

Stephen Jay Gould: "Worm for a Century, and All Seasons," in *Hen's Teeth and Horse's Toes*, Stephen Jay Gould, New York: W. W. Norton and Company, 1983, pp. 120-133.

Ask Gale Rhodes for a copy of the Gould essay.

Biochemical Windows on the Past
Gale Rhodes

In this essay, Stephen Jay Gould, one of the most successful recent interpreters of evolutionary theory, looks at Darwin's most obscure and specialized books, those that treat corals, orchids, and earthworms. Gould argues that each book exemplifies and recommends a different strategy for studying life's history. The scientist's choice of strategy depends on the nature and adequacy of data:

...if you must work with a single object [orchids], look for imperfections that record historical descent; if several objects are available [coral reefs, barrier reefs, and atolls], try to render them as stages of a single historical process; if processes can be directly observed [accumulation of earthworm castings on top of soil], sum up their effects through time. (Material in brackets added.)

Of course, this description is simplified and idealized, and often in studying the past, our methods partake of one or more of these strategies at the same time.

Biochemistry includes various bodies of evidence that support the theory of evolution by natural selection, and that allow specific evolutionary relationships to be established. For instance, protein chemists construct phylogenetic trees by comparing the sequences of homologous proteins obtained from many organisms. These trees serve as a means of discovering how the organisms evolved from a common ancestor. In this type of reconstruction of the past, is the scientist using one or more of the strategies that Gould describes? If so, which one(s)?

This reading invites us to think about the various means by which biochemists attempt to glimpse the history of life. As you proceed through this course, keep Gould's three strategies in mind: Do they cover the whole range of techniques for studying evolution? Can you describe principles, distinct from Gould's three, that are used in studying the past? If so, can you find examples of these principles in experiments described in your biochemistry text?

