A Little Animal Illustrates a Big Story

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F rom the earliest light that touches the morning Gulf to the hour when the clouds above are suffused with afterglow, people walk, play and relax along the tidelines of the shore.

Footsteps crunch old shells that have been washed up there; grinding them into the sand. Joggers break the edges off mussels and conchs; visitors pick up sand dollars and pen shells and handfuls of coquinas and then throw them down; children building sand castles demolish the last crumbling protective covers of soft snails.

In the immense panorama of life on Earth, a great gap exists between the tiny animals that made the shells and the people who tread on them, since the animals are invertebrates far down in the litany of scientific classification. But, there's a great bond, a bond in which we see is its skeleton, called a test, which is made of calcium carbonate.

A sand dollar hatches from its egg as a gelatinous, almost microscopic larva in an environment that isn't easy. Affected by offshore currents and blown by wind, the salty water heaves and churns, perhaps losing the larva against rocks and other hard objects and also subjecting it to temperatures too hot or too cold. A sand dollar is as flat and thin as a silver dollar, although a bit thicker.

A sand dollar metamorphoses to radial symmetry. As spines go, the sand dollar's are spectacular because each is at the end of a slender leg that slides so easily into the sand that it doesn't seem to move at all. When the spines work together in a waving motion, they push sand grains up through the holes in the test and thus conceal it. People feel for live sand dollars with their toes.

A sand dollar is as flat and thin as a silver dollar, although a bit larger — from 3 to 6 inches. What makes it so thin, so flat, so circular, is which is made of calcium carbonate plates that are bound together with muscle and covered with epidermis. Five holes perforate its test. Its top side bears short, fine spines, hundreds of them, so many and so close together that they are velvety.

A sand dollar metamorphoses to radial symmetry.

Most animals are bilaterally symmetrical, with right and left sides that are mirror images of each other. A sand dollar begins that way, looking in its larva stage nothing like an adult. If it survives and itself finds food, it grows until its outside layer tightens and splits. This occurs several times (for reasons science doesn't know), and its shape changes somewhat each time. Development is slow or fast, according to the temperature of the water and the percentage of salt in it. The end result of all the metamorphoses is a switch to radial symmetry, looking in its larva stage nothing like an adult. If it survives and itself finds food, it grows until its outside layer tightens and splits. This occurs several times (for reasons science doesn't know), and its shape changes somewhat each time. Development is slow or fast, according to the temperature of the water and the percentage of salt in it. The end result of all the metamorphoses is a switch to radial symmetry, looking in its larva stage nothing like an adult. If it survives and itself finds food, it grows until its outside layer tightens and splits. This occurs several times (for reasons science doesn't know), and its shape changes somewhat each time. Development is slow or fast, according to the temperature of the water and the percentage of salt in it. The end result of all the metamorphoses is a switch to radial symmetry, looking in its larva stage nothing like an adult. If it survives and itself finds food, it grows until its outside layer tightens and splits. This occurs several times (for reasons science doesn't know), and its shape changes somewhat each time.