

The FOSSILETTER

VOL. 37

Number 6

April 2020

April Meeting CANCELLED

The April section meeting which was to be on Tuesday, April 7, is CANCELLED, as Dan Krisher notified members by email on March 15. I am sure that this comes as no surprise to anyone. I surely hope that the May meeting, still scheduled for May 5, can be held, even if virtually. With the current state of the pandemic, we may well still all be hunkered down. So stay home, take care of yourself and your family, and catch up on your reading (which includes this newsletter).

All April Fossil Section Events CANCELLED

No surprise, this. Schools are now closed through April 14, at the least, so there is no program at the **Cobbles Elementary School**. The **RAS Annual Meeting** is postponed until this summer. The Syracuse University **Central New York Earth Science Student Symposium** is cancelled and unlikely to be rescheduled.

President's Report

by Dan Krisher

The March meeting for the Section was scheduled for March 10 and was to feature a training session for the Science Olympiad participants. Both the Section meeting and the competition was canceled due to COVID-19. The Section was scheduled to participate in the Rochester Museum and Science Center Mastodon party on March 13th but this too was canceled due to the virus.

I hope all of you and your families are doing well in these trying times. As you are all aware COVID19 has severely disrupted all public activities which of course includes both the Rochester Academy of Science and the Fossil Section. While our April 7th meeting for the

Section has been canceled, the board is in the process of planning a May meeting to be held on 5/5 at 7:30PM. This meeting will be held remotely on ZOOM and will feature a talk and PowerPoint presentation on recent discoveries in the fields of paleontology and geology. Board members will also be providing updates on tentative plans for future Section activities.

The June meeting is typically our Section picnic and has been held at the Ionia site for the past few years. As this is an outside event and social distancing is easy the Board is holding out hope on continuing the tradition. The feasibility of having this picnic will be reassessed and a final decision will be made in the second half of May.

Late April is the beginning of our field trip season, however due to the virus and restrictions on travel, no field trips will be held at least until the first of July. The possibility of field trips in the second half of the season will be determined in late June.

WinterFest at Mendon Ponds



The Section participated in the delayed WinterFest at Mendon Ponds on February 23rd. The attendance was good and the Section table was staffed by John Handley, Michael Grenier and Dan Krisher. (photo by M. Grenier)

Fossil News

Fossil hunters find evidence of 555m-year-old human relative.

(news.ucr.edu/articles/2020/03/23/ancestor-all-animals-identified-australian-fossils). Material by University of California–Riverside, additional reporting from *The Guardian*. Mon 23 Mar 2020



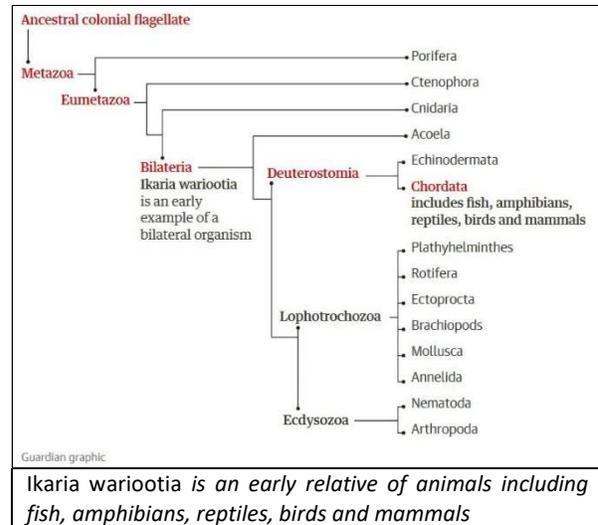
The team found more than 100 fossil impressions of this tiny creatures in the outback in South Australia.
Photograph of model: Sohail Wasif/UCR

A team led by UC Riverside geologists has discovered the earliest animal on the family tree of most familiar animals, including humans.

The tiny, wormlike creature, named *Ikaria wariootia*, is the earliest bilaterian, or organism with a front and back, two symmetrical sides, and openings at either end connected by a gut.

The Ediacaran Biota contains the oldest fossils of complex, multicellular organisms, including lily pad-shaped creatures known as *Dickinsonia* that lack basic features of most animals, such as a mouth or gut. Most of these are not directly related to today's animals. The development of bilateral symmetry was a critical step in the evolution of animal life, giving organisms the ability to move purposefully and a common, yet successful way to organize their bodies.

The Guardian noted that Dr. Scott Evans, of the Smithsonian National Museum of Natural History and a co-author, said: "The major finding of the paper is that this is possibly the oldest bilaterian yet recognized in the fossil record. Because humans are bilaterians, we can say that this was a very early relative and possibly one of the first on the diverse bilaterian tree of life."



For 15 years, scientists agreed that fossilized burrows found in 555 million-year-old Ediacaran Period deposits in Nilpena, South Australia, were made by bilaterians. But there was no sign of the creature that made the burrows, leaving scientists with nothing but speculation.

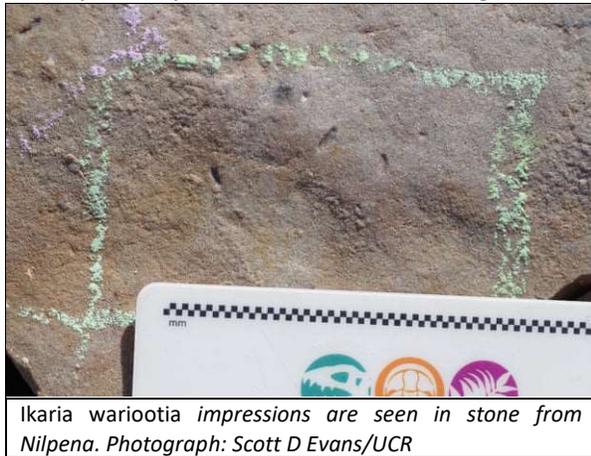
Post-grad student Scott Evans and Mary Droser, a professor of geology, noticed miniscule, oval impressions near some of these burrows. With funding from a NASA exobiology grant, they used a 3-D laser scanner that revealed the regular, consistent shape of a cylindrical body with a distinct head and tail and faintly grooved musculature. The animal ranged between 2-7 millimeters long and about 1-2.5 millimeters wide, with the largest the size and shape of a grain of rice—the right size to have made the burrows. This is an unusual discovery since *Ikaria*, like many other animals of the time, were soft-bodied.

Ikaria wariootia was named to acknowledge the original custodians of the land. The genus name comes from Ikara, which means “meeting place” in the Adnyamathanha language and is the name for a mountain grouping known in English as Wilpena Pound, and from Warioota Creek, which runs from the Flinders Ranges to Nilpena Station. (But I suspect is it also a nod to the 1986 Nintendo video game, Ikari Warriors.)

“Burrows of *Ikaria* occur lower than anything else. It’s the oldest fossil we get with this type of complexity,” Droser said. “*Dickinsonia* and other big things were probably evolutionary dead ends.” In spite of its relatively simple shape, *Ikaria* was

complex compared to other fossils from this period. It burrowed in thin layers of well-oxygenated sand on the ocean floor in search of organic matter, indicating rudimentary sensory abilities. The depth and curvature of *Ikaria* represent clearly distinct front and rear ends, supporting the directed movement found in the burrows.

The burrows also preserve crosswise, “V”-shaped ridges, suggesting *Ikaria* moved by contracting muscles across its body like a worm, known as peristaltic locomotion. Evidence of sediment displacement in the burrows and signs the organism fed on buried organic matter reveal *Ikaria* probably had a mouth, anus, and gut.



Ikaria wariootia impressions are seen in stone from Nilpena. Photograph: Scott D Evans/UCR

That is important since bilateral organisms have been thought to have evolved during the Ediacaran period that stretched from 571m to 539m years ago, however previous evidence for such creatures has largely relied on traces such as the burrows they made.

Dr. Simon Conway Morris of the University of Cambridge, who was not involved in the work, described the findings as exciting—“Although the tiny fossils are near the limits of resolution they both tantalizingly suggest a creature very close to the earliest known ancestor of all advanced animals and, even more intriguingly, a likely association with small traces made as the animal forged through the sediment in search of food.” (from *The Guardian*)

This paper, (Evans, S. D., Hughes, I. V., Gehling, J. G., & Droser, M. L. (2020). Discovery of the oldest bilaterian from the Ediacaran of South Australia. *Proceedings of the National Academy of*

Sciences), is not available except by \$10 purchase from PNAS.

Fossil flowers from the Early Jurassic

This paper from 2018 is exciting for anyone who likes flowers. It presents the discovery in China of fossil flower specimens from the Early Jurassic and pushes the earliest known fossils of flowering plants back from the early Cretaceous, 130 million years ago (MYA), into the latest Early Jurassic, more than 174 MYA.



Figure 1F. A siltstone slab with numerous flowers.

This paper has 91 stunning color photographs of the 198 individual flowers preserved on 34 rock slabs from the South Xiangshan Formation in the Nanjing region. The authors named the flower species *Nanjinganthus dendrostyla*, and it has a variety of “unexpected” characteristics according to almost all previous theories on the evolution of angiosperms, whose origin has been of long-standing debate among evolutionary biologists. Many thought angiosperms could be no more than 130 million years old, but molecular clocks have

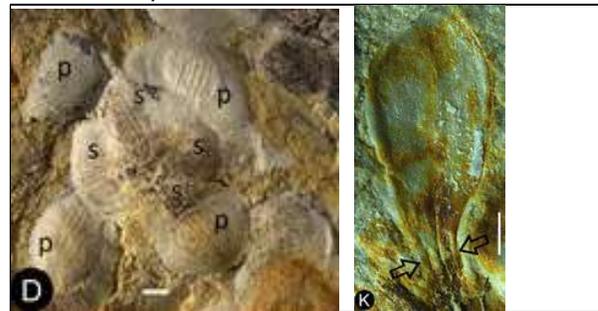


Figure 2D. Bottom view of Flower 2 in Figure 2a, showing four sepals (s) and four petals (p) with longitudinal ribs. Figure 5K. Detailed view of the narrowing base (between arrows) of a petal.

indicated that they must be older. Now, there is convincing fossil-based evidence that they do go further back in time. The amazingly preserved fossils include complete flowers, with fully enclosed ovules and seeds.

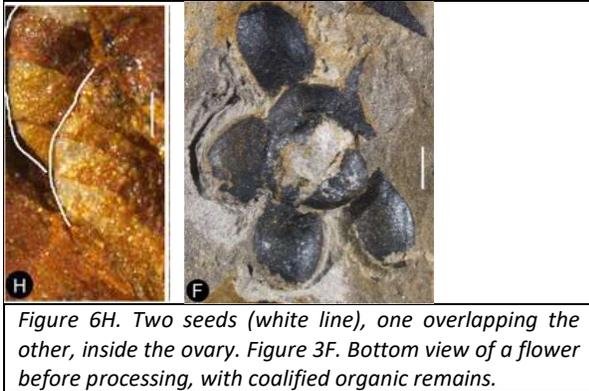


Figure 6H. Two seeds (white line), one overlapping the other, inside the ovary. Figure 3F. Bottom view of a flower before processing, with coalified organic remains.

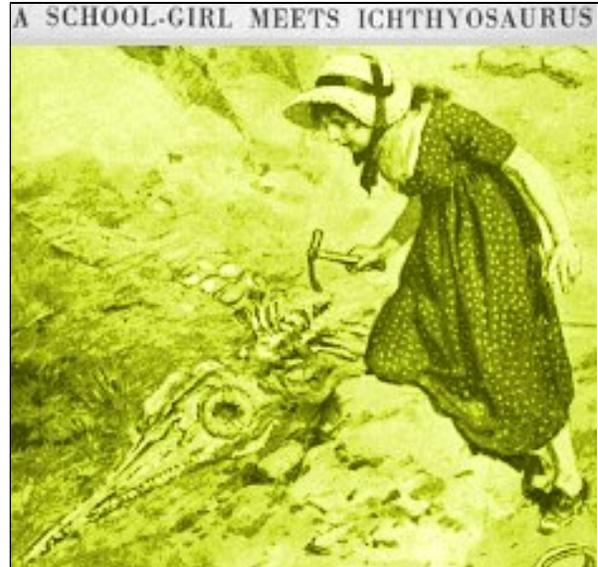
This paper (Fu, Q., Diez, J. B., Pole, M., Ávila, M. G., Liu, Z. J., Chu, H., ... & Wang, X. (2018). An unexpected noncarpellate epigynous flower from the Jurassic of China. *Elife*, 7, e38827) is available for down load at <https://cdn.elifesciences.org/articles/38827/elife-38827-v2.pdf>

Book Review

Long time readers will no doubt recognize that your editor has a fascination with Mary Anning. I first encountered the story of her life when I was 12 years old and had already decided that I was going to be a paleontologist. I was struck by the fact that her first major find occurred when she was 12 years old, the same age I was. (*What great friends we could be, I thought, if only she wasn't 150 years older than I am.*) Her brother Joseph had found an ichthyosaur skull, Mary found the complete post-cranial skeleton to go with it—the most complete ever found to that time. Joseph and Mary's discovery was used as the basis for the first ever scientific paper written about the ichthyosaur, published in 1814 by Everard Home, who wrote five more papers on the specimen, with no acknowledgement of the Annings, the first of many snubs in her lifetime.

The specimen went to the British Museum in 1819 and is now on display at the Natural History Museum to which it was transferred in 1881.

I don't remember what the book was—it may have been *The Children's Encyclopedia* (1925). I

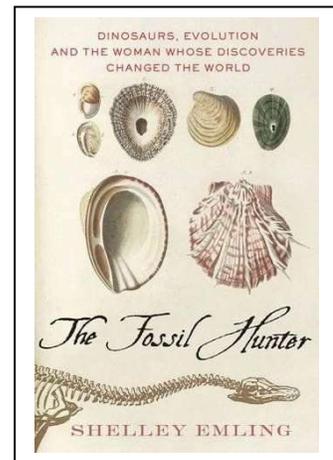


Mary Anning, age 12, in *The Children's Encyclopedia*. A fanciful illustration. (www.famousscientists.org)

had read older books than that in my New England town library, which seemingly still had every book it had ever purchased, back to the 18th century. My wife of 49 years is named Mary. Coincidence?

Mary Anning was born to Richard and Mary Moore Anning on May 21, 1799 in Lyme Regis, Dorset, England, and died there of breast cancer at the age of 47 in 1847. A knowledgeable professional fossil collector and dealer, Mary was well-regarded by scientists and aristocrat collectors throughout Europe. She was famed for her truly important fossil finds in the Jurassic marine fossil beds in the cliffs of Lyme Regis. Her findings contributed to important changes in scientific thinking about prehistoric life and the history of the Earth.

Anyway, that brings us to this month's book review, a biography of Mary Anning--***The fossil hunter: dinosaurs, evolution, and the woman whose discoveries***



changed the world, by Shelley Emling. St. Martin's Press, 2009. 256 pages. This is the most recent

adult biography of her, though there are a score of Anning biographies for children. (It is apparent that Mary Anning has deservedly become a popular role model for girls.) This is a good biography and well-worth the reading. However, it would have been a much better book if it had been a slimmer and strictly factual biography of, say, 130 pages. It is much padded with speculative material. Whether this was to stretch it out to make a more substantial tome, or because the author felt so connected to her subject that she imagined she could know the unknowable is beyond me. You might like her enthusiastic style, or you could save time reading if you skip every paragraph that begins with "Maybe," "Perhaps," "Probably," "It might be that," "She may have," or any other introduction to imaginative material.

Until a better biography is written, this is, in my opinion, the best of a rather narrow lot. I do not believe another researcher will come up with much additional material on Mary's life, and Ms. Emling has comprehensively covered what is known. The story stands on its own merits.

I will have this book at the next Fossil Section meeting, whenever that will be. Meantime, if you want a short biography, there is a reasonably good and detailed article (31 pages) by Dr. Larry E. Davis (2009) "Mary Anning of Lyme Regis: 19th Century Pioneer in British Palaeontology," and published in *Headwaters*. (Vol. 26, 96-126) at <https://digitalcommons.csbsju.edu/headwaters/vol26/iss1/14>

A Short Version of the Life of Mary Anning

Born of humble and impoverished parents, her carpenter father died when she was 11, leaving the family with no means. She had learned from her part-time fossil collector father, who had a small added income from fossil sales, and continued to pursue this as a youngster to help the indigent family, already on the parish dole, get by. Of ten children, only she and Joseph survived to adulthood. She had little schooling, but mastered fossil anatomy and identification.

She became a paleontologist through study of her fossils, dissection of marine animals, frequent discussions with leading scientists, and reading all the scientific literature on fossils she could

borrow. (Henri de Blainville gave this new field of natural history the name, *paleontology*, in 1822.) She exquisitely prepared the fossils herself before making them available. At this time, Natural History was a game for wealthy, educated, usually aristocratic men who would buy specimens from field collectors and make them available to credentialed and respected scientists to study and publish, and sometimes donate the specimens to museums.

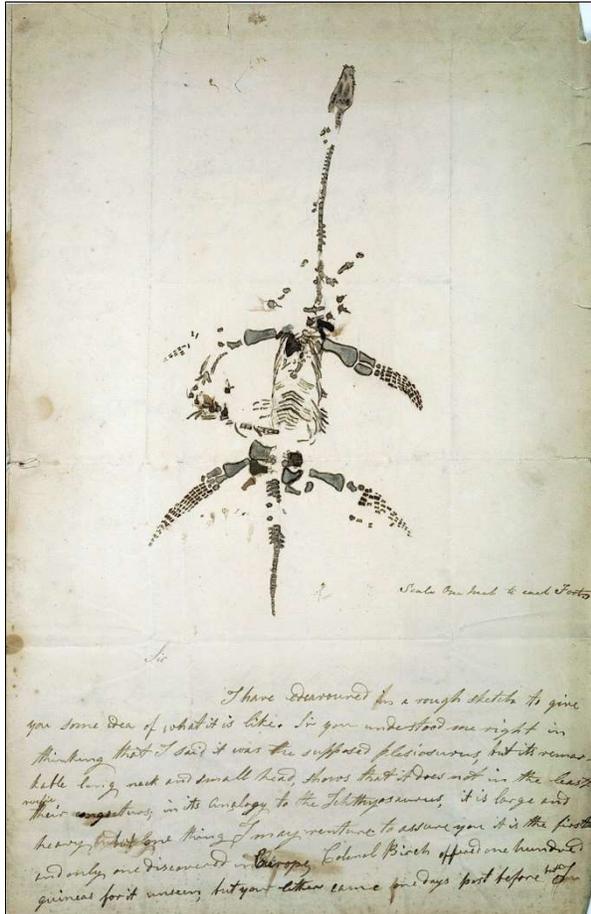


Portrait of Mary Anning, in oils, probably painted by William Gray in February 1842, now in the British Museum of Natural History, with the fossil cliffs of Lyme Bay in the background, her dog Tray and Mary pointing at an ammonite. (www.nhm.ac.uk)

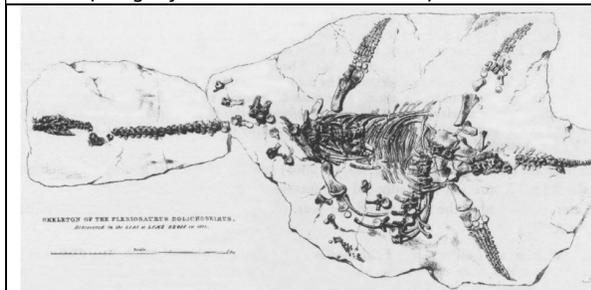
Anning found several other ichthyosaur fossils between 1815 and 1821, including nearly complete skeletons. Many of her specimens were analyzed by noted geologists William Conybeare and Henry De la Beche in their 1821 paper that established that ichthyosaurs were a previously unknown type of marine reptile. In this paper, they also named and described the genus *Plesiosaurus* (near lizard) based on several partial specimens, the best of which (OUMNH J.50146, at Oxford University) was made available to them by Lt-Col. Thomas James Birch of the Life Guards, a collector who frequently purchased specimens

from Anning. Although not proven, it has been proposed that OUMNH J.50146 was collected by Anning in 1820/21.

In 1823, Anning discovered a nearly complete plesiosaur skeleton (now BMNH 22656). Birch tried to buy it, but she also had offered it to famed geologist Reverend William Buckland, who wrote



Above, Anning letter to Buckland, 26 December 1823. Below, drawing in Conybeare 1824, in Transactions of the Geological Society, captioned "Skeleton of the Plesiosaurus dolichodeirus, Discovered in the LIAS at LYME REGIS in 1823". (images from Wikimedia Commons)



back for more information on it. Her response survives and shows her skill at scientific illustration. The drawing is noted as "Scale 1 inch

to each foot". The letter goes on, "Sir I have endeavored in a rough sketch to give you some idea of what it is like. Sir you understood me right thinking that I said it was the supposed Plesiosaurus, but its remarkably long neck and small head, shows that he does not in the least verify their conjectures; in its analogy to the Ichthyosaurus, it is large and heavy but one thing I may venture to assure you it is the first and only one discovered in Europe, Col. Birch offered 100 guineas for it unseen, but your letter came one days post before but I . . ." (Sorry, I do not have the second page.)

Once he finished reading Anning's description, Buckland talked Richard Grenville, the first Duke of Buckingham, into buying the skeleton. They must have outbid Birch's £105 offer. Conybeare was allowed to do the analysis, presented at the largest meeting ever at the Geological Society, and then published. He did not acknowledge Anning in either. She went on to find more plesiosaurs, including *P. microcephalus*.

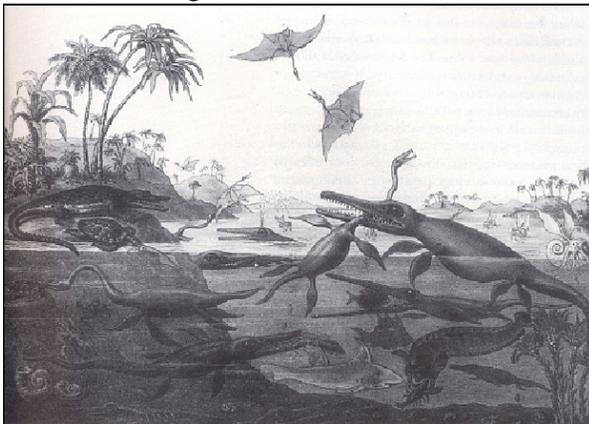
However, it is a myth that that she was spurned and never given credit by the other scientists of her time. In announcing the discovery of the first English pterosaur skeleton to the Geological Society of London, Reverend William Buckland began, "In the same Blue Lias formation at Lyme Regis, in which so many specimens of Ichthyosaurus and Plesiosaurus have been discovered by Miss Mary Anning, she has recently found the skeleton of an unknown species of that most rare and curious of all reptiles, the Pterodactyle ...". This is only one example. While much is made today of the many very real barriers to her as an early Victorian period woman, she sought successfully to have an aristocratic professional fraternity and their wealthy sponsors take her seriously, despite being not only female, but also of low class, poor, uneducated, and not least a nonconformist outside the established Church of England.

By the time Mary Anning became a serious collector of fossils, the occurrence of pterosaurs had already been established and Buckland believed that a long, thin fragment of flat bone with minute, flat, lancet-shaped teeth in a collection from the Blue Lias Formation might be a

pterosaur. In December, 1828, Mary made an important discovery, the first pterosaur found outside Germany. Although Mary's fame is linked to her findings of ichthyosaurs, plesiosaurs, and pterosaurs, it is important to note she was also the discoverer of the fish *Dapedius* sp., the shark *Hybodus*, and primitive chimaera fish *Squaloraja polyspondyla*. Mary was also the first to recognize the true nature of coprolites (fossil feces), and ink sacs in fossil belemnites (related to squid).

Despite the rare vertebrate fossil finds that fetched high prices, the Anning family mostly made their living from selling common invertebrate fossils such as ammonite and belemnite shells to tourists for a few shillings each. They were often in poverty.

In evidence of her standing in the scientific community, in 1835, the British Association for the Advancement of Science, knowing that Anning was having financial difficulty and with Buckland's sponsorship, granted her a £25/year lifetime annuity in honor of her outstanding contributions to paleontology. It was not the first time money had been raised. In 1820, Lt-Col. Birch learned that the poverty-stricken family had to sell their furniture to pay the rent, auctioned the fossils he had purchased from them on their behalf, and raised £400 for the Annings. In 1830, paleontologist Henry De la Beche sold prints of his painting, *Duria Antiquior*, showing Jurassic life based on Anning's fossils, to raise funds for her.



Lithographic print produced in 1830 by Georg Scharf (1788 – 1860) from Henry De la Beche's (1796 – 1855) *Duria Antiquior* water color. (www.nhm.ac.uk)

Again, in 1846, Geologic Society members learned of her breast cancer diagnosis and raised money to cover her medical expenses. When she died (March 9, 1847) her funeral was paid for by the Geological Society, which also financed the stained-glass window dedicated to her memory in St. Michael's Parish Church in Lyme Regis.

Mary Anning is memorialized in the names of several fossils, some during her lifetime. A favorite of mine is an ichthyosaur, *Ichthyosaurus anningae*, reported here when published in 2015 by Dean Lomax and our own RAS member, Dr. Judy Massare. One of the specimens in their study had been found by Anning. (Lomax, D. R. & Massare, J. A. "A new species of Ichthyosaurus from the Lower Jurassic of West Dorset, England, UK." *Journal of Vertebrate Paleontology* 35, no. 2 (2015): e903260.)

More at:

1. https://en.wikipedia.org/wiki/Mary_Anning
2. <https://www.famousScientists.org/mary-anning/>
3. <https://biography.yourdictionary.com/mary-anning>
4. www.mentalfloss.com/article/89716/overlooked-paleontologist-who-may-have-inspired-she-sells-sea-shells

*"She sells seashells on the seashore,
The shells she sells are seashells, I'm sure,
For if she sells seashells on the seashore,
Then I'm sure she sells sea shore shells."*

Mary Anning in Ammonite

Mary is in the news all over -- a campaign, *Mary Anning Rocks*, has been launched to fund the creation of a statue of her in Lyme Regis; she is a candidate to have her face on the next UK £50 note; and Kate Winslet is to play Mary Anning in *Ammonite*, a period drama about Anning's life. The film is in post-production and is due to be released in 2020, but the date has not yet been announced. Hollywood has apparently taken liberties with her love life, however.

CALENDAR OF EVENTS

April

Tuesday April 7, FOSSIL MEETING CANCELLED

May

Tuesday May 5, FOSSIL MEETING 7:30 PM Brighton **Town Hall Auditorium** 2300 Elmwood Ave.
Program to be determined. Visitors welcome.

June

Tuesday June 2, FOSSIL SECTION ANNUAL PICNIC 6:00 PM Location: **Farash Center for Observational Astronomy, Ionia, NY.**

Visitors are welcome to all Fossil Section meetings! Refreshments are served. 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 held the first Tuesday of each month from October to December and from March to May at 7:30 pm at the Brighton Town Hall, Community Meeting Room, 2300 Elmwood Avenue, Rochester, NY unless otherwise listed.

OFFICERS

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Vice President/Program Chair: *Open*

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Treasurer: John Handley

Director (two-year-term): Michael Grenier

Director (one-year-term): Fred Haynes

Director (three-year-term): *Open*

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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.



Kate Winslet (l.) and Saoirse Ronan on the set of *Ammonite*, the new film about Mary Anning's life. Photograph: GC Images