



NARG NEWSLETTER

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NARG Puts on a Successful Fossil Fest 2023

More than 30 NARG members organized and put on a very successful Fossil Fest at the Tualatin Heritage Center on August 5, 2023. This annual event requires many hands to set-up tables, tents, display boxes, and activities. Fossil Fest includes a wide range of educational exhibits, from professional level displays to kids' games, all to let visitors learn about paleontology. Arnold Williams, our official counter, marked 302 people who attended Fossil Fest.

This year's theme was "Coastal Fossils," so most display cabinets were filled with large arrays of shells and vertebrate fossils. Kent Gibson and Weylin Charland brought many coastal fossils from Newport where they are able to collect often. Arnold Williams and Aaron Currier had displays showing a wide variety of invertebrates they had collected. Bob Manley had presented a couple really nicely prepared vertebrate skulls he had collected. Tara Baker, Debbie Shannon, and Greg Carr had displays that included prepared and unprepared vertebrate fossils. The last coastal fossil display was a historical box explaining the NARG rescue of whale fossils from Fossil Point, Oregon. Robert Rosé exhibited petrified wood and Greg Carr had a second display presenting NARG's sabretooth salmon excavations. Finally, NARG put together a nice display honoring Linda Harvey, a long-time NARG member and board member.



More than 300 people attended Fossil Fest 2023 on Aug 5

(Fossil Fest 2023, continued from previous page)

In addition to the displays, NARG members had kids' activities like "guess the number of dinosaurs in the jar" and "spin the era wheel for prizes." Dan O'Loughlin and Katie Hefner ran these activities. Isaac Gagner was in-charge of the raffle and "dig for shark teeth" table.

Another always-popular table at Fossil Fest is the identification station. Aaron Currier, Robert Rosé, and Anne Sivers ran this activity. Eighteen visitors brought in 25 fossils that were identified from Oregon, Washington, Montana, and Illinois. An interesting fossil was identified as a demostylus bone, possibly a tibia. Aaron suggested that the bone be prepared a bit and that the owner contact Kirk Johnson at the Smithsonian for consultation.

Joe Cantrell set-up his photography station and took gorgeous pictures of petrified wood and agate all day. Kids and adults had fun using paleotools to engrave their names on rocks at Greg Carr's table. Several other volunteers ran the t-shirt and information station, directing all the visitors through the festival. Finally at the end of the day, many NARG members worked tearing down displays, tents, and tables.

Over-all, more than 300 people, from babies to folks using walkers, attended, and learned about paleontology from NARGers. It was wonderful to see smiles and laughs, and chat with other folks who are passionate about fossils. More than twenty people signed-on as new NARG members during the festival. Another successful Fossil Fest!



Arnold Williams shows his very first display containing a variety of coastal shell fossils he collected.



A family wearing dinosaur masks, prizes from the kids' games.



Kent Gibson expresses his excitement while Weylin Charland looks on.



Packing up the show. Dan O-Loughlin (right) generously transports and stores all show materials in trailers.

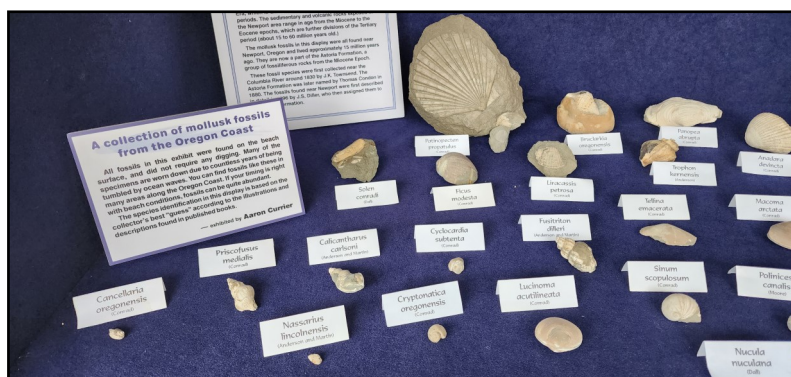
(Fossil Fest 2023, continued from previous page)



Bob Manley taking a break during the Fossil Fest



One of the educational table displays showing a variety of interesting fossils including turtle, plants, ammonites, teeth, and bone. the fossil?"



Part of Aaron Currier's coastal mollusk display



Just some of Kent Gibson's coastal skulls of pinnipeds and dolphins.



Greg Carr works with two children as they use paleotools to engrave their names in rocks.

Fossil Fest 2024



Saturday August 3

Theme: To be decided

In Honor of Linda Harvey



Linda and her husband, Bill, have been very active members of NARG since 2011. Linda served as a board member since 2015. Some of the many roles she held at NARG were Committee Chair for the annual auction/dinner and co-chair for the annual Fossil Fest. She was also the club's Treasurer and Membership Coordinator since July, 2022. She helped to grow metasequoia and ginkgo trees that were sold as fundraisers for NARG at the club's annual Fossil Fest.

Linda collected rocks and fossils from around the world; her favorites were petrified wood (especially if it contained knots), spheres of various things (including wood) and polyhedroids. She was always up for an adventure and was an amazing, talented and welcoming person.

In addition to NARG, Linda was an active member of the following local clubs: Tualatin Valley Gem Club, Columbia Faceter's Guild, and the Mount Hood Rock Club. She was also an important part of the Portland Regional Gem and Mineral Show, serving as a Board Member and Vendor Contact. Linda was the Volunteer Coordinator at the Rice Northwest Museum of Rocks and Minerals since 2016 and the Treasurer of the Northwest Federation Mineralogical Society for the past two years. If you could catch her, it was never sitting down!

She was a very busy, generous, giving person who passionately loved geology and people. She was a loving wife, mother, and grandmother. She will be missed by so many.



Pictures by Linda Kepford

Issac Gagner Goes off to College

August means a big move for member Isaac Gagner. August 21st will be Isaac's first day of classes at South Dakota School of Mines and Technology. Isaac will be studying for a bachelor's degree in geology and plans to stay a fifth year for their masters in paleontology program. The weekend before school starts Isaac will be going on his first field trip with the campus paleontology club to the Badlands.

Isaac dreams of working in a museum overseeing collections, research and/or designing exhibits to educate the public about fossils. You all know Isaac's interest in trilobites, but he looks forward to the opportunities in South Dakota to learn more about such Miocene mammals as hell pigs and mammoths. Hopefully the next newsletter will contain articles from Isaac about the paleontology club, on campus museum and the prep lab.

Isaac's SAT scores qualified him for a \$4,000 a year scholarship from SDSMT. Isaac applied for and won the Best Buy scholarship through OMSI. However, once he chose SDSMT instead of the expensive University of Chicago, our income to the school cost ratio put him out of the qualifications for this partially need-based scholarship. \$10,000 a year won and lost, oh well. Isaac did apply for the scholarship with Willamette Agate and Mineral Society. He received a phone call in June that they wanted to award him the scholarship but had trouble receiving his application electronically. He re-sent his application upon returning home from South Dakota but has not heard back.

Best wishes for a great school year, Isaac. See you on Zoom!



Pictures provided by proud mother, Megan Gagner

You Can Call Him “Doctor”

MacKenzie Smith Earns His Ph.D.

Our own MacKenzie Smith has graduated from the University of Florida with a Ph.D. in Paleobotany. This ends a long college experience that included earning a B.S. in Zoology with a minor in Geology from Oregon State University in 2016 Summa Cum Laude. While at OSU, he described a new species of fossil fern, *Osmundacaulis whittlesii*, from the Cretaceous Haida Formation (ca. 100 Ma) of British Columbia (<https://www.journals.uchicago.edu/doi/abs/10.1086/679352>). [Editor's note: This work was published with Dr. Gar Rothwell, another NARG member. To see his recent publications, look elsewhere in this newsletter.] MacKenzie was also a paleobiology teaching assistant while at OSU.



MacKenzie receives his doctoral hood at graduation. Picture provided by proud mother, Tami Smith

At the University of Florida, MacKenzie was a social media contributor and involved in providing content for myFOSSIL (<https://www.myfossil.org/>). This was in addition to his research efforts with Dr. Stephen Manchester. He has published several articles with Dr. Manchester and can expect to have a couple more publications from his dissertation. MacKenzie presented his dissertation defense on July 6 entitled “Climate and diversity of early and middle Eocene floras from middle latitudes of the Northern Hemisphere.” He graduated on August 11, receiving his doctoral hood in Gainesville, Florida.

Currently living in Connecticut, MacKenzie is looking for a position that includes community outreach.

Citations:

Smith, MacKenzie & Manchester, Steven. (2020). CT-scans of capsules from the Clarno Formation (Oregon, USA) reveal an extinct Eocene theaceous taxon. *Acta Palaeobotanica*. 60. 251-258. 10.35535/acpa-2020-0013.

Smith, MacKenzie & Manchester, Steven. (2019). A new species of “gigantic” capsular fruits of Vaccinioideae from the Miocene of Idaho. *Palaeontologia Electronica*. 10.26879/982.

Smith, MacKenzie & Manchester, Steven. (2018). Nut of *Juglans bergomensis* (Balsamo Crivelli) Massalonga in the Miocene of North America. *Acta Palaeobotanica*. 58. 199-208. 10.2478/acpa-2018-0011.

Smith, MacKenzie A., Rothwell Gar W, & Stockey, Ruth A. (2015) Mesozoic Diversity of Osmundaceae: *Osmundacaulis whittlesii* sp. nov. in the Early Cretaceous of Western Canada *International Journal of Plant Sciences* 176(3):245-258.

I finally landed my dream job as a paleontologist. It took years of studying and hard work, but I've never been happier.

As I excavated a new find from the ground, a mother and her young son passed by. She pointed at me and told him, "This is why you need to do well at school and get a good job, or else you'll spend the rest of your life digging in a hole just like him.—<https://upjoke.com/palaeontologist-jokes>

Paleontologists are having a party to celebrate unearthing the largest ever dinosaur Tibia. It's going to be quite the shindig.—<https://upjoke.com/paleontologists-jokes>



Gar Rothwell, Isle of Skye, Scotland, 2011

Gar Rothwell Recent Publications

Long-time NARG member, Gar Rothwell, Ph.D., has been a professional paleobotanist for more than 50 years. He first published in 1970 as a master's degree student. He spent most of his professional life as a Professor at Ohio University and "retired" from there in 2010. He is a Distinguished Professor Emeritus there and also has had a courtesy appointment at Oregon State University since 2011. Gar has published more than 250 articles in peer-reviewed journals and has co-authored the principal textbook for paleobotany students, "Paleobotany and the Evolution of Plants" (<https://www.amazon.com/Paleobotany-Evolution-Plants-Wilson-Stewart/dp/0521126088>).

Gar continues his research and collaborations. This is a current list of his recent articles including one that is "in press."

Publications of Gar Rothwell for 2022-23

Rothwell, G.W., R.A. Stockey and S.Y. Smith. 2023. Evolutionary diversification of taiwanioid conifers illuminated by a new species from the Upper Cretaceous of Alaska. *International Journal of Plant Sciences*, In press. <https://doi.org/10.1086/726082>

Blanco-Moreno, C., R. A. Stockey, G. W. Rothwell, A. M. F. Tomescu. 2023. A second species of *Tricosta* expands the diversity of the intriguing Mesozoic tricostate mosses. *International Journal of Plant Sciences* 184 (7): 549-561. <https://doi.org/10.1086/726016>.

Walker, Z., G. W. Rothwell and R. A. Stockey. 2023. Fossil evidence for sporeling development of a Mesozoic osmundaceous fern. *American Journal of Botany* 110(8):e16210. <https://doi.org/10.1002/ajb2.16210>

Stockey, R.A., G.W. Rothwell, G. Beard and J. Gemmell. 2023. Refining our understanding of Late Cretaceous-Paleogene evolution within the monocot family Araceae: *Appianospadix bogneri* gen. et sp. nov. *International Journal of Plant Sciences* 184: 470-484.

Rothwell, G.W., R.A. Stockey, D.W. Stevenson, and C. Zumajo-Cardona. 2022. Large permineralized seeds in the Jurassic of Haida Gwaii, Western Canada: Exploring the mode and tempo of cycad evolution. *International Journal of Plant Sciences* 183: 674-690. <https://doi.org/10.1086/721710>.

Rothwell, G.W. and R.A. Stockey. 2022. Enriching our knowledge of Late Cretaceous wetland plant communities: *Zlatkovia crenulatum* gen. et sp. nov., an amphibious angiosperm from the St. Mary River Formation, Alberta, Canada. *Cretaceous Research* 140: 1-9; 105328.

Edmonds, N.L., R.A. Stockey and G.W. Rothwell. 2022. *Tolmania aquatica* gen et sp. nov. from southern Alberta, Canada. *International Journal of Plant Sciences*. 183: 567-575.

DiMichele, W.A., R.M. Bateman, G.W. Rothwell, I. Duijnste, S.D. Elrick and C.V. Looy. 2022. *Stigmaria*: a review of the anatomy, development, and functional morphology of the rootstock of the arboreal lycopsids. *International Journal of Plant Sciences* 183: 493-534.

Klymiuk, A.A., G.W. Rothwell and R.A. Stockey. 2022. A novel cupulate seed plant, *Xadzigacalix quatsinoensis* gen. et sp. nov., provides new insight into the Mesozoic radiation of gymnosperms. *American Journal of Botany* 109: 966-985.

Tomescu, A.M.F. and G.W. Rothwell. 2022. Fossils and plant evolution: structural fingerprints and modularity in the evo/devo paradigm. *EvoDevo* 13:1-18. <https://doi.org/10.1186/s13227-022-00192-7>

Rothwell, G.W., M.T Dunn and A.C. Scott. 2022. Reconstructing the *Tetrastichia bupatides* Gordon plant; a Lower Carboniferous/Devonian (Tournaisian) hydrasperman gymnosperm from Oxroad Bay, Scotland and Ballyheigue, Ireland. *Review of Palaeobotany and Palynology* 296: 1-18.

Fossil Photos Creates Stunning Backdrop for Portland Chamber Orchestra

By Joe Cantrell



[Editor's note: Joe Cantrell has developed a photography system to capture almost 3-D images of structures inside clear fossils and stones.]

This was the premier of the symphony, "Celilo Falls, We Were There," composed by Nancy Ives with Ed Edmo (in hat and blue jeans to the left of Yaki here) reading his poetry and visuals by me. It was performed in Patricia Reser Center for the Arts by the Portland Chamber Orchestra conducted by Maestro Yaki Bergman, 4 June 2022, followed by performances in a NE Portland church and at The Granada Theater in The Dalles, Oregon. I had picked several hundred images to be projected above the orchestra, but I don't read music so Nancy, the composer, and I sat together controlling the slide show and she changed them as the symphony progressed.

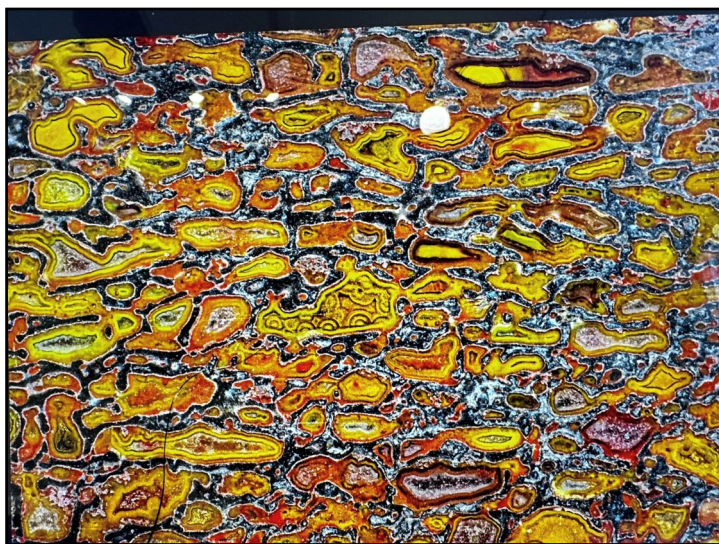
It was a joyful experience to feel, artistically, the images of natural beings such as these ammonites as they relate to the music in my head. The late Carl Sagan's series, "Music of the Cosmos" must have influenced me, as certainly did the day when I was 7 years old that I brought two round sandstone rocks home but dropped one as I opened the front door with my butt. It cracked open and there were 2" crystals! I immediately, of course, broke open the other rock and there were crystals too! I think they were probably selenite, but they disappeared while I was in Vietnam. Among the many things that shape art in later life. I wish I could take you inside those crystals with stacked focus imagery. I'll find another piece of selenite and we'll go there. [From Joe's Facebook posts on July 21, 2023.]

Joe Cantrell Paleo-Art

Long-time NARG member, Joe Cantrell, continues to capture unique and beautiful images of transparent fossils and other rocks. These are a few recent images he has shared on Facebook.



Bog wood fossil, high magnification on the left and lower magnification on the right. Cellular structure is visible. July 18, 2023



Dinosaur bone marrow. August 5, 2023



Fungus gnat in Baltic amber, 90 million years old. Stellate pollen in lower left-hand corner.
July 27, 2023

Mnemonics to Memorize the Geologic Time Scale

Larry Purchase found this resource from the Earth Sciences Department at Santa Barbara City College. It was published as a webpage (science.sbccc.edu/~earthsc/geo/TimeScaleMnemonics.htm) that has since been taken down. Luckily Larry printed it out and wants to share it with the rest of the club.

To memorize the Eras → Precambrian, Paleozoic, Mesozoic, Cenozoic:

- Please pay my children!
- Pizza places make chicken.
- Peter Piper milks cows.

To memorize the Periods → Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, Permian, Triassic, Jurassic, Cretaceous, Tertiary, Quaternary:

- Cold oysters seldom develop many precious pearls, their juices congeal too quickly.
- Come over some day, maybe play poker. Three jacks can take queens.
- Charlie Oliver still drives my purple Plymouth to Jersey City through quicksand.
- Can old senators demand more political power than junior congressmen? Tough question!
- Quiet time can just tease people particularly men dodging spouses ordering chores. (Reverse order)

To memorize the Epochs of Cenozoic Era → Paleocene, Eocene, Oligocene, Miocene, Pliocene, Pleistocene, Holocene (or Recent):

- Pretty eager old men play poker hard.
- Pigeon egg omelets make people puke heartily.
- Put eggs on my plate, please, Homer.

Crab from the Nestucca Formation



Bernie Kleutsch shared a crab fossil he collected in the late 1980s from the Little Nestucca River near Neskowin, Oregon. This crab was probably fossilized 34-40 million years ago within the [Nestucca Formation](#). Bernie said it was much more crumbly than other crab fossils found in the Pacific Northwest. It is a very rare fossil to find from the Oregon Coast.



Crabs Donated by Bob Manley Basis for Poster Presented at GSA

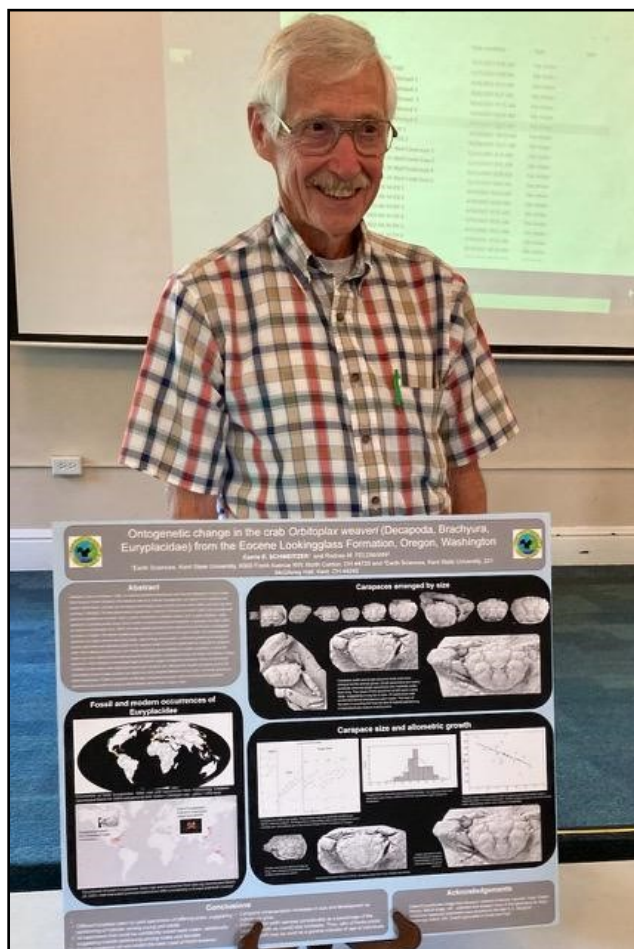
by Bruce Thiel

Using the 13 *Orbitoplax weaveri* crabs that Bob Manley found, prepared and donated from the Lookingglass Formation of SW Oregon, Drs. Carrie Schweitzer and Rod Feldmann, faculty at Kent State, presented a poster at a Geological Society of America regional meeting this spring in Michigan. Because Bob sent them an assortment of various sizes, they measured carapace width and length and compared it with measured specimens donated by the late Ross Berglund, of Seattle. They concluded that while the crabs were small, width and length were relatively close--but as they grew, the carapace width and length become more and more unequal. They also concluded that as the animal became larger, spines and ornamentation also became more pronounced.

This is one of many examples of NARG members who are amateur fossil collectors that make contributions to the academic body of knowledge of fossils, evolution and science.

The original poster is too large to reprint in the newsletter, however if you would like to download a smaller version that's still readable (11" x 17"), please email BruceThiel@icloud.com for a pdf.

Reference: Ontogenetic change in the crab *Orbitoplax weaveri* (Decapoda, Brachyura, Euryplacidae) from the Eocene Lookingglass Formation, Oregon Washington, by Carrie E. Schweitzer and Rodney M. Feldmann. Poster presented at GSA Regional Meeting, North Central Section, May 4, 2023.



Fossilized Barnacle-Covered Crab

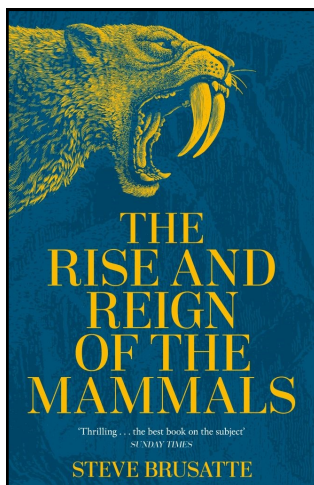
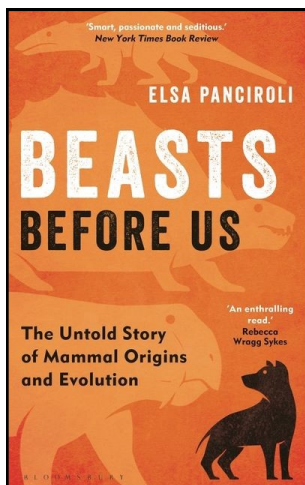
Weylin Charland found a fossilized crab carapace completely covered with about 60-70 fossilized barnacles. The piece had tumbled in the surf and was badly eroded. When Jim Goedert examined it he thought it was Yaquina Formation, or possible Nye mudstone, which would place it somewhere around 20 - 24 MYO. Weylin gave it to Bruce Thiel to prep and see if anything could be uncovered. It appears that most of the identifying features of the crab and the claws were eroded or missing—Bruce uncovered a portion of the light brown matrix (showing in lower-right of the first picture next to the barnacle with its center missing) where one could see the presence of the crab carapace underneath, as shown in the second picture, however the dentition or margin of the shell had eroded limiting identification of the crab.

NARG members have always been very generous to share fossils with scholars who are interested in exploring research and publishing their results and insights in scientific journals. Once a fossil has been described, or analyzed by scientist, it must go into the public domain for others to see and study, and as a result, NARG members have donated many fossils to museums where they can be available for any scholar to examine and/or dispute findings or provide further research. Weylin has indicated that this barnacle crab is available for continued study and is willing to donate it to a public repository if needed. Over the years, NARG members have donated, many significant fossils to museums, such as the Smithsonian, as was the case with Kent Gibson's, donation of important coastal marine fossils. Three fossil crabs were donated by Bruce Thiel to the Smithsonian are currently on display in the Deep Time exhibit which opened a few years ago, in the Natural History Museum. Important fossils, found by Andrew Bland, Tim Fischer, and Greg Carr are currently being studied and will reside in the Condon collection at the University of Oregon's museum. Other important fossils found by NARG members and by advisor and amateur collector Jim Goedert reside in museums all around the world.



Mammalian Origins and Evolution: Two Recent Syntheses and Commentaries

by Harold E. Hinds, Jr.



Elsa Panciroli, *Beasts Before Us: The Untold Story of Mammal Origins and Evolution* (London: Bloomsbury Sigma, 2021).

Steve Brusatte, *The Rise and Reign of Mammals: A New History from the Shadow of the Dinosaurs to Us* (New York: Mariner Books, 2022).

Rarely do two books appear almost simultaneously on essentially the same topic, both of which masterfully summarize the development and present state of our knowledge of an important subject: in this case, mammalian paleontology. Both are well worth your attention and are highly recommended. While both do cover much the same ground, and do not significantly differ as to main conclusions, each delves into greater depth on some subjects or offers an aside which significantly explores a relevant topic not covered by the other.

Steve Brusatte probably will need no introduction. Indeed, the book's front dust jacket proclaims that he is the "*New York Times* bestselling author of *The Rise and Fall of Dinosaurs*." On the back dust cover, an excerpt from the *Washington Post*'s praise for his dinosaur book could just as easily apply to his mammals study: "Brusatte's mastery of his field, formidable explanatory powers, and engaging style have combined to produce a masterpiece of science writing [for a general public]." Brusatte was originally a "dinosaur specialist," but when he began to teach at the University of Edinburgh, in Scotland, he became "obsessed with mammals" (Brusatte, pp. xix-xx). Today, he, together with his students and post-docs, is engaged in a project that combines "evidence from the anatomy of fossils with the anatomy and DNA of today's species, to build a master family tree" (p. 211). While he has named "several ancient mammals" (jacket, bio), and seems to have read everything published on the subject, he is a relative newcomer to the field, and relied heavily on "a handful of excellent books" by Tom Kemp, Liam Drew, David Rains Wallace, Donald Prothero, Robert Schoch, Kenneth Rose, Ross MacPhee, and the legendary Zofia Kielan-Jaworowska (p. 409).

Elsa Panciroli undoubtedly will be new to you. Currently "she is a researcher based at the University of Oxford and associate researcher at the National Museums of Scotland," and like Brusatte, a "keen science speaker and communicator" (jacket). She has published most significantly on Jurassic mammals and is a prize-winning paleontological presenter. Strangely, even though Brusatte was involved in the supervision (together with Zhe-Xi Luo) of her most important research, on the Jurassic fossil *Borealestes*; and although in the past they have published jointly; Panciroli does not even mention Brusatte, who in contrast does praise her work (compare Brusatte, pp. 98-99, 424; and Panciroli, pp. 173-199). Perhaps she believes that often females do not receive adequate recognition (see, for example, her discussion of Lone Rudner, who "found herself expected to cook meals and make sandwiches, despite her expertise as a palaeontologist and archaeologist" (p. 159).

Panciroli and Brusatte both establish a similar story of mammalian evolution. If you thought that mammals' ancestry originated with the dinosaurs, you'd be mistaken. Both authors place their roots in the Carboniferous, and mammals and reptiles "share a common ancestor — an amniote tetrapod" (Panciroli, p. 61). Thereafter each traces the subsequent evolution from mammalian forebears to true mammals: from tetrapods to synapsids to therapsids to cynodonts to *Morganucodon*-type mammals to multituberculates to placentals and marsupials and monotremes. Each stresses the slow accumulation of the essential traits that will combine to set mammals apart: turbinates, secondary palate, upright posture (limbs fully underneath the body), four spinal regions, enhanced senses of sound and scent (enlarged olfactory bulbs; reduced jaws, leading to refined hearing), milk teeth, complex teeth (incisors, canines, premolars, molars) that occlude, mammary glands, the hyoid, and fur.

(Mammalian Origins, continued)

Panciroli and Brusatte do differ in what they choose to emphasize in asides: for example, Panciroli has an extended discussion on applying synchrotron radiation to fossils, a method which employs "x-rays that can be used to scan fossils, looking through rock and into structure in unprecedented detail" (p. 176). And she provides an extended discussion on when and how "the first mammal ancestors became endothermic" (pp. 114-112). Brusatte, on the other hand, gives special attention to the dentary-squamosal joint (pp. 65-76), ear bones, and the placenta (pp. 188-190).

At page 289, Panciroli wraps up her book: "There are still many more stories to tell, but I can only fit so much of evolution's wonders into a single book"; and "The journey of the most recent 'age of mammals' has been told countless times. It is a path that starts 66 million years ago" (p. 289). Perhaps she intends a sequel?

Brusatte, in contrast, at the same point in geologic time, and after 193 pages, states that the "Age of Mammals had begun," and devotes pages 194-408 to the "Reign of the Mammals." In Chapter 6, "Mammals Modernize," he particularly focuses on the Eocene, and the dominance of placental mammals, with an extended discussion of South American examples. Chapter 7, "Extreme Mammals," emphasizes elephants, bats, and sirenians. Chapter 8, "Mammals and Changing Climates," stresses the effects of a cooling climate during the Oligocene and early Miocene, and that, "By the Miocene the modern groups had become almost fully modern" (p. 296). Chapter 9, "Ice Age Mammals," covers "strange, stupendous, shaggy, and most of all supersized mammals" (p. 341). Then in Chapter 10, "Human Mammals," we and our primate cousins are introduced. Finally, in Chapter 11, "Future Mammals," Brusatte is "hopeful the reign of mammals will continue" (p. 408).

Woven into Brusatte's reign of mammals are a couple of sub-themes that may be of particular interest: DNA-based mammalian genealogy, and convergent evolution. Mark Springer's DNA-based "family tree has now replaced [George Gaylord] Simpson's [tree based on morphology] as the standard." Or to state this somewhat differently: "The overall structure of the tree, therefore, reflects geography more than anatomy or ecology" (p. 209). Thus placentals are divided into four groups: Afrotheria ("because most of its members live in Africa today"), Xenarthra ("incorporates mostly South American species"), Laurasiatheria (dogs, cats, odd and even-toed hoofed mammals, whales, bats, and Eurachontoglires (primates, rabbits, rodents). DNA analysis, coupled with fossils, has led to some amazing and quite unexpected conclusions: for example, rodents rafted from Africa to South America during the Eocene, when the two were separated "by at least a thousand miles ... of open Atlantic Ocean" (p. 236).

Rodents also help illustrate convergent evolution: "Two organisms may independently evolve the same feature if they are faced with similar environmental pressures" (pp. 206-207), or "form follows function" (p. 207). The rodents, the "Eocene rafters," evidently met little resistance in out-competing others in filling numerous South American ecological niches: they evolved into "hundreds of species burrowing, climbing, running, and swimming across basically every environment South America can throw at them" (p. 237).

One major difference between Panciroli and Brusatte is their marshaling of evidence. Panciroli cites specific textual facts or discussions. Brusatte in contrast includes 61 pages of "Notes on Sources," specific citations and discussions of associated scholarly studies, past and present. Brusatte's essay on sources is amazing, and an extensive guide, should you wish to further pursue any topic covered in his volume in further depth.

Both volumes have considerable value for anyone interested in mammalian paleontology and are highly recommended.

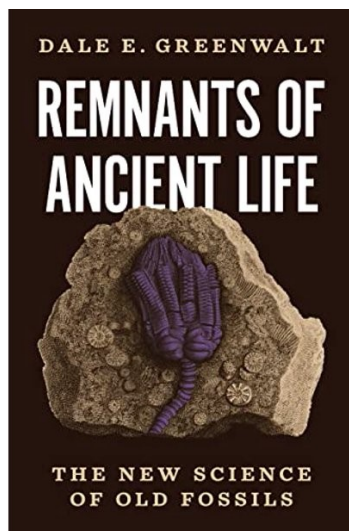
Recommendation: Thomas Condon Documentary

For an interesting 30 minute video covering Oregon's first state geologist, Thomas Condon (1822-), you can go to: <https://www.opb.org/television/programs/oregon-experience/article/thomas-condon-of-faith-and-fossils/>. The documentary entitled "Thomas Condon: Of Faith and Fossils," takes a look at his significant discoveries, development as a geologist, and how he intertwined his faith (he was a preacher) with paleontology.

Molecular Paleontology

By Harold E. Hinds, Jr.

Dale E. Greenwalt, *Remnants of Ancient Life: The New Science of Old Fossils* (Princeton: Princeton University Press, 2022).



Dale Greenwalt, Resident Research Associate at the Smithsonian Institution's National Museum of Natural History, and Curator of its fossil collection, has produced an overview of one of the frontiers of paleontological science, that is, the world of ancient molecules. It's a readable and engaging, but certainly challenging, survey, that will significantly broaden your understanding of how we can recover the deep past.

Greenwalt appears to have an encyclopedic knowledge of the current science of ancient biomolecules. He devotes chapters to the following: the use of mass spectrometry to identify blood in the abdomen of an apparently blood-engorged ancient mosquito; the deep time limits of ancient molecules, whether preserved *in situ* or as disassociated molecules; ancient pigments and the origin of color vision; the black pigment melanin, which "with the exception of ancient DNA, ... may represent the most exciting area of ancient biomolecule research" (p. 67, & ch. 4); dinosaurs' pigmented feathers and eggs and color vision; "the potential of both metallic and non-metallic elements to elucidate the anatomy of fossil organisms" (p. 102, & ch. 6); proteins and proteomes (the compilation of all proteins of an organism) as a major focus of ancient biomolecule research, especially molecular clocks

and ancient collagens (isolated from bone tissue); proteins or fragments of proteins in dinosaur bones; "the holy grail of ancient biomolecules: ancient DNA" (p. 5, & chs. 9, 10) and the human species; and "the current consensus is that deep time plant DNA is simply not preserved" (p. 166), but that ancient biomolecules of chlorophyll, cutin, cellulose, and lignin, as well as sporopollenin (a component of pollen), do allow for the classification of plants. Greenwalt concludes, in Chapter 12, "The Future of Studying the Past," that "the current science of ancient biomolecules looks dramatically different compared to even ten years ago. We have witnessed an explosion of progress" (p. 208). And he goes on to say, "given the technical advances of the past few years, the future looks very promising" (p. 207).

Remnants of Ancient Life is chock full of fascinating reports, insights, and analysis. A few illustrative examples:

1. As a boy, when I collected fossils from the Burgess Shale, I assumed, as did others, that the fossils I gathered were "fossilized via the process of mineralization"
2. (p. 41). But in fact, those fossils "are composed entirely of kerogen," "organic-rich material ...
3. [that fell] to the bottom of a lake and [became] deeply buried and heated" (p. 41). Therefore, "ancient biomolecules ... actually form the body of the fossil"! (p. 42).
4. Biometals, especially zinc, harden insect mandibles, and when fossil insects were examined for zinc, it was distributed in their mandibles just as it is in extant insects.
5. eDNA, environmental DNA, has been found in the "frozen mix of ice and salt" in the "silty bottoms of ice cores." The cores contained sequences [of DNA] from "trees, ground cover plants, and insects," thus revealing that between glaciers, Greenland was "covered by large forests of pine, spruce, and yew trees" (p. 169).
6. The fossil leaves found in the 16-million-year-old shale at Clarkia, Idaho, and studied by Bill Rember, are familiar to our NARG organization. But Clarkia isn't just a terrific site for fossil leaves, but it is also a key deposit for the preservation of ancient chlorophyll!

Remnants of Ancient Life is highly recommended and is available in our library.

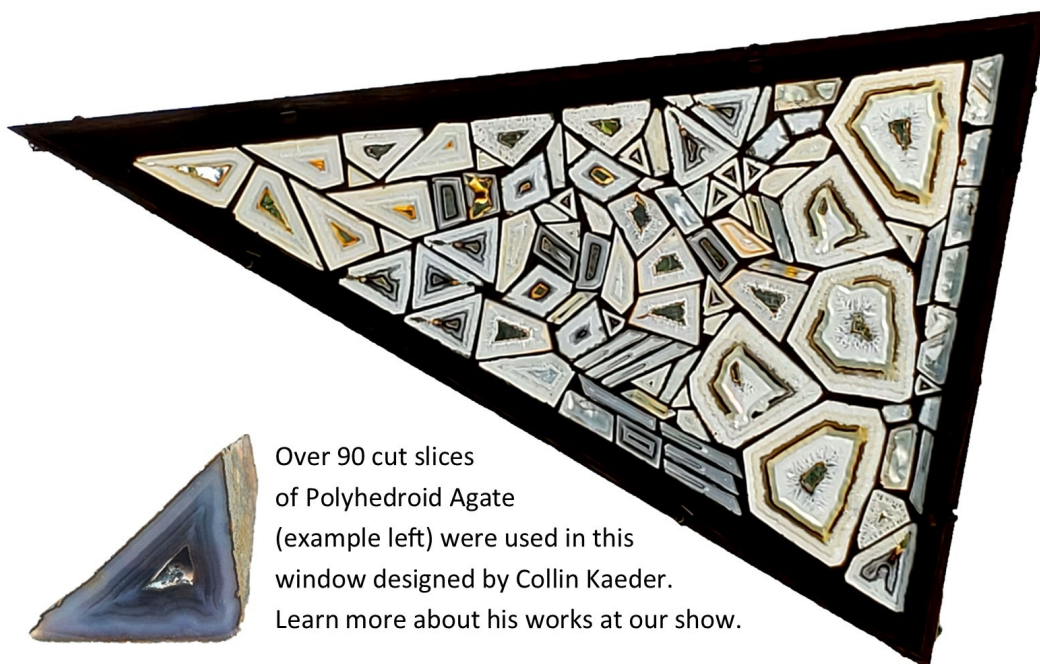
Portland Regional Gem & Mineral Show Assoc. (a non-profit organization)

42nd Show of Gems, Minerals & Fossils

Wingspan Event and Conference Center

At Westside Commons, 801 NE 34th Ave., Hillsboro, OR 97124

October 6, 7 & 8, 2023 Fri & Sat 10-6, Sun 10-5



Over 90 cut slices
of Polyhedroid Agate
(example left) were used in this
window designed by Collin Kaeder.
Learn more about his works at our show.

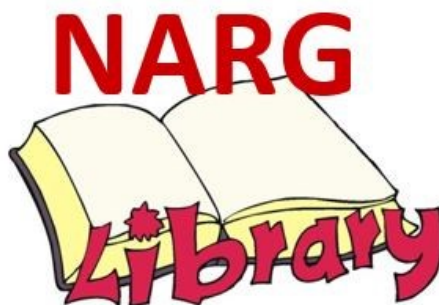
40+ Dealers / Presentations / Fossil Discovery Area / Kids Activities
Door Prizes / Silent Auction / Demonstrations / Exhibits

Admission \$7 weekend pass, kids 12 & under free
Venue charges separately for parking.

www.portlandregionalgemandmineral.com

PRGMSA is a 501(c)(3) nonprofit and not affiliated with any school program or district





The NARG library has just become easier for members to use. The 430 books can be viewed by using the link below. Once you find a book you want, click on it and find its 'index' number. Requests for books using the index number are made to danolough@aol.com. He will notify you if the book is already checked out. If it is not, he will bring it to the next NARG meeting. Members can check out 2 books at a time and should return them at one of the following 2 meetings.

<http://cloud.collectorz.com/danolough/books>

NARG Membership

NARG's membership dues are due January 1, 2023.

Individual Membership	\$25
Family Membership	\$40
Student Membership	\$10

Pay your membership by:

*Mail a check and [application](#) to:

NARG (North America Research Group)
Membership
PO Box 233
Tualatin, OR 97062

*Renew membership and pay via credit card with PayPal (No account necessary.):

Use the following links:

Family membership: \$40, click [here](#).

Individual membership, \$25, click [here](#).

Student membership, \$10, click [here](#).

Fossil Calendar

Oct. 4	NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM
Oct. 5	PRGMSA 42nd Show of Gems, Minerals, and Fossils set-up
Oct. 6-8	PRGMSA 42nd Show of Gems, Minerals, and Fossils @ Wash. Cty. Fairgrounds
Nov. 1	NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM
Nov. TBD	Annual Holiday Get-Together and Fossil Swap (look for details in emails)
Dec. 6	NARG Monthly Meeting, Tualatin Heritage Center, Tualatin @ 7PM

Check the web-site, emails, and Facebook for any changes or alternatives.

For a listing of local gem and mineral shows check out:

<http://www.mineralcouncil.org/shows.pdf>

<http://orerocon.com/> Click on Portland Area Rock Clubs, includes PNW Clubs)

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Michael Santino
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Committees:

Newsletter:	Tara Baker (organizer) Dan O'Loughlin, Peg Johnson, Bruce Thiel (proof-readers)
FossilFest:	Tara Baker Debbie Shannon
NARG Fossil Swap	Debbie Shannon Gerry Lukos
Portland Regional	Tara Baker Debbie Shannon



NARG's Mission Statement

To encourage responsible stewardship of earth's paleontological resources; to promote scientific research, communication, and public education.