

October 3, 2002

News and notes

Before looking at terrestrial animals, other than mammals, from the [Paleogene Period](#), here are some news items that I thought were interesting.

Research

- Oceanography: [Thermohaline-turbulence instability and thermohaline staircase formation in the polar oceans](#); Phys.org summary [here](#).
- Banded iron formations: [Milankovitch cycles in banded iron formations constrain the Earth–Moon system 2.46 billion years ago](#); behind a paywall.
- Stratigraphy: [The Cretaceous-Paleogene contact in the Tornillo Group of Big Bend National Park, West Texas, USA](#).
- Geochemistry: [Pyrite mega-analysis reveals modes of anoxia through geological time](#).

Plate Tectonics

- [Did transit through the galactic spiral arms seed crust production on the early Earth?](#) Scientific American summary [here](#).
- Early plate tectonics: [Intraplate continental basalts over the past billion years track cooling of the mantle and the onset of modern plate tectonics](#); behind a paywall, Phys.org summary [here](#).
- Future plate tectonics: [Will Earth's next supercontinent assemble through the closure of the Pacific Ocean?](#); Phys.org summary [here](#).
- [A tectonic-rules-based mantle reference frame since 1 billion years ago – implications for supercontinent cycles and plate–mantle system evolution](#).
- [Dynamic processes at the ends of collisional mountain chains](#).
- [Wide-angle seismic reflections reveal a lithosphere-asthenosphere boundary zone in the subducting Pacific Plate, New Zealand](#).

Paleontology

- Fossilization research: [Cave opening and fossil accumulation in Naracoorte, Australia, through charcoal and pollen in dated speleothems](#).
- Dinosaur bones and evolution: [Re-description of the early Triassic diapsid *Palacrodon* from the lower Fremouw formation of Antarctica](#); Phys.org summary [here](#).
- More on dinosaur bones: [Closer examination does not support infection as cause for enigmatic *Tyrannosaurus rex* mandibular pathologies](#); behind a paywall, Phys.org summary [here](#).
- Dinosaur diversity: [Calibrating the zenith of dinosaur diversity in the Campanian of the Western Interior Basin by CA-ID-TIMS U–Pb geochronology](#).

- [‘Snakey crocodile-face’: New prehistoric sea monster discovered in Wyoming.](#)
- Evolution and bones: [To be or not to be heavier: The role of dermal bones in the buoyancy of the Late Triassic temnospondyl amphibian *Metoposaurus krasiejowensis*](#); Eureka Alert summary [here](#).
- [Fish fossil catch from China includes oldest teeth ever.](#)
- More on fossil fish from China: [Spiny chondrichthyan from the lower Silurian of South China](#); behind a paywall, Phys.org summary [here](#).
- A neat fossil: [A Cambrian tommotiid preserving soft tissues reveals the metameric ancestry of lophophorates](#); Live Science summary [here](#).
- [Evolution of the ancestral mammalian karyotype and syntenic regions](#); Phys.org summary [here](#).
- See, that guy really is a Neanderthal: The [contribution of Neanderthal introgression to modern human traits](#).

Ice Ages and Glacial Geology

- [Rapid northern hemisphere ice sheet melting during the penultimate deglaciation](#); Phys.org summary [here](#).
- Sea level changes: [A detection of the sea level fingerprint of Greenland Ice Sheet melt](#); behind a paywall, Phys.org summary [here](#).
- [Listening to the song of melting glaciers.](#)

Mining and Energy

- [Fuel exploitation and environmental degradation at the Iron Age copper industry of the Timna Valley, southern Israel](#); Mining.com summary [here](#).
- [Iron ore price marks quarterly losses on China covid, property woes.](#)
- [London gold dealer runs out of bullion as Truss budget shocks.](#)
- [Oil Sinks to First Quarterly Drop Since 2020 as Outlook Darkens.](#)
- [Canada Weekly Rig Count Down 2 for Week Ending September 30, 2022.](#)
- From the United States Energy Information Administration (USEIA): [Advances in technology led to record new well productivity in the Permian Basin in 2021.](#)
- Also from USEIA: [The United States exported record amounts of petroleum products in the first half of 2022.](#)

Environmental Geology and Hydrogeology

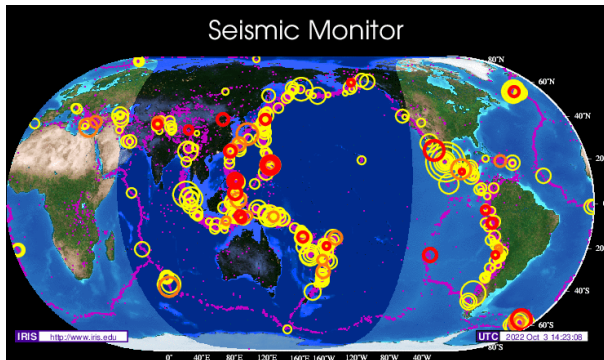
- [Goelectrical Measurements to Monitor a Hydrocarbon Leakage in the Aquifer: Simulation Experiment in the Lab.](#)

From Out of This World

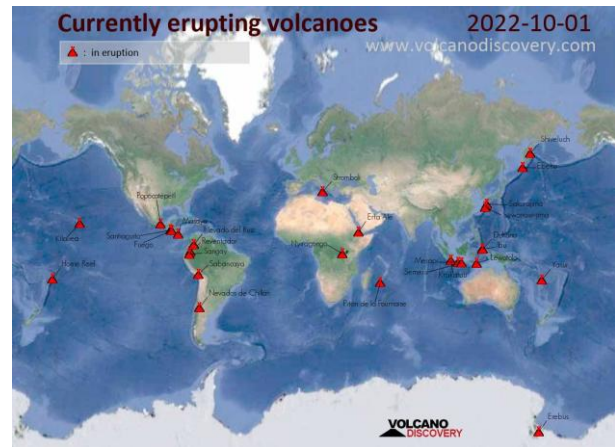
- Minnesota: [U of M geologists discover major meteor crash site.](#)

- Martian floods: [Layered subsurface in Utopia Basin of Mars revealed by Zhurong rover radar](#); Nature News summary [here](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor Link](#)



[Currently Erupting Volcanoes](#)

- [Today's Biggest Earthquakes.](#)
- [Worldwide Volcano News and Updates.](#)
- [Volcanic Eruption Creates a New Island in the South Pacific.](#)
- Volcanoes and tsunamis: [Diverse tsunamigenesis triggered by the Hunga Tonga-Hunga Ha'apai eruption](#); Phys.org summary [here](#).
- From the Geological Society of America (GSA): [Discovery Of Ash In Sediments Around The Las Vegas Valley: Implications For Future Ashfall Hazards From Distal Volcanoes](#); Phys.org summary [here](#).
- [Catastrophic growth of totally molten magma chambers in months to years](#); Phys.org summary [here](#).
- Historical volcano: [Second Intermediate Period date for the Thera \(Santorini\) eruption and historical implications.](#)
- Earthquake research: [The effects of pre-stress assumptions on dynamic rupture with complex fault geometry in the San Gorgonio Pass, California, region.](#)
- From the United States Geological Survey: [National Strategy for Landslide Loss Reduction](#); Phys.org summary [here](#).
- Landslide modelling: [Dynamic numerical simulation and risk predictive assessment of the slope debris flow for the rear mountain at the management office of the Erlang Mountain Tunnel.](#)
- [Updated Understanding of the Thompson River Valley Landslides Kinematics Using Satellite InSAR.](#)
- [Map of Eastern Canada battered by Fiona's hurricane-force winds and storm surges.](#)
- [Hurricane Ian temporarily disrupts Florida's gasoline supply chain.](#)

Upcoming Events



University
of Manitoba

Department of Earth Sciences

The Jack Gallagher Visiting Scientist 2022 Dr. David London

David London obtained his B.A. in geology (1975) at Wesleyan University, Connecticut, after which he mapped for the U.S. Geological Survey (1975-1976) in the high-grade metamorphic terrane of eastern Connecticut, USA. He continued annual summer field mapping in metamorphic rocks of central Connecticut through 1988. Dr. London received his M.S. (1979) and Ph.D. (1981) in geology from Arizona State University.

His graduate studies included investigations of pegmatites in the White Picacho district, Arizona, and he began laboratory research for his Ph.D. in Washington, D.C., at the Geophysical Laboratory, the U.S. Geological Survey, and the Smithsonian Institution. He returned to the Geophysical Laboratory as a postdoctoral research fellow (1981-1982).

Dr. London joined the faculty of the School of Geology and Geophysics at the University of Oklahoma (1983-2020), where he held several professorships and a chaired position. He established and directed the University's electron microprobe lab.

Dr. London is the managing editor of the Pegmatite Interest Group of the Mineralogical Society of America. His book *Pegmatites* (Canadian Mineralogist, 2008, Special Publication 10) is the only authoritative monograph on the subject. Londonite, isometric $\text{CsAl}_4\text{Be}_4[\text{B}_{11}\text{Be}]\text{O}_{28}$ (Can. Mineral. 39: 747-755), was named for him in 1999. London has published 144 research articles and has received \$4.4M in funding through 31 grants from the U.S. National Science Foundation and the U.S. Department of Energy. Please join us as Dr. David London shares his expertise with Manitoba geoscientists for his upcoming lecture series as noted below.

Tuesday, October 18, 1:00 p.m., Klaus Hochheim Theatre, 5th Flr Wallace

"Granite-Pegmatite Systems"

Tuesday, October 18, 3:00 p.m., Klaus Hochheim Theatre, 5th Flr Wallace

"The Pegmatite-Forming Environment"

Wednesday, October 19, 11:30 a.m., Klaus Hochheim Theatre, 5th Flr Wallace

"Crystallization of Pegmatites"

All are welcome to attend

Department of Earth Sciences, University of Manitoba

ONE planet
MANY
perspectives

October 3, 2002

Other Terrestrial Animals of the Paleogene

Although the [Cenozoic Era](#) has been called the [Age of Mammals](#), mammals were far from alone. So let's look at some of the other animals that lived during the [Paleogene Period](#).

Birds - *Gastornis*



Figure 1 - Skeleton of *Gastornis giganteus*

Credit: [Vince Smith](#), [Creative Commons Attribution-Share Alike 2.0 Generic](#) license

About 1.8 to 2 metres tall and weighing in at a few hundred kilograms, [fossil evidence](#) suggests that *Gastornis* lived from the [Paleocene](#) to the [Eocene](#) in North America, Europe and Asia. It is sometime called *Diatryma* from one of the early [descriptions](#) of the bird by [E. D. Cope](#).

Researchers [continue to debate](#) whether *Gastornis* was predatory, omnivorous or an herbivore. Early descriptions by [Cope](#) and [others](#) suggested a predator. A more recent [analysis](#) of suggests a varied diet that included scavenging and active predation. whatever its preferred diet, I don't think that you would want to meet up with it if you were a small mammal like [Eohippus](#).



Figure 2 - Reconstruction of *Gastornis*

Credit: [Creative Commons Attribution-Share Alike 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic](#) license

[Gaston Planté](#) found the [first fossils of *Gastornis*](#) in 1855 within the [Argile Plastique](#) formation near Meudon, a suburb of Paris, France. Later, in 1876, Cope [described](#) fossils that he called *Diatryma* from fossils he found in the [Wasatch Formation](#) of New Mexico. Cope's rival, [O. C. Marsh](#) also got in on the act, describing a fossil toe bone from New Jersey as *Barornis regens*. After Cope, Marsh and other giant egos of the fossil hunting world had died and began the fossilization, paleontologists got together and agreed that the original name, *Gastornis*, applied to all these finds. There are seven species of *Gastornis*: *G. parisiensis*, *G. gigantea*, *G. sarasini*, *G. geiselensis*, *G. russeli*, *G. xichuanensis*, and *G. laurenti*.

Birds - *Masillaraptor*



Figure 3 - *Masillaraptor* Leg Bones
Credit: Figure 6 in Mayr & Kitchener, 2022

Masillaraptor was a predatory bird, apparently related to the ancestors of modern [falcons](#), that lived in Europe during the Eocene. The leg bones of *Masillaraptor* are long, suggesting that it may have hunted while running on the ground. Its beak was fairly large, almost as long as the rest of the skull.



Figure 4 - *Masillaraptor* Restoration
Credit: El fosilmaniaco, Creative Commons Attribution-Share Alike 4.0 International license

[Gerald Mayr](#), Curator of Ornithology at the [Senckenberg Research Institute](#) first [described](#) *Masillaraptor* in 2006 from fossils found in the [Messel Pit](#), a [lagerstätte](#) and [UNESCO World](#)

[Heritage Site](#) 35 km southeast of Frankfurt am Main, Germany. More recently, Mayr and [Andrew Kitchener](#), of the [National Museums Scotland](#), described [fossils of *Masillaraptor*](#) recovered from the [London Clay Formation](#).

Reptiles - *Adocus*



Figure 5 - Fossil *Adocus* in the [Peabody Museum](#)

[Credit: Hectonichus, Creative Commons Attribution-Share Alike 3.0 Unported license](#)

One of the survivors of the [End Cretaceous Mass Extinction](#), *Adocus* was a [turtle](#) that lived from the [Barremian Age](#) of the [Early Cretaceous](#) until the end of the [Oligocene](#) Epoch. Fossils of *Adocus* are often just the shells, which are flattened, smoothly contoured and with horny sculptured plates. Fossils of *Adocus* are up to 1 m long. Like many turtles, it was probably an omnivore. *Adocus* fossils are widespread and can be found in Canada, China, Japan, Kazakhstan, Mexico, Mongolia, Tajikistan and the United States ([a full list is on this site](#)).

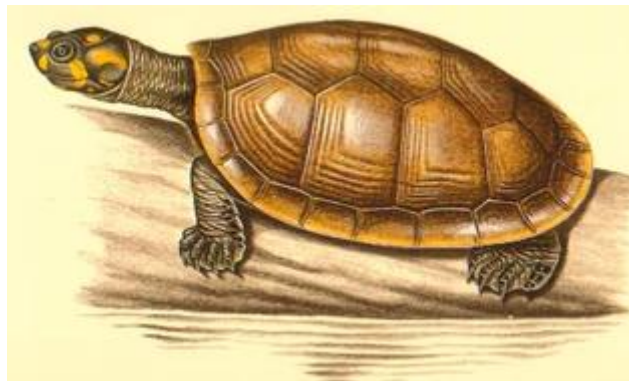


Figure 6 - *Adocus* Restoration

[Credit: dinopedia, CC-BY-SA](#)

American paleontologist [Joseph Leidy](#) first [described](#) fossils of *Adocus* in 1865, calling it *Emys beatus*. E. D. Cope also [described](#) fossils of *Adocus* in 1868 and is credited with the current name for it. There are about 18 species of *Adocus*.

Adocus also shows up in the [Bone Wars](#). E. D. Cope was a former student of J. Leidy and both of them were initially on friendly terms with each other and with fellow paleontologist O. C. Marsh. However, the increasingly bitter rivalry between Cope and Marsh apparently led Leidy to leave the study of western American vertebrate paleontology. The Bone Wars are a fascinating story about how people can allow their search for prestige to ruin professional relationships. The scientific method doesn't preclude people from being competitive.

Reptiles - *Diplocynodon*



**Figure 7 - *Diplocynodon* Skeleton at the at [Musee d'Histoire Naturelle, Paris](#)
Credit: [Ghedoghedo](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license**

A [crocodylian](#) related to modern [alligators](#), *Diplocynodon* lived from the [Paleocene](#) until the [Middle Miocene](#). The longest *Diplocynodon* fossil was about 1.2 m long.



**Figure 8 - *Diplocynodon* Reconstruction
Credit: [Nobu Tamura](#), [CC-BY-SA](#)**

Fossils of *Diplocynodon* have been found in Europe and Eastern North America, including in the Messel Pit and the [Geiseltal lignite](#) deposit in Germany. [Auguste Pomel](#) first described *Diplocynodon* in 1847. There are 11 species in the genus.

Insects - *Alicodoxa rasnitsyni*



Figure 9 - *Alicodoxa rasnitsyni* in Amber

**Credit: Figure 3 in [Emeljanov & Shcherbakov, 2011](#)
[Creative Commons Attribution-Share Alike 3.0 Unported](#) license**

Found in [Rovno Amber](#) from Ukraine, *Alicodoxa rasnitsyni* was a [planthopper](#) that lived during the Eocene. The species is known from several fossil specimens of nymphs. The fossilized nymphs are about 4 mm long and 2 mm wide.

The Rovno Amber comes from the Mezhygorje Formation and underlying Obukhov Formation near [Klesov](#). The two formations are Late Eocene, either [Lutetian](#) or [Bartonian](#). Rovno Amber is very similar chemically to [Baltic Amber](#) and they may have similar origins.

Russian entomologists [Alexander Emeljanov](#) and [Dmitry Shcherbakov](#) were the first to [describe](#) *Alicodoxa rasnitsyni* in 2011. *Alicodoxa rasnitsyni* is the only species in the genus.

Insects - *Elephantomyia irinae*



Figure 10 - *Elephantomyia irinae* in Amber

Credit: [Iwona Kania](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Another insect preserved in amber, this time Middle Eocene Baltic Amber, [Elephantomyia irinae](#) was a species of [crane fly](#). Known from five specimens of male insects, *Elephantomyia irinae* is one of six species of *Elephantomyia* found in Baltic amber, the others being [E. baltica](#), [E. brevipalpa](#), [E. bozenae](#), [E. longirostris](#), and [E. pulchella](#). Polish entomologist, [Iwona Kania](#), was the first to [describe](#) *Elephantomyia irinae* in 2015.

The genus [Elephantomyia](#) exists today and have many, many species. The genera was first identified by [John O. Westwood](#) and 1835 and the current name was first coined by [Carl Robert Osten-Sacken](#) in 1866.

Winding It Up

I think we can leave the Paleogene Period, for now. So far in this blog, we have seen only a fraction of the fossils from the Paleogene. If you want to look at some more, here are some links to follow up on:

- [Paleogene animals](#)
- [Paleogene amphibians](#)
- [Paleogene arthropods](#)
- [Paleogene birds](#)
- [Paleogene insects](#)
- [Paleogene reptiles](#)

Next week, we'll take a look at the world of the [Neogene Period](#).

Standard Caveat

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.