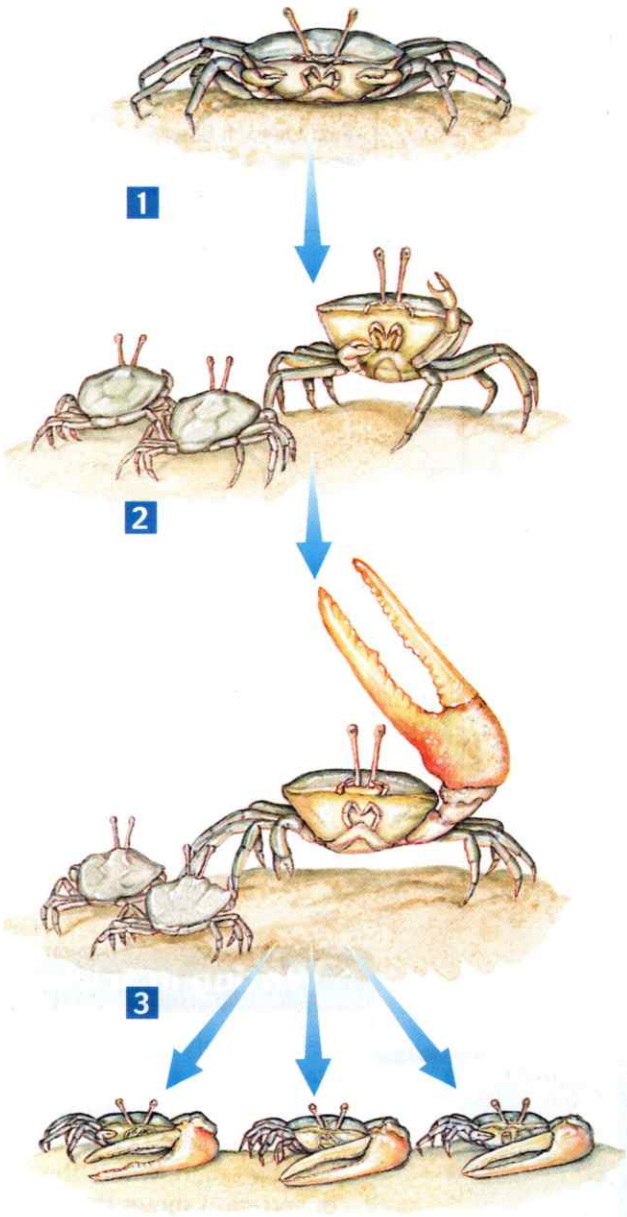

▲ **Figure 15–7** **Lamarck proposed that the selective use or disuse of an organ led to a change in that organ that was then passed on to offspring.** This proposed mechanism is shown here applied to fiddler crabs. (1) The male crab uses its small front claw to attract mates and ward off predators. (2) Because the front claw has been used repeatedly, it becomes larger. (3) The acquired characteristic, a larger claw, is then passed on to the crab's offspring. Lamarck's explanation, proposed in 1809, was found to be incorrect.

Lamarck's Evolution Hypotheses

The French naturalist Jean-Baptiste Lamarck was among the first scientists to recognize that living things have changed over time—and that all species were descended from other species. He also realized that organisms were somehow adapted to their environments. In 1809, the year that Darwin was born, Lamarck published his hypotheses.

Lamarck proposed that by selective use or disuse of organs, organisms acquired or lost certain traits during their lifetime. These traits could then be passed on to their offspring. Over time, this process led to change in a species.

Tendency Toward Perfection Lamarck proposed that all organisms have an innate tendency toward complexity and perfection. As a result, they are continually changing and acquiring features that help them live more successfully in their environments. In Lamarck's view, for instance, the ancestors of birds acquired an urge to fly. Over many generations, birds kept trying to fly, and their wings increased in size and became more suited to flying.

Use and Disuse Because of this tendency toward perfection, Lamarck proposed that organisms could alter the size or shape of particular organs by using their bodies in new ways. For example, by trying to use their front limbs for flying, birds could eventually transform those limbs into wings. Conversely, if a winged animal did not use its wings—an example of disuse—the wings would decrease in size over generations and finally disappear.

Inheritance of Acquired Traits Like many biologists of his time, Lamarck thought that acquired characteristics could be inherited. For example, if during its lifetime an animal somehow altered a body structure, leading to longer legs or fluffier feathers, it would pass that change on to its offspring. By this reasoning, if you spent much of your life lifting weights to build muscles, your children would inherit big muscles, too.

Evaluating Lamarck's Hypotheses Lamarck's hypotheses of evolution, illustrated in **Figure 15–7**, are incorrect in several ways. Lamarck, like Darwin, did not know how traits are inherited. He did not know that an organism's behavior has no effect on its heritable characteristics. However, Lamarck was one of the first to develop a scientific hypothesis of evolution and to realize that organisms are adapted to their environments. He paved the way for the work of later biologists.