

Early birds had an old-school version of wings

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An artist's impression of what the *Archaeopteryx lithographica* would have looked like in flight. Art work by Carl Buell. Copyright Jakob Vinther/University of Bristol

In comparison to modern birds, the prehistoric *Archaeopteryx* and bird-like dinosaurs before them had a more primitive version of a wing. The

findings, reported on November 21 in *Current Biology*, lend support to the notion that birds are the descendants of gliding dinosaurs that spent much of their days in the trees.

"By studying fossils carefully, we are now able to start piecing together how the wing evolved," said Nicholas Longrich of Yale University.

"Before, it seemed that we had more or less modern wings from the Jurassic onwards. Now it's clear that [early birds](#) were more primitive and represented transitional forms linking birds to dinosaurs. We can see the wing slowly becoming more advanced as we move from *Anchiornis*, to *Archaeopteryx*, to later birds."

"This makes us rethink the aerial capabilities in the early phases of avian evolution," added Anthony Russell of the University of Calgary.

What Longrich, Russell, and their colleague Jakob Vinther from the University of Bristol discovered by poring very carefully over the [fossil evidence](#) was that neither the wings of bird-like dinosaurs nor the wings of the very early bird *Archaeopteryx* looked quite like those of modern birds. That is, the feathers on their wings were configured differently.



A close-up of the cast of the Berlin specimen of *Archaeopteryx lithographica*.
Credit: University of Bristol

"[Archaeopteryx](#) has this weird design with multiple layers of long flight feathers," Longrich said. "The dinosaur *Anchiornis* has tons of simple, strip-like feathers that overlap—the only bird that has anything remotely similar is a penguin."

That means that early wings probably worked effectively as simple airfoils for gliding, and perhaps for very primitive flapping flight at high speeds, the researchers say. But the feathers on those wings couldn't separate and twist in the way they do in a modern bird. Low-speed flight

and ground takeoff may have been difficult, or even impossible, for them.

The researchers propose that the wing feather arrangement seen in modern birds may have evolved within a period spanning perhaps a few tens of millions of years and then remained largely unchanged for the last 130 million years.

"We are starting to get an intricate picture of how feathers and birds evolved from within the [dinosaurs](#)," said Vinther. "We now seem to see that feathers evolved initially for insulation. More complex vaned or pinnate feathers evolved for display. These display feathers turned out to be excellent membranes that could have been utilized for aerial locomotion, which only very late in bird evolution became what we consider [flapping flight](#)."

More information: Longrich et al.: "Primitive wing feather arrangement in *Archaeopteryx lithographica* and *Anchiornis huxleyi*." [DOI: 10.1016/j.cub.2012.09.052](https://doi.org/10.1016/j.cub.2012.09.052)

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