



NEW BIOLOGICAL BOOKS

The aim of this section is to give brief indications of the character, content and cost of new books in the various fields of biology. More books are received by The Quarterly than can be reviewed critically. All submitted books, however, are carefully considered for originality, timeliness, and reader interest, and we make every effort to find a competent and conscientious reviewer for each book selected for review.

Of those books that are selected for consideration, some are merely listed, others are given brief notice, most receive critical reviews, and a few are featured in lead reviews. Listings, without comments, are mainly to inform the reader that the books have appeared; examples are books whose titles are self-explanatory, such as dictionaries and taxonomic revisions, or that are reprints of earlier publications, or are new editions of well-established works. Unsigned brief notices, written by one of the editors, may be given to such works as anthologies or symposium volumes that are organized in a fashion that makes it possible to comment meaningfully on them. Regular reviews are more extensive evaluations and are signed by the reviewers. The longer lead reviews consider books of special significance. Each volume reviewed becomes the property of the reviewer. Most books not reviewed are donated to libraries at SUNY Stony Brook or other appropriate recipient.

The price in each case represents the publisher's suggested list price at the time the book is received for review, and is for purchase directly from the publisher.

Authors and publishers of biological books should bear in mind that The Quarterly can consider for notice only those books that are sent to The Editors, The Quarterly Review of Biology, Life Sciences Library, Rm. 110, State University of New York, Stony Brook, NY 11794-5275 USA. We welcome prepublication copies as an aid to early preparation of reviews.

THE SCANDALS OF SAN MARCO

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A review of
UNDERSTANDING SCIENTIFIC PROSE. *Rhetoric of the
Human Sciences.*

*Edited by Jack Selzer. The University of Wisconsin
Press, Madison (Wisconsin). \$19.95 (paper). xv +
388 p.; ill.; index. ISBN: 0-299-13904-2. 1993.*

Understanding Scientific Prose (USP) is a retrospective review of "The spandrels of San Marco and the Panglossian paradigm: a critique of the adaptationist programme," which appeared in the volume reporting a Royal Society Discussion Meeting in 1978 (*The Evolution of Adaptation by Natural Selection*, The Royal Society, London, 1979). "Spandrels" is among the best known and most factious papers in evolutionary biology in the past 50 years. In it, two high-profile evolutionary biologists, Stephen Jay Gould and Richard Lewontin, bring together the core arguments featured in their 16-year cam-

paign against sociobiology and what they call adaptationism.

"Spandrels" is an aggressive attack on the commonly held view that natural selection is the predominant force shaping adaptations of organisms. Gould and Lewontin identify most of those studying evolutionary processes as "adaptationists," and sarcastically characterize them as naively Panglossian storytellers who have adopted an untested and untestable paradigm. They fault the study of individual adaptations and instead argue for a vaguely defined holistic Bauplanism. "Spandrels" is relentlessly partisan; its unforgiving tone and use of hyperbole is designed to incite emotion rather than encourage reasoned debate.

USP is a collection of 14 reviews of "Spandrels" by rhetoricians, plus a concluding chapter by Gould. The editor is well aware that "Spandrels" is a rhetorical outlier, but he is undeterred in using it to

support his view that scientific texts are not as rhetorically transparent as has been previously supposed, and are thus suitable for rhetorical analysis. The *USP* authors use different and narrowly focused forms of literary criticism. Most stay within their own rhetorical culture and demonstrate no particular interest in science or its rules of discourse. Several *USP* authors stand apart by offering important insights that help reveal the design of this unique paper and its authors' intentions.

Journet describes Gould and Lewontin's attempt to deconstruct adaptationism, and how in the process they deconstruct their own position. "In attacking the adaptationist program as story-telling, Gould and Lewontin implicitly set up another binary opposition: mere story-telling versus real science. . . . By 'story-telling,' then, Gould and Lewontin seem to mean offering explanations that are unproven; but that sense quickly glides into connotations of explanations that are false or deceptive, as opposed to the 'proper explanations' that they themselves advocate. In this sense, a story is an explanation that is not only plausible (because it is consistent) and unproven, but also probably wrong: all the adaptationist stories are offered in order to be rejected" (p. 242). Anticipating Gould's discussion of his narrative approach to science in the concluding chapter, Journet notes that ". . . Gould and Lewontin may be more fundamentally connected to narrative or 'story' than adaptationists" (p. 243).

Similar views are presented by Miller and Haloran, who describe the double standard and self-contradiction in Gould and Lewontin's arguments: ". . . on the one hand claiming the authority of an experimental-predictive science they would later define as alien to their enterprise, on the other identifying themselves both with and against adaptationism and assuming the narrative voice even as they reject 'story-telling'—a strategy Gould would later recognize as central to historical science" (p. 121).

Bazerman's analysis of citations in "Spandrels" shows a distinct biasing of information. Ten of the 38 cases he investigated were miscitations, and all of these were biased towards premises developed in "Spandrels." In four self-citations of earlier papers, Gould had taken an adaptationist position, but Bazerman says, "He in effect rewrites those articles after the fact by quietly assimilating them into an opposite position" (p. 30).

Rosner and Rhoades discuss the uncollegial tone of "Spandrels" and take its authors to task for what Gould describes as "a defense of feminist principles by an almost antifeminist adversarial argument" (p. 330). Signaling that the agenda is larger than a scientific debate, Gould says, "I would reply that the defense of pluralism by adversarial devices is

honorable . . . and practically necessary. How else could we proceed, given the opposition?" (p. 330).

The most condemning voices heard in *USP* do not come from any of the authors, but from participants in Charney's reader response analysis, in which anonymous evolutionary biologists were asked to read "Spandrels" aloud and to voice their thoughts as they read. Quite in contrast to the generally supportive or neutral analyses of many *USP* contributors (Wells, Herndl, Winsor, Lyne, Gragson, Selzer, Myers, and Couture), these criticisms were uniformly negative. They expressed strong disagreement and even outrage over passages in the text.

This strong difference in opinions about "Spandrels" can be attributed largely to these rhetoricians' limited knowledge of evolutionary biology, which handicaps them in setting "Spandrels" in its proper context. Most accept at face value Gould and Lewontin's statements, whereas Charney's biologist-respondents have first-hand knowledge of the field and its practitioners. Respondents rejected outright many of Gould and Lewontin's core arguments. They point out that evolutionary biologists are not Panglossian, that claims about not testing hypotheses are false, and that the strong emphasis on selection in evolutionary biology results from overwhelming evidence that selection is critical for producing adaptations. The respondents knew that the examples Gould and Lewontin used were selected cases of bad science and not representative of the discipline. They complained that concerns about reductionism in "Spandrels" are severely overplayed and that typically researchers attempt to test all reasonable hypotheses, although tests of nonfunctional ones are not always possible.

Gould and Lewontin claim to explore alternatives to adaptationism, but in almost every case their alternatives turn out to be illusory. In the section "Selection without Adaptation" they hypothesize a trait that spreads because of its positive effect on personal reproductive success, but it is not adaptive, by their reckoning, because there is no increase in population numbers. But the occurrence of "selfish" traits demonstrates that adaptations need not increase population numbers. This is an unexpected error, given Lewontin's earlier authoritative writing on levels of selection. In describing correlated consequences of selection, Gould and Lewontin suggest (on p. 157 in the original article) that "It would be foolish to seek adaptive significance in paedomorphic morphology [that allows offspring to eat their mother] *per se*; it is primarily a by-product of selection for rapid cycling of generations." The more likely explanation is that paedomorphosis is not a by-product but part of the mechanism that allows for rapid cycling. In these and other cases, more plausible selectionist alternatives

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are not mentioned, nor is any evidence supporting the nonselectionist explanations offered.

Gould and Lewontin attempt to create differences where few exist. Like selectionists, they claim natural selection as a dominant force in evolution and they agree that adaptationists consider constraints. They cast themselves as open-minded pluralists and characterize their opponents as dogmatic, even though they differ only in the degree of pluralism. (In a section entitled "His Master's Voice" they cite Darwin in support of their argument because he considered alternative mechanisms of evolution, but like most modern selectionists, and less like their position, his pluralism was strongly selectionist.) Gould and Lewontin preach against reductionism but "atomize" characters, or architectural features like St. Mark's spandrels, whenever it is convenient. Fahnestock observes that "Gould and Lewontin want . . . to erase the gradations and create mutually exclusive categories, so that instead of conceptualizing their field as a spectrum of individuals holding more or less the same views but emphasizing them differently, they want opposing camps separated by an either/or test" (p. 164). She points out that their strategy is to inflate small differences into a good versus bad moral argument.

Why should Gould and Lewontin invest so heavily in escalating conflict where fundamental differences are so slight? Bazerman, Wells and Herndl suggest a strong political motivation behind the "Spandrels" argument. They describe Gould and Lewontin's view, articulated elsewhere, that the sanctioning of determinisms by biologists, especially predictions about genetically selfish behavior from evolutionary models, presages political repression and frustrates the creation of a benign Marxist society. Enlarging the role of constraint and nonselective forces defuses the hegemony of natural selection, and thus evolutionary theory loses its predictive ability and genetic selfishness is no longer expected.

In his *USP* chapter Gould blusters at Arthur Cain's suggestion ". . . that Lewontin and I had consciously betrayed the norms of science and intellectual decency by denying something that we knew to be true (adaptationism) because we so disliked the political implications of an argument (sociobiology) based upon it" (p. 317). Gould admits that

he dislikes its political implications but justifies his attack on sociobiology as a consequence of a "fatal flaw" in its central assumption—adaptationism. "Spandrels" is then part of his and Lewontin's effort to expose this flaw. Thus, his discovery of this supposed flaw and its concurrence with his and Lewontin's political views are, if you wish to believe him, merely coincidental and fully account for the intensity of, and misrepresentations in, their attack.

But there are significant flaws in Gould's argument. Nonscientist critics in *USP* were able to point out that adaptationism is not distinctly different from Gould's own point of view. Selectionism and Bauplanism agree (at least as presented in "Spandrels") on the critical issue: the predominant role of selection in producing adaptations. Where they differ—in their emphasis on phyletic and developmental constraints—has little relevance to assessing the validity of sociobiology. Phyletic and developmental constraints can be formidable in limiting large-scale changes in the macrostructure of organisms, but they have relatively little effect on the fine tuning of behavior that is the concern of sociobiology.

Political bias remains as the only plausible explanation for Gould's attacks on adaptationism and sociobiology. This hypothesis accounts for the polemical tone of "Spandrels" and the ends-justifies-the-means mentality that permits the unreasonable distortion, miscitations, self-contradiction, and hyperbole characteristic of "Spandrels" and later papers. (Gould failed to deal directly with any of these severe criticisms of his work in his responses to *USP* authors.) Of course, he denies direct political motivation and rejects the suggestion that he is subordinating science to his politics. To do otherwise would make him like the abusers of science that he railed against in *The Mismeasure of Man* (Norton, New York, 1981).

In the 16 years since the publication of "Spandrels" the striking ascendance of sociobiology and behavioral ecology, and the marginalization of Gould and Lewontin's alternatives declare selectionism the clear winner in the "Spandrels" debate. This is a bittersweet victory in that Gould and Lewontin's rhetorical smoke screen hampered these advances and still causes much confusion, as is evident in *USP*, but fortunately their elitist attempt to misdirect science failed in the end.