

RECAPITULATION

A TALE OF TWO ENTITIES: WHALES AND HIPPOS

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Raymond Sutera's article on the early evolution of whales (RNCSE 2000; 20 [5]: 33-41) missed one effective and entertaining way to rebut anti-evolutionist arguments about the impossibility of whale evolution. During their presentations on intermediate forms, anti-evolutionists often use a picture of a cow and a whale to prompt their audience into laughing at the silly notion that one could have evolved from the other. It is a classic comparison of irrelevant extremes, carefully crafted to leave a false impression via gross omission of important facts.

Recent research has provided us with a ready-made answer for the "Bossie-to-Blowhole" challenge. To begin, show an audience pictures of a cow and a whale. But then ask if anyone knows what living hoofed mammals — even-toed artiodactyl ungulates, specifically — do exhibit a form intermediate between cows and whales. Mention that they have all probably seen them at the zoo and on television, and, if they are lucky enough to have traveled, in Africa.

Then show a photograph of the so-obvious-how-could-anyone-not-think-of-it answer — hippos — both the standard *Hippopotamus* and the pygmy *Choeropsis*. These living artiodactyls are as adapted for life in the water as for life on land. Although the legs remain functional, they are reduced to the point that hippos can go no faster than a trot; they cannot gallop. There is also some webbing between the toes. As in whales, the bones are unusually dense, allowing the beasts to submerge easily. The overall form of hippos is much more hydrodynamically streamlined than in other ungulates because they are encased in smooth, hairless skin and thick coats of fat similar to the blubber coverings of whales. The result of all these adaptations is that hippos swim better than other ungulates, but not as well as whales. Hippos give birth both on land and in the water, and the young nurse underwater.

Of course whales did not directly evolve from modern hippos any more than humans evolved from living

chimpanzees. Hippos serve as a living demonstration that hoofed beasts can have whale-like aquatic adaptations, thus directly refuting the creationist claim that the anatomical and lifestyle gap between modern ungulates and modern whales is far too great to be bridged. The opposite is true — hippos exhibit many of the intermediate terrestrial-aquatic features and habits predicted for the ancestral protowhales.

Furthermore, it now appears that the phylogenetic relationship between hippos and whales may be much closer than previously realized. The fossil evidence seemed to favor the extinct carnivorous mesonychids as the closest relatives of whales, but it turns out that this was due to lack of some critical evidence. Molecular data links hippos and whales (Luo 2000). New fossil remains, including key data from the ankle region, verifies that whales are not closely related to mesonychids. Instead, whales evolved from primitive artiodactyls (Gingerich and others 2001; Thewissen and others 2001), and although exact details remain obscure, the closest living relatives of whales may be hippos.

But even if hippos are not the *closest* living ungulate relative to modern whales, they *are* the kind of whale-like hoofed mammals that anti-evolutionists dare not mention, so it is up to us to be sure that everybody knows about the existence of an "impossible" intermediate between hoofed land animals and whales. And after doing so, ask the audience why they should have confidence in the claims of anti-evolutionists who fail to inform their audiences of such fundamental information.

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