

ARISTOTE
TRADUCTIONS ET ÉTUDES

**LE LANGAGE
LECTURES D'ARISTOTE**

ÉDITÉ PAR
LEONE GAZZIERO

Publié avec le soutien de l'Agence Nationale de la Recherche
(Projet ANR-15-CE33-0008) et du Laboratoire
« Savoirs, Textes, Langage » (CNRS / Université de Lille)

PEETERS
LEUVEN - PARIS - BRISTOL, CT

2021

TABLE DES MATIÈRES

Leone GAZZIERO : Aristote et le langage. Mode d'emploi	1
Walter LESZL : Aristotle on Language and on Language and Thought.	9
Simon NORIEGA-OLMOS : Aristotle's Semantic Thinking and His Notion of Signification in <i>De interpretatione</i> 1 and Beyond .	81
Luca GILI : Tensing the Verbs	143
Ana Maria MORA-MARQUEZ : Elements of (Dialectical) Argumentation Theory in Aristotle's <i>Topics</i>	173
Myriam HECQUET : Aristote linguiste et grammairien : l'analyse de la λέξις dans les <i>Réfutations sophistiques</i>	201
Leone GAZZIERO : Ὁ ἄπειρος πρῶτος τὴν ψῆφον βαλέτω. Leaving No Pebble Unturned in <i>Sophistici elenchi</i> , 1.	241
Pierre CHIRON : La question du langage dans le premier livre de la <i>Rhétorique</i> d'Aristote	345
Andrea FALCON : Aristotle on the Infant Mind in <i>Physics</i> I 1. . . .	367
Michel CRUBELLIER : La pensée langagière dans le <i>De Anima</i> d'Aristote	383
Giuseppe FEOLA : Φαντασία and νοῦς: on the Relation between φαντάσματα and νοήματα in Aristotle's Psychology.	413
Annick JAULIN : <i>Metaphysica</i> Z 17.	439
Aurélien DIJAN : Aristote et le langage – une bibliographie essentielle	457

ARISTOTLE ON THE INFANT MIND IN *PHYSICS* I 1

Andrea FALCON
(Concordia University, Montreal)

*S'io avessi le rime aspre e chiocce,
come si converrebbe al tristo buco
sovra 'l qual pontan tutte l'altre rocce,
io premerei di mio concetto il succo
più pienamente, ma perch'io non l'abbo,
non senza tema a dicer mi conduco,
ché non è impresa da pigliare a gabbo
discriver fondo a tutto l'universo,
né da lingua che chiami « mamma » o « babbo »*
(Dante, *Inferno*, XXXII 1-9)

Introduction

Travelling in the abyss, at the edge of the frozen lake of the Cocytus, Dante tells his reader that there are no rhymes adequate to describe the horror that he is witnessing. Thus, he brings himself to speak in fear because describing the very bottom of the universe is not a task to be taken lightly. *Nor is it a task for a tongue that cries out « mama » or « papa. »*

This is not the only time that, in his journey in the Christian other-world, Dante finds himself in a situation in which he has no words to report what he sees.¹ But in this case – and only in this case – Dante makes

* I would like to thank Leone Gazziero for his helpful feedback on a draft of this essay.

¹ Ineffability is a major theme in the third canticle (*Paradiso*). For an early, clear statement of this theme, I refer the reader to the second and third tercets of the opening canto: « *Nel ciel che più de la sua luce prendel fu' io, e vidi cose che ridirel né sa né può chi di là sù discende; / perché appressando sé al suo desire, / nostro intelletto si profonda tanto, / che dietro la memoria non può ire* » (*Paradiso* I, 4-9). Memory is given as the reason for the kind of limitations that Dante experienced in *Paradiso*. What Dante says in connection

an implicit reference to the opening chapter of *Physics* I, where Aristotle focuses on the linguistic behavior of the infants who call all men « papa » and all women « mama » (*Physica* I 1, 184b 12-14).²

Dante is notoriously committed to the view that language is a mere vehicle to express our thoughts. This view is explicitly stated at the outset of his treatise on the vulgar tongue:

« now, if we wish to define with precision what our intention is when we speak, it is clearly nothing other than to expound to others the concepts formed in our minds » (*De vulgari eloquentia* I, 2, 3).

At least for Dante, there can be thoughts without language. For instance, he believes that angels communicate with one another, and with God, without language. They do not need language because their thoughts are, so to speak, transparent. By contrast, language is given to us because our minds are not immediately transparent. By Dante's lights, the tongue serves to express the contents of the mind. The tongue that cries out « mama » and « papa » is no exception to the rule. It is the tongue of a mind that is not fully formed, that is, of a mind that does not have the conceptual resources to describe what it sees or experiences.

Aristotle would agree that the foundation of language is in thought, and that thought is prior to language in the natural order of things. The opening sentence of the *De interpretatione*, where Aristotle establishes a relation between written words, spoken sounds, thoughts, and things lends support to such a view.³ There, we are told that spoken words are signs (σημεῖα) of what is in the mind.⁴ What is in the mind, moreover, are affections of the soul (παθήματα τῆς ψυχῆς). Hence, spoken words such as « mama » or « papa » signify affections of the soul.

with the vision of God in the last canto of the *Paradiso* confirms the role memory plays in the explanation of these limitations: « *Da quinci innanzi il mio veder fu maggio/ che 'l parlar mostra, ch'a tal vista cede/ e cede la memoria a tanto oltraggio* » (*Paradiso* XXXIII, 55-57).

² For Dante, « mamma » and « babbo » are words associated with childhood. Both are recalled in the *De vulgari eloquentia* as examples of *puerilia* (childlike expressions) that a poet should avoid (*De vulgari eloquentia*, II 4). I owe this reference to Leone Gazziero. Of course, Dante has changed his mind on this point as he finds it perfectly appropriate to use them in the *Commedia*.

³ *De interpretatione* 1, 16a 3-9. Needless to say, this text is in the background of Dante's conception of language. Dante did not know Greek but he could read Aristotle's *De interpretatione* in the Latin translation produced by Boethius.

⁴ Aristotle says that spoken sounds are also σύμβολα of what is in the mind. I am following the line of interpretation that takes « σημεῖα » to be a general term for signs and considers σύμβολα a particular class of signs – namely, conventional signs.

Reflecting on the example of the infants crying out « mama » or « papa » may help us better appreciate the wording adopted at the outset of the *De interpretatione*. Admittedly, we do not know whether Aristotle considered the case of the infant mind in the context of the project attempted in the *De interpretatione*, but it is at the very least dubious that such a mind can engage in a successful instance of thinking. More directly, it does not seem right for Aristotle to say that « mama » and « papa » signify full-fledged thoughts (νοήματα). At most, he can opt for a rather vague expression like « affections of the soul » (παθήματα τῆς ψυχῆς).

What Aristotle says at the outset of the *De interpretatione* suggests the following working assumption: in *Physics* I 1, Aristotle is concerned with the linguistic behavior of infants not *per se* but insofar as their linguistic behavior is symptomatic of some non-linguistic problem. In the rest of this essay, I focus on the nature of this problem. I argue that Aristotle's diagnosis of the problem is that there is not enough conceptual articulation in the infant mind that calls all men « papa » and all women « mama ». I also reflect on the reasons why Aristotle is interested in the infant mind, and explore the way (or, perhaps, ways) in which he uses the linguistic behavior of infants to shed light on the errors that his predecessors committed in the search for the principles of nature.

1. The Context

In *Physics* I 1, Aristotle outlines a method of inquiry that he considers natural:

« it is natural the road (ὁδός) that is from what is better known and clearer to us to what is clearer and better known by nature: for it is not the case that the same things are known to us and also without qualification. So it is necessary to proceed in this way from what is unclear by nature but clearer to us to what is clearer by nature and better known. The things that are confounded to a degree are at first evident and clear to us: it is only later, starting from these <confounded> things, that the elements and the principles come to be known to those who analyze them » (*Physica* I 1, 184a 16-23).

I offered an in-depth study of this programmatic passage elsewhere (Falcon 2017). Here I am content to recall the main lines of my interpretation in order to provide a context for the subsequent discussion.

In all probability, the reference to nature in our passage has a double meaning. To begin with, the method outlined here is natural in the sense

that it is open to all of us to adopt it. We can adopt it because we all share the same (human) nature. But it is also clear that there may be no alternative to this method. In other words, this method of inquiry is forced upon us by our (human) nature. Hence, at least for Aristotle, we have no choice but to adopt this method. This would explain why he says that *it is necessary to proceed in this way* – namely, from what is better known and clearer to us to what is better known and clearer by nature. What is better known and clearer to us is better known and clearer to sense-perception. While this equivalence is not explicitly stated in our passage, it is an equivalence that Aristotle makes elsewhere. For example, Aristotle identifies what is better known to us with what is closer to sense-perception in the *Posterior Analytics*.⁵

When we take the natural road of inquiry outlined in *Physics* I 1, we engage in an epistemic journey that Aristotle describes in terms of clarity. The *terminus a quo* of the journey is identified with « the things that are better known and clearer to us » (ἐκ τῶν γνωριμωτέρων ἡμῖν καὶ σαφεστέρων) whereas the *terminus ad quem* is described as « the things that are better known and clearer without qualification » (ἐπὶ τὰ σαφέστερα τῇ φύσει καὶ γνωριμώτερα). Aristotle elaborates on how he conceives of this journey in the second part of our passage by saying that we are required to begin our investigation from the things that are confounded to a degree but initially clear and evident to us (to sense-perception). The key words are « confounded to a degree » (συγκεχυμένα μᾶλλον).

What Aristotle has in mind can be illustrated with the help of a parallel passage from the *Historia animalium*. There, Aristotle is recalling his well-known thesis that living bodies display up to three functional parts, namely up/down, front/back, and left/right. These functional parts are most clearly articulated in the human body because of its erect posture. But the human body is the exception rather than the rule. Other animals either do not have all three dimensions or « *they do have them but confounded to a degree* ». ⁶ Aristotle does not mean to say that these functional parts are not present in the second group of non-human animals; rather, he means to say that they are found in this group as well, but they are found in the same place. And yet, an expert investigator can discriminate the front and the up in a living body even when they are found

⁵ *Analytica Posteriora* I 2, 72a 1-5. Cf. also *Topica* VI 4, 141b 5-14.

⁶ *Historia animalium* I 15, 494a 32: τὰ δ' ἔχει μὲν συγκεχυμένα δ' ἔχει μᾶλλον.

in the same place because an expert investigator can trace these functional parts to different capacities of the living body. More directly, the front is where the sense-organs are implanted, whereas the up is the entry point of nourishment. This distinction may not be immediately evident to sense-perception but it is always *clear to reason*. Put differently, and more generally, Aristotle has developed a biological theory that enables him to bring the functional organization of a living body to light. While this functional organization is not accessible to sense-perception, it can be used to illuminate what is given to us by sense-perception, and it is also confirmed by sense-perception.⁷

The *Historia animalium* passage suggests that the cognitive process outlined in *Physics* I 1 can be understood as a rational process entailing the progressive articulation of what is initially confounded to a degree. We are expected to begin our investigation from what is clear and evident to us. What is clear and evident to us is clear and evident to *sense-perception*. It reveals its complexity and structure as we analyze it. Even if Aristotle does not elaborate on what he means by analysis, it is safe to assume that *analysis involves reason*. It is only by means of reason that we move from what is clear and evident to us (and to sense-perception) to what is clear by nature (and to reason). Our analysis will reach its natural end when we have reached what is maximally clear. Relative to what we are trying to understand, the latter does not admit of any further articulation or discrimination.

Physics I 1 ends with two examples. Nothing in the Aristotelian text forces us to think that the two examples serve to illustrate different moments, or different aspects, of the epistemic journey outlined in *Physics* I 1. However, it is reasonable to assume that, in a text as short and elliptical as ours, the two examples serve different purposes. In other words, while possible, it is extremely unlikely that Aristotle is giving two examples if only one were enough. Thus, as a general exegetical rule, it seems to me that an interpretation that shows that the two examples play different roles in Aristotle's mind ought to be preferred to one that does not yield this result.

Let us focus, briefly, on the first example, which is a geometrical example. Aristotle contrasts and coordinates the name « circle » with the

⁷ This final addition is important, especially for those who think that Aristotle is committed to the view that his biological theory is, *at least in principle*, answerable to sense-perception.

definition of the circle. The name and the definition are conceived, respectively, as the beginning and the end of our epistemic journey. We begin our inquiry by reflecting on the meaning of a name. The name cannot be empty but must signify some genuine whole (ὅλον τι).⁸ Aristotle adds that the name signifies the genuine whole *in an undetermined way* (ἄδιορίστως). Clearly, the task that Aristotle envisions for himself (and for us) consists in bringing the internal complexity of the whole to light. We will have completed our task when we will have reached a definition that distinguishes the parts of the whole. We are left to guess what these parts are in the case of the circle. One possibility is that these parts are (a) the point that serves as the center, and (b) the line that serves as the radius of the circle. With the help of a center and a radius, we can draw a circle. Alternatively, we may suppose that (a) all the points equidistant from the center of the circle and (b) the point that serves as center are the parts of the circle.

Notwithstanding these complications, it is clear that the first example isolates both the starting point and the endpoint of our epistemic journey. While the starting point is a *nominal definition* that signifies some unanalyzed whole, the endpoint is a *scientific definition* that highlights the parts or elements that a successful analysis has found in the whole. At least in the case of the circle, it is tempting to say that the endpoint is a geometrical definition that singles out the formal cause of the circle. *Nothing at all is said on how we move (or fail to move) from one stage of the inquiry to the other.* My suggestion is that the second example serves to fill this lacuna.

2. The infant mind in *Physics I 1*

Let us recall how Aristotle introduces the second example: « little children too at first call all men fathers and all women mothers, and later distinguish each of the two » (*Physica I 1*, 184b 12-14). This example can be used to illustrate an error that we may commit in the course of our

⁸ The qualification « genuine » is important. It is meant to rule out the case of a *prima facie* whole that disappears as soon as we try to analyze it. A *spurious* whole would be a collection of things that have only the name in common. The ancient Greek name « κύκλος » can be used to lump together things as different as the geometrical κύκλος, the epic κύκλος, and the κύκλος of the zodiac. What we obtain in this way is a spurious whole that cannot serve as the starting point of any inquiry.

epistemic journey. Shortly I will argue that it may be difficult, or even impossible, to determine the precise nature of the error that Aristotle has in mind. For the time being, however, I would like to stress that the error in question is committed by reason rather than by sense-perception. To see why, we only need to recall that sense-perception is expected to get us on the road to the principles by providing us with a reliable starting point to our investigation. It would be very surprising, to say the least, if Aristotle tried to undermine the power of sense-perception by suggesting that little children cannot perceptually discriminate their mothers and their fathers from one another and from all the other women and men. First, such a reading of Aristotle's example would contradict an easy observation we can all make: children are able to discriminate perceptually their parents from strangers. Second, this reading would contradict Aristotle's epistemic commitment to begin any investigation from things that are perceptually clear but confounded to a degree. Such things are confounded to a degree because they are still unanalyzed. It is from things of this sort that we get, by means of rational analysis, to the relevant endpoint of our investigation.

As we try to understand the message that Aristotle would like to convey with his example of the little children who call all men fathers and all women mothers, we may want to see how the commentary tradition has dealt with this example. I propose to focus on the interpretation that David Ross has defended in his immensely influential commentary on the *Physics*. My main reason for concentrating on this interpretation is that Ross is not original in his reading of the Aristotelian example. On the contrary, he relies on an interpretative tradition that goes back to the ancient Greek commentators, and that is transmitted first to the Arabic commentators, and then from the Arabic to the Latin commentators.

The language that Ross uses in his discussion of the Aristotelian example is slightly different from the one adopted here. Ross speaks of a universal rather than a whole. He agrees, however, that the universal in question cannot be a standard universal – namely, a universal that is by nature predicated of many things (*De interpretatione* 7, 1a 39-b 1). Rather, it must be *an unanalyzed thing that is known to us by sense-perception*:

« the reference must be not to a universal conceived quite clearly in its true nature but to that stage in knowledge in which an object is known by perception to possess some general characteristic (e.g., to be an animal) before

it is known what its specific characteristic is (e.g., to be a horse or a cow). It is this phase of Aristotle's meaning that is illustrated by the example of the child who recognizes the general appearance presented by all men and that presented by all women, without noticing the special appearance of its father and its mother, and therefore calls all men father and all women mother » (Ross 1936, 457).

According to Ross, Aristotle's chosen example of the little children is equivalent to another example that is not found in Aristotle's text. This new example requires us to imagine that we are observing an approaching object that is still at some distance from us. This object reveals its internal structure as it comes closer to us. The tacit assumption is that this case is somehow comparable to one envisioned by Aristotle.⁹ If this comparison holds, this new example can replace the original example by Aristotle. What is not said but is clearly the main motivation behind this exegetical strategy is that the second example is easier to understand because it does not require us to adopt the point of view of the infant mind.

At least two questions can be asked in connection with my last observation. The first has to do with the original example chosen by Aristotle. To evaluate this example, we need to adopt the point of view of the little children that Aristotle envisions in *Physics* I 1. *But can we really adopt such a point of view?* I do not think that we can, or at least I do not think that it can be easily done, and this is the reason why the commentary tradition, from very early on, has replaced Aristotle's original example with one that does not require us to perform this difficult, if not impossible, task. But this observation leads us to a second question: *are the two examples really comparable?* If they are, the original example by Aristotle may be expendable. But if they are not, at the very least we have to be careful when trying to use one example to shed light on the other.

In order to decide whether the two examples are comparable, we have to look more closely at the example that is found in the commentary tradition but is not transmitted in Aristotle's text. This example requires

⁹ The fullest discussion of the example of an approaching object that is at first undetermined (or underdetermined) and subsequently reveals its internal structure to the observer can be found in Philoponus, *In Physicam*, 11.24-14.20. The reader who is interested in how this example is transmitted from the Greek to the Arabic tradition (with a focus on Ibn-Bajja and Ibn-Rush) should have a look at Lettinck 1994.

us to imagine that we are observing an approaching thing that is still at a considerable distance from us. Because of the distance, we can see that the approaching thing is an animal, but we cannot tell whether this animal is a human being or something else (e.g., a horse or a cow). In other words, this thing is still *undetermined*, or *underdetermined*, when it is at a considerable distance from us. Following Ross, we can say that while the thing is distant from us we can have only an indiscriminate perceptual knowledge of it. When this thing gets closer to us, we can establish first that it is a two-footed rather than a four-footed animal, and then that it is Socrates rather than Plato. Clearly, this example shows how an *adult* mind can progressively analyze something that is originally undetermined (or underdetermined). In the envisioned case, the adult mind is fully equipped with the network of concepts required to analyze the surrounding world successfully. I note, in passing, that such a mind is very reliable in performing this task. Therefore, the most obvious lesson that we can drive home from reflecting on this example is the following: when the mind is equipped with an adequate network of concepts, and is trained to apply them, it can do so very reliably.

Note that the situation envisioned in this example is not quite the one in which we find ourselves when we are about to launch an investigation of the sort outlined in *Physics* I 1. At the outset of such an investigation, our task does not simply consist in analyzing the reality by applying an already existing network of concepts. Rather, an important part of our task is *developing* a network of concepts adequate to perform the required task. Aristotle introduces the case of the infant mind precisely because it is closer to the situation in which we find ourselves when we embark in any investigation of the sort outlined in *Physics* I 1. While Aristotle remains remarkably optimistic about our prospects to develop a network of concepts adequate to the task of making sense of the world around us, he does not mean to say that achieving this goal is a foregone conclusion. Quite the opposite: *mistakes are made*. The example of the little children introduced at the end of *Physics* I 1 is intended to shed light on those mistakes.

By now, it should be clear that the example chosen by Aristotle and the example adopted in the commentary tradition are not really comparable, let alone interchangeable.¹⁰ More to the point: the example chosen

¹⁰ Pace Philoponus, who thinks that they are (11.19-23).

by Aristotle is not expendable because it is crucially concerned with acquiring the relevant set of concepts. This case cannot be equated to the case of an adult mind that has already acquired an adequate set of concepts and is able to apply them to make sense of the surrounding world. What prevents an adult mind from applying the relevant concepts is only the relative distance from the approaching object. The infant mind envisioned by Aristotle either does not have the relevant concepts or still has to perfect the art of applying them in order to make sense of the surrounding world. That Aristotle is concerned with how the infant mind (mis)applies concepts is made explicit in the textual tradition that reads ὑπολαμβάνει/think instead of προσαγορεύει/call. On this alternative reading, the example of Aristotle should be translated as follows: « the little children too at first suppose that all men are fathers and all women mothers, and later distinguish each of the two ».¹¹

What the infant and the adult minds share is sense-perception as a reliable way of knowing the surrounding world. Beyond that, however, the two minds – and indeed the two examples – are not really comparable. I have already discussed the example of the adult mind that has perfected the art of applying concepts. It is time to turn to the case of the infant mind. The little children envisioned by Aristotle can perceptually discriminate their mother and their father from one another and from all other men and women. In other words, the normal operations of their senses allow them to recognize perceptually their parents from all strangers. However, these little children are not able to perform some other cognitive feat. Unfortunately, it is not entirely clear what they are not able to achieve. One possibility is that they are not able to see that one and the same person can be both a father and a man, or that this person can be both a mother and a woman. In other words, these children are not able to draw a distinction between being a father and being a man, or between being a mother and being a woman. What is appealing about this first possibility is that it allows us to focus on the ability to draw distinctions, which is central to how Aristotle conceives of analysis in the rest of *Physics* I. But we cannot rule out that the little children that Aristotle envisions at the end of *Physics* I 1 are committing a false

¹¹ But we have already seen that spoken sounds are signs of what is in the mind, so the reading that has προσαγορεύει/call instead of ὑπολαμβάνει/think comes down to the same philosophical position.

generalization when they call all men father and all women mother. Either way, these children do not have all the relevant concepts they need to divide the surrounding reality. As a result, we can safely say that they commit a *conceptual* rather than a *perceptual* mistake. This may be due to the fact that they do not have the relevant concepts or, even if they have acquired those concepts, they have not yet perfected the art of applying them.

3. The infant mind beyond *Physics* I 1

I have argued that Aristotle is not interested in the linguistic behavior of the little children *per se* but only insofar as their behavior is a sign of what is in their mind. I have also argued that their mind is an infant mind that is still in the process of acquiring the conceptual apparatus required to make sense of the surrounding world. Strictly speaking, it is not even clear that such a mind can engage in an instance of successful thinking. Last but not least, I have argued that Aristotle is interested in certain instances of unsuccessful thinking. What goes wrong in those instances may help us illustrate what goes wrong in the mind of investigators who have not yet fully mastered their field of study. In this third and final section, I would like to elaborate on this point by arguing that Aristotle equates his predecessors and their failed attempt to reach the principles of nature to the little children who call all men papa and all women mama. If I am right, in *Physics* I 1, Aristotle does not only outline the method to be used in the search of the principles of nature; he is also setting the stage for the discussion of what his predecessors failed to accomplish in their search for the principles of nature.

To make my exegetical hypothesis more plausible, I would like, first, to recall a remarkable passage from the end of *Metaphysics* I. There, in looking back to what his predecessors achieved – or rather failed to achieve – on the topic of causality, Aristotle offers the following general assessment: ancient philosophy as a whole seems to speak in a childlike manner.¹² The verb that Aristotle uses in making this assessment is *ψελλίζεσθαι*. This verb means stuttering, but there is no evidence that Aristotle is interested in this speech defect *per se*. Rather, he is using this

¹² *Metaphysica* A 10, 993a 15-16: *ψελλιζομένη γὰρ ἔοικεν ἡ πρώτη φιλοσοφία περὶ πάντων.*

speech defect metaphorically to point to something else, the significance of which becomes clear when one takes the context into account. The context suggests that what is stated by his predecessors on the topic of causality lacks articulation and clarity. In other words, Aristotle claims that his predecessors, taken as a whole, are like little children who spoke in an inarticulate and unclear way about the causes. By so doing, Aristotle equates himself to an adult who provides articulation and clarity to what they say.

This reading is confirmed by another occurrence of the Greek verb $\psi\epsilon\lambda\lambda\iota\zeta\epsilon\sigma\theta\alpha\iota$ found in *Metaphysics* A. In this case, Aristotle equates himself to an adult who can supply the relevant articulation to *the childlike manner of speaking of Empedocles*.¹³ The two passages are parallel. What distinguishes them is only the scope of Aristotle's assessment. While in the second case Aristotle is concerned with a single predecessor, in the first case he makes a sweeping generalization about the whole of Greek investigation on the topic of causes. We may object that, in both cases, Aristotle does not do full justice to the achievements of his predecessors, and that his overall attitude toward them takes the unpleasant form of patronizing. But we should also keep in mind that Aristotle has developed a theory of causality that distinguishes four kinds of causes and spells out how these causes should be used in the search for a scientific explanation of the world around us. It is not difficult to see that, from the vantage point of this theory, what is said on the topic of causes by Aristotle's predecessors may be felt to be underdetermined or even outright obscure.

My brief excursus on how Aristotle deals with previous attempts to speak of the causes in *Metaphysics* A is meant to make plausible the hypothesis that Aristotle is willing to compare his predecessors to little children who struggle with the task of developing an adequate set of concepts to deal with the world around them. It is now time to return to *Physics* I in order to see how the example of the little children offered at the end of *Physics* I 1 can help Aristotle assess the lack of success of his predecessors. Consider the following statement that Aristotle makes at the beginning of *Physics* I 5:

« all identify the elements and the things they call the principles with the opposites, as if they were forced by the truth itself, even though they posit them without reason ($\acute{\alpha}\nu\epsilon\nu\ \lambda\acute{o}\gamma\omicron\upsilon$) » (*Physica* I 5, 188b 27-30).

¹³ Full discussion of this second passage in Betegh 2012.

Aristotle's statement consists of two parts. On the one hand, Aristotle states that all his predecessors – no-one excluded – identified the principles with the opposites compelled, as it were, by the truth itself. Aristotle singles out Parmenides in connection with this claim (188a 20-21). The mention of Parmenides has caused some perplexity, especially since the previous treatment of Eleatic philosophy in *Physics* I 2-3 suggests that Aristotle does not consider Parmenides a natural philosopher, or a philosopher who is engaged in the search for the principles of nature. On the contrary, Aristotle treats Parmenides as a sophist who questions the whole project of inquiry into the principles of nature. There is no reason to think that Aristotle has changed his mind on Parmenides. By recalling his name, Aristotle is making clear that even someone like Parmenides is forced by the truth itself to identify the principles with some kind of opposites. In all probability, the truth in question is empirical: the observation, for instance, that any change in temperature takes place between hot and cold, where hot and cold are to be regarded as the extremes of a process that can take place anywhere in between. On the other hand, Aristotle thinks that all his predecessors – no-one excluded – posited their opposites *without reason* (ἄνευ λόγου). It is precisely because they did not possess a λόγος that enabled them to analyze what was forced upon them by the truth itself that they ended up making some particular pair of contraries their principles. More directly, their selection of the relevant pair of contraries turned out to be arbitrary: whereas some identified the principles with what is better known by perception (κατὰ τὴν αἴσθησιν), others made them identical with what is better known to reason (κατὰ τὸν λόγον).

It is possible to illustrate what Aristotle has in mind with the help of an example. Consider a physical theory that takes the dense and the rare as principles of change. Such a theory does not only select the dense and the rare over other pairs of opposites; it also tries to explain all natural processes in terms of condensation and rarefaction. However, the prospects of explaining everything in terms of condensation and rarefactions are (to say the least) not very good. What is better known by perception (κατὰ τὴν αἴσθησιν) is always a particular thing. At least for Aristotle, advancement in science does not take place by reducing the complexity of the world around us to any particular thing. On the contrary, this complexity is to be preserved and organized, and thereby explained, by means of reason.

Let us see, briefly, what happens when we try to equate the mistake made by the proponents of the view that the rare and the dense are the principles of nature to the mistake committed by the little children who call all men papa and all women mama. Recall that, on a possible reading of this example, the little children envisioned by Aristotle commit a false generalization. It is easy to see that, at least by Aristotle's lights, those who take one particular opposition – for instance, the dense and the rare – and make it their primary opposition commit a similar mistake. Like little children, they commit a false generalization. More to the point: like little children, they are *perceptually but not conceptually* competent. Their mistake is a conceptual, or better, a rational, mistake – the sort of mistake that an infant mind commits as it tries to make sense of the surrounding world.

Recall, however, that the example of the little children is open to another reading. On this alternative reading, the little children that Aristotle envisions in *Physics* I 1 do not have the ability to see that one and the same person can be both a father and a man, or that this person can be both a mother and a woman. On this second reading, these little children are not able to draw the distinction between being a father and being a man, or being a mother and being a woman. In other words, they do not yet have the ability to draw conceptual distinctions, which requires the acquisition and correct use of the relevant concepts. Clearly, by Aristotle's lights, his predecessors are very much like these little children. On the one hand, they grasped by means of sense-perception that all change takes place between opposites. On the other hand, they failed to see that what undergoes change is not a simple thing but rather a complex entity entailing the distinction between the substance that undergoes change and two termini of change. More to the point, they were not able to see that the two opposites that are perceived by sense-perception to be the termini of change are amenable to further rational analysis.

Aristotle offers an analysis of change along these lines in *Physics* I 6.¹⁴ He does so by dealing with two difficulties (*ἀπορίαι*) for the claim that the opposites undergo change. The first is that change is not just the replacement of one opposite with the other but also requires a third thing that undergoes change by being acted upon by the opposites (188a 22-26).

¹⁴ The relevant text is *Physica* I 6, 189a 20 - 189b 29. For an insightful analysis of this stretch of text, see Code 2017, 154-177.

The second is that the opposites are not themselves substances but rather they are said of a substance (188a 27-34). Both difficulties point to the conclusion that change involves at least one other thing that is not itself an opposite. And yet, they are not conclusive. It is telling that Aristotle concludes *Physics* I 6 by saying that it is not yet clear whether the principles involved in any instance of change are two *or* three. In fact, we are left with what Aristotle describes as a great difficulty.¹⁵

I will not engage in a discussion of how Aristotle deals with this difficulty in *Physics* I 7. Here, suffice it to say that, at the end of *Physics* I 7, Aristotle is not only able to establish *that* the principles are two *and* three, but he is also able to explain *how* they are two *and* three. Very briefly, the principles are two: the subject that undergoes change, which Aristotle calls *matter*, and the *form* that the subject takes up when the process of change is complete. But since the subject of change can be described as the thing that does not yet have the form, there is also a third principle, namely *privation*. It is clear that there is a difference between this last principle and the other two. Aristotle tries to capture the difference by saying that privation is a principle only in a coincidental way.

What is more important, at least for the present discussion, is to stress that the acquisition of the relevant concepts for our analysis of change, as well as their correct use, is secured only at the end of *Physics* I 7. It is only at the end of this chapter that what is known and clear to us is also known and clear by nature. From this vantage point we can see why Aristotle may be inclined to compare his predecessors to little children who have failed to develop the conceptual resources to deal successfully with natural change.

BIBLIOGRAPHY

Sources

- Aristotelis De interpretatione*, H. Weidemann (ed.), Berlin, W. de Gruyter, 2014.
Aristotelis Analytica posteriora, D. Ross (ed.), Oxford, Clarendon Press, 1949.
Aristotelis Topica, J. Brunschwig (ed.), Paris, Les Belles Lettres, 1967 and 2007.
Aristotelis Physica, W.D. Ross (ed.), Oxford, Clarendon Press, 1950.

¹⁵ *Physica* I 6, 189b 27-29: « Now, that the element is neither one nor more than two or three is clear; but whether two or three, as we have stated, gives rise to a *great difficulty* (ἀπορίαν ἔχει πολλήν). »

Aristotelis Historia animalium, D.M. Balme (ed.), Cambridge, Cambridge University Press, 2002.

Aristotelis Metaphysica A, O. Primavesi (ed.), in C. Steel (ed.), *Aristotle's Metaphysics Alpha. Symposium Aristotelicum*, Oxford, Oxford University Press, 2012.

Ioannis Philoponi in Aristotelis Physicorum libros commentaria, H. Vitelli (ed.), Berlin, G. Reimer, 1887.

Dante Alighieri. De vulgari eloquentia, S. Botterill (ed.), Cambridge, Cambridge University Press, 1996.

Dante Alighieri. Inferno, G. Petrocchi (ed), Firenze, Le Lettere, 1994

Dante Alighieri. Paradiso, G. Petrocchi (ed), Firenze, Le Lettere, 1994.

Studies

Betegh 2012: G. Betegh, « The Next Principle », in C. Steel (ed.), *Aristotle's Metaphysics Alpha. Symposium Aristotelicum*, Oxford, Oxford University Press, 2012, p. 105-140.

Code 2017: A. Code, « *Physics I 6* », in D. Quarantotto (ed.) *Aristotle's Physics I: A Systematic Investigation*, Cambridge, Cambridge University Press, 2017, p. 154-177.

Falcon 2017: A. Falcon, « *Physics I 1* », in D. Quarantotto (ed.) *Aristotle's Physics I: A Systematic Investigation*, Cambridge, Cambridge University Press, 2017, p. 41-59.

Lettinck 1994: P. Lettinck, *Aristotle's Physics and its Reception in the Arabic World*, Leiden, Brill, 1994.

Ross 1936: W.D. Ross, *Aristotle's Physics*, Oxford, Clarendon Press, 1936.