# Darwin and His Bears

## How Darwin Bear and His Galápagos Islands Friends Inspired a Scientific Revolution

Frank J. Sulloway

ILLUSTRATED BY THE AUTHOR

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**To Edward O. Wilson**

Whose deep love for the natural world
and far-reaching understanding
of its fundamental principles have enlightened us all.

# Contents

# Foreword

We were very lucky to meet Frank Sulloway during lunch at the Charles Darwin Research Station in Puerto Ayora in October 2017. I was on a field trip with the founder of the COmON Foundation, Wijnand Pon, to the fabulous Galápagos Islands. The COmON Foundation is involved with a number of projects in the Galápagos Archipelago, as a donor to the Charles Darwin Foundation. At the Station, we had lunch outside near the Exhibition Hall where we met several participants in workshops. One of them was Frank Sulloway. I was told that Frank had visited the Galápagos Islands many times and that he knew a lot about the archipelago. There was something special with Frank: He had a bag with a little bear hanging out of it, peering up at me.

In preparation for our trip to the iconic Galápagos Islands I had done some reading. The Galápagos Islands are associated with Charles Darwin, the voyage of the *Beagle*, and Darwin's revolutionary book *On The Origin of Species*. A question that puzzled me was Darwin's mindset during and shortly after his visit to the Galápagos Islands. Was he, like almost all scientists in his days, a creationist (someone who believes that everything on our planet is the work of God) or was he already on his way to become an evolutionist (and someone who also thinks that there is "selection and survival of the fittest")?

Frank was able to answer this question. An expert in the field, he spoke in such a clear and easy-to-understand way that we challenged

him to write it down. His answer: "I already have a manuscript ready to publish on this subject, and I am looking for a publisher!"

*Darwin and His Bears* is this book, and it provides the answer I was searching for. With its whimsical historical narrative, one might ask whether *Darwin and His Bears* is a children's book. The answer is yes and no. Yes, because it is a well-written and funny story with a group of smart bears in the title role. No, because the story deals with a wide variety of scientific ideas and their history. The story is also intricately entwined with Darwin's own life and theories, including his collecting and classification errors, as well as the current evolutionary significance of the Galápagos Islands. Those who know Frank Sulloway's scientific life and work will appreciate that *Darwin and His Bears* builds on a lifetime of research as a Darwin scholar, an evolutionary biologist, and a field researcher in the Galápagos.

We consider the 60th anniversary of the Charles Darwin Foundation an excellent moment to publish this extraordinary, one-of-a-kind book. We are sure young and old readers alike will thoroughly enjoy the intriguing story of *Darwin and His Bears*.

Maas Jan Heineman,
COmON Foundation
www.COmON.earth

CHAPTER 2

# Darwin Bear Reveals a Scientific Secret

## or

# The Little Bear Tells Another Incredible Tale

So, how is it that you know so much about Darwin's *Origin of Species?*" I asked as we sat down together to have some tea.

Perched on his large white bag—with a teacup balanced carefully on his lap—the little bear stared me right in the eye. "You may not believe this, but I knew Charles Darwin. In fact, I knew him very well. You might even say we were the best of friends."

"You say you actually knew Charles Darwin!" I blurted out. "That's impossible! Darwin lived and died more than a century ago, and he never visited America."

"Well, I'm not from America," the little bear insisted, "and I'm much older than you might think."

"How could you possibly be that old, and where exactly are you from?" I asked, wondering what outlandish claim I might hear next.

Darwin Bear did not disappoint. "Why, I'm from the Galápagos Archipelago, a group of islands located on the equator, about 600 miles (1,000 kilometers) west of Ecuador, in South America. And that's where I first met my friend Darwin, in October of 1835, when he was visiting the island that used to be my home."

My eyes practically popped out of my head when I heard this astonishing claim. It seemed utterly impossible to be talking with someone who knew Charles Darwin, who, along with Isaac Newton


Darwin Bear, seated on his white travel bag, having tea and biscuits with me at the café.

and Albert Einstein, is generally considered one of the most brilliant scientists who ever lived. More to the point, Darwin died in 1882, and if the two first met in 1835, that would make the bear upwards of a hundred and eighty years old. Unlike tortoises or redwood trees, bears generally do not live that long. Nor do they normally befriend genius scientists. So I had to be more than a bit skeptical.

"How do I know that you ever really met Charles Darwin?" I asked. "I don't mean to sound impolite, but you could be making up this whole story just to see how gullible I might be."

"Well," the little bear declared, "I know that Darwin's middle name was Robert, which is why his sisters sometimes called him

Bobby; that he was the fifth of six children; that his *Beagle* voyage assistant's name was Syms Covington; that his various dogs were named Bobby, Button, Dicky, Pepper, Polly, and Tyke; that he liked to ride Galápagos tortoises; and finally that he loved gooseberries. I also know that he was born on the same day in history as Abraham Lincoln—February 12, 1809. Isn't that proof enough? Could someone who didn't know Darwin very well know all those details?"

"That's impressive," I admitted. "Very few people know such obscure facts about Darwin's life, except perhaps Darwin scholars."

"I know even more about Darwin," the little bear added, "things that even the most dedicated Darwin scholars could not possibly know."

"Like what?" I scoffed, not believing him at all.

The little bear shot back: "For example, I know exactly how Darwin reached his theory of evolution."

"But everybody knows that," I said. "Darwin was inspired to develop his theory of evolution when he realized that some of the islands in the Galápagos Archipelago were inhabited by their own form of mockingbird, tortoise, and finch. This remarkable fact led him to conclude that animals and plants separated by geographic barriers, such as mountain ranges or oceans, eventually begin to evolve along separate pathways. Over time, diverging populations became separate breeds or geographic races, like the many different kinds of dogs and cats, or human races. Eventually, many of these populations evolved into new species altogether, producing the enormous variety of creatures that live on the earth today.

"This is also why animals and plants often tend to differ in striking ways from one continent to another. For example, Australia is the only continent that has kangaroos and platypuses, and South America is the only place where llamas live. Although geologists tell us that these continents were once united, that was several hundred million years ago. After the continents drifted apart, their inhabitants evolved in different ways."


A map of the Galápagos Islands, showing Darwin's route on H.M.S. *Beagle* and the island (Santiago) where Darwin Bear claims to have made his home. Darwin visited the four islands shaded in green.

The little bear had been listening patiently, but I could see that he wasn't particularly impressed.

"You seem to know the textbook account of how Darwin came to develop his theory of evolution," the little bear snorted, "but that's only part of the story. You have left out the most important part."

"And what 'most important' part is that?" I demanded.

"The part about bears, of course!" he said as he enthusiastically pounded the table with his paw.

"And what exactly do you mean by that?" I was sure that by pinning him down, I would catch my new acquaintance in another impossible claim. His story was becoming more and more unbelievable, which is often what happens with a series of little lies—they grow into ridiculously big ones. So I continued: "Scientists claim to have determined that there are no bears at all in the Galápagos Islands, and although there are bears in some parts of South America, Darwin never mentioned having seen any there or in any other place he visited during the *Beagle* voyage."

"That's what you and everyone else thinks," the little bear retorted, "but you're wrong, and I can prove it."

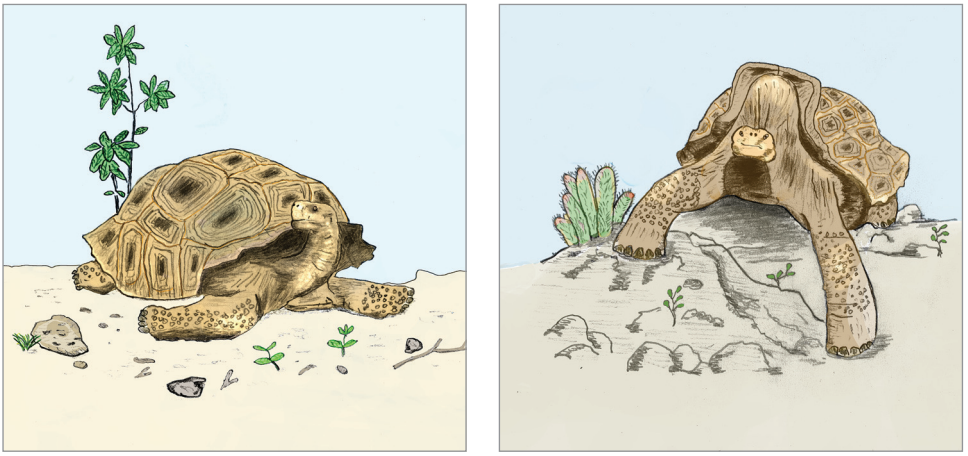
"How can you possibly prove such an astonishing claim?"

"Easily! I come from the Galápagos, and I'm a bear, so the Galápagos Islands *must* have been inhabited by bears! It's a simple matter of logic. I thought you were a scientist yourself. Aren't scientists supposed to be logical?"

Of course, what he had said was logical only if it were true, which I seriously doubted. But bald-faced lies are hard to refute when the liar keeps on insisting they're absolutely, positively, 100% true. I decided the best thing to do was let the little bear ramble on with his story.

"Darwin camped on my island for nine days, collecting specimens of unknown birds, animals, and plants. I was minding my own business, as bears tend to do, when Darwin spied me taking a nap under a spiny *Acacia* tree. Not being sure what species I was, Darwin

Buccaneer Cove on Santiago Island (also known as James), where Darwin camped for nine days. In the foreground on the right is a lava lizard, which exists on some islands as distinctly different species. In the background on the left is a colony of land iguanas and their numerous burrows. In his *Journal of Researches* (1839)—the book he published about his experiences during the *Beagle* voyage—Darwin wrote, "I cannot give a more forcible proof of their numbers, than by stating, that when we were left at James Island, we could not for some time find a spot free from their burrows, on which to pitch our tent" (p. 469). Land iguanas have been driven to extinction on this island by the introduction of rats, pigs, and other animals.



LEFT: A dome-shaped tortoise from Santiago Island, where Darwin Bear came from. RIGHT: An Española tortoise, with its carapace turned up like a Spanish saddle. (The Galápagos Islands take their name from an old Spanish word for "tortoise.")

tried to capture me in one of his big collecting nets. It's a good thing we Galápagos bears are so nimble. His galumphing footsteps woke me up and I quickly ran behind a large cactus. From there I yelled, 'Hey, Mr. Presumptuous Busybody, why are you trying to trap me? I haven't done you any harm. Besides, you're a guest on *my* island, and you should really be ashamed of yourself for even thinking of capturing your host. Otherwise, who is going to show you around the island and keep you from getting into trouble?'

"With a flustered look on his face, Darwin at once dropped the net and offered me his most sincere apologies—which naturally I accepted. I told him that if he wanted to capture anything, he should trap all of the goats on the island. Goats, as you probably know, were brought to the Galápagos by visiting sailors, and they were eating the blueberries that only we bears should have been eating.

"Darwin immediately agreed that the goats were wreaking havoc in the Galápagos environment. United by our low opinion of goats,

Darwin and I shook hands. I then told him the very story about bears and the Galápagos that inspired him to write his most famous book."

The little bear sat back with a satisfied smile. But his story wasn't over. "You see," he continued, "every island in the Galápagos was once inhabited by a different kind of bear. Darwin knew nothing of this, and at first he was inclined to disbelieve me. Much like you right now! So I asked him, 'Haven't you noticed that the mockingbirds are a bit different from island to island?'

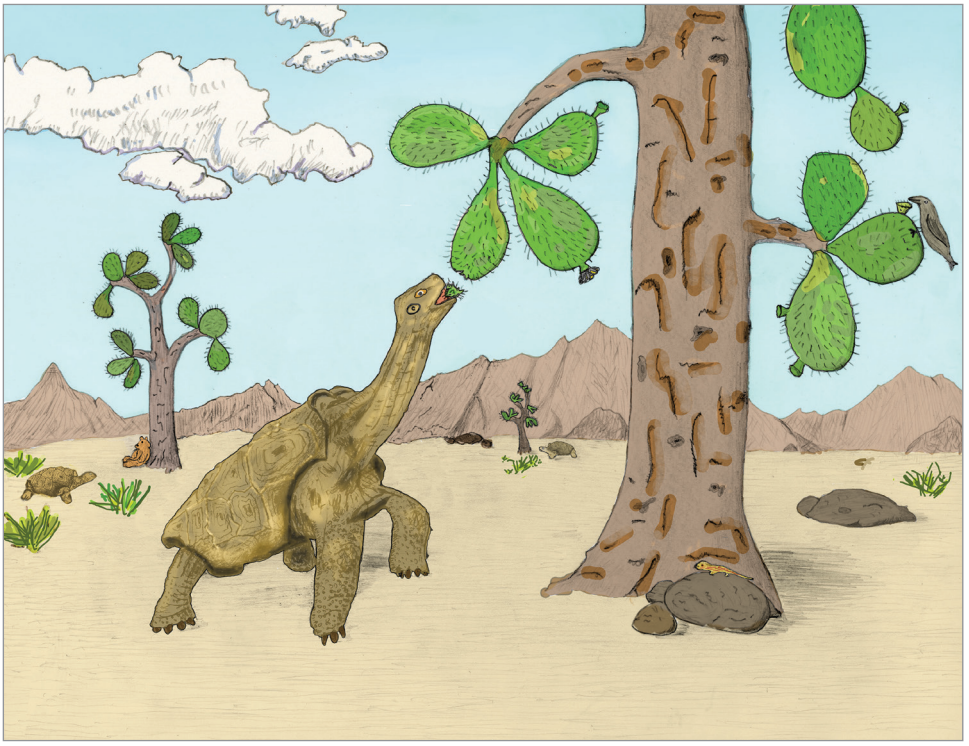
"Darwin thought for a moment and said, 'Well, yes, I had noticed they were a bit different, but I just assumed these birds were local varieties and that the observed differences from one island to next are relatively unimportant variations within the same species.' 'They are hardly unimportant,' I insisted. 'In fact, there are four distinct kinds of mockingbirds in my archipelago, and three of them are confined to their own islands. Also, the tortoises and even some of the finches differ from island to island.'

"Darwin didn't believe me. He continued to think that the island-to-island differences among the bears, tortoises, and finches weren't truly differences between distinct species but just differences between local varieties. What could I say? The differences were plain as day to us bears. Humans, however, may be more short-sighted."

"So how did you convince Darwin?" I asked, wondering if I, too, would ever be convinced by the little bear.

"He admitted I might have a point, but he worried that my claims involved potentially revolutionary facts that could upset everything we knew about biology! He really didn't want to believe me—the truth was so inconvenient—and he also confessed that up to this point in his visit to the Galápagos, he had failed to label most of his collections by island and that most of his specimens from each island were hopelessly mingled with the rest. Where, then, was the proof of all this? Do you know what he said to me next?"

Of course I had no idea, so I shook my head.



A saddleback Galápagos tortoise eating the fruit of an *Opuntia* cactus. These prickly pear cacti grow in the Galápagos as tall as 40-foot (13-meter) trees on the eight islands where tortoises also live. On the Galápagos Islands without tortoises, *Opuntia* cacti grow only as low bushes, as they do in other parts of the world. Tortoises and land iguanas are avid consumers of prickly pear cactus pads and fruits, which are important sources of scarce food and water. Over time, these cacti have evolved into trees to avoid being eaten by these animals. On the hottest and driest of these islands, the tortoises have evolved carapaces displaying a rise above their necks (a characteristic saddle shape), which allows them to stretch their necks higher to reach vegetation. These various relationships reflect textbook examples of "coevolution," or the mutual evolution of two or more species in response to the changes in one another.

A volcanic landscape on San Cristóbal (Chatham), the first island Darwin visited. Darwin explored this region extensively, and in his *Journal of Researches* (1845 edition) he wrote, "Nothing could be less inviting than the first appearance. . . . The entire surface of this part of the island seems to have been permeated, like a sieve, by the subterranean vapours: here and there the lava, whilst soft, has been blown into great bubbles; and in other parts, the tops of caverns similarly formed have fallen in, leaving circular pits with steep sides" (pp. 373-374).