
# ISPH 2017 Field Trip
# Independence National Historical Park, Philadelphia, Pennsylvania
# Haddonfield, New Jersey and Ellisdale, New Jersey Fossil Sites

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The 4th international Symposium on Paleohistology is organized by the New Jersey State Museum, and supported in part by the New Jersey State Museum Foundation.

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***"A day in the field with friends is a day well spent"***

-Robert C. Ramsdell (1921-2014)
Geologist, Paleontologist, Teacher, Friend

## INTRODUCTION

The field trip described in this Guidebook will visit the city of Philadelphia, birthplace of America's independence from Great Britain. We will also visit Haddonfield, New Jersey, the discovery site of the first fairly complete dinosaur ever found. This discovery, and subsequent finds in the marl pits of southern New Jersey make this area the birthplace of dinosaur paleontology in North America. The final stop will be at Ellisdale, New Jersey where the New Jersey State Museum has an on-going paleontological research project that continues to ensure New Jersey's place as an area of active paleontological research, especially as regards to the Late Cretaceous faunas of Appalachia.

Philadelphia, or Philly as it is commonly referred to by locals, is the largest city in the Commonwealth of Pennsylvania and the sixth most populous city in the United States. The city was founded by William Penn in the year 1682, to serve as the capital of the Pennsylvania Colony. By the 1750s it had surpassed Boston to become the largest city and port in British North America and, second largest in the British Empire after London.

We will be touring part of Independence National Historical Park, including: Independence Hall, the Liberty Bell Center and Independence Visitor Center. Weather and time permitting, we'll have lunch at an iconic "Philly Cheesesteak" restaurant and take a driving tour of some of Philadelphia's other highlights, including the Philadelphia Art Museum. Its 72 steps leading to the front entrance will be forever known as "the Rocky steps" after their use in the iconic Sylvester Stallone film.

Our afternoon will be spent visiting the site in Haddonfield where the first relatively complete dinosaur skeleton known to the world, were discovered in 1838 (excavated in 1858). The *Hadrosaurus foulkii* site is listed in the *National Register of Historic Places* of the National Park Service. This will be followed by a visit to the New Jersey State Museum's Ellisdale Fossil Site where dinosaur, and many other vertebrate, Late Cretaceous fossils, continue to be unearthed and described.

## BEGINNING OF TRIP—PRINCETON, NEW JERSEY

We begin our trip from the Nassau Inn, Princeton, New Jersey. It first opened at 52 Nassau Street in 1769, in a home built in 1756. The Inn experienced British occupation during the American Revolution, and played host to members of the Continental Congress when it met in nearby Nassau Hall. In 1937, the original inn was demolished to make way for the Palmer Square development and a new, much larger inn opened at 10 Palmer Square in 1938. The hotel

restaurant, the Yankee Doodle Tap Room, has a large mural by Norman Rockwell depicting Yankee Doodle behind the bar. It is within walking distance of Princeton University.

Princeton University was chartered in 1746 as the College of New Jersey and remained so-named for the next 150 years. The fourth college founded in colonial North America it was originally located in Elizabeth for one year, then in Newark for nine. The College of New Jersey moved to Princeton in 1756, housed in Nassau Hall, which was newly built on land donated by Nathaniel Fitzrandolph. Nassau Hall contained the entire College for nearly half a century. In 1896, when expanded program offerings brought the College university status, the College of New Jersey was officially renamed Princeton University in honor of its host community of Princeton. Four years later, in 1900, the Graduate School was established.

The Princeton area is underlain by siltstones, shales and sandstones of the Late Triassic Stockton and Locatong Formations. The underlying Stockton is gradational to the Lockatong. The fine grained sandstones and shales of both formations contain numerous reptilian footprints including those of early dinosaurs. The Lockatong Formation contains cyclic lacustrine deposits which often contain fossils of fish, phytosaurs and swimming reptiles. During the construction of the Firestone Library at Princeton University in 1948, a layer of the Lockatong Formation, that contained numerous specimens of the early coelacanth fish *Osteoplurus* (*Diplurus*) *newarki*, was uncovered.

***Nassau Hall or Old Nassau, the oldest building at Princeton University***
**https://en.wikipedia.org/wiki/Nassau_Hall**

## INDEPENDENCE NATIONAL PARK, PHILADELPHIA, PA

The first stop of our field trip will be Independence National Park in Philadelphia. We will stop at the Visitors Center to get our tickets for a guided tour of Independence Hall. We will separate into two groups. At 9:15 am, Group 1 will tour the Hall and Group 2 will go on a guided walking tour of the historical area. At 9:45 am, Group 2 will tour the Hall and Group 1 will go on the walking tour. There should be sufficient time before returning to our buses to see the Liberty Bell and the grave of Benjamin Franklin.

### INDEPENDENCE HALL

Independence Hall will forever be remembered as the birthplace of the Declaration of Independence (1776) and the Constitution of the United States (1787). When the Second Continental Congress met there beginning in 1775, the Hall was the State House for the colony of Pennsylvania. The tower over the Hall housed the Liberty Bell from 1753 until about 1846, when it suffered its now famous crack. The Liberty Bell became an international symbol of freedom, remaining so to this day. To increase its access to visitors, in 1976, the Liberty Bell was moved from Independence Hall to its own center across the street.

After the colonies gained their independence from Great Britain, Philadelphia was the capital of the United States of America from 1790 to 1800. Independence Hall and its side buildings served as the meeting place for all three branches of government: the Executive (the President), the Legislative (the United States Congress) and the Judicial (the United States Supreme Court). The capital was moved to Washington, DC in 1800.

***Independence Hall.*** **Independence National Historical Park photograph**

**HISTORIC WALKING TOUR**

In our walking tour of the Philadelphia Historic Area, we will visit a number of buildings from the fledgling days of the United States. Most of the buildings on our tour show the influence of classic Greek architecture.

**First Bank of the United States**

The First Bank of the United States was chartered in 1791, and the building itself completed in 1794. The Bank was the first to issue a type of national currency. The Bank assisted the new United States to resolve the debt caused by the war. At the time individual states were permitted to issue currency. Questions arose about whether the bank was permitted under the Constitution. This debate continued for a number of years. Its 20 year charter was not renewed and it expired in 1811.

**Second Bank of the United States**

The debate swung back in favor of the bank and the Second Bank of the United States was chartered in 1816. The Second Bank building was completed in 1824. Its design borrowed heavily from the Parthenon in Athens. When Andrew Jackson became President, he opposed the Bank and ordered all its money removed in 1832. Not surprisingly, its charter was not renewed and lapsed in 1836. This building now serves as a Portrait Gallery of figures of the American Revolution.

**Philadelphia Merchant Exchange**

Philadelphia was (and is) a major commercial port for the United States. The Merchant Exchange was built in the 1830s and operated as a financial center, a clearing house for merchants and a stock market for about 40 years. In 1952, the National Park Service took ownership of the building. It now serves as the headquarters for Independence National Historical Park.

**Carpenters Hall**

This Hall was built in 1771 by the Carpenters Company, essentially a guild of carpenters. Historically, it served as the meeting place for the First Continental Congress in 1774. This Congress compiled a list of grievances against Great Britain, paving the way for the Declaration of Independence. The second floor contained a library owned by Benjamin Franklin. The building is used today for group functions.

**Courtyard of Benjamin Franklin**

Benjamin Franklin owned many of the buildings in this courtyard. His house of residence was demolished in 1812. There is a frame approximating the contours of his residence. This area was the subject of an archaeological dig and viewing points were installed through which, one can see the ruins of the original house. Of particular interest are the viewing portals showing the

privies of Benjamin Franklin. The buildings and tunnel on the north side are original and were a source of rental income for Benjamin Franklin. They now house a working United States Post Office, a reproduction of Franklin's printing shop, and a display of objects found during the excavation of the courtyard.

***Merchant Exchange*** ***Carpenters Hall***

**Independence National Historical Park photographs**

## PAT'S KING OF STEAKS AND GENO'S STEAKS, PHILADELPHIA, PA

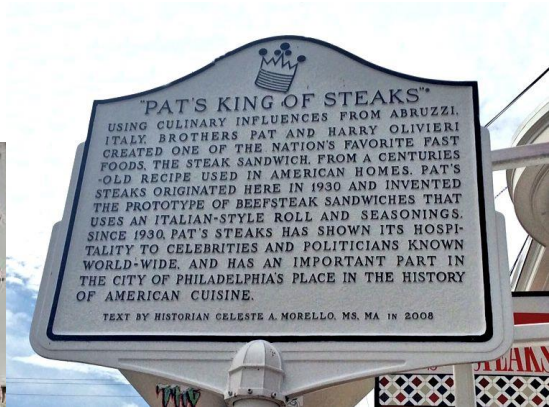
After departing Independence National Park, our bus will take us to our lunch stop, two specialty shops that offer the typical Philadelphia sandwich: the Philly Cheesesteak.

Also known as Philadelphia Cheesesteak, or just plain "cheesesteak" to the residents of Philadelphia, this sandwich is a regional icon of edible Americana. The classic cheesesteak is a sandwich of sizzling, thinly sliced beef "wit" or "witout" onions and served with a choice of provolone cheese or Cheez Whiz (a cheese sauce) on a long roll. Located directly across from each other on Passyunk Avenue in Philadelphia, you will get your choice of visiting one of the two most famous cheesesteaks shops in the city:

Pat's King of Steaks: the birthplace of the cheesesteak. Established in 1930 by Pat and Harry Olivieri, the business has been in the family ever since, doling out cheesesteaks to locals and tourists alike.

Geno's Steaks: The opening of this shop across the street from Pat's in 1966 by Joey Vento, offering a "perfected" cheesesteak, set off the long-standing rivalry between them that continues to this day.

This rivalry has generated a regional phenomenon where one of the first things asked of a Philadelphian is "[Do you prefer] Pat's or Geno's?"

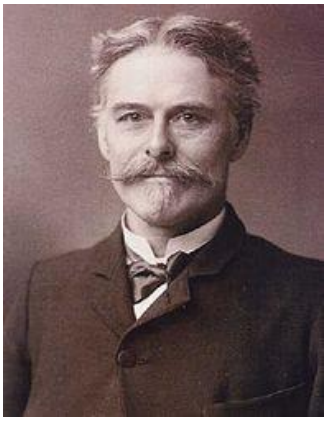




***Pat's ordering instructions*** ***Historic marker at Pat's King of steaks***

**Photographs by R. A. Pellegrini**

## INTERMEZZO

Leaving Pat's or Geno's our bus, traffic permitting, will pass by several important Philadelphia landmarks which will be pointed out. Of special interest will be the two rowhouses located at 2100-2102 Pine Street in the Center City District. Built in 1880, they were longtime homes of paleontologist and herpetologist Edward Drinker Cope (1840-1897). The buildings were purchased by Cope not long after their construction and he at first lived at 2100 using 2102 as space for specimen storage and as a work room. Later in 1886, facing financial problems, Cope moved into 2102 and rented out 2100 for income. He occupied 2102 until his death in 1897. It was declared a National Historic Landmark in 1975.



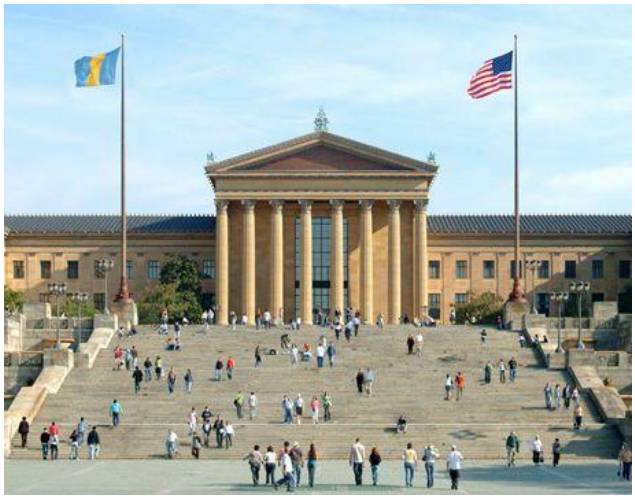
***Edward Drinker Cope c1885*** ***Cope's study in 1897***

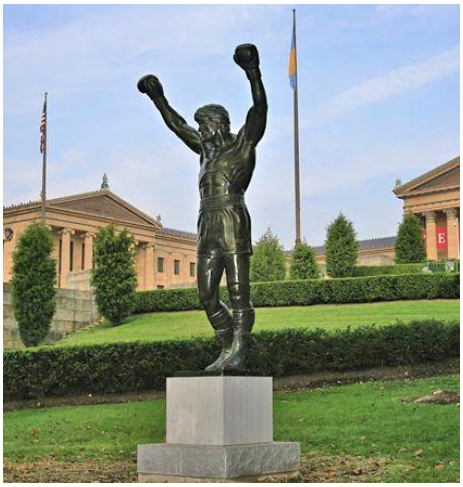
Both photographs are public domain images

Continuing north to Logan Square we will pass the Franklin Institute. Founded in 1824 for the "Promotion of the Mechanic Art", it opened to the public in 1934 as the Franklin Institute Science Museum. Today this science and technology museum is the most visited museum in the Commonwealth of Pennsylvania and a top-five tourist destination in the City of Philadelphia.

As we ride around Logan Square we will also pass the Academy of Natural Sciences of Drexel University (formerly of Philadelphia) or ANSP. Founded in 1812, the "Academy" is the oldest natural science research institution and museum in the New World. Among the noted naturalists and paleontologists associated with the ANSP are: John James Audubon, Edward Drinker Cope, Ferdinand V. Hayden, Joseph Leidy, Samuel Morton, and Horace G. Richards. Research in vertebrate paleontology continues today under the direction of Edward (Ted) B. Daeschler who is perhaps best known as co-discoverer of the transitional "fishapod" *Tiktaalik roseae* from the Canadian Arctic. There is a statue of Joseph Leidy just outside of the museum entrance. We will discuss Joseph Leidy in detail at Haddonfield.

Our last major drive-by before heading over the Benjamin Franklin Bridge to New Jersey will be the Philadelphia Museum of Art. The museum is one of the largest art museums in the world and administers collections containing over 240,000 objects. These include major holdings of European, American and Asian origin. The museum is also famous for the east entrance stairway. The 72 stone steps before the entrance have become known as the "*Rocky steps*" as a result of their appearance in the triple-Oscar-winning film *Rocky* and its sequels. A bronze statue of Rocky Balboa is located at the bottom right of the stairs.





***Rocky Stairs and statue at the Philadelphia Museum of Art***
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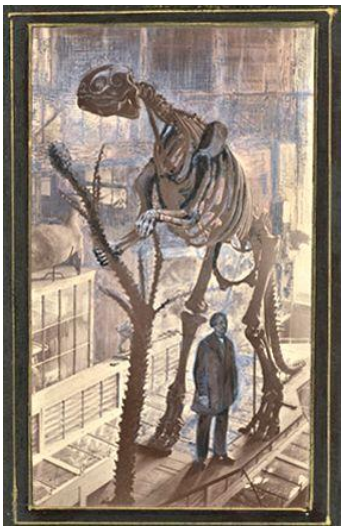
## *HADROSAURUS FOULKII* DISCOVERY SITE, HADDONFIELD, NJ

The third stop of the field trip kicks off the second leg: visits to two important paleontological sites of Late Cretaceous age in New Jersey. The first of these is the *Hadrosaurus foulkii* Leidy discovery site in Haddonfield, which is a National Historic Landmark.

In 1838 workers on the farm of John E. Hopkins were digging up marl for fertilizer along a tributary of the Cooper River in Haddonfield, New Jersey. They recovered a number of large ancient bones from what is now recognized as the Late Cretaceous Woodbury Formation. Hopkins later recalled that most of the bones were "huge vertebrae". No skull, leg bones or other large pieces were found except for one that resembled a "shoulder blade." Hopkins had little interest in these items and allowed visitors to carry the fossils away. Hopkins kept none of the bones for himself and could not remember the names of those who had taken the vertebrae. It is rumored that many of these fossil bones ended up as doorstops, ash trays and window props.

Twenty years later, in 1858 William Parker Foulke learned of the bones while vacationing in Haddonfield. Being a naturalist and member of the Academy of Natural Sciences of Philadelphia he asked Hopkins for permission to reopen the marl pit to see if he could find additional bones. At a depth of about 10 feet they hit pay dirt. As the excavation continued Foulke contacted paleontologist Joseph Leidy of the University of Philadelphia to lend his expertise to the project. With Leidy's help and guidance they recovered what Leidy described various elements that Leidy described as follows: "The bones consist of 28 vertebrae, mostly with their processes lost; a humerus, radius. And an ulna complete; an ilium and a supposed pubic bone, imperfect; a femur and tibia complete; a fibula, with one end lost; two metatarsal bones and a phalanx, complete; two small fragments of jaws, and nine teeth".

**Joseph Leidy with femur of *H. foulkii***



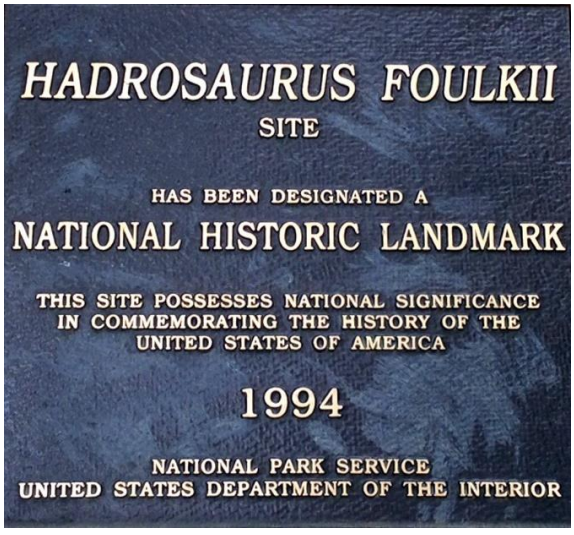
**Retouched photograph of Benjamin Waterhouse Hawkins with Mount of *H. foulkii* 1868**

In 1858 Leidy formally described and named the dinosaur *Hadrosaurus foulkii*, *Hadrosaurus* meaning “bulky lizard” and “*foulkii*” in honor of William Foulke.

Leidy recognized that these bones were from a dinosaur by their similarity to those of *Iguanodon*, (discovered in England decades before), but the skeleton of *Hadrosaurus* was far more complete. Leidy's monograph “Cretaceous Reptiles of the United States,” describing *Hadrosaurus* thoroughly and with illustrations, was subsequently written in 1860, but the American Civil War delayed its publication until 1865.

Leidy reconstructed *Hadrosaurus* as a biped, in contrast to the view at the time that such dinosaurs were quadrupedal. The entire skeleton was completely assembled in 1868 by a team including English sculptor and naturalist Benjamin Waterhouse Hawkins, and was put on display at the Philadelphia Academy of Natural Sciences. It was the first-ever mounted dinosaur skeleton, and the most complete dinosaur skeleton ever found at that time.

*Hadrosaurus* was named the state fossil of New Jersey in 1994, officially designated such by an act of the State legislature. The original bones are in the Academy of Natural Sciences of Drexel University.


**Plaques at the *Hadrosaurus foulkii* discovery site**

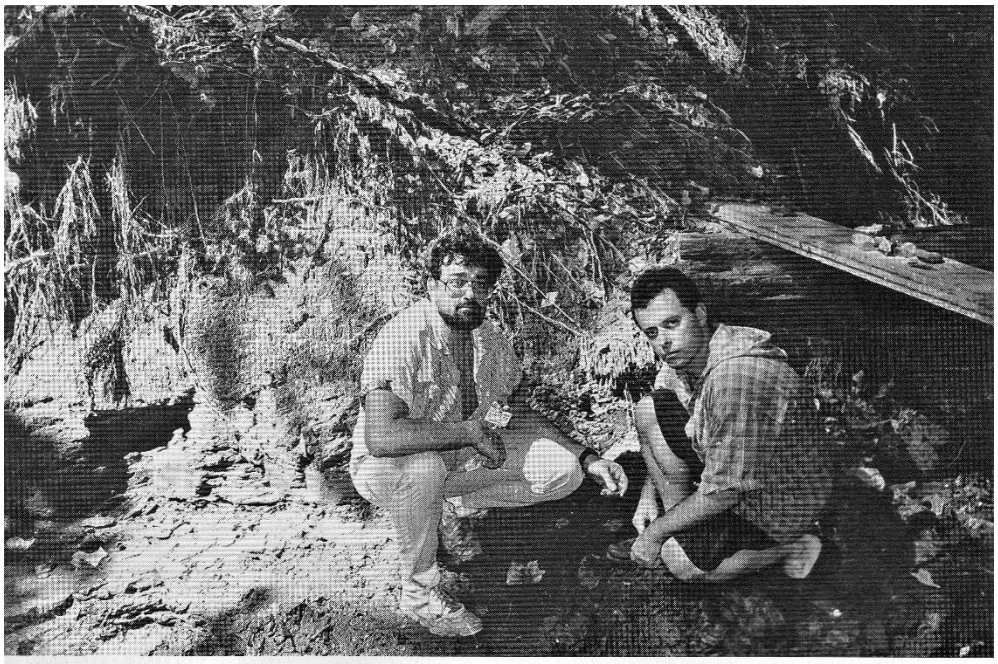
## ELLISDALE SITE, NJ

The fourth and final stop is at the Ellisdale Site in Ellisdale, New Jersey. The site is one of the most important Late Cretaceous localities on the East Coast, and perhaps one of the ugliest.

During the summer of 1980 serious avocational paleontologists Robert (Bob) K. Denton and Robert (Bob) C. O' Neill were looking for promising exposures of the Late Cretaceous (Campanian) Marshalltown Formation. On the advice of Ralph O. Johnson, founder and curator of the Monmouth Amateur Paleontologists Society, they concentrated on an area along the banks of Crosswicks Creek near the common corner of Monmouth, Mercer and Burlington Counties. Exploring a small tributary they found lignite and scraps of fossil bone.

They returned often to the site to collect from the material eroded from the banks of the tributary, and amassed a very important collection of vertebrate fossils including fish, turtle, crocodile and dinosaur bone. The two Bobs continued to collect the area especially after heavy storms, and in March 1984 a torrential storm dropped 8 inches (20 cm) of rain in the area. When the Bobs checked the site (now nicknamed "Bobs' Run") after the storm, they found the entire streambed littered with bone fragments. Within a month they had collected over three hundred specimens including very rare teeth and bone from lizards and mammals.

Denton and O'Neill brought the site to the attention of David C. Parris, the Curator of the Bureau of Natural History at the New Jersey State Museum. Parris encouraged the two collectors to continue monitoring the site, and within a few years hundreds of disarticulated bones of dinosaurs, crocodilians, turtles and fish had been donated to the New Jersey State Museum, which became the repository for the collection. The significance of the Ellisdale Site was recognized by the National Geographic Society, which sponsored research under Society grants in 1986 and 1987.



**Bob Denton (right) and Bob O'Neill at the Ellisdale site in 1993. Research at the site is on-going under the management of the New Jersey State Museum**

Remains of animals from at least four paleoenvironments are represented at the Ellisdale Site: marine, lagoonal/backbay, estuarine/freshwater, and terrestrial. Mixed faunal assemblages of this type are typically associated with transgressive lag deposits, and result from the slow accumulation of transported skeletal remains in tidal channels, backbays, and lagoons. Wave action and storms relocated the bones of marine animals to shallow water, while river currents and flooding events transported and deposited the remains of freshwater and upland terrestrial animals such as crocodilians and dinosaurs.

Megafossils of at least three different types of plants have been found at the site: *Liriodendron, Metasequoia,* and *Picea*. In addition, possible remains of Mangrove roots have been found encased in siderite concretions. Amber has been found at the site occurring in small droplets, generally less than 5 millimeters in size. Taphonomic analysis of the Ellisdale fauna has revealed two distinctly different types of preservation. Bones of both marine and upland terrestrial animals are typically broken, heavily worn, and missing the outermost layer of bone. Some bones show evidence of boring by the marine shipworm *Teredo*. In contrast, the bones of microvertebrates such as amphibians, lizards and mammals are much more complete, with delicate processes and the periosteal bone intact.

The small animal fauna of the site probably represents a "proximal" assemblage that lived at or near the final point of deposition, while the heavily worn bones represent a "distal" fauna. It is thought that the proximal fauna may have lived within a freshwater deltaic estuary that was affected by a coastal storm surge or a possible tsunami. The presence of numerous well-preserved amphibian fossils support the idea that the environment was freshwater, as amphibians are salt-intolerant. The disarticulated bones which accumulated in the lagoonal backbays by river transport, and in the shallow marine environment offshore, would have been mixed with the skeletal remains of the animals that lived within the delta as the storm surge swept over the estuary. Return flooding from the overfilled lagoons and estuarine channels after storm passage would have subsequently filled with debris, resulting in the mixed assemblage of animal and plant remains that are found at the site today.

During Late Cretaceous times, the North American Continent was divided by an inland sea into two subcontinents: a western continent now known as "Laramidia", and an eastern continent named "Appalachia". Although a rich and diverse assemblage of taxa has been found from Laramidia, little is known of the contemporaneous terrestrial fauna of the Appalachian subcontinent. The Ellisdale Site has provided the first detailed look at the terrestrial fauna of Appalachia, including the rare fossil remains of frogs, salamanders, lizards and mammals.

To date over 20,000 specimens have been collected. The Ellisdale Site is currently owned by Monmouth County Park System and is under the management of the New Jersey State Museum. Fossil collecting by the general public is prohibited.

This is a “wet” site and participants should dress accordingly. **Insect repellent is highly recommended**. We will walk the tributary and point out the areas where the principal fossil

quarries were located, and will discuss the significance of this site in relation to other Late Cretaceous sites of the East and Gulf Coasts.

**"Bobs' Run" The Upper Cretaceous Ellisdale fossil Site.**

After returning to the bus we will return to the Nassau Inn in Princeton. Expected arrival time is 5:00 PM. Feel free to join in a round of the "One Hundred Bottles of Beer" song along the route.

This will complete our trip. We hope you enjoy learning some of the revolutionary and paleontological history of the area.