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Author: Prindle, David

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Stephen Jay Gould as a political theorist

David Prindle, Ph.D.

Department of Government
University of Texas at Austin
1 University Station
Austin, Texas 78712-0119
dprindle@mail.la.utexas.edu

ABSTRACT. Before his death in 2002, paleontologist Stephen Jay Gould elaborated a large and inclusive theory of life's change. In this essay I concentrate on the aspects of Gould's vast theory that have the most direct political relevance. I briefly discuss his views on the philosophy of science. I examine the way he combined political values and methodology in a seamless, critical analysis of intelligence-testing and sociobiology. I concentrate most extensively on the impact his "punctuated equilibria" concept has made on contemporary political analysis, and I demonstrate that in their appropriation of this concept political scientists have violated the rules that Gould himself articulated for its use. In closing, I consider the possibility that a comprehensive theory of life, a theory that must include political values, might approach traditional questions of political thought more satisfyingly than has conventional philosophy.

When he died at the young age of sixty in 2002, evolutionary biologist Stephen Jay Gould was arguably the best known natural scientist in the United States and probably the second-best known in the world, after Stephen Hawking. Gould's three hundred consecutive monthly essays in *Natural History* magazine from 1974 to 2000, many of which had been collected into books, had been widely read and worked their way into American public thought in a variety of settings. His 1989 book *Wonderful Life* had become a best-seller. His "personal rule" of composition, that "the concepts of science, in all their richness and ambiguity, can be presented without any compromise, without any simplification counting as distortion, in language accessible to all intelligent people,"¹ successfully implemented, had caused his writings to be popular among non-scientists, even those who fundamentally opposed his worldview, such as Christian creationists.

In this article, however, I will argue that Gould was much more than a theorist of evolutionary biology. It is my thesis that, over the course of three decades of remarkable productivity, he elaborated a meta-philosophy of life's change. Because human beings are part of life,

and because Gould had intense political commitments, this meta-philosophy included within its purview much that was directly relevant to political theorizing. His individual ideas must be interpreted as facets of one large integrated factual and moral system that encompasses a natural-scientific, social-scientific, and normative worldview — in other words, as facets of an ideology. At the end of the paper, I will discuss his relationship to more conventional political philosophy.

The M word

As a public intellectual who never flinched from participating in scientific polemics, Gould spent more than the usual amount of time in the academic spotlight. Many of the ideas he promoted over his career at Harvard became familiar well outside the confines of evolutionary biology, and many became subjects of contention within those confines. As one of the most prolific, and written-about, scientific figures of the last three decades of the twentieth century, he may be dismissed as already overexposed. Whether anything new is left to be said about him at this date is a fair question.

I offer three major justifications for discussing Gould as a political theorist. First, while he and his ideas have been praised and criticized endlessly in the scientific literature and the popular press, those discussing him have rarely or never been political scientists. I am motivated to discuss him because I see that his biological positions were seamlessly connected to his political positions. An explicitly *political* analysis of his thought, while not necessarily unearthing new evidence, might derive value from its freshness of view.

Second, in the year of his death appeared Gould's magnum opus, *The Structure of Evolutionary Theory*, wherein Gould had attempted to summarize his differences with the dominant strain of Darwinian theory, answer various critics of his previous three decades, and evaluate some uses that had been made of his ideas. Thus, we can now see Gould's theoretical edifice whole and begin to consider it. Because it is political as well as biological, that edifice deserves a summary critique.

Third, while the lucidity of Gould's prose may have made him one of the most understood scientists in history, he was and is persistently misunderstood on some issues. The most important of those issues arose from the persistent contention that the basis of his work was Marxism.

It is only necessary to read one of Gould's popular essays to perceive leftist political ideas and values. He consistently argued for human equality, which, in practice, meant arguing against intellectual tendencies that might have furthered racial, sexual, or other less well defined inequalities. He co-authored a famous article with his friend, colleague, and teaching partner, molecular biologist Richard Lewontin, an avowed Marxist.² He was associated during much of his career with the Sociobiological Study Group and Science For the People, two loose organizations of left-wing academics.³ Moreover, in a 1977 essay he made a statement that has often caused his subsequent thought to be dismissed simply as Marxist theory with a biological face.

In discussing the origins of the theory of punctuated equilibria (which I will address shortly), Gould was attempting to explain why he and his co-author Niles Eldredge were intellectually prepared to envision natural selection differently from the way Darwin and many subsequent Darwinists had seen it. Scientific theories, he asserted (although the article was officially co-authored, Gould actually penned it) were always

related to their social context. Scientists applied to their scientific theorizing the styles of logic and models of causation to which they were accustomed in non-scientific areas of life. The orthodox, gradualist interpretation of the fossil record, he argued, was "congenial with some important trends of Western thought," which, from context, we can guess to have been capitalism and reformist, rather than revolutionary, democracy.⁴ Meanwhile, "It may . . . not be irrelevant to our personal preferences that one of us learned his Marxism, literally, at his daddy's knee."⁵

Although the point of this passage was to explain why his mind was prepared for a non-gradualist theory of evolution rather than to endorse a Marxist theory of evolution, and although Eldredge was and is not a Marxist, and although Gould spent much time and ink in subsequent years attempting to explicate the meaning of that sentence in context, this one throw-away line dogged him and his theories for the rest of his days. All of his writing from 1977 onward became associated in a sort of intellectual haze with Marxist theories in the political realm.

The problem of the quick-and-easy political stereotype is well illustrated by my own experience in conversation with a biology graduate student at the University of Texas in 2006. Having been told earlier by another professor about my project, he asked, "So you're writing about Stephen Jay Gould?" When I acknowledged that I was, his eyes narrowed a bit, and he sneered half-jokingly, "Communist biology!" Those two words summed up Gould's reputation among many in his field.

But I must make several points before proceeding. The first is that at least twice Gould disassociated himself from Marxist politics, and he never explicitly endorsed it. His politics, he wrote in *The Structure of Evolutionary Theory*, were "very different from my father's."⁶ After the fall of the Soviet Union, he commented on the "failure and inadequacy" of "Marx's theory of historical stages toward a communist ideal."⁷ Meanwhile, although he sometimes applied specific Marxist concepts (such as "dialectical thinking"⁸) to narrow explanatory purposes, he never, in print, identified himself as a Marxist or recommended Marxism as a general principle of thought.

The second point is that Gould was clearly a scientist first. He bowed to the authority of empirical evidence, not the authority of any party or leader. Both Marxes

(Karl and Groucho) functioned for him as did Sigmund Freud, Mark Twain, Gilbert & Sullivan operettas, both Testaments of the Bible, baseball, and Kurt Vonnegut: useful sources of ideas, metaphors, and quotable phrases, to be used when they helped explicate a scientific argument but never to be regarded as sacred. If he had a loyalty, it was to the “primary methodological criterion of testability,”⁹ and the necessity of at least *potential* falsifiability.¹⁰

Third, while many of Gould’s values and opinions were probably Marxist, he also incorporated other, more distinctly modern, political views. As I will discuss shortly, for example, much of his ethic is of the modern environmentalist sort, putting preservation of the diversity of life at the center of discussion rather than putting class conflict or economic determinism there. For much of what Gould wanted to say, Marxism was anachronistic or counterproductive.

Therefore, while Gould may have been a variety of Marxist in his private thoughts, that putative fact is of limited value in discussing his public mixture of scientific and political ideas. Both his science and his politics are better evaluated on their own terms. His thinking is interesting enough without bringing in adventitious ideologies.

Science and history

Gould wanted his readers to understand that although he admitted to having “literary pretensions,”¹¹ he was not to be thought a mere scientific popularizer. He asked them to see him as a *scientist* who was writing accessibly about science. This self-concept was so important to Gould that he told us he often put “original findings” into his popular essays, and he requested scholars to cite them as readily as they would reference his articles in scientific journals.¹² In this article I will honor his wish and treat all his writings, regardless of the forum in which they appeared, as equivalently indicative of his thought.

Because science was “the greatest of human adventures,”¹³ Gould spent a considerable amount of time in all his writings discussing not just the substantive content of evolutionary investigations but the epistemological underpinnings of scientific progress. He was, in other words, a scientist *and* a philosopher of science. The fundamental thesis he wished to argue, one that he expressed, refined, and defended in dozens of pub-

lications over three decades, was that no significant difference separated “historical sciences,” such as cosmology, geology, and paleontology, from the more experimental sciences, such as physics and chemistry. Although “I am a historian at heart,”¹⁴ and although “Paleontologists are . . . historians at heart and by profession,”¹⁵ Gould said, he and fellow participants in the “historical sciences” were *unquestionably* scientists, every bit as much as were participants in the “hard sciences.” The methods of the two domains differed only in a superficial manner. Physicists and chemists were able to work with their empirical subjects in real time, manipulate them, and observe changes in effects as causes were altered. The historical sciences, on the other hand, relied upon “consilience of induction”¹⁶ applied to ancient evidence to fashion a “narrative explanation”¹⁷ that allowed scientists to infer “the processes we cannot see from results that have been preserved.”¹⁸

The historical method, while different in kind from the experimental method, did not yield results that were in any respect inferior. “[H]istorical science is not worse, more restricted, or less capable of achieving firm conclusions because experiment, prediction, and subsumption under invariant laws of nature do not represent its usual working methods. The sciences of history use a different mode of explanation, rooted in the comparative and observational richness of our data,”¹⁹ but a mode that was completely equal in its ability to yield understanding. Historical sciences relied on the “primary methodological criterion of testability”²⁰ to just as great an extent as did the experimental sciences. And scientific tests were tests of hypotheses, which meant that they were tests of predictions. Therefore, although “historical explanations take the form of narrative,”²¹ the word meant an explanation cast in a causal chain whose links could be predicted to occur in the fossil record. Although evolutionary biology could not predict the future, as could chemistry and physics, Darwinian theory gave it the capacity to predict what would be discovered about the past.

Moreover, the historical sciences were just as open to the possibility of falsification as were chemistry and physics.²² They searched just as sincerely for ways to quantify their evidence.²³ Therefore, they shared with experimental sciences the fundamental and scientifically defining claim to be able provisionally to assess the

“causal consequences of spatio-temporally invariant laws.”²⁴

If we accept the point that narrative science is as reliable in studying the past as experimental science in studying the present and future, then we should find several of Gould’s further points germane. One that he repeated often, and to which he devoted an entire book *Wonderful Life*, was that history was a “contingent” science, by which he meant that, although life evolved according to general laws, the individual working out of myriad causes rendered prediction of specific outcomes impossible. He defined the term *contingency* as “the tendency of complex systems with substantial stochastic components, and intricate nonlinear interactions among components, to be unpredictable in principle from full knowledge of antecedent conditions, but fully explainable after time’s actual unfoldings.”²⁵ Thus, “the unique contingencies of history, not the laws of physics, set many properties of complex biological systems,”²⁶ and “contingency represents the historian’s mode of knowability.”²⁷ Nothing can be predicted, but everything can be scientifically explained in retrospect.

The meaning of history

This emphasis on the contingent nature of history had two politically important implications, each of which Gould explored at some length. First, it meant that if the “tape of life” were to be rewound and evolution allowed to replay itself according to Darwinist rules, the result would certainly not be the same:

The divine tape player holds a million scenarios, each perfectly sensible. Little quirks at the outset, occurring for no particular reason, unleash a cascade of consequences that make a particular future seem inevitable in retrospect. But the slightest early nudge contacts a different groove, and history veers into another plausible channel, diverging continually from its original pathway.²⁸

Therefore, “each replay of the tape would yield a different set of survivors and a radically different history.”²⁹ In particular, human beings “are an improbable and fragile entity, fortunately successful after precarious beginnings as a small population in Africa, not the predictable end result of a global tendency.”³⁰ “Humans are here by the luck of the draw, not the

inevitability of life’s direction or evolution’s mechanism.”³¹ The species *Homo sapiens* is not the crown of creation; it is an accident.

Gould’s second conclusion about history, which was actually the first conclusion restated from a different perspective, was that it had no direction; the story of life was not a narrative of progress. The pattern of history displayed increasing diversity, not improvement. Humans had always succumbed to “canonical misreadings of the history of life”³² by inferring progress, particularly a progress that pointed to us. Therefore, “we hide most of nature’s complexity in plain sight when we spin our usual tales about increasing complexity as the central theme and organizing principle of both evolutionary theory and the actual history of life.”³³

The metaphor humans had employed to help them picture evolution was a ladder, which life ascended by growing larger, more complex, and more intelligent. But this metaphor was completely misleading. The history of life was shaped more like a bush, with ever-greater variation but no overall direction. The perspective that began with humans and looked backward to simple beginnings blinkered us to the profusion of side-branches, some of them leading to more complexity, some (as with many parasites) to increasing simplicity, some (as with bacteria) to general stasis. “The increasing complexity of the most complex” is thus “a false surrogate for the progress of the whole.”³⁴

Indeed, if we measured “success” in biological terms by longevity, ubiquity, usefulness to other forms of life, or total biomass, bacteria were the most important kind of life on earth.³⁵ We were not living in the age of humans, or of mammals, or of animals, or of multicellular life, as legions of biological popularizers had proclaimed. Instead, “We live now in the ‘Age of Bacteria.’ Our planet has always been in the ‘Age of Bacteria.’”³⁶

This point may strike the reader as strained to the point of absurdity. After all, if aliens arrive from a distant star system tomorrow, with whom will they want to parley after they step from their flying saucers, humans or bacteria? And is it not clear that bacteria, at the bottom of the food chain, must constitute many times more biomass than humans, at the top? Clearly then, *Homo sapiens* is reasonably viewed as the star, and bacteria as part of the supporting cast, in the pageant of life. These questions, and the responses they

provoke, seem so obvious that we might suspect that Gould was having fun with his readers. Such a supposition would be a mistake, however; he was serious:

I do realize that bacteria can't laugh (or cogitate) — and that philosophical claims for our greater importance can be based on the consequences of this difference between them and us. But do remember that we can't live on basalt and water six miles under the earth's surface, form the core of novel ecosystems based on the earth's interior heat rather than solar energy, or serve as a possible model for cosmic life in most solar systems.³⁷

It was, he said, “my favorite theme,” oft-repeated in many essays, that “Darwinian evolution cannot be read as a theory of progress, but only as a mechanism for building better adaptations to changing local environments.”³⁸ As evidence for the typicality of this interpretation, he quoted one of Darwin's own aphorisms, “Never say higher or lower.”³⁹ He seemed to want us to believe that his own emphasis on non-progressivity was only an echo of his master's voice.

Nevertheless, Gould's twin emphases on evolutionary non-directionality and human non-specialness served his own specifically political intentions and took biology in a direction not envisioned by Darwin. The two principles worked in unison toward an ideological goal. That goal was best understood in relation to a favorite quotation from Sigmund Freud. Gould had read a great deal of Freud and referred to many of Freud's arguments while making his own points. One particular Freudian statement, however, occupied a central place in Gould's pantheon of insights. He quoted it early in his first book,⁴⁰ and, by my count, reproduced it in two more books and summarized or alluded to it in seven others. Here it is:

Humanity has in course of time had to endure from the hands of science two great outrages upon its naive self-love. The first was when it realized that our earth was not the center of the universe, but only a speck in a world-system of a magnitude hardly conceivable . . . The second was when biological research robbed man of his particular privilege of having been specially created and relegated him to a descent from the animal world.⁴¹

“Freud claimed,” in a comment Gould repeated many times in the essays, whether or not he referred to the

Austrian psychiatrist's specific words, “that all important scientific revolutions share the ironic property of deposing humans from one pedestal after another of previous self-assurance about our exalted cosmic status.”⁴² Gould returned to the point so often because he wished to endorse it. Yes, that was exactly what scientific enlightenment did, remove the props from human hubris. Or, at least, that would be the tendency of science if the public truly understood and accepted it.

Unfortunately, however, biology has not been as thorough as it should have been in the re-education project. “Darwin removed this keystone of false comfort [human cosmic significance] more than a century ago, but many people still believe that they cannot navigate our earthly vale of tears without such a crutch.”⁴³ People continued to resist their existential demotion: we “grasp at the straw of progress (a desiccated ideological twig) because we are still not ready for the Darwinian revolution.”⁴⁴ Therefore, “Darwin's revolution remains incomplete to this day because we spin-doctor the results of evolution to preserve our pedestal of arrogance by misreading the process as a predictable accumulation of improvements, leading sensibly to the late appearance of human intelligence as a culmination.”⁴⁵

The essential question then becomes, why does it matter? Supposing that Gould was correct, and humans continue to resist the Darwinian solvent that should otherwise be dissolving their self-esteem as a species, so what? What harm does it do if humans think that nature has awarded them the title of “most evolved”?

Gould's answer to this question revealed his central moral assumption as a philosopher and the way he wove morality and science into an ideological whole. It mattered, he said, because “success in our profession's common battle for preserving biodiversity requires the reorientation of human attitudes toward other species — from little care and maximal exploitation to interest, love, and respect. How can this change occur if we continue to view ourselves as better than all others by cosmic design?”⁴⁶ Humans were the most arrogant and rapacious species on the planet, and the arrogance falsely justified the rapacity. If we were to save other species from a human-caused holocaust, we had to re-educate humans out of their arrogance.

When Gould spoke of “our profession's common battle,” he was not mischaracterizing his colleagues. In his campaign to educate, embarrass, or frighten

humanity into pulling back from biocide, he was only one general in a war that had become desperately important to evolutionary biologists in general. Take, for example, Edward O. Wilson, who, as we will see shortly, engaged in a long-running battle with Gould on the topic of sociobiology. Wilson is one of the many biologists who have published eloquent pleas for people to stop their assault on the diversity of life:

Signals abound that the loss of life's diversity endangers not just the body but the spirit. If that much is true, the changes occurring now will visit harm on all generations to come. The ethical imperative should therefore be, first of all, prudence. We should judge every scrap of biodiversity as priceless while we learn to use it and come to understand its meaning to humanity.⁴⁷

On this, the most important political issue within their profession, Gould and Wilson had no disagreements. All of Gould's undoubted competence as a scientist was in league with his skill as a rhetorician in the service of this crucial collective battle for public opinion. The very way he defined and explained his craft was part of a strategy that aimed beyond science to politics.

The morality of science

In his endorsement of a particular take on scientific epistemology, Gould naturally adopted some themes more than others. One classic position that he embraced fervently and repeatedly was that science had to adhere to a rigid distinction between "is" and "ought." Again, this stance was not only relevant to his notion of scientific worldview but was also inextricably bound to his political preferences.

"Science can supply information as input to a moral decision, but the ethical realm of 'oughts' cannot be logically specified by the factual 'is' of the natural world — the only aspect of reality that science can adjudicate."⁴⁸ Furthermore, it was not just science in general but biology in particular that had to be wary of those who would enlist it on the side of a cause. "Those who recruit Darwin to support a particular moral or political line should remember that, at best, evolutionary biology may give us some insight into the anthropology of morals ... But science can never decide the morality of morals."⁴⁹

This warning had to be sounded repeatedly because humans had frequently ignored it, extending supposed biological truths to rationalize nefarious causes. Of the three examples that Gould found most egregious, the first, social Darwinism, was undoubtedly right-wing, and the second and third, intelligence-testing and sociobiology, were accused by him of being right-wing.

To repeat, although Gould never actually described them in a thorough, organized manner, his own political leanings were clearly leftist. He implicitly endorsed human equality as a fundamental value and was extremely suspicious of any interpretation of nature that might lead to the conclusion that some humans were fundamentally superior to others in skills, intellectual capacity, or moral worth. He not only wanted all ethnic groups but also both sexes to be seen as emerging from the evolutionary process with no differences that might justify invidious distinctions. His effort was necessary, because "biological determinism possesses ... evident utility for groups in power ... After all, if the status quo is an extension of nature, then any major change ... must inflict an enormous cost ... in forcing people into unnatural arrangements."⁵⁰ He quoted with approval Condorcet's observation that, in their use of biology to justify the power of elites, conservatives "make nature herself an accomplice in the crime of political inequality."⁵¹

Therefore, as a scientist and not just as a citizen, Gould endorsed the leftist assumption that whatever inequalities did exist must have been socially constructed. He attacked any political tendency that pointed, in his view, in the direction of a "natural" basis for human inequality. Similarly, he attacked the methodological bases of the science underlying the assertions embraced by right-wingers. He tried to undermine the legitimacy of their "is" as part of a larger intention to undermine the legitimacy of their "ought."

In the case of social Darwinism, the demolition project mostly fell under the category of flogged dead horses, for the arguments of Herbert Spencer that rich people and corporations were the "fit" in a biological sense had been effectively discredited before Gould was born. In the other two cases, however, Gould's position was part of a contemporary controversy and therefore remains relevant.

Gould considered the intelligence-testing case so important, and so dangerous, that he devoted an entire book and several articles to the subject. While they

contained enough rhetoric to leave no doubt as to their political purpose, these writings were largely devoted to extensive, detailed, and subtle methodological criticisms of various theories — and theorists — who taught that intelligence was a single *thing* that was possessed to greater or lesser extent by individuals.⁵² To recapitulate these criticisms would take me far beyond the purpose of this article. Suffice it to say that Gould accused psychologists of having misused factor analysis and correlation coefficients to reify a non-existent entity called “intelligence” under the guise of measuring it. This reified entity was then used to make invidious distinctions between people, and, unsurprisingly, the “natural” distinctions thus uncovered were parallel to the distinctions of social stratification — of class, race, and sex. The supposedly natural relationships of superiority and inferiority revealed in such testing was then invoked to justify political and economic inequality.

The essential point in context is that Gould’s presentation was neither wholly political nor wholly scientific. His firm political stance and dedicated scientific work were complementary facets of a unity and cannot be separated into two spheres. (It is worth noting, however, that some psychologists have harshly criticized Gould’s harsh criticism of intelligence-testing.⁵³ I do not take a position in this controversy because my purpose is to explicate Gould’s blending of politics and science, not evaluate his scientific methodology).

Gould’s criticisms of the whole field of sociobiology exhibited the same blending. This subdiscipline was founded by Edward O. Wilson in his 1975 tome, *Sociobiology*, and has since expanded into a major arena of research.⁵⁴ The basic approach of sociobiologists has been to hypothesize what sorts of behavior, arising from primate evolution, might have led some individual people to breed more successfully than others; sociobiologists have then searched for evidence to confirm or disconfirm their hypotheses. Sociobiologists, therefore, have tended to interpret patterns of behavior — especially universal, cross-cultural patterns of behavior — within the context of genetics. In doing so, they early on crossed swords with Gould and other leftists who wanted to discourage the practice of interpreting the social injustices as based in “human nature.”

Again, however, although Gould was not shy about expressing his distaste for the alleged political implica-

tions of sociobiology, most of his many writings on the subject addressed philosophical and methodological issues. Once more, his attack was seamless. Sociobiology was reprehensible politics, but “we must recognize that a more fundamental criticism questions the essential style of sociobiological argument itself as an appropriate application of evolutionary theory.”⁵⁵ Thus, the real problem was not so much sociobiology as the Cartesian habits of mind that underlay too much science:

The chief fallacy ... is reductionism — the style of thinking associated with Descartes and the bourgeois revolution, with its emphasis on individuality and the analysis of wholes in terms of the underlying properties of their parts ... We must ... go beyond reductionism to a holistic recognition that biology and culture interpenetrate in an inextricable manner ... Thus, we cannot factor a complex social situation into so much biology on one side, and so much culture on the other.⁵⁶

By factoring complex social situations in a manner that overemphasized nature and downgraded nurture, stated Gould and other leftist scientists in a 1975 polemic against Wilson in the *New York Review of Books*, sociobiologists “tended to provide a genetic justification of the *status quo* and of existing privileges for certain groups according to class, race, or sex” and thereby joined “that long parade of biological determinists whose work has served to buttress the institutions of their society by exonerating them from responsibility for social problems.”⁵⁷

With sociobiology as with IQ testing, Gould showed us a homogenized mix of science and politics. The difference between “ought” and “is” turned out to be the difference between right-wing bad science and left-wing good science.

But Gould, who in his frequent excursions into intellectual history displayed a sensitive and nuanced understanding of the many ways that previous scientists had allowed themselves to misinterpret evidence, think illogically, and contradict themselves when in thrall to a particular epistemological assumption, was not himself immune to the occupational disease. Ever aware of it when pursuing the negative activity of exposing the mistakes of others, he overlooked the distinction between “ought” and “is” when pursuing the positive activity of drawing leftist political morals from scientific facts. Attempting to exhort his readers

to recognize fundamental human equality and to endorse human brotherhood, he was himself not above deriving moral conclusions from evolutionary biology.

In addressing anthropological findings about the (lack of) differences between races, for example, he informed us that “the great preponderance of human variation occurs within groups, not in the differences between them ... [W]e now know that our usual metaphor of superficiality — skin deep — is literally accurate.”⁵⁸ As a consequence (and this is a thunderous “ought”), “Human equality is a contingent fact of history.”⁵⁹

Moreover, in one essay Gould let down his rigorous-thinking guard and broadcast what can only be called a sentimental appeal for human brotherhood. The “is” in this case was the finding that “three human species still coexisted as recently as thirty or forty thousand years ago.”⁶⁰ The contemporary moral relevance of this discovery might not have been evident to his readers, so he interpreted it for them:

Most of hominid history has featured a bush, sometimes quite substantial, of coexisting species. The current status of humanity as a single species, maximally spread over an entire planet, is distinctly odd. But if modern times are out of joint, why not make the most of it? ... If our current times are peculiar in substituting the bushy richness of most human history with an unusual biological unity to undergird our fascinating cultural diversity, why not take advantage of this gift? ... We could do it; we really could. Why not try sistership; why not brotherhood?⁶¹

Although he would have vigorously denied the appellation, therefore, the truth is that Gould was a social Darwinist, albeit on the opposite end of the political spectrum from Spencer. He would derive conclusions about appropriate social arrangements from the realities of evolution. There was no distinction between “is” and “ought” in this formulation.

The nature of historical change

Although Gould created the overarching ideology just sketched, his renown and influence outside of biology rest on his elucidation, with Eldredge, of just a sliver of that mammoth system. In 1972, and in subsequent publications, the two former fellow graduate students propounded a new theory of evolutionary

change that made them both famous and infamous and ensured their lasting impact within natural science and the larger world.⁶²

Both authors, while students, had become dissatisfied with evolution’s *pace* as envisioned in orthodox Darwinian theory; with its *mode* as a concatenation of small changes in individuals and populations translating into a transformation of species — that is, microevolution becoming macroevolution; by its *evidence* as traditionally adduced paleontologically; and, therefore, by its very *conceptual framework* as Darwinists had until then used it to interpret the story of life. (Other evolutionary biologists have vigorously contested the two young upstarts’ characterization of orthodox Darwinism. In this article I will summarize Eldredge and Gould’s portrait of the “modern synthesis” of Darwinian theory, without attempting to evaluate its accuracy).

The main tenet of orthodox Darwinism is “phyletic gradualism,”⁶³ that is, a “long and insensibly graded chain of intermediate forms”⁶⁴ linking one species to another over deep time. Individuals of any given species are generally undergoing some tiny mutational changes. Most of these changes are disadvantageous, and the individuals possessing them are quickly eliminated from the gene pool. A few changes are advantageous and are therefore preserved through selective survival and breeding. Over thousands or millions of generations the tiny changes cumulate, and one species is transformed into another. Writ large, this process ensures the relatively constant, albeit very slow, process of speciation and variation that has resulted in the world of living things evident today.

Eldredge’s and Gould’s dissatisfaction with this moving picture was sparked by the fact that it was supported by “blatantly inadequate data.”⁶⁵ Darwinian orthodoxy leads us to expect that earth’s rock layers must contain the preserved evidence of a series of smoothly transitional sequences of types. Instead, “The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology.”⁶⁶ Instead of the pattern orthodox Darwinism predicts, we see in the fossil record a pattern marked by the sudden appearance of all or most species, which then persist relatively unchanged for their entire existence and at some point become extinct. The evidence of the rocks shows a history of life “characterized by *rapid* evolutionary events punctuating a history of stasis.”⁶⁷

Such a pattern of evidence demanded a new explanatory theory. Eldredge and Gould wished to retain the core Darwinian principle of natural selection — the culling of advantageous bodily forms and behaviors by a ruthless environment and the consequent preservation of their genetic causes, resulting in the spread of the “fit” forms and the extinction of the unfit. But they dramatically altered the pace and mode of change:

The history of life is more adequately represented by a picture of “punctuated equilibria” than by the notion of phyletic gradualism. The history of evolution is not one of stately unfolding, but a story of homeostatic equilibria, disturbed only “rarely” (i.e., rather often in the fullness of time) by rapid and episodic events of speciation.⁶⁸

The publication of their new view of life caused turmoil in their own and related disciplines and sparked decades of empirical research. The theory of punctuated equilibrium, in its specific context of evolutionary biology, has come in for some very sharp criticism.⁶⁹ It has been defended vigorously by Eldredge and Gould, separately and together, and by several other natural scientists.⁷⁰ Reviewing three decades of controversy, the best this nonspecialist can say is that the extremely imperfect fossil record seems to provide examples of some species whose histories support the gradualist model and some species whose histories support the punctuational model. (For a similar evaluation by an eminent professional, see Mayr.⁷¹) Meanwhile, the debate continues within paleontology.

Of more immediate relevance is the impact of the theory of punctuated equilibria on intellectuals outside the small circle of evolutionary biology. Almost as soon as it was published, various thinkers realized that in its general form it provided a model for stability-and-change in any complex system. As an ideal pattern existing in abstraction rather than a specific theory of natural selection, it could be adapted to a seemingly limitless sample of natural, and human, phenomena. Resistance to change is routine, and resistance prevails for a time, resulting in stasis. After awhile, forces tending toward change build to an irresistible level, at which point change is rapid and thorough. Then stasis prevails again until next time. Thus, the general punctuational model has been applied to human learning, organizational dynamics, technological development, fractal geometry, chaos theory, non-linear

dynamics, complexity theory, economics, and other realms.⁷²

Eldredge has embraced the applications of punctuated equilibrium to human history, suggesting that “social entities may themselves be susceptible to a form of selection directly analogous to large-scale natural selection.”⁷³ Gould, however, was more cautious in endorsing the promiscuous application of their theory. While pronouncing himself pleased to have been the inspiration for so much fruitful thought,⁷⁴ he also felt the obligation to point out potential dangers in the enterprise.

First, the biological theory of punctuated history was strictly Darwinian in that it conceptualized change in life over time as entirely a process of the conservation of randomly generated mutations. Organisms did not inherit acquired modifications. As Gould pointed out often, however, culture was Lamarckian; the inheritance of acquired characteristics was one of its defining features.⁷⁵ Thus, the addition of consciousness and meaning to human history complicated the process of analyzing change.

Second, and more importantly, in wrenching a specific theory out of its specific context, other intellectuals had loosed it from its empirical anchor. Gould was a committed empiricist and was wary of grand theoretical projects not safely secured to operational definitions. When punctuated equilibria was removed from the empirical base where Eldredge and Gould situated it, it lost its character as a theory and became only a metaphor. Gould warned that “these ‘brave’ statements about conceptual homology across disparate scales and immediate causalities must remain empty and meaningless without operational criteria for distinguishing ... meaningful similarities of genesis (homology) from misleading superficiality of appearance (analogy) ... I am more interested in exploring ways in which the theory might supply truly causal insights ... rather than broader metaphors that can surely nudge the mind into productive channels, but that make no explicit claim for causal continuity or unification.”⁷⁶

This caution has direct application to any consideration of Gould as a politically relevant theorist. For the idea of punctuated equilibria has had an impact on political science, also. But the way it has been assimilated suggests that Gould’s distinction between theories and metaphors has not always been appreciated.

The greatest influence of the theory has been its application to the “realignment” or “critical elections” conceptual framework. Arising out of a famous article by V. O. Key in the 1950s,⁷⁷ it was worked into a coherent, wide-ranging, and extremely influential theory of American elections by Walter Dean Burnham, James Sundquist, and others.⁷⁸ It envisions American electoral history as being divisible into eras, each of approximately a generation in length. During stable periods, the coalitional bases of the two major parties remain relatively impervious to various stresses arising from developmental forces in the economy and society. After roughly thirty years, however, the stresses have built to a breaking point, and some crisis (war or civil war, depression, etc.) arises that causes social discontent to boil over and dissolve the psychic bonds that attach citizens to parties. In one or a series of critical elections — 1800, 1828, 1856–60, 1896, 1928–36, and perhaps 1968–1980 — new issues and leaders have arisen, party coalitions have been reshuffled, a new electoral party majority has been created that, once in power, has enacted new policies, and new political arrangements have then endured for about another generation.

Although enormously influential in organizing vast quantities of research by political scientists and historians, the critical-elections framework has attracted persistent skepticism. Critics have faulted it for failing to offer clear operational definitions for both stasis and realignment; for failing to generate unambiguous research results; for failing to explain in a consistent fashion the period since 1964, in which party decomposition rather than party realignment has seemed evident; for failing to integrate micro-theories of voting behavior into a macro-explanation of American politics, as it has long had pretensions to do; and for failing in various other ways to convince.⁷⁹ In response, Walter Dean Burnham, the foremost expositor of the theory, has, in effect, defended it by arguing that his formulation is only a subcategory of the larger pattern of historical change posited by natural science. Burnham no longer speaks of critical realignments but of punctuated equilibrium, with explicit reference to Eldredge and Gould.⁸⁰

My point here is not to attack or defend the notion of critical elections as a useful insight into American politics. My purpose is to point out that the application of the concept of punctuated equilibria to electoral history is a perfect example of the confusion — of

empirical homology with non-empirical analogy — against which Gould warned. In biology, the theory is based upon measurable trends in the fossil record and backed by an explicit model of historical process. In political science, it rests uneasily upon a debatable record of voting and policy enactment, an even more debatable series of assumptions about the relationships among socioeconomic trends, voting, and policy, and no model of historical process. It is, in short, a metaphor, not a theory. It may be a good metaphor, but it has no causal explanatory power of the type Gould insisted upon.

The same can be said about other applications of punctuated equilibrium in political science. For example, Baumgartner and Jones base their study of policymaking in American politics explicitly on a punctuationist model. Citing the original Eldredge and Gould article and several other of their individually authored formulations, Baumgartner and Jones assert that “Punctuated equilibrium, rather than stability and immobilism, characterizes the American political system.”⁸¹ As with discussions of critical elections, however, their formulation has no grounding in operational definitions of stasis and sudden change and is therefore a metaphor rather than a causal theory. The authors actually state that “We have adopted the terminology of punctuated equilibrium because it evokes the image of stability interrupted by major alterations in the system.”⁸² Clearly, any framework that relies upon evocative images rather than operational definitions of core concepts is a metaphor at heart.

My argument as to the metaphorical nature of punctuated equilibria in realignment theory is similar to the one made by Carl Gans in this journal in 1987.⁸³ My account differs from his in two respects; first, in the relatively greater and more explicit emphasis I place on operationalization of concepts and, second, in my advantage in being able to quote Gould’s own reaction to the uses that had been made of his theory.

Political science looks to Gould for inspiration, not for a model.

Discussion

Gould thus turns out to have been less relevant to the thinking of political scientists than he may have appeared to be. The theoretical innovation of punctuated

equilibria is less useful in a scientific sense than its frequent invocation would at first lead us to believe.

Nevertheless, punctuated equilibria are only the most famous facet of a comprehensive theoretical framework that transcends and subsumes politics. Gould elaborated a long and intricate theory of biological change in *The Structure of Evolutionary Theory* (2002), which constituted an effort to create a new conceptual framework, one that preserved the notion of natural selection but expanded, transformed, supplemented, and replaced Darwinism in a variety of directions. He retained the notion of punctuated equilibria but fit it into the new theory in such a way that it functioned in a different manner to explain historical change. I have not tried to elucidate this theory as a whole in the present paper but have only discussed those sections that have direct political application.

By subsuming politics into a truly grand meta-theory, Gould inspired questions about the nature of political theory itself. All political theorists make assumptions about human nature. Indeed, such assumptions could be said to be the foundation theorists stand on when they discuss legitimacy, justice, the public interest, stability and change, and other staples of the literature. Without the idea of nature and *Homo sapiens's* place in it, these theories would be trivial and unconvincing. But the assumptions are generally rather brief axioms about nature. Even the arguments of such theorists as Aristotle and Hobbes, who tried to ground their discussions in a complete system of nature and man's place in it, look pallid compared with the real biological theory propounded by Gould. Besides, in their understanding of the way nature works, Aristotle and Hobbes were wrong. And Gould's theory, as I have tried to show, has many implications for political thought. The political relevance of this biologist's ideas might lead us to suspect that classical political theorists, from Aristotle forward, may not have been going about their business the right way. Perhaps they started — and still start — in the middle of their theories, while Gould started at the beginning.

Gould did not try to "reduce" politics to nature. He abhorred reductionism and said so often.⁸⁴ His position was that things must be considered at their own level and in their appropriate context. But, as I have shown, much of his framework is relevant to political thought; it is at the right level.

This is not to say that Gould's derivation of philosophical conclusions from biological premises will convince philosophers. But some may conclude that the fundamental idea of inferring political conclusions from the insights of natural history is a more promising approach to political theorizing than inferring political conclusions from assumptions about humanity that do not derive from modern biological knowledge.

The opinion that biology should play a larger part in political thought has been around for decades,⁸⁵ but it has never produced much more than a micro-subfield within political scholarship. Perhaps the time has come for political thinkers not just to attempt to derive philosophical conclusions from biologists' research but to realize that biologists themselves can sometimes be philosophers.

My conclusion is that the case of Stephen Jay Gould may teach us that the best political theory is not political theory *per se* but, rather, science expanded to its philosophical potential. A grand theory of life may be a better starting point for addressing legitimacy, justice, and equality than is any set of explicitly political assumptions.

David Prindle is Professor of Government at the University of Texas at Austin.

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