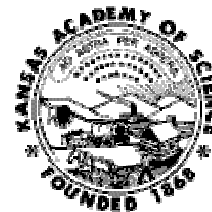


KAS BULLETIN



NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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144th Annual Meeting of the Kansas Academy of Science at Wichita State University

The 144th annual KAS meeting was held at Wichita State University, on March 30 and 31, 2012. Special thanks are due to LeLand Russell and MaryLiz Jameson who spearheaded the effort to produce a well organized, interesting meeting. Two field trips, one focusing on the geology of the Flint Hills, and the second on prairie restoration and the bird fauna of Ninnescah Reserve, were conducted on Friday afternoon. That evening we gathered at WSU for the annual banquet and enjoyed good food and the companionship of colleagues.

After dinner, the guest speaker, Andrew H. Knoll of Harvard University, who is the 2012 Watkins Visiting Professor in Geology at Wichita State University, gave an illuminating presentation entitled, “The Search for Life on Mars.” Mars has captured the fascination of people through the centuries. The first two maps of Mars, published in 1877 and 1878 by Nathaniel Green and Giovanni Schiaparelli, respectively, presented two rather different views of the red planet. The first map indicated dark and light areas on the surface, while the second one showed stark contrasts with the presence of what the author called “canali,” or channels. In 1908, Percival Lowell declared that these channels were actually aqueducts built by an advanced Martian civilization. This view spread through the general public and led to H.G. Wells’ classic book, “The War of the Worlds.” In 1907, an aged Alfred Russell Wallace, who was well known as Darwin’s “collaborator” in the theory of evolution by means of natural selection, opposed Lowell’s idea of life on Mars. However, the limited technology of the time did not provide either author with enough resolution to answer the question, “Is there life on Mars?”

The Mariner flights (1969) and the Viking expedition (1977) revealed the presence of branched channels and therefore the possibility that there had been flowing water on the surface of Mars. In 2005, images from a Mars rover showed the harsh Martian surface, with layered rocks similar to the Grand Canyon on Earth. The two solar-powered rovers, Spirit and Opportunity, have black and white as well as a high resolution color cameras, and several different types of spectrometers. Initially, the rovers would be considered successful if they lasted 90 Martian days and traveled a distance of 600 meters. They have lasted over 3,000 days and traversed over 10 kilometers! The rovers were placed in Gusev Crater, which was an old lake bed with an inflow channel. In addition to being an interesting site to explore, the location was chosen because it was flat (easy to land) and was close to the equator (needed for the solar panels to receive adequate sunlight).

The rovers discovered the presence of hematite (Fe_2O_3), which is a “beacon” for water, sedimentary sandstone with cross-bedding, and jarosite, a hydrated iron sulfate mineral. Jarosite precipitates out only in very acidic water with a pH = 2-4. Therefore, 3.5 to 4 billion years ago, the water on Mars was very acidic. Rio Tinto in Spain is a location on Earth with similar conditions. The water is very acidic, iron sulfate and jarosite are both present, and it supports a variety of bacterial species. However, the presence of amorphous silica and other unstable juvenile precipitates are still present on Mars, which indicates that water was no longer present after their formation.

Although this evidence does not prove that there is or was life on Mars, it does suggest that several billion years ago, aquatic conditions existed which are not incompatible with the presence of bacteria. Later this year, a rover named “Curiosity” will be headed to the red planet to hopefully make new discoveries, maybe even find molecules which could have been produced only by living organisms. We shall see.

Saturday we enjoyed oral and poster presentations presented by scientists and their students from across the state. The broad range of topics can be seen in the titles of the five concurrent sessions: paleontology symposium; biogeography, toxicology and human biology; plant ecology; cell biology and geography; and, mathematics, physics, and chemistry.

Joe Arruda, a retired professor from Pittsburg State University, is currently studying the biodiversity and distribution of terrestrial snails in Kansas. Currently, sixty-four species comprise the state snail fauna. Clear images of several of the more common species with interesting common names, such as the “crested snaggletooth,” the “white-lipped dagger,” and “liptoath,” showed the key characters and intricate beauty of this group of organisms.

Mike Everhart, former editor of the Transactions, has gleaned an amazing amount of information from an exceptionally preserved fossil of shark skin from the Greenhorn Formation in Republic County. Small, dermal denticles as well as two layers of underlying dermal fibers which are associated with fast-moving species such as the great white shark, were observed in this 95-million year old fossil.

Randy Miller of Baker University has developed an online reference resource for the fascinating, diminutive creatures known as “water bears,” or tardigrades. It will be released in approximately three months. This ambitious project gathers together all of the relevant literature, including species descriptions, images, and maps of all the species of water bears known in the world. This promises to be a ground-breaking resource for anyone interested in the group, as well as a template for other animal groups, such as spiders and snails.

Students and faculty of Emporia State University gave several poster and oral presentations on various aspects of the biology and distribution of the invasive zebra mussel in Kansas. It appears that low water impoundments actually increase the numbers of larval zebra mussels collected along river systems in southeastern Kansas.

After the oral presentations, we had a wonderful lunch in the student union, then returned to view the posters. They ranged from assessing the potential of wind energy development in Kansas, to examining the bee flora in central Nepal. Although the antibiotic resistance of bacteria in hospitals is well known, bacteria found in snapping turtles from the Flint Hills also showed resistance to antibiotics, indicating the somewhat ubiquitous nature of the problem.

The final keynote address was given by Dr. Andrew Knoll, who enlightened us concerning the presence of early life on Earth. The most ancient known animal fossils are approximately 600 million years old. Although significant amounts of oxygen were present on Earth 2.4 billion years ago, evidence of life based on isotopic signatures had been found in samples of rock that are a billion years older.

Student awards were presented and all adjourned the meeting.

Student Research Grant Applications are due February 12, 2013!

There are three levels of competition: Undergraduate, MS, and PhD.

For more information, please see the KAS webpage:

<http://www.KansasAcademyScience.org/research-grants.html>.

KAS Fall Field Trip Kansas Underground Salt Mine and Museum

Saturday, October 20th 1:00pm

Cost: \$19 per person

3504 East Ave. G at Airport Road, Hutchison, KS

<http://www.undergroundmuseum.org>

2012 Overland Park Arboretum Bioblitz

Join scientists, teachers, students and the public on September 29th, 2012! We will gather to participate in this one day biological inventory, attempting to identify and record the many species of living organisms at the Arboretum. BioBlitzes are conducted to learn more about an area's biodiversity, distribution and abundance. They are a blend of science, education, community and loads of fun.

Spend a day with experts identifying birds, insects, flowers, reptiles and even spiders. And there's lots more! All that is required is an interest in nature!

http://www.artsandrec-op.org/files/FOTA-Bio-Blitz-FINAL-flyer_20120704207.pdf

Scott State Park chosen as 1 of 51 Great American Beaches

USA Today Travel Magazine featured Scott State Park, north of Scott City; it opens like a surprise package amidst the vast plains and farmland of western Kansas. Hidden in a wooded canyon of craggy cliffs, the park's spring-fed lake has a pleasant swimming beach with a playground and concession stand offering food, fishing supplies, canoes and paddleboats. The 1,020-acre state park also has camping, hunting, nature trails and historic sites.

Beth Reiber, a freelance travel writer based in Lawrence, KS, recommended Scott State Park to USA Today Travel Magazine.

Scott State Park is rich in history and provides an ideal setting for a variety of outdoor and water activities. Hunting is allowed in the public hunting area.

The Steele home is the original settler dwelling and it has been preserved much as it was 100 years ago. The park also has the northern most pueblo in the U. S. - El Cuartelejo. It is the site of the El Cuartelejo Archeological District, a National Historic Landmark, which contains the remains of at least 25 archeological sites.



KAS Council meeting, June 29, 2012, at Lake Kahola, KS.
Hosted by Jim & Susie Aber

Scott State Park has a number of natural springs, deep wooded canyons, and craggy bluffs. The 1,020-acre park surrounds the 100-acre, spring-fed Scott State Fishing Lake.

The park has 55 utility campsites, including some with 50-amp service and water hookups. Three modern shower buildings, 100 primitive campsites and several vault toilets are also available. Visitors enjoy a swimming beach and playground, and a privately operated concessions building which stocks camping and fishing supplies. Canoe and paddleboat rentals are available at the concession facility seasonally. The park is also handicap accessible.

Nature trails accommodate hikers, horseback riders, and naturalists and provide excellent opportunities to observe wildlife in their natural habitats. Wild turkey, deer, bobcat and beaver are common in the area, along with cranes, finch's woodpeckers and a variety of Mother Nature's animals. A horse camp area provides amenities for equestrian visitors.

Scott State Park lies in a canyon formed by Ladder Creek, which feeds Lake Scott.

Lake Scott State Park was built by Civilian Conservation Corps in the 1930s and the story of the area dates at least as far back as the 1700. Some evidence indicates early people camped in the area in the 1300s. Thousands of ancient artifacts have been found in the area, the result of careful archeological investigations beginning in 1898.

The focal point of the park is the remains of a seven-room pueblo called El Cuartelejo. The pueblo is thought to have been built by Taos or Picuris Indians who were fleeing Spanish control in the southwest in the late 1600s and took refuge among the Plains Apaches already living in the region. They settled in the canyon, built pueblos and nourished crops with a system of irrigation ditches from a nearby spring. El Cuartelejo was the name given to a Plains Apache village in the High Plains where Taos Indians fled in 1664 to escape Spanish rule.

The remains of El Cuartelejo were first excavated in 1898 by paleontologists from the University of Kansas, who also found evidence of other pueblos in the vicinity. They learned of the site from Herbert Steele, an early homesteader who purchased the land in 1888, and was curious about a mound of dirt, stone and Indian artifacts on his

land. Only the foundation was left, but numerous artifacts were found at the site. Steele and his wife lived in a dugout until they built a home from sandstone found along the nearby bluffs.

A Spanish expedition led by Lieutenant Juan de Archuleta later returned the Taos to their pueblo on the Rio Grande. In 1696 another Pueblo group, the Picuris, fled from the Spanish and resettled El Cuartelejo. They were later rounded up and brought back by General Ulibarri, the sergeant major of the kingdom. During the years that followed came reports of Frenchmen attempting to trade with the Cuartelejo Apaches. The ill-fated Villazur expedition stopped at El Cuartelejo on its way north to investigate the extent of French influence. Near the forks of the Platte River, the Pawnees killed most of the party, reportedly under French direction.

By the 1730s raids by Comanche, Ute, and Pawnee had been killed or removed from the Cuartelejo Apache. The survivors moved south to join the Jicarilla Apache at Pecos.

The Lake Scott site was developed in 1971 as an interpretive exhibit by Kansas Historical Society archeologists. The outline of the ruins was restored and markers placed for park visitors to see. The site was designated a National Historic Landmark by the National Park Service in 1964.

The Steele's wanted to share the history of this land with the public so in 1922 they transferred ownership in the two acres surrounding the El Cuartelejo ruins to the Kansas Society of the Daughters of the American Revolution (DAR). In 1925, the DAR erected a monument at the site to commemorate its historical significance. The monument still stands near the ruins, which are on the National Register of Historic Places.

Once the ruins of the pueblo's foundation were unearthed in 1898, they began to degrade. In 1970, the Kansas Historical Society restored the foundation to its likely appearance when first discovered in 1898. Today, visitors can view the restored foundation and visit the Steele home, the DAR monument, and other sites and near in the park (including Battle Canyon, about one-mile south of the park entrance).

Scott Lake was recently closed for a little while because of the Blue-Green Algae but has since opened back up.

Odor Draws an Outsider to Help Moss

by Kate Yandell,
The New York Times, July 23, 2012

Flowering plants often get outside help in reproducing — pollination by bees, for example. But a new study suggests that they may not have been the first to recruit animals to fertilize them.

It turns out that mosses, which evolved hundreds of millions of years earlier, appear to emit smelly compounds to attract tiny arthropods that carry sperm from plant to plant.

Until recently, it was thought that moss sperm swam overland through thin films of water to reach female moss, rarely making it farther than about four inches.

A study in the current issue of the journal *Nature*, however, shows that springtails — blind arthropods that crawl and jump across the terrestrial landscape — improve fertilization rates in moss colonies and favor hanging out near female moss scents.



Mosses produce a scent to attract arthropods known as springtails.
Rocky Cookus/Portland State University

An earlier study had established that arthropods could carry sperm between mosses, but it was unclear how important they were and why they were attracted to fertile moss.

“I think it puts out a whole new hypothesis,” said the study’s lead author, Sarah Eppley, a biologist at Portland State University. If it turns out that using arthropods for fertilization is widespread among moss, it may indicate that plant-and-pollinator-like relationships evolved before flowering plants.

Dr. Eppley is struck by the fact that, distracted by the interactions between flowers and insects, scientists overlooked this parallel relationship between mosses and arthropods. “We as humans just walked over it for years,” she said.

Step Into My Parlor, Coaxes This Pitcher Plant

by Sindya N. Bhanoo,
New York Times, June 18, 2012

Pitcher plants are carnivores that rely on insects for nourishment. One species of the plant, found in Southeast Asia, uses raindrops to trap prey in its fluid-filled pitcher, a new study reports. Writing in the journal *PLoS One*, researchers describe how the species *Nepenthes gracilis* has a springboard-like mechanism built into its lid.

Insects seek shelter from rain on the underside of the plant’s lid. Then, when raindrops hit the top of the lid, the insects are flung into the pitcher, said Ulrike Bauer, a biologist at the University of Cambridge in England and the study’s first author.



Insects seeking shelter from the rain are instead catapulted down.
Ulrike Bauer

Dr. Bauer and her colleagues set up a pitcher plant in a laboratory, with a drip system hanging above that simulated raindrops. In a box nearby, the researchers kept a colony of ants that were naturally attracted to the plant’s nectar.

The underside of the pitcher plant’s lid is covered with specialized wax crystals, Dr. Bauer said. This surface seems to allow enough grip for the insects to walk on the surface to seek shelter and feed on nectar when the weather is calm. But it is also slippery enough that when it rains, insects are thrust from the lid into the clutches of the pitcher. This mechanism may let the pitcher plant capture a wider variety of insects than other types of pitcher plants.

“Flying insects with very delicate wings, like flies and bees and wasps, may seek shelter from the rain,” Dr. Bauer said.



KANSAS ACADEMY OF SCIENCE
ATTN: Sam Leung
Stoffer Science Hall Room 312C
1700 SW College Ave
Washburn University
Topeka, KS 66621-1117

MAIL TO:

The 145th KAS Annual Meeting will be held at Johnson
County Community College on April 5 - 6, 2013.
