KAS BULLETIN

NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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155th ANNUAL MEETING OF THE KANSAS ACADEMY OF SCIENCE

The 155th annual meeting of the Kansas Academy of Science will be held at McPherson College on April 14-15, 2023. Check the KAS website for updates.

KAS Student Grants Available

Fall undergraduate submission deadline: October 5, 2022

Supporting science education within the state, the Kansas Academy of Science is offering competitive grants up to $1,500 for Ph.D. and Masters grants and up to $1,000 for Undergraduate research grants. Funding is to be used by the student for expenses incurred in doing research such as purchases of supplies and equipment, travel to and from research sites, and the purchase and collection of data. Check the website for eligibility requirements and application, submission and notification procedures.

Submit Proposals to: Dr. Erin Morris
Baker University
Biology Department
PO Box 65
Baldwin City, KS 66006

KAS Annual Meeting at Sterling College a Great Success

by Hank Guarisco, editor

The 154th annual meeting of the Kansas Academy of Science was held in conjunction with the Kansas Entomological Society's 92nd annual meeting at Sterling College in Sterling, Kansas on April 1st and 2nd. Friday afternoon began with two field trips: a tour of the Kansas ethanol plant, and a tour of Hyatt Life Sciences and associated greenhouses.

Since I went on the second tour, I will focus on Hyatt Life Sciences. We were ushered into an enormous greenhouse containing 30,000 pots of *Arum palaestinum*, a medicinal plant from the Middle East that is a relative of our local Jack-in-the-pulpit. It is a strikingly beautiful plant with a deep purple, velvety spathe and hood. The company founder, Gene Zaid, produced a patented combination of this plant with curcumin and vanilla, which combats inflammation, boosts the immune system, and supports the respiratory system. The vice-president, Preston Moore, demonstrated the machinery involved in converting the plant into a powder, and producing the "dietary supplement" in capsule form. They have even produced a patented formula for optimal canine health!

After registering for the meeting, we greeted old friends and met new ones while waiting for the annual banquet. While we consumed a superb dinner, the keynote speaker, Sabrina Beckmann, currently at Oklahoma State University, gave a stirring presentation of her work with deep sea microbes and their role in the anaerobic oxidation of methane. She has uncovered new species and genera of Archaea that are

symbiotically associated with bacteria. There is an entire, virtually unknown world in the ocean depths that is responsible for much of the methane production and sequestration occurring throughout the globe.

The next morning began with a continental breakfast and coffee, followed by three concurrent oral presentations and a poster session which lasted until the luncheon banquet. Students received cash awards for the best presentations. During lunch, Dr. Jacob Goheen spoke about his extensive research with African wildlife on cattle ranches in Kenya. His presentation entitled, " A Game of Thorns: Megaherbivores and Mutualists on African Savanna," explained the complicated interactions of cattle, lions, zebras, and antelope. Lions preferentially prey upon all the antelope they encounter, but only attack zebra in proportion to their numbers. At night, the cattle are enclosed in either traditional bomas consisting of walls of thorn brush or heavy duty fencing. After a while, they are moved to another location on the ranch. The vacated boma produces a flush of rich grass that attracts herbivores, such as antelope and zebra. Instead of culling lions, which are valuable for ecotourism, he and his students discovered they could limit antelope predation by moving the boma far away from its most recent location. The lions would follow the cattle to the new site, while the antelope and zebras remained behind to feed on the new grass. Other animals encountered on the ranch included elephants and black rhinos.

After lunch, the student awards were presented and we said goodbye to colleagues and friends. I met Dr. Wai-Foong Hong, a biology professor at Sterling College who did a survey of spiders in buildings on campus. As expected, most of the spiders in sticky traps were brown recluses.

I thank Dr. Jonathan Conrad, chair of the host committee, for making this meeting a wonderful experience for all who attended.

Scientific Presentations at the KAS Annual Meeting

by Hank Guarisco, editor

Although the abstracts of the oral and poster presentations will be published in the Transactions of the KAS, I want to present highlights of some that I attended. There were three concurrent sessions, so it was possible to hear only one-third of the oral presentations. Field biology of the green toad, which occurs sporadically in the extreme western part of the state, and of the red-spotted toad found in the Red Hills was discussed by students from Fort Hays State University.

Richard Schrock of Emporia State University reported upon the rise of China in STEM education, and a stark warning that the United States is falling behind in this area. While China is enlarging their institutions of higher learning and building new universities, enrollment in science programs in the US is flat or even declining. Foreign students from countries that value science education, such as India and the Asian countries, make up a large percentage of these US programs, many of which would close without them. In his opinion, primary and secondary education is lacking because schools of education emphasize teaching methods at the expense of deep content-based learning. Additionally, our society appears to undervalue education, as evidenced by low teachers' salaries.

The last lecture before lunch was presented by Mary Liz Jameson of Wichita State University who regaled us with the ecological workings of dung beetle communities in pastures grazed by cattle and bison. Although we are most familiar with the dung rollers, ie. species which form round balls of dung and roll them across the plains to burrows in the ground, there is another group that makes several burrows directly below the dung pile. Some species are very specialized, and will only use dung of a particular type of animal, such as rabbits or deer. Dung beetles are the consummate carbon sequestration agents.

When I attend these annual meetings, I am always amazed at the wide variety of research being presented: from the latest extant and paleontological field research, to genetics and complex chemical interactions. In an age of specialization, this is can be viewed as a strength as well as a drawback. One unfortunate result of specialization is the fostering of silo thinking, ie. that which is confined to a particularly narrow discipline. We only have to look at the world around us to recognize that it is all interconnected in deep and often subtle ways that we are still uncovering. Therefore, the KAS annual meeting is a unique forum that reflects this reality, and helps scientist with different interests to share their knowledge.

Hackberry Heaven

by Hank Guarisco, editor

On June 9, I made a nostalgic trek to the Fitch Natural History Reservation north of Lawrence. Based on previous experience, I knew it was around the time of the emergence of hackberry butterflies, which have always been particularly abundant on the reservation. As I did my best to avoid the large ruts and potholes that had increased in size due to recent heavy rains, I began noticing small groups of butterflies rising from the ground as I neared my destination. The dirt and gravel parking lot across the road had turned a dark brown due to the solid clusters of hackberry butterflies that I tried to avoid crushing as I parked my red Toyota pickup. Most were greedily sucking up moisture from puddles, while several groups were tightly clustered upon poop recently deposited by birds and small mammals.

Entering the driveway to Reservation Headquarters where my former mentor, Henry Fitch had lived with his family since 1948, coolness and a silent peace descended upon me as I walked under the forest canopy. Clouds of butterflies rose at each step, filling the air with wonder. Sometimes I encountered a band dead butterflies on the driveway that had unfortunately been crushed under the tires of a passing vehicle.

As I wandered along trails through the woods I encountered a bird watcher from southern Texas who was photographing butterflies and birds. He also marveled at the spectacle and tried to calculate their numbers. The driveway is half a mile in length, and a minimum of 100 to 150 butterflies were encountered every three feet. Therefore, about 100,000 butterflies were present just along the driveway!

As we marveled at the sight, I remembered a very special encounter during such an emergence several decades ago when Henry Fitch and his wife, Virginia, still lived here. After driving through clouds upon clouds of butterflies along the driveway, I stood there near the house with Virginia as a butterfly land upon her hand. We both gazed at one another in amazement upon noticing that a small pseudoscorpion had grasped one of the butterfly's legs with its claw! Pseudoscorpions are known to hitch rides to new locations by attaching themselves to various flying insects. Although I was aware of this phenomenon, called phoresy, it was a truly wonderful experience to see it in person, and to share with Virginia Fitch.

Later that evening, I returned with a friend to experience this wonder of nature a second time. Although clouds of butterflies rose from the ground, their numbers had decreased by about 90%. May the hackberry butterflies continue to fill the air with their numbers for decades to come.

LARGEST MUSHROOM IN KANSAS

by Hank Guarisco, editor

What is the largest mushroom ever recorded in Kansas? I believe a specimen of the shelf mushroom, *Bondarzewia berkeleyi*, discovered by KAW Council elder, Dan Bentley, on his North Lawrence property may have earned the title. This rarely seen mushroom was at the base of a large, white oak tree (*Quercus alba*) during the summer of 2008. By the end of July, it had grown to a width of 36 inches (Guarisco and Kay 2008).

April Haight with Giant Mushroom, August 2008

Although it is not poisonous, and may be edible when very young, Dan described the taste as that of "dirty socks." Unfortunately, it is a parasitic mushroom that eventually kills the host tree by digesting the roots and tree base, leaving it vulnerable to toppling over in strong winds. It is found world-wide in association with a variety of angiosperm and conifer trees.

It has appeared on the same tree every summer, year after year, since 2007. After the Lawrence Journal World reported its presence in the Friday, August 1, 2008 edition, flocks of folks descended on the site to see the giant mushroom.

Now is the time to be on the lookout for this large, interesting mushroom.

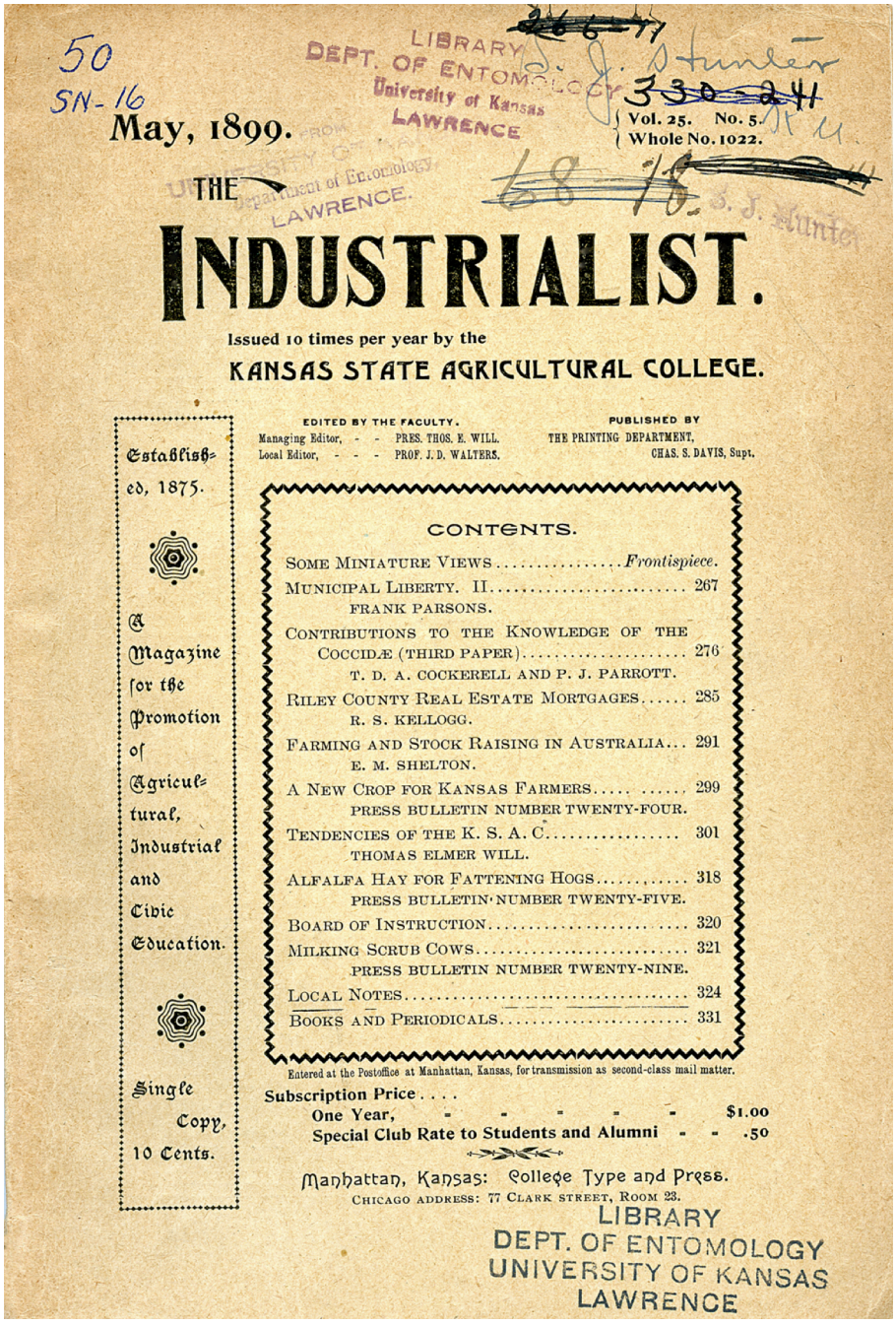
Literature Cited

Guarisco, H. and S. Kay. 2008. Reappearance of the large polypore mushroom, *Bondarzewia berkeleyi*, in northeastern Kansas. *Transactions of the Kansas Academy of Science* 111(3/4): 307-309.

Kansas State Agricultural College: Looking Back in Time

by Hank Guarisco, editor

As I was cleaning out my library, I came across an issue of "The Industrialist," dated May, 1899. As the cover indicates, this magazine was established in 1875 for the "promotion of agricultural, industrial and civic education." I first became aware of its existence years ago while researching the spiders of Kansas and found references to checklists of Kansas spiders in the 1904 and 1905 issues. Perusing the table of contents of the issue at hand, we readily see a wide array of topics, ranging from an entomological treatment of the Coccidae (scale insects), real estate values of all the land in Riley County – 617 sq. miles or 394,880 acres, a new crop for Kansas farmers (soybeans), a discussion on the limits of municipal rights, to the educational goals of the Kansas State Agricultural College. Talk about diversity!



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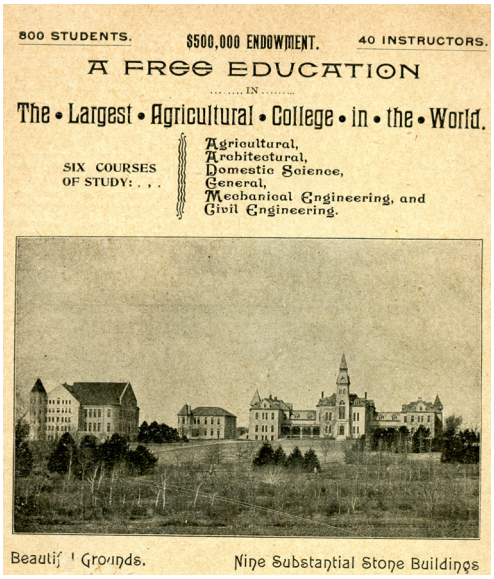
In the present age of specialization, an all-inclusive publication such as this may seem useless or antiquated, at best. If I want to become a biologist, then a specialist in mosquitoes, why should I study herpetology, spanish, western civilization, economics, poetry, or philosophy? Shouldn't I just enter the door of my particular ivory tower, then climb hundreds or thousands of steps to reach the pinnacle of my chosen profession? The downside? My world view would be very limited, hence I would be thinking in a silo, next to others who live exclusively within their tall silos.

The push toward specialization is not a new one. In the Industrialist issue mentioned above, then president of Kansas State Agricultural College, Thomas Elmer Will, responsed to pressure to limit courses to agriculture. He begins by quoting the act of July 2, 1862, which states that "the interest upon moneys derived from the sale of lands granted by congress to states and territories is to be inviolably appropriated 'to the endowment, support, and maintenance of a least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.'" He remarks that "A more catholic provision it would be difficult to conceive. Those who toil in the world of matter not less than those who labor in the realm of the mind, those who perform the nation's work in overalls and roundabouts, who callous their hands and begrime their faces, as well as those who dress in doeskins and corkscrew diagonals, silk hats and patent leathers, and plead law, preach sermons, administer drugs, or shuffle bank notes and commercial paper, are to be fitted for their work: and the nation is to furnish the means." From here, President Will details what the college has done over the years to make the Kansas farmer better able to compete in the agricultural marketplace, and outlines courses that have been provided.



Over the past 50 years, however, we have seen a reversal of this trend in some areas. The walls among the following disciplines have been breached: organic chemistry, biochemistry, genetics, molecular biology, virology, biomechanics etc. Great advances, such as CRISPR, are the result of cross-fertilization of several disciplines. Advances in elucidating the human genome has led to concomitant medical advances that target faulty genes. Hopefully, this trend will continue in the broader sense, and an appreciation for a "liberal arts" education will wax in coming years.

Rattlesnakes in Trees?

by Hank Guarisco, editor

As we traverse the Kansas countryside appreciating nature, we know to always have an eye on the ground and see where we are stepping. Aside from the usual dangers, such as a ditch, rock or poison ivy, some habitats are also the home of venomous snakes, including the copperhead and several species of rattlesnakes. However, a friend recently sent me an image she took outside of Austin, Texas of a rattlesnake in a tree.

Image of either a diamondback or prairie rattler by Lisa Nelick

To find out more about rattlesnakes in trees, I consulted Laurence Klauber's classic 1972 two-volume tome entitled, "Rattlesnakes their habits, life histories, and influence on mankind." He states that while they are generally ground-inhabiting, rattlers do occasionally climb trees, presumably in search of food. Furthermore, timber rattlers appear to have stronger tree-climbing proclivities than many other species of rattlesnakes.

One interesting account from March 29, 1894, involves E. McIlhenny of Avery Island, Louisiana, who encountered a timber rattler resting ten feet above ground in the crotch of a large water oak tree while he was hunting (Klauber 1972). He also happens to be famous for the formulation and marketing of Tabasco hot pepper sauce in 1868, which is still produced on Avery Island today.

During a telemetry study of timber rattlers in Ohio, they were observed off the ground in vegetation in 56 of 425 encounters (13.2%). A courting male and female were located 12 feet above ground in a large, dead conifer (Coupe 2001).

A very interesting long-term investigation of the foraging behavior and diet of timber rattlers in eastern Virginia revealed that most of these ambush predators waited at the base of trees with their heads pointed upward, resting on the tree trunk. Half of their diet consisted of eastern grey squirrels (Goetz et al. 2016). Of course, the diet of this species varies widely in different parts of its range, so the incidence of arboreal behavior would also vary considerably. In the Sand Hills of central Kansas, cottontail rabbits are the major food item of timber rattlers (pers. comm. Henry S. Fitch).

In a fragmented agricultural landscape in west-central Missouri, timber rattlers fed on voles and mice, less frequently on rats, rabbits and squirrels. Out of 627 observations, only one was located in a tree (Wittenberg 2012).

In southwestern Georgia, a female with fourteen recently born young was discovered under a log in mixed pine/hardwood forest. The young were fitted with radio transmitters to track their movements. Although they were found beneath or next to woody debris 62.4% of the time, eleven of them were seen in hardwood tree branches on 31.6% of encounters (Howze et al. 2012).

While investigating a timber rattler population in Leavenworth County, Kansas, Fitch et al. (2004) observed only one of seven snakes, a two-year old, in trees. However, it was seen in trees on many occasions.

Therefore, as we walk through the forests of eastern Kansas, it would be prudent to examine the trees as well as the ground in front of us!

Douglas County Timber Rattler © Hank Guarisco

Literature Cited

Coupe, B. 2001. Arboreal behavior in timber rattlesnakes. *Herpetological Review* 32(2): 83-85.

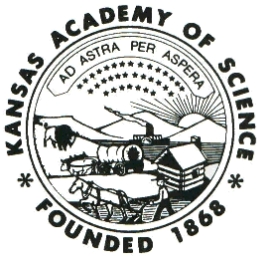
Fitch, H.S., G.R. Pisani, H.W. Greene, A.F. Echelle, and M. Zerwekh. 2004. A field study of the timber rattlesnake in Leavenworth County, Kansas. *Journal of Kansas Herpetology* 11: 18-24.

Goetz, S.M., C.E. Petersen, R.K. Rose, J.D. Kleopfer, and A.H. Savitzky. 2016. Diet and foraging behaviors of timber rattlesnakes, *Crotalus horridus*, in eastern Virginia. *Journal of Herpetology* 50(4): 520-526.

Howze, J.M., K.M. Stohlgren, E.M. Schlimm, and L.L. Smith. 2012. Dispersal of neonate timber rattlesnakes (*Crotalus horridus*) in the Southeastern Coastal Plain. *Journal of Herpetology* 46(3): 417-422.

Klauber, L.M. 1972. Rattlesnakes Their Habits, Life Histories, and Influence on Mankind. Vol.1 (2nd ed). University of California Press, Berkeley and Los Angeles. 740 p.

Wittenberg R.D. 2012. Foraging Ecology of the timber rattlesnake (*Crotalus horridus*) in a fragmented agricultural landscape. *Herpetological Conservation and Biology* 7(3): 449-461.



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