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FOSSIL SECTION

The FOSSILETTER

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Number 1

October 2024

October Meeting

The October section meeting is on Tuesday, October 1, at 7:30 PM. **Note NEW Location!** This meeting will be at Pittsford Community Center, 35 Lincoln Ave, Pittsford, NY 14534. The meeting is in Room 019, which is downstairs from the entrance. Park behind the building. This hybrid meeting will also be broadcast on Zoom. Details on how to login are in the accompanying email. Refreshments will be served. Welcome back!

Our speaker is Dr. William Korth, Emeritus Professor of Biology, Nazareth University (retired) and editor, Rochester Institute of Vertebrate Paleontology. He will speak on "**Taphonomy of Miocene Fossil Sites in Kansas or How Did Those Fossils Get There?**" Taphonomy is the study of how organic remains become fossilized, from the time of death of an organism (or the discard of shed parts, such as trilobite molts) through decomposition, burial, and preservation.



*Dr. William Korth, at the lab at Nazareth with the jaw of a rodent called *Paradjidaumo trilophus*; member of an extinct family (*Eomyidae*) of rodents. It is early Oligocene in age (c. 30 mya) from the Badlands area, midwestern US.*

Bill is a researcher on the evolution of small mammals such as primates and rodents early in the Cenozoic, the "Age of Mammals." He will describe what he has learned from detailed study about how the fossil animals he has collected and studied died at several fossil localities in Kansas and why they were accumulated and preserved the way

they were. Observations on the orientation, condition of the bones, and sedimentary environment are the key to unfolding the stories of each of these localities.

President's Report by Dan Krisher

Welcome one and all to the 2024-2025 season of the Rochester Academy of Science Fossil Section. For those keeping track, this marks the 49th year of our existence. The Genesee Valley Fossil Club was formed in 1975 as an independent group and in 1981, at the Rochester Academy of Sciences' 100th anniversary dinner, the club was formally accepted into the academy.

The ensuing years have featured many changes including but certainly not limited to the format and location of our meetings. The meetings for the first 5 years typically took place in members' homes but in 1981 we began a 10-year run at the Emmanuel Covenant Church on Browncroft Boulevard. In the early 90's the Section moved its meetings to the Brighton Community and Senior Center located off Winton Road. Due to a decline in membership and Section activities the later part of the 90's featured a return to meetings in various members' homes.

The turn of the century featured a surge in membership and activities with the Section meeting in the facilities of Brighton Town Hall. Our relationship with the town hall continued until COVID struck. After COVID restrictions eased we found the town hall option unavailable permanently due to ventilation issues and a change in Brighton's facility use policy. The last two years have featured meetings in the Northeast Quadrant Advanced Life Support Facility (NEQALS) in Webster. The use of this venue also featured the beginning of the hybrid meeting format. The practice of both in-person and streamed meetings has proved extremely popular with Section members as well as allowing the participation of

other clubs and groups across the country and throughout the world.

The Fossil Board learned last Spring the NEQALS facility is being sold so we were forced once again to seek a new home. Through the diligent efforts of Jutta Dudley and Michael Grenier the Section will now be holding its monthly meetings at the Pittsford Community Center.

The Center is by far the nicest facility the Section has used with a variety of large meeting rooms and excellent WIFI capability to enable the continuation of our hybrid meetings. The Pittsford Community Center is located at 35 Lincoln Avenue in Pittsford. The driveway is located on the west side of the building as well as a small parking lot. A larger parking lot is located at the rear of the building and the main entrance is located at the rear of the building on the left side. Our first meeting is on October 1st at 7:30 and we hope to see you there.

Election Results of June 2024

A total of 24 votes were received, 20 in advance and 4 at the picnic meeting and the election results were tallied with the slate of nominated candidates winning unanimously.

President: *Daniel Krisher*

Vice President: *Michael Grenier*

Secretary: *Daniel Krisher*

Treasurer: *John Handley*

Director 1-year term: *Open*

Director 3-year term: *Open*

Positions begin immediately.

Director whose term has not expired is Fred Haynes (2025).

National Fossil Day

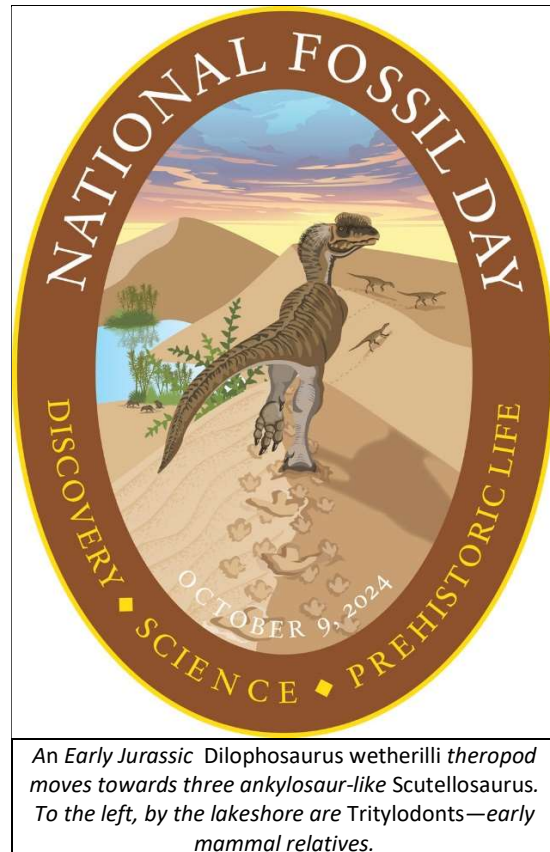
We celebrate the fifteenth annual National Fossil Day™ on Wednesday October 16, 2024.

The following material from the National Park Service site is only a small part of the information on the website. You can learn more at: www.nps.gov/subjects/fossilday/index.htm.

The 2024 National Fossil Day Logo is inspired by the Glen Canyon National Recreation Area and ancient life along the Colorado River.

The desert vistas, canyonlands, and the waters of Lake Powell attract almost 3 million people each year to Glen Canyon National Recreation Area. Visitors enjoy the natural splendor of this region for

hiking, camping, and boating. The canyons surrounding and hosting the Lake Powell reservoir were carved by the Colorado River and its smaller tributaries. Established in 1972, Glen Canyon National Recreation Area consists of 1,254,429 acres set aside for public use and enjoyment and to preserve the area's scientific, historic, and scenic features. The recreation area contains a varied geologic story that begins approximately 310 million years ago. This geologic story told within the rocks tells of environmental change over time and the organisms that adapted to these environments.



An Early Jurassic Dilophosaurus wetherilli theropod moves towards three ankylosaur-like Scutellosaurus. To the left, by the lakeshore are Tritylodonts—early mammal relatives.

The oldest rocks within the recreation area date to the Pennsylvanian and Permian periods of the late Paleozoic Era and record the ebb and flow of tropical coastal seas and coastal swamps between approximately 310 million years ago and 252 million years ago. Early sharks patrolled these seas and ancient reefs, while early reptiles and amphibians lived within the coastal forests in rocks that are part of the Cutler Group and later Permian marine limestones. Occasionally the seas left the area and were replaced by areas of sand dunes, now preserved as sandstone beds.

The great Permian/Triassic Extinction event 252 million years ago saw a great reduction in the diversity of life, but plants and animals slowly rebounded and diversified during the Triassic, recorded in the Moenkopi and Chinle Formations. By the Late Triassic (Chinle Formation), conifer forests along river channels were common and large reptiles (including early dinosaurs) and amphibians were the dominant creatures on land.

Later Cretaceous rocks within Glen Canyon National Recreation Area demonstrate the formation of a Great Interior Seaway some 100 million years ago that would divide the North American continent into two landforms, Appalachia in the east and Laramidia in the west. This seaway, represented primarily by the Tropic Shale, shows evidence of large marine reptiles, as well as sharks, large bony fish, and ammonites, leaving isolated teeth, occasional skeletons, and other material preserved in the marine sediments. Dinosaur carcasses are occasionally found within these marine sediments, suggesting these creatures lived along the nearby eastern coastline of ancient Laramidia. Younger dinosaur and other fossils from coastal deposits (the Straight Cliffs and Wahweap Formations) dating between 80–70 million years ago demonstrate the slow retreat of the Great Interior Seaway during the Late Cretaceous.



In early 2023, an amazing discovery was made along the shores of Lake Powell, a unique bone bed site that had body fossils of early mammal relatives called tritylodonts, with pelvic structures like living monotremes (such as the platypus and echidna), suggesting they laid eggs.

However, although these rocks have all provided significant discoveries, Glen Canyon National Recreation Area's best-known fossils come from the early beginnings of the Jurassic

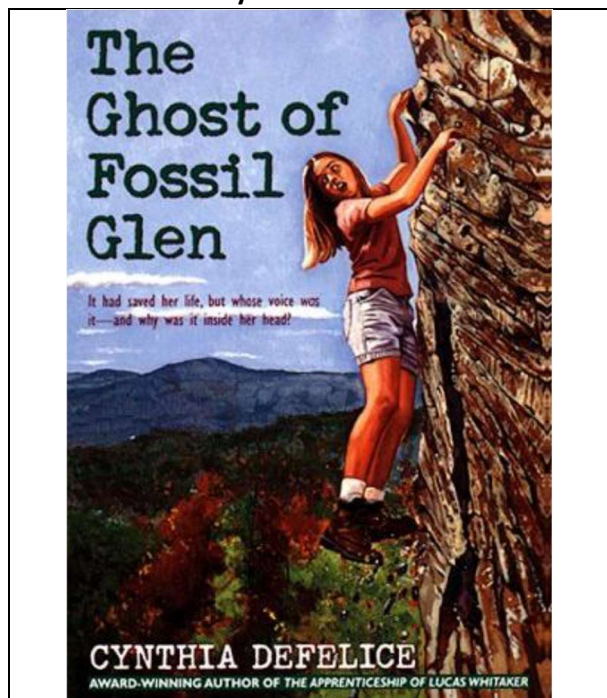
Period, when dinosaurs began their true reign on our planet. A number of amazing and surprising discoveries dating to this time are what inspired the 2024 National Fossil Day artwork.

November Meeting

Save the date—November 12, 2024, for our next meeting which will feature our own marine reptile expert Dr. Judy Massare, Professor Emeritus, Earth Sciences, SUNY Brockport. She will discuss her experiences and the latest research, including her most recent paper with co-authors on ichthyosaurs in April 2024. Learn more about these engaging fossil creatures. Remember that we do not meet on the first Tuesday due to election day.



Books for Kids by Michael Grenier



We had a report on this book—*The Ghost of Fossil Glen* by Cynthia DeFelice—in our March 2015 issue. It is the only book report I have run without

having read the book. I copied the report from the *Wayne County Gem & Mineral News*, with permission of report author and Fossil section member, Fred Haynes. My wife Mary recently received some hardcover copies in a book box donation. “Do you want this?” she asked, showing me one. I took it.

The book is rated as being at the 8-to-12-year-old reading level. I read it—it was a quick read—and enjoyed it, which might say more about me than about the book. It is a ghost-story murder-mystery involving a sixth-grade fossil collector and very clever. I have added the March 2015 issue to the available archive at <https://rasny.org/fossil-letter-pdfs> if you want to read the review. Its rating on Amazon is 4.7/5.0 with 165 reviews.

I liked it so well that Mary has donated all the copies to us. These will be given FREE to children attending our DECEMBER 3, 2024 Pizza Party and Show-and-Tell meeting. Copies must be reserved by writing to paleo@frontier.com by November 30. Children must be aged 6 to 14 and must be present at the meeting with a member. If not all copies are reserved, I will take orders for youth up to age 16. Note that Amazon sells the paperback edition for \$11.99.

Fossil Section at 25th ADK Outdoor Expo By Fred Haynes



Two youngsters are searching for a favorite fossil to take home using magnifying glasses. (Photo by Fred Haynes)

We entertained well over 100 kids and families on a very windy but otherwise pleasant day, but this is about the only picture I took worth much. Two youngsters are searching for a favorite fossil to take home using magnifying glasses! Even an ad for the PRI book on Devonian Fossils by Karl Wilson in the extreme lower left!

Thank you very much to all who volunteered to make this event a success. I was assisted by Matthew Bouffard, John Handley, and Jeff Gutterman. The Mineral table was staffed by Fossil Section members Jutta Dudley and Howard Heitner, aided by past member Kathy Henrie.

(This was also reported in the August issue of the *RAS Bulletin*.)

Did a magnetic field collapse trigger the emergence of animals? Live Talk!



Rochester Academy of Science
Larry King Memorial Lecture
Dr. John Tarduno
William Kenan, Jr. Professor
Earth and Environmental Sciences
University of Rochester
Paleomagnetic Research Group

**Did a magnetic field
collapse trigger the
emergence of animals?**



University of Rochester (Illustration: Michael O'Quinn)



Public Lecture
▫ Saturday, November 16, 2024 ▫
SUNY BROCKPORT
Edwards Hall, 191 Holley Steet
Brockport, NY 14420
1:00 p.m. ▫ Free

We reported on this exciting new study on the origin of multicellular life as we know it in our last issue (June 2024). Now I am thrilled to report that RAS VP Jeff Gutterman secured the leader of the research team, Dr. John A. Tarduno, to be our keynote speaker at the 50th Annual Rochester Academy of Science Fall Scientific Paper Session.

This is our 2024 Larry King Memorial Lecture on November 16 at 1 PM at SUNY Brockport Edwards Hall. Please join us there.

Fossil News by Michael Grenier

Nearly complete mounted *Stegosaurus* skeleton sells for \$44.6 million



Sotheby's *Stegosaurus*. Photo provided by Sotheby's has been lightened to show detail.

On July 18, 2024, Sotheby's New York auction house sold at auction a 79% complete *Stegosaurus* skeleton nicknamed "Apex" for \$44.6 million—the most ever paid for a fossil. Seven bidders drove the final price. The buyer's name is undisclosed. The previous record of \$31.8 million was for the 70%+ complete remains of a *Tyrannosaurus rex* nicknamed Stan, sold in 2020. The most well-known perhaps is the ~90% complete *T. rex* named Sue, which sold for the then-astonishing price of \$8.36 million in 1997. Inflation accounts for some of the difference as Sue and Stan's prices were equivalent to \$16.26 million and \$38.41 million respectively in July 2024 dollars.

This *Stegosaurus* fossil was discovered by commercial paleontologist Jason Cooper on his property in Colorado. He has about 100 acres on top of the dinosaur-rich Morrison Formation near Dinosaur National Monument and has found several dinosaurs over the past dozen years that he has been working his property. Some were sold and some were donated to museums. After finding a prospective specimen, he excavates it carefully with friends and has his own preparation lab for cleaning and preserving the bones. In the United States, anyone who finds a dinosaur on their own property can do with it as they please. It pleases Mr. Cooper to make his living from them.

The provenance is secure as Sotheby's collaborated closely with Cooper from the day of discovery to document the entire process, from

excavation to restoration, preparation, and mounting. It was preserved in hard sandstone, which protected the bones from becoming distorted. Sotheby's ensured that the specimen was removed, cleaned, preserved, prepared, and mounted to the highest standards. Every step was recorded. Attention was paid to non-skeletal preservation including skin impressions and three skin bone armor ossicles. These were included in the sale. The missing 65 skeletal elements were synthesized in epoxy with a 3D printer and included in the mount making it appear to be complete. However, without proper study, the species type remains unknown.

Stegosaurus is not rare, as over 80 specimens of this genus have been found. There are three identified species, *S. sulcatus*, *S. stenops*, and *S. ungulatus*. Most are partial specimens and mounts that look mostly complete are typically put together from several like-sized specimens. They are found in Late Jurassic rock, about 155–145 million years old. The most complete specimen to date is from Wyoming in 2003 with 360 bones (85% complete), is 5.8 meters (19 feet) long, and is in London's Natural History Museum. It was privately purchased at a price that has not been disclosed. Mr. Cooper's mounted *Stegosaurus* is much larger and measures 8.2 meters (27 feet) long and 3.3 meters (11 feet) tall. The specimen was a large, robust adult individual based both on its large size and that it lived long enough to show signs of arthritis. It has no evidence of predation damage.

Sotheby's said that the person who bought Apex is American and "intends to explore loaning the specimen to a U.S. institution." (Material from Sotheby's, news media sources, and Wikipedia.)

World's oldest meal offers food for thought

Australian National University press release issued November 23, 2022.

<https://reporter.anu.edu.au/all-stories/worlds-oldest-meal-helps-unravel-mystery-of-our-earliest-animal-ancestors>

The contents of the last meal consumed by the earliest animals known to inhabit Earth more than 550 million years ago has unearthed new clues about the physiology of our earliest animal ancestors, according to scientists from The Australian National University (ANU).

Ediacaran biota are the world's oldest large organisms and were first discovered in the Ediacara Hills in South Australia's Flinders Ranges. They date back 575 million years. ANU researchers found the animals ate bacteria and algae that was sourced from the ocean floor. The findings reveal more about these strange creatures, including how they were able to consume and digest food.

The scientists analyzed ancient fossils containing preserved phytosterol molecules — a type of fat found in plants — that remained from the animals' last meal. By examining the molecular remains of what the animals ate, the researchers were able to confirm the slug-shaped organism *Kimberella*, had a mouth and a gut and digested food the same way modern animals do. The researchers say it was likely one of the most advanced creatures of the Ediacaran.



The slug-shaped animal *Kimberella*. Photo: Dr Ilya Bobrovskiy

The ANU team found that another animal, which grew up to 1.4 meters in length and had a rib-like design imprinted on its body, was less complex and had no eyes, mouth or gut. Instead, the odd creature, called *Dickinsonia*, absorbed food through its body as it traversed the ocean floor.

Both *Kimberella* and *Dickinsonia*, which have a structure and symmetry unlike anything that exists today, are part of the Ediacara biota family that lived on Earth about 20 million years prior to the Cambrian Explosion — a major event that forever changed the course of evolution of all life on Earth. "Ediacara biota really are the oldest fossils large enough to be visible with your naked eyes, and they are the origin of us and all animals that exist today. These creatures are our deepest visible roots," Dr Bobrovskiy said. Study co-author Professor Jochen

Brocks, from the ANU Research School of Earth Sciences, said algae are rich in energy and nutrients and may have been instrumental for *Kimberella*'s growth. "The energy-rich food may explain why the organisms of the Ediacara biota were so large. Nearly all fossils that came before the Ediacara biota were single-celled and microscopic in size," Professor Brocks said.

Using advanced chemical analysis techniques, the ANU scientists were able to extract and analyze the sterol molecules contained in the fossil tissue. Cholesterol is the hallmark of animals and it's how, back in 2018, the ANU team was able to confirm that Ediacara biota are among our earliest known ancestors. The molecules contained tell-tale signatures that helped the researchers decipher what the animals ate in the lead up to their death. Professor Brocks said the difficult part was differentiating between the signatures of the fat molecules of the creatures themselves, the algal and bacterial remains in their guts, and the decaying algal molecules from the ocean floor that were all entombed together in the fossils.



Dickinsonia, the world's earliest known animal, with its distinctive rib-like design imprinted on its body.

Ediacara biota are the world's oldest large organisms and were first discovered in the Ediacara Hills in South Australia's Flinders Ranges. They date back 575 million years.

This paper (Ilya Bobrovskiy, Alexey Nagovitsyn, Janet M. Hope, Ekaterina Luzhnaya, Jochen J. Brocks. Guts, gut contents, and feeding strategies of Ediacaran animals. *Current Biology*, 2022; DOI: 10.1016/j.cub.2022.10.051) is available for free download from [https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01699-2](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01699-2).

Brazilian fossils reveal jaw-dropping discovery in mammal evolution



Riograndia and Brasilodon. Image credit: Jorge Blanco

University of Bristol Press release issued: 25 September 2024.

<https://www.bristol.ac.uk/news/2024/september/brazilian-fossils.html>

The discovery of new cynodont fossils from Brazil has led to a breakthrough in understanding the evolution of mammals. These fossils, belonging to the mammal-precursor species *Brasilodon quadrangularis* and *Riograndia guaibensis*, offer critical insights into the development of the mammalian jaw and middle ear, revealing evolutionary experiments occurring millions of years earlier than previously thought.

Mammals stand out among vertebrates for their distinct jaw structure and the presence of three middle ear bones. This transition from earlier vertebrates, which had a single middle ear bone, has long fascinated scientists. The new study explores how mammal ancestors, known as cynodonts, evolved these features over time.

Using CT scanning, researchers were able to digitally reconstruct the jaw joint of these cynodonts for the first time. The researchers uncovered a 'mammalian-style' contact between

the skull and the lower jaw in *Riograndia guaibensis*, a cynodont species that lived 17 million years before the previously oldest known example of this structure, but did not find one in *Brasilodon quadrangularis*, a species more closely related to mammals. This indicates that the defining mammalian jaw feature evolved multiple times in different groups of cynodonts.

These findings suggest that mammalian ancestors experimented with different jaw functions, leading to the evolution of 'mammalian' traits independently in various lineages. The early evolution of mammals, it turns out, was far more complex and varied than previously understood.

Lead author James Rawson explained: "What these new Brazilian fossils have shown is that different cynodont groups were experimenting with various jaw joint types, and that some features once considered uniquely mammalian evolved numerous times in other lineages."

This discovery has broad implications for the understanding of the early stages of mammal evolution, illustrating that features such as the mammalian jaw joint and middle ear bones evolved in a patchwork, or mosaic, fashion across different cynodont groups.

By integrating these findings with existing data, the scientists hope to deepen their understanding of how early jaw joints functioned and contributed to the development of the mammalian form.

This paper (Rawson, J. R., Martinelli, A. G., Gill, P. G., Soares, M. B., Schultz, C. L., & Rayfield, E. J. (2024). Brazilian fossils reveal homoplasy in the oldest mammalian jaw joint. *Nature*, 1-8.) is available for free download from <https://www.nature.com/articles/s41586-024-07971-3>.

CALENDAR OF EVENTS

October

Tuesday October 1, FOSSIL MEETING 7:30 PM. LOCATION: Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534. Speaker is Dr. William Korth on “Taphonomy of Miocene Fossil Sites in Kansas or How Did Those Fossils Get There?” Visitors are welcome.

November

Tuesday November 12, FOSSIL MEETING 7:30 PM. LOCATION: Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534. Speaker is Dr. Judy Massare, Professor Emeritus, Earth Sciences, SUNY Brockport discussing the latest ichthyosaurs research. NOTE 2nd Tuesday date due to elections. Visitors are welcome.

Saturday November 16, RAS 50TH ANNUAL FALL SCIENTIFIC PAPER SESSION & ANNUAL LARRY KING MEMORIAL LECTURE 9 AM to 3 PM. LOCATION: SUNY Brockport Edwards Hall. Keynote speaker is Dr. John A. Tarduno on “Did a magnetic field collapse trigger the emergence of animals?” Paper Session and lecture are open to the public.

Visitors are welcome to all Fossil Section meetings! For more information and the latest updates check the RAS Website (www.RASNY.org). You can also contact Dan Krisher at DLKFossil@gmail.com or John Handley at jhandley@rochester.rr.com for further information.

ROCHESTER ACADEMY OF SCIENCE FOSSIL SECTION

Monthly meetings are held as hybrid meetings, live but also broadcast on Zoom. Meetings are held the first Tuesday of each month from October to December and from February to May at 7:30 pm. In person meetings are now held at the Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534 unless otherwise listed.

OFFICERS

President: Dan Krisher
Vice President/Program Chair: Michael Grenier
Secretary: Dan Krisher
Treasurer: John Handley
Director (three-year term): *Open*
Director (two-year term): Fred Haynes
Director (one-year term): *Open*

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APPOINTED POSITIONS

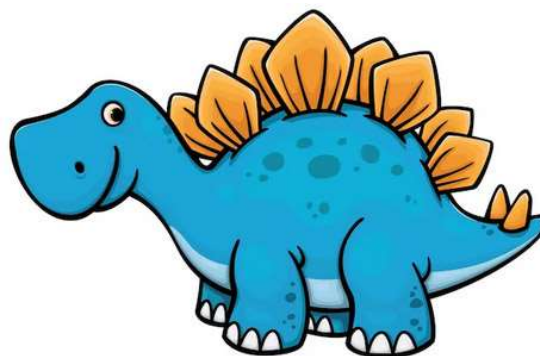
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The FossilLetter is published before each meeting month of the year. Please send submissions to mgrenier@frontiernet.net or by U.S. Postal Service mail to 692 Maple Drive, Webster, NY 14580. Deadline for submissions to the FossilLetter is the 15th of the month.

For scheduling changes and the latest updates please check the RAS Website (www.rasny.org) and click on the Fossil Section link. Last minute updates can also be found on the *General Announcements* page of the Academy Website.



Not all artistic recreations of Stegosaurus can be considered accurate depictions of the animal as it would have been in life.