

Some Predictions of Evolution

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I'm in the middle of an article on pesticides, so I thought I would revise some information I collected as part of a private debate on religion. This is specifically around very specific predictions (of what scientists would discover) made by evolution that have been "fulfilled". While technically not *proof* that evolution is true, they are *strong evidence* which increases the likelihood of it being a correct theory. It is *only* negative predictions that can really disprove a theory. And any honest theory should contain those negative predictions.

I want to add that the original pointers for most of these was found on other sites (especially talk.origins [here](#) and [here](#) and [here](#)). Talk origins have tons more of these predictions, I just picked the ones I found particularly interesting and fleshed them out with additional explanations and sources.

Jaw to Ear Transition

In 1837, C.B. Reichert (who was a Creationist, but not much choice on those pre-Darwinian days), observed that when pig fetuses were growing, there was a point at which a portion of the jawbone detaches to become the tiny bones of the middle ear, which he found quite remarkable. Once we had a theory of evolution, one of its early predictions was that there should exist a fossil between reptiles and mammals that essentially has two separate jaws, one of which was smaller and near the ear. When fossils of early *cynodonts* were found, specifically the *Diarthrognathus* ("two-jointed jaw"), this prediction was found to be true. This is [described better by Stephen Jay Gould](#) in his book *Eight little piggies: reflections in natural history*.

Trilobite Precursors

Darwin [predicted that precursors to trilobites](#) should be found in pre-Cambrian fossils, honestly acknowledging that a lack of such would be bad for the theory (Darwin 1872 ¹). Despite what a

¹Darwin, Charles. "The origin of species by natural selection". Odhams Press Limited. 6th ed. 1872. pp338

(presumably outdated) [anti-Darwin site](#) would like to believe, [precursor fossils have been found](#), even in the scant fossils that exist pre-Cambrian (Gon 2009 ²). The evidence is admittedly not 100% certain, but nothing can be.

Long-tongued Moth (1862-1903)

This is one of my absolute favorites. [Darwin predicted in 1862](#), from observation of the Madagascar Star orchid, that there should exist a species of moth with a tongue a bit less than 30 cm (specifically “between 10 and 11 inches”) (Darwin 1862 ³). At the time, one with a tongue that long had not been discovered. However, evolution predicts a battle between the orchid and moths in an “arms race” to get/deny nectar without proper “payment” (in the form of pollination in this case). In 1903, A hawk moth with a tongue around 300mm was discovered, from the species known as [Xanthopan morgani](#) (the one pictured below only has a 7 inch tongue, but demonstrates the point I think) (Wikipedia 2010 ⁴)



Archaeopteryx Teeth (1872-1877)

When the first Archaeopteryx (a sort of intermediary between reptiles and birds) fossils was found, the head was not in good shape and had no teeth. Then [when Ichthyornis and Hesperornis were found](#) in 1872, they were determined to be seabirds, but they retained teeth (Huxley 1872

²Gon III, S.M. “Origins of Trilobites”. Updated Jan 22, 2009. Accessed Nov 10, 2010. <<http://www.trilobites.info/origins.htm>>

³Darwin, Charles. “On the various contrivances by which British and foreign orchids are fertilised by insects”. Harvard University. 365 pages. pp. 198

⁴Wikipedia contributors. “Xanthopan morgani.” *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 9 Nov. 2010. Web. 11 Nov. 2010.

⁵). The early evolutionists of the time, specifically Henry Woodward of the British Museum, predicted that [that the archaeopteryx should also have had teeth](#) since reptiles had teeth, and birds descended from them. Woodward recognized the controversy of his proposal, putting words to it: *“But, it may be urged, ‘your proposition that the Archaeopteryx had teeth is a pure assumption. Show me some evidence of a fossil bird whose head and skeleton are in juxtaposition so as to leave no reasonable doubt of their unity’”*. (Woodward 1875 ⁶)

But if the Archeopteryx *didn't* have teeth, that was a problem for evolution.

In 1877, more intact Archaeopteryx fossils were found... with teeth. It is now accepted (even among Creationists) that the Archaeopteryx had teeth. And Archeopteryx would have had teeth whether or not we thought it should. The point is, evolutionary theory virtually *demand*ed that it, and the prediction held out.

Antarctica, and its fossils (1893-1982)

Believe it or not, we didn't always know Antarctica existed. In 1893, [H.O. Forbes presented a paper](#) at the Royal Geographic Society in which he discussed his findings in the Chatham Islands. He (and other naturalists) predicted that there should have existed a large sub-tropical southern continent:

“Taking these fresh facts into consideration, he marshals all the data which he considers prove a strong case for the probability of the existence of a former southern continent, and he sketches on a map of the Southern Hemisphere what he believes was the configuration of Antarctica, as he has named that vanished continent. He believes that it followed nearly what is the 2,000-fathom line, and extended northward from a circumpolar area, by broad extensions, one to join an old New Zealand continental island (including the Antipodes, the Maquarries, New Zealand, the Chatham, Lord Howe, Norfolk, the Kermadec, and the Fiji Islands); another to East Australia with Tasmania; another to the Mascarene and surrounding islands (the Lemuria of Sclater); perhaps one to South Africa, and, lastly, one to South America. The form of this continent would not interfere with the opinions expressed by many authorities in the permanence of the great ocean basins.” (Editors 1893 ⁷).

Viewing the article, you can see that it was not just about a single bird, but actually a wide variety of species whose distribution only made sense in light of there being this continent. At this time Antarctica had been spotted, but was seen as just being ice shelves. Additionally, at this

⁵Huxley, TH. “Prof. Huxley's lectures on the evidence as to the origin of existing vertebrate animals”. Nature. Volume 13. 1876. p.515

⁶Woodward, H. “Birds with teeth”. The Popular Science Review. 14(57). 1875. 337-350.

⁷Editors. “Antarctica: A Supposed Former Southern Continent”. Natural Science, vol. 3. July 1893. pp54-57 (summary of paper by H.O. Forbes)

time scientists were just starting work on the idea of prior large connected continents that broke up over millions of years. In any case, Antarctica was obviously finally discovered.

One of his examples was “Marsupials - *Nototherium*, *Diprotodon*, *Thylacoleo*, *Thylacinus* in Australia ; *Prothylacinus*, *Amphiproviverra* in Patagonia.” There were obviously not going to be live marsupials extent in the current Antarctica, but it stood to reason that there should be fossils from the Mesozoic era.

These were found in 1982, [with Polydolops](#). It was a 9-foot marsupial (Woodburne 1984 ⁸)

No doubt you can find papers for all the other fossils that were predicted to exist.

Flying Insects with Hemocyanin (2003)

The theory of evolution held for a long time that flying insects evolved from gilled crustaceans (Burmester 1996 ⁹). Those crustaceans use a protein known as [hemocyanin](#) to circulate oxygen. Evolutionary theory would hold that there should be still be remnants of that in some flying insects, but none had been found. In 2003, scientists discovered a type of [stonefly](#) (generally considered to be some of the most “primitive” of insects, which makes sense) which [still had functional versions of that protein](#) (Hagner-Holler 2004 ¹⁰). This is discussed more fully in an [article by James H. Marden](#) where he talks about the evolution of flight in aquatic insects (Marsden 2008 ¹¹).

Ancestral whale with teeth and baleen (-2008)

Currently there are two types of whales: those that have teeth, and those that have baleen to filter their food. None exist currently that have both. On the assumption that all whales must have descended from a common ancestor, it was predicted that there must have existed a whale that had both teeth and baleen at the point in time when the two diverged. Even today, baleen whales start with tooth buds that disappear (evidence that the toothed whale was first). Well, in 2008 this [transitional form was found](#) to have existed 24-28 million years ago, when baleen whales were splitting from toothed whales (Coyne 2010 ¹²).

⁸Woodburne MO, Zinsmeister WJ. "The First Land Mammal from Antarctica and Its Biogeographic Implications". Journal of Paleontology. Vol. 58, No. 4 (Jul., 1984), pp. 913-948

⁹Burmester T, Scheller K. Common origin of arthropod tyrosinase, arthropod hemocyanin, insect hexamerin, and dipteran arylphorin receptor. J Mol Evol. 1996 Jun;42(6):713-28.

¹⁰Hagner-Holler S, Schoen A, Erker W, Marden JH, Rupprecht R, Decker H, Burmester T. A respiratory hemocyanin from an insect. Proc Natl Acad Sci U S A. 2004 Jan 20;101(3):871-4. Epub 2004 Jan 8.

¹¹Marsden JH. “Evolution and Physiology of Flight in Aquatic Insects.” In: Aquatic Insects: challenges to populations. CABI 2008. pp230-248

¹²Coyne, JA. “Baleen whales: a lovely transitional form”. Accessed 11/11/2010. <<http://whyevolutionistrue.wordpress.com/2010/07/22/baleen-whales-a-lovely-transitional-form/>>

“Junk” DNA fingerprinting

“Junk” DNA can actually be used to predict (coming from a retrovirus) whether two seemingly-unrelated animals shared a common ancestor. Or, to put it another way. When we know that two species are related, we can predict whether or not they will share certain sequences of “junk” DNA. For example, There is a particular sequence found in hippos, whales and cows but not in humans, mice, kangaroo, elephants or horses. This would lead to conclusion that there was a common ancestor that split off and shared by hippos, whales and cows (which is true). And based on this theory, they should be able to find this same set of “junk” DNA in deer, but **not** in monkeys. Incidentally, finding this particular “junk” DNA in monkeys would actually be a point *against* evolution, since the retro-virus that caused it came after the ancestor to primates. (Lindsay 2010 ¹³)

As another example, both guinea pigs and humans have a specific defect in the gene that encodes for Vitamin C processing, meaning that anything from guinea pigs up to humans should have that mutation (the math works out that that genetic divergence would have occurred approximately 20 million years ago) (Nishikimi 1988 ¹⁴). If this exact same “typo” (of the same letters) were found outside of the primate line from guinea pigs to humans, that would be a problem for evolution.

Conclusion

As I said at the beginning, strictly speaking none of these predictions actually *prove* evolution to be correct. But the fact that they were able to be made, and found true, might leave you pondering how that could be if it *weren't* true. Outside of evolution, there is no reason for many of them to be true, and certainly no reason to predict ahead of time for them to be true. Creationism is unable to make any predictions of this sort. Compare these with the predictions that Creationism/Intelligent Design attempts to make.

¹Lindsay, D. “Different species with the same ‘Junk DNA’”. Don Lindsay Archive. Updated 1/12/2001. Accessed 11/11/2010. <http://www.don-lindsay-archive.org/creation/dna_virus.html>

¹Nishikimi M, Koshizaka T, Ozawa T, Yagi K. Occurrence in humans and guinea pigs of the gene related to their missing enzyme L-gulonono-gamma-lactone oxidase. Arch Biochem Biophys. 1988 Dec;267(2):842-6.