



Observations of an Owl (18)

I'm a Dino (Hear Me ROAR!)

I presume you know who my evolutionary forefathers were: the mighty dinosaurs. Yes, yes, it was *my* ancestors that absolutely dominated our planet for more than 150 million years.

Impressed? Well, it gets even better: it wasn't just any old dinosaur, we birds once originated from the distinct group of bipedal theropod dinosaurs. Theropod means 'the beast-footed' and this group

included the largest terrestrial carnivores ever to have made the earth tremble – *Tyrannosaurus*, *Allosaurus*, *Gigantosaurus et al.*

Even your human scientists have now come to agree that we birds are actually the descendants of non-flying theropods. And the evidence is not only based on the similarity of our bone architecture to skeletal fossils of *T. rex* and Co. Oh no! Since you have recently succeeded in extracting protein samples from preserved dinosaur soft tissue, the first sequence data also seems to indicate our close relationship to those 'mighty monsters'. In 2007, for example, a Harvard group claimed that "collagen extracted from bone fragments of a 68-million-year-old *T. rex* closely matched the amino acid sequences of modern day chickens (*Science* 316: 280–285). (No worries, this time I'll refrain from ranting about my scatty 'special friends'...)

Thus when people say that dinosaurs are extinct, they are technically incorrect. My feathered fellows and I, we are today's dinosaurs. GRROOARRGHH!! (... cough, cough, splutter...)

Okay, it might not have exactly been *T. rex*. Sadly, the 'king of dinosaurs' actually seems to represent a dead-end branch on the theropod evolutionary tree, meaning that he is not our *direct* ancestor (rather a kind of grand⁽ⁿ⁾-cousin). In fact, our direct origin is currently favoured to lie within a special clade of the theropod subgroup of coelurosaurs, the dromaeosaurs, which included, for example, *Deinonychus* or the 'Jurassic Park star' *Velociraptor*.

All of whom were sufficiently impressive brothers and sisters of my direct ancestor, even if I say so myself. Think about what *your* ancestral group was like at that time. Small, furry creatures (hardly larger than mice) that spent most of their days (and probably nights) cowering in the bushes, always in fear of becoming lunch for one of *my* ancestors.

Admittedly, much later on, some quite impressive species also appeared within your mammalian evolutionary tree, for example, the woolly mammoth, the sabre-toothed tiger, the giant ground sloth or, especially, the blue whale. Sadly, they all represented the tips of dead evolutionary branches (as apparently, and sadder still, the blue whale does today).

But what about the direct ancestors of you humans? Obviously, they have *always* been small and inconspicuous. Just take 'Ida', the most recent and grandly celebrated fossil of one of the earliest primates ever, which means she must have been fairly closely related to the human's direct ancestors. 'Ida' lived about 47 million years ago and her skeleton had a total length of 58 cm,

34 of which comprise the tail. Really impressive! My grand⁽ⁿ⁾-cousin *Deinonychus* had more than three metres.

But this is certainly not the reason why 'Ida' is currently being so illustriously celebrated. Instead, many of you humans have praised the find as being the "eighth wonder of the world", a "Holy Grail for paleontologists", "Man's oldest ancestor" or, at least, "the missing link".

Utter rubbish! 'Ida' forms the basis for a new genus and species of the extinct so-called adapiform primates, *Darwinius marssilliae*, and the Adapiformes, in turn, form a branch on the primate tree that leads to modern lemurs. No more and no less – apart from being a wonderful specimen of a complete fossil.

But the 'missing link'? What was missing? And what is 'Ida' linking? If you find something bridging a gap in a *chain*, then you have a missing link. However, as the Australian philosopher of science, John S. Wilkins states in his blog 'Evolving Thoughts', "Evolution, at least at the scale of animals and plants, is mostly a *tree*. And all we see are individual nodes of the tree, the extant species that form, in Darwin's metaphor, the leaves of the living tree, and the extinct species that form branching points deeper in the tree. But we do not have enough information to know the shape of the tree for all but the smallest twigs and larger branches. There may be, for all we know, millions of missing species. We might have a species that is an ancestor of some other species, and yet not know enough to say that they are indeed the ancestor in question."

Got it? Well, let's turn it around this way: the evolution of us owls has produced many branches, all but one of which have ended in extinction. Some are very close to my own ancestry (*Velociraptor*), some are reasonably close (*T. rex*), and others are further away (duck-billed dinosaurs). So that's why today, *real* experts don't get excited about a fossil because they think they've found the missing link but because a fossil can show how certain early traits, such as feathered wings, evolved. That's exactly 'Ida's' value, too: to provide hints as to when and how certain traits developed in early primate evolution. And that's a lot!

Archaeopteryx is an excellent example. Without its feathers, *Archaeopteryx* looks much like a small dromaeosaur. Hence, it would represent a perfect 'transitional form' linking birds and coelurosaurs (or even reptiles in general) and has thus been regarded as the ancestor of all living birds. Wrong! Like *T. rex*, *Archaeopteryx* also sits on a dead end branch of the evolutionary tree and, therefore, cannot actually link anything; however, it *can* provide good insight as to how our early avian traits might have evolved.

You want examples for dead end branches in your human evolution? Well, definitely the Neanderthals, apparently *Homo erectus* and – very, very likely – dear old 'Ida'.

Comments: owl@lab-times.org

