Research highlights

STAR POWER: THE FOSSIL NAMED FOR UKRAINIAN LEADER

Scientists who discovered an ancient ocean-dwelling invertebrate with ten arms have named it in tribute to a man with only two: Ukrainian President Volodymyr Zelenskyy.

Distant cousins of starfish, marine animals called feather stars have a central disc with featherlike arms that can regrow when they get torn off by predators. Mariusz Salamon at the University of Silesia in Katowice, Poland, and his colleagues discovered an exquisitely preserved fossilized feather star in what is now Ethiopia.

Near the base of its central disc, which measures about 8 millimetres in diameter, it has a series of claw-like appendages for attaching itself to surfaces. Some of its arms show evidence of regeneration — probably a response to damage by predators, the researchers say.

The newfound species, *Ausichicrinites zelenskyyi*, lived roughly 150 million years ago and is named after two people: palaeontologist William Ausich, for his work on fossil feather stars and related animals, and Zelenskyy for "his courage and bravery in defending free Ukraine", the authors write.

R. Soc. Open Sci. **9**, 220345 (2022)

FIRST LIGHT: WHY EARLY FIREFLIES BEGAN TO GLOW

Adult fireflies evolved their glow to attract mates, not to ward off predators.

Mature fireflies (family Lampyridae) illuminate the sky primarily for courtship. But research suggests their flashy properties are also a stay-away signal, warning a predator not to expect a tasty treat. Scientists have long debated which purpose sparked the evolution of the beetle's aerial glow.

Gareth Powell at Brigham Young University in Provo, Utah, and his colleagues examined the evolutionary histories of fireflies and their luminescent relative, click beetles (family Elateridae). Extrapolating from eight beetle fossils with known ages, the authors estimated when other species arose. They then built a firefly family tree that suggested an origin date for the insect's bioluminescence.

They determined that fireflies and click beetles began lighting up the air about 133 million and 105 million years ago, respectively. These ages suggest that the insects glowed long before their current aerial predators — bats and birds — existed. Because adult fireflies began twinkling before flying animals posed a threat, the authors infer that their luminescence evolved as a sexual signal.

Proc. R. Soc. B **289**, 20220821 (2022)

BIOROBOTS DELIVER LETHAL DRUGS TO CANCER CELLS

Engineered bacteria bearing drug-filled sacs can swim, unencumbered by their cargo, into simulated tumours.

Bacteria that are naturally strong swimmers, such as *Escherichia coli* (pictured, red) make good candidates for delivering payloads. But so far, most methods for attaching cargo to bacteria have involved harsh treatments that affect the microbes' swimming abilities.

Metin Sitti and his colleagues at the Max Planck Institute for Intelligent Systems in Stuttgart, Germany, used genetically modified *E. coli* whose exteriors were decorated with molecules of biotin, a form of vitamin B. The authors attached magnetic nanoparticles and nanometre-sized sacs containing drugs to the biotin molecules simply by incubating the modified bacteria with both components.

Guided by a magnet, the drug-carrying bacteria were able to penetrate dense collagen gels simulating solid tumours. Near-infrared light exposure heated dye molecules in the sacs' membranes, triggering drug release.

Colon cancer cells inside model tumours died when bombarded with the cargo-carrying bacteria and near-infrared light.

Sci. Adv. **8**, eabo6163 (2022)

ALPINE ICE REVEALS CLUES TO TOXIC POLLUTANT'S SOURCE

Coal is the main culprit behind the release of a dangerous pollutant in Europe.

Thallium is a toxic metal that can cause nerve damage. It occurs naturally in the ground, but it is also released by cement manufacture and burning coal. How much these two industries contribute to thallium pollution is up for debate.

Searching for answers, Michel Legrand at Grenoble Alpes University in France and his colleagues tracked thallium levels over about 150 years by analysing its concentration in an ice core collected near the summit of Mont Blanc (pictured) in the French Alps. The researchers then combined this information with data on cement production and coal consumption in Europe between the nineteenth and twenty-first centuries.

The team found that, during most years between 1910 and 1970, thallium levels measured around 20 times higher than pre-industrial levels, mirroring the growing consumption of coal in Europe in the twentieth century. Then in the 1970s, Europeans started burning less coal, but cement production soared — and thallium pollution dipped. This indicates that coal was the main driver of thallium pollution in twentieth-century Europe.

Geophys. Res. Lett. **49**, e2022GL098688 (2022)

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