Journal of the Biblical Creation Trust. 2020, Volume 2, pages 2–8

Feathered dinosaurs and the creation model

MATTHEW A. McLAIN

ABSTRACT

Many creationists are uncertain of what to do with feathered dinosaurs. Some view the fossils as fake and the claims as untrustworthy, whereas others conclude all fossils with feathers are from birds. Review of the many fossils and species involved in this debate reveals that feathered dinosaurs were real creatures and that there are genuine similarities between dinosaurs and birds. Contrary to the evolutionary claim, however, the existence of feathered dinosaurs does not exclusively lead to the conclusion that birds evolved from dinosaurs. Rather, we can see from a creationist model larger design plans at work that require an adjustment in our thinking on animal classification.

INTRODUCTION

Anyone familiar with palaeontology and evolution has heard that birds evolved from dinosaurs, specifically theropod (bipedal, hollow-boned, typically carnivorous) dinosaurs, that – along with the long-necked sauropod dinosaurs – possessed skeletal evidence for a bird-like breathing system (Butler et al. 2012). Among the theropods, birds are thought to have evolved from a group called Maniraptora, which is within another group called Coelurosauria (Figure 1). Within Coelurosauria, we find bird-like features such as a furcula (wishbone) and feathers, and within Maniraptora we find even more features such as a bird-like wrist. Because birds find their ancestry within Dinosauria, we can say that birds are actually dinosaurs, using cladistic taxonomy.[1] Thus, what the public typically thinks of as a dinosaur should be termed a 'non-avian dinosaur' using a cladistic approach.

Creationists have been opposed to the idea of birds evolving from dinosaurs for good reason. Scripture discusses the creation of flying birds on Day 5 of the Creation Week (Genesis 1:20–23), a full day before the creation of land animals (Genesis 1:24–25). This is an exactly opposite narrative from what the evolutionary perspective suggests. Additionally, creationists (e.g. Thomas and Sarfati 2018) have long noted the many unique features of birds that make them well-suited to life in the sky (e.g., feathers, unidirectional breathing, hollow bones, endothermy (warm-bloodedness), large attachment sites for flight muscles, etc.).

Creationists have been opposed to the idea of birds evolving from dinosaurs for good reason.

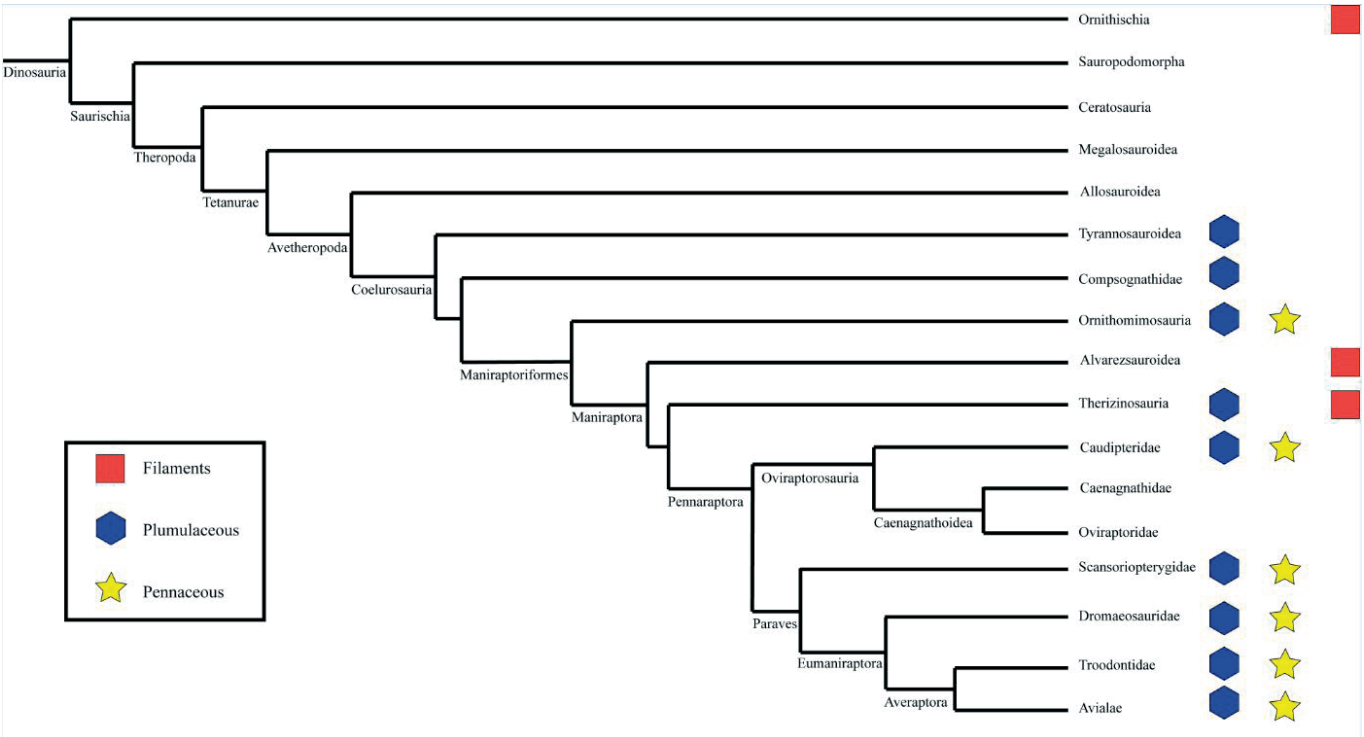

Figure 1. Simplified cladogram of feathered dinosaurs. Types of feathers have been indicated by symbols as described in the legend. Cladogram and feather data from Hendrickx et al. (2015), Lefèvre et al. (2014) and Prado et al. (2015).

Figure 2. Photograph by the author of a replica of the Berlin specimen of *Archaeopteryx lithographica* (or possibly *A. siemensii*). The real specimen is on display at the Museum für Naturkunde in Berlin.

In science, we want to take observations and make predictions. The distinctiveness of birds in our world today might prompt us to predict that birds have always been distinct from all other animals. After all, no other living animal possesses feathers, or the multitude of unique features found in birds. Secondly, a creationist might predict that we will not find any transitional forms linking birds to any other animal group in the fossil record.

SURVEY OF THE EVIDENCE

If we are going to attempt to test our predictions, then we need to look at the evidence. The evidence, in this case, consists of fossils and observations in modern birds (e.g. genetics, ontogeny, etc.). Because we are looking specifically at the question of feathered dinosaurs, I am going to focus on the evidence found in fossils.

Any discussion of feathered dinosaur fossils must begin with the first one found: *Archaeopteryx lithographica* (Figure 2). The first skeletal specimen of *Archaeopteryx* was described by Richard Owen in 1863. He immediately recognized it as a bird since it has clear imprints of feathers, but he also recognized some peculiarities. Unlike modern birds, *Archaeopteryx* has a long bony tail,[2] teeth in its jaws[3] and three clawed digits on the hand.[4] Although these features are visible in the

Figure 3. Photograph of a *Caudipteryx zoui* cast exhibited in the Houston Museum of Natural Science. Photograph dedicated to public domain by Daderot.

specimen Owen described (the London specimen), they are even clearer in the most famous specimen, the Berlin specimen (replica pictured in Figure 2). In 1868 and 1870, Thomas Henry Huxley ('Darwin's bulldog') recognized the skeletal and dental similarities between *Archaeopteryx* and the dinosaurs known at the time and used them to argue *Archaeopteryx* was a transitional form between dinosaurs and birds.

Interestingly, not much was discovered to support this hypothesis for roughly 100 years. In fact, the idea that birds had evolved from dinosaurs fell out of favour in the 1900s because of a publication by a Danish scientist named Gerhard Heilmann (1927). Heilmann concluded that birds could not have evolved from dinosaurs because he erroneously believed that dinosaurs did not have clavicle bones (the wishbone in birds is a fused pair of clavicles). However, in 1964, John Ostrom discovered *Deinonychus*, a dromaeosaurid – theropod dinosaurs with a large, sickle-shaped 'killing claw' on the second toe – and argued that the many similarities between *Deinonychus* and *Archaeopteryx* were strong evidence for dinosaurian ancestry for birds (Ostrom 1969; Ostrom 1974).

Despite the many skeletal similarities between *Deinonychus* and *Archaeopteryx*, what the *Deinonychus* fossil did not preserve was evidence of feathers.

Figure 4. The feathered arm and hand of the dromaeosaurid *Sinornithosaurus*. Photograph by Paul Garner and used with permission.

However, in the 1990s dinosaurs with feather-like structures started to turn up in China. The first one discovered was *Sinosauropteryx*, a small coelurosaurian theropod, which had filamentous (filament-like or thread-like) structures stretching from its head to the tip of its tail. These structures are not immediately reminiscent of feathers, and some researchers suspected they might actually be degraded collagen tissue (e.g. Feduccia et al. 2005; Lingham-Soliar et al. 2007). However, microscopic examination of the filaments in *Sinosauropteryx* revealed that they were hollow, and further analysis revealed preserved melanosomes[5] in these filaments suggesting they are not collagen because collagen does not contain pigment (see Smithwick et al. 2017 for a review). Regardless, obvious and clear feathers can be found on several dinosaurs from China including the oviraptorosaur *Caudipteryx* (Figure 3) and the dromaeosaurids *Sinornithosaurus* (Figure 4) and *Microraptor* (Figure 5).

Looking back at Figure 1, we can see the known extent of feathers in dinosaurs. Feathers are known from almost every major group of coelurosaurian theropods with over *fifty* different genera (and even more species) of feathered dinosaurs known (Barrett et al. 2015). Interestingly, filamentous structures are also known from some ornithischians – dinosaurs far away from the main line leading to birds – including *Psittacosaurus* (Mayr et al. 2002) and *Kulindadromeus* (Godefroit et al. 2014). Even more fascinating is that filamentous structures – called pycnofibres – have long been recognized in pterosaurs ('pterodactyls'), and a recent discovery suggests some pycnofibres may have been branching very much like what is seen in many feathered dinosaurs (Yang et al. 2018). Pterosaurs are not dinosaurs, but are typically considered to be close relatives of dinosaurs in a group called Ornithodira (Nesbitt et al. 2017). Thus, it may be that feathers and feather-like structures are common to all of Ornithodira or perhaps even higher levels.

RESPONSE

Having reviewed the evidence, we can conclude that there are abundant and well-preserved fossils of animals we call dinosaurs that possess feathers and feather-like structures. Some authors have suggested that some or all of these fossils might be fake, but there are original chemical signatures on some of these feather fossils (Bergmann et al. 2010), and it is not good scientific reasoning to automatically assume that something we do not understand is fake. Fossils that were demonstrated to be altered or faked, such as the 'Archeoraptor' hoax, were caught by other evolutionists (Simons 2000), which demonstrates that most scientists, regardless of their worldview, want to be accurate in their claims and assessment of evidence within their fields.

Instead, when we see discoveries that challenge our assumptions, we need to go back and rethink our assumptions. At the beginning of this article, I proposed two predictions: 1) birds have always been distinct from other animals and 2) there should be no transitional forms between birds and other animals. Concerning the first prediction, one of the features that is distinct to birds today is feathers, yet we now have evidence of feathers in animals that we do not think of as birds. Many creationists think that for a dinosaur to have feathers means that it is turning into a bird, but that is not necessarily true. After all, where is it written that birds are the only animals allowed to have feathers? Birds today may look so distinct because everything else that had feathers is now extinct.

when we see discoveries that challenge our assumptions, we need to go back and rethink our assumptions.

Concerning the second prediction, we know Scripture is clear that birds could not have evolved from land dwelling ancestors. However, this does not preclude the possibility of an animal that looks intermediate in morphology

between a traditional dinosaur and a traditional bird. After all, one could easily view a chimpanzee as intermediate in morphology and DNA between a lemur and a human. That does not immediately imply that humans evolved from other primates, although it is one possible interpretation of the evidence (if Scripture is ignored). Instead of being afraid of similarity, we should seek to understand biological similarity from a creationist perspective.

When we make statements like 'Because today only birds have feathers, then no other non-bird animal in the past can have feathers,' we are inadvertently using a uniformitarian perspective (i.e. 'the present is the key to the past'). Yes, today birds, reptiles, mammals, amphibians, and fish are all very distinct groups, but in the past we can find animals that appear to fill gaps between them (Figure 6). There are 'mammal-like reptiles' (non-mammalian synapsids), 'fishapods' (non-tetrapod tetrapodomorphs), and 'dino-birds' (non-avian maniraptorans). One could interpret these creatures as evidence for universal common descent, but that is not the only possible interpretation. It could also be that a larger design blueprint is in view, one of nested hierarchies.

An analogy may be of help. Consider bats. Bats are mammals. By this, the creationist means that bats have traits in common with other mammals (production of milk, possession of fur, etc.) and are more similar to them than they are to other creatures. We recognize other, very different animals as mammals, too, such as whales, horses, and dogs. Even though creationists recognize these creatures as mammals, they do not assume that they must all share a common ancestor. Instead, we see distinct created kinds of mammals. At the same time, we see Mammalia as a real taxonomic grouping. Similarly, we can recognize birds as very similar to dinosaurs (in fact, we could even say birds are a type of dinosaur) without implying their evolution. We are just saying that birds are more similar to dinosaurs than they are to any other creatures.

Thus, even though we can recognize a spectrum of similarity in various creature groups – whether it is dinosaurs and birds or monkeys and humans – we can still recognize discontinuity surrounding particular created kinds. I can simultaneously recognize that humans are more similar to monkeys than other mammals and that

Figure 5. The type specimen (holotype) of the feathered dromaeosaurid *Microraptor gui*. Photograph by Paul Garner and used with permission.

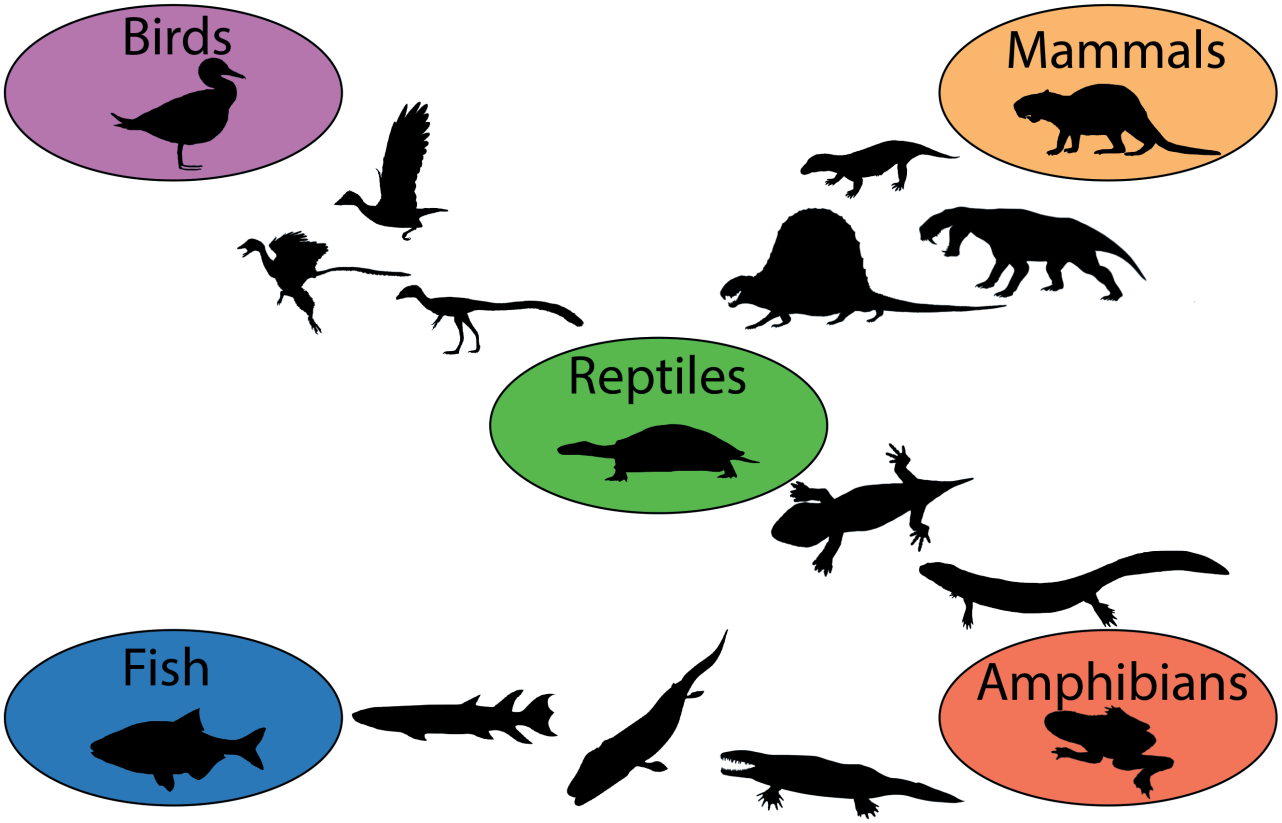

Figure 6. Diagram demonstrating vertebrate groups we recognize from living animals and the fossil creatures that do not neatly fall into those categories and could be construed by some as transitional between the modern groups. The creatures that fall in between can be considered intermediate in morphology, but this does not automatically imply an evolutionary connection between the major vertebrate groups. Images from PhyloPic. Bird image by Matt Martyniuk (modified by T. Michael Keesey) / CC BY-NC-SA 3.0. *Callobatrachus* image by Emily Willoughby / CC BY-SA 3.0. *Castoroides* image by Zimices / CC BY-SA 3.0. *Confuciusornis* by Scott Hartman / CC BY 3.0. *Dimetrodon* image by Dmitry Bogdanov / CC BY-SA 3.0. *Glyptops* image by Scott Hartman / CC BY-SA 3.0. *Kotlassia* image by Dmitry Bogdanov (vectorized by T. Michael Keesey) / CC BY 3.0. *Procynosuchus* image by Nobu Tamura / CC BY-SA 3.0. *Tiktaalik* image by Obsidian Soul (vectorized by T. Michael Keesey) / CC BY-SA 3.0. All other images are public domain.

they are distinct from all other created things. After all, we recognize all birds as birds without assuming that all birds share a common ancestor. Rather, creationists assume from the text of Scripture and from biological observations that there are distinct created kinds of birds. We would assume the same to be true of non-avian dinosaurs.

To investigate the created kinds of feathered dinosaurs, McLain et al. (2018) used statistical baraminology[6] (Wood and Murray 2003; Wood 2008) to analyse five published datasets of bone and teeth characteristics of coelurosaurian theropods. They recognized at least eight different holobaramins[7] of feathered coelurosaurian theropods, which they identified as likely created kinds. These created kinds roughly correspond to the recognizably distinct families to superfamilies[8] known for coelurosaurian theropods (Table 1). Additionally, these feathered dinosaur kinds are all discontinuous from avialan (bird) taxa, although there were some problematic avialan taxa that were difficult to place, such as *Archaeopteryx*. Further investigations should yield a clear placement for *Archaeopteryx*, although McLain et al. (2018) stated they suspect it will turn out to be in the Dromaeosauridae + Troodontidae created kind.

CONCLUSION

Feathered dinosaurs are a part of God's creation, but a dinosaur with feathers does not mean that birds evolved from dinosaurs. As creationists, we can be hesitant to point out similarities between different groups of creatures, but we need not be. Such hesitancy can be due to a number of factors – incomplete evidence, ignorance of evidence, etc. – but one factor that should not play a role in hesitancy is fear. Some people are afraid that if we admit that some dinosaurs had feathers, then we are giving evolutionists a victory. But if God is the one who created some dinosaurs with feathers, then he is the one who gets the glory when we display his wonders. We have nothing to fear from investigation into fossils, biological change, or earth history because we know

Coelurosauria						Compsognathidae	Multiple Holobaramins?
	Tyrannosauroidea					*Dilong*	?
						Proceratosauridae	?
						Other tyrannosauroids Tyrannosauridae	Holobaramin
	Maniraptoriformes	Ornithomimosauria				*Nqwebasaurus*	?
						Deinocheiridae Ornithomimidae	Holobaramin
		Maniraptora	Alvarezsauroidea			*Haplocheirus*	?
						Alvarezsauridae	Holobaramin
			Therizinosauria			*Falcarius*	?
						Jianchangosaurus	Holobaramin
				Therizinosauroidea		Therizinosauridae Alxasauridae	
			Pennaraptora	Oviraptorosauria		Caudipteridae Caenagnathidae Oviraptoridae	Holobaramin
				Paraves		Scansoriopterygidae	Holobaramin
						Troodontidae Dromaeosauridae	Holobaramin
						Archaeopteryx	?
						Avialae	Multiple Holobaramins

Table 1. A list of feathered dinosaur clades and their baraminic status as determined by McLain et al. (2018).

that God exists and that his word is true. Rather than being fearful, suspicious, or condescending of scientific discoveries, we should be thrilled because God's wondrous works are being exposed with every new find. These kinds of discoveries are good because they keep us humble, and they challenge us to make sure our core assumptions are grounded in God's word.

ENDNOTES

1. Taxonomy is the science of classifying living things. Cladistics is a taxonomic method that uses physical or molecular characteristics to determine relatedness. In general, it is assumed that the more traits two organisms share, the more closely related they are. In cladistics, the animals we call birds nest within the group Dinosauria.
2. Modern birds have a short bony tail made up of fused vertebrae called a pygostyle.
3. Some living birds appear to have teeth in their jaws, but those are just serrations of the beak or bill.
4. The one exception is juvenile hoatzins (Opisthocomus hoazin), living birds found in South America, which have two clawed digits. They use these claws in climbing and lose them before they reach adulthood.
5. Melanosomes are pigment-producing structures found in some cells. They are a big part of what gives colour to animals.
6. Baraminology is a creationist classification method of studying the created kinds of creatures. Statistical baraminology uses software to locate statistically significant similarity and dissimilarity, which are usually interpreted as evidence for continuity and discontinuity, respectively.
7. In baraminology, the holobaramin is the grouping of creatures that are all continuous with each other and are discontinuous from all other living things.
8. A taxonomic rank above family and below order.

REFERENCES

Barrett, P.M., D.C. Evans and N.E. Campione. 2015. Evolution of dinosaur epidermal structures. *Biology Letters* 11, doi: 10.1098/rsbl.2015.0229.

Bergmann, U., R.W. Morton, P.L. Manning, W.I. Sellers, S. Farrar, K.G. Huntley, R.A. Wogelius and P. Larson. 2010. *Archaeopteryx* feathers and bone chemistry fully revealed via synchrotron imaging. *Proceedings of the National Academy of Sciences* 107:9060–9065.

Butler, R.J., P.M. Barrett and D.J. Gower. 2012. Reassessment of the evidence for postcranial skeletal pneumaticity in Triassic archosaurs, and the early evolution of the avian respiratory system. *PLoS ONE* 7, doi: 10.1371/journal.pone.0034094.

Feduccia, A., T. Lingham-Soliar and J.R. Hinchliffe. 2005. Do feathered dinosaurs exist? Testing the hypothesis on neontological and paleontological evidence. *Journal of Morphology* 266:125–166.

Godefroit, P., S.M. Sinitsa, D. Dhouailly, Y.L. Bolotsky, A.V. Sizov, M.E. McNamara, M.J. Benton and P. Spagna. 2014. A Jurassic ornithischian dinosaur from Siberia with both feathers and scales. *Science* 345:451–455.

Heilmann, G. 1927. *The Origin of Birds*. Witherby, London.

Huxley, T.H. 1868. On the animals which are most nearly intermediate between birds and reptiles. *Annals and Magazine of Natural History* 4:66–75.

Huxley, T.H. 1870. Further evidence of the affinity between the dinosaurian reptiles and birds. *Quarterly Journal of the Geological Society* 26:12–31.

Lingham-Soliar, T., A. Feduccia and X. Wang. 2007. A new Chinese specimen indicates that 'protofeathers' in the Early Cretaceous theropod dinosaur *Sinosauropteryx* are degraded collagen fibres. *Proceedings of the Royal Society of London Series B: Biological Sciences* 274:1823–1829.

Mayr, G., S.D. Peters, G. Plodowski and O. Vogel. 2002. Bristle-like integumentary structures at the tail of the horned dinosaur *Psittacosaurus*. *Naturwissenschaften* 89:361–365.

McLain, M.A., M. Petrone and M. Speights. 2018. Feathered dinosaurs reconsidered: new insights from baraminology and ethnotaxonomy, pp.472–515 in Whitmore, J.H. (ed.), *Proceedings of the Eighth International Conference on Creationism*. Creation Science Fellowship, Pittsburgh, Pennsylvania.

Nesbitt, S.J., R.J. Butler, M.D. Ezcurra, P.M. Barrett, M.R. Stocker, K.D. Angielczyk, R.M.H. Smith, C.A. Sidor, G. Niedźwiedzki, A.G. Sennikov and A.J. Charig. 2017. The earliest bird-line archosaurs and the assembly of the dinosaur body plan. *Nature* 544:484–487.

Ostrom, J.H. 1969. Osteology of *Deinonychus antirrhopus*, an unusual theropod from the Lower Cretaceous of Montana. *Yale Peabody Museum Bulletin* 30:1–165.

Ostrom, J.H. 1974. *Archaeopteryx* and the origin of flight. *Quarterly Review of Biology* 49:27–47.

Owen, R. 1863. On the *Archaeopteryx* of von Meyer, with a description of the fossil remains of a long-tailed species, from the lithographic stone of Solenhofen. *Philosophical Transactions of the Royal Society of London* 153:33–47.

Simons, L.M. 2000. Archeoraptor fossil trail. *National Geographic* 198:128–132.

Smithwick, F.M., G. Mayr, E.T. Saitta, M.J. Benton and J. Vinther. 2017. On the purported presence of fossilized collagen fibres in an ichthyosaur and a theropod dinosaur. *Palaeontology* 60:409–422.

Thomas, B. and J. Sarfati. 2018. Researchers remain divided over 'feathered dinosaurs'. *Journal of Creation* 32:121–127.

Wood, T.C. 2008. Baraminic distance, bootstraps, and BDISTMDS. *Occasional Papers of the Baraminology Study Group* 12:1–17.

Wood, T.C. and M.J. Murray. 2003. *Understanding the Pattern of Life: Origins and Organization of the Species*. Broadman and Holman Publishers, Nashville, Tennessee.

Yang, Z., B. Jiang, M.E. McNamara, S.L. Kearns, M. Pittman, T.G. Kaye, P.J. Orr, X. Xu and M.J. Benton. 2018. Pterosaur integumentary structures with complex feather-like branching. *Ecology and Evolution* 3:24–30.

AUTHOR BIOGRAPHY

Matthew A. McLain attended Cedarville University, where he received his BS in geology. He then moved to Southern California to pursue his PhD in earth sciences from Loma Linda University. He is currently Associate Professor of Biology and Geology at The Master's University. His research interests include vertebrate palaeontology, specifically projects involving dinosaurs and pterosaurs, and he has authored and coauthored several publications in peer-reviewed journals. He and his wife Jessica have four children: Alaric, Cody, Iris and Soren.