books & ideas.net

# The First Biologist

*by Bertrand Vaillant*

**In a scholarly yet accessible study, Pierre Pellegrin argues that Aristotle is the true founder of biology, contrary to what a distorted perception of his finalism has long led us to believe.**

About: Pierre Pellegrin, *Des animaux dans le monde. Cinq questions sur la biologie d'Aristote,* Paris, CNRS Editions, 2022, 328 p., 25 €. / *Animals in the World: Five Essays on Aristotle's Biology*, translated by Anthony Preus, State University of New York, 2023.

## Aristotle as the First Biologist

Why do gazelle horns grow upwards? How is it that oysters, which reproduce by spontaneous generation in seawater (as we all know), all look alike? Do the female bear and the female panther, both of them braver than their male counterparts, constitute inexplicable exceptions? Pierre Pellegrin displays remarkable skill in situating these byzantine and disparate questions within a general understanding of Aristotelian biology, in uncovering what these questions reveal about Aristotle's conception of animals and the natural world, and in thus identifying the very special place that this conception occupies in the history of biology. After having examined Aristotle's political philosophy in *Endangered Excellence* (2020), and building on his experience as a translator of the Stagirite's work and his impressive knowledge of the

exegetical debates this work has occasioned, Pellegrin tackles, in *Animals in the World*, the Aristotelian zoological corpus, offering a vision of the latter which is renewed by the "biological turn" taken in Aristotelian studies over the last half century. He draws on the numerous studies to which this turn has given rise (including those by David Balme, James Lennox, John Cooper, and, more recently, Sophia Connell, David Lefebvre, and Andrea Falcon) to develop his own reading of Aristotle's biology. In so doing, he distances himself both from those who see in Aristotle's finalism a mere "as if" philosophy anticipating Kant (see Wolfgang Wieland, *Die aristotelische Physik*, Göttingen, Vandenhoeck und Ruprecht, 1962) and from those who insist on the anthropocentric character of his teleology (see David Sedley, "Is Aristotle's teleology anthropocentric?" *Phronesis*, XXXVI, 2, 1991). Nevertheless, in line with these authors, Pellegrin engages in a rehabilitation of Aristotle's biological thought that sets him apart from those who, with Bachelard, see in it only pre-scientific speculations (for instance, Robert Joly and Simon Byl[1]) and those who deal with Aristotle's world but leave biology aside (as did Rémi Brague with his Heideggerian reading of Aristotle in *Aristote et la question du monde*). On the contrary, he argues, not only is this part of the corpus essential to our understanding of Aristotle's thought, but it must be recognized that "Aristotle, and he alone for more than twenty-two centuries, has been a real *biologist*" (p. 15). He thus shows that, far from conceiving the world as a perfect whole ordered for man by an all-powerful nature, the philosopher gave pride of place to the diversity of living forms, to mechanical causality, and even to the eternity of species in a way that distinguished him from the entire "chorus of ancient thinkers" (p. 8).

The book is divided into five chapters, each devoted to a problem posed by Aristotle's zoological corpus. Pellegrin attempts to solve these problems by engaging in a patient work of explanation, translation, and comparison of the texts and in a thorough review of the debates and recent studies to which these texts have given rise. This dense book will appeal to Aristotle specialists and non-specialist philosophers alike. The first will read the positions taken by the author in difficult exegetical debates, all of them justified by precise proposals for interpreting the texts. The second will find rich presentations on physics, finalism, the powers of the soul, and more generally Aristotle's relationship to his predecessors and to the history of biology, their

[1] Pellegrin, a great reader of Bachelard, had endorsed this view himself in his 1982 study of *Aristotle's Classification of Animals*.

curiosity aroused by parts of the Aristotelian corpus reputed to be difficult or less worthy of interest.

## A Real Biological Thought

The first central thesis of the book concerns Aristotle's place in the history of biology. Contrary to his physics, which the author claims (following Bachelard) has nothing in common with Galileo's, Aristotle's studies of the living world do constitute a *biology* comparable in both method and object to that which only (re)appeared in the 19th century in the work of Cuvier. To demonstrate this commonality of approach, Pellegrin proposes a rehabilitation of the *History of Animals*. Although this is one of the most imposing works in Aristotle's zoological corpus, commentators often prefer the great theoretical treatises *Parts of Animals* and *Generation of Animals* (to which we might add the treatises on *Animal Motion* and *Animal Locomotion* as well as numerous smaller ones on respiration and sleep). Pellegrin, for his part, refuses to view it as an earlier work or as a simple collection of facts destined to be entirely explained by the principles laid out in the theoretical treatises: While many of these facts are present in the treatises, it is precisely the absent ones that underscore the *History*'s importance. According to Pellegrin, this multitude of unexplained exceptions and oddities of animal form and behavior, which have no finalistic explanation in *Parts of Animals*, signal an *excess* of observation over explanation that is typical of the biological approach (p. 51).

What makes Aristotle a biological thinker is not only his taste for observation, but also his approach to classification. Taking up part of Foucault's analysis in *The Order of Things*, Pellegrin distinguishes real biology from the natural history and taxonomy of the classical age, which classified living beings according to their visible structure and generally ended up placing them on a continuous "scale of beings." By contrast, biology, which only appeared with Cuvier in the modern age, classifies living beings according to their function and ranks fundamental functions (the nervous system) against superficial ones (circulation, respiration). Such "in-depth classification" (p. 22) highlights the irreducible diversity of levels of animal constitution against the backdrop of a fundamental "functional homology" (p. 20), identifies the major laws of correlation and subordination between organic characteristics, and grants the living world an autonomy that is irreducible to physico-chemical mechanisms.

Pellegrin thus sets out to demonstrate the existence of these characteristics in Aristotle's zoological corpus. This corpus does identify groups of animals that cannot be reduced to a single level and whose organizational forms are "contradictory" or "opposed" to each other: A division is made between sanguine and non-sanguine animals, and non-sanguine animals are divided into "mollusks, shellfish, crustaceans, and insects." It establishes, albeit in a less formalized manner, correlations and mutual exclusions between organs ("no animals have both projecting teeth and horns"). It "distinguishes more or less basic characters and functions": Digestion that produces blood is more fundamental than the cooling of this same blood (pp. 23-24). Finally, it is structured by a vitalism that translates in particular into the principle of explanation of the inferior by the superior: It is always the developed form (the virtue of man, the adult organism) that must serve to explain the inferior forms (the virtue of the child or woman, the embryo), the latter being considered incomplete.

The unpacking of Aristotelian biology continues in Chapter 3 ("A Philosophy of Life?"), where Pellegrin addresses, through the study of reproduction, the question of the autonomy of the living in nature, and therefore of the possibility of a transition from the non-living to the living. The author demonstrates the complexity of theses that are often presented in a simplistic manner (the "three souls," the activity of the male and the passivity of the female, spontaneous generation). In so doing, he shows that Aristotle does indeed postulate the autonomy of the living—since a living being is always generated by another—and grants an important role to matter and its properties.

Sexual reproduction—which according to Aristotle entails the animation by the male semen of the material produced by the female—and, more importantly, spontaneous generation—which Pellegrin shows to be a mode of reproduction in its own right and not a marginal anomaly—or even the formation of homoiomeries—whether living (flesh, bone) or non-living (metals and minerals)—would seem to indicate that Aristotelianism requires a transition from the non-living to the living. Yet, by asserting the thesis that the world and species are eternal, Aristotle was able to conceive of a biology wherein the living is always generated by a living being, and therefore to avoid making the living emerge from the non-living. The material of the embryo produced by the female, to which the male semen must impart the form of the species through its motion and heat, is thus to be conceived as *living* and not as non-living matter; as such, it plays a real "generative role" (p. 138)—though, of course, this is not to obscure Aristotle's thesis of the superiority of the male over the female, which has often been denounced. In spontaneous generation, of which seashells is the

paradigmatic case, a *pneuma* or psychic principle diffused through seawater animates the "bubbles" that matter itself produces under certain conditions.

While it is true that it always takes a living being (or a "floating principle of animation" (p. 155) like *pneuma*) to generate a living being, material causality plays an essential role in all cases: It is indeed an organized, formed matter capable of life that is animated. Here, Pellegrin applies the "theory of the two natures," which he presented in Chapter 2 to account for Aristotle's integration of pre-Socratic material causality into his physics. "Nature according to reason" can only make teleological use of "natural necessity." In other words, finality can only make the best use of matter and its mechanical properties without transgressing them. To this must be added that:

> the last word goes to necessary nature, to which Nature according to reason must adapt, without the former needing to adapt to the latter (p. 179).

By sketching out a "General Theory of Homoiomeries" whereby Aristotle conceived of the production of iron or gold as analogous to the reproduction of the living, with spontaneous generation being itself an imperfect version of sexual reproduction, Pellegrin completes his description of the place accorded by the philosopher to mechanical causality (rain does not fall for the sake of wheat, but Nature has made wheat in such a way that it can take advantage of the water present in its environment), while also showing that Aristotelian finalism rejects both reductionism and the "vitalism of exception": Life is not an exception to the laws of matter, which it must use; rather, it is purely mechanistic processes that are imperfect imitations of life. Aristotle's biology can thus be viewed as a real "biological thought" in Canguilhem's sense and as a vitalism that is not comparable to any of the thoughts usually classified under this term.

## A Moderate Finalism

What, then, of Aristotle's famous finalism and of his eternal, perfect cosmos? Do they not point to an insurmountable gulf between the philosopher and real biological thought? Here again, Pellegrin shows just how far Aristotle is from his caricatures: While Aristotelian physics is undeniably finalist, this finalism does not reject mechanical causality, but integrates it and makes full allowance for the diversity and even imperfection of life forms. For its part, the thesis that the world and species are eternal allowed Aristotle to dispense with questions that were impossible to

answer in his days, but also enabled him to grant the living world a stability wherein each generation transmits to the next the form of its species. Aristotelian biology could thus fully focus on the study of the characteristics of the species and the genera to which these belong, as well as on the analysis of reproduction as the transmission of a typical form.

Aristotle thus took up the material necessity of the mechanists, namely the fact that certain living things are such because of the properties of their material constituents and not because they were conceived with an end in view. Pellegrin demonstrates this by analyzing the concept of "necessity," which the philosopher employed in different senses, and particularly in the sense of "hypothetical necessity." According to Pellegrin, this concept served polemical purposes: It allowed Aristotle to affirm the ability of his finalism to account for material necessity, including as a means used by nature to serve an end. Aristotle's "Nature according to reason" is indeed a teleological principle, but it is neither an all-powerful magical force, nor a Demiurge who deliberates before acting: Rather, it refers to the fact that nature makes "cunning" use of matter and its properties (matter of the organism and environmental properties) in such a way as to put them at the service of the survival of each species (pp. 108-109). This brings Aristotle closer to Darwin, even though the philosopher's eternal and unchanging biology differs radically from all evolutionist perspectives.

This "cosmology without cosmogony" (p. 294) also distinguishes Aristotle from Plato, who defended a finalism whereby all existing beings or types of being belong to a perfect, harmonious totality, from which none can be missing (p. 214). Pellegrin argues that such a thesis cannot be attributed to Aristotle, for whom the diversity of life forms is a matter of observation and has no finality in itself. He begins his demonstration by delineating Aristotle's conception of animals through a careful study of the relationship between the powers of the soul as

> a living system able to discriminate, thanks to faculties that, by provoking desire and repulsion in it, bring about movements (p. 202).

Pellegrin goes on to show that neither this general definition nor the various criteria of Aristotle's comparative anatomy can give rise to a "*scala naturae*"—a continuous scale of beings based on perfection—or to a combinatorial system making it possible to deduce *a priori* all real or possible animal forms. Likewise, relationships of "friendship" and "hostility" between animals are conceived neither as a perfect harmony or as an evil necessary for the perfection of the whole, but as a correction of nature necessitated by the scarcity of resources. By breaking both with the cosmogonic

model of the Demiurge who deliberately shapes the world and with the mechanism that attributes the world's creation to chance, Aristotle ultimately grants only relative perfection to animal species. In Aristotelian finalism, these species are perfect in the sense that they are such as they survive and reproduce for all eternity—no more, no less. They are not flawless, but each species sees its faults (often linked to the necessities of matter) sufficiently offset by its qualities.

Lastly, Pellegrin investigates the complex relationship between human nature and animal nature in Aristotle's writings, and this, along a number of axes. He begins by considering the status of man as the most perfect species in the sublunary world (due in particular to his bipedal body, which orients him in the absolute directions of the universe: up, down, left, right) in order to show that Aristotle's biology is less anthropocentric than one might think: While the superior perfection of the human species is undeniable, man serves neither as a universal explanatory model, nor as a model to be imitated by other forms of life, nor as the end point of an impossible continuous scale of beings. Nevertheless, there is an unbridgeable gulf between man and other animals, which owes to the former's possession of the *logos*, the ability to speak an articulate language and to deliberate. It is not easy, however, to determine what separates man from animals in domains pertaining to the body and to sensibility, particularly the domain of pleasure. Pellegrin thus addresses both the existence of specifically human pleasures, including those of the senses such as flavors and scents, and the ethical issues involved in establishing distinctions and similarities between the animal, the disturbed man, and the virtuous man. He ends by considering the problematic case of sheep and other domesticated animals dependent on humans, as well as the difficulty of granting them a place in Aristotle's unchanging cosmology—yet another case where the diversity of living things can hardly be reduced to a unified explanatory scheme.

## Conclusion

Pellegrin thus offers his readers a complex and important book, and though he argues from the outset that any synthesis of Aristotle's biological studies has become impossible, he succeeds in presenting many of their achievements while also proposing his own reading of them—a reading that will have to be judged by specialists. One should also highlight that he takes great care to reconstruct the debates in which he himself takes side—along with his own evolutions—in a way that will

enlighten those unfamiliar with them, even if he sometimes makes choices without being able to explain himself at length. The index of Aristotle's texts also constitutes a valuable tool for researchers. Clearly, the author strives to give Aristotle's thought the greatest possible internal coherence, insisting on his general approach rather than on the weakness or erroneous nature (which he obviously recognizes) of many of his observations.

Yet this is, of course, the role of the commentator, and Pellegrin cannot be faulted for it. Readers unfamiliar with Aristotle and his zoological corpus will have to make a sustained effort to follow some of the twists and turns of the argument. They will also sometimes have to link certain analyses, which would have benefited from being more explicitly connected to each other and to the general thesis they serve, particularly in the last two chapters. They will nevertheless gain a rich and elegant understanding of Aristotle's biology to which this book is an essential contribution.

## Further reading


- David Balme, "Teleology and necessity," in A. Gotthelf and J. G. Lennox (eds), *Philosophical Issues in Aristotle's Biology,* Cambridge, Cambridge University Press, 1987.
- Rémi Brague, *Aristote et la question du monde. Essai sur le contexte cosmologiques et anthropologique de l'ontologie*, Paris, Puf, 1988.
- Simon Byl, *Recherches sur les grands traités biologiques d'Aristote : sources écrites et préjugés,* Bruxelles, Palais des Académies, 1980.
- Sophia M. Connell, *Aristotle on Female Animals: A study of the Generation of Animals*, Cambridge, Cambridge University Press, 2016.
- John Cooper, "Hypothetical necessity and natural teleology," in A. Gotthelf and J. G. Lennox (eds), *Philosophical Issues in Aristotle's Biology,* Cambridge, Cambridge University Press, 1987.
- Andrea Falcon, *Aristotle and the Science of Nature: Unity without Uniformity*, Cambridge, Cambridge University Press, 2005.
- Andrea Falcon and David Lefebvre, *Aristotle's* Generation of Animals: *A Critical Guide*, Cambridge, Cambridge University Press, 2018.
- Robert Joly, "La biologie d'Aristote," *Revue philosophique*, 1968, pp. 219-253.
- James G. Lennox, *Aristotle's Philosophy of Biology*, Cambridge, Cambridge University Press, 1996.


First published in laviedesidees.fr, 27 July 2022. Translated by Arianne Dorval, with the support of Cairn.info. Published in booksandideas.net, 4 January 2024