

Long-necked dinosaurs probably had even longer necks than we thought

By [Laura Geggel](#) published about 2 hours ago

Their necks were likely at least 3 feet longer.



Argentinosaurs dinosaurs walking in the rocky desert. Could *Argentinosaurs* have sported an even longer neck than anyone thought? (Image credit: Stocktrek Images/Getty Images)

Imagine a lumbering long-necked dinosaur — perhaps you've seen these herbivores animated in movies, munching on hard-to-reach leaves, or maybe you've visited a mounted skeleton in a museum. But now, get ready for a reality check: Every sauropod neck you've ever seen is likely wrong, a new study finds.

Surprisingly few complete sauropod necks have been scientifically documented, and even specimens with relatively complete necks often have misshapen bones, distorted from tens of millions of years in the great outdoors. What's more, paleontologists often can't agree where the neck stops and the backbone begins; and many don't factor in how long sauropod necks would be if [tissues such as cartilage](#) and fat were included in models.

in the U.K., told LIVE Science. If researchers had access to a complete sauropod neck and accurately accounted for its missing cartilage (which rarely fossilizes), sauropod necks could easily be about 3 feet (1 meter) longer than we currently envision them to be, he said.

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Sauropod necks have mesmerized Taylor for upward of 20 years. "They're just fascinating on so many levels — mechanically, biologically, physiologically, ecologically," he said. "They're arguably the most extreme body parts **evolved** by anything that's ever lived."

However, when he began to study them — for instance to suggest that sexual selection was not the main driver for the sauropod's gratuitously long neck — Taylor realized that many sauropod neck fossils were woefully incomplete.



Mike Taylor shows a single neck vertebra of *Supersaurus* (left) and a model of how it would have looked before damage (right). (Image credit: Mathew J. Wedel; [CC BY 4.0](#))

Dozens of specimens, even "celebrity" sauropods, such as Pittsburgh's Carnegie Museum of Natural History's [Diplodocus](#) and [Apatosaurus](#), whose replica casts can be found around the world, and the large brachiosaur at the Natural History Museum in Berlin, have "imperfectly known necks," Taylor wrote in the new study. In specimens uncovered in the 19th and early 20th centuries, missing bone can be difficult to spot due to over-enthusiastic restorers.

Sauropods were big — the largest terrestrial animal, likely *Argentinasaurus*, may have [measured 115 feet \(35 m\) long](#) and weighed 77 tons (70 metric tons) — so it's not unexpected that complete fossilizations are rare. To fossilize, an animal has to be quickly covered with sediment before predators or the elements lay waste to it, and that's unlikely

process, Taylor said.

"It is no accident that the most completely preserved sauropods are small individuals such as ... the cow-sized juvenile *Camarasaurus lentus*," and not a larger beast, he wrote in the study. To date, the longest known necks of titanosaurs, or supersized sauropods, belong to [Patagotitan](#), *Puertasaurus* and [Dreadnoughtus](#), and are thought to be around 32 feet (10 m) long, but the material is meager. *Patagotitan* has only three known neck vertebrae, and *Puertasaurus* and *Dreadnoughtus* have just one apiece.



These cervical vertebrae, from the sauropod *Giraffatitan brancai*, are subtly distorted. (Image credit: Michael P. Taylor; [CC BY 4.0](#))

Sometimes, vertebrae are missing or jumbled, making it hard to decipher how long the neck was. "In mammals it's really easy to tell because there are seven cervical vertebrae in the neck and they don't have ribs attached [to them]," Taylor said. But in sauropods, some neck vertebrae attach to the ribs, making it hard to see where the neck ends and the trunk begins in some dinosaurs.

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The Carnegie *Diplodocus* — nicknamed "Dippy" — appears as a cast in museums all over the world, including in London, Berlin and Paris, but even this well-known dino's neck is

cervicals, or maybe fewer, given that one of them may have been misassigned, Taylor wrote in the study.

One improvement would be to better inform the public about what's known and what's just a guess; for instance, highlighting the known bones in a different color in reconstructed museum mounts, Taylor said.

Understanding the current limits of our knowledge regarding sauropod neck is important, especially when it comes to constructing family trees based on anatomical features, said Femke Holwerda, the Elizabeth Nicholls postdoctoral research fellow at the Royal Tyrrell Museum of Paleontology in Alberta, Canada, who was not involved with the study.

The study was published online Jan. 24 in the journal [PeerJ](#) and detailed on Taylor's blog, [SV-POW](#).

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Laura is an editor at Live Science. She edits Life's Little Mysteries and reports on general science, including archaeology and animals. Her work has appeared in The New York Times, Scholastic, Popular Science and Spectrum, a site on autism research. She has won multiple awards from the Society of Professional Journalists and the Washington Newspaper Publishers Association for her reporting at a weekly newspaper near Seattle. Laura holds a bachelor's degree in English literature and psychology from Washington University in St. Louis and an advanced certificate in science writing from NYU.

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