

which he has little defence when out of the water. Even in the absence of predators, beavers require water, for their whole system of transport and storage of winter food depends upon it. Beavers are rodents, but they have evolved distinctly aquatic features such as webbed feet and a rudder-like tail.

Polar bears show little exterior difference from other bears, yet they are almost completely marine in their habits. Seals are their major prey, and they spend most of the year hunting them on and among ice floes. Polar bears are even able to reproduce away from land; females require an enclosed den in which to bear their cubs, and this need is often met by cavities among ice pressure ridges.

Seals represent the next advance in aquatic evolution, since their locomotion is basically adapted to swimming rather than walking. True seals, including our own gray and harbour seals, use only their hind flippers for propulsion, while steering and braking with their front flippers. Despite the extensive modifications to their limbs, seals are able to hump along on dry land with surprising agility. Being able to move on a solid surface is necessary for seals, since whelping takes place either on ice floes or on land.

The final step in the march to the sea has been taken by the whales, which are not only completely at home in the water, but absolutely helpless outside it. The front limbs of whales are modified as flippers, and the hind limbs have degenerated into a few bone fragments that are not even attached to the spinal column. Propulsion is provided by the long tail with its horizontal

flukes, which moves the fish-shaped body with up-and-down strokes. Whales keep warm in cold water not by fur, but rather by their thick blubber layer. Being unable to leave the water, whales of course bear their young directly into the water.

None of the animals considered above can be considered to have "descended" from the previous group with less-developed aquatic adaptations, but rather each represents the culmination of an independent line of evolution.

Although the great sea monsters of the age of dinosaurs have long since disappeared, sea turtles and diving iguanas still remind us that reptiles too have followed the call back to the sea. But present day marine reptiles still have one terrestrial tie that is shared by marine birds as well: they must return to the land to reproduce. Although many seabirds spend the majority of their lives at sea, none has yet learned to incubate an egg on the water. Only those Antarctic penguins which breed on ice shelves can claim to complete their life cycle without ever touching dry land.

David Cairns
60 Newland Crescent
Charlottetown, P.E.I.

Conserve water

Beavers make many small dams, each based on hydrological principles and maintained regularly so that they hold back water while allowing excess to seep through or flow over. Water impounded behind their dams in rainy times is held in reserve for times when there is no rain.