

Luis M. Chiappe: *Glorified Dinosaurs*

# Feathered Friends from the Phanerozoic



The famous *Urvogel Archaeopteryx*, provided with flesh and feathers by the illustrator.

Ornithologists beware! The twittering cuties in our back gardens are, in fact, direct cousins of *Tyrannosaurus* and *Velociraptor*. A recently published book reviews what we know about the origin and evolution of birds.

**T**weet, tweet! Where does that cheeky robin outside your living room window come from? Who are his feathered ancestors? And who are the ancestors of those greedy feral pigeons that beg for food in our city centres? From which primeval creatures did Uncle Eagle, Auntie Seagull, Grandnephew Hummingbird and all the other chattering cousins evolve? Sophisticated aficionados of Steven Spielberg's *Jurassic Park* trilogy know the answer: birds are the cuddly offspring of fearsome carnivorous dinosaurs of the Cretaceous Period, which roamed Earth more than 65 million years ago. Look into an avian eye! Can you see the reflection of *Deinonychus*' terrible killer claws and *Tyrannosaurus*' carnassials?

## What birds are made of

However, Spielberg's aficionados know only half the truth: modern birds aren't the offspring of long extinct dinosaurs – they are dinosaurs. Phylogenetically speaking, birds are theropod dinosaurs that evolved during the Mesozoic Era. The feathered lightweights of today share dozens of skeletal



Paleontologist Luis Chiappe on a job at the other end of the world.

features with their extinct cousins. Fossils reveal digestive and cardiovascular systems that are similar to those of modern birds and, let's not forget, the most obvious similarity: the presence of feathers.

Another spectacular discovery, recently made in Montana by US paleontologists,



Looking into avian eyes: *Glorified Dinosaurs* gives a profound and up-to-the-minute insight into how dinosaurs evolved into birds.

confirmed the long-held assumption of a close dinosaur-bird relationship. In 2005, Mary Higby Schweitzer and her colleagues at North Carolina State University found soft tissue inside the fossilized femur of a *T. rex* (the only soft tissue ever recovered from a dinosaur). Schweitzer's team found strong similarities to the cellular anatomy of birds. In addition, extracts of dinosaur bone reacted with antibodies to chicken collagen (*Science* 25 March 2005: 1952). Two years later, Harvard Medical School researchers sequenced pieces of collagen protein from the femur. The *T. rex* amino acid sequences most closely matched those in the collagen of modern chickens.

## Grandpa *Tyrannosaurus*, Cousin Chicken?

"Just wait a cotton-pickin' minute!", scream the creationists of North Carolina and elsewhere. "Evolution never happened! Earth is less than 10,000 years old! Don't listen – science is fake!"

Yes, according to a study published in 2006 in *Science*, such stubbornness is becoming more prevalent in the United States, whereas the number of Darwin's supporters is decreasing significantly. Ironically, most creationists live in places where the evidence for evolution is at its most compelling (the Hell Creek formation in Montana, which has produced impressive arrays of fossils, is one such place. The *T. rex* femur mentioned above was found just there – in a place surrounded by bastions of creationism).

## Author to be tarred and feathered

Looking at the scientific literature published in the U.S., one can't help brooding on extremes. No other nation on earth boasts such an abundance of medieval thinking and doubters of evolution. On the other hand, no other nation's science writers publish such an abundance of vivid and informative books on the origin of life, on the mechanisms of natural selection and on biodiversity. A case in point for the latter is *Glorified Dinosaurs*, a brand-new textbook on the origin and early evolution of birds. Published in 2007 by palaeontologist Luis Chiappe, it ticks all the boxes necessary to make it outlawed in states such as North Carolina.

If so, then Chiappe would seem to be the ideal candidate to be tarred and feathered. He is Director of the Dinosaur Institute at the Natural History Museum of Los Angeles County and considered a world authority on early bird evolution. A native of Argentina, he has conducted research on non-avian dinosaurs, pterosaurs and fossil crocodylians, and has done field work in the Gobi Desert and Patagonia. In Patagonia in 1997, Chiappe discovered a nesting site with thousands of dinosaur eggs, including fossilized embryos and fossilized skin – one of the most significant paleontological findings of the last few years.

## Discussing the evolution of cherubs

Surprisingly few scientists are articulate and first-rate scientists are particularly prone to the production of incomprehensible drivel. Chiappe is a laudable exception. His magnificent opus provides a fascinating insight into how modern birds evolved from meat-eating dinosaurs, beginning with the first significant fossil discoveries 150 years ago and ending with the latest, in the fossil-rich shales of northeastern China. The reader makes the acquaintance of Thomas Henry Huxley, who, in the 1860s, became the foremost proponent of the theropod origin of birds, and of John Ostrom, whose

1960s studies of *Deinonychus* reopened the bird debate.

The book is printed on premium high-gloss paper and contains more than 220 brilliant full-colour photos, drawings and reconstructions of fossils and habitats, alternating with charts, maps, cladograms and pedigrees. In ten chapters Chiappe tells the fascinating story of how the lost world of feathered aviators became comprehensible thanks to extraordinary fossil discoveries.

Essentials such as plate tectonics, the phenomenon of convergent evolution, the process of fossilisation and the art of biological classification are clearly explained, at times with a mischievous authorial wink (for example when Chiappe argues that, despite the similar appearance of their wings, a close relationship between cherubs and birds is unlikely). One instructive passage covers the sensational *Archaeoraptor* which was hailed as the ultimate proof for the di-

nosaur-bird evolutionary connection in a *National Geographic* article in 1999 (a 'discovery' that was later exposed as a hoax and discredited reputable researchers).

### The oldest pellet on Earth

In subsequent chapters we learn that *T. rex* himself was probably feathered (at least as a teenager), that birds are both dinosaurs and reptiles, and that the perplexing discovery of *Microraptor*, the "four winged dinosaur", has rather complicated the lives of paleontologists. We get to know an ancient sap-eater, amongst whose lithified bones were found the remains of its last meal, and we can admire the oldest pellet – assumedly digested and regurgitated by a raptor 115 million years ago. The reader will also meet the famous Urvogel *Archaeopteryx*, the most distant relative of modern birds, looking as fresh as if it had stepped out of the Solnhofen limestone only yesterday.



The cute skull of the earliest and most primitive bird known. Its owner, *Archaeopteryx*, was similar to a chicken and lived in southern Germany around 155–150 million years ago.

*Glorified Dinosaurs* is a risky read. The book causes captivation, sleeplessness and dark circles around the eyes.

WEANÉE KIMBLEWOOD

Luis M. Chiappe: *Glorified Dinosaurs. The Origin and Early Evolution of Birds*. Wiley, 2007. 263 pages, €52.60.

## Christmas lottery



## And the Winner is...

The *Lab Times* Christmas competition turned out to be unexpectedly tricky. There were plenty of entries but many were on the wrong track.

Rien van der Linden from the CBS/Fungal Biodiversity Center in Utrecht, was "quite surprised to learn he had won something in a contest".

The Palazzi publishing house ([www.palazzi.de](http://www.palazzi.de)) provided eight calendars. The five lucky winners of a *Nature Fine Art* calendar are: Pierre Savagner (Montpellier, France), Ilse Kern (Genève, Switzerland), Serena Cappelli (Milano, Italy), Rien van der Linden (Utrecht, The Netherlands) and Sara Campos (Oeiras, Portugal). *Arctic Worlds* calendars went to: Terese Bergfors (Uppsala, Sweden), Keith Davidson (Cambridge, UK) and Nihal Yueksekdag (Munich, Germany). Please accept the congratulations of everybody at *Lab Times*!

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Who was that "unimportant Viking from Norway" that gained immortality for his "groundbreaking method of navigation"? Who gave this small island in the North Atlantic Ocean the inventive name "Iceland", later describing it as "worthless", more than 1,100 years ago?

In *Lab Times* 5-2007, readers were asked to unravel this little mystery and send us the Viking's name in order to be entered into our prize draw and stand a chance of winning one of eight magnificent calendars. Nearly a quarter guessed incorrectly. We were looking neither for Naddoddr, who was one of the first settlers of the Faroe Islands, nor for Gardar Svavarsson, the first person to circumnavigate the island, nor the legendary navigators Erik the Red and Leifur Eiríksson, nor Reykjavík's founder Ingólfur Arnarson. In fact, the "unimportant Viking" was *Flóki Vilgerðarson* (nicknamed *Raven-Floki*). Both names were permitted.

Correct (and incorrect) submissions reached us from 17 European countries, from Portugal to Poland and from Norway to Italy (most came from the UK and Germany).



Photo: Mark Harris

Terese Bergfors from the Department of Cell and Molecular Biology at Uppsala University "was delighted to win". The photo above was taken by her colleague, Mark Harris, who has published the book *Sweden. A personal view* (<http://frozentime.se>).