

November 14, 2022

News and Notes

Before going on to a look a terrestrial animals from the [Neogene](#), here are some news items that I thought were interesting.

Remembrance Day



November 11 was Remembrance Day in Canada, see the late Leonard Cohen [recite the poem "In Flanders Fields"](#) on YouTube.

Credit: [Hyacinth45](#), [Creative Commons Attribution 4.0 International license](#)

Research

- Coastal geology: [Historic Spatial Patterns of Storm-Driven Compound Events in UK Estuaries](#); Phys.org summary [here](#).
- Geological heritage sites: [Frasassi Caves and Surroundings: A Special Vehicle for the Geoeducation and Dissemination of the Geological Heritage in Italy](#) and [Large-Scale Accessibility as a New Perspective for Geoheritage Assessment](#).
- Glacial geology modelling: [An ensemble of Antarctic deglacial simulations constrained by geological observations](#).

Paleontology

- From Phys.org: [The evolution of tree roots may have driven mass extinctions](#); original research papers [here](#) and [here](#).
- [Research team discovers a new fossil paleoctopus in southern Manitoba](#).
- Here kitty, kitty: [The history of the domestic cat in Central Europe](#); Heritage Daily summary [here](#).
- End of the Ediacaran: [Environmental drivers of the first major animal extinction across the Ediacaran White Sea-Nama transition](#); behind a pay wall, Science Daily summary [here](#).
- [Advanced two- and three-dimensional insights into Earth's oldest stromatolites \(ca. 3.5 Ga\): Prospects for the search for life on Mars](#); Eureka Alert summary [here](#).

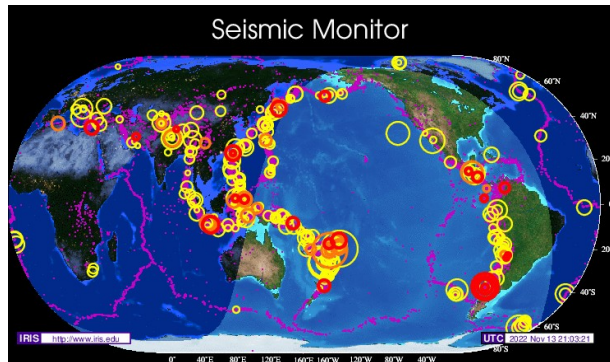
Mining and Energy

- Geopolitics and mining: [The Mining Gap: Critical Minerals and Geopolitical Competition](#).
- More geopolitics and minerals: [China has links to dozens of Canadian miners tied to critical minerals](#) and [LME decides against ban on Russian metal](#).
- Platinum group element deposit in Canada: [Diversity of Net-Textured Sulfides in Magmatic Sulfide Deposits: Insights from the Eagle's Nest Ni-Cu-\(Platinum Group Element\) Deposit, McFaulds Lake Greenstone Belt, Superior Province, Canada](#).
- Copper deposit geology: [Hypogene enrichment in Miduk porphyry copper ore deposit, Iran](#).
- From Mining.com: [South African efforts to clear coal railway derailment disrupted by violence](#).
- From the United States Information Administration (USEIA): [Most U.S. coal is mined in the West, but most coal mining jobs are in the East](#).
- Exploration activity: [U.S. drillers add oil and gas rigs for second week in a row – Baker Hughes](#).
- [Capping energy sector emissions would cost the Canadian economy \\$44.8 billion a year without any net global emission reductions](#).
- Also from the USEIA: [Strong demand for diesel leads to high prices and tight inventories going into winter](#).
- From OilPrice.com: [Trinidad Asks U.S. To Allow Gas Imports From Venezuela](#).
- [EU Needs \\$460 Billion Investment To Maintain Nuclear Power Capacity](#).

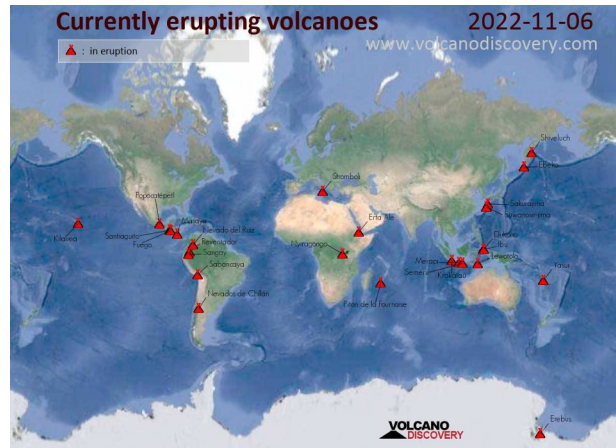
Environmental Geology and Hydrogeology

- Remediation techniques: [Synthesis of new Cr₂O₃/Fe₂O₃/glass composites from industrial wastes: from undesired to advanced optical products](#).
- From Phys.org and the Los Angeles Times: [Legacy of dust: How Owens Valley air pollution increases LA water bills](#).
- Pollution: [A systematic review on microplastic pollution in water, sediments, and organisms from 50 coastal lagoons across the globe](#); Phys.org summary [here](#).
- Climate cycles: [Two annual cycles of the Pacific cold tongue under orbital precession](#); Phys.org summary [here](#).
- Climate modelling: [Climate models fail to capture strengthening wintertime North Atlantic jet and impacts on Europe](#).
- [Global Carbon Budget 2022](#).
- A preprint under review: [Stable isotope \(\$\delta^{18}\text{O}\$, \$\delta^2\text{H}\$ \) signature of river runoff, groundwater, and precipitation in three river basins in the center of East European Plain](#).

Volcanoes, Earthquakes and Geohazards



[Link](#)



[Link](#)

- Research into volcanic rocks: [Heavy Rare Earth Elements and the Sources of Continental Flood Basalts](#); Phys.org summary [here](#).
- Petrology of an Icelandic lava flow: [Vikrahraun—the 1961 basaltic lava flow eruption at Askja, Iceland: morphology, geochemistry, and planetary analogs](#).
- Predicting an eruption: [Diffuse CO₂ degassing precursors of the January 2020 eruption of Taal volcano, Philippines](#).
- Earthquake hazard research in Japan: [Could the magnitude of the 3/11 disaster have been reduced by ecological planning? A retrospective multi-hazard risk assessment through map overlay](#); Phys.org summary [here](#).
- Earthquake research in Turkey: [Stress change generated by the 2019 İstanbul–Silivri earthquakes along the complex structure of the North Anatolian Fault in the Marmara Sea](#).
- Earthquake research, Canada: [Depth-Dependent Crustal Stress Rotation and Strength Variation in the Charlevoix Seismic Zone \(CSZ\), Québec, Canada](#).
- Geaux LSU Tigers, From Phys.org: [Geoscientists analyze fans' earthshaking reaction to win over Alabama](#).

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Neogene Terrestrial Animals – Insects and Other Invertebrates

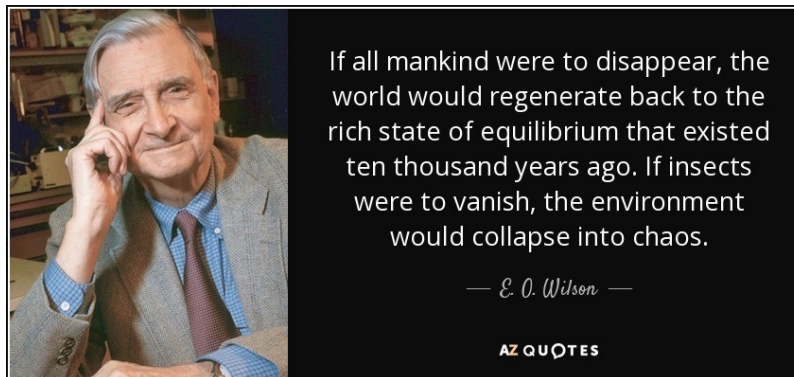


Figure 1 – E. O. Wilson and Insects
Credit: [A-Z Quotes](#)

Before looking at fossils of “cute” critters from the [Neogene Period](#), let’s see what kinds of fossils we have for the creatures we often overlook – insects and other invertebrates.

Many of the invertebrate fossils from the Neogene came from [Dominican amber](#). Dominican amber comes from the [Miocene \(Burdigalian\)](#) aged [La Toca](#) and the [Yanigua](#) formations in the Dominican Republic. The amber seems to have originally come from the sap of the [Hymenaea protera](#) tree. Dominican amber has yielded many interesting fossils including two protozoans, four plants, one fungus and 41 animals, The animals are mostly insects but also include the [feather of a woodpecker](#), [a gecko](#) and [a salamander](#).

Hymenoptera: Ants, Bees and Wasps

[Hymenoptera](#), the order that includes [ants](#), [bees](#) and [wasps](#), are among the most important animals in terrestrial ecosystems. Here are some examples from the Neogene.

Aphaenogaster amphioceanica

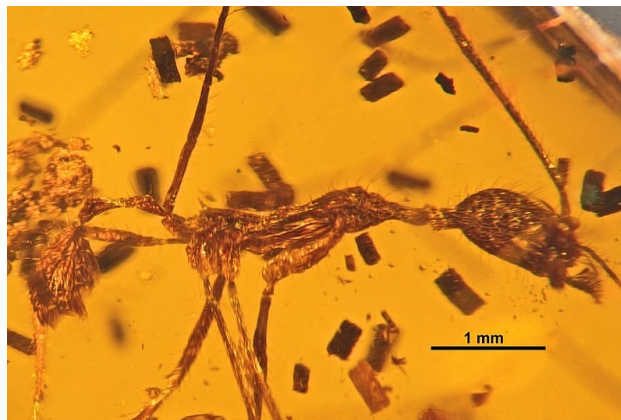


Figure 2 - *Aphaenogaster amphioceanica*

Credit: [Vincent Perrichot of Antweb.org](#), [Creative Commons Attribution 4.0 International license](#)
[Aphaenogaster amphioceanica](#) is known from only one fossil found in Dominican amber. It was a small ant, about 5.36 mm long, and brown in colour.

Brazilian entomologist, Maria L. De Andrade, then at the [University of Basel](#), first described *Aphaenogaster amphiocanica* [in 1995](#). The [genus *Aphaenogaster*](#) has approximately 200 species including [Aphaenogaster avita](#) from the Miocene of Japan.

Cephalotes alveolatus



Figure 3 – *Cephalotes alveolatus*

Credit: [Vincent Perrichot of Antweb.org](#), [Creative Commons Attribution 4.0 International license](#)

Another ant preserved in Dominican amber was [Cephalotes alveolatus](#). It was a small ant, about 6 mm long.

Gijsbertus Vierbergen and Joachim Scheven first described the species in 1995 ("*Nine new species and a new genus of Dominican amber ants of the tribe (Cephalotini Hymenoptera: Formicidae)*". *Creation Research Society Quarterly*. 32 (3): 158–170, not online), calling it *Zacryptocerus alveolatus*. In 1999, [Cesare Baroni Urbani](#) and M. L. De Andrade [re-classified the species](#).

Paraponera dieteri



Dominican amber also yielded the specimen of [Paraponera dieteri](#). This is another species known only from a single specimen. C. B. Urbani described *Paraponera dieteri* [in 1994](#).

Figure 4 – *Paraponera dieteri*

Credit: [Hans-Jörn Freiheit of Antweb.org](#), [Creative Commons Attribution 4.0 International license](#)

Bombus cerdanyensis

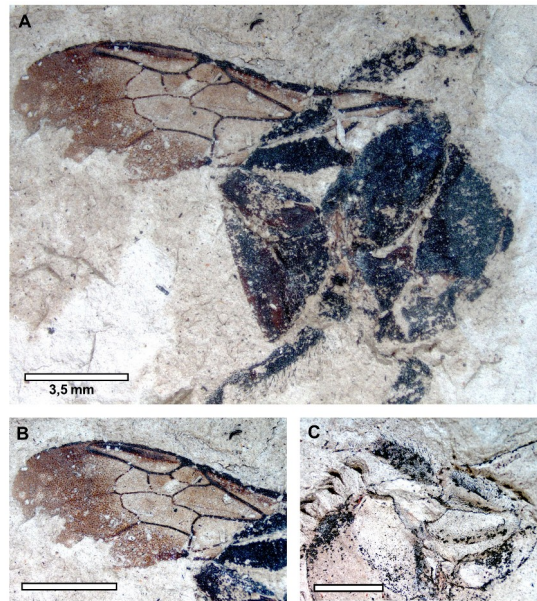


Figure 5 – *Bombus cerdanyensis*

Credit: T. De Meulemeester in [Dehon et al.](#),
[Creative Commons Attribution 4.0 International license](#)

[*Bombus cerdanyensis*](#) was a [bumblebee](#) known from a single fossil that came from Miocene lacustrine shale deposits near [Bellver de Cerdanya](#) Spain. The fossil of *Bombus cerdanyensis* shows only part of the body and only one wing.

Manuel Dehon, Denis Michez, André Nel, Michael S. Engel, and Thibaut De Meulemeester [first described *Bombus cerdanyensis*](#) in 2014. Bumblebees are still with us and the genus [Bombus](#) has more than 250 living and extinct species.

Oligochlora



Figure 6 – *Oligochlora*

Credit: Michael S. Engel, [Creative Commons Attribution 3.0 Unported license](#)

Oligochlora is an extinct genus of [sweat bee](#) containing six species, all of which are known from samples of Dominican amber. [Dr. Michael Engel](#) first [described *Oligochlora*](#) in 1995.

Leptofoenus pittfieldae

Another fossil from Dominican amber is of a wasp, [Leptofoenus pittfieldae](#), excavated from the La Toca mine group northeast of Santiago de los Caballeros in 2008



Figure 7 – Male *Leptofoenus pittfieldae*

Credit: Michael S. Engel, [Creative Commons Attribution 3.0 Unported license](#)

Michael Engel [first described *Leptofoenus pittfieldae* in 2009](#) from a specimen found in amber. The specimen was a male wasp, 8.8 mm long.

Butterflys

Doritites bosniackii

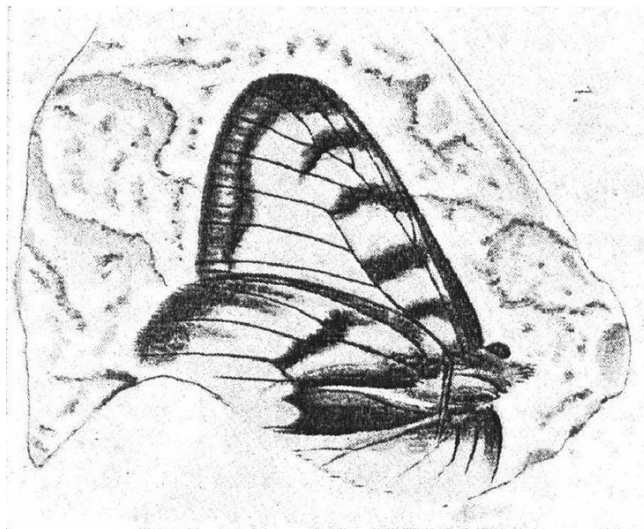


Figure 8 - *Doritites bosniackii*

Credit: [Rebel](#), [public domain](#)

Found in Miocene deposits from Tuscany, Italy, *Doritites bosniackii* was a [swallowtail butterfly](#). [Hans Rebel](#) first described the species in 1898.

Mylothrites pluto



Figure 9 – *Mylothrites pluto* Reconstruction

Credit: Apokrytaros, [Creative Commons Attribution 4.0 International license](#)

Another extinct [butterfly](#) was *Mylothrites pluto*. Found in Late Miocene deposits from near Öhningen, Germany, [Oswald Heer](#) was the first to describe the species in 1849. Heer originally placed the fossil in the genus [Vanessa](#), however Samuel Scudder [later placed it in its own genus](#), *Mylothrites* in 1875.

Other Invertebrates

Araneagryllus dylani, a Cricket



Figure 10 – *Araneagryllus dylani* holotype

Credit: Heads 2010, [Creative Commons Attribution 4.0 International license](#)

Not all the insects in Dominican amber are the remains of ants and other Hymenoptera, *Araneagrillus dylani* was a cricket. *Araneagrillus dylani* was about 12 mm long and is the first example of Phalangopsidae crickets in the fossil record.

Samuel Heads was the first to describe *Araneagrillus dylani* in 2010. *Araneagrillus dylani* is the only species in the genus.

***Paradoryphoribus chronocaribbeus*, a Tardigrade**

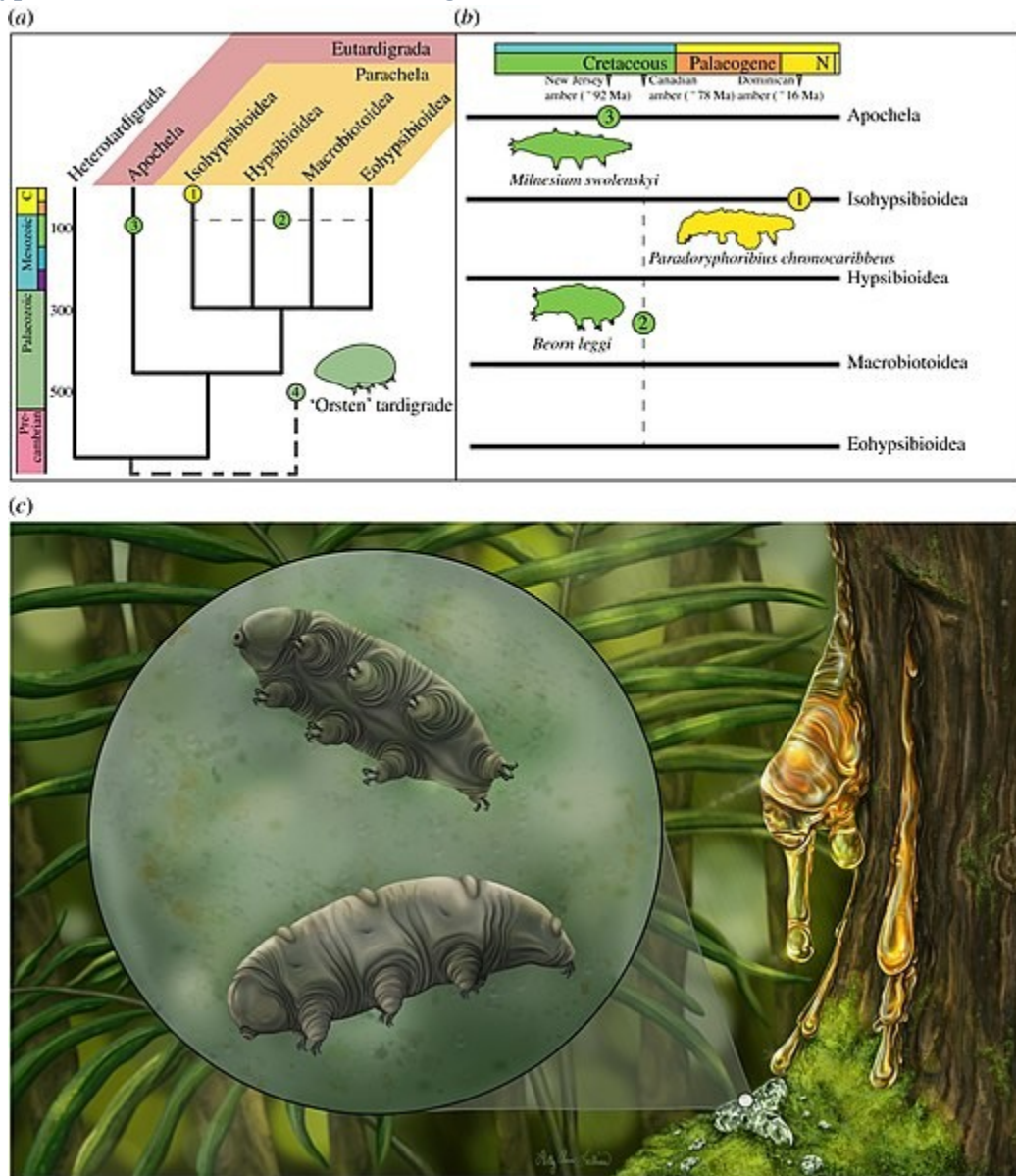


Figure 11 – Phylogenetic and temporal summary of the tardigrade fossil record
Credit: [Holly Sullivan](#), [Creative Commons Attribution 4.0 International license](#)

Tardigrades have been around since the Late Cretaceous and are among the world’s great survivors, able to survive a variety of harsh conditions. Although they can’t survive being encased in resin they do make

excellent fossils in Dominican amber. Like all tardigrades, [Paradoryphoribius chronocaribbeus](#) was tiny, about 539 microns (0.539 mm) long. It is also the earliest tardigrade found in the [Cenozoic](#).

Marc A. Mapalo, Ninon Robin, Brendon E. Boudinot, Javier Ortega-Hernández and Phillip Barden [first described](#) *Paradoryphoribius chronocaribbeus* in 2021. *Paradoryphoribius chronocaribbeus* is the sole species in its genus.

Wrapping it Up

The paleontology of invertebrates fascinates some people; if you are one of them, here are some links to start your search:

- [Miocene insects](#)
- [Neogene insects](#)
- [Neogene invertebrates](#)
- [List of prehistoric insects](#)

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.