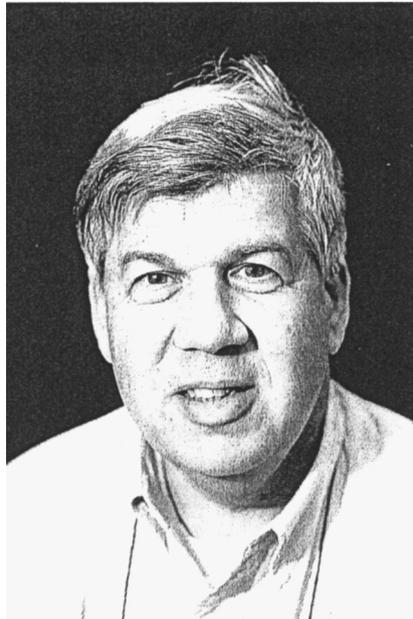


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MEMORIAL

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STEPHEN J. GOULD (1941–2002): A personal reflection on his life and work

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In his memorial for George Gaylord Simpson, Steve Gould quoted Cassius' assessment of Julius Caesar: "Why, man, he doth bestride the narrow world like a Colossus; and we petty men walk under his huge legs, and peep about" (1985a). These were the first words that occurred to me when I learned of Steve's death on May 20, 2002.

Steve was indeed a Colossus. He accomplished the equivalent of several normal lifetimes of work; had he only been a popular writer and lecturer or only worked on island land snails or only written *Ontogeny and Phylogeny* or only co-authored the theory of punctuated equilibrium, he would have been considered to have had a very successful career. But he did all of these and much more. One hardly knows how to begin to assess such a legacy.

Since his death, many commentators have focused on Steve the essayist. Certainly, his 27-year run with *Natural History* magazine is one of the most remarkable literary achievements of recent times in any discipline. These essays exposed thousands, perhaps millions, of people to paleontology and evolutionary biology who would otherwise probably not have given these subjects much thought. He once said that he thought there were a lot of people who subscribed to *Natural History* just so they could say they read it; perhaps, but his achievement of making paleontology a cocktail party subject was nevertheless remarkable.

Yet I believe that history will conclude that Steve Gould's greatest accomplishment was not popular, but technical. I believe he will be remembered most for what he did to the sciences of paleontology and evolutionary biology, not mostly for explaining these subjects to the lay reader. Although many other workers contributed to the rebirth of paleontology in the 1970s, it was clearly Steve who led the charge and served as principal spokesperson for making the fossil record newly relevant to biologists,

making "paleobiology" a household word within our field, and bringing us to the "high table" of evolutionary biology. He was thereby fundamental in changing our entire discipline. In my view, Steve accomplished this in three distinct but closely related ways.

First, he took the idea of punctuated equilibrium that Niles Eldredge and he developed in the late 1960s and quickly extrapolated it into a comprehensive and internally coherent and logical world view (he would undoubtedly have preferred "*Weltanschauung*"). Lots of us have good ideas and flashes of insight; few of us have the ability or energy to connect those ideas to all other ideas and forge a new way of seeing the world.

Punctuated equilibrium is (still) so often oversimplified, misunderstood, and misrepresented, even by professionals, that the logical consistency of its basic argument and the extension of that argument to macroevolution are missed more often than they are comprehended. Yet the logic is, as Steve always argued, "inexorable" (Gould, 1993): if one accepts Mayrian peripatry as a mode of speciation, then it follows that speciation will appear abrupt on geological timescales, speciation will be the locus of most evolutionary change, species originate and go extinct and therefore act as "individuals," and long-term trends are mainly the result not of gradual change within populations guided by directional natural selection but the sorting of species. Some of this may be empirically incorrect, but contrary to the critics (e.g., Ridley, 2002) it all logically follows, and it is certainly not "so confused as to be hardly worth bothering with" (Maynard Smith, 1995).

Second, he explored the limits of ideas, and ran them to their logical extremes, very quickly. This occasionally, maybe even

frequently, led to him overshooting what even he probably knew was likely the correct answer. This was the source of some of his most incendiary statements, such as that the Modern Synthesis “as a general proposition, is effectively dead” (1980), that Goldschmidt was more right than he was wrong (1982), that mass extinction was a coherent “third tier” of a comprehensive macroevolutionary view (1985b). This habit of hyperbole regularly infuriated his critics and frequently baffled his students, but in retrospect it is clear that this method of argument was a powerful one. By quickly jumping to the endpoint of the story, Steve got our attention and challenged us to think about things we hadn’t before. So we went out and tested them. Some of his most cherished ideas (e.g., hierarchy) have not fared particularly well so far as a result; others (e.g., stasis, heterochrony) are now essentially part of the cannon.

Third, Steve wrote in such a way as to magnify the impact of his ideas. His writing was both incredibly prolific (he had the energy and drive to write down and publish a huge proportion of his very free-ranging thoughts) and cleverly repetitive (he kept coming back to the same themes again and again from different points of view). He was quite conscious and proud of both of these traits. He once said he hated to waste an idea by not writing something about it, and he described himself as an “urchin in the storm” for what he called his “personal, stubborn consistency of viewpoint” (1987). Steve’s ideas would have been stimulating in any case, but cascading over us all as often and as forcefully as they did forced us to pay more attention than we might have otherwise. It is important to remember in this context that Steve frequently said that he saw no distinction between his technical and popular writing; in both his popular and his technical work he was “most moved by general themes,” but found them “vacuous unless rooted in some interesting particular” (1987, p. 10). This was true of cathedrals and snails, Darwin and dinosaurs.

He may, alas, have succeeded too well. He wrote so much—and so much of it sounded so similar—that many stopped reading. I am often struck by how few of his papers students and colleagues in paleontology and especially in biology have actually read. And this is a real shame. In surveying his “popular” writing, from *Natural History* to the *New York Review of Books* to the *New York Times* to *Science for the People*, one is awestruck by the breadth of it all. Much of this may have been written for the non-scientist, but I have a feeling that scientists would be the chief beneficiary of reading it. Essays about the poem on the base of the Statue of Liberty or the political use of Darwinism or the light in the south transept of Chartres enormously expand our view of what we do as scientists and why, and, perhaps most importantly, serve as a model for what all of us should be able to elucidate to our students and fellow citizens.

The most troubling part of what one might call the non-reading of Steve Gould, however, is the ultimate fate of his magnum opus (if ever a work deserves this over-used sobriquet, it is this one), *The Structure of Evolutionary Theory* (2002). This book is a grand and awe-inspiring romp if you more or less know where he is going. It actually pulls it all together and paints a breathtakingly coherent view of how evolution works and why paleontology is uniquely suited to add to the discussion of it. But the book is also so inflated and baroque in its execution that I fear that those who do not understand it in advance may well give up and not see the overarching vision in those 1,400 pages. I don’t agree with everything in this book, but I plan on assigning pieces of it as often as I can.

One digression: Amidst all of his theoretical work and the controversies it generated, Steve was sometimes criticized for using but not “doing” or even appreciating systematics. Nothing could have been farther from the truth; he was in fact a great champion of systematics in all its forms. It’s true that doing descriptive

systematics was not the centerpiece of his career (I recall a chorus of grumbling from some traditionalists when he published a new species description as an appendix in a paper in *Paleobiology*; “systematics doesn’t belong in an appendix!” they groused). He told me (and, I learned later, many other students) in our first meeting upon arrival in graduate school that it was “OK” if I did systematics in my dissertation, but I could not do “just” systematics; it had to be *for* something. Yet Steve published numerous papers in descriptive systematics of land snails of Bermuda and the Bahamas, and he was in his popular writing and lecturing a tireless advocate for the value and practice of systematics, which was, as he frequently said, “not mere stamp collecting, a perjorative aspersion which this former philatelist deeply resents.” Steve ended what he called a “self-indulgent” essay on *Cerion* with what is still my favorite summary of the beauty and essence of why systematics matters: “But all the frustration and dull, repetitive effort [of field work] vanish to insignificance before the unalloyed joy of finding something new—and this pleasure can be savored nearly every day if one loves the little things as well. To say, ‘We have discovered it; we understand it; we have made some sense and order of nature’s confusion.’ Can any reward be greater?” (1983, p. 21).

All of this stunning scientific productivity was done by someone who, in dramatic contrast to Simpson, trained numerous graduate students—at least 30 PhDs in geology, biology, and the history or philosophy of science over 30 years. Steve taught his students how to be not only researchers, but teachers and professional intellectuals in our field. He taught us to value knowledge for its own sake in all its guises; that “teaching is half theater”; that we must know and teach big ideas as well as details; that dumbing down was not necessary to communicate complex ideas to students or the general public; that even in the bitterest of debates ad hominem nastiness was never justified. He imbued us with an appreciation of—indeed, the essential value of understanding—the history of ideas, not least of all those at the very core of our discipline. His advice to me on preparing for my oral exam was to read “widely” in evolutionary theory and, he added as almost an afterthought, also the introductions to all the volumes of the *Treatise on Invertebrate Paleontology*.

Steve was also the greatest promoter and explainer of Darwin since Huxley and he taught us all more about Lyell, Cuvier, Hutton, Buffon, and countless other intellectual luminaries of our past—and why they really mattered—than anyone ever has. He taught historical scientists to respect themselves, and equipped us with the rhetoric to defend ourselves from assaults by reductionists and science-phobes.

As almost everyone knows, Steve was not a modest person. My own favorite example of his hubris is the time I told him that PRI’s founder Gilbert Harris was noteworthy for having had more graduate students who went on to win the Paleontological Society Medal than any other individual, and he quickly said that Norman Newell (his own advisor) would certainly exceed Harris eventually. Steve knew he was arrogant, but he also believed that he was humble where it mattered, in the world of ideas. He once wrote that “the most important lesson that every decent scholar must learn sooner or later” was humility. He then added, giving a hint of the internal complexity of this remarkable man: “Some who know me might deny that I have ever encountered such a notion, but external appearance and internal conviction do not always match, and only the latter is a constant companion” (1990, p. 35).

“Some people,” Steve once wrote (referring to Sewall Wright), “win our admiration for sheer persistence.” He continued, in what may be his own best epitaph: “When... such persistent consistency combines with true brilliance, then we can only recall

Emerson's quip: 'Beware when the great God lets loose a thinker on this planet'" (1988, p. 273).

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