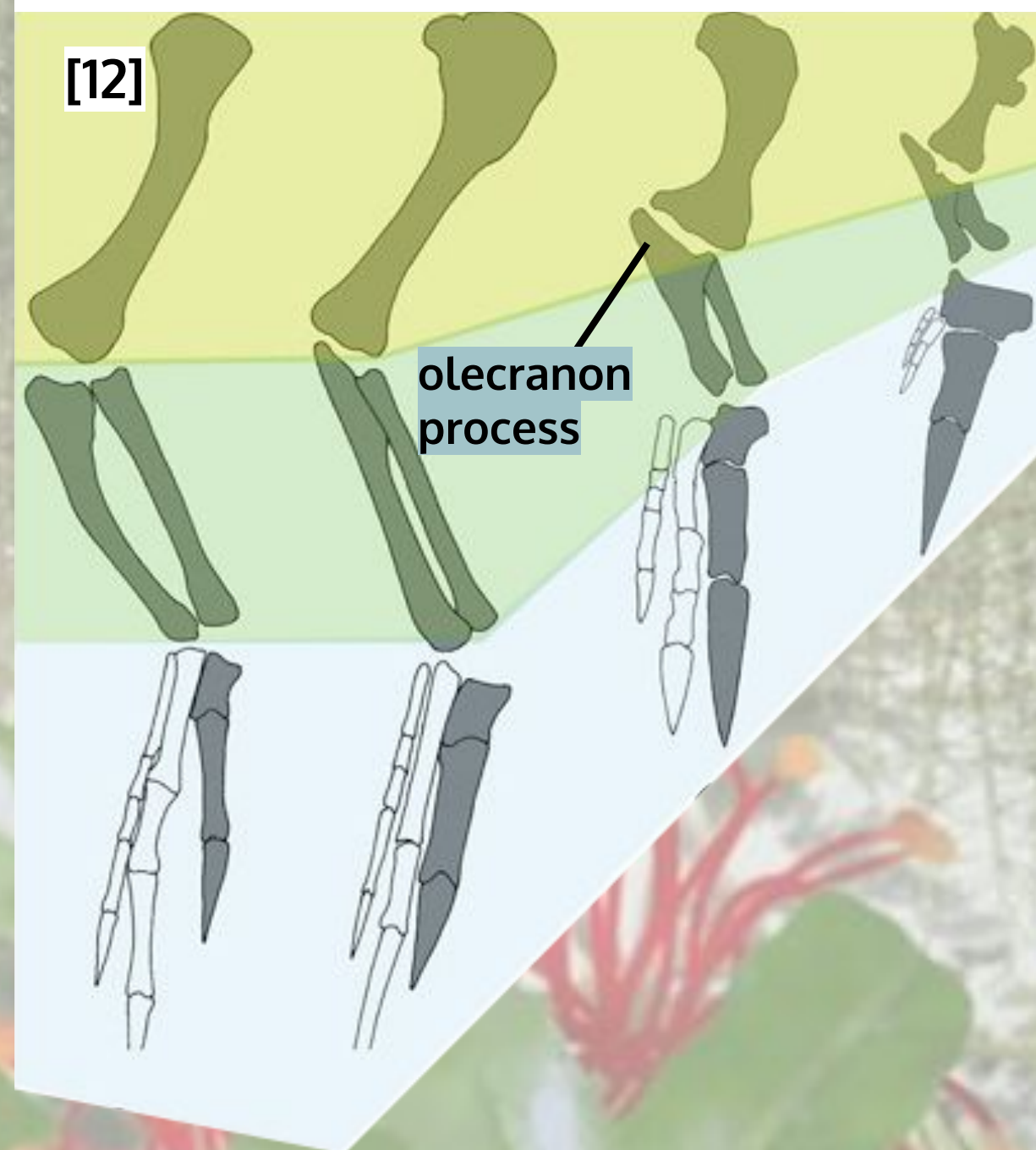


Ancient Aardvarks: Meet the Alvarezsaur

Stunted But Strong

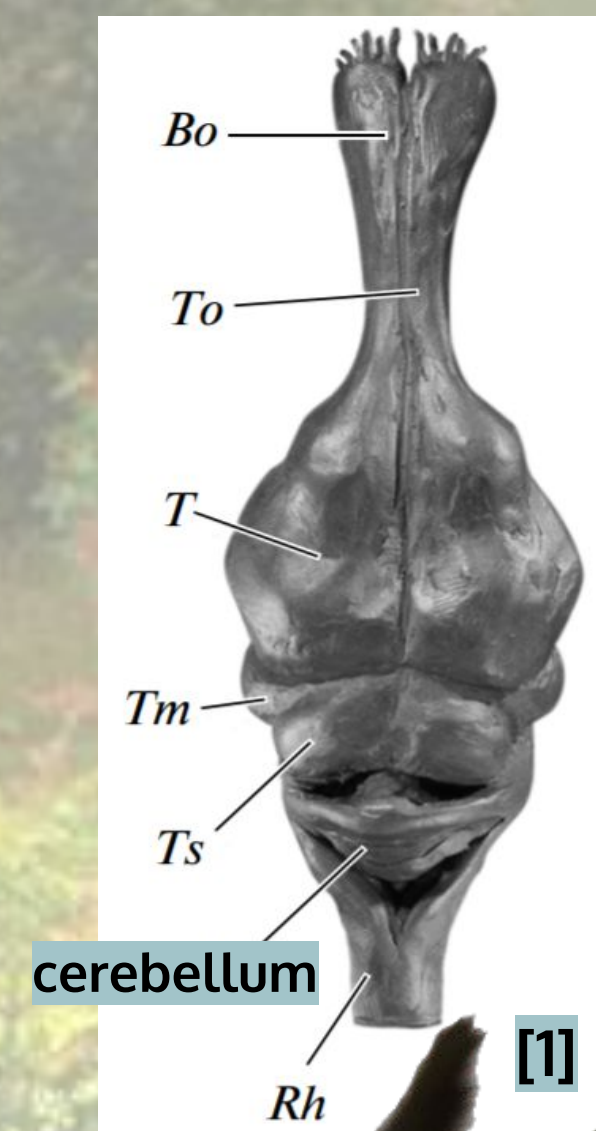
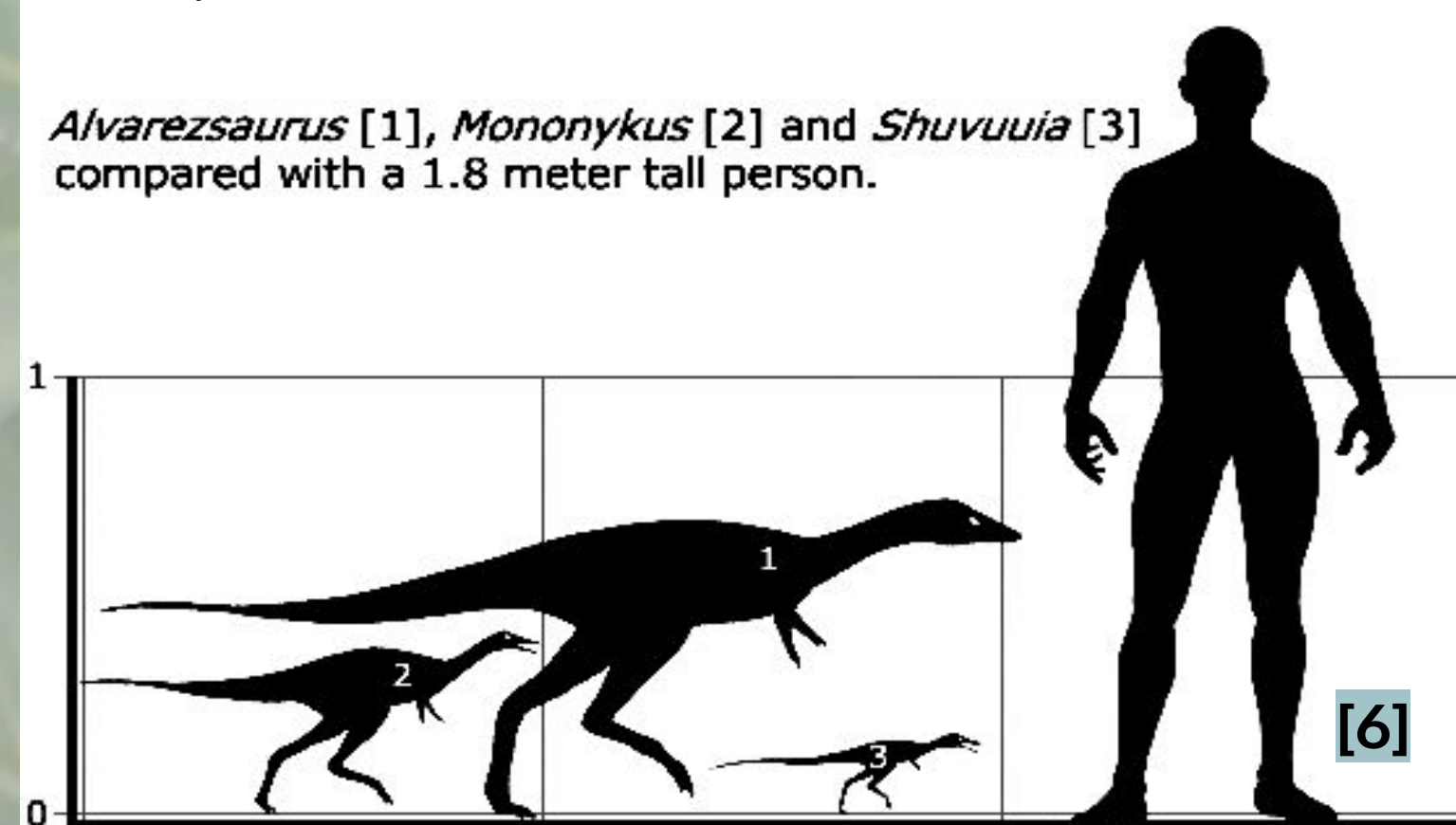
Alvarezsaur have strangely powerful forearms, with one large thumb claw and the other two digits highly reduced. They are radically transformed from the typical theropod forelimb, which is longer, with three functional digits and grasping ability.^[10] Given their highly specialized nature, it has been difficult to determine the relationship of alvarezsaur to other theropods.^[3] Recently discovered species *Xiyunykus* and *Bannykus* have filled in the time gap in their evolutionary history, solidifying the clade as members of Maniraptora and documenting the development of their unique forelimbs. The transition was very gradual and occurred in a "mosaic" fashion (piece-by-piece, with parts modified at different rates). The olecranon process is elongated, the arm shortens and becomes more powerful, and the thumb claw grows in size as the other fingers are increasingly stunted.^[12]



Smaller Than You Think

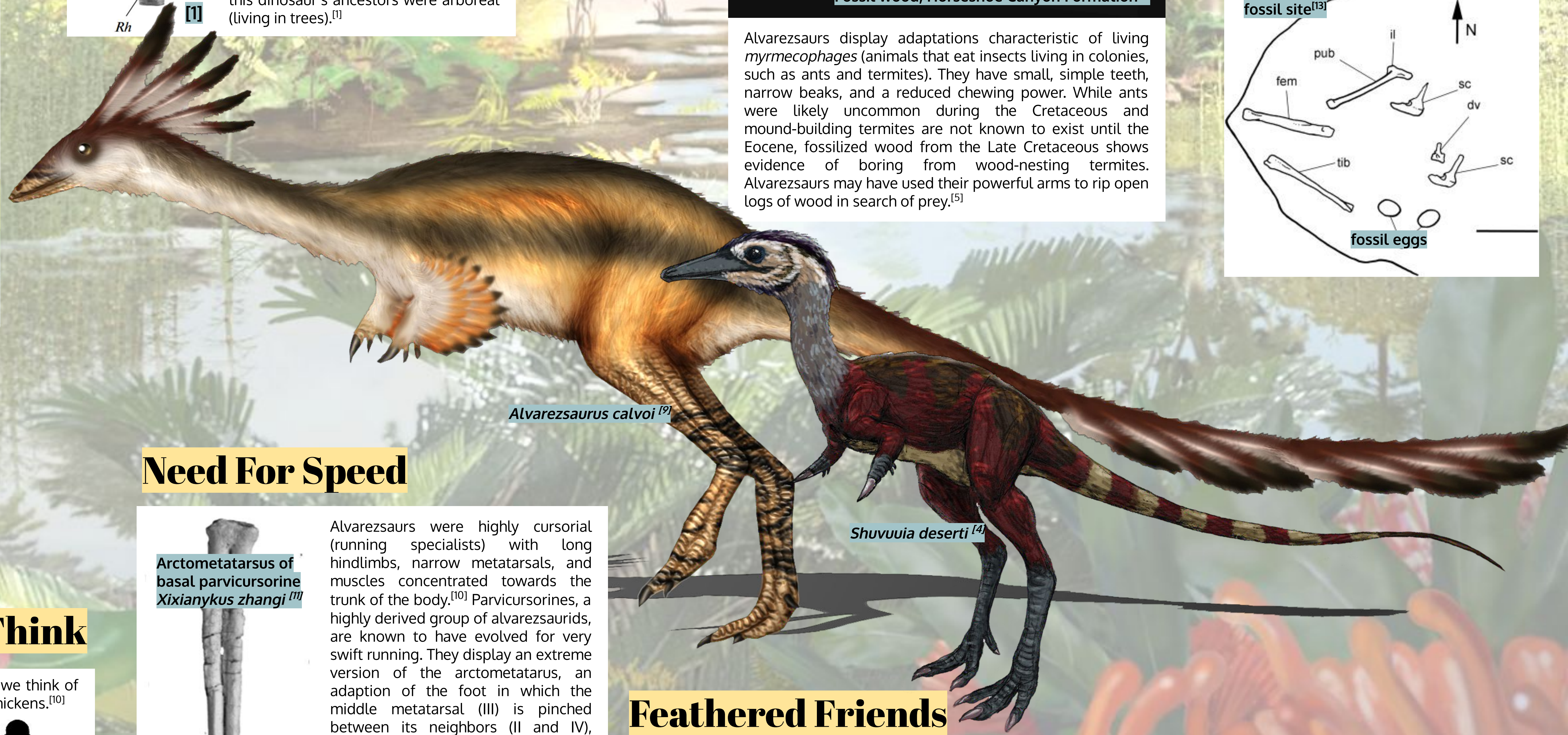
Alvarezsaur aren't the giants we picture when we think of theropod dinosaurs — some were as small as chickens.^[10]

Alvarezsaurus [1], *Mononykus* [2] and *Shuvuuia* [3] compared with a 1.8 meter tall person.



Bird-Brained?

Using a cast of a skull from the species *Ceratomykus oculatus*, researchers reconstructed an alvarezsaurian brain. Their analysis revealed that this dinosaur had acute hearing and excellent eyesight, with intelligence comparable to living birds. Additionally, *C. oculatus* had a complex cerebellum, a part of the brain that governs coordination, balance, and motor control. Its structure may indicate that this dinosaur's ancestors were arboreal (living in trees).^[1]



Need For Speed

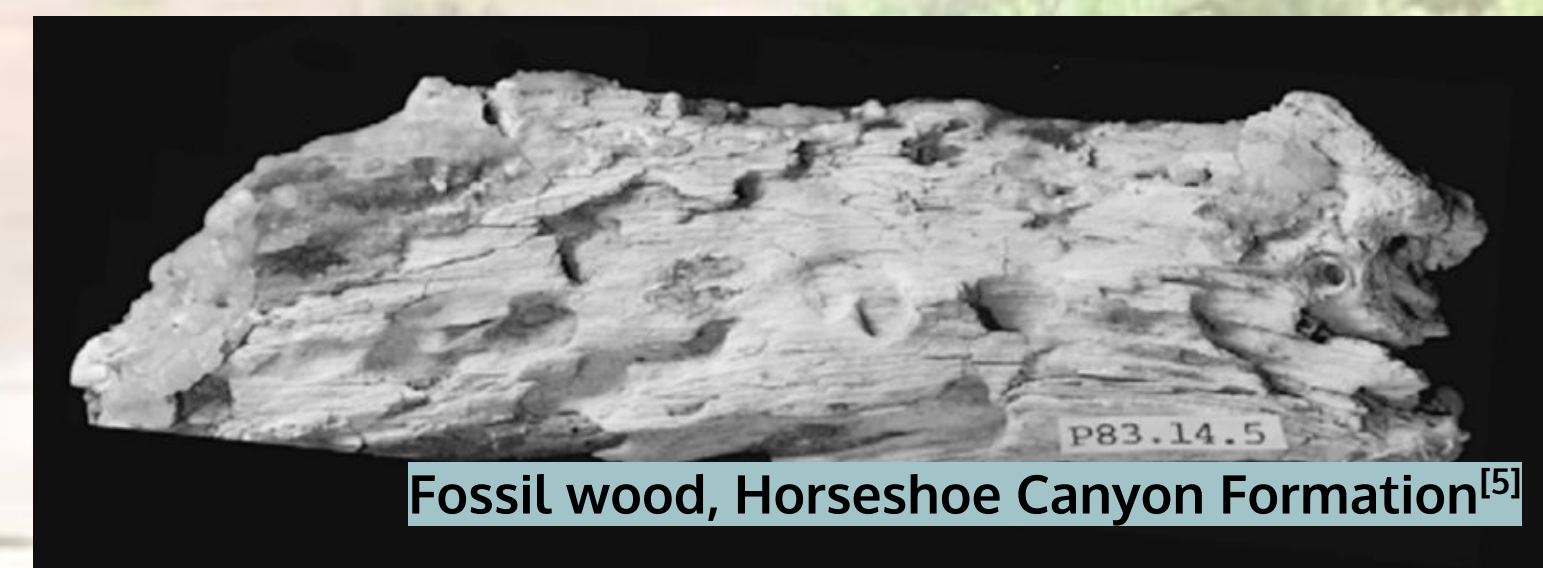


Alvarezsaur were highly cursorial (running specialists) with long hindlimbs, narrow metatarsals, and muscles concentrated towards the trunk of the body.^[10] Parvicursorines, a highly derived group of alvarezsaurids, are known to have evolved for very swift running. They display an extreme version of the arctometatarsus, an adaption of the foot in which the middle metatarsal (III) is pinched between its neighbors (II and IV), allowing for greater speed and improved turning ability; in parvicursorines, the upper portion of metatarsal III is completely absent.^[10] Alvarezsaur may have used their extreme running ability to escape predators, or to efficiently cover ground to forage for food.^[11]

An Introduction

The clade Alvarezsauria is a group of small-bodied maniraptoran dinosaurs.^[10] The first known alvarezsaurid, *Alvarezsaurus calvoi*, was discovered in partial remains in the late 20th century, and named by Jose F. Bonaparte. *A. calvoi* was uncovered in Argentina, but today alvarezsaur are known to have ranged across the Americas, Asia, and Europe.^[10] It is currently estimated that members of this clade existed between the Late Jurassic and the Cretaceous. This feather covered bird-like dinosaur is known for its insect based diet and especially its unique hooked forelimbs. These highly derived and powerful arms evolved throughout the clade Alvarezsauridae, giving these dinosaurs a predatory advantage.^[12]

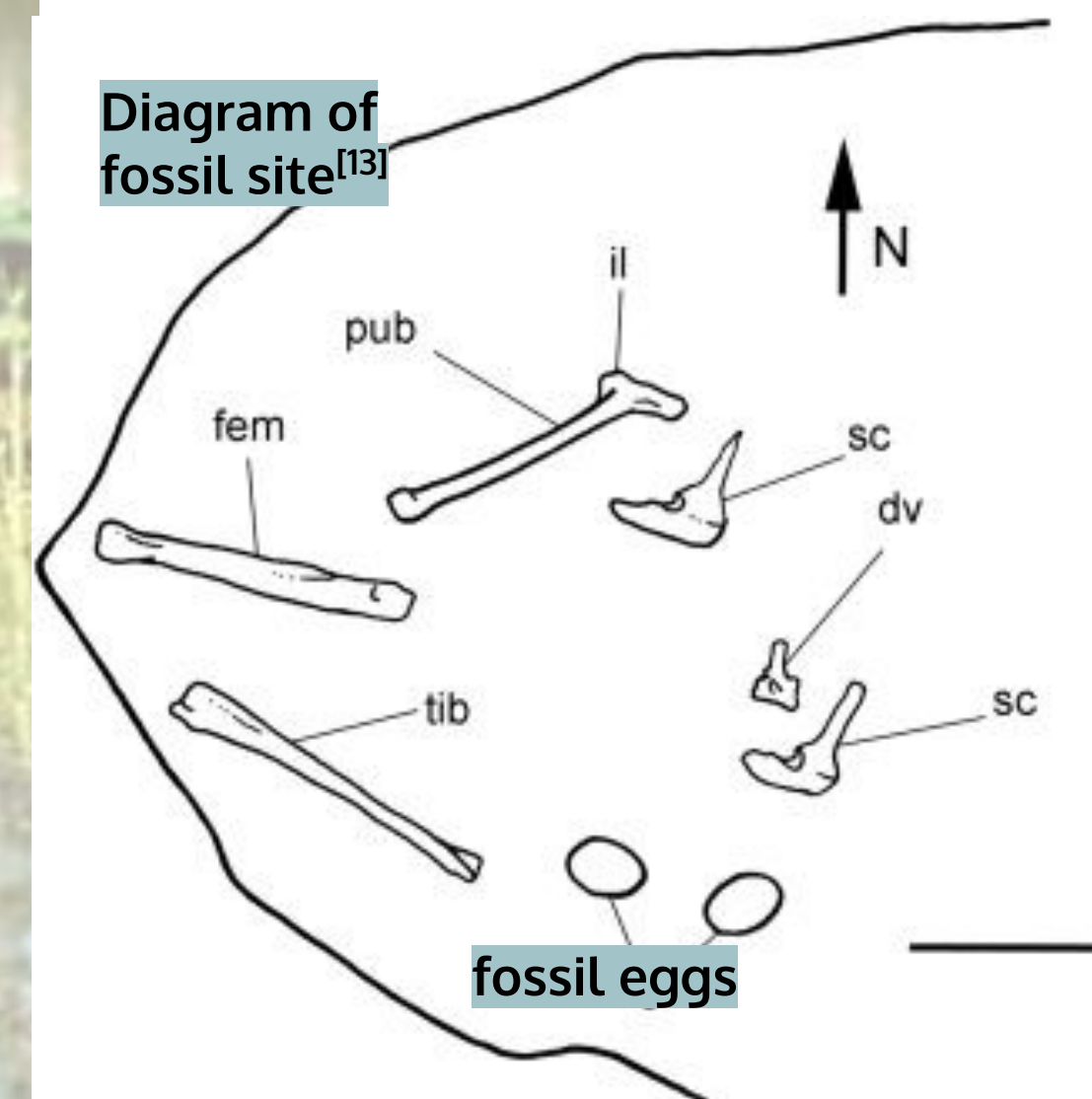
Prehistoric Delicacies



Alvarezsaur display adaptations characteristic of living *myrmecophages* (animals that eat insects living in colonies, such as ants and termites). They have small, simple teeth, narrow beaks, and a reduced chewing power. While ants were likely uncommon during the Cretaceous and mound-building termites are not known to exist until the Eocene, fossilized wood from the Late Cretaceous shows evidence of boring from wood-nesting termites. Alvarezsaur may have used their powerful arms to rip open logs of wood in search of prey.^[5]

Eggs and Bones

The recently discovered *Bonapartenykus ultimus* represents a new genus of Alvarezsaur. A 70 million year old pocket of fossilized bones and two eggs of this species have been discovered in Argentina. This is the first time Alvarezsaur bones and egg remains have been found in close proximity. Though evidence of brooding behavior has been found for other theropod dinosaurs, no conclusion can yet be drawn for Alvarezsaur as no indication of a nest was found at the site. It's possible that these two eggs were still being carried by *B. ultimus*.^[13]



Feathered Friends

Despite being closely related to birds, the feathers on the Alvarezsaur do not give it flying capabilities. Their feathers are similar to those of modern birds as they were tested to contain the protein beta-keratin. Biochemical analysis allowed scientist to confirm this in decayed feathers. Therefore, it is fair to assume that Alvarezsaur had an entire coat of feathers, rather than just a few.^[7]



[8] (background image)