

Darwin's pluralism, then and now

David N. Reznick: *The Origin then and now: An interpretative guide to the Origin of Species*. Princeton: Princeton University Press, 2010, 448pp, \$29.95 HB

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Tom Stoppard's 1966 play (and 1990 movie) *Rosencrantz and Guildenstern are Dead* combines existentialist philosophy, the history of science, and absurdist theater (and metatheater). This creative and stimulating piece builds a playful story based on the perspective of Hamlet's two childhood friends, Rosencrantz and Guildenstern. Of interest to us is the fact that Stoppard remains true to the words and scenography of Shakespeare's original text whenever the two main characters interact with any of the characters from the original play, whether they be Hamlet, King Claudius and Queen Gertrud, or Polonius. All the other dialogue and staging is Stoppard's creation, written in modern English.

David N. Reznick's book is also a metatext—i.e., a text commenting on, building upon, and referring to another single text. Reznick divides his own book into three sections: *Natural Selection*, *Speciation*, and *Theory*. The sections cover, respectively, the following chapters of Darwin 1859 *On the Origin of Species*: (1) Natural Selection: Chapters 1–5, (2) Speciation: Chapters 2, 4, and 8, and (3) Theory: Chapters 6, 7, and 9–14. Each section starts with a “preamble” on the section topic, provides roughly one chapter for each chapter of Darwin's text (with some non-one-to-one mapping: Darwin (1859) has two chapters on geology, Reznick four; Darwin (1859) Chapters 2 and 4 are each analyzed in two separate sections of Reznick's book), and ends with an “evolution today” section. In his metatext, Reznick quotes key passages from the 1859 *Origin* and tries to explain details of Darwin's argument, fact, and context. Reznick's book is intended to be “a reader's guide to the *Origin*” (x).

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Stoppard and Reznick have each written a metatext. Stoppard's play exhibits three families of virtues: (1) brevity and precision, (2) intrigue and appeal, and (3) a genuine value-add to the original. How does Reznick's biological–philosophical metatext fare in comparison? Alas, it is neither short nor precise. However, Reznick's book is more successful with the second and third virtues. It does bring to the fore some intriguing aspects of Darwin's text (e.g., that Darwin's theory consisted of two theories: evolutionary mechanism and speciation) and it is appealing and catchy at moments (e.g., the last chapter is set up as Darwin on trial, “facing a jury box filled with Cambridge dons, mentors, role models, and colleagues” p. 381; moreover, Chapter 12 is a well-written “evolution today” on speciation focusing on “the mosquitoes of the London underground”). Finally, Reznick's tripartite section identification is a value-add to Darwin's text and to the typical exegeses of it, in that it clarifies that Darwin's theory consisted of theories of mechanism and speciation and not only mechanism and *history*. Sadly, despite his value-add, Reznick continues the all-too-frequent tradition of presenting Darwin's theory of evolution from a monistic point of view, rather than from the more accurate, to my mind, perspective of a pluralism of process and pattern. It is to this third virtue, the value-add of Reznick's book, and its unfortunate, associated monism, that I now turn.

Typically, Darwin's theory is interpreted as having two components. For instance, Sober (1993, 21) writes:

Darwin's ambition was to establish two hypotheses: that evolution has occurred and that natural selection has been one of its preeminent causes. By “evolution” he subsumed both the modifications that occur within a species and the large-scale changes that are involved in the production of new species.

In short, large-scale historical changes occurred, and natural selection is the main cause. Above we saw that Reznick also distinguishes two components in Darwin's theory: natural selection and speciation. Reznick (29) writes:

As a first step in making the *Origin* accessible, I have separated Darwin's proposal of natural selection as the mechanism of evolutionary change from speciation, which is a possible consequence of natural selection.

I suggest that we can add the typical distinction, expressed by Sober, to Reznick's distinction in order to make clear that Darwin's theory of evolution consists of three components:

1. *A theory of mechanisms of variation and adaptation.* Natural selection and use and disuse explain adaptation; variation is accounted for by many other mechanisms such as direct and indirect effects of the conditions of life. Moreover, there are important *constraints* on variation and adaptation including internal, systemic correlation of growth.
2. *A theory of speciation.* This includes Darwin's “principle of divergence” (niche differentiation and subsequent specialization; e.g., Darwin 1859, 112), his thesis

of the continuity between varieties and species, and a (partial, occasional) theory of allopatric speciation.

3. *A theory of universal history*. Any two organisms, no matter how dissimilar, are related and descend from a common ancestor. Global common descent can be represented by a branching tree. Theories (1) and (2) above, applied recursively, give the universal history pattern.

This is the theoretical backdrop against which we can consider Reznick's reconstruction of Darwin's theory of evolution.

Reznick's account of Darwin's *Origin* is monistic rather than pluralistic. This is meant in two senses. First, he reduces the complexity of Darwin's historical theories (2) and (3), where speciation is more a theory of (historical) process, and universal history primarily a theory of (historical) pattern. Reznick's reduction occurs by downplaying Darwin's theory of universal history. The tree is interpreted as a simple consequence of local speciation: "a pattern of multiplication of species" (177). It should be noted that due to Reznick's expertise on the biology of speciation and adaptive radiation, his descriptions of the speciation process itself, and of Darwin's commitments to the continuity between varieties and species and to the "principle of divergence", are scientifically rich and astute.

Reznick's exploration of Darwin's classic text is also monistic in a second sense—the account focuses on natural selection as the sole agent of evolutionary change. There is no question that natural selection was the bedrock mechanism of adaptation for Darwin. But a man so familiar with the broad gamut of biological traditions available in the mid-nineteenth century, including German transcendental morphology and French paleontology and functional physiology, was responsible enough to conclude his introduction with the claim that natural selection was "the main but not exclusive means of modification" (Darwin 1859, 6). Other mechanisms of variation and adaptation that Darwin repeatedly made reference to include use and disuse, as well as direct and indirect external effects (the two sets of mechanisms subsequently maligned as "Lamarckian"), and internal correlation of growth. It should also be noted that Darwin softened his appeal to natural selection as the sole mechanism of adaptation, and as the powerful breaker of internal constraints, across the six different editions of the *Origin*, a fact Reznick necessarily misses since he only analyzes the first edition. Let us look at a few examples of Darwin's softening. Reznick writes: "when Darwin argued for each trait being independently honed by natural selection, he was arguing for the predominance of natural selection in shaping all features of organisms" (110). But consider that in the first edition of the *Origin*, Darwin wrote: "Natural selection, it should never be forgotten, can act on each part of each being, solely through and for its advantage" (1859, 149). By the sixth and last edition of 1872, the last two phrases of the sentence were changed to: "can act solely through and for the advantage of each being" (Peckham 1959, 298). The reference to "each part" had been dropped. Second, the first edition says "natural selection will always succeed in the long run in reducing and saving every part of the organisation" (Darwin 1859, 148), while in the sixth edition, "natural selection will tend in the long run" (Peckham 1959, 297). In both of these (and other) passages, natural selection's influence on each and every

part, and on correlations between parts, was weakened. As Gould and Lewontin (1979) pointed out in their classic paper, Darwin was a pluralist about mechanisms of variation and adaptation.

In short, Darwin was a pluralist about historical theses and about mechanisms of variation and adaptation. Reznick reads Darwin through limited and limiting monistic glasses.

While I take issue with the narrowness of the general framework of Reznick's book, I applaud the fact that it insists on a bipartite description of Darwin's theory that is distinct from the typical bipartite description of mechanism and universal history. There are also other gold nuggets in the book. I conclude with two.

Chapter 13, "Preamble: What Is a Theory?" nicely explains what is wrong with the "oh, evolution is just a theory, not a fact" circumlocution. Without appealing to standard philosophy of science, Reznick clear-headedly explains that facts confirm (or disconfirm) particular theories and that a theory grounds predictions that can then serve to test the theory empirically. Evidence is collected through active experiments and/or passive observations in museums, laboratories, and the field and is compared to the prediction. Reznick's chapter is strengthened by explicitly comparing Darwin's theory to another non-physics and non-mathematical theory: Mendeleev's periodic table (and periodic law).

In the immediately preceding Chapter 12, "Evolution Today: The Mosquitoes of the London Underground", Reznick's is in his element. The story of the "origin of species" of a new mosquito variant/species without seasonal diapause and without the need for a blood meal to produce a clutch of eggs emerging in the London underground is told in a captivating manner. The genetics of *Culex pipiens* is mentioned in explicating how the Tube mosquitoes evolved from London surface mosquitoes rather than from underground mosquitoes that might have been imported from, for instance, the Paris Métro. Reznick's mosquito story is a powerful and rich example of adaptive radiation and speciation, and human impact.

Reznick's book is long, and monistic in outlook. It could have used some of the precision and charm of Stoppard's *Rosencrantz and Guildenstern are Dead* or of Darwin's own text. But Reznick's metatext does have intrigue and appeal and provides value-add. Last but not least, worthwhile future research projects include in-depth explorations and comparisons of Reznick's metatext to other recent commentaries (and metatexts) by giants of the Darwin Industry, such as MJS Hodge (2009) and Sober (2011).

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