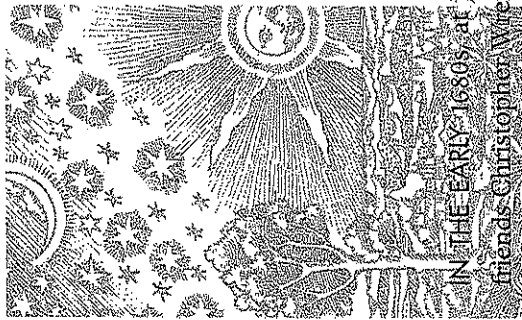


Concluding chapter of  
*A Short History of Nearly Everything*  
By Bill Bryson

(2003 – New York: Broadway Books)

30 GOOD-BYE



IN THE EARLY 1600s, at just about the time that Edmond Halley and his friends Christopher Wren and Robert Hooke were settling down in a London coffeehouse and embarking on the casual wager that would result eventually in Isaac Newton's *Principia*, Henry Cavendish's weighing of the Earth, and many of the other inspired and commendable undertakings that have occupied us for much of the past four hundred pages, a rather less desirable milestone was being passed on the island of Mauritius, far out in the Indian Ocean some eight hundred miles off the east coast of Madagascar.

There, some forgotten sailor or sailor's pet was harrying to death the last of the dodos, the famously flightless bird whose dim but trusting nature and lack of leggy zip made it a rather irresistible target for bored young tars on shore leave. Millions of years of peaceful isolation had not prepared it for the erratic and deeply unnerving behavior of human beings.

We don't know precisely the circumstances, or even year, attending the last moments of the last dodo, so we don't know which arrived first, a world that contained a *Principia* or one that had no dodos, but we do know that they happened at more or less the same time. You would be hard pressed, I would submit, to find a better pairing of occurrences to

illustrate the divine and felonious nature of the human being—a species of organism that is capable of unpicking the deepest secrets of the heavens while at the same time pounding into extinction, for no purpose at all, a creature that never did us any harm and wasn't even remotely capable of understanding what we were doing to it as we did it. Indeed, dodos were so spectacularly short on insight, it is reported, that if you wished to find all the dodos in a vicinity you had only to catch one and set it to squawking, and all the others would waddle along to see what was up.

The indignities to the poor dodo didn't end quite there. In 1755, some seventy years after the last dodo's death, the director of the Ashmolean Museum in Oxford decided that the institution's stuffed dodo was becoming unpleasantly musty and ordered it tossed on a bonfire. This was a surprising decision as it was by this time the only dodo in existence, stuffed or otherwise. A passing employee, aghast, tried to rescue the bird but could save only its head and part of one limb.

As a result of this and other departures from common sense, we are not now entirely sure what a living dodo was like. We possess much less information than most people suppose—a handful of crude descriptions by "unscientific voyagers, three or four oil paintings, and a few scattered osseous fragments," in the somewhat aggrieved words of the nineteenth-century naturalist H. E. Strickland. As Strickland wistfully observed, we have more physical evidence of some ancient sea monsters and lumbering saurapods than we do of a bird that lived into modern times and required nothing of us to survive except our absence.

So what is known of the dodo is this: it lived on Mauritius, was plump but not tasty, and was the biggest-ever member of the pigeon family, though by quite what margin is unknown as its weight was never accurately recorded. Extrapolations from Strickland's "osseous fragments" and the Ashmolean's modest remains show that it was a little over two and a half feet tall and about the same distance from beak tip to backside. Being flightless, it nested on the ground, leaving its eggs and chicks tragically easy prey for pigs, dogs, and monkeys brought to the island by outsiders. It was probably extinct by 1683 and was most certainly gone by 1693. Beyond that, we know almost nothing except of course that we will not see

its like again. We know nothing of its reproductive habits and diet, where it ranged, what sounds it made in tranquility or alarm. We don't possess a single dodo egg.

From beginning to end our acquaintance with animate dodos lasted just seventy years. That is a breathtakingly scanty period—though it must be said that by this point in our history we did have thousands of years of practice behind us in the matter of irreversible eliminations. Nobody knows quite how destructive human beings are, but it is a fact that over the last fifty thousand years or so wherever we have gone animals have tended to vanish, in often astonishingly large numbers.

In America, thirty genera of large animals—some very large indeed—disappeared practically at a stroke after the arrival of modern humans on the continent between ten and twenty thousand years ago. Altogether North and South America between them lost about three quarters of their big animals once man the hunter arrived with his flint-headed spears and keen organizational capabilities. Europe and Asia, where the animals had had longer to evolve a useful wariness of humans, lost between a third and a half of their big creatures. Australia, for exactly the opposite reasons, lost no less than 95 percent.

Because the early hunter populations were comparatively small and the animal populations truly monumental—as many as ten million mammoth carcasses are thought to lie frozen in the tundra of northern Siberia alone—some authorities think there must be other explanations, possibly involving climate change or some kind of pandemic. As Ross MacPhee of the American Museum of Natural History put it: "There's no material benefit to hunting dangerous animals more often than you need to—there are only so many mammoth steaks you can eat." Others believe it may have been almost criminally easy to catch and clobber prey. "In Australia and the Americas," says Tim Flannery, "the animals probably didn't know enough to run away."

Some of the creatures that were lost were singularly spectacular and would take a little managing if they were still around. Imagine ground sloths that could look into an upstairs window, tortoises nearly the size of a small Fiat, monitor lizards twenty feet long basking beside desert high-

ways in Western Australia. Alas, they are gone and we live on a much diminished planet. Today, across the whole world, only four types of really hefty (a metric ton or more) land animals survive: elephants, rhinos, hippos, and giraffes. Not for tens of millions of years has life on Earth been so diminutive and tame.

The question that arises is whether the disappearances of the Stone Age and disappearances of more recent times are in effect part of a single extinction event—whether, in short, humans are inherently bad news for other living things. The sad likelihood is that we may well be. According to the University of Chicago paleontologist David Raup, the background rate of extinction on Earth throughout biological history has been one species lost every four years on average. According to one recent calculation, human-caused extinction now may be running as much as 120,000 times that level.

In the mid-1990s, the Australian naturalist Tim Flannery, now head of the South Australian Museum in Adelaide, became struck by how little we seemed to know about many extinctions, including relatively recent ones. "Wherever you looked, there seemed to be gaps in the records—pieces missing, as with the dodo, or not recorded at all," he told me when I met him in Melbourne a year or so ago.

Flannery recruited his friend Peter Schouten, an artist and fellow Australian, and together they embarked on a slightly obsessive quest to scour the world's major collections to find out what was lost, what was left, and what had never been known at all. They spent four years picking through old skins, musty specimens, old drawings, and written descriptions—whatever was available. Schouten made life-sized paintings of every animal they could reasonably re-create, and Flannery wrote the words. The result was an extraordinary book called *A Gap in Nature*, constituting the most complete—and, it must be said, moving—catalog of animal extinctions from the last three hundred years.

For some animals, records were good, but nobody had done anything much with them, sometimes for years, sometimes forever. Steller's sea

cow, a walrus-like creature related to the dugong, was one of the last really big animals to go extinct. It was truly enormous—an adult could reach lengths of nearly thirty feet and weigh ten tons—but we are acquainted with it only because in 1741 a Russian expedition happened to be shipwrecked on the only place where the creatures still survived in any numbers, the remote and foggy Commander Islands in the Bering Sea.

Happily, the expedition had a naturalist, Georg Steller, who was fascinated by the animal. "He took the most copious notes," says Flannery. "He even measured the diameter of its whiskers. The only thing he wouldn't describe was the male genitals—though, for some reason, he was happy enough to do the female's. He even saved a piece of skin, so we had a good idea of its texture. We weren't always so lucky."

The one thing Steller couldn't do was save the sea cow itself. Already hunted to the brink of extinction, it would be gone altogether within twenty-seven years of Steller's discovery of it. Many other animals, however, couldn't be included because too little is known about them. The Darling Downs hopping mouse, Chatham Islands swan, Ascension Island flightless crane, at least five types of large turtle, and many others are forever lost to us except as names.

A great deal of extinction, Flannery and Schouten discovered, hasn't been cruel or wanton, but just kind of majestically foolish. In 1894, when a lighthouse was built on a lonely rock called Stephens Island, in the tempestuous strait between the North and South Islands of New Zealand, the lighthouse keeper's cat kept bringing him strange little birds that it had caught. The keeper dutifully sent some specimens to the museum in Wellington. There a curator grew very excited because the bird was a relic species of flightless wrens—the only example of a flightless perching bird ever found anywhere. He set off at once for the island, but by the time he got there the cat had killed them all. Twelve stuffed museum species of the Stephens Island flightless wren are all that now exist.

At least we have those. All too often, it turns out, we are not much better at looking after species after they have gone than we were before they went. Take the case of the lovely Carolina parakeet. Emerald green, with a golden head, it was arguably the most striking and beautiful bird ever to

live in North America—parrots don't usually venture so far north, as you may have noticed—and at its peak it existed in vast numbers, exceeded only by the passenger pigeon. But the Carolina parakeet was also considered a pest by farmers and easily hunted because it flocked tightly and had a peculiar habit of flying up at the sound of gunfire (as you would expect), but then returning almost at once to check on fallen comrades.

In his classic *American Ornithology*, written in the early nineteenth century, Charles Willson Peale describes an occasion in which he repeatedly empties a shotgun into a tree in which they roost:

At each successive discharge, though showers of them fell, yet the affection of the survivors seemed rather to increase; for, after a few circuits around the place, they again alighted near me, looking down on their slaughtered companions with such manifest symptoms of sympathy and concern, as entirely disarmed me.

By the second decade of the twentieth century, the birds had been so relentlessly hunted that only a few remained alive in captivity. The last one, named Inca, died in the Cincinnati Zoo in 1918 (not quite four years after the last passenger pigeon died in the same zoo) and was reverently stuffed. And where would you go to see poor Inca now? Nobody knows. The zoo lost it.

What is both most intriguing and puzzling about the story above is that Peale was a lover of birds, and yet did not hesitate to kill them in large numbers for no better reason than that it interested him to do so. It is a truly astounding fact that for the longest time the people who were most intensely interested in the world's living things were the ones most likely to extinguish them.

No one represented this position on a larger scale (in every sense) than Lionel Walter Rothschild, the second Baron Rothschild. Scion of the great banking family, Rothschild was a strange and reclusive fellow. He lived his entire life in the nursery wing of his home at Tring, in Buckinghamshire,

using the furniture of his childhood—even sleeping in his childhood bed, though eventually he weighed three hundred pounds.

His passion was natural history and he became a devoted accumulator of objects. He sent hordes of trained men—as many as four hundred at a time—to every quarter of the globe to clamber over mountains and hack their way through jungles in the pursuit of new specimens—particularly things that flew. These were crated or boxed up and sent back to Rothschild's estate at Tring, where he and a battalion of assistants exhaustively logged and analyzed everything that came before them, producing a constant stream of books, papers, and monographs—some twelve hundred in all. Altogether, Rothschild's natural history factory processed well over two million specimens and added five thousand species of creature to the scientific archive.

Remarkably, Rothschild's collecting efforts were neither the most extensive nor the most generously funded of the nineteenth century. That title almost certainly belongs to a slightly earlier but also very wealthy British collector named Hugh Cuming, who became so preoccupied with accumulating objects that he built a large oceangoing ship and employed a crew to sail the world full-time, picking up whatever they could find—birds, plants, animals of all types, and especially shells. It was his unrivaled collection of barnacles that passed to Darwin and served as the basis for his seminal study.

However, Rothschild was easily the most scientific collector of his age, though also the most regrettably lethal, for in the 1890s he became interested in Hawaii, perhaps the most temptingly vulnerable environment Earth has yet produced. Millions of years of isolation had allowed Hawaii to evolve 8,800 unique species of animals and plants. Of particular interest to Rothschild were the islands' colorful and distinctive birds, often consisting of very small populations inhabiting extremely specific ranges.

The tragedy for many Hawaiian birds was that they were not only distinctive, desirable, and rare—a dangerous combination in the best of circumstances—but also often heartbreakingly easy to take. The greater koa finch, an innocuous member of the honeycreeper family, lurked shyly in the canopies of koa trees, but if someone imitated its song it would abandon

don its cover at once and fly down in a show of welcome. The last of the species vanished in 1896, killed by Rothschild's ace collector Harry Palmer, five years after the disappearance of its cousin the lesser koa finch, a bird so sublimely rare that only one has ever been seen: the one shot for Rothschild's collection. Altogether during the decade or so of Rothschild's most intensive collecting, at least nine species of Hawaiian birds vanished, but it may have been more.

Rothschild was by no means alone in his zeal to capture birds at more or less any cost. Others in fact were more ruthless. In 1907 when a well-known collector named Alanson Bryan realized that he had shot the last three specimens of black mamos, a species of forest bird that had only been discovered the previous decade, he noted that the news filled him with "joy."

It was, in short, a difficult age to fathom—a time when almost any animal was persecuted if it was deemed the least bit intrusive. In 1890, New York State paid out over one hundred bounties for eastern mountain lions even though it was clear that the much-harassed creatures were on the brink of extinction. Right up until the 1940s many states continued to pay bounties for almost any kind of predatory creature. West Virginia gave out an annual college scholarship to whoever brought in the most dead pests—and "pests" was liberally interpreted to mean almost anything that wasn't grown on farms or kept as pets.

Perhaps nothing speaks more vividly for the strangeness of the times than the fate of the lovely little Bachman's warbler. A native of the southern United States, the warbler was famous for its unusually thrilling song, but its population numbers, never robust, gradually dwindled until by the 1930s the warbler vanished altogether and went unseen for many years. Then in 1939, by happy coincidence two separate birding enthusiasts, in widely separated locations, came across lone survivors just two days apart. They both shot the birds, and that was the last that was ever seen of Bachman's warblers.

The impulse to exterminate was by no means exclusively American. In Australia, bounties were paid on the Tasmanian tiger (properly the thylacine), a doglike creature with distinctive "tiger" stripes across its back,

until shortly before the last one died, forlorn and nameless, in a private Hobart zoo in 1936. Go to the Tasmanian Museum today and ask to see the last of this species—the only large carnivorous marsupial to live into modern times—and all they can show you are photographs. The last surviving thylacine was thrown out with the weekly trash.

I mention all this to make the point that if you were designing an organism to look after life in our lonely cosmos, to monitor where it is going and keep a record of where it has been, you wouldn't choose human beings for the job.

But here's an extremely salient point: we have been chosen, by fate or Providence or whatever you wish to call it. As far as we can tell, we are the best there is. We may be all there is. It's an unnerving thought that we may be the living universe's supreme achievement and its worst nightmare simultaneously.

Because we are so remarkably careless about looking after things, both when alive and when not, we have no idea—really none at all—about how many things have died off permanently, or may soon, or may never, and what role we have played in any part of the process. In 1979, in the book *The Sinking Ark*, the author Norman Myers suggested that human activities were causing about two extinctions a week on the planet. By the early 1990s he had raised the figure to some six hundred per week. (That's extinctions of all types—plants, insects, and so on as well as animals.) Others have put the figure even higher—to well over a thousand a week. A United Nations report of 1995, on the other hand, put the total number of known extinctions in the last four hundred years at slightly under 500 for animals and slightly over 650 for plants—while allowing that this was "almost certainly an underestimate," particularly with regard to tropical species. A few interpreters think most extinction figures are grossly inflated.

The fact is, we don't know. Don't have any idea. We don't know when we started doing many of the things we've done. We don't know what we are doing right now or how our present actions will affect the future. What we do know is that there is only one planet to do it on, and only one

species of being capable of making a considered difference. Edward O. Wilson expressed it with unimprovable brevity in *The Diversity of Life*: "One planet, one experiment."

If this book has a lesson, it is that we are awfully lucky to be here—and by "we" I mean every living thing. To attain any kind of life in this universe of ours appears to be quite an achievement. As humans we are doubly lucky, of course: We enjoy not only the privilege of existence but also the singular ability to appreciate it and even, in a multitude of ways, to make it better. It is a talent we have only barely begun to grasp.

We have arrived at this position of eminence in a stunningly short time. Behaviorally modern human beings—that is, people who can speak and make art and organize complex activities—have existed for only about 0.0001 percent of Earth's history. But surviving for even that little while has required a nearly endless string of good fortune.

We really are at the beginning of it all. The trick, of course, is to make sure we never find the end. And that, almost certainly, will require a good deal more than lucky breaks.

#### CHAPTER 1 HOW TO BUILD A UNIVERSE

PAGE	
9	"Protons are so small that..." Bodanis, <i>E = mc<sup>2</sup></i> , p. 111.
9	"Now pack into that tiny, tiny space..." Guth, <i>The Inflationary Universe</i> , p. 254.
10	"about 13.7 billion years..." <i>U.S. News and World Report</i> , "How Old Is the Universe?" August 18–25, 1997, pp. 34–36; and <i>New York Times</i> , "Cosmos Sits for Early Portrait, Gives Up Secrets," February 12, 2003, p. 1.
10	"the moment known to science as $t = 0$ ," Guth, p. 86.
11	"They climbed back into the dish..." Lawrence M. Krauss, "Rediscovering Creation," in <i>Shore, Mysteries of Life and the Universe</i> , p. 50.
11	"an instrument that might do the job..." Overbye, <i>Lonely Hearts of the Cosmos</i> , p. 153.
11	"They had found the edge of the universe..." <i>Scientific American</i> , "Echoes from the Big Bang," January 2001, pp. 38–43; and <i>Nature</i> , "It All Adds Up," December 19–26, 2002, p. 733.
12	"Penzias and Wilson's finding pushed our acquaintance..." Guth, p. 101.
12	"about 1 percent of the dancing static..." Gribbin, <i>In the Beginning</i> , p. 18.
13	"These are very close to religious questions..." <i>New York Times</i> , "Before the Big Bang, There Was..." May 22, 2001, p. F1.
13	"or one 10 million trillion trillion trillionth..." Alan Lightman, "First Birth," in <i>Shore, Mysteries of Life and the Universe</i> , p. 13.
14	"He was thirty-two years old..." Overbye, p. 216.
14	"The lecture inspired Guth to take an interest..." Guth, p. 89.
14	"doubling in size every $10^{34}$ seconds." Overbye, p. 242.