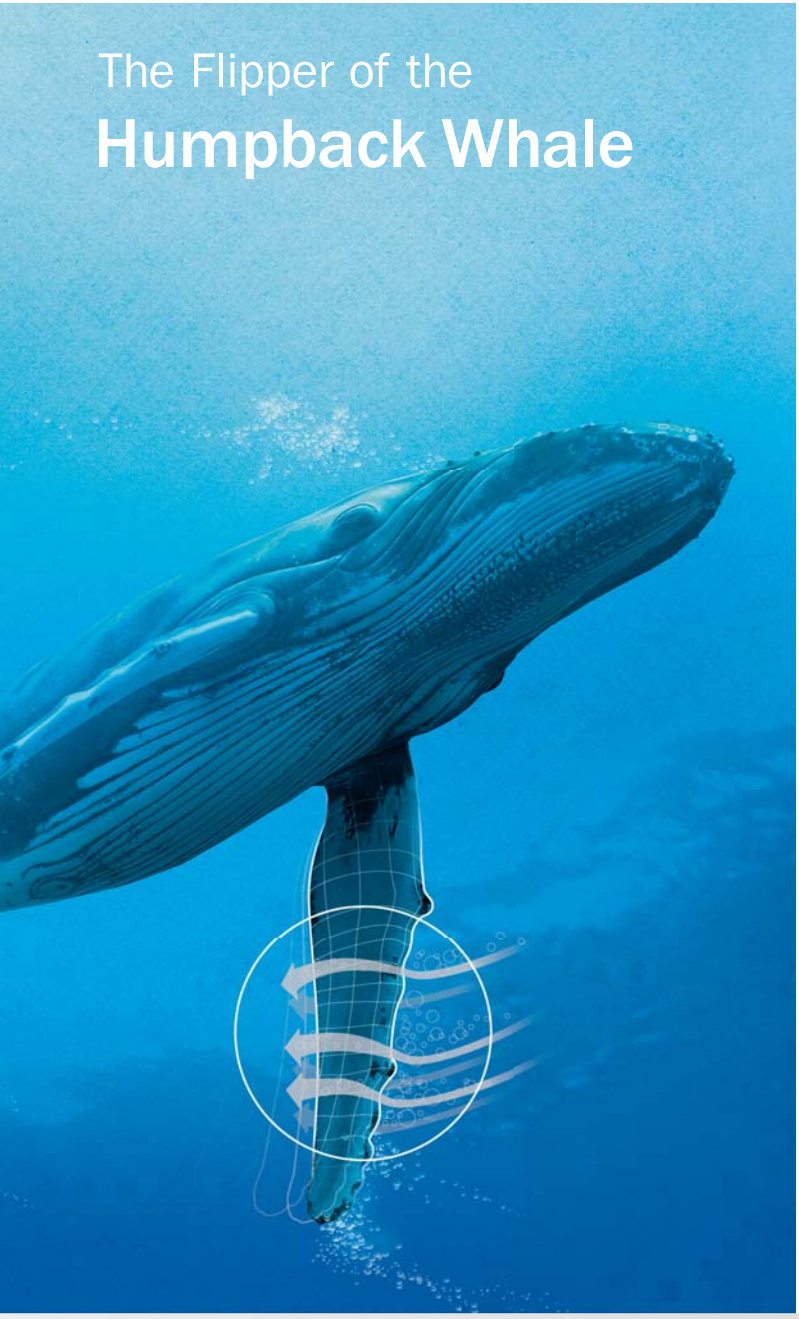
The Flipper of the Humpback Whale



THE adult humpback whale is bigger and heavier than a city bus. Still, this colossal mammal is remarkably agile when diving and turning. How can the humpback whale be so nimble? Part of the secret lies in the bumps on its flippers.

Consider: Most whales and other cetaceans have flippers with smooth leading edges. However, the humpback whale is different. It has uniquely large bumps (called tubercles) on the leading edge of its flippers. As the humpback swims, water flows over the bumps and breaks up into a multitude of vortices. The bumps channel the water flow and create turbulence. This "tubercle effect" provides the whale with more lift, allowing it to tilt its flippers at a high angle without stalling. At high angles these bumps also reduce drag—an important benefit for the humpback's long flippers, each being about one third of the whale's body length.

Researchers are applying this concept to make more-efficient boat rudders, water turbines, windmills, and helicopter rotor blades.

What do you think? Did the flipper of the humpback whale come about by evolution? Or was it designed? ■