

Michael T. Ferejohn: *Formal Causes. Definition, Explanation, and Primacy in Socratic and Aristotelian Thought*. Oxford / New York: Oxford University Press 2013.

One of the more puzzling features of Aristotle's theoretical philosophy is his formal cause, the what-is-it. For instance, the form *Triangle* is the formal cause of triangles having internal angles equal to two right angles (*APo.* I 4, 73b29-32). Scholars of Aristotle have very often found the formal cause puzzling and objectionable (e.g. Anscombe & Geach 1961, 6). More recently the formal cause has received more sympathetic interest (e.g. Charles 2000 and 2014; Lennox 2014; Correia & Schnieder 2012). The problem has two aspects: The first difficulty is to make the formal cause philosophically plausible as part of contemporary philosophical discussion on causation and explanation. The second difficulty is to integrate all the passages from most (if not all) of Aristotle's works discussing the formal cause and strongly related notions. Ferejohn's relatively brief and easily readable monograph presents a highly detailed possible solution to both aspects of this problem. Ferejohn defends an interpretation of the *Posterior Analytics* where the formal cause is a definition-based explanation exhibiting the characteristic of analyticity, but where the *definiens* is explanatorily prior to the *definiendum* (vii). However, Ferejohn claims that Aristotle himself in the *Posterior Analytics* realized the fundamental problems with his formal cause. This realization led Aristotle in an empirical phase of his career to reject the formal cause in favour of the final (teleological) cause in the *Physics* and in *On Generation and Corruption*. Finally, in a later mature phase, Aristotle integrated the formal and final cause in his hylomorphic theory of *Metaphysics Z* and *H* and *De Anima* (158-160).

Ferejohn's book consists of an introduction and six chapters. In the following, I will discuss these parts of the text in order, with the exception that I will discuss chapters one and two together in one section and chapters three and four together in the then following section.

## I

In his introduction (1-20), besides giving the customary schematic presentation of the book, Ferejohn defends history of philosophy as a critical engagement with past philosophers (1-2), remarking "that a good historian of philosophy must also be at least a reasonably competent philosopher in her own right" (2). However he says that the best philosopher does not make the best historian of philosophy, as illustrated by the fact "that Aristotle's discussions of his predecessors' views generally come to us through the prism of his own philosophical doctrines" (2). After this Ferejohn introduces (5-6) two passages from Aristotle claiming that Socrates<sup>1</sup> was the first to concentrate on definitions and essences as basic explanatory principles (*Metaph. A* 6, 987b1-3 and *Metaph. M* 4, 1078b22-30, wrongly given as 987b103 and 1087b22-30, as also mentioned by Lennox 2014b).

## II

---

<sup>1</sup> For Ferejohn Socrates is primarily the character in Plato's dialogue, which might also be the historical Socrates, cf. 4 n.

Chapter one ('The Origins of Epistemology and the Socratic Search for Definitions', 21-37) and chapter two ('Definition-Based Explanations in the *Eutyphro*', 38-63) elaborate on these two passages through identifying possible sources of a primitive concept of the formal cause, especially in Plato's *Eutyphro* and *Meno*. The Eutyphro-fallacy is a well-chosen example, where Socrates shows that something is not pious because it is loved by the gods, but rather that it is loved by the gods because it is pious (*Eutyphro* 10e-11a). Eutyphro's proposed definition fails because the *definiendum* (viz. piety) is explanatorily prior to the *definiens* (viz. loved by the gods), and therefore the definition fails to explain why Eutyphro's prosecution of his own father is pious. This emphasis on explanatory priority in definition is, as far as I can see, the main thesis that Aristotle inherits from Socrates according to Ferejohn.

A second and separate path running through the first two chapters is the epistemological aspect of getting to know explanatory definitions. To this aim Ferejohn distinguishes between what he calls three grades of epistemological involvement (22-24). The first and lowest grade is the recognition of necessary conditions of knowledge, found in some of Plato's early dialogues like the *Eutyphro*, especially the necessary condition of knowing the essence of F in order to know F (28-33). To avoid what Geach 1966 named the 'Socratic fallacy', viz. that to know F one must first know the essence of F but to get to know the essence of F one must know F, Ferejohn proposes to weaken this necessary condition. Through discussing the *Eutyphro* Ferejohn suggests that it is only a necessary condition that one knows the essence of F in the most complex and difficult instances of F, viz. that it is a necessary condition for knowing all F's and not a necessary condition for knowing most F's (35-37). The second grade is the discussion of the sufficient conditions of knowledge, i.e. by presenting an analytic definition of knowledge. Here Ferejohn (62-63) refers to the definition of knowledge as justified true belief and the discussion of it in the *Theaetetus* and the *Meno* 97a-98a. The third and highest grade is epistemology as it is practiced in the *Theaetetus* and still today, viz. "the comparative assessment of *competing* analyses of knowledge" (24). I fail to see that this discussion of the second grade, viz. the thesis that knowledge is justified true belief, is of much relevance for the rest of the argumentation in the book. Ferejohn attempts to tie it together with *APo.* I 2, 71b9-16, but I remain unconvinced. He thinks that Aristotle is implicitly referring to the passage in the *Meno*, and that the demonstrations discussed in the *Posterior Analytics* are supposed to be the justifications of a belief (68-70). The definition of knowledge as justified true belief is certainly to be found in these two Platonic dialogues. It is however far from certain that Plato himself endorsed the definition (*prima facie* he rejects it in the *Theaetetus*), and it is implausible that Aristotle endorsed it. Moreover, it is no understatement to say that it is highly controversial within contemporary epistemology. However, Ferejohn's argument seems only to require that knowledge is of what is true and requires justification or proof, and not that knowledge is a kind of belief.

### III

Chapters three ('Knowledge, Explanation, and Foundational Premises in Aristotle's *Posterior Analytics*', 64-97) and four ('Aristotelian Definition-Based Explanatory Accounts: The Formal *Aitia*', 98-120) are the central chapters of the book, and defend an interpretation of the formal cause in the

*Posterior Analytics* as a definition-based explanation exhibiting the characteristic of analyticity. This is what I take to be the key thesis of the book. Ferejohn's interpretations of the *Posterior Analytics* build heavily on his previous book (Ferejohn 1991), especially on what he calls 'catholic predication' (made from the greek καθόλου translated as 'universal', or even as 'universal and commensurate', 81-84, cf. Ferejohn 1991, 68-72). Ferejohn's discussion in his latest book of the passages is self-sufficient, but a reader might find it beneficent to also look at the more in-depth discussion in his previous book.

At *APo.* I 4, 73a23-7 Aristotle presents what Ferejohn calls the three conditions for catholic predication: 1) 'to all of the subject (κατὰ παντός), 2) 'per se' (καθ' αὐτό), and 3) 'qua itself' (ἢ αὐτό). Ferejohn argues that the first and third of these are independent extensional requirements, while the second is an intensional requirement (83-95, cf. Ferejohn 1991, 69-130). This claim is highly controversial, and I would be prepared to challenge the claim that any one of them is exclusively extensional. All three requirements depend, as I see it, on the intensional nature of the subjects, and not on the extension of the subjects instantiating it. Against the claim that the 'to all of the subject'-requirement is extensional, one can cite Aristotle's discussion of exceptions (cf. Sandstad forthcoming), e.g. of the blind mole which lacks the essential (*qua* footed vivipara) characteristic of sight (*HA* IV 8, 532b34-533a12; *HA* I 9, 491b27-35; and *DA* III 1, 425a9-11). Against the claim that the 'qua itself'-requirement is extensional, one can cite the discussion of the possibility of separate explanations for the same thing in *APo.* II 17, 99a1-99b6. Simply finding the largest extension of things with a certain attribute does not ensure that there is one formal cause for the whole extension. E.g. "things which are the same by analogy will have their middle term the same by analogy too" (99a15-16). A case of this would be the wings of birds, insects, and the bat, which are merely analogous to each other (*HA* I 5, 490a6-13). Rather, the 'qua itself'-requirement seems to determine the intension by giving the relevant universal (cf. Lennox 2014b: "I would say that the 'as such' condition establishes an intensional context for distinguishing different sorts of predication."). Ferejohn's interpretation of the first and third requirement as purely extensional must be rejected, at least for a unified interpretation of Aristotle. But as we will see, Ferejohn defends a developmental rather than a unified interpretation.

In any case, Ferejohn's interpretation of the formal cause is mainly dependent on the second requirement, that it should be *per se* (cf. 95: "it is the per se condition on catholic predication in particular that guarantees their necessary truth"). Ferejohn discusses in detail *APo.* I 4, 73a35-73b18 (90-95; there are a couple of mistyped references here: quote (D) on page 91 should be 73b6-9, and quote (E) on page 92 should be 73b10-16). Ferejohn writes that the *per se* is contrasted with the coincidental (κατὰ συμβεβηκός: usually translated as 'accidental', but I think Ferejohn's alternative translation is in many ways preferable). For the primary sense of *per se* (named *per se*<sub>1</sub> by Ferejohn) there is a necessary meaning-relation between the two terms, more precisely "as analytic relations between subject and predicate" (95). "This relation, which Aristotle refers to in later works as 'priority in account', or 'logical priority', is very likely an early ancestor of what in later periods was referred to as analyticity" (94-95). A motivation for this interpretation is Aristotle's view that essential predications are commensurate and convertible, e.g. 'rational animal' is the same as 'man'.

This seems to mirror cases like the classic example of ‘bachelor = unmarried man’,<sup>2</sup> and I suppose Ferejohn to implicitly draw on examples like this. However, I think it is a significant mistake of Ferejohn to interpret the formal cause and catholic predication by means of analytic statements. For one, it leads Ferejohn to focus on definitions understood as terms united in a proposition. But while terms can play a limited explanatory role (one can explain a term by giving a synonymous term), terms cannot have the key explanatory and causal role which Aristotle’s formal cause has. This focus on terms is prevalent throughout the remainder of the book. E.g. “a definition is a *phrase*, i.e., a complex *logos* made up of a plurality of words” (172). Surely the formal cause cannot primarily be terms, but something that can be argued to have a causal role, e.g. things or facts, or perhaps less likely for Aristotle events or states-of-affairs. In the remainder of the book, Ferejohn develops an elaborate developmental theory in order to account for Aristotle’s actual usage of the formal cause, and for the large number of problematic cases that arise from interpreting the formal cause as analytic definitions. The reader might conclude, as I have done, that the problems that arise from such an interpretation as well as the developmental theory meant to deal with these problems in fact constitute a *reductio* of Ferejohn’s analytic interpretation of the formal cause.

#### IV

Chapter five (‘Non-Canonical Forms of Aristotelian Demonstration’, 121-155) discusses two types of non-canonical explanations, based upon some very interesting cases in the *Posterior Analytics*, and where both types are problematic (and hence non-canonical) under Ferejohn’s interpretation of the formal cause. The first type (122-131) is the case where one already knows the formal cause, e.g. that the form *Triangle* is the formal cause of having internal angles equal to two right angles (for short: 2R). From this knowledge one can supply a second syllogism showing that 2R therefore necessarily belongs to a particular kind of triangle, viz. *Isosceles*. Here the form *Triangle* will correctly figure as the middle term and cause. However, in contrast to canonical formal explanations, the formal cause *Triangle* will not be commensurable and convertible (cf. *APo* II 17, 99a33-36) with the minor (viz. *Isosceles*), because it is only *a* kind of triangle (cf. Lennox 1987).<sup>3</sup> Ferejohn argues that Aristotle nonetheless allowed for such non-canonical formal explanations, and his discussion of passages supporting this conclusion (*APo*. I 19-22 and 24, and II 13) is highly interesting. Ferejohn notes that “it is difficult to understand how someone could know [...] that the possession of 2R followed from the definition of *isosceles* [...] without knowing that the specific *part* of that definition from which this followed is its reference to the genus under which *isosceles* falls, namely *triangle*” (129; the reader should note that the reference should be 85b7-8, rather than the printed 86b7-8). I admit it might be difficult in this concrete case (except for a student who has only seen isosceles triangles and made the proof by construction), but what of a case discussed by Ferejohn earlier (125, and originally on 104f., cf. *APo*. II 17, 99b5-6 and *Long*. 4, 466a13-14), viz. the elephant being long-lived because it lacks a gall bladder? Assumedly, one can know that the elephant is by definition long-lived without

<sup>2</sup> Assuming the widower and the divorced man also are bachelors, cf. Johansson1989, 321.

<sup>3</sup> Similarly a disjunction or conjunction of all the kinds of triangle will also fail to satisfy this requirement.

knowing that it is long-lived because it is among those animals that lack a gall bladder. If one accepts cases like this, then one does not have to accept “that Aristotle’s conception of ‘particular demonstration’ in *Posterior Analytics* A 24 is hopelessly muddled” (130).

The second type of non-canonical explanations (131-147), ‘the causal model’, is the explanation of events (which Ferejohn controversially assumes to be composed of processes; 135, fn. 21), where the middle term is an efficient cause. The examples Ferejohn discusses are the eclipse of the moon and thunder (*APo.* I 8, 75b33-35; and *APo.* II 8, 93a22-93b14). He argues that these cases are problematic because Aristotle’s canonical model is only suited for an ontology of things and their kinds (and more generally for Aristotle’s ontological square, *Cat.* 2, 1a20-b10, of which I will have more to say on below, cf. 159). And, his argument continues, while a property may follow from an essence and belong to a thing, a process does not follow from the essence of the thing undergoing it – it is merely something that happens to the thing. Ferejohn makes a further assumption, by connecting these passages with Aristotle’s division between things where the explanation is external and where it is internal (*APo.* II 9, 93b22-28). This assumption creates a difficulty in treating efficient causation for biological organisms. He discusses this in-depth with the case of broad-leaved plants shedding their leaves (147-155, cf. *APo.* II 16, 98a35-b39), concluding that these cases represent a middle-position between the canonical model and the causal model. A simpler solution would be to reject the assumption that the causal model requires an external cause (for a recent interpretation along these lines, which also views events as the subject of the efficient cause, cf. Hennig 2009). Aristotle would simply be presenting two explanations for the shedding of leaves, namely the (here superior, cf. 154) formal cause and the efficient cause. The tension would be very much reduced.

✓

Chapter six (‘Explanation, Definition, and Unity in Aristotle’s Later Works’, 156-195) defends a highly comprehensive developmental thesis, where Aristotle is said to have gone through three stages in his philosophical development. The first stage is Aristotle’s time in Plato’s Academy (368/7 to 348/7), which Ferejohn claims were a logical and Platonic stage represented by Aristotle’s *Organon*. To this belongs Aristotle’s canonical formal cause, i.e. the formal cause as two terms connected by analyticity. The second stage begins with Aristotle’s departure to Asia Minor – Ferejohn gives (wisely) no indication of when this stage ends. This is the stage of his empirical studies, and Ferejohn thinks the most relevant works for the formal cause is the *Physics* and *On Generation and Corruption*, although he also includes all of Aristotle’s biological works<sup>4</sup> as well as that on meteorology and astronomy in this group (159). In these works Ferejohn claims that Aristotle favours teleological causes, but also makes use of efficient causes (the material cause he views as a special case of efficient cause, where the efficient cause is located in the matter, cf. 168). In the third and final stage Aristotle developed his mature theory, integrating the logical and the empirical in *Metaphysics* Z and H and in *De Anima* (Ferejohn discusses deals only much of Z, and H 6). Ferejohn also considers the rest of the *Metaphysics*, as well as the psychological, ethical, and political works, to

---

<sup>4</sup> As Lennox 2014b remarks, it is unfortunate that Ferejohn does not discuss the biological works of Aristotle since much recent scholarship has emphasized the direct relation between the *APo.* and the biological works. Ferejohn needs to show that this recent trend in Aristotle-scholarship is mistaken in order to make his developmental thesis plausible.

belong to this stage (160). Ferejohn argues that in this stage Aristotle reintroduced the formal cause through his hylomorphism, but gave it a subsidiary role by requiring that the formal cause must be “transformed into the physical notion of an efficient or teleological cause” (194, italics in the original). Still, Ferejohn concludes the book with saying that the tension between the logical and the empirical aspect was never entirely resolved (195).

The critical assumption in Ferejohn’s argument is that nature (*φύσις*) as explicated in the *Physics* (and presumably also in *GC*, though there *λόγος* also seems strongly related to form) is fundamentally different from that of form (161). This is highly heterodox, but given Ferejohn’s interpretation of the formal cause as exhibiting the characteristic of analyticity the conclusion is inevitable. Ferejohn cites the definition of nature in *Pb.* II 1, 192b13-15, viz. “an internal principle of change and rest”. Reasonably, Ferejohn interprets this to mean that a nature is (in a non-reductive sense I assume) “a cluster of *capacities* for change, the actualization of which are *causally responsible* for various sorts of changes occurring (or not occurring)” (162). But if a formal cause is merely an analytical definition, merely a phrase or a collection of terms (172), then the formal cause cannot be causally responsible for anything (a term is surely not a cause). Therefore form and nature must be fundamentally different, because one is causally responsible and the other is causally inert. However, there is no difficulty in finding an interpretation of the formal cause such that the form can be causally responsible. As a minimum the form must have some ontological existence, say as some sort of substantial universal (or a substantial particular for those more inclined to that interpretation). Such a position could make use of the ontological square of *Cat.* 2, 1a20-b10, consisting of the four categories ‘substantial particulars’, ‘substantial universal’, ‘non-substantial universal’ and ‘particular accidents’ – an ontology that Ferejohn criticizes as “austere” (159, fn. 4, cf. Ferejohn 1991, 78-83), but which many contemporary philosophers have found attractive (e.g. Strawson 1959, 167f.; Mulligan et al. 1984, 291; Lowe 2006). This would allow one to maintain the orthodox view that for Aristotle form and nature are strongly related. And further, one would not have to posit any developmental schism between his logical and empirical works. Ferejohn’s discussion of *Metaphysics Z* and *H* 6 (168-195) has much to offer, and while it gives no definite solution to these highly vexed books, it does contribute not insignificantly to the vast literature.

## VI

Ferejohn’s newest book is a thorough and powerfully argued interpretation of Aristotle’s formal cause. It is a book that deserves to be discussed and taken seriously, while also being provocative and engaging. I have indicated some problems that I take to be critical, centred on Ferejohn’s interpretation of the formal cause as a definition-based explanation exhibiting the characteristic of analyticity. Even if my criticism is justified, Ferejohn should be commended for working out his interpretation and the implications following from it. For Aristotle scholars the book is a welcome addition to the literature on the formal cause. The book is easily readable, sparse on references to secondary literature (which has both benefits and disadvantages), and all Greek words are

transliterated. For these reasons, the book is also accessible to students and could therefore be excellent study material for a course on scientific explanation and the *Posterior Analytics*.<sup>5</sup>

Petter Sandstad

### *Bibliography*

- Anscombe, G. E. M. / Geach, P. T. 1961. *Three Philosophers*. Oxford: Blackwell.
- Charles, D. 2000. *Aristotle on Meaning and Essence*. Oxford: Oxford UP.
- Charles, D. 2014. Aristotle: Definition, Explanation, and Essence. *Metascience* 23, 16-24.
- Correia, F. / Schnieder B. 2012. Grounding: an Opinionated Introduction. In: Correia, F. / Schnieder B. (eds.). *Metaphysical Grounding: Understanding the Structure of Reality*. Cambridge: Cambridge UP.
- Ferejohn, M. 1991. *The Origins of Aristotelian Science*. New Haven / London: Yale UP.
- Geach, P. T. 1966. Plato's *Eutypbro*: An Analysis and Commentary. *The Monist* 50, 369-382.
- Hennig, B. 2009. The Four Causes. *The Journal of Philosophy* 106, 137-160.
- Johansson, I. 1989. *Ontological Investigations: An Inquiry into the Categories of Nature, Man and Society*. London / New York: Routledge.
- Lennox, J. G. 1987. Divide and Explain: the *Posterior Analytics* in Practice. In: Gotthelf, A. / Lennox, G. A. (eds.). *Philosophical Issues in Aristotle's Biology*. Cambridge: Cambridge UP. (Reprinted in: Lennox, J. G. 2001. *Aristotle's Philosophy of Biology*. Cambridge: Cambridge UP.)
- Lennox, J. G. 2014a. Preparing for Demonstration: Aristotle on Problems. *Metascience* 23, 24-33.
- Lennox, J. G. 2014b. Review of Ferejohn 2013. *Notre Dame Philosophical Reviews*, 2014.10.16.
- Lowe, E. J. 2006. *The Four-Category Ontology: A Metaphysical Foundation for Natural Science*. Oxford: Oxford UP.
- Mulligan, K. / Simons, P. / Smith, B. 1984. Truth-Makers. *Philosophy and Phenomenological Research* 44, 287-321.
- Sandstad, P. Forthcoming. Aristotle on Exceptions to Essences in Biology. In: Strobel, B. / Wöhrle, G. (eds.). *Applied Epistemology in Ancient Philosophy*. Trier: Wissenschaftlichen Verlag Trier.
- Strawson, P. F. 1959. *Individuals: An Essay in Descriptive Metaphysics*. London / New York: Routledge.

---

<sup>5</sup> I would like to thank Ludger Jansen and Markus Schrenk for very helpful comments.