Florida Fossil Horse Newsletter

Volume 13, Number 1, 1st Half 2004

What's Inside?

Family Day at Thomas Farm 1999. (Jeff Gage photo)

Beth Hardin finds a Parahippus *jaw during the 1999 field season. (Erika Simons photo)*

Pony Express, Past, Present and Future

Twelve years ago, in March 1992, the *Pony Express* newsletter was started to communicate news, activities, and research about Florida fossil vertebrates, particularly horses, to the interested public. At that time, a colleague remarked "will you really have enough to write about and sustain the newsletter?" Since then the *Pony Express* program has published the newsletter continuously and is now in the 13th volume year. We have never had a problem with enough to write about. In addition to the newsletter, over this time the *Pony Express* program has grown and expanded to many related public education activities. The Thomas Farm annual spring digs are very popular. The Pony Express also has sponsored the Badlands adventure (1998-2003), Lab sessions (1997-2004), and Family Day (1999-2004) at Thomas Farm. *Pony Express* has also been represented at, and supported, fossil festivals such as Paleofest, including the upcoming Paleofest04 on 22-23 May coinciding with the opening of the *Hall of Florida Fossils: Evolution of Life and Land* at the FLMNH.

In addition to publishing a newsletter, both printed and on-line versions, and sponsoring the popular fossil digs and lab sessions, the *Pony Express* has also resulted in other activities that support the science of paleontology and public outreach, particularly in Florida. These accomplishments include:

- Through donations and net revenues, an endowment, which now stands at $55,000, was established and has been used to support collection, research, and outreach activities.
- Approximately 217,469 specimens are catalogued in the Vertebrate Paleontology research collections, including 37,578 from Thomas Farm and 2,457 from Nebraska. These have included many spectacular specimens, for example, the *Archaeohippus* skull that was featured on CNN in 1995 and in US News & World Report in June 1996.
- Many fabulous fossil specimens and reconstruction of the *Equus* and *Archaeohippus* horse skeletons for exhibition in the FLMNH have resulted.
- Support of research projects and travel, including Jay O'Sullivans's dissertation on *Archaeohippus* and the International Student Travel program. Many students that have "grown up" through the *Pony Express* program and have seen them move on in their careers.
- Outreach activities, including talks to fossil clubs and other community organizations.
- Many scientific publications describing the fossil specimens have resulted from *Pony Express* activities.

This spring we will hold two Thomas Farm digs, both of which are full. We also plan to hold Family Day and the Lab session. In the Fall we will publish volume 13, number 2 of the newsletter.

I am stepping down from my administrative position

as Associate Director of Exhibits & Public Programs in mid 2004 and for the next year will be returning to full-time research, teaching/advising, and related collections activities. In the Spring 2005 I will be on sabbatical. In mid 2004 Erika Simons will "retire" as Editor, able field general, and research assistant of the *Pony Express*. I sincerely appreciate all of Erika's dedication and enthusiasm for the *Pony Express* over these years.

As a result of these changes, we will not sponsor the Thomas Farm digs or related activities nor do we plan to publish the newsletter in 2005. Thereafter, it is my hope and intention to continue public educational outreach as part of my professional activities. In the upcoming months I will seek your input as to the kind of activities that you might see as beneficial to continuing and promoting Florida vertebrate paleontology.

Bruce MacFadden speaks of fossil horses in the Senior Discovery Program. (Jeff Gage Photo)

Bruce J. MacFadden

FLMNH Welcomes New Vertebrate Paleontology Curator

Dr. Jonathan I. Bloch with wife Elizabeth Kowalski and their son Aidan at the South Dakota School of Mines Museum of Geology

The Florida Museum of Natural History extends a warm welcome to our new Assistant Curator of Vertebrate Paleontology, Jonathan Bloch, currently the Haslem Postdoctoral Paleontology Fellow at South Dakota School of Mines and Technology, Rapid City. Jonathan received his Ph.D. at the University of Michigan. Most of his paleontological fieldwork, both past and current, involves Paleocene and Eocene small mammals from the Big Horn and Crazy Mountains basins of Wyoming and Montana. He has also collected fossils from Egypt, Kazakhstan, and Pakistan. With his extensive museum and

curatorial experience from the University of Michigan Museum of Paleontology and the South Dakota School of Mines Museum of Geology, Jonathan will begin his work at FLMNH in Spring of 2004, accompanied by his paleobotanist wife, Elizabeth Kowalski and their newborn son Aidan. While continuing his work with Paleogene mammals from the western U.S. and Asia, Jonathan will include Florida vertebrate fossils in his research as well.

Fossil Birds from Thomas Farm

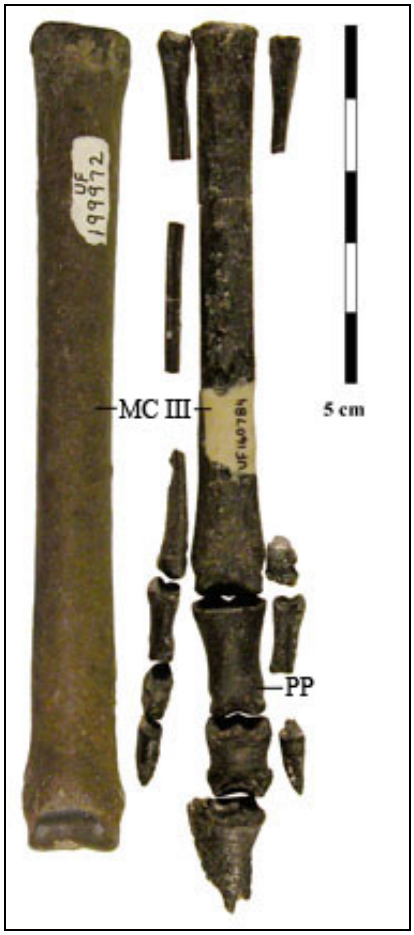
Dr. David Steadman, FLMNH Curator of Ornithology and Chair of the Department of Natural History, has recently started a research study of the extinct "avifauna" (fossil birds) from Thomas Farm, Florida. This project is part of a larger initiative funded by the National Science Foundation called "Assembling the Tree of Life," which will result in a better understanding of the interrelationships within and among groups of organisms today and in the past.

Dr. David Steadman examines avian study skins from the ornithology collection at the Florida Museum of Natural History. Jeff Gage photo

Because of their delicate bones and lack of teeth, birds are preserved as fossils less frequently than mammals. David reports that the avifauna from Thomas Farm is exceedingly rich, and is turning out to be one of the most prolific localities in the North American fossil record. Interestingly for all of you who have spent countless hours screenwashing at Thomas Farm, the resulting tiny bones ("microfauna") are providing extraordinary insight into the birds that lived in Florida 18 million years ago. Just as with the reptiles and mammals, all of the species of birds from Thomas Farm are extinct. Only seven of the 20 or so species that David has recognized thus far have even been named! These are an anhinga, three hawks, a chachalaca, a small turkey-like gamebird, and a small dove. Awaiting further study is a heron, ibis, rail, pigeon, owl, roller, puffbird, barbets, various songbirds, and others. Many of the birds from Thomas Farm represent families that are confined today to the tropics. Additional screenwashing at the site is sure to

produce more new species of birds, and thus help
us to understand avian evolution in Florida and throughout North America.
Bruce J. MacFadden

A New Species of Archaeohippus from Florida



Metacarpal III of Achaeohippus blackbergi *from Thomas Farm (left) compared with metacarpals and toes of* Archaeohippus mannulus *from Pinellas Co.(right) Erika Simons photo*

Editor's note: Jay O'Sullivan is a former UF paleontology graduate student. After receiving his Ph.D. in 2002, he has been an Assistant Professor at Macon State College, Georgia.

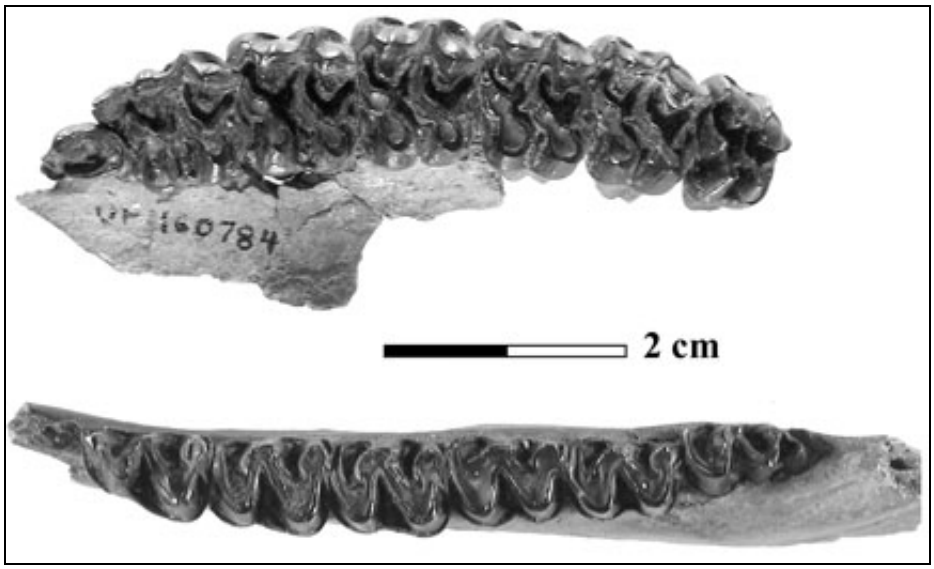
At about the same time I started researching the small Miocene equid *Archaeohippus* for my dissertation, a spectacular fossil horse arrived at the Florida Museum of Natural History. Found in Pinellas County by Christian B. Skillman, it was purchased by the Tampa Bay Fossil Club and donated to the Museum. At that time, it was tentatively identified as a specimen of the Oligocene horse *Miohippus*. As such, I thought it would prove useful to my studies, a specimen to compare with *Archaeohippus*. Only after much additional study, when I had learned to recognize the features that made *Archaeohippus* distinct from other equid genera, did I realize that the Pinellas County specimen was, in fact, an *Archaeohippus*.

The specimen includes numerous fossilized elements of a single individual. Most of the bones come from the head and forelimbs, and include most of the teeth. The specimen almost certainly was articulated when found, which is not the normal way we find *Archaeohippus* fossils in Florida. Most of these are isolated skeletal elements found at the Thomas Farm fossil site in Gilchrist County. Another feature of the specimen (catalogued as UF 160784) that is quite striking is its small size; its third metacarpal (MC III) is tiny compared to those of *Archaeohippus blackbergi*. It is only about 70% as long as the average metacarpal length from Thomas Farm. However, in overall appearance as well as in specific characters, these bones of the manus are clearly like those of *A. blackbergi*. The proximal phalanx (PP) of the third digit is long and narrow, just as you'd see in *A. blackbergi* and *Parahippus leonensis*, also from Thomas Farm.

The upper molars, however, show similarity with A. blackbergi from Thomas Farm. I noticed several details of the molar that

distinguish horses like

Archaeohippus and *Parahippus* from more primitive horses like *Miohippus*. The small teeth of both *A. blackbergi* and *A. mannulus* also differentiate these species from other Miocene horses. Other features of the teeth looked just as I'd seen them in *A. blackbergi*.



Maxilla (right reversed) and left mandible of Archaeohippus mannulus. *Erika Simons photo*

Having arrived at the conclusion that I was looking at *Archaeohippus*, I was faced with the task of determining to which species of *Archaeohippus* specimen UF 160784 belonged. While it most closely resembled *A. blackbergi* in its features, its tiny size and a few unique tooth characteristics set it apart from that species

Having determined that I had a unique, undescribed species, I had to name it. I decided on a species name that, for me, included several important facets of what made this specimen special. The word mannulus is a diminutive form of the Latin word mannus, which means "a small horse of Gaul". Now, while the part about Gaul didn't really work in this case, I liked the idea of a word that meant small horse having a diminutive form, since UF 160784 is like the small equid A. blackbergi, but even smaller. Also, mannus differ by one letter from the Latin word manus, which means hand, and many of the elements of UF 160784 are hand bones. Finally, *Archaeohippus* mannulus sounds a bit like *Archaeohippus nanus*, which was the name applied by George Gaylord Simpson to the Thomas Farm fossils. Because those fossils were later assigned the older name *A. blackbergi,* the name *A. nanus* (which is Latin for dwarf, and is therefore very appropriate for the Thomas Farm species), is a junior synonym of *A. blackbergi* and cannot be used for *Archaeohippus*. Thus, the name *A. mannulus* serves as a tangential tribute to *A. nanus*.
Jay O'Sullivan, Ph.D.
A technical description of this new species can be found in : O'Sullivan, J. A. (2003). A new species of *Archaeohippus* (Mammalia, Equidae) from the Arikareean of Central Florida. Journal of Vertebrate Paleontology 23:877-885.

The Use of Skeletochronology to Determine Paleoecology

Editor's note: Dana Ehret is a UF geology Masters student who will graduate in May 2004. This is an update on his research.

Many members of the *Pony Express* have gone out west to Nebraska with Dr. Bruce MacFadden and his crew to collect fossils that are late Eocene - early Oligocene in

A large tortoise washes out of the badlands sediments. Sometimes the limb bones wash out of an "exploded" shell like this one. (Patricia Ward photo)

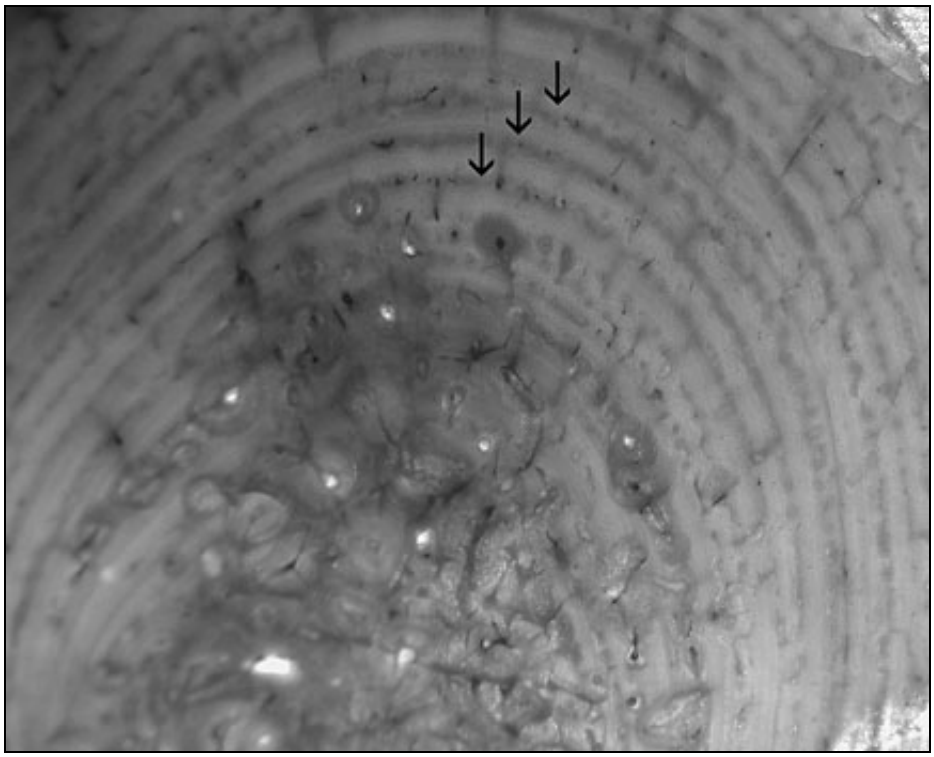
age. While many of you are out there scouting for oreodont, horse and titanothere bones, you have likely come across the many shattered remains of tortoises. And while most of you probably exclaim, "Not Another Tortoise", some of us go out there just to find them. Not just the shells mind you, but other important bones that most collectors overlook.

Skeletochronology is an aging technique that is becoming popular in many reptile and amphibian studies, including dinosaurs. A good comparison for skeletochronology is dendrochronology, the counting of a tree's rings within its trunk, to determine its age. In skeletochronology, annual rings within the animal's bones are counted. Skeletochronology is often used in reptiles and amphibians because they have indeterminate growth, meaning they grow for their entire lives, and most will hibernate for part of the year. The rings that are seen and counted in the bone are actually created by a significant drop in their metabolism while they are hibernating.

Dana is extracting a tortoise limb bone from matrix. Erika Simons photo

As a graduate student at the University of Florida working with Dr. Bruce MacFadden, I decided to try this method of aging on the tortoises that are collected in the badlands of Nebraska. During the Summer 2001 field season, members of the *Pony Express* trip (including Marcia Wright and Helen Cozzini) ventured out to the field site on Barbara and Reed Toomey's ranch to collect tortoise specimens. We were looking for *Stylemys nebrascensis* (the most common badlands tortoise) and the lesser-known *Gopherus laticuneus* (a distant relative of the modern gopher tortoise). Rather than just collecting shells, more importantly we were looking for limb bones, particularly the humerus. These are important bones to find because they are used in the age determination process. Obviously, to anyone who's been out to the badlands, we collected many tortoise specimens over the course of

the week.



Cross section of a fossil tortoise (probably Stylemys sp.) humerus. Arrows point to the darker rings, (formed during periods of slow growth or hibernation). The lighter regions show periods of more rapid growth.

Back at the Florida Museum of Natural History, the bones were thin-sectioned and mounted on slides so that the rings could be counted and analyzed. Before cutting up all of the fossil specimens, I tried the same aging technique on modern gopher tortoise bones from Florida. All of the specimens analyzed showed positive results. The fossil tortoises from Nebraska also showed clear, defined growth rings when analyzed. Of the specimens collected, individuals ranged in age from hatchlings to full-grown adults that were over 40 years old and half a meter long!

This type of research is important for paleoecological and paleoenvironmental studies in the badlands. Learning more about the age structure and growth rates of tortoise groups can give insight into the bigger ecological picture. Hopefully, in the years to come, I will have the opportunity to venture back out to the badlands and collect more specimens.
Dana Ehret

Publications by *Pony Express* Volunteers and Staff

Many of our former staff members have moved on in their careers, but are certainly not forgotten. Jay O'Sullivan has moved to Macon, Georgia, where he teaches biology at Macon State College. Dennis Ruez moved to the University of Texas in Austin where he is a doctoral candidate. Brian Beatty is now a doctoral candidate at the University of Kansas. Dr. Bruce MacFadden, our Program director and Grand Chef has been busy publishing. Below are several of their publications released during the past four years:

2000. Robert S. Feranec and Bruce J. MacFadden. Evolution of the grazing niche in Pleistocene mammals from Florida: evidence from stable isotopes. Palaeogeography, Palaeoclimatology, Palaeoecology 162 (2000):155-169
Using stable isotopes, the authors examine the tooth enamel of *Equus*, Bison, mammoth (*Mammuthus*), a camel (*Hemiauchenia*) and a peccary (*Platygonus)* among others to determine their grazing niches in the Pleistocene.

2001. Bruce J. MacFadden. Three-toed browsing horse *Anchitherium clarencei* from the early

Miocene (Hemingfordian) Thomas Farm, Florida. Bulletin of Florida Museum of Natural History 43(3):79-109 The rare Thomas Farm horse *Anchitherium* is compared to it's close relative Kalobatippus. All known specimens of *Anchitherium* including those collected during the past decade by *Pony Express* diggers are described in this paper.

2002. Bruce J. MacFadden and Oscar Carranza-Castañeda. Cranium of *Dinohippus mexicanus* (Mammalia: Equidae) From the early Pliocene (Latest Hemphillian) of Central Mexico, and the origin of *Equus*. Bulletin of Florida Museum of Natural History 43(5):163-185 The authors demonstrate that primitive species of *Equus* originated from *Dinohippus mexicanus* by cladogenesis (branching evolution).

2001. Dennis R. Ruez, Jr. Early Irvingtonian (Latest Pliocene) rodents fom Inglis 1C, Citrus County Florida. Journal of Vertebrate Paleontology 21(1):153-171.
The author describes the rodent fauna of the sinkhole fossil site Inglis 1C, thus adding significantly to the knowledge of these tiny mammals.

2002. Dennis R. Ruez, Jr. Mammalian taphonomy of the early Irvingtonian (Late Pliocene) Inglis 1C Fauna (Citrus County, Florida). Southeastern Geology 41(3):159-168. The author analyses the faunal remains from a sinkhole site to reveal how the fossils were deposited and biases in accumulation.

2003. S. David Webb, Brian Lee Beatty, and George Poinar, Jr. New evidence of Miocene Protoceratidae including a new species from Chiapas, Mexico. Bulletin of the American Museum of Natural History 13(279):348-367 The authors describe *Protoceras tedfordi* from Chiapas, Mexico as well as new cranial and postcranial material of *P. texanus* from Alum Bluff and Thomas Farm.

2003. Bruce J. MacFadden and Gary S. Morgan. New oreodont (Mammalia, Artiodactyla) from the late Oligocene (Early Arikareean) of Florida. Bulletin of the American Museum of Natural History 13(279):368-395. A new oreodont species is described from the White Springs Local Fauna. *Mesoreodon floridensis* is based on a population of individual skeletons recovered from this site.

Fossil Hall Filming at Thomas Farm

A part of the fossil record of Florida was recorded for all to see. On Monday February 16, 2004 Karst Productions from High Springs Florida was at Thomas Farm to film a dig for a video segment to be shown in the Hall of Florida Fossils at the Florida Museum of Natural

Wes Skiles (right) films the muddy task of excavating a little prehistory at Thomas Farm, one of 5 sites to be featured in 2 minute film segments in the Hall of Florida Fossils. (Jeff Gage photo)

History. The hall will open on Saturday May 22, 2004.

Karst Productions is headed by Wes Skiles. Wes is a modern day explorer whose work has spanned the globe from the deepest caves to the polar climes to the wilds of the African Savanna. His work appears on major networks both in the U.S. and around the world. A small list of his works are: Water's Journey done for PBS, Ice Island for National Geographic, and Journey to Amazing Caves an IMAX movie project. To see more on Wes and his talented crew go to www.karstproductions.com. The project was filmed entirely in HD, or high definition format. Thomas Farm was one of five fossil sites that were filmed by Karst Productions. Each site depicted a specific epoch in the fossil timeline. Each epoch displayed in the Hall of Florida Fossils will have a two minute video showing the highlights of that specific epoch. In addition to filming in the field, Wes and his crew filmed many of the skeletons that will be on display in the upcoming hall, and also a behind the scenes look at what happens to a fossil after it is uncovered until it reaches display in the hall. The behind the scene look shows the collection staff preparing, cataloging, preparing a fossil for display.
Jeff Gage

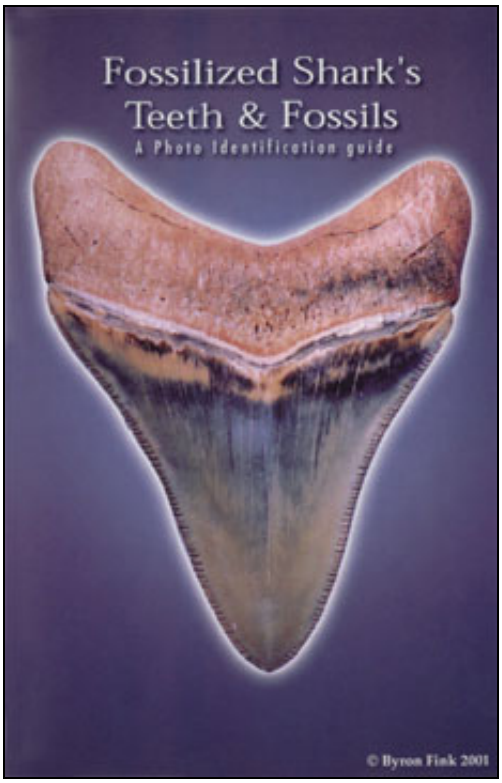
Book Reviews

Fossilized Shark's Teeth & Fossils a photo identification guide. 2001. Byron Fink - DBA Shark's Teeth of Venice

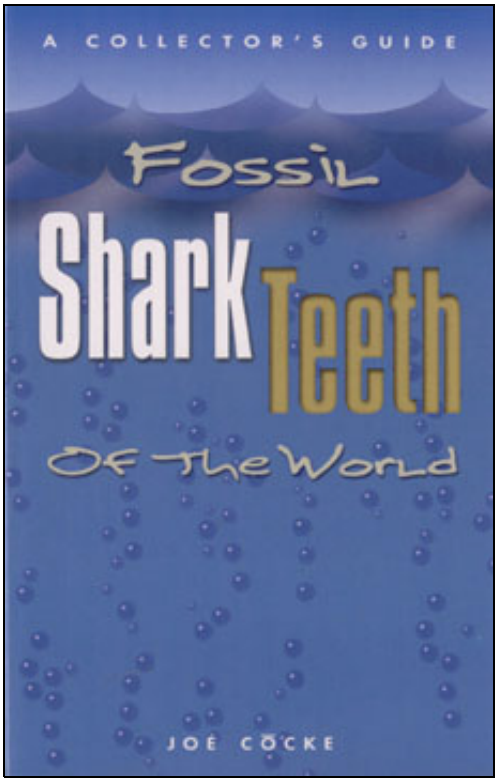
- Wholesale, retail, fossilized shark's teeth, jewelry, information products. 941-488-1205. Soft Cover 28 pages. The book is available for $8.00 at:
http://www.cooperriverdiving.com/fossil_shopper.html

This booklet is contains many beautiful color pictures of some of the more common fossil shark teeth and other vertebrate fossils found on beaches and in streams around Florida. It is small enough to conveniently take with you on your fossil hunting trips. The author has placed a few

corrections inside the front cover. Listed below are additional errata that will be corrected in future printings:
Page 10: 1-2 - shrimp claw pinchers, 3 - sea-robin neurocranium(top of skull), 5 - hogfish (*Lachnolaimus maximus*) grinding plate, 3a - 3b alligator gar (*Atractosteus spatula*) scales.
Page 14: 2-5 - eagle ray (Myliobatidae) mouth plates.
Page 16: only the 2nd and 5th are alligator teeth, the others are from dolphins or small whales.
Page 17: fused frontal bones from alligator skull
Page 18: portion of lower shell (plastron) of a turtle (a fluke implies a fin or foot)
Page 23: 1 - upper 2nd premolar (M2), 2 - upper molar, 3 - lower molar, 4 - lower 3rd molar(m3)
Page 25: If this tooth is from Florida it is a Columbian mammoth, not a Wooly mammoth.
With these corrections printed on a sticky label and added to the current edition this is a fine pocket guide for any fossil hunter.



Fossil Shark Teeth of the World a collector's guide. 2002. Joe Cocke



- Lamna Books P.O. Box 10372 Torrance, CA 90505. Library of Congress Catalog # 2001-133121. ISBN 0-9715381-3-1. Soft Cover, 150 pages. This book retails for $19.95 at http://www.amazon.com

Joe Cocke has recently retired after 33 years of work in the departments of Vertebrate Paleontology, Education and Animal Habitats at the Natural History Museum of Los Angeles County, Califoria. His book is an easy to understand field guide for the beginner and the serious shark tooth hunter. It includes many black-and-white photos and information such as common and scientific names, location, age, average size, occurrence, description, similar teeth, and notes. In addition the author gives valuable tips on how to start and maintain a growing collection of fossils. He discusses what information should be associated with each fossil and how to store the collection. Terminology is well explained. The book is broken down into categories of sharks, including Mega-tooth sharks, Maco sharks and Goblin sharks.

The book is useful to collectors around the world. It is a valuable resource for any fossil collector.

International Student Travel Award 2003-Victor Manuel Bravo Cuevas

Victor Bravo repairs a horse mandible of Equus conversidens *from the Pleistocene of Hidalgo.*

Each year the vertebrate paleontology program sponsors the travel of an international student to come to Gainesville to study our collections. Funds for this award come from the Vertebrate Paleontology Endowment, which was established during the mid 1990s as a result of generous contributions from *Pony Express* supporters. In 2003 the recipient of this award was Victor Manuel Bravo Cuevas from the Universidad Autonoma del Estado de Hidalgo, México. Victor currently is researcher and collection manager in the paleontology museum and on the faculty at Hidalgo while pursuing the Ph. D. degree in the Instituto de Geologia at the Universidad Nacional Autonoma de México (UNAM) in Mexico City. His major professor at UNAM is Dr. Ismael Ferrusquia-Villafranca.

For his research Victor is studying middle Miocene horses from Mexico. These are comparable to those from Florida, and include extinct three-toed horses such as Merychippus. In the Fall Victor spent one week in our Vertebrate Paleontology collection. Relative to North America, the Miocene history of horses (Family Equidae) is poorly represented south of the border. Victor is making great strides with his research to advance our understanding of this group. This research trip bore additional fruits as Victor and Bruce MacFadden will collaborate on a study of the chemical signatures of the Miocene horse teeth from Mexico in order to understand ancient diets and habitats.

Each recipient of the International Student Travel Award receives a stipend that partially defrays travel costs, a plaque, and their names are inscribed on a plaque that is displayed in VP at the FLMNH. Previous recipients of this award have been: 1995--Federico Anaya, La Paz, Bolivia
1996--Marcelo A. Reguero, La Plata, Argentina
1997--Graciela Esteban, Tucumán, Argentina
2000--Thomas Tütken, Tübingen, Germany
2001--Eduardo Jiménez, Hidalgo, México
2002--Rodolfo Salas Gismondi, Lima, Peru

We wish Victor much success with his research and look forward to collaborating with him in the future. For additional information about this award, see:
http://www.flmnh.ufl.edu/vertpaleo/INTstudent.htm

Marian Mae Galusha 1916 - 2004

Editor's note: Ever since his graduate school days in the 1970s Bruce has enjoyed the friendship and gracious hospitality of the Galushas. More recently, during the Pony Express western adventures, Marian was a (sometimes surprise) guest at the Cookshack get-togethers in Crawford. We will miss Marian during our trips to the Nebraska badlands, a region that she and her family dearly loved.

Marian Galusha (Center) with friends Jim Martin and Dan Chaney 1993

Marian Mae Galusha was born March 20, 1916, on the Dawes County, Nebraska, family farm. She attended Pepper Creek country school where her mother taught, then moved to Chadron to complete her high school degree and Chadron State Normal College's teaching program. Shortly thereafter she met Theodore Galusha, a paleontologist and geologist who worked with the Frick Laboratories of the American Museum of Natural History in New York City. They were married in 1935.

The frequent travels required by Ted's field work collecting, documenting and describing fossil mammals led the couple to live in many states...Florida, California, New Mexico, Oklahoma, New York, as well as Nebraska. The varied local activities in which they participated marked their lives with disparate interests and provided them with life-long friends.

When their two children were grown, Marian worked for over 10 years in her own right as scientific secretary in the Department of Vertebrate Paleontology of the American Museum of Natural History. She continued to accompany and document collecting expeditions and mapping after they both retired in 1976 to the family farm. After Ted's death in 1979, she continued to work at the New Mexico Bureau of Mines and AMNH, reviewing and cataloguing Ted's contributions to New Mexico geology and paleontology and later, analyzing his field diaries, shipping lists, photographs and correspondence for the Museum.

A member of the Society of Vertebrate Paleontology, she seldom missed an annual meeting. Marian died of cardio-pulmonary arrest on Saturday, February 28, 2004.
Adapted from , Marilyn Galusha Farreras

Pony Express

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Editorial Staff:

- Bruce J. MacFadden Program Director
- Erika H. Simons, Editor and Program Coordinator

PONY EXPRESS BACK ISSUES AVAILABLE!

Printed back issues of this newsletter are available at a cost of $8.00 per volume, or $3.00 per issue. Issues 1 and 2 of Vol. 1 are only available as photocopies. Other issues, which are available in their original printing, are: Vol. 1, # 3, 4; Vol. 2, # 1-4; Vol. 3, #1-3/4; Vol. 4, # 1 and 2; Vol. 5, # 1 and 2; Vol. 6, #1 and 2; Vol. 7, #1 and 2; Vol. 8 # 1and 2; Vol. 9 #1; Vol.9 #2; Vol. 10 #1, Vol.10 #2, Vol.11 #1, Vol.11 #2, Vol.12 #1, Vol.13#1

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