

Florida Fossil Horse Newsletter

Volume 11, Number 2, 2nd Half 2002

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Year of the bear Dog

The 2002 Thomas Farm field season turned out to be a thematic success. It was unseasonably hot and participants were forced to take frequent breaks to cool down and rehydrate. Fossil digging slowed with the heat and discovery of new and exciting fossils seemed to drag, but enthusiasm picked up when Isabel Betancourt of Ft. Meyers uncovered a 4inch bear-dog canine in the southern end of the boulder-bar. The perfect tooth brought everybody together for their "fossil fix" and renewed enthusiasm. Shortly after Isabel's discovery, Tom Ahern of Temple Terrace found the distal end of a bear-dog radius in the northern end of the boulder bar. The boulder bar at Thomas Farm is, as the name suggests, replete with large rocks and boulders possibly resulting from an ancient collapse of the sinkhole/or cave wall of the fossil site. Fossils recovered from this area are usually badly crushed, but some specimens are remarkably intact and over the years some very special fossils have been recovered from there. Two of these specimens are the rhinoceros jaw



Judy Lundquist digs around the beardog skull. The anterior portion is located at Judy's right hand. Erika Simons photo

contained. All the other diggers converged around the little 1meter square to have a peek at the find of the season. The rest of the afternoon and a frantic Sunday morning were spent digging a deep trench around the fossil giving it plenty of space in its protective plaster jacket. Many of the diggers took turns with this huge job. The normal size plaster jackets that are taken from Thomas Farm are small and only require the use of small plaster bandages. This monster needed burlap and plaster...we were not prepared. Luckily, Steve and Suzan Hutchens came to visit and offered to drive back to their nearby home to pick up the necessary supplies. We cut up all the burlap they brought and still did not have enough. Participants donated their bath towels and an old pair of jeans to complete the plaster jacket. By noon on Sunday the twolayer plaster jacket was drying in the sun, but much more work was needed to prepare the area so we could free it from the ground and roll it over. This had to wait until next weekend during Family Day.

On Family Day Tabitha Cale, our student helper, and her family came to help with the bear-dog jacket and to continue trenching around a large mass of fossils discovered by Sarah Killingsworth during the second Thomas Farm session. While trenching around Sarah's discovery, Tabitha came across a large complete bear-dog humerus. After Family Day was over we stayed until 8 p.m. working feverishly on Sarah's jacket and this new find. We did not leave until we had protected each fossil with a plaster jacket. We even managed to get another layer of plaster on the bear-dog skull, but it would have to wait to be freed until next time.

Over the next two weeks I gathered a crew of people who would dig that monster out and bring it home. With the new layer of plaster the jacket weighed around 500 pounds! It was no small task to drag it up out of its hole and up the side of the sinkhole. We had agonized over the logistics and each had come up with elaborate engineering feats, but when it came down to actually doing anything we just went down and did

discovered by Erika Simons while carving a drainage ditch and excavated by Jeff Yaun (see *Pony Express*, vol. 7, no. 1, page 5) and a well preserved bear-dog skull discovered in May 1999 by Eric Sargis (see *Pony Express*, vol. 8, no. 2, page 5.

During the second 2002 Thomas Farm session graduate student Dana Ehret started to uncover a bone on Friday. Judy Lundquist of Lexington Kentucky, continued excavating that square when Dana had to return to Gainesville, and the fossil was not identified until midafternoon Saturday. It turned out to be a bear-dog skull, the biggest and greatest find of the season. The mass of bone grew and grew under Judy Lundquist's careful excavation and when it was finally identified the excitement could hardly be

what came natural. Jerry Bond had brought a big pickup truck and a long towing rope, I had brought some tie-down straps and we had 2 x 4 lumber behind the pole barn at Thomas Farm. The rest of the crew included Russell McCarty, Jay O'Sullivan, Penny Higgins, Bob Simons, Sergio Quintana and Garrison Boyle. We bound the carrying straps around the bulk of the jacket, passed a couple of 2 x 4 boards through and lifted the hulk out of the pit. Then we dragged it to the edge of the sinkhole and prepared to drag it up. We were already winded from carrying it this far. Now Jerry attached the towing rope to the jacket, routed it around a fence post at the top of the sinkhole and attached the other end to the truck. While four of us lifted the front of the jacket Jerry pulled it up the hill with his truck. We used some of the shower pallets to make a stepup to the truck bed and all hands lifted the monster up for the ride home.

I have been working on the bear-dog skull and hope to have it finished by the time this newsletter goes to press. In the process of re-discovering the skull I came across two other specimens worthy of mention. One is the canine of the rare peccary Floridachoerus olseni and the other is a left jaw of the camel *Floridatragulus dolichanthereus*. Most of the other bear-dog specimens have been prepared. The canine and radius are awaiting catalog numbers, half of the skull is prepared, George's humerus is in preparation and Tabitha's humerus still slumbers in its plaster jacket. This is indeed the year of the bear dog!

Amphicyon evolved in Europe and immigrated to North America about 18 million years ago. It has been described as a tiger-sized carnivore with a bear-like skeleton and dog-like



Isabel Betancourt of Fort Meyers excavates the Amphicyon canine during the first session at Thomas Farm 2002. Erika Simons photo

teeth. For four million years Amphicyon was the largest predator in North America. It likely also scavenged and ate some plant matter, much like the modern grizzly bear. Although bones of the skeleton and isolated teeth of Amphicyon longiramus are not uncommon at Thomas Farm, skulls are quite rare--only about five have been found in eight decades of excavation. The large size of the new specimen indicates that it was a male. A much smaller skull of a female was collected by E. Sargis in May 1999. (Erika Simons and Richard Hulbert)

References

Hunt, R. M. 1998.
 Amphicyonidae. Pp. 196-221
 in C. M. Janis, K. M. Scott,
 and L. L. Jacobs (eds.),
 Evolution of Tertiary
 Mammals of North America,
 Volume 1. Cambridge
 University Press, New York.



Skull of Amphicyon longiramus prepared out of its plaster jacket with anterior portion facing right. Top right insert: Ampicyon longiramus canine and top left insert A. longiramus proximal portion of radius. Erika Simons photo composite

I was also great to meet some of the people whose names I had seen so many times written on jackets I had prepared. Overall I had a great time, ate some wonderful food, gained more field experience, and got to know a few of the nice folks who make an amazing dig even better.

Olson, S. J. 1958 & 1960. The fossil carnivore Amphicyon longiramus from the Thomas Farm Miocene. Parts 1 and 2. Bulletin of the Museum of Comparative Zoology, 118:157- 172 & 123:1-44. Savage, R. J. G., and M. R. Long. 1986. Mammal Evolution, An Illustrated Guide. Facts on File, New York, 259 pp.

Student Volunteer Profile: Tabitha Cale

Last year I became a student at UF and began volunteering in the FLMNH vertebrate paleontology department. I was able to go out to Thomas Farm for the 2002 session 1 dig, and it was fantastic to collect some of the material I had become acquainted with in the prep lab.

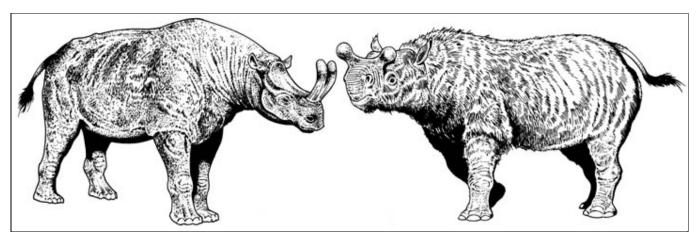
Brontotheriidae: A Dilemma of Horns

Editors note: Phyllis Park Saarinen has been an avid participant on the past three Pony Express trips to the Nebraska badlands. On the last day in the field in 2000 Phyllis discovered what appeared to be a skeleton of a brontothere from the Chadron beds. This individual, consisting of the ribs, limbs, and lower jaws (but not the skull) of Brontops, was then excavated in 2001. Phyllis audited my Vertebrate Macroevolution course during the Spring 2002. For her class presentation, she discussed the evolution and function of bronothere horns, a subject that has both fascinated and perplexed paleontologists for more than a century. The following article is an outgrowth of this class project. (Bruce J. MacFadden)



Tabitha Cale excavates Amphicyon humerus at Thomas Farm. Erika Simons photo

The family Brontotheriidae (aka Titanotheres) has long been



Artist reconstruction of Brontotherium (left) and Brontops (right)

famous among paleontologists for its large-scale changes in size and the growth of bony horns over the 20-25 million years of the family's existence. Along with other Perissodactyla, (hoofed mammals including horses, tapirs and rhinos) Brontops probably originated in western North America during the early Eocene (about 58-55 million years ago, mya) from sheep-size condylarths and dispersed to Asia. In the late Paleocene and early Eocene, the diversity of Perissodactyla (odd-numbered toes outnumbered artiodactyls (even-numbered toes) by 60-40 percent, but has since diminished to less than 10 percent of hooved herbivore genera. Among perissodactyls, brontotheres are closely related to horses. While horses had a major skull growth impulse in front of the eyes and developed long noses, brontothere skulls grew relatively long behind the eyes and at the same time developed bony knobs and ultimately large bony projections on the front of their snouts. This results in an animal that looked somewhat like a modern rhinoceros with the size of a small elephant.

In studying brontotheres, scientists have long puzzled over the function of the massive bony snout projections that developed in several brontothere species of the late Eocene/early Oligocene (40-35 mya). Many scientists have drawn parallels with modern horned artiodactyla and proposed that the horns were used for ritual combat and display during mating season. Stanley (1973) goes to great lengths to calculate the force and countering defensive strength necessary to swing and parry brontothere horns during battle.

But is this interpretation a predictive parallel or merely a human bias? Christine Janis points out that there is a problem comparing territorial and sexual display behavior of modern herding Artiodactyla with extinct members of an entirely different family living in a different habitat and subsisting on a different diet. Modern ruminant

Artiodactyla (such as bovines, camel, deer and antelopes) have a forestomach to ferment and breakdown tough plant cellulose. They are able to digest efficiently a variety of plants with a low fiber/protein ratio but have difficulty with high fiber plants. Perissodactyla developed a hind-gut arrangement which digests high fiber plants but which is less efficient at extracting nutrition. Thus Perissodactyla must eat a relatively greater amount of food to satisfy their energy requirements. Janis notes that this characteristic is a dominant factor in social behavior and thus morphology. Modern Perissodactyla such as Amazonian tapirs and SE Asian rhinos that live in semi-tropical habitats similar to that of early Eocene brontotheres in western North America are solitary and nonterritorial. Janis suspects that with their characteristic short-crowned molars brontotheres were fruit eaters, enjoying the thenabundant breadfruits, pomegranates, and other fleshy fruits and nuts now found in tropical and semi-tropical areas.

Janis also observes that the differences between modern Artiodactyla and Perissodactyla in digestion and foraging strategies result in very different territorial/social behavior. In her 1982 paper, she refers to studies demonstrating that in Artiodactyla the degree of sexual dimorphism and relative size of horns are correlated with social behavior and reproductive strategy, which in turn appear to be closely related to the structure of the habitat and availability of food. The evolution of horns in artiodactyla is correlated with the evolution of boundary patrol behavior by territorial males in woodland savanna or open savanna habitats. However, brontotheres were the only perissodactyls to develop bony horns and one of the few herbivore groups to do so in North America. Further, the horns are just above the animal's mouth. Both male and female brontotheres developed horns, though there may have been some differences in size between gender. Are we still so sure that those horns were used just for ritual display and combat?

Sediments laid down in Nebraska, Wyoming, and Colorado in the early Eocene, (about 55 mya) indicate that brontotheres first lived in semi-tropical fluvial wetlands, not unlike the modern Amazon basin. There have obviously been significant global climate changes in the last 55 million years, but until relatively recently (5 million years, during the Pliocene and Pleistocene Ice Ages), the most dramatic shifts occurred during the Eocene and especially at the Eocene-Oligocene boundary 37 mya (Prothero 1994). Not only did mean global temperatures drop steadily, but the planet began to experience seasons. Fossil pollen and especially changing fossil faunal assemblages indicate that these changes took place particularly strongly and early in North America. The rainforests and broad shallow freshwater lakes of Nebraska and Wyoming changed over time from canopied mesic forest with winding rivers, to open woodlands, wooded savanna and finally the modern semi-arid grasslands (Janis 1982).

What we know for sure is that the significant evolution in brontothere size and shape was taking place during a time of relatively rapid and dramatic climate change and at least partially in response to habitat changes. Whether the bony horns at the end of the animal's snout evolved for ritual display or for some other purpose associated with foraging is still an open question...a dilemma of horns. (Phyllis Park Saarinen)

Suggested Reading

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Helen Cozzini

Helen Cozzini has been an avid fossil collector for many years and has participated on *Pony Express* digs both at Thomas Farm and the Nebraska badlands. A native of Wisconsin, for years Helen and her family have lived in the Tampa area, and most recently she spends her summers in Crawford,



Helen Cozzini (right) and Dana Ehret (left) trench around one of the many turtles they collected during the 2002 Pony Express Fossil Hunt in the Oligocene Badlands of Nebraska. Bruce Macfadden Photo

Nebraska, where she lives in a beautiful turn-of-the 20th century Victorian home. Helen is a tireless collector and has a special eye for microfauna. When asked what was her most memorable fossil discovery, she responded: "Everyone"-being the first person to see the fossil uncovered makes these all memorable. Back in her home she prepares fossils and sorts matrix to find the tiny creatures. During the most recent *Pony Express* badlands trip, Helen spent most of her days assisting my graduate student, Dana Ehret, prospecting for, and collecting, tortoises (*Stylemys* and friends) from the badlands. (Bruce J. MacFadden)

Youthful Volunteer: Garrison Boyle

Hi, my name is Garrison Boyle. I am 14 years old and a member of 4-H. 4-H is an organization for kids and teens up to 18. It gets kids and teens into different activities that are fun and educational. It also lets them volunteer to help out around their community.

The coolest activity I've done in 4-H was the "Career Mentoring Program". In this program 4-Her's get to work with people who have the same job that the 4-Her's want when they grow up. I wanted to be a paleontologist so I am now working with Mrs. Erika Simons from the University of Florida. On the second day I met my mentor, we went to the Thomas Farm fossil locality in Gilchrist County to help remove a large plaster jacket that had a fossil bear-dog skull in it. This summer on Tuesdays and Thursdays I worked at Dickinson Hall (the old museum) where I helped to make labels for fossils, uncover fossils from their plaster jackets, and many other things that paleontologists do. I really enjoyed myself and look forward to doing this project again next year.

A Little Glimpse Into One of our Future Exhibits

The Florida Museum of Natural History is now constructing its 3rd new permanent exhibit, Florida Fossils: Evolution of Life and Land. This exhibition will display thousands of the museum's most spectacular fossils, including a large case and skeleton vignette dedicated to the Thomas Farm locality. Four complete



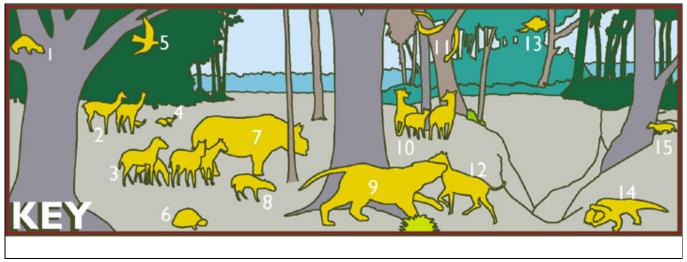
skeletons will be displayed in a dynamic interaction of life and death between the bear-dog *Amphicyon* attacking the small three-toed browsing horse, *Archeohippus*, *Parahippus*, another 3-toed small horse, looking on with great trepidation, and *Alligator olseni* lurking in the sinkhole. In the case, some of the most complete specimens recovered from Thomas Farm (e.g., *Alligator olseni*, *Epicyon*, and *Metatomarctos*, 2 small beardogs) will be displayed. Acompanying these exquisite specimens is a beautiful painting that reconstructs the Thomas Farm environment 18 million years ago.

This work was created by Bob Beach (retired Director of the Department of Medical Illustration at Shands) in collaboration with curators from the FLMNH. It is the most complete reconstruction of the Hemingfordian fauna (early Miocene) of North America. Several of these animals have never before been reconstructed (e.g., Metatomarctos (small dog), Leptarctus (small badger).

This Thomas Farm display is just one of the many that present evidence for the story of the Florida peninsula's journey across the Atlantic Ocean, and its emergence from the sea.

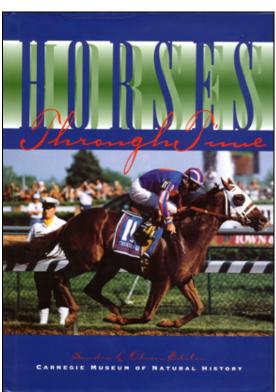
We thank our Pony Express Thomas Farm diggers for their many contributions, a number of which will be on display in the new Fossil Hall.





This artist's recontrsuction features Thomas Farm and its inhabitants 18 million years ago. The animals are as follows: 1. Leptarctus ancipidens (small badger), 2. Floridatragulus dolichanthereus (large headed camel), 3. Parahippus leonensis (three-toed horse), 4. Rhegminornis calobatus (turkey), 5. Columba prattae (dove), 6. Hesperotestudo tedwhitei (land tortoise), 7. Floridaceras whitei (rhino), 8. Parablastomeryx floridanus (musk deer), 9. Amphicyon longiramus (bear-dog), 10. Prosynthetoceras texanus (slingshot-horned cameloid), 11. Boa barbouri (constrictor snake), 12. Archaeohippus blackbergi (browsing horse), 13. Petauristodon pattersoni (flying squirrel), 14. Alligator olseni (alligator), 15. Metatomarctus canavus (dog) Painting by Bob Beach, Key by Ian Breheni

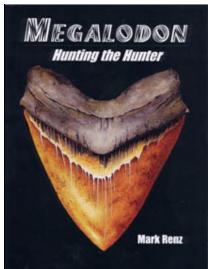
Book Reviews: Horses Through Time and Megalodon



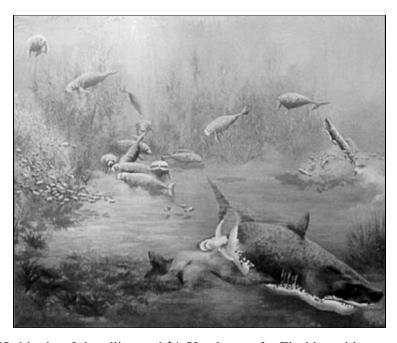
Horses Through Time. 1996. Edited by Sandra L. Olsen. Roberts Rinehart Publishers (Boulder, CO) for Carnegie Museum of Natural History. ISBN 1-57098-060-8 (hardcover). 222 pages. Retail Price \$35. Used copies available from amazon.com or other booksellers, paperback forthcoming in late 2002.

This very pleasing, well-illustrated book contains ten chapters on various aspects of horses written by experts. These cover prehistoric horses, domestication, horses in history, both wild and the various breeds of present-day horses, horse relatives, and of particular relevance to *Pony Express*, a chapter on fossil horses by Dr. Richard C. Hulbert, the FLMNH Collection Manager. There is a wonderful flesh/hair reconstruction of "eohippus" (*Hyracotherium*) in this article (see below) that is taken from the display at the Carnegie Museum of Natural History. I highly recommend this book as a general overview and Richard's article is a recent account of fossil horses written for the educated layperson.





MEGALODON: Hunting the Hunter. 2002. Mark Renz. PaleoPress. ISBN 0-9719477-0-8 (softcover). 170 pages, with close to 390 photos and illustrations, including 100 color pitures. Autographed copies available from PaleoPress at



http://www.PaleoPress.net. Price \$24.95 plus \$3.75 shipping & handling and \$1.50 sales tax for Florida residents.

In this fun-to-read and informative book Mark Renz writes conversationally about "Meg", which may have reached sixty feet in length and taken Ford Explorer size bites out of whales.

He describes Meg's likely diet, how his Florida neighborhood was once a Meg birthing suite, what scientists think may have driven the massive shark to extinction, and why there are people who believe Meg still exists. He also presents the reader with a "Terror Index", in which Meg is compared to some of the biggest and baddest dinosaurs and reptiles. Finally, he discusses why it is important that we think more about protecting sharks than fearing them.

Thoughout the book there are well illustrated guides to help shark tooth hounds identify their finds. The foreword or introduction are written by vertebrate specialists Dr. S. David Webb of the Florida Museum of Natural History and Bretton Kent, author of "Fossil Sharks of the Chesapeake Bay Region. Dr. Bruce MacFadden is quoted as well.

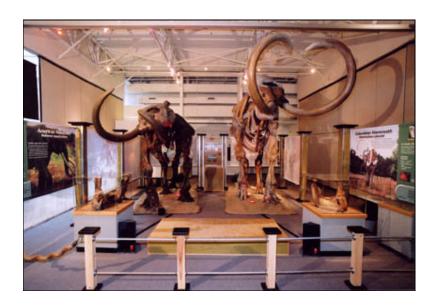
Tusks! Ice Age Florida's Mammoth and Mastodons

Tusks! opened to the public at the FLMNH on Saturday, June 15th, 2002. This exhibit was produced "in-house" by the FLMNH staff and represents the culmination of four decades of fossil collecting and 18 months of intensive exhibits design development and fabrication. Tusks! highlights fossil proboscideans (elephants and their relatives) mostly from Florida and features more than 80 specimens and artifacts from our extensive research collections. The "centerpiece" of Tusks! includes two mounted skeletons, one of an American Mastodon (above, left) and one of the Columbian Mammoth (right), both from the late Pleistocene (~16,000 years old) and collected from north Florida rivers. The American Mastodon skeleton was recently acquired and newly reconstructed for Tusks!. It represents one of the largest of its kind in North America.

The exhibit was first viewed at a FLMNH Members' Sneak Preview on May 13th, at which time Don Serbousek of Holly Hill, (the collector of the American Mastodon skeleton) cut the ribbon to open the exhibit.

The underlying theme of Tusks! is the process of paleontology--from Discovery, to Research, to Exhibits. In addition to the first-time viewing of such a large grouping of proboscideans from our collections, Tusks! also includes photographic murals, graphic texts panels, videos, and interactive exhibit modules. It highlights the extensive fossil record of proboscideans of Florida, and the recent discoveries and current research by UF paleontologists.

This exhibit was supported by the State of Florida, Florida Museum Associates, National Science Foundation, *Pony Express*, and Toomey Foundation for the Natural Science. Tusks! will be on display at Powell Hall through May 2003 and then parts of it will travel to other museum venues. It is still available for rental to a limited number of additional venues. An on-line version of Tusks!, including a virtual tour and related information, is available at www.flmnh.ufl.edu/tusks.



2003 Pony Express Adventures

Pony Express 2003 Adventures!

12th Annual Thomas Farm Digs

Session 1 (April 10-13, 2003)
Session 2 (April 24-27, 2003)
Join us again for these exciting weekends of collecting 18-million-year-old fossils in a retreat like camp.

5th Annual Family Day (Saturday, May 3, 2003) Families bring a bag lunch and join us for a day at our 18-million-year-old Thomas Farm fossil locality, to hunt fossils. Sort for tiny fossils in screenwashed matrix.

6th Annual Badlands Fossil Hunt in Nebraska (June 14-21, 2003)

Come with us to northwestern Nebraska and hunt Oligocene fossils with us, hike in Toadstool Park and learn Badlands geology, visit the Hudson-Meng bison kill site, and collect fossils in the badlands.

6th Annual Paleontology Lab Session (July 31-Aug 2, 2003)

Learn how to make a simple mold and cast using modern techniques and materials. Make your own cast



Don Serbousek cuts the ribbon to the new Tusks! Exhibit during the Members Preview

To register for these events please complete the form on the enclosed brochure and return to Erika Simons at the Florida Museum of Natural History P.O. Box 112710, Gainesville FL 32611-2710. For further information and extra registration forms for friends see our website at: http://www.flmnh.ufl.edu/vertpaleo/ponyexpr.htm. The registration forms are linked to each adventure.

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.

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Erika Simons (Pony Express Program Coordinator) at (352) 846-2000 ext. 255 or e-mail: esimons@flmnh.ufl.edu

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