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## What was historical about natural history? Contingency and explanation in the science of living things



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### ABSTRACT

There is a long-standing distinction in Western thought between scientific and historical modes of explanation. According to Aristotle's influential account of scientific knowledge there cannot be an explanatory science of what is contingent and accidental, such things being the purview of a descriptive history. This distinction between *scientia* and *historia* continued to inform assumptions about scientific explanation into the nineteenth century and is particularly significant when considering the emergence of biology and its displacement of the more traditional discipline of natural history. One of the consequences of this nineteenth-century transition was that while modern evolutionary theory retained significant, if often implicit, historical components, these were often overlooked as evolutionary biology sought to accommodate itself to a model of scientific explanation that involved appeals to laws of nature. These scientific aspirations of evolutionary biology sometimes sit uncomfortably with its historical dimension. This tension lies beneath recent philosophical critiques of evolutionary theory and its modes of explanation. Such critiques, however, overlook the fact that there are legitimate modes of historical explanation that do not require recourse to laws of nature. But responding to these criticisms calls for a more explicit recognition of the affinities between evolutionary biology and history.

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... that there is no science of the accidental is obvious; for all science is either of that which is always or of that which is for the most part.

Aristotle, *Metaphysics* 1027a19–21

Uniqueness is particularly characteristic for evolutionary biology. It is quite impossible to have for unique phenomena general laws like those that exist in classical mechanics.

Ernst Mayr, *Toward a New Philosophy of Biology* (1988, 34).

Moreover, to explain not merely the possibility but the actuality of rational beings, the world must have properties that make their appearance not a complete accident: in some way the likelihood must have been latent in the nature of things.

Thomas Nagel, *Mind and Cosmos* (2012, 86).

We have become accustomed to the idea that the study of the natural world and inquiries into human affairs belong to two distinct families of disciplines—the natural sciences and the humanities. Biology belongs to the former and history to the latter, and the two disciplines have fundamentally different subject matters and methods. We need go back only two hundred years, however, to encounter quite different arrangements of the academic disciplines. One indication of this is the terms used for the two predominant approaches to the study of the natural world before the nineteenth century—“natural philosophy” and “natural history.” Neither of these enterprises maps directly onto any of our modern sciences, and, indeed, “science” did not then exist in anything like the sense with which we are now familiar. Moreover, taken at face value, the names of these two activities seem to bring together the subject matter that now belongs in the natural sciences—nature—with approaches that fall within the purview of the humanities—philosophy and history. Clearly, then, a significant

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realignment of the disciplines took place over the course of the nineteenth century.

In this paper I will discuss some of the implications of this realignment with a particular focus on one of these categories, “natural history,” and its genealogical relationship to modern evolutionary biology. As the title of this piece suggests, one question that I wish to explore is what, precisely, was *historical* about natural history. More specifically, I hope to show that the historical elements of traditional natural history persist to some degree in modern evolutionary biology and in popular accounts of it. This raises further questions about whether there might be much closer connections between understandings of evolutionary biology and history than are often supposed. A final concern is the way in which over the course of the seventeenth and eighteenth centuries natural theology was at first incorporated into natural history and subsequently expelled from biology in the nineteenth.

### 1. History vs. science: the Greek background

Considered historically, the term “history” has two distinct senses. In its familiar sense “history” refers to a chronological account of human affairs. But there is an older and much broader sense dating back to Greek antiquity, in which “history” (Gk., Lat. *historia*) means something like “a collection of particular facts.” This might well be an enumeration of deeds of individual people, in which case it will map onto our modern and more restricted sense of “history.” But it might equally refer to a collection of facts about animals and plants, in which case we have a natural history. These would have no chronological component. A “historical” account of particular things, in this more general sense, was typically contrasted with a more elevated “scientific” knowledge of universals or of the essences of things. This, in turn, related to a widespread conviction in Greek antiquity that genuine knowledge was possible only of what was permanent and unchanging.

In the fifth century BC, for example, the influential Ionian philosopher Parmenides distinguished “the way of truth” from “the way of opinion.” The former concerned what was timeless, uniform, necessary, and unchanging, while the latter was to do with the world of changing appearances. This kind of distinction is now familiar from Plato’s subsequent and better-known theory of the “forms” or “ideas,” which rehearses the basic insight that the most elevated knowledge is that of the eternal and unchanging forms that lie behind the material things that inhabit the inferior and evanescent realm of the senses. Aristotle’s philosophy is commonly thought to represent a significant parting of the ways from Plato, particularly in its emphasis on the world of the senses. Yet in its own way, it too insists that genuine scientific or philosophical knowledge is to be had only of what is permanent and necessary. Aristotle carefully explains in book VI of the *Metaphysics* that there can be no science of what is accidental (where “accidental” is understood to be that which is “not always or for the most part”).<sup>1</sup> Natural philosophy is a science (*epistēmē*) in so far as it grasps the unchanging essences of material things and arrives at logically necessary explanations of their causes. A true science of living things would thus be premised on the assumption that natural things had immutable natures. While the proper *subject matter* of that science was held to be the permanent substrate of the material

world, Aristotle also specified conditions for the *method* of science. This called for a knowledge of causes arrived at through logical demonstration (Aristotle, *Posterior Analytics* 71b18–20).<sup>2</sup> This was possible because the fixed natures of things resulted in necessary causal outcomes. Combining these two conditions, genuine scientific knowledge was held to be causal knowledge based on logical deduction from premises that could not be otherwise.<sup>3</sup>

It is worth saying a little more about Aristotle’s understanding of nature as “what happens always or for the most part” and his conviction that science deals with nature in this sense. For Aristotle, things in nature move towards a particular goal or end—their *telos*. This is why Aristotle’s biology is said to be teleological (*Physics*, bk. 2, chap. 8 [198b10–199b32]). The acorn, for example, has an inherent tendency to develop into an oak tree. But particular acorns, in the course of their development, may undergo accidents of various kinds. The young oak sapling might be eaten, or trodden under foot, or (in an admittedly improbable scenario) obliterated by a meteorite impact. But a “scientific” discussion of oaks and acorns will not concern itself with the accidents that might befall them, but rather with what would typically happen were accidental factors not to intervene. Historical accidents do not count against the contention that acorns develop into oak trees. The accidental consequences of rare meteorite impacts cannot be part of a scientific explanation of nature, at least in Aristotle’s account.<sup>4</sup>

Returning to our main topic, we can say that this more strictly “scientific” knowledge (Gk. *epistēmē*, Lat. *scientia*) was contrasted with “history.” As we have noted, history in the broad sense was descriptive of particular things, and did not seek to identify universals, essences, or causes. It could be applied to a chronological account of events and deeds—history as we now understand it. But it also applied more generally to any collection of facts that was predominantly descriptive rather than explanatory. Accordingly, Aristotle’s descriptive zoology is found in a work entitled *History of Animals*.<sup>5</sup> Aristotle seems to have had in mind the idea that this “historical” or descriptive treatment of animals would form a prelude to a more scientific account that sought explanatory causes (*History of Animals* 491a11–13). (In the case of animals this would entail reference to Aristotle’s “formal” and “final” causes.) History, as dealing with the particular, was thus distinguished from science, which dealt with the universal.

One final point is worthy of brief mention. Aristotle not only discusses historical knowledge in relation to scientific knowledge, but he also contrasts history and poetry. He suggests that the latter, though humanly authored, deals with matters of universal significance. Poetry “is something more philosophic and of graver import than history, since its statements are of the nature rather of universals, whereas those of history are singulars.” Good poetry required probability and necessity “in the sequence of its episodes.” Even apparently chance events related by the poet must have “an appearance of design” (*Poetics* 1451b, 5–6, 35, 1452a7).<sup>6</sup> Because it deals with universals, moreover, poetry has the capacity to be

<sup>2</sup> For the early modern reception of this ideal see Sorell, Rogers & Kraye (2010).

<sup>3</sup> In *Posterior Analytics* 1.13 (78a23–79a15) Aristotle offers a famous example that distinguishes “knowledge of the fact” from “knowledge of the reasoned fact.” Scientific knowledge consists of these latter, so-called *propter quid* arguments.

<sup>4</sup> Thomas Aquinas will subsequently endorse this view of nature, allowing that there are genuine accidents in nature, and that these are consistent with divine providence. *Summa contra gentiles* III, 74, 2 (1975, 3/1: 264).

<sup>5</sup> For the history of *historia* see Louis (1955), Seifert (1976), and the more recent Pomata & Siraisi (2005).

<sup>6</sup> Quotations in this paragraph may be found in Barnes (1984, 2322). For their part, historians could argue that history could be written in such a way as to demonstrate repeatable patterns—the so-called cyclical view of history—or offer moral exemplars. See, e.g., Thucydides, *History of the Peloponnesian War* 1.22; Plutarch, *Life of Pericles* 1.1–2.

<sup>1</sup> See also *Physics* 197a31–35. The formula “always or for the most part” reflects necessary conditions. In principle, nature always operates in exactly the same way, although particular circumstances may hinder its unerring operation, requiring the qualification “for the most part.” The relations among chance, necessity, and the accidental in Aristotle are rather complicated. See, e.g., Judson (1991); Striker (1985).

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