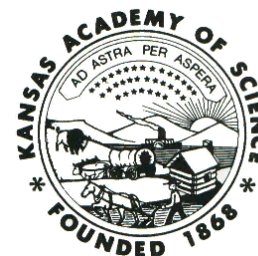


# KAS BULLETIN



## NEWSLETTER OF THE KANSAS ACADEMY OF SCIENCE

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VOL. 48 NO 2

<http://www.KansasAcademyScience.org/>

August, 2023

## 156<sup>th</sup> ANNUAL MEETING OF THE KANSAS ACADEMY OF SCIENCE

The 156<sup>th</sup> annual meeting of the Kansas Academy of Science will be held at Emporia State University on April 5-6, 2024. Check the KAS website for updates.

### KAS Offers Both Student and Teacher Grants

Teachers (K-12) may apply to the KAS for grants up to \$500. Priority will be given to projects that focus on student experiences, increase student engagement, and bring a new topic or activity to the classroom. Application deadline is **September 29, 2023**. Check the website and contact the KAS educator grant coordinator, Dr. Erin Morris:  
[erin.morris@bakeru.edu](mailto:erin.morris@bakeru.edu).

Five research grants of \$1,500 each are available to graduate students (MA and PhD), and three research grants of \$1,000 each to undergraduates who are members of the KAS, or whose major advisor is a member. Research funds may be used to support investigation in any scientific field and in any locality. The deadline for undergraduate applications is October 4, 2023 and for graduate students, **February 5, 2024**. Check the KAS website for more information.

## **KAS Annual Meeting at McPherson College a Great Success**

by Hank Guarisco, editor

The joint annual meeting of the Kansas Academy of Science and the Kansas Entomological Society held at McPherson College on April 14-15, 2023, was a great success, due to the tireless effort of our host, Dustin Wilgers, and his staff. We met on Friday afternoon to attend one of two field trips: a tour of the McPherson Museum, or a tour of the Land Institute. In the evening, we gathered to talk and dine together while listening to the keynote speaker, Dr. Gregory McDonald, who gave a fascinating presentation on ground sloths, interspersed with a generous sprinkling of puns.

There is a mounted skeleton of the giant ground sloth in the McPherson Museum that is truly captivating for both its impressive size and its artful depiction. One thing that captured my attention was the very large calcanium on each hind limb. Other bones and mounted skeletons of ancient animals, including *Smilodon*, the saber-toothed cat, that were recovered from the LaBrea tar pits in Los Angeles were also prominently featured.

McPherson College was also the location of the creation of the first synthetic diamonds. There is a small film discussing the history of this process in the museum.

Museum curator and long-time KAS member, Brett Whitenack, retrieved a nice assortment of meteorites and tektites, and related their interesting histories. We also got to see a piece of the moon that had landed on earth, presumably after a large asteroid impacted the moon and ejected some rocky debris into space.

After coffee and snacks, Saturday was spent hearing oral presentations and viewing posters. Meeting registrants could choose among three concurrent morning sessions: physics & chemistry, ecology & organismal biology, and health & molecular biology. In the afternoon, there were two sessions on ecology & organismal biology and one on geology & science education.

I began the morning session by listening to three lectures on subatomic particles presented by University of Kansas students who have been collaborating with scientists at the supercollider in CERN, Switzerland. We quickly left the realm of classical atomic theory, ie. atoms, electrons, protons, and neutrons, and traveled (at less than the speed of light) into the entangled world of gluons and quarks that existed in the plasma soup very near the beginning of the universe, as we understand it. It turns out that protons and neutrons are not fundamental particles, but are rather complex, composite particles composed of a sea of quarks and gluons. Presently, we know that protons contain two “up quarks” and one “down quark.” However, the energy contained in these three subprotonic particles amounts to 9.1 MeV, while the proton has the equivalent energy of 938 MeV. Therefore, the picture is much more complex and “strange” as we delve into relativistic reality.

During the Saturday luncheon, Dr. Lee DeHaan, from the Land Institute, enlightened us on progress being made in developing a sustainable, perennial wheat variety named Kernza. Both laboratory and field trials are being conducted to achieve a rich grain that can be mass produced and harvested under a variety of environmental conditions.

The afternoon began with Richard Schrock, retired professor from Emporia State University, explaining how and why China is quickly becoming a world leader in STEM research and education. He has lectured

in China for many decades, and remarked how the Chinese leadership from the president down to local governors, are all educated in the sciences, and therefore place great value on science education. I think it became really obvious that our leaders often fell short in this arena during the COVID epidemic. While universities in the US are struggling to maintain current levels, China has built many new universities and expanded their programs.

Randy Miller, of Baker University, gave us a glimpse of the advances he has initiated in improving the collection and examination of our favorite little animals, the tardigrades – also known as “water bears,” because of their pudgy, eight legs armed with a varying number of long claws. These small animals, often no larger than the period at the end of this sentence, have amazing survival attributes. Some have been resurrected from the virtually indestructible dormant, cyst stage after 125 years. They are able to withstand temperatures slightly above absolute zero and pressures of over 6,000 atmospheres, and are prime candidates for interstellar travel. Dr. Miller has devised a drone that can fly into the tree canopy and take samples of moss, which harbor tardigrades, from these almost inaccessible locations. He is also devising ways to mechanize routine laboratory tasks.

The last session I attended reviewed the results of field work on the small, threatened green toad, *Anaxyrus debilis*, in western Kansas. They appear to be more common near streams in the area.

When we arrived at the meetings on Friday, we were wearing T-shirts, but after thunderstorms rolled in and the temperature dropped, we retrieved our coats. By the time the meetings were over, it was very windy but the rain had ceased. I look forward to next year’s annual meeting in Emporia.

## **KAS Looking For Social Media Editor!**

The Kansas Academy of Science is looking for a student who would like to earn extra income by bringing the society into the world of social media. The amount of time and remuneration is very flexible at this point, and depends on the development of entirely new means of communication via social media. So, if you enjoy social media, this may be an enjoyable way to help the KAS and earn extra cash at the same time.

Check the KAS website and contact the secretary and webmaster, Sam Leung:

[sam.leung@washburn.edu](mailto:sam.leung@washburn.edu).

## Sad News: KAS Vice-President Passes Away

by Hank Guarisco, editor

Our soon-to-be-president of the KAS, Brett Whitenack of McPherson, died on June 18, 2023 at the age of 60, after receiving a diagnosis of an advanced stage of cancer. Part of the obituary in The McPherson Sentinel is presented below:



“Brett worked full time as a Curator and Director of Daily Operations for the McPherson Museum since 1997. Brett was born on February 22, 1963, in Wichita, KS, the son of William “Bill” H. and Ina Jane (Berry) Whitenack. Brett graduated from McPherson High School in 1981 and later furthered his education at McPherson College, graduating in 2009, with degrees in Biology and Philosophy/Religion. On November 26, 1983, Brett was united in marriage to Jeanne Horn in McPherson. This union was blessed with two children, Jake and Bethany. Since 1980, he was a member of the McPherson Gem & Mineral Club and currently was the web master and historian. He was the Vice President of the Kansas Academy of Science. He attained membership to the Honor Society of the Tri-Beta Biological Science Iota Chapter in 2008. He worked with 4-H Clubs by attending rock field trips and gave talks about rocks and fossils to the schools and

clubs around the McPherson area. For many years, he led tours at the McPherson Museum for school kids. Brett received the Burkholder Research Award from McPherson College for outstanding achievement in student research in the Natural Sciences. ...Memorial donations may be given to the McPherson Museum & Arts Foundation or McPherson Gem & Mineral Club in care of Stockham Family Funeral Home, 205 North Chestnut, McPherson, KS 67460. Personal condolences may be sent to the family at [www.stockhamfamily.com](http://www.stockhamfamily.com).”

Brett’s fascination with meteorites culminated in his discovery of a practical, economic method to halt their corrosion due to the release of chlorides. He devised a way to remove the chlorides, and also traces of corrosion, from the outer surface of meteorites by electrolytic reduction, a cleaning process used in marine archeology (Whitenack 2008).

On a personal note, I will miss Brett. I went on several KAS field trips that he led, and often sat with him at the KAS banquet dinners where we became more acquainted. He looked forward to becoming president of the KAS, and was always committed to the advancement of science education of the public, especially our youth. He will be missed.

### Reference

Whitenack, W.B. 2008. The use of electrolytic reduction for the removal of chlorides from iron-nickel meteorites. *Cantaurus* 16: 21-27.



## **New Roadside Geology of Kansas Book Coming Soon!**

by Hank Guarisco, editor

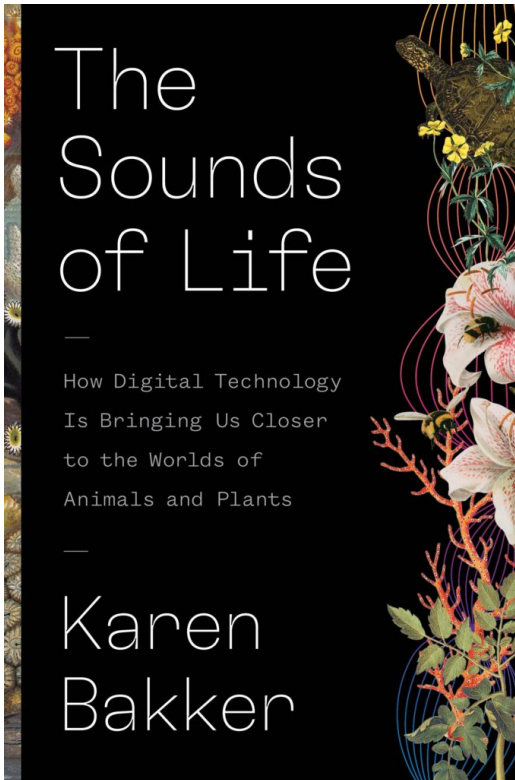
Due to be released this September, Roadside Geology of Kansas will be a welcomed addition to your traveling library of field guides. Written by long-time KAS members, James and Susan Aber, and Michael Everhart, with illustrations by Chelsea M. Feeney, this guide will enable you to better understand the geology of the surrounding landscape. Below is a short publicity description for the new book.

“Flyover Country no more. Fossils, badlands, and caprocks are scattered through the prairie, all there to be found with Roadside Geology of Kansas as your guide. A billion years of geologic history left zinc and lead deposits, salt beds, and oil buried beneath layers of limestone and shale, deposited in the many seas that inundated the continent. Finally, glaciers reconfigured stream drainages, left enormous boulders scattered about, and provided the windblown silt for excellent cropland. Nineteenth-century paleontologists flocked to the chalk outcrops of western Kansas to collect fossils of dinosaurs, mosasaurs, giant turtles, and more. Settlers used the rock they found at the surface to build houses, bridges, water towers, and churches, as well as stone fence posts that wouldn’t burn during prairie wildfires. Guides for sixteen roads, including all the state’s scenic, historic, and national byways, point out prominent landmarks such as Mushroom Rock, Coronado Heights, and Mount Mitchell, along with more hidden geologic delights, such as kimberlite pipes, Rock City, and the source for Kansas amber. Informative sections detail the history of fossil collection in Kansas and the state’s native stone architecture, and colorful photographs, including many taken from aerial kites, illuminate the geologic history for all to see.”



## Book Review: The Sounds of Life by Karen Bakker 2022

Hank Guarisco, editor



Every so often, a book comes along that is superbly written and entirely transforms our understanding of a major aspect of the natural world. This is such a book. Written by Rhodes Scholar and professor at the University of British Columbia, Karen Bakker, “The Sounds of Life” describes current research into auditory communication, both below and above the narrow band of frequencies of human hearing. To get a sense of the author’s writing style the first paragraph of the introduction is presented below.

“ Compared with our cousins on the Tree of Life, humans are poor listeners. Below the lower end of human hearing lies deep infrasound: the realm of thunder and tornadoes, elephants and whales. Many creatures can sense and communicate in infrasound, which travels long distances with ease, passing through air and water, soil and stone. In one of the animal kingdom’s most famous mating rituals, male peacocks transmit powerful infrasound with their raised tails; what humans perceive to be a visual display, is in fact, a sonic summons.”

At the other end of the sonic spectrum, diverse forms of life, including bats, moths, beetles, as well as corals, emit ultrasonic sounds. The recent rapid advances in digital technology have provided a means for humans to listen to these other life forms and decode their languages. Some of the astonishing discoveries include: “Dolphins and belugas, mice and prairie dogs use unique vocalizations (like signature whistles) to refer to one another, much as we do with individual names. Baby bats ‘babble’ at their mothers, who speak back to their young in ‘motherese,’ just like humans do. Turtle hatchlings – previously thought to be mute – coordinate the moment of their birth by calling to one another through their shells.” “Plants emit distinct ultrasonic noises when dehydrated or distressed. In response to the sound of buzzing bees, flowers flood with sweetened nectar, as if in anticipation. The Earth is in continuous conversation.”

Each chapter in this 354-page book features an animal and the latest research concerning its communication by sound. The historical progress of unraveling the language of whales is recounted, including the discovery that their calls can be transmitted hundreds or even thousands of miles when produced at a depth of 600 feet below the surface. Reef fish and the coral reef itself produce sounds that are attractive to fish fry, crustaceans, and even sea turtles. Just like salmon returning to their natal stream, coral and fish larvae appear to recognize and prefer the sounds of their natal reef.

Believe it or not, even plants emit and respond to ultrasound. New research has revealed that some plants have better resistance to pests, and experiments are testing whether aerial ultrasound can be used as an alternative to pesticides!

This wealth of new information has raised recurring questions of the capacity of animals to have emotions, think, and reason. This also entertains the view that they could possess consciousness. Of course this line of enquiry, aptly termed “cognitive ethology,” has challenged long-held assumptions of the firm boundary that separates our species from the rest of the living world. During the Age of “Reason,” vivisectionists were convinced that animals were just little machines that could not feel pain. Humans were believed to be unique because only they used tools. Of course, research has shown that many other species use tools. Altruism was another trait that was presumed to be uniquely human. However, Richard Dawkins in his book, “The Selfish Gene,” has elucidated a compelling mechanism to explain the many examples of altruism in nature that have been documented in E.O. Wilson’s classic text, “Sociobiology.”

One of the worst accusations that can be hurled at a scientist is the “sin” of anthropomorphism. Jane Goodall was initially admonished for giving her chimpanzees human names instead of numbers. The implicit gulf between our species and others who share our planet has stifled research in the area of cognitive ethology. Our anthropocentrism has also been reinforced by the sacred texts of Western religions. In spite of genetic research that has revealed our shared legacy with all living creatures, we are still trying to discover what makes us unique, where to draw the line.

The recalcitrance of the scientific establishment can also be traced to other commonly held beliefs. Surely, arthropods such as insects are too small to have a brain capable of anything more than enabling them to respond by approach or avoidance to stimuli. The meticulous work of Karl von Frisch, which proved that bees communicated information to their hive-mates concerning the location, distance, and quality of a nectar source, was not fully acknowledged until he received a Nobel Prize in 1973, 30 years after his research had been published. The Nobel Prize Committee commented on the shameless vanity of our species in refusing to recognize the extraordinary abilities of bees.

In spite of this slow start, our understanding of the impressive capabilities of bees is still growing. Since bees have very good eyesight, they can distinguish between human faces, and with minimal training can also distinguish between the paintings of Picasso and Monet! They also exhibit social learning and cultural transmission – a first for invertebrates! With recent advances in robotics and machine learning, dancing honeybee robots have been created. These robot bees were able to perform waggle dances that guided the native bees to artificial nectar sources.

Although the recent advances in our understanding of animal communication is interesting in its own right, there are practical applications for animal conservation. Elephants and farmers are often in conflict because these large animals routinely invade and destroy gardens and farms. The Maasai herdsmen know that elephants are afraid of African honeybees, and will refuse to feed on acacia trees if a hive is nearby. Playing recordings of disturbed honeybees on speakers was sufficient to elicit their retreat as well as behaviors such as head shaking and dusting themselves. Although placing these speakers along the perimeter of farms did deter elephant intrusion while thornbush barriers did not, this solution was too expensive to employ. Therefore, live beehive fences were used instead. The crops were protected and the farmers were especially excited to have the honey produced.

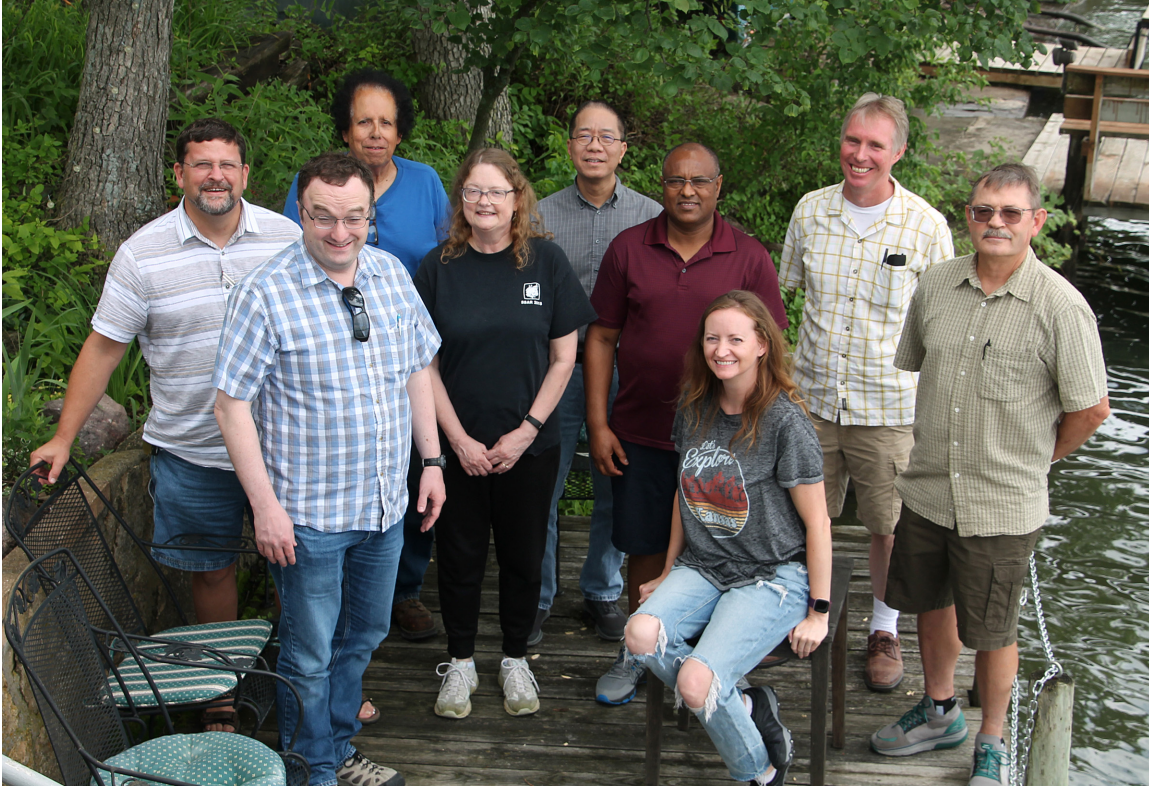
I could go on to describe more interesting examples, however, you get the idea. This is a book worth having on your shelf.



## Enjoyable Summer Meeting of the KAS Council at Lake Kahola

Hank Guarisco, editor

On June 10<sup>th</sup>, Kansas Academy of Science council members were hosted by James and Susan Aber at their rustic cabin next to beautiful lake Kahola in the Flint Hills. It had rained the night before so the ground was saturated, but all ten members of the council were able to successfully navigate the rural roads to the lake.



KAS Council: from left to right: Shaun Schmidt (treasurer), Stewart Gardner (past president), Hank Guarisco (KAS bulletin editor), Lynnette Sievert (president-elect), Sam Leung (secretary/webmaster), Seid Adem (graduate research grant coordinator), Jill Fisher (KJAS director/AAAS representative), Leland Russell (member at large), and Mark LaBarge (president).

We had expected a “light lunch” provided by the Abers, but were very surprised to discover that our hosts were gourmet chefs! The sideboard held a wonderful selection of local meats and cheeses for sandwiches, assorted fruits and veggies, two types of salad (very good), a pie, and homemade, creamcheese muffins topped with lingonberry jam. After eating and catching up with each other, the board meeting began.

In addition to the ten board members who were present, Erica Martin, the KAS transactions editor, joined us by phone to discuss some delays in the upcoming issue due to a new company taking over Allen Press, our long-time publisher. Membership has declined over the past several decades, but has stabilized at slightly above 200 members. In an attempt to better advertise the KAS among students, last year the board decided to establish a funded, part-time position for a student to develop our presence on social media.

Shaun, our treasurer, happily informed us that we have money – sufficient funds to publish the transactions and provide student grants during the coming year. A motion was made to increase the number of research grants to graduate students (MA and PhD) from four to five.

Several other items were discussed, including who is hosting the KAS annual meetings for the next two years. Emporia State University will host it in 2024, and Friends University offered to host it in 2025.

After several hours of discussion, Mark, our president, called for the end of the summer council meeting. The relaxed, congenial atmosphere and great food made this board meeting one to remember.



# New US Postage Stamps Feature Endangered Species

Hank Guarisco, editor

The new postage stamps featuring a wide diversity of endangered species are really beautiful works of art. From the black-footed ferret, the Florida panther, and the San Francisco garter snake, to the Laysan teal, piping plover, desert bighorn sheep and Mexican gray wolf, these stamps are a great way to keep the images of these rare animals in our minds and hearts.



## **The Tables Turned**

By William Wordsworth, 1798

Up! up! my Friend, and quit your books;  
Or surely you'll grow double:  
Up! up! my Friend, and clear your looks;  
Why all this toil and trouble?

The sun, above the mountain's head,  
A freshening lustre mellow  
Through all the long green fields has spread,  
His first sweet evening yellow.

Books! 'tis a dull and endless strife:  
Come, hear the woodland linnet,  
How sweet his music! on my life,  
There's more of wisdom in it.

And hark! how blithe the throstle sings!  
He, too, is no mean preacher:  
Come forth into the light of things,  
Let Nature be your Teacher.

She has a world of ready wealth,  
Our minds and hearts to bless-  
Spontaneous wisdom breathed by health,  
Truth breathed by cheerfulness.

One impulse from a vernal wood  
May teach your more of man,  
Of moral evil and of good,  
Than all the sages can.

Sweet is the lore which Nature brings;  
Our meddling intellect  
Mis-shapes the beauteous forms of things:-  
We murder to dissect.

Enough of Science and of Art;  
Close up those barren leaves;  
Come forth, and bring with you a heart  
That watches and receives.







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