The story of evolution: right on or all wrong? Variation doesn't always mean progress.

Darwin at large

Full House: The Spread of Excellence from Plato to Darwin
By Stephen Jay Gould
New York: Harmony Books
$25, 256 pages

Climbing Mount Improbable
By Richard Dawkins
New York, London: W. W. Norton
$25, 288 pages

Ever since the publication of Charles Darwin's *The Origin of Species* in 1859, most societies—without rejecting it outright—have reworked his theory of evolution to suit their own needs. In the former Soviet Union, for example, Stalin had his own peculiar version of Darwinism: "Marxism rests on Darwinism and regards it uncritically," he wrote in *Anarchy and Society*. "Darwin dialectically understood development, including revolution." By pandering to history's greatest murderer, the semiliterate peasant botanist Lysenko was elevated to the top of the heap of Soviet scientists. Cross-breeding Darwinism with dialectical materialism, Lysenko "proved" wheat crops could be reëducated to triple their yields. His Creative Soviet Darwinism held that characteristics acquired during individuals' lifetimes could be passed on to progeny. It rejected Mendelian heredity, natural selection in intraspecies competition, genetics, and, in the end, Darwin himself. Lysenko boasted, "Darwinism is not only being cleared of mistakes, not only attaining a higher level, but in large measure is also changing a number of its propositions. The transformation of one species into another occurs at a single leap by means of retraining."

Soviet Darwinism is a particularly grotesque example of a trend that Stephen Jay Gould calls "Darwin among the spin doctors." In his new book *Full House*, Gould examines how human beings tell evolution's story in order to find authority for their most cherished beliefs. Citing both fellow scientists and pop gurus as culprits, he says that while many of us have nominally accepted the immensity of deep geological time and the essential factuality of evolution, we nevertheless cling to one final consoling lie: that evolution embodies progress, which we define as some tendency toward increases in anatomic complexity or size or specialization or behavioral flexibility or neurological elaboration. We desire that universal history display such an overarching thrust so we can tell ourselves that from time's beginning, humankind was the inevitable culmination of everything.

The illusion of progress

Throughout *Full House*, Gould returns again and again to this grace note: "Progress is, nonetheless, a delusion based on social prejudice and psychological hope engendered by our unwillingness to accept the plain (and true) meaning. We grasp at the straw of progress (a desiccated ideological twig) because we are still not ready for the Darwinian revolution."

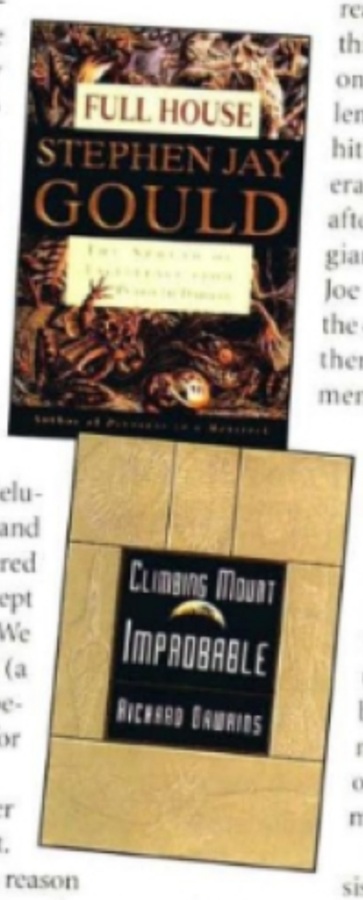
Gould wants us to reconsider deeply rooted habits of thought. To persuade us that there is no reason to believe in evolutionary progress, he explains a subject that normally renders most of us glassy-eyed with boredom: statistics. But he makes it fascinating with two great real-life hooks.

The first relates how, at age 40, Gould found himself diagnosed with a rare cancer that had an "eight-month median mortality." After his initial shock, he considered the prognosis and reasoned that, by definition, half the distribution of deaths would be compressed into the "left half" of the curve between the minimum value (dropping dead at diagnosis) and the median. The "right half," however, might extend into extreme old age. Researching, he found that indeed his disease was not invariably fatal. And Gould reckoned that as he was young and strong, had access to the best possible medical care, and had been diagnosed early, he might be placed somewhere far along the "right."

As it happened, an experimental treatment worked. Fourteen years later, Gould is still going strong.

Curveball

While convalescing, Gould occupied himself with a statistical study in another realm. Occupying a quarter of this book, it provides his second real-life hook: the problem of why baseball's highest hitting standard, the 0.400 average, vanished from the game after 1941. Was it simply that giants—Babe Ruth, Shoeless Joe Jackson, Ty Cobb—strode the earth in olden days? Or has there been overall improvement in every aspect of the game—including the elements of pitching, fielding, and managing—so that hitting has had tougher competition? And if the latter is the case, why should hitting be uniquely exempt from baseball's general improvement, especially as averages of average players have remained constant?



Gould's statistical analysis revealed a symmetrically shrinking variation in batting averages. From this he eventually established that

today's average players are superior to those of previous decades and that the rise in general performance means the very best players are that much nearer the right end of the bell curve: "A right wall must exist. . . . We cannot, after all, perform beyond the limits of what human bone and muscle can accomplish." The true picture can be grasped only through this way of looking at things, which tracks changes in the variation of all components.

Biology is like baseball, Gould says. We need to consider life in the "full house" of its variations. Viewed thus, the left wall of minimal organic complexity means that the only open direction for variation is rightward. Causality lies at the left wall, while the right tail (which we inhabit) is only a consequence of life's inevitable motion leftward. But the vast majority of successful life continues to reside in the bacterial mode, as it always has done, and scientists have yet to measure any inherent bias toward complexity or progress—only toward variation.

Darwin himself initially resisted the word *evolution*, preferring *descent with modifications*. He once said: "After long reflection, I cannot avoid the conviction that no innate tendency to progressive development exists." Nevertheless, as a progressive Victorian gentleman, he suggested progress might result from natural selection in interspecies and intraspecies competition. Gould states, "Darwin, the intellectual radical, knew what his own theory entailed and implied, but could not undermine the defining principle of a culture to which he felt such loyalty."

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For Gould, the power that the idea of progress holds over us is a snare that leads to the "reductionist assumption that the Darwinian natural paradigm will fully encompass our social and technological history." The results: pernicious doctrines like social and Soviet Darwinism. In *Full House*'s final chapter, Gould suggests we also need to reconsider standards in the creative arts that award greatness only to those devising novel styles, because the likelihood is that human neurology provides a "right wall" in the range of accessible styles.

We're all replicants

Richard Dawkins is more the conventional Darwinian hard-liner. In his new book *Climbing Mount Improbable*, he unequivocally declares, "Natural selection is a nonrandom process, pushing toward improvement." Still, like Gould, he rejects the belief that humanity is anything other than a highly unlikely consequence of life's

movement toward complexity. And like Gould, who helped formulate the theory of punctuated equilibrium, Dawkins built his reputation on his "selfish gene" concept, in which DNA constitutes a kind of single being pouring itself into the temporary receptacles that are the forms of insects and fish, animals and human beings. "DNA, building its robot vehicles to ride around in, has evolved various extraordinary digressions—elephants, flowers, ourselves—as elements of its fundamental self-replicating program."

From sharp eyes to strong noses

Climbing Mount Improbable paints pictures of the development of these digressions. For example, according to Dawkins, eyes have evolved probably more than 60 times independently in various parts of the animal kingdom. Elephant trunks have 50,000 muscles. Our three mammalian ear bones—called the hammer, the anvil, and the stirrup—are descended from three bones that formed the jaw joint in our reptilian ancestors. Readers will also learn about computer fish running in slow time, spiderwebs and male spider sex ploys, kaleidoscopic embryology, light-sensitive cells in butterflies' genitals, and much else.

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Near his book's end, Dawkins duplicates a speculation from *Full House*'s last chapter: either intelligent life around other stars is unlikely or else it rises often but is inherently self-destructive because technological capacity outstrips restraint. In other words, our cerebral elaboration may be an evolutionary dead-end. Otherwise, where is everybody? Why haven't we heard from them?

It seems strange that neither author—especially Gould, who believes in a neo-Lamarckian acceleration of evolutionary development through technology—considers a third possibility: knowledge changes its accumulator. As intelligent races acquire knowledge, might they not transcend—through genetic engineering, augmentation with machine intelligence, whatever—their previous natures? Might not such races regard us as having the interest value of, at best, transitional forms?

In the meantime, science-fictional notionalizing aside, our contemporary culture isn't in bad shape if it produces notable scientists who can write like Dawkins and Gould. Dawkins's book is worthy. Gould's—contrarian, brilliant—transcends normal science writing and may have the power to change readers' minds permanently.

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