A publication of the Rochester Academy of Science
FOSSIL SECTION

The FOSSILETTER

VOL. 42 Number 2 November 2024

November Meeting

The November Rochester Academy of Science Fossil Section meeting is on Tuesday, November 12, at 7:00 PM. It is not on the usual first Tuesday so as not to conflict with election day. **Note the change in time.** Due to the closing time at our new location, it is advised to start earlier. 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 log in are in the accompanying email. Refreshments will be served.

Dr. Judith Massare

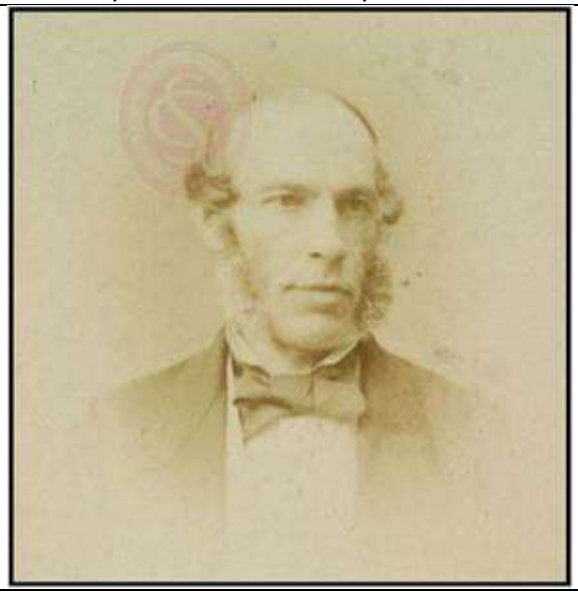
SUNY Brockport Professor Emerita Dr. Judy Massare will speak on "***The Charles Moore Collection of Lower Jurassic Ichthyosaurs***." She will discuss how collections amassed in the 19th Century are still relevant to research today. Judy is one of the leading researchers and experts on Mesozoic marine reptiles, especially ichthyosaurs. She describes herself as "Retired but still active in research on Lower Jurassic ichthyosaurs of the UK and Upper Jurassic ichthyosaurs from the Sundance Formation, Wyoming."

We last had Judy speak with us in 2016, so we are looking forward to this opportunity. She writes to us, "My present research is focused on taxonomy of Lower Jurassic ichthyosaurs. However, taxonomy makes for boring talk unless you are fascinated by computer generated phylogenies or the shapes of various bones. Instead, I would like to talk about the contribution of 19th century collectors to current research in paleontology, specifically my research on ichthyosaurs. The contributions of Mary Anning of Lyme Regis are well known (finally), but specimens were also being discovered in quarries around the village of Street in Somerset. None of those quarries exist today, but we have an outstanding record of ichthyosaurs from Somerset, albeit without precise stratigraphic data. In fact, the research collections of marine reptiles in major museums in England were built through purchases and donations of collections made in the 19th century.

"One collector in particular, Charles Moore (1815-1881) of Bath, England, is often overlooked. He was a self-taught paleontologist and geologist. Growing up in a modest, working-class family, he married into money in the 1850s and was able to pursue his passion for geology and paleontology full-time. In 1855, he persuaded the Bath Royal Literary and Scientific Institution to let him use their large lecture hall for a free public museum. After his death, the ups and mostly downs of the Institution led to the dispersal of much of his invertebrate collection, but the ichthyosaurs, being large, heavy, framed specimens, remained together. Since 1963, they have been on long-term loan to the National Museum of Wales, in Cardiff.

"The collection has many nearly complete skeletons of all the major genera of the Lower Jurassic. Unlike the impressive collection at the Natural History Museum, London, these are accessible for detailed study. Highlights include

one of the largest, most complete skulls of *Temnodontosaurus platyodon*, the largest marine predator of the Lower Jurassic, as well as what is probably the smallest specimen of that species. The collection includes three skeletons of *Protoichthyosaurus* (including the type specimen), ten skeletons of *Leptonectes tenuirostris* (~20% of all known skeletons), and five skeletons of *Ichthyosaurus somersetensis* (and a cast of the type specimen), as well as more fragmentary specimens. My present research is on *Leptonectes tenuirostris* and the collection presented some surprises. Beyond taxonomy, the collection has the potential for taphonomic studies and biostratigraphic work that could identify the zones from which the specimens were collected. All this potential research from a private collection that survived the collector by more than a century."



Portrait of Charles Moore c.1870, well-respected English amateur geologist and renowned fossil collector. Image courtesy of The Geological Society of London, https://www.geolsoc.org.uk/

Membership Renewal Time

Unless you are a life member, note that your membership will expire on December 31st, 2024. Don't wait—renew now while you are thinking of it. You can get a membership form or even complete the renewal at **rasny.org/mbform.pdf**.

President's Report **by Dan Krisher**

The Section held its first meeting of the 2024-2025 season on Tuesday 10/1 in its new venue at the Pittsford Community Center. The short business portion of the meeting featured a brief overview of the Section's upcoming schedule and activities for the next few months.

The evening's speaker was Dr. William Korth, Emeritus Professor of Biology, Nazareth University. Dr Korth's talk was titled "Taphonomy of Miocene Fossil Sites in Kansas or How Did Those Fossils Get There." The science of taphonomy is the study of the processes that occur between the time of death and fossilization.

The November Section meeting will be held on 11/12 due to elections. The speaker for the meeting will be Dr. Judy Massare and she will update us on her ongoing ichthyosaur research.

Volunteers Needed at RAS Paper Session on November 16

Fossil Section will have its outreach display tables set up at the 50th Annual Rochester Academy of Science Fall Scientific Paper Session. on November 16 at 1 PM at SUNY Brockport Edwards Hall. We need a few members to help us with that. Please contact Michael Grenier at paleo@frontier.com.

The tables will be staffed during the two Poster sessions. This is from 10:30AM to 1PM. Please consider coming earlier to help with the set-up. You might find some of the talks going on earlier to be of interest also.

Scientific Paper Session

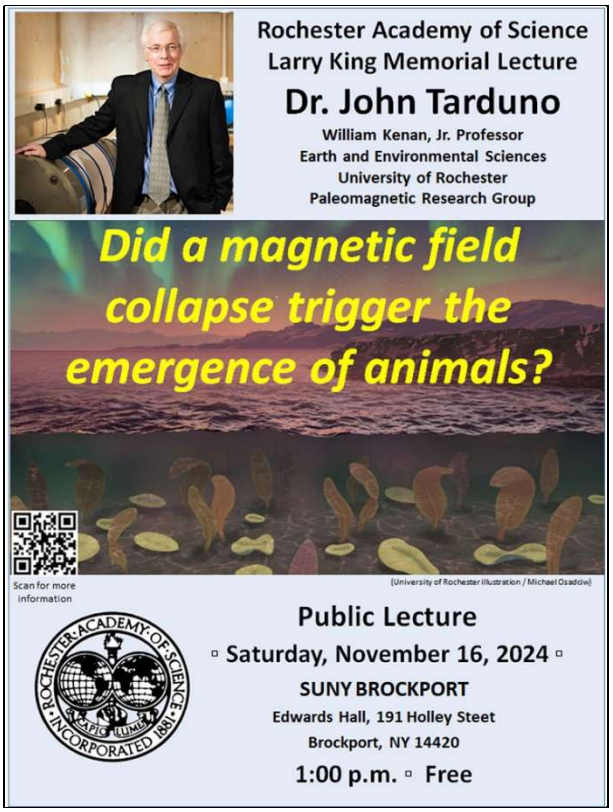
The 50th Rochester Academy of Science Fall Scientific Paper Session will be held at the Nazareth College Shults Center and Peckham Hall this coming Saturday November 6th. One hundred and five research studies will be reported as posters or oral presentations across a wide range of disciplines including a paleontology talk--*TENTACULITES MINUTUS* HALL 1843 – ADVENTURE IN CURATION OF A SILURIAN MICROFOSSIL by Dr. D. Jeffrey Over, SUNY Geneseo.

If you plan to come, please register (free!) at https://rochesteracademyofscience.godaddysites.com/paper-session.

At 1PM we have the John Tarduno presentation, *Did a magnetic field collapse trigger the emergence of animals?* This is on the emergence of bilaterians

(most modern animals--those with bilateral symmetry). We featured this exciting paleontological research into the Ediacaran Period in our June issue, so see that for more details.

The Ediacaran Period, spanning from about 635 to 541 million years ago, was a pivotal time in Earth's history. It marked a transformative era during which complex, multicellular organisms emerged, setting the stage for the explosion of life. But how did this surge of life unfold and what factors on Earth may have contributed to it? Come to this lecture to learn all about it.



October Meeting Recap

by Michael Grenier

On October 1, we had Dr. William Korth of SUNY Fredonia discussing what we can learn from the condition, number, and arrangement of vertebrate fossils about the animals in life, how they died, and what happened to their remains after death. Taphonomy is the study of how organisms decay and become fossilized or preserved in the paleontological record. How they are preserved tells us much about how they lived.

In this talk, Bill presented four case studies from his own finds. For example, he found two rhinoceros buried together, but the older fossil was weathered from being exposed for a long time and the younger was buried shortly after death. The sedimentary structure and clay ball inclusions showed that they had died at separate times and were then buried together in a landslide.

You can watch the video of the talk to learn more at https://youtu.be/Q9cAZ5WqDXI.

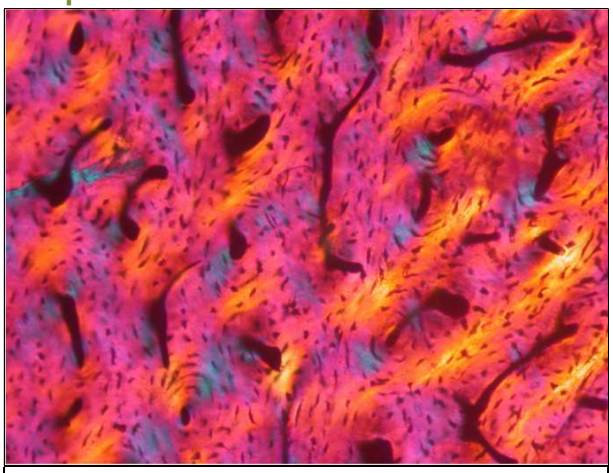
December Meeting

To give everyone time to prepare and to ensure it is on everyone's schedule, we remind you that our December meeting is our annual holiday pizza party and Show-and-Tell, with pizza and drinks being provided by the section. The meeting is Tuesday, December 3rd at the Pittsford Community Center, 35 Lincoln Ave, Pittsford, NY 14534 at 7:00 PM.

Members are asked to bring their interesting finds and any specimens in need of identification. This is a great opportunity to show off your finds from the past year. Visitors are welcome. Don't worry if what you have is not flashy, fossils rarely are. Many specimens which appear at first glance to be bland may turn out to be something rare or unusual. If you have specimens which are defying identification, bring them along. Between us we usually have enough knowledge to put a name to something.

Bring children. We will have a table set up where they can pick fossils. We will also have a kid's raffle for those 17 and younger in which every one of them will win a prize. These are donated toys, games, and books.

2024 *BMC Ecology and Evolution* image competition—one with a fossil



BMC Fig. 9. Inside a dinosaur bone: Unlocking the life history of Megapnosaurus*. Attribution: Anusuya Chinsamy-Turan*

In 2024, researchers from around the world entered the *BMC Ecology and Evolution* photography competition. These photographs had to be in one of the following four categories: 'Research in Action', 'Relationships in Nature', 'Protecting our planet', and 'Life close-up'. Last year 'Paleoecology' was one of the categories which made nice photos for us.

However, one of the winning images of the 'Life close-up' category is of a fossil! To see winners in the other categories, visit the website, which is well worth seeing.
https://bmcecolevol.biomedcentral.com/articles/10.1186/s12862-024-02291-6

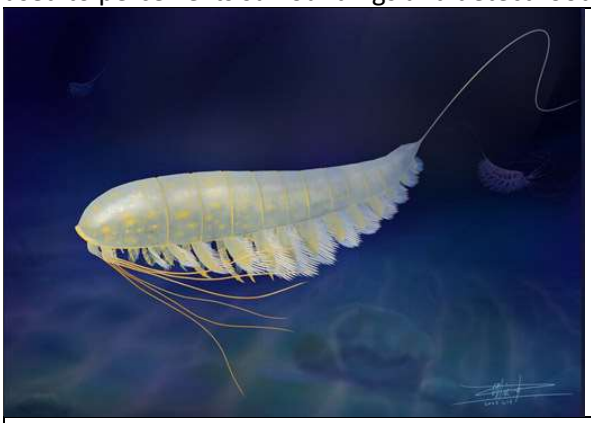
Fossil News **submitted by David Bishop**

***Fossil hunters strike gold with new species*.** By Jim Shelton. Ancient "gold" bug fossils, infused with pyrite, have been identified as a new species of arthropod. Yale University press release issued October 29, 2024.
https://news.yale.edu/2024/10/29/megacheiran-candidate-fossil-hunters-strike-gold-new-species

Paleontologists have identified fossils of an ancient species of bug that spent the past 450 million years covered in fool's gold in central New York. The new species, *Lomankus edgecombei*, is a distant relative of modern-day horseshoe crabs, scorpions, and spiders. It had no eyes, and its small front appendages were best suited for rooting around in dark ocean sediment, back when what is now New York state was covered by water. *Lomankus* also happens to be bright gold — thanks to layers of pyrite (fool's gold) that have crept into its remains. And the gold color isn't just for show. The pyrite, located in a fossil-rich area near Rome, New York, known as "Beecher's Bed," helped to preserve the fossils by gradually taking the place of soft-tissue features of *Lomankus* before they decayed.

"These remarkable fossils show how rapid replacement of delicate anatomical features in pyrite before they decay, which is a signature feature of Beecher's Bed, preserves critical evidence of the evolution of life in the oceans 450 million years ago," said Derek Briggs, the G. Evelyn Hutchinson Professor of Earth and Planetary Sciences in Yale's Faculty of Arts and Sciences. Briggs is a co-author of a new study in Current Biology describing the new species. He is also a curator at the Yale Peabody Museum. [Editor's note: Dr. Briggs has also been a popular speaker at our recent meetings.]

Briggs and his co-authors said *Lomankus*, which is part of an extinct group of arthropods called Megacheira, is evolutionarily significant in several ways. Like other Megacheirans, *Lomankus* is an example of an arthropod with an adaptable head and specialized appendages (a scorpion's claws and a spider's fangs are other examples). In the case of *Lomankus*, its front appendages bear a trio of long, flexible, whip-like flagella — which may have been used to perceive its surroundings and detect food.



This life reconstruction image shows Lomankus edgecombei *in what would have been its natural marine environment. (Illustration by Xiaodong Wang)*

The *Lomankus* fossils show that Megacheirans continued to evolve and diversify for longer than previously thought. *Lomankus* is one of the only

known Megacheirans to have survived past the Cambrian Period (485 to 541 million years ago) and into the Ordovician Period (443 to 485 million years ago). Paleontologists believe Megacheirans were largely extinct by the beginning of the Ordovician Period.

In these images, the morphology of Lomankus edgecombei *was reconstructed using computed tomography. The fossils are infused with pyrite (fool's gold), causing the gold color.*

The site where they were discovered, Beecher's Bed, is named after Charles Emerson Beecher, who was head of the Yale Peabody Museum from 1899 until 1904. Beecher published classic papers on the anatomy and relationships of trilobites from the site.

Briggs' first paper on Beecher's Bed fossils was published in 1991, and as curator of invertebrate paleontology at the Peabody in the early 2000s (and subsequently director of the museum), he arranged for Yale to lease the site for field studies until 2009.

Paleontologist Yu Liu of Yunnan University in China, co-corresponding author of the study, contacted Briggs about the new fossils from Beecher's Bed, which he had acquired from a Chinese fossil collector. The new fossil specimens were donated to the Peabody Museum. Luke Parry, Briggs' former postdoc with whom he was already collaborating on research about similar fossils, took the lead on this study.

"The preservation is remarkable," Briggs said. "The density of the pyrite contrasts with that of the mudstone in which they were buried. Their details were extracted based on computed tomography [CT] scanning, which gave us 3D images of the fossils."

This paper, Luke A. Parry, Derek E.G. Briggs, Ruixin Ran, Robert J. O'Flynn, Huijuan Mai, Elizabeth G. Clark, Yu Liu. **A pyritized Ordovician leanchoiliid arthropod**. *Current Biology*, 2024 is available at DOI: 10.1016/j.cub.2024.10.013

Symbiosis in ancient Corals

Max Planck Institute for Chemistry press release issued October 23, 2024.
https://www.mpic.de/5609113/symbiosis-in-ancient-corals

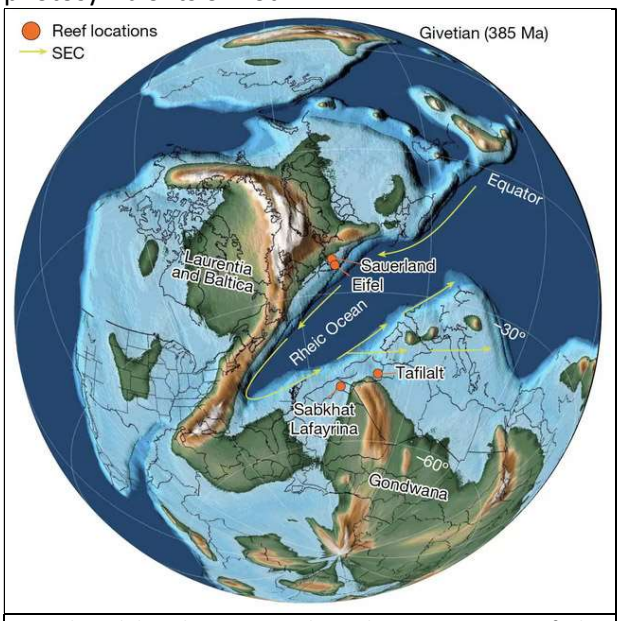
A research team led by researchers from the Max Planck Institute for Chemistry in Mainz has used nitrogen isotope analysis to demonstrate that 385 million years old corals from the Eifel and Sauerland regions had symbionts. This is the earliest evidence of photosymbiosis in corals. Photosymbiosis might explain why ancient coral reefs grew to massive sizes despite being in nutrient-poor environments.

Modern reef building corals evolved in the Triassic Period around 250 million years ago. They can live in symbiosis with tiny organisms, often algae, which can carry out photosynthesis. This photosymbiosis is particularly beneficial in nutrient-poor waters because it helps the corals to recycle scarce nutrients.

An example of a Middle Devonian reef limestone (polished section) from the Hönnetal in the Sauerland region with the branching soil coral Thamnopora *sp. Scale 1 cm. This coral was one of the most important reef-building corals of the Devonian geological period worldwide. Credit: Simon Felix Zoppe, 2021*

Corals already existed in the Devonian period, over 385 million years ago, for example in the Eifel and Sauerland regions in Germany. Fossilized corals of the extinct orders Tabulata ("honeycomb corals") and Rugosa ("horn corals ") found in these regions indicate that the Rhenish Massif was once covered by a tropical sea during the Middle

Devonian period, where huge reefs thrived. However, it was not known whether the extinct groups of corals of the Devonian had photosymbionts or not.



The globe shows a geological reconstruction of the continents during the Middle Devonian, more precisely the Givetian stage about 385 million years ago. The locations of the fossil corals that were analyzed are marked: Sauerland, Eifel, Tafilalt (Morocco) and Sabkhat Lafayrina (Western Sahara). The arrows indicate the direction of the former South Equatorial Current, a permanent warm ocean current. Credit: Jonathan Jung/MPIC

The researchers were able to demonstrate the symbiosis by comparing nitrogen isotope values in the organic material of today's symbiotic and of non-symbiotic corals. Nitrogen isotope values, specifically the ratio of "heavy" nitrogen (^{15}N) to "light" nitrogen (^{14}N), are suitable to differentiate between different stages of the food pyramid. For example, researchers can analyze the nitrogen isotopes to determine whether a living organism has a vegetarian or meat-based diet. The higher an organism is in the food pyramid, the higher its nitrogen isotope value. This is because organisms metabolize lighter nitrogen more quickly than heavier nitrogen, leading to easier excretion of the lighter isotope.

Analyzing modern corals revealed a consistent difference: corals that obtain their energy primarily from the photosynthesis of symbiotic algae have lower nitrogen isotope values. In contrast, corals that feed themselves by actively catching plankton have nitrogen isotope values that are higher.

Jonathan Jung, first author of the study, says: "The constant difference in nitrogen isotope values is in line with our expectations and shows the typical jump in the food chain." The researchers analyzed freshly collected fossil corals from the Sauerland, and museum specimens from the Eifel, the Western Sahara and Morocco. The difficulty lies in the fact that, in fossils, the proportion of organic material required for analysis is extremely low. The laboratory team used a novel analytical method that only requires a few milligrams of finely ground fossil coral material.

The fossils also revealed a consistent difference in nitrogen isotope values among individual coral species. Typically, the colony-forming Tabulata corals showed significantly lower nitrogen isotope values which led the scientists to conclude that they were already living in photosymbiosis during the Middle Devonian period. The solitary Rugosa corals had higher values indicating that they did not.

This method aids in understanding the extent to which the mass extinction of corals and other reef inhabitants towards the end of the Devonian period is connected to ocean nutrient levels. This could, in turn, offer valuable insights into contemporary coral ecosystems.

New York Fossils Reveal Extra Set of Trilobite Legs
American Museum of Natural History press release issued on Sep 12, 2024.
https://www.amnh.org/explore/news-blogs/research-posts/trilobite-extra-legs

An extremely well-preserved fossil of Triarthrus eatoni from upstate New York. Daniel Kim /© AMNH

Because of their hard exoskeletons and ability to molt, trilobite fossils are a relatively common find, but rarely do they preserve the soft parts of the animal. Now, newly recovered, exceptionally well-preserved trilobite fossils from upstate New

York have led to a new discovery: an extra pair of legs.

Examining these fossils, which are described today in the journal *Palaeontology*, is "just like looking at the appendages of horseshoe crabs on a beach by grabbing them and turning them upside down," said lead author Jin-Bo Hou from Nanjing University. Hou conducted the study with coauthor Melanie Hopkins, curator and chair of the Museum's Division of Paleontology.

Trilobites are a group of marine arthropods that lived for almost 300 million years until 250 million years ago, when Earth experienced the largest mass extinction in its history. Their closest living relatives today include lobsters and spiders.

Like other arthropods, the bodies of trilobites were made up of many segments. The segments were associated with appendages, which range from antennae used for sensing to legs that moved the animal along the sea floor and assisted with feeding.

Curator and study co-author Melanie Hopkins holding an extremely well-preserved fossil of Triarthrus eatoni from upstate New York. Daniel Kim /© AMNH

"The number of these segments and how they are associated with other important traits, like eyes and legs, is important for understanding how arthropods are related to one another, and therefore, how they evolved," Hopkins said.

Counting those segments, especially in the trilobite's fused head, has been a challenge. To infer the number of segments, researchers look at the grooves on the upper side of the trilobite fossil's hard exoskeleton and then compare it to the pairs of preserved antennae and legs on the underside of the fossil. But because the soft appendages of trilobites are rarely preserved, there often is a mismatch between these two methods.

Exceptionally preserved Triarthrus eatoni *underside.*

In the new study, Hopkins and Hou examined exceptionally well-preserved specimens of *T. eatoni* from upstate New York, finding an additional, previously undescribed leg underneath the head, no doubt, one of a pair. By making comparisons with another well-preserved trilobite species, *Olenoides serratus* from British Columbia, the researchers propose a model for how appendages were attached to the head in relation to the grooves in the exoskeleton. This model resolves the apparent mismatch and suggests that the trilobite head included six segments: one associated with the developmental origin of the eyes and five additional segments, associated with one pair of antennae and four pairs of walking legs.

Hou and Hopkins have previously shown that the walking legs of T. eatoni carry micron-sized respiratory structures (gills) and that the function of some of the spines on the walking legs was to keep these gills clean. This study expands upon that work.

CALENDAR OF EVENTS

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.

December

Tuesday December 3, FOSSIL MEETING 7:30 PM. Pittsford Community Center, Room 019, 35 Lincoln Ave, Pittsford, NY 14534. Our traditional Show-and-Tell with pizza and drinks provided by the section. This is a great opportunity to show off your finds from the past year. Visitors welcome.

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.

Tabulate coral Emmonsia emmonsii *from the Devonian Onondaga Limestone of Genesee County, New York (PRI 76736). Specimen is from the collections of the Paleontological Research Institution, Ithaca, NY.*