RETROSPECTIVE EVOLUTION

# Stephen Jay Gould (1941–2002)

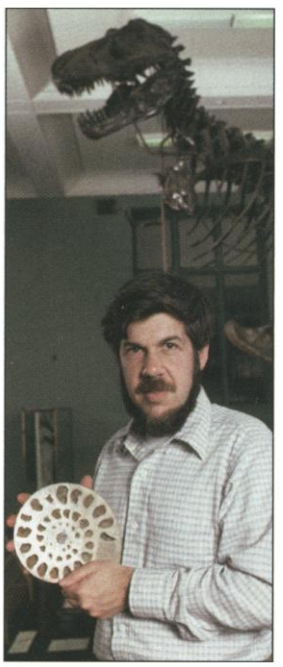
Richard A. Fortey

Twenty years ago I was sitting at my desk in the Natural History Museum, London, when a colleague burst into the room and announced that Stephen Jay Gould was dead. The news had traveled around the world on the scientific grapevine; we were all devastated. It was, it turned out, untrue. Steve had been gravely ill with an abdominal mesothelioma—one of the nastiest cancers there is—but he was one of the few to be spared, albeit by a whisker. But the hushed tones of my friend were an indication of the esteem in which he was held even then; he was the brightest star on the paleontological firmament. Over the ensuing 20 years, the light never dimmed.

He was one of the few scientific intellectuals to whom the overworked phrase "Renaissance man" could be applied without blushing. As essayist, historian, and author, his influence on the wider cultural scene was exceptional. He was a prime example of the cultivated Harvard academic, in the mould of J. K. Galbraith and Ernst Mayr. The mystery to his colleagues was how one who wrote so much could possibly find time to read so widely: from esoteric 18th-century tracts to the latest molecular and genetic literature, he seemed to know it all. A few months before his death his last, massive work, *The Structure of Evolutionary Theory* (*1*), appeared, summarizing his thoughts on evolution (the mere thought of reading its 1400 pages is intimidating). It is almost as if the reappearance of cancer was held in check by force of will until this book, his magnum opus, was completed.

He contributed to biological debates in so many ways that almost any selection from his output is bound to be arbitrary. Certainly, his development, together with Niles Eldredge, of what came to be known as the theory of "punctuated equilibrium" changed the way researchers looked at the fossil record during the 1970s and 1980s. The notion that species endured with little change, and that speciation occurred during short-lived events, sent geologists and paleontologists scurrying back into the field to log examples, and to test the ideas for themselves. It had the effect of reintroducing paleontology to the evolutionary debate; it is scarcely surprising that Gould soon became a leading figure in this branch of science. Arguments continue about the theory—some well-supported examples are now known of the converse "gradualistic" mode, and the deconstruction of "punctuation" by population geneticists has been vigorous. But Gould's legacy is the dialogue that now exists between the macroscopic world of the fossil hunter, and the microevolutionary world of those interested in fruit flies and selection.

Many regard his book *Ontogeny and Phylogeny* (*2*) as his most lasting work. With typical historical scholarship, he reinterpreted the hoary adage "ontogeny recapitulates phylogeny" by clearly unpicking the different trajectories of morphological development in a range of organisms. He clarified what pedomorphosis really means (the appearance of "larval" characteristics in the adults of descendant species) and gave scientists a new vocabulary for describing the appearance of features during development. Papers on heterochrony (the timing of the appearance of developmental features) subsequently proliferated in the journals. Now that *Hox* genes are seen as the masters of development, Gould's insights should be incorporated into the emerging field of "evo-devo." To be sure, there are as many critics of the significance of Gould's contribution to this field as there are with punctuated equilibria, but few would question that morphogenesis lies at the heart of understanding the adaptive program.



Gould's political views were consistently to the left, and his philosophy might be best summarized as secular humanism. On fundamentals, he was not so far removed from some of his most trenchant critics, such as Richard Dawkins. Perhaps the book that exemplifies his deep humanism is *The Mismeasure of Man* (*3*), in which he illustrated the abuse of the scientific method. In the 19th century, measures of cranial proportions were adduced as evidence of the inferiority of African and North American native peoples, and in the past century the theory of Aryan superiority was based upon a perverted anthropology. When issues of individual liberty were at stake, Gould was acutely aware of how authoritarian regimes recruit sycophants to their service, including some of our own profession. He believed that scientists, like poets, should be on the side of intellectual freedom.

Although we will have to wait on the judgment of history to appraise his scientific contribution, few would question Gould's mastery as an essayist. The essays altogether lack the wordiness that can affect his scientific writing. Gould can be mentioned in the same breath as one of his heroes, J. B. S. Haldane (another principled polymath). His long series of articles in *Natural History* sold prodigiously in collected form around the world (*4*). They probably did more for the recruitment of young biologists into the trade than any number of TV programs and recruitment drives. I have met a dozen young scientists who claimed him as their inspiration. At the final count, this is probably as important as anything else he achieved.

Stephen Jay Gould has been described as arrogant. It would not have been surprising if he were, given the corrupting adulation that so often attends fame in the United States—but I never noticed it. I disagreed profoundly with the conclusions of his examination of the Cambrian evolutionary "explosion" made famous in his book *Wonderful Life* (*5*), especially his interpretation of the disparity of design of the fossils found in those ancient strata. Although the arguments batted to and fro, as they do, Steve Gould remained charming and civilized on a personal level. He was, I believe, rather more restrained with his intellectual enemies than they were with him. It is a mark of the same civilized mind that he maintained two fee levels for lectures: Often he would talk to a small society gratis, while charging the full whack to a well-heeled organization. He would always spare time to take a visiting scientist out to lunch in Cambridge, and he was attentive to what the guest had to say.

Stephen Jay Gould died last month at the age of 60. There is nobody who can replace his humanity, erudition, and eloquence. It is going to be difficult to manage without him.

The author is at the Institute for Advanced Studies, Bristol BS8 1UJ, UK. E-mail: r.fortey@bristol.ac.uk

**References**

1. S. J. Gould, *The Structure of Evolutionary Theory* (Harvard Univ. Press, Cambridge, MA, 2002).
2. _____, *Ontogeny and Phylogeny* (Harvard Univ. Press, Cambridge, MA, 1977).
3. _____, *The Mismeasure of Man* (Norton, New York, 1981).
4. _____, *I Have Landed: The End of a Beginning in Natural History* (Harmony, New York, 2002).
5. _____, *Wonderful Life. The Burgess Shale and the Nature of History* (Norton, New York, 1989).