

TERRA

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THE WORLD'S LARGEST FLYING BIRD

by KENNETH E. CAMPBELL

How big can a bird be and still fly? For years scientists thought they had the answer, an answer provided by the fossilized bones of two long extinct species of birds. One of these was a land bird, *Teratornis incredibilis*, and the other was a marine bird, *Osteodontornis orri*. Fossils found in southern California of both of these species indicated that their wingspans were between sixteen and seventeen feet. People marveled that birds that large could fly.

But buried beneath the dry, dusty plains of Central Argentina, Nature had hidden a most spectacular surprise and kept it safe for millions of years. The surprise was the fossilized bones of *Argentavis magnificens*, now the world's largest known flying bird. With a wingspan of twenty-five feet, and stretching eleven feet from the tip of its bill to the tip of its tail, the Magnificent Bird of Argentina pulls one's imagination to the limit as the mind struggles to grasp its enormous size.

The giant bird, a new genus and species of teratorn (from the Greek *teratos*, meaning wonder, and *ornis*, meaning bird), was discovered a few years ago by two well-known Argentinian paleontologists, Drs. Eduardo Tonni and Rosendo Pascual. What they found were a number of pieces of a skull, wing bones, and leg bones, all from a single bird. Preliminary work on this important discovery was carried out in the La Plata Museum in Argentina, the most important center for research in vertebrate paleontology in South America.

My introduction to this spectacular bird began when the National Geographic Society sponsored an expedition consisting of David Frailey of the University of Kansas, Lidia Lustig, an Argentinian geologist, and myself, to Peru during the summer of 1979. The purpose of the

expedition was to explore the Amazon jungle of eastern Peru for fossil vertebrates. We were fortunate to find a large number of fossils and decided it was necessary to take some of them to Argentina for direct comparison with fossils in the collections there. It was this visit that resulted in the fossil bones of the giant bird coming to Los Angeles, the reason being so they could be compared directly with the fossil bones of the smaller teratorns that have been found in the asphalt deposits at Rancho La Brea.

The announcement of the discovery and identification of the world's largest flying bird was made jointly by the Natural History Museum of Los Angeles County and the National Geographic Society. The timing of the announcement coincided with the publication by the Natural History Museum of a book entitled "Papers in Avian Paleontology Honoring Hildegard Howard." The fossil species was formally described in that publication.

Dr. Hildegard Howard, one of the world's preeminent paleornithologists, has been studying fossil birds at the Natural History Museum since 1924. In fact, it was Dr. Howard who described both *Teratornis incredibilis* and *Osteodontornis orri*, previously the largest known flying birds. It seemed only appropriate that the new teratorn from Argentina be described in the book honoring Dr. Howard's lifelong dedication to the study of fossil birds.

It was also Dr. Howard who worked so hard, along with the late Dr. Chester Stock, to reveal the secrets of the fossil animals from Rancho La Brea and the mysteries of life in the Los Angeles Basin during the last Ice Age. Over the decades Dr. Howard has studied literally tens of thousands of bird bones from Rancho La Brea, including those of the best known teratorn, *Teratornis merriami*.

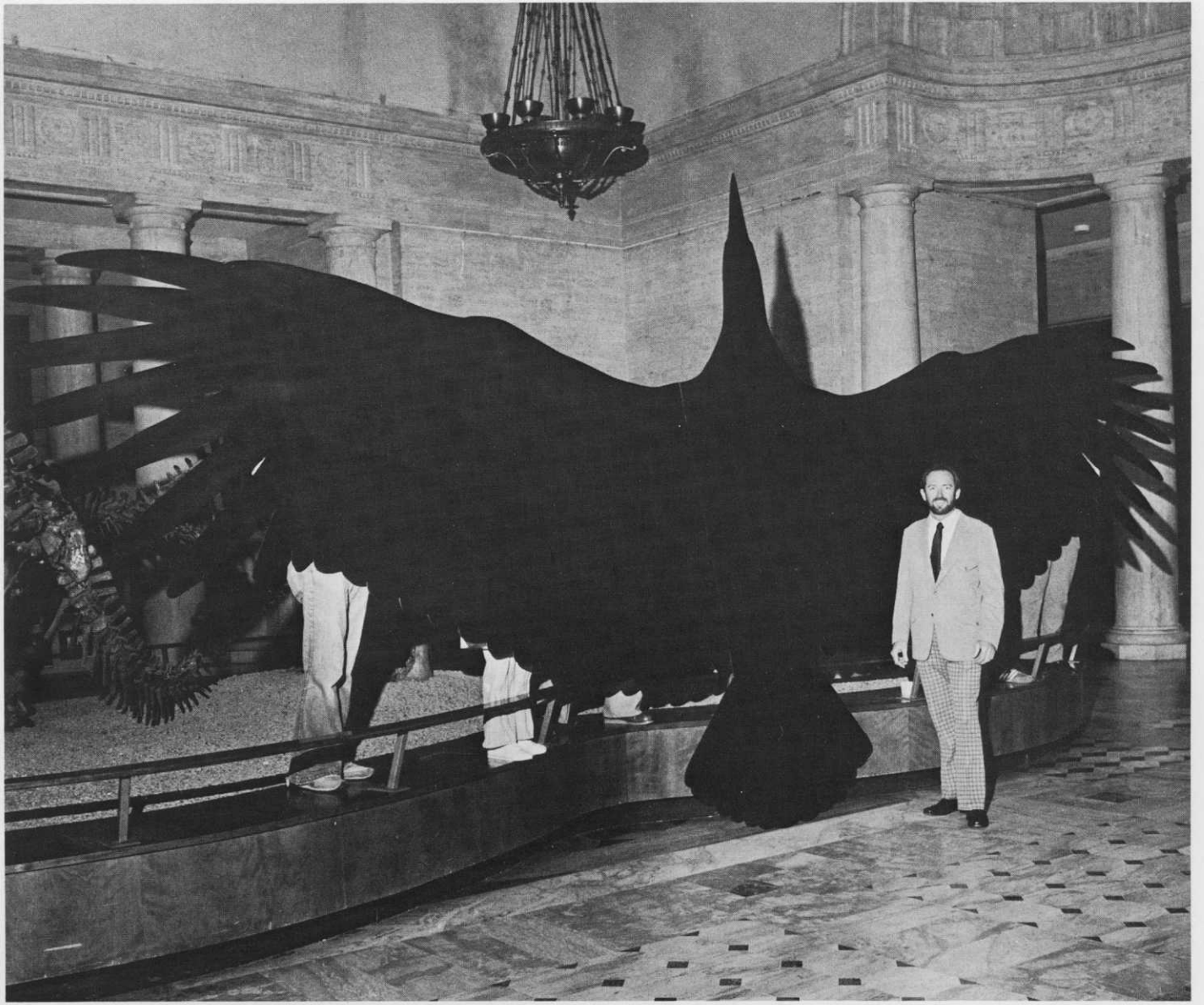
Teratornis merriami was the last surviving species of the extinct avian family Teratornithidae. It became extinct at the end of the last Ice Age, about 10,000 years ago. This species was also the first teratorn known to science, being described in 1909 from bones found at Rancho La Brea. Hundreds of fossil bones of this species are now known from Rancho La Brea, and it is these fossils that tell us most of what we know about the teratorns.

Argentavis magnificens is the oldest known teratorn. It has been dated at between five and eight million years old, or from the late part of the Miocene epoch, on the basis of the fossil mammals found in the same deposits as the fossil bird. Fossils of these same species of mammals have been found at other sites in Argentina for which radiometric dates are available.

Teratornis merriami weighed approximately thirty-six pounds and had a wingspan of about twelve feet. In comparison, *Argentavis magnificens* weighed between 160 and 170 pounds! And while *Teratornis merriami* stood only slightly over two and one-half feet tall, *Argentavis magnificens* could have looked a six-foot tall man in the eye!

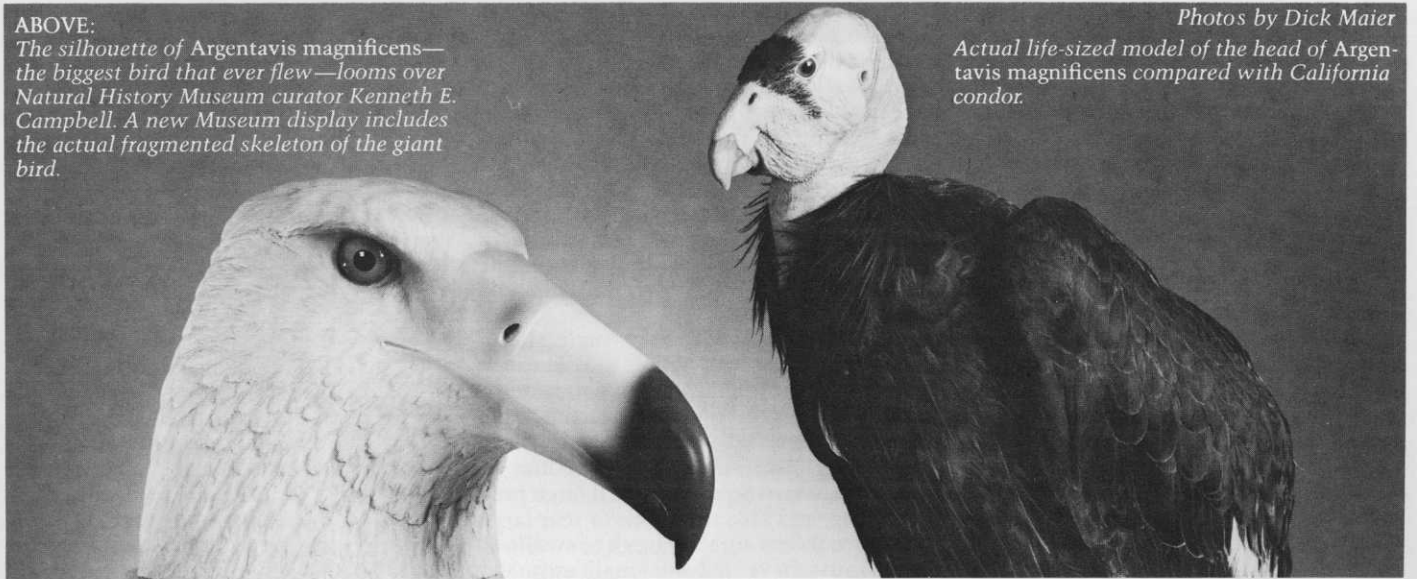
In all, four species of teratorns are now known to science. Two of them, *Teratornis incredibilis* and *Cathartornis gracilis*, are known from only two or three bones, so little can be said of them other than that they were teratorns. We can estimate their size, however. *Teratornis incredibilis* was about forty percent larger than *Teratornis merriami*, while *Cathartornis gracilis*, known only from Rancho La Brea, was slightly smaller than *Teratornis merriami*.

Teratorns have always been considered relatives of the New World vultures because their bones look very much like condor bones. Teratorns were heavy-



ABOVE:
*The silhouette of *Argentavis magnificens*—the biggest bird that ever flew—looms over Natural History Museum curator Kenneth E. Campbell. A new Museum display includes the actual fragmented skeleton of the giant bird.*

Photos by Dick Maier
*Actual life-sized model of the head of *Argentavis magnificens* compared with California condor.*





Artist: Jill Littlewood

bodied birds with long, broad wings and an eagle-like head. In flight, at a distance, they probably looked like a condor. Up close, they would have looked like an eagle with a very elongated, sharply hooked bill. In proportion to the body of an eagle, a teratorn's head was almost twice as long.

Although all of the bones of *Argentavis magnificens* are broken and only pieces are available for study, it has been possible to determine several features of this large flying bird. For example, we are sure the bird flew because we have pieces of four different wing bones, and they are all of a size to be expected in a flying bird with a twenty-five foot wingspan. Large birds that have lost the ability to fly, such as ostriches, rheas, and emus, have only rudimentary wings and the wing bones are very reduced and some may even be missing.

Also, the ulna, one of the middle wing bones, bears the marks where the secondary feathers attached. The secondary feathers are one of most important types of flight feathers, and it is unlikely that a bird would have both feathers and wing bones suitable for flight if it did not fly.

When airborne, the big bird probably soared much as condors do today, seldom flapping its huge wings. This is suggested by the similarity between the structure of the bones of teratorns and condors. The physical limits of bone and muscle activity would have worked against continual flapping of the wings, although the big bird could assuredly have flapped its wings when necessary. To become airborne, it is not unreasonable to assume that all the big bird had to do was to spread its wings into the wind. Condors of today often become airborne in just such a fashion. Addition-

ally, there is considerable evidence to suggest that strong winds were a permanent phenomenon on the Argentine landscape at the time *Argentavis magnificens* ruled the air.

The large size of the giant teratorns' wings would have limited them to living in savannas or open grassland. Consider that their primary flight feathers could have been as large as six or seven inches wide and close to five feet long! With wings that large the birds would not have had the maneuverability to fly in or around trees or brush. They also would have had difficulty, to say the least, in opening their wings in a forest.

It was long believed that teratorns were scavengers, feeding off the remains of dead animals as condors do. This was because their bones look so much like condor bones. This idea was given credence because so many teratorn bones have been found in the asphalt deposits at Rancho La Brea, where the birds were thought to have been trapped while feeding on the carcasses of other animals that died at the site.

A new analysis of the head bones of *Teratornis merriami* shows that this interpretation is incorrect. The long, narrow, hooked beak and the type of jaw mechanism (*i.e.*, how the mouth opened) found in this species are similar to those in birds that grab small animals with their beaks and swallow them whole. The partial skull of *Argentavis magnificens* shows similar features.

Teratorns probably used their sharp, hooked beaks to catch their prey because their feet were not of the type found in hawks, eagles, or owls; the latter being types of birds that use their feet to catch their prey. And since the jaw bones of teratorns were too weak to kill large prey by biting, and also too weak to tear large prey into pieces small enough to swallow, they must have fed on small animals,

swallowing them whole.

And, since it has been concluded that teratorns were primarily active predators, we can be rather certain that they had feathered heads as do almost all birds that are active predators. Carrion feeders like condors have naked heads because they often stick their heads inside the carcasses of dead animals. If they had feathers on their heads, these would quickly become caked with dried blood and rotten meat, creating a potential cause of disease and infection, or a home for parasites.

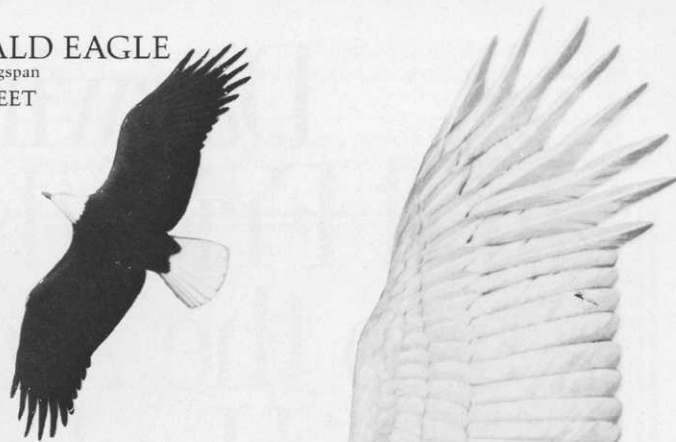
We do not know exactly why teratorns became extinct, but we believe the ultimate cause was a change in climate. The teratorns from Rancho La Brea became extinct at the end of the last Ice Age, at a time when much of southern California became much drier than it had been previously. The shift to more arid conditions probably resulted in the loss of the teratorns' food supply. A similar sequence of events could have led to the extinction of *Argentavis magnificens*. Although this species lived well before the Ice Ages, there is evidence suggesting that Argentina was becoming much drier at the time the giant teratorn lived than it had been during earlier times.

There is still much to learn from the fossil bones of *Argentavis magnificens*. Casts of the original bones are being made for the collections of the Natural History Museum; the fossils themselves will soon be returned to the La Plata Museum in Argentina. An expedition to Argentina in search of more specimens of the giant teratorn is being planned for 1981.

Meanwhile, some of the actual bones of the giant teratorn, a life-size silhouette of the bird in flight, and a life-size model of its head are on display in the main foyer of the Natural History Museum. We hope everyone will take this opportunity to view for themselves the grandest "Wonder Bird" of them all.

BALD EAGLE

wingspan
8 FEET

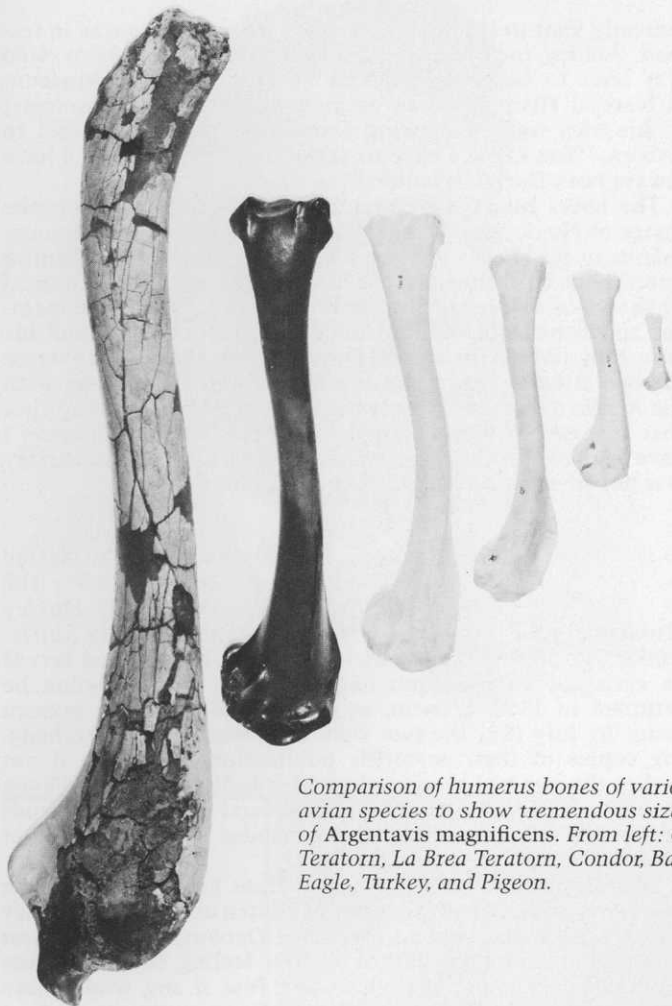


GIANT TERATORN

wingspan
25 FEET

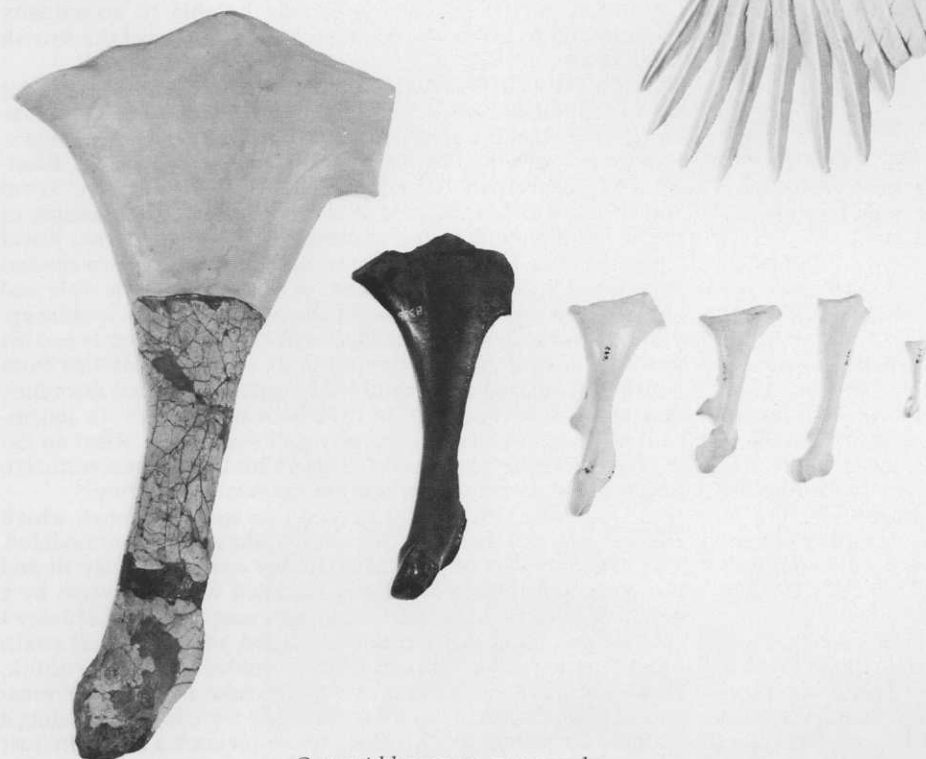


Comparison of humerus bones of various avian species to show tremendous size of *Argentavis magnificens*. From left: Giant Teratorn, La Brea Teratorn, Condor, Bald Eagle, Turkey, and Pigeon.



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PREHISTORIC BIRD whose bones were found in Argentina had wings that would have dwarfed the bald eagle. The world's largest known flying bird, it was reconstructed from fossil evidence.



Coracoid bones are compared.

Dr. Kenneth Campbell is an avian paleontologist who has concentrated his research interests on the birds of Rancho La Brea and South America. He is a curator of paleontology at the Natural History Museum of Los Angeles County. Dr. Campbell edited "Papers in Avian Paleontology Honoring Hildegard Howard." This latest in the Museum's Contributions to Science series is available in the Museum Book Shop.