Book Review: Darwin's Backyard: How Small Experiences Led to a Big Theory

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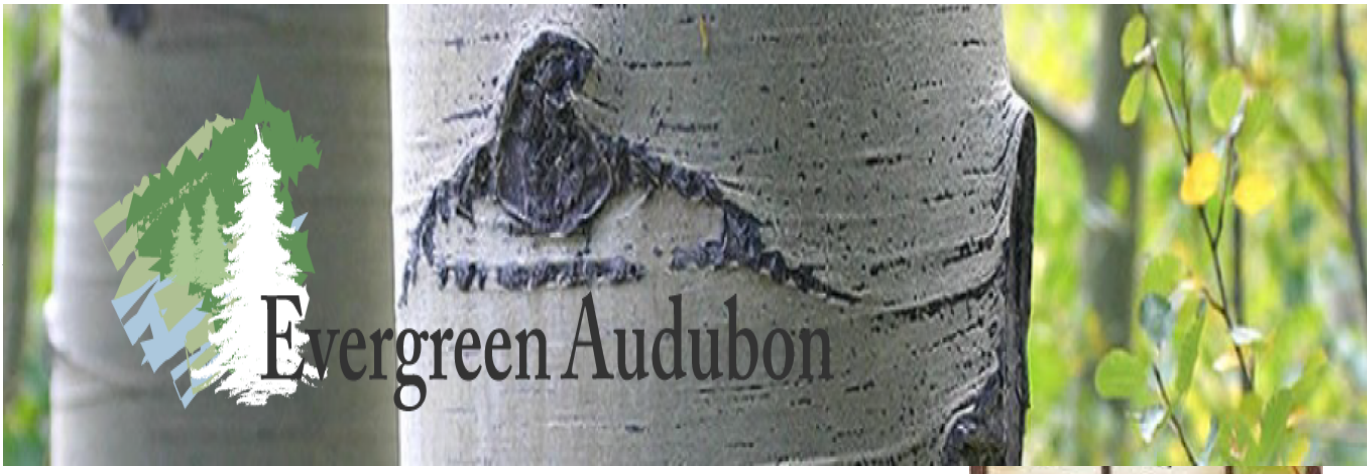

Each chapter in *Darwin's Backyard* focuses on a different plant or animal and describes in some detail how Darwin's interest was aroused and the experiments he led to answer his questions. Costa opens the Preface with an amusing anecdote about Darwin's wife, Emma.

> "We can only imagine that Emma Darwin had the patience of Job. At one point in the 1850s, sheets of damp paper stuccoed with frog eggs lined the hallway of her house, pigeons cooed boisterously in a dovecote in the yard, row upon row of glass jars with saltwater and floating seeds filled the cellar, and malodorous pigeon skeleton preparations permeated the air. And that was only the beginning: there was a terrarium of snails with suspended duck feet, heaps of dissected flowers, and the fenced-off plots in the lawn where the grass was carefully scraped away to study struggling seedlings. Of course, being married to Charles Darwin over a dozen years by then, she was undoubtedly used to it. Charles, she might have said to friends, was experimentising again."

Unlike many earlier theorists, Darwin did not pull his evolutionary ideas "out of thin air." He was a careful and astute observer and experimenter. He continuously gathered data to test his hypotheses, practicing science much as we do today. And, he did so while writing *The Origin of Species* and myriad books and articles about his discoveries.

Darwin started experimenting young, following in the footsteps of his renowned grandfather, Erasmus Darwin. While studying at Cambridge University, he became an ardent beetle collector and a budding botanist. Of course, we know about his famous voyage aboard the Beagle, where he not only began to form his ideas about natural selection but where he also studied the geology of South America. On the voyage, he was continuously testing his ideas through

experimentation, even testing if carrion-feeding condors could smell. Once he returned home, he was quickly recognized as a major contributor to the scientific understanding of his time, and even more quickly moving beyond it to his "heretical idea that species change over time."

The chapters in *Darwin's Backyard* detail Darwin's experiments with a variety of species. He became interested in the domestic breeding of pigeons through careful selection of particular traits. He studied barnacles, most of which, he discovered, were both male and female, hermaphrodites. But some were distinctly male or female, with the females thousands of times larger than the males. These creatures were more variable than anyone had conceived. Fascinated, Darwin studied barnacles for 8 years. In fact, one of his boys, visiting a friend, and seeing no microscope or dissecting equipment, asked his friend's dad, "Then where does he do his barnacles?"

Chapters following detail Darwin's experiments on grasses, bees, floating seeds, wildflower pollination, orchid pollination, sundews and Venus flytraps, climbing vines, and earthworms. Darwin wanted to know if earthworms could hear. He decided to serenade them to find out.

"The assembled musicians included 5-year-old Bernard (his grandson) on penny whistle, Frank (his son) on bassoon, and the accomplished pianist Emma (his wife) on piano."

Unfortunately, he concluded, worms cannot hear. "When placed on a table close to the keys of a piano, which was played as loudly as possible, they remained perfectly quiet."

One of my favorite accounts tells of his family's experiments with bees. Darwin wanted to learn where and why bumblebees "buzzed" certain areas in the garden. His son, Georgy, had discovered a buzzing place, and Darwin wanted to know all about buzzing places. He needed field assistants and so recruited the rest of his six children, even little Lenny, just 4. They were stationed about the garden and called out when they saw a bee at a buzzing place. They illuminated the bees with white flour to make them more visible, and Darwin sent the little ones onto their tummies so they could track the bees under the foliage. It must have been great fun to live in his family. Many of his children became scientists.

After details about Darwin's experiments and scientific conclusions, each chapter in Costa's account ends with an experiment for the reader. The bee chapter provides step-by-step instructions for dissecting a honeycomb to understand its structure and using bubbles to understand its wall-sharing construction. The experiments would be great fun for children, and even for adults.

Darwin's Backyard provides a unique view of a renowned scientist, one often depicted as an old man with a huge beard. Apparently, he usually did not sport a beard, but he was a scientific giant nonetheless. In Costa's work, we find a different Darwin, one who was always curious and

having a great time with family, friends, and colleagues experimenting on the world around him. I thoroughly enjoyed learning about him. I hope you do as well.

*Did you know that Charles Darwin was born on the same day in the same year as Abraham Lincoln?