

# THE PLASTER JACKET

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Florida State Museum  
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## FOSSIL RHINOCEROSES OF FLORIDA

Bruce J. MacFadden

*Florida State Museum*

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*Florida Paleontological Society, Inc.*

Official News

## IMPORTANT ANNOUNCEMENT

*The Plaster Jacket* has been published since September 1966 by the Florida State Museum. It has been available free of charge to anyone interested in Florida paleontology. This publication has been extraordinarily successful and the mailing list has grown to about 2,000.

As a result of the enthusiasm in Florida paleontology, the Florida Paleontological Society, Inc., was officially formed in October 1978 (coinciding with the 3rd Annual Paleontological Meeting held in Gainesville on 14 October). One of the major commitments of the FPS is to publish *The Plaster Jacket* with its present "face-lift."

Until October 1979 *The Plaster Jacket* will still be distributed free of charge to everyone on the mailing list and anyone else who requests it. However, due to financial limitations, AFTER OCTOBER 1979 *THE PLASTER JACKET* WILL BE DISTRIBUTED TO INDIVIDUAL AND INSTITUTIONAL MEMBERS IN GOOD STANDING IN THE FPS, INC. After this time, single issues will be available for purchase to non-members.

Membership dues or subscriptions should be sent to the Secretary-Treasurer (see outside back cover).

## MUSEUM ASSOCIATES

The Florida Paleontological Society, Inc., would like to express its appreciation to the Museum Associates of the Florida State Museum for supporting the costs of printing the Articles of Incorporation.

(Bruce J. MacFadden, Editor)

# THE PLASTER JACKET

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## FOSSIL RHINOCEROSSES OF FLORIDA

Bruce J. MacFadden<sup>1</sup>

Although rhinoceroses have been extinct in North America since the Pliocene, they had a spectacular evolutionary history in this continent for some 40 million years. During the first half of this century, rhinoceroses were only known from fragmentary specimens from a few localities in Florida. Within the last several decades the fossil record of rhinoceroses in Florida has become better sampled at localities such as Thomas Farm, Mixon's Bone Bed, the Bone Valley Formation, and of particular interest because of their abundance, at the Love Bone Bed, a site presently being worked by field crews from the Florida State Museum. Now that the history of this group is becoming better known, it seems appropriate to devote this issue to a discussion of the fossil rhinoceroses of Florida.

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## PRESENT-DAY RHINOCEROSSES

At the present time two different groups of rhinoceroses are found isolated from one another in Africa and eastern Asia. The genera *Diceros* and *Ceratotherium* include, respectively, the African black and "white" rhinoceroses (Fig. 1). It is interesting to note that the "white" rhinoceros is not actually white. This misnomer crept into English usage from the Afrikaans word "weit," meaning wide, in reference to the broad lips of *Ceratotherium*. The African rhinoceroses are characterized



Figure 1. The present-day African black rhinoceros, *Diceros* (photo courtesy of Ronald G. Wolff).

by two horns, the absence of incisor tusks, and high-crowned teeth. The genera *Rhinoceros* and *Diceros* include the Indian, Javan, and Sumatran rhinoceroses. They are characterized by one horn, the presence of upper and lower incisor tusks, and relatively short legs. These two present-day rhino groups appear to have had a separate origin from several distinct groups of fossil rhinoceroses.

One might think of rhinoceroses as heavy and lumbering animals. On the contrary, they are capable of running in excess of 30 mph. They have been known to attack cars, elephants, and humans. Their eyesight is poor but they have keen senses of smell and hearing. Rhinoceroses feed on leafy, woody, or grassy vegetation. They give birth to one offspring at a time after a gestation period of about one and a half years. The life span of a rhinoceros can reach 50 years.

#### RELATIONSHIPS

Rhinoceroses are grouped in the order Perissodactyla, or "odd-toed hoofed mammals" along with the present-day tapirs and horses, and numerous other extinct forms. The odd-toed hoofed mammals derive their name from the fact that on each limb there are either 5 or 3 "digits" (fingers or toes), as is the case in rhinoceroses and tapirs, or 1 digit, as is the case in horses. This condition is in contrast to the order Artiodactyla, or "even-toed hoofed mammals" such as deer, pigs, cows, and antelope that have 2 or 4 digits on each limb (see *The Plaster Jacket* No. 17).

The earliest perissodactyl, *Hyracotherium* (also called "eohippus" or "the dawn horse"), is first found about 55 million years ago in late Paleocene and early Eocene rocks in western North America and

early Eocene rocks in England and Europe. For many years it had been thought that *Hyracotherium* was relatively unspecialized in many features and could have been ancestral to tapirs, rhinoceroses, and several extinct perissodactyl forms as well as to horses. Recent work has shown that *Hyracotherium* has numerous features that are horse-like, or "equoid," and therefore remove this earliest perissodactyl from a direct, or immediately ancestral, relationship with tapirs and rhinoceroses, or the "tapiroids."

The earliest tapiroid *Homogalax* is known from early Eocene deposits in North America. During the medial and late Eocene some 40-50 million years ago, the tapiroids underwent a rapid adaptive radiation, or proliferation into different kinds. The earliest recognizable rhino-like perissodactyls, for example the amynodonts, are found throughout North America and Asia, with the intercontinental interchange occurring across the present-day Bering Straits (or "Land Bridge") between Siberia and the Aleutian Islands in the north Pacific. During the late Eocene and Oligocene the true rhinoceroses and the closely related rhino-like perissodactyls evolved several distinct lineages. This adaptive radiation resulted in several stoutly built forms and an offshoot group of more graceful and highly adapted running forms, the hyracodonts. The hyracodonts are found in both North America and Asia. They became extinct by the medial Miocene some 20 million years ago.

Several genera of stoutly built rhinoceroses flourished during the Oligocene to earliest Pliocene from about 35 to 5 million years ago. Again, there were several periods of interchange of rhinoceroses across the Bering Land Bridge between North America and the Old World. In North America, the early Miocene is characterized by forms such as *Diceratherium*

and *Menoceras* (see further discussion below). The later Miocene and earliest Pliocene is characterized by forms such as *Aphelops* and *Teleoceras*. At many localities during this time, both of these genera are represented. Rhinoceroses became extinct in North America by the early Pliocene. In Asia and Africa rhinoceroses persisted to the present day in the genera *Diceros*, *Ceratotherium*, *Dicerorhinus*, and *Rhinoceros*. In short, the present-day rhinoceroses are the remnants of a spectacular evolutionary history that spanned some 40 million years in North America, Asia, Europe, and Africa.

### FOSSIL RHINOCEROSES OF FLORIDA

No fossil rhinoceroses are known in Florida before the Miocene. This absence is not at all surprising because there is only one pre-Miocene land vertebrate locality in the entire state, the late Oligocene I-75 Local Fauna from southwest of Gainesville. At this I-75 locality it is not known whether the lack of rhinoceroses resulted from the small number of specimens collected, unfavorable local ecology, or the absence of these forms from Florida at that time.

During the early and medial Miocene (also called Arikareean and Hemingfordian Land Mammal Ages) from about 25 to about 15 million years ago, fragmentary remains of fossil rhinoceroses are known from several localities in northern Florida (Fig. 2), including the well-known Thomas Farm Quarry in Gilchrist County. These early Miocene rhinoceroses include the genera *Menoceras* and *Floridaceras*. *Menoceras* is a medium-sized rhinoceros with a nasal horn in males that is common in equivalent-aged sediments in the mid-continent of North America. *Floridaceras* is a very large, hornless, and long-legged rhinoceros; it is known only from the Thomas Farm Quarry and not

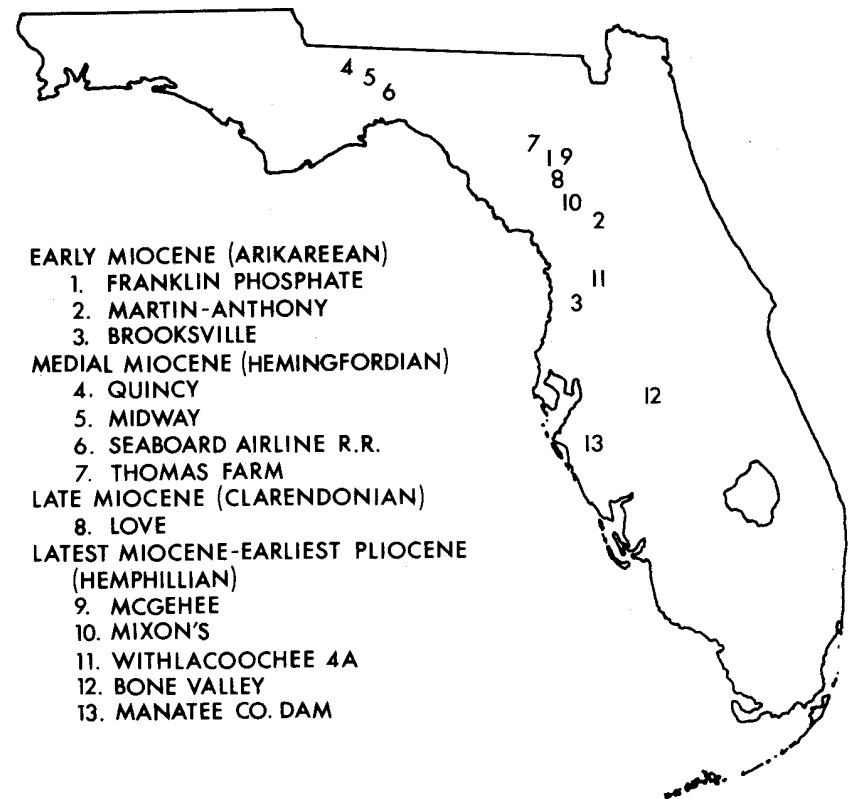


Figure 2. Fossil rhino localities in Florida

from the mid-continent. It is interesting to note that in the large fossil samples from Thomas Farm, rhinoceroses are rare in contrast to, for example, the rich sample of horses.

During the late Miocene between about 10-15 million years ago (representing the Barstovian and early portion of the Clarendonian Land Mammal Ages) there are no well-sampled land mammal localities in Florida. As a result of this gap in the rock record, we have

no information as to the presence or absence of rhinoceroses in Florida at that time.

The next chapter in the history of Florida rhinoceroses begins during the late Miocene (late Clarendonian) some 9 to 10 million years ago as represented by the extremely rich Love Bone Bed in Alachua County. At this site, rhinoceroses are among the most abundant land mammals encountered during digging. This abundance is in striking contrast to the apparent scarcity of rhinoceroses seen at the earlier Miocene Thomas Farm Quarry.

Two genera of rhinoceroses, *Aphelops* and *Teleoceras*, are represented at the Love Bone Bed. These two forms are readily distinguished from one another. *Aphelops* has a long tooth row, low-crowned teeth, upper incisor tusks that are reduced or absent, no horns, narrow back portion of the skull, and limbs proportioned as in the present-day African rhinoceroses. *Teleoceras* has a shorter tooth row, high-crowned teeth, well-developed upper and lower incisor tusks, small horns on the nasal bones of males, broad back portion of the skull, and very short and stout limbs (Figs. 3 and 4). At the Love site *Teleoceras* outnumbers *Aphelops* by a ratio of about three to one. Both *Aphelops* and *Teleoceras* from the Love Bone Bed are similar to representatives of these genera from the mid-continental United States, except that the ratios of abundance are sometimes reversed. The similarity of these rhinoceroses in both the mid-continent and Florida implies ready interchange between these regions rather than geographic isolation in Florida and descent from some earlier Miocene Florida rhinoceros.

During the latest part of the Miocene and into the earliest Pliocene (Hemphillian) from about 8 to 5 million years ago, the same genera of rhinoceroses, *Teleoceras* and *Aphelops*, are found at numerous sites in central and northern Florida including Mixon's

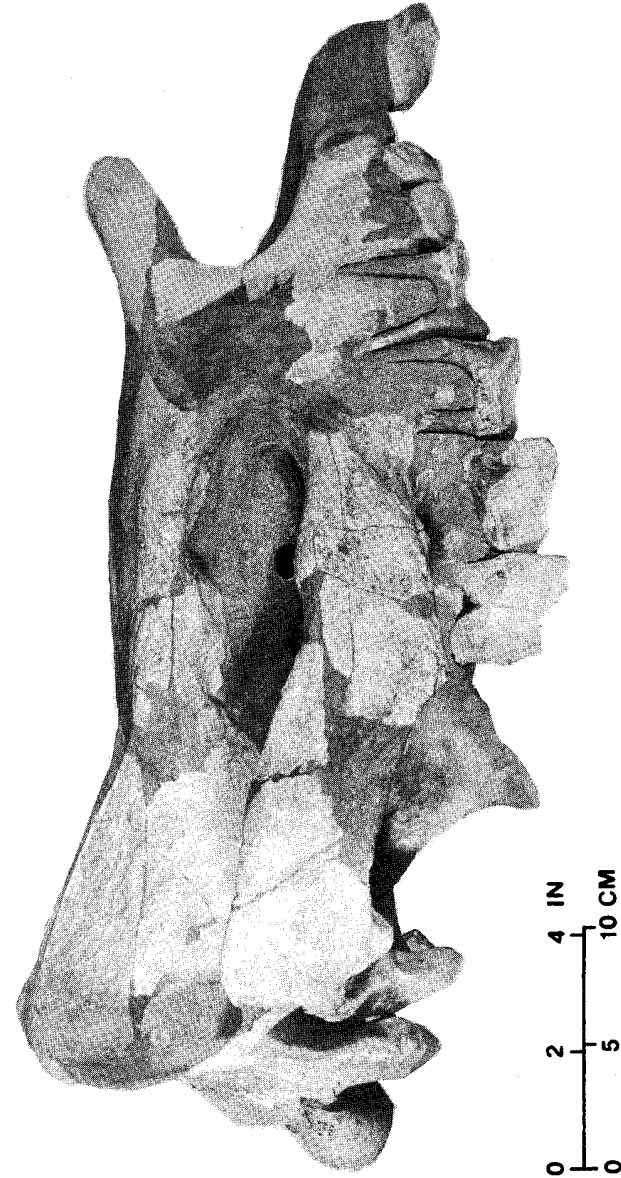


Figure 3. Right side view of skull of *Teleoceras* from the Miocene of northern Florida. Darker areas are reconstructed.

Figure 4. Lower jaw of *Aphelops* from the Miocene of northern Florida.

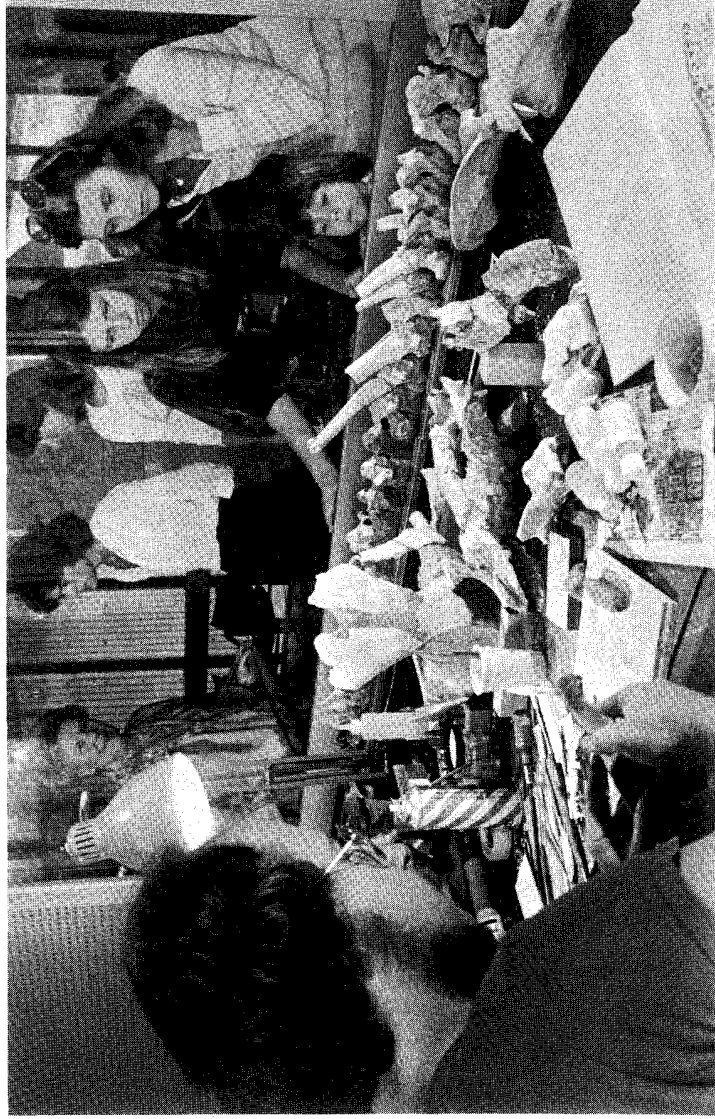
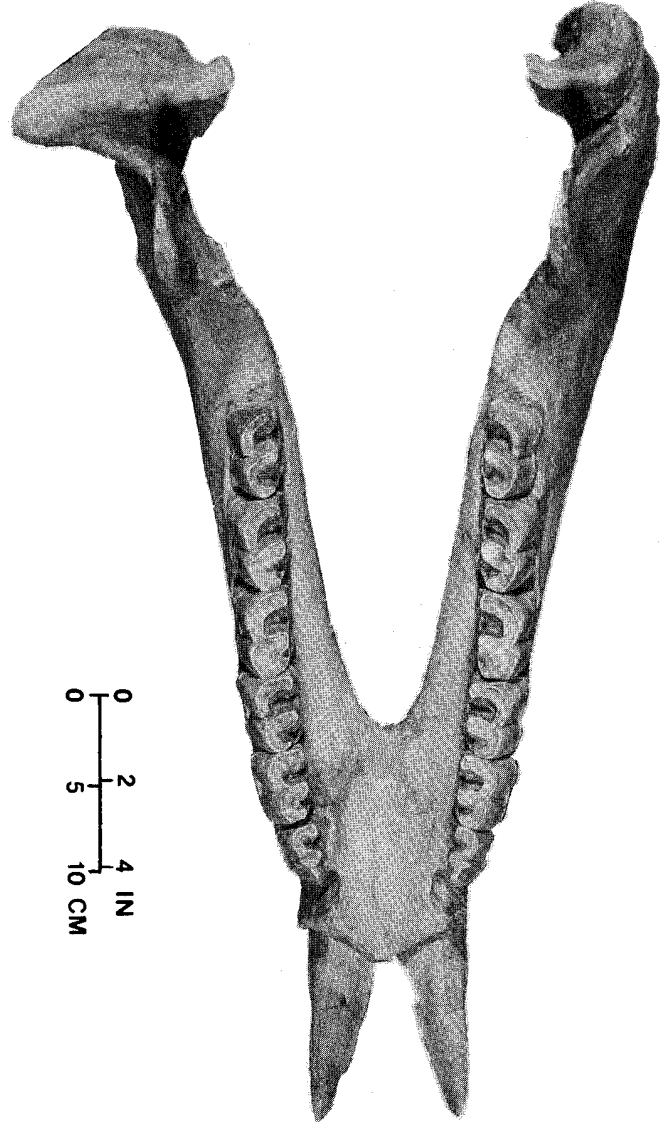


Figure 5. Mr. Robert Allen, Paleopreparator at the Florida State Museum, working on a skeletal reconstruction exhibit of *Teleoceras* from the Miocene of northern Florida (see discussion in text).

Bone Bed, McGehee Farm, Withlacoochee River, Manatee Dam, and Lower and Upper Bone Valley. The sample from Mixon's Bone Bed is of particular importance as it represents the largest accumulation of rhinoceroses from any locality in North America. Rhinoceroses became extinct in Florida during the earliest Pliocene some 5 million years ago as they also did elsewhere in North America.

#### FOSSIL RHINO EXHIBITS AT THE FSM

There are several exhibits at the Florida State Museum that deal with fossil rhinoceroses. Specimens of *Aphelops* and *Teleoceras* are shown in the McGehee Fossil Site exhibit. This "life-like" paleontological excavation is very informative because it shows how these and other fossil vertebrates are uncovered during collecting. Before you enter the McGehee Fossil Site exhibit there is a mural depicting late Miocene vertebrate life in northern Florida, including a rendering of *Teleoceras*. An additional specimen of *Teleoceras* and other fossil perissodactyls can be seen downstairs in the outdoor display.

The exciting news at the Florida State Museum is the Museum Associates are supporting the reconstruction of a *Teleoceras* skeleton based on a composite of specimens from the late Miocene of northern Florida (Fig. 5). This project is designed so that visitors to the Museum can see the various stages in the reconstruction of this fossil rhinoceros, which is being assembled by Mr. Robert Allen, Museum Paleopreparator. In most cases when looking at skeletal reconstructions, the museum visitor sees the final product of many months of skillful labor. Therefore, the FSM-Museum Associates' *Teleoceras* skeletal reconstruction represents a novel approach in exhibition techniques. When this skeleton is completed it will become part of the permanent exhibits at the FSM.

#### ERRATA FOR THE PLASTER JACKET NO. 29

- pg. 8. Add to caption for Figure 1: (A) cheek tooth of *Zygorhiza*; (B) incisor of *Basilosaurus*; (C) lumbar vertebra of *Basilosaurus* (1/5 natural size)
- pg. 11. Line 6: Remington Kellogg (1924, 1944)
- pg. 13. Line 25 should read: (see Figure 3C)
- pg. 14. Alter caption for Figure 3: (A) tooth of *Megalodelphis*; (B) tooth of *Goniodelphis*.
- pg. 15. Line 7 should read: (see Figure 3D), Line 19 should read: (see Figure 3B), Line 30 should read: (See Figure 3A)
- pg. 16. Line 7 should read: *Balaenoptera floridana*, Line 20 should read: Figure 4A
- pg. 18. Line 21 should read: *Ziphius cavirostris*

#### FLORIDA PALEONTOLOGICAL SOCIETY, INC.

As stated in the Articles of Incorporation: "The purposes of this Corporation shall be to advance the Science of Paleontology, especially in Florida, to disseminate knowledge of this subject and to facilitate cooperation of all persons concerned with the history, stratigraphy, evolution, ecology, anatomy, and taxonomy of Florida's past fauna and flora. The Corporation shall also be concerned with the collection and preservation of Florida fossils."

(Art. III, Sec. 1)

*THE PLASTER JACKET* is a publication of the Florida Paleontological Society, Inc. Its purpose is to circulate authoritative material on Florida paleontology and to foster communication among enthusiasts of this subject. It is our intent to produce this series at a rate of three or four issues per year.