A publication of the Rochester Academy of Science
FOSSIL SECTION

The FOSSILETTER

VOL. 40 Number 1 October 2022

October Meeting

The October section meeting is on Tuesday, October 4, at 7:30 PM. This meeting *and all future meetings this season* will be at the new state-of-the-art Community Meeting Room at the NEQALS (North East Quadrant Advanced Life Support) building at 1030 Jackson Rd, Webster, 14580. From Route 104, take Holt Road exit south to end, turn left on Ridge Road, take first right at light onto Jackson Road, look for NEQALS on the left. This hybrid meeting will also be broadcast on Zoom. Details on how to login in are in the accompanying email.

Our speaker is Dr. Lisa Amati, the New York State Paleontologist, who found her first trilobite at the age of four. In addition to that position, she is also the curator of Invertebrate Paleontology at the New York State Museum in Albany. She has her Ph.D. from the University of Oklahoma.

Dr. Lisa Amati, in the NY State Museum collections in Albany.

Dr. Amati has gone on to become a leading Ordovician trilobite specialist. She mainly studies the Middle to Late Ordovician trilobites of New York, Ontario, and Quebec but has recently started working on the Upper Cambrian trilobites of the Potsdam Sandstone in New York. She focuses on the paleoecology and evolutionary relationships of trilobites.

Dr. Amati will speak on "*New York's Finest Fossils*." Take a virtual trip with her around New York State visiting some of the most impressive fossil localities. From Neoproterozoic stromatolites to the oldest fossil forest, this talk gives an overview of the famous fossils for which New York is known. Several specimens will be on hand for viewing.

Dr. Amati sent the following: "New York is home to millions of fossils. While some fossils from New York are common elsewhere, others show exceptional preservation, occur in high abundances, or represent unique occurrences. This talk provides an overview of some of the most interesting and, in some cases globally important, fossil localities in New York State."

Dr. Lisa Amati sampling through the Ordovician at City Brook near Middleville, NY

Eurypterus remipes, *the official fossil of New York State*

President's Report **by Dan Krisher**

The Section did not hold a section meeting in July, August, or September. We did have several field trips.

On 6/18/22 the Section visited the Swamp Road site near Morrisville and the Pompey Center site near Pompey. Two members attended this trip.

On 7/6/22 Section members Michael Grenier, Fred Haynes and Dan Krisher met at the home of Section member Sam Ciurca to complete the dispersal of Sam's fossil and mineral collection.

On 7/16/22 the Section visited the Little Beard's Creek site located near Leicester. Four hours of collecting resulted in a wide variety of specimens for all attendees. Seven members attended.

On 7/30/22 the Section visited the Jaycox Run site located between Geneseo and Avon. The site showed evidence of the scattered heavy rains we have received over the past few months. Six members attended the trip.

On 8/6 and 8/7/22 members of the Section attended the 2-day annual symposium at the Paleontological Research Institute in Ithaca.

On 8/13/22 the Section had a field trip to the Portland Point site near Ithaca. This the second trip to this new site for the Section and required permission from the owner. Four members attended this trip.

On 8/20/22 the Section had a day long fieldtrip to the Albany region with the entire fieldtrip being organized by Michael Grenier. More below.

The Section did not hold a section meeting in September.

Election Results of June 2022

The election results were tallied with the slate of nominated candidates winning unanimously.
President: *Daniel Krisher*
Vice President: *Michael Grenier*
Secretary: *Daniel Krisher*
Treasurer: *John Handley*
Director 3-year term*: Fred Haynes*
Director 2-year term: *Open*
Positions begin immediately.
Director whose term has not expired is Melanie Martin (2023)

Devonian Forests Field Trip Recap

By Michael Grenier & Dan Krisher

The first visit on this trip on August 20 began in Albany where six Section members visited the New York State Museum. Dr. Lisa Amati, the New York State Paleontologist, with her assistant Sarita Morse, greeted us and gave us a backroom tour of the paleontological labs and storage rooms with a particular focus on the Devonian flora of the state. She showed off several drawers of spectacular fossils.

Our host at State Museum, Dr. Lisa Amati, with Isotelus gigas.

Then we went to an aisle between cases where eight tables or so were laid out with Devonian botanical specimens, many destined for a new exhibit still in design phase. Hundreds of specimens were presented just for us. Although we were scheduled for an hour-long stop, we overstayed, as the material was just too good for us to tear ourselves away.

After viewing this part of the collection, we were given a rare visit to their climate controlled storage room where they had several spectacular Devonian

forest fossils that have to be kept in special conditions to prevent their deterioration.

Dan Krisher and John Handley touring the collection.

Demaris Verzulli with more specimens.

Close-up of some of the specimens. All were labelled.

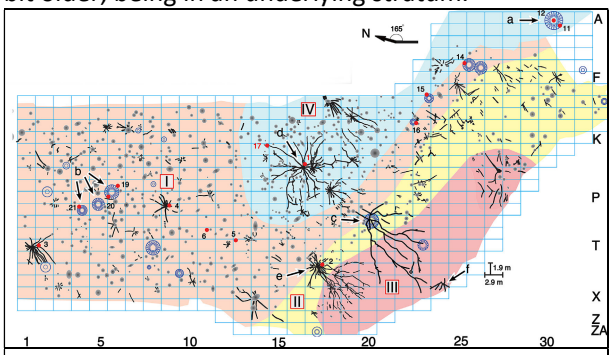
In 1882 D. Dana Luther found and excavated in Grimes Glen in Naples, NY an almost complete large fern-tree trunk fossil, named *Lepidosigillaria* when described. This tree was sent to the NY State Museum. In the late Devonian, over 350 million years ago, a great shallow inland sea covered much of what became New York State. Storms of course slammed into the eastern shores of this sea, flooding the streams that made up the Catskill delta and undercutting the tiny fibrous roots of these trees. Over the years probably countless trees were undercut and floated out far into this sea. This tree drifted perhaps 150 miles west before it became waterlogged and sank to the mud at the bottom of the sea. Eventually sediments covered and encased the tree and fossilization began, preserving the features of the tree to a remarkable extent. (from http://nyshmsithappenedhere.blogspot.com/2013/06/it-happened-here-naples-tree-grimes.html)

Above, Gerry Kloc (l.) and Dan examine "the Naples Tree" with Steve Verzulli behind. Below, a close up look at the bark structure near the root base. (All photos by the editor.)

From there the group made the drive to the Cairo Quarry where we were given a tour by Dr. Charles Ver Straten, the New York State Geologist. This restricted site consists of a fully exposed Devonian Forest floor. Only the root structure of the trees in this forest have been preserved.

Charles Ver Straten amongst root impressions, each radiating in all directions from a central base.

In the map below, *Eospermatopteris* root systems are indicated by blue double circles with stylized radiating lines indicating approximate radial extent of roots observed on the paleosol surface when present. Black lines indicate identified *Archaeopteris* root systems and isolated linear roots. Fragmentary fish fossils are also found. (Figure 1, Stein et. al. (2019) Mid-Devonian *Archaeopteris* Roots Signal Revolutionary Change in Earliest Fossil Forests.) The Cairo Forest remains are close in age to those at Gilboa, but are a bit older, being in an underlying stratum.



Stein et.al. (2019) Figure 1. Map of fossils at Cairo site.

Stein et.al. (2019) Figure 4. Archaeopteris Root Systems Scale bar, 1 m.

Above is an aerial view of a conspicuous pair of *Archaeopteris* bases partly cast by greenish overwash siltstone, indicated by arrow "d" in Figure 1.

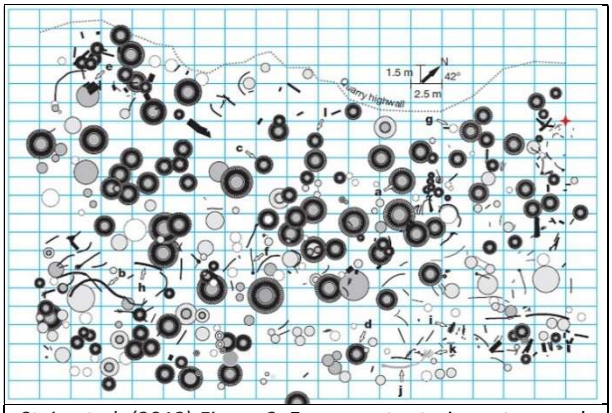
After the tour we made the drive to the Gilboa Museum where we were given a tour by curator Kristen Wyckoff. This is a really nice small museum and is well worth visiting. They have many botanical fossils, with the *Eospermatopteris* trees the major attraction. The museum has a wing on the history of the town including the dam building and a wing with the local fossils, including a video room.

These trees were spectacularly preserved when the forest was flooded in the Middle Devonian period, approximately 390 million years ago. The remains were unearthed at the Riverside Quarry site in the 1920s when Schoharie Creek was excavated at Gilboa to create a reservoir for New York City. The entire village was submerged under the reservoir waters and the forest was flooded a second time. In 2010, the site was exposed again during dam repairs and a team led by Dr. William Stein re-excavated it using current advanced techniques. The results were reported in *Nature* in 2012. (This paper and the 2019 Cairo paper are available from the editor.)

Eospermatopteris was the only tree recorded from the original excavation, which produced hundreds of stumps that were removed, unwittingly leaving the root systems which were found in the new study. Stein's team also found *Tetraxylopteris,* large woody rhizomes with aerial branch systems that probably climbed into *Eospermatopteris* trees. The team also found a single large preserved tree—clearly a member of the class Lycopsida (club mosses). The fossil is 3.9m long, over 11cm in diameter at the bottom end, and expanding distally. The surface is smooth with broad longitudinal ridges and curved over its preserved length. As a partial specimen, the original tree would have been larger. Many small lycopsids have been found at Riverside Quarry and other Catskill localities, but none as large as this one. This one is older than the previous earliest known (Frasnian age) lycopsid trees in North America.

Kristen Wyckoff at the Gilboa Museum shows the famous sandstone casts which replaced the original tree stumps during fossilization.

The figure following is from Stein et al. (2012) *Surprisingly complex community discovered in the mid-Devonian fossil forest at Gilboa* and is a map of the area of the excavated forest floor original rooting horizon.

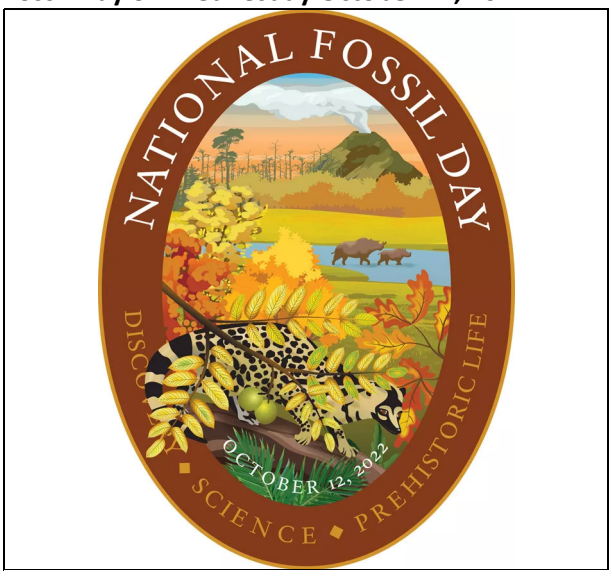


Stein et.al. (2012) Figure 2. Eospermatopteris *root mounds indicated with different levels of confidence. Dark shading, high confidence; light shading, intermediate confidence; dashed circles with no shading, low confidence. Radiating lines, radiating pattern of roots associated with root mound; central double circle, approximate diameter of central basin; outer circle, entire diameter of observed root system. Aneurophytalean main stems and other linear stem fragments are shown in black. Lycopsid main stem (arrow j) and probable distal branches (arrow k) are grey. The approximate position of the quarry highwall is indicated by a dotted line.*

Our final stop was at the Rickard Hill Road site where we spent our final couple of hours collecting in the exposed Lower Devonian strata.

National Fossil Day

We celebrate the eleventh annual National Fossil Day on Wednesday October 12, 2022.



The following material is from the National Park Service site. You can learn more at: www.nps.gov/subjects/fossilday/index.htm.

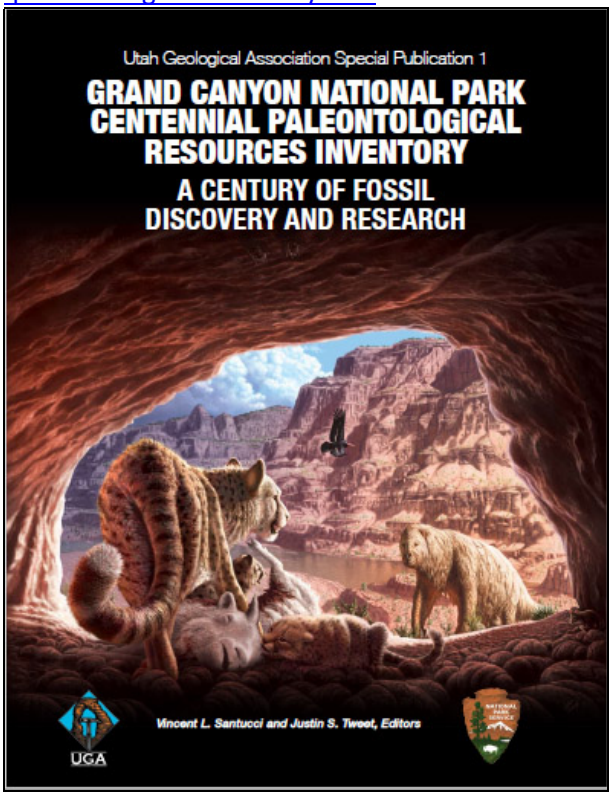
The 2022 National Fossil Day Logo is inspired by the Eocene fossils of Yellowstone National Park, which has 150 years as America's First National Park and a 500 million-year Fossil Record.

In the foreground, partially concealed beneath the Eocene foliage, hides an early cousin of today's modern carnivorous mammals. This civet-like mammal is called *Didymictis*, a member of a larger group of primitive meat-eating mammals called the Viverravidae. *Didymictis* lived throughout much of the late Paleocene and early Eocene in North America and Eurasia, and were common carnivores during this time. Most viverravids did not get much larger in size than today's foxes, and *Didymictis* was not much bigger than a modern house cat. It may have behaved similar to civets and mongooses today, hunting for prey on the ground or occasionally in the branches of trees. Although no fossil remains of *Didymictis* or other viverravids have been found directly within the park boundaries of Yellowstone, their fossils have been found not far away in other early Eocene fossil localities in northwestern Wyoming. *Didymictis* and its kind represent the ancient ancestral group of mammalian carnivores that would eventually lead to the ancestors of grizzly bears, wolves, pine martens, and other carnivores that live in Yellowstone today.

During the Eocene, there were chains of smaller volcanic cones that spanned the area. rises Specimen Ridge in the northeastern section of Yellowstone National Park consists of a series of volcaniclastic sedimentary rocks which preserve a sequence of at least 27 individual Eocene petrified forests covered by volcanic ash and debris, forming the famous Yellowstone Fossil Forests. Not only were these trees buried in place roughly 50 million years ago, in some cases the ancient trees were buried while standing vertically in place. A large petrified tree stump is part of the driving tour at Yellowstone National Park which represent ancient conifers. Aside from petrified wood of conifer trees, fossilized leaves, cones, and nuts have also been found in these beds. These plant fossils show that at one time this region was much warmer and moister than it is today but still had seasonal cooler periods that caused leaf fall. The art depicts the Yellowstone Eocene Forest with Fall coloration of the leaves of deciduous trees such as oak, poplar, and walnut. The large animals shown walking in the river bed are titanotheres.

Grand Canyon National Park Centennial Paleontological Resources Inventory

https://www.nps.gov/grca/learn/news/centennial-paleontological-inventory.htm.



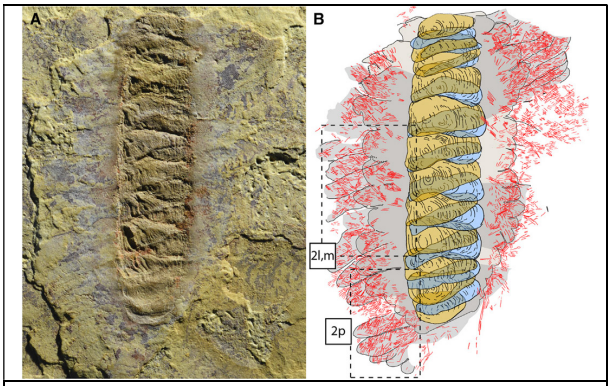
This book was published in April of 2021 for the Grand Canyon National Park centennial celebration, which was a bit muted due to the pandemic, of course. The above link will enable you to download this massive, informative, and highly recommended tome of 465 pages. And, the price is right—FREE. The chapters include material on the History of Paleontological Work at Grand Canyon, Stratigraphy, Precambrian Paleontology, Paleozoic Invertebrate Paleontology, Paleozoic Vertebrate Paleontology, Paleozoic Paleobotany, Paleozoic Invertebrate Ichnology, Paleozoic Vertebrate Ichnology, Mesozoic Paleontology, Pleistocene/Holocene Cave Fossils; Flora, Fauna, Environments, and Climate; and Park Paleontological Resources Management and Protection. There are also 135 pages of appendices and supplemental material.

Fossil News **by Michael Grenier**

Armored worm reveals the ancestry of three major animal groups.

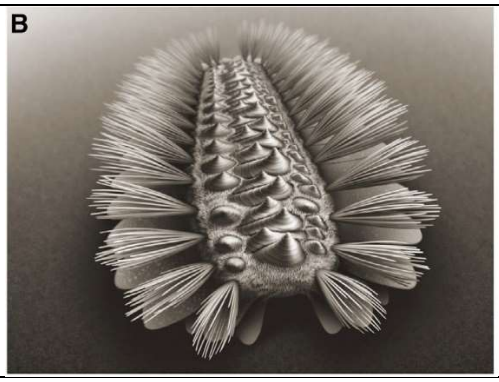
University of Bristol Press release issued: 27 September 2022.

Scientists have discovered a well-preserved fossilized worm dating from 518-million-years-ago that is close to the ancestor of three major groups of living animals. Measuring half-an-inch long, the fossil worm – named *Wufengella* and unearthed in China, was a stubby creature covered in a dense, regularly overlapping array of plates on its back, belonging to an extinct group of shelly organisms called tommotiids.



Guo et al. (2022) Figure 1. Holotype specimen of Wufengella bengtsoni gen. et sp. nov. (A) Part, illuminated from the northwest. (B) Interpretative drawing of part, incorporating observations from multiple lighting directions and fluorescence microscopy.

Surrounding the asymmetrical armor was a fleshy body with a series of flattened lobes projecting from the sides. Bundles of bristles emerged from the body in between the lobes and the armor. The many lobes, bundles of bristles and array of shells on the back are evidence that the worm was originally serialized or segmented, like an earthworm.



Guo et al. (2022) Figure 4. Reconstruction of W. bengtsoni *in anterior dorsolateral view. Artwork by Bob Nicholls.*

Co-author Dr. Luke Parry from the University of Oxford said: "*Wufengella* belongs to a group of

Cambrian fossils that's crucial for understanding how lophophorates evolved. They're called tommotiids, and thanks to these fossils we have been able to understand how brachiopods evolved to have two shells from ancestors with many shell-like plates arranged into a cone or tube." [Ed. note: This clade includes all lophophore feeding animals—brachiopods, bryozoa, and phoronid worms.] The fossil fulfills the paleontological prediction that the lophophorates' ancestral lineage was an agile, armored worm.

This paper (Guo, Jin, et al. "A Cambrian tommotiid preserving soft tissues reveals the metameric ancestry of lophophorates." *Current Biology* (2022). DOI: 10.1016/j.cub.2022.09.011), is available for download at: https://www.cell.com/current-biology/fulltext/S0960-9822(22)01455-5.

The Science Daily article on the paper is at https://www.sciencedaily.com/releases/2022/09/220927111341.htm.

Ancient trilobites grew like shrimp: slowly

University of British Columbia Press release issued: July 25, 2022

Researchers have shown that trilobites, which roamed the world's oceans 450 million years ago, may have grown to a similar size and age as current crustaceans. Just like modern arthropods whose growth is limited by having gill-like appendages rather than lungs, trilobites lived in low-oxygen environments and so, exhibited low growth rates.

Researchers from the University of British Columbia (UBC) and Uppsala University show that the Ordovician trilobite *Triarthrus eatoni* reached a length of just above four cm in about 10 years, with a growth curve very similar to that of today's shrimp.

"*T. eatoni* lived in low-oxygen environments and, similarly to extant crustaceans exposed to hypoxic conditions, exhibited low growth rates compared with growth under more oxygenated conditions," said UBC marine biologist and fisheries expert Dr. Daniel Pauly, lead author of the study. "Low-oxygen environments make it more difficult for water-breathers to grow, and add to the difficulties of breathing through gills, which, as two-dimensional surfaces, can't keep up with the growth of their three-dimensional bodies. Thus, under hypoxic conditions, they must remain small if they are to maintain the rest of their body functions."

In the case of trilobites, their exopods—external branches on the upper part of their limbs—functioned as gills which caused similar growth constraints to those of their modern counterparts.

To reach these conclusions, Dr. Pauly and his colleague from Uppsala University, paleontologist Dr. James Holmes, resorted to the analysis of length-frequency data, a method developed within fisheries science and marine biology for studying the growth of fish and invertebrates lacking the physical markings that indicate their age. The information to perform their analysis was obtained from an earlier publication with information of the length-frequency distribution of 295 exceptionally-preserved trilobite fossils collected in the 1830s at Beecher's Trilobite Bed in New York State.

Pauly & Holmes (2022) Figure 1. A ventral view of the olenid trilobite Triarthrus eatoni *from the Ordovician of New York State (U.S.A.) showing exceptional preservation of appendages. Scale bar, 5 mm.*

This paper (Pauly, Daniel, and James D. Holmes. "Reassessing growth and mortality estimates for the Ordovician trilobite Triarthrus eatoni." *Paleobiology* (2022): 1-11.), is available for download at: https://scholar.google.com

The Science Daily article on the paper is at https://www.sciencedaily.com/releases/2022/07/220725164911.htm.

CALENDAR OF EVENTS

October
Tuesday October 4, FOSSIL MEETING 7:30 PM. LOCATION: NEQALS Community Meeting Room, 1030 Jackson Rd, Webster, 14580. Speaker is Dr. Lisa Amati on "New York's Finest Fossils." Visitors are welcome.

November
Tuesday November 8, FOSSIL MEETING 7:30 PM. LOCATION: NEQALS Community Meeting Room, 1030 Jackson Rd, Webster, 14580. Speaker is TBD. NOTE 2nd Tuesday date due to elections.

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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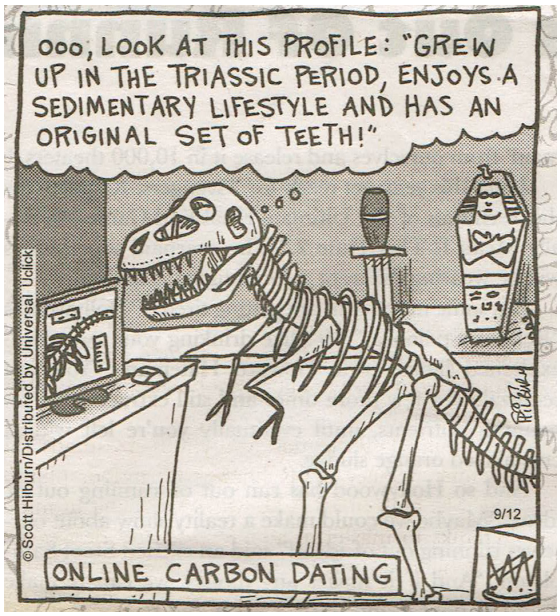
Director (two-year term): ***Open***		
Director (one-year term): Melanie Martin	585 413 8264	martin@nanoparticles.org
APPOINTED POSITIONS		
Field Trip Coordinator: Dan Krisher	585 293 9033	DLKFossil@gmail.com
FossiLetter Editor: Michael Grenier	585 671 8738	mgrenier@paleo.com

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. 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.



Thanks to Helen Haller!