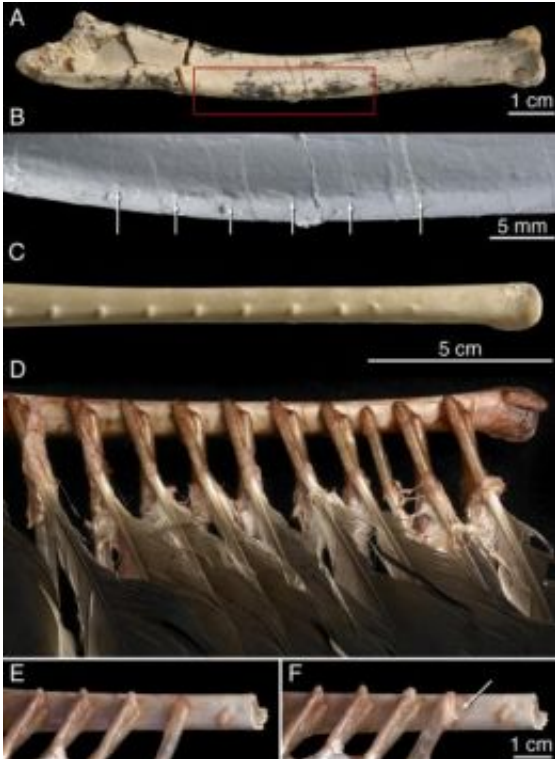


Velociraptor had feathers

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(A) View of right ulna of Velociraptor IGM 100/981. (B) Detail from cast of red box in (A), with arrows showing six evenly spaced feather quill knobs. (C) View of right ulna of a turkey vulture (*Cathartes*). (D) Same view of *Cathartes* as in (C) but with soft tissue dissected to reveal placement of the secondary feathers relative to the quill knobs. (E) Detail of *Cathartes*, with one quill completely removed to reveal quill knob. (F) Same view as in (E) but with quill moved to the left to show placement of quill, knob, and follicular ligament. Follicular ligament indicated with arrow. Credit: Mick Ellison

A new look at some old bones have shown that velociraptor, the dinosaur

made famous in the movie Jurassic Park, had feathers. A paper describing the discovery, made by paleontologists at the American Museum of Natural History and the Field Museum of Natural History, appears in the Sept. 21 issue of the journal *Science*.

Scientists have known for years that many dinosaurs had feathers. Now the presence of feathers has been documented in velociraptor, one of the most iconic of dinosaurs and a close relative of birds.

The fossil specimen that the group examined was a velociraptor forearm unearthed in Mongolia in 1998. They found on it clear indications of quill knobs—places where the quills of secondary feathers, the flight or wing feathers of modern birds, were anchored to the bone with ligaments. Quill knobs are also found in many living bird species and are most evident in birds that are strong flyers. Those that primarily soar or that have lost the ability to fly entirely, however, were shown in the study to typically lack signs of quill knobs.

“A lack of quill knobs does not necessarily mean that a dinosaur did not have feathers,” said Alan Turner, lead author on the study and a graduate student of paleontology at the American Museum of Natural History and at Columbia University in New York. “Finding quill knobs on velociraptor, though, means that it definitely had feathers. This is something we'd long suspected, but no one had been able to prove.”

Previous signs of feathers on dinosaurs had been restricted to fossils found in a particular kind of lake sediment that favored preservation of small-bodied animals.

The velociraptor in the current study stood about three feet tall, was about five feet long, and weighed about 30 pounds. Combined with its relatively short forelimbs compared to a modern bird, this indicated it lacked volant, or flight, abilities. The authors suggest that perhaps an

ancestor of velociraptor lost the ability to fly, but retained its feathers. In velociraptor, the feathers may have been useful for display, to shield nests, for temperature control, or to help it maneuver while running.

“The more that we learn about these animals the more we find that there is basically no difference between birds and their closely related dinosaur ancestors like velociraptor,” said Mark Norell, a Curator in the Division of Paleontology at the American Museum of Natural History and co-author on the study. “Both have wishbones, brooded their nests, possess hollow bones, and were covered in feathers. If animals like velociraptor were alive today our first impression would be that they were just very unusual looking birds”.

Source: American Museum of Natural History

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