A publication of the Rochester Academy of Science
FOSSIL SECTION

The FOSSILETTER

VOL. 42 Number 6 April 2025

April Meeting

The April Rochester Academy of Science Fossil Section meeting is on Tuesday, April 1, at 7:00 PM 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. Refreshments will be served. This meeting will be LIVE ONLY, no Zoom. Sorry.

Our featured speaker this month is member Gerry Kloc, who will be speaking on *News Flashes from the Paleozoic: Important Fossil News You Likely Missed*. Unless you subscribe to a myriad of journals covering paleontology, you will be surprised at the fascinating discoveries that have been made over the past couple of years. Everyone who collects should know more about their specimens and Gerry is just the fellow to give you information you can share with your paleo-minded friends. Well-known as a speaker on trilobites, Gerry will cover a wide range of phyla in this talk. Brachiopods— sure, crinoids— of course, trilobites — naturally, and lots of others.

RAS Member Gerald Kloc with trilobite Comura bultyncki.

Besides being a superb fossil preparator at the University of Rochester, Gerry is the author or co-author on several important papers on trilobites. He is also well-known as one of the authors of the magnificent book, *Trilobites of New York: An Illustrated Guide*.

Bring a friend, visitors are welcome.

President's Report by Dan Krisher

Two Section members participated in the 2025 Syracuse Earth Science Student Symposium on Match 1st.

The Section's March meeting was on 3/4 and featured a training session for the area participants of the upcoming Science Olympiad. The attendees were able to view, handle and ask questions about a wide variety of fossils which will be featured in the competition. About 9 students attended.

The Section participated in the University of Rochester Family STEM Event on 3/22. The presentation featured two activities centered on brachiopod/bivalve symmetry and the impact of diet on vertebrate tooth types.

The Section's next meeting is on 4/1 and will feature Section Member Gerry Kloc.

RAS Annual Meeting & Spring Lecture

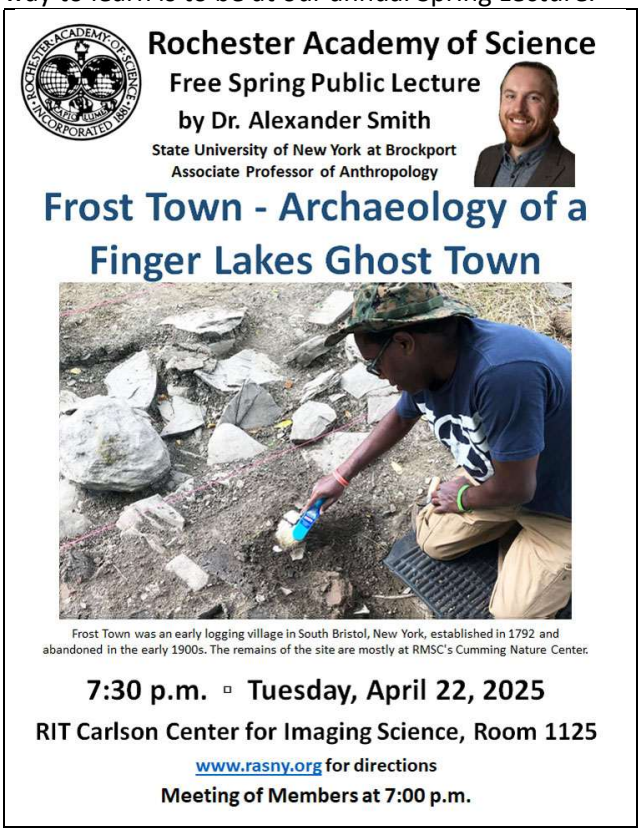
The Rochester Academy of Science Annual Meeting and Spring Lecture are Tuesday, April 22, 7:00 p.m. This live meeting (with Zoom remote) will be at the Rochester Institute of Technology Chester F. Carlson Center for Imaging Science, Room 1125, 54 Lomb Memorial Drive, Rochester, NY 14623. After a brief introduction and report, the Board of Directors election will conclude the business meeting. Note that you must have renewed your membership by March 31st.

The Spring Lecture will follow the business meeting at 7:30PM. Our speaker is Dr. Alexander Smith, professor of Anthropology at SUNY Brockport. He leads the Frost Town Archaeology project in partnership with the Rochester Museum & Science Center. Frost Town Archaeology is dedicated to the excavation and understanding of this abandoned Euro-American sawmill town, located on what is now the Cumming Nature Center in South Bristol, NY. He will also discuss his

excavations of iron-age sites on Mediterranean islands such as Mallorca and Menorca.

Frost Town was one of the region's earliest industrial mill and logging communities. It was settled in the late 18th Century and abandoned when logging ran out and the area moved to agriculture. Since 2019, Frost Town has undergone physical and interpretation changes.

The area's first water-powered sawmill was built by Revolutionary War veteran Gamaliel Wilder on Briggs Creek a year after he bought the land in 1791. He was familiar with this part on the frontier, having served on the Sullivan Expedition, which invaded Iroquoia with 5,000 men of George Washington's army in 1779. It was chosen not only for its waterpower but also because he knew it had Seneca apple and peach orchards that hadn't been destroyed by Sullivan's army. This 42 square mile lot became the town of South Bristol. There's more at https://frosttownarchaeology.com but the best way to learn is to be at our annual Spring Lecture.



Fossil Section Summer Field Trips

by Dan Krisher

Welcome to the 2025 field trip season for the FOSSIL Section. The process for signing up for a trip is largely unchanged from years past. About a week or so before each trip I will send an email out to all Section members. All interested members should get back to me via email at least 2 days before the trip and I'll respond with additional information for that trip as soon as I receive your email. I will send out a final email to all attendees the night before the trip. If you have any questions or otherwise need to get a hold of me, you can contact me at 585.698.3147 or DLKFossil@gmail.com. At this time the following field trips are scheduled or are in the process of being scheduled:

4/26 - Split Rock Quarry near Syracuse: This family-friendly site is a large quarry located southwest of Syracuse. The site exposes Upper Silurian and Lower Devonian strata but the main point of interest will be the large exposures of the Onondaga Limestone. Collecting here is limited to picking up loose material scattered near the quarry walls. This will be an exploratory visit to the site as we need to locate the best areas for collection.

Split Rock Quarry. Image taken during a 2004 SUNY Cortland Historical Geology field trip. https://earthathome.org/splitrock/

5/03 - The Gulf at Lockport:

In this trip we will visit two sites. The first is located on the west side of the town of Lockport. The site is a railroad cut a few yards off of the road and it exposes the Silurian Rochester Shale Formation. This is a family-friendly site with no hazards, plenty of room to spread out, and many fossils. The fossils are relatively small but can be found lying loose on the hillside. The material consists primarily of brachiopods and bryozoan with some trilobites, corals, and cystoids as well as other rarer specimens. The second stop is optional and consists of a road cut nearby at Hickory Corners. This site exposes the Silurian Reynales

Formation and the fauna consists of bryozoa, brachiopods, and the occasional gastropod.

The Gulf at Lockport is is a family-friendly site with no hazards, plenty of room to spread out, and many fossils.

5/24 – Watertown/Rodman Area: This will be a long day trip. We will visit a series of Ordovician sites some of which are detailed in the 2014 New York State Geological Association Guidebook.

6/28 Little Beard's Creek:

(Date pending – awaiting permission)

This is a large shale exposure along Little Beard's Creek in a stream near Geneseo. The site exposes the Windom Member of the Moscow Formation and aside from many brachiopods and a few trilobites, the site is most well-known for the size and quantities of horn corals it produces. This trip is still in the process of being set up with the landowner so there is a small chance this date could change.

The highly productive Little Beard's Creek trip in June 2019.

7/12 - Jaycox Run:

(Date pending - awaiting permission.) In this trip we will visit the Jaycox Run site between Avon and Geneseo and the collecting will be in the Middle Devonian Ludlowville and Moscow Formations. This is a Genesee Valley Nature Conservancy site that requires permission to visit. Heavy rains over the past few years have seriously eroded the Green's Landing bed so collecting in that area of the outcrop will be limited. No large-scale removal of bedrock will be allowed. Collecting will be limited to surface collecting, only the removal of exposed fossils.

Jaycox Run trip in July 2019. (photo by Fred Haynes)

7/26 – Penn Dixie

(Date pending - awaiting availability.) This family-friendly site is a large open shale pit. There is a modest daily fee to collect but we may be able to get a group rate. The site exposes the Middle Devonian Windom Member of the Moscow Formation. A wide variety of fauna can be found but the site is most well-known for its trilobites. The date selected is shortly after the 'Dig with the Experts' so there will be many well-weathered piles of broken up rock to sort through.

https://penndixie.org

8/23 Portland Point:

(Date pending - awaiting permission.) This site is a large railroad cut on the east shore of Cayuga Lake**.** The site exposes Middle Devonian siltstones, and shales. A wide variety of Hamilton Group fauna are available for collecting however organisms that favored this sandier environment are somewhat different from those found further west in the muddier facies. If weather and water levels allow, we will also visit a second nearby site at Sandy Creek.

Quarry floor at Portland Point

May Meeting

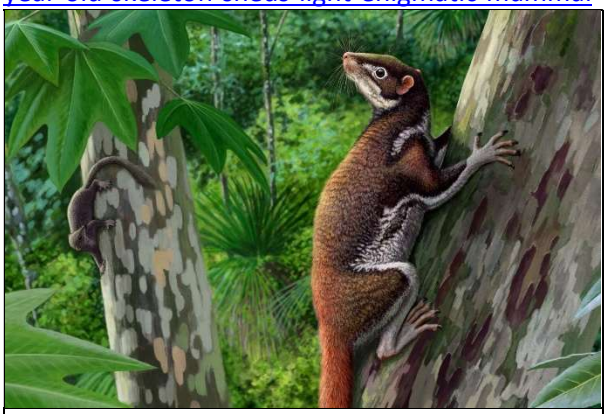
Join us on May 6, 2025, when our speaker will be section member Michael Grenier, who is also your editor for this newsletter. Michael will discuss the research published over the past two years in dinosaur paleontology, while tossing in a few other topics and creatures of interest. He is a Cretaceous specialist with many summers' experience in the field and is a long-time member of the Society of Vertebrate Paleontology. This meeting will also be on Zoom.`

Fossil News

A 62-million-year-old skeleton sheds light on an enigmatic mammal

Yale University press release issued March 11, 2025

https://news.yale.edu/2025/03/11/62-million-year-old-skeleton-sheds-light-enigmatic-mammal



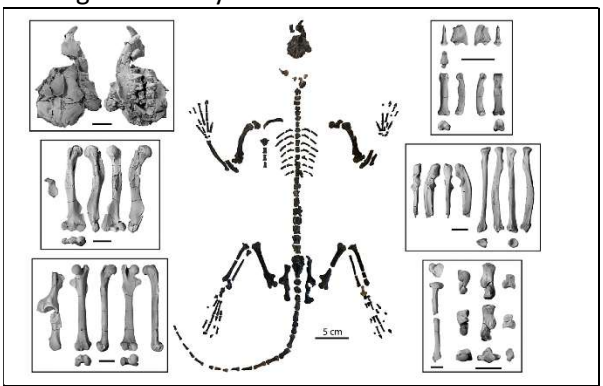
Mixodectes pungens *(foreground), inhabited the same forests as early primates like* Torrejonia wilsoni *(background). Illustration by Andrey Atuchin.*

For more than 140 years, *Mixodectes pungens*, a species of small mammal that inhabited western North America in the early Paleocene, was a mystery. What little was known about them had been mostly gleaned from analyzing fossilized teeth and jawbone fragments.

But a new study of the most complete skeleton of the species known to exist has answered many questions about the enigmatic critter — first described in 1883 by famed paleontologist Edward Drinker Cope — providing a better understanding of its anatomy, behavior, diet, and position in the Tree of Life.

The study demonstrates that the mature adult *Mixodectes* weighed about 3 pounds, dwelled in trees, and largely dined on leaves. It also shows that these arboreal mammals — an extinct family known as mixodectids — and humans occupy relatively close branches on the evolutionary tree.

"A 62-million-year-old skeleton of this quality and completeness offers novel insights into mixodectids, including a much clearer picture of their evolutionary relationships," said co-author Eric Sargis, Yale professor of anthropology, curator of vertebrate paleontology and mammalogy at Yale Peabody Museum, and the director of the Yale Institute for Biospheric Studies. "Our findings show that they are close relatives of primates and colugos — flying lemurs native to Southeast Asia — making them fairly close relatives of humans."



The newly described skeleton in this study includes a partial skull with teeth, spinal column, rib cage, forelimbs, and hind limbs. Discovered in New Mexico's San Juan Basin, it is the most complete of its kind known to exist.

The skeleton is of a mature adult that weighed about 1.3 kilograms, or 2.9 pounds. The anatomy of the animal's limbs and claws indicate that it was arboreal and capable of vertically clinging to tree trunks and branches. Its molar teeth had crests to break down abrasive material, suggesting it was omnivorous and primarily ate leaves.

"This fossil skeleton provides new evidence concerning how placental mammals diversified

ecologically following the extinction of the dinosaurs," said lead author Stephen Chester. "Characteristics such as a larger body mass and an increased reliance on leaves allowed *Mixodectes* to thrive in the same trees likely shared with other early primate relatives."

Mixodectes was quite large for a tree-dwelling mammal in North America during the early Paleocene — the geological epoch that followed the Cretaceous-Paleogene extinction event that killed off non-avian dinosaurs 66 million years ago.

For example, the *Mixodectes* skeleton is significantly larger than *Torrejonia wilsoni*, a small arboreal mammal from an extinct group of primates called plesiadapiforms, that was discovered alongside it. While *Mixodectes* subsisted on leaves, *Torrejonia's* diet mostly consisted of fruit. These distinctions in size and diet suggest that mixodectids occupied a unique ecological niche in the early Paleocene that distinguished them from their tree-dwelling contemporaries.

Two phylogenetic analyses performed to clarify the species' evolutionary relationships confirmed that mixodectids were primatomorphans, a group of mammals that consists of primates and colugos. "While the study doesn't entirely resolve the debate over where mixodectids belong on the evolutionary tree, it significantly narrows it," Chester said.

This open-source paper, Chester, S.G.B., Williamson, T.E., Crowell, J.W., Silcox, M.T., Bloch, J.I., & Sargis, E.J., 2025, New remarkably complete skeleton of *Mixodectes* reveals arboreality in a large Paleocene primatomorphan mammal following the Cretaceous-Paleogene mass extinction. *Scientific Reports*, 15:8041 may be downloaded at https://doi.org/10.1038/s41598-025-90203-z.

Plants struggled for millions of years after the world's worst climate catastrophe

University College Cork (Ireland), press release issued March 7, 2025.
https://www.ucc.ie/en/eri/news/plants-struggled-for-millions-of-years-after-the-worlds-worst-climate-catastrophe.html

A team of scientists has uncovered how plants responded to catastrophic climate changes 250 million years ago. Their findings reveal the long, drawn-out process of ecosystem recovery following one of the most extreme periods of warming in Earth's history: the 'End-Permian Event'.

At an outcrop north of Sydney, Australia, the research team unearths a rock covered in fossil leaves of the extinct 'seed fern' Dicroidium*; credit: C. Mays.*

With more than 80% of ocean species wiped out, the end-Permian event was the worst mass extinction of all time. But the impacts of this event on life on land have been elusive. By examining fossil plants and rocks from eastern Australia's Sydney Basin, researchers have pieced together a multi-million-year story of resilience, recovery, and the long-term effects of climate change.

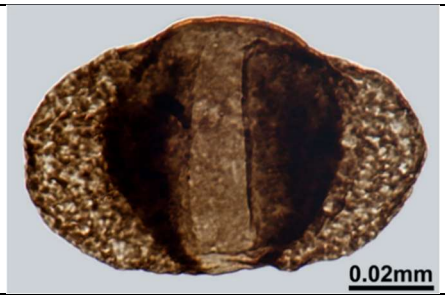
The fossils from these Australian rocks show that conifers, like modern pines, were some of the earliest to colonize the land immediately after the End-Permian catastrophe. But the recovery back to flourishing forests was not smooth sailing.

The researchers discovered that even higher temperatures during the 'Late Smithian Thermal Maximum' caused the collapse of these conifer survivors. In turn, they were replaced by tough, shrubby plants resembling modern clubmosses. This scorching period lasted for about 700,000 years and made life challenging for trees and other large plants.

It wasn't until a significant cooling event—the 'Smithian-Spathian Event'—that large, but unusual plants called 'seed ferns' began to flourish and establish more stable forests. These plants eventually came to dominate Earth's landscapes for millions of years, paving the way for the lush forests during the Mesozoic Age of Dinosaurs.

After millions of years, the forest ecosystems of the Mesozoic came to look like those from before the end-Permian collapse. But crucially, the plant species that made up the new forests were completely different. "The term 'recovery' can be

misleading" says Dr Chris Mays, Leader of the Mass Extinction Group at University College Cork, "forests recover eventually, but extinction is forever."



Microscopic pollen shed by the Dicroidium plant (scale bar = 0.02 mm); credit: M. Amores

By understanding how ancient plant ecosystems weathered extreme climate swings, researchers hope to learn valuable lessons about how modern plants and ecosystems might cope with today's climate crisis. Ecosystems depend on a fragile balance, with plants as the backbone of land food webs and climate regulation.

"This research highlights how crucial plants are, not just as the base of land food chains, but also as natural carbon sinks that stabilize Earth's climate," explains PhD Student, Marcos Amores, the study's lead author. "The disruption of these systems can have impacts lasting hundreds of thousands of years, so protecting today's ecosystems is more important than ever."

Amores, M., Frank, T. D., Fielding, C. R., Hren, M. T., & Mays, C. (2025). Age-controlled south polar floral trends show a staggered Early Triassic gymnosperm recovery following the end-Permian event. *Geological Society of America Bulletin*.

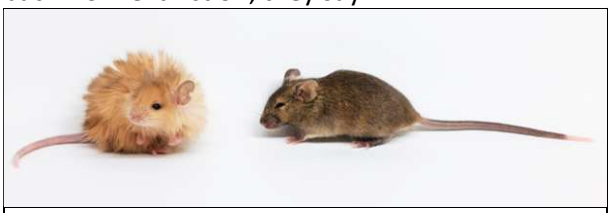
Hoping to revive mammoths, scientists create 'woolly mice'

https://www.npr.org/sections/shots-health-news/2025/03/04/nx-s1-5299962/woolly-mammoth-extinction-mice-genetic-engineering

March 4, 2025, Heard on All Things Considered

by NPR's Rob Stein

The woolly mouse, a breed created by scientists using genetic engineering, is the first step toward reviving a version of the extinct woolly mammoth. Scientists have genetically engineered mice with some key characteristics of an extinct animal that was far larger — the woolly mammoth. This "woolly mouse" marks an important step toward achieving the researchers' goal — bringing a woolly mammoth-like creature back from extinction, they say.



One of Colossal's wooly mice compared to an ordinary lab mouse.

"For us, it's an incredibly big deal," says Beth Shapiro, chief science officer at Colossal Biosciences, a Dallas company trying to resurrect the woolly mammoth and other extinct species.

The company announced the creation of the woolly mice March 2, 2025 in a news release and posted a scientific paper online detailing the achievement. Scientists implanted genetically modified embryos in female lab mice that gave birth to the first of the woolly pups in October.

"This is really validation that what we have in mind for our longer-term de-extinction project is really going to work," Shapiro told NPR in an interview. The company says reviving extinct species like the mammoth, the dodo and others could help repair ecosystems. Critics, however, question whether de-extinction would be safe for the animals or environment.

Shapiro and her colleagues started by trying to identify the genes responsible for making mammoths distinctive. They compared ancient samples of genetic material from mammoths with genetic sequences of African and Asian elephants, the mammoth's closest living relative. These included genes for long, woolly hair and a way of metabolizing fat that helped the animals survive well in the cold. "And then we look in the mouse for those same genes and instances where those genes have been involved with making a woolly coat, or longer hair, or changing the color of the hair," Shapiro says.

The researchers used the latest genetic engineering techniques to make a combination of modifications based on what they found in the mammoth genomes and in mouse DNA in the hopes the changes would produce the desired attributes in the offspring. And the experiment appears to have worked.

"We ended up with some absolutely adorable mice that have longer, woolly, golden-colored coats," Shapiro says.

The mice also have fat similar to that of the mammoth, Colossal says, enabling them to survive in cold weather. "This is exciting to us because it confirms that the genes and gene families that we identified using our comparative genomics approach really do cause an animal to have a woolly coat and a golden coat and longer hairs," Shapiro says. "And this is the way that we're going to create mammoths for the future."

They hope to do that by editing the genes in the embryos of Asian elephants and implanting the modified embryos into female elephants so that they can give birth to calves with the key traits that made the mammoths distinctive.

Other researchers say the woolly mice are exciting. "I'm pretty skeptical about this, but that mouse is pretty adorable," says Vincent Lynch, a professor of biology at SUNY Buffalo. "And for people like me who want to understand the genetic basis of traits, this is particularly impressive."

"Our intention is to re-create these extinct species that played really important roles in ecosystems that are missing because they've become extinct," Shapiro says. In addition, the technologies the company is developing could be used to try to protect living species, says Ben Lamm, Colossal's co-founder and CEO.

"Current conservation models work. They just don't work at the speed at which we are changing the planet and eradicating species," Lamm says. "So we need new tools and technologies so we can engineer life in a better way that's more adaptable to be co-existent with humans."

Colossal hopes to produce mammoth-like Asian elephant embryos by next year and their first calves by 2028.

Fossil discovery in the Geiseltal Collection: researchers identify unique bird skull

Martin Luther Universität Halle-Wittenberg press release issued January 22, 2025.

Around 45 million years ago, a 4.6 feet-tall (1.40 metres) flightless bird called *Diatryma* roamed the Geiseltal region in southern Saxony-Anhalt. Researchers now report on the bird's fully preserved skull unearthed in the 1950s in the Geiseltal in Germany. It was initially misclassified and led a shadowy existence until its rediscovery. The only other place that a similar skull fossil has been found is the USA.

The Geiseltal Saxony-Anhalt was a lignite mining area until 1993. Numerous exceptionally well-preserved animal fossils have been unearthed there. The Geiseltal Collection at MLU comprises 50,000 fossils and is considered a national heritage asset. These fossils offer unique insights into the evolution of animals and the Eocene Epoch around 45 million years ago.

At that time, the Geiseltal was a warm, tropical swamp. Ancient horses, early tapirs, large land crocodiles as well as giant tortoises, lizards and numerous birds lived here. Some of the latter were flightless and the largest of these was *Diatryma*, an herbivore with a gigantic beak which stood around 4.6 feet high. Up until ten years ago, it was assumed that *Diatryma* hunted prehistoric horses. More recent investigations have found that the bird was, in fact, an herbivore.

For many years no one knew that an almost completely preserved skull of *Diatryma* was part of the collection. "The find was misidentified as a crocodile skull," says co-author Michael Stache, a geological preparator at MLU's Central Repository of Natural Science Collections. Stache came across the fossil again by chance several years ago. He realized the mistake and got to work, restoring and then analyzing the piece of skull. He combined the fossil with another object from the collection, reconstructing an almost entire skull. Lead author Dr. Gerald Mayr examined the find more closely and realized its importance: the skull clearly belonged to a *Diatryma*. Only one other fully preserved skull is known to exist and it is housed in the American Museum of Natural History.

"This shows once again that many of the most interesting discoveries in paleontology occur in museum collections," said Dr. Mayr.

Gerald Mayr, Cécile Mourer-Chauviré, Estelle Bourdon, Michael Stache. Resurrecting the taxon Diatryma: A review of the giant flightless Eocene Gastornithiformes (Aves), with a report of the first skull of Diatryma. *Palaeontologia Electronica*, 2024; Read the paper at DOI: 10.26879/1438

CALENDAR OF EVENTS

April

Tuesday April 1, FOSSIL MEETING 7:00 PM. Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534. Member Gerry Kloc reports on latest paleontology news. Visitors welcome.

Tuesday April 22, RAS ANNUAL MEETING 7:00 PM. RIT Carlson Center for Imaging Science, Room 1125, 54 Lomb Memorial Drive, Rochester, NY 14623.

Saturday, April 26, FIELD TRIP: Split Rock Quarry near Syracuse.

May

Tuesday May 6, FOSSIL MEETING 7:00 PM. LOCATION: Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534. Michael Grenier on latest Dinosaur Research. Visitors are welcome.

Saturday, May 3, FIELD TRIP: The Gulf at Lockport.

Saturday, May 24, FIELD TRIP: Watertown/Rodman Area.

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.

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.

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The FossiLetter 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. The deadline for submissions to the Fossiletter 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.

We imagine that the next step will be to create wooly mice with long curvy tusks followed by mice with a long flexible proboscis. When released into the Siberian tundra will these cute little mice survive?