Stephen Jay Gould (1941–2002): a critical appreciation

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On May 20th, Biology lost one of her best known, influential and controversial figures, the evolutionary biologist Stephen Jay Gould, who died of cancer, age 60. His death followed by only a few months the publication of his magnum opus, *The Structure of Evolutionary Theory*, a book that had been in the making for two decades. In its obituary, *The New York Times* hailed him as "perhaps the best known [evolutionary biologist] since Charles Darwin".

That assessment is accurate but it does not even begin to hint at the multiplicity of paths by which he achieved such prominence. Professionally, he began life as a paleontologist and paleontology remained his scientific foundation. In addition, he remained a fine field biologist throughout his career. Yet, from his early thirties onwards, he added many other roles. These included: student of allometry and heterochrony; essayist and public educator; historian, philosopher and sociologist of science; scourge of both so-called "Creationist Science" and those who would misuse intelligence testing for political purposes; media star; and combative participant within the scientific community in various debates about evolutionary theory. Less visibly, he provided a key stimulus for the beginnings of modern evolutionary developmental biology, through his scholarly classic, *Ontogeny and Phylogeny* (1977). Comparably, a second book, his popular *Wonderful Life* (1989), brought a much wider recognition and discussion of the intriguing problems of animal origins posed by the Cambrian explosion than had existed previously.

Given his range of interests and activities, it is hardly surprising that as a personality, he was equally protean, with virtues, contradictions and flaws in abundance. Depending upon your point of view, he was either a *wünderkind* or an *enfant terrible*. Without question, he was a charter member of the Scientific Establishment (via his chair at Harvard, membership in the National Academy of Sciences, and presidency of the American Association for the Advancement of Science). Yet he seemed to see himself as an iconoclastic David, aiming his slingshot at the Goliath of scientific orthodoxy. He did not advertise his politics but they were clearly left-of-centre and he was reputedly both socialist, and more specifically, Marxist in his sympathies. Yet the lecture fees that he charged seemed to reflect a robust acquisitive instinct rather than a socialist one and his antipathy to ideas of deterministic historical outcomes and inevitable progress was most un-Marxian.

Furthermore, the disjunction between the private and public Stephen Jay Goulds was equally striking. In private conversation, he was a good listener, straightforwardly modest about things he did not know about, and warm and supportive of persons and ideas about which he was enthusiastic. His love of life was palpable and his interest in and knowledge about nearly everything were legendary. The personal tributes to him, on the 25th anniversary of his *Natural History* column, "This View of Life" (see "This view of Stephen Jay Gould", *Natural History*, 1999; 108; 48-56) bear ample testimony to what a good friend and intellectual companion he could be. In his public appearances, however, he not infrequently came across as arrogant, bombastic, and highly self-congratulatory, the latter quality also appearing with irksome frequency in his writings. Furthermore, he was all to ready to saddle up his favourite hobbyhorses, sometimes when it was far from appropriate to do so. For instance, at the 1993 meeting at Trinity College in Dublin, to commemorate the lectures by Erwin Schrödinger that became the basis of Schrödinger's book, *What is Life*, Gould used the occasion to depict Schrodinger as a typical product of the outmoded gradualist, progressivist mind-set that was Gould's special bete-noir. This was not only inappropriate to the occasion but also far from accurate. Schrödinger, in one of his essays, described why evolution should be expected to proceed, at times, in rapid bursts.

Of course, what might be deemed the flaws of Gould's public personality were integral to his success as a public educator. His arrogance and extroversion helped make him a lively, confident speaker whose enthusiasm for his subject was infectious. Had he spoken in the more conventional, neutered prose of the cautious academic, he never would have had the public impact that he did. He raised public awareness of and interest in evolutionary biology more successfully than anyone since T.H. Huxley, who, unsurprisingly, was one of his heroes.

At the same time, his mode of presentation was highly irritating to many individuals in his community of peers, especially in Britain, several of whose most prominent evolutionary

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biologists virtually disdained him. They perceived him as a somewhat woolly thinker who had managed to punch above his intellectual weight, to fame and fortune, through sheer rhetorical fire-power. Though one of Gould's themes was the influence of general cultural world-views on the shaping of scientific ideas, his own career may have illustrated how the cultural conditioning of one's mode of expression—he was unambiguously American in his speaking style—might influence the way ideas are received. Sometimes the messenger is in danger of being shot because of the impression he makes, even before he delivers his news.

The central difficulty that the reception of his ideas faced, however, stemmed from questions about their validity. Those ideas, in particular his and Niles Eldredge's theory of punctuated equilibrium and the idea that species themselves are units of selection (the central thesis of *The Structure of Evolutionary Theory*) were highly controversial. With respect to punctuated equilibrium, one may even question whether the idea is a theory or simply a description of a pattern. Indeed, even if it should eventually be validated as a description of a general pattern, the nature of its genetic-evolutionary basis would become a pressing issue. Steve's ideas on the latter subject were all over the place, although he never explicitly acknowledged the shifts in his position. Oddly, Ernst Mayr's 1954 specific genetic hypothesis on why speciation may happen rapidly, which was and is a sensible (though still unproven) mechanism, and which Eldredge and Gould acknowledged as a key inspiration, was not given much attention by them. In addition, Gould's portrayal of Neodarwinian theory as a highly deterministic view of evolutionary change was something of a straw man. Contingency, or chance, or stochasticity, call it what you will, is intrinsic to the Neodarwinian scheme of things. Though he tirelessly championed the importance of contingency, aka chance, in evolutionary history, he was, in reality, emphasizing what might be called Seriously Bad Luck as a factor in species survival. (Though the discoveries about mass extinctions were not his, his stress on their significance in shaping the course of evolutionary history was an important contribution.) As for the reality of species *per se* as units of selection, the questions of what constitute the precise causes and effects in species turnover remain highly contentious matters, to say the least.

In light of these considerations, one cannot help but wonder how important a contributor to evolutionary theory he will be rated in the history of scientific thinking. That is impossible to predict, at this point, since reputations of ideas and persons in Science often rise and fall in unpredictable ways. (At the time of Darwin's death in 1882, for instance, the theory of natural selection was widely regarded as a failure.) Nevertheless, even acknowledging that caution, the odds seem to be against History according Gould a major status as a theorist. Yet, in two respects, at least, he was tremendously important. First, he had a gift for directing attention to subject areas and possibilities that had been neglected. Simply to try to imagine what evolutionary biology during the past 30 years would have been like without him is to realise immediately the scope of his influence. Second, his contributions to the public's awareness of and interest in evolution and in biology more generally are beyond doubt. One may also predict that fifty and 100 years from now, when the more grating aspects of his public persona are, at most, a dim cultural memory, many of his essays will still have the capacity to give pleasure, enlightenment, and stimulation. In this respect, his reputation may well come to resemble that of T.H. Huxley, whose role as public educator looms far larger today than his direct contributions to scientific thinking. Should Steve Gould's place in the history of biology be based principally on that, that would still be a substantial, honourable, and important legacy.