A publication of the Rochester Academy of Science FOSSIL SECTION

The FOSSILETTER

VOL. 43 Number 7 May 2025

May Meeting

The May section meeting is on Tuesday, May 6th, at **7:00 PM** Eastern Time. 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.

Dan Krisher will kick off with a brief business meeting. Then our guest 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 talk is entitled, *Dinosaur Research in 2023 & 2024: Tracking Down Dinosaurs*.

Michael in the Unit 6 fish bed at the St. George, Utah emergency fossil recovery project in April

President's Report *by Dan Krisher*

The Section's April meeting was on April 1st and was not a hybrid in-person/ ZOOM meeting due to the absence of our technical support and it could not be recorded. The meeting began with a short business meeting. The topics discussed include past and future outreach events, the upcoming Geological Society of America meeting, the RAS Spring lecture, and field trips. The speaker for the evening was long time Section member Gerry Kloc who updated us on some of the "weird" stem arthropods being found in various pre-Cambrian, Cambrian, and Ordovician Lagerstätten.

Three Section members participated in the Family STEM Event at the University of Rochester on 3/22. The Section's tables were quite busy with activities around symmetry differences in brachiopods and bivalves and using tooth types to deduce an animals preferred diet.

Two Section members attended the annual Northeast Geological Society of American meeting running from 3/27 – 3/30 with one member presenting on the Devonian coral faunas of New York state.

The Section will have its first field trip of the year on 4/26 when it visits Split Rock Quarry near Syracuse

The following field trip will be on 5/3 to the Silurian Rochester Shale near Lockport

Fossil Section Election – Need Volunteers

It is once again time for the Fossil Section to nominate its slate of officers for the 2024-2025 year. PLEASE consider helping and nominate yourself to be President, Secretary, or Board member. We promise that it is not much work! If you might be interested in running for any of these positions but would like additional information as

to the duties and time involved, please contact one of the current Officers or Board members. The finalized ballot will appear in the June newsletter. Current RAS Fossil Section Officers are listed on the last page of this newsletter. Please note that one of the Board positions is currently unfilled and that it is unlikely that any incumbent would contend for the position if another nominee stepped forward.

U of R STEM Initiative Sends Thanks

The STEM Initiative would like to extend a huge thank you to all of you and your volunteers for participating in Family Science Day 2024! Thanks to you, with thirty-seven student and community organizations co-sponsoring and connecting with over 100 students and families from Rochester, the event was an incredible success! We hope to see you as a co-sponsor for Family Science Day next year!

Thank you all so much for working with us and giving back to the Rochester community!

Best, Mila Kaplan - President STEM Initiative E-Board

Upcoming Fossil Section Field Trips

by Dan Krisher

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 that is a few yards off the road and it exposes the Silurian Rochester Shale Formation. This is a family-friendly site with no hazards, with plenty of room to spread out and many fossils. The fossils are small but can be found lying loose on the hillside. The material consists primarily of brachiopods and bryozoan with 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, crinoid pieces, and occasionally trilobites or gastropods.

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.

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

June Picnic Meeting with Mineral Section

We will be holding our June 3 Picnic returning to the Marian and Max Farash Center for Observational Astronomy operated by the Astronomy Section of the RAS. This is in Ionia, NY, just south of Mendon at 8355 County Road 14, Ionia, NY 14475. We will have a tour of the observatory, the largest in upstate NY. We will use the large deck and gas grill attached to the Louis Wolk Education Center building for our picnic. This has a large classroom to which we can retreat if the weather is bad as well as indoor restrooms. The section provides the meat, and everyone brings something to share. More details will appear in next month's issue.

Paleontological Society Medal Awarded to Dr. Carlton E. Brett

Dr. Brett is well known to many of our members, having been in the geological sciences faculty of the University of Rochester from 1978 to 1998 before moving to the University of Cincinnati where he remains a University Distinguished Research Professor. He is a co-author of the definitive *Devonian of New York* (2023) and continues to lead field trips in New York, such as those at the PRI's Summer Symposium.

Dr. Brett was awarded the Paleontological Society Medal—the society's highest honor—in 2023. The award proclamation by Dr. Arnold I. Miller (Professor Emeritus of Geosciences, University of Cincinnati) was published just this past September in the prestigious *Journal of Paleontology*. Dr. Miller noted that Carl is

rightfully regarded as perhaps the preeminent stratigraphic paleontologist on the planet. He cited the following:

(1) Carl's findings with his close research partner, Gordon Baird, that regional Silurian and Devonian biotas of the Appalachian Basin collectively exhibited intervals of relative, multispecies stasis, punctuated by shorter-duration intervals of biota-wide change.

(2) His establishment in the 1980s of a practical, diagnostic framework for understanding taphonomic impacts in organismal and environmental contexts, which Carl dubbed 'comparative taphonomy,' and the attendant concept of 'taphofacies.'

(3) Building off the taphofacies approach, Carl's work with colleagues using a submersible in the 1990s and early 2000s to deploy and periodically retrieve deepwater experiments to determine how biotic remains degrade or are preserved across shelf and slope gradients in carbonate and siliciclastic regions.

(4) Carl's documentation in the 1980s of the Paleozoic precursors of the Mesozoic marine revolution, which fueled an extensive re-examination of evidence for biotic interactions throughout the Paleozoic Era.

We congratulate Carl for this deserved honor.

The full proclamation can be found at https://www.cambridge.org/core/journals/journal-of-paleontology/article/presentation-of-the-2023-paleontological-society-medal-to-carlton-e-brett/B968051AAF50AD880687E43C4CB1FF6F.

Fossil News

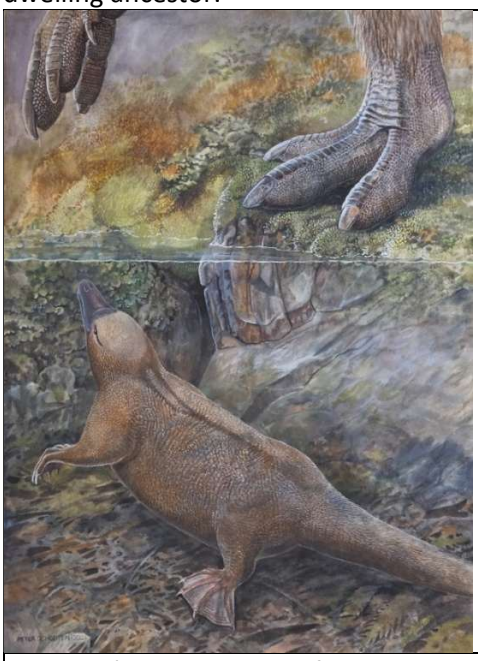
'Extremely rare event': bone analysis suggests ancient echidnas lived in water

University of New South Wales (UNSW) press release issued 28 April 2025.

A small bone found 30 years ago at Dinosaur Cove could turn what we know about the evolution of echidnas and platypuses on its head. Up until now, the accepted understanding about these egg-laying monotremes—arguably the most unusual mammals on the planet—was that they were both descended from a land-bound ancestor. While the platypus ancestors became semiaquatic, the echidnas stayed on the land, or so the story went.

Echidnas and the platypus are the only mammals that lay eggs. Courtesy: San Diego Zoo.

But following a UNSW-led analysis of the bone – which was discovered by a team from Museums Victoria Research Institute – it now looks like echidnas and platypuses evolved from a water-dwelling ancestor.



An artist's reconstruction of Kryoryctes *at Dinosaur Cove. Image: Peter Schouten*

Lead author and UNSW paleontologist Suzanne Hand says that there are about thirty instances where mammals evolved from land-dwelling to live wholly or partly in water, for example, whales, dolphins, dugongs, seals, walruses, otters and beavers. But it's virtually unheard of to see mammals evolve in the opposite direction. "We're talking about a semiaquatic mammal that gave up the water for a terrestrial existence, and although an extremely rare event, we think that's what happened with echidnas," she says.

The researchers describe how a humerus bone discovered in Victoria in the early 1990s challenges

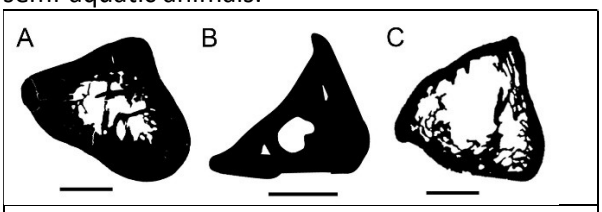
the terrestrial ancestor theory. The humerus bone – which is the upper arm bone between the shoulder and elbow – is the only bone known that belongs to the extinct species, *Kryoryctes cadburyi*, named in 2005. Outwardly, the single humerus looked more like those found in echidnas than in platypuses and led some scientists to conclude it may have been an ancestor of modern echidnas. But other scientists have suggested it was an early common ancestor to the platypus and echidna—a stem-monotreme. Whether *Kryoryctes* lived life solely on land like modern echidnas, or were amphibious like the living platypus, has been debated.

The fossilized humerus bone of the Kryoryctes*. Museums Victoria*

To answer these questions, the team had a closer look at the fossil, including the internal microstructure of the bone using CT and other scanning techniques. "While the external structure of a bone allows you to directly compare it with similar animals to help work out the animal's relationships, the internal structure tends to reveal clues about its lifestyle and ecology," she says. "So, the internal structure doesn't necessarily give you information about what that animal actually is, but it can tell you about its environment and how it lived."

When *Kryoryctes cadburyi* lived in southern Victoria ~108 million years ago, monotremes and monotreme-relatives dominated Australia's mammal faunas. Australian Mesozoic mammals are rare and are known mostly only from their teeth and jaws. *Kryoryctes cadburyi* is so far the only one known from a limb bone.

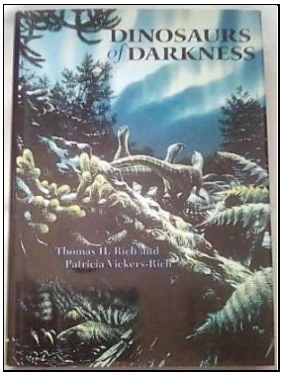
When the researchers looked at the internal structure of the ancient humerus bone, they were surprised to discover it didn't match the light bones of echidnas. The internal structure revealed that platypuses have very thick bone walls and a very reduced cavity within the bone for the bone marrow, while echidnas have very thin bone walls. The microstructure of the fossil *Kryoryctes* humerus is more like the internal bone structure seen in platypuses, in which their heavy bones acted like ballast to allow them to easily dive to forage for food. This analysis adds far more weight to the idea that stem-monotremes started off as semi-aquatic animals.



A CT scan comparison of Kryoryctes *(A), platypus (B) and echidna (C) bone midsections. The bars represent 5mm. Hand et al.*

There are other oddities about echidnas that could be further clues that speak to their semi-aquatic, ancient past. See the full press release for more details at https://www.unsw.edu.au/newsroom/news/2025/04/ancient-echidnas-may-have-lived-in-water.

This paper—Hand, Suzanne J., et al. "Bone microstructure supports a Mesozoic origin for a semiaquatic burrowing lifestyle in monotremes (Mammalia)." *Proceedings of the National Academy of Sciences* 122.19 (2025): e2413569122—is available at https://www.pnas.org/doi/abs/10.1073/pnas.2413569122



Book Review

Dinosaurs of Darkness, In Search of the Lost Polar World, 2nd ed., *by Thomas H. Rich and Patricia Vickers-Rich.* Published by: Indiana University Press. 332 Pages, 150 color illus., 46 b&w illus.

The previous article references the excavations at Dinosaur Cove in Victoria, Australia, in the 1990's. If you would like to learn more about this extraordinary multi-year fossil recovery project,

this is the book for you! I will have my first edition copy at the June picnic, and you may borrow it for your summer reading.

(The following is from the publisher's notes.) *Dinosaurs of Darkness* opens a doorway to a fascinating former world, between 100 million and 120 million years ago, when Australia was far south of its present location and joined to Antarctica. Dinosaurs lived in this polar region.

How were the polar dinosaurs discovered? What do we now know about them? Thomas H. Rich and Patricia Vickers-Rich, who have played crucial roles in their discovery, describe how they and others collected the fossils indispensable to our knowledge of this realm and how painstaking laboratory work and analyses continue to unlock the secrets of the south polar dinosaurs.

This scientific adventure makes for a fascinating story: it begins with one destination in mind and ends with another, arrived at by a most roundabout route, down byways and back from dead ends.

Dinosaurs of Darkness is a personal, absorbing account of the way scientific research is actually conducted and how hard and rewarding it is to mine the knowledge of this remarkable life of the past.

The dig at Dinosaur Cove, Victoria, which turned up the Kryoryctes *fossil in the 1990s. Peter Menzel*

Author Information: Thomas H. Rich is Curator of Vertebrate Palaeontology at Museums Victoria, Melbourne, Australia and is affiliated with Swinburne University of Technology and Monash University. Patricia Vickers-Rich is Professor of Paleontology in the School of Chemistry and Biotechnology, Faculty of Science, Swinburne University of Technology and an Emeritus Professor of Paleobiology in the School of Earth, Atmosphere and Environment at Monash University and a Research Associate at Museums Victoria and at Deakin University, Victoria, Australia.

More Fossil News

Why did some ancient animals fossilize while others vanished?

University of Lausanne press release issued 30 April 2025. See complete release at https://www.unil.ch/news/1746050358701

Why do some ancient animals become fossils while others disappear without a trace? A new study reveals that part of the answer lies in the body itself. The research shows that an animal's size and chemical makeup can play an important role in determining whether it's preserved for millions of years—or lost to time.

Fossils are more than just bones; some of the most remarkable finds include traces of soft tissues like muscles, guts, and even brains. These rare fossils offer vivid glimpses into the past, but scientists have long puzzled over why such preservation happens only for certain animals and organs but not others.

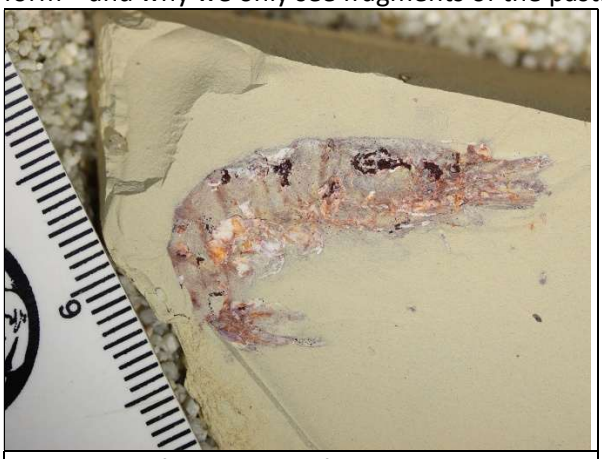
To dig into this mystery, a team of scientists from the University of Lausanne (UNIL) in Switzerland turned to the lab. They conducted state-of-the-art decay experiments, allowing a range of animals including shrimps, snails, starfish, and planarians (worms) to decompose under precisely controlled conditions. As the bodies broke down, the researchers used micro-sensors to monitor the surrounding chemical environment, particularly the balance between oxygen-rich (oxidizing) and oxygen-poor (reducing) conditions.

The results were striking. The researchers discovered that larger animals and those with a higher protein content tend to create reducing (oxygen-poor) conditions more rapidly. These conditions are crucial for fossilization because they slow down decay and trigger chemical reactions such as mineralization or tissue replacement by more durable minerals.

"This means that, in nature, two animals buried side by side could have vastly different fates as

fossils, simply because of differences in size or body chemistry," affirms Nora Corthésy, PhD student at UNIL and lead author of the study. "One might vanish entirely, while the other could be immortalized in stone" adds Farid Saleh, Swiss National Science Foundation Ambizione Fellow at UNIL, and senior author of the paper. According to this study, animals such as large arthropods are more likely to be preserved than small planarians or other aquatic worms. "This could explain why fossil communities dating from the Cambrian and Ordovician periods (around 500 million years ago) are dominated by arthropods.

These findings not only help explain the patchy nature of the fossil record but also offer valuable insight into the chemical processes that shape what ancient life we can reconstruct today. Pinpointing the factors that drive soft-tissue fossilization brings us closer to understanding how exceptional fossils form—and why we only see fragments of the past.



Cretaceous fossil shrimp from Jbel Oum Tkout, Morocco registered at the Museum d'histoire naturelle de Marrakech. © Sinéad Lynch – UNI

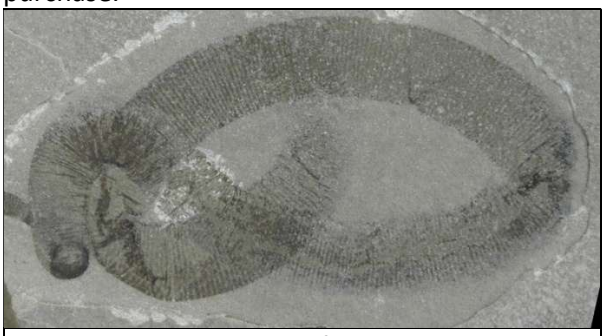
Earliest, 437-million-year-old, putative leech is not what it seems Published online by Cambridge University Press, 04 September 2023.

The Brandon Bridge Formation Lagerstätte (site of exceptional fossil preservation) also known as the Waukesha Biota, from Wisconsin, is noteworthy for being one of the best sources of soft-bodied early Silurian fossils. It significantly informs on the true biotic diversity of early Silurian seas, 437 million years ago. Other than trilobites, heavily mineralized organisms are rare or absent, but an unusual set of conditions preserves noncalcified dasycladalean algae, sponges, conulariids, graptolites, polychaetes, palaeoscolecids, a conodont animal, lobopodian, phyllocarids, ostracodes, a thylacocephalan, synziphosurine, and several enigmatic arthropods. Their exceptional preservation was largely due to tidal conditions and/or microbial entombment. Soft tissues are preserved in some of the worms, arthropods, lobopodian and conodont animal.

One large worm (~160 mm long), known from a single compression, bears numerous annulations on its cuticle and a large circular structure at one end. In 1985, when the Waukesha Biota was published, this fossil was attributed to a possible leech, which, if correct, would make this species one of only about five possible fossil leech species known to date (we point out that none of these is convincingly a leech). This fossil could be used as a calibration point for molecular-clock analysis of leech phylogenetics. The origin of leeches would be pushed back at least 130 million years.

In our study, we present evidence refuting the suggestion that this fossil from Waukesha may be the oldest leech. We also conclude that it is more likely a molt of a cycloneuralian—a group of molting worms that includes 'mud dragons,' 'horsehair worms', nematodes ('roundworms'), priapulids, and loriciferans.

This paper—Braddy, S.J., Gass, K.C. and Tessler, M., 2023. Not the first leech: An unusual worm from the early Silurian of Wisconsin. *Journal of Paleontology*, *97*(4), pp.799-804—is available for purchase.



Likely cycloneuralian molt of Waukesha Biota

CALENDAR OF EVENTS

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

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 24, FIELD TRIP: a series of Ordovician sites in the Watertown/Rodman area

June
Tuesday, June 3, FOSSIL ANNUAL PICNIC 6:00 PM Location: Farash Center for Observational Astronomy, Ionia, NY.

Saturday, June 28, FIELD TRIP: Little Beard's Creek

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.

Reconstruction of the yet-to-be found Silurian Period Waukesha Biota saber-toothed leech