

## Essay Review: “What Made Ernst Unique?”\*

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This is Ernst Mayr’s twenty-fifth book, and sadly, it is his last. He died at just over 100 years of age, actively pursuing his scholarly interests right until the very end. His nine-decade career spanned much of the history of biology and by the end of it, he had not only contributed a great deal to its understanding, but had himself become a kind of living history. But readers of this journal don’t really need much in the way of an introduction to Mayr. Some aspect of his multi-faceted career is known to even the most disengaged of readers: he was an avian systematist, turned evolutionary biologist, turned historian and philosopher of biology. He was a teacher and writer, a curator and administrator, an editor and keen organizer who made a career out of building, promoting and defending the scientific discipline of evolutionary biology. Especially important for historians of biology, he was one of the forces behind founding this journal, which he hoped would contribute to a fuller understanding of the history of biology and would provide insights into the philosophy of biology.

His last book, *What Makes Biology Unique? Considerations on the Autonomy of a Scientific Discipline* is an intentional – and I think appropriate – last statement of Mayr’s “life-work”; in fact, he tells us explicitly that it will be his “last survey of controversial concepts in biology”(p. ix). It is comprised of a collection of essays, some of which are new and some of which are heavily revised that reflect major themes that have engaged Mayr in his long career. Although they superficially appear to be a “hodge podge of unrelated themes” (p. 3), they are in fact selected and arranged so that they form the backbone of an outline in support of Mayr’s philosophy of biology. As he states in the preface, the major “objective” of the book is to answer the question of whether

\* Mayr, Ernst. *What Makes Biology Unique? Considerations on the Autonomy of a Scientific Discipline* (Cambridge: Cambridge University Press, 2004).

one really needs to construct a new philosophy of science just for biology, because it doesn't resemble the physical sciences. To do that Mayr states, one would require "a deep analysis of the conceptual framework of biology and its comparison with the conceptual framework of physics" (p. x), and that is what he sets out to do.

Most of the terrain covered in the book is vintage Mayr.<sup>1</sup> In the first four chapters ("Science and the Sciences," "The Autonomy of Biology," "Teleology," and "Analysis or Reductionism?") we are treated to the usual arguments in support of a new philosophy of science based on biology, not physics. We hear much of the "physicalists," those hapless individuals who look to physics only for understanding science or who otherwise ignore the biological sciences. We hear arguments for the non-reducibility of biological theories, biological processes, and biology itself. We are treated to arguments for holistic organicism and emergentism, which Mayr believes are philosophies upheld by most biologists, all of which can work with an increasingly analytical approach to biology. We are patiently instructed to draw distinctions between teleomatic processes, teleonomic processes, purposive behavior, adapted features, and cosmic teleology. All are "strictly material" phenomena and therefore strip teleology of its "former mystery and supernatural overtones" (p. 61). Biology, he tells us, over and over again, is comprised of two components, the functional and historical (his older proximate and ultimate cause distinction), and the historical portion can never be reduced to the laws of physics or chemistry. As good philosophers, we should all know that, and stop behaving like outdated Cartesians looking for crude physicomachanical principles when we try to understand biology.

As a science, biology does not, he exhorts, obey the same kinds of laws in physics and chemistry, but is instead grounded on key concepts like selection, development, function, ecosystem, population and the like. It is a science every bit as rigorous as physics, with its own conceptual framework, its own set of concepts and concerns that draws heavily on narrative explanations of the natural world; in short, it is a science that is "unique" from the rest, and therefore "autonomous" from the physical sciences – hence the title of this book.

Readers familiar with Mayr's oeuvre won't find much of this surprising. What is new is a greater emphasis in the first part of this book (and in his call for a new philosophy of science) on the explanatory

<sup>1</sup> For some of the recent work in books that he draws on see Ernst Mayr, 1997 and 2001. See also his most comprehensive statement of his philosophy of biology in Mayr, 1982; and see also the collection of essays in Mayr, 1976.

power of narratives in biology generally, and in evolutionary biology in particular, and how philosophers should do more to understand how narratives operate in science. Much is also revealed about Mayr's ongoing conversation with the unity of science, a topic especially critical to him and to his argument for the autonomy of biology. Maintaining a delicate balance between the unity and autonomy of biology has always characterized much of Mayr's philosophy of biology, but nowhere is his strong stance against complete unification – and therefore reduction to the physical sciences – more apparent than in this book. Reflecting on the recent book titled *Consilience* by E. O. Wilson (which he really didn't like) and on Wilson's attempt to create a totalizing, unified theory of knowledge, Mayr writes that unification might be a "beautiful dream," but it is not likely to happen with such an autonomous science. Drawing an analogy with an infamous mirage, he declares: "The endeavor of a unification of the sciences is a search for a Fata Morgana. As is said in the vernacular, 'you cannot unify apples with oranges'" (p. 36).

Mayr rails against philosophers of science who can't seem to get any of this straight. Beginning with positivist philosophy, which Mayr studied as part of his doctoral examinations way back when he was just a munchkin in Berlin, philosophy of science was built so heavily on physics that it could not possibly accommodate understanding of the biological world. Philosophers building on this tradition, like Ernest Nagel, got it even more wrong, and philosophers of science through the 1960s including the celebrated Thomas Kuhn only added to the misunderstandings (he was after all *just* a physicist, Mayr points out). Even some of the shining lights of contemporary philosophy of science like Michael Ruse, Philip Kitcher, Alexander Rosenberg, and Elliot Sober, all of whom study biology, keep getting it wrong (or only partially right) because they "deal with biological issues and theories but use the same epistemological framework" common to physics (p. 3).<sup>2</sup> He seems to be especially fond of picking on Ruse.

Having done the initial spadework for his philosophy of biology, Mayr then turns to more specific topics, famous problems, key concepts, and historical developments that lend clarity or support for his philosophy of science. Subsequent chapters are thus dominated by his life-long concern with Darwinism, its importance to western intellectual thought, and its enduring legacy. As usual, Mayr doesn't hesitate to play historical partisan; little or nothing in the history of science

<sup>2</sup> As typical examples, Mayr cites: Ruse, 1973, Kitcher, 1984, Rosenberg, 1985, Sober, 1993.

(especially physics) could rank alongside the importance of Darwinism and the impact of the publication of his *Origin* in 1859. “No other book, except for the Bible, has had a greater impact on our modern thinking,” he writes without any reservation. Even the greatest contributions of physics and even the work of the mighty Einstein didn’t have the impact of Darwin and his theory; he very much doubts that “any of the great discoveries in the physics of the 1920s had any influence whatsoever on the thinking of the average person” (p. 84). Darwin’s greatest impact, he adds, was in establishing “secular science”; and, not hesitating to drop a name or two to muster support for his argument, he evokes a conversation with the distinguished philosopher Willard Van Ormond Quine just a year before Quine’s death: “[he] told me that he considered Darwin’s greatest philosophical achievement to consist in having refuted Aristotle’s final cause (p. 91).” So there.

Mayr continues to elaborate on Darwin’s actual “five theories,” and closes the section on Darwinism with a chapter titled the “Maturation of Darwinism.” He takes the reader through the stages in the maturation of Darwinism through its “eclipse,” charts the rise of genetics, the work of mathematical population geneticists, the contributions of naturalist-systematists, the evolutionary synthesis, the molecular revolution, the importance of genomics, all of which build to his argument for the “robustness of the current Darwinian paradigm.” Especially noteworthy here is his naming of the first part of the evolutionary synthesis as the “Fisherian synthesis,” as though the contributions of people like Wright or Haldane were insignificant (they weren’t of course, but we know Mayr wasn’t fond of Wright, who got too much attention from historians, and he wasn’t ever quite sure what to do with the overly polymathic Haldane). Mayr disengages the remaining synthesis of the 1940s from this earlier phase. So that we historians can continue to get the story straight, Mayr closes the chapter by offering us a list of his recent publications that include “detailed narratives of the history of the synthesis, with a discussion of various errors and inaccuracies that mar the accounts of some geneticists and historians” (p. 129).

Remaining chapters pick up on some special scientific concepts associated with Mayr like selection or take “another look at the species problem.” In the latter chapter, Mayr sets the record straight on the history of the biological species concept (the BSC) and the fact that neither he nor Dobzhansky should get full credit. The best part here is his characterization of the “dissension” and “confusion” surrounding the species problem and especially some of the recent papers on species which he notes “...have been a rather troubling experience for me.” No

holds barred, Mayr goes after some of his greatest adversaries in systematics (here I read especially an assault on cladists), and tells them outright that as systematists, they just don't know what they are doing. He writes: "[T]here is only one term that fits some of these authors: *armchair taxonomists*. Because they have never personally analyzed any species populations or studied species in nature, they lacked any feeling for what species actually are" (p. 172).

Closing chapters pick up on other important topics that are perennial favorites for Mayr, like human evolution and the big question of "Are We Alone in This Vast Universe?" The latter chapter is my favorite. Here Mayr incisively points out that the "SETIANS," his term for the followers of SETI (the acronym for the search for extraterrestrial intelligence), come mostly from backgrounds in the physical sciences or from areas like biochemistry. By now, of course, we know what Mayr really means by that: few of these people properly understand biological principles like evolution, else they'd understand how futile and indeed silly their attempts at making contact with ET really are. Even looking for organisms like bacteria doesn't have much merit, according to Mayr, especially when there's plenty of living stuff here on earth that's rapidly disappearing. He writes "If life, in the form of some bacteria-like organisms, actually were found unexpectedly, this would tell us very little. Yes, living molecular assemblages might originate occasionally. So what? Is it worth hundreds of million dollars, like the ill-fated recent Mars probe? I doubt it. The money could have been spent far more effectively in researching the rapidly dwindling diversity of the tropical rainforests on earth. But that task is neglected in favor of possibly finding some fossil bacteria on Mars." Mayr closes with the following quite remarkable thought "Should we perhaps organize a search for *terrestrial* intelligence?" (p. 213).

No one, of course, ever accused Ernst Mayr of mincing his words. The Mayrian lexicon was characteristically comprised of absolute statements and stark pronouncements, punctuated lightly by the occasional snark, and commonly delivered with an authorial if not hectoring tone. As his colleagues quickly learned (some of them the hard way), he had little patience with people who were ill-informed, or lazy, or just plain wrong, and practiced a kind of zero-tolerance policy for the undigested or the half-baked idea. It wasn't so much an intolerance for something different that moved him to such occasional extremes, but an absolute absorption with the subject at hand, whether it was the birds of Melanesia, the philosophy of biology, or the legitimacy of evolution and the writing of its history. That's why he could just as rapidly convert

disagreement or sharp criticism to an opportunity for a healthy exchange of ideas and even learning, especially when a younger scholar was involved; what ultimately mattered to him were the fruitfulness of the ideas – that’s what got his full attention and won his respect. The reality of the man was that he was much more frequently generous and attentive, and could be downright funny about intellectual differences, than he was ever critical or dismissive, but that’s the kind of personal knowledge that usually doesn’t come from reading only his published texts. What does come from Mayr’s monumental texts has shaped not one but at least a couple of academic generations in both the history and philosophy of biology (not to mention his influence on evolutionary biology). Mayr’s influence on the field has been deep, and I would argue defining. Reading this, his last book, devoted to his life-long pet controversies, simultaneously made me laugh and cry because it made me appreciate what I valued in both the scholar and man and how much he will be missed by us all.

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