Reptiles of the United States," *Smithsonian's Contributions to Knowledge*, Vol. XIV (Washington, D.C.: Smithsonian Institution, 1865).

³³ *Ibid.*, p. 170.

by expanding the minds of the masses.... He will also advance science by increasing the number of those who can appreciate the labors of men of science, sympathize in their labors and secure for them objects of interest which would be thrown aside and destroyed by the ignorant.³⁴

Everything the Academy expected the reconstructed dinosaur to accomplish for science and for the Academy came to fruition. When it was unveiled in November 1868, it became the world's first reconstructed and mounted dinosaur skeleton.³⁵ Other dinosaur presentations had been made, but with only a few bones and a lot of speculation. *Hadrosaurus foulkii*, on display at the Academy, had a much greater representation of actual bones than any previous attempt at representational interpretation of dinosaurs.

Hawkins' reconstruction was quite important from an educational standpoint. Leidy had brought the Haddonfield dinosaur to the attention of his fellow scientists, but it was Hawkins, through his reconstruction, who brought it to the attention of the general public.

The Academy, founded in 1812, had always been a respected research institution, but with Foulke's discovery, Leidy's scientific writings, and Hawkins' and Leidy's reconstruction, the Academy "became one of the most highly regarded natural science centers in the hemisphere."³⁶

During the first year in which the Hawkins reconstruction was on exhibit, it was viewed by 66,000 people, twice the usual visitation to the Academy. The next year brought 100,000 visitors to the Academy museum largely because of the giant dinosaur on display.³⁷

Public education regarding *Hadrosaurus foulkii* Leidy was extended far beyond the Academy by the 'clones' Hawkins made for Princeton University, Central Park in New York City, the Smithsonian Institution, and the Centennial Exhibition in Philadelphia.³⁸ The copy made for the Centennial Exhibition was commissioned by Prof. Thomas Archer of Great Britain, with

³⁴ Hawkins Album, The Academy of Natural Sciences of Philadelphia.

³⁵ Ryder, *op. cit.*, p. 169.

³⁶ *Philadelphia Inquirer*, June 21, 1986.

³⁷ *Courier Post*, May 29, 1984.

³⁸ Baird, Telephone conversation with Bond, March 3, 1993.

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the eventual location to be the Science and Art Department in the Royal Scottish Museum in Edinburgh.³⁹ When the Centennial copy was put on display in Edinburgh in 1879, it was the first dinosaur skeleton exhibited in Europe.⁴⁰

The reconstructed dinosaur remained on display at the Academy until 1938.⁴¹ During its exhibition it had helped to mould for an entire generation the public image of dinosaurs. "When the Academy of Natural Sciences opened its new dinosaur hall in January of 1986, a cast of the original specimen of *Hadrosaurus fouldii*, stripped of Hawkins' accretions, was given the prominent place it richly deserves."⁴²

³⁹ Benjamin Waterhouse Hawkins, Letter to Dr. Joseph Leidy, May 29, 1876.

⁴⁰ Ryder, *op. cit.*, p. 171.

⁴¹ *Courier Post*, May 29, 1984.

⁴² Ryder, *op. cit.*, p. 171.

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Mr. Rauschenberger is Director of Haddonfield Public Library and Historian for the Borough of Haddonfield.

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Previous documentation on file (NPS):

- Preliminary Determination of Individual Listing (36 CFR 67) has been requested.
- Previously Listed in the National Register.
- Previously Determined Eligible by the National Register.
- Designated a National Historic Landmark.
- Recorded by Historic American Buildings Survey: #
- Recorded by Historic American Engineering Record: #

Primary Location of Additional Data:

- State Historic Preservation Office
- Other State Agency
- Federal Agency
- Local Government
- University
- Other (Specify Repository): The Academy of Natural Sciences of Philadelphia; New Jersey State Museum, Trenton, New Jersey; Haddonfield Public Library, Haddonfield, New Jersey.

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Page 19**10. GEOGRAPHICAL DATA**

Acreage of Property: 4.0 acres

UTM References: Zone Easting Northing

A 18 497620 4417500

Verbal Boundary Description:

Beginning on the south side of Maple Avenue at its eastern terminus within the Borough of Haddonfield, New Jersey and continuing in a straight line across Camden County Park land to the west bank of Cooper River, thence up the west bank of Cooper River to the south side of "Hadrosaurus Run" and continuing along the crest of the south bank of that stream for approximately 725 feet to a point which would be at the end of a line perpendicular to the south side of the eastern terminus of Maple Avenue, and continuing in a straight line to point of beginning, including the mini-park developed by the Boy Scouts in 1984.

Boundary Justification:

On February 3, 1993, Historical Consultant John W. Bond and Paleontologist/Geologist Dr. William B. Gallagher, Registrar of the Bureau of Science, New Jersey State Museum along with Ed and Marydelle Frazier and their son, Howard, Superintendent of Public Works, Borough of Haddonfield, toured the site where the dinosaur bones were found. In establishing the site of the 1858 discovery, they followed the excellent map prepared by Joseph Leidy and William Parker Foulke to accompany their December 1858, report to the Academy of Natural Sciences of Philadelphia. That map, drawn with a clear understanding of surveying, contained notations with compass points and metes and bounds. The 1858 map showed the stream flowing in a straight line from the marl pit where the bones were discovered to the point where it entered Cooper River. We followed the 1858 course of the stream for approximately 330 feet to the discovery site, as calculated from the scale on the Leidy-Foulke map.

The boundary for the National Historic Landmark should include both sides of "Hadrosaurus Run," paying special attention on the north side of the "Run," to include the 1858 course of that stream at its confluence with the river. On the south side of the "Run," the boundary should extend for 50 feet beyond the top of the bank and continue along the top of the ravine as long as it is within Camden County Park land. The ravine should be included because of the geology it displays and the prominence it played in the description of the area in 1858. The mini-park should be included because it presents an important ongoing history of the site.

It was considered important from an interpretive standpoint to include the small stream because one can easily see there the strata of marl with fossilized sea shells intermixed, enabling one to understand better some of the things W. Parker Foulke saw in 1858. Here, one can acquire a sense of the geology of the late Cretaceous Period, 70-80 million years ago, when *Hadrosaurus fouldii* Leidy was alive.

11. FORM PREPARED BY

Name/Title: Mr. John W. Bond, Historical Consultant
309 Old Orchard Road
Cherry Hill, New Jersey 08003-1216

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Telephone: 609/424-4653

Date: March 15, 1993

National Park Service/WASO/History Division (418): May 26, 1994