

Biodetective

come le biotecnologie aiutano a risolvere
misteri dal passato

Dr. Marco Signore



Detectives!

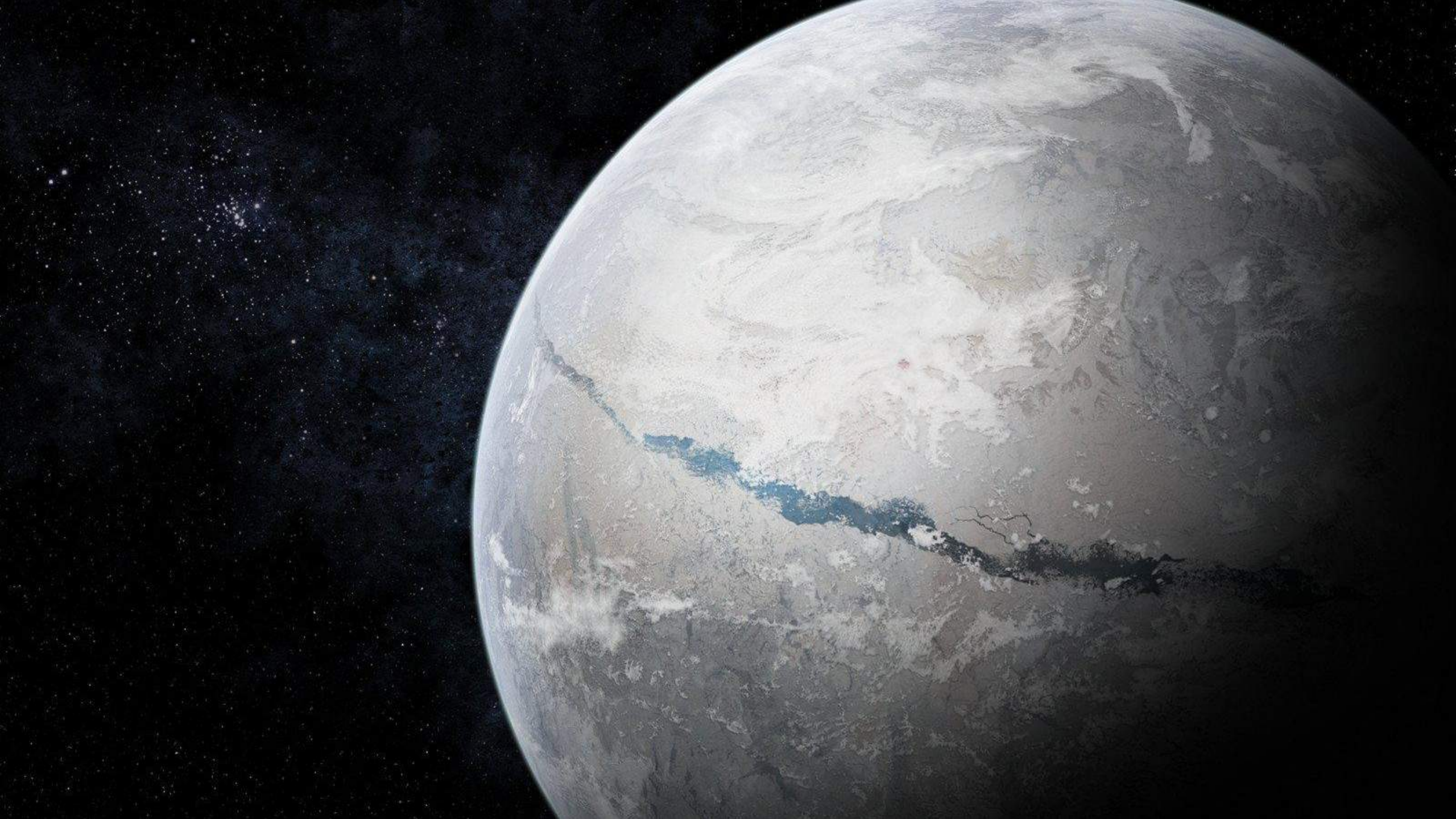


Il caso del primo animale della storia



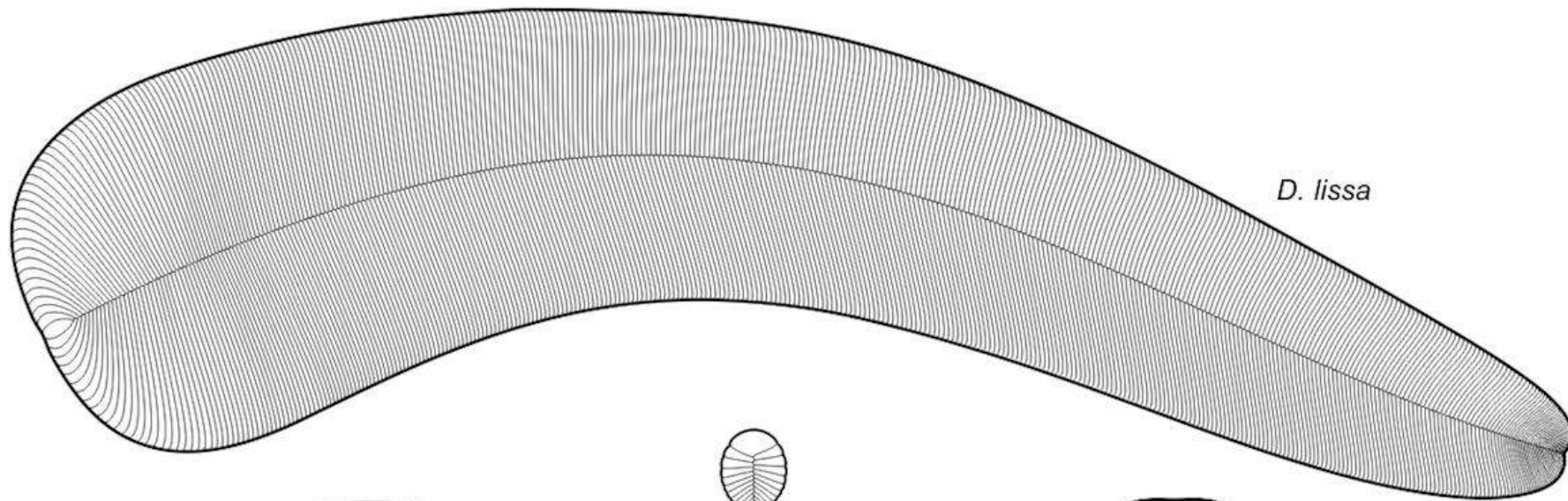








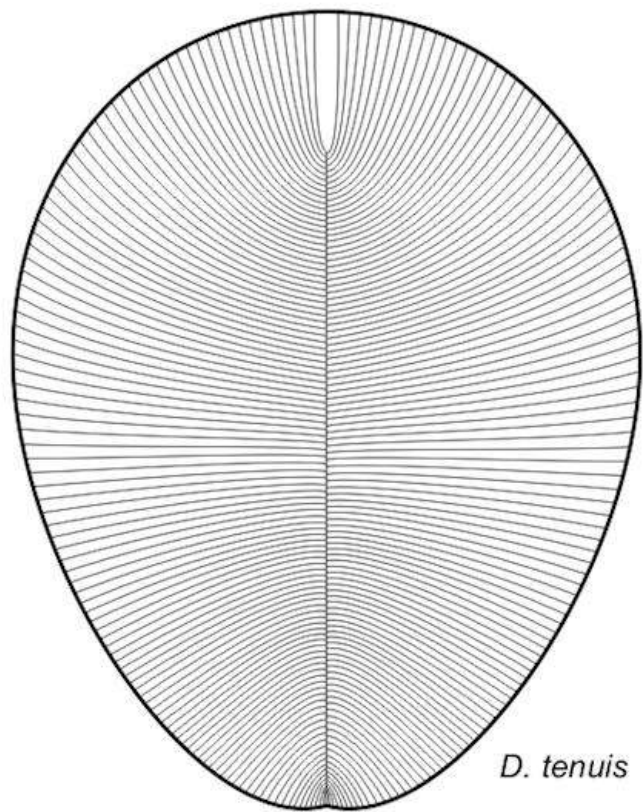




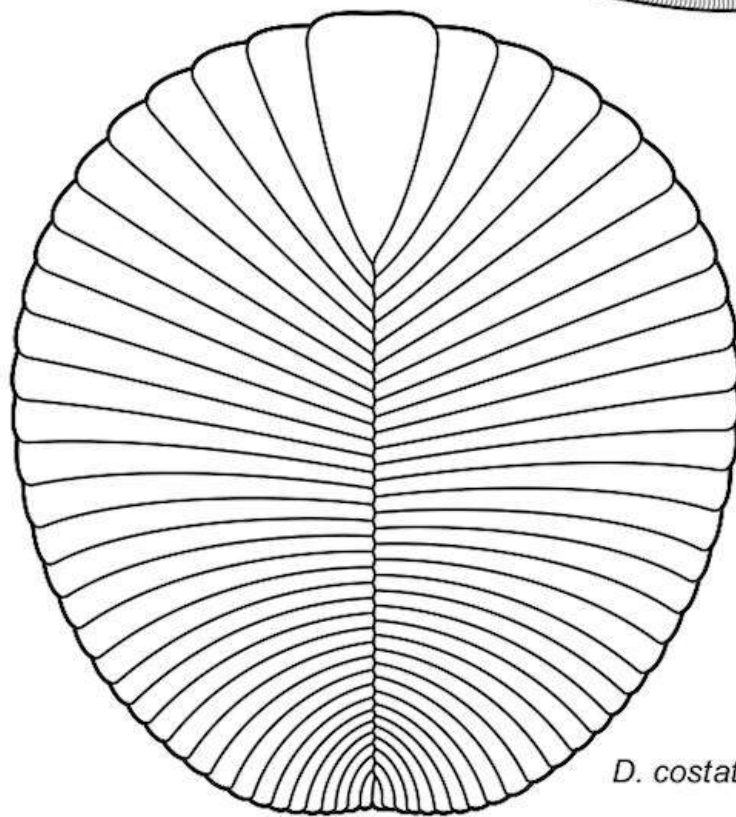
D. lissa



D. menneri



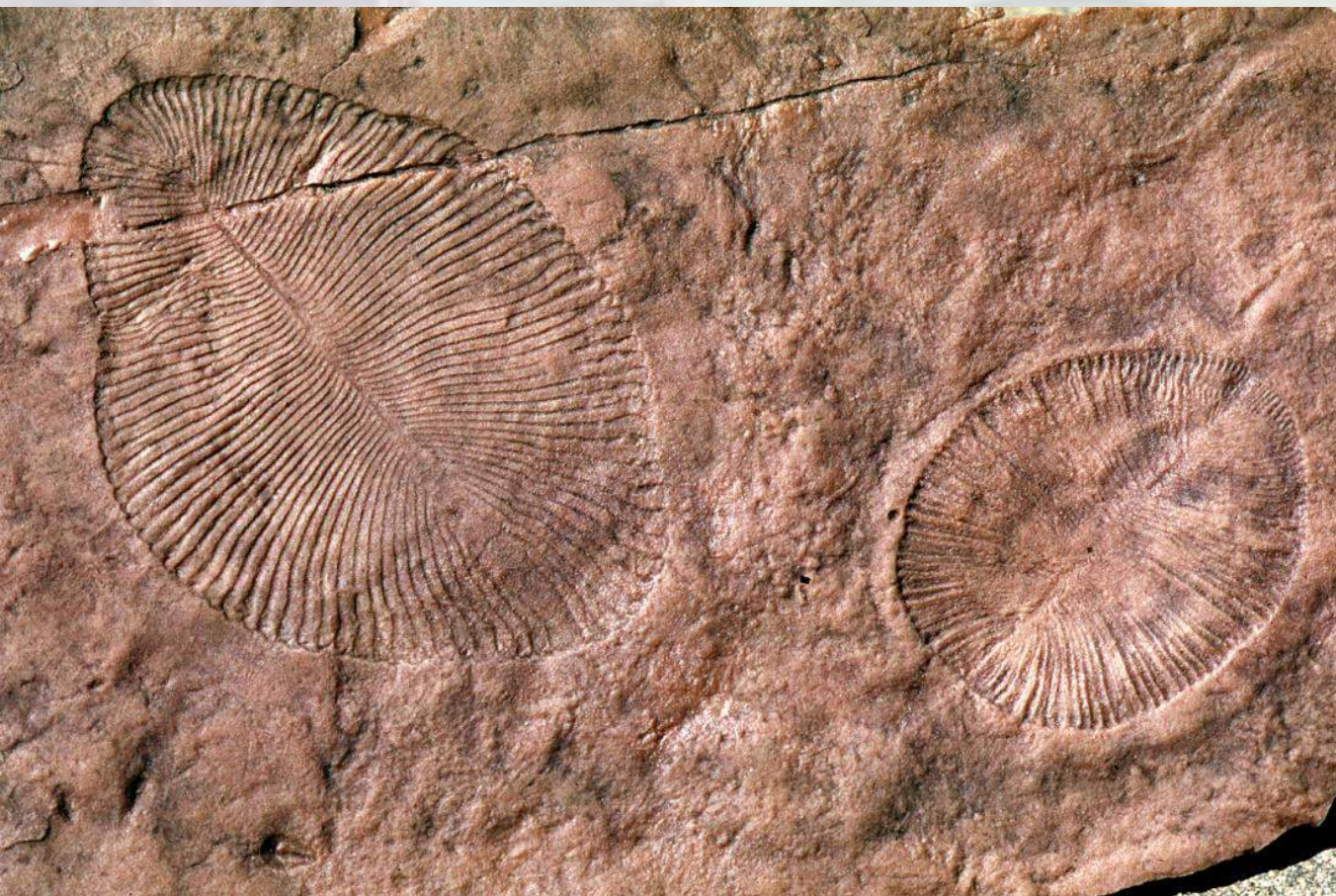
D. tenuis



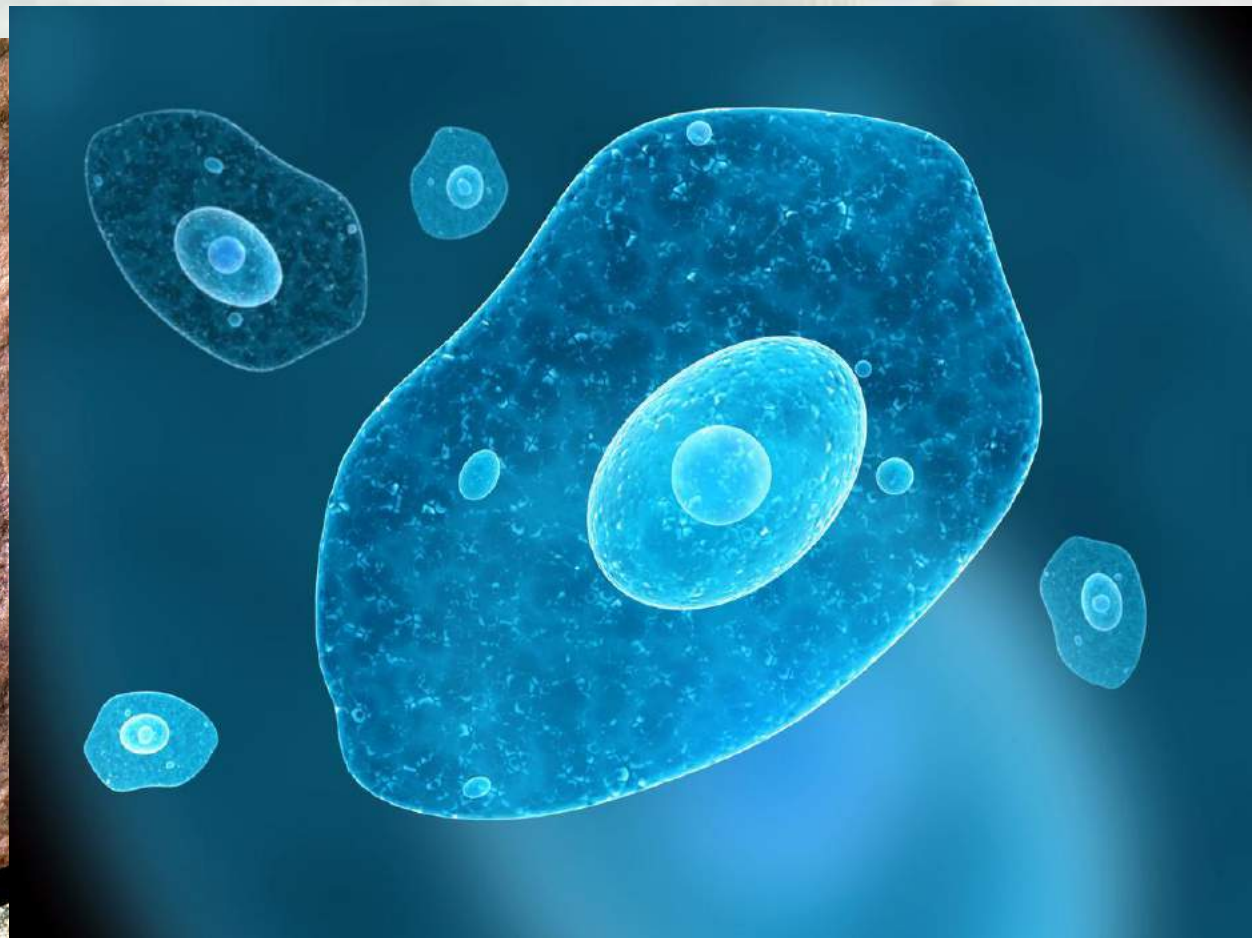
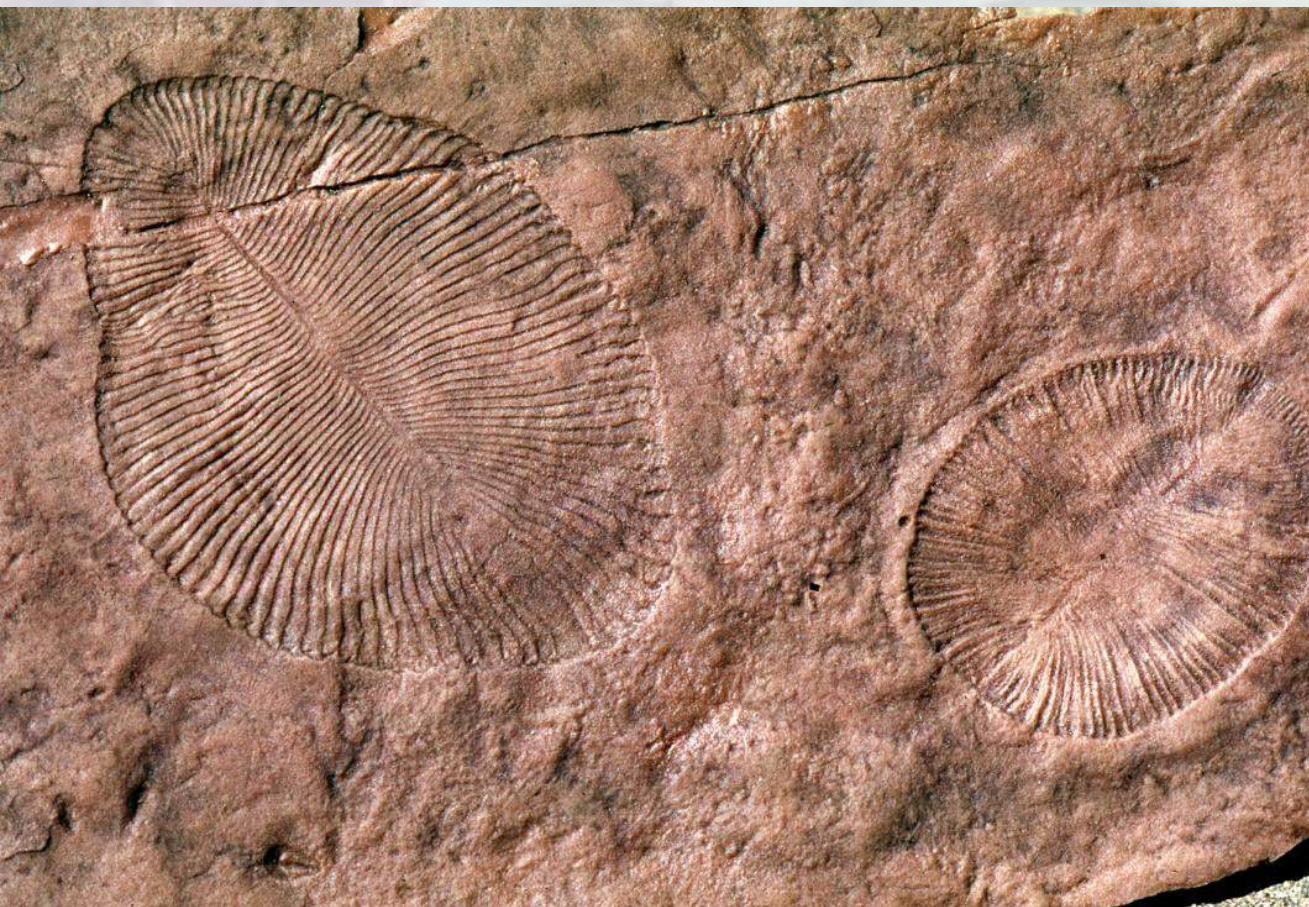
D. costata



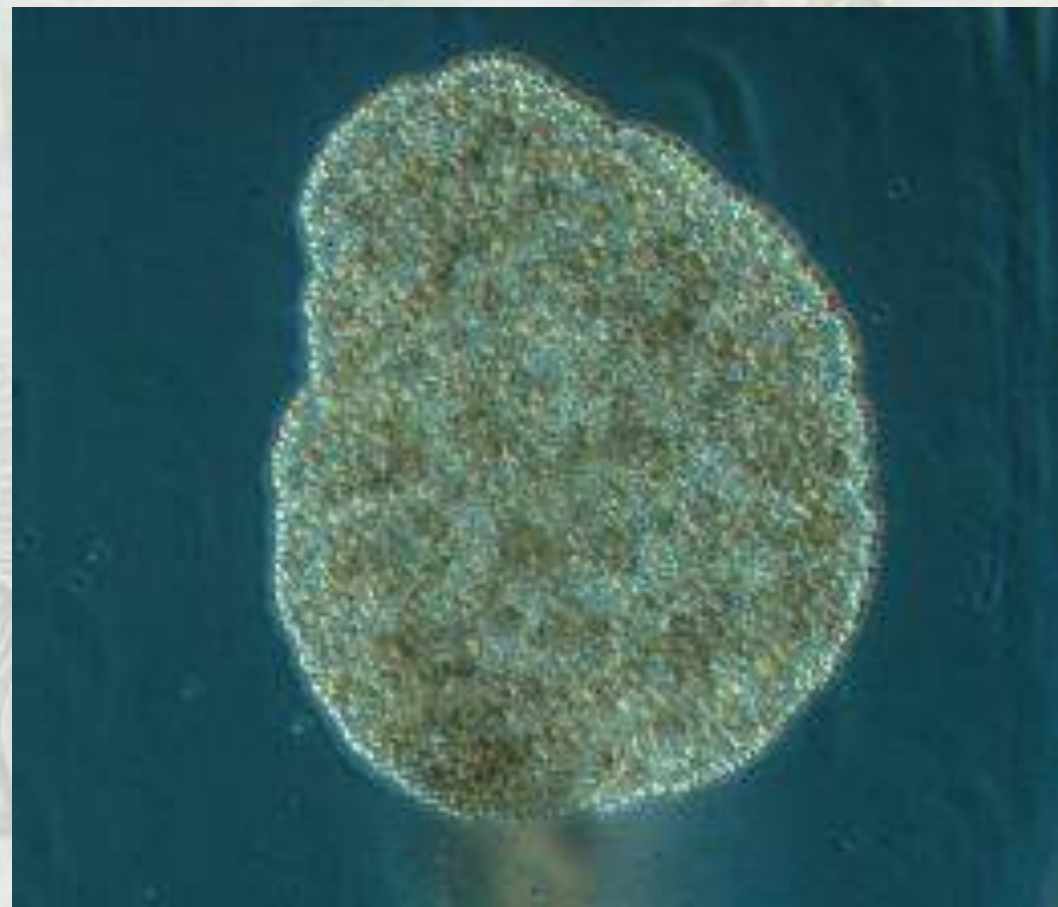
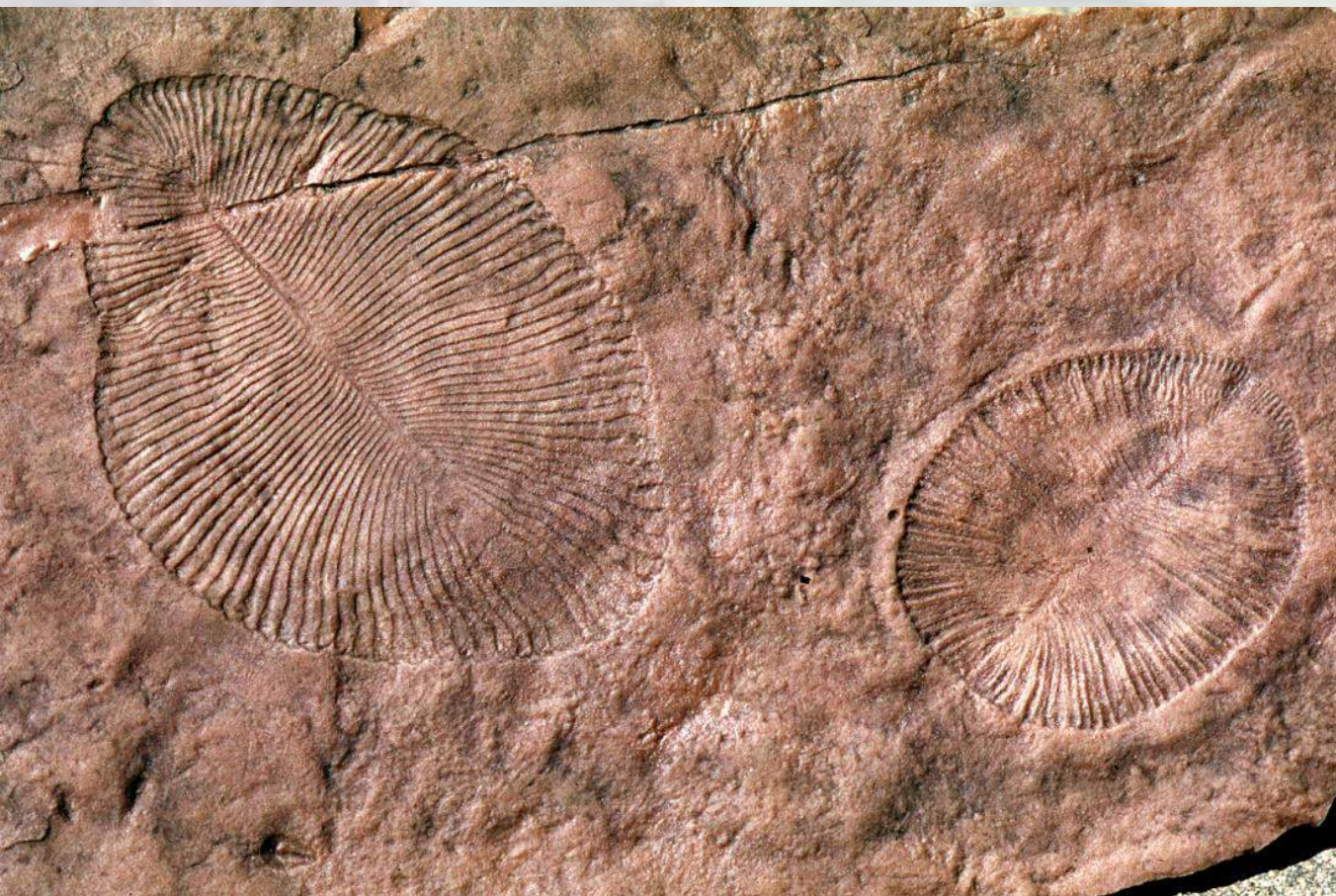
È un lichene?



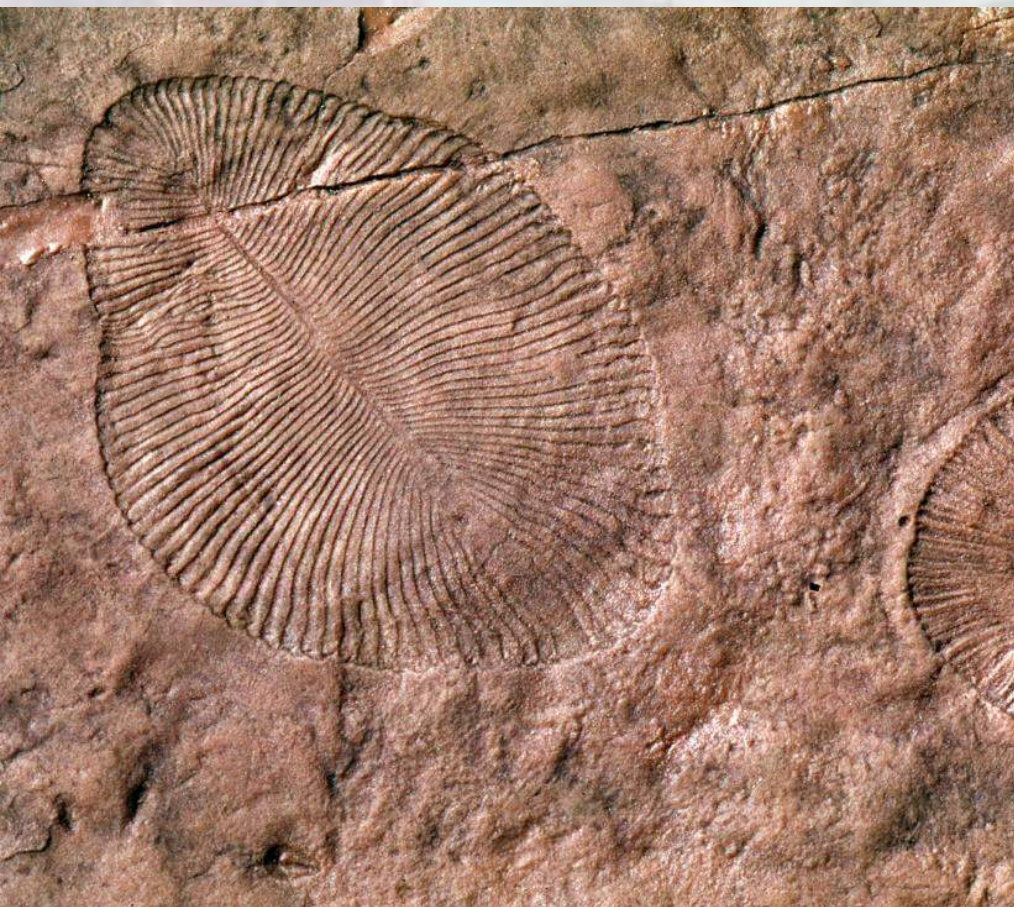
È un protista?



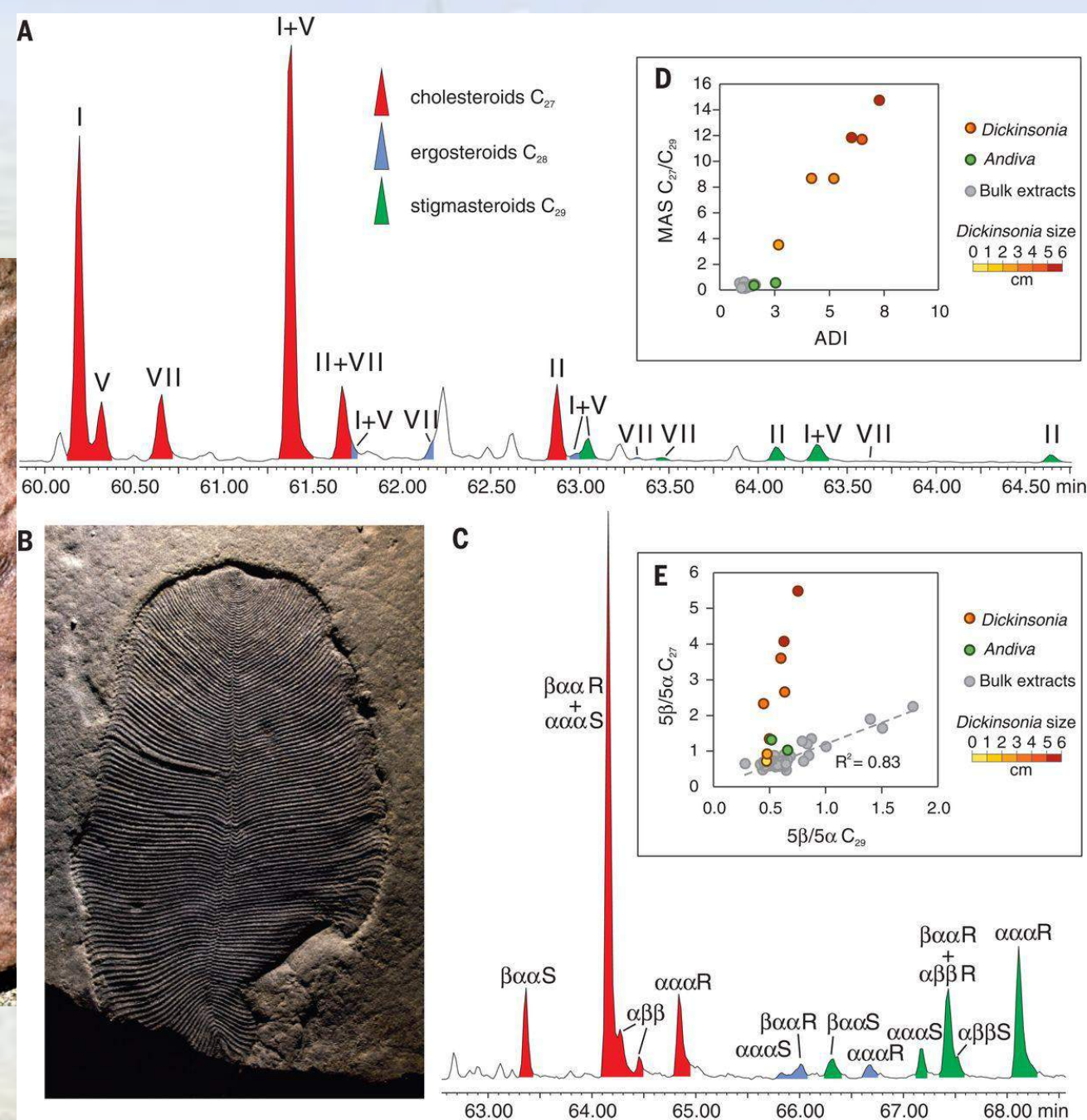
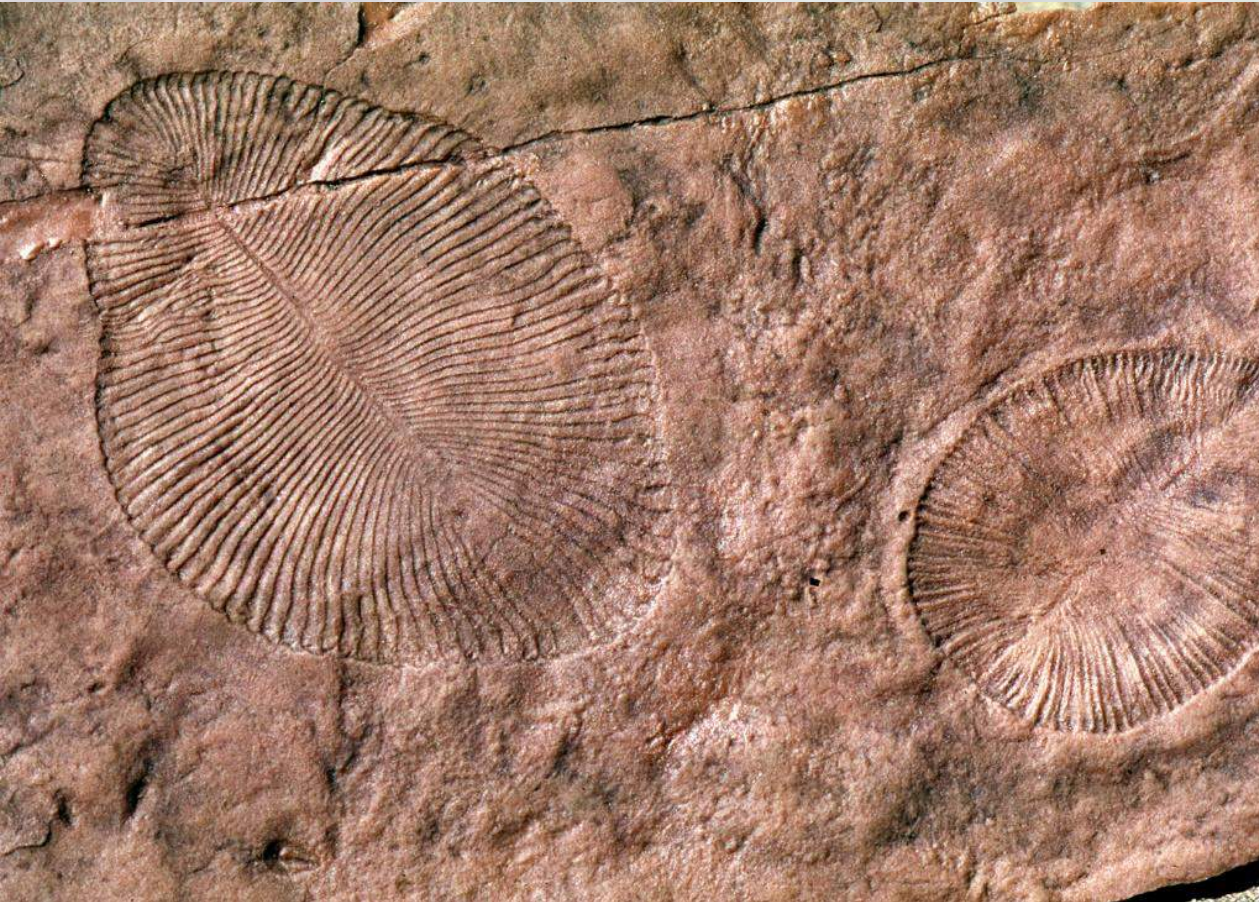
È un super-placozoo?



È un alieno?



È un animale.



Il caso del colore dei dinosauri



XIX century



1930s

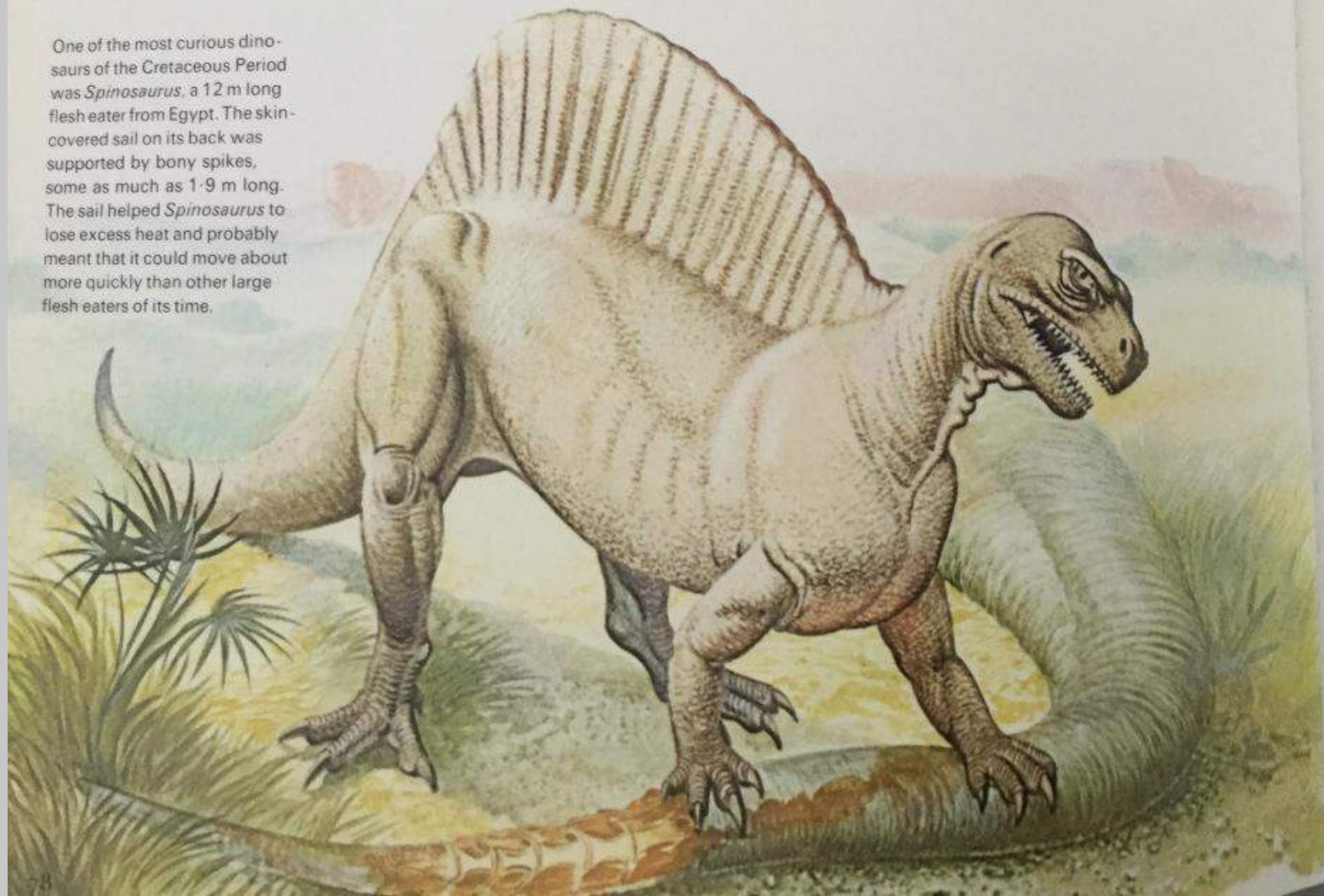


1970s



pushed itself along. However, with its two-clawed fingers stuck firmly into the ground, it was able to straighten its back legs without slithering and sliding forward on its belly and so lift its heavy body up. At the same time it threw its head back, putting most of the weight of the front of the body over its hips so that it did not topple forward again.

One of the most curious dinosaurs of the Cretaceous Period was *Spinosaurus*, a 12 m long flesh eater from Egypt. The skin-covered sail on its back was supported by bony spikes, some as much as 1.9 m long. The sail helped *Spinosaurus* to lose excess heat and probably meant that it could move about more quickly than other large flesh eaters of its time.

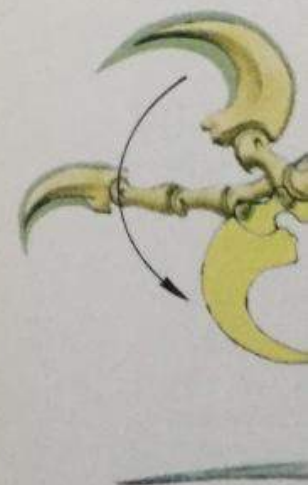


In the heat of the day *Spinosaurus* could turn head-on to the sun. Only a thin edge of the sail would be directly exposed, while the side provided a large surface for heat loss. By turning the sail sideways towards the sun in the early morning, *Spinosaurus* could quickly increase its internal temperature and become active before other reptiles had fully

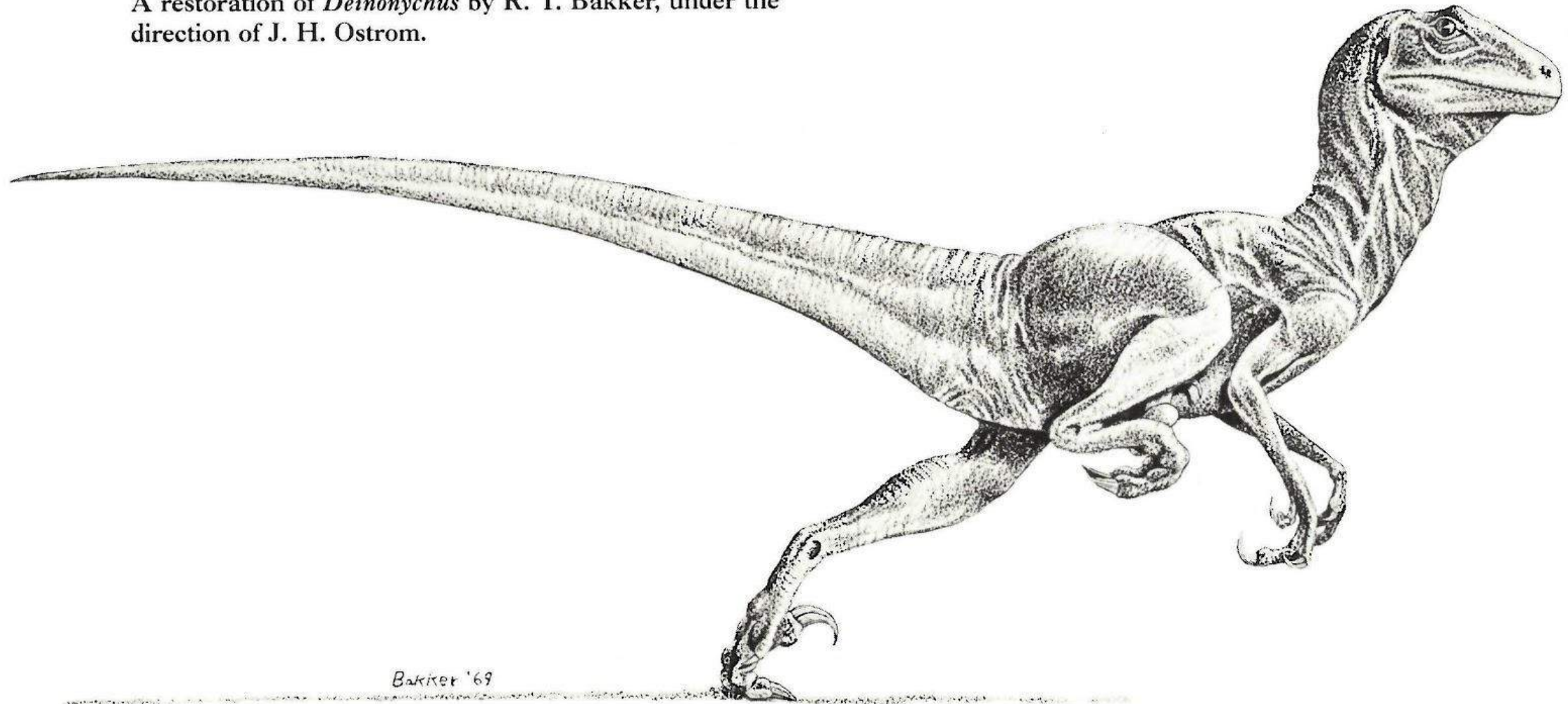
animal
eaters that had

THE CLAWED

All the large fle
back feet to kill
one small and c
especially effect
dinosaur of all



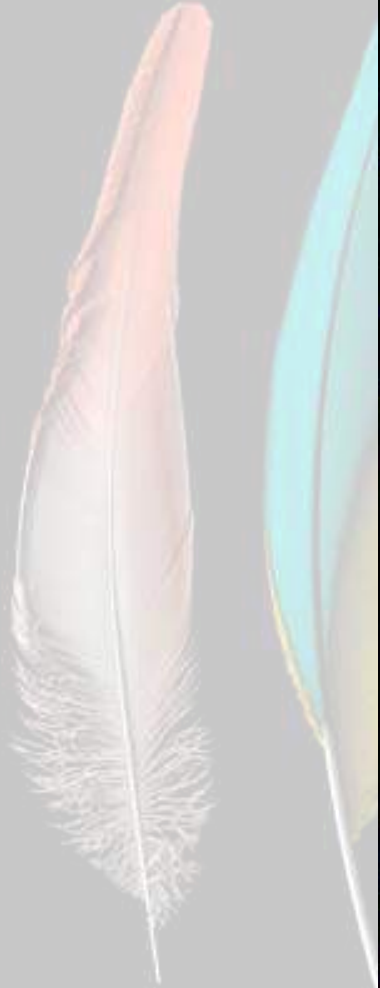
A restoration of *Deinonychus* by R. T. Bakker, under the direction of J. H. Ostrom.



Sinosauropteryx prima



Rey, XIX c.



Oggi

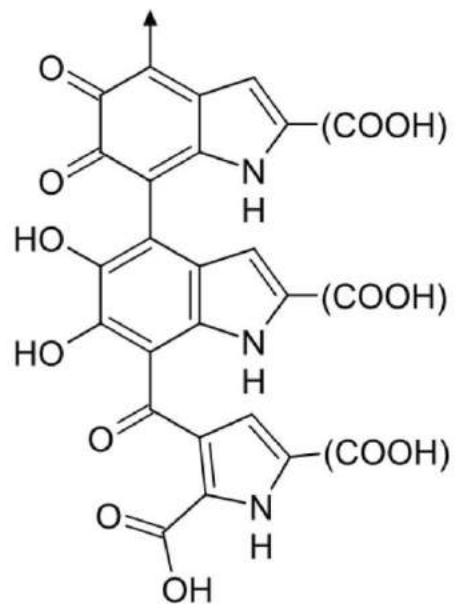




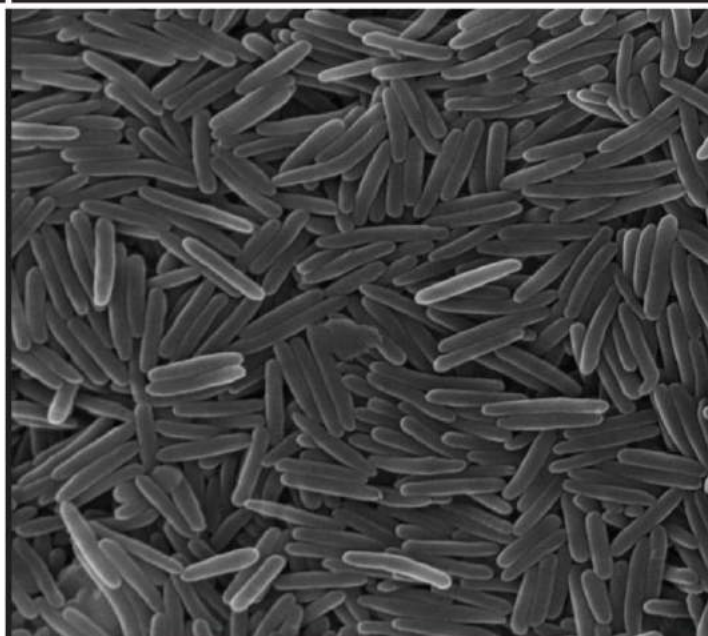
邱骥 邢立达 复原
Reconstructed by Qiu Ji & Xing Lida

Eumelanin

Melanin

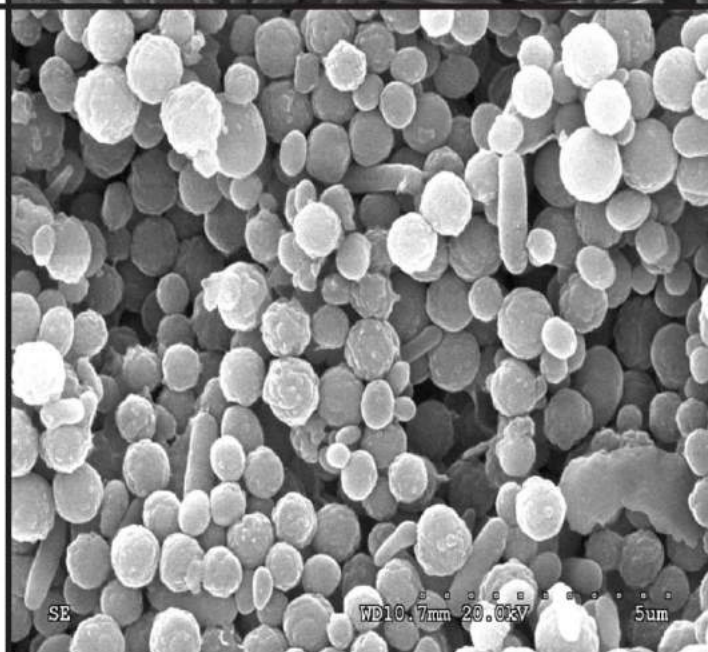
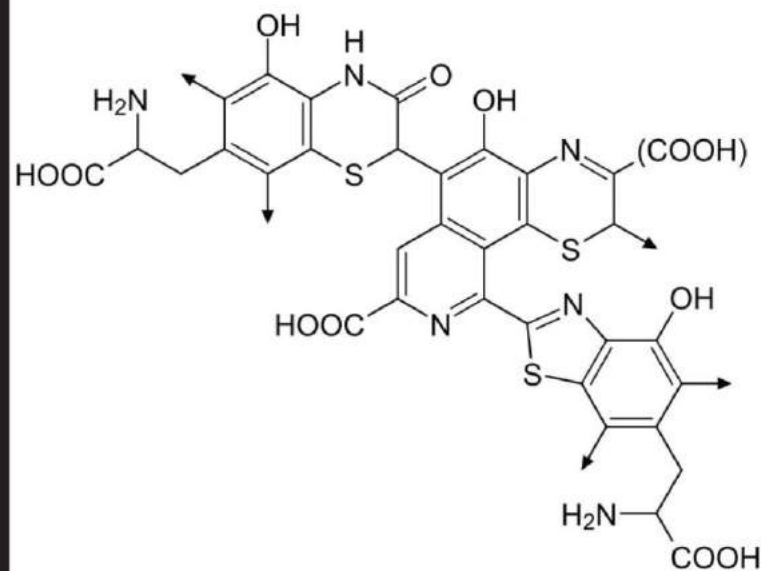


Melanosomes



Eumelanosomes

Pheomelanin



Pheomelanosomes

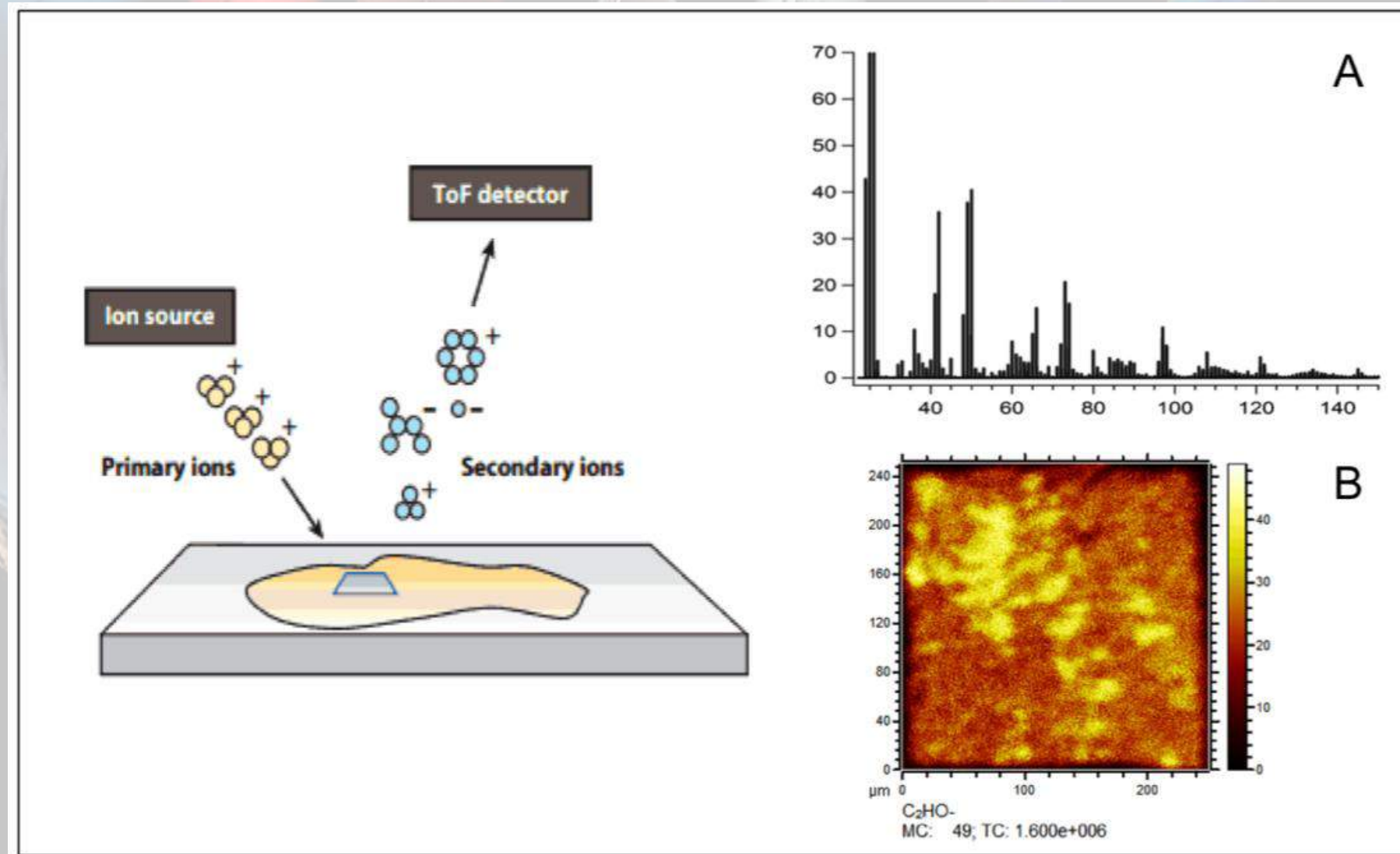




Anchiornis huxleyi



Time-of-flight secondary ion mass spectrometry





Armored Dinosaur:

- Exceptional, 3D preservation
- Organically preserved scales and horn sheaths

Mass spectroscopy

Results:



*

Ginger

Borealopelta



Current Biology 2017 27, 2514-2521 e3DOI: (10.1016/j.cub.2017.06.071)

1) Color pattern



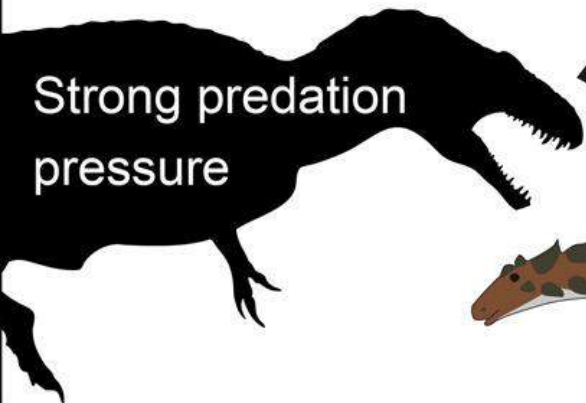
2) Pigment

Pheomelanin

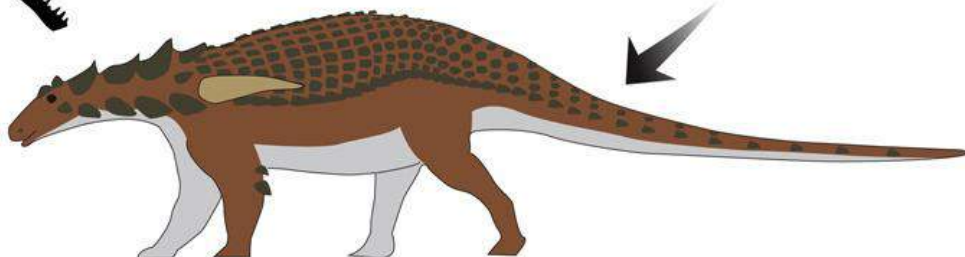
Eumelanin

Paleobiology:

- 1) Countershaded camouflage
- 2) Reddish-brown color



Strong predation pressure



Il caso dell'ultima notte di Ercolano

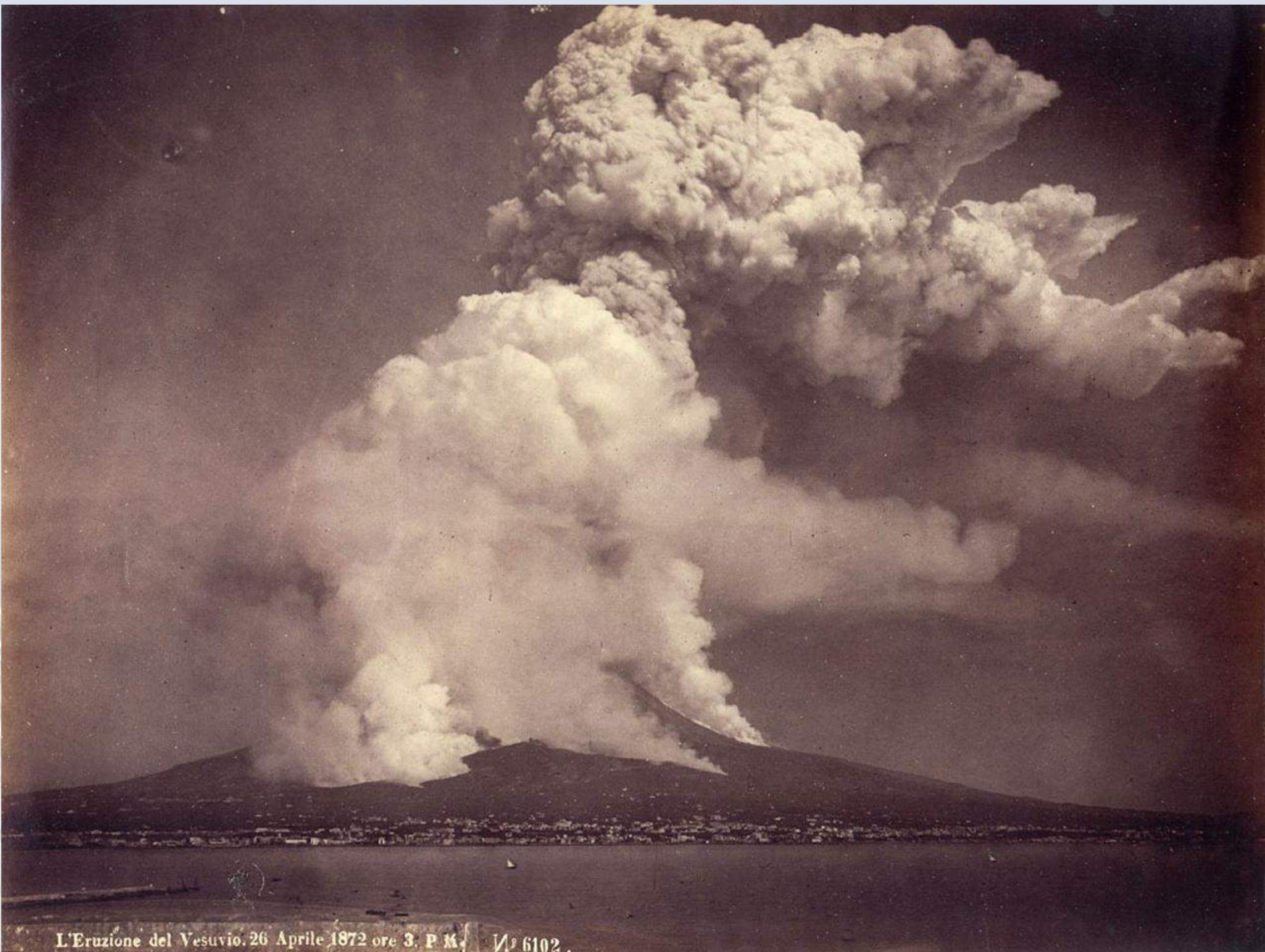




18 marzo 1944



26 aprile 1872



L'Eruzione del Vesuvio. 26 Aprile 1872 ore 3. P. M. N.º 6102.

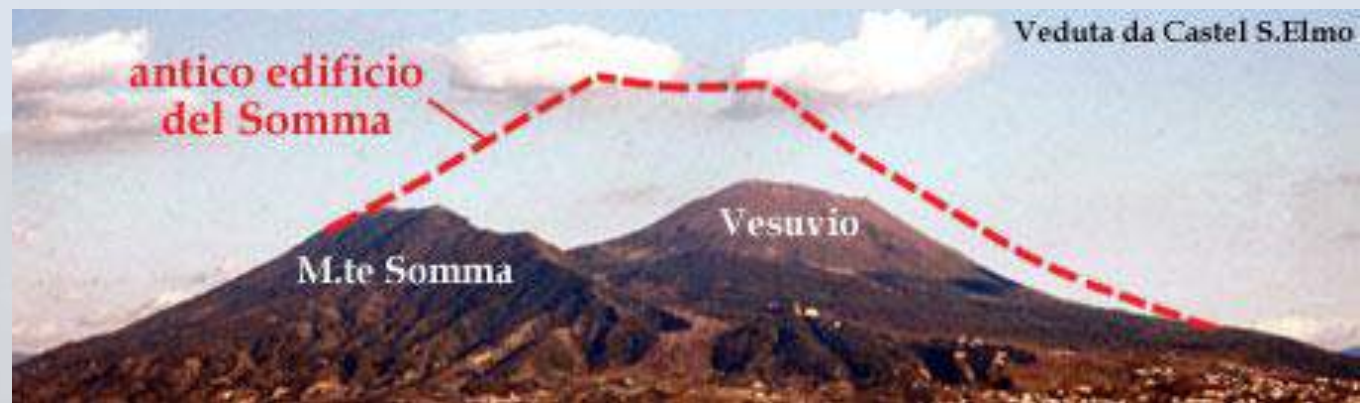
Eruzione del 1631

Opera di Micco Spadaro
(Domenico Gargiulo, 1656 – 1660)



1880 a.C.





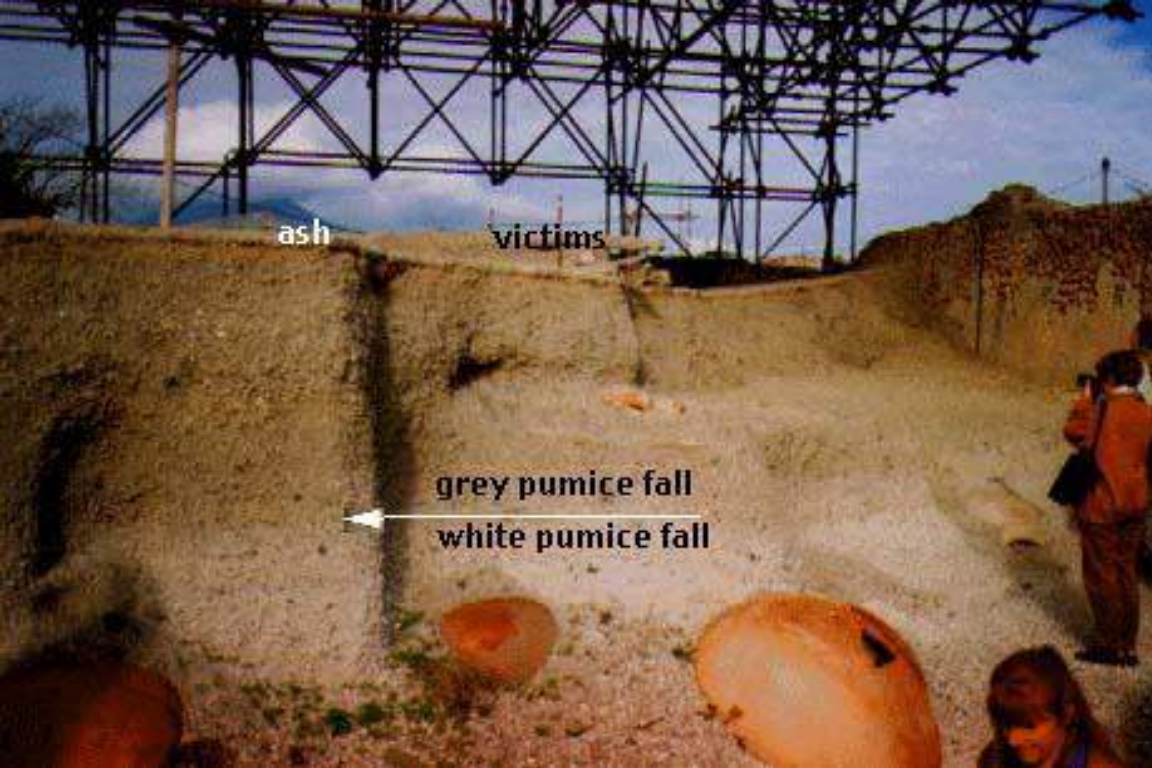
24 ottobre, 79 d.C.

13:30





























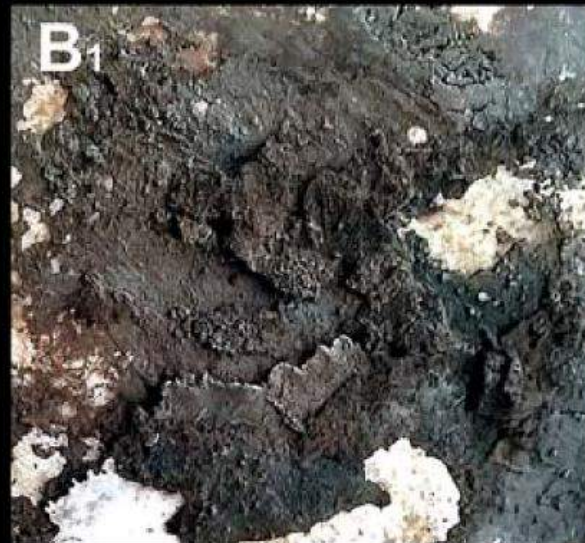
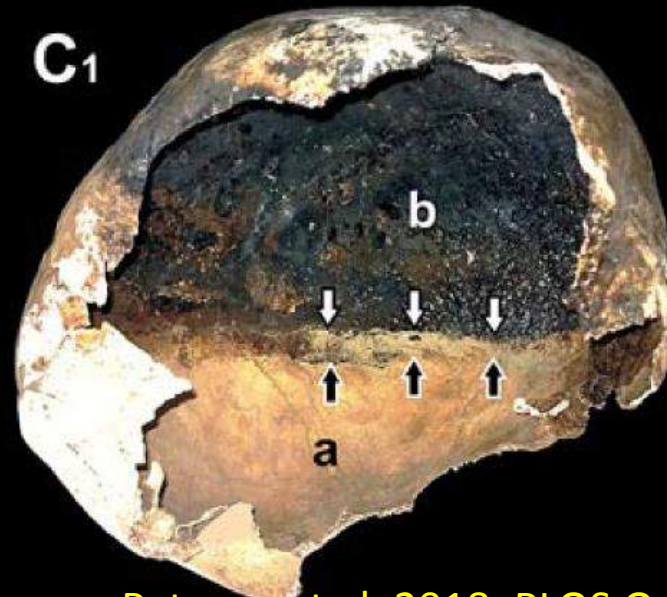


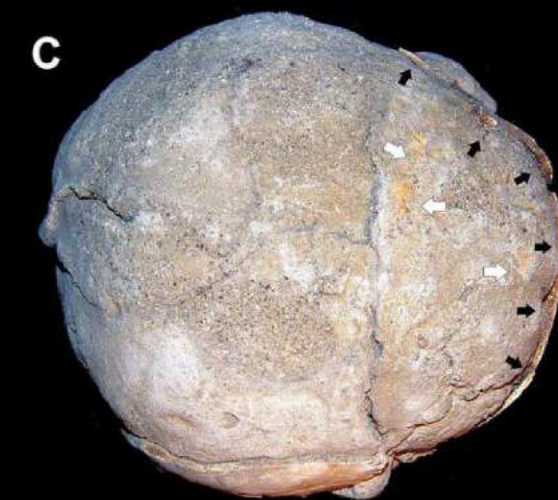
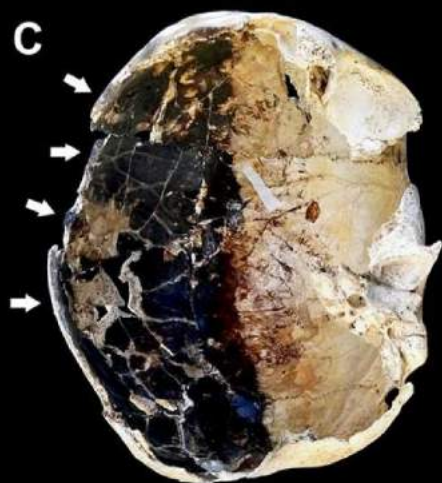
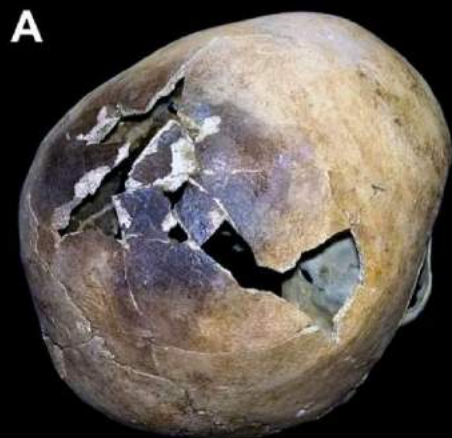


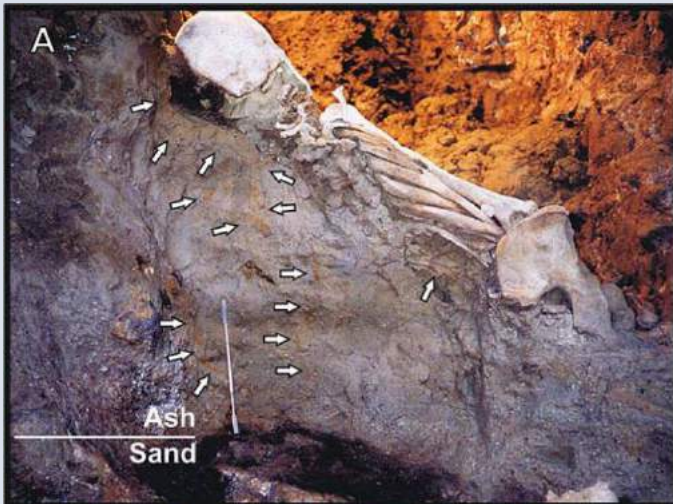






A**B****C****A₁****B₁****C₁**







Parco Archeologico
di Ercolano

