

Summary

The large majority of American Christian youth abandon their faith while at college. A major factor contributing to this tragedy is ubiquitous and very aggressive teaching of evolutionary theory as scientific fact. Students are coercively indoctrinated to believe a series of visually persuasive iconic images - which are presented as evolutionary "facts". The famous monkey-to-man cartoon is such an icon. One of the leading iconic "proofs" of evolution now appearing in biology textbooks is a cartoon showing a land mammal morphing into a whale. The cartoon is supposedly based upon fossil evidences that conclusively prove that whales and dolphins evolved from a wolf-like land creature. Students trust the textbook cartoons and are quickly convinced. But by God's grace, there is strong evidence against this (and many other), evolutionary icons. Before they decide to turn away from their Maker, young people need to know that these very persuasive evolutionary visual images are misleading and are not scientifically honest. In this article we will address the alleged fossil evidence used in textbooks to support the whale evolution story.

Tales of “Walking Whales”

One of the standard "proofs of evolution" which is included in today's biology textbooks involves the evolution of a whale from a small wolf-like land mammal. Students are presented with a cartoon showing a series of apparent fossil intermediates, which are said to smoothly transition from a small wolf-like land mammal to modern whales. The textbook explanation of whale evolution is nothing short of remarkable. It is claimed that land mammals originally evolved from fish which made their way onto land to develop lungs as well as front and hind limbs. Then, certain mammals returned back to the seas to lose their hind limbs and acquire a host of new functions flawlessly suited for the oceans – in order to evolve into modern whales. This scenario is routinely represented in biology textbooks as a scientific fact – but how much of this is actually verifiable?

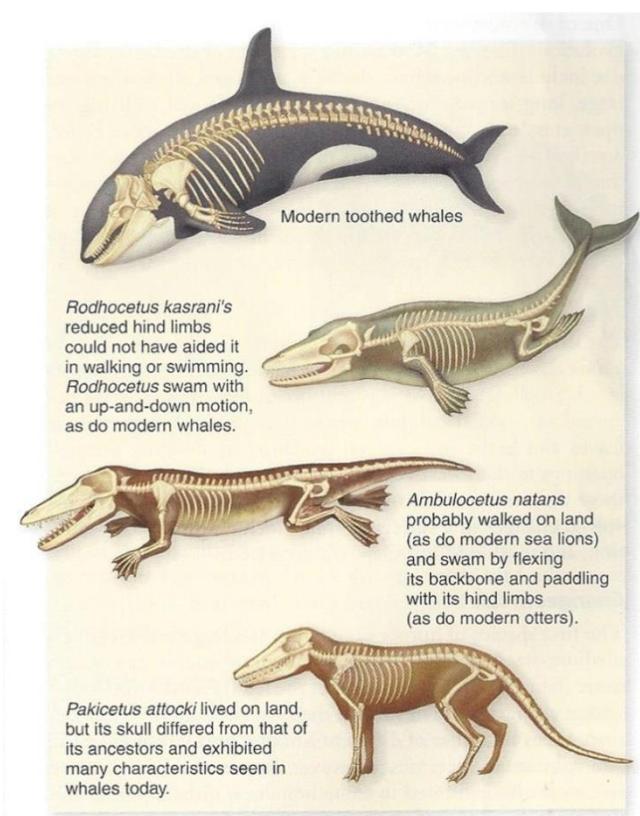


Figure 21.12 **Whale “missing links.”** The recent discoveries of *Ambulocetus*, *Rodhocetus*, and *Pakicetus* have filled in the gaps between whales and their hoofed mammal ancestors. The features of *Pakicetus* illustrate that intermediate forms are not intermediate in all characteristics; rather, some traits evolve before others. In the case of the evolution of whales, changes occurred in the skull prior to evolutionary modification of the limbs. All three fossil forms occurred in the Eocene period, 45–55 MYA.

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Figure 1: A common textbook representation of the whale evolution story, with three major transitional forms leading to modern toothed whales. The actual fossil remains are not shown.

Standard biology textbooks all show an artistic rendition of what appears to be an impressive series of fossil intermediates which connect marine mammals (“cetaceans” – including whales, dolphins, and porpoises), to a specific ancestral land mammal that lived approximately 50 million years ago (figure 1). For instance, McGraw Hill’s 2011 *Biology* textbook proclaims, “Today, the fossil record is far more complete, particularly among the vertebrates; fossils have been found linking all the major groups.... For example, a four-legged aquatic mammal was discovered only recently that provides important insights concerning the evolution of whales and dolphins from land-dwelling, hoofed ancestors.”[1] To support their claim, the authors use the figure shown to the left (figure 1). Similar cartoons are used in all the standard textbooks. Artistic renditions of the reputed fossil intermediates are typically represented similarly across textbooks – they include three pivotal “missing link” species: *Pakicetus attocki*, *Ambulocetus natans*, *Rodhocetus kasrani*, which are said to have given rise to modern toothed whales. It is claimed this fossil sequence is one of the best proofs of evolution. Let’s examine these claims!

First, let’s examine the extinct land mammal *Pakicetus*, which is claimed to be the ancestor to all modern cetaceans, including the gigantic blue whale (drawn to scale below, figure 2).

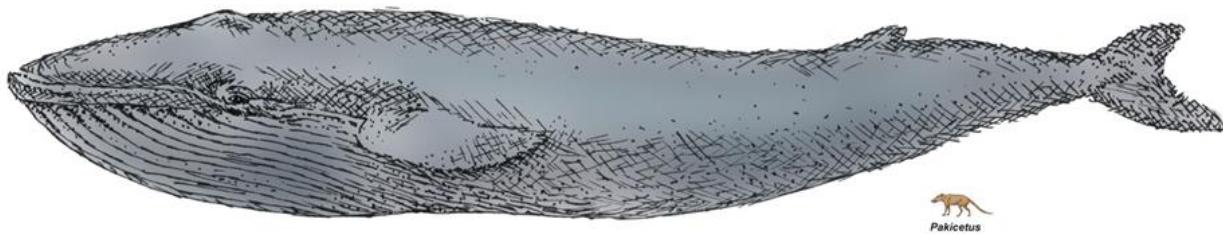


Figure 2: The modern blue whale drawn to scale compared to *Pakicetus* – the alleged wolf-sized ancestor to all modern cetaceans (whales, dolphins, and porpoises). *Pakicetus* is approximately the size of the great blue whale’s eye. Image: icr.org.

Pakicetus attocki

Little information is provided in textbooks as to the reasons why *Pakicetus* is believed to be a legitimate transitional form. Instead, textbooks make the general claim that their skulls share “many characteristics seen in whales today.”¹ Digging a little deeper, we looked into the original fossil discovery of *Pakicetus* described in the prestigious journal *Science*, published in 1983.² On the right (Figure 3) is a picture from the journal article of the fossil remains that were discovered. The shaded portions of the

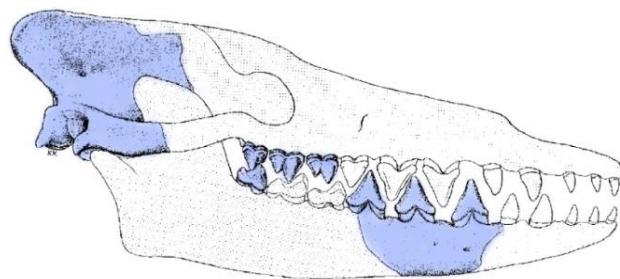


Figure 3: The original fossil discovery of *Pakicetus* as shown in the journal of *Science* in 1983.² The fossil consisted of only a few skull fragments shown here in blue.

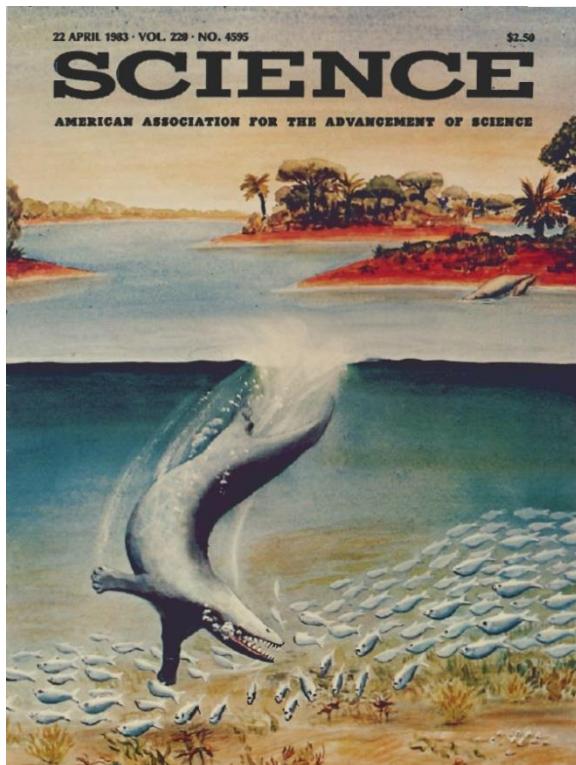


Figure 4: Despite only finding a few skull fragments, *Pakicetus* was artistically represented as a full-fledged aquatic mammal on the cover of *Science* in 1983.²

vision, inner ear, etc.) all revealed *Pakicetus* was not aquatic, but was a land mammal anatomically similar to a wolf. The researchers concluded in the journal *Nature*,

“Taken together, the features of the skull indicate that pakicetids were terrestrial, and that the locomotor skeleton displays running adaptations. ... Pakicetids were terrestrial mammals, no more amphibious than a tapir”.⁴

Below (Figure 5) is a more accurate reconstruction of what *Pakicetus* might have looked like based on the more complete assemblage of fossil remains (drawn by Carl Buell using the description of fossils reported in the 2001 *Nature* article, see reference 4).

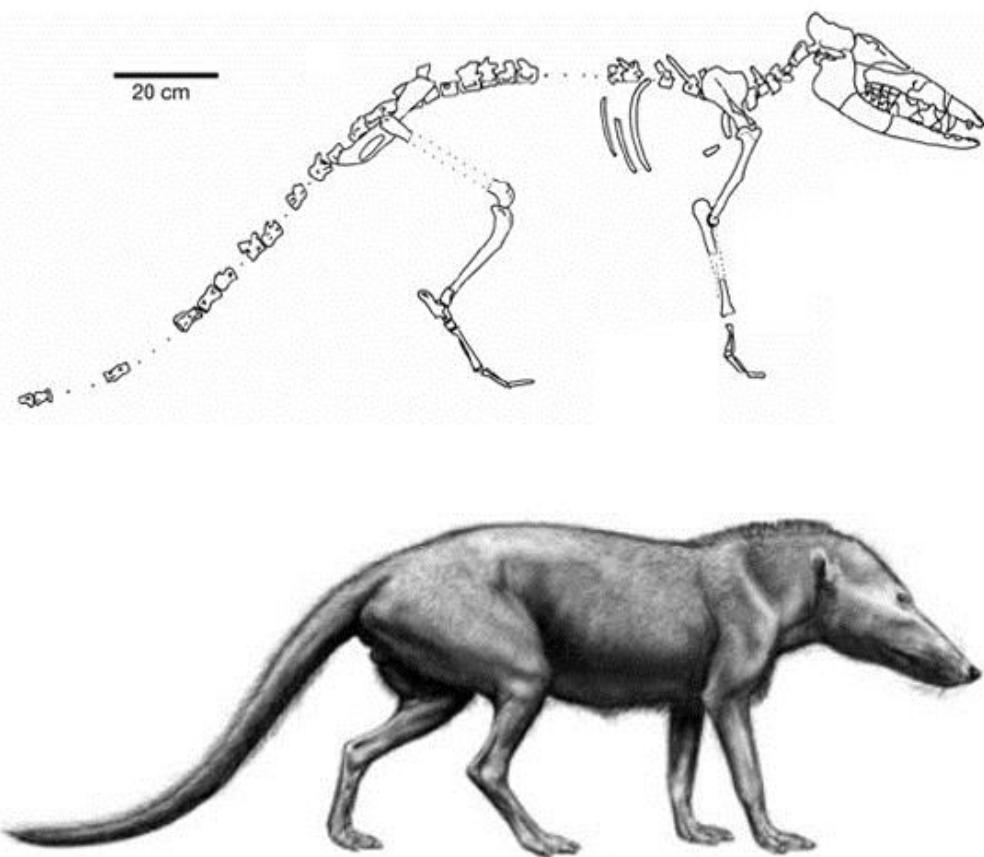


Figure 5: A more realistic representation of *Pakicetus* based on a more complete assemblage of fossils.⁴ Rather than discarding *Pakicetus* as a whale intermediate, it was reclassified to fit another missing link in the whale evolution story.

Current textbooks no longer show *Pakicetus* as an aquatic whale-like mammal. Instead, they show it as an ordinary land animal. But rather than retracting the claim that it was a whale-like aquatic mammal which led directly to modern whales, they simply redrew their cartoons and modified their story. Suddenly *Pakicetus* was just the terrestrial precursor to the real missing links (*Rodhocetus* and *Ambulocetus*). Whatever happened to the original “indisputable” representation of *Pakicetus*? And on what basis do textbooks justify representing the newer wolf-like *Pakicetus* as an ancestor to all modern cetaceans? As mentioned, textbooks don’t offer much explanation, but make a general reference to the skull as sharing certain characteristics with that of modern whales. However, upon close examination, the skull features are perfectly consistent with a fully terrestrial mammal – just like the rest of the body. One of the distinguishing features of the skull that have been studied is the semicircular canal system of the inner ear, a sophisticated sense organ that provides coordination and balance. Researchers found that whales have, on average, a canal size that is three times smaller (when scaled to proportion based on body size) than that of land mammals. In the article in *Nature*, developmental biologists compared the canal system in modern whale skulls to that of *Pakicetus*’s partial skulls. Based on their analysis, they concluded, “The oldest of these, *Ichthyolestes* [referring to *Pakicetus*], shows a canal size similar to that of the closest living relatives of cetaceans, the artiodactyls”.⁴ The artiodactyls include even-toed hoofed animals like pigs, hippopotamuses, camels, llamas, deer, giraffes, antelopes, sheep, goats, and cattle;

the group excludes whales. In other words, the size of the semicircular canal is not at all consistent with whales, but fits well with land animals (as shown in figure 2a in *Nature* 2001 article, see reference 5).

Another aspect of the skull that is described as a “whale-like” attribute is the “large, remarkably long-snouted head of... terrestrial *pakicetids*”.⁴ The idea meant to be conveyed is that evolution is already favoring in *Pakicetus* the adaptation of streamlined, hydrodynamic snouts for swimming. Do long snouts prove an animal is morphing into a whale? An elongated snout is not unique to whales. Consider greyhound dogs (and other dolichocephalic breeds), their snouts have approximately the same proportions as the *Pakicetus* snout shown in the *Nature* 2001 article.⁴ There are many other examples of modern land mammals that exhibit “streamlined” snouts, yet no one believes they are ancestors to whales.



Figure 6: The *Nature* article published in 2001 shows an artistic representation of the skeletal remains of *Pakicetus*.⁴ The elongated snout is described as a whale-like characteristic. This is not a whale-specific feature, however, and is characteristic of a number of other fully terrestrial land dwelling mammals, including modern dog breeds like the grey hound. Image credit (grey hound): Anna Frandsen.

Ambulocetus natans

Ambulocetus is presented in many textbooks as the next intermediate form after *Pakicetus* to have “filled in the gaps between whales and their hoofed mammal ancestors”.¹ The Latin name *Ambulocetus natans* literally translates “walking whale that swims”. Is there any reason to believe *Ambulocetus* was a walking whale? Is there sufficient fossil evidence to place this very incomplete fossil in the whale lineage? Below (Figure 7) is a photograph from the journal of *Science* displaying the fragmentary fossil remains of *Ambulocetus*.⁵

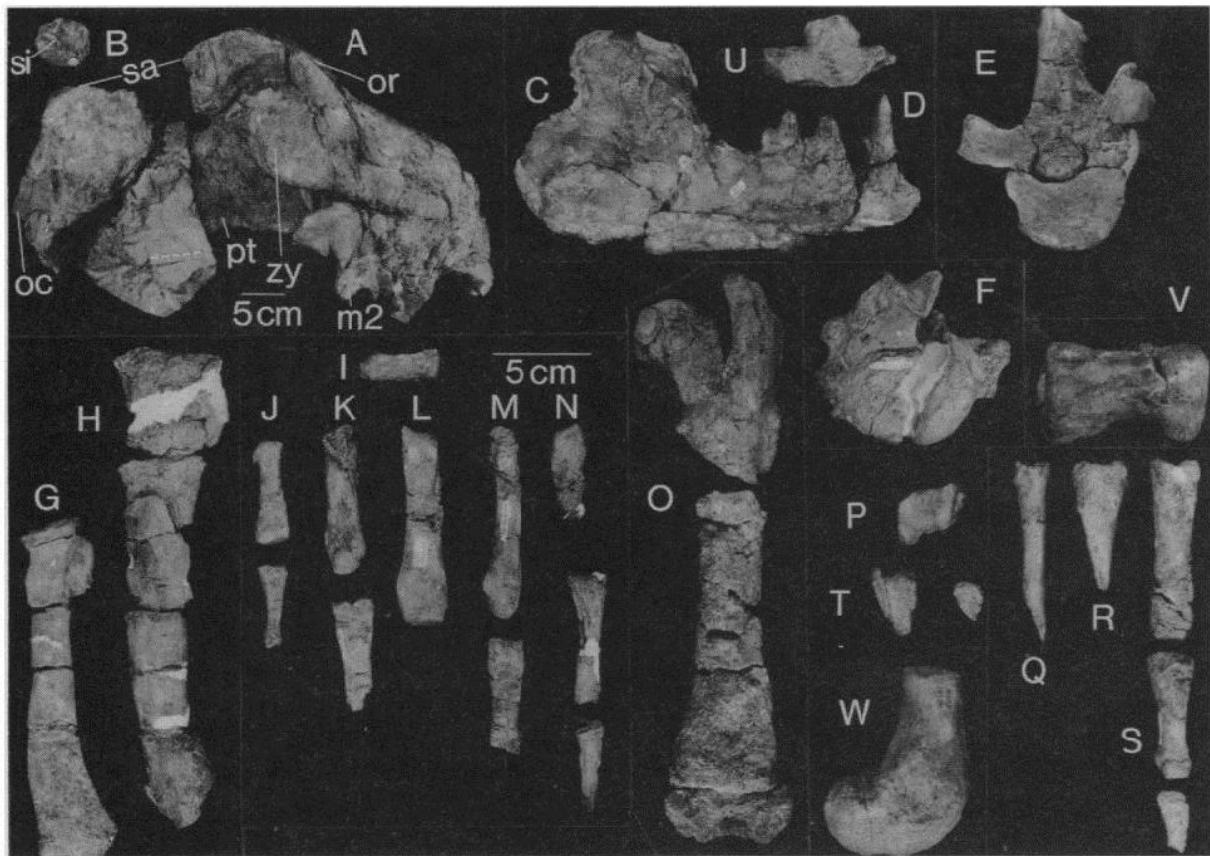


Figure 7: A photograph from the *Science* article published 1994 showing the actual fossil remains discovered.

In the article the researchers describe the stratigraphic environment the fossil were found in,

"The best specimen [shown above] is a partly articulated skull and skeleton of *Ambulocetus*. It was found in a silt and mudstone bed, scattered over an area of approximately 1.8 m^2 [equivalent to 19.4 square feet]."⁵

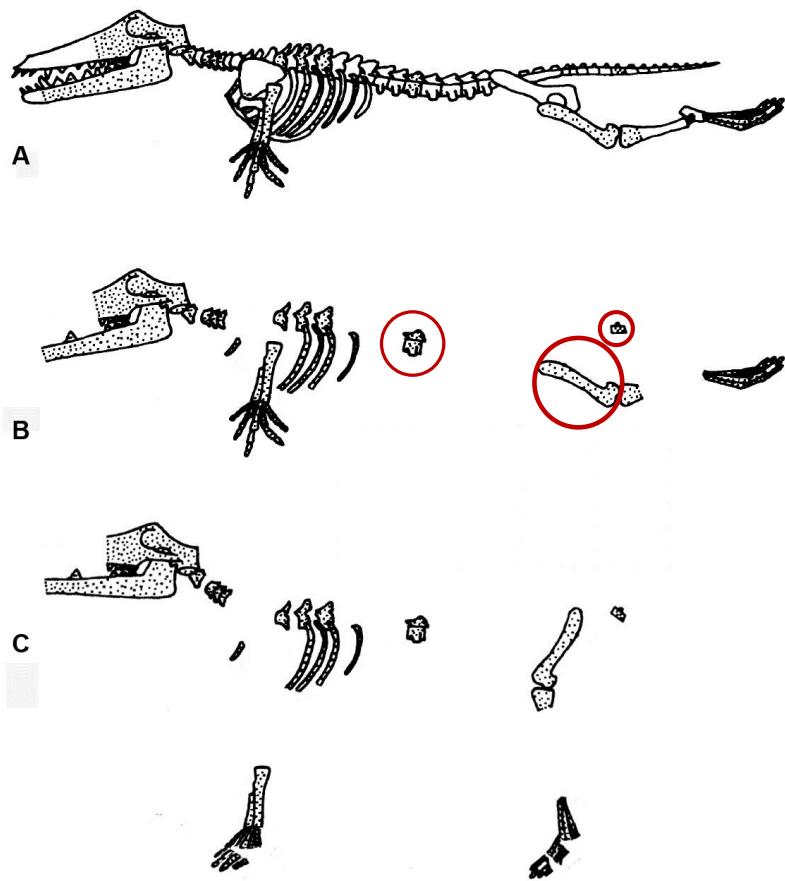


Figure 8: The first illustration (A) is from the *Science* article published in 1994.⁵ Illustration (B) was an alteration of this image where the “added” bones were erased to show only the actual fossil remains. Illustration (C) is a speculative arrangement of the fossils that may or may not be an equally valid representation of the fossils. The point is, with so few bones recovered; it’s hard to know for sure what *Ambulocetus* actually looked like. Note: Illustration (C) is not anatomically correct in all places since the original journal illustration that it is based upon was not a detailed drawing.

Notice they report that the skeleton was found “partly articulated” and “scattered” in a silt and mudstone layer. This means the assembly of the bones would be uncertain – not all the bones were necessarily even from the same creature or species. In fact, a few of the bones were found 5 meters (more than 15 feet) above the rest (circled in red left in figure 8B).⁶ Figure 8A is an illustration shown in the *Science* article of what they believed *Ambulocetus* might have looked like.⁵ The stippled portions represent actual fossil evidence. It is important to realize that much of the skeleton was missing, as seen in figure B. Showing the actual fossil remains with the “plaster additions” removed creates a very different picture. It becomes clear that the impression that this was primarily a swimming creature is largely an *illusion* created by drawing the animal in a swimming posture. The truth is, it is hard to say exactly what this creature

looked like. Arguably, we could just as easily arrange the bone fragments in a standing position. The *Journal of Biological Sciences* actually describes *Ambulocetus* as “crocodile-like”, and capable of walking on land.⁷ Alternatively, the fossil pieces could have been arranged to look more like a fully upright and fully terrestrial land mammal. As shown in figure 8C, the head could have been positioned higher, realistically the front leg could have been much longer (the upper foreleg bone appears to be missing), and the back leg and foot could have been placed in a walking rather than swimming position. Even the tail could have been shown to be hanging downward rather than streaming back. Assembling incomplete skeletons requires a lot of imagination and guess-work – and has more to do with what the researchers want to see as opposed to what can actually be known based on the available remains. For example, when speculating about the tail (the most distinguishing feature of whales) the researchers did a bit of hand waving and wrote, “Little is known about the tail, *but there is always many caudal vertebrae in primitive cetaceans and their relatives....*”.⁵ Reading between the lines, what they are really saying is that it is difficult to say what the tail looked like because that fossil evidence is absent, however, because of their *a priori* assumption that this animal was a *walking whale* it must have had a long tail like other reputed “early cetaceans” – a classic case of circular reasoning. They also assume the

hind limbs had webbed feet, but how can they know for sure without the fleshy parts preserved? It is all speculation and unsupported inference. To their credit, they at least acknowledge, "Unlike modern cetaceans *Ambulocetus*... probably lacked a tail fluke."⁵

Let's summarize the *Ambulocetus* evidence: there is no evidence this animal was a better swimmer than most other mammals. There is no evidence the tail was big enough to aid in swimming. *Ambulocetus* clearly had strong terrestrial features and could walk on land, and if it was at all aquatic, it might have filled a niche something like that of a crocodile. The authors write, "The skeleton of *Ambulocetus* indicates that it could locomote on land and in the water".⁵ But just about any land mammal can do this! With so few skeletal remains (i.e.: most of the critical parts are missing – including all but one tail vertebrae, hip bones, humerus, scapula, etc.), it is remarkable how confident they were that it was a "walking whale". But even if their interpretation is right, and *Ambulocetus* looked just like textbook representations, it in no way shows that it evolved into a whale. The creature *Ambulocetus* – even if it was a superb swimmer, had not yet acquired any of the features that make whales so unique. For example, whales locomote exclusively by the very unique tail/fluke assembly, they exclusively drink seawater, they hold their breath for enormous lengths of time, they dive to great depths and pressure, they give live birth under water, they navigate and even echolocate (as in dolphins), they hear, see, and communicate at great distances underwater, etc. At best, *Ambulocetus* was a water-adapted mammal. Finding a water-adapted mammal, such as an otter, does not make that animal a walking whale and does not prove whale evolution.

Casting further doubt on *Ambulocetus* as a transitional form, Dr. Gingerich from the University of Michigan has noticed a very crocodile-like feature of *Ambulocetus* and now doubts its inclusion into the whale lineage and writes,

"Ambulocetus has its eyes raised up on top of its head in a very strange way, and it is unusually large for an early whale... maybe it's not in the main line [of whale evolution]."⁸

Unlike whales that have eyes on the side of their head, *Ambulocetus* had eyes near the top of its head similar, to a crocodile. If leading evolutionary experts seriously doubt *Ambulocetus* as a whale intermediate, shouldn't textbooks be more upfront with the questionable nature of this reputed "transitional fossil"? *Ambulocetus* is called a "walking whale". The bones clearly show that it walked – but what evidence is there that it is a whale?

Rodhocetus kasrani

Textbooks portray *Rodhocetus* as the transitional form just before modern toothed whales. To create the appearance of a smooth transition into full-fledged whales, *Rodhocetus* is shown in textbooks and museums with a tail fluke (though not in all textbooks; see figure 9 below which shows an alternate textbook representation). Also shown are front flippers and reduced hind limbs that are shown to be no longer functional and hence vestigial. Raven's 9th edition, *Biology* textbook writes, "*Rodhocetus kasrani*'s reduced hind limbs could not have aided it in walking or swimming"¹ Dr. Berta from San Diego State University offers a similar story, "*Rodhocetus*... [was] using its tail fluke for propulsion through the water and not using the hind limbs".⁹ What is interesting is that the actual fossil remains of the original discovery lack any type of fossil evidence for either front and hind limbs, and the tail bones were never found, including the ball vertebra – the primary indicator of a fluke that is present in all modern whales.

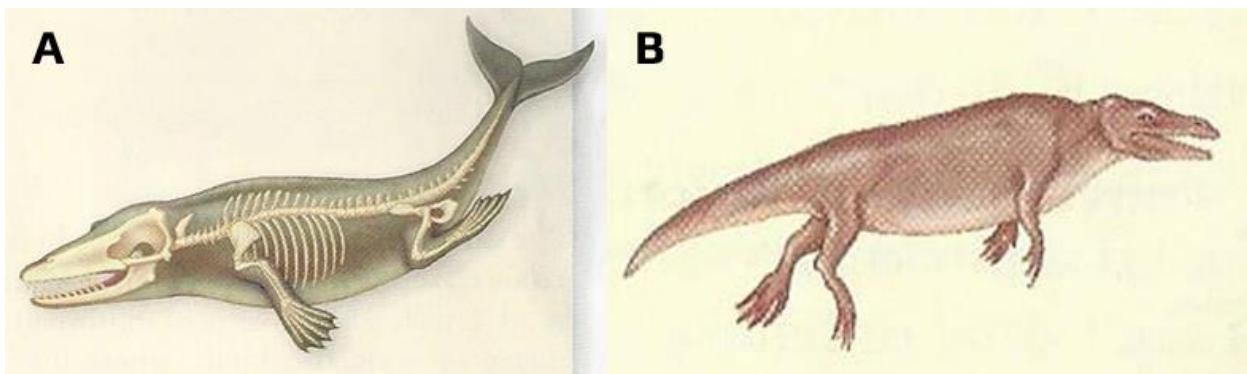


Figure 9: The fact that different textbooks published at the same time (2011 editions) show very different looking representations of the same fossil (*Rodhocetus*) confirms the highly speculative nature of so-called whale “transitional” forms. Compare the artist rendition shown in the textbook figure shown in A with the textbook figure shown in B.^{1,10} Instead of a fluke and underdeveloped flippers, *Rodhocetus* is pictured here with webbed feet and a streamlined, hefty tail, (a necessary revision since the later recovered leg remains were not a part of the original discovery). Notice, however, this updated version is very similar to the original reconstruction of *Pakicetus* shown on the cover of *Science* (See Figure 4). This is because whale evolution requires this basic form, so they have no choice but to force-fit their reconstructions to fit the whale evolution “mold.” As the Editor for Science at *National Geographic Magazine*, J. Shreeve writes, “Everybody knows fossils are fickle; bones will sing any song you want to hear.”¹¹

It turns out, all of the critical distinguishing skeletal features are missing. There is no evidence of a large tail/fluke assembly, no evidence of massive motive tail, no evidence of reduced hind limbs, no evidence of fusion of the back leg into the belly, no evidence of front flippers, no evidence of a streamlined massive neck musculature, and no evidence that a swimming position was its natural posture (Figure 10).

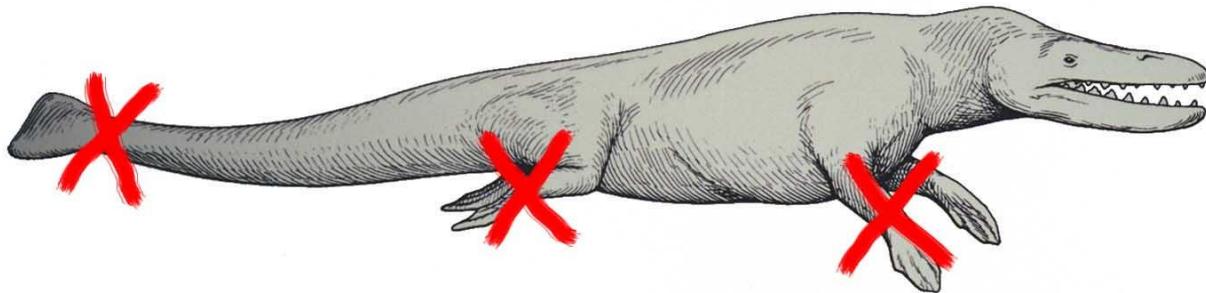


Figure 10: A highly imaginative artistic representation of *Rodhocetus* displayed at the Museum of Natural History at the University of Michigan. Virtually every aspect of this illustration cannot be verified by the available fossil remains.

There is no strong evidence that *Rodhocetus* wasn't a land mammal similar to *Pakicetus*. Despite the lack of evidence, *Rodhocetus* is promoted as a perfect intermediate form. Below is a picture of the *Rodhocetus* exhibit at the Museum of Natural History at the University of Michigan, one of the few places where the actual fossils can be seen. Dr. Gingerich, who discovered *Rodhocetus*, was asked how he knew it had a fluke since the tail bones were missing.

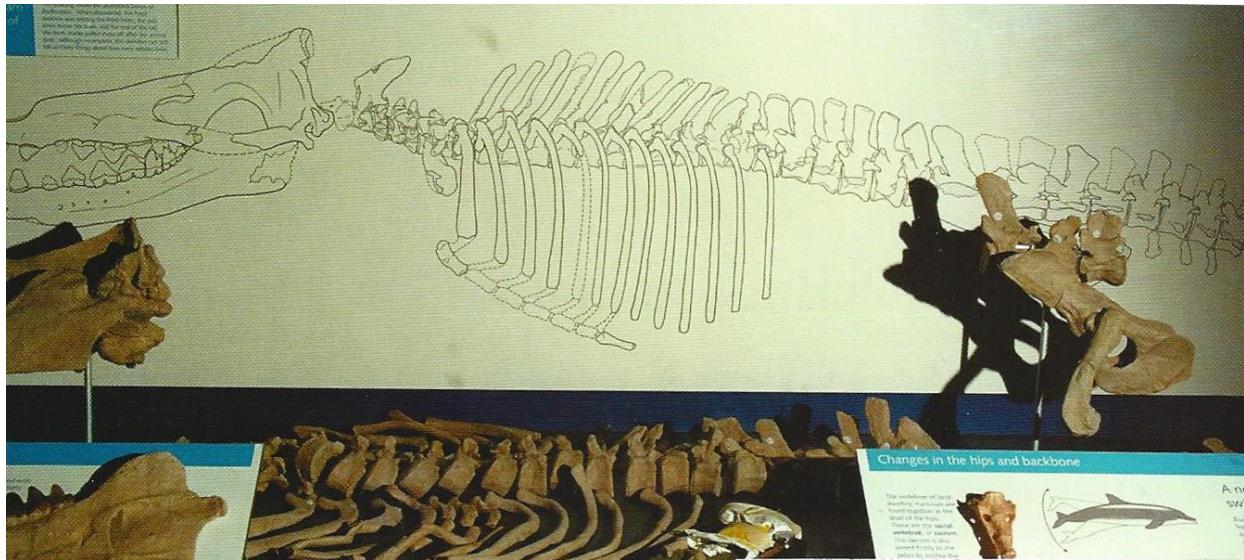


Figure 11: The actual fossil remains are showcased at the Natural History Museum at the University of Michigan; one of the few places in the world the fossil remains can be seen. Image courtesy Dr. Werner.⁸

To his credit, he answered honestly and admitted,

"I speculated that it might have had a fluke...I now doubt that *Rodhocetus* would have had a fluked tail"⁹

Dr. Gingerich was then asked why he portrayed *Rodhocetus* with flippers and reduced hind limbs when the bones were entirely absent. He confessed he was wrong about that as well saying,

"Since then we have found the forelimbs, the hands, and the front arms of *Rodhocetus*, and we understand that it doesn't have the kind of arms that can spread out like flippers on a whale."⁹

Please realize that Dr. Gingerich was the discoverer of *Rodhocetus* and he promoted it as a legitimate transitional form with reduced hind limbs, underdeveloped flippers, and a whale fluke. It is this portrayal that still persists in museum displays, textbooks, and is believed by many scientists and misleads tens of millions of students. Why is the misrepresentation maintained? It is certainly not based upon the evidence of the fossils, but is quite clearly maintained based upon the necessity to fill in the much-needed gap in the reputed fossil sequence leading from land mammals to whales.

Conclusions

The reputed fossil transitional sequence which is said to trace the evolution of land mammals into modern whales is considered the "poster child of evolution".¹² This collection of fossils is said to be the best evidence of macro-evolution. The *Journal of Biological Science* says just that, "The origin of whales (order Cetacea) from a four-footed land animal is one of the best understood examples of macro-evolutionary change".⁷ However, a closer examination of the fossil evidence reveals a very different picture than the textbook illustrations seem to suggest. When you look at the discrepancy between highly biased artistic representations and the actual fossil evidence, the truth emerges. The presumed transitional forms including *Pakicetus*, *Ambulocetus*, and *Rodhocetus* are highly questionable. The claim that these are all whale precursors is based more on speculation and wishful-thinking that on an honest evaluation of the fossil remains. *Pakicetus*, formerly assumed to be a fully aquatic mammal, has undergone a drastic revision and is now portrayed as an ordinary land mammal – far from being a

"primitive cetacean." *Ambulocetus* and *Rodhocetus* are represented in museum displays and textbook figures as nearly perfect intermediates transitioning into modern toothed whales. This is, at best, misleading. The fossil evidence was reconstructed based on only a few scattered, fragmentary fossil remains and the key distinguishing bones were consistently absent. The key missing bones were replaced by fabricated or invented webbed feet, flippers, shortened arms, re-worked necks, reduced hind limbs, and enormous fluked tails. If whale evolution is a "poster child of evolution", what does this say about the other evolutionary stories? What can we expect to find when we critically examine other famous icons of evolution?

The terrestrial animals that appear most similar to whales based upon genomics are hooved mammals (the Artiodactyla order which includes horses, cows, deer, hippos, etc.). Although whale evolution theorists feel compelled to argue that whales arose from hooved animals, it is very problematic in that hoofs are not useful for swimming, and cannot develop into webbed feet with finger-like bones. Hooved animals are thought to have evolved fused hooves to replace the five toes common to most mammals. This is a problem because neither *Pakicetus*, nor the other two reputed transitional forms have hooves. *Pakicetus* is shown to have toes, not hooves, as does *Ambulocetus* (the extremities of *Rodhocetus* were completely missing and only represent artistic invention). *Indohyus*, the more recently discovered tiny deer-like "primitive cetacean" is believed to have immediately preceded *Pakicetus*, and it also lacks obvious hooves, but the artist has added tiny hooves to the tips of the toes (see Nature 2007 image below, figure 11).¹⁴ The only reason the artist added hooves was to make the fossil evidence fit evolutionary assumptions. Since none of the reputed transitional forms have hooves, and since whales have no evidence of vestigial hooves, whale evolution experts are stuck between a rock and a hard place. On one hand, genetic similarities suggests whales evolved from a hooved ancestral lineage, yet, the fossil evidence of reputed whale precursors do not conform with this assumption.

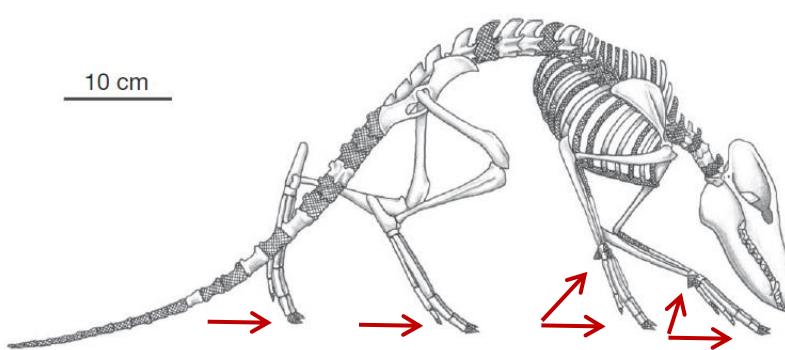


Figure 5 | Skeletal reconstruction of *Indohyus*. Hatched elements are reconstructed on the basis of related taxa.

Figure 12: Shown in the journal of *Nature* in 2007, the 47 million year old *Indohyus* is believed to be the earliest known ancestor to modern whales. The red arrows were added in to show the hooves that were added by the artist as well as all other crosshatched bones.

Lastly, it is important to realize that whale evolution itself is an ever-changing story. For instance, in 1859 when Darwin published, *The Origin of Species*, he believed whales evolved from bears. He wrote,

"I can see no difficulty in a race of bears being rendered, by natural selection, more aquatic in their structure and habits, with larger and larger mouths, till a creature was produced as monstrous as a whale."¹⁵

While Darwin seemed confident in his claim, scientists no longer believe whales evolved from bears. Instead, evolutionary paleontologists have considered and discarded a number of other ancestors to whales including a cat-like ungulate (*Sinonyx*) and a hyena-like Mesonychidae (*Pachyaena*). Not long ago, based on DNA similarities, it was discovered that hippos are the most genetically similar species to whales and were therefore assumed to be ancestors to them. However, this view is problematic and

losing popularity (think of the tail). A major problem is that hippos are found too late in the fossil record – roughly 30 million years after the first true whales had already evolved.¹⁴ More recently, evolutionists have proposed that modern whales evolved from a miniature, deer-like ancestor (*Indohyus*).¹⁵ So which is the right answer? Did whales evolve from a bear-like, cat-like, hyena-like, hippo-like, or tiny deer-like ancestor? To this day, evolutionists are in disagreement, and a consensus view has not been reached. One thing is certain, however, the evolutionary history of whales is a convoluted and ever-changing story. If we can't trust yesterday's "indisputable" fossil ancestors to whales, how can we trust today's claims? In light of so much uncertainty, should any of this be taught in biology textbooks as unquestionable scientific fact?

The Bible says that whales and dolphins were miraculously created on the 5th day of creation with the rest of the sea and flying creatures (Genesis 1:21). Whales and dolphins have many amazing characteristics and abilities that make them utterly unique among mammals. These very complex features could never arise by any Darwinian trial and error process – they had to be created. The reputed "missing links" reported in this update have been used by textbook writers to misrepresent the actual fossil evidence. The land mammal-to-whale icon does not support evolutionary theory, and should not be used to undermine Biblical faith.

By Christopher Rupe & Dr. John Sanford
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FURTHER READING

[*Evolution: The Grand Experiment, Vol. 1*, by Dr. Carl Werner.](#)

[*The Fossil Record*, by Dr. John Morris & Dr. Frank Sherwin.](#)

[*Whale of a Tale*, by Dr. Don Batten.](#)

[*Refuting Evolution*, by Dr. Jonathan Sarfati.](#)

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