

THE Pteranodon

Highlights from the Sternberg Museum of Natural History

No. 32

Summer 2005

The Audubon of Moths

Largest exhibition of John Cody's watercolors brings opportunity to practice his techniques

Would you prefer to purchase a print of John Cody's famous moth paintings, or would you prefer to spend a weekend under his tutelage in order to paint your own?

Fortunately, you don't have to choose!

Twelve hours of hands-on study under John Cody is available in a workshop offered from 8:00 am to 5:00 pm on Saturday, July 16 and from 1:00 pm to 5:00 pm on Sunday, July 17 at the museum's Engel Education Center.

The registration fee for the workshop is \$60 for Sternberg Museum members and \$75 for the general public. The registration deadline is July 9. Forms can be picked up at the museum admission desk or accessed online at www.fhsu.edu/sternberg/programs.shtml.

And if you would like to purchase a print of Cody's work, those can be ordered online, by visiting the museum's website at www.SternbergMuseum.com and using the link at the bottom of the homepage.

On the other hand, would you like to win one of Cody's prints instead of purchasing it? Then enter the monthly drawings!

For the duration of the "John Cody's Moths" exhibition (through August 21) one random drawing is scheduled for each calendar month, with one of Cody's prints as the prize for each drawing. Each paid admission or valid admission on a membership receives one ballot, on which the visitor must vote for his or her favorite



Visitors interact with an activity panel to explore the effect of the destruction of Saturniid moth habitat before they move on to view one of Cody's paintings.

painting. Ballots are deposited in a box at the admission desk, and at the end of each calendar month, a random drawing is held from that month's entrants to determine the winner. Individuals may enter each drawing only once, but may enter each of the four drawings during the exhibition.

Elaine Smriga, a museum visitor from Hays, Kansas, won a print of Cody's

African Atlas moth painting when her ballot was selected in the May drawing.

The present exhibition is the largest ever of Cody's paintings. It comprises not only the artwork but also interactive stations with activities through which visitors may come to understand some of the scientific and artistic background pertinent to Cody's work.

Sleepovers raise funds for Discovery Room



Q: What makes kids entering first, second, or third grade the luckiest kids on the planet?

A: They have the opportunity to come to the dinosaurs' sleepover party, with their registration fees going to support the Sternberg Discovery Room!

The mascot of McDonald's corporation may be a clown, but Rick and Gail Kuehl, owners of the Hometown McDonald's stores of WaKeeney, Russell, and north and south Hays, are very serious about educational opportunities for children.

They support that cause in a big way: as the end of summer draws near, they donate all the bedtime snacks and breakfast the next morning for children who sign up for a special pair of sleepovers, and they challenge other Hays businesses to join them by donating the other materials used for sleepover activities and crafts.

Because of the donations, registration fees for the sleepovers are kept at a moderate level, and the full sum of the fees amounts to a donation that helps to support the Children's Discovery Room at the museum.

Museum staff and the kids' parents had at least as much fun as the kids did



A common kingsnake provides a memorable experience for Alan Wilson as he regards it intently.

at last year's sleepovers, according to Cami Liggett, Museum Educator. Those sleepovers were supported by the Kuehls' McDonald's stores, and raised over a thousand dollars in support for the Discovery Room. Eagle Radio and Midwest Energy also contributed.

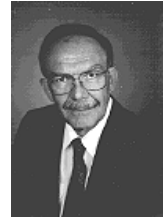
Kids participating in the sleepovers must be accompanied by an adult (up to four kids per adult) and must be preregistered. For the boys' sleepover, held from 7:30 PM July 29 to 9:00 AM July 30, preregistration is due by July 18. On August 1 preregistration is due for the girls' sleepover, to be held from 7:30 PM August 12 to 9:00 AM August 13. The sleepovers are open to children who will be entering grades one, two, or three.

The fee is \$35 for an adult and one child; \$40 for an adult and two children; \$45 for an adult and three children; and \$50 for an adult and four children. Pick up registration

forms at Russell, Hays, or WaKeeney McDonald's restaurants, or call the Sternberg Museum office during business hours at (785) 628-5516.



Choate's Notes



Dr. J. R. Choate
Director

At several places in this issue of *The Pteranodon*, Sternberg Museum staff members are quoted as saying how much fun they have when they work with children in the museum's educational programs. I have observed them, and I can vouch for their truthfulness. Cami Liggett, Thea Haugen, and their various assistants are really at their best when surrounded by inquisitive, enthusiastic kids. And, as you would expect, children learn scientific topics best when everyone, including the teachers, are having fun.

This method of teaching science is termed "informal science education." Museums, zoos, and similar institutions normally employ informal methods to reinforce the science standards that are learned in the classroom, or to relate topics learned in the classroom to the real world. However, given what is happening in Kansas with respect to the teaching of evolution, we may need to rethink this role.

Evolution truly is the foundation for everything we do at the museum. The collections and exhibits of the museum document past evolutionary events and current evolutionary forces. If schools deemphasize evolution, the Sternberg will need to revise exhibits and educational programs that mention evolution in passing so to place greater emphasis on the geological time scale, natural selection, speciation, and other basic tenants of the biological principal of evolution. In these and other ways, the Sternberg Museum and similar institutions can help children in Kansas learn what they need to know about evolution to succeed in college and eventually as members of society.



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MUSEUM EVENTS

www.SternbergMuseum.com



July

5 So Many Snakes! children's class; *preregistered youth through grade 5; 4:00 PM - 5:00 PM, Engel Education Center; see p. 6 for details*

6 So Many Snakes! children's class (repeated); *preregistered youth through grade 5; 1:00 PM - 2:00 PM, Engel Education Center; see p. 6 for details*

9 Cody workshop registration deadline; see p. 1 for details

11 Dig-a-Dino children's class registration deadline; see p. 6 for details

14 Animal Babies! children's class; *preregistered youth through grade 5; 4:00 PM - 5:00 PM, Engel Education Center; see p. 6 for details*

15 Animal Babies! children's class (repeated); *preregistered youth through grade 5; 1:00 PM - 2:00 PM, Engel Education Center; see p. 6 for details*

16 Watercolor Workshop with John Cody, Day One; *preregistered participants; 8:00 AM - 5:00 PM, Engel Education Center; see p. 2 for details*

17 Watercolor Workshop with John Cody, Day Two; *preregistered participants; 1:00 PM - 5:00 PM, Engel Education Center; see p. 2 for details*

18 registration deadline for Boys' Sleepover; see p. 2 for details

19 - 23 Discovery Table at the Ellis County Fair; *general public all ages; 5:30 - 10:00 PM nightly in the air-conditioned Gold Building; no admission fee*

22 SPIDERS!! presentation at Hays Public Library; *general public children; 2:00 PM - 2:45 PM, Hays Public Library Children's Department*

25 Who Speaks for the Land exhibition opens; continues through August 28

29 - 30 McDonald's Discovery Room Boys' Benefit Sleepover; *preregistered boys (with adult male) entering first through third grades; 7:30 PM Fri. - 9:00 AM Sat., throughout museum; see p. 2 for details*

August

1 registration deadline for Girls' Sleepover; see p. 2 for details

3 Dig-a-Dino! children's class; *preregistered youth through grade 5; 4:00 PM - 5:00 PM, Engel Education Center; see p. 6 for details*

5 Dig-a-Dino! children's class (repeated); *preregistered youth through grade 5; 1:00 PM - 2:00 PM, Engel Education Center; see p. 6 for details*

12 - 13 McDonald's Discovery Room Girls' Benefit Sleepover; *preregistered girls (with adult female) entering first through third grades; 7:30 PM Fri. - 9:00 AM Sat., throughout museum; see p. 2 for details*

21 John Cody's Moths exhibition final day

26 Hays Arts Council's Fall Gallery Walk; *general public; includes Who Speaks for the Land, 6:00 PM - 7:00 PM*

28 Who Speaks for the Land exhibition final day

30 AugustFest special admission rates; *FHSU students, faculty, and staff with valid Tiger card; 5:00 PM - 7:00 PM; free admission; all others regular admission*

September

23 New Docent Training registration deadline; contact Cami Liggett at (785) 628-5502 or cliggett@fhsu.edu or Mark Kellerman at (785) 628-5298 or mkellerm@fhsu.edu

13 Docent Training ten-part series begins; *preregistered participants; 1:30 PM - 3:30 PM, Engel Education Center; contact Cami Liggett at (785) 628-5502 or at cliggett@fhsu.edu*

16 Discover Kansas: Exploring our Local Cemeteries, by Dr. Paul Phillips; *general public; 7:00 PM - 8:30 PM, Engel Education Center; museum members free, public \$1*

23 Floral Diagrams of Charles Eastman exhibition opens; continues through November 13

28 Sternberg Museum partners with host Rolling Hills Zoo to present the Safari Expo Career Fair; *preregistered grade 8 - 12 school classes; 9:00 AM - 1:00 PM; for further information contact Linda Talbot at Smoky Hill Education Service Center (785) 825-9185*

October

14 Sternberg Museum partners with host Rolling Hills Zoo to present Safari EdVenture Day; *preregistered grade K - 7 school classes; 10:00 AM - 1:30 PM; for further information contact Linda Talbot at Smoky Hill Education Service Center (785) 825-9185*

20 Sternberg Eco-Meet competition; *preregistered teams ONLY, grades 6 - 12; 8:30 AM - 3:00 PM throughout the museum; inquiries contact Cami Liggett, (785) 628-5502 or cliggett@fhsu.edu*

Boning up on the Pterosaurs:



The bones of flying reptiles, like the bones of birds, tend to be small and lightweight, lending themselves to compact storage in shallow trays.



Any visitor to the Sternberg Museum, passing the admission desk and walking up the stairs into the galleries, easily perceives that only a short distance separates the fossilized fish-within-a-fish in its exhibit case from the corresponding model in the undersea diorama.

The conceptual distance is far greater. How does one traverse that distance?

How does a paleontologist move from the bare fossilized bones of an ancient, extinct creature to a fleshed-out lifelike conceptualization such as the model of a huge blueish fish awash in the dim, water-filtered light of the Cretaceous sea?

This path from the actual fossil, sticking out from the side of a chalk bluff in the heat and wind of a Kansas summer, backward to the equally-real creature swimming in the tropical saltwater of an ancient Kansas sea is the sort of path that Chris Bennett knows well.

Bennett, Associate Curator of Vertebrate Paleontology at the Sternberg Museum of Natural History and Assistant Professor of Biological Sciences for Fort Hays State University, walks this path frequently.

Rather than fish, however, Bennett pursues the flying reptiles that filled the

Jurassic and Cretaceous skies. His research on pterosaurs has appeared regularly in refereed publications for the past seventeen years.

Pteranodon sternbergi



collected in 1952 by George Fryer Sternberg

discovered in Upper Cretaceous Niobrara Chalk of Kansas

wingspread up to 26'

crest: unusual upright orientation with overall broad shape

number of teeth: none; toothless

Bennett moves comfortably between the empirical evidence, such as fossilized bones which can be observed with the senses, and conclusions about non-preserved characteristics like soft body structure and even intangible attributes such as movement. Meticulous, detailed observation paves his path between the empirical and the inferred.

Last year, Bennett came to western Kansas from Connecticut to teach human anatomy and physiology at FHSU. But he's not the first to visit western Kansas with an interest in pterosaurs.

In 1870, when the field of North American vertebrate paleontology was new, O. C. Marsh also set out from Connecticut and visited western Kansas, on one of the first paleontologic expeditions to explore the

western United States. He discovered a finger-bone of a pterodactyl (a type of pterosaur), likely the first such bone knowingly discovered in western Kansas. At the time, the only pterodactyls known were European species with two-foot wingspans — this bone was an order of magnitude larger than those!

In the 135 years between Marsh's and Bennett's travels from Connecticut to western Kansas, vertebrate paleontologists have discovered that pterosaurs were a highly diverse group; that they were widespread (having been found on all continents but Antarctica); and that they include the largest flying vertebrates ever known: genus *Quetzalcoatlus*, of North America, with a wingspan up to 39 feet.

Bennett is primarily interested in the origination and evolution of vertebrate groups that became secondarily adapted to environments radically different from their initial environments. Pterosaurs, which derived from an unknown terrestrial reptile and came to dominate the skies for 160 million years, are an ideal subject for Bennett's research.

To put this 160 million years of aerial dominance in perspective, one might recall



Bennett points out a subtle protrusion on a bone — the sort of thing he is accustomed to noticing as an anatomist. These observations help him reconstruct the physical body and even the movements of the flying reptile that the bone came from.

Paleontology meets anatomy

that dinosaurs have been extinct for only 65 million years.

How can questions about pterosaur flight movements be answered, when the whole group is extinct, with no known descendants?

“I look for the osteological correlates of soft structures,” is Bennett’s response. That is, he uses the surface shapes and textures of bones to discern information

“I look for the osteological correlates of soft structures,” is Bennett’s response.

about muscles, and how the bones and muscles worked together in motion.

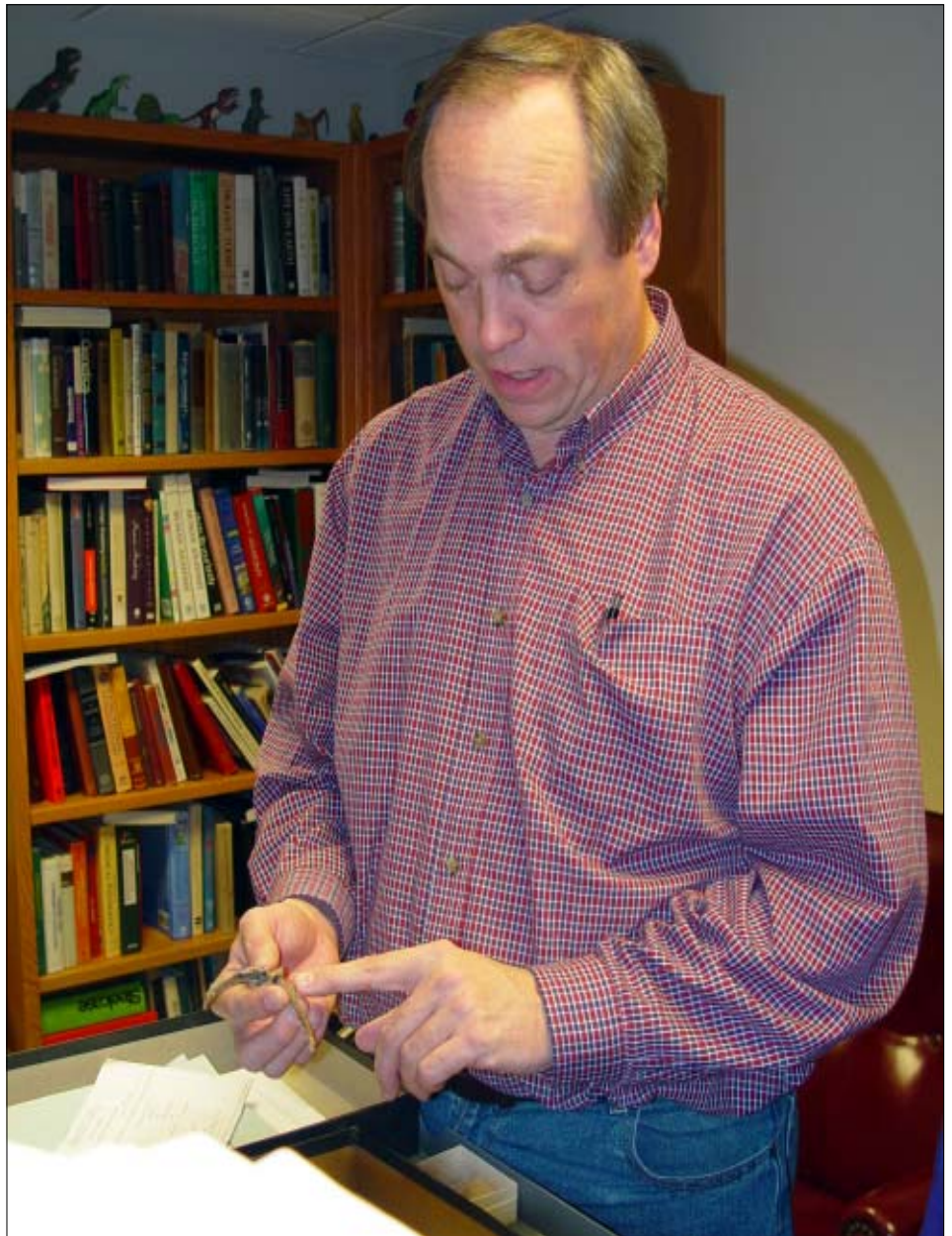
“Chris has considerable experience with anatomy,” commented Greg Liggett, Director of the Northern California Natural History Museum and Adjunct Curator of Vertebrate Paleontology at the Sternberg Museum. “He understood nuances that nobody else had noticed in the shape of the pectoral girdle where the muscles attach.

“Chris recognized that, with regard to the musculature, the pterosaurian pectoral girdle is significantly different from the pectoral girdle of birds,” Liggett added. “People had assumed they were similar because both were flying creatures.”

Bennett has been delving into the details of anatomy since he began teaching it well over a decade ago. It’s a fairly unique emphasis to bring to vertebrate paleontology today.

“A hundred years ago, it was more common for vertebrate paleontologists to have extensive experience in anatomy,” said Liggett, “because many of them trained as medical doctors and then became ‘gentleman scientists’ later on in their lives.

“Because of his teaching experience, Chris is far more accomplished in anatomy than many of today’s paleontologists.”



Dinosaur models peer down from atop a bookcase as Bennett discusses characteristics that distinguish various species of flying reptiles.

How diverse were the pterosaurs?

diets included insects, or crabs and shellfish, or fish, or organisms filtered from water

wingspans ranged from 6” to 35’

habitats probably ranged from forest, to ocean coast, to desert

number of teeth ranged from none to 1,100

bodies of some species featured crests, others featured tails, and others sported no such adornments

pterosaur fossils have been found on all continents except Antarctica

Current & Upcoming Changing Exhibitions

Journey to South Africa: An Exhibit Experience; ongoing

Video, artifacts, and photographs recap the Sternberg Museum's exciting 2003 eco-tour to South Africa.

Museum Memories: A Centennial Exhibition; ongoing

Artifacts and specimens formerly displayed in the Sternberg Memorial Museum on the FHSU campus are again presented to the public.

John Cody's Moths; continuing through Aug. 21, 2005

Exquisite watercolors by "The Audubon of Moths" and interactive exhibits capture the beauty and biology of Cody's life-long passion.

Who Speaks for the Land? June 25 - Aug. 28, 2005

Fine art photographs by Robert Lindholm are paired with 1854 quotations attributed to American Indian leader Chief Seattle that presaged today's ecological awareness.

Floral Diagrams of Charles Eastman; Sept. 3 - Nov. 13, 2005

Art and science merge in floral diagrams—graphic representations of flower anatomy.

Beetles, Bees, Flies, & Fleas; Nov. 19, 2005 - Jan. 15, 2006

This mixed media exhibition celebrates the world of insects as seen through the eyes of children.

Museum Hours

Closed Mondays

Tues. - Sat.: 9:00 AM - 7:00 PM

Sun.: 1:00 PM - 7:00 PM

Discovery Room closes at 6:00 PM each night

Admission Prices

free for all museum members; otherwise:

\$6 adults (ages 13 - 59)

\$4 seniors (age 60+)

\$4 youth (ages 4 - 12)

\$3 FHSU students with valid ID card

free for children (age 3 and younger)



Two monarch butterflies perch contentedly on white gravel, enjoying the fruit juice in the bottom of their feeding stations, while Thea Haugen, Education Assistant, introduces a third monarch to its feeding station. Haugen uses jar lids as feeding trays to hold a small quantity of fruit juice, and places gravel in them so the butterflies have a clean, dry place to alight. They perch contentedly on the rocks, unfurl their proboscises (sucking mouthparts), and begin sipping their juice meal. Children's summer classes that involve caterpillars or butterflies are among the museum's most consistently popular offerings—among children and museum staff alike.

Visit our Discovery Table at the Ellis County Fair

Community events help take discovery to public

Can a county fair be a place for doing discovery learning?

Sure it can—especially when the Sternberg Museum has its annual Discovery Table there!

At the Ellis County Fair, from Tuesday, July 19 to Saturday, July 23, our annual Discovery Table will be available to the public in the air-conditioned Gold Building from 5:30 to 10:00 each evening.

Each night, the Discovery Table features different hands-on nature specimens on a different theme, so it's worth coming out more than once during the fair.

There is no fee to enter the fairgrounds or the Gold Building, or to visit the Discovery Table.

The museum's annual Discovery Table at the county fair is one of several public outreach events that the Education Division is involved in each year, establishing a presence at events held away from the museum grounds.

Similar events include the Hays Daily News Home and Garden Show and the Family Fun Fest, both spring events that have customarily been held on The Mall in Hays, and Quivira Wildlife Refuge's annual celebration of National Wildlife Refuge week, on a Saturday in October.

The Education Division also participates with booths and tables at a variety of education events, such as Safari Expo and Safari Adventure Day at Rolling Hills Zoo.

Information about pterosaurs as diverse as they were

If the research pursued by Chris Bennett, described on the previous pages, has piqued your interest about pterosaurs,

try the following links as a source of additional information. All links were active as of press time.

for an introduction to the pterosauria:

<http://www.ucmp.berkeley.edu/diapsids/pterosauria.html>

for a National Geographic article and some photos take in western Kansas:

<http://www.nationalgeographic.com/ngm/0105/feature5/zoom4.html>

for additional information about Chris Bennett, his research, and FHSU:

<http://www.fhsu.edu/biology/cbennett/>

Volunteer Venues

Our volunteers' opportunities for involvement, social activities, and lifelong learning!

July

29 Boys' Sleepover (details on p. 3 and 2); many diverse roles available; contact Cami Liggett at (785) 628-5502 or cliggett@fhsu.edu

13, 20, 27 New Docent Training; for preregistered individuals only and contingent upon sufficient enrollment; 1:30 PM - 3:30 PM, Engel Education Center

August

12 Girls' Sleepover (details on p. 3 and 2); many diverse roles available; contact Cami Liggett at (785) 628-5502 or cliggett@fhsu.edu

October

4, 11, 18, 25 New Docent Training continues

September

6 New Docent Training registration deadline; if you are interested in this training (20 hours total) contact Cami Liggett at (785) 628-5502 or cliggett@fhsu.edu, or Mark Kellerman at (785) 628-5298 or mkellerm@fhsu.edu

20 Sternberg Eco-Meet; for this event we need a variety of types of assistance: with mailings and contacts in August and September to potential participants and bookkeeping; preparing and setting up prior to the competition; scoring and judging on competition day, as well as hosting roles on competition day; contact Cami Liggett at (785) 628-5502 or cliggett@fhsu.edu

"John Cody's Moths" available at the Sternberg Store

Exhibition Catalog & Souvenir Booklet \$ 1.00
Full-color illustrated catalog about this exhibition

"The Audubon of Moths" Posters \$25.00
24" x 36" full color printed on heavy poster stock

Special Edition individual Note Card \$ 1.50
Full-color card and envelope, choice of 3 images

"Wings of Paradise" by John Cody \$70.00
Full-color "coffee table book," 72 illustrations

Collectors' Signed Note Cards \$10.00
Signed special edition note card, biography, folio

Signed and Numbered Prints (Prices vary)
Please contact the store for further details

Special Edition Giclée Print **by special order \$1000.00**
museum proceeds support a traveling educational exhibition of Cody's works
Exceptionally high-quality full-size print of most any of Cody's works; please contact the store for further details

STERNBERG MUSEUM ASSOCIATES

Enclosed is my check payable to *Sternberg Museum of Natural History* -OR- please charge to my:

VISA MASTERCARD DISCOVER

Acct. # _____ Exp. Date _____

Signature _____



Membership Categories

- Student \$20
- Senior \$20
- Senior Couple \$35
- Individual \$30
- Family \$55
- Sponsor \$100-\$249
- Curator's Club \$250-\$499
- Director's Club \$500-\$999
- Lifetime Member \$1000

Please send information about including the museum in my estate plans.

Name _____ Address _____

City/State/ZIP _____ Home Phone _____ Daytime Phone _____

Mail to: Sternberg Museum of Natural History, 3000 Sternberg Drive, Hays, KS 67601-2006
Charge by phone (toll-free call): (877) 332-1165

No. 32



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I have accomplished the
object which I set
before myself as a boy,
and have done my
humble part toward
building up the great
science of paleontology.
—Charles H. Sternberg
The Life of a Fossil Hunter

