KAS BULLETIN

NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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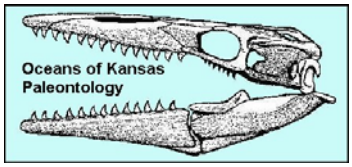
142nd ANNUAL MEETING OF THE KANSAS ACADEMY OF SCIENCE

April 9 and 10, 2010
(FRIDAY AND SATURDAY)
Fort Hays State University
Memorial Union, Albertson Hall, and Tomanek Hall
Hays, Kansas



MEETING ANNOUNCEMENT

The 142nd Annual Meeting of the Kansas Academy of Science is scheduled for April 9th and 10th, 2010, at Fort Hays State University.

Events will include the following:

- Friday tour of the ***Sternberg Museum*** (9:00 am-6:00 pm)
- *Free* Friday tour of the ***Kansas Wetlands Education Center*** (9:00 am - 6:00pm)
- Friday evening ***banquet***
- Saturday ***luncheon***

Currently, the registration form, and abstract submission guidelines can be found on the KAS website. Additional detailed information, including the schedule of events and keynote speaker information, will be added regularly to the website.

Participants presenting papers must register by mail in advance. Abstracts are to be submitted online. The deadline for submitting abstracts is **March 19, 2010**. **For participants not presenting papers, t**he deadline for on-time registration is **March 26, 2010**. This year all registrations are to be submitted by mail.

KAS PARTICIPANTS ARE STRONGLY ENCOURAGED TO REGISTER IN ADVANCE

Late registration begins March 27, 2010. Only late registration fees can be paid on the days of the conference—April 9 and 10—meals may not be purchased after April 1.

WE LOOK FORWARD TO SEEING YOU IN HAYS

Elmer Finck, Past President and Meeting Organizer (efinck@fhsu.edu)

This year's meeting includes:

The 11th Annual Kansas Academy of Science Paleontology Symposium

featuring Paleontology in the Midwest

Paleontology symposium abstracts submitted thus far appear at:

http://www.oceansofkansas.com/KAS2009.html

ABSTRACT SUBMISSION

Abstracts may be submitted by e-mail to William.Miller@BakerU.edu. You can download the submission form at ***www.kansasacademyscience.org/meeting2010/KAS_Abstract_Form2010.doc***.

The abstract should be no more than 250 words (excluding title, authors, departments, and affiliation) and be single-spaced. Indicate the presenter with an asterisk (*). Do not abbreviate department and institution names. Do not give city, state, or zip code. Punctuate as shown in the example below. The title in ALL CAPITALS, with no abbreviations, should begin two spaces following the institution name.

If the presenter is a student and is competing for an award, please include a number corresponding to the competition level after the student's name in the abstract:
(1) = B.S., (2) = M.S., (3) = Ph.D.

Example of an abstract:
*Cook, N.H., E. Blackwell, A.D. Gasking and J.T. Clay, Department of Natural Sciences and Mathematics, Lincoln University. IN VITRO EFFECTS OF METHOXYETHYL CARBAMATE ON CHINESE HAMSTER FIBROBLASTS. Our previous studies have revealed the mutagenic potential of methoxyethyl carbamate (MEC)...

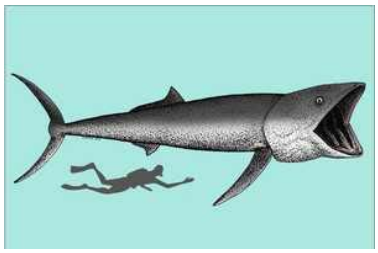
To submit an abstract, please download and complete the submission form. Send the completed form as an e-mail attachment to William.Miller@BakerU.edu with "KAS Abstract Submission" in the e-mail subject line.

Questions can be e-mailed to William.Miller@BakerU.edu .

ANCIENT FISH NAMED FOR KANSANS

by Roy Wenzl and Beccy Tanner, Excerpted from The Wichita Eagle, February 19, 2010

Paleontologists are announcing the discovery of a new genus of ancient giant fish, uncovered in the chalk deposits of Kansas, Britain and elsewhere. And with that discovery comes the story of the relentless Kansas family that solved a fish science mystery. The scientists named the new genus after the Bonner family of Leoti, who found the breakthrough specimen. The family for decades has hunted fossils in the bone-rich Niobrara chalk.



Bonnerichthys were 20 to 25 feet long

Bonnerichthys the scientists are calling it: 20 to 25 feet long, eyes 6 inches wide, a mouth that could have swallowed the eight Bonner children in one or two gulps.

The giant fish ate microscopic plankton, and that's a big deal to fish historians; they didn't know fish like that lived in the dinosaur age. The Bonners have changed fish history. They did not know this on the day in 1971 that they hauled a giant fish head out of the chalk canyons along Twin Butte Creek.

Chuck, a 21-year-old art major at Fort Hays State University, was the one who found the fish; he climbed to the top of a butte the Bonners called "The Big Place," a butte 40 feet tall from summit to valley floor. In one of the chalk spires, Chuck saw something big and brown sticking out. "Dark fossil bone," he said. "I did a little digging. I assumed it was a fin." For four days, Marion Bonner dug out jumbled bones, applying plaster to hold them in place for study. Their discoveries lay now in museums in Kansas, Chicago, Los Angeles and elsewhere.

See another image of Bonnerichthys on the KAS Bulletin's front page.

A LOST EUROPEAN CULTURE, PULLED FROM OBSCURITY

by John Noble Wilford, Excerpted from The New York Times, December 1, 2009

Before the glory that was Greece and Rome, even before the first cities of Mesopotamia or temples along the Nile, there lived in the Lower Danube Valley and the Balkan foothills people who were ahead of their time in art, technology and long-distance trade.

For 1,500 years, starting earlier than 500 B.C., they farmed and built sizable towns, a few with as many as 2,000 dwellings. They mastered large-scale copper smelting, the new technology of the age. Their graves held an impressive array of exquisite headdresses and necklaces and, in one cemetery, the earliest major assemblage of gold artifacts to be found anywhere in the world.

VARNA CULTURE
Bulgaria, c. 4800-4200 B.C.
Grave sites containing the earliest major collection of gold ornaments found anywhere in the world.

The striking designs of their pottery speak of the refinement of the culture's visual language. Until recent discoveries, the most intriguing artifacts were the ubiquitous terracotta "goddess" figurines, originally interpreted as evidence of the spiritual and political power of women in society.

New research, archaeologists and historians say, has broadened understanding of this long overlooked culture, which seemed to have approached the threshold of "civilization" status. Writing had yet to be invented, and so no one knows what the people called themselves. To some scholars, the people and the region are simply Old Europe.

At its peak, around 4500 B.C., Old Europe was among the most sophisticated and technologically advanced places in the world and was developing many of the political, technological and ideological signs of civilization. Historians suggest that the arrival in southeastern Europe of people from the steppes may have contributed to the collapse of the Old Europe culture by 3500 B.C.

COPPER AXE
Cucuteni, Bogdăneşti, 3700-3500 BC
Moldova National Museum Complex

The story now emerging is of pioneer farmers after about 6200 B.C. moving north into Old Europe from Greece and Macedonia, bringing wheat and barley seeds and domesticated cattle and sheep. They established colonies along the Black Sea and in the river plains and hills, and these evolved into related but somewhat distinct cultures, archaeologists have learned. The settlements maintained close contact through networks of trade in copper and gold and also shared patterns of ceramics.

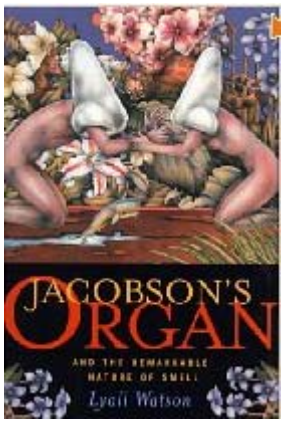
SAVING TINY TOADS WITHOUT A HOME

Read the full article at http://www.NYtimes.com/2010/02/02/science/earth/02toads.html

This is a story about a waterfall, the World Bank and 4,000 homeless toads. Maybe the story will have a happy ending, and the bright-golden spray toads, each so small it could easily sit on a dime, will return to the African gorge where they once lived, in the spray of a waterfall on the Kihansi River in Tanzania. The river is dammed now, courtesy of the bank. The waterfall is 10 percent of what it was. And the toads are now extinct in the wild. But 4,000 of them live in the Bronx and Toledo, Ohio, where scientists at the Wildlife Conservation Society and the Toledo Zoo are keeping them alive in hopes, somehow, of returning them to the wild. This month, the Bronx Zoo will formally open a small exhibit displaying the toads in its Reptile House. Meanwhile, though, the toads embody the larger conflicts between conservation and economic development and the complexity of trying to preserve and restore endangered species to the wild. Their story also raises questions about how much effort should go to save any one species. These issues are particularly pressing for frogs, toads and other amphibians, whose populations are plunging worldwide in the face of factors like habitat loss, climate change and disease. Jennifer B. Pramuk, the curator of herpetology at the Bronx Zoo. said at least 120 species vanished in recent years.

Jacobson's Organ and the Remarkable Nature of Smell by Lyall Watson

Book Review by Hank Guarisco



Readers who immediately recognize the term, "Jacobson's Organ," undoubtedly have some knowledge of snakes because it is widely known as the sense organ located in the roof of the mouth that detects odors picked up by the snake's forked tongue. However, I venture to guess only a small minority of readers are aware that mammals, including ourselves, are also equipped with *functional* Jacobson's Organs! That's right folks.

The author of this delightful, well written, engaging book has synthesized a wealth of interesting information on the nature of this sense organ across the animal kingdom, emphasizing how this newly discovered "sixth sense" functions in people. "The Organ of Jacobson seems to feed the primitive brain. It is not our olfactory link to consciousness, but rather a chemical clearing house for subliminal impressions, for all the things that lead to what science writer Karen Wright calls 'bad vibes, warm fuzzies, instant dislikes and irresistible attractions.'" "They respond most often to a range of substances which have large molecules, but often no detectable odor. And they communicate not with the olfactory bulbs and the cortex, but with the accessory bulbs and that part of the brain that coordinates mating and other basic emotions."

After noting that it was Linnaeus who first classified odors into seven basic types (fragrant, goaty, ambrosial, foul, nauseating, aromatic, and garlicky), the author traces the evolution of olfaction and Jacobson's Organ through fishes, birds and mammals. Laboratory experiments designed to explore the ability of plains garter snakes to follow a scented maze revealed that Jacobson's Organ was both necessary and sufficient to perform the task. Mammals rely on scent to distinguish between their own young and those of other parents. For example, mule deer have glands on the inside of their hind legs which secrete odors into a specialized tuft of hairs, "each equipped with ridged scales and spaces designed to hold the aroma. Fawns recognize their mothers by sniffing at the knees of several females before making their choice." The author concludes: "Mammals have the best developed Organs of Jacobson in the world, and exploit these, very largely, for their social potential, for acquiring information about other members of their species that cannot be gathered in any other way."

Of course, animals live in a world filled with plants, so it is not surprising that chemical communication exists between both kingdoms. Clover produces flavenoids which are biochemically almost identical to estradiol, a primary mammalian estrogen which coordinates mating and reproduction in a wide variety of animals, including sheep. Apparently, the plant-herbivore relationship between sheep and clover has led to clover "defending" itself by producing a key hormone which acts as a contraceptive. It reduces grazing pressure by reducing the number of grazers. Another interesting example is the use of pigs to find truffles, a highly valued fungus. "...the musky smell of a ripe truffle is caused by steroids: not just any steroids, but a combination identical to the one that boars produce and store in their salivary glands."

After delving into many aspects of human odors and their effects upon hormonal cycles, the author concludes that, "Odors are indeed guardians and gatekeepers of the past." Distant memories, complete with emotions, can be evoked by smelling an odor that was present at the time.

I highly recommend this interesting small, hardback book: Jacobson's Organ and the Remarkable Nature of Smell by Lyall Watson, the first American edition published in 2000 by W.W. Norton & Company, Inc, NY. ISBN 0-393-04908-6

WHEN BUILT-IN ANTIFREEZE BEATS A WINTER COAT

By Sean B. Carroll, Excerpted from The New York Times, January 19, 2010

As the mercury plunges to its annual lows, those of us at higher latitudes retreat to cozy shelters. We might sympathize with the birds and the squirrels that endure the subfreezing cold outside and fill some feeders, but we don't give any thought to smaller, less appealing creatures — the insects and spiders, for instance, that inhabited the backyard or woods in the summer.

They will re-emerge in the spring, so somehow they must make it through the bitter cold. How do these animals survive the deep freeze without the benefit of fur or feathers?

The threat to life at low temperatures is not really cold, but ice. With cells and bodies composed mostly of water, ice is potentially lethal because its formation disrupts the balance between the fluids outside and inside of cells, which leads to their shrinkage and irreversible damage to tissues.

Insects have therefore evolved all sorts of ways to avoid freezing. One strategy is to escape winter altogether. Butterflies like the monarch migrate south. A great solution, but this is a relatively rare capability. Most insects remain in their local habitat and must find some other way to avoid freezing. They evade the ice by crawling into holes or burrows below the snow cover and frost line, or, as some insect larvae do, by overwintering on the bottoms of lakes and ponds that do not completely freeze.

But many insects, and other animals, defend themselves against direct exposure to subfreezing temperatures through biochemical ingenuity, by producing antifreeze. The first animal antifreezes were identified several decades ago in the blood plasma of Antarctic fish by Arthur DeVries, now at the University of Illinois, and his colleagues. The ocean around Antarctica is very cold, about 29 degrees Fahrenheit. It is salty enough to stay liquid several degrees below the freezing temperature of fresh water. The abundant ice particles floating in these waters are a hazard to fish because, if ingested, they can initiate ice formation in the gut and then — bang, you have frozen fish sticks. Unless something prevents the ice crystals from growing.

That is what the fish antifreeze proteins do. The tissues and bloodstream of about 120 species of fish belonging to the Notothenioidei family are full of antifreeze. These proteins have an unusual repeating structure that allows them to bind to ice crystals and to lower the minimum temperature at which the crystals can grow to about 28 degrees. That is just a bit below the minimum temperature of the Southern Ocean and about two full degrees lower than the freezing point of fish plasma that does not have antifreeze. This small margin of protection has had profound consequences. Antifreeze-bearing fish now dominate Antarctic waters.
The ability to survive and thrive in frigid water is impressive, but insects must survive much colder temperatures on land.

Some, like the snow flea, are active even in winter and can be found hopping about on snow banks when the temperature is as low as 20 degrees. These bugs are not really fleas, but springtails, a primitive wingless insect that can leap long distances using its tail. Laurie Graham and Peter Davies at Queen's University in Kingston, Ontario, isolated antifreeze proteins from snow fleas and discovered that they also had a simple repeating structure that bound to ice and prevented crystal growth.

The snow flea antifreeze proteins have an entirely different composition from those of antifreezes that have been isolated from other insects, like the fire colored beetle, which has antifreeze proteins that are in turn different from those of the spruce budworm caterpillar. And all of these insect antifreezes are distinct from the kind that keeps Antarctic fish alive. Each animal's antifreeze is a separate evolutionary invention.
But insect innovation goes beyond antifreeze. Biologists have discovered another strategy for coping with extreme cold: some bugs just tolerate freezing.

In the most northern climates, like the interior of Alaska, midwinter temperatures fall as low as minus 60 degrees Fahrenheit, and snow cover and subzero temperatures can last until May. At these extreme temperatures, most insects are bugsicles. The Alaskan Upis beetle, for example, freezes at around minus 19 degrees. But, remarkably, it can survive exposure to temperatures as low as about minus 100 degrees.
To tolerate freezing, it is crucial that insects minimize the damage that freezing (and thawing) would normally cause.

Insects have evolved a variety of cryoprotective substances. As winter approaches, many freeze-tolerant insects produce high concentrations of glycerol and other kinds of alcohol molecules. These substances don't prevent freezing, but they slow ice formation and allow the fluids surrounding cells to freeze in a more controlled manner while the contents of the cells remain unfrozen.

For maximum protection, some Arctic insects use a combination of such cryoprotectants and antifreezes to control ice formation, to protect cells and to prevent refreezing as they thaw. Indeed, a new kind of antifreeze was recently discovered in the Upis beetle by a team of researchers from the University of Notre Dame and the University of Alaska-Fairbanks. Unlike the protein antifreezes of other beetles, snow fleas and moths, the Upis antifreeze is a complex sugar called xylomannan that is as effective at suppressing ice growth as the most active insect protein antifreezes.

The necessity of avoiding freezing has truly been the mother of a great number of evolutionary inventions. This new finding raises the likelihood that there are more chemical tricks to discover about how insects cope with extreme cold.

This is not merely a matter of esoteric Arctic entomology.
A long-standing challenge in human organ preservation has been precisely the problem that these insects have solved — how tissues can be frozen for a long time and then thawed out successfully. Research teams are now exploring how to apply insights from the animal world to the operating room.

KU DISCOVERS FIRST VENOMOUS RAPTOR

Taken from www.zeenews.com/news589927.html

Sinornithosaurus c*ourtesy of Robert DePalma/KU*

Researchers have stumbled on the remains of the first ever venomous, birdlike raptor that flourished 128 million years ago in China. "This thing is a venomous bird for all intents and purposes," said study leader Larry Martin, Kansas University (KU) professor and curator at the Natural History Museum.

"This is an animal about the size of a turkey," said Martin. "It's a specialised predator of small dinosaurs and birds. It was almost certainly feathered. It's a very close relative of the four-winged glider called Microraptor." The venom most likely sent the victim into rapid shock, shrinking the odds of retaliation, escape or piracy from other predators while the raptor manipulated its prey.

This dromaeosaur or raptor, Sinornithosaurus (Chinese-bird-lizard), is a close kin of Velociraptor. It lived in prehistoric forests of northeastern China that were filled with a diverse assemblage of animals including other primitive birds and dinosaurs. "You wouldn't have seen it coming," said KU study co-author David Bumham. "It would have swooped down behind you from a low-hanging tree branch and attacked from the back. It wanted to get its jaws around you." Once the teeth were embedded in your skin the venom could seep into the wound. The prey would rapidly go into shock, but it would still be living, and it might have seen itself being slowly devoured by this raptor," said Burnham, according to a university release.

"When we were looking at Sinornithosaurus, we realised that its teeth were unusual, and then we began to look at the whole structure of the teeth and jaw, and at that point, we realised it was similar to modern-day snakes," Martin said. Sinornithosaurus is represented by at least two species. These specimens have features consistent with a primitive venom-delivery system.

These findings were published in the early edition of the Proceedings of the National Academy of Sciences.

KANSAS ACADEMY OF SCIENCE
ATTN: Pieter Berendsen
Kansas Geological Survey,
University of Kansas,
Lawrence, KS 66047

KAS Bulletin In Your Inbox

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REGISTRATION FORM

Deadline for Abstract: March 19, 2010

Deadline for On-Time Registration: March 26, 2010
(NO MEALS MAY BE PURCHASED AFTER APRIL 1, 2010)

CONTACT INFORMATION (PLEASE REGISTER FOR ONE PERSON ONLY PER FORM)

LAST NAME	*FIRST NAME*	*INITIAL*

MAILING ADDRESS (INCLUDE SUITE OR APT NUMBER)	*AFFILIATION (WILL APPEAR ON NAME TAG)*

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☐ ***I CAN JUDGE STUDENT PAPERS SATURDAY MORNING*** *(PLEASE CHECK BOX IF AVAILABLE)*

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REGISTRATION (CHECK ONLY ONE BOX AND LIST TOTAL)

☐ ***KAS MEMBER $40***	☐ ***LATE REGISTRATION $60***
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MEALS (CHECK DESIRED MEALS AND LIST TOTAL)

☐ *FRIDAY EVENING BANQUET $14 (PLEASE MARK ONE OF THE CHOICES)*

- ☐ *NON-VEGETARIAN (BREAST OF CHICKEN WITH PASTA)*
- ☐ *VEGETARIAN*

☐ *SATURDAY LUNCH $14 - TWO TYPES OF PASTAS WITH CHICKEN AND MEATBALLS*

NO MEALS MAY BE PURCAASED AFTER APRIL 1, 2010

MEAL TOTAL $_____

SPECIAL EVENTS (CHECK BOX IF INTERESTED)

☐ *TOUR THE STERNBERG MUSEUM FRIDAY OPEN 0900 TO 1800 PAY AT THE GATE $8.00 ADULTS $6.00 STUDENTS*

☐ *TOUR THE KANSAS WETLANDS EDUCATION CENTER FRIDAY OPEN 0900 TO 1800 FREE*

METHOD OF PAYMENT (CHECK ONE BOX)

☐ CHECK ☐ PURCHASE ORDER **MAKE CHECKS PAYABLE TO DEPARTMENT OF BIOLOGICAL SCIENCES -KAS**

TOTAL SUBMITTED $_____

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