

A publication of the **Rochester Academy of Science** FOSSIL SECTION

The FOSSILETTER

VOL. 41

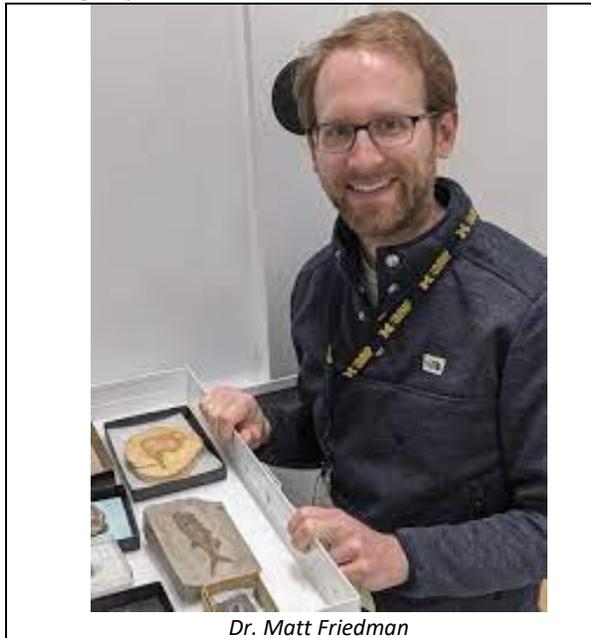
Number 4

February 2022

February Meeting

The February section meeting is on Tuesday, February 7th at 7:30 PM. This meeting will be on Zoom only. The Zoom Link is included in the cover email for this issue.

Our speaker is Dr. Matt Friedman, Associate Professor in the Department of Earth and Environmental Science at the University of Michigan and Director at the UM Museum of Paleontology. As with many of our speakers, there is a Rochester connection. Raised in the Cleveland area among Devonian outcrops, he developed an interest in earth science and paleontology. This brought him to the University of Rochester where he received his B.S. in biology and geology in 2002. He went on to Cambridge for his Masters in zoology (2004) and to University of Chicago for his Ph.D. in evolutionary biology (2009). He is a leading expert in the evolution of fishes.



Dr. Matt Friedman

Although the Devonian is often popularly called “The Age of Fish,” this is a misnomer. Fish were not more populous than today nor more dominant nor more diverse at that time. Dr. Friedman will

speaking on “*The Ages of Fishes.*” reviewing important steps in the evolution of ray-finned fishes from the late Devonian up through the present with a focus on the Devonian/Carboniferous and in the late Cretaceous/early Cenozoic. He works with exciting though understudied fossils, with CT scanning, with molecular phylogenetic analysis, and with other techniques to understand the evolutionary history of fishes.

Actinopterygian fishes (ray-finned fishes) make up half of all vertebrates, with about 30,000 known species. The earliest known fossil actinopterygian is *Andreolepis*, found in both shallow and deeper marine sediments that date back to the late Silurian. Ray-finned fishes lived throughout the Devonian, but were a minor part of the fish communities. They underwent a major radiation during the Carboniferous and became dominant. During the Mesozoic and Cenozoic teleost ray-finned fish diversified widely and now 96% of living fish species are teleosts. Non-teleost actinopterygians today include paddlefishes and sturgeons, gars, and bowfins.

President's Report by Dan Krisher

The Section’s December meeting was held on December 6th and featured the return of our annual pizza party and show-n-tell which was last held in 2019. A wide range of fossils were on display and the event was well attended. The meeting also featured the long-awaited raffle for Eurypterid fossils from the estate of long time member and renowned eurypterid researcher Sam Ciarca. All members who attended left with an example of the New York State fossil from Sam’s collection.

On December 31st, the Section participated in an outreach event at the Rochester Museum and Science Center. Section members John Handley, Michael Grenier, Fred Haynes, and Dan Krisher

staffed the display which was crowded throughout most of the event.

As is tradition, the Section did not have a January meeting.

Upcoming Meetings

March - Dr. Derek Briggs (Yale) on “*Remarkable fossils from Sam Ciurca’s eurypterid collection.*”

April - Gerry Kloc on Silurian Trilobites

May - Dr. Jennifer Olori on Devonian tetrapods

June - Picnic at ASRAS observatory

Correction: GSA Meetings Announcement

Two of the reported dates and locations in our December issue were incorrect for the 2023 GSA Sectional meetings. Following is the corrected information. Date in parentheses is the due date for Abstracts.

South-central: 17–19 March 2023, Reston, VA (6 Dec. 2022).

<https://www.geosociety.org/GSA/Events/SectionMeetings/GSA/Sections/se/2023mtg/home.aspx>

Southeastern-Northeastern: 13–14 March 2023, Stillwater, OK (13 Dec. 2022)

<https://www.geosociety.org/GSA/Events/SectionMeetings/GSA/Sections/sc/2023mtg/home.aspx>

Buffalo Geological Society’s 53rd Annual Gem-Mineral-Fossil Show

by Jerry Bastedo, Show Chairman

“Fossils of New York” will be featured at the Buffalo Geological Society’s 52nd Annual Gem, Mineral and Fossil Show on March 19-20, 2022, featuring Fossils of New York, at the Erie County Fairgrounds in Hamburg in the Grange, Market and NYS Police Buildings.

This annual show provides an instant museum of Buffalo Geological Society Members fossils, minerals, and jewelry; demonstrators; the famous Mini-Mine for young collectors; the new mining operation for children and adults; mineral and fossil identification; and a variety of non-profit exhibitors. This highly educational family event affords attendees the opportunity to interact with demonstrators who work with minerals and gems. Demonstrators include fossil preparation, jewelry designers, and other lapidary artists. In addition,



The Buffalo Geological Society, Inc.
53rd ANNUAL
Gem Mineral Fossil Show
DINOSAURS are coming!

Sat. March 18, 2023 9am to 7 pm
Sun. March 19, 2023 9 am to 6 pm
1 DAY ADMISSION \$7 PER PERSON • 2 DAY ADMISSION \$10 PER PERSON
Scouts in uniform & children 12 yrs & under FREE

NEW
Mining for Minerals and Fossils
Mini Mine for Children
A GREAT FIELD TRIP FOR THE FAMILY
& a real learning experience
ALSO SHOWING
DISPLAYS & INFORMATION
NYS Parks & Recreation
Reinstein Woods Nature Center
Buffalo Association of Professional Geologists
Paleontological Research Institute
Penn Dixie

Demonstrations
Beads
Jewelry
Presentations
Private Gem Collections
Unique Gifts

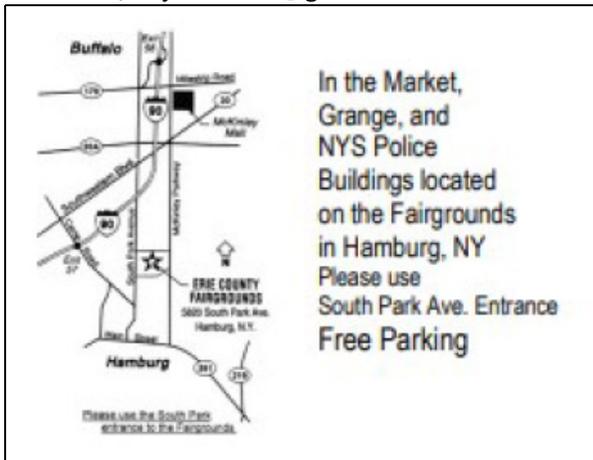
DRAWINGS & REFRESHMENTS



over 32 dealers selling gems, beads, minerals, fossils, and jewelry, selling their items from around the world. A food vendor and hourly door prizes will be available.

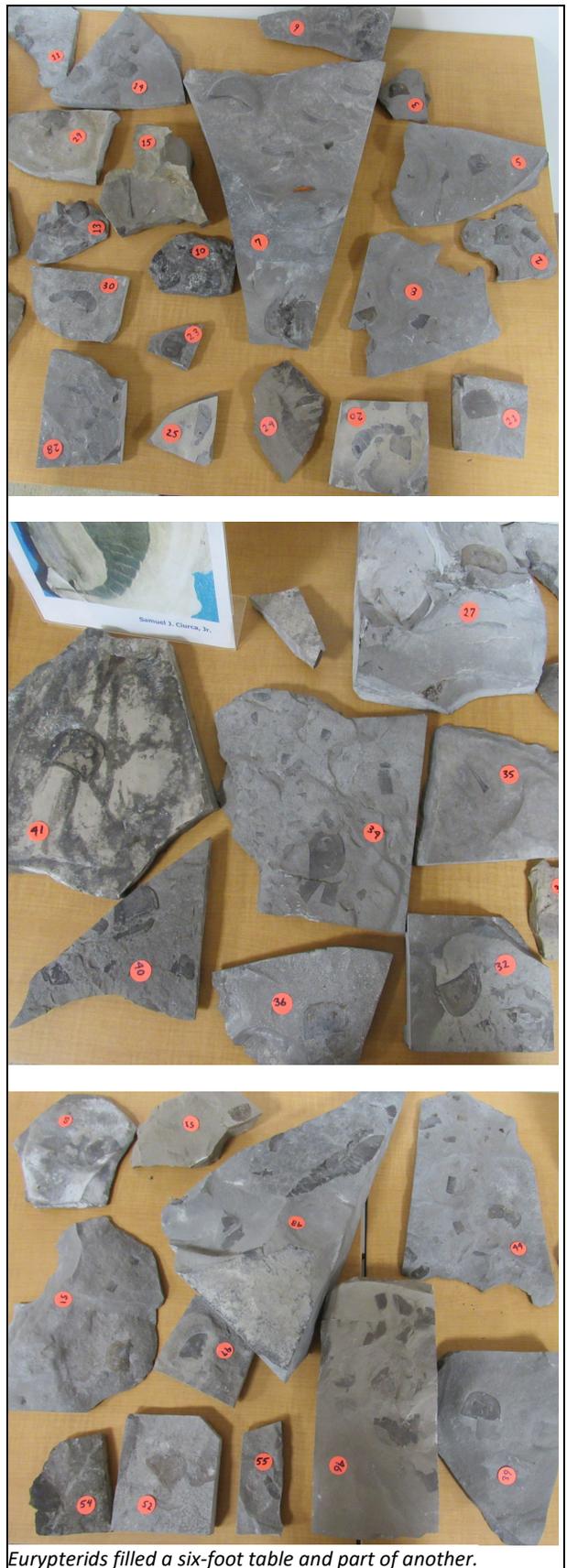
Young scientists can visit the “Mini-Mine” that offers them the chance to search for mineral specimens in a simulated mine setting. The mining operation is for young miners who can search for minerals and fossils in a bag of sand that they wash. All who attend can experience hands-on fun and learn something new about the geological sciences. Professional Geologists will be available to discuss what geologists do and what types of jobs are present in the area for geologists.

This is a perfect family field trip to learn more about the geological sciences. Boy Scouts, Girl Scouts, students, teachers, the public, and rock hounds are welcome. Adults are \$7 each, scouts in uniform and children under 12 are FREE. A 2-day admission for \$10 each is also available. Door prizes are drawn hourly. FREE parking. Wheel chair and stroller accessible. For any additional information or questions, please contact Jerry Bastedo, Show Chairman, at jcbastedo@gmail.com



December Meeting by Michael Grenier

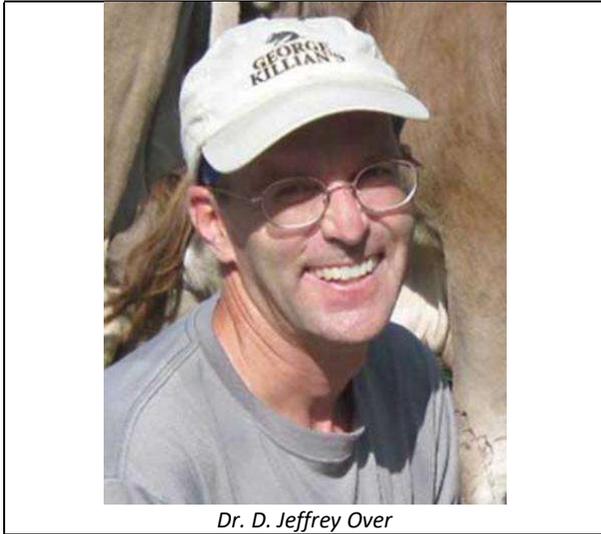
We had 27 members show up for pizza, good fellowship, sharing of fossil collections, and—of course—eurypterids. With over 50 specimens from the Samuel Cieurca specimen from which to choose, everyone got a good specimen. With everyone’s name in a tub, we drew names with first name getting first pick, until all attendees had a chance to pick what they thought was the best remaining specimen. Specimens left over will be used in our outreach programs.



Eurypterids filled a six-foot table and part of another.

Local Paleontologist Wins Honor

One of our regular speakers and long-time supporters is Dr. D. Jeffrey Over, on the Geological Sciences faculty at SUNY Geneseo since 1991. He last met with us in December 2020 and presented on “Devonian Mass Extinctions in New York.” He is on the team that is revising Devonian stratigraphy and is an editor with Charles Ver Straeten on the resulting three volume treatise coming in the *Bulletins of American Paleontology* in June this year (as we reported here in the December 2022 issue). We will be having him again as a speaker on this as soon as we can.



Jeff has now received a signal honor from the SUNY Board of Trustees. He has been awarded the rank of Distinguished Professor. This is the highest honor awarded by SUNY for faculty members.

In nominating him, SUNY Geneseo President Denise A. Battles and faculty colleagues noted his outstanding research record, international reputation in his field, passion for mentoring students, and ability to integrate his research into his teaching. The award submission recognizes Over’s body of work, “which has advanced knowledge of the interval of Devonian time some 360 million years ago that saw colonization of land by plants and vertebrate animals, including our distant ancestors, the world’s first forests, two episodes of mass extinction, and descent into an ice age.” Over’s work has appeared in respected journals, including the *Journal of Paleontology* and the *American Journal of Science*.

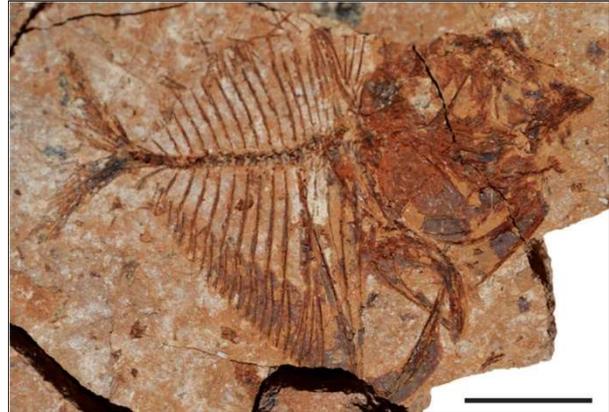
Congratulations, Jeff, from all your friends at the Rochester Academy of Science. – *Michael Grenier*

Fossil News edited by Michael Grenier

Egyptian fossil surprise: Fishes thrived in tropics in ancient warm period, despite high ocean temperatures

University of Michigan Press release issued: May 25, 2021. <https://news.umich.edu/egyptian-fossil-surprise-fishes-thrived-in-tropics-in-ancient-warm-period-despite-high-ocean-temperatures/>

This one is a little late, perhaps, to be considered “news,” but since our February speaker, Matt Friedman, is a co-author, I thought it would be of interest to our readers to see the sort of research in which he is involved.



El-Sayed et al. Figure 3G. Paleotropical ichthyofauna from Ras Gharib A, eastern Egypt, deposited at the Mansoura University Vertebrate Paleontology Center (MUVPC) includes Mene sp., articulated specimen (MUVPC 556). The moonfish Mene, which is still alive today in the Indian and Pacific oceans, is a common fossil at Ras Gharib A. Scale bar equals 10 mm.

The Paleocene-Eocene Thermal Maximum, or PETM, was a short interval of highly elevated global temperatures 56 million years ago that is frequently described as the best ancient analog for present-day climate warming. We have often covered the PETM in these pages in discussions of climate change in the paleontological record.

Fish are among the organisms thought to be most sensitive to warming climates, and tropical sea-surface temperatures during the PETM likely approached temperatures that are lethal to some modern marine fish species, according to some estimates. However, newly discovered fish fossils from an eastern Egyptian desert site show that marine fishes thrived in at least some tropical areas during the PETM. The study, from a team of Egyptian scientists and a University of Michigan colleague, provides a snapshot of an ecosystem

during an extreme warming event and may provide insights for the future. The paper available from the editor includes 14 more beautifully done photographs of fish fossils found there.

“The impact of the PETM event on life at the time is of wide interest. But a major gap in our understanding is how life in the tropics responded, because this region is not well-sampled for many fossil groups,” said U-M paleontologist Matt Friedman. “On the basis of the scant evidence we have for fishes—remembering that this Egyptian site provides our first peek from the tropics—they seem to have weathered the PETM surprisingly well, and there are even hints that important diversification in the group might have happened around or just after this time.”



A team of paleontologists from Mansoura University Vertebrate Paleontology Center excavates fish-bearing rock layers at Ras Gharib A in Egypt. Image credit: Sanaa El-Sayed.

The lead author of the *Geology* paper is Sanaa El-Sayed of Egypt’s Mansoura University. The newly discovered fossil assemblage, known as Ras Gharib A, was excavated from a site in Egypt’s Eastern Desert, roughly 200 miles southeast of Cairo and west of the Gulf of Suez and the Sinai Peninsula. The fossils provide the first clear picture of marine bony fish diversity in the tropics during the PETM. Previous studies estimated that sea surface temperatures in some parts of the tropics likely surpassed 95 degrees Fahrenheit (35 C) at that time, suggesting dire consequences for low-latitude ocean fishes.

However, the Egyptian fossils capture an intact ecosystem with diverse fish lineages and a variety of ecologies. Several factors might help explain why the Ras Gharib A fishes seem to have weathered the PETM. First, it’s possible that the

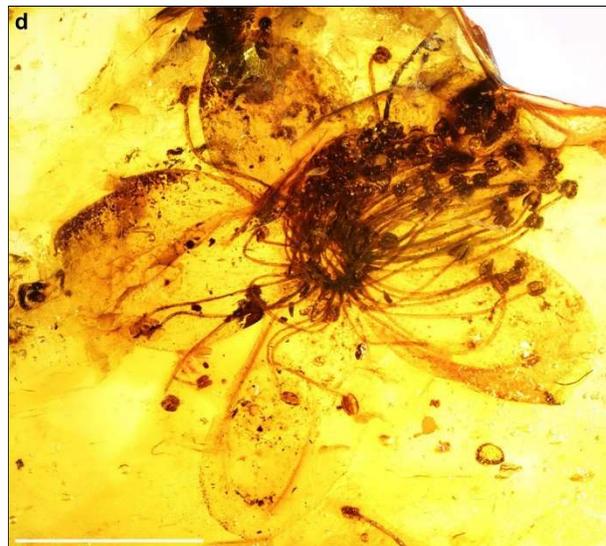
northern coast of Africa experienced an upwelling of cool water from deeper in the ocean, for example. Or perhaps fishes moved to deeper, cooler waters to avoid the warmest temperatures. Another possibility is that marine fishes at that time were simply more resilient than researchers had thought.

While the fishes from Ras Gharib A survived and may even have thrived during the PETM, coral reef ecosystems were practically wiped out at low latitudes. There is more information available at the UMichigan link at the start of this article. This paper (El-Sayed, S., Friedman, M., Anan, T., Faris, M.A. and Sallam, H., 2021. Diverse marine fish assemblages inhabited the paleotropics during the Paleocene-Eocene thermal maximum. *Geology*, 49(8), pp.993-998), is available from the editor.

The Largest Amber-Preserved Flower

Thank you to Melanie Martin for submitting this.

On January 12, 2023, *Scientific American* and much of the popular press reported on a newly published analysis of a fossil flower in amber that was first published in 1872. The authors, Eva-Maria Sadowski and Christa-Charlotte Hofmann, made the following report, taken from their abstract and introduction.



Sadowski & Hoffman Figure 1d. Flower inclusion of *Symplocos kowalewskii*. from late Eocene Baltic amber. Flower from upper side after preparation.

Amber exquisitely preserves the delicate organs of fossil flowers for millions of years. However, flower inclusions can be rare and usually do not exceed 10 mm in size. We report on an

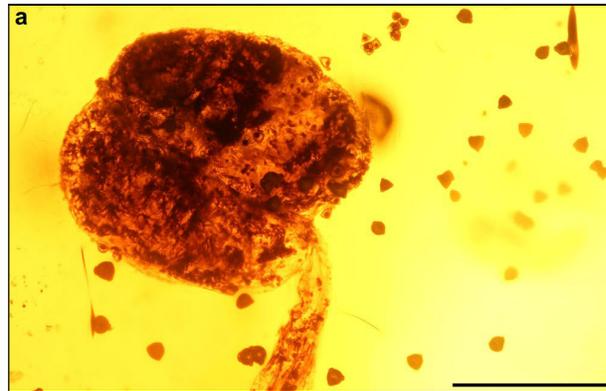
exceptionally large flower from late Eocene Baltic amber, measuring 28 mm across, which is about three times as large as most floral inclusions. This fossil was described as *Stewartia kowalewskii* over 150 years ago and has never been revised. The analysis of pollen extracted from the anthers of the flower inclusion, however, revealed strong affinities to Asian species of *Symplocos* (sweetleaf family), prompting the new combination *Symplocos kowalewskii* *comb. nov. et emend.* This fossil represents the first record of Symplocaceae from Baltic amber and supports affinities of its flora to evergreen broadleaved and mixed mesophytic forests of present-day East and Southeast Asia. The rarity of such large-sized flower inclusions is likely due to the size of the resin outpouring and its properties, which might affect the embedding of plant organs.

Amber preserves organisms 3-dimensionally and with great fidelity, including arthropods, fungi, bryophytes, lichens, as well as minute inclusions of seed plants, such as leaves, flowers, catkins and pollen. These inclusions are rare in the fossil record and therefore can yield new insights into paleo-ecosystems and their biota ranging from the Triassic up to the Cenozoic.

Inclusions of arthropods are most abundant, whereas plant inclusions are generally rare. Only 1–3% of all inclusions from late Eocene Baltic amber are botanical. However, those that are present are valuable for understanding evolution of plant lineages and paleobiogeography. We can also learn about habitats, plant diversity, and the paleoclimate of the amber source area. The exquisite preservation often allows assignment to genus or even species. Most botanical amber inclusions are small in size. For example, inclusions of detached flowers from Baltic amber mostly range between a few millimeters and about 15 mm in size, which is also the case for most flower inclusions from other amber deposits.

This study focuses on a corolla inclusion with attached stamens. The group of petals on a flower is known as the corolla. By attracting pollinators, the corolla promotes pollination and protects the reproductive organs. This one is the largest floral inclusion from all ambers known. The analysis of gross morphology and in-situ pollen extracted from the inclusion justifies its assignment to *Symplocos*,

thus making the fossil the first record of this family from Baltic amber.



Sadowski & Hoffman Figure 3a. Figure 3. Pollen extracted from anthers and the surrounding amber of *Symplocos kowalewskii*. Anther, releasing pollen. Scale bar 500 μm .

Additional information can be found at <https://www.scientificamerican.com/article/see-the-largest-flower-ever-found-encased-in-amber/>. This paper (Sadowski, E.M. and Hofmann, C.C., 2023. The largest amber-preserved flower revisited. *Scientific Reports*, 13(1), pp.1-11.) is available at <https://www.nature.com/articles/s41598-022-24549-z>.

52-million-year-old fossils from high Arctic show near-primates were cool with colder climate

University of Kansas Press release issued: January 25, 2023.

<https://today.ku.edu/2023/01/25/arctic-monkeys-52-million-year-old-fossils-prove-near-primates-were-cool-colder-climate>

Two sister species of near-primate, called “primatomorphans,” dating back about 52 million years have been identified by researchers at the University of Kansas as the oldest to have dwelled north of the Arctic Circle. According to lead author Kristen Miller, both species—*Ignacius mckennai* and *I. dawsonae*—descended from a common northbound ancestor who possessed a spirit “to boldly go where no primate has gone before.”

The specimens were discovered on Ellesmere Island, Nunavut, Canada, in layers of sediment linked with the Early Eocene Climatic Optimum (EECO), an episode of global warming characterized by the warmest sustained temperatures of the Cenozoic. “No primate relative has ever been found at such extreme latitudes,” Miller said.

“They’re more usually found around the equator in tropical regions. I was able to do a phylogenetic analysis, which helped me understand how the fossils from Ellesmere Island are related to species found in mid-latitudes of North America — places like New Mexico, Colorado, Wyoming and Montana. Even down in Texas we have some fossils that belong to this family as well.”



Artist's reconstruction of *Ignacius dawsonae* surviving six months of winter darkness in the extinct warm temperate ecosystem of Ellesmere Island, Arctic Canada. Credit: Kristen Miller, Biodiversity Institute, University of Kansas.

The Arctic Circle was much warmer when these close evolutionary cousins of primates lived — a boreal ecosystem that hosted a plethora of early Cenozoic vertebrates, including ancient crocodiles — but like today was still mostly dark for half of the year. This darkness, says Miller, may have triggered both species to evolve more robust teeth and jaws compared with other primate relatives of the time.

“A lot of what we do in paleontology is look at teeth — they preserve the best,” said Miller, who analyzed high-resolution microtomography of the fossil teeth described in the paper. “I’ve been trying to understand what they were eating, and if they were eating different materials than their middle-latitude counterparts. They were most likely very arboreal — so, living in the trees most of the time.”

Miller and her co-authors believe food was much tougher to find during dim winter months when the Arctic primate relatives likely were forced to consume harder material. “To survive those long Arctic winters, when preferred foods like fruits were not available, they had to rely on 'fallback foods' like nuts and seeds,” said corresponding author Chris Beard.

The researchers think adaptations displayed by both Arctic species during a time of global warming show how some animals likely could evolve new traits in response to climate change driven by human activity today.

This paper (Miller, K., Tietjen, K. and Beard, K.C., 2023. Basal Primatomorpha colonized Ellesmere Island (Arctic Canada) during the hyperthermal conditions of the early Eocene climatic optimum. *Plos one*, 18(1), p.e0280114.) is available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0280114#ack>.

Dinosaur’s Last Meal was Small Mammal

McGill University Press release issued: 11/7/22. <https://www.mcgill.ca/newsroom/channels/news/other-paleo-diet-rare-discovery-dinosaur-remains-preserved-its-last-meal-344495>

Microraptor was an opportunistic predator which fed on fish, birds, lizards—and small mammals. The discovery of a rare fossil reveals the creature was a generalist carnivore in the ancient ecosystem of dinosaurs. Finding the last meal of any fossil animal is rare, but Hans Larsson found a complete mammal foot inside the rib cage of the small, feathered dinosaur. Of the many hundreds of carnivorous dinosaur skeletons, only 20 cases preserve their last meals. This new find makes 21.

“There was a tiny rodent-like mammal foot about a centimeter long perfectly preserved inside a *Microraptor* skeleton. These finds are the only solid evidence we have about the food consumption of these extinct animals—and they are exceptionally rare,” says Larsson, who saw the fossil while visiting museum collections in China. Fully feathered with wings on both its arms and legs, this dinosaur is closely linked to the origin of birds. *Microraptor* was about the size of a crow and one of the smallest dinosaurs. The first specimen was discovered in Liaoning, China, around 2000. This paper (Hone, D.W., Alexander Dececchi, T., Sullivan, C., Xing, X. and Larsson, H.C., 2022. Generalist diet of *Microraptor zhaoianus* included mammals. *Journal of Vertebrate Paleontology*, p.e2144337.) is available at

<https://www.tandfonline.com/doi/full/10.1080/02724634.2022.2144337>.

CALENDAR OF EVENTS

February

Tuesday February 7, FOSSIL MEETING 7:30 PM. Virtual Meeting on Zoom. Speaker is Dr. Matt Friedman of the University of Michigan and the UM Museum of Paleontology. on “*The Ages of Fishes.*” Visitors welcome.

March

Tuesday March 7, FOSSIL MEETING 7:30 PM. Virtual Meeting on Zoom. Speaker is Dr. Derek Briggs of the Yale Peabody Museum of Natural History on "*Remarkable Fossils from Sam Ciurca's Eurypterid Collection.*". 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.

ROCHESTER ACADEMY OF SCIENCE FOSSIL SECTION

Monthly meetings are now 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, when they can be held again, are at the Brighton Town Hall, Community Meeting Room, 2300 Elmwood Avenue, Rochester, NY unless otherwise listed.

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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.



Microraptor with lunch.
Credit: Hans Larsson