

Florida Fossil Horse Newsletter

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Horse bones and skeletons: Progress on New Fossil Horse Exhibit at FLMNH

Skeletons of long-extinct animals represent the cornerstone of most fossil exhibits in natural history museums. Although beautifully reconstructed fossil skeletons are important exhibit focal-points, and they represent an immense sense of pride and accomplishment for the museum curators, staff, designers, and volunteers, few museum visitors touring these exhibits are aware of the long process that is involved in the reconstruction of a fossil skeleton. This article describes the process that we have started to reconstruct a skeleton of the 1.5 million-year old Ice-Age Florida horse, an extinct relative of the modern-day *Equus*. The goal of this process is to use this *Equus* skeleton as a focal point in a new fossil horse exhibit that is currently being planned for the new FLMNH Exhibition Center on 34th Street.

Our story begins almost 15 years ago in a open-pit quarry located in Ruskin, south of Tampa Bay. The Leisey Shell Pit (as we now call it) was originally opened by road-builders, but during the digging of shells for road grade, hundreds of dark brown fossil bones were discovered. These bones were soon brought to the attention of paleontologists at the FLMNH. During the middle 1980s field digs at Leisey by FLMNH crews uncovered thousands of fossil shells and bones. Based on modern dating techniques, we know that the fossil mammals from Leisey are 1.5 million years old and include the remains of extinct condors, mastodons, mammoths, gigantic ground sloths, tapirs, lamas, horses, saber-toothed cats, rodents and the like--indeed this is one of the richest Ice Age sites in all of North America. The Leisey fossils preserve a window on prehistoric animal life in what is now Florida that would be unknown to us without this marvelous fossil site and all the hard work that has gone into excavating it.

After all of the bones were brought back to the FLMNH, the laborious process started to clean, sort, reconstruct, and identify the myriad individual bones that were collected from Leisey, or donated to us by the large cadre of hobbyist fossil collectors in south Florida. Now, some ten years later, the Leisey fossils in our collection number some 25,000 catalogued bones and taken together, these represent a spectacular opportunity to advance scientific knowledge of prehistoric life in Florida during the Ice Age.

In planning for our new building on 34th Street, it became clear that an exhibit on horses and their extinct relatives in Florida could tell a wonderful story about natural history and evolution, and that we had wonderful, potentially exhibit-quality specimens in our existing fossil collection. Preliminary planning for this exhibit, to become part of the Hall of Florida Fossils, called for a newly reconstructed horse skeleton to be placed next to our existing fossil skeleton of the 20 million-year old three-toed extinct horse *Parahippus* (currently located in the fossil exhibits in Dickinson Hall, and to be moved to the new horse exhibit on 34th Street). With all of the wonderfully preserved bones of Leisey *Equus*, plus its link from the past to the present, a skeletal reconstruction of this horse was a natural and easy decision for us to make. That, however, was only the beginning. There are no companies that come in and prepare the skeleton for you--it is an exceedingly laborious process that takes literally thousands of hours and the cooperation of many people; not to mention that it is very expensive.

Once we decided to reconstruct the Leisey *Equus* skeleton, the first order of business has been to assemble all of the individual bones. This is quite a challenge from Leisey because we do not have a single intact fossilized skeleton to work with--each of the 200 individual bones are disarticulated and each one has had to be found in the collection in order to be combined into the single composite skeleton. At this point, the volunteer activities of Dr. Frank Stehli, retired paleontologist and former UF Dean of the Graduate School and Sponsored research, became of great help to us. Not surprisingly, Frank quickly took hold of the project, has concentrated his volunteer activities during 1995 on the Leisey *Equus* skeleton, and has made immense progress towards assembling all of the bones required for the reconstruction. Frank says that the most rewarding aspects of this project



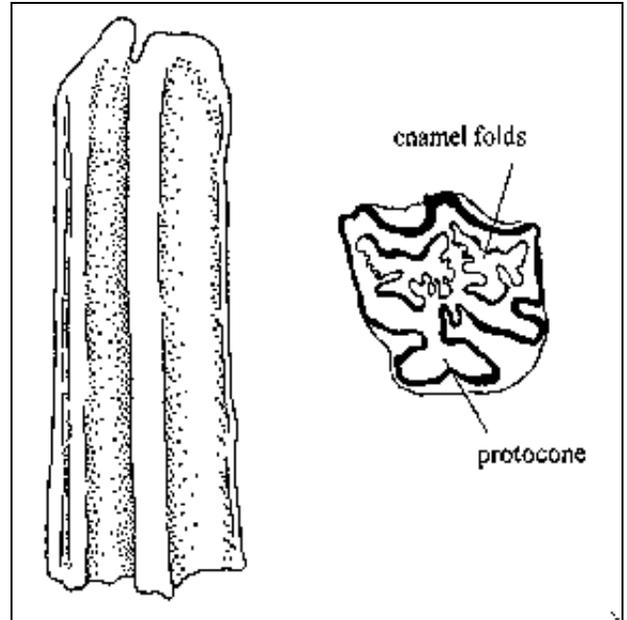
include: "...an appreciation of how extensive the FLMNH's collections are and how good the material from Leisey is. It also gives me a chance to learn something new. And, I enjoy the opportunity to interact with former and new colleagues at the museum." Frank determined that certain bones, particularly the limbs, skull, and jaws, were relatively easy to find in our collections, whereas others, like individual vertebrae and ribs, require more detective work. In order to complete this phase of the *Equus* project, Frank will be working in our collections for most of the Winter and Spring.

After all of the bones are chosen, and some minor reconstruction takes place in our preparation laboratory, the actual process of putting back together the composite *Equus* skeleton will be contracted out to an experienced fossil reconstruction expert. The process of building a supporting and hidden metal frame for the skeleton and articulating each bone in its proper place, as well as posing the skeleton in a life-like stance, requires an extraordinarily high level of craftsmanship and ingenuity. This phase will in itself require about 1,500 hours of full-time work by an experienced, freelance "paleo-preparator."

Once the skeletal reconstruction is completed, the *Equus* mount will be ready to take its rightful place in the new fossil horse exhibit. It will provide the nucleus from which the scientists, graphic designers, artists, and exhibit builders can interpret the ancient biology and extinction of this wonderful and unique (it will be the only mounted skeleton of a Florida fossil *Equus* horse anywhere in existence) member of the horse family.

In the future, when you tour our new museum facility on 34th Street, or visit another natural history museum farther afield, we hope you will have an enhanced appreciation and understanding of the long process involved and immense resources, planning, and cooperation required to bring all of the old bones back to life in the fossil skeletons of long-extinct animals.

Fossil Horses in My Back Yard

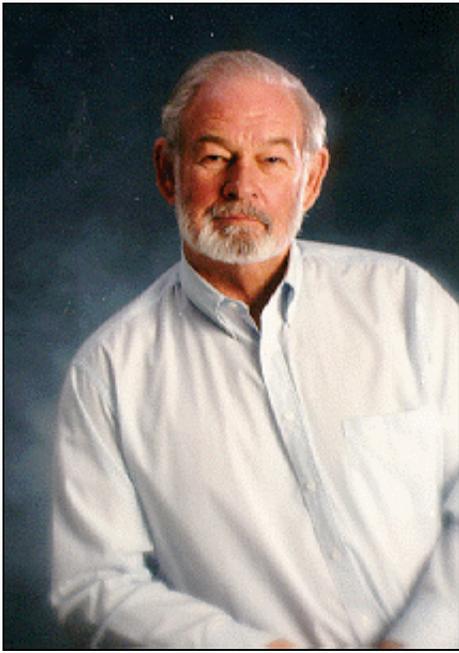


The creeks that wind through many of the residential neighborhoods of northwest Gainesville produce a variety of fossils, including shark's teeth, rib fragments of sea-cows (extinct relatives of our present-day manatee), and, rarely, remains of extinct land mammals, including 20 million-year-old horses similar to those found at Thomas Farm. These creeks are favorite collecting spots for school-children and families on beautiful weekends. These fossils give us important clues to what prehistoric Gainesville was like during the Miocene. Firstly, the kind of fossils tell us that the age of the sediments (named the Hawthorne Formation) in these creeks are Miocene, about 20 million years old. Secondly, the large abundance of marine life in the Hawthorne sediments indicated that back during the Miocene, what is now Gainesville was inundated by the marine salt-water as global sea-levels were higher than they are today. The occasional land mammal, including horses from within the Hawthorne sediments, indicates times when the sea-levels had dropped during the Miocene, exposing the ancient peninsula and allowing horses and the like to roam in what is now central Florida.

Above the Hawthorne sediments we frequently find loose sands that were deposited during the Ice Age, but these are mostly devoid of fossils. Imagine, therefore, my delight when my next-door neighbor Gary Junior and his son, Eric, came by my house a few months ago with the fossil tooth depicted here. Gary said that the creek that runs behind his house has periodically produced fossils, including, for example (and not surprisingly) sharks's teeth, but also this beautifully preserved fossil horse tooth. This tooth preserves many diagnostic characters that allows it to be identified as an extinct relative of the modern-day horse *Equus*. It also indicates that above the omnipresent Hawthorne clays in our neighborhood there are some Ice Age "cover-lands" and in this case they yielded this *Equus* upper molar. It is indeed quite a thrill to have your neighbors bring you fossils to identify, particularly in my case those of fossil horses. When Gary and his son first came over to my house with the tooth they asked me if the tooth was something that I might know about. I responded: "I think you have come to the right place!"

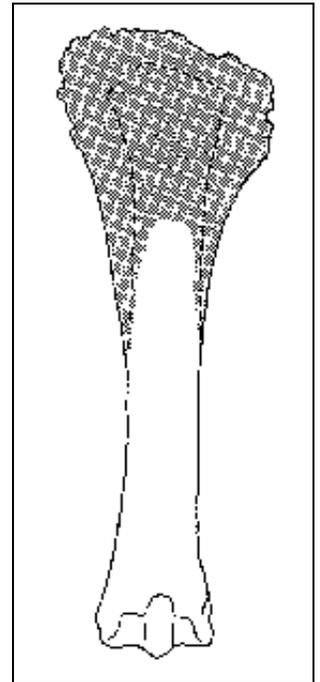
Visiting Scientist--Dr. James R. Rooney

Over the past few months we have had a steady stream of visiting scientists to our collection. One of these, Dr. James Rooney, has embarked on some fascinating research using our fossil horse collections.



Dr. Rooney is a veterinary pathologist and recently retired from the University of Kentucky. During his career he has done research on many things related to equine pathology and anatomy, but his principal interest has been in the anatomical basis for equine lameness, including its causes, symptoms, and treatment.

Pathologists study diseases of all sorts. Most diseases don't preserve in fossils, but some do, i.e., those that affect bones themselves or bony structures. Paleontologists sometimes find fossil bones, deformed or healed during the life of the animal, in the course of their excavations. Study of these abnormalities is termed "paleopathology." A unique example of an abnormal fossil horse bone was donated to our collection by Terry and Margaret Sellari in 1992 (see Pony Express, vol. 2, number 1,



page 6). It represents a highly deformed metacarpal toe-bone in which the joint was greatly expanded by bony arthritis. This was a wonderful addition to our collection, although probably indicated an animal in considerable pain during its lifetime.

Traditionally, most paleontologists, few of whom are trained in standard osteopathological techniques (e.g., use of X-rays and bone sections) regard bony "lesions" (the more proper term for abnormalities or what we have been calling pathologies) as scientific curiosities. A careful, systematic analysis of the incidence of lesions in fossil horses (and most other mammal groups, for that matter) has never been done. Our fossil collection, and in particular our fossil horse sequence from Florida, represent a potentially rich storehouse from which the kinds, incidence, frequency, and longevity (in geological time) of bony lesions has occurred.

Dr. Rooney spent one week surveying all of our fossil horse collections for the occurrence of fossilized lesions. He found numerous example of diseased bones, including arthritic bony lipping and a congenital deformation of the footbones, the latter of which affects about 15% of new-born foals. Dr. Rooney plans to return to our collection in the future and expand upon this initial survey for "paleopathologies."

Other than a general knowledge of the occurrence and distribution of disease in fossil horses, study of paleopathology can have some interesting evolutionary insight. Once a "normal" or "background" frequency of lesions is assessed in fossil horses, the next really interesting question to ask is: "do any fossil horse populations have a greater than normal incidence of bony disease." If so, then the question naturally is why did they have so much disease, and did that level of disease decrease the overall fitness of the species in their ancient community. Dr. Rooney's research on ancient equine bone disease is still in its initial stages, but the survey of our fossil horse collection here at the FLMNH has convinced him that there is much more research to do and interesting questions to be answered.

Paleontology Discussion Groups on Computer

Discussion groups or lists are specific interest groups that use computers to pass along information, submit queries, and provide a general clearing house for all aspects of the group's focus. E-mail is used to sign on or off of a list, to submit or extract information, and to post messages to the subscribers of a particular group. One signs on (subscribes) by sending an E-mail message to the group's E-mail address. Further instructions, and a list of information (data bases) available to members are sent upon sign on, or can be requested by the new subscriber.

Assuming that you have a computer, all you need to participate in these groups is E-mail capability and a modem. E-mail, or electronic mail, is a message sending and retrieval service, which can be accessed in a number of different ways. With E-mail, the user can chat with people all over the globe, almost instantaneously, and while there is no cost for the message itself, there can be a charge from the E-mail provider. For instance, E-mail service is provided to subscribers of all the commercial internet providers, such as America on Line, CompuServe, Genie, Prodigy, etc., but E-mail is just one of the many services offered by these commercial providers which usually charge a flat monthly rate. America on Line, for example, charges \$9.95 a month, for five hours of use time. Two other commercial providers, Delphi and NetCom, will give you basic internet services, without all the other commercial features (computer shopping, travel reservations, book reviews, etc) that America on Line and the others listed above have as part of their package deal.

If you do not want to spend \$10 - \$20 a month on a commercial service, don't despair, there may be a FREENET in your area. Freenets, are internet and E-mail providers, that usually serve a regional area such as a city or a county. As the name implies, these nets are free to users, and usually depend on stalwart volunteers to keep things going, especially in the set-up stages when a Freenet is first going on-line. Here, in Gainesville, Florida, the Alachua County Freenet, just went on-line last year. In addition to providing local information, the Alachua County Freenet offers E-mail service, and access to the World Wide Web, the 'really Big Basket of Internet Information'. So with a Freenet, you have the basic services offered by the commercial groups, without all the commercial fluff.

If you are fortunate enough to work for a college or university, or are a student, you probably have access to the internet and all its features. Here at the University of Florida, the primary campus computing entity is NERDC. NERDC provides free user accounts to grad students and all departments of the University.

There is one more internet provider available to all teachers in the state of Florida. It is called FIRN (Florida Instructional Resources Network), and I believe it is also available to all employees of schools, colleges, and universities.

Let's look at a few discussion groups of interest to paleo people. Subscribing to a discussion list is free of charge, and all are easily accessed by sending a short E-mail message to the server's E-mail address. A word of warning here! Some of these groups generate so much message traffic that you can find yourself inundated. Fortunately, you don't have to read each message; instead, you can browse the subject list and read only those messages of interest you. There are other message management techniques found in the information which each list sends when you sign on their list.

Rocks and Fossils

This is an interesting group with members from all over the world, both professional and amateur. In addition to communicating with each other, members post questions about where to find, sell, preserve, identify, and retrieve more information about their fossil and mineral specimens. An active discussion list. To subscribe, send this E-mail message: **SUBSCRIBE ROCKS-AND-FOSSILS**

Send the message to: **MAJORDOMO@WORLD.STD.COM**

You must type the message and address with dots and dashes as shown. Also, please be aware that your messages go to a computer whose sole use is to manage traffic on the discussion list. So, when subscribing you must send only the message shown here. Any other words in the message text will cause the server computer to go bonkers and misunderstand the message. The server computers are not usually case sensitive, but if the message does not work in all capital letters, try typing the message in lower case and sending it.

Paleonet

Paleonet is a discussion list that originates in England. It seems to have a lot of scientists as members and some of the topics discussed are quite technical, though very interesting. But subscribers post many general questions as well. Paleonet also has three sub-nets to which you may subscribe, each more specific in focus. These are the CollectionsNet, the DatabaseNet, and the TrainingNet. To subscribe to

Paleonet send this message: **SUBSCRIBE PALEONET**
to: **LISTSERVER@NHM.AC.UK**

If you are interested, Paleonet will send you information on the sub-nets and how to subscribe to them.

Vertpaleo Discussion List

The vertpaleo discussion list originates in California and subscribers are paleo students, professional and amateur paleontologists, preparators, and conservation specialists. A good place to ask questions about mold making, casting, adhesives, and preservation and conservation techniques to use on your specimens. Also short courses, classes, meetings, and seminars, are posted on this list. To subscribe send this message: **SUBSCRIBE VERTPALEO**
to: **LISTSERV@VM.USC.EDU**

Dinosaur List

As the name implies, the focus of this list is dinosaurs. Many amateurs, students, and professionals discuss everything you ever wanted to know about dinosaurs. To subscribe send this message: **SUBSCRIBE DINOSAUR**
to: **LISTPRO@LEPOMIS.PSYCH.UPENN.EDU**

Other Paleontology Information Sources on the Internet

The Society of Vertebrate Paleontology News Bulletin is now available on-line through the World Wide Web. You must use one of the net browser programs such as Mosaic, Netscape, or Lynx to access selected issues of the bulletin. The URL address is: <http://141.211.110.60/svp/>. If you don't have access to World Wide Web, you can contact David Polly (his E-mail address is: dpolly@umich.edu). Tell him what kind of access you have, e.g. Gopher, FTP, E-mail).

The Bibliography of Fossil Vertebrates is a yearly bibliography listing articles and papers on vert paleo topics. It was begun in the 1930s or 1940s, and is an invaluable resource for paleontologists. It is now on line. Here's how to access it:

1. You must send an e-mail message to: bfv@vulcan.lscf.ucsb.edu
2. The Subject of the message must be: query
3. The first line of the message text contains the actual query, e.g. taxon='Australopithecus'
4. The second line of the message text should contain the word address: and your E-mail address.
Mine would be: address:cormac@flmnh.ufl.edu

Here is what the message would look like from my computer:

- **TO:** bfv@vulcan.lscf.ucsb.edu
- **SUBJECT:** query
- **Message text:** taxon='Australopithecus'
- address:cormac@flmnh.ufl.edu

This query on the fossil hominid Australopithecus produced a list of 42 articles published in various journals. The personal computer, in conjunction with the Internet, has placed the individual in the center of an information explosion. Much of it is still very confusing and mysterious to the uninitiated, but that is changing rapidly as more and more people take their first steps along the "yellow brick road" of the Internet. What's out there for amateur paleontologists? Believe me...a lot! A short example here will prove the point. The exhibits department here at this museum recently purchased a fossil beetle which the sellers claimed was from the La Brea tar pits. The exhibits staff, who were incorporating this specimen into a traveling exhibit, noticed that the matrix in which the beetle was embedded was crumbling badly and approached me to preserve the specimen for them. That was somewhat of a problem, since, in our 400,000 specimen collection of vertebrate fossils, we didn't have a single La Brea tar pit specimen. Just

how do you preserve a matrix that consists of sand and asphalt? Certainly not with any solvent-base hardeners such as Butvar, which would only dissolve the matrix. The answer was on the Internet. I posted the problem and my questions on how to preserve the specimen to the Vertebrate Paleontology Discussion List, which I access through E-mail on my computer. Within a few hours I had twenty responses to my query, and more specifically, preparators from the Page Museum at the La Brea tar pits, who work exclusively with tar pit material, gave me advice I needed to properly conserve this material. I might add that they also told me the specimen wasn't from the La Brea tar pits at all, since fossil insects are not found there. The specimen was indeed asphaltic sand matrix, but from another site.

Collections and Databases Searchable by Computer

A number of museums which have cataloged their fossil collections on computer have made all or part of these databases available to searches by computer users with access to the World Wide Web. Some of the museums now on-line with their data bases are the New Mexico Museum of Natural History, Yale, UC Berkeley, the Smithsonian, and the Florida Museum of Natural History. World Wide Web browser tools such as Yahoo, Gopher, and others can connect you with these museums.

The information available on the internet is growing at an astronomical rate as more and more organizations, institutions, governmental agencies, clubs, interests groups, and individuals make their information available. As I hope I have shown, a part of this information explosion is fueled by the growing number of paleontological resources out there for your information and edification.

What Do You Need to Access The Internet?

I won't say too much about this, except that bigger and faster is better. Older, slower, computers with less RAM and smaller hard drives may work alright for E-mail discussion lists, but if you want to download large blocks of information or databases, you will want a fast modem (14,400) and a large hard drive. You will need to run windows on the World Wide Web browsers such as Mosaic and Netscape. Ask around in your area, to see what internet providers you have access to. As I learn of more resources dealing with paleontology, or even archeology, I will pass them on to the readers. And please feel free to contact with me with questions, or comments by E-mail. My E-mail address is: cormac@flmnh.ufl.edu. Have fun surfing the Paleo Internet.

Questions, comments, suggestions? Contact Russ McCarty at the VP Prep Lab care of the Florida Museum of Natural History, University of Florida Campus, Gainesville, FL 32611.

Telephone: (904) 392-1721. E-mail: cormac@flmnh.ufl.edu

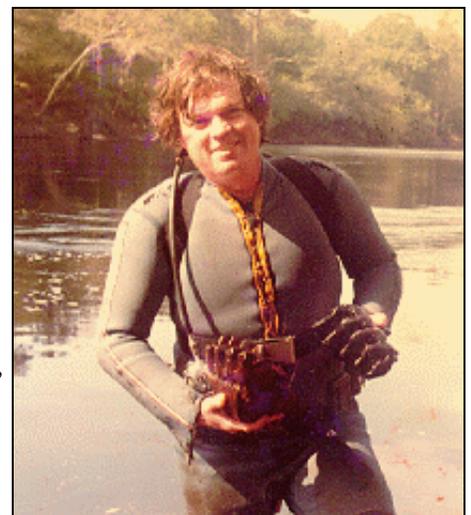
Tim Cassady Receives Howard Converse Award

The Howard Converse award was established by the FLMNH in 1988 to recognize the accomplishments of hobbyist paleontologists who have made scientifically important fossil collections. The recipient is chosen annually by the FLMNH paleontologists. This award is presented at a meeting of the Florida Paleontological Society and the recipient receives a plaque.

This year's recipient of the Converse award is Tim Cassady of Bascom, in the Florida panhandle. Tim writes that he:

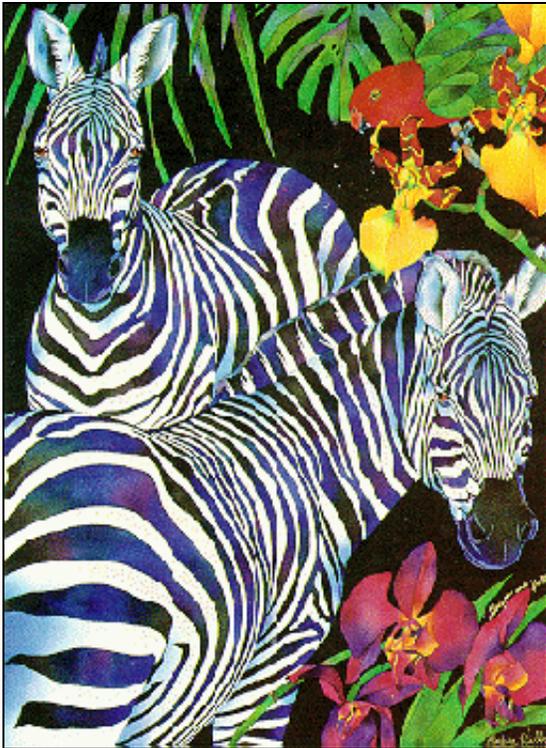
"plans to continue collecting fossils in the Chipola River. In the past I collected without any specific goal in mind other than to satisfy my curiosity. It was through my association with FPS and the staff of the FLMNH that my interest in fossils became meaningful. In particular,

Roger Portell has been most helpful and I appreciate his generous support. In recent years, I've been



paying more attention to invertebrates and the smaller vertebrates. I'm collecting from the Chipola Formation for its amazing variety of shells; a dive even the most dedicated vertebrate collector would enjoy."

"Why Do Zebras Have Stripes?"



There are several distinct species of living zebras, all of which are characterized by their black and white striped hair patterns. Biologists have wondered why zebras have stripes, particularly because their hides are so visible to potential predators in the open grasslands. Evolution tends to minimize bright coloration patterns in species that are particularly vulnerable to predation.

Like the human fingerprint, no two zebras have exactly the same stripe pattern. As such, one plausible explanation for zebra stripes is for social recognition of one's close relatives within a zebra family unit. It has also been suggested that when zebras bunch together or travel together in herds, their sea of stripes visually confuse predators trying to select out individual prey. A third possibility, seemingly bordering on the absurd, is that zebra stripes are unrecognizable to Tsetse flies, and thus protects these equids from the dreaded sleeping sickness.

As in all nature, there rarely are simple explanations to phenomena that we observe. In zebras, the presence of stripes is a trade-off between mate or family-member recognition versus the "cost" of being more visible to predators.

Contributors to the Fossil Horse Fund -- 1995

***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.

If you would like to receive future issues of the Pony Express, be eligible for participation in the annual fossil horse digs, and be placed on our mailing list for announcements of other fossil horse activities and services provided by the Florida Museum of Natural History, there is a one-time subscription fee of \$20.00. Checks should be made payable to:

- **Pony Express**
- **Florida Museum of Natural History**
- **University of Florida**
- **P.O. Box 117800**
- **Gainesville, Fl., 32611-7800**

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