Dino-bird theory—a flight of fancy

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A review of the extensive literature covering the more popular theories of the evolution of birds was completed. Of the numerous theories proposed, all of them were found to be problematic, and for this reason most are now rejected by evolutionists. The most popular current theory, the evolution of birds from dinosaurs, was briefly reviewed, and also found to suffer from major problems, some of which were discussed. The major problem is the differences between birds and both reptiles and mammals, and the fossil record has not been of much help in solving this evolutionary problem. Nor have genetic or biochemical comparisons.

Birds (class Aves) are winged, feathered, bipedal, endothermic (warm-blooded), hard-shelled egg-laying vertebrates that have horny bills instead of teeth.[1] They are programmed to achieve complex activities, such as building intricate nests and singing elaborate songs. Of all higher lifeforms except humans and dogs, birds are arguably the most beautiful, melodious, admired, studied—and defended.[2]

All living bird species possess wings except the now extinct flightless Moa of New Zealand. Except ratites, penguins, and several diverse endemic island species, all birds are excellent flyers. Their entire anatomy and physiology is designed around their flight abilities. Bird design even includes an eloquently designed locking mechanism in their toes to insure that they do not fall off their perches while sleeping. Their navigational skills are unsurpassed in the animal world:

> "The amazing navigational skills shown by migratory birds are believed to result from tiny magnetic crystals set in the upper beak, creating a compass, combined with an astounding ability to memorize features of land and sky, such as star patterns."[3]

Their flying feats are astounding—falcons can fly as fast as 290 km/h (180 mph). Many bird species undertake annual long-distance migrations, and many more take shorter irregular journeys. Furthermore, their variety is enormous, with twice as many known kinds of birds as mammals.

Birds are among the most successful of all land animals, and the most varied of all known chordates.[4] The estimated 10,000 living bird species inhabit every known ecosystem from Arctic to Antarctic, including desert, temperate, and tropical lands. Furthermore, this enormous variety extends all the way back to the origin of birds.[5]

Evidence for bird evolution

The most common theory of bird evolution is that birds resulted from "the culmination of a long process of development. For millions of years this process has been going on, building up in the race for perfect mastery of the air."[6]

Thomas Henry Huxley first proposed in the 1800s that birds evolved from some dinosaur-like creature, because he noted that the bone structure of a small rooster-sized dinosaur called compsogna and the *Archaeopteryx* (figure 1) were very bird-like. He also noted that the skeleton of certain modern birds, such as ostriches, looked remarkably similar to many dinosaur skeletons (figure 2).[7]

In spite of skeletal similarities, this theory, and the entire field of the "origin of birds and avian flight … has been among the most contentious issues in paleobiology".[8] Furthermore, "the evolutionary history of birds has long been an enigma. Ever since a single fossil feather was dug up 150 years ago, the origin of birds has been one of biology's most contentious issues."[4]

The origin of birds is one of the most problematic fields in evolution for reasons that include a complete lack of uncontested fossil evidence except that of the very controversial *Archaeopteryx* and the protoavis (meaning 'first bird') discovered by Sankar Chatterjee in 1984.[9] Protoavis, which Chatterjee described as a modern crow-like 35-cm-tall bird, is regarded by its supporters as "much more closely related to modern, neornithine birds than is *Archaeopteryx*".[10] Chatterjee interpreted his fragmentary remains of a Late Triassic specimen to be from a single animal that lived in what is now Texas, that he estimates c 210 Ma ago. The fossils were believed to be a primitive bird, which, if the identification is valid, would push back avian origins, according to evolutionists, some 60–75 Ma.

Though it existed far earlier than *Archaeopteryx*, its skeletal structure appears more bird-like with teeth on the tip of its jaws and eyes located at the front of its skull, indicating a nocturnal or crepuscular lifestyle. A recent re-evaluation has convinced most paleontologists that Protoavis is not a bird, and that all the remains did not come from a single species. Its fossils were found in a jumbled cache of disarticulated bones that indicate mass mortality following

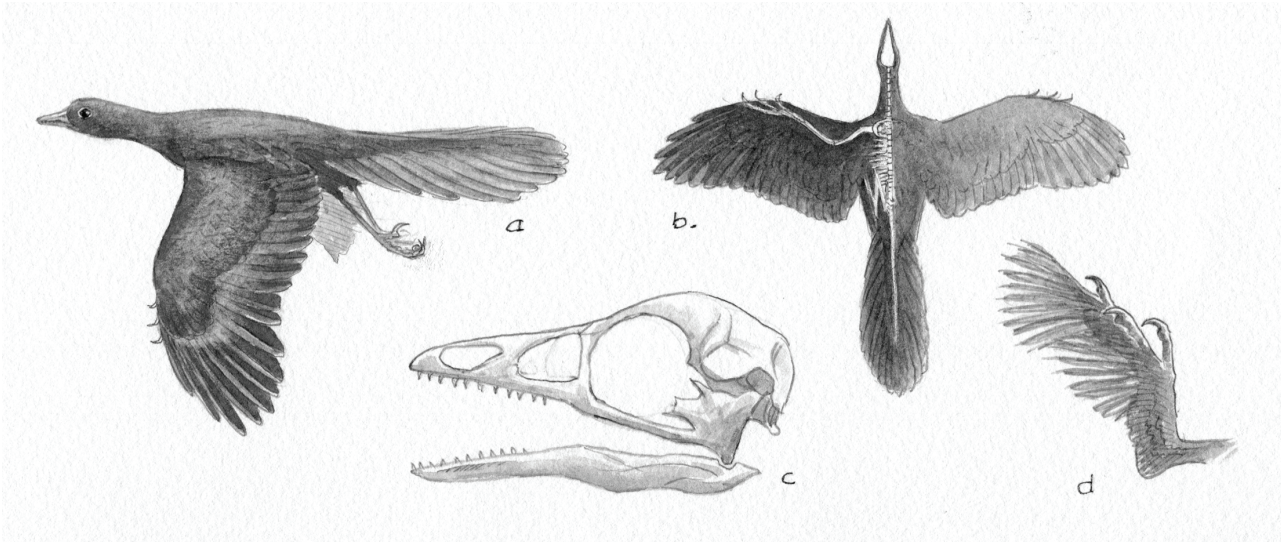

Figure 1. *Archaeopteryx lithographica* [AL] reconstructions by Philip Snow: (a) AL; (b) AL after Reitschel (from Shipman, P., *Taking Wing*, 1998); (c) AL skull reconstruction after Martin, L. and Buhler, P.; (d) Wing claws of modern Hoatzin juvenile.

a flash flood. As a result *Archaeopteryx* "stands alone in the fossil record of birds of the end of the Jurassic period".[11] *Archaeopteryx* origin theory is also problematic:

> "*Archaeopteryx* has always been considered to be the most primitive as well as the most ancient bird. Yet its strange mix of traits—the teeth, legs, claws and tail of a dinosaur but the wings and feathers of a bird—continues to raise doubts about its true affinities. Recent discoveries have only added to the enigma."[4]

After the "discovery of *Archaeopteryx*, no other reptile-bird intermediates were found for many years, leaving a gaping hole between modern birds and their ancestors".[12]Although Coyne claims that a "spate of astonishing discoveries from China began to fill in the gap", none of these discoveries actually fill in this enormous gap. Almost all examples that Coyne lists of so-called proto-feathered dinosaurs, or putative feathered dinosaurs, have been refuted or questioned because the research

> "… findings show no evidence for the existence of protofeathers and consequently no evidence in support of the follicular theory of the morphogenesis of the feather. Rather, based on histological studies of the integument of modern reptiles, which show complex patterns of the collagen fibers of the dermis, we conclude that 'protofeathers' are probably the remains of collagenous fiber 'meshworks' that reinforced the dinosaur integument. These 'meshworks' of the skin frequently formed aberrant patterns resembling feathers as a consequence of decomposition. Our findings also draw support from new paleontological evidence."[8]

The fossil record

The major problem for evolutionists is, "of all the classes of vertebrates, the birds are least known from their fossil record".[13] Of the many bird and other fossils discovered so far, none help to bridge the enormous gap between birds and any theorized ancestors. Many bird fossils are extinct birds, some very different from modern birds, but all appear in the fossil record as fully formed birds. A large chronological and phylogenetic gap even exists between the so-called first bird, *Archaeopteryx*, and the life-forms postulated to be the key to avian origins that cannot be explained away by the putative feathered dinosaurs.[10]

Another problem is that not much weight "can be placed in single fossil elements or bone fragments that have so frequently been described from both the Cretaceous and early Tertiary: regretfully, many must simply be ignored".[14] Unfortunately, many ancient birds consist only of fragmentary evidence.

The lack of fossil evidence for bird evolution is often explained by postulating an extraordinarily explosive evolution of birds, one that produced all living orders within a "short time frame like the Cambrian explosion".[15] So, the "tremendous diversity of early avian" animals documents an avian evolutionary explosion similar to the Cambrian explosion. Therefore, the origin of birds has stirred "intense, nearly century-long, controversies".[16]

One very early theory postulated birds that evolved from dinosaurs, but fell out of favour with Professor Heilmann's 'hugely influential book' in 1926, which argued birds "evolved from a primitive archosaur reptilian group which also gave rise to dinosaurs, pterosaurs and crocodiles".[17]

A classic 1935 book on birds concluded that it is "among the reptiles that we must look for the origin of birds in the fossil record."[6] Therefore it is among the reptiles that, for the past century and a half, evolutionists have looked for evidence of bird evolution without finding any valid evidence for bird origins, although some debated evidence has been found, such as the dinosaur proto-feathers noted above.

The Aymar text includes *Archaeopteryx*, *Archaeornis*, the dodo, and others, but admits no good evidence exists for bird evolution. No significant progress has been made on bird evolution since 1935, although Whetstone and Martin claim that a recent upheaval in bird evolution theory has occurred:

> "During the period 1926–73 most ornithologists and vertebrate palaeontologists supported Heilmann's theory of avian origins. Heilmann argued that all dinosaurs and pterosaurs were too specialized to have been ancestral to birds. Instead he chose to derive birds directly from a primitive group of Triassic archosaurs, the Pseudosuchia. Heilmann's theory has recently been challenged by Walker, who has suggested that birds evolved from an early crocodilian, and by Ostrom, who argued that birds descended from theropod dinosaurs."[18]

Currently, the most popular theory is that birds evolved from a theropod dinosaur during the Jurassic period, estimated by evolutionists to be about 150 to 200 Ma ago. Many paleontologists regard birds as the only dinosaur clade to have survived the Cretaceous–Tertiary extinction event, dated by evolutionists approximately 65.5 Ma ago. Colbert writes:

> "It has long been evident that birds are descended from archosaurian reptiles, and for many years it was thought that they had a theocodont ancestry … . Thus, in one sense, dinosaurs did not become completely extinct because one line of theropods evolved into all the birds alive today."[19]

Colbert adds that although the "majority of workers today hold the view that birds are descendants of theropods" other paleontologists have concluded that

> "… the similarities between birds, especially *Archaeopteryx,* and small theropods are the result of convergent evolution in the two lineages from a common ancestor that was an advanced ornithosuchian thecodont. In this minority view, theropods and birds are not ancestor and descendant, respectively, but rather are sister groups that evolved from the same ancestor group."[19]

The main evidence for the conventional view of dinosaur-bird evolution are the commonalities between birds and certain dinosaurs, such as similarities in bone structures existing at both macroscopic and microscopic levels. Major problems include the many anatomical and size differences, and the fact that both dinosaur and bird fossils are commonly found together in the fossil record, but no set of existing fossils show a set of intermediate transitional forms.

Figure 2. Imagined comparisons of flightless bird with dinosaur, reptile, and 'ancient birds': (a) Ostrich; (b) Hadrosaur; (c) coelurosaurus (gliding reptile); (d) Protoavis; (e) *Archaeopteryx lithographica*.

From which dinosaur did birds evolve?

The controversy about bird origins also questions whether they evolved from dinosaurs or from more primitive archosaurs. Researchers disagree about whether ornithischian or theropod dinosaurs were more likely to be the ancestors of birds because little or no evidence of fossil transitions exists to support either theory. Although ornithischian (bird-hipped) dinosaurs share the basic hip structure of modern birds, the saurischian (lizard-hipped) dinosaurs have more similarities to birds, thus are more widely accepted as the bird ancestor.

Therefore some evolutionists argue that birds must have evolved their ornithischian hip structure independently of dinosaurs, yet postulate them to have evolved at least three separate times, finally among a group of theropods known as the Therizinosauridae. Other ornithologists argue, based on fossil and other evidence, that birds are not dinosaurs, but evolved from some early archosaur such as Longisquama.

The 1913 discovery of the small carnivorous animal *Euparkeria*, the best-known member of the pseudosuchians, seemed to solve the mystery of the origin of birds. It had a collarbone, and could run either bipedally or on all fours, and had lived earlier than any known fossil bird.[20] The *Euparkeria* origins theory became so well accepted that "for over fifty years the problem of the origin of birds was thought to be solved".[20]

The theory hypothesized that pseudosuchians were the ancestors of not only birds, but also pterosaurs, dinosaurs, and, later, archosaurs.[21] That theory was not seriously questioned until the 1970s; since when a dozen or so theories of bird origins have been advanced, all of which have good reasons why they cannot be scientifically valid. Feduccia *et al.* write that before

> "… the 1970s birds and dinosaurs were thought to have shared a common ancestry through Triassic basal archosaurs, often collectively termed thecondonts, characterized by the Triassic *Euparkeria*. But with John Ostrom's discovery of the bird-like Early Cretaceous *Deinonychus*, the dinosaurian origin of birds gained ascendancy as the reigning dogma, based on overall similarity of this newly discovered dromaeosaur to birds and *Archaeopteryx*."[8]

Challenging the *Euparkeria* hypothesis was an idea proposed in 1972 that birds evolved from crocodylomorphs (animals similar to crocodiles). Based on comparisons such as the ear region of living birds and crocodiles, and also that of fossil reptiles and dinosaurs, Whetstone and Martin rejected the dinosaurian ancestry for birds, concluding that these "advanced features in the ear region support a common ancestry for crocodiles and birds, independent of both saurischian and ornithischian dinosaurs".[21]

The crocodylomorph that birds were considered to be most closely related to was the sphenosuchus. Although the external morphology of crocodylomorphs and birds were very different, they possessed a number of critical skull similarities, including teeth shapes, ear region details, jawbone attachment system and skull cavity design.[22] The theory soon lost favour, mostly because too many major differences in external morphology exist, and a new, more plausible discovery, deinonychus, came along.

Deinonychus as the link to birds

A fourth theory is that birds evolved from Coelurosaurs, then into Ornithurines (which include *Ichthyornis*, *Hesperornis*, *Hongshanornis*, and *Gansus*) and, ultimately, into modern birds, a theory that Cusack admitted had "great gaps".[23] Other paleontologists concluded that birds evolved from pterosaurs based on the many structural similarities they share with birds.[24]

Others concluded that birds could not have evolved from any type of dinosaur because dinosaurs were "too specialized to have been the ancestors of birds".[24] Other problems with the dinosaur-bird theory include the fact that many major structural differences exist between them—birds have wishbones and most all dinosaurs and pterosaurs do not even possess collar-bones. This exemplifies the clear limitations of using morphology as a basis for postulating evolutionary ancestry.

Another theory postulates that birds evolved from a small coelurosaurian dinosaur called compsognathus,[25] a small (rooster-sized) theropod saurischian dinosaur that Huxley first discussed. Although bipedal with bird-like legs, it definitely was lizard-like. Compsognathus was largely selected as an ancestor of birds because it is physically the closest known extinct animal to birds. Coelurosaurs and Ornithurines both were judged to be "more advanced in design than their contemporary 'cousins'" and also had some 'primitive' traits like *Archaeopteryx's*, such as wing claws. Actually, the fossil record shows that most birds have a combination of so-called primitive and modern traits. As a result, a term now

> "… consistently used by researchers in regard to the pattern of evolution [of birds] is 'mosaicism'. It pretty much discards the long held dream of finding a direct ancestral line, since progress over many tens of millions of years seems to have come in tiny spurts across a huge variety of experiments. It may be that identifying sister groups is as close as can ever be achieved."[26]

As Witmer noted, some theories about bird evolution "came and went quickly" and the next in vogue concerned a small theropod saurischian called Deinonychus.[22] This

animal was "very closely related to Velociraptor".[27] Support for this theory included the fact that Deinonychus, although very different from most modern birds, possessed a number of critical similarities to Archaeopteryx, including number and shape of the snout openings, position of the teeth, number of fingers, comparative sizes and shape of the wrist bones and phalanges, hip bone arrangement, and foot and ankle structure similarities.[28]

Although *Deinonychus* is more similar to birds than to other dinosaurs, it still is very different than birds.[29] Other candidates are even more different. Nonetheless, the *Deinonychus* theropod-like dinosaur ancestor of birds theory is now the most widely accepted view in spite of many problems and disagreements.

One reason for disagreement is because other theropod dinosaurs, such as *Troodon*, are even more similar to birds; although arguments for *Troodon* include that *Deinonychus* has "certain skull traits closer to birds, and lacks the many bird-like features of *Deinonychus*."[30] The major problem with this theory of bird origins is that "nearly all of the birdlike theropod dinosaurs appeared later in time than the first bird, *Archaeopteryx*".[31]

The ancestor of birds should not be younger than its descendants. Evolutionists deal with the problem by assuming *Troodon* and *Deinonychus*, or both, are descendants of the common ancestor of *Deinonychus*, *Troodon*, and birds. However, no fossil evidence exists for this view. A second theory is that both *Troodon* and *Deinonychus* evolved from birds, a subject treated below. A third theory is that both the *Troodon* and *Deinonychus* theories are wrong and all of the bird-like traits in these animals evolved separately and do not provide evidence for evolution.

The argument for the origin of birds by *fiat* creation

The last theory presented here is that birds and theropods were created separately and did not evolve. This explanation best fits the fossil record and all of the other known facts. One is the enormous gap between birds and dinosaurs because

> "… over the decades researchers who doubted the dinosaur-bird link also made good anatomical arguments. They said dinosaurs lack a number of features that are distinctly avian, including wishbones, or fused clavicles; bones riddled with air pockets; flexible wrist joints; and three-toed feet. Moreover, the posited link seemed contrary to what everyone thought they knew: that birds are small, intelligent, speedy, warm blooded sprites, whereas dinosaurs—from the Greek for 'fearfully great lizard'—were coldblooded, dull, plodding, reptile-like creatures."[31]

Since detailed evidence of dinosaur anatomy is lacking, comparisons are in some ways very problematic. Comparing skeletons of extant and extinct animals provides only conflicting theories of bird evolution. Although fused clavicles have been found in some dinosaurs, major differences between birds and dinosaurs remain. Many evolutionists continue to hope to find fossils that provide conclusive evidence for one of the proposed theories, but after almost two centuries of looking, and billions of fossils uncovered, they're still hoping![32] Witmer concludes that many of the clues to bird evolution

> "… point to different and conflicting stories. *Deinonychus* does indeed resemble the Jurassic bird *Archaeopteryx*. But what about *Troodon*? What about *Protoavis*? And what about the 'time problem?' Where are the Jurassic relatives of *Deinonychus* and *Troodon*, if they existed at all? These questions still need to be answered. There are points of agreement, however. The ancestor of birds was probably a small theropod dinosaur, probably resembling *Deinonychus*."[33]

Problems with the dinosaur-bird theory

Although many paleontologists accept dinosaur-bird descent theory, a wide variety of bird forms from the Cretaceous Period have caused major problems in the theory. John Ruben, of Oregon State University, wrote, "When interpreting the Paleobiology of long extinct taxa, new fossils, and reinterpretations of well-known fossils sharply at odds with conventional wisdom never seem to cease popping up."[16] Ruben added that

> "… it would have been quite possible for birds to have evolved and then, at some point, have various species lose their flight capabilities and become ground-dwelling, flightless animals—the raptors. This may be hugely upsetting to a lot of people, but it makes perfect sense."[34]

Another problem is that millions of fossilized bird tracks have been found alongside dinosaur foot tracks in many parts of the world, precluding their evolution from dinosaurs.[35] Evolutionists cite this as compelling evidence that birds and dinosaurs have a common ancestor.

An unusual fossil discovered in 2003 called 'microraptor' also caused major questions about the dinosaur-to-bird evolution theory. Three-dimensional models were used to study its flight potential, concluding this small-feathered species must have been a 'glider' that jumped from trees. A 1915 drawing by naturalist William Beebe shows one theoretical view of early birds bearing a striking similarity to a fossil discovered in 2003 that is raising major doubts about the theory that birds descended from ground-dwelling theropod dinosaurs.[36]

University of Kansas scientists recently examined a fossil bird that had feathers on all four limbs, thus somewhat resembling a biplane.[37] Glide tests have determined that it would have been impractical for it to have flown from

the ground up, but it could have glided down from trees somewhat like modern-day flying squirrels.

Many researchers have long believed that some type of glider, and not a tetrapod dinosaur, was the ancestor of birds. In contrast, if birds descended from theropod dinosaurs, a great lineage of ground-dwelling meat-eaters with strong hind legs and short forelimbs must have existed, a lineage for which no evidence has been located.

The level of speculation involved in bird evolution is indicated by one expert who noted that the dinosaur-bird "model was not consistent with successful flight from the ground up, and that makes it pretty difficult to make a case for a ground-dwelling theropod dinosaur to have developed wings and flown away". The new research

> "… is consistent with a string of recent studies that increasingly challenge the birds-from-dinosaurs theory … . The weight of the evidence is now suggesting that not only birds did not descend from dinosaurs, but that some dinosaur species may have descended from birds. We're finally breaking out of the conventional wisdom of the last 20 years, which insisted that birds evolved from dinosaurs. This issue isn't resolved at all."[33]

But if dinosaurs evolved from birds, where did birds come from? The conclusions of almost 20 years of research at Oregon State comparing birds and dinosaurs is much more consistent with the view that birds had an ancient common ancestor with dinosaurs, but evolved separately along their own path and not from dinosaurs.

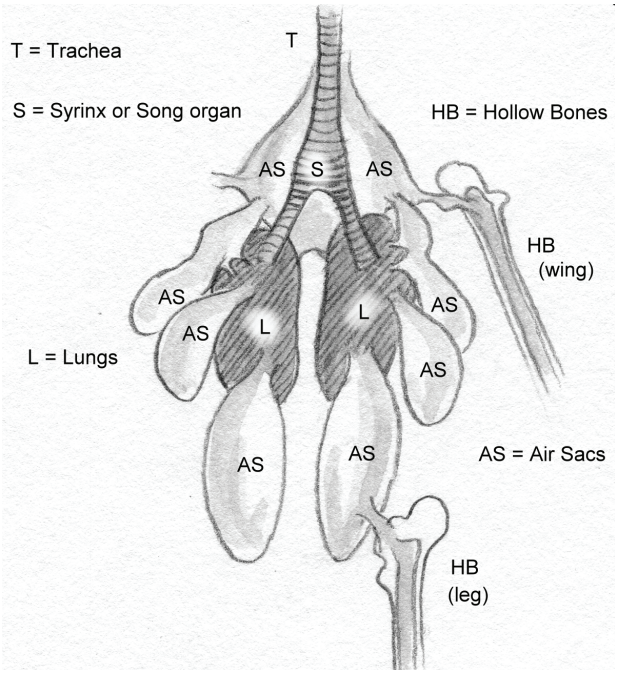

Figure 3. Modern bird's respiratory system, simplified.

This view postulates that, after millions of years of separate evolution, raptors evolved from birds. Support for this is mainly the idea that raptors "look quite a bit like dinosaurs but they have much more in common with birds than they do with other theropod dinosaurs such as Tyrannosaurus [Rex]".[33]

The researchers concluded that raptors, which are considered dinosaurs, were "actually descended from birds, not the other way around. Small animals such as velociraptor that have generally been thought to be dinosaurs are more likely flightless birds."[34] Other studies have raised similar doubts.[38]

Anatomical differences between birds and non-birds

A major problem in determining what non-bird animal birds evolved from is the chasm that exists between birds and all other animals. One example is that birds are highly adapted for flight, including birds' unique digestive and respiratory systems, their high metabolic rate, and lightweight, but very strong, skeleton. In some ways birds are more similar to mammals than reptiles. For example, in contrast to reptiles, birds have a four-chambered heart like mammals.

Among the other radical changes required to convert a reptile into a bird is reptiles' bellow lungs, similar to mammals', which must be converted into a bird tube lung. Mammal lungs draw air into tiny sacs called alveoli where red blood cells extract oxygen and allow carbon dioxide to be exhaled out of the same pathway that air travelled into the lungs.

In contrast, birds have a unique and elaborately complicated system of air sacs involving the head and neck sinuses and air sacs in the thorax designed to insure that air flows in one direction through special tubes in the lung system called parabronchi (figure 3). Blood moves through the lung's blood vessels in the opposite direction, allowing very efficient oxygen uptake. This superior engineering design allows birds to conserve the energy normally used for breathing.

How the 'bellows' lung system of mammals and reptiles could have gradually evolved into avian lungs has baffled evolutionists for generations because all hypothetical intermediate stages were non-functional, and therefore the animal could not breathe during the transition. Natural selection would preserve the existing reptile arrangement and eliminate any misfit intermediates required to evolve the modern respiratory bird system. The fact that the design of the avian respiratory system is extremely similar in all birds is evidence that bird-reptile transitions are not even remotely feasible.[39]

Assuming that a theoretical series of functional intermediate stages could be constructed, natural selection alone could not drive the bird gas exchange evolution because bats manage very well with bellows-style mammal lungs. This indicates that flying birds could also function fairly well with bellows-style lungs. There would thus have been no major selective advantage in replacing the reptilian lung design with a new, radically different, respiratory system.

Although the avian lung's super-efficient design is especially advantageous at very high altitudes where low oxygen levels exist—some species can hunt at altitudes of over 2 miles (3 km) high—the fact that bats do very well at low altitudes indicates that only a minor, if any, selective advantage exists for the bird system, at least at lower altitudes.

Another major difference between reptiles and birds is that reptiles are cold-blooded and birds are warm-blooded. Aymar speculates that this evolution occurred as follows:

> "From the cold-blooded, sluggish reptile this increased activity of climbing, gliding and finally flapping, changed it into a warm-blooded animal. The feathers acted as insulation to protect it from the cold."[40]

Other differences include that bird and dinosaur bones are very different. For example, theropods lacked collarbones (clavicles), which fuse together to become the wishbone (furcula) in birds. Heilmann (1926) argued that if this feature were lost it would have to have re-evolved at a later date—a very unlikely scenario— thus theropods could not be the ancestor of birds.[41] Yet another contrast between birds and dinosaurs is the enormous size difference. The average modern bird is about the size of the average dinosaur heart. Learning to fly is yet another major problem for the bird-to-dinosaur evolution theory.[42]

The biochemical evidence

Evidence derived from DNA hybridization and other biochemical studies disagrees with the current fossils-based phylogeny of birds. For example, the results of biochemical research for totipalmate birds (pelicans, boobies, gannets, cormorants, anhingas, frigatebirds, and tropicbirds), has produced a conclusion rejected or greeted with surprise by ornithologists, namely that DNA comparisons indicate that *Pelecanus* is the sister group of the Shoebill (*Balaeniceps rex*) and that the frigatebirds are part of the *Procellarioidea*, which also includes penguins, albatrosses, petrels, and loons. The evolutionists speculate that tropicbirds appear to be descendants of an ancient evolutionary divergence, which makes them a sister group of a large group of aquatic birds, including the other totipalmate taxa.[43] As more biochemical and genetic research on birds is completed, no doubt the conflicts with the fossil record will continue to create major problems for evolutionists.

Conclusions

An enormous unbridgeable gap, both fossil and morphological, exists between birds and all other animals. The earliest-known bird, *Archaeopteryx*, has been dated back to the Late Jurassic, around 150–145 Ma ago, by evolutionists. Fossil and other evidence is clear: "evolutionary change in avian morphology primarily occurs in terms of minor size adjustments, while changes in shape are very rare".[44]

The evolution of birds has stymied Darwinists since 1859 and still is a major problem. It is clear that "morphological change in birds in general consists of changes in growth such that species become larger or smaller than their ancestors but reclaim their ancestral shape".[45] It is also clear that "many points [of evolution] are still under fierce contention and a lack of fossil material leaves some enormous blank spots".[46] Feduccia *et al.* note, although much heated debate exists, their conclusion "that birds are derived from within the archosaurian assemblage: whether birds are derived from 'dinosaurs' depends largely on how one defines the Dinosauromorpha".[8] As Ruben wrote:

> "When interpreting the paleobiology of long extinct taxa, new fossils, and reinterpretations of well-known fossils, sharply at odds with conventional wisdom never seem to cease popping up. Given the vagaries of the fossil record, current notions of near resolution of many of the most basic questions about long-extinct forms should probably be regarded with caution. Even major aspects of the paleobiology of intensely studied, recently extinct taxa … remain unresolved … . Little wonder then that so fascinating a subject as the origins of birds and bird flight, both of which almost surely occurred more than 150 million years ago, have stirred such publicly visible and intense, nearly century-long, controversies."[16]

The claim by some evolutionists, such as Chiappe, that "the century-old debate on bird ancestry has largely been resolved" is false—he argues for the maniraptoran theropod theory against all of the other theories noted in this review.[47] More accurate is the observation by evolutionist Professor Lawrence Witmer that "we will probably never be lucky enough to find the fossils of the true ancestor of birds".[48] The extant fossil, DNA, and other evidence reveal that the first bird was a bird, and no evidence exists to support the idea that birds evolved from reptiles or any other non-bird animal. The attempts to document the evolution of birds is a long history of discontinuities and reversals and scientists are no closer to the answer today then we were at the time of Darwin.[49]

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