

Florida Fossil Horse Newsletter

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What's Inside?

- [Ancient dwarf horse Archaeohippus featured in the Florida Press and CNN](#)
 - [Undergraduate Teaching and the FLMNH](#)
 - [Experience Digging for Ancient Horses, by W. R. Killingsworth](#)
 - [Mitchell Hope \(1918-1996\), by Pat Stream](#)
 - [Racing Toward the Finish Line--The New FLMNH Fossil Horse Exhibit and New Museum](#)
 - [The Pony Express Supports Research, Teaching, and Public Outreach](#)
 - [Public Outreach Programs in Vertebrate Paleontology](#)
 - [Fossils and Paleontology in Cyberspace at the FLMNH](#)
 - [Paleofest96 to be held in Gainesville on 8-9 November 1996](#)
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Ancient, 18 million-year-old fossil horse *Archaeohippus* featured in the Florida Press and CNN

(The following article was released to the press during December 1995 and January 1996 and appeared in many of the daily newspapers throughout Florida. The discovery of this fantastic new specimen was also the basis for a short feature that appeared worldwide on CNN (See http://cnn.com/TECH/9601/fossil_horse/index.html). This article was written by Lurel Ponjuan of UF News and Public Information.)

Gainesville--An 18-million-year-old skeleton of a dog-sized horse--the only one in existence--is coming together at the University of Florida, thanks to a part-time fossil collector.

The dwarf horse, known as the *Archaeohippus*, was about the size of a greyhound and weighed close to 50 pounds when it roamed Florida millions of years before the Ice Age. Its lifespan was about five years, or about 1/5 the length of a modern horse's life.

Jeff Yaun, a senior chief in the Navy stationed in Mayport, discovered the final piece of the skeleton--the skull--during a weekend dig last spring at a University of Florida site in North Florida. The Thomas Farm site was deeded to the University following World War II to preserve and protect fossils.

"I've always been kind of lucky at finding things," Yaun said. "All weekend they (UF paleontologists) kept telling us they needed the skull to complete the exhibit." After three days of digging, Yaun discovered the missing skull. "Once I found a row of teeth I called over one of the staff members," he said. "Everybody else stopped what they were doing and gathered around to watch me."

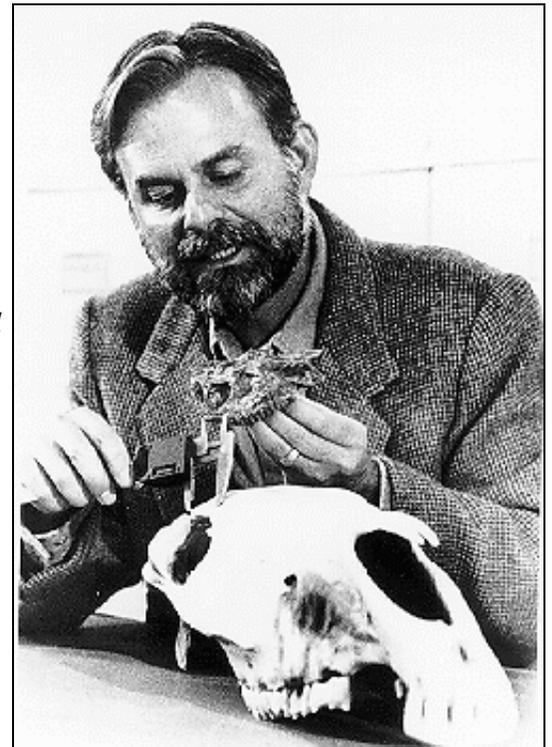
Each participant is assigned a square meter to dig fossils and is trained to prepare plaster jackets, which protect the fossils as they are returned to the Florida Museum of Natural History in Gainesville.

The skeleton of the *Archaeohippus* is the only one in existence and is a valuable addition to the museum, said Bruce MacFadden, paleontology curator of the museum. He also believes fossil horses are of prime importance in studying evolution.

"Because most people are familiar with the modern horse, it's easy for them to compare the fossils with the real thing and see first-hand how this group has evolved," he said. "These horses from Florida allow us to better understand principles of evolution that we teach in textbooks. This particular skeleton will be unique to science."

In addition to the skull, a significant portion of the skeleton also was discovered by amateur paleontologists during annual digs at UF's Thomas Farm site.

Bruce MacFadden, paleontology curator of UF's Florida Museum of Natural History, compares the skull of a dog-sized horse from Florida 18 million years ago with the skull of a modern horse. The skull of the Archaeohippus--found by a part-time fossil collector--completes the only skeleton in existence of this prehistoric creature. (UF photo by Jeff Gage)



"The site is so rich, everyone finds something and goes home happy," MacFadden said.

The skeleton will be on display at the new Florida Museum of Natural History Education and Exhibition Center still under construction. "Our museum exhibit is going to be unique because it is going to have fossil skeletons from Florida and the *Archaeohippus* is the only one in existence anywhere," MacFadden said.

The Florida Museum of Natural History ranks in the top five of university museums in North America in terms of its paleontology program, the size of its collection, its number of graduate students, amateur involvement, and its international status.

Undergraduate Teaching and the FLMNH Experience

The University of Florida is a comprehensive institution of higher education--one of its core missions is to educate undergraduates. Consistent with this, I recently started a new course entitled "Vertebrate Macroevolution" (ZOO 4926) that I geared toward advanced undergraduates from several majors, including zoology, geology, and anthropology. **Macroevolution** is the study of patterns and processes of evolution that have occurred over millions of years. There is no better way to study macroevolution than to investigate the rich fossil record of vertebrates. This class currently has 27 students. In addition to attending formal lectures and student seminar presentations, the class recently took a behind the scenes tour through our vertebrate paleontology collection at the FLMNH (see photo). The purpose of the tour was for the students to appreciate the magnitude of our collection, which ranks in the top five nationally for university-based natural history museums, and contains almost a half-million specimens. Other museum-related experiences during this course include a self-guided tour of the exhibits in preparation for an essay exam question entitled "What do the FLMNH exhibits teach the public about macroevolution?" Later this semester, the class will take an all-day field trip to Thomas Farm to collect 18 million-year-old fossil mammals (and, of course, lots of horses, too).



UF students during a tour "behind the scenes" in the Vertebrate Paleontology collection at the FLMNH.

The FLMNH has much to offer UF undergraduates in the field of natural history, paleontology, biodiversity, systematics, and evolution. One goal of Vertebrate Macroevolution is for students to obtain an enhanced appreciation of the fundamental importance of this museum within a major university.

1996 Thomas Farm Dig

The 5th Annual Thomas Farm fossil dig sponsored by the *Pony Express* will be held during the weekends of April 18-21 (Session I) and 25-28 (Session II). We are pleased that both sessions are fully subscribed. Previous diggers will note a major improvement to the site--an open-air enclosure over the pit, funded by the *Pony Express* and FLMNH.

Digging for Fossil Horses, by William R. Killingsworth, B. S., M. S., Ph. D.

(Editor's Note: Dr Killingsworth, normally is interested in horses of a much younger vintage, most

notably the beautiful Andalusian breed of today, was on the 1995 Thomas Farm fossil dig. Bill, a resident of Leeds, Alabama, is also Co-President of the International Andalusian and Luistano Horse Association and Editor of their official publication, Andalusian. This article, originally published in that magazine (July/August 1995 issue) is reprinted here, with only slight modification, with his permission.)

Background. North America is the ancestral home of the horse. The earliest ancestor was the *Hyracotherium* (also known as eohippus) which existed 55 million years ago (mya) as a dog-sized, four-toed in front, three-toed in back, woodland scamperer. Hyracotherium had low-crowned teeth and ate berries, buds, and leaves from the lower limbs of trees and bushes. From 55 mya to 30 mya, the North American habitat was largely forest and woodlands. Fossil sites from this period generally contained two to four species of horses that apparently coexisted. Over the next 30 million years, there was a dramatic increase in horse diversity in North America such that some fossil sites from 15 mya contain as many as a dozen species of horse. About 20 mya, however, horses began to change, developing high-crowned teeth better for grazing on grass as the woodlands began giving way to grassy savannas. At about the same time, early horses also began to lose their side toes, perhaps as an evolutionary response so as to cover more ground in locating grass for grazing. Over the next fifteen million years, changing climatic conditions and food supply substantially reduced the diversity of horse species. By two million years ago, *Equus* was the only remaining lineage of horse in North America. *Equus* migrated to the Old World across the Bering land bridge approximately three million years ago. *Equus* became extinct in North America approximately 10,000 years ago as part of the "megafaunal extinction" during which many large mammals became extinct. The causes for this massive extinction are unknown but are commonly believed to be a combination of climatic and vegetation changes as well as overkill by humans. Following this extinction, there would be no horses on the North American continent until they were reintroduced in the 1500s by the Spanish.

Thomas Farm. In 1931, a member of the Florida Geological Survey working in a remote area of north central Florida noticed that the ground around him contained chocolate-colored bones. By complete chance, he had stumbled upon one of the richest fossil sites in North America. It is now believed that the site is the location of an ancient sinkhole which had certain cave-like features such as an overhang. It was a perfect trap for animal remains. It is believed that bats and snakes lived, hunted, and died in the sinkhole and that other animals fell into the sinkhole or were carried into the sinkhole by predators as prey. The site so far has been found to contain fossils of bats, fish, birds, snakes, and over thirty species of mammals including horses, various types of camels, deer, bear-dogs, and rhinoceroses. It is one of the richest sites in the world for fossil horses, in particular, the grazing *Parahippus leonensis* (about 28 inches tall) and the rare dwarf horse *Archaeohippus*. For thirty years, this site, called Thomas Farm, was worked by crews from the Harvard University Museum of Comparative Zoology which had purchased the "bone hole" soon after its discovery. The site is now owned and worked by the University of Florida and the Florida Museum of Natural History.

The Dig. Judy [Bill's wife] and I drove 8 hours from Leeds, Alabama to a very remote area of north central Florida not far from the Suwanee River. We arrived late in the day as the group was setting up camp. The crew consisted of Dr. Bruce MacFadden, three museum staff members, and five somewhat nervous and apprehensive amateurs, including ourselves. After dinner (all meals were eaten under an open air pole barn near the dig site) we saw a slide presentation on the site and photographs and specimens of previously discovered fossils. Bruce MacFadden "guaranteed" us that because of the incredible density of fossils at the site we would all find important and well-preserved fossils. He was right.

The author, Bill Killingsworth (upper right), listens while UF paleontologist Art Poyer gives instructions to the diggers. Marcia Wright of Winter Park, is in the lower right. (Author's photo)



The next morning after breakfast (it turned out that Dr. MacFadden had worked his way through school as a chef at a country club so our meals were quite wonderful), we walked down a steep incline to the dig site. The most remarkable feature of the "bone hole" is its very small size, it is only about 30 feet by 30 feet. To date, after 50 years of on-again, off-again digging, about 10 to 15 feet of earth has been taken off the top. Core drillings, however, reveal that fossils go down another 90 feet. Thus this remarkable site has the potential to reveal clues of unknown species as well as providing better specimens of little known species. The 30 X 30 site has been marked off in a grid of one meter squares for excavation. When we reached the floor of the site that first morning, we were told to select a square meter on which to work. Much of the next two and a half days would be spent sitting, kneeling, and squatting within or next to our chosen square. As can be seen in the photograph, working conditions were somewhat tight.

For digging tools, we were given a dental pick and a very small flat head screwdriver. I then understood why only ten feet of material had been removed in all those years of work. We were also given a bucket with which to carry away sand and earth which we dug. This waste material was to be dumped, not in the adjacent meter, but carried to a dump pile. We were then told to start digging. The apprehension one feels about possibly destroying something that is 20 million years old is quite sobering, and we all proceeded very cautiously. The material enclosing the fossils ranged from a sandy soil to a rather mud-like material. With a gentle probe into the surface using the dental pick, the fossils generally felt more solid than the surrounding material. If a hard surface was felt, the pick was carefully used to remove the surrounding material so as to expose the fossil. The fossils enclosed in the sand were much easier to excavate than those surrounded by the wetter mud material.

Judy and I soon began to find wonderful fossils including molars and phalanges (toes) from Parahippus and Archaeohippus. The phalanges and molars of these ancient horses were not much larger than a penny. Indeed, these horses were about the size of a German Shepherd. We also found large segments of tortoise and turtle shells and alligator scales. One member of our group found a jaw bone of what was believed to be an ancient camel. Large fossils like this specimen were exposed, but not removed, from the surrounding material. They were encased in a plaster jacket so that they could be removed and more carefully cleaned in the lab. All of the fossils that were found went to the Florida Museum of Natural History for cleaning, preparation, and possible exhibition.

Conclusions. The horses in your barn are the result of millions of years of evolution followed by perhaps only three or four thousand years of selective breeding by humans. Over a 55 million year period, horse evolution has gone through two major phases. The first phase lasted about 35 million years--from 55 mya to about 20 mya. During this period, the form and relatively small size of the horse remained constant with a growing diversity in the number of species.

Then, 20 mya, horses began changing into grazing animals with high crowned molars. They also became powerful runners with longer limbs accompanied by a simultaneous loss of side toes. During this period, the diversity of species sharply declined, but the form of the horse remained remarkably similar except for a distinct trend, over the last ten million years, toward larger size. As one examines a fossil horse bone today, one is struck by the great similarity in form to the present

day Equus. Indeed, these fossils are being used in a number of ways to study modern horses. Dr. James Rooney of the University of Kentucky has recently studied the fossil bones of horses in the Florida Museum of Natural History finding signs of arthritis and congenital foot problems. This study of disease through fossils is called paleopathology and may very well yield insights into problems that have plagued horses for millions of years and still puzzle modern-day owners and breeders.

Contribute to *Pony Express*!

The *Pony Express* is almost entirely supported by contributions from its readers. Please send a donation to us in the enclosed envelope

Mitchell Hope (1918-1996), by Pat Stream, President, SW Florida Fossil Club

Mitchell Hope, a charter member of the Pony Express, died on Jan. 6, 1996 at age 77. He was born in Dunedin, FL on Jan. 12, 1918. He served our country as a Captain in the army during World War II and received the Bronze Star and the Silver Star for valor. He was described as a "soldier's soldier" by those who served with him. He attended the University of Florida and after graduation became a fruit buyer for the Coca Cola Company. He was very active in the 1st Methodist church of Wachula where he served by teaching adult Sunday School. He was known there as an active member and a serious student of theology.

Mitchell was above all both a dedicated student and teacher. In the 1960s, he organized and led a troop of Explorer Scouts. While on a canoe trip with his troop, he spied a mastodon tusk sticking out of the river bank. From that time on Mitchell was hooked on paleontology. He called the Smithsonian at once and received their help in excavating the tusk. Local people began telling Mitchell about their finds. He and his troop of Explorer Scouts excavated an entire mammoth with the assistance of Dr. Clayton Ray. Later, he took his scouts to Washington where they were honored by the Smithsonian for their donation. Not long after, Mitchell began an excavation at the first Paleo-Indian spring burial site at Republic Grove. That excavation sparked his interest in archaeology, as well. Since that time, Mitchell was very active in the fields of paleontology and archaeology. He was a member of The South West Florida Fossil Club, The Paleontological Society of Lee County and the Archeological Society. He was also a Master Mason of Mason's Lodge 17 F & AM at Wachula, Florida. Mitchell was very active in all the societies to which he belonged. He often gave slideshows and lectures to these societies and to children in the Public School System. Mitchell was always ready to educate anyone who had a "yearn to learn," from the youngest child to the oldest adult. He made many important donations to science and society. Mitchell Hope was a man who was gifted in many areas and gave freely of himself to others. His death is a loss to us all and he will be sorely missed.

(Editor's note: For a photo of Mitchell collecting fossils at Thomas Farm, see Pony Express, vol. 3, no. 2, back cover. Mitchell has willed his important collection of vertebrate and invertebrate fossils, and archaeological artifacts to the FLMNH. We are delighted that Mitchell choose the FLMNH to perpetuate his collection of Florida fossils, which is now in Gainesville.)

***Paleofest96*--Be sure to mark November 8th and 9th on your calendar now! (see back page)**

Racing Toward the Finish Line--The New FLMNH Fossil Horse Exhibit and New Museum

Over the past year FLMNH paleontologists and exhibits designers have made great progress on our new fossil horse exhibit. This exhibit will become an integral part of the Hall of Florida Fossils in our new FLMNH Exhibits and Education Center in Powell Hall on 34th street.

The groundbreaking for the new FLMNH Exhibits and Education Center was celebrated in April 1995. Since that time construction crews have made steady progress on the beautiful new building, which along with the Center for the Performing Arts and Harn Art Museum, will become part of UF's new cultural complex. We are very excited about this "great leap forward" for our public outreach and are as excited about the wonderful new exhibits that will go into this new facility. Construction should be completed by the end of 1996 or beginning of 1997 and the exhibits will go into the museum soon thereafter. The exhibits implementation process is a laborious one and will take major efforts in fundraising as well as scientific and design input, all of which are well underway. We are proud that the fossil horse exhibit will be one of the first scheduled for installation in the new museum.

Because of their exceedingly rich fossil history worldwide over the past 55 million years, and also because we have such high regard for them in modern society, horses are among the most important examples of evolution. Our new fossil horse exhibit is designed to teach the museum-goer about horse evolution, particularly as it pertains to the wealth of fossils in our collections from Florida. This exhibit will also have artist's depictions of what Florida was like millions of years ago. The new horse exhibit has been designed by MacFadden and exhibits designer Mike Falck and will consist of three modules that address the following questions of interest to museum-goers: (1) What is a horse and who are horses related to?; (2) What were ancient horses like in Florida and in what sorts of habitats did they live?; and (3) What has the entire family tree of horses been like over the past 55 million years? This exhibit will include actual fossil specimens, casted replicas of some rare specimens, entire skeletons (see below), photographs, artist's mural backdrops, and a mock-up of what an active fossil site looks like in the field when it is being excavated by paleontologists.

Complete fossil skeletons are an attractive and integral part of our new exhibit and will be used as focal points to introduce the museum-goer to horse evolution. It is not widely appreciated that fossil skeletons can take years to put back together. Last year, largely thanks to a devoted volunteer, Dr. Frank Stehli, all of the bones required to mount a complete, articulated skeleton of a 1.5 million year extinct *Equus* horse were assembled in our museum (see *Pony Express*, vol. 4, no. 1, page 3). This specimen was collected from the Leisey Shell pit south of Tampa Bay from one of the most spectacular Ice-Age fossil localities in North America. Since last year, we have received funds from the State of Florida to have this unique skeleton put back together for exhibition. The reconstruction of a single fossil skeleton is a painstaking process that takes anywhere from hundreds to thousands of hours to complete. Steve Hutchens, a skilled preparator and sculptor, is now actively engaged in the process of articulating the Leisey *Equus*. To date Steve has completed the reconstruction of the skull and jaws (see photo), neck vertebrae, shoulder blades, hips, and many limb elements. When completed in mid 1996, this skeleton will be the only one of its kind in existence from Florida.

Reconstruction of original skull and jaws of the 1.5 million year old Leisey Equus (foreground) with an exact cast replica (background). Photo by Erika Simons

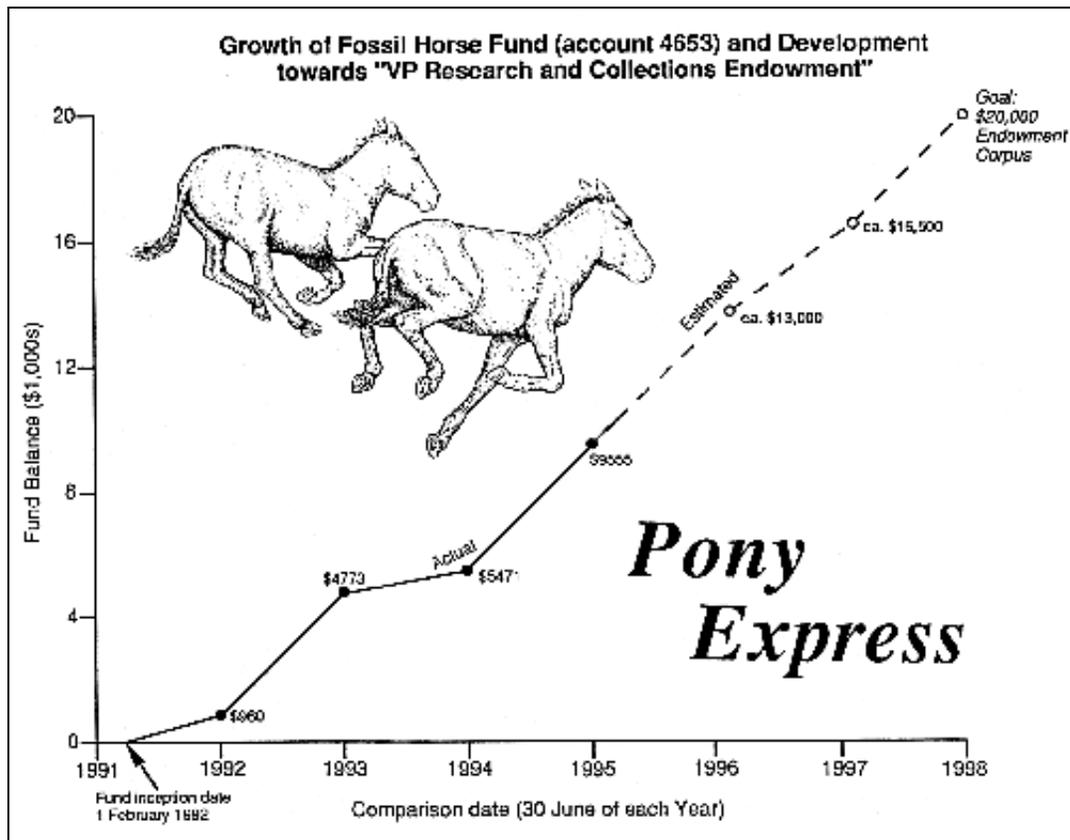


One of the joys of working at a museum with an active research program is the opportunity to make new fossil discoveries that can advance science as well as be displayed for the public to appreciate. Such a discovery occurred recently--In April 1995, paleontologists and volunteers digging at the 18-million-year old Thomas Farm fossil site in northern Florida unearthed a truly spectacular discovery of an exceedingly rare, tiny dwarf horse called *Archaeohippus* (literally "ancient-horse"). Prior to that dig, bones and teeth of this rare extinct horse had been collected from Thomas Farm, but we had never before collected a skull--a part of the skull that preserves many important scientific features and also was the crowning piece needed for a skeletal reconstruction for exhibits. During April, one of our diggers, Jeffrey Yaun, a Navy Chief Petty Officer and fossil collector extraordinaire, unearthed a virtually complete skull of an *Archaeohippus* (see photo). This specimen, the only one of its kind in existence, has received much notoriety in newspapers throughout Florida and has also been reported throughout the world by CNN. Paleontologists know from study of its fossil remains that the Florida *Archaeohippus* probably weighed about 50 pounds, lived in small family units ("bands"), had a maximum life span of about 5 years, and probably fed mostly on soft leafy vegetation (in contrast to modern-day horses that prefer to feed primarily on grasses). Our *Archaeohippus* skeleton, once completely reconstructed and articulated, will take its place alongside the other skeletons in our new horse exhibit.

We are very excited about the Florida fossil horse exhibit for many reasons. It allows us to depict and interpret, in light of the most modern scientific data and theories, the classic evolutionary story of this beloved group. It allows us to display and highlight some of the "gems" of our fossil collections. And, it allows us to present to the museum-goer an enhanced appreciation of fossil horses as they lived in our state millions of years ago

The Pony Express Supports Research, Teaching, and Public Outreach

Since its inception in 1992, the *Pony Express* has been supported almost entirely by contributions from its readership. We are pleased that this program continues to increase in popularity (as evidenced by the annual growth in readers and the response to the fossil dig in April--now fully subscribed for 1996). In addition to these activities, within the past year the financial stability of the Fossil Horse Fund (generated by the *Pony Express*) has allowed us to support other related museum activities, including site improvements at Thomas Farm, sending our Senior Preparator to a fossil conservation workshop, and helping foreign students and paleontologists to study specimens in our collections. This semester the *Pony Express* will also support some of the costs associated with the class field-trip (Vertebrate Macroevolution, ZOO 4926, also see page 3) to Thomas Farm.



Actual and projected growth and Endowment goal of the Fossil Horse Fund generated from the Pony Express.

One of the goals of the Pony Express is to be supported from **voluntary contributions and donations** and **not** required subscription fees. This has been very successful recently, but in order to perpetuate the *Pony Express* and its related programs, as well as benefit the overall activities of VP research, collecting, education, and public outreach, we have determined one of our goals is to raise sufficient funds to form a VP Endowment for the *Pony Express* and related activities (see graph). Once this is accomplished, then support of our VP programs will be derived on an annual basis from income generated from the endowment and will therefore continue these programs in perpetuity. Every one of your contributions/donations, no matter how large or small, to the Fossil Horse Fund via the *Pony Express* is greatly appreciated. Your enthusiastic support has allowed its growth and increased success over the past four years.

Public Outreach Programs in Vertebrate Paleontology

In addition to field work, collections improvement, research, teaching, and many daily visitors and inquiries (many for specimen identification), the staff of the VP collection has recently been very active in public outreach to the statewide constituency of fossil enthusiasts. In early January, Marc Frank (Collections Manager), Russ McCarty (Senior Preparator), and Dave Webb (VP Curator) hosted a group of 40 members of the Tampa Bay Fossil Club in our collection. This day-long Saturday activity included a tour behind the scenes, fossil identification, and a tour of the exhibits.

Bruce MacFadden traveled south to present public lectures to the Florida Fossil Hunters (Orlando, 17 January), the Tampa Bay Fossil Club (3 February) and the Southwest Florida Fossil Club (Port Charlotte, 10 February). Bruce's talks included presentations of the Pony Express program as well as discussions about new paleontological research at the FLMNH, "surfing the net" for Florida fossils, and other initiatives including *Paleofest96*, a festival celebrating Florida Paleontology to be held at the FLMNH on Friday and Saturday, the 8- 9 November, 1996 (**also see Announcements**)

Fossils and Paleontology in Cyberspace at the FLMNH

The internet is here to stay and, in addition to everything else that it can do for us, it is a fantastic educational resource for paleontology. The FLMNH currently has a "Home Page" on its "Web site" (all this new computer-speak!). By accessing our Home Page and then clicking through the various sub-pages, you can use our Web site as a communication and educational resource. From our site you can:

- Learn of announcements of activities of interest to you (for example, *Paleofest96*)
- Read the recent issues of the *Pony Express* "on-line"
- Search our on-line VP specimen catalog (as if you were here in the collection). Instead of opening drawers in Gainesville, you merely have to "ask" our catalog what specimens you would like to know about. In the future, we plan for you to be able to see images of fossils on your computer screen at home.

Paleofest96--First Announcement

**A Festival Celebrating Florida Paleontology
Friday & Saturday, the 8th & 9th of November 1996--Gainesville, FL**

You are cordially invited to join us at the FLMNH for a festive meeting of Florida paleo-folks and friends. Paleofest96 coincides with the 20th Annual Fall meeting of the Florida Paleontological Society and we are taking this opportunity to invite everyone with an interest in fossils to this weekend in Gainesville. This is a non-football weekend and we will be arranging for blocks of rooms at reduced rates for out-of-town participants.

Paleofest96 Activities will include:

- *Reception-social at the museum*
- *Unveiling of a new fossil horse skeleton (Leisey Equus)*
- *Dedication of the new Eocene Sea exhibit*
- *Book-signing and public lecture by world-famous dinosaur paleontologist Dr. Louis L. Jacobs III (author of "Lone Star Dinosaurs" and "Quest for African Dinosaurs"), Director, SMU Shuler Museum of Paleontology*
- *20-year retrospective lecture by Dr. S. David Webb*
- *A variety of workshops on Florida fossils*
- *Fossil club book and membership displays*
- *Awards banquet*
- *Fund-raising happy-hour and auction*

Join us starting at 8pm on Friday night at the "Icebreaker" reception, or at 8:30 am on Saturday morning for coffee and doughnuts. Either way, you are sure to have an educational and enjoyable time at the ***Paleofest96!*** Registration for all activities (\$20 per person plus, if desired, Barbecue \$10) and hotel reservation information will be available in the Second Announcement. Until then, you may also direct inquiries via e-mail to: paleofest96@flmnh.ufl.edu or access the ***Paleofest96 Page*** at:

http://www.flmnh.ufl.edu/admin/calendar.htm#vp_input.

Pony Express

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Pony Express--Statement of Purpose:

The purpose of this newsletter is to communicate news and information and disseminate knowledge about fossil horses, particularly in Florida, and to develop a state-wide constituency that will support and enhance the research, exhibition, and educational programs offered at the FLMNH that pertain to fossil horses. Contributions to the Fossil Horse Fund are deposited into an account at the University of Florida Foundation, Inc., a tax-exempt entity, and will be used for the purposes stated here.

Do you travel along the information superhighway?

**The *Pony Express* is now on the World Wide Web via the Internet (URL location:
/vertpaleo/ponyexpr.htm**

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