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**Starting from the Functionalist Interpretation.
Perspectives on Aristotle's Hylomorphism and Psychology**

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Introduction

«Aristotle hylomorphism is unlike many of the theories currently on offer in philosophy of mind. What it offers us *vis-à-vis* the dualist-materialist dichotomy, hylomorphism is a template not of a theoretical option already well articulated, as many recent interpreters of Aristotle have claimed, but an option in need of articulation».

W. Jaworski

The basic inspiration of my dissertation is the belief that the functionalist interpretation of Aristotle's hylomorphism and psychology represents an occasion to raise and discuss many crucial aspects of Aristotle's thought, which are still useful for various current philosophical problems, such as the nature of the mind, the concept of biological life and what is to live a fulfilled human life. As I shall show, I think that functionalism correctly grasps the functional roles Aristotle attributes to matter and form, although it understates the genuine causal efficacy Aristotle attributes to formal-final causes.

In Chapter One I present some interpretations of Aristotelian hylomorphism. In the second half of last century, dualist as well as strong physicalist interpretations were suggested. In presenting them, my aim is to show that, although they correctly pick some aspects of Aristotle's thought, their interpretations are somewhat partial. Dualism in philosophy of mind is the theory that the mental and the physical are different kinds of things: as I shall try to show, scholars which attribute dualism to Aristotle pick his claim that intellect has no organ and, hence, that it is a faculty which works in a non-physical way; while understating Aristotle's overall theory of *psuche* as being inseparable from the living body. Physicalist scholars also trace back to Aristotle, emphasizing how he seeks to trace back psychological states to physiological states. Yet by identifying the mental and the physical, physicalists overlook the core of Aristotle's hylomorphic distinction: as I shall try to show, the matter-form distinction is *logical in character* and attributes to both terms of analysis *genuine causal powers*. After having showed these elements of Aristotle's dualistic and physicalist interpretation, I briefly illustrate which theoretical commitments functionalism and Aristotle have in common without getting into the details of the varieties of functionalisms.¹ I shall focus on the core

¹ I refer to the traditional classification between "machine functionalism", "psychofunctionalism", "analytic functionalism". cf. Levin (2010). Moreover, the strong and conflicting influence exercised by Hilary Putnam

of the functionalist proposal, that is, the doctrine that mental states are defined by the causal role they play within the system they belong to, rather than by the material they are constituted of. I shall keep this simple thesis as a reference point throughout my work.

Since the notion of “form” is central in order to understand the functionalist interpretation of hylomorphism in which the functional organization structures and defines its physical substrate, being thereby prior to it, in Chapter Two I focus on the issue of hylomorphism. I consider hylomorphism in conjunction with the principle of homonymy, a concept which binds fundamental metaphysical notions, such as that of “function” and “definition”. After having illustrated the criticisms to the relation between hylomorphism and homonymy, I conclude that hylomorphism, if properly conceived, not only does not rule out homonymy but rather entails it as a consequence. I conclude providing my own definition of hylomorphism, maintaining that it is an ontological thesis with predicative consequences which have been too often and easily overlooked.

In Chapter Three a discussion of the nature of Aristotle’s final cause is illustrated, highlighting the functional analysis of the living body it makes possible. My aim is to underline how Aristotelian hylomorphism proves to be a particularly fruitful paradigm for analyzing both biological life and human life. I indicate the fault of functionalism in having understated this biological aspect of Aristotle thought. I put forward as an hypothesis that this is due to the fact that functionalism’s aim was to explore the possibility of artificial intelligence rather than providing an overall philosophical view about nature. To better underline this aspect, in the Appendix I hint at a parallel between Aristotle and Darwin, insofar as they both rely on a functional analysis of biological life.

Thus, I take the functionalist interpretation proposed by Hilary Putnam (1975) and Martha C. Nussbaum (1978) - as well as the important debate between experts and scholars of ancient philosophy and philosophy of mind - just as the *starting point* for raising and discussing wider issues. While attributing to functionalism the merit of having properly identified and translated into modern terms the metaphysical and logical roles attributed to matter and form within the Aristotelian doctrine of hylomorphism, my goal is to show how the philosophical problem around which functionalism developed, namely the idea of artificial intelligence, has meant that some far-reaching implications of Aristotelian hylomorphism (and, not coincidentally, in particular those related to biological life) have undeservedly remained neglected.

The functionalist interpretation of Aristotle provoked different reactions. Among the numerous approvals, there are also some outstanding attacks on Aristotle from an anti-functionalist

on the development of functionalism makes an exhaustive investigation unnecessarily complicated and useless for my present purposes.

perspective. Among these, one of the most influential is undoubtedly that of John Ackrill (1972-1973) who, in an influential article published in the early Seventies, argues that the treatment of the living body by Aristotle leads to an unacceptable conclusion, namely, that the body is “necessarily alive”. The analysis of the substances proposed by Aristotle assumes, according Ackrill, that each in compound can be separately identified both matter and form. If this analysis is certainly possible as regards artifacts (e.g. roundness and bronze conceived respectively as form and matter of the bronze sphere), hylomorphism is not consistently applicable to the living body, Ackrill contends. While hylomorphism implies that matter, seen as potentiality, can be identified before it acquires the substantial form (e.g. the bronze not yet processed) and after having acquired the shape in actuality (e.g. the bronze, which is the bronze sphere), this scheme cannot be applied to the living body. The only matter that we can identify the living body is the body itself, already “shaped”, or in-formed, by the *psuche*. According to Aristotle, it is possible to identify the matter of the body both before life (in *Metaph.* Θ 7 Aristotle says that it is too “remote”) and after death (as the corpse is “body” only homonymously, as Aristotle says in many passages). Ackrill believes that the principle of homonymy is an insurmountable obstacle for the hylomorphic analysis, that will make it impossible to identify the matter of the living body separately from the substantial form. So the principle of homonymy Aristotle would require the body to be necessarily alive. Criticism of Ackrill have provided a formidable base for other criticisms, which concern both the philosophy of the mind of Aristotle, as well as the functionalist interpretation of it: in particular Burnyeat (1992), in a famous article, attacked the concept of matter in Aristotle, accusing him of considering the matter of the living body as essentially conscious, related to form by an essential, rather than contingent, relation. This is enough to refute the intuition that functionalism hoped to have found in Aristotle, that is, the contingency of the relation between matter and form. At this point, I deal with the principle of homonymy, trying to show how it is consistent with the hylomorphic analysis of substances and, in particular, of the living body. I divide the issue into four sections. The first analyzes homonymy as such, the second introduces the problem of homonymy of the living body, in the third section I propose a solution that takes into account the consequences of hylomorphism, and finally, in the fourth section, in the light of this proposal, I offer a definition of hylomorphism, whose consequences will be discussed in the third chapter. Let me sketch briefly how I achieve this result in the second chapter.

The first section of the second chapter, entitled “*Homonymy as such*” introduces homonymy in general, pointing out that for Aristotle it is a prominent theme in different crucial contexts. According to Owen (1960), the failure to resolve the problem of homonymy in Aristotle would have been, in a first phase of his philosophical work, a serious epistemological obstacle to the definition

of the special sciences, and would therefore be the reason why Aristotle, unable to find a univocal meaning for “being” and “well”, has abstained from conceive metaphysics and ethics as unitary sciences. The section proceeds by highlighting the new features of the Aristotelian treatment of homonymy in comparison to Plato’s theory of Ideas. Even without engaging in an exhaustive comparison between the two theories, I take some passages from the “*Republic*”, which show how Plato’s analysis considers various applications of “just” as invariably univocal, whereas Aristotle would have opted instead for the recognition of “just” as an homonymous term. In this regard, I recall the essay by Owen (1960) about the “focal meaning”, with which the scholar identifies the relation that several applications of an homonymous term have with a central instance.

Further, I focus on an important debate: according to Aristotle, the homonymy is primarily concerned with *words* or *things* designated by those words? Authoritative scholars maintain each of the two alternatives. The importance of the issue is that, depending on the answer that you give to this question, it is determined whether Aristotle’s interest in investigating homonymy is primarily semantic or metaphysical. My position is divided into two parts: first, it is well known that in Aristotle’s view words and things are connected in an important way, so it is likely that homonymy concerns both. However, the discussion of homonymy in Aristotle has relevance primarily from a metaphysical point of view. I argue this position by analyzing in detail the relationship that exists for Aristotle between essence, definition and function. First, for Aristotle names define essences, which are not meanings, but rather non-linguistic entities, sets of essential properties summarized in the metaphysical notion of “function”.

I continue emphasizing how Aristotle distinguishes between the “essence” of a thing and the “meaning” of a word, and show that this can be maintained regardless of which of the two current positions regarding the nature of meaning is adopted. In fact, if one adopts *internalism* about the nature of meaning, Aristotle distinguishes between the set of essential properties of the object *F*, designated by the word *t*, on the one hand, and the meaning of *t* dependent on mental states of the subject, on the other hand. At first glance, *externalism* about the nature of meaning (strongly supported by Putnam 1975) may appear closer to the Aristotelian position, because it makes meaning depending on factors which are external to the subject. But while externalism conceives meaning as dependent on “relevant” factors - which can therefore be causal, historical, cultural, physical, chemical and so forth – for Aristotle, by contrast, the definition is a metaphysical concept that linguistically expresses the essential function of the object in question.

Finally, I emphasize the relationship between essence, function and definition as Aristotle illustrates it in the *Metereologica*: homonymy is the instrument through which the philosophical differences between the definitions are found, i.e., linguistic expressions of set of non-linguistic properties and

able to express the characteristic functions of a certain kind of things, in spite of the fact that such sets are designated by the same homonymous term. My aim is to show that “meaning” and “essence” are for Aristotle not synonymous and, therefore, that homonymy holds philosophical interest in virtue of the second, rather than of the first. I defend this position by answering a possible objection that takes into account the analysis of universals, for which the meaning and essence, however, coincide. My argument is that this does not affect the relationship between metaphysical essence, function and definition, since for Aristotle universals *are* definitions.

I conclude pointing out that Aristotle regards homonymy as the relation between entities designated by the same word and which do not share the same essence. Beyond the merely dialectic interest for homonymy showed in the *Topics*, motivated by avoiding fallacies in arguments, homonymy is for Aristotle an essential tool to overcome the philosophical theory of the Ideas of Plato, and consider in a unified way the objects of particular sciences, such as “good” for ethics and “being” for metaphysics. According to Aristotle, definition is a metaphysical concept derived from the essence, or function, of the thing that needs to be defined. The Aristotelian notion of “definition” is never reduced to the notion of “meaning”, whatever position you take on the nature of the latter. Homonymy concerns entities which do not share the same definition; consequently, it points out differences between essences, and therefore functions, of things that are designated by the same term.

After this discussion concerning homonymy as such, the second section of the chapter is entitled “*Homonymy of the body*”. In it, I dedicate myself to solving the problem posed by Ackrill and which I have presented at the beginning of the second chapter, that is, the alleged inconsistency that would result from the simultaneous application of homonymy and hylomorphism to the analysis of the living body. My aim is to disprove the analysis of Ackrill, demonstrating not only that hylomorphism and homonymy do not conflict with each other, but rather that the hylomorphism, if properly understood, involves homonymy as a consequence.

I refer to remarks I have drawn in the first part of the chapter, noting how according to hylomorphism the form of x has to be conceived as the defining function of x . Through this relation between form and function, I establish the metaphysical difference between extrinsic configuration and substantial form, excluding that objects sharing only one extrinsic configuration, e.g. artistic representations, share with the represented object the substantial form. The sharing of the substantial form implies the sharing of all the essential properties (e.g. co-specific individuals).

In light of this remark I illustrate how, for Aristotle, there is no metaphysically significant connection between the “body” and “corpse”, and I expose two consequences of this conception. The first is that it conflicts with some common-sense beliefs about life and death: in fact, we would

be inclined to think that the body is (or, at least, used to be) the matter *of* the living body. The second consequence is purely metaphysical and poses serious problems in the interpretation and reconciliation of the two fundamental doctrines of Aristotle, i.e. homonymy and hylomorphism, particularly with regard to the concept of matter.

According to the principle of homonymy, matter should be seen as what it should be called “body” only to the extent that it now constitutes a living body: this is the thesis for which Aristotle argues, for example, in *De Anima*; on the contrary, according to the hylomorphic treatment of change outlined in *Physics*, matter is the element that pre-exists the process of change and, therefore, should be identifiable as such, both before and after change. The contrast between the two doctrines can be summed up in the fact that while hylomorphism involves the ability to identify separately the two terms of the analysis, namely matter and form (especially with regard to the matter as potentiality), the principle of homonymy, apparently, leaves no room for potential, since “body” is only what is actually living. Thus, it seems that this issue has, in Aristotle’s view, a schizophrenic treatment. On this basis rests Ackrill’s attack concerning the “necessary alive body”, as well as Burnyeat’s argument (1992) who, interpreting homonymy as a physical thesis revealing how for Aristotle matter is essentially alive, concludes that Aristotle’s conception of the mind is simply to “junk”.

To address this sensitive conflict between doctrines, I distinguish two separate problems, whose solutions must not only be plausible in themselves, but also consistent with each other. The first problem is *generation* (it seems you cannot identify the matter of the living body before the living body as such is already present), the second issue is that of *death* (the matter of the living body cannot exist if not as of the living body as such, informed by the essential form).

To address these issues, I elaborate on the *functional determination thesis* originally proposed by Shields (1993). In my formulation, a natural individual *a* has all the essential properties of the species *A* if and only if *a* is potentially able of performing the set of relevant functions expressed in the definition of *A*. In this way, I highlight how living bodies are defined by those activities, or functions, which are potentially able to perform.

Given fundamental thesis of functionalism, first proposed by Hilary Putnam, namely that mental states have a contingent relation with respect to the physical states that implement them and that their nature is determined by the role they play and not from the material they are made of, the importance of the Aristotelian theory for the functional determination of functionalism is evident and, in particular, for the artificial intelligence hypothesis: everything able to express the functions considered essential to the human being would count as a human being, regardless of other inessential characteristics (such as, for example, have skin or be able to walk). But if homonymy

were to decide that matter is essentially (and not contingently) alive, then the functionalist interpretation – and, along with it, the credibility of Aristotle – would be discarded.

The third section, entitled "*A Fresh Start*", sets forth the solution in four steps. First, I propose to distinguish between a weak, intuitive, non-Aristotelian notion of potentiality and a strong notion, in my opinion purely Aristotelian. In my view, potentiality is to be conceived as a non-transitive relation, which not only allows but actually requires different levels of actualization, and can be expressed by ordered pairs of potentiality and actuality. Thus I propose a solution to the problems introduced in the previous section concerning the generation and death making use of a strong notion of potentiality, gradualistic and always conceived in relation to a possible subsequent actuality.

Rejecting some objections that may possibly be made by an advocate of a weak notion of potentiality, I explain the passage from inanimate to life (generation) by a progressive view. Starting from the interpretation of the Aristotelian conception of the so called privative states (death), I illustrate my view about the logical character of the causal roles attributed to matter and form. I recall such a logical character of Aristotle distinctions in the third chapter: in the second chapter, however, my aim is to show how such a logic interpretation is consistent with the contingency of the relation between matter and form highlighted and revived by functionalism.

Secondly, I look for an explanation of the alleged conflict between homonymy and hylomorphism. I suggest that such a conflict arises insofar as hylomorphism is conceived as a thesis concerning solely the ontological relation between matter and form. On the contrary, hylomorphism has to be understood as an ontological thesis entailing logical and predicative consequences. I reserve further comments on this in Chapter 3, dealing with final causation. In the present context, I highlight how for Aristotle form is predicated of matter, and never *vice versa*: accordingly, without a form, there can be no proper subject of predication.

Thirdly, I suggest an interpretation of hylomorphism in line with the functionalist one: Aristotle does attribute *functional roles* to matter and form. On this basis, I argue that the criticisms advanced by Ackrill and Burnyeat against the “necessarily alive body” highlight a dualistic understanding of hylomorphism. I maintain that Aristotle conceives matter as the element able to have a certain relation with the compound acquiring the relevant form in the process of change. The synchrony between “body” and “life” does not support any essentialist conception of matter; on the contrary, it arises from the fact that hylomorphism is logical in character and, hence, entails definitional and predicative consequences.

In the section entitled “*Understanding Hylomorphism*” I suggest a definition than can sum up and unify all these elements. Hylomorphism is a metaphysical, non-ostensive thesis, applicable to all

material entities and it entails both an ontological and a predicative aspect. By “ontological aspect” I mean that the matter of a compound is what realizes, or embodies, a structure – i.e. substantial form, or essence – which enables the resulting compound to the exercise of the characteristic functions. By “predicative aspect” I mean that matter is for Aristotle undetermined in itself, whereas it is the form, i.e. the set of functions, which establishes the definition and the name of the thing and is truly predicable of it.

I conclude, *contra* Ackrill and Burnyeat, pointing out that Aristotle, far from believing that the matter of the living body is essentially alive, holds rather that the body is inseparable from the *psuche* from a *definitional* point of view, insofar as the body is defined by (the ability to perform the characteristic functions of) the *psuche*.

In the “*Appendix*” I address some remarks and criticisms to the analysis Shields devotes to a special case of homonymy, that is, core-dependent homonymy. In this case, the instances of homonymous terms are referred to a central instance. Given the relation between homonymy and definition, the definitions of all the core-dependent instances must contain the definition of the core-instance, which hence turns out to be definitionally and explicatory prior. In particular, I offer arguments in order to criticize Shields’ idea, originally introduced by Cajetan, that each of these dependency relations the peripheral instances have with the core-instance have to be specified in the terms of the four causes.

In the third chapter I deal with Aristotle’s final cause, that is, his conception that the end of a process explains, or is to be held responsible, for the process itself. The most general formulation of final cause can be expressed as follows: if x happens for the sake of y , then y is the final cause of x . Being the final cause an integral part of the four causes, I open the chapter illustrating this doctrine. Pointing out that for Aristotle to have knowledge of x is always to have knowledge of the causes of x , I stress how in Aristotle’s view causes are to be understood as “relevant factors” which lead to (and/or explain) x . I emphasize the scientific pluralism implicit in such a doctrine, as well as the notion of “complete explanation”, that is, the explanation that can state all the relevant truths about all the relevant factors which can account and/or are causally responsible for x .

In order to clarify the terms of the problem and explore the elements of an answer, I suggest to regard the central question about the naturalization of Aristotle’s final causation to be the following: is a teleological process causally due to or merely explained by its end? Is final cause to be understood as a cause in the modern sense or as an element of our explanatory discourse? Depending on the answer provided to this question, scholars are divided between those who argue for the *empirical status* of final causation and those who argue for the *epistemological status* of it.

After having justified this distinction, I stress how Aristotle holds the necessity of employing irreducible types of causes in investigating nature. Nonetheless, he holds that the four causes are further classified in two groups, namely (i) material-efficient causation, that Aristotle describes as unconditional necessity, and (ii) formal-final causation, that Aristotle describes as conditional or hypothetical necessity. By hypothetical necessity he means that, given a certain end, some material processes are necessary on the hypothesis that that end is to be obtained.

Thus, in what kind of relation do these types of causation stand to each other? I propose to specify it as follows. First, they are *compatible, or not mutually exclusive*: the application of formal and final causes does not exclude material and efficient causes. For instance, Aristotle explains respiration taking into account both mechanical and teleological processes. Secondly, they are *conjointly exhaustive*: Aristotle allows for the existence of only these types of causation and holds that, taken together, they provide a complete explanation. Thirdly, they are *not wholly complementary*: factors relative to different aspects are to be taken into account for explaining the process under consideration.

Within this framework, I recall a sharp distinction drawn by Aristotle: either a phenomenon is susceptible exclusively of the first type of explanation, i.e. material-efficient explanation (if this is the case, then the result is merely accidental) or the phenomenon is susceptible also of the second type of explanation, i.e. formal-final explanation (if this is the case, the process is teleological and, consequently, involves the notion of hypothetical necessity).

Thus, Aristotle sees an alternative between random and accidental processes (brought about by mere material-efficient causes) and teleological processes (characterized by regular outcomes). In light of this result, he holds that natural processes which have regular outcomes are teleological, that is, they take place for *the sake of* their outcome. I take a clear example to be that of the parts and organs of the living organism, which regularly develop *for the sake of* survival and reproduction of the organism as a whole.

To better support this natural teleological view, I try to illustrate Aristotle's characterization of material necessity as chance, since we might be inclined to think that exactly when a material cause necessitates its result, then there is no room for chance. Hence, I take into account some examples concerning the low probability that an undirected process brings about a highly ordered outcome, showing how a *necessitated* outcome can nonetheless be consistently defined as *accidental*.

In the second section I take into account which is the domain of teleology. It has been much argument about this, since unfortunately Aristotle does not explicitly states to which classes of phenomena teleology can be ascribed to. After having illustrated the most important positions in this debate, I suggest that teleology may be ascribed to: a) living organism's development, parts,

functions and, in general, their overall structure; b) regular physical patterns in nature; c) action; d) production.

At this point, I introduce what I regard as the fundamental distinction between *extrinsic* and *intrinsic* teleology. Whereas the end of the former is intentional and external to the *explanandum* (psychological paradigm), the end of the latter is intrinsic to the process itself (biological paradigm). I reject the position held by several authors that extrinsic teleology is the most intuitive paradigm for understanding a process directed toward an end and, as I did in Chapter 2, I emphasize the innovation of the Aristotelian teleology comparing it to the extrinsic teleology advanced by Plato in the *Timaeus*. Indeed, Aristotle's natural teleology is a not-intentional notion, and neither it is extrinsic. Further, I suggest that such a characterization is the source of the interpretations, now out-of-date, that Aristotle's teleology concerns the cosmos as a whole.

It is interesting that the same characterization of teleology (not-intentional, extrinsic) might be applied to the functionalist interpretation of Aristotle. Nussbaum, indeed, relying on Wieland, interprets teleology as a level of our *explanatory discourse*, superior as regards epistemic elegance and generality but endowed with no causal efficacy. However, as regards all these interpretations that, albeit in different ways, conceive Aristotle's teleology as extrinsic, I contend that Aristotle's natural teleology is rather to be understood as intrinsic and inspired by non-reductive physicalism. To elucidate the terms, I suggest an interpretation of the points c) and d), namely action and production in the aforementioned classification, stressing how the teleological interpretation requires that the agent have an intention, a belief or a desire and, hence, how Aristotle regards mental causation in an anti-reductionist fashion.

Yet I regard main application of Aristotelian teleology as intrinsic and applied to biological processes. Scholars such as Gotthelf, Charlton and even Nussbaum, despite the diversity of their interpretations, have agreed to establish what in my work I call "*primary use thesis*", that is, the thesis that Aristotle's natural teleology concerns primarily *living things*, as well as the natural processes which involve them. In support of this view I cite several passages that show how Aristotle makes use of teleology in order to explain processes, functions, parts, organism's overall structure and, in particular, embryonic development.

Once shown this outline of final cause, I continue by proposing that two classic Aristotelian identifications are to be understood as *levels of analysis*.

The first is to identify the elements of hylomorphism, namely matter and form, respectively, as the material cause and formal cause, or fundamental factors in order to provide an explanation of the process in question.

The second is to identify material and form as potentiality and actuality. Since potentiality and

actuality are primitive concepts mutually related in a correlative pair of which a definition cannot be given, but only infer their relationship by means of analogy starting from specific cases, it follows that we are to understand matter and form as a *relation*, in which the two terms are irreducible to each other.

In response to possible objections, I argue that such identifications favor one of my central assumptions, namely that the distinction between these terms (matter and form, potency and act, and the two irreducible types of causes) is *logical rather than ontological*.

And this is, as I announced at the beginning of the chapter, the fundamental question of final cause, namely the reducibility of the materials it processes: can the actualization of the potentials possibly be reduced to the qualitative changes of its material constituents? The answer to this question determines whether Aristotle believes that the physical and chemical processes are *due to* (ontologically irreducible) or merely *explained by* (ontologically reducible) their ends or goals. Since Aristotle clearly favors the former hypothesis, i.e. the *ontological irreducibility* of matter and form (and/or of potentiality and actuality, and/or of the two types of causation), the aim is to show how his teleology can be naturalized within a non-reductive physicalist framework. The consequence of this complex *logical distinction* between irreducible terms is that Aristotle can consistently support physicalism, denying, however, that anything can be explained in terms of material elements and processes.

Thus, the *ontology* involved in Aristotle's analysis turns out to be crucial. In short, I argue that Aristotle refuses the idea that matter and form exist *as such* in things. If they did, this would threaten the unity of substance, and Aristotle ridicules this idea both in the *Metaphysics* and in the *De Anima*. Instead, matter and form constitute a unity *in re*. But if they are not separated things, in that sense they are different and even irreducible to each other? The keystone is the conjunction of two thesis: matter and form constitute fundamental levels of analysis and they are not identifiable *as such* in things. I summarize my analysis as follows: matter and form never exist separately from each other and, at the same time, they are distinguishable through the *identification of their relationship*, that is, the relationship between what potential constituents and the thing actually constituted. It is possible to distinguish between matter and form *logically* attributing different and irreducible causal powers.

On the basis of this theoretical understanding of the overall effort of Aristotle, I return to the final cause, suggesting that it involves both a logical thesis that an ontological one: on one hand, stressing the distinction between types of causal powers attributed to the form and matter respectively (*thesis of the logical distinction*), on the other hand, form and matter (as well as their identifications with potentiality and actuality and with different types of causation) are a unity *in re*

(*thesis of ontological unity*). Aristotle, despite all the warnings about the distinctions that I summarize in the thesis of logical distinction, mocks those who wonder how matter and form can form a unity, since it is evident that they do form a unity in concrete substances. I suggest that in order to harmonize these two thesis we need to accept what I regard as a fundamental Aristotelian thesis, that is, *the ontological unity of the substances is to be analyzed by means of levels of analysis irreducible to each other*.

This brings me to the fundamental point of final cause: although my analysis may seem to suggest that the final cause is merely an explanatory device, I reject this interpretation, reproaching to Nussbaum (1978), who supported functionalism, to overlook that Aristotle attributes to the formal-final cause not only a privileged role in the production of satisfactory explanation, but also genuine *causal efficacy*. I understand Aristotle in a way opposite to that of functionalists: it is precisely because of the causal role played by the formal-final cause that they are a source of knowledge of the external world.

Thus, even though I recognize that functionalism correctly understands the functional roles Aristotle attributes to matter and form, I object that functionalism fails to draw the correct conclusions regarding the causal roles played by forms and ends.

Indeed – after taking into account some traditional issues concerning the final cause (the comparison between the modern empiricist conception of cause and the Aristotelian conception of *aitia*, as well as the problem of temporal sequence of cause and effect) – I analyze the process of generation and highlight how the final cause is both the form and the mover of that development. Thus for Aristotle the form and the end of the process of generation are causally efficient.

Therefore the role of formal and efficient causes in the organism's natural development shows that we acquire knowledge through formal and final explanations *because of* the logical relation, by means of which we distinguish them in respect to matter, attributes to them efficient causal roles.

The fourth section is devoted to summarize my position on the final cause. I distinguish between those who support the material sufficiency thesis and consequently conceive the final cause as a mere epistemological tool (which I call “sufficientist”, in order to to highlight their position with regard to the fact that the material causes are sufficient to bring about their effects) and those who conceive the final cause as empirical, thus denying the argument of sufficient material (which I call the “insufficientist”, since they argue that material processes are not sufficient to bring about their effects). In my opinion, however, some key elements are missing in both these positions. The fatal error is that both Aristotle's position his opponent's one are compatible with the idea of material sufficiency.

So I label my position as *logical compatibilism*: on one hand, I hold *compatibilism* to the extent that

the thesis of material sufficiency is compatible with the natural teleology of Aristotle; and the other hand, as my analysis shows, I think that the distinction between different causal powers is *logical in character* and informed by an underlying monism. In my logical compatibilism, Aristotle suggests a logical relationship between irreducible factors which are causal and, hence, explanatory. Therefore I distinguish between a weak physicalist thesis (according to which the organism's development is completely caused by material necessity) that, I believe, Aristotle would not have difficulty in supporting, and a strong physicalist thesis (according to which material necessity exhaustively accounts for the development of the organism), that, I think, Aristotle rejects the extent that, in his view, natural forms and ends should be recognized as naturalistically acceptable causal factors. The sequence of the DNA seems to be the best demonstration of this distinction (Berti).

The third chapter ends with a section devoted to showing how the teleological and functional analysis proposed by Aristotle in relation to the living organism is far from being anti-scientific, but rather can be properly compared to the functional analysis proposed by Darwin in his theory of evolution by natural selection. Despite the obvious differences (not just Aristotle was convinced of the fixity of natural species but, secondly, his problem was the *persistence* of natural species, not their *origin*), important points of contact between the two naturalists can be traced in attempt to explain the evidence of fitness (the form) of living beings in relation to life. Also, I remember the concept of hypothetical necessity, according to which the teleological processes cannot be explained only in material terms, but because of some intrinsic order (such as that of life and reproduction of the organism), then certain processes and equipment are needed to make it happen. As Charlton observes, Darwin made extensive use of the concept of hypothetical necessity in the *Origin of species* and it is important to stress that it is a teleological notion, since it regards purely material processes under the condition of the fulfillment of natural functions and ends, such as survival and reproduction. Moreover, Aristotle and Darwin agree about the priority of the structure over physiology and Aristotle often says that the set of functions through which the body exercises, so to speak, his own essence, is aimed to the survival of the organism. Finally, as shown in a private correspondence of Darwin (Gotthelf 1999), he had great respect for Aristotle and, although claimed to ignore his texts, towards the end of his life he was able to read the first part of *De Partibus Animalium* (which, luckily, it is one of the key texts of the Aristotelian teleology), drawing from the belief that Aristotle was the father of comparative functional explanation. This observation may reflect the fact that Darwin had understood the heart of Aristotle's natural teleology, namely that the full explanation of the body must include not only processes at the material level, but also the ability to express relevant functions that, according to Aristotle, is equivalent to the essence aimed to survival and reproduction of the species.

I conclude by comparing the argument of the theory of Intelligent Design argument, highlighting certain premises in common and, above all, the profound differences between it and the natural teleology of Aristotle.

To sum up, I begin by illustrating the interpretative context in which Aristotle's philosophy of mind is revisited. As Jaworski (2004) points out, the functionalist interpretation is just one in a series of interpretations that interpreted hylomorphism as «at best anticipating a theory that had only recently been articulated with any clarity». Hence, after that Aristotle is interpreted as an identity theorist and a substance dualist, Putnam and Nussbaum develop the interpretation that regards Aristotle as the first functionalist. Given that hylomorphism is central in functionalist interpretation, I go on taking into account the alleged conflict which between it and the homonymy principle. I analyze the notions of form, function and essence in order to show that hylomorphism is an ontological thesis which entails predicative consequences. Such a suggestion is central also in the third and last chapter, in which I consider Aristotle's final causation suggesting a position which I label as logic compatibilism, in order to underline that, while teleology is compatible with the thesis of material sufficiency, the logical character of Aristotle's distinction between material-efficient and formal-final causes allows to regard forms and ends as endowed with genuine causal efficacy.

Chapter One

Aristotle's Philosophy of Mind Revisited

«Philosophy of mind has for centuries been whirled between a Cartesian Charybdis and a scientific Scylla: Aristotle has the look of an Odysseus».

Jonathan Barnes

I. Aristotle's Dualistic Interpretation

«Thus that in the soul which is called thought (by thought I mean that whereby the soul thinks and judges) is, before it thinks, not actually any real thing. For this reason it cannot reasonably be regarded as blended with the body: if so, it would acquire some quality, e.g. warmth or cold, or even have an organ like the sensitive faculty: as it is, it has none».² By this famous argument, Aristotle claims in the third book the *De Anima* that the intellect has no organ. Even though in the second book of the same work Aristotle maintains that the rational *psuche* potentially contains the other *psuchai* like a square potentially contains the triangle – hence establishing a strong relation between the “disembodied” rational faculty and those directly arising from the body – the aforementioned passage seems to constitute a dualistic argument, to the result that Aristotle is understood as a dualistic philosopher. Some further assumptions are needed, though, in order to consistently interpret Aristotle as a proto-Cartesian philosopher. I shall start this section devoted to dualism by addressing Descartes, the champion of dualism. I shall show how his proposal was pervasive in Western philosophy by underlining some similarities with Turing's thought experiment. I discuss the arisen issues and, further, I investigate the interesting, and maybe paradoxical, relation between dualism and mechanicism. I conclude by addressing the related question of self-motion within a dualistic framework, aiming to show that, even though Aristotle shares some typical dualistic concerns dualism, dualism as a doctrine cannot be consistently attributed to him.

Descartes and Turing

The question whether animals are self-movers may be formulated in the following terms: do

² *DA* III 4, 429a 23-26. For all Aristotle's passages I shall quote from the *Revised Oxford Translation* edited by J. Barnes (1984).

animals have an intrinsic cause of their motions or are they mechanically moved by objects belonging to the surrounding environment?³ As it is well known, Descartes' response to these questions are negative. He believes that animal behavior is purely mechanistic and thus that any reference to consciousness or awareness should be avoided in providing an adequate explanation of it. I regard these thesis as distinct given that, supporting a mechanistic account of consciousness, one could hold the former while denying the latter. However, according to Descartes, animals can display only mechanically induced behaviors and a mechanistic explanation is suitable – and, for epistemological reasons, required – to account for it. The point is that Descartes is committed to the opinion that animals are automata, i.e. biological machines which are moved mechanically. To put in other words, he denies that they have thought and consciousness,⁴ thus attributing to them only the *res extensa* and concentrating typical human faculties in the *res cogitans*.

In Descartes' view typically human faculties, such as consciousness and language, cannot be accounted in purely mechanistic terms. In the *Discourse on the Method* he challenges the reader with a famous thought experiment: while a speaking machine is conceivable, in his view we have to admit that it would count as a mechanistic linguistic performance, intrinsically different than human language. Descartes thinks it is self-evident that an automata (be it a robot or an animal, for in his view they are equivalent) could have only a limited and fixed repertoire of responses. Automata's linguistic acts would be mechanically triggered by some external cause, being hence a mere response to a stimulus or a command. Thus an automata could never show a linguistic behavior similar to that of human beings, given that our linguistic performance is rather informed by our rational part which by definition is non-physical and, therefore, not subject to the principles of physics. Nor, *a fortiori*, our ability to think and to speak is mechanistic.

«[F]or we may easily conceive a machine to be so constructed that it emits vocables, and even that it emits some correspondent to the action upon it of external objects which cause a change in its organs; for example, if touched in a particular place it may demand what we wish to say to it; if in another it may cry out that it is hurt, and such like; but not that it should arrange them variously so as appositely to reply to what is said in its presence, as men of the lowest grade of intellect can do. [...] It could be discovered that they did not act from knowledge, but solely from the disposition of their organs».⁵

³ Here I shall not be concerned with the thesis that, even though animals have an intrinsic cause of their motions, they can nevertheless be regarded as moving mechanically.

⁴ Harrison (1992) emphasizes that these assertions do not commit Descartes to the thesis that animals are by nature incapable to feel pain and pleasure. For my purposes it does not matter very much, since what I am concerned with in this section is Descartes' traditional interpretations rather than the nuances and implications of his original thought.

⁵ The original passage, written by Descartes in French and published in 1637, is the following: «Car on peut bien concevoir qu'une machine soit tellement faite qu'elle profère des paroles, et même qu'elle en profère quelques-unes à propos des actions corporelles qui causeront quelque changement en ses organes: comme, si on la touche en quelque endroit, qu'elle demande ce qu'on lui veut dire; si en un autre, qu'elle crie qu'on lui fait mal, et choses semblables; mais non pas qu'elle les arrange diversement, pour répondre au sens de tout ce

An automata, in Descartes' view, could show a language, but only a mechanistic one, produced in a stimulus-response fashion. Automatic language is mechanistic or, which is the same, soul-less. The cause of automata linguistic behavior is external and interacts with machines parts in a way such to produce that behavior. On the contrary, humans do not talk and think in a mechanistic way, but in virtue of their *res cogitans*, which is not material and, therefore, does not follow mechanistic principles. On the ground of this metaphysical reason, no machine can talk and think as human beings do. To put it another way, typically human faculties are due to human soul, whose nature is non-physical and which, therefore, cannot be reproduced in a physical device. The question regards not only x 's ability to speak but also, and more importantly, x 's ability to think, which was coincident, for Descartes and his followers, with x having a soul. The Cartesian philosopher Géraud de Cordemoy elaborated on the issue in *A Philosophicall Discourse Concerning Speech*:

«To speak is not to repeat the same words, which have struck the ear, but to utter others to their purpose and suitable to them. [...] None of the bodies that make echoes do think, though I hear them repeat my words [...] I should by the same reason judge that parrets do not think neither. [...] But not to examine any further, how it is with parrets, and so many other bodies, whose figure is very different from mine, I shall continue the inquiry ... [Concerning those] who resemble me so perfectly without [...] I think I may [...] establish for a Principle, that [...] if I finde by all the experiments I am capable to make, that they use speech as I do, ... I have infallible reason to believe that they have a soul as I».⁶

Although I cannot fully develop the idea here, it seems interesting to point out that Descartes conceives a machine programmed with a finite repertoire of responses. So could a machine provided with an *infinite* repertoire of linguistic responses do better? Even though it is technically impossible to produce it, such a machine is surely conceivable. It is indeed the Turing machine. Descartes' and Turing's thought experiments are strictly related, insofar as both of them regard the metaphysical possibility for machines to perform a human-like linguistic behavior. Nevertheless, there is a crucial difference between them, namely the very philosophical questions they want to answer. On one hand, Descartes asks "Can machines think?" and his answer is negative, because they are mere physical devices and hence do not have soul, which is the element that enables humans to think. On the other hand, Turing famously suggested to replace the old Cartesian problem with a new one. His question is whether, in line of principle, there are imaginable computers which pass the test of the "imitation game", deceiving a human interrogator into thinking that they are human.

qui se dira en sa présence, ainsi que les hommes les plus hébétés peuvent faire. [...] on découvrirait qu'elles n'agiraient pas par connaissance, mais seulement par la disposition de leurs organes».

⁶ Géraud de Cordemoy (1668), quoted in Copeland (2000). Copeland speaks of a Cartesian «anticipation» of the Turing test.

«I propose to consider the question, “Can machines think?”. This should begin with definitions of the meaning of the terms “machine” and “think”. [...] Instead of attempting such a definition I shall replace the question by another, which is closely related to it and is expressed in relatively unambiguous words. The new form of the problem can be described in terms of a game which we call the “imitation game”. It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either “X is A and Y is B” or “X is B and Y is A”. [...] We now ask the question, “What will happen when a machine takes the part of A in this game?”. Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, “Can machines think?”».⁷

What is new in Turing’s approach? Contrary to Descartes, in his view we do not need to focus on the *nature* of the human thinking, insofar as the machine can carry out an activity which can satisfactorily perform the *imitation* game. Turing discards the objection that machines cannot feel, pointing out that this counts as a solipsist point of view about consciousness: the only way to disprove it would be to *be* the machine and *feel* oneself thinking. The point is rather whether the machine could satisfactorily play the imitation game and, if so, the claim that they are not conscious is supported just by induction (I have seen X machines in my life and none of them was able to think), from which we cannot conclude that being not conscious is a necessary property of machines in general.⁸

Nevertheless Turing and Descartes have one more aspect in common. Turing’s «new form of the problem» recovers Descartes’ advantage to drawing a line between the physical and the mental capacities of man. Indeed regardless of whether the machine, for instance, has limbs or not, Turing’s point is whether it can conduct a dialogue in a human-like way. Likewise, Descartes casts his radical doubt on all the physical features and focuses just on the mental capacities of man. The fact that the mental capacities of man always take place in a human body is dismissed by both Descartes and Turing, even though on different philosophical grounds. They face the issue of human thought regarding the living body as secondary. I hold this to be a mistake which Aristotle does make. I shall substantiate this view in what follows.

Dualistic Elements

There has been much debate about both the significance of the Turing test and the opinions Descartes hold about consciousness. However, none of them is my focus here. I just want to emphasize the following aspects, which I regard as common to both Descartes and Turing:

(i) *Thought material constraints*. Rational thought is typically conceived as an active faculty.

⁷ Turing (1950), pp. 433-434.

⁸ Turing (1950), pp. 445-447.

Several reliable thinkers throughout history have regarded this active character as requiring thought to be non-material. The metaphysical reason is a strong one: if this is not the case, the alternative seems to be that thought should be subject to the principles of physics, being thus a mechanical process and losing its active nature. Regardless of whether a mechanical process can be conceived as being able to *emulate* the human faculty to think and to speak (that is, regardless of whether we hold the opinion that a machine could, in line of principle, do well in the imitation game), the argument concerning the necessary immateriality of thought retains its cogency. As I see it, Turing makes a concession to this Cartesian belief in setting the structure of his argument in a way such that what is tested is the ability to emulate thought, and not the ability to think itself: in Turing's argument the very nature of thought is set aside as an «ambiguous» problem. The question whether this philosophical approach is renunciative or cautious is not what I am concerned with here. The point is that the active character of thought seems to require that it be non-material.

Aristotle, in the *De Anima* as well as elsewhere, appears to suggest a similar thesis. He holds that the intellect has no organ.⁹ It has been much argument about this and adopt either position is a task greater than my purposes require. However, it has been argued that Aristotle reaches the conclusion of the immateriality of *nous* on the basis of his causal account of cognitive faculties. Since a cognitive faculty, such as perception, involves the transmission of some quality, or form, *x* from an external object that is actually *x* to the sense organ that is potentially *x*, Aristotle appears to regard external objects to be the cause of such a transmission and sense organs to be constituted in a way such to be suitable to receive these forms. If we understand such a suitability to regard the matter the sense organ are constituted by, then, given that the intellect can think *all* forms, it would have itself not to possess matter.¹⁰

Robinson argues that the capacity to receive forms of any origin proves the immateriality of *nous*.¹¹ Sisko holds the same opinion. He argues that the cognitive power is able to interact with its objects insofar as there is something common possessed by each: thus, while perceptual power and sensible forms share materiality, *nous* and intelligible forms share immateriality. This is in favor of the thesis that Aristotle conceives *nous* as an immaterial faculty existing separately from the body.¹² If Robinson and Sisko were right, then Aristotle's account of *nous* would be hardly compatible with a naturalistic project.

⁹ cf. *DA* I 1, 403a 8, *DA* I 4, 408b 19; *DA* III 4, 429a 31-429b 5; *GA* III 2, 736b 24.

¹⁰ Block (1961) advances the thesis that all that this argument proves is that *nous* could not have a single organ, but it could still possess different parts of different compositions. The heart as central organ, which in the biological works is said to have *phantasmata* from different sense (cf. *Somn.* 2, 455a 20; *Juv.* 1, 467b 28; 3, 469a 12) could carry out this physiological-cognitive task.

¹¹ Robinson (1983). Aristotle infers this conclusion in *DA* III 4, 429a 18-16.

¹² Sisko (2000).

It is worth to point out that Sisko, as well as Robinson, rely on a literal interpretation of Aristotle's theory of perception. According to this interpretation – originated from Sorabji¹³ – the sense organ, in perceiving, *literally* instantiates the perceptible quality of the object. According to Sisko both the “blind spots constraint” (the sense organ is in a manner “blind” to the qualities it already instantiates), and the “intensity constraint” (exposure to sufficiently intense perceptible impedes the sense organ) support such a literal interpretation of Aristotle's theory of perception. Yet, as Pakaluk points out, Sisko does not explain how hylomorphism should be related to the immateriality of *nous*.¹⁴ I shall not attempt to get into the details of this debate but let me hint at the ironic fact that the opposite interpretation, advanced by Burnyeat also prevents a naturalistic interpretation of Aristotle's psychology. Regarding perception as a “spiritual” event involving no physiological change is also in contrast with the modern problem of explaining the mind from bottom up, that is, starting from the material processes which give rise to psychological phenomena.¹⁵ As Caston points out, «at issue is nothing less than how psychological phenomena fit into the natural world of Aristotle, and consequently whether his approach is a viable one for our own investigations».¹⁶ But neither the literal interpretation of Aristotle's interpretation nor a spiritualistic one appear to face the issue concerning the material constraints of thought.

(ii) *Identity*. The second remark is strictly related to the first one, even though – at least at the level of an unconscious belief or even as a kind of “folk” theory¹⁷ – it is probably more wide spread. Substance dualism is the thesis that we are a compound of two distinct and irreducible kinds of substances, namely body and mind. What about the issue of identity within the context of this theory? It is clear that personal identity is polarized in the mind. Roughly, the argument runs as follows: while our body is fully material, we also have a “mental” dimension which mere material thing lack and which cannot be made up starting from mere matter. The non-material element which characterizes and distinguishes us is our mind, or soul (let me pretend that the two terms are equivalent in drawing this parallel), thus I am what I am in virtue of having a mind, or a soul. As Kim puts it, the general idea is that «strictly speaking, we do not really “have” souls, since we are in

¹³ Sorabji (1974).

¹⁴ Pakaluk (2000).

¹⁵ Burnyeat (1992).

¹⁶ For an excellent overview of the debate about Aristotle's theory of perception, cf. Caston (2005).

¹⁷ cf. Astuti (2001) reports interesting findings that have been made in the context of cognitive anthropology. Whereas some non-Western people *speak* in such a way that supports the claim that they are free from Cartesian dualistic thinking, the analysis of their *reasoning* highlights that they systematically differentiate between culture and biology, mind and body: «between the biological processes that determine the organism and the social processes that shape personhood», p. 429. I am not sure whether this counts as being dualistic or simply as non-reductionist. However, besides the interesting question about the validity of the inferences drawn from linguistic expressions to theoretical beliefs, Astuti points out that this “folk” theoretical presupposition is fundamental for the production and transmission of knowledge. As I see it, this is an assertion that an hylomorphic advocate would, or should, accept.

an important sense *identical with* our soul – that is, each of us *is* a soul». ¹⁸ Descartes takes a step further and identifies our soul with consciousness, to the result that each of us *is* her consciousness. This is indeed the only thing which we cannot doubt of, in virtue of the very fact that *cogito ergo sum*, that is, in order to be able to doubt we need to think and, by thinking, we demonstrate that we exist. Consequently we may doubt of all the things which are not ourselves, that is, which are external to our consciousness. This class includes all the objects we receive from or through the senses.

«How, then, do I know that he [God] has not arranged that there should be neither earth, nor sky, nor any extended thing, nor figure, nor magnitude, nor place, providing at the same time, however, for the rise in me of the perceptions of all these objects, and the persuasion that these do not exist otherwise than as I perceive them?».¹⁹

Descartes' idea is that, at least in line of principle, perception could be stimulated to the result that we (think to) perceive the outside world, while the objects which should activate such perceptual experiences do not really exist outside us. This skeptical argument is known in contemporary philosophy as the “brain in a vat argument”: we cannot rule out the possibility to be just brains hooked up to a computer program able to simulate the relevant perceptual experiences. As Descartes puts it:

«Let us suppose, then, that we are dreaming, and that all these particulars – namely, the opening of the eyes, the motion of the head, the forth-putting of the hands – are merely illusions; and even that we really possess neither an entire body nor hands such as we see».²⁰

Thus Descartes casts his radical doubt not only on the external objects but also, and more importantly, on the body. Insofar as he excludes that the body contributes to personal identity, he supports the thesis that our identity derives from mind only. The point is that we can be sure that we *are* a mind but not that we are a body. Turing implicitly endorses this point. Even though, as I said, his point is about the ability to emulate thought and not the ability to think itself, he reformulates Descartes' problem in dis-embodied terms. It does not matter whether the machine able to do well in the imitation game has a human-like body, all that matters is that it can show a human-like language. Insofar as mental and physical abilities are sharply separated, and even though Turing is not committed to such an ontological theory, his approach is inspired by some sort of dualism. The body is excluded, and possibly even removed, from both Descartes' and Turing's approaches. All that matters is the mind, either in terms of consciousness and identity or in terms of deceptive linguistic performance.

¹⁸ Kim (2006), p. 29, emphasis as found.

¹⁹ Descartes (1996), Section I, Part 9.

²⁰ Descartes (1996), Section I, Part 6.

(iii) *Living body*. The third point sums up and extends the precedent remarks. Insofar as dualism draws a sharp line between the physical and the mental capacities of man and polarizes all the human characterizing features in the latter, it dismisses the living body. It has been disputed whether the «logical geography» of the distinction between the mental and the physical makes sense; in fact, I regard it as being far from clear.²¹ The metaphysical difficulty concerning the nature of the interaction between the mental and the physical highlights that, once we distinguish between two irreducible kinds of substances, the question of how they can possibly interact remains open. But this picks up just one aspect of the theoretical discontent. Even if we could specify from a theoretical point of view how our mechanical body and our non-material mind interact, the contempt that dualism shows towards the living body would still seem unsatisfactory. Not only we live *through* our body, we *are*, at least in a sense, our body. For Descartes the living body is an object in the space, subject to mechanical laws, and public insofar as it is inspectable by external observers. Descartes regards the body as an object among other objects; the fact that it is, at least in a sense, the body *of* someone, seems to make no theoretical difference. Turing's thought experiment shows that contemporary philosophy has internalized such a concept of *disembodied mind*. Not accidentally, the simulation context in which the human-like ability to engage in a dialogue is tested, the performance is regarded as not requiring to be embodied. However, the living body will be a crucial issue throughout the present work. For now is enough to emphasize that Descartes has made a strong contribution to the philosophical tradition that has led to the debate concerning artificial intelligence: the mind is disembodied, definitively separated from the body. The idea that the mind not only is non-material, but also should be such in order to preserve its features, is formalized in contemporary philosophy. The price to pay in order to establish that the mind follows laws different from physical laws is the removal of the body.

In what follows my attempt will be to show that Aristotle's dualistic interpretation is guided by these factors. I think that in the *De Anima* Aristotle considers the first of these concerns, that is, the difficulty that arises if higher human capacities are subject to material constraints. This is related to his theory of perception as reception of form without matter, that has prompted a wide debate. I shall recall it in the section devoted to functionalism, since the question whether perception does require a *physiological* process in the sense organ or rather it is the subject's *spiritual* awareness of sensible qualities has implications for the functionalist interpretation of Aristotle.²² Here I just hint at the fact that Hamlyn, in order to support a mechanistic view of non-human life, relies on the

²¹ Ryle (1949) often uses this expression referring to his attempt to reshape the inquiry about the concept of mind.

²² The most important points of view of this debate are surely those of Burnyeat (1992) and Sorabji (1974). I am indebted with Caston's (2005) excellent overview.

interpretation that in perception it is the sense-organ that undergoes the change determined by the external object, whereas it would be in virtue of the fact that reason has no organ that Aristotle can differentiate it from mechanical perception and attribute to it an active character. However, even though it is relatively uncontroversial that Aristotle is concerned about the implications of the materiality of thought (Barnes defines it as «an acute rational dilemma»²³), that is altogether too weak to show that his hylomorphism requires a dualistic interpretation.

The polarization of personal identity in the mind, as well as the removal of the living body, do not play a role in Aristotle's philosophy, but only in its dualistic interpretations.

Dualism and Mechanicism

The most detailed accounts of Aristotle's alleged dualism are those of Hamlyn and Robinson.²⁴ Both of them aim to show that Aristotle is a dualist arguing that he applies the principles of physics to living bodies but not to thought.

Not accidentally, Hamlyn's paper is entitled *Aristotle's Cartesianism*, in order to highlight the position of Aristotle as regards the immateriality of thought. Robinson's paper, even more explicitly, is entitled *Aristotelian Dualism*, as his target is to show that Aristotle is committed to the immateriality of thought in virtue of his theory of biological forms.

Hamlyn comments on some passages of the Book VIII of the *Physics*, in which Aristotle says that animal motions are due to extrinsic causes, such as «the environment, and many of the things that come into the animal, such as, in some cases, food».²⁵ Aristotle appears to say that the cause of the motion is not the animal itself, but rather objects in the environment able to affect its organs. If external objects exert their causal efficacy to the result that they are *sufficient* to bring about the living being's movements, then Aristotle would be committed to a mechanistic theory of the functioning of living bodies, excluding the need to bring in the causal efficacy of high-grade functions, such as some form of consciousness or awareness. If this is the case, Aristotle would deny that living things are able of self-motion and would be prepared to reduce life and intentional actions to mechanical movements triggered from outside the living body.

Yet the possibility for human beings to be able of self-motion is crucial in the domain of ethics. A theory that proposes that action is not originated from the agent, but is rather *fully determined* by external objects, challenges the concepts of agency and moral responsibility. If this is the case, we could not be held responsible for our actions. Fortunately, this is not the account of responsibility offered in the *Nicomachean Ethics*. There Aristotle holds that man is the source of his actions,

²³ Barnes (1971-1972), p. 110.

²⁴ cf. Hamlyn (1978) and Robinson (1982).

²⁵ *Phys.* VIII 6, 259b 11-12.

having thus full responsibility for them.

It could be objected that for Aristotle it is man's *character* to be decisive: the agent does not start from scratch any time he has to choose how to act. Rather we are given a framework in which man is influenced, are even determined, by the history of his choices. Given that, in this view, we are in a way acted upon by our character, it might be argued that we are not responsible for our actions. Aristotle considers this objection and rejects it emphatically: the agent is however responsible for his character, for his goals and desires.

«But perhaps a man is the kind of man not to take care. Still they are themselves by their slack lives responsible for becoming men of that kind, and men are themselves responsible for being unjust or self-indulgent, in that they cheat or spend their time in drinking bouts and the like».²⁶

Thus in the *Nicomachean Ethics* we are responsible for our tendencies and dispositions. Exercising the virtue does not come from the external environment, we are responsible for improving our deliberative and emotional responses. On the contrary, as Furley points out, the «theory of desire» set out in the *Physics* is oversimplified because of the different approach Aristotle is adopting there. In the *Physics* the object of desire is regarded as causing a chain of movements which mechanically lead the living thing to move accordingly. For example, animal's desire for food and its consequential movements in order to attain it are fully determined by food as object of desire. Yet when it comes to moral responsibility Aristotle refines his strategy. As Furley emphasizes:

«But people desire things in the external world, and exert themselves to get them, *under certain descriptions*, and their actions cannot be explained without some notion of what each of their goals means for them».²⁷

Furley argues that human beings desire objects “under certain descriptions” and hence that these objects are of a certain significance for the agent, significance that is not reducible to the mechanistic model sketched in the *Physics*.²⁸ I shall not get into details but on the ground that animals share with men perceptual imagination (*phantasia*) – that is, the ground for self-motion and appetite (*orexis*) – Furley defends the idea that Aristotle does support the reality of self-motion for

²⁶ *EN* III 5, 1114a 3-5.

²⁷ Furley (1978), p. 63, emphasis as found.

²⁸ I shall not get enmeshed into the details of the debate about *phantasia* here. Let me hint at the fact that it has been much argument about this and that I think we are in a position to understand the role of *phantasia* within the more general picture of Aristotle's hylomorphism. The general line I would take would be that of a non-reductionist physicalist interpretation. Furley's references to “significance” or “intentionality” do not need to be understood in a spiritualistic framework. In fact Nussbaum (1978, pp. 221-269) argues that Aristotle introduces *phantasmata* into the explanation of desire and thinking in order to maintain a consistently *physicalist* picture. *Phantasia* provides abstract thought with the forms of the concrete objects or situations. Consequently, thought (*i*) is not identical with physiological change and (*ii*) would be necessarily, although indirectly, linked to some previous physiological change.

both animals and human beings.²⁹ Hamlyn, instead, restricts it to human beings only.

Dualism and Active Potentialities

Back to Hamlyn's dualism now. On one hand, Hamlyn wants to preserve the possibility for Aristotle to ascribe moral responsibility to human beings; on the other hand, he interprets him as regarding animals in a Cartesian way, that is, as machines fully determined by the causality that objects in the environment exert upon animal's natural potentialities. Thus in Hamlyn's interpretation of Aristotle there is a line to be drawn between animals and human beings.

Roughly, there are two reasons on the ground of which Hamlyn justifies the parallel between Descartes and Aristotle. The first concerns the mechanistic character of animal life, while the second concerns the immateriality of the rational part. Let me start from the former:

«[I]n the end the movements [in animals] are due to causes lying outside the animal. [...] It is clear enough that nourishment and what it produces will not take place unless something is taken in from outside the living thing – food. Hence the external object, food, functions as a cause, i.e. a part condition of the living thing's being nourished».³⁰

Thus animals are regarded as mere biological machines whose functions – such as nourishment and reproduction, as well as perception – are mechanically activated from extrinsic causes, acting from outside of the body.

The fact that Aristotle repeatedly states that the soul is the cause of bodily functions is downgraded in Hamlyn's interpretation: in fact, he claims that «neither of these functions will be fulfilled unless the capacity exists in the corresponding living thing».³¹ So the external object in the environment play the role of the mover, while the psychological capacity causes motion in a weaker and derivative way, that is, insofar as it is moved by the external object.

Surely the conditions of actualization for potentialities involve objects in the environment external to the living things, but this is too weak to demonstrate that external objects are the only relevant causes of such an actualization. What is demonstrated is rather that their causal role is necessary, but not sufficient, in order to activate the processes which lead to the self-motion. Still, the result is that in Hamlyn's view it is *not* possible to distinguish between the interactions that non-human living things and simple elements have with the environment. Their changes are completely set up

²⁹ «To sum up, then, and repeat what I have said, inasmuch as an animal is capable of appetite it is capable of self-movement; it is not capable of appetite without possessing imagination; and all imagination is either calculative or sensitive. In the latter all animals partake», *DA* III 10, 433b 27-30. Furley points out: «Animals are clearly distinguished from inanimate natural bodies in that although both require external things to explain their movements, only animals require external things perceives (or otherwise apprehended) to have significance *for them*», p. 64.

³⁰ Hamlyn (1978), p. 12.

³¹ Hamlyn (1978), p. 12.

by external objects interacting with their natural potentialities: it follows that there would be no relevant difference between a stone falling down to earth and a tiger running to hunt its prey. In this view, both of them are characterized by passive potentialities, those that in the *Metaphysics* are defined as «the potentiality to be acted on»³² by things in the environment. In fact, when Hamlyn states that «whether that potentiality will be realized depends on whether there is something that makes it possible, *qua* cause», he refers to external objects which exert their causal role. Consistently, he denies that «every individual thing [is] its own cause of change and movement», claiming that «in the end the movement must be due to causes lying outside the animal».³³ Non-human life's potentialities are possibilities of change and movement that require satisfaction of external causal conditions to be realized, as Hamlyn himself puts it. No desire is involved in the stone's fall, neither is in tiger's hunting. It is striking how the causal efficacy of psychological functions is overlooked within this framework.

Hamlyn emphasizes the causal role of external objects, while understating the causal role Aristotle ascribes to the *active potentialities* characterizing the living body. Yet Aristotle surely wants to preserve the evidence that animals, and *a fortiori* men, move themselves in a different way from how inanimate things move, that is, animals and men do not move only because of external agents but also because their nature enable them to have the potentialities to be self-movers.³⁴ Thus the question turn out to be whether a physics which implies the reality of natures and potentialities is philosophically acceptable.³⁵ Yet let me skip this issue here, given that for now, what it is important to underline is that Hamlyn interprets Aristotle as fully Cartesians about animals: they are Aristotelian machines, able to react to external stimuli but incapable of self-motion. From the point of view of actuality-potentiality doctrine, animals are characterized by passive potentialities which cannot do anything by themselves except being acted upon by extrinsic causes.

Within this mechanistic framework, man is an exception. Indeed the second reason of the parallel between the Stagirite and Descartes is that human beings only are endowed with the rational part

³² *Metaph.* Θ 1, 1046a 11.

³³ Hamlyn (1978), pp. 11-12.

³⁴ Obviously in drawing this parallel I have to overlook some essential differences between animals and men, as well as some similarities between animals and lifeless things. Both animals and men are endowed with perceptual *phantasia*, even though only men have also the deliberative one (on the two kinds of *phantasia* and their role in action, deliberation and thinking cf. Nussbaum 1978). Further, Aristotle claims that animals and lifeless things have in common non-rational potentialities, which can produce just one effect each. On the contrary, rational potentialities can produce contrary effects, just as a doctor can produce both health and its opposite, disease, in the patient. (cf. *Metaph.* Θ 5, 1048a 1-24). Men can plan for the future choosing between different courses of action (that is, between different *phantasiai*) in view of a desired good outcome, whereas non-rational beings cannot weigh their choices and can follow only one *phantasia* at time. Yet I doubt that the fact that animals do not deliberate is enough to commit Aristotle to a mechanistic theory of animal psychology.

³⁵ cf. Gotthelf (1976) and Burnyeat (1992) for opposite answers to this question.

which allows to overcome the physical laws which are valid for all bodies in the space, thus enabling itself to function as an intrinsic cause. Aristotle's claim that reason (*nous*) has no organ is interpreted as parallel to Descartes' claim that consciousness (*res cogitans*) is a kind of substance different and irreducible to the physical substance (*res extensa*): Hamlyn contends that Aristotle sees intellect as not being subject to the the natural physical processes which affect all bodies.

Hamlyn supports the thesis that for Aristotle animals are machines subject to laws of physics and men are not. The main aim is to polarize the characteristic human potentialities in soul's higher functions. The most crucial core of this philosophical operation is to *reduce* animals' potentialities to the potentialities of their material constituents. But Aristotle does want to distinguish between these two kinds of potentialities. The falling stone and the hunting tiger are not actualizing the same type of potentiality. As Aristotle himself puts it:

«It is impossible to say that their motion [of light and heavy things] is derived from themselves: this is a characteristic of life and peculiar to living things».³⁶

For Aristotle the causes of simple elements changes and movements are material-efficient, whereas as regards living things functions and ends are involved and they are not reducible to the motions of matter. In the course of this work I shall devote much attention to Aristotle's account of four-fold causation, with special regard to its irreducibility.

For now, what I wish to emphasize is the twofold character of dualistic interpretation: on one hand, the explicit aim is to rescue human thought from the danger of mechanism which seems to threaten it as long as it is regarded as fully material. The complementary aim, more or less implicit, is to regard biology as reducible to mere material necessitation. Yet Aristotle contends that phenomena concerning living things cannot be explained simply by reference to material-efficient causation but must involve reference to form. He points it out in *De Anima*, considering the causal role played by a simple element, such as fire, within the living body:

«By some the element of fire is held to be the cause of nutrition and growth, for it alone of the bodies or elements is observed to feed and increase itself. Hence the suggestion that in both plants and animals it is it which is the operative force. A concurrent cause in a sense it certainly is, but not the principal cause; that is rather the soul (*psuche*); for while the growth of fire goes on without limit so long as there is a supply of fuel, in the case of all complex wholes formed in the course of nature there is a limit or ratio which determines their size and increase, and limit and ratio are marks of soul but not of fire, and belong to the side of account rather than that of matter».³⁷

Thus fire is not the intrinsic cause of nutrition and growth, rather it is the reference to the *psuche*

³⁶ *Phys.* VIII 4, 255a 5.

³⁷ *DA* II 4, 416a 10-18.

which explains the interactions between the potentialities of the living body's constituents. The general conclusion is that phenomena related to biological life – whether rational or not – cannot be reduced to simple elements potentialities; they must rather be explained teleologically.³⁸ As Gotthelf puts it, one cannot account for a particular living process in terms of laws governing the materials involved in the process. In Aristotle's view it is necessary to make mention of the form and the end of the process, which are not reducible to the elements-potentials.³⁹ The problem regarding thought material constraints is a sound one but, as I shall try to show, Aristotle formulates a different solution, rescuing from the danger of reductionism not only human beings but, more generally, biological life.

Dualism and Self-Motion

According to principles of physics, Aristotle shows that the analysis of the motion of x is to be broke down into the analysis of the movements of parts or objects, namely what is moving and what is moved.⁴⁰ With regard to the motion of inanimate things, what is moving and what is moved are different objects or parts belonging to different objects (the moving object A is always moved by some other moving object B, which is in turn moved by the moving object C, and so forth). Yet when it comes to self-motion of living things – which Aristotle regards as wholes – both the moving and the moved parts are x 's parts. Within the whole it is always possible to distinguish a part which acts (being a mover) and a part which is acted on (being moved): consequently, Aristotle argues, the thing conceived as a whole may be said to move itself.

«Thus let A be something that imparts motion but is unmoved, B something that is moved by A and moves C, C something that is moved by B but moves nothing [...]. Then the whole ABC moves itself. [...] That which moves itself, therefore, must comprise something that imparts motion but is unmoved and something that is moved but does not necessarily move anything else; and each of these two things, or at any rate one of them, must be in contact with the other. [...] So it is clear that it is not through some part of the whole being of such a nature as to be capable of moving itself that the whole moves itself: it moves itself as a whole, both being moved and imparting motion through containing a part that imparts motion and a part that is moved».⁴¹

Yet from a logical point of view x cannot move and being moved at the same time and under the same respect. Thus a difficulty arises because of the fact that the moving part belongs to the whole and so is also moved.⁴² How can a thing simultaneously be moved and moving? Aristotle's answer is that it is moved *accidentally*, like when someone moves a leverage and moves himself along with

³⁸ I address Aristotle's teleology in chapter III.

³⁹ Gotthelf (1976), spec. p. 235.

⁴⁰ cf. *Phys.* VIII 5, 256a 5 ff.

⁴¹ *Phys.* VIII 5, 258a 9-27.

⁴² Furley (1978) states that in the *Physics* this is argued a priori.

the leverage.⁴³

What Aristotle wants to show is that the moving thing within the whole is an *unmoved mover*. Such appears to be the character of the *psuche* in living things. In fact when it comes to consider living things, he applies this general conclusion. Looking at *Physics* VIII 4, as well as at the *De Anima* I 3-4, we know that Aristotle holds that living things are capable of self-motion in virtue of their soul, which moves being unmoved – or, better, being moved accidentally.⁴⁴

Thus the difficulty is how to distinguish between the moving part and the moved part, as they are parts of one and the same thing.⁴⁵ Given that *psuche* can act as an unmoved mover which causes movement by itself, how can we distinguish between the *psuche* which acts as a mover and the body which is moved? In the *De Anima*, Aristotle wonders whether a sound analogy might be that of a boat and a sailor.

«Further, we have no light on the problem whether the soul may not be the actuality of its body in the sense in which the sailor is the actuality of the ship».⁴⁶

The *psuche* - ship analogy is repeated in the *Physics*:

«It would seem that in animals, just as in ships and things not naturally constituted, that which causes motion is separate from that which suffers motion, and that in this way the animal as a whole causes its own motion».⁴⁷

If the relation between the body and the soul is to be seen in terms of the relation between the sailor and the boat, Aristotle's analogy might be regarded as dualistic: the sailor and the boat are not one and the same substance, they are rather two different substances. Is it so for the body and the *psuche*?

It might be argued that attributing to Aristotle substance dualism is too strong for his overall picture that substance can be analyzed into two elements, related to each other as form to matter.

⁴³ cf. *Phys.* VIII 6, 259b 16-21.

⁴⁴ cf. *DA* 408b 1-18: «We speak of the soul as being pained or pleased, being bold or fearful, being angry, perceiving, thinking [...]». Aristotle suggests that expressions which make *psuche* the subject are misleading, urging to say that man, as a whole, is the subject of his *pathē* («It is doubtless better [...] to say that it is the man who does this with his soul»). Aristotle can thus hold the idea that man is the proper subject of his movements, while the soul moves without being moved. Barnes (1971-1972) points out that in this passage Aristotle is Rylean. Barnes probably refers to the fact that in this and others passages (such as *DA* II 1, 413a 7) Aristotle rejects the idea that the exercise of psychological functions is an occult performance that takes place “inside us”, of which effects are manifest acts and utterances. Aristotle's argument is rather that psychological functions *are* actualities of bodily parts, that is, as Ryle might put it, they *are* acts and utterances performed by the subject as a whole. cf. Ryle (1949), esp. chap. II, *Knowing How and Knowing That*. To this extent, Aristotle would be classified as an anti-Cartesian, even though Barnes thinks he rejects the strong physicalism advanced by behaviorism.

⁴⁵ *Phys.* VIII 4, 254b 25-31.

⁴⁶ *DA* II 1, 413a 8.

⁴⁷ *Phys.* VIII 4, 254b 30.

Nevertheless the *life* of the organism cannot be reduced to its *body*: according to the analogy, the soul is the actuality of the body, as the man (*qua* sailor) is the actuality of the boat (*qua* physical object) to the extent that the former actualizes the potentialities which characterize the latter. Thus, if this view could be proved to be consistent with the general framework of hylomorphism and, more generally, with Aristotle's philosophy, then the Stagirite may be interpreted as supporting some form of dualism. This is indeed Robinson's interpretation of the analogy.

«The analogy is dualistic, for nothing about the life of the ship can be properly reduced to the operation of its instruments or parts alone, though everything special to each faculty derives its complexion from the nature of those parts or instruments and how they serve the overall end».⁴⁸

As I have attempted to show, dualism interpretation requires mechanicism as counterpart. Insofar as soul instantiates all human active powers, it is necessary to contrast this with mechanicism, drawing a sharp line between the active soul the passive body, regarding the latter as a mere physical object. To sum up, the aim of dualism might be a noble one, that is, avoiding the risk of reductionism as regard biological life and, typically, human thought. As aforementioned, I am convinced that Aristotle does consider such a difficulty and is concerned about how to solve it. Nonetheless, the solution I think he suggests is neglected or at least misinterpreted by those who interpret him as a dualist. For reasons that will become clear in what follow, I suggest to amend Robinson's sentence in the following way:

The ship analogy is hylomorphic, for nothing about the life of the ship can be properly reduced to the operation of its instruments or parts alone, because everything special to each faculty derives its complexion from the nature of those parts or instruments and how they serve the overall end.

Such a formulation is physicalist, as it does not introduce any special kind of substance besides matter. It is also non-reductionist, insofar as life is not *identical* with the chemical-physical material processes which take place in the living body. And, finally, it highlights that hylomorphism entails some linguistic and logical implications. As Robinson himself admits, if we are to consider Aristotle's notion of having a soul, the ship-sailor analogy would not work. The analogue of a living body would rather be a boat which could *sail itself*: in this context what is taken *qua* soul is its overall functioning.⁴⁹ The fact that we are able to name this capacity does not in any way support the hypostatization of the capacity itself.

⁴⁸ Robinson (1983), p. 129.

⁴⁹ Glossing *Pol.* I 4, 1277a 6, Barnes (1971-1972) argues similarly that an animal that is made from *psuche* and body is as a motor-car with its engine running is "made" from the running and the works, cf. p. 103.

II. Aristotle's Physicalist Interpretation

There are many types of physicalism but, loosely speaking, physicalism is the thesis that everything is physical. Hence, in the context of the mind-body problem, physicalism states that if the mental exists, then it is physical. My purpose here is to take into account the analyses of some of those authors who directly suggest an interpretation of Aristotle as a physicalist, and some of those who elaborate on the issue of physicalism, providing an indirect theoretical support for such an interpretation of Aristotle. In light of the fact that it is relatively uncontroversial that Aristotle does recognize some form of reality to the mental, I shall not deal with the crude alternative of eliminative physicalism.⁵⁰

What Kind of Physicalism

Further, in spite of the fact that there is an important debate about what physics is supposed to be (and, hence, which are the subjects the advocates of physicalism refer to), I shall regard them in a rather traditional way, that is, for instance, as being physical particulars (e.g. atoms), physical properties (e.g. masses) as well as entities of any other ontological category so long as they traditionally fall under the field of physics and not of other higher-level sciences, such as biology and psychology, not to mention ethics and, say, economics.⁵¹ This counts as a strong kind of physicalism; indeed, I shall not count within this field weaker forms of physicalism, such as those committed to the existence of entities not-physical in themselves but constituted by (or composed of) physical entities. This kinds of physicalism allow for the existence of non-physical things, even though as long as they are exhaustively constituted by physical things. Thus, weaker form of physicalism can take into account higher-level entities, such as biological particulars and properties. For reasons that will become clearer in what follows, I shall focus on the former type of strong physicalism, the so called identity theory. The doctrine has ancient roots, I shall concern myself with the family of theories which some pioneering scholars developed straddling the Fifties and Sixties.

Physicalism and Consciousness: Place

Place's paper is impressive and pioneering in the field of the physicalist conception of

⁵⁰ cf. for instance Paul and Patricia Churchland's works.

⁵¹ I follow Crane (1995) for this definition of the class of the subject matter of physics. The example about economics is typical in those scholars who argue for the non-reducibility of special sciences to physics. As it is doubtful whether, say, economic concepts and laws are "physical" in any sense of the word (just think to "money", or to the notion of "sale": are they physical or non-physical concepts?), *a fortiori* they are not ontologically and epistemologically reducible to the concepts and laws of the material substrates realizing them.

consciousness. He sets the issue of consciousness being a process in the brain by distinguishing two kinds of identity, namely the “is of definition” and the “is of composition”. While the former is a kind of *a priori* statement, being thus necessarily true (e.g. “a square *is* an equilateral triangle”), the latter is contingent and, hence, is to be verified by observation (e.g. “his table *is* an old packing case”). According to Place, “consciousness *is* a process in the brain” is a statement of the second kind and, hence, it cannot be refuted on logical grounds alone as long as it is what Place defines a “is of composition”. Thus Place has established that there is nothing logically untenable in the identity statement stating that consciousness *is* a process in the brain. Through scientific observations it can be verified that any psychological predicate ψ is a physical predicate ϕ , such that $\psi = \phi$. From this point of view, Place holds a “contingent” or *a posteriori* physicalism, that is, an identity theory of mind on the grounds of empirical observations, rather than on purely logical grounds.⁵² On this basis, he dismisses as a fallacy the inference that states that because of the *logical independency* of the expressions “consciousness” and “brain process”, it can be inferred an *ontological independency*. According to Place, from the fact that these two expressions are logically, or definitionally, independent, it does not follow that there is something self-contradictory in stating that, from an empirical point of view, they are two sets of observations of one and the same event.

Place faces the objection stating that the two sets of observations are not of one and the same event but rather are observations of two events systematically correlated through a causal connexion. Thus if brain processes are the cause of consciousness, then they count as two distinct events (the same holds *vice versa*, if consciousness is the cause of brain processes), and not as two sets of observations characterized by different verification methods of one and the same event (empirical observations for the former, introspection for the latter). Place refutes this objection insofar as «the technical scientific observations set in the context of the appropriate body of scientific theory provide an *immediate explanation* of the observations made by the man in the street»⁵³, that is to say, consciousness is nothing more than a brain process because brain processes are necessary and sufficient to *explain* subject’s introspective observations.

Accordingly, Place offers a purely physiological explanation of consciousness. Consciousness is not to be explained by the assumption that there are two continuous series of events, one being physico-chemical and the other being psychological. On the contrary, Place relies on the *a posteriori* statement that there is one single event: he identifies consciousness with a brain process because a brain process immediately *explains* the rise of consciousness. We have a purely physiological, and hence

⁵² For the difference between a priori and a posteriori physicalism, cf. Stoljar (2009).

⁵³ Place (1956), p. 48, emphasis added.

strongly physicalist, theory of mind.

Physicalism and Referents: Feigl

Together with Ullin Place, Herbert Feigl is one of the father of physicalism. In particular, he interprets Aristotle as the first philosopher who properly *identified* mental states with physical states.⁵⁴ Like Place, Feigl also holds that the logical or definitional independence between “consciousness” and “brain processes” does not prevent them to refer to one and the same event. A famous example among the authors who hold this conception concerns “the Morning Star” and “the Evening Star”: the meaning of the two expressions is different, but that does not prevent them both to refer to Venus. Likewise, the argument which relies on the different logical meaning of “consciousness” and “brain processes”, according to the physicalists, fallaciously infers their ontological independency. The independence in meaning does not necessarily imply the ontological independence of the empirical referents.

The strength of this argument is that the identity of consciousness with the brain activity is established contingently and *a posteriori*. In fact, as it is perfectly conceivable a world in which the morning star and the evening star do have not only different meanings, but also different concrete referents, so the identity of consciousness and brain processes is established in our world not by necessity but through empirical observations. As Feigl has it:

«Philosophers should certainly *not* assume that such a basic scientific issue can be settled merely by logical analysis».⁵⁵

Thus advocates of the identity theory hold that consciousness is identifiable with physico-chemical phenomena not on logical grounds but rather *empirically*. This entails that the concepts and laws which fall under the remit of physics are sufficient to explain inorganic, biological as well as psychological phenomena. Feigl opposes several arguments in order to reject various mind-body hypothesis – such as vitalism, interactionism, epiphenomenalism, emergentism – in order to establish the mind-body unity and the synthetic, or empirical, character of this statement. By “physical” he means the sort of processes or objects which can be described in the concepts of a language with an intersubjective observation basis. Psychology, which provides phenomenological descriptions through introspection, is relevant only insofar as it is definable in empirical and theoretical terms falling under the field of physics.⁵⁶ As Feigl himself puts it:

⁵⁴ cf. Berti (1998), p. 44.

⁵⁵ Feigl (1958), p. 375, emphasis added.

⁵⁶ Feigl distinguishes between “physical (1)” and “physical (2)”. By the first term Feigl means *empirical* terms whose meaning necessarily involves the intersubjective observation language. By the second term, he means *theoretical* concepts and statements which are sufficient for the explanation of observation statement. Although

«The private states known by direct acquaintance and referred to by phenomenal (subjective) terms can be described in a public [...] language and may thus be empirically identifiable with the referents of certain neurophysical terms».⁵⁷

Thus the “subjective” is connected with the “intersubjective” to the extent that the referents the former terms are identified with the *referents* of the latter ones. Feigl traces back this view to Aristotle, regarding him as the first philosopher which reduced psychological states to physiological ones. The interpretation is thus sketched: Aristotle is understood as stating that $\psi=\phi$, that is, that the inner, subjective experience *is* a physical process. Clearly enough, the fact that Aristotle identifies the heart, and not the brain, as the organ devoted to such an activity is a detail to be attributed to his obsolete physiology, keeping the grounds of philosophical proposal intact.

Physicalism and Identity: Smart

Smart thesis is that sensations *are* brain processes. The object of his famous paper is to deny that there is any argument which compel us to allow for the existence of states of consciousness “over and above” the arrangement of physical constituents.

«A man is a vast arrangement of physical particles, but there are not, over and above this, sensations and states of consciousness».⁵⁸

As Place and Feigl, also Smart refutes the interpretation of physicalism as a thesis requiring that psychological statement can be *translated* into physicalist statement (or, as Smart has it, sensation statement into brain process statement). On the contrary, the logical independence of A-statements, say psychological, and B-statements, say physical, does not entail their *ontological* independence.

«Nations are nothing “over and above” citizens, but this does not prevent the logic of nation statements being very different from the logic of citizen statements, nor does it insure the translatability of nation statements into citizen statements».⁵⁹

Although the nation-citizens example is not very accurate, as citizens are not the only “constituents” of nations, being geographical territory, government, institutions, and other things constitutive for a nation, the *ratio* of Smart’s example is clearly the same as Feigl’s one about “the Morning Star” and “the Evening Star”: from the logical independence of A and B it cannot be inferred that A and B are empirically different, that is, A e B can be logically independent and, consistently, be empirically (i.e. in fact) one and the same entity.

such a distinction allows to clarify some issues once that emergence is established, for my present purposes it is not essential to deal with such a distinction.

⁵⁷ Feigl (1958), p. 448.

⁵⁸ Smart (1959), p. 143.

⁵⁹ Smart (1959), p. 145.

«[W]hen we say “I have an after-image” we cannot *mean* something of the form “I have such and such a brain-process”. But this does not show that what we report (having an after-image) is not *in fact* a brain process. [...] Again, “I see the Evening Star” does not *mean* the same as “I see the Morning Star”, and yet “the Evening Star and the Morning Star are one and the same thing” is a contingent proposition».⁶⁰

It is important to notice that Smart throughout the paper defines the opponent’s arguments and objections as “dualistic”, as if psychology being *not* identical with physical arrangement could, merely as such, commit us to dualism. That seems implausible, given that this restricts the choice either to strong physicalism or to substance dualism, as if no other position could ever make sense. Indeed, the most interesting objection with which Smart has to deal does escape such a rigid distinction. As I regard it as being a strong objection to identity theory, I quote it in full:

«[T]he qualities of sensations are something over and above the qualities of brain-processes. That is, it may be possible to get out of asserting the existence of irreducibly psychic processes, but not out of asserting the existence of irreducibly psychic *properties*. For suppose we identify the Morning Star with the Evening Star. There must be some properties which logically imply that of being the Morning Star, and quite distinct properties which entail that of being the Evening Star».⁶¹

Accordingly, we can allow that psychological events and processes *are* physical events and processes (and nothing else) and, still, we can appeal to the fact that psychological properties are distinct from physicalist properties. For insofar as psychological properties are logically distinct from physical properties – as all the identity theory’s advocates do admit – then, even though the mental and the physical are in fact one and the same thing, they can be regarded as phenomenally different.

Physicalism and Perception: Slakey

Perception is by Slakey explained as an event (a kind of “change” or “being acted upon”) in the sense organ.

«Perception is simply the movement which occurs in the sense organs, not some psychic process *in addition* to the movement in the organs».⁶²

Slakey suggests that the blind spots constraint (424a 2-4), as well as the intensity constraint (424b 29-32) supports a literalist interpretation of Aristotle’s theory of perception, of which he offers a fully physicalist interpretation. Perception amounts to that fact that in perceiving *x* a sense organ becomes *x*. As Slakey has it: «An object which is perceived to be *x* makes the sense organ involved

⁶⁰ Smart (1959), p. 147, emphasis as found.

⁶¹ Smart (1959), p. 148, emphasis as found.

⁶² Slakey (1961), p. 472.

in its perception to be itself x ».⁶³ Aristotle claims indeed that the sense organ undergoes a change because of the object it is perceiving, and *De Anima* II 7-11 is devoted to illustrate this notion as regards the five sense. Nonetheless, the important question is whether Aristotle holds that for perception to occur there must be also a psychological change, something similar to what today we would refer to as awareness or an event in consciousness.⁶⁴ For it not surprising that Aristotle holds that the sense organ becomes hot in perceiving heat. The point is that this account would allow inanimate objects to perceive only in virtue of the fact that they undergo physical change along with the changing of environmental conditions. A stone becomes hot if it is exposed to sunlight for a sufficient period of time, and nonetheless Aristotle would not claim that a stone perceives heat. Likewise, air is not able to smell, even though it is affected by odors, and so forth.

Thus perception must involve something over and above physical undergoing, otherwise it would be reduced to mere physical undergoing.⁶⁵ Aristotle faces this objection and this is indeed what he claims with regard to plants: in spite of the fact that their temperature can be lowered or raised depending on the environment, they cannot perceive because they have «no principle in them capable of taking on the forms of sensible objects but are affected together with their matter».⁶⁶ Thus the plant's matter is affected by the environment in a way such that its qualities change in accordance with the qualitative environmental variations. Plant's matter can be said to become, say, hot when the environment is hot, but this is altogether not enough for perceiving heat. Given that it is clear that a qualitative change caused by external environment is not enough for perception to take place, the causal account of perception leads Aristotle to face this objection. The solution he suggests in *De Anima* II 12 is to point out that there is a difference between the portion of matter constituting the sense organ and the sense itself. Here he is applying one again, I think, the matter-form distinction: while the *sense organ* is regarded as what is suitable to undergo change, that is, the matter; the *sense* is regarded as the principle capable of taking on the forms of objects, that is, form itself. I agree that Aristotle holds a causal theory of perception, insofar as the quality x of the object causes the sense organ to undergo change and “become x ”, but he holds as well that sensible qualities do not have causal efficacy unless there is also the specific organic capacity (*dunamis*) potentially able to perceive it. This is the conclusion Aristotle reaches in *De Anima* II 12. It is often held that the advocates of some form of awareness besides the physiological change have an advantage over their opponents in accounting for this passage, for it is often regarded as

⁶³ Slakey (1961), p. 475.

⁶⁴ cf. Hardie (1976); Caston (2002).

⁶⁵ For this conclusion, I agree with Barnes (1971-1972).

⁶⁶ *DA* II 12, 424b 1.

uncomfortable for any literalistic interpretation of his theory of perception.⁶⁷ The fact that Slakey neglects the distinction between the sense organ and the sense itself is proved by his statement:

«The only distinction between “sense” and “sense organ” is that the word “sense” refers to the power of the sense organ to change within a certain range of qualities».⁶⁸

Thus Slakey reduces what Aristotle regards as a formal principle (sense) to a material mean (sense organ), regarding the former as the mere physiological range within which the sense organ is able to undergo change, without destroying itself.

I think Slakey’s aim is to regard the causal process which starts from the object and leads to perception as *one fully physical causal chain*. What I regard to be the main lack in Slakey’s interpretation is that he does not face the issue of which is the difference between the sense organ undergoing change and the sense itself which is perceiving. For how do these physical processes differ when they take place in a sense organ or when they take place in a plant or in an inanimate body, given that, as Slakey suggests, perception is just one fully physical chain of causes and effects which leads from the object in the environment to the relevant change, regardless of whether this change takes place in the living organism or in a non-sentient object?

I think Aristotle would focus on the notion of sense organ. conceived as such, a sense organ is logically incomplete. There is nothing as a sense organ *as such*. Rather, we have to take into account that a sense organ is the sense organ *of* something and, more specifically, *of* a living body. A living body is said to live only in virtue of its *psuche*, which, according to the famous definition of *De Anima* II 1, is an actuality of the first kind of a natural body having life potentially in it. Among the potentialities of the sensitive *psuche* there is also the potentiality to perceive, with which plants (and all the more so, inanimate objects) are not endowed. Thus the becoming *x* (say, hot) of a sense organ and the becoming *x* of a plant or a stone must differ in some way. According to Aristotle, their impossibility to perceive is caused not only by the *matter* they are made of: that is proved by the fact that he allows that, through their matter, they are affected by the sensible qualities of objects in the environment.⁶⁹ As I see it, this amounts to the suggestion that perception is made possible primarily in virtue of the substantial *form* which characterizes the living organism. If we accept the general idea that the sense organ is related to sense as matter is related to form, we would be in the position to make sense of Aristotle’s statement in *De Anima* II 12:

⁶⁷ For instance Murphy (2005). In the passage Aristotle appears to claim that perception must involve something over and above the physiological process in the sense organ. For the debate about Aristotle’s theory of perception, cf. *Essays on Aristotle’s De Anima*, which are largely devoted to this issue.

⁶⁸ Slakey (1961), p. 476.

⁶⁹ cf. *DA* II 12, 424a 34. For the debate structured about the understanding of perception of plants cf. Everson (1997) and Murphy (2005).

«The sense and its organ are the same in fact, but their essence is not the same. What perceives is, of course, a spatial magnitude, but we must not admit that either having the power to perceive or the sense itself is a magnitude; what they are is a certain form or power in a magnitude».⁷⁰

Thus Aristotle regard the sense organ to be an object in the space, and the sense itself to be an attribute of it.⁷¹ The sense itself cannot exist separately from the sense organ and, nonetheless, it as no magnitude because it is conceived as the potentiality of the sense organ to perceive. To this extent, Slakey is right to state that the word “sense” refers to the power of the sense organ to perceive a certain range of qualities. But according to Aristotle, on one hand the sense and its organ are the same and, on the other hand, they are not the same, since the sense organ is a part of the living body and the sense itself is the sense organ *qua* potentiality. Hence Aristotle is an advocate of physicalism insofar as he regards perception as taking place through the sense organ and, at the same time, he is not an advocate of strong physicalism, since he does not hold that a psychological phenomenon, such as perception, is *identical* with the physiological phenomenon. These phenomena rather differ in essence, that is, they can be distinguished from an analytical point of view. As I have already hinted, in order to achieve this result Aristotle applies, once again, the matter-form distinction. Being affected by an external object is not enough to explain perception, as far as this involves only matter (indeed, air has not the potentiality to smell, though it is affected by odors⁷²).

I think that the point Aristotle is attempting to make is that cognitive faculties require the relevant form, that is, they cannot take place unless the appropriate *psuche* is present. Thus perception is indeed an affection of an external object on a part of the living body *and* a kind of psychological event which take place in the *psuche*. Aristotle repeatedly claims that perception is common to body and soul.⁷³ What is interesting in Aristotle’s account is that the distinction between bodily affection and psychological phenomena (as well as, more generally, the distinction between the *psuche* and the body) is logical in character. These are not two separated events, they are rather *one and the same event* conceived from different points of view, namely physiological and psychological.

Slakey neglects the intimate unity of *psuche* and body when he presents Aristotle’s account of perception as purely physiological: he states that Aristotle tries to explain perceiving simply as a physiological change occurring in the sense organ. Yet Slakey dismisses the fact that the sense organ and the sense itself are one and the same thing, related to each other as matter to form.

⁷⁰ DA II 12, 424 a 25-26.

⁷¹ For the interpretation that regards Aristotle to be an upholder of an attribute theory of mind, see Barnes (1971-1972).

⁷² DA II 12, 424b 16-19.

⁷³ *Sens.* 1, 436b 7; *Mem.* 1, 450a 27; *Somn.* 1, 454a 7-10.

III. Aristotle's Functionalist Interpretation

The claim that functionalism has Aristotelian roots has now become traditional.⁷⁴ The main reason is that functionalism, as well as Aristotle, privileges formal accounts over material accounts. A famous question originally asked by Putnam was the following:

«[W]hy does a bronze sphere of radius r pass through a wooden hoop of radius just slightly greater than r , while a bronze cube of side $2r$ will not pass through?»⁷⁵

It is clear that material explanations include many irrelevant informations, such as those concerning the material the geometric solids are made of. On the contrary, formal explanations introduce only the relevant features, and are thus defined by Putnam *simpler* and *more general*. As I think that in this example are summarized both the strength I shall praise and the weakness I shall contend to functionalism, I briefly sum these up, before proceeding with some introductory remarks.

I agree that Aristotle thinks form prior to matter. Yet he ascribes such a priority on the basis of metaphysical reasons, not for the mere explanatory roles they play. On the contrary, I think, in Aristotle's view it is because of their metaphysical roles that matter and form are explanatory.

For reasons that will become clearer in what follows, I hold that Putnam and Nussbaum correctly individuate the priority Aristotle attributes to form over matter; nonetheless, they fail to recognize the logical structure of hylomorphism, to the result that they do not grasp the potential inherent in Aristotle's view about mind, life and nature. The balance of this work will consist of arguments in behalf of this thesis and its corollary.

Functionalism: Rise and Fall

Hilary Putnam is the pioneer of functionalism, the philosophical doctrine that he developed in a series of papers during the Sixties. The first sketch of functionalism traces back to 1960, in a paper entitled *Mind and Machines*, and is fully developed some years later, in 1967, in a paper entitled *The Nature of Mental States*.⁷⁶ In these papers Putnam outlined functionalism, a doctrine about the nature of mental states that claims that mental states are identical with functional states, that is, mental states are exhaustively defined by the function they play within the system to which they belong. As regards the human cognitive system, the identity of a mental state is defined on the basis of the relations it has with inputs (sensory stimulations), outputs (behavior) and with other mental states (again, mental states are to be conceived as functional states). Within this framework, mind is

⁷⁴ See for instance the entry devoted to functionalism of the Stanford Encyclopedia of Philosophy, in which it is claimed that «this doctrine is rooted in Aristotle's conception of soul», cf. Levin (2010).

⁷⁵ Putnam (1975), pp. 295-298.

⁷⁶ Both the mentioned papers are collected in Putnam (1975), respectively pp. 362-385 and pp. 429-440.

to be understood as independent from the physical structure realizing it, to the extent that such physical structures are potentially infinite.

As, in line of principle, it is logically possible that mental states are realized by a *non*-physical system, functionalism is officially compatible with both dualism and physicalism. Nevertheless, I shall not consider this option here since, historically, functionalism has been an option more for physicalists than for dualists and thus traditionally belongs to the family of non-reductive physicalism.⁷⁷

By establishing the independence of the functional states causally connected within the logical structure of the system from the physical substrate implementing them, Putnam aims, first of all, to suggest *logical* corrections to the traditional setting of the mind-body problem, thereby showing the false assumptions on which the debate is founded. His purpose is to provide the basis necessary to argue for the autonomy of mental life. Thus the doctrine of functionalism goes against the identity theory formulated by Feigl, Place and Smart who, as I have shown, interpreted the thesis that the mind is produced by the brain activity in terms of a *type* identity between the mind and the brain. The only doctrines able to contrast such a reductive account of mind appeared to be dualistic accounts, which points to a gap between mental states and physico-chemical states. Nonetheless in the context of a naturalistic account of mind, the nature of such a gap could not receive a satisfactory explanation. Dualistic accounts come to “save” mind from the risk of ontological reduction only by avoiding the contemporary challenge of a naturalistic explanation of it.

On one hand, Putnam contrasts strong physicalist positions by opposing to their logic framework the centrality of the functional organization, rather than of the physical substrate realizing it. On the other hand, given the fundamental unity of form and matter – which, he claims, he takes from Aristotle – functionalism contrasts also the setting of the problem typically suggested by dualism. Further, Putnam extended his criticisms to logical behaviorism,⁷⁸ the philosophical doctrine developed in the mid-Thirties by Carnap and Hempel and culminated in 1949 with the publication of Ryle’s famous essay.⁷⁹ Logical behaviorism identified mental states with sets of behavioral dispositions, concentrating its criticisms on the «ghostly» conception of mental causation. By means of a series of thought experiments, Putnam attacks behaviorism arguing that mental states cannot be regarded as logical constructs starting from public behaviors. Thus the success of Putnam’s functionalist proposal lies in being able to overcome the difficulties faced by both physicalism and behaviorism. To this reason should be added the so called “cognitive revolution”,

⁷⁷ cf. Levin (2010).

⁷⁸ Putnam’s most important paper against behaviorism is entitled *Brains and Behavior*. First published in 1963, it is collected in Putnam (1975), pp. 325-341.

⁷⁹ Ryle (1949).

which started in 1959, the year of the publication of the review by Chomsky of the book *Verbal Behavior* by Skinner.⁸⁰ Such a revolution prompted the replacement of behaviorist research programs with cognitive ones. The development of a new theoretical framework for the study of mind started to develop, under the name of cognitive science. As the central assumption of this newborn “cognitive science” was to regard the processes underlying cognitive capacities as information processes (i.e. computations operating on mental representations), Putnam’s functionalism was able to provide to these research programs the necessary theoretical basis, for instance, by the development of an externalist semantics.

However, it is worth to point out that Putnam later abandoned such an attempt, highlighting that propositional attitudes cannot be described in terms of purely computational terms without involving an (irreducible) interpretative practice.⁸¹ The issue is also central in *Representation and Reality*, in which Putnam claims that holding the “same belief” – that is, being in the same propositional attitude – not only does not entail that there is one physico-chemical state in which all the subjects of belief are in, but also that there is no one single *computational* state they are all in. The only “tool” we have in order to detect the notion of “same belief” is interpretative practice, which is, Putnam claims, irreducible to both physical and computational states. This counts as Putnam’s repudiation of functionalism. As just some years earlier he was undoubtedly the pioneer of this doctrine, Putnam nicely writes in the Introduction that the main target of *Representation and Reality* is «one of my former selves, and those who have adopted his views».⁸²

Aristotelian Functionalism

In the context of this twentieth-century debate, the influence of Aristotle’s hylomorphism and psychology plays an exceptionally relevant role. Because of the attention he paid to the physiology of perception and his numerous remarks about the inseparability of the *psuche* from the body, Aristotle is interpreted as a proto-physicalist by the advocates of the identity theory. And in virtue of his account of *nous* and the statements concerning the fact that *nous* has no organ, he was interpreted as a dualistic philosopher, or even as a forerunner of Descartes. However, in order to confute the dualistic interpretation of Aristotle, a functionalist argument is at hand. It might be argued that *psuche* is a second-order (functional) property, that is, a *dunamis* which has to be *realized* by physical states, understood as first-order properties.⁸³ An immediate objection is that according to “the causal inheritance principle” a second-order property has no causal efficacy,

⁸⁰ Chomsky (1959). Skinner’s book was published in 1957.

⁸¹ For the development of externalist semantics, cf. Putnam (1975), p. 215-271.

⁸² cf. Putnam (1988) p. XIII.

⁸³ cf. Lewis (1988).

insofar as its causal status is «entirely “inherited” from the causal efficacy of its first order realizer».⁸⁴ Aristotle, on the contrary, undoubtedly attributes causal powers to the *psuche*. Thus, the aforementioned interpretation of *psuche* as second-order property would be refuted and if we wish to argue, along with Aristotle, for the existence of *psuche*'s causal powers, our view would have to leave room to some form of anti-naturalism, such as dualism of substances. Yet, if we understand Aristotle's hylomorphism as an anti-dualistic view and wish to make sense of the notion of *psuche* as a functional property, what is at stake is how attributing causal efficacy to second-order properties in general (of which *psuche* would be a special case), given that their causal status seems to be depending on their first-order realizers. If the *psuche* is a logical entity which groups an appropriate set of first-order properties together, how can we avoid the understanding that thought is epiphenomenal and action is mechanistic, two opinions which Aristotle is surely willing to avoid? The answer to the problem lies in a typical functionalist thesis, that is, *multiply realizability*. The causal powers of a second-order property is identical with those of its physical realizers but, speaking in terms of second-order properties, we gain both metaphysical and methodological advantages.⁸⁵

Thus Putnam and Nussbaum opposed to these Aristotle's interpretations and challenge them: being «Aristotelians» today means to hold that our mental capacities arise from our physical constitution, a claim which they prove consistent with the thesis that such higher-level capacities are not reducible to the material they are made of. As Putnam and Nussbaum have it:

«the *psuche* as our organization to function permitted Aristotle to separate question about specific material composition from the main questions of psychology».⁸⁶

The *De Anima*, as well as some biological works, are precious sources for this interpretation. There Aristotle holds that the definitions of affections of *psuche* must include reference to (parts of) the body, still without being reducible to them. Indeed the famous argument about the affection of *psuche* in *De Anima* I 1 is often interpreted in this functionalism-friendly direction and, in fact, Aristotle concludes this argument by stating that the affection of *psuche* are enmattered form.⁸⁷ To put it in functionalist terms, mental states are functional states of matter. Further in the second book, Aristotle holds that at least some psychological functions are actualities of bodily parts. Hence, the separability of the *psuche* (at least conceived as a whole) from the body is excluded: having a

⁸⁴ cf. Gozzano (2001).

⁸⁵ Again, Gozzano (2001) argues that the causal powers of an instance of second order property are identical with those of its realizers.

⁸⁶ Putnam; Nussbaum (1994).

⁸⁷ cf. *DA* I 1, 403a 16-25.

psuche entails having a living, functioning body, insofar as the *psuche* is the actuality of that body.⁸⁸

One further point is worth mentioning. Since hylomorphism is conceived as an anti-reductionist physical thesis, one of the issues a contemporary “hylomorphist” should face is how to *individuate* Aristotelian forms. As it is well known, in his view forms pertain to all substances, non-living and living, both conceived as wholes and as parts of wholes. Thus a classical problem that any attempt of translating Aristotle’s hylomorphism into modern philosophical terms has to address is how to *individuate* the form of a living body (given that, on the basis of some detailed arguments I illustrate in Chapter Two, form cannot be identified with external configuration). Although I shall just hint at this, I think Berti’s suggestion is right: if we inform our understanding of Aristotle’s biology identifying the formal principle of the whole body with the DNA, we sort out several problems and gain some important insights. Let me just hint at them. First, we could solve the locating problem, making justice to Aristotle’s claim that form or *psuche* is in the whole body as the DNA indeed is. Secondly, we could be in the position to understand some *logical* features of hylomorphism, for instance, Aristotle’s claim that by feeling an emotion the heart is moved but the *psuche* is not. Thirdly, the opening claim of the *De Anima*, that is, that *psuche* (the DNA) is «the principle of animal life», would probably sound old-fashioned but would make sense in the context of contemporary science. Finally, there would be the advantage of being able to make Aristotle and Darwin babble some common word: even though neither of them knew about the existence of genetic instructions active in the development and functioning of organisms, loosely speaking they both theorized about the *functional forms* of living organisms.⁸⁹

This is just a suggestion. Even though I cannot argue for this here, this is the line of research I would follow if I were to revitalize Aristotle’s notion of form in both its philosophical and biological range.

⁸⁸ cf. *DA* II 1, 413a 7.

⁸⁹ I devote to this issue a synthetic and probably unsatisfactory Appendix to Chapter Three.

Chapter Two

Homonymy, Things and Words

«When things have only a name in common and the definition of being corresponding to the name is different, they are called homonymous».

Aristotle, Categories

A) Homonymy as Such

Introduction

The functionalist interpretation of Aristotle's psychology represents a chance to raise and discuss several issues.

Among these, I shall focus on homonymy, an issue which has sparked a wide ranging debate both as a starting point for general and abstract issues and as a proper philosophical focus. The main task of this chapter is to argue that hylomorphism is not only an ontological thesis but entails also predicative consequences. Hylomorphism and homonymy are consistent with each; moreover, the former entails the latter as a corollary.

The first part of the chapter is organized as follows: in the first section I will present Ackrill's criticisms of Aristotelian psychology. I regard them as an introduction to homonymy and as a piece of evidence proving that homonymy is a central issue in the context of Aristotle's metaphysics. After having introduced some issues related to homonymy as such, I shall return to Ackrill's problem in the next part of this chapter, dealing with the homonymy of the body.

In the second section I will present homonymy in the context of Aristotelian philosophy, stressing several innovations as regards Plato's theory of Forms.

In the third section I will consider the debate about homonymy which has taken place among the scholars. I will stress the distinction between meaning and definition, arguing that Aristotle's concern investigating homonymy is primarily about things' essence rather than about words' meaning. I will consider a possible objection concerning universals to the view I am going to defend.

Finally, in the fourth section I shall present core-dependent homonymy and refute an interpretation

of it offered by Shields.

In the next part of this chapter, entitled “*Homonymy of the body*”, I shall consider in greater detail the debate raised in the contemporary philosophy of mind prompted by the functionalist (and the anti-functionalist) interpretation of Aristotle’s psychology. As Ackrill shows, homonymy is a central issue in this context, insofar as it appears to threaten the conceptual consistency of hylomorphism, especially as regards the notion of matter. Thus the analysis of mind in terms of matter and form is in danger of being compromised, depending on how hylomorphism and homonymy are interpreted.

I. Ackrill’s Criticism

According to Ackrill hylomorphism and homonymy are not compatible with each other. Ackrill’s famous paper could be considered the father of the attacks to Aristotle from an anti-functionalism point of view.⁹⁰ Indeed one of the most powerful attacks on the “credibility” of Aristotelian psychology relies on the “necessarily alive body” Ackrill accuses Aristotle of introducing.⁹¹

First of all, Ackrill presents Aristotle’s account of the relation between the *psuche* and body as pointing out three elements. (1) The first is the matter which constitutes an item; (2) the second is the form (shape, arrangement or power); (3) the third is the composite of matter and form. So, for instance, being (1) bronze and (2) sphericity, (3) the compound would be a bronze sphere. Ackrill correctly points out that Aristotle applies this triadic scheme both to artificial and natural items.

«What Aristotle says about axes is that some wood and iron (matter) constitutes an axe (composite) in virtue of its having the power to chop (form). Similarly, some part of the body is an eye because it has sight; and the body as a whole is a man because it has certain living powers, *psuche*. *Psuche* is the power a body must have if it is to be a man, as sight and the power to chop are what objects must have to be eyes or axes».⁹²

Ackrill continues with an accusation: he deems that the hylomorphistic scheme cannot be consistently applied to the living body. The reason has to do both with the alleged inconsistency between the definitions of *psuche* supplied by Aristotle in *De Anima* and with the homonymy principle.

In *De Anima*, Aristotle defines the *psuche* as the form, or the first actuality, of a natural body that has life potentially, that is, that has organs.

Keeping this account of *psuche* in the background, Ackrill brings in the critical point. He points out that the application of the scheme matter-form-compound requires that the relevant matter can be identified as such. Trivially, Ackrill means that the metaphysical distinction between matter and

⁹⁰ cf. Ackrill (1972-1973).

⁹¹ cf. Burnyeat (1992).

⁹² Ackrill (1972-1973), p. 122.

form demands that these elements should be capable of being picked out separately. According to him, the problem concerns mainly the matter, given that Aristotle conceives the matter as the element potentially capable of acquiring the form. Thus matter should be capable of being picked out separately, that is, it should be possible to conceive it both as not yet having the form (existing without it, having it only potentially) and as having it in actuality.

«For it is not clear how the notions of form and matter or of actuality and potentiality are in this case to be understood. They normally find application where the relevant matter (or what is potentially an X) can be picked out and (re-)identified in both an unformed and an in-formed state (or both as potentially and as actually an X)».⁹³

The problem Ackrill remarks that, applying the triadic scheme to the living body, the material side of the compound can only be the body itself, *already in-formed by the psuche*.

Concerning inanimate things, the potentiality-actuality distinction makes plain that matter might exemplify different forms. The matter can be conceived as potentiality, that is as being able to acquire the relevant form and to constitute a certain compound in actuality. In the case of an artefact, say a bronze sphere, the relevant matter can be considered both as the actual material side of the composite (the bronze which constitutes the sphere) and as unformed matter (the bronze itself, before being shaped in any way).

But with regard to the living body, being “potentially able to acquire the relevant form” is to have a certain set of characteristic powers which can result only from the *psuche*. Aristotle states clearly this in *De Anima*, when he defines the *psuche* as the first actuality of a body which has life potentially.⁹⁴ According to Ackrill, the hylomorphic triadic scheme cannot be applied *sic et simpliciter* to the case of the living body because, he argues, in this case there is no material constituent to be identified besides the living body itself: the body is by definition already *empsychon*. What can be picked out is not the material aspect of the composite but rather the already in-formed body. For Aristotle the in-formed body is alive, whereas, in virtue of homonymy principle, if it is not alive it cannot be correctly defined as “body”. Bodily parts and body as a whole are defined by the function they perform. A dead hand, say, is called “hand” just homonymously, because it is not able to perform the relevant function.⁹⁵ Therefore, Aristotle claims that properly speaking a dead hand, like a painted one, is not a hand anymore. Insofar as it does not perform the function a hand does, a dead hand does not have anything in common with a hand.⁹⁶

⁹³ Ackrill (1972-1973), p. 124.

⁹⁴ cf. *DA* II 1, 412a 27.

⁹⁵ cf. *Meteor.* IV 12, 389b29 – 390a 1.

⁹⁶ Aristotle expresses this opinion many times. See for instance *De An.* 412b 17-22; *Meteor.* 389b 20-390a16; *Pol.* 1253a 20-25; *PA* 640b 30 - 641a 6; *GA* 734b 25-27; *Metaph.* E 2, 1026b 14. In the course of the chapter I shall argue that, according to Aristotle, a living body and a dead one do not have anything *definitionally* in common.

«For there is no such thing as face or flesh without soul in it; it is only homonymously that they will be called face or flesh if the life has gone out of them, just as if they had been made of stone or wood. [...] The same applies also to flesh, for this too has a function».⁹⁷

Ackrill's point is that the material aspect of the living body appears to be missing from Aristotle's account: if it is there, it is already necessarily alive. If it is not, then it cannot be the matter of the body. The conclusion is that the body is inseparable from the *psuche*.

The intersection of the definitions of *psuche* on one side and the homonymy principle on the other side thus leads to an inconsistency: the hylomorphic analysis applied to the living body leads to the unacceptable conclusion that the body is necessarily ensouled (*empsychon*). Ackrill's conclusion is that hylomorphism clashes with the homonymy principle: Aristotelian bodies are always necessarily alive.

«If being alive, whether for an organ or for a whole body, is having certain powers (not necessarily exercising them) and to be an organ or a human body is to possess such powers, no distinction can be drawn for organs and bodies between their being potentially alive and their being actually alive. They are necessarily actually alive. If they lack the relevant powers they are just not organs or human bodies; if they have them they are *eo ipso* alive».⁹⁸

It should be clear that, in this problematic framework, homonymy plays a central role. Ackrill's view is that it is the issue that makes Aristotelian hylomorphism inconsistent. If the dead body cannot be defined as "body", then the form and the matter cannot be conceived separately, blocking the hylomorphic analysis.

I shall consider Ackrill's criticisms and proposals again at the very end of the chapter. As I had better say at once, I consider Ackrill's criticisms to be subtle and well-formulated, but I take them to emphasize the strength of the unity of hylomorphism and homonymy.

Let me elaborate on this theme by introducing homonymy as such.

II. Homonymy in context

Homonymy is set out at the very beginning of the *Categories*.

«When two things have only the name in common and the definition of being which corresponds to the name is different, they are called homonymous. Thus, for example, both a man and a picture are animals. These have only the name in common and the definition of being which corresponds to the name is different; for if one is to say what being an animal is for each of them, one will give two distinct definitions».⁹⁹

Aristotle describes the notion of homonymy as a three-place relation between two entities *a* and *b*

⁹⁷ *GA* 734b 25-31.

⁹⁸ Ackrill (1972-1973), p. 126.

⁹⁹ *Cat.* I 1, 1a 1-5.

and a word *t*, where *t* is applied to both *a* and *b* although the definition of the word *t* is different in the two cases.¹⁰⁰ For example, the ground bordering a river and a financial establishment are both called “bank”, but the definition of the two instances is obviously not the same. So the ground bordering a river and a financial establishment have «only the name in common», since the corresponding definitions of the word *t* are different. A problem concerning things turns out to be related to words as well: in Aristotle’s view the word “bank” is homonymous with regard to the two foregoing applications to essentially different things.

An important feature of this account is that, setting out homonymy, Aristotle does not claim that the word “bank” has different meanings. Rather, he claims that the «definition of being which corresponds to the name is different». In what follows I shall try to highlight how fundamental this feature of Aristotelian homonymy is.¹⁰¹

The relation between the “bank” of a river and the establishment called a “bank” is merely *accidental*; that is, there is no conceptual structure that grounds the relation between the two. Therefore this kind of “mere homonymy” does not have for Aristotle much interest, besides a dialectic one aimed basically to avoid fallacies in arguments.¹⁰²

Yet some applications of homonymy reveal a certain kind of relation between the definitions of being corresponding to the things the homonymous word refers to. For example, a food type may be “good” to our palate, a drug can be “good” for our health, and so forth. As before, what-it-is-to-be good respectively for a food type and for a drug is not the same, nevertheless the corresponding definitions are not merely accidental like in the case of “bank”. Indeed all the uses of “good” are connected through a reference to some central use. Owen quotes *Nicomachean Ethics* in order to show that Aristotle thinks that the things that are called “good” do not have the same name only by chance.¹⁰³ But, even though there is a special relation between the different applications, the definitions of being corresponding to the classes of subject of predication are different. Therefore, in conformity with the beginning of the *Categories*, Aristotle argues that the universal “good” is homonymous.

«Good in the case of food is what is productive of pleasure, and in the case of medicine what is productive of health, whereas as applied to the soul it is to be of a certain quality, e.g. temperate or courageous or just; and likewise also, as applied to a man. Sometimes it signifies what happens at a certain time, as (e.g.) what happens at the right time; for what happens at the right time is called good. Often it signifies what is of a certain quantity, e.g. as applied to the proper amount; for the proper amount is called good. So the good is homonymous».¹⁰⁴

¹⁰⁰ For setting out homonymy as a 3-place relation cf. Lewis (2004), p. 1.

¹⁰¹ See section III of this chapter, “*Things and Words*”.

¹⁰² *Soph. El.* 8, 170a 12-15.

¹⁰³ cf. *EN* I 6, 1096 20-26. See also Owen (1960), p. 166.

¹⁰⁴ *Top.* I 15, 107a 5-10.

Further attention is warranted on homonymy for many reasons. The first to be mentioned is that homonymy is recalled in many crucial domains of Aristotelian philosophy, such as ethics, metaphysics, logic and, as I have already stressed, psychology. But it is not only a matter of wide application. For Aristotle homonymy seems to be both a decisive problem and a fundamental philosophical tool.¹⁰⁵

A further general reason of attention is that homonymy seems to be the issue which in the first place stopped Aristotle from formulating of his metaphysics.¹⁰⁶ Indeed in some earlier works Aristotle denies the possibility of a unitary science on the ground of homonymy: since, for instance, “being” has no unitary sense – that is, “being” is homonymous – there can be no science able to gather all these senses together and investigate them unitarily.¹⁰⁷ Only once the homonymy problem is circumvented, it does leave room for the science of being *qua* being.

Homonymy has also represented a fundamental point of Aristotle’s polemic against the Platonic doctrine of Ideas. In order to better understand the criticisms Aristotle addresses to it and to better highlight the differences with his own doctrine, it is helpful to recall roughly some features of it. I shall not engage in a thorough interpretation of Plato’s view about homonymy, nor in a exhaustive comparison with Aristotle’s one. The attention I shall give to Plato’s theory of Forms in this context is limited: I shall take in consideration one example of Plato’s view insofar as it will help to better understand some features of Aristotelian homonymy. I pick the treatment of “justice” from the *Republic*.

In the second book, Socrates declares his intention to consider the soul and the city as two *loci* suitable to instantiate the *same kind* of justice. He points to an isomorphism between the individual soul and the *polis*, which allows him to draw an analogy of proportion¹⁰⁸ with regard to justice and to introduce the important issue of the similarity between the two. As it is easier to read larger letters than little ones, Socrates says, so it will be easier to inquire into justice in the *polis* first, which is larger, before taking it into account in the individual soul. It seems clear that Plato’s

¹⁰⁵ In the light of the famous works of W. Jaeger, *Aristoteles: Grundlegung einer Geschichte seiner Entwicklung*, Owen (1960) gives an account of the development of the doctrine of homonymy throughout Aristotle’s works. It is no accident that the most part of the chapters of the miscellany in which Owen’s chapter was published deal with the chronology and the development of Aristotle’s doctrines. Here I shall not deal with the so called “development thesis” and I will take it into account only insofar I am persuaded that, for Aristotle, the homonymy problem was subject to some important reconsiderations.

¹⁰⁶ cf. Owen (1960).

¹⁰⁷ Aristotle states in *Posterior Analytics* that the unity of science can only derive from the fact that its objects fall inside one genus. cf. *An. Post.* I 28, 87a 38 – 87b 4. A similar remark is to be found in the *Eudemian Ethics* concerning both good and being. cf. *EE* I 8, 1217b 25 – 1218a 1.

¹⁰⁸ The so called “analogy of proportion” takes into account two entities *a* and *b* with regard to a property P. The ratio between *a* and P(*a*) is the same as that which is between *b* and P(*b*), regardless of the ratio that exists between *a* and *b*. In this context, the similarity between the soul and the *polis* relates to the property of “being just”.

underlying hypothesis is that justice in the *polis* has to be *of the same kind* as the one contained in the soul, as the model of the small and large letters suggests¹⁰⁹ and as Socrates claims later, in the fourth book.¹¹⁰ The analogy's boundaries are later extended. In the dialogue the applicability of the same predicate "just" to both cases leads up to a comprehensive similarity in general structure.¹¹¹ In virtue of this similarity, psychological characteristics are analyzed on the basis of the model of the *polis* (but Plato uses the analogy in either way).¹¹² All the more so, if the knowledge of the former refers to the knowledge of latter and *vice versa*. In fact, Plato considers Ideas to be primary and fundamental in various ways, not only epistemically but also ontologically.¹¹³

If we recall the account of "good" Aristotle gives in *Topics* I 15, it will be clear that in this case he would think that Plato's account of justice neglects homonymy. Rather Aristotle would assume that justice in the soul and justice in the *polis* have different corresponding definitions of being, even though it is plausible that they do not have the same name by mere chance, and thus that they appear to be connected.¹¹⁴ Although there is a special relation between the definitions of "just" in the different applications, still the definitions of being corresponding to the classes of subject of predication are different. What-it-is for a soul to be just and what-it-is for a *polis* to be just do not coincide. Therefore, in conformity with the beginning of the *Categories*, Aristotle would claim that a soul and a *polis* are called "just" homonymously.

I think the difference with Plato is plain: assuming that justice has a single definition, Plato investigates it in the human soul starting from statements about it in the *polis* (and *vice versa*). Aristotle would rather start the investigation by stating that the applications of "just" refer to things of which the corresponding definitions are different (and this is true even in the case in which the definitions refer to some central use).

Now, what does it mean to say that the definitions corresponding to the different applications of an

¹⁰⁹ cf. *Rep.* II, 368c-e.

¹¹⁰ cf. *Rep.* IV, 435a-c. In fact there is no unanimous agreement among the scholars about whether Socrates' analogy between the city and the soul is intended to be a philosophical or rather a rhetorical move. For instance Rosen (2005) claims that the justice to be found in the city is of the same kind of the one to be found in the soul, with the only quantitative difference that it is "more" in the bigger. cf. Rosen (2005), pp. 70-71. Blössner agrees that Plato puts forward as a hypothesis that justice in the city and justice in the soul are similar. cf. Blössner (2007), p. 347 and pp. 351-352.

¹¹¹ cf. *Rep.* IV, 441c-d.

¹¹² cf. *Rep.* IV 434a-435a.

¹¹³ cf. *Rep.* VIII, 543c-576b. Besides the traditional interpretation of Ideas as ontological principle of reality, there is also a line of interpretation which point out the epistemological role they play. For example, Kosman argues that Platonic Ideas are able to account for human ability to understand the structure of reality because they are primarily principles of organization of our experience. cf. Kosman (2007), p. 136. Berti (1975) claims that the relationship between the Idea and the things which participate in it is both natural and logical (cf. p. 167). Sellars (1962) recognizes as the «Platonic traditional cluster» the philosophical kinship which relies on the «causal influence of the world as intelligible to the individual mind», p. 44 and p. 52, (emphasis added).

¹¹⁴ As Aristotle indeed does in the *Nicomachean Ethics* with regard to two homonymous applications of justice. cf. *EN* V 1, 1129a 25-30.

homonymous word are ordered around a core central use, given that homonymy requires the definitions to be not the same? A line of interpretation which traces back to Owen (1960) argues that the so called core-dependent homonymy (or, as Owen call it, *focal meaning*) has represented for Aristotle the solution to the epistemological problems posed by homonymy itself. The notion of core-dependent homonymy exemplifies the asymmetrical relationship that the many uses of an homonymous word have with a dominant instance. “Healthy” is for Aristotle a standard example: in *Topics*, he claims that “healthy” bears different senses but that all of them refer to the core instance “health”.¹¹⁵ The different uses of a single homonymous word are characterized by a definitional dependency to a core notion, which is present in the definition of every core-dependent use.

Fundamental Homonymous

Homonymy as a feature of many fundamental philosophical concepts (“being”, “life”, “good”, “friendship”, “one”, “body”, “justice” and many others) represented for Aristotle a serious obstacle to be circumvented. In an influential paper, Owen argues that for a time homonymy prevented Aristotle from formulating metaphysics and ethics as unitary sciences.¹¹⁶ In the philosophy of Aristotle, homonymy affects epistemology, insofar as a science requires that its object have some sort of unity (e.g. there can be no science of “bank” as such, since “bank” is a mere homonymous).

Since homonymy requires that the definitions are not the same, they may partially overlap or not overlap at all. Shields, as well as others,¹¹⁷ offers a complete taxonomy of kinds of homonymy, but I shall not recount it here in its entirety. It is sufficient to say that the definitions which do not overlap at all (e.g. “bank”) are merely accidental and hence they are not of great philosophical interest but rather of a dialectic one; whereas when the definitions overlap in some fashion, and namely are

¹¹⁵ «[...] healthy means what produces, preserves or indicates health», *Top.* I 15, 106b 35. Thus a walk, a regimen and a complexion can be predicated of the adjective “healthy”.

¹¹⁶ cf. Owen (1960), pp. 163-190. Quoting the *Posterior Analytics* about the unity of a science – which derives from the unity of the genus to which its objects belong – Berti (1975) argues that *mere* homonymy of “being” and “good” would prevent metaphysics and ethics (cf. *Post. An.* I 28, 87a 38 – 87b 4). Therefore, Berti agrees with Owen the doctrine of *focal meaning* represents for Aristotle the solution to the homonymy problem, being the condition of possibility of metaphysics and of ethics (p. 161; p. 164; p. 166). *Contra* Owen’s developmental reading, Berti brings evidences to show that in the *EE* Aristotle is already aware of the possibility of the *focal meaning* of the “good”. In Berti’s view, Aristotle’s polemical target in *EE* I 8 is one of the traditional Platonic arguments, which was aimed at demonstrating the existence of the Idea from the unity the science inquiring into it (cf. *Metaph.* A 9, 990b 12). Confuting the existence of the science, Aristotle’s aim is to refute the existence of the Ideas. Thus, in *EE* I 8 Aristotle is arguing against the science of good in Plato’s sense (i.e. against the univocity of “good”) and not against *any* science of good; most certainly, not his own. Berti states Aristotle is still not pointing out his own solution, viz. *focal meaning*, for rhetorical reasons (pp. 163-166, spec. p. 166: «In effetti, nell’*Etica Eudemia* egli intende rifiutare l’esistenza dell’idea del bene; non ha quindi nessun interesse a segnalare una unità qualsiasi tra i diversi beni, nemmeno un’unità fondata sul *focal meaning*»).

¹¹⁷ cf. Shields (1999). See also Ward (2008) and Lewis (2004).

ordered around a core notion, then Aristotle thinks they tell us something about the essence of things.¹¹⁸

Let me briefly illustrate the case of “good”. In the *Eudemian Ethics* I 8 Aristotle criticizes the Idea of the good. His lines of attack appeal to the concept of homonymy, for he points out that the applications of “good” have no common element beyond and separable from themselves. Instead, Aristotle states, each thing seeks its own separate good, not being possible to apply one single definition to all of them (eye seeks vision as its good, body seeks health as its own, and so forth).¹¹⁹ There is no general account of good applicable equally to all these senses, i.e. good is not univocal. Therefore there can be no unitary science of it. This amounts to saying that good is homonymous, that is – following the definition given at the beginning of *Categories*¹²⁰ – the definitions of being which correspond to the things to which “good” applies are different and not reducible to a single field of investigation.

In the *Nicomachean Ethics*, Aristotle circumvents this obstacle about the good. Aristotle claim that “good” is homonymous because its applications do not refer to one single account. At the same time, he highlights the non-accidental nature of its homonymy. He points out that the uses of “good” are different but related in virtue of some common nature. That in the *Nicomachean Ethics* Aristotle’s attempt is to solve the problem of homonymy of “good” posed in the *Eudemian Ethics* is also supported by the use of the same example about the sight as good in the body (or of the eye as proper organ).¹²¹

«But if the things we have named are also things good in themselves, the account of the good will have to appear as something identical in all them, as that of whiteness is identical in snow and in white lead. But of honor, wisdom, and pleasure, just in respect of their goodness, the accounts are distinct and diverse. The good, therefore, is not something common answering to one Idea. But then in what way are things called good? They do not seem to be like the things that only chance to have the same name».¹²²

Similarly with regard to “being”, Aristotle states in the *Eudemian Ethics* that the homonymy of being applies both throughout the categories and within the same one. It is stated that homonymy prevents a general sense of “being” over and above its applications, being that these both refer to a substance or to one of the categories.¹²³ In *Metaphysics* A and N he argues the same thesis: the

¹¹⁸ cf. Ward (2008), p. 77.

¹¹⁹ cf. *EE* I 8, 1218a 30.

¹²⁰ cf. *Cat.* I 1, 1a 1-5.

¹²¹ cf. *EN* I 6, 1096b 27-30.

¹²² *EN* I 6, 1096b 20-26.

¹²³ cf. *EE* I 8, 1217b 25-35.

variety in the uses of “being” show that is impossible to investigate them unitarily.¹²⁴

The problem is solved in *Metaphysics* Γ, appealing to the fact that all the senses of being are related to one (*pros hen*).

«Everything which is healthy is related to health, one thing in the sense that it preserves health, another in the sense that it produces it, another in the sense that it is a symptom of health, another because it is capable of it. And that which is medical is relative to the medical art, one thing in the sense that it possesses it, another in the sense that it is naturally adapted to it, another in the sense that it is a function of the medical art. And we shall find other words used similarly to these. So, too, there are many senses in which a thing is said to be, but all refer to one starting-point; some things are said to be because they are substance, others because they are affections of substance, others because they are a process towards substance, or destruction or privations or qualities of substance, or productive or generative of substance, or of things which are relative to substance, or negations of some of these things or of substance itself».¹²⁵

Aristotle thinks that “good”, as well as “being”, are predicated of entities which have different definitions and, even though he suggests they are connected around a central notion, they must be controlled, both for dialectic and metaphysical reasons.

III. Things and Words

Does Aristotle think that homonymy concerns the meanings of the words or rather the objects designated by those words? Thus the question is raised whether inquiring about homonymy is either of linguistic or ontological interest.

As I see it, given that according to Aristotle things and words are related in an important way, surely homonymy concerns both. The proper formulation for Aristotle’s philosophical concern has to take into account both of them. As Aristotle asserts in *Topics*, investigating homonymy is valuable not only for detecting differences in the meanings of terms but also to construe the correct definitions of the things inquired.¹²⁶ Thus the question is more usefully formulated by pointing out at a *priority* of things to words, rather than at a sharp alternative between the two.¹²⁷ That is, the question appears to be whether homonymy is *primarily* a semantic or rather a non-semantic concept. There are

¹²⁴ cf. *Metaph.* A 992b 18-24; *Metaph.* N, 1089a 6 – 1089b 33. Not arguable here, but in 1089a 6-31 Aristotle discusses the thesis that not only “being”, but also “non-being” has as many senses as the categories.

¹²⁵ *Met.* Γ 2, 1003a 35 – 1003b 10.

¹²⁶ cf. *Top.* I 15, 106a 2-4.

¹²⁷ I think J.L. Austin argues for the same interpretation of Aristotle’s overall view. In a paper about the ethics of Aristotle, Austin argues that two problems about good life are faced, the first being the analysis of its meaning and the second being its specification, that is, what good life consists in concretely. If we take the first problem to be, *latu sensu*, about words, the second is about things. Austin concludes that, if in the domain of ethics we may investigate «(1) What does the word “good” mean? or (2) What things are good, and in what degrees?», Aristotle concerns himself with the second only. cf. Austin (1979).

influential scholars supporting each side of this controversy.¹²⁸

On one hand, Aristotle surely wants to pay attention to meanings. If differences in meaning are not identified as such, they lead to fallacies, which would in turn prevent sound reasoning and knowledge or would lead to oversimplification of the phenomenon.¹²⁹ Recognizing homonymy is fundamental in order to produce genuine arguments and give a consistent account of concepts.¹³⁰

On the other hand, investigating homonymy we find words that do not necessarily refer to a unique ontological referent and therefore can signify more than one thing.

*Aristotle's conviction regarding homonymy is that it is impossible to read the structure of the ontology out from the structure of language.*¹³¹

Aristotle states that “definition” is a metaphysical notion, which relies on the essential function of the thing to be defined. The only correct definition of F is the one that says what-it-is-to-be F. Yet Aristotle admits the existence of different definitions, which express common beliefs about F.¹³² From a metaphysical point of view these definitions are not correct, because they do not express the essence of F; nevertheless they express what is known “to us”.¹³³ For Aristotle is clear that natural language does not systematically reveal metaphysics. Thus it is common that we call entity *a* and entity *b* with the same name, although they do not share the same essence. Aristotle suggests a “naturalistic” explanation of why it is so at the beginning of *Sophistical Refutations*: since the names are finite, whereas things are infinite in number, a one-to-one correspondence is impossible. So, inevitably, some single terms will turn out to signify more than one thing.¹³⁴

I hope to show that if we take seriously the relationship between essence, correct definition and homonymy, I think it is clear that Aristotle's treatment of homonymy is primarily aimed to solve non-linguistic, metaphysical puzzles.

¹²⁸ For the “linguistic” side of the debate cf. Owen (1960); Leszl (1970); Hamlyn (1977-8); Ward (2008); for the “ontological” side cf. Ackrill (1963); Irwin (1981); Charlton (1970).

¹²⁹ Aristotle emphasizes the danger embedded in homonymy by means of what I would classify as a thought experiment. He argues that if homonymy were over-expanded so that every word would have an infinite number of meanings, then it would be impossible not only to communicate each other, but even to think in the private dimension of our own minds. cf. *Metaph.* Γ 4, 1006b 5-11.

¹³⁰ This is what one of the fallacies Aristotle points out in the *Sophistical Refutations* is about. In *Soph. El.* 8, 170a 12-15 Aristotle claims the following: «For unless that which depends upon homonymy assumes that the term has a single meaning [...] there will be neither refutations nor deductions». This reading is strengthened if we look at *Soph. El.* 33, 182b 13-32, where Aristotle explicitly states the existence of «fallacies that depend on homonymy». Quoting *Top.* I 18, 108a 27-31, Ward labels resisting fallacies as a «negative function» of homonymy testing. cf. Ward (2008), p. 71.

¹³¹ In conversation, Victor Caston highlighted this general conclusion about Aristotle's treatment of homonymy.

¹³² *Top.* 141b 4-19.

¹³³ cf. *Metaph.* Γ 7, 1012a 22-4; 1045a 26. See also cf. Irwin (1982), p. 250-251.

¹³⁴ cf. *Soph. El.* 1, 165a 5-14.

The Debate

Those who hold that homonymy is about meaning, maintain that inquiry is conducted on the basis of Aristotle's view about language. When Aristotle asks the question "What is F?", he is looking for the meaning of F. Inquiry about homonymy would be aimed to clarify the senses of a word. Given an homonymous word F, Aristotle wants to clarify the concepts associated with F: the recognition of homonymy in the different usages of F points out the set of meanings of the word. Systematic inquiry would be able to discover also the different relationships in which the meanings stand with one another: they may be not related at all, or be related in some way. In the special case of core-dependent homonymy, they are systematically connected around a central meaning.¹³⁵

I think that the "*linguistic*" position about homonymy is only partially valid because it underestimates the ontological commitment embedded in Aristotle's treatment of homonymy.

I agree instead with those who argue that homonymy is about things, since they hold that it marks a *difference in the essences of the things denoted by the homonymous term in question*.

As already hinted, essence is a metaphysical notion which establishes what-it-is-to-be something. Essences are linguistically expressed in corresponding correct definitions. According to Aristotle, a correct definition expresses the essence of the word it defines;¹³⁶ so, for instance, the definition of man is a "biped rational animal". Aristotle thinks that a name can be replaced by its definition while preserving the same truth value in the surrounding sentence:¹³⁷ this implies that a name and its correspondent definition *signify* the same.

In a brilliant paper, Irwin argues that names, as well as definitions, signify essences, and not meanings.

«Names signify essences and essences are not meanings, but belong to non-linguistic reality; Aristotle thinks they are features of the world, though not separate from particulars».¹³⁸

Given that according to Aristotle a thing has only one essence, and that essence is expressed in correct definition, it follows that a thing has only one correct definition. In a natural language some words signify more than one thing; that is, things that do not share the same essence: indeed homonymy marks a lack of overlap in the definitions corresponding to the things a word signifies. When Aristotle says that word F is homonymous, he is claiming that F is applied to many essences; or, what amounts the same thing, that things with different essences are nonetheless named with the

¹³⁵ cf. Owen (1960).

¹³⁶ cf. *Top.* 101b 38.

¹³⁷ cf. *Top.* 106a 1-4.

¹³⁸ cf. Irwin (1982), p. 246.

same word F.

It is worth noting that Aristotelian essence denotes a set of real properties predicable of individual entities. This set of essential properties is metaphysically summarized in the notion of function. In virtue of this relationship with reality a word can carry meaning and, if it is shared between two or more speakers, it allows communication to take place.

Hence, inquiring homonymy, Aristotle has first of all an ontological concern. Nevertheless, what I have called the “linguistic side” of the debate is right insofar as it would not be correct to state that Aristotle is not interested at all in meanings. Yet if words refer to something, then their meanings have to be connected to things’ essences, viz. to things’ definitions.

I believe therefore that semantic and ontological levels are to be distinguished but strictly interconnected. But which is the nature of their relationship?

Essence and Meaning

In what follows I will argue that the *meaning* of a word “to us” need not coincide with the *essence* of the thing which the word refers to.

As we conceive it, the meanings of a word are up to speakers. The same does not hold for essences. Homonymy points out exactly this aspect of Aristotelian semantics. To say that a word x has n different meanings is taking it to have n different ontological referents, whose definitions do not (totally) overlap. In a community of competent speakers the *meanings* of a word coincide with its common usages. But, given that according to Aristotle the correct definition of a thing picks up its essence, it is perfectly possible that the word’s meaning and the thing’s definition differ. Aristotle’s treatment of homonymy suggests that he considers it to be a fundamental philosophical tool in many domains. It would be unclear how the mapping of words’ different meanings would be supposed to help by itself to reach sound philosophical conclusions, beyond the apparent one that a single word can be applied to different things and used in different contexts.

Insofar as Aristotle’s treatment of homonymy has a metaphysical scope, it is aimed to distinguish differences in definitions, that is, differences in essences of things named with the same word.

Furthermore, Aristotle is committed to the thesis that one thing has just one essence and, consequently, one definition whereas this one-to-one correspondence does not hold for words and meanings.¹³⁹ On the contrary, investigating homonymy is philosophically worthy exactly because

¹³⁹ cf. *Top.* VI 4, 141a 35 - 141b 2; cf. Charles (2000), pp. 251-255.

this correspondence lacks in meanings involved in common language.

Traditionally, we can adopt either (a) an internalist or (b) externalist position about the nature of meaning. I argue that, no matter which one we choose, the meaning of a word does not coincide with the essence of the corresponding thing.

(a) Internalism

It is quite easy to argue in favor of my perspective if we are to adopt an internalist view. Roughly, we are accepting an internalist position about meaning if we take meaning to be a content of thought. In this framework, meaning supervenes on properties “in the head” of the competent speaker, which grasp them by learning the word. On the internalist view, all we need in order to communicate is to share our contents of thought with our interlocutor, regardless of the nature of the relationship between the contents of thought and the essence of things they refer to. An internalist view especially makes sense of conventionality in language. If I think that cars are called “cat” and everyone I speak with has the same belief, then there will be no communication problem when I ask someone if his cat is parked in the parking lot. Yet given that according to Aristotle the concept of definition is bound to the essence of the corresponding thing, it differs from meaning, which is bound to mental states.

From Aristotle’s point of view, there is another argument to offer against the identification of essence and “internalist meaning”. Aristotle regards the common beliefs about a subject (*endoxa*) to be worthy of epistemological consideration.¹⁴⁰ Therefore the ordinary usages of words are surely worthy preliminary data for the philosophical reconstruction of true beliefs. Yet Aristotle is convinced that many competent speakers do not fully grasp the true essence of the thing signified by the words they use.¹⁴¹ There is no systematic coherence between the ordinary use of language and metaphysics. I think Owen is right when he argues that *phainomena* – which «must be collected as a prelude to finding the theory which explains them»¹⁴² – are for Aristotle a twofold concept,

¹⁴⁰ Berti (2009) argues that *endoxa* are reputable *dokouta*, which in turn are a subclass of *legomena*, belonging to the class of non-perceptual *phainomena*. Criticizing Owen (1975), Berti shares Cooper’s (1988) criticisms to Nussbaum’s (1986) interpretation: in the attempt to present Aristotle as an internal realist, in Putnam’s sense, she translates and interprets *endoxa* as «the beliefs we hold». Yet, Cooper objects, the Greek expression has no reference to *us* in it (p. 549). Berti argues that *endoxa* have an epistemological priority to *phainomena* not because they show «the conceptual structure revealed by language» – as Owen (1975) and Nussbaum (1986) suggest – but instead because, according to Aristotle, an *endoxon* is *eikos* (*Rhet.* I 1, 1355a 14-18; I 2, 1356b 16-18; 1357a 34). Thus Berti applies the definition of *eikos* to *endoxon* (cf. *An. Post.* II 27, 70a 2-6) and concludes claiming that it is because *endoxa* are true “for the most part” (*hos epi to polu*) that they can constitute the premisses for dialectical and rhetorical syllogisms. Hence *endoxa* are “reputable opinions” (held in esteem or honor, of high repute) about what usually happens for the most part; therefore they play a cognitive and epistemological role.

¹⁴¹ cf. Owen (1961), p. 117.

¹⁴² *Ivi*, p. 113.

including both perceptual phenomenon and *endoxa*. It is to say that the starting point of Aristotle's inquiries includes also what people commonly think about a subject. Aristotle considers that the same word or expression can have many different senses. But, as it seems to me, it is not correct to state *endoxa* as having the same epistemological value as data of perception.¹⁴³ Instead Aristotle thinks that, in order to produce a satisfactory theory, able to state the essence of a subject, the characteristics which are commonly believed to belong essentially to something need to be conceptually investigated and scientifically completed.¹⁴⁴ The meanings ordinarily assigned to a word may not coincide with the essence of the thing the word refers to.

So far I have used "meaning" as it were what the speaker implicitly grasps. Nevertheless, I agree with Irwin when he argues that this is true only if we conceive it to be the meaning "for us"; whereas the meaning of a word "by nature" is the essence of the thing the word refers to, regardless of the subject's beliefs.¹⁴⁵ *It follows that Aristotle contrasts the mental states of a speaker and the natural meaning of the word she utters.*

It might be objected that, even if a word's natural meaning is a reference's essence, it is still a task of conceptual analysis to work it out. But, as I hope to show in what follows, according to Aristotle essence is not only a conceptual puzzle, although dialectic is fundamental to check the conceptual consistency of the principles of inquiries.¹⁴⁶ Rather, the essences signified by the word are a set of real properties, whether or not the mental states of the subject correspond to the appropriate knowledge of it.¹⁴⁷

¹⁴³ cf. Berti (2001-2002), *Il valore epistemologico degli endoxa secondo Aristotle*, in AA.VV., *Dialectica y Ontologia. Coloquio Internacional sobre Aristoteles*, «Seminarios de Filosofia», 14-15 (2001-2002), pp. 111-128 republished in Berti (2004), *Nuovi Studi Aristotelici*, Morcelliana, vol. 1.

¹⁴⁴ cf. *Phys.* IV 4, 210b 32 – 211a 12: «Let us take for granted about it [place] the various characteristics which are supposed correctly to belong to it essentially. [...] Having laid this foundations, we must *complete* the theory. We ought to try to conduct our inquiry into what place is in such a way as not only to solve the difficulties connected with it, but also to *show that the attributes supposed to belong to it do really belong to it*, and further to make clear the cause of the trouble and of the difficulties about it. In that way, each point will be proved in the most satisfactory manner». That *endoxa* have to be conceptually controlled is stated also in *Top.* I 2, 101a 36- 101b 4.

¹⁴⁵ cf. Irwin (1982).

¹⁴⁶ I rely on the passage of (*Top.* I 2, 101b 1-4): «It is through reputable opinions about them [the principles of sciences] that these have to be discussed, and this task belongs properly, or most appropriately, to dialect; for dialectic is a process of criticism wherein the path to the principle of all inquiries». Austin is of the same opinion, since he states that, according to Aristotle, the knowledge of the meaning of words is considerable chiefly for dialectic purposes. cf. Austin (1979), p. 22.

¹⁴⁷ As Irwin puts it: «He [Aristotle] does not think that what someone signifies is what he means; the speaker signifies what the word he uses signifies». And later in the paper: «Our actual beliefs determine what a word signifies to us, but only our reconstructed true beliefs determine what it really signifies». cf. Irwin (1982), p. 253 and p. 256.

(b) Externalism

We might adopt an externalist view about meaning. If we take meaning to derive from some feature external to the subject, we are adopting externalism. Indeed semantic externalism states that the meaning of the words depend on external factors. This position may appear to bring the notion of meaning closer to the one of definition: unlike internalism, in this case both meaning and definition depend somehow on the nature of the thing. But they still differ. Meaning depends on “relevant” factors, which can be causal, historical, social, or even chemical;¹⁴⁸ these factors are external to the subject and internal to the thing, but this feature is all they share with the thing’s essence. Instead definition picks out the thing’s substantial function, that in Aristotle’s view is a precise metaphysical notion. Being “internal” to the thing is not enough to be an Aristotelian essence. Even if we adopted a stronger externalist view, and state that meaning derives from the *intrinsic nature* of the external objects, this would not coincide with Aristotelian essence, which draws from notions of substantial form and essential function.¹⁴⁹

To sum up, Aristotle does not hold neither an internalist nor an externalist view about meaning. Instead, it seems correct to distinguish sharply our notion of meaning and Aristotle’s notion of essence. He in fact takes *words to signify essences*, that is, non-linguistic entities. It follows that by investigating homonymy his metaphysical concern is prior over his linguistic one. When Aristotle is attentive to the different uses of the same word he is concerned with the different essences signified by that word.

Essence, Definition and Function

So far I have argued in favor of contrasting words’ meaning “to us” and things’ essence. Now I would like to focus on the latter and offer a clearer account of it.

On the view I am defending, the mistake of those who argue that homonymy is about meaning is that they fail to highlight the metaphysical relationship between definition and function. Instead, I claim Aristotle’s concerns comes from the philosophical issue about what-it-is-to-be a certain thing and how this essence can be expressed in a correct definition. As I have stressed, *meanings may not coincide with thing’s respective essences: Aristotle’s point is rather that definitions do*. In fact,

¹⁴⁸ I hint here at the two champions of semantic externalism: Kripke with *Naming and Necessity* and Putnam in *The Meaning of Meaning*.

¹⁴⁹ I think this “strong externalist” view is the position of Hilary Putnam, when he introduces to the thought experiment of Twin Earth. His aim is to show that semantics varies depending on the physical environment in which the words are uttered, even in the case in which the subject’s mental states are *ex hypothesis* the same. In order to state this argument, Putnam appeals to the physical-chemical structure of the object (namely, H₂O for the water on Earth and XYZ for the liquid on Twin Earth). My point is that object’s «deep structure» does not coincide with essence in the Aristotelian sense. cf. Putnam (1975).

investigating the notion of definition in *Topics* he states:

«A definition is a phrase signifying a thing's essence».¹⁵⁰

And similarly in *Metaphysics*:

«Clearly, then, definition is the formula of the essence».¹⁵¹

Aristotle states the relationship between definition, function and essence in the *Metereologica*. I shall deal with this issue at some length in what follows, but it is worthy to introduce it here. In a passage of the *Metereologica* Aristotle is particularly explicit: while the *matter* of all sensible bodies is made up of the four elements, *their form and essence is determined by their function, which is expressed in their definition*. This is true both for artefacts and for living bodies, since both are compounds of matter and form.

It is no accident that in this context Aristotle takes into account the application of homonymy to the dead body. The essence is determined by function, thus the corpse is called a “body” without sharing its essence anymore: as a matter of fact, it has lost its substantial form, that is, the power to perform its natural functions which defined it, as long as it was one.

«All the homogeneous bodies consist of the elements described, as matter, but their essence is determined by their definition. This fact is always clearer in the case of later products, of those, in fact, that are instruments, as it were, and have an end: it is clearer, for instance, that a dead man is a man only in name. And so the hand of a dead man, too, will in the same way be a hand in name only, just as stone flutes might still be called flutes».¹⁵²

A dead man, as well as a stone flute, are called “man” and “flute” but, insofar as they are not able to perform the relevant functions of a living man and a functioning musical instrument, they do not share the same essence. That is the reason why Aristotle claims that they are “man” and “flute” only in name.

My aim is not to deny that Aristotle has no concern about the meanings of words at all. If we take the common usages of a word by competent speakers to establish word's different meanings, then it is correct to state that meanings are Aristotle's starting point. Irwin appeals to the Aristotelian distinction between what is “by nature” and what is “to us”: in some cases, it may be necessary to start the inquiry mentioning what is known to us, in order to get to what something is by nature.¹⁵³ As already stressed, the common meanings of the word we are investigating are a useful starting

¹⁵⁰ *Top.* I 5, 101b 38.

¹⁵¹ *Metaph.* Z 5, 1031a 12.

¹⁵² *Meteor.* IV 12, 389b 29 - 390a1.

¹⁵³ cf. Irwin (1982), p. 248.

point.¹⁵⁴ Consequentially, it is not completely incorrect to say that Aristotle is concerned about the meaning of “man”, since it can signify both a living rational animal and the corpse of it.

Yet, homonymy marks a difference in the definitions corresponding to things which have the name in common.¹⁵⁵ The definition of F signifies the essence of F,¹⁵⁶ and the essence of F is a set of properties shared by things in the world. Therefore, inquiring homonymy, definition and function are Aristotle’s metaphysical goals.¹⁵⁷

Universals

So far I have defended the view contrasting meaning and definition. The universals may be a piece of evidence contrary to the view I have defended so far, since Aristotle claims that, as regards universals, meaning does overlap with definition. In *Metaphysics* Γ Aristotle considers the example of the universal “man”:

«Again, if “man” has one meaning, let this be “two-footed animal”; by having one meaning I understand this: if such and such is a man, then if anything is a man, that will be what-being-a-man-is».¹⁵⁸

Thus for universals meaning overlaps with definition. A difficulty may arise, since I have offered arguments to show that the Aristotle’s notion of definition is not reducible to our contemporary options about the nature of meaning. I have appealed on one hand to I what I would call a normal “metaphysical inaccuracy” of natural languages and, on the other hand, to the metaphysical relationship between essence, definition and function. Is there an inconsistency?

I think not. It is possible to make good sense of this passage highlighting that (i) universals are under no circumstances concrete entities and (ii) Aristotle contrasts two aspects of meaning, namely the mental state of a speaker (meaning “to us”) and essence (meaning “by nature”), so that is not necessary that the speaker knows the true meaning of the words he is uttering or thinking.

(i) As well known, according to Aristotle universals have no separate existence: instead, they are always to be found instantiated in a substratum,¹⁵⁹ a particular compound of matter and form, of

¹⁵⁴ cf. Owen (1961). As an example of Aristotle’s use of *endoxa* see *EN* VII 1, 1145b 14-21.

¹⁵⁵ *Cat.* I 1, 1a1.

¹⁵⁶ *Top.* I 5, 101b 38.

¹⁵⁷ Reviewing David Charles’ book, Politis (2005) correctly claims: «By the essence of a thing Charles means what it is to be that very thing, and the essence of a thing is something that can be stated in the correct definition of that thing. This concept of the essence of things, and the associated concept of real definition, must be distinguished from the concept of the meaning of words and the associated concept of nominal definition». cf. Politis (2005).

¹⁵⁸ *Metaph.* Γ 4, 1006a 30-33.

¹⁵⁹ cf. *Metaph.* Z 8, 1033b 20 ff.

which they are predicated.

It follows that universals, far from being self-subsistent entities, are rather logical entities, even though they are built up from a set of concrete properties instantiated in material beings. What-it-is-to-be a universal overlaps with its definition because universals do not have as such a concrete existence. The logical nature of universals is the reason why two particular subjects, even though they are different, can share the same form (e.g. man) being nevertheless distinct.

According to Aristotle to be «the same in form» is to share the same universal, that is, to have the same set of properties. Callias and Socrates indeed «are different in virtue of their matter (for that is different), but the same in form».¹⁶⁰ Consistently with this account, Aristotle defines a universal as something «which is by nature predicated of a number of things, and particular that which is not; man, for instance, is a universal, Callias a particular».¹⁶¹ Essences are universals, essential to all the individuals falling under a certain species or genus.¹⁶² For an individual to belong to a genus is to share the essential function, that is the «essence, pure definition».¹⁶³ Essence as universal is the kind's essential form shared by the individuals belonging to that kind. As Lewis puts it, Aristotle «explains the content of the kind to which a given material substance belongs in terms of the content of its constitutive form».¹⁶⁴ With regard to universals, then, meaning overlaps with definition. This is so because universals *are* definitions.

(ii) Furthermore, as I have already stressed, according to Aristotle the meaning “by nature” of a word does not depend on the meaning “to us”. That is, the true meaning of a word does not depend on speaker's knowledge. Aristotle thinks that when we say “man” we pointing at the universal – that is the universal predicable of all those particulars which share that substantial form – and that regardless of our knowledge of the universal itself.

Thus it is possible to make good sense of the fact that as regards universals meaning coincide with definition underlining that, regardless of speaker's mental states, universals are definitions predicable of all the particulars which share the same essence.

Therefore there is no contradiction in the claim I have defended: meaning, as we conceive it, does not overlap with definition, which is a metaphysical notion linked with those of essence and function.

When Aristotle states that two entities are called F homonymously if they have the name F in common but different definitions correspond to the two applications of the name, he is not

¹⁶⁰ *Metaph.* Z 8, 1034a 6.

¹⁶¹ *De Int.* 7, 17a 36.

¹⁶² cf. *Metaph.* Z 17; H 2.

¹⁶³ *Meteor.* IV 12, 390a 6.

¹⁶⁴ Lewis (2004), p. 26.

concerned about differences in word's meaning; instead, he is stating that homonymy pertains to differences in definition, that is, differences in essence of things which have the name in common.

IV. Conclusions

Aristotle regards homonymy as a relations between entities which are referred to by the same word but do not share the same definition. Besides a dialectical interest, homonymy is an important philosophical tool used by Aristotle in order to overcome Plato's theory of Forms and elaborate fundamental notions in both metaphysics and ethics, such as "being" and "good". In Aristotle's view, definition is a metaphysical notion, the what-it-it-to-be for the thing, and it is set out by the essence and function of the thing to be defined. Aristotle's account of "definition" is not reducible to our contemporary account of "meaning", regardless of which contemporary position (either internalist or externalist) we adopt as regards the nature of meaning. Accordingly, since homonymy concerns entities which do not share the same (metaphysical) definition, it marks a difference in essences and functions of things referred to by the same homonymous word. While a synonymous word is applied to things which do share the same essence, an homonymous word is applied to things which do not share the same essence.

B) Homonymy of the Body

Murì, murì!
Morte le man
morti gli ogi
morta la boca
morti i cavei
ohi!, che m'han tradita.

Madonna sotto la Croce
Dario Fo, Franca Rame, *Mistero Buffo*¹⁶⁵

Introduction

Aristotle claims that a dead body is not a “body” anymore. I shall devote this part of the chapter to illustrate the problems such a claim rises, the most remarkable of which is the conflict of homonymy with hylomorphism, that is, the Aristotelian doctrine about the nature of substances.

Once a conflict between two doctrines of the same thinker is recognized, the most obvious solution might appear to drop one of them. Dropping the homonymy principle, at least with regard to dead bodies, is the solution that Ackrill suggested.¹⁶⁶ Another might be to disown hylomorphism, and that has been more recently put forward by Loewe.¹⁶⁷ I hope to show not only that there is no conflict between hylomorphism and homonymy but rather that they entail each other. If hylomorphism is properly and completely conceived, it entails homonymy as a corollary. Therefore dropping one of them would be a mistake.

Let me sketch the problem. First of all, it is certain that Aristotle regards the corpse as a case of homonymy.¹⁶⁸ He repeatedly states that the corpse is analogous to painted or sculpted bodies, which are called “bodies” and yet are called so only homonymously. As I have recalled in the previous chapter, by homonymy Aristotle means that two or more things have the name in common, while the definitions which correspond to each of them is different.¹⁶⁹ Accordingly, claiming that the

¹⁶⁵ The theatrical piece *Madonna sotto la croce* (Madonna under the Cross) is performed by Franca Rame in the context of *Mistero Buffo*, by the Literature Nobel Prize Dario Fo (1969). It is presented as a piece of popular theatre well-known in the medieval oral tradition of Northern Italy. I could not find any published transcription of the piece. The English translation of the extract is: «He died, he died! / Dead are the hands / Dead are the eyes / dead is the mouth / dead is the hair / alas!, which betrayed me».

¹⁶⁶ cf. Ackrill (1972-1973), p. 127.

¹⁶⁷ cf. Loewe (1998)

¹⁶⁸ For some relevant passages in which Aristotle contrasts manifest structure and *eidos* or function cf. *Meteor.* 389b 31 – 390a 4; *DA* II 1, 412b 20; *PA* I 1, 640b 30 – 641a 20; *GA* 734b 25-27; *Metaph.* Z 10, 1035b 23; *Pol.* 1253a 20-25.

¹⁶⁹ cf. *Cat.* I 1, 1a 1-5.

living body and the corpse are called “body” only homonymously implies that they do not share the same (metaphysical) *definition*. This holds for body as a whole as well as for bodily parts. According to Aristotle, we use to fail to linguistically recognize the proper metaphysical difference between a body and a corpse but, through philosophical analysis of forms and essences expressed in definitions, we are able to draw such a distinction.

Aristotle’s typical argument to show that a body and a corpse do not share the same definition runs as follows: a body is defined by the functions it can perform. Yet a corpse cannot perform any relevant function. Therefore the corpse cannot be defined as a “body”. For the same reason, the dead bodily parts cannot be defined in the same way they were when they were part of a living whole. Among other passages, Aristotle points it out in *Politics*:

«[...] for example, if the whole body is destroyed there will be no foot or hand, except homonymously, as we might speak of a stone hand [...] Things are defined by their function and power; and we ought not to say that they are the same when they no longer have their proper quality, but only that they are homonymous».¹⁷⁰

Thus Aristotle regards the corpse called “body” as a sound case of homonymy. Many scholars have argued that this view conflicts with hylomorphism, the Aristotelian thesis according to which every entity, both natural and artificial, is a compound of matter and form, where matter is the element potentially able to acquire the form, and the form is the actuality of matter. Why does homonymy conflict with hylomorphism? Because the standard criticism against the homonymy principle concerns precisely the matter-form distinction. It seems intuitive to say that the corpse is (or at least was) the matter of a living body. Yet Aristotle’s statement about the homonymy of the corpse seems to entail that the corpse has nothing in common with a body. How can we justify Aristotle’s claim that the corpse is “body” only homonymously?

My main task in this chapter is to show that the homonymy of the body is consistent with Aristotle’s hylomorphic conception of form as defining function of a compound.

As I have already hinted, the homonymy of the body is strengthened by Aristotle’s customary parallel between the corpse and painted or sculpted bodies. If we were to ask what a statue representing Callias has in common with the concrete living Callias, we would be right to point out a mere *resemblance*: what they have in common is an external structure such that we are able to recognize one as the statue of a man.¹⁷¹ It is plain that it ought be maintained that the resemblance is

¹⁷⁰ *Pol.* I 2, 20-25.

¹⁷¹ For my purposes it does not really matter whether the man whose the statue is a copy of is recognizable as the model for it. For being man homonymously it is sufficient that the statue may be predicable of the universal “man”, e.g. “The statue is a man”. Thus it is enough that the statue displays a configuration such that it is (recognizable as) the statue of a man. However, for the sake of argument, let us suppose that the statue is produced in a 1:1 scale with Callias’ body and that the accuracy is as great as possible. The piece of art of

merely an *extrinsic* one. For instance, the statue and Callias do not share any modal property: Callias will certainly have to die one day but his statue will not; the statue might shatter but Callias cannot, and so forth. It might be objected that it is possible to produce a statue which shares some properties with Callias, such that they come to share some modal properties¹⁷² and, nonetheless, it is obvious that Callias and the statue can share only a few properties but not all and, moreover, only accidental ones. This remark might be equally formulated pointing out that Callias and his statue do not share the same essence.

Thus when Aristotle maintains that a living body has the same relation with its corpse and with sculpted or painted bodies, he is emphasizing that the body has nothing essential in common with the corpse. Artistic representations, as well as corpses, entertain a relation with the living body, such that it involves the sharing of only accidental properties, such as extrinsic configuration.

Claiming that the resemblance relationship establishes nothing “relevant”, I am not willing to refute the view assigning some philosophical importance to the relation subsisting between two similar entities.¹⁷³ Thus the question evidently turns out to be what I consider “relevant” in the present context and I have shown the reasons why, considering homonymy, what is “relevant” are forms, essences and definitions. And identifying *a mere resemblance relationship entails that the substances do not share the form and essence nor, consequently, the definition*. Indeed Aristotle considers homonymy a relation which does not involve sharing any essential property.

According to the *Categories*, homonymy is established when two entities share the name but not the definition, even allowing (or, at least in some cases, requiring) the sharing of some other inessential properties, like configuration is. Certainly we can identify some standard reasons why an object which does not share genuine *x-s'* essence is nevertheless called *x* and, arguably, a resemblance in *configuration* is one of these reasons.

Thus form (*eidos*) and configuration (*skema*) are contrasted. Aristotle explicitly sets the contrast with regard to living body and corpse. Criticizing Democritus, he claims that configuration is not a sufficient condition for the embodiment of an *eidos*.

Madame Tussaud's Wax Museum in London are probably a good way to think the resemblance relationship I am dealing with.

¹⁷² For instance, it is easily conceivable that the statue is produced in a way such that it has exactly Callias' weight, so that in a free fall they will be characterized by the same gravity acceleration.

¹⁷³ Saying that the body has nothing relevant in common with the corpse, as well as with statues and drawings, I do not wish to claim that a resemblance relationship has no philosophical value at all. Resemblance is a two-places relationship which at least exhibits: (1) reflexivity, since for any given *x*, *x* bears the resemblance relation to itself (*xRx*); (2) symmetry, since for all *x* and *y* such that *xRy*, then *yRx*. Even if a priority of some kind may be ascribed to one element over the other – as in the case of a man and his artistic representation – some kind of resemblance relation must be valid in either direction. Finally resemblance exhibits (3) transitivity, since for all *x*, *y* and *z* such that (*xRy* & *yRz*), then *xRz*.

«Does, then, configuration and color constitute the essence of the various animals and of their several parts? For if so, what Democritus says will be correct. For such appears to have been his notion. At any rate he says that it is evident to every one what form it is that makes the man, seeing that he is recognizable by its shape and color. And yet a dead body has exactly the same configuration (skema) as a living one; but for all that is not a man».¹⁷⁴

This understanding is strengthened once we consider that, on the contrary, sharing the same form (*eidos*) does involve sharing all the essential properties. It is the case of co-specific individuals, which embody the same *eidos* and hence share the same essence. Socrates and Callias can be truly predicated of the *eidos* “man” because they share the same species form and hence share the same essence.¹⁷⁵

Aristotle stresses this contrast arguing that the form and essence is what-it-is-to-be for a compound. As regards living beings the what-it-is-to-be is the *psuche*, and hence the animal is, or exists, as long as it is *empsychon*. Once the living body ceases to perform its defining functions, according to Aristotle the animal – as well as its body and its bodily parts – ceases to exist. On this ground, what a corpse and a depiction have in common is that they share no essential property with the living body *and* that they are characterized by an extrinsic resemblance with its configuration.

«If now the form of the living being is the soul, or part of the soul, or something that without the soul cannot exist; as would seem to be the case, seeing at any rate that when the soul departs, what it is left is no longer an animal, and that none of the parts remain what they were before, excepting in mere configuration, like the animals that in the fable are turned into stone».¹⁷⁶

At this point it is worth pointing out that Aristotle would have valid reasons to claim that a bronze sphere and a bronze statue do share a relevant element, namely proximate matter. Similarly, a bronze sphere and a wood one share a relevant element, namely form.¹⁷⁷ Consequently, given that we are to argue that *nothing relevant* is shared between a body and its corpse, we are committed to state that this applies both to (i) form and to (ii) proximate matter.

(i) Let me first focus on the question of form. Claiming that the body and the corpse do not share anything relevant (like the body and the statue do not), Aristotle explicitly states that the corpse has

¹⁷⁴ *PA I 1*, 640b 30-35.

¹⁷⁵ cf. *Metaph. Z 8*, 1034a 5-8. In the passage Aristotle claims that co-specific individuals (i.e. members of the same *infima specie*) share the same form and thus can be distinguished only by means of their matter. In *Metaphysics Λ 5* he points out that the form is specifically the same but numerically not the same, triggering a debate among the scholars about the existence of individual forms. See Lloyd (1970); Charlton (1973); Furth (1978); Whiting (1986); Shields (1990); Woods (1993). However, as regards the issue of homonymy, it is not directly relevant whether Aristotle allow or denies the existence of individual forms, since it is sufficient that the *eidos* of individuals, either individual in itself or universal, has the same definition of being. Anyway I am sympathetic with Woods (1993). See note 108.

¹⁷⁶ *PA I 1*, 641a 18-22.

¹⁷⁷ cf. *Metaph. I 9*, 1058b 13-15.

not longer the same *form* of the body. Once we accept the Aristotelian notion of form as function, the argument is quite unproblematic and would run like this. Forms are shapes or structures providing the ability to perform some characteristic activities to the compound they inform. Aristotelian forms are thought of in terms of essential functions, insofar as they enable such abilities and define the essence of the compound as a whole. Since it is a matter of fact that the body and the corpse do not share the ability to perform the same functions, they do not share the same form nor the same essence.

(ii) More surprising is that Aristotle denies that the body and the corpse have the same *proximate matter*. Limbs, organs and bits of flesh do not survive the end of the *psuche*. Accordingly, bodies – and not only souls – cease to exist in the very instant of death.

So the body and the corpse share neither the form nor the proximate matter. Having established this, we can now turn to explore some consequences of this account. One is its impact on our pre-reflexive beliefs about life and death. Another is that the consistency of Aristotle's account itself is endangered.

I. Unwelcome Consequences of the Homonymy Principle

The first unpalatable consequence of this account is that it conflicts with our intuitive view that the corpse *is* a body (even though a dead one). The challenging view is that the body of someone who is dead simply does not exist anymore. Indeed, according to the homonymy principle, the matter of a living body ceases to exist after the death of the organism. We could imagine to close in a box an animal during its death throes: what we are going to find in the box once it is dead, according to Aristotle, is not the animal, nor its body. Aristotle deems that there is no relevant relation between the matter of the corpse and the individual body to which – we would intuitively say – it used to belong.¹⁷⁸ Hence the first problem appears to be that the application of the homonymy principle to living bodies prompts a conflict with some of our intuitions about death and life.

The second unwelcome consequence regards the metaphysical structure of Aristotle's philosophy. What Aristotle claims about the living body in *De Anima* is said to conflict with his conception of matter, as explained especially in *Physics* I 7-9. In this latter work, he introduces matter as the element which is not yet the final product and, at the same time, is that from (or out of) which the product comes to be. It follows that matter must pre-exist the compound. Aristotle introduces matter

¹⁷⁸ Shields makes the example of the Lenin's body in Red Square which, in Aristotle's view, would not be Lenin's body. cf. Shields (1993), p. 3. Irwin claims that for dead things Aristotle's view conflicts with common beliefs, cf. Irwin (1981), p. 542.

as the substrate potentially capable of undergoing change, that is to say, capable of acquiring (or losing) a form. Analyzing the process of “coming to be” in its widest sense, the outline of Aristotle’s analysis is three-fold: on one hand we have matter and, on the other hand, two opposites, namely the form and the privation of it (*steresis*). Aristotle claims that when a form comes to be, it comes to be from the privation of it, e.g. being musical comes to be from being unmusical. The privation of form does not survive,¹⁷⁹ since it is replaced by the form in the result of the process of change. Moreover, Aristotle does not conceive immaterial changes, regardless of whether the change is substantial or not: in his view, the set or class of things which have matter is co-extensive with that of those which inevitably undergo change.¹⁸⁰ So, from Aristotle’s point of view, matter is fundamental if we have to account for processes of change, such as coming-to-be and passing-away. Matter is what has to underlie such a process inasmuch as it is what is capable of acquiring (or losing) the form.¹⁸¹

But in *De Anima* Aristotle claims that the matter of a living body is the “organic body” itself, that is, a parcel of matter already informed by the ability to live.¹⁸²

Given that it is hard to see how this kind of “organic body” might be different from the body itself, it is doubtful how it can be that from which the body comes to be. On one hand, in *Physics* the matter of sensible compounds is described as the element which pre-exists and underlies the process of change. Matter has the potentiality to acquire the form and so complete the process of change whose outcome is the compound itself. On the other hand, in *De Anima* the matter of the body is conceived as the “organic body” already *empsychon*.

What follows can be seen as fatal to hylomorphism: its consistency is threatened by the dubious role Aristotle assigns to matter. The homonymy principle has a direct effect on hylomorphic analysis because of the role of matter in the constitution of living bodies.

According to homonymy principle, matter should be conceived as something which can be defined as a body only insofar as it constitutes a living body; whereas, according to hylomorphism, matter should be conceived as the element which pre-exists and underlies the change which brings about the compound, and thus should be identifiable regardless of whether it constitutes something living or not.

The conception of matter throughout change is crucial in the context of hylomorphic analysis: matter is the element that has the potentiality of acquiring form, which is the actuality. Therefore, as

¹⁷⁹ cf. *Phys.* I 8, 191b 17.

¹⁸⁰ cf. *Metaph.* H 5, 1044b 25-29.

¹⁸¹ cf. *Phys.* I 7, 190a 34 – 190b 4.

¹⁸² cf. *DA* II 1, 412a 27 – 412b 1.

regards the identification of the matter of the living body, it is necessary to identify an element *potentially* able to acquire the substantial form. But the homonymy principle seems to prevent from such an identification. Since a “body”, properly speaking, is only that which is already living, homonymy seems to rule out anything which is not actually (or necessarily) living. This contrast applies both before and after life, given that, before being alive, there is not yet a “body” but just parents’ liquids and tissues and, once the individual is dead, there is a corpse which, even if it is commonly called a “body”, it is not such anymore. Consequently it seems impossible to identify the matter of the body regardless of its form. On Aristotle’s view only *actually living* bodies are, properly speaking, “bodies”, given that a body that is not alive is not a “body” (and the same holds for all the bodily organs). Yet, as Ackrill pointed out, if we are to take hylomorphism seriously, we expect to be able to *separately identify* the form and the matter of every hylomorphic compound. We require that hylomorphism be able to make sense of the living body.

Thus the matter from (or out of which) the living body is made of seems to hopelessly slip away. The homonymy principle requires the matter of material bodies to be synchronic with the actuality of life. As long as an organism is alive its matter *is* its living body. Yet, before being alive, we cannot speak of the organic elements which have the potentiality to develop in the newborn body as a “body” and, starting from the moment of death, we cannot identify the matter of the body with its corpse: we use to call it a “body”, but we do so homonymously and, so to speak, conventionally, in virtue of what I have called the “metaphysical inaccuracy” of natural language.

The contrast between the two doctrines is that while hylomorphism seems to require the possibility to separately identify the two elements of the analysis (matter and form, with particular regard to matter as potentiality), seemingly the homonymy principle leaves no room for potentiality, given that it is a “body” only the one which is actually living.

II. Subproblems

Having highlighted some consequences of the homonymy principle, for methodological reasons it is useful to divide the problem in subproblems. Evidently homonymy principle and hylomorphic analysis can modulate according as different subproblems but not substantially (at the risk of inconsistency). Dividing different sets of questions will help to clarify what is under discussion and whether we can find a consistent solution for all the applications of the doctrine.

I take the first subproblem to be *generation*. Even though it is obvious that we are not allowed to call something a “body” as long as there is not a unitary organism, it seems that we should be able

to identify the matter existing before the body, the element being able to be that from (or out of) which the body comes to be. Yet Aristotle's puzzling remarks make the framework less straightforward.

The second subproblem is *death*, when the living body ceases to exist and, according to Aristotle, we are left with a portion of matter we call "body" only homonymously.

If Aristotle develops hylomorphism consistently, the answers we will find narrowing the issue of the matter of the body to these specific questions must be not only credible in themselves but also consistent with one another. I will sketch out both the questions of generation and death before trying to show the reasons why they emerge and suggest my own proposals to solve them.

(a) Generation

Aristotle's account of the matter of the body is not limited to the moment of death. Even as regards generation we have apparently no grasp of the matter existing *before* the living body and being able to acquire the relevant form. Every natural *genesis* starts from processes which patently involve only inanimate liquids and tissues and nonetheless results in a living body. The question of where does the matter of the living body come from is legitimate.

A simple answer seems at hand: since we are looking for something which is potentially able to constitute the coming-to-be body, we might be willing to pick out some pieces of inanimated matter which are to develop into an organic body. At first glance reproductive liquids and tissues are plausible candidates or, going backwards, even the elements which constitute them. If we were able to identify the matter which is going to acquire the form *before* it actually acquires it, then we would be able to identify the matter which pre-exists and underlies the change which brings about the living body. Indeed we are able to individuate *that* piece of bronze both before and after it acquires the form 'statue'. What should prevent us to do the same as regards the living body, should it even be necessary to go back to the elements and individuate *that* amount of earth, *that* of water, and so forth?

Unfortunately Aristotle explicitly rules out this answer. The "history of the matter of the living body" stops early, indeed at the living body itself. We are not able to trace the matter of the body back.

In *Metaphysics* Θ 7 Aristotle argues that earth is potentially seed, that seed located in the female

womb is potentially an embryo and, finally, from the biological works¹⁸³ we know that he deems that the embryo is potentially an adult human being. Yet at the same time he holds that it not the case that earth is potentially a human being.

«But we must distinguish when a thing is potentially and when it is not; for it is not at any and every time. E.g. is earth potentially a man? No – but rather when it has already become seed, and perhaps not even then».¹⁸⁴

The point seems to be potentiality. In Aristotle's view matter *is* potentiality, insofar as it can potentially realize all kinds of different forms. Thus label x as matter of y entails that x "is" potentially y .¹⁸⁵

From the passage in Θ 7 we know that earth is potentially seed and seed is potentially an embryo, but earth is not potentially an embryo. So for the potentiality relationship R , if $(xRy \ \& \ yRz)$ is not the case that xRz . We understand that in Aristotle's view potentiality is *not* a transitive relation.

The statement in *Metaphysics* Θ 7 prevents us to identify the matter of the body with one or more elements potentially able to undergo the series of transformations which would eventually lead to the living body.

It might be objected that if earth is not rightly labeled as potentially man, then the embryo is such. In fact the embryo is what has the potentiality to develop into an adult animal and so it should be regarded as what is potentially the living body. The embryo is not yet able to perform the characteristic human functions and nonetheless it has the potentiality to develop in a way such that it will.

Yet the embryo cannot count as matter of the living body because it is already a living body. Indeed it performs some (basic) vital functions and Aristotle has no doubt it is alive.¹⁸⁶ Pointing out that the embryo is potentially a man is not helpful in this context, because we are looking for the element existing *before* the living body and able to underlie the relevant changes. In fact the analysis of change drawn in *Physics* introduces matter as the element existing *before* the change and therefore capable of (having the potentiality to) underlying it. But this analysis appeared to be contradicted by

¹⁸³ Especially *De Generatione Animalium*. cf. for instance *GA* II 3 736b 15, where Aristotle claims as regards human embryo: «For all three kinds of soul [...] must be possessed potentially before they are possessed in actuality».

¹⁸⁴ cf. *Metaph.* Θ 7, 1049a 1-5.

¹⁸⁵ A fundamental feature of Aristotle's hylomorphism is that he maintains that there is a special sense in which matter "is" the compound. In *Metaphysics* Aristotle makes some important remarks about sentences such as "the bronze *is* the statue": among the scholars such a predication is called the "is" of constitution. See for instance Loux (1979) and Whiting (1992). I shall deal with this aspect of hylomorphism at some length further so let me shelve this for later comment.

¹⁸⁶ cf. *GA* II 3, 736a 32: «For nobody would put down the embryo as soulless or in every sense bereft of life».

our inability to identify the matter of the living body.

This point is strengthened by the fact that in *De Anima* Aristotle claims that only the in-formed matter has the potentiality to live, that is to say, only what is a living body is potentially alive.

«We must not understand by that which is potentially capable of living what has lost the soul it had, but only what still retains it».¹⁸⁷

How can the matter of the body exist *before* the change that brings about the body, if the body (and consequentially its matter) is present only *after* the relevant change?

(b) Death

The second subproblem concerns death: the matter existing *after* the living body too is elusive. In *De Anima* II 1, as well as elsewhere, Aristotle claims that a dead eye is no longer a eye, «except in name», that is, homonymously. The same holds for any other bodily part as well as for the body as a whole.

As I have already recalled, Aristotle's argument is that the *psuche* is the set of relevant functions natural bodies are able to perform.¹⁸⁸ In *Metaphysics Z* he argues that the *psuche* is the essence, or the *eidos*, of substances: the *eidos* is what-it-is-to-be for substances and hence it defines them as such and is truly predicated of them.¹⁸⁹ Once the *psuche* disappears, bodies are no longer able to perform their characteristic functions; therefore, they do no longer have the same essence. It follows that the definition applying to them is not the same: if they are still referred to in such a way, philosophical inquiry states that it happens so only homonymously.

«Suppose that the eye were an animal – sight would have been its soul, for sight is the substance of the eye which corresponds to the account, the eye being merely the matter of seeing; when seeing is removed the eye is no longer an eye, except in name – no more than an eye of a statue or of a painted figure».¹⁹⁰

Since the homonymy principle establishes that once the body is dead there is not a “body” anymore, apparently the problem is that there is a body only when the body is alive. The iron of an axe is still iron even if it does not constitute an axe, whereas bodily organs which do not constitute a body, are not such anymore. As Ackrill puts it:

¹⁸⁷ *DA* II 1, 412b 25-27.

¹⁸⁸ cf. *Meteor.* IV 12, 390a 10.

¹⁸⁹ cf. *Metaph.* Z 6.

¹⁹⁰ *DA* II 1, 412b 16-21.

«In short – and I am of course only summarizing Aristotle – the material in this case is *not* capable of existing except as the material of an animal, as matter so in-formed. The body we are told to pick out as the material “constituent” of the animal depends for its very identity on its being alive, in-formed by *psuche*». ¹⁹¹

III. Provisional Conclusions

So we are unable to grasp neither the matter existing *before* the generation of living body, nor the matter existing *after* the death of it. It seems that we have no clue about the matter of the body itself. The only situation in which we are able to identify the matter of the living body is when considering the living body as such. Yet hylomorphism aspires to explain change: we rightly expect more than the sudden appearance of matter and the equally sudden vanishing of it.

Summarizing, the fact Aristotle’s hylomorphism regards “bodies” as synchronic with their being alive prevents that bodies as such can acquire and loose form. This view conflicts with Aristotle’s conception of matter as potentiality to underlie changes and to embody different forms.

IV. Functional determination

Given this framework, some conceptual features of the Aristotelian framework are said to clash. The so called *functional determination* of the living body plays a particularly important role, since it is the thesis that living bodies are defined by the activities, or functions, they are able to engage. ¹⁹² It is the ground on which Aristotle argues that the living body and the corpse do not share the same essence nor, consequentially, the same definition. This is how Shields formulates the functional determination thesis:

«(FD): An individual *a* will belong to a kind or class *F* iff: *a* can perform the function of that kind or class». ¹⁹³

Such a formulation highlights how functional determination relates to kind membership and so underlines the affinities between Aristotelian philosophy and functionalism in the context of philosophy of mind. According to Shield’s formulation, any entity *a* which is able to perform the relevant set of functions that, say, characterizes the kind *F* of human beings, would count as human being. In the context of functionalism, that means that a digital computer could count as a human being as long as it can perform the relevant set of functions. This holds regardless of other

¹⁹¹ cf. Ackrill (1972-1973), p. 126.

¹⁹² In Aristotle’s view the functional determination holds both for living bodies and for artefacts but what is at stake here is mainly the Aristotelian metaphysical framework’s credibility about living things.

¹⁹³ Shields (1993), p. 9.

characteristics (such as, say, having the skin or being able to breath). Shields indeed firmly supports the functionalist interpretation of Aristotle's psychology.¹⁹⁴

Nonetheless I regard as a risk that Aristotle's credibility is made so strictly related to the functionalism's one. So far I would settle for a more focused formulation. For the sake of simplicity, let us evaluate Aristotle's functional determination with regard to living things (although it holds for artefacts as well). In first place, then, I narrow my definition to natural living bodies, starting from vegetal life up to the life of all animals (man obviously included). Secondly, I want to focus on the notion of function, where by "function" I mean, broadly, every activity a living thing can perform. It is plain that a function of a living thing can be identified and defined as such regardless of whether it is performed consciously or not by the subject. (It turns out to be a disparate set of functions, from digestion to growth). Moreover, I think we have good reasons to follow Aristotle in drawing the distinction between the capacity to perform a function and the actual taking place of the function itself. It is enough that the entity in question is able to perform that function, even without actually performing it (a violinist who is cooking at t' is nevertheless *able* to play the violin at t')¹⁹⁵. Finally, it is well-known that according to Aristotle essence is liable to definition. The ground for this remark is the strong connection Aristotle draws between essence, function and definition. As I have already pointed out,¹⁹⁶ the essence of a substance *is* the function and is expressed in the substance's definition. I shall mention kind membership only insofar as I deem it is the result of the functional determination Aristotle suggests in *Metereologica* 390a 10-15. Thus if (and only if) Callias is able to (roughly speaking) eat and grow, perceive and move, imagine and think, then his form (*eidos*) is *man* and he will belong to the species (*eidos*) *man*. The essence of an individual is the *eidos* predicated of the matter and expressed in the proper definition, which synonymously apply to all the individuals belonging to the same species.¹⁹⁷

¹⁹⁴ cf. Shields (1990).

¹⁹⁵ The philosophers of the Megaric school wanted to deny this distinction, arguing that a thing can act only when it is actually acting (e.g. nobody is able to build unless he is actually building). Aristotle uses an example about what he deems to be an obvious *reductio ad absurdum*: if Megarians were right – and nobody were able to see unless he was actually seeing – everybody would be blind many times a day. Yet only "real" blind people cannot see, whereas it is obvious that a sleeping person is able to see even though she is not actually seeing. Thus it is necessary to distinguish between potentiality and actuality. Relying on this distinction, it is sufficient to my present purpose to say that Aristotle thinks that for the functions of living things to be present, it is sufficient that they are potentially. cf. *Metaph.* Θ 3.

¹⁹⁶ See § "Essence, definition and function" in the first part of this chapter "Homonymy as such".

¹⁹⁷ The same Greek word *eidos* is translated sometimes with "form" and sometimes with "species". This interpretation was started by Ackrill (1972-73), who identified the double use of the word *eidos* and argued that in Aristotle's works the context usually makes sense of what the word means. Thus there is «no reason for confusing – or supposing that Aristotle confuses – form with species, or, more generally, form with composite substance», p. 122. This interpretation was accepted by many scholars but, more recently, it has been debated. Woods (1993) challenges Ackrill's reading and argues that, even though different translations are appropriate in different passages, Aristotle does not *distinguish* "form" from "species". «In saying that Socrates is a man, I assign him to a species; but I do so by identifying the form *man* common to the species; *man*, the sharing of

Summarizing all these introductory remarks, I propose the following formulation of the functional determination thesis:

(FD*): A natural individual *a* will share all the essential properties of its species *A* iff: it is potentially able to perform the set of relevant functions *F* expressed in the definition of *A*.

For instance, Callias will share all the essential properties of the species men, if (and only if) he is potentially able to perform what we consider the set of relevant functions of being man, which are expressed in the proper definition of man. Such a formulation includes references to both essence and definition, which lack in Shields' formulation but which I hold as crucial in order to understand Aristotle's view. Obviously this formulation of the functional determination thesis would make sense even if we stretch or narrow the set of relevant functions.¹⁹⁸

which distinguish Socrates and other members of this species from members of other species», p. 413. It is clear that what is disputed is the metaphysical status of Aristotelian forms but it is not my purpose here to add to the discussion about whether Aristotle allows the existence of only individual (or only universal) forms. I think it is beyond dispute that the word *eidos* should be translated sometimes with "species" and sometimes with "form" and that, starting from this assumption, different conclusions may be drawn. One of them would be that Aristotle draw a metaphysical distinction between species and individual forms but I am sympathetic with Woods about the fact that «our view of Aristotle's central ontological doctrines in *Metaphysics* is distorted if we think of species as distinct from the forms that their members embody», p. 403. As Woods himself recognizes, the connexion between this issue and the existence of particular forms is complicated but I think it is worth emphasizing that one of the main differences between Aristotle and Plato is that the former does not admit the existence of supra-individual entities ontologically grounding the existence of sensible individuals which partake of them. On the contrary, it is in virtue of the existence of particulars that there are universals. Moreover, it is not an accident that the treatment of secondary substances is more intense in the *Categories*, where the hylomorphic model is not at work, whereas some scholars (cf. Frede and Patzig 1988) have argued that in *Metaphysics* Aristotle denies that secondary substances are substances at all. I think the issue becomes less obscure once we recognize that, at least as regards biological life, by *eidos* Aristotle means a biological structure (*i*) embedded in hylomorphic compounds and unable of separated existence; (*ii*) shared among a specific group of individuals, the set of which is called the species; and (*iii*) naturally transmitted through the process of generation. According to my understanding, Whiting (1986) would take *i-iii* to show that Aristotle allows the existence of individual forms, defined as including their proximate matter. Whiting argues that *eidos* as "species form" is not sufficient as metaphysical principle of individuation (see p. 361). Even though I agree that individual forms so defined enable us to distinguish between co-specific individuals both synchronically and diachronically, I think Whiting fails to highlight that (*ii*) and (*iii*) call for an acceptance in which the *eidos* is common to numerous individuals (or, anyway, to more than one). I find Woods' interpretation more convincing: *eidos* is not ambiguous between the species form and the individual form. Claiming that «Socrates is a man» entails both to identify his substantial form (man) and to assign him to a species (man). Woods' remarks emphasize the anti-Platonic strength of Aristotle's forms, given that otherwise the Third Man Argument – the infinite regress argument Aristotle directs against Plato's theory of Forms (cf. *Soph. Ref.* 178b 36; *Metaph.* A 9, 990b 17; *Metaph.* Z 13, 1039a 2; *Metaph.* K 1, 1059b 8; *Metaph.* M 4, 1079a 13) – would apply to Aristotle's doctrine as well.

¹⁹⁸ Leaving aside Aristotle, we could deem that the "ability to make mistakes" or the "ability to have a sense of humor" are relevant characteristics of human beings and so include them in the set. Such arguments from abilities was taken into account by Turing (1950) in his classical article *Computing Machinery and Intelligence*. I acknowledge the importance of precisely identifying the set of relevant functions in the context of the debate about artificial intelligence (when are we allowed to say that something which was not born in the usual way is intelligent, or even human?). We could include or exclude some abilities usually found in human beings, such as, say, feel pleasure while listening to music or feel pity for someone – and this would be of course of great importance in the debate about non-human intelligence. Yet I think this aspect is not relevant in the present context, insofar as the functional determination, in both Shields' formulation and mine, makes

Yet, as we have seen, the functional determination seems to lead to a loop concerning the matter of the bodies.

V. Developments of Criticism

The first and most famous version of the critical argument concerning the matter of the living body is due to Ackrill. His influential paper is commonly considered the source of inspiration of the attacks to Aristotle from an anti-functionalism point of view.¹⁹⁹ Ackrill argues that the application of the hylomorphic scheme matter-form-compound requires these elements should be capable of being picked out separately. With “pick out separately” he means that it should be possible to conceive matter both as not yet having the form (existing without it, having it only potentially) and as having it in actuality. The problem Ackrill remarks is that, applying the triadic scheme to the living body, the material aspect of the compound can only be the body itself, already in-formed by the *psuche*. There is no material constituent to be identified besides the living body itself. Matter seems to be missing from Aristotle’s account. If the matter of the living body is there, it is already necessarily alive. If it is not, then it cannot be the matter of the body. Ackrill’s conclusions are that (i) Aristotle is committed to bodies essentially ensouled; and that (ii) this conflicts with the conception of matter as potentiality to embody different forms. And this means that hylomorphism and homonymy, two of Aristotle’s fundamental doctrines, clash with each other.

Ackrill’s line of thought was followed by Myles Burnyeat, which resumed and expanded the criticism, arguing that the Aristotelian philosophy of mind is not plausible in the context of contemporary philosophy of mind. Burnyeat reaffirms Ackrill’s fundamental point, that is, on Aristotle’s view there is no body potentially alive, because there is no “body” which lacks life. Homonymy would be not only a linguistic ruling but rather a «physical thesis to the effect that flesh, bones, organs, etc. of which we are composed are *essentially* alive, *essentially* capable of awareness». ²⁰⁰ Thus we must «junk» Aristotle’s philosophy of mind.

I have pointed out that homonymy principle causes two unappealing consequences concerning Aristotle’s philosophy, the first being that our intuitions are challenged by the view that a corpse is not “body” at all, whereas the second concerns hylomorphism and particularly the role of matter as the element out of which the compound comes to be. Burnyeat is the supporter of the third unpalatable consequence highlighted by the criticisms to the homonymy principle. What is

sense whatever set of relevant functions we decide for.

¹⁹⁹ cf. Ackrill (1972-1973).

²⁰⁰ cf. Burnyeat (1992), p. 26, italics as found.

interesting is that Burnyeat's consequence is not limited to Aristotle's philosophy but rather involves the functionalist interpretation of it. Functionalism in philosophy of mind is a thesis about the nature of mental states stating that their type is determined by the function they play in the whole they belong to. Therefore mental states are not determined by some intrinsic nature of the matter they are made of: as Hilary Putnam provocatively argued, mental states could be realized even by a brain made of cheese, as long as it is able to realize the functions required.²⁰¹ Accordingly, it follows that mental states are *contingently* related to the physical states realizing them, since their nature is determined by the role they play rather than by the material they are constituted by. Given the priority of the constituted function above the constituent matter, functionalism has been said to be rooted in Aristotle's philosophy, with particular regard to priority recognized to form over matter in the context of hylomorphism.²⁰² Yet the homonymy of the body seems to establish that life is not a *contingent* but rather an *essential* property of the living body. Regarding essential properties as those which *necessarily* belong to a subject, Aristotelian bodies have life as an essential property, given that, by definition, there is no body which lacks it. Thus the homonymy principle leads us to divorce the Aristotelian hylomorphism from the functionalist thesis of multiple realizability.²⁰³ If there are only necessarily alive bodies, then it seems reasonable to conclude that Aristotle would not accept the thesis that any material substrate is suitable to realize mental states, as long as it can perform certain functions.

C) A Fresh Start

Preliminary Remarks

We have gone through the main points of the puzzle concerning the homonymy of the body. In what follows I shall explain my position, that is, not only the homonymy principle is not in conflict with hylomorphism, but rather it is entailed by it as a corollary.

Section I argues that Aristotle's view implies graduality in potentiality. These remarks aim to address what I regard as the "biological questions" of the controversy. In *Metaphysics*, as well as in

²⁰¹ cf. Putnam (1975), p. 303.

²⁰² See the Chapter I of this work.

²⁰³ Shields (1993), p. 4, identifies two problems that he presents as distinct but related. The first regards the contingent relationship between the functional and the material states; the second specifically the thesis of multiple realizability. I regard them as a single problem, not only because the second entails the first but above all because they are to be solved jointly, if at all.

several passages of the biological works, Aristotle argues that potentiality not only allows, but indeed requires degrees of actualization. In my opinion, that is to say that potentiality is a *graded notion*. Such a conception accounts for both the coming to be and for the death of the living body. I hope to show how the Ackrill's problem can be (at least) reshaped from this point of view.

Section II shows that the reason why the conflict between homonymy and hylomorphism seems to arise is that the latter is mistakenly regarded as a thesis which affects only the relation between matter and form while it does not entail definition and predication. As Aristotle repeatedly points out, form is predicated of matter and not *vice versa*. Without form, matter is not even a "this" and cannot be a subject of predication.

Section III is a functionalism-friendly understanding of hylomorphism, insofar as it gives reasons for regarding the roles Aristotle recognizes to matter and forms as functional ones. I shall argue that a way to refute the criticisms against the alleged "necessarily alive body" is to point out that Aristotle conceives matter as the element which stand in a certain relation to the product which acquires the relevant form during the process of change.

Finally, section IV attempts a definition of hylomorphism which enable us to join all these elements together and consider them in a unified way.

I. Potentiality: a Graded Notion

One aspect of the problem concerns the identification of the matter of the body as the matter potentially able to realize the relevant form. In this section I will argue that Aristotle regards potentiality as a notion depending on the state in which matter actually is.

In *Metaphysics* H 5 Aristotle addresses the difficulty about the relationship that the matter has with the contrary states of the thing it constitutes, i.e. form and the privation of it.

According to the traditional understanding of hylomorphism, matter is related to form as potentiality is related to actuality, in the sense that matter has the potentiality to constitute the form. That is how matter is related to form. But what about the relation between matter and the *privation* of form? Thus an intriguing question concerns the potentialities of matter with regard to the disintegration of the substantial form it constitutes. Aristotle's answer is relevant to our puzzle, given that the death of a living body is clearly the disintegration of a substantial form. This is exactly the issue Aristotle addresses in *Metaphysics* H 5.

Aristotle considers the problem of how matter is related to contrary states. He explicitly mentions

the problem of the corpse (1044b 35) but prefers to look for the solution by means of an analogy involving compounds and the privation of their form. The analogy assumes that the living body is to the corpse as wine is to vinegar.²⁰⁴ The point is that both of these ordered pairs express the same relation, namely that of a substance to its disintegration.

The point is that Aristotle maintains that wine is not potentially vinegar and, analogously, that the living body is not potentially dead.

«There is also a difficulty as to why wine is not the matter of vinegar, nor potentially vinegar (though vinegar comes from it), and why the living man is not potentially dead».²⁰⁵

Aristotle recognizes such a claim is counterintuitive. For vinegar is exactly produced from wine, and we might want to understand potentiality as the chronological relationship that relates different conglomerates of matter to the further stage of their developmental history (so that a tree is potentially a wood board, which is potentially a table, which is potentially ash).

In H 5 Aristotle is puzzled by the same difficulty: what can be said to be potentially something else when we consider not forms but instead privations? His treatment of this subject shows that he understands potentiality in a more substantive way than we would expect. Since his account is consistent with the account of change he gives in *Physics*, let me turn to that account. I shall return later to the problem addressed in *Metaphysics* H 5.

Gradualism

In *Physics* I 7 Aristotle explains how many principles are involved in change. He argues they are three, namely matter and two opposites, viz. presence and absence of form.²⁰⁶ Matter is the element which has to be present in order to the process of change to take place, whereas form is the element whose presence substitutes (or eliminates) the privation of itself.²⁰⁷

It is plain that there is a requirement to Aristotle's analysis, that is, that matter and form can unite into a compound in which they, as well as their compound, can be identified. The process starts with matter and ends up with its acquisition of form. Charlton argues that Aristotle identifies matter as

²⁰⁴ cf. *Metaph.* H 5, 1044b 29 – 1045a 6. Code (unpubl.) devotes his article to this example. His article, entitled *Aristotle on Matter of Corpses in Metaphysics H 5*, is unpublished and can be consulted on Code's website.

²⁰⁵ *Metaph.* H 5, 1044b 34-36.

²⁰⁶ cf. *Phys.* I 7, 191a 4-7.

²⁰⁷ cf. *Phys.* I 7, 190b 3. Even though he does not agree about the identification of them, that opposite principles are to base the analysis of change is an aspect Aristotle thinks his account has in common with his predecessors, cf. *Phys.* I 5, 188b 26-27.

the *terminus a quo* the process of change starts and form as the *terminus ad quem* of the process.²⁰⁸

Such unions (and disunions) of matter and form do not happen merely by chance, for some kind of regularity is present in their natural coming to be and passing away processes.²⁰⁹

«Our first point must be that nothing whatever is by nature such as to do or undergo any chance thing through the agency of any chance thing, nor does anything come to be out of just anything, unless you take a case of concurrence».²¹⁰

This passage give us an insight about the way in which Aristotle conceives the compounds of matter and form. He thinks that, looking at the elements involved in the processes of coming-to-be and passing-away, we are facing a pervasive regularity in nature. Recalling the four causes, Aristotle notices that it is not the case that a substance has a chance material cause. Rather, natural things *regularly* come to be out of something specific, and similarly he argues for the other three causes.

With regard to living things, this substantive thesis becomes even stronger: animals regularly come to be from another animals. Aristotle often repeats the refrain «man begets man».²¹¹ And even though his point about regularity of natural processes is relatively clear, still, according to the account given in *Physics*, we should be able identify matter in itself. It should be such that it has the ability to embody the essential form transmitted from the parent to the offspring – in other words, it should be the element characterized by the potentiality to be that out of which the animal comes to be.

This attention is warranted because Ackrill's and Burnyeat's criticisms pose an alternative. Either we are able to argue that Aristotle conceives coming to be and passing away of living substances as processes which involve a naturalized conception of matter (i.e. an element which is not essentially alive and able to underlie both living and inanimate bodies), or we have to admit that in Aristotle's awkward view living bodies are *essentially* alive. Thus the reason of concerning for proponents of hylomorphism is that, if we accepted the second horn of the alternative, there would be no plausible argument to account for such a view. If hylomorphism is credible, there is no room for essentially living matter.

²⁰⁸ cf. Charlton (1970), p. 70, respectively considering 190b 15 and 190b 28.

²⁰⁹ I will address the opposition between chance and natural regularity dealing with teleology in the Chapter III. Here I refer to the treatment of *Phys.* I 5, esp. 188a 32 – 188b 26.

²¹⁰ *Phys.* I 5, 188a 32-35.

²¹¹ For instance *GC* II 6, 333b 10; *Phys.* II 7, 198b 26; *PA* II 1, 646a 34; *PA* I 1, 640a 25; *Metaph.* A 2, 994a 25; *Phys.* II 1, 193b 8-12.

The “Stardust” Thesis

The problem might be not with hylomorphism but rather with our understanding of it. It seems to me that the current understanding of potentiality is weak and akin to what I shall call a “stardust thesis”. We can consistently claim that simple matter (whatever we think it to be, say prime matter, atoms or subatomic units) should be potentially anything. For if we consider that (i) everything is made of simple matter, (ii) everything material is meant to corrupt, that is, to undergo that process which will result in its being simple matter again, we can conclude that (iii) potentially, every material thing is any other material thing. Thus the stuff which constitute the keyboard I am typing on is a portion of matter present in the universe since the Big Bang and in the billions of years that precede the moment of its industrial production, it has been in the enormous expanse of the universe constituting things, like black holes and stars, completely other than my keyboard.

The stardust thesis can be perfectly right, or even necessary to maintain, in the case we argue from a merely physical perspective. Yet Aristotle thinks it makes no sense from a metaphysical point of view. He conceives the notion of potentiality in a much more strict sense, especially with regard to living things. Potentiality and actuality are the framework in which Aristotle looks at change and, more precisely, the *regularity* of natural changes which involves substances. His focus is set on the changes substances regularly undergo. *Physics* I 5 shows that what strikes him is that substances regularly undergo certain processes in certain ways. This is the reason why the book of *Metaphysics* devoted to potentiality he introduces it as «the starting-point of change in another thing or in the thing itself *qua* other».²¹² Hence Aristotle consistently denies that what is potentially something else could be just anything (as he would deny that, properly speaking, stardust was *potentially* my keyboard).

«But we must distinguish when a thing is potentially and when it is not; for it is not at any and every time».²¹³

Aristotle gives two senses of potentiality, the strictest and primary sense being a kinetic one, the broadest being the capacity of a substance to change or to be changed. The framework in which potentiality is considered contains an important distinction, namely that between *receptive* and *active* potentiality. Investigating change, Aristotle points out that there is a crucial difference between things which undergo change in virtue of an external efficient cause (e.g. artefacts) and those which undergo change in virtue of an internal efficient cause (e.g. living bodies). The conditions for something with an external efficient cause to be potentially something else is that the

²¹² cf. *Metaph.* Θ 1, 1046a 10.

²¹³ *Metaph.* Θ 7, 1048b 36.

efficient cause has to be present and that matter is suitable for that change. Thus, these bricks will be potentially a house as long as they are suitable to be juxtaposed by a builder.

On the other hand, Aristotle claims that living things have an internal efficient cause, for they are able to undergo change in virtue of their own nature.²¹⁴ It is not an external agent that makes a living body develop, grow or age. Rather, a living body is characterized by the natural capacity to undergo these changes «*di' auton*», by itself. Obviously many factors can prevent these processes to come about but, in the case nothing prevents, living bodies are characterized by the natural capacity to be through themselves.

Obviously Aristotle does not think that living bodies suddenly appear out of nothing. He identifies the element which is suitable to become a living body. As we would expect, the element out of which the living body comes to be is not a living body in itself. Therefore, it does not have the capacity to develop «*di' auton*». And if this element does not have an internal efficient cause (*active* potentiality), in order to undergo the changes whose outcome is the living body, it has to be able to receive the impulse to change from the outside (*receptive* potentiality).

These are exactly the features Aristotle ascribes to seed. It has the potentiality to undergo biological change in the female womb and this can happen only in virtue of an external cause. After this event has occurred, the seed will have the potentiality to become the entity able to grow and nourish «*di' auton*», i.e. the living embryo. The living embryo, in turn, is potentially an adult man, because, if nothing hinders, it has the active potentiality to develop into it. The distinction is drawn between the *receptive* potentiality of the seed and the *active* potentiality of the embryo.

«The seed is not yet potentially a man; for it must undergo a change in a foreign medium. But when through its own principle it has already got such and such attributes, in this state it is already potentially a man; while in the former it needs another principle, just as earth if not yet potentially a statue, for it must change in order to become bronze».²¹⁵

Thus we have that, as long as seed is outside the female womb, it has a receptive potentiality to become an embryo, and that an embryo has an active potentiality to become an adult individual. Aristotle holds a similar view in the case of artefacts and their matter, the difference being only that their potentiality does not turn into an internal source of changing as in the case of living things. The parallel is that something is potentially something else if and only if its matter is suitable for that change to happen and for giving rise to the related actuality.

²¹⁴ cf. also *GA* II 4, 740a 15, «[...] it is as if they were talking of animals of stone or wood. For such as these have no principle of growth at all, but all animals have, and have it within themselves»).

²¹⁵ *Metaph.* Θ 7, 1049a 13-17.

A Strong(er) Notion of Potentiality

The point Aristotle is making is that, if we consider matter, there is a series of *steps or stages* at which matter can possibly be and, more importantly, every step has a related actuality, which the previous stage potentially is. If we were given a series such as $\langle m(1), m(2), m(3), \dots, m(n) \rangle$ and if it was established that each element of the series is potentially the following one (thus $m(1)$ is potentially $m(2)$; $m(2)$ is potentially $m(3)$ and so forth), Aristotle would maintain that $m(1)$ is not potentially $m(3)$, nor any other further step of the series besides $m(2)$.

In order to understand this claim, we have to recall that Aristotle is taking into account the «the starting-point of change in another thing or in the thing itself *qua* other».²¹⁶ Hence he is taking into account the change that a precise substance can undergo, either by itself or by an external agent, and not any change possibly undergone by any portion of matter, regardless of the stage at which it is, that is, the form it actualizes.

According to Aristotle it is necessary to establish the stage at which matter is (the form it actualizes), in order to be able to identify its potentiality to develop or to change into something else.

So the right perspective is to look at the potential material element of the compound as the element which can be the matter *of* that further stage.

This reading is reinforced when we recognize that potentiality and actuality are mutually related notions by which Aristotle identifies a relation between two subsequent stages. The relation they detect is so broad that it cannot be defined, but rather grasped by induction, in virtue of the analogy subsisting among the two terms which Aristotle labels as actuality and potentiality.

«Our meaning can be seen in the particular case by induction, and we must not seek a definition of everything but be content to grasp the analogy – that as that which is building is to that which is capable of building, so is the walking to the sleeping, and that which is shaped out of the matter to the matter, and that which has been wrought to the unwrought. Let actuality be defined by one member of this antithesis, and the potential by the other».²¹⁷

It follows that potentiality is a graded notion, for it is always referred to a further achievable form, i.e. an actuality of some sort.

From this point of view, prime matter can be reasonably conceived not as a kind of stuff with a special metaphysical status but, putting it more modestly, as a logical implication of this point of

²¹⁶ cf. *Metaph.* Θ 1, 1046a 10.

²¹⁷ *Metaph.* 6, 1048a 1048a 34 – 1048b 5.

view.²¹⁸

Moreover, it is always possible to think backwards and identify in the series the matter $m(n-1)$ of the matter $m(n)$ we are considering. Aristotle exemplifies this concept considering the series “earth, wood, box”.

«It seems that when we call a thing not something else but “of” that something (e.g. a casket is not wood but of wood, and wood is not earth but made of earth, and again perhaps in the same way earth is not something else but made of that something), that something is always potentially the thing which comes after in this series».²¹⁹

Aristotle thinks that *only* the further formal step in the series is what something potentially is. In other words, in order to establish the potentiality of something, we have first to figure out the relevant series. This counts as the *graduality* of the notion of potentiality. For instance, this earth, being the nourishment for this plant, is potentially a fruit, this fruit, being the nourishment of a man, is potentially blood, and this blood is potentially seed, which, if seed located in the womb, is potentially a man.²²⁰

The fundamental feature of potentiality, which applies both to artefacts and living bodies, is that every thing is potentially only the thing it can develop into, either by itself or through an external agent.

This is the reason why earth is not, properly speaking, a potential adult human (nor is seed as such, for it has to be in the womb in order to be suitable to undergo the processes whose outcome is the living body of the embryo). Aristotle has a strong conception of potentiality as a notion relative to a form or actuality, which is achievable by the thing either by virtue of an internal source of change (as it is in the case of living things, active potentiality) or by virtue of an external agent (inanimate portions of matter, receptive potentiality).

The proponent of a weak version of potentiality might object that we can consider the series as the process which, in its entirety, leads toward the complete realization of the form and hence label both the earth and the seed as potentially human. In this sense we would be allowed to regard all the steps which precede the full realization of the form as oriented toward that final outcome and, insofar as we are able to identify the regularity of the process as a whole, we would be able to label all of them as being potentially that outcome. This would lead to a less demanding notion of

²¹⁸ As regards the conception of prime matter I am sympathetic with Jones (1974). He criticizes E. Zeller (1897), N. Luyten (1965) and MacKinnon (1965), defining the notion of prime matter as «a bad joke, the typical illusion of a metaphysician». He argues that the Aristotelian notion of matter is rather a formal one.

²¹⁹ cf. *Metaph.* Θ 7, 1049a 18-23.

²²⁰ Roughly, this is the biological process responsible for the formation of the seed in the body. cf. *GA* I 18-19. The physiology is not important here and it should not shadow the metaphysical insights.

potentiality.

Yet what would distinguish the potentiality of earth to be the adult human being from the potentiality of the embryo? If the the proponent of this weak version of potentiality refuted to distinguish between these patently different stages the boundaries of his notion of potentiality would be so broad that the notion itself becomes irrelevant and uninformative at all.²²¹ But if the proponent of the weak version of potentiality accepted to introduce degrees in being potentiality something else (so that the embryo is potentially human at degree n , the seed is potentially human at degree $n-1$ and so forth), then there would be just a linguistic difference between his version and Aristotle's strong one, who does recognizes the series as a whole even dividing it in subsequent steps related to each other in terms of potentiality-actuality.

Privative States and Potentiality

We have recognized that potentiality requires a strong interpretation, that is, potentiality is a graded notion which makes sense if and only if it is referred to a further achievable form or actuality. We are in the position to understand how *Metaphysics* H 5 accounts for the relation of matter to the contrary states, namely form and privation of it.

Aristotle's point is that the matter of a substance potentially is that substance, whereas it potentially is not the privation of it. Form is a positive state that matter is suitable to realize or embody. Yet privation is not a form, therefore it is not essential: rather it is a loss, a regress of matter to a state in which it does not realize any form. This does not mean that matter cannot realize a privation, for it surely does. Only, we are not allowed to interpret such a privation as form, or actuality, or essence of anything. Aristotle labels processes such as fermentation and death as accidental corruptions (1045a 1), not in the sense that these privative states may come about or not, but rather because they happen *not* in virtue of an essence but in virtue of the indefinite nature of matter itself.

«And is water potentially wine and vinegar? We answer that it is the matter of one in virtue of its positive state and its form, and of the other in virtue of the privation of its positive and the corruption of it contrary to its nature».²²²

Vinegar and death are privative states because they coincide with the end of a form, respectively that of the wine and that of the living body. The portions of matter which used to realize those forms lose these informative states and thus regress to a state in which they do not realize a form anymore.

²²¹ For my remarks about Feinberg's conception of potentiality, see note 139 in next section.

²²² *Metaph.* H 5, 1044b 31-34.

If the state of matter is not a form, it is neither an actuality. And if it is not an actuality, there is not a related potentiality oriented toward it. Hence the relevant series of related potentiality-actualities cannot include death.²²³ The point is that death is not an actuality, nor a form, nor an essence. So it is not surprising that when Aristotle has to account for privative states, he refuses to place them in the series of related potentiality-actuality.

When Aristotle denies that wine is potentially vinegar and, analogously, that body is potentially a corpse, is he denying that wine can ferment or, even worst, that living things can die? Not at all.

The explanation Aristotle supplies in order to account for such privative states consists in attributing the causal role of corruption to the nature of matter itself and not to that of forms.

«The corruptions in question are accidental, and it is the matter of the animal that is itself in virtue of its corruption the potency and matter of a corpse, and it is water that is the matter of vinegar».²²⁴

This is consistent with hylomorphism in general for, if matter has to have the potentiality to realize, or embody, different forms, it has to be indeterminate in itself. In fact, without a form, matter is not even a “this”.²²⁵ It is the form which plays the causal role to make matter the constituent of the substance. And, in order to have the potentiality to acquire the form, matter has to be in itself an indefinite element.

Therefore Aristotle’s account for corruption of substances is that matter has the tendency to go back to its indefinite state.

«And all things which change thus into one another must be reduced to their matter, e.g. if from a corpse is produced an animal, the corpse is first reduced to its matter, and only then becomes an animal; and vinegar is first reduced to water, and only becomes wine».²²⁶

It is worth pointing out that this is the reason why matter *is* potentiality; indeed, if it were not so, matter would always be essentially what it is. On the contrary, it is related to form only contingently and, starting from the “degree zero” it tends to, it will be capable of receiving different forms again.

²²³ According to the biological works, the relevant series of potentiality-actuality as regards the process of human coming-to-be is the following: <earth-nutrition, nutrition-blood, blood-seed, seed-embryo, embryo-human being>. However, Aristotle’s biology is not essential to hylomorphism and this is the reason why we are allowed to harmonize the latter with our current understanding of natural processes.

²²⁴ *Metaph.* H 5, 1044b 36 – 1045a 1.

²²⁵ *DA* II 1, 412a 7-8; *Metaph.* Z 3, 1029a 20; *Metaph.* Z 17, 1042a 28.

²²⁶ *Metaph.* H 5, 1045a 4-6.

A Point About Contingency

For the functionalist interpretation of Aristotle to be consistent it is crucial to show that in the context of hylomorphism matter and form are related in a purely contingent manner. When some scholars, such as Ackrill and Burnyeat, object that the hylomorphic relation between matter and form is essential or necessary, they are attacking the heart of functionalism interpretation of Aristotle. Since the matter and the form of the living body seem impossible to disentangle, it is argued that in the context of hylomorphism matter and form are essentially (and not contingently) related.

I think that solving the homonymy puzzle requires to regard hylomorphism as a doctrine that can be applied to different subjects from different points of view. We can make better sense of how matter is related to the form it constitutes or realizes, if we distinguish between a *wide* and a *narrow* sense of potentiality.

On one hand, matter and form are surely contingently related. Roughly speaking, matter is characterized by a potentiality such that matter is able to acquire any form. This is what I have called the “stardust thesis” which, as I have shown, has the virtue to make sense from a mere scientific point of view. What distinguishes me and my keyboard is not to ascribe to some mysterious property of the portions of matter which respectively constitute us. In a sense Aristotle supports this thesis, since it is beyond dispute that he argues that every physical entity is made out of the four elements, in different combinations.²²⁷ This is the *wide* sense of the notion of potentiality as well as the wide sense of the notion of matter in itself. Its virtue is that can be rightly regarded as compatible with the scientific point of view, while its flaw is that it is barely informative.

It would be a mistake to think that Aristotle would say that something like the four elements (or the universal dust) *are potentially* a such-and-such thing. Rather, as I have shown, in *Metaphysics* Θ 7 it is argued that “*x* is potentially *y*” is truly predicated only of portions of matter which are not only suitable to undergo the relevant changes but also *proximate* enough to the further actuality in the relevant series.

If we are looking for a precise and informative notion of potentiality, we have to consider proximate matter. It has to be recognized that potentiality is always proper of something determined and hence depends on the form a particular portion of matter constitutes already. Only setting limits, the notion of potentiality can be an informative one. Indeed a situation in which “everything is potentially everything else” is uninformative at all, for the simple reason that such a remark does not increase

²²⁷ cf. *GC* II 3.

our knowledge about anything,²²⁸ beyond the pretty obvious observation that every entity is made out of the same fundamental elements, which are capable of recombining again and again. Further, Aristotle is looking for a doctrine able to explain change and, particularly, regular changes occurring in nature. Thus something is potentially only what is the further step in an ordered series of potentiality-actualities. This is the *narrow* (and, I think, proper) sense of the Aristotelian notion of potentiality and it counts as the notion of proximate matter. Fine defines proximate matter as follows:

«x is the proximate matter of y iff x is the matter of y and there is no z such that x is the matter of z and z is the matter of y».²²⁹

Thus the relation between matter and form is stronger than a merely contingent one, given that a particular portion of matter *x* is not potentially everything else but rather only the proximate stage *x* can reach being the subject of such-and-such changes.²³⁰

It follows that Aristotle, in a way, is an advocate of the wide sense of the notion of potentiality, since he reckons that, through combination, the four elements can constitute every perceptible entity (330a 30). The important warning is that – as I think *Metaphysics* Θ 7 shows – he wants to narrow the notion of potentiality to that of proximate matter. It applies, so to speak, step by step, starting from a potentiality related to an actuality which, in turn, is potentially something further.

Form As Actuality

I have started this section presenting the puzzle concerning Aristotle’s understanding of the relation between the matter of a substance and contrary states, namely form and privation of the form.

²²⁸ On the contrary, the interpretation of the notion of potentiality as “everything is potentially everything else” leads to deep and confusing misunderstandings. cf. Feinberg (1980). In the Appendix entitled “*The paradoxes of potentiality*” (pp. 183-184) Feinberg takes the notion of potentiality into account. He does not distinguish between the wide (or remote) and the narrow (or direct) sense of potentiality. Thus he points out that «everything at all can be potentially almost anything at all», without setting limits or drawing distinctions to the notion of potentiality. As I have shown, such an approach is doomed from the outset. Not surprisingly, Feinberg ends up with a uninformative account of potentiality. He points out that «dehydrated orange powder is potentially orange juice [...]. More remotely, however, it is also potentially lemonade [...]. It is also potentially poisonous brew [...], a potential orange cake [...], a potential orange-colored building block [...], and so on, *ad infinitum*». No doubt that all these claims are, in principle, correct. The point is how we understand the notion of potentiality. Using it in claims such as “everything is *potentially* everything else” leads to share the flaws of the “stardust thesis” I have pointed out before. Even if this thesis can be correct from a mere scientific point of view, it makes the notion of potentiality uninformative. Aristotle, on the contrary, is interested by setting limits to the notion of potentiality, in order to make it informative and suitable to give account of change.

²²⁹ Fine (1992), p. 41.

²³⁰ cf. Section III of this part of the chapter.

As I have already hinted, in *Metaphysics* H 5 Aristotle considers two ordered couples he regards as analogous, namely <wine; vinegar> and <living body; corpse>. I have followed what I believe is Aristotle's account about the graduality of potentiality and I have argued that potentiality is an informative notion only if we keep in the background what I have called the "stardust thesis" and inquire what a particular portion of matter is potentially in the light of its present status and thus of the series of changes it can undergo (*proximate matter*). I have stressed that the reason why Aristotle denies that a living body potentially is a corpse (and similarly that wine is potentially vinegar) is that he thinks matter *is* potentiality and form *is* actuality. Potentialities and actualities are to be understood as linked in ordered series of subsequent changes, in which every step requires that *x*, which is potentially *y*, becomes *y* in actuality. In other words, for *x* being potentially *y* it is required that *x* is the matter capable of acquiring the form of *y*. Thus Aristotle regards changes such as death and fermentation as accidental corruptions (1045a 1) insofar as they are not directed toward the realization of a form but rather toward the loss of it.

In view of such analysis, form is actuality of substances. Once matter acquires a substantial form, that form is predicated of that matter²³¹ and we have a new subject of predication.

In substantial changes, the resulting substance is the subject of the sentence describing the process itself, for example "A man comes to be" or "A statue is made".²³² An aspect I regard as fundamental is that, from Aristotle's point of view, substantial changes do not end up with matter being the subject of a new property (form). On the contrary, form is that by which matter constitutes the outcome of the process of change. In virtue of its being undetermined, matter is capable of acquire the form of the compound we speak of as the subject of the process of change but it is not suitable to supply any characterization to the compound, besides of realizing it as a sensible substance.²³³ It is the form of the compound which is characterized by a "subjecthood" and which is the cause of being of the compound.

It is in virtue of this difference that Aristotle distinguishes between generation and alteration.²³⁴ Indeed the result of the former is a substance which is a subject of predication, whereas the latter involves only accidental qualitative changes.²³⁵ As regards generation, form comes to be predicated of matter constituting the coming-to-be thing. On the contrary, alteration do not involve changes in

²³¹ See, for example, *Metaph.* H 3 *passim* and Z 8, 1033b 18, where Aristotle claims that the *sunolon* gets its name from *eidos* or *ousia*.

²³² cf. Jones (1974), p. 479.

²³³ That form is, in a way, ontologically dependent on matter, inasmuch as no form can exist without matter realizing it, See *Phys.* VII 3, 246b 15-16, *DA* II 1, 413a 3-5, *GA* II 3, 736b 4-12.

²³⁴ This is one of the main remarks of Whiting (1992).

²³⁵ See *GC* I 2, esp. 317a 25; I 3, esp. 319b 25-30; I 4, 319b 6 – 320a 1.

predication.

«Things which come-to-be and pass-away cannot be called by the name of the material out of which they have come-to-be: it is only the result of alteration which retain the name».²³⁶

Aristotle argues similarly in *Physics*:

«Since, therefore, having regard to the figure or shape of a thing we no longer call that which has become of a certain figure by the name of the material that exhibits the figure, whereas having regard to a thing's affection or alterations we do, it is evident that becomings of the former kind cannot be alterations».²³⁷

Thus, when a substance comes to be, it does not keep the name of the material out of which it comes: the compound *is* not the matter constituting it, it is rather *of* it.²³⁸ Indeed the compound gets its proper metaphysical definition from the form that matter acquires. It is in virtue of the form that matter constitutes a whole, able to perform the characteristic functions of the kind corresponding to the form essential to the individual. This highlights the reason why Aristotle regards form as the “cause of matter” and the “cause of being” of the compound as a whole: form is the *explanation* – that is, the *cause* – of matter being organized as it is.²³⁹

«Now since we must know that the fact actually exists, it is surely clear that the question is “Why is the matter so-and-so?” e.g. “Why are these materials a house?”. Because the essence of house is present in them. And this matter, or the body containing this particular form, is man. Thus what we are seeking is the cause (i.e. the form) in virtue of which the matter is a definite thing; and this is the substance of the thing».²⁴⁰

If we are to ask why matter constitute this or that thing, according to Aristotle the answer is: in virtue of form, the essence of that substance. So what about sensible things which do not have an essence but rather that have lost it?

Losses of Form

The moment of death coincides with the loss of form and function and so, properly speaking, death is not an actuality, since it is rather a privation of it. Potentiality and actuality are related notions and, as it is well known, Aristotle assigns to the former a priority: potentiality exists for the sake of

²³⁶ *GC* II 1, 329a 20. Accordingly in I 4 Aristotle points out that when a new form is acquired by a *substratum* (thus a coming-to-be of a substance coincides with the passing-away of another), «the second thing, into which the first changes, must not be a property of this. Otherwise the change will be alteration», *GC* I 4, 319b 23.

²³⁷ *Phys.* VII 3, 246a 1-4.

²³⁸ See, for example, *Metaph.* Z 7, 1033a 6.

²³⁹ cf. Irwin (1988), p. 238.

²⁴⁰ *Metaph.* Z 17, 1041b 7-9.

actuality (1050a 15).

Fermentation (as regards wine) and death (as regards living body) are respectively losses of form and Aristotle defines them as accidental. As I have already stressed, Aristotle is contrasting “accidental” with “essential”. The loss of form does not belong to the essence of a compound, i.e. its form, since it is rather the privation of it. This reading is confirmed if we look at the second sense of “accident” Aristotle explains in *Metaphysics* Δ 30:

«Accident has also another sense, namely, whatever belongs to each thing in virtue of itself, but is not in its essence».²⁴¹

Indeed corruption is exactly the end of a sensible compound and hence does not *essentially* belong to it, even though it belongs to the thing in the sense that it is a process that the thing inevitably undergoes.

Aristotle sees the tasks he faces in terms of the matter-form distinction. Accordingly, form plays the *causal role* to be that by which matter is some one thing. Matter plays the *causal role* to be that which constitutes the thing and by which it undergoes corruption. Aristotle’s four causes, especially the formal and the material one, are different kinds of explanation, in which both matter and form are regarded as the causes of change.²⁴² In fact Aristotle thinks that the fundamental elements like fire, earth, etc., are characterized by natural movements; consequentially, matter constituting perceptible entities is characterized by some sort causality. Matter, and not only form, is a factor of change.²⁴³

This reading is reinforced when we turn to *Physics*, the work devoted to the analysis of substances as subjects of change. As Charlton points out, according to Aristotle it is what the thing is made of which is often a source of explanation: in particular, matter is the source of explanation in those cases in which Aristotle wants to give an account of the process of corruption.²⁴⁴

«All things that come to be either by nature or by art have matter; for each of them is capable both of being and of not being, and this capacity is the matter in each».²⁴⁵

²⁴¹ *Metaph.* Δ 30, 1025a 30-35.

²⁴² With regard to this causal reading of matter-form distinction, I am sympathetic with Charlton (1970), p. 89.

²⁴³ In reality, Aristotle would probably reverse the terms and say that form, and not only matter, is a factor of change. Indeed he worries to demonstrate that form is a factor of change, since he thinks that the causal role of matter is plain and yet not exhaustive. His effort is identifying two factors of change, namely matter *and* form. It is beyond dispute that his critical targets are his predecessors, which identified *only* matter as source of change. See for instance *Phys.* II 1, spec. 193a 10-11 and *GA* V 8, where Aristotle criticizes Democritus for having explained the formation of the front teeth taking into account just the material cause.

²⁴⁴ See for instance *Phys.* II 1, 192b 15-20; V 1, 224b 5-10.

²⁴⁵ *Metaph.* Z 7, 1032a 21.

Thus *matter is characterized not only by the potentiality to realize a form but also by the potentiality to corrupt, hence matter is the explanation of decay that compounds of matter and form undergo.*

In the case of study presented in *Metaphysics* H 5, Aristotle concludes that wine is not potentially vinegar and a body is not potentially a corpse. It might now be asked how wine can nevertheless become vinegar, if it potentially is not such. Likewise, if a living body is not potentially a corpse, how can it become a corpse at all? Aristotle's answer is that compounds can lose their *eidos* because of matter. He identifies the nature of matter itself as an explanation of the tendency to corruption of compounds.

The framework we have hitherto presented is at work also in *De Anima*. In this work we are given an account by which the blunting of functions concurrent with old age is not caused by the corruption of *psuche* but rather by the matter constituting the living body. The decay is an affection of matter and hence, if we were able to replace it, the formal principle which made it functioning would still work. This is the reason why Aristotle claims that if an old man could get a new eye, he would recover sight.²⁴⁶

Although I shall not argue for this, the attribution of the causality of corruption to matter has to do with Aristotle's claims about the incorruptibility of forms.²⁴⁷ Aristotle claims that forms cannot be generated because they do not come from something else and, if it were so, we would have an infinite regress. But if forms are not generated, then they do not undergo corruption. This is why we find Aristotle appealing to the potentiality to corrupt of matter, which is however overall consistent with hylomorphism.

Thus the natural tendency of matter is essential to matter itself but accidental to the compound as a whole.

Once the potentiality of corrupt of matter breaks, so to speak, the "banks" of the form, the

²⁴⁶ *DA* I 4, 408b 21: «[...] if the old man could recover the proper kind of eye, he would see just as well as the young man». The passage is interesting because, on one hand, it prefigures the possibility of organ transplants and, on the other hand, it shows that the hylomorphic framework is more plausible than it would seem at first sight. It makes indeed perfect sense that a person in need of an organ transplant retains still the functional organization of her whole body (substantial form), while an organ has somehow undergone corruption and need to be replaced, not as regards its function (every heart works in the same way and has to) but as regards its matter (*this* heart is damaged and need to be replaced, *that* heart is healthy and can be transplanted). Thus some diseases, and surely the inconveniences of aging, affects matter and not form. This is why replacing an organ (a new portion of matter) can possibly lead to the correct functioning of the whole body.

²⁴⁷ cf. *Metaph.* Z 8, esp. 1033b 1-5 and H 3, esp. 1043b 16. This characterization of the generation of form has an anti-reductionist purpose, since is postulated by Aristotle in order to avoid the reduction of substance to the material it is constituted of. cf. *Metaph.* Z 8, 1033b 1033a 31 – 1033b 8; H 3, 1043b 16; H 5, 1044b 21-25. I cannot undertake now to inquire the debate about the sempiternality or perishability of forms. For an account of this issue I recommend Whiting (1986); Shields (1990); Woods (1993) and Frede (1987), esp. pp. 63-71.

compound ceases to exist, both as subject of predication and as subject of change. In some cases we are able to refer to the new entity with a new name (vinegar, corpse), in other we are unable to refer to it except homonymously (as when we call “body” the corpse). The fact is that, once the form ceases to organize the matter in such a way that it is able to perform functions, (a) there is not a “this”, *subject of predication*, anymore; and (b) there is not an unitarian *subject of change* constituting a whole. Matter organized and made functioning by the form traces back to its most fundamental elements (fire, earth, etc.) and disaggregate the whole, which ceases to exist.

Potentiality to Die

Death is a certain physical state which can be inquired from a metaphysical point of view. Since death realizes some natural tendencies, these might be regarded as potentialities and, consequentially, death might be regarded as the actuality relative to these tendencies. So, is death an actuality? This is a difficult question and I am tempted to provide reasons for both the possible answers. In a way, death is an actuality because it is a privation of form and, as Aristotle states in *Physics*, «even privation is form».²⁴⁸ This statement is supported by the fact that, in a sense, there is a related potentiality to the actuality of death, namely the potentiality of matter to regress to its most basic states. Thus corruption of sensible substances might be regarded as the actuality of the potentiality to corrupt of matter.

Does it follow that death can be conceptualized as the *last actuality of a potentiality of the body* which it carries on from the outset, i.e. the loss of ability to perform its biological functions? Not really. And that because the living body ceases to exist in the instant of death. So, even though this conceptualization is fairly intuitive, I fear it is dissonant with Aristotle’s overall account. Once form is lost, we are left only with a portion of matter devoid of a principle of individuation, if not a mere extrinsic principle of spatial unity (i.e. corpse). But the continuity of organization, the what-it-is-to-be for that body, has ceased to exist. Thus we cannot regard death as something proper of a subject of predication such as the body is, given that there is not subject of predication anymore. Death is the actuality of the natural tendency to disaggregate of elements, such as that of fire to go upwards and that of earth to go downwards. This tendency plays an explanatory role as regards the destiny of the living body but it is not predicable of it as such. In the instant of death, the elements which remotely constitute the body are “freed” by the counteracting force of the form which have been holding them together and actualize their natural tendencies. The point is that, *once a body is dead*,

²⁴⁸ *Phys.* II 1, 193b 20.

there is no subject to predicate such an actuality of. Let me shelve this for later comment in the third section.

II. Solving Subproblems

In light of such analysis we can now consider again the questions concerning Aristotelian living bodies. I have identified two subproblems, namely generation and death.

How to Solve the Puzzle about Generation

In Aristotle's view the living body comes to be out of inanimate elements. In virtue of the *graduality* of potentiality, only the last degree of actualization of these developments is properly definable as what is potentiality an adult human being. Even if Aristotle's biology is not up to date, the logical framework makes perfectly good sense with a contemporary naturalized view. The passage to life starts with biological elements which are *not* alive. They do not have the continuity in organization supplied to living things by the substantial *eidos* and hence they are not suitable to be defined as a body.²⁴⁹

In *Metaphysics* Θ 7, we are given an account for matter of the body. Aristotle claims that elements that are too remote as regards the living body are potentially not the human body. Rather, it is the embryo which potentially is a human adult, even though it is already living and hence does not help us to identify the inanimate elements out of which the living body comes to be. At the same time, the account of change given in *Physics* maintains that matter is what underlies the changes which bring about the body. So the question is how can the matter of the body exist before it, if anything which comes before the body is either too remote to be regarded as its matter (e.g. earth) or already living (e.g. embryo).

The answer, I think, is to be found in the functional determination thesis and in the graduality of the

²⁴⁹ cf. *GC* I 3. Such a view is necessary in order to avoid an infinite regress and, moreover, to maintain a plausible conception of life and individual. The alternative is to classify as living individuals the biological elements out of which the embryo comes to be. Yet this would lead at least to two difficulties: first, an infinite regress. Indeed out of what these living biological individuals come to be? Either out of alive elements or out of inanimate ones. If we accept the former hypothesis, the aforementioned infinite regress starts; whereas, if we accept the latter, we are contradictorily committed to the thesis that life comes to be out of inanimate elements, which is what we refuted at the outset. The second difficulty arises because classifying as living individuals the biological elements out of which the embryo comes to be would entail implausible conceptions of both life and individual: if a sperm cell is a living individual, why should not every cell of the body be regarded as such? And if we accept this thesis, which would be the criteria of identity of an individual constituted by a mass of other individuals? Thus living individuals, such as the embryo, are brought about by processes which start from not living matter.

notion of potentiality. On one hand, the functional determination thesis commits Aristotle to require that only the living body potentially able to perform the relevant set of functions is a member of the kind individuated by that set. The embryo has certainly the potentiality to develop in such a living body, nothing should prevent. It is already a living body and it has the potentiality to develop the bodily parts which will make him able to perform the relevant functions.²⁵⁰

On the other hand, the graduality of the notion of potentiality accounts for the matter of the coming-to-be body. Earth is not potentially human. It is simply too remote. In the relevant series of related potentialities-actualities, earth is potentially nutrition (i.e. the related actuality) and is not potentially a living body (i.e. the very last actuality in the series). This does not commit Aristotle to the idea that earth (or any other fundamental material element) is not going to partake to compose the matter of the living body. It will, but only once all the changes of the relevant series have already come about. Earth is potentially nutrition, which is potentially blood, and so forth. The graduality of the notion of potentiality accounts for this understanding.

Thus the charge of inconsistency is refutable. Changes in inanimate matter lead to the living body of the embryo, which, should nothing prevent, will develop the potentialities it has. The point is that we should consider the relevant series of related potentialities-actualities.

How to Solve the Puzzle about Death

On the other hand, living bodies lose their form and function in the instant of death. I have shown that *wine is not potentially vinegar because vinegar represents the loss of wine-form. Similarly, a living body is not potentially a corpse because death is the loss of its substantial form, which implies the end of it both qua subject of predication and qua subject of change.*

Aristotle accounts for them contrasting “essential” and “accidental”. Privative states are “accidental” not in the sense they may somehow be avoided but rather insofar as they represent the loss of essence.

Denying that the corpse is a body, Aristotle is not denying that a living thing can die or that its

²⁵⁰ In *DA* II 5, 417a 20 – 417b 1 Aristotle distinguishes between three levels of potentiality and actuality. His example concerns the cases in which someone can be described as a “knower”: a human being (because he can acquire knowledge); a man who knows grammar (because he can use his knowledge whenever he wants to, should nothing prevent); and finally a man who is actually exercising his knowledge. Traditionally, the first sense is called *potentiality* and the other *first* and *second actuality* respectively. A knower in the first sense may not have any knowledge, but fall within the class of beings which have the potentiality to acquire it. I cannot argue for this now, but the embryo is a human being in this first sense of potentiality, since it falls within the class of beings which have the potentiality to develop all the essential properties of human beings, though it is not yet able to perform them.

matter is essentially alive. Rather he is claiming from a metaphysical point of view that, once a living body is dead, it is not appropriate to define it or refer to it as it were still a portion of informed matter. If we still do so, we are aware that we are calling it so not in virtue of its essence but rather only homonymously.

III. Reconsidering Ackrill

Akrill argues that the hylomorphic analysis cannot be consistently applied to the living body, since the application of the hylomorphic scheme matter-form-compound requires that the constituting matter to be picked out as such. Ackrill means that the metaphysical distinction between matter and form demands that these elements should be capable of being identified separately. According to him, the main problem concerns matter: Aristotle conceives matter as the element potentially able of acquiring the form and this role entails that we should be able to conceive it both as having form in actuality and as not yet having the form (that is, existing without it, having it only potentially).²⁵¹

The problem Ackrill remarks is that the hylomorphic analysis requires that a triadic scheme is applied, namely (i) matter; (ii) form and (iii) the composite. While such a scheme makes sense with regard to an artefact (e.g. bronze; sphericity; a bronze sphere), when it is applied to the living body, the matter of the compound can only be the *body* itself. Without the *psuche* the body is not “body”. Ackrill’s conclusion is that the matter of the body is the *body already in-formed by the psuche*.

According to Ackrill, when we take both hylomorphism and homonymy into account as regards the living body, that leads us to the unacceptable conclusion that Aristotelian bodies are necessarily ensouled. The crucial point is that hylomorphism clashes with the homonymy principle. If Aristotelian body are “body” only as long as they are alive, then they are essentially ensouled and the account of matter as potentiality developed in the context of hylomorphism is contradicted.

«They [organs and bodies] are necessarily actually alive. If they lack the relevant powers they are just not organs or human bodies; if they have them they are eo ipso alive».²⁵²

It is plain that homonymy plays a central role in this problematic framework. Ackrill’s view is that homonymy is the issue that makes Aristotelian hylomorphism inconsistent. Indeed he deems that if a dead body cannot be defined as “body”, then the form and the matter cannot be conceived separately, thus blocking the hylomorphic analysis.

Akrill’s concludes his article with three proposals.

²⁵¹ Ackrill (1972-1973), p. 124.

²⁵² *Ivi*, p. 126.

(A) The first proposal is «dropping the homonymy principle at least in regard to living versus dead (or severed) organs or bodies»,²⁵³ suggesting that if the dead body could be properly defined as “body”, then it could stand for the material side of the compound in-formed by the *psuche*. This is a drastic solution. Since Aristotle explicitly maintains the homonymy principle, it is plain that he would reject this alternative. If possible, it would be preferable to find an interpretation by which these doctrines can be freed from the charge of inconsistency.

(B) If it is impossible to regard the body as the matter of the living body, Ackrill’s second suggestion is to consider such the homeomerous parts, i.e. flesh and bones. The advantage of adopting such a position would be to be able to trace back the elements constituting limbs and organs and, consequentially, the matter of the body. If flesh and bones could be regarded as the matter constituting the living body, hylomorphism and homonymy would fit together. We would indeed be able to identify the three variables hylomorphism requires, namely (i) flesh and bones as matter, (ii) *psuche* as form, (iii) living body as compound.

The fact that in some passages Aristotle contrasts homeomerous with ahomeomerous parts (such as, for example, face and hands) seems encouraging.²⁵⁴ In *Metaphysics Z* Aristotle hints to such a view:

«[...] the begetter is adequate to the making of the product and to the causing of the *form in the matter*. And when we have the whole – such and such a *form in this flesh and in these bones* – this is Callias and Socrates [...]».²⁵⁵

Aristotle may think that flesh and bones are the *matter of* limbs and organs, but only in the relative sense that ones constitute the others. Nevertheless, flesh and bones too are parts of the living body and they perform their particular function in the organism as a whole. Therefore, even if they are what constitutes the ahomeomerous parts, it is perfectly consistent with Aristotle’s overall account that they are functionally defined. Flesh and bones are defined by the function they perform, like organs and body as a whole are. And once they cannot do their work anymore, they are “flesh” and “bones” only homonymously, which means that in the corpse they are flesh and bones only homonymously.

«All the homogeneous bodies consist of the elements described, as matter, but their essence is determined by their definition».²⁵⁶

Aristotle points out that the function of flesh is not evident as an organ’s one, but he confirms that

²⁵³ *Ivi*, p. 127.

²⁵⁴ cf. *GA I 1*, 715a 9-11; *Meteor.* IV 12 398b 26-28.

²⁵⁵ *Metaph.* Z 8, 1034a 5-6, emphasis added.

²⁵⁶ *Meteor.* IV 12, 389b 28.

the functional definition applies to every part of the body, whether homeomerous or not. He expresses this thesis in a crucial passage in *Meteorologica*.

«What a thing is always determined by its function: a thing really is itself when it can perform its function; an eye, for instance, when it can see. When a thing cannot do so it is that thing only in name, like a dead eye or one made of stone, just as a wooden saw is no more a saw than one in a picture. The same, then, is true of flesh, except that its function is less clear than that of the tongue».²⁵⁷

The passage makes clear that the function determines the essence. While the function of the eye is clear (seeing) the function of flesh is not as much clear. However, from a metaphysical point of view, it does not matter whether we understand more or less clearly that a part of the body performs a function. The obviousness of a bodily function is just an *epistemic* trouble which does not affect that a bodily part is defined by the work it does.

«For there is no such thing as face or flesh if the life has gone out of them, just as if they had been made of stone or wood. [...] The same applies to flesh, for this too has a function».²⁵⁸

Just as the bodily parts and the body as a whole are what they are only insofar as they perform the relevant functions (otherwise they are, say, “hand” and “body” only homonymously), so the homonymy principle applies to flesh and bones constituting the body at a more remote level. Insofar as flesh and bones perform a function as well, they are defined by it.

Summarizing, once flesh and bones have ceased to be able to do their work as parts of the whole living body, what is left can be called “flesh” and “bones” only homonymously. Ackrill recognizes this and concludes that not only the body as a whole and the ahomeomerous parts (such as organs) are «inseparable from the *psuche*»; given that it is not possible to pick homeomerous parts out as not-formed matter to be organized and structured by the form, his criticism applies to homeomerous parts as well: in his interpretation, they are «necessarily living». Accordingly the homeomerous

²⁵⁷ *Meteor.* IV 12, 390a 10-15. The picture Aristotle gives us is an imagine of an axis (similar to which of a Cartesian coordinate system) on one extreme of which is pure matter and, on the other, pure form. Thus in a compound matter and form are inversely proportional: the more matter is prevalent, the less form is, and *vice versa*. Aristotle’s point is that in homeomerous parts matter is more prevalent over form, whereas in ahomeomerous parts form (and thus function) is more evident (390a 5-7). Given the functionally defined parts of the body, Aristotle supposes it is less hard to believe that a corpse has no organs anymore than it is to believe that a corpse has no flesh and bones anymore. In the former case function is evident and similarly it is evident when it ceases to be performed. In the latter case, the function is less clear and thus the end of it is more hardly recognized. cf. *GC* I 4, 321 b 28-32: «For there [in ahomeomerous parts] the fact that the matter is distinct from the form is more manifest than in flesh and homoemerics. That is why there is a greater tendency to suppose that a corpse still possesses flesh and bone than that it still has a hand or an arm».

²⁵⁸ *GA* II 1, 734b 24-31. Code points out that the Greek for “if the life has gone out of them” is simply “*phtharenta*” (“have perished”) and emphasizes that Aristotle’s point is that when the flesh has perished, that portion of matter is only homonymously flesh. cf. Code (unpubl.) n.19 p. 16.

parts are not suitable to count as matter of the body.

(C) Ackrill's third proposal is to take a further step back in the constituents of the body. If the whole body cannot be regarded as the matter of the *psuche*, nor can the homeomerous parts, maybe we could regard the four elements as the matter of the body. Aristotle contrasts them with the formal and final causes²⁵⁹ and there is no doubt he thinks they are the fundamental elements constituting all perceptible bodies.²⁶⁰ Yet, as I have stressed, Aristotle explicitly denies that fundamental elements such as earth are potentially alive. They are too remote from the body to count as matter of it. Potentiality is a graded notion always referred to a further related actuality. Thus earth is not potentially a man (1049a 1-16) because man is not the next stage in the ordered series of the achievable actualities. So not even the elements are suitable to be regarded as the matter of the body.

To sum up, neither the body itself, nor the homeomerous parts, nor the fundamental elements can count as the matter suitable to receive the form of the living body. Ackrill's conclusion is that the material aspect of the living body seems to be missing from Aristotle's account: if it is there, it is already alive. If it is not, then it cannot be the matter of the body. Ackrill's conclusion is that the body is inseparable from the *psuche*.

I consider Ackrill's criticisms to be subtle and well formulated, but I take them to show the strength of both hylomorphism and homonymy, rather than to undermine them. I take his criticisms to underline that according to Aristotle:

(i) the relevant functions are caused by the presence of form in the portion of matter constituting the composite (*hylomorphism*).

(ii) the essence of an individual derives from the ability to perform the relevant function, no matter how we use to call objects in the world (*homonymy*).

Let me start from the latter.

Homonymy and Function

With regard to homonymy, I recall that according to Aristotle "definition" is a metaphysical notion, which relies on the essential function that the thing to be defined has the ability perform.²⁶¹ We

²⁵⁹ cf. *Metaph.* Λ 5, 1071a 14.

²⁶⁰ cf. esp. *GC* II 2 and *Phys.* I 6-9.

²⁶¹ For an account of these claims, see the section entitled "Homonymy as such" in this work.

know that, according to Aristotle, a correct definition expresses the essence of the word it defines²⁶² and that essence is not a linguistic entity, but rather a set of real properties²⁶³ predicable of an individual entity which he often interprets as the formal cause. Thus homonymy detects that a word is applied to different things characterized by different definitions, whereas synonymy detect that a word is applied to different things characterized by the same definition.²⁶⁴ Although thing *x* (e.g. living body) and thing *y* (e.g. corpse) are named with the same word, from a metaphysical point of view they do not share the same essence because they do not share the ability to perform the relevant function.

By “essence” Aristotle means the substance of each thing: as I have already stressed, its notion is expressed in the thing’s definition.²⁶⁵ Once a compound loses the ability to perform its set of functions, it might still be called by the same name but, technically, it has ceased to exist as such: the compound is not informed by the *eidōs* anymore.

What remains after death is a portion of matter that cannot perform the defining function of the composite it used to constitute. Therefore it does not have the same essence and consequentially it cannot be called by the same name, except homonymously.

My point is that it is functional determination that accounts for homonymy. There is no inconsistency in Aristotle’s view with regard to the change of the name by which we call an alive and a dead body. Why not? Because the definition of *x* express the essence of *x*, the essence of *x* is determined by the function *x* has the ability to perform and, once this ability is lost, the essence of *x* is not the same. Consequentially the proper definition of *x* changes as well.²⁶⁶

Further, Ackrill overlooks what I consider to be a central point: when Aristotle argues that painted, sculpted and dead bodies cannot be defined as a “body”, he is pointing out a lack of potentiality to perform the relevant function. A painted eye does not have the ability to see, neither does a dead eye. The homonymy principle relies on Aristotle’s conviction that essence is defined by function (*functional determination thesis*). It follows that the lack of function corresponds to the lack of essence. And names change consequentially. Summarizing, homonymy is a linguistic ruling which takes root in metaphysical predication.²⁶⁷

²⁶² cf. *Top.* 101b 38.

²⁶³ cf. Irwin (1982), p. 246.

²⁶⁴ cf. *Cat.* I 1, 1a-11.

²⁶⁵ cf. *Metaph.* Δ 8, 1017b 21.

²⁶⁶ cf. Code (unpubl.), esp. n. 19 p. 16.

²⁶⁷ The term “metaphysical predication” is due to Lewis (1991). By this term Lewis wishes to emphasize that in Aristotle’s view a predicate (a metaphysical item) is metaphysically predicated of a substance. I am sympathetic with his understanding of the connection between theory of substance and predication. As I have argued in the previous chapter, I think that Aristotle’s notion of subject and predicate is primarily ontological

Hylomorphism and Chemical Change

Ackrill's most powerful criticisms are drawn in the very last section of his article. As I have recalled, he suggested three candidates for the matter of the body, namely (A) the body itself, (B) the homeomerous parts and, eventually, (C) the four elements. It is easily noticed that Ackrill's candidates are an ordered series that includes subsequent material stages of decreasing structural complexity.

At least three characteristics of Ackrill's candidates are of metaphysical interest: (i) every element can physically be *traced back* to the following one in the series, (ii) every element is the *matter of* the previous one; (iii) none of them is metaphysically *reducible* to the following one.

Accordingly, bodily organs are constituted by the homeomerous parts such as flesh and bones, which, in turn, are constituted by the four elements. The matter of the body is exactly the matter of the homeomerous parts and of the four elements. So, if not matter, what does distinguish these altogether different subsequent stages? Just form. That is, what accounts for the differences between the body, the homeomerous parts and the elements is not matter but rather a *principle of organization* of matter. The body can be traced back to the homeomerous parts and ultimately to the four elements, because the four elements are the matter *of* flesh and bones, and flesh and bones are the matter *of* the body. Indeed, as Fine points out, Aristotle has a *hierarchical conception* of matter, that is that «what is matter may itself have matter».²⁶⁸

So a metaphysical reduction of one of this stage to the subsequent would fail to take into account the *form* of each one. For form is exactly what accounts for different levels of organizations of the *same* material constituents. For instance, it is obviously possible to trace a cake back to eggs, flours, water etc., in the sense that these material ingredients are exactly the matter *of* the cake: no other materials have been added during the chemical process that takes from the separated ingredients to the composite. Yet any attempt to identify eggs, flour, water *after* the cake is blended and cooked would fail. The ingredients have undergone changes such that they are no longer eggs, flour, water etc. And it does not mean that something else has been added. In other words, chemical processes have occurred in a way such that the ingredients, mixed and combined together, have lost their previous identity. *It follows that the "ingredients" (i.e. the not-proximate matter) are not separately identifiable anymore.* No material has been added to the cake apart from the initial ingredients and

rather than linguistic. «Our dominant notion of predication today is exclusively linguistic, so that both the subject and what is predicated of it are invariably linguistic items [...]. For Aristotle, by contrast, the subject is an item in the ontology [...]», Lewis (1991), p. 4.

²⁶⁸ Fine (1992), p. 36. Fine interprets Aristotle's account of matter as a hierarchical one, describable by the notion of mediate constitution, which he defines as follows: « x mediately constitutes y if for some $x_1, x_2, \dots, x_n, n > 1, x = x_1$ constitutes x_2, x_2 constitutes $x_3, \dots,$ and x_{n-1} constitutes $x_n = y$ », p. 50.

yet, as the relevant form is acquired by the composite through the chemical processes, the final outcome is something different than the mere sum of its constituents.

I think Aristotle expresses this doctrine claiming that the matter underlying change is numerically one and nonetheless changes form as the process moves forward.

«There must always be an underlying something, namely that which becomes, and that this, though one numerically, in form at least is not one».²⁶⁹

An attempt to formulate this paradox would be that in the final composite there is something more than at the beginning (namely form), even though nothing (material) has been added.

Aristotle labels this non-material structural factor as *form*.²⁷⁰ Form is the substance of the composite, for it bears what-it-is-to-be the composite. Notice that form itself is not material: it is not eggs, nor flour, etc., and, nonetheless, it is in a sense *within* this matter, given that it is the structure of it. This is the core of the anti-dualistic strength of Aristotle's framework and also one of its most delicate issues.²⁷¹

Now, Aristotle's hylomorphism is a doctrine according to which every object in the world is a composite of matter and form, that is, the material ingredients of an object plus its structure, shape or form. Everything which undergoes a process of becoming, comes to be *from* something, in the sense that its material aspect realizes or embodies a new form through the relevant process. It might be, for instance, a non-substantial change, such as a learning process (e.g. the musical man example in *Phys. I 7*) or rather a substantial change. As regards this latter case (which is labeled as "coming to be without qualification" and is proper only of substances²⁷²) Aristotle thinks that the thing out of which the outcome of the process comes to be does not survive the process of change.²⁷³

How can we account for such a view, given that matter is what underlies the change and hence should be exactly what is preserved throughout the change? The example of the cake shed light on this problem. Aristotle means that if matter *m* undergoes a process in which a new form supervenes

²⁶⁹ cf. *Phys. I 7*, 190a 15.

²⁷⁰ «And the same is true in other cases, e.g. if the threshold is characterized by its position, the position is not produced by the threshold, but rather the latter is produced by the former. Nor is man animal and biped, but there must be something besides these, if these are matter – something which is neither an element nor is produced by an element, but is the substance, which people eliminate and state the matter», *Metaph. Z 3*, 1043b 11.

²⁷¹ Williams (1986) states that Aristotle's capacity to resist materialism lies in the hylomorphic distinction between *A* and *A*'s body, cf. p. 189.

²⁷² cf. for instance *Phys. I 7*, 190a 31-33 or *Metaph. Θ 7*, 1049a 19-24.

²⁷³ cf. *Phys. I 8*, 191b 7; *Metaph. Z 8*, 1033a 20-21. For a brilliant account of the reason why matter is what does not remain cf. Jones (1974).

on it, *m* is the element which undergoes change and, if so, then it does *not* remain *as such*.²⁷⁴ In order to constitute a cake, eggs, flour and water do not remain as such but rather undergo change and eventually end up being the cake.

«... its coming to be implies change in that from which it comes, and not permanence».²⁷⁵

In light of these observations, we can account for predication as regards substantial changes. If matter is the element which does not remain a such, it makes sense that matter is not the subject of which a new property is ascribed. Indeed the outcome of the change is expressed by the *subject* of the sentence describing the coming-to-be process; the subject is not the matter, but rather the compound called by the name of the form proper of the relevant kind.²⁷⁶

I think that Aristotle's warnings about paronymy are to be understood in this context. Matter is what underlies process of substantial changes but it is not the subject of them, hence we do not say that a thing *is* its material constituents. Rather, either we say that the thing is *of* this-and-that constituent or we label it with the adjective derived from the constituent.

«And so, as there also a thing is not said to be that from which it comes, here the statue is not said to be wood but is said by a verbal change to be not wood but wooden, not bronze but of bronze, not stone but of stone, and the house is said to be not bricks but of bricks».²⁷⁷

Let me consider again Ackrill's candidates to play the role of matter as regards the living body. If what I have argued so far has shed some light on the issue of the matter of the body, we are now in the position to understand that (i) every element can be traced back to the following one in the series exactly because (ii) every element is the matter *of* the previous one. However, on the other hand, (iii) none of these elements is completely *reducible* to the following one because another factor has intervened, that is, form. E.g. earth, water, etc. are potentially present in flesh but, as form intervened, the body is not suitable for a metaphysical reduction to its material ingredients. A physical reduction is, in line of principle, perfectly conceivable and indeed is what Aristotle thinks happens when – through processes of corruption and decay – matter regress to its most basic state. There is one element more in the compound that is not reducible to matter, namely form. This is the anti-reductionist strength of hylomorphism.

²⁷⁴ This is one of the conclusions of Jones (1974). According to his interpretation, matter is a formal notion based upon the relation it has to the final product of coming-to-be. Since it is that *from* which the process of coming to be starts, it is the element which does *not* remain.

²⁷⁵ *Metaph. Z 7*, 1033a 20.

²⁷⁶ E.g. "A man comes to be"; "A statue is made". cf. Jones (1974), p. 479.

²⁷⁷ *Metaph. Z 7*, 1033 16-19. See also *Phys. I 7*, 190a 25; *Metaph. Z 7*, 1033a 5-23; *Metaph. Θ 7*, 1049a 19 – 1049b 1.

Thus the very general point of Ackrill's criticism is that matter-form analysis is in difficulty when living things or artifacts are produced by means of chemical action. How to define matter when it is not in some "fundamental" state but, rather, it has already undergone some chemical processes which have modified its structure, shape, organization, disposition, or in one word, its form?

Ackrill's dead end argument indicates three possibilities. On one hand, we could regard the matter so-and-so organized as the matter of the compound. Yet in this case the trouble is that we are counting the organization of matter simply as matter and hence we are unable to separately identify the form. On the other hand, if we regard the organization of matter as the form, we are counting such a material organization just as formal and hence matter seems to disappear from the scene, for its organization is regarded as an "immaterial" element of the compound. If we do not want neither form nor matter to disappear from our analysis, the third possibility is that we count as matter all the material ingredients *plus* their organization. However, in this case, form would turn up to be a necessary property of matter. This would disappoint not only Aristotle but also the functionalists, at least for two reasons: the first is that this understanding of hylomorphism would be inconsistent with the contingency of the relation between matter and form, the second reason is that form should not be a property of matter but rather its substance.²⁷⁸

In my view such a dead end suggests that Ackrill's view fails to take into account some fundamental aspects of hylomorphism, especially its connections with Aristotle's theory of predication.

IV. Definition and Predication

In what follows, I wish to argue that Aristotle thinks that only the form has the title to be the subject of predication. This predicative aspect of hylomorphism should be taken into account jointly with the metaphysical aspect of the doctrine.

A clue in the direction is to be found in *Metaphysics Z 7*. Here Aristotle claims that «the statue is not said to *be* wood».²⁷⁹ He means that matter (wood) is the part of the compound which underlies the coming to be but it cannot be predicated of something else, nor can it be identical with the subject of the predication (the statue). Paronymy is a subtle aspect of hylomorphism, for it allows Aristotle to maintain the priority of form over matter. Form is not reducible to matter, rather, form is what organizes matter and is predicated of it. Claiming that matter is not the subject to which a new property (the form) is ascribed, hylomorphism stands as a strong alternative to materialism. The

²⁷⁸ Ackrill (1972-1973), p. 133.

²⁷⁹ cf. *Metaph. Z 7*, 1033a 17; IX 7, 1049a 20.

point is that the possibility of physical reduction is allowed while metaphysical reductionism is avoided.

Further, matter is the element that undergoes change insofar as it is the element which does not remain unchanged. This allows to make good sense of the account illustrated in *Physics* I 7, that from a formal point of view matter is the element which does not remain.²⁸⁰ Exactly because matter plays this role, it cannot be a permanent subject of predication. As Frede points out:

«[...] what is organized in this way, the matter, is continually changing or, at least, could be changing. We only have an individual object in virtue of a particular organization; it is only the identity of this organization that makes the object the individual it is».²⁸¹

A further virtue hylomorphism has over materialism is that this allows Aristotle to distinguish between a compound and its matter, since the hylomorphic compound of matter and form is not identical with the matter it is made of.²⁸² Therefore Aristotle suggests to use paronymous expressions: not *x* is *y* (where *x* is the compound and *y* is matter), but rather *x* is *y*-en.²⁸³

The form is the element which provides unity and identity to the hylomorphic compound, while the matter in itself is «unknowable»²⁸⁴ as long as it does not actualize the form and it is not identifiable as the matter *of* a compound.

In *Metaphysics* Δ 6 Aristotle is distinguishing in how many sense we can attribute unity to something. He explains the reason why matter is not even numerable before this process is completed: as long as matter does not have a form, it does not have any organized structure we can refer to.

«While in a sense we call anything “one” if it is a quantity and continuous, in a sense we do not unless it is a whole, i.e., unless it has the form; e.g. if we saw the parts of a shoe put together anyhow we should not call them one all the same (unless because of their continuity); we do this only if they are put together so as to be a shoe and have thereby some one form».²⁸⁵

In this passage Aristotle argues that there are two reasons why we can attribute the property of being unitary to something physical. In the first case something is one is because of its continuity in time and space and in spite of its disomogeneity, for example, the disassembled parts of a potentially functioning whole. In this case we do not have a proper unity but only an accidental one.

²⁸⁰ cf. Jones (1974).

²⁸¹ Frede (1987), pp. 67-68.

²⁸² cf. Williams (1986), p. 189.

²⁸³ On the same issue, cf. Whiting (1992), p. 83.

²⁸⁴ «But matter is unknowable in itself», *Metaph.* Z 10, 1036a 8.

²⁸⁵ *Metaph.* Δ 6, 1016b 10-14.

For instance, a heap can be defined “one” because of its continuity in space and time but, beyond this reason, its boundaries and condition of identity remain uncertain. In the second case, we call something “one” more properly in virtue of its unitary form, of the unity its parts are actually realizing. This clearly holds for artefacts, purposely designed to perform a function, as well as for the simplest form of life – like plants, which are able to engage in relevant activities, whose variety resulting from the different tasks performed by the parts does not jeopardize the unity of the system as a whole. Obviously the second sense of being one implies the first one: being one in virtue of a form implies being one according to spatio-temporal criteria. The senses do not coincide for, as the example of the shoe shows, being one according to spatio-temporal criteria is necessary but not sufficient to being one in virtue of a form.²⁸⁶

Likewise, a spot of melted wax might be called “one” in virtue of its continuity in space, but a candle is called “one” in virtue of a stronger reason, i.e. a unitary, functional form, in virtue of which the parts of the candle (the fuel and the wick) interact in a way such to realize a common function (lighting). Applying this distinction to the body, we have that a corpse is called “one” merely because of its continuity in space, which is not granted by a unitary form and essence but is rather merely accidental. Genuine bodies are characterized by a stronger unity supplied by a form which, in Aristotle’s view, is functionally defined. The same understanding of the problem inspires the opening of the second book of *De Anima*, where Aristotle states that matter is not a “this”:

«We say that substance is one kind of what is, and that in several senses: in the sense of the matter or that which in itself is not a “this”, and in the sense of form or essence, which is that precisely in virtue of which a thing is called a “this”, and thirdly in the sense of that which is compounded of both».²⁸⁷

A quick glance to parallel passages confirms that form is that which is a “this”, that is, the element which supplies identity to the compound, not only of functioning but also of predication. Matter lacks of ontological unity and is not predicable of anything in itself, that is, it is unknowable.²⁸⁸

Hence hylomorphism implies not only that every body in the sublunary world can be regarded as a compound of matter and form, but also that form is the element which gives to things unity from a point of view both ontological and predicative. Form makes the compound identifiable and intelligible. This is the issue with which I am concerned here: it is in virtue of the form that we can predicate something of a bit of matter, and not *vice versa*.

²⁸⁶ I am adapting to my purposes Llyod’s distinction between principle of unity and principle of individuation. cf. Llyod (1970), p. 519.

²⁸⁷ *DA* II 1, 412a 6-9.

²⁸⁸ cf. *Metaph.* Δ 8, 1017b 24-25; *Metaph.* H 1, 1042a 28; *Metaph.* Θ 7, 1049a 26-28;

Let me illustrate my point by mean of an example. Suppose we live in a world of heaps, piles or stacks, in short, in a world in which nothing has a form. It could be a windy desert in which there are only hills which disaggregate and recombine continuously. In a world like this we would have very fragile clues about the identity of things. Even if we were to call something “this” or “one”, we would do so only on the fragile basis of easily disaggregable unities. This is just an example of how the presence or absence of form would affect our customary understanding of unity and individuation and I think that the metaphysical perspective Aristotle gains as regards corpse unity is the same. Indeed the unity of the corpse is extrinsic. It does not derive from a functioning form. It is just a difference in the speed of dissipating (plus, of course, some moral beliefs) that makes it seem that a corpse is different from a sand hill.²⁸⁹

In fact, in order to contrast being one without any formal principle of unity and being one in virtue of some form, Aristotle mentions heap (*soros*). Organs are akin to heaps when they are separated from the continuity of organization supplied by the *eidos* to the living body. Once they have lost the potentiality to perform their defining function in the whole of the living body, they are just matter, in the same way as fundamental elements. And, accordingly, they are not “one”.

«Evidently even of things that are thought to be substances, most are only potentially, – e.g. the parts of animals (for none of them exists separately; and when they are separated, then they too exist, all of them, merely as matter) and earth and fire and air; for none of them is one, but they are like a heap before it is fused by heat and some one thing is made out of the bits».²⁹⁰

As Frede points out, the existence of a thing bears on its capacity of functioning and not on its matter, which can be identified only by means of form.²⁹¹

Thus in the context of hylomorphism, form is the crucial element for unity, intelligibility and predication of things.

²⁸⁹ Code (unpubl.), p. 16, n. 19, addresses the functional determination of the parts of animals and points out that comparing *GA* II 1, 734b 24-36; *Metaph. Z* 10, 1035a 18-19, 30-33 and *Meteor.* IV 12, 390a 10-14, we figure out that Aristotle assumes that flesh continues to exist after the death of the animal. In the corpse, it does not perform its proper function but it can still be defined as flesh insofar as it retains the properties which enable its power to perform it. I would add to Code’s account that there is an *epistemic* problem about the possible revivification of the body (or the possible re-use of some parts, cf. *DA* I 4, 408b 23), in addition to a genuine *metaphysical* one. Although Code does not emphasize the former aspect, he claims that «when a corpse is thoroughly corrupted it is easy to determine that what we have is no longer flesh». Code states that the parts – such as the softness of flesh and the rigidity of bones – «are still characterized by all sorts of physical properties that previously enabled them to contribute to the life of animal». Whether these properties remain potentially active after death or not is a problem for us as it was for Aristotle and I would be more careful: for instance, we have to transplant organs from bodies which are technically defined as living (even though this depends obviously on our definition of death). The problem is precisely the “corruption” of the body, given that many organs deteriorate within some minutes after death – that is, the physical properties of the body do not remain potentially active after death.

²⁹⁰ *Metaph. Z* 16, 1040b 5-10.

²⁹¹ cf. Frede (1987), p. 67.

This claim may be too strong if we do not allow that, in a sense, this is true for matter as well: without matter we would have just nothing, and it goes without saying that if we had nothing, we would not be able to identify anything. Yet matter is not the defining element, for it is a necessary but not sufficient condition for the coming-to-be of the compound; matter is rather the defined element, just as the sand is necessary but not sufficient in order to individuate an hill.

Considering again Aristotle's account in *Physics*, matter is the element that has to undergo change and does not remain as such. Consequentially it makes sense that it is not *definitionally* the same before and after acquiring the form. In the former case we have no conceptual tool apt to define it otherwise than "matter", while in the latter it is finally defined by its form. Thus it is not the case that the matter remains definitionally the same, regardless of the presence or absence of the form. The relation "matter of" between matter and *x* (where *x* might be either the form or the compound), is such that in the hylomorphic framework the material aspect of a compound is *a fortiori* defined by the definitionally prior element. It is worth emphasizing that this is a *definitional* point of view: Aristotle does not think that matter changes its own nature once it acquires a form and constitutes a compound. Instead he argue only that, after that happened, we have the element which enable us to define it as the *matter of which* the compound is constituted. However, matter has the potentiality to realize different forms even when it is realizing one form in actuality. It will just need to undergo the set of corrupting processes which bring it back to a "degree zero" and then it will be able to realize or embody a form again. As Aristotle concludes his treatment of <wine; vinegar> and <body; corpse>:

«...the corpse is first reduced to its matter, and only then becomes an animal; and vinegar is first reduced to water, and only then becomes wine».²⁹²

This is the reason why – even though everything which exists is enmattered – it is not the organized matter which defines the compound. The organizing form *defines* the "body" as such. Insofar as the form is what-it-is-to-be for the compound, it defines it and, accordingly, it plays the predicate role of being predicated of the compound.²⁹³

The priority of the form in definitions is a general feature of hylomorphism. Hence does not regards only natural bodies.²⁹⁴ It is a theory of predication that plays a role here and not, *pace* Burnyeat and Williams, a more or less mechanical conception of life.²⁹⁵ Aristotle regards the form as prior in definition, and this priority is non-neglectable feature of hylomorphism itself.

²⁹² *Metaph.* H 5, 1045a 5.

²⁹³ *Metaph.* Z 11, 1036a 27.

²⁹⁴ cf. *PA* I 1, 640a 31-32; *GA* II 1, 734b 24-31; *Metaph.* VII 8, 1033b 25.

²⁹⁵ Cf. Burnyeat (1992), p. 23 and Williams (1986), p. 193.

In the context of the homonymy of the body, the more important consequence of the priority of form concerns the predicative consequences triggered by death. In the very moment in which the form ceases to play its role and consequentially to enable the compound to perform its defining functions, the matter can no longer be defined as the matter constituting that form – since, evidently, there is not a predicable form anymore. Nor there is a “this” we can refer to: the corpse is one only in virtue of its contingent spatio-temporal continuity, which is meant to be dissipated in a certain amount of time. Consequently, the corpse is not suitable for a definition in any substantial sense of the word.

V. Aristotle’s Functional Roles

In the present section I shall attempt to provide reasons for regarding Aristotle’s conception of matter and form as functionally defined. Both matter and form are defined as the “elements” which stand in certain functionally defined relations to the subject of the coming-to-be and passing-away. My main purpose is to confute the interpretations which regard Aristotle’s notion of matter as essentially alive. Insofar as I regard matter and form as functionally defined, my understanding is sympathetic with the functionalism interpretation of Aristotle.

Let me start with one of the clearest passage supporting the thesis that Aristotle defines both matter and form as functional notions, that is, defined by the role they play. In the final chapter of *Meteorology* Aristotle claims that:

«What a thing is is always determined by its function: a thing really is itself when it can perform its function; an eye, for instance, when it can see. When a thing cannot do so it is a thing only in name, like a dead eye or one made of stone, just as a wooden saw is no more a saw than one in picture».²⁹⁶

I shall start defending the thesis that Aristotle defines the notion of form from a functional point of view and continue defending the same interpretation as regards the notion of matter.

Form

The function of a thing is what defines the thing itself and Aristotle states that form is «pure definition».²⁹⁷ It counts as an eye what can potentially perform the function of seeing; likewise, it counts as an axe what can potentially perform the function to cut in such-and-such way. In

²⁹⁶ *Meteor.* IV 12, 390a 10-15.

²⁹⁷ cf. *Meteor.* IV 12, 390a 6.

Aristotle's lexicon function is equivalent to form and essence, since it is what structures and organizes matter in a way such that the thing in question is able to perform its defining function. Form is that by which matter is some one thing. Aristotle regards form as the cause – i.e. a source of explanation – of the being of the thing and of its continuity in organization.

«Since we must know the existence of the thing and it must be given, clearly the question is why the matter is some individual thing, or this body in this state, a man? Therefore what we seek is the cause, i.e. the form, by reason of which the matter is some definite thing; and this is the substance of the thing».²⁹⁸

Accordingly, Aristotle defines form as «the cause of continuity»²⁹⁹ of the thing, meaning that it is in virtue of its characteristic structure that the thing is able to perform its functions. Form is what-it-is-to-be for the thing, insofar as it is what supplies the functional unity which defines the thing as such.³⁰⁰

Moreover, an interesting point in Aristotle's view is that form is the cause of cohesion of the thing, since it is what holds the bodily parts together. In absence of form, the elements which constitute the bodies would “explode”, tending to go to their natural places. In *De Anima* Aristotle asks the question “What holds body together?” and his answer is the following:

«Surely not the body; on the contrary it seems rather to be the soul that holds the body together; at any rate when the soul departs the body disintegrates and decays».³⁰¹

Aristotle reaffirms this role of form a little further:

«We must ask what is the force that holds together the earth and the fire which tend to travel in contrary directions; if there is no counteracting force, they will be torn asunder; if there is, this must be the soul and the cause of nutrition and growth».³⁰²

Aristotle's point is that basic material elements are characterized by the natural tendency to disaggregate. Thus it must be the form, he thinks, the organizing force which holds them together.

«The incapacities of animal, age, decay, and the like, are all unnatural, due, it seems, to the fact that the whole animal complex is made up of materials which differ in respect their proper places, and no single part occupies its own place».³⁰³

²⁹⁸ *Metaph.* Z 12, 1041b 5-9.

²⁹⁹ *Metaph.* I 1, 1052a 23-25.

³⁰⁰ See for instance *Cat.* I 1, 1a 1-2; *DA* 412b 19-20; *Meteor.* IV 12, 389b 32 and 390a 10; *Phys.* II 7, 198a 25; *PA* 640b 30.

³⁰¹ *DA* I 5, 411b 7-10.

³⁰² *DA* II 4, 416a 6-10.

³⁰³ *De Caelo* II 6, 288b 15-10. As regards the potentiality to corrupt of matter, see also “*Losses of Form*” and “*Potentiality to Die*” in the previous Section.

Even nowadays it is indeed a common conception that the structural order within organisms represents a local decrease of universal entropy. While the second law of thermodynamic states that the entropy of an isolated system which is not in equilibrium will tend to increase over time, organisms – temporary, at least – disavow this law. As Putnam and Berti suggested, the storage of genetic information in the DNA can be regarded as the Aristotelian notion of form, insofar as it is the formal principle which plays the role to make the organism grow according to a biological plan and which holds it together as a functioning unity throughout time.³⁰⁴

As regards living things, form is transmitted from parents to the offspring through the process of generation³⁰⁵ whereas, as regards artefact products, it is transmitted from the artist to the product through the process of production.³⁰⁶ Thus form is what holds matter together and structures it in a way such that the compound, which is named after the form, can perform its characteristic function. Finally, form is not reducible to the matter that constitutes it; it is indeed more than the sum of its constituents even though it is not an element but rather the cause of the being of the compound.³⁰⁷

Matter

As I have already stressed, Aristotle thinks that matter is not itself an individual nor has a quantity nor falls in any category.³⁰⁸ Rather, form is that by which matter can constitute the compound, which is called by virtue of the form.³⁰⁹ Thus, even though matter in itself is not a “this”, it potentially is such³¹⁰ and it is in virtue of such potentiality that matter can realize or embody different forms. Matter does not constitute essentially any form but, after it has been reduced by natural processes of decay to some basic state, it can realize or embody different forms.³¹¹

In line of principle form can be realized in any portion of matter, as long as matter is suitable to realize that form. Thus the only constraint to be met as regards hylomorphic compound is that matter is suitable to realize the function proper of form or essence.

«Regarding material substance we must not forget that even if all things have the same primary constituent or constituents, and if the same matter serves as starting-point for their generation,

³⁰⁴ Putnam (1994), Berti (2007).

³⁰⁵ Even though the traditional view holds that in the process of reproduction the father contributes the form and the mother contributes the matter, Henry (2006) argues that *GA IV 3* shows that Aristotle explains maternal inheritance assigning a formal contribution to the mother.

³⁰⁶ In the passage *PA I 1*, 640a 17-33 Aristotle takes into account both generation and production.

³⁰⁷ cf. *Metaph. Z 17*, 1041b 10-35.

³⁰⁸ cf. *Metaph.* 1029a 20-21.

³⁰⁹ cf. *DA 412a* 7-8.

³¹⁰ cf. *Metaph.* 1042a 27-28.

³¹¹ cf. *Metaph.* H 5, 1045a 3-6.

yet there is a matter proper to each».³¹²

Which the matter *of* something? Aristotle means to draw the distinction between not-proximate and proximate matter. Surely the elements always count as the former, while the matter which has already undergone some processes which have made it different and thus suitable to realize such-and-such form counts as the latter. Thus Aristotle states that «some different things must have their matter different, e.g. a saw could not be made of wood»,³¹³ insomuch as wood is a complex stage which lacks the properties to realize the form of saw, namely chopping.

As I have shown, Aristotle assigns to matter the causal role which explains why material compound undergoes corruption. But such natural tendency of matter not to realize substantial form is not only the explanation of corruption of natural bodies, since it is a characteristic which conceptually reinforces Aristotle's view about the nature of the notion of form. As the example of the old man in *De Anima* I 4 shows, form is a capacity realized by some portion of matter and yet, in a way, it is independent from that precise portion of matter, since it is *multiply realizable* by other portions.

As Charlton puts it:

«Aristotle's matter-form distinction is primarily a distinction between constituent and the thing constituted, between what a thing is made of and what that of which it is made makes or constitutes».³¹⁴

If we take into account that according to Aristotle only form is definable while matter has to be suitable to realize the function which coincide with the form itself, we are now in the position to understand the reason why in *Metaphysics* Z 11 Aristotle wonders about the possibility of men not realized in flesh and bones, but in some other matter. It is tempting to interpret the passage as claiming that if another material constituent was suitable to realize the set of functions proper of human beings, the outcome would count as a human being. As long as the form is realized, it is the element in virtue of which we define things (men obviously included). Accordingly, a man realized in some other proximate matter (since the not-proximate matter, the basic elements, are always the same, just recombined in different proportions) would count as man, just «as a circle may exist in bronze, stone or wood».³¹⁵

It follows that material constituents are not part of definition, that is, of form and essence. Aristotelian bodies are not at all essentially ensouled. The point is that they are defined by (and

³¹² *Metaph.* H 4, 1044a 15-19.

³¹³ *Metaph.* H 4, 1044a 27.

³¹⁴ Charlton (1970), p. 73.

³¹⁵ *Metaph.* Z 11, 1036a 26 – 1036b 6.

called after) the form and essence, as long as it keeps functioning. Thus the corpse is not a body not because the body was essentially ensouled but rather because that portions of matter was structured, held together, made functioning and intelligible by its form.

It would be surely anachronistic to claim that Aristotle predicted the possibility of artificial intelligence. But it is surely consistent with hylomorphism to claim that the same form may be fully realized in different material substrates, as long as they are suitable to realize that set of functions. Form, and not matter, is what defines a compound.

VI. Conclusions: Reshaping Ackrill's Problem

Living bodies, and all their parts, have functions and exists as such insofar as they have the potentiality to perform the set of defining functions. The synchronicity between body and life does not support an understanding of Aristotelian body as necessary living. On the contrary, a body can be defined as such as long as it can perform the set of functions proper of its form and essence. Once it loses this potentiality, what is left is matter, which is not definable at all, so much so as "body".

In what follows my attempt is to sum up and reshape Ackrill's problem. His analysis points out the alleged contradiction between hylomorphism and the «necessarily alive body» which, according to him, homonymy leads to. But he runs into a contradiction which, in my opinion, is much worse. Given his treatment of *psuche*, he conceives it as separate substance. This is inconsistent with hylomorphism, which conceives matter and form as related in a substantial unity.

Ackrill's first suggestions is to define the corpse as "body". But in this case we would be unable to account for the difference between the living and the dead body. Aristotle clearly states that the difference is to be found in the capacity to perform certain functions and, according to him, as long as the body is able to perform the characteristic set of functions, it is definable as a "body". But once the body loses the relevant capacities, it is cannot be defined as a "body" anymore: it has lost its form and essence. In short, according to Aristotle the organism is defined by the functions it can perform, which are characteristic of its substantial form, i.e. the *psuche*, and once it loses these capacities, both its essence and its definition change.

Ackrill suggests to remove the functional distinction between the body and the corpse and to define both as "body". He claims that the advantage of such a move would be to be able to pick out matter separately from the form.³¹⁶ corpse would count as the matter of the living body. The matter could

³¹⁶ Ackrill (1972-1973), p. 124.

be picked out and identified in both an unformed and in-formed state. But, as far as I can tell, this amounts to a form of dualism. Let me explain.

Defining both a corpse and a living body as a “body”, we are rejecting Aristotle’s constraint that form is not a property of matter. In Aristotle’s view, Socrates and Socrates’ corpse are not definitionally the same. It is not the case that being alive and being dead are two properties of the same material substratum.³¹⁷ The substantial form is predicated of the former (e.g. Socrates is a man), while the latter does not a form and, so much so, neither a predicable one. The potentiality to perform psychological functions is the form and its absence makes the *definitional* and *predicative* difference.

«For it suggests that being a man and being a corpse are simply accidents of the underlying matter and so that Socrates’ death is simply an alteration of this matter which is first a man and then a corpse».³¹⁸

Nevertheless, according to Ackrill’s proposal, the psychological functions realized by the living body make no definitional difference. *This* or *that* portion of matter (now we can individuate them only in a mere ostensive way) is properly defined as “body” anyway, be it functioning or not. On the contrary, in Aristotle’s view, such potentialities to function are what define the compound as such.

Since Ackrill suggests to define the corpse as “body”, he does not take into account Aristotle’s view about the relation between reality and language (of essence and definition). Thus in Ackrill’s view *psuche* is able to give (or to take) life to a portion of matter which however does not change its essence and definition. In Ackrill’s view the living body and the corpse are liable to the same definition, and that not homonymously, so we have to suppose that in his view the corpse and the body share the same essence. *The only difference is an element coming from outside and able to vivify the body, namely the psuche.*

Hence the *psuche* is regarded as a separate substance which vivifies a portion of matter. After all, this is a dualistic framework. Ackrill’s proposal is to imagine a body and a *psuche* mutually definition-proof, whereas Aristotle’s hylomorphism, as I understand it, regards them as definitionally unitary. It seems to me no accident that in this framework Ackrill has to hint at a Frankensteinian scenario: indeed he hints to the possibility of «the re-use of severed organs and the re-activation of dead bodies»³¹⁹. Indeed if *psuche* is regarded as a substance taking hold of the body

³¹⁷ cf. Whiting (1992).

³¹⁸ Whiting emphasizes the difference which the functional definition of body draws between substantial changes (such as generation and destruction) and alteration. cf. Whiting (1992), p. 85.

³¹⁹ Ackrill (1972-1973), p. 128.

from outside, nothing prevents it to happen anytime, even after death occurred.

In other words, the condition to count the corpse as “body” is to shift from hylomorphism to dualism, since if we are conceiving the body as the material constituent which has to be in-formed by a separate substance, i.e. the *psuche*. Ackrill sets out a wrong choice when he presents the alternative to be between a “necessarily alive body” and what I regard as a “Cartesian body”, which needs to be ensouled by a form which, ultimately, plays the role of an immaterial soul. What else, if the dead body can still be «re-activated» by the acquisition of form?

The attempt to distinguish matter and form in a way such that we are able to point at them as we could do with the iron of an axe, is simply meant to fail. Aristotle conceives the matter-form distinction as a conceptual one, where form is the function and essence which defines the living body and it predicated of it, while matter is the plastic element potentially able to realize such forms. Trying to pick them out separately means to underestimate the predicative consequences of hylomorphism and, at the same time, overrate the ontological nature of both matter and form. Matter and form are not objects in the world, they are rather conceptual distinctions between the constituent and the thing constituted. In virtue of the nature of matter-form distinction, hylomorphism conceives matter and form able to being conceived separately only from a logical point of view, while matter and form are an actual ontological unity. I think Aristotle’s answer to Ackrill’s criticisms is summarized in a passage of *De Anima*:

«That is why we can dismiss as unnecessary the question whether the soul and the body are one: it is as though we were to ask whether the was and its shape are one, or generally the matter of a thing and that which it is the matter».³²⁰

Thus the distinction between matter and form is a metaphysical one, while the “being one” of the compound is beyond dispute.

Akrill overlooks that the homonymy principle applied to the living body not only does not contradict hylomorphism but rather comes as a corollary of it. Aristotle labels as form the compound’s ability to perform the relevant function and it is the form which sets up the definition. According to Aristotle, the question “What it is to be *x*?” asks why a certain portion of matter constitutes *x* and, given the predicative aspect of hylomorphism, in order to answer this question one must give the form of *x*, that is, the element which the matter has to get or to have in order to constitute the composite. The relevant criteria of identity does not rely on the matter which constitutes but on the constituted form. If matter does not realize any form, we can conceive it as a

³²⁰ *DA* II 1, 412b 5-9.

sandy hill in a windy desert: it is not even a “this”. And this undetermined nature is the reason why matter has the potentiality to constitute different forms, to enmatter them as long as it is in a suitable state. Thus the form of *x* coincides with the definition of *x* because it is the cause, and supplies the explanation, of the fact that matter is structured as it is.

That is the reason why homonymy depends on hylomorphism. Not only homonymy does not contrast with hylomorphism but rather calls for it. If the living body is able to perform the set of functions enabled by the form, the definition does apply. When the living body loses this ability, it loses its form and only the not-definable matter remains. Thus a corpse is called body «only homonymously».

«In short, and I am of course only summarizing Aristotle, the material in this case is *not* capable of existing *except* as the material of an animal, as matter *so in-formed*. The body we are told to pick out as the material “constituent” of the animal depends on its very identity on its being alive, in-formed by the *psuche*». ³²¹

As Ackrill points out, the identity of matter relies on the presence of form but, far from being «not capable of existing» if not in-formed, matter is simply not capable of being predicated of something. It is form which is predicated of matter and which supplies the name to the *sunolon*. ³²² When form does not in-form matter any longer, then matter goes back to a more basic state, in which it does not have neither separability nor individuality. We have no longer an *eidos* we can refer to and thus we point to the corpse on the basis of a mere extrinsic unity.

Thus Ackrill is right on one point: matter’s identity depends on its being informed by the psuche. My point is that this, far from being the proof that hylomorphism allows «essentially alive bodies», counts rather as a predicative consequence of hylomorphism.

What I take to be Ackrill’s fatal mistake is that, as long as we try to interpret Aristotle’s hylomorphism as a doctrine by which we are able to separately pick out matter and form, confusion will occur.

³²¹ Ackrill (1972-1973), p. 126.

³²² For instance see *Metaph. Z 8*, 1033b 18: «[...] but the concrete thing (*sunolon*) which gets its name from this [the form] is produced».

D) Understanding Hylomorphism

Hylomorphic Ontology and Hylomorphic Predication

If my interpretation is correct, it should be recognized that the matter-form distinction does not enable us to point to a portion of matter and label it as the inanimate substrate suitable to receive an immaterial soul, because that, from for being hylomorphism, is rather a dualistic account of the mind-body problem.

The previous remark is valid especially as regards living bodies, wherein different elements are combined by chemical changes to constitute a new form of matter. As in the case of the ingredients of a cake, so the living body. Once the cooking process is accomplished, eggs, flour and sugar are no longer identifiable as such since the ingredients lose their principles of individuation. Their previous identities count now as the not-proximate matter of the cake. Likewise, the elements which remotely constitute the body – such as earth, water, etc. – count as not-proximate matter of the body, and they are no longer identifiable as the matter of the body once they actually constitute it (as Aristotle consistently states as regards earth and human body in Θ 7). The principle of individuation of the body is the substantial form, which prevents from predicating the “ingredients” of the body as matter of it.

Once the process of coming to be has started, the elements which remotely constitute the compound are no longer there to be picked out separately: they cannot be predicated of the compound. Water undoubtedly constitutes wine but it is not the case that the former is predicated of the latter. Stating that wine *is* water is, according to Aristotle, a mistake.³²³ Likewise, earth undoubtedly constitute the human body but it cannot be predicated of it. According to hylomorphism, stating that man *is* earth is wrong. Is it so because Aristotelian matter is essentially alive? Not at all. Rather, predicating matter of the compound is wrong because claiming so we overlook the form and essence of the earth constituting the body. This is how hylomorphism resists crude materialism.

Thus hylomorphism is a metaphysical, not ostensive, distinction applied to material entities, both artefacts and living and it has both a *metaphysical* and a *predicative* aspect.

The *ontological aspect* can be summarized as follows: the matter of the compound is what realizes or embodies a structure, which is the form and essence of the compound and which enables the compound to perform certain functions.

³²³ Recalling the example of wine in *Metaphysics* H 5, we are now in the position to understand what Aristotle states it in *Topics*: «Likewise neither is wine fermented water, as Empedocles speak of “water fermented in wood” - for it is simply not water at all», *Top.* IV 5, 127a 16.

The *predicative aspect* is: matter is in itself undetermined, whereas the set of functions set up the thing's name and definition; only form can be predicated of matter, and not *vice versa*.

To sum up, homonymy fits with hylomorphism. *Form is (i) the actuality of a portion of matter which has the potentiality to realize it and, further, form is (ii) what is predicated of matter, which in itself is not predicable of anything.*

In light of these remarks, Ackrill's and Burnyeat's criticisms about the fact that Aristotelian bodies are inseparable from the *psuche* are misleading. Rather, Aristotle means that the body is *definitionally inseparable* from the *psuche* because the body is defined by (the power to perform the functions proper of) the *psuche*.³²⁴ The loss of these powers coincides with death and leads to the impossibility to define the corpse as "body". Hylomorphism, that is, the Aristotelian doctrine about matter-form distinction, ought to be recognized in both its ontological and predicative aspects.

³²⁴ «Plainly those principles whose activity is bodily cannot exist without a body, e.g., walking cannot exist without feet» (GA II 3, 736b 4). Notice that on the ground of homonymy principle the statement is true also reversing the terms. Indeed walking is the function of the feet and, given that according to homonymy principle, not only the body as a whole, but also each bodily organ, exists only insofar as it can perform its function. Thus walking cannot exist without feet *and* feet do not exist without walking.

Appendix

Criticisms of Shields' Account of Core-dependent Homonymy

Core-dependent homonymy is a special case of homonymy, in which the definition of a core notion must be contained in the definitions of all the core-dependent notions.

A stock example of core-dependent homonymy for Aristotle is that of “health” and its paronymous derived: a man and a walk can both be called “healthy” – and thus have, as Aristotle would say, «the name in common» – but the definition of the word in the two cases is not the same. So a man and a walk are homonymous in regard to health or, in other words, health is applied homonymously in regard to the respective subjects of the predication.

A way to consider whether a term is homonymous or not is what I shall call “replacement-test”, that is, for all definable terms P -s, P can be replaced by its correct definition.³²⁵ If we try to replace a single definition of the term “healthy” both with regard to a man and a walk, it is obvious that what-it-is-to-be healthy cannot be predicated the same sense of them. Nevertheless the relation R between these two definitions is not a “junk” one: they are related in a particular way. Indeed a walk is called “healthy” in virtue of “health” in a man and, more particularly, a walk is called healthy insofar as it produces, or helps to produce, health in a man. It is not the case that a man is called healthy because of the health of the walk, but rather the opposite. Indeed the specific point about the core-dependent homonymy is that the relation between the two terms is asymmetrical. Aristotle retains that there is a core notion, which is prior in definition, and one or more core-dependent instances which can be defined in virtue of the former. This means that the application of “healthy” to a walk is definitional-dependent from “healthy” applied to a man, in the sense that its definition requires the definition of the latter.

This leads us to the central notion of *definitional priority*: when x is prior in definition to y , x is to be mentioned in y 's definition.³²⁶

Given that account, the question arises about which kind of constraints apply to the relation which connects the core notion and the core-dependent instances.

Picking up a specification of core-dependent relation originally introduced by Cajetan during the Renaissance, Shields indicates that a four-causes requirement has to be satisfied.³²⁷

³²⁵ cf. *Top.* I 6, 101b 37 – 102a 1.

³²⁶ cf. Lewis (2004), p. 7.

³²⁷ Cf. Shields (1999), pp. 110-122. Appealing to Cajetan's and Shields' indications, Ward's account of

Since the asymmetrical relation between the core notion and the core-dependent instances implies a *explanatory priority* of the former to the latter, Shields argues that we want to look for some other form of priority in explanation.

As well known, in Aristotle's philosophy causes play this explanatory role. Aristotle thinks that the knowledge of *x* coincides with the knowledge of the relevant causes of *x*.³²⁸ This obviously implies that from an epistemic point of view the causes play an explanatory role. They are considered by Aristotle as distinct answers to the question "why?" and enter, as such, in explanations. Alluding to the explanatory adequacy, Shields argue that the core-dependent relation *R* between the core notion *a* and the core-dependent instances *b*-s has to be one of the four causal relations: he claims that *all* the dependent cases have to stand in an appropriate *causal relation* with the core notion.

«Necessarily, if (i) *a* is *F* and *b* is *F*, (ii) *F*-ness is associatively homonymous in these applications, and (iii) *a* is a core instance of *F*-ness, then *b*'s being *F* stands in one of the four causal relations to *a*'s being *F*».³²⁹

It turns out that the core notion need not be causally prior to the dependent cases: one or more of the Aristotle's four causes³³⁰ has to connect the core notion with the core-dependent notion, in either direction. So the relation *R* can either start from the core and go outwards or, in the reverse direction, from the core-dependent notion inwards. Shields notes that, since it is plain from the example of "healthy" referred to a walk that the physical exercise causes (or contributes to cause) the health in a man, in this case the core-dependent instance is causally prior to the core notion.

Shields goes through the Aristotelian four causes looking for examples supporting this view. I consider some of them compelling. Although not generally, the *final* cause is an example of such a kind of causal relation in core-dependent homonymy. Yet the arguments Shields gives with regard to the *efficient* and *material* causes seems forced and – as he himself recognizes – the *formal* cause is extremely problematic.

In my opinion the main objection to Shield's thesis is that the existence of one of the four causal relation may be a sufficient condition to the core-dependent homonymy, but not at any rate a

homonymy relies on causation as well. Therefore what follows can be regarded as a criticism to her analysis, as well as the one of Shields. cf. Ward (2008), esp. "Aristotle's Causal Account of Related Homonymy", pp. 79-86.

³²⁸ cf. *An. Post.* 71b 9-11; *An. Post.* 94a 20; *Phys.* 194b 15-20.

³²⁹ cf. Shields (1999), pp. 111.

³³⁰ Frank A. Lewis (2004, n. 16, pp. 7-8) reports that Shields (1999) stipulate the four-causes requirement to involve just *one* cause. It is not so. Regarding to Shields, with regard to the material cause he claims that «some derived homonyms are doubly derived by standing in *more than one* of the four causal relations to the core instance» (p. 114). Furthermore Shields has no reason to argue in favor of one-cause relation: not only it not necessary to his argument but Aristotle clearly retains some causal relations to exemplify more than one cause (e.g. the father is the both efficient and the formal cause of the son).

necessary one.

Thus, contra Shields, the four-causes requirement does not represent a constraint anymore, given that without it, it would be possible to have a genuine core-dependent homonymy. Let me go through the four causes.

Final cause

The final cause is a fairly clear example of a cause setting the relation between the core dependent notion and its instances. The scalpel is called “medical” because its *purpose* is specified in terms of the core notion of medicine. As many passages about this issue show, Aristotle is convinced that an artifact having a function offers a clear and easily understandable example of final causation. Namely, the object is shaped in a such-and-such manner *in view of* the function it is made for. The craftsman purposely gives to the object the relevant characteristics suitable to perform the certain function (*ergon*) he is aiming at. Consequently, the artifact is made in such-and-such way *for the sake of* the final result. In Aristotle’s view, this is a case in which the teleology is explanatory prior to the object’s characteristics. It follows that the scalpel is called “medical” because its aim is to perform a function which is proper and refers to the medical art.

Thus, as regards final causation, Shields has an easy target: the relation between the core notion “medicine” and a core-dependent instance such as a scalpel called “medical” is actually one of the four causes, namely that of the final one, and the direction of R is from the center (medicine) going outwards (the tool).

Efficient cause

The account of the efficient cause is quiet clear but presents some problematic aspects.

It is true that Aristotle considers healthy and medical as “indicative” or “productive of” the central notions of health and medicine.³³¹ A regimen can be called “healthy” because it is productive of the core notion of health (even in the cases in which it is not sufficient to produce it). As Shields correctly points out, in Aristotle’s view the efficient cause has not to necessitate a given result, that is, an efficient cause has not to be a sufficient condition for the outcome. A healthy regimen could just *contribute* to the health of a person, being possibly a co-cause but without bringing it about by itself. Since it is not requested by Shield’s account that the core-notion be the causal source of the

³³¹ cf. *Metaph.* K 3, 1060b 31-1061a 10.

relations, there is no contradiction in having core-dependent terms as efficient cause of the core notion.

The point is that Shields considers relations such as “being indicative of” and “guarding” to fall within the efficient cause. My concern is that those are really problematic examples. On one hand, they are clearly considered by Aristotle cases of core-dependent homonymy, that is, something indicative of health of a person is called “healthy” for the sake of the core notion (e.g. healthy complexion). But, on the other hand, they are not clear instances of any of the four causal relations. Consequentially, they could undermine Shields’ view. By appealing to the aforementioned difference between causing and necessitating, Shields grounds the inclusion of these relations in the set of the efficient causes in the sense that they *contribute* to the core notion. It is evident, although, that in this way Shields *weakens the efficient causation itself*.

A healthy complexion can “be indicative of” health being actually neither an effect nor a cause of health. A complexion can be called healthy being nevertheless an accident, namely having no sound causal relation to health. Aristotle states complexion to be indicative sign (*sêmeion*) of health, but signs show inference at work, rather than causality, an epistemic operation performed by a rational agent rather than an ontological relation between causes and effects.

Aristotle thinks inferences can possibly reach true conclusions and nevertheless be refutable, insofar as they are not formal valid. As Burnyeat points out, it is not only a matter of arranging them in a proper logical form: even in the case we could supply them with unexpressed assumptions and arrange premisses and conclusion, they would not have the logical form adequate to be conclusive. Aristotle consider signs-inference as not adequate to lead to knowledge.³³²

Thus, it is not plausible that an inference (such as the one starting from healthy complexion to the general health of man) is considered by Aristotle sufficient to establish the presence of an efficient causal relation.

On the contrary, as *Rhetoric* shows, Aristotle would classify an healthy complexion as a «non-necessary sign» of the whole organism’s health, that is, the complexion is a sign that provides some sort of evidence but, being not *necessary*, is refutable and does not lead to knowledge.³³³ Whereas necessary signs are the only kind which constitute evidence – and they may ground sound deductions, for they cannot be refuted – non-necessary signs are not generalizable, refutable and, therefore, not suitable to constitute rigorous syllogistic reasoning.

³³² cf. Burnyeat (1982).

³³³ Remarkably, Aristotle retains non-necessary sign to lead to persuasion rather than to real knowledge. cf. *Rhet.* I 2, 1357b 1-21.

In the *Rhetorics*, Aristotle considers the example of faster breathing as a symptom of fever. Remarkably, Aristotle's example about fever is close to Shields' one about complexion. Yet while Shields considers the relation between a healthy complexion and health in the man a specimen of efficient causation, Aristotle rather considers it as a non-necessary sign producing non-generalizable knowledge.

«“The fact that he breathes fast is a sign that he has fever”. This argument also is refutable, even if true, since a man may breathe hard without having fever».³³⁴

I take the example in the *Prior Analytics* about the pallor of pregnant women to be exactly of the same sort:

«[...] for a syllogism can never be formed when the terms are related in this way: for though a woman with child is pale, and this woman also is pale, it is not necessary that she should be with child».³³⁵

Thus considering, as Shields does, the healthy complexion to stand in a causal relation with healthy being would be considered by Aristotle a bad example of causation, since a man may have an healthy complexion accidentally, without any sound causal relation to health in general, that is, being healthy complexion neither a cause nor an effect of health in a man.

It follows the Shield's attempt to consider relations such as “being indicative of” as specimen of efficient causation is undermined. Nevertheless Aristotle does consider them as grounding cases of core-dependent homonymy. Therefore consider – as Shields does – the one or more of the four causes as necessary and sufficient to establish the core-dependent relation R between the core notion and the core-dependent instances is wrong.

This criticism should have given an evidence to establish that Aristotle recognizes core-dependent homonymy at work also in applications in which the core notion and its instances are connected by a much weaker relation than a causal one.

Material cause

Concerning the material cause, in which sense a material substrate should ground the causal relation between a core notion and its instances? Dealing with this issue, Shields correctly refers to the Aristotelian hylomorphism. He though leaves aside some problems about which there has been important controversies. Aristotle considers the living body as an hylomorphic compound, so let me

³³⁴ *Rhet.* I 2, 1357b 19-21.

³³⁵ *Pr. An.* II 27, 70a 35-36.

consider the example of a bodily organ.

Now, “healthy” referred to the heart is a clear example of core-dependent homonymy, since the what-it-is-to-be healthy for the hearth implies the definition of what-it-is-to-be healthy for the whole organism. Obviously, for a part of the body to be called healthy, it is first of all necessary that it *is* a part of the body, namely, it is necessary that the matter of which the part is composed is suitable to receive the essential form of the body. Yet it is hard to see how the material cause is involved in the core-dependent homonymy *as such*. The parts of the body are called “healthy” not in virtue of being the material cause of health, but rather being (healthy) hylomorphic compounds of which health is predicated. It is inconsistent that the material cause of the body might be called “healthy” *per se*, regardless of the formal cause which constitute it as a body.

A solution might be to not require to have involved just *one* of the four causes at time. Indeed Shields allows multiple derivations of homonyms, which stand at the same time in more than one of the four causal relations. So the healthy hearth could be core-dependent in virtue of being material *and* formal causes of the body’s health. Notwithstanding Shield oversimplifies and, I suspect, equivocates the problem by claiming that a organ «is called healthy by being the material cause of a healthy organism». ³³⁶ Since an organ is by definition a compound of matter and form, the material cause *qua* material cause has no clear role to play in setting the core-dependent homonymy.

On the contrary, Aristotle would exclude at any rate the material cause from grounding the core-dependent homonymy, at least with regard to the important example of the living organism.

I shall return to the problem of the “inseparability” of matter and form in substances in the next part of this chapter, dealing with the homonymy regarding the living body and corpse.

However, given that it is in the light whether each and every cause can ground the core-dependent homonymy that we can tell whether or not Shields’ four-causes requirement is valid, the lack of a clear role of the material cause as such represents a strong objection to Shield’s account. But even more problems are to be found with regard to the formal cause.

Formal cause

Undoubtedly, formal cause is the most problematic obstacle to the consistency of Shields’ account. Considering formal cause as able to establish the relation R between the core notion and the core dependent instances, it is helpful to consider synonymy. Aristotle defines synonymy as follows:

³³⁶ Shields (1999), p. 114.

«When things have the name in common and the definition of being which corresponds to the name is the same, they are called synonymous. Thus, for example both a man and an ox are animals».³³⁷

Aristotle is claiming that if *a* and *b* share the form F, then the account of F used in the two applications is the same. Looking at the quoted passage, it follows that *a* and *b* are called F-s synonymously, and that in virtue of the single universal form they fall within (and are predicated of). Aristotle claims this in *Categories*:

«It is a characteristic of substances and differentiae that all things called from them are so called synonymously».³³⁸

The litmus test is that if *a* and *b* do not share the same universal form but are nevertheless predicated of two different accounts of F, then they are F-s homonymously.

It is thus no accident that the form exhibits a resistance to be included in a causal account of core-dependent homonymy. Sharing a formal identity not only does not lead to core-dependent homonymy but, even more, that formal causation and homonymy reciprocally exclude one another.

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Shield does recognize that none of Aristotle's illustrations is a clear instance of formal causal relation between the core-notion and its instances. As argued, it seems that in Aristotle's view the sameness of form cannot involve any kind homonymy (neither discrete nor, all the more, core-dependent) but rather synonymy and, *vice versa*, that homonymy cannot involve sameness of form. Homonymy and synonymy of all kinds are mutually exclusive and jointly exhaustive. It follows that, if the sameness of form does involve synonymy, then it excludes homonymy by definition.³⁴⁰

As I have stressed, homonymy is at work also: (i) in applications in which the relation between the core notion and its instances is not a causal one, but rather a weaker relation, in which the instance represents only a non-necessary sign of the core notion (e.g. complexion as "being indicative of" the individual health in general); (ii) in applications in which picking up the material cause loses

³³⁷ *Cat.* I 1, 1a 6-8.

³³⁸ *Cat.* I 1, 3a 34.

³³⁹ cf. Lewis (2004), n. 16 p. 8.

³⁴⁰ Shields tries to avoid this difficulty suggesting that Aristotle allows for non-standard formal causation. In his view, there are cases in which the form is not inherent to the thing in the same way in which it is inherent to the entity which plays the causal role. Shields thus claims that in *De Anima* Aristotle describes how the sense faculty receives the form of an object without its matter. I do not think this is a striking example and, as I see it, I even doubt that this an example at all. It seems to me to explain *obscura per obscuriora*: the debate about the formal causation in Aristotle's theory of sense perception has been too wide to advocate it as a standard example of anything and, even if a non-reductive interpretation (like Shields' one) were commonly accepted, it would still be unclear how formal causation could set homonymy. Ward's revised version of Shields' four-causal account recognizes this problem about formal causation. cf. Ward (2008), p. 81.

sight of the fact that the subject of predication is the compound of matter and form (e.g. healthy predicated of an organ); (iii) in applications in which the formal cause establishes with its instances synonymy rather than homonymy (e.g. the ox and the man).

Thus Shield's four-causal core primacy is not able to account for core-dependent homonymy. Sometimes causal relations subsist between the core notion and the dependent instances and so they may be sufficient condition for the core-dependent relation R. *Yet the four causes are not necessary to establish the core-dependent homonymy, therefore Shields' four-causes requirement cannot count as a constraint.*

Chapter Three

Naturalizing Aristotle's Teleology

«Where there is an end, all the preceding steps are for the sake of it».

Aristotle, Physics

Introduction

The most general form of final causation is that X happens for the sake of Y. Front teeth (X) are sharp for the sake of biting (Y), back teeth (X) are broad for the sake of chewing (Y), as well as walking after dinner (X) is for the sake of agent's health (Y). In Aristotle's view, Y explains and accounts for X. A wide debate has been prompted by the consistency of Aristotle's teleology.³⁴¹ Being Y a state of affairs chronologically posterior to X, how can we make sense that the future causes the past?

In section I, the four-fold doctrine of causes is introduced and explained. With the support of Aristotle's text I emphasize that the four causes can be further divided into two main types of causation. In section II, I explore the domain of Aristotle's teleology, taking into account the proposals of some scholars and suggesting my own, which involves what I shall call the "Primary Use Thesis", that is, the assumption that in formulating final causation Aristotle has in sight

³⁴¹ I shall use "final causation" and "teleology" as synonyms and therefore I shall switch between them implying no relevant consequence but stylistic ones. Depew (2009) reports that the term "teleology" was originally devised by Christian Wolff to refer to the hierarchical system among the various parts of the *scala naturae*, by which the the lower levels (both inanimate stuffs and lower living kinds) serve the purposes of the higher levels, culminating in serving those of human beings. Accordingly, Depew reports that Buckland (1836) argued that coal was put in the secondary strata so that later human beings would have fuel to burn. This naïve teleology was satirized by Voltaire in *Candide or Optimism* («"Manifestly," he said, "nothing could have been different. Since everything was designed for a purpose, everything is necessarily meant to serve the best of all purposes. Observe how noses are designed to hold up eyeglasses, and therefore we have eyeglasses. Legs are obviously meant for wearing shoes, and so we have shoes. Rocks having been designed to be quarried and used for building purposes, the Baron has a singularly beautiful mansion. The greatest Baron in Westphalia requires the greatest dwelling – and because pigs were made to be eaten, we dine on pork all year long. Accordingly, those who have suggested that everything is good have spoken obtusely: what they should have said is that everything is for the best»). Yet the original (and naïve) Wolffian-Voltairean conception is not the contemporary meaning of teleology. Depew (2009) contrasts it with what he regards as the Aristotelian-Kantian-Cuvierian one. I am not sure that Aristotle's and Kant's conceptions of teleology were the same; however establishing this is beyond the scope of this dissertation and at least Depew's remarks paves me the way to claim that teleology is said in many senses. In the Appendix to the present chapter I attempt to compare Aristotle's and Darwin's teleologies. Summarizing, it is now commonly agreed in literature that the expression "teleology" is equivalent to that of "final causation", even though it is not yet established whether they can be accepted as naturalistic terms or not. I shall argue for a positive answer to this latter question.

primarily biological life. Moreover, I show how to harmonize this thesis with the doctrine of potentiality and actuality. In section III the ontology of Aristotle's final causation is investigated. I address some traditional issues concerning final causation, such as Aristotle's conception of cause and the problem of the succession in time of cause and effect. In section IV I present the traditional views about Aristotle's final causation, namely the epistemological and the ontological interpretations. For reasons that will become clearer in what follows, I label them as "sufficientist" and "insufficientist" thesis. I point out what I think is missing in both these accounts and finally illustrate my own position, which I call "logical compatibilism". In the final section I hint at a "dangerous liaison" between Aristotle in Darwin. Despite some remarkable and undeniable differences, both Aristotle and Darwin are convinced that the form of the living organism is *irreducible* to its material constituents and that it has to be fit for life and reproduction of the organism itself. I think that this connection – that Darwin himself appeared to recognize in private correspondence – is much less surprising than it could seem at first sight. The functional analysis of the living body proves to be one of the most powerful intuition of two of the greatest biologists of all times.

I. The Four Causes

For Aristotle knowledge is explanatory. If X is the object of our knowledge, Aristotle thinks that the questions whose answers will provide us knowledge about X are such as: "X, on account of what?" or "What is responsible for X?". It is apparent that such questions allow for more than one answer. «We must explain the "why" in all the senses of the term», states Aristotle.³⁴² Thus why-questions refer to several factors, or aspects, which account for X in different ways. The inspiration of such a framework lies in Aristotle's idea of knowledge and explanation. If we have knowledge of X, Aristotle claims, we have a complete explanation of it, where by "complete" he means that we have to state all the relevant truths about all the relevant factors which can account and/or are causally responsible for X.

Which sort of thing may be regarded as *aitia*, that is, as a cause? The central question about final causation is whether Aristotle means that teleological processes are *causally due* to or merely *explained by* their ends. Depending on the answers on this question, scholars disagree about whether teleology is empirical or epistemological in character. I shall elaborate on this theme throughout the present chapter.³⁴³

³⁴² *Phys.* II 7, 198b 4.

³⁴³ Charlton (1970, p. 98) points out that the Greek the meaning of the word *aition* can be translated with the verb "to blame", or "hold accountable", and thus that it is used considerably more widely than the English "cause":

Aristotle thinks that the relevant explanatory factors are classifiable under four types: matter, form, source of change and end. Once we can tell the matter a thing is made of, its form, its source of change and the end it tends to, then we (are allowed to) think that we have knowledge of the thing under investigation.³⁴⁴ Consequently, in Aristotle's view explanatory knowledge has a plurality of sources.

«It is clear then that there are causes, and that the number of them is what we have stated. The number is the same as that of the things comprehended under the question "why". [...] Now, the causes being four, it is the business of the student of nature to know about them all, and if he refers his problems back to all of them, he will assign the "why" in the way proper to his science—the matter, the form, the mover, that-for-the-sake-of-which».³⁴⁵

Thus the philosopher of nature is expected to gain knowledge through all the irreducible types of causes. He has to state the material conditions and particularly the formal account which is what the thing is for and the end toward *which* it tends. The need to employ irreducible types of causes is also confirmed in the *De Anima*, where Aristotle states that the *psuche* is to be investigated by means of the four causes. Since «affections of soul are enmattered accounts»,³⁴⁶ both the material and the formal account have to be stated.

«The one [physician] assigns the material conditions, the other [dialectician] the form or account; for what he states is the account of the fact, though for its actual existence there must be embodiment of it in a material such as is described by the other [...] but there is a third possible description which would say that it was that form in that material with that purpose or end. Which, then, among these is entitled to be regarded as the genuine physicist? The one who confines himself to the material, or the one who restricts himself to the account alone? Is it not rather the one who combines both?».³⁴⁷

Aristotle supplies a formal classification of the four causes in *Metaphysics* A 3 and, almost with the same words, in *Physics* II 3 and *Metaphysics* Δ 2. To be a cause is to be a factor responsible for something. His analysis can be summarized as follows:

The material cause is that out of which the thing comes to be. With some highly controversial exceptions (such as the *nous* and the unmoved mover) I shall abstract from, in Aristotle's view everything which exists is necessarily realized or embodied in matter. Nonetheless, it would be wrong to believe that matter identifies the object; for, in Aristotle's view, matter is identified by the

«X is called an *aition* in respect of Y, if it is responsible for Y in any way whatever, if Y can for any reason be set down or ascribed for it». I think that the main difficulty I point out (whether causes other than the material one *efficiently causes* or merely *accounts for* the thing in question is not resolved.

³⁴⁴ Hankinson (1995) maintains that according to Aristotle scientific knowledge is explanatory. cf. p. 110.

³⁴⁵ *Phys.* II 7, 198a 14-24.

³⁴⁶ *DA* I 1, 403a 25.

³⁴⁷ *DA* I 1, 403b 1-9.

form it constitutes. .³⁴⁸

The formal cause is characterized as what it is to be X. It corresponds to the essence of X and it is constituted by the matter it actualizes. Indeed the matter-form distinction corresponds to a distinction between (potential) constituent and things (actually) constituted.³⁴⁹ Aristotle calls the form also the *logos* and the function of X,³⁵⁰ whereas as regards living things he calls it *psuche*.

The source of change is what Aristotle regards as the cause of movement or of staying unmoved. It is commonly agreed to call it “efficient” cause and I shall follow this convention, but it is worthy to emphasize that not even in this case we are dealing with a modern conception of causation.³⁵¹ Caution is required in calling Aristotle’s source of change efficient cause. His heterogeneous examples suggest this remark.³⁵² In general, Aristotle characterizes the moving cause as the relevant factor from which the change starts instead as the fact or event that necessarily brings about an effect.

Finally, Aristotle argues that it is a cause also that which is the end of X. He equates the end with what is the best for X. Including the final cause among the other causes, Aristotle shows that he is regarding it as a fundamental source of knowledge about things in the world.

Two Types of Causation

Aristotle often shows that he regards the four causes as susceptible to further classification into *two types of causation*. They are: (i) matter and unconditional necessity (material-efficient causation) and (ii) that-for-the-sake-of-which and conditional, or hypothetical, necessity (formal-final causation).³⁵³ Accordingly, a phenomenon can *either* be accounted for by assuming the mere necessity due to matter alone, *or* it requires to take into account also forms, ends and hence hypothetical necessity. In order to understand Aristotle’s teleology we have to consider the sharp,

³⁴⁸ For my attempt to sort out this apparent paradox, see chapter 2 of this work.

³⁴⁹ The thesis has been accurately supported by Charlton (1970), esp. pp. 72-73 and pp. 100-101. Since my focus is about nature, I shall not consider here how Aristotle thinks that the formal cause comes into account as regards mathematic objects.

³⁵⁰ For instance, see respectively Physics 194b 27-29 and DA II 1, 412b 19.

³⁵¹ Nor, *a fortiori*, we are dealing with a type of causation reducible to the modern “efficient” cause as regards the other Aristotle’s causes. cf. Charlton (1970, p. 101) and Quarantotto (2002, p. 15), who attributes this view to Wieland (1961, pp. 52-140) and Lear (1988, pp. 26-42).

³⁵² Aristotle, for instance, thinks that the father is the efficient cause of the son and that injustice is the efficient cause of a murder. But he also thinks that deliberation is the efficient cause of action, which would fit with some contemporary positions in favor of mental causation. The general form of Aristotle’s source of change is «that which changes something of that which is changed», *Phys.* II 3, 194b 31.

³⁵³ cf. Charlton (1970): «Although, however, the fourfold classification of causes is flexible in these ways, underneath it there seems to lie a firmer twofold division between *two radically different types of explanation*, one employing the concepts of *matter*, source of change, and unconditional necessity, the other employing the concept of *form*, *end*, and conditional necessity», p. 115, emphasis added.

fundamental distinction he draws between final causation and mere material causation. In his view, a thing is *either* a result of coincidence *or* for the sake for its result, thus *once we have established that X is for the sake of something, we have thereby excluded that X can be accounted for by the activities of its material constituents alone*. By this latter type of causation outcomes are automatic, accidental, due to chance, whereas by the former type of causation outcomes are brought about regularly.

This is the strategy by which Aristotle establishes that the parts of living organism are regularly for the sake of something (namely, the survival and reproduction of the organism as a whole).

«The things mentioned, and all things which are due to nature, come to be as they do always or for the most part, and nothing which is the outcome of luck or an automatic outcome does that. [...] If, then, things seem to be either a coincidental outcome or for something, and the things we are discussing cannot be either a coincidental or an automatic outcome, they must be for something».³⁵⁴

The argument of *Physics* II 8 runs as follows: we see that the parts of animals come to be regularly in a given way, that is, they are thus-and-thus «always or for the most part». So they are *not* due to material necessity alone for, if so, they would have come about by chance, which would have made impossible for them to come about in a regular way. It is apparent that as regards organisms and the processes which involve them there is a regularity which, for Aristotle, requires an adequate explanation: «man begets man» is the refrain he repeatedly uses to highlight this point. Therefore, *either* these natural outcomes come about by chance (that is, by material necessity) *or* they regularly come about in sight of their result (that is, for the sake of something). If we exclude chance, it follows that we have thereby established that the parts of animals come about for the sake of something.

Thus, according to Aristotle, if we are to give an explanation we have only two types of causation available, which are the material-efficient causes and the final-formal one. But which is the relationship between these types of causation? As I understand it, it can be specified in the following way:

a) *compatible, or not mutually exclusive*: the same object has to be explained in different ways. The material-efficient causes and the formal-final causes can jointly account for the same process or event, e.g. the process of respiration is explained taking into account both the physical-chemical level and what is good for organism's survival.³⁵⁵

³⁵⁴ *Phys.* II 8, 198b 35-199a 6, emphasis added.

³⁵⁵ For the compatibility of mechanical-efficient explanations and final ones, see the methodological preface of *PA* I 1, especially 639b 10 – 642b 5. As regards examples of teleological as well as mechanical accounts of the same phenomenon, see in the biological works *PA* I 1, 642a 32 ff. (respiration); *PA* III 2, 663b12 ff. (deers'

b) *conjointly exhaustive*: they are the only types of scientific explanations available to Aristotle and he is convinced that once we know both X's types of causation we know everything which is relevant about X.³⁵⁶

c) *not wholly complementary*: the types of explanation require to take into account factors which are relative to different aspects of the process to be explained. For instance, in order to explain the production of a sword we have to refer both to the physical laws to which iron is subject and to the art of the smith, which requires a formal account.³⁵⁷

However, Aristotle's characterization of material necessity as chance may seem odd. We might be inclined to think that exactly when a material cause necessitates its result there is no room for chance. In order to better understand what Aristotle means when he equates material necessity and chance, a family of examples which does not directly have to do with the debate about Aristotle's final causation may be useful to illustrate the point. These examples echo that used by Alexander Oparin, which wondered which was the probability that a box full of typographic characters might fall on the ground composing exactly a Shakespeare's complete work.³⁵⁸ Such an event is not very likely at all and, to be sure, it is not a regular outcome. The argument has been reformulated by several authors who, in a similar vein, wondered whether a herd of typing monkeys could fortuitously write a complete work of Shakespeare. The point to be highlighted is that the type of causation involved would be just *mechanical* and nonetheless, if the monkey really end up typing the poem, the result would be brought about just by *chance*. From a mathematical point of view, it is true that an infinite number of monkeys typing for an infinite length of time will produce the complete works of Shakespeare³⁵⁹ yet, this is a probabilistic remark justified by the infinite possible combination of characters and thus it surely does not amount to what Aristotle sees in natural processes such as generation (man begets man), that is, the main applications of natural regularities he refers to by the expression «always or for the most part». Indeed the event would be caused, i.e. necessitated by the movements of the monkeys and, at the same time, it would happen by mere chance. One example more might help to illustrate the relationship between cause and chance:

«A junkyard contains all the bits and pieces of a Boeing-747, dismembered and in disarray. A whirlwind happens to blow through the yard. What is the chance that after its passage a fully

antlers fall); *PA* II 14, 648b 1-5 (human hair); *GA* III 4, 755a 22 ff (fish eggs growth); *GA* V 8, 789a 8 ff (animal's teeth fall).

³⁵⁶ cf. Gotthelf (1976) p. 247.

³⁵⁷ cf. Charlton (1970) p. 114 and 118.

³⁵⁸ Oparin (1956).

³⁵⁹ Hawking (1988) holds exactly this statistical position: «It is a bit like the well known horde of monkeys hammering away on typewriters – most of what they write will be garbage, but very occasionally by pure chance they will type out one of Shakespeare's sonnets», p. 128.

assembled 747, ready to fly, will be found standing there?».³⁶⁰

If the whirlwind happens to assemble the pieces of the aircraft it would do it as the *necessary* outcome of a mechanical process and, at the same time, it would come about *by chance* insofar as it does not proceed toward an end but it is rather brought about in virtue of its probability to happen. In order for the mechanical necessity to bring about the result not by mere chance, Aristotle maintains, the process should be directive toward an end, for the sake of which all the preceding steps will be. «Where there is an end, all the preceding steps are for the sake of it».³⁶¹

II. The Domain of Teleology

Which is the domain in which teleology applies? Also because Aristotle does not explicitly state the class of phenomena to which final causation can be ascribed, thus the question has raised a broad debate among his scholars.

It has been argued that, because the heavens move toward the unmoved mover, Aristotle's teleology applies to the cosmos as a whole. Philosophers such as Kant and Hegel opposed this view and regarded the self-formation of the organism as the primary locus of teleology. This interpretation is widespread today, since many influential scholars think that it is the case of an immanent, or natural, or intrinsic teleology.³⁶²

Restricting teleology to living things is maybe a concession to Aristotle, but it is not unwarranted. He often claims that the Pre-Socratic natural scientist have reduced all the physical world to ultimate matter and thus failed to take into account that living things «are born, grow, live and decay as organic wholes»³⁶³ thus emphasizing that his formal-teleological accounts are to be applied to living things.

To be sure, the primary use of Aristotle's teleology depends on which domain he assigns to final cause. Hankinson maintains that Aristotle invokes final causes in biology in two distinct ways: *a*) regularities in the physical world, which require a final-cause explanation; and *b*) animal's structures, in which the parts are there in order for the organism as a whole to perform its functions.

³⁶⁴ Gotthelf proposes a richer classification. In his view teleology applies to: *a*) action and

³⁶⁰ Hoyle (1983), p. 19.

³⁶¹ *Phys.* II 8, 199a 9.

³⁶² For a brief and exhaustive review of the debate about the alleged Aristotle's cosmological teleology, cf. Berti (2005). He identifies Zeller (1879), Mansion (1913) and Theiler (1925) as the main advocates of such cosmological interpretation and contrasts them with those scholars which interpret final causality as an epistemological (or even merely heuristic) tool: Le Blond (1939), Wieland (1961), Duering (1966) and Vegetti (1971).

³⁶³ Even though I do not fully agree with Nussbaum's interpretation I regard this point about living things to be correct. cf. Nussbaum (1978), p. 67.

³⁶⁴ cf. Hankinson (1995), p. 128.

production (even though Gotthelf does not argue for this, it might be pointed out that we can speak of action within part of the animal kingdom, while artistic production is pertinent only as regards human beings); *b*) the motion of heavenly bodies, the so called cosmical teleology; and, finally, *c*) the notion of a part of an organism, which is for the sake of the organism as a whole. Gotthelf contrasts these uses of final causation with the natural motions and changes in simple elements, the movements of which are *not* for the sake of anything, as long as they are outside the living organism.³⁶⁵

I shall propose my formulation of the domain in which final causation can account for phenomena: *a*) living organism's development, parts, functions and, in general, their overall structure; *b*) regular physical patterns in nature; *c*) action; *d*) production.

Let me elaborate on my formulation starting from *c*) and *d*). At the very introduction of final cause, both in *Physics* II 3 and in *Metaphysics* Δ 5, Aristotle supplies an example which is on one hand striking but, on the other hand, somewhat misleading: it concerns a purposive rational action, namely walking for the sake of health.

«On account of what does he walk? We answer “To keep fit” and think that, in saying that, we have given the cause».³⁶⁶

The example is very clear and maybe even intuitive, given that everybody knows what it is to undertake action because of an intention and for the sake of a goal, closer or further away in time. As I have already hinted at the outset of the chapter, the most general form of final causation is: X happens for the sake of Y and, consequently, Y accounts for (and/or is causally responsible of) X. Thus if we ask, why does she walk?, the answer is: for the sake of her health, because she wants to stay fit. This implies that the agent *knows* that walking is healthy and that she purposely acts so on the basis of her belief and hence in order to achieve her rationally defined goal. Thus, in Aristotle's example, that for-the-sake-of-which (health) is the content of the *intention* of an agent performing a goal-directed activity and, possibly, the outcome of the action itself.

Extrinsic and Intrinsic Teleology

At this point, a distinction must be drawn, namely that between extrinsic and intrinsic teleology. By *extrinsic teleology* it is meant that the end or goal of a process is intentional and external to the explanandum. For instance, teleology is extrinsic as regards the production of artifacts: the goal of an axe, i.e. cutting, is intentionally brought about by the craftsman. On the contrary, by *intrinsic teleology* it is meant that the end or goal which explains X is pursued by X itself. Living beings are

³⁶⁵ cf. Gotthelf (1976), p. 237.

³⁶⁶ *Phys.* II 3, 195a 33-34.

characterized by intrinsic teleology because they are characterized by a basic *teleological tendency* to live and reproduce. The organism's goal of its own survival and reproduction explains its development, its functions and its overall structure. Whereas extrinsic teleology applies to rationally defined goals and hence has a psychological paradigm, intrinsic teleology applies to the results of a physical, chemical or biological processes, such as organism and its parts.

Here I shall just hint at the fact that as regards ethics, final causation ascriptions allow to analyze how particular practical *tele* are related to the more general *telos* of being just. The same final framework is consistently applied to artistic production. Yet I hesitate to agree with Walsh,³⁶⁷ who argues that our most successful paradigm of extrinsic teleological explanation is psychological, both as regards action (we explain action by the intention of agent) and production (the feature of artifacts are explained by the intention of the artisan). Aristotle often uses artistic production as an example of teleology, as he thinks that it is more "knowable to us". The form of a the piece of art is a *schema* which is intentionally given to the piece of matter from a conscious agent external to it; consequently that form does not intrinsically belong to that piece of matter. But we must not lose sight of the fact that what is more "knowable by nature" is intrinsic natural teleology concerning living things. «Now in the works of nature the good and that for the sake of which is still more dominant than in works of art».³⁶⁸ Even though I agree that consistent applications of teleology are to be found in action and production, I doubt *intentionality* to be crucial to our understanding of teleology and wonder whether it might be a source of misunderstanding as regards the non-intentionality by which Aristotle's natural teleology is characterized.³⁶⁹

I recall that the most well known example of extrinsic teleology is *Timaeus'* demiurge: the order of nature follows from a *design* which is both intentional and extrinsic to the explanandum.³⁷⁰ Accordingly, Plato is committed to extrinsic teleology, given that (independently from the question whether the mind which organizes the physical world is personal, such as the character of the demiurge suggests, or whether the latter is a metaphor for impersonal separate forms and number) he does not find an alternative between material necessity and chance, on one hand, and mind and reason on the other hand.³⁷¹ Plato's model seems to be that the function of an artifact follows from the *design* of the craftsman: here as well teleology counts as extrinsic because the goal or end of the

³⁶⁷ Walsh (2008), p. 116.

³⁶⁸ *PA I I* 639b 12-13.

³⁶⁹ Among others, this idea is expressed in the *Dictionary of the History of Science*, s.v. "Teleology", quoted in Berti (2005).

³⁷⁰ cf. *Timaeus*, for instance 30a: «God desired that all things should be good and nothing bad, so far as this was attainable. Wherefore also finding the whole visible sphere not at rest, but moving in an irregular and disorderly fashion, out of disorder he brought order, considering that this was in every way better than the other».

³⁷¹ cf. Charlton (1970), p. 121.

artifact is intentional (it is pursued by a conscious agent) and extrinsic to the artifact itself (form is not “internal” to the piece of art but rather comes from outside of it).

The same remark holds for all instances of rational and intentional action and within this class falls also Aristotle’s example of walking for the sake of health. Thus, it seems that Aristotle characterized teleology as his master, that is, that he argues for extrinsic teleology.

But Aristotle does not agree with Plato about the analogy of the cosmos with an artifact and hence his natural teleology cannot count as *intentional*. Even so, he still could have give up the condition of intentionality and keep the condition of being extrinsic. Thus, he could have in mind a *not-intentional and extrinsic* view of teleology.

- This kind of teleology might look like as an unconscious (and hence not-intentional) tendency the world shows toward something external (extrinsic) to it. As I see it, this is the source of the cosmological interpretations of Aristotle’s teleology.

- Otherwise, the final cause might be extrinsic because it does not have to do with natural objects but rather with the structure of our explanatory discourse. As a result, teleology is regarded as a mere explanatory device. Moreover, the fact that Aristotle’s action explanation (walking) has the form of an “answer”, has led some scholars to suppose that final cause is a linguistic object, rather than something characterized by real causal powers. This is the view functionalism attributes to Aristotle, conceiving *teleology as a level of our explanatory discourse*. Both Putnam and Nussbaum contrast low-level explanations with formal-teleological (functional) ones. In comparison with analysis of the ultimate constituents, teleological explanations are superior in generality, economy, predictivity and simplicity and are thus characterized by epistemic elegance. Yet, teleological causes do not have any causal efficacy. According to this interpretation, it follows that Aristotle thinks that simple elements can fully explain everything and, in spite of this, that explanations in terms of forms and ends are just essential for our epistemic discourse.

«I have tried to show that you, Democritus, although you are right to suppose that living creatures are necessarily physical entities, are wrong to infer from this that *the best explanation* of their behavior is on the level of basic particles. Whether we think of animals or of artifacts, in most cases structural principles provide *explanations* that are superior in economy and generality to elaborate atomistic accounts you project».³⁷²

Robinson correctly summarizes this thesis as follows:

«[Nussbaum’s view is that] his [Aristotle’s] difference from the atomists is a difference concerning the importance of certain forms of *explanation*, rather than a difference about the actual manner of *operation of things*».³⁷³

³⁷² Nussbaum (1978), pp. 73-74, emphasis added.

³⁷³ Robinson (1983), p. 133, emphasis added.

If this brief analysis is correct, we can understand what cosmological interpretations and functionalism interpretations of teleology have in common: both of them regard Aristotle's teleology as *extrinsic*, even though as *not-intentional*. Since "being extrinsic" means originating from the outside, teleology might be extrinsic either because of the existence of a cosmological object outside the things (the unmoved mover) or because of the structure of our scientific explanations (which is extrinsic to the things and the physical processes which involve them).

I rather understand Aristotle's teleology to be *intrinsic*. These cosmological and functionalist interpretations suggest a reductive interpretation of teleology, which is inappropriate to restore the original extent of Aristotle's teleology and which makes us lose the opportunity to be inspired by Aristotle's antireductionist physicalism. I think that functionalism, in particular, has only partially enabled itself to discover ways in which today we can take advantage of Aristotle's philosophical speculation about nature and life.

Back to my formulation of the domain of which final causation. I distinguish between *c*) action and *d*) production, whereas many scholars take them to individuate the same events. Let me illustrate why.

I have recalled that some scholars have suggested that final cause is just a linguistic or mental object, but drawing the adequate distinction between action and design the opposite view could also be justified.

As a matter of fact, Aristotle applies teleological explanations to both action and design. I find interesting that Walsh regards both action and design as instances of *extrinsic* teleology.³⁷⁴ As I understand it, the requirements to be met for a performance to be an instance of artistic production are 1) an agent, i.e. the craftsman, and 2) the artistic product. Teleological explanation applies insofar as we attribute to the agent the intention to act upon the product in such-and-such way, so that all the steps preceding the realization of the product are for the sake of that result. The final outcome is the product itself.

On the contrary, being teleological for a purposive or intentional action requires that the agent has an intention or a desire. These are, by definition, "internal" to her and thus there is no need to leave room for an external object upon which she acts or desires to act. A walk is for the sake of health if and only if the agent acts on the basis of a rational belief and, likewise, an animal's movement is teleological if and only if the animal has a desire to do so (e.g. in order to reach some food).³⁷⁵ When the source of change is an *intentional* capacity,³⁷⁶ the actualization of that capacity follows of

³⁷⁴ Walsh (2008), p. 118.

³⁷⁵ *Metaph.* 1048a 7-15: «That which decides, then, must be something else; I mean by this, desire or choice».

³⁷⁶ The word "rational" is inadequate, given that Aristotle refers to both men and animals. In this context, I take intentional to be descriptive of movements of both men and animals and hence to be independent from rational

necessity only if the agent in question has the desire to exercise it and find herself in circumstances suitable to do so.³⁷⁷

In light of this remarks, I think it could be shown that in Aristotle's view the purposive action is both *causally due to* and *explained by* the end toward which it tends and thereby that he sides with those who argue for mental causation in an anti-reductionist way. The fact that by introducing final causation Aristotle does not exclude material necessity at all (but rather regards it as complementary to final causation) witnesses in favor of his non-reductionist physicalism. A work could be devoted to defend the thesis that Aristotle today would defend the possibility of *free* will in a *deterministic* world. However, I shall not attempt to follow this argument in detail.³⁷⁸

To summarize, scholars usually refer to "transcendent" or "extrinsic teleology" referring to those explananda of which ends or goals are *intentional* and *extrinsic*.³⁷⁹ Aristotle rejects the cosmological hypothesis of an extrinsic final cause which intentionally governs the universe and, with the necessary distinctions, he applies extrinsic teleology to production. Action is also explained by final cause but it is at least dubious that it could be the case of extrinsic teleology, since the explanation of purposive behavior requires desire, which seems to be intrinsic to agent's mental life. Even though Aristotle himself uses extrinsic teleology, e.g. as regards to production, I take it to be misleading if we do not carefully distinguish between it and intrinsic, or natural, teleology.

In the present context, I shall focus on teleological approaches to the organism (intrinsic teleology) rather than to action (probably intrinsic) and production (surely extrinsic). I shall try to show that the development of the organism represents a fundamental application of teleology.

Primary Use Thesis

So, is there a primary locus in which Aristotle recognizes that for-the-sake-of-which to be at work? Today most scholar are agreed that philosophy and contemporary science might easily agree about final causation, provided that we interpret teleology as *intrinsic* to living beings.³⁸⁰ Thus it paves the way that Aristotle himself conceives his teleology as intrinsic and invokes it primarily as regards biology.³⁸¹ In recent years many scholars have defended the thesis that the primary use of Aristotle's teleology is intrinsic and concerns *living things* as well as the natural processes which

choice.

³⁷⁷ cf. Meyer (1992), p. 801.

³⁷⁸ For the apparent oxymoron of free will in a deterministic world, cf. De Caro (2004). However, sorting out Aristotle's view about free will is beyond the scope of this chapter.

³⁷⁹ These are the two criteria suggested by Walsh (2008), p. 118.

³⁸⁰ Berti (2005, p. 42). I am sympathetic with this view. I delve into the argument in the "Appendix" to this chapter.

³⁸¹ See section "Domain" in this chapter.

involve them.³⁸² Allan Gotthelf is the one who most considerably argued for this thesis. He points out that the fundamental contribution the natural philosopher's investigation obtains from the four causes is that «the development of (the parts of) a living organism is for the sake of (their contribution to) its mature functioning».³⁸³

Charlton authoritatively supports the same position. He points out that in the main text as regards teleology, namely *Physics* II 8, Aristotle is discussing only a limited class of natural phenomena, that is, the parts of living things. In support of this, he quotes the passage in which Aristotle rejects mere material necessity and invokes final cause as regards teeth and, more generally, parts of animals (198b 23-28). Here Aristotle identifies Empedocles as his opponent, but a similar remark is to be found in *De Generatione Animalium*, where Democritus is charged to have not recognized that the parts of animals develop and exist for the sake of their functions, and thus for the sake of the mature functioning of the organism.³⁸⁴

Also Nussbaum, although disagreeing about the nature of final explanation, thinks that functional accounts are useful primarily for living things and that in Aristotle's use they can be applied to artifacts «only derivatively and by regarding them as extensions of the living body».³⁸⁵

What I wish to argue for with what I shall call the Primary Use Thesis is that, if we have to identify the primary use of Aristotle's teleology, we have to look to the investigations of natural scientist (194b 16-23) which understands that the overall structure of living things, their functions, their parts, as well as their embryonic development are for the sake of something. Aristotle states this very clearly in the main texts about teleology. In *Physics* II 8 Aristotle refers to parts such as teeth (198b 25-28), to natural functions of animals such as spiders and ants (199a 20-24, 26-27), to natural functions of plants (199a 25, 28; 199b 10, 15) and of the development starting from seed (199b 14-18). In *De Partibus Animalium* I 1 he relates teleology to natural generation (639b 12; 640b 1-5; 641b 25-35), to parts (640a 27-30; 642a 20-24) and functions (642a 32-642b 1) of living organisms, as well as to their overall structure (642a 17-22), stating that, although the final cause is present as essence both in artifacts and living things, the latter is primary for the student of nature (639b 23; 640a 20-25; 641a 16-24), showing thus that teleology is applied to the former extrinsically and derivatively (641 4-15; 642a 17-22).

The Primary Use Thesis is not to deny that Aristotle applies teleology to regular physical patterns in nature, as well as to action and production, but rather to underline that living things are prior as

³⁸² For instance: Ayala (1970), Gotthelf (1976), Cooper (1982), Code (1987), Meyer (1992), Lennox (1993), Berti (2005), Depew (2009).

³⁸³ Gotthelf (1976), n. 7 p. 299.

³⁸⁴ *GA* V 8, 788b 1 ff.

³⁸⁵ Nussbaum (1978), p. 81.

regards natural teleology. Such a priority has to do with Aristotle's doctrines of potentiality-actuality and hylomorphism, in both of which final cause plays a crucial role.

Potentiality, Actuality and the Four Causes

The doctrine of the four causes is intimately related to the doctrine of hylomorphism. As I have shown in the chapter devoted to homonymy, according to Aristotle everything is a compound of matter and form, where form is the *actuality* of the compound and matter is *potentially* it. The matter of the compound is what constitutes the structure, which is the form of the compound and which enables the compound to perform the relevant functions. In order to show that hylomorphism has both a metaphysical and a predicative aspect (and hence that it fits with homonymy), in the previous chapter I suggested the following definition of matter and form:

*Form is (i) the actuality of a portion of matter which has the potentiality to realize it and, further, form is (ii) what is predicated of matter, which in itself is not predicable of anything.*³⁸⁶

In light of the analysis I have offered, it is clear that in Aristotle's view form is predicated of matter because form is responsible for matter, while matter is not responsible for form. In light of the meaning of *aitia* (blamable, hold responsible) that is to say that form is characterized as having causal and explanatory priority over matter.³⁸⁷

There are two further steps to take into account. I suggest here two *identifications*, both of which are to be understood in terms of *levels of analysis*.

(i) Matter and form are respectively the material cause and the formal cause. They are the same notions considered according to a new description. I have recalled that in the context of hylomorphism Aristotle regards matter as the *terminus a quo* and the form as the *terminus as quem* of the process of change.³⁸⁸ Thus Aristotle has strong reasons to regard matter and form as factors which account for (and are responsible of) change: that means that he has strong reasons to regard them as causes. Indeed, in virtue of his conception of knowledge and explanation, what account for (and is responsible of) change is a cause.

Whereas in the context of hylomorphic analysis Aristotle suggests the matter-form distinction, in the context of explanation of natural processes he identifies them as causes, i.e. material cause and formal causes.

I regard this first identification to be quite uncontroversial.

(ii) The second step is that, in Aristotle's view, matter and form can be thought of in terms of

³⁸⁶ See chapter 2, especially the section entitled *Understanding Hylomorphism*.

³⁸⁷ cf. *Phys.* II 9, 200a 34-35. For further discussion, see chapter 2.

³⁸⁸ cf. *Phys.* I 7. For a commentary I am sympathetic with, see Charlton (1970), pp. 70-79.

potentiality and actuality.³⁸⁹

Aristotle maintains that we must not seek a definition of potentiality and actuality since, he claims, it is impossible to give. Berti points out that everything which *is* can be either potentially or in actuality and hence that potentiality and actuality are coextensive to “being”. As I have shown in the previous chapter, defining X entails expressing the essence of X, which is clearly impossible for a notion as wide as being as such (which is rather distinguished in particular essences).³⁹⁰ Hence potentiality and actuality are primitive concepts we cannot define but only grasp by analogy, comparing particular cases.

«Our meaning can be seen in the particular cases by induction, and we must not seek a definition of everything but be content to grasp the *analogy*, that as that which is building is to that which is capable of building, so is the waking to the sleeping, and that which is seeing to that which has its eyes shut but has sight, and that which is shaped out of the matter to the matter, and that which has been wrought to the unwrought. Let actuality be defined by one member of this antithesis, and the potential by the other. But all things are not said in the same sense to exist actually, but only by analogy – as A is in B or to B, C is in D or to D; for some are as movement to potentiality, and the others as substance to some sort of matter».³⁹¹

Thus potentiality and actuality are mutually related in a correlative pair and they are to be understood as a *relationship* rather than two concepts defined once and for all. If we understand matter and form respectively as potentiality and actuality, it is not surprising that we have a grasp of matter and form only if we understand them as a relationship of which the terms are not reducible to each other. Why should not they be reducible to each other? Here lies one of the main problems relative to final causation.

The fundamental question is whether the actualization of potentialities is reducible to the qualitative changes of its material constituents. The answer to this question decides whether by final causation Aristotle means either that the material-efficient processes are due to (ontologically irreducible) or just explained by (ontologically reducible) their ends.

If reduction is possible, then the material-efficient causes fully account for the coming about of the outcome. According to Aristotle, this is apparent in changes involving simple elements. For example, water (the bearer of the passive potential) and the appropriate heat (the bearer of the active potential) explain why water is brought to boil (actualization of the pair). But living things count as a different case: Aristotle repeatedly states that their development is *not reducible* to the qualitative changes of its material constituents but entails reference to formal-final causation.

«Again, whenever there is plainly some final end, to which a motion tends should nothing stand

³⁸⁹ Gotthelf (1976, p. 251) suggests an account of Aristotle’s four causes in terms of potentiality and actuality.

³⁹⁰ Berti (2006), p. 100.

³⁹¹ *Metaph.* Θ 6, 1048 a 35 – 1048b 9.

in the way, we always say that the one is for the sake of the other; and from this it is evident that there must be something of the kind, corresponding to what we call nature».³⁹²

This formulation of material cause as due to and explained by formal-final cause evokes that of the active potentiality of organism for its development, should nothing hinders it.

«And in the cases in which the source of the becoming is in the very thing which suffers change, all those things are said to be potentially something else, which will be it of themselves if nothing external hinders them».³⁹³

Thus the identification of material-efficient and formal-final causes respectively with potentiality and actuality supports the irreducibility thesis: given that the conceptual elements of the latter pair are irreducible to each other, likewise the two types of causation are also not reducible.

Indeed Aristotle maintains that the classification of causes cannot collapse into one single type of causation. The causes have to be regarded as compatible, that is to say, not mutually exclusive, and synchronically effective. If actuality *is* form, then potentiality *is for* form, and given that according to Aristotle form is irreducible to its material constituents, then also potentiality for form (final cause) is irreducible to its material constituents (material cause).³⁹⁴

Aristotle's way to avoid physicalist reduction is to maintain that we can account for natural processes only offering an analysis that provides irreducible levels, namely matter-potentiality and form-actuality.

From an ontological point of view, the form of a thing is the *actuality* of that thing insofar as it is the overall structure that enables that thing as a whole to perform the relevant set of embodied abilities; whereas matter of a thing is the *potentiality* of that thing insofar as it is the element able to underlie such embodied abilities. Matter is what can *potentially* realize or embody the form; whereas form is what *actualizes* matter and, hence, the compound as a whole. From an epistemological point of view, form is *actuality* in the sense that it is the principle organizing, defining and identifying the compound as a whole throughout time; whereas matter is *potentiality* in the sense that it is the principle able to be organized in such-and-such a way and that underlies the

³⁹² *PA I 1*, 641b 23-24.

³⁹³ *Metaph.* Θ 7, 1049a 15-16.

³⁹⁴ Code (1987) points out that «this conception [of soul] presupposes a physics according to which physical bodies are endowed with natures that cause (and explain) their natural changes and motions. Aristotle's hylomorphic conception of soul is inextricably intertwined with this physics, and makes no sense without it», p. 53. Gotthelf as well observes that such a conception of causality presupposes the reality of "natures" (i.e. essences, forms, actualities) and "potentials" (i.e. "that out of which", matter). Gotthelf quotes *Metaph.* Θ 3, 1047a 11-13, where Aristotle criticizes the arguments proposed by the Megaric school, which maintained that potentiality does not exist at all. Against their position, Aristotle argues that if we do not commit ourselves to the existence of potentiality then we find ourselves unable to account for change and becoming. «Again, if that which is deprived of potentiality is incapable, that which is not happening will be incapable of happening; but he who says of that which is incapable of happening that it is or will be will say what is untrue; for this is what incapacity meant. Therefore *these views do away with both movement and becoming*», emphasis added.

processes of change throughout the existence of the compound.

In the context of hylomorphic analysis Aristotle identifies matter and form, while he identifies actuality and potentiality in the context of first principles investigation.

At this point a warning must be given. As I have already hinted, Aristotle is not identifying objects or elements but rather different *levels of analysis*.

Depending on at which level of analysis Aristotle is considering, matter-form distinction may turn into that between potentiality and actuality or into the fourfold classification of causes. Although usage varies depending on the context, the matter-form distinction is constantly at the center of Aristotle's scientific interests. Let me elaborate on this theme.

In the second book of the *De Anima*, after having criticized the doctrines of his predecessors, Aristotle is attempting to supply his own definition of *psuche* (412a1-5). At the outset of the book he claims that first of all we call substance matter, that is that which underlies change but that «in itself is not a this» (412a 7). Matter, as we have seen, is *logically conceived* as unformed, precisely because it is potentially able to realize or embody any kind of form. Secondly, we call substance form, «which is that precisely in virtue of which a thing is called a this» (412a 8). As matter is *logically conceived* as unformed, form is *logically conceived* as the principle able to determine the unformed matter. Thirdly, we call substance the compound of matter and form, that is, a real thing in the world (such as animals, plants, artifacts etc.). Accordingly Aristotle concludes and summarizes the analysis stating that matter is potentiality and form is actuality, with the usual distinction between what Scholasticism calls first actuality and second actuality, that is, the possession of a capacity and the actual exercise of it.

«Now matter is potentiality, form actuality; and actuality is of two kinds, one as e.g. knowledge, the other as e.g. reflecting».³⁹⁵

The fact that Aristotle easily switches from one distinction (matter-form) to the other (potentiality-actuality) suggest that he regards such formulations as expressing the same fundamental *logical distinction*, and not something perceptible.

An objector may dispute to this argument that, even though Aristotle labels matter and form in different ways depending on the context, this does not demonstrate that he regards them as logical formulations. From an ontological point of view, matter and form might well be real as such in things, being what changes just the level of our inquiry about them. The fact that in the relevant conditions Smith defines rain as “seasonal precipitation” could be regarded as a identification of the

³⁹⁵ *DA* II 1, 412a 10.

real object rain with a logical concept, but this does not support the interpretation that Smith does not take seriously the ontological status of rain.

According to the objector's view, Aristotle regards matter and form as respectively ontologically subsistent. Since it is beyond doubt that he thinks that they can form a (temporary) unity in compounds, we should expect him to sort out under which conditions they are able to do this. But Aristotle dismisses such a question as unnecessary. They are a unity in compounds because compounds *are* unities. What is logical in character is the matter-form distinction. The ontological status of matter and form is clear if we regards them as a *conceptual articulation* of Aristotle's analysis, as well as potentiality-actuality relationship is. It is not an accident that Aristotle pushes aside the question about the unity of matter and form stating that the form of living things has to be regarded as actuality of a body. The reason is that he does not understand matter and form as independently subsistent entities but rather as *logically individuated principles*.

«If, then, we have to give a general formula applicable to all kinds of soul, we must describe it as an actuality of the first kind of a natural organized body. That is why we can dismiss as unnecessary the question whether the soul and the body are one: it is as though we were to ask whether the wax and its shape are one, or generally the matter of a thing and that of which it is the matter. Unity has many senses (as many as "is" has), but the proper one is that of actuality».³⁹⁶

I argue that such different identifications of the same conceptual tool suggest that Aristotle regards the relationship between matter-form, potentiality-actuality, material-formal and final causes as *logical in character*. This would shed some light on the reason why he claims in the aforementioned passage that substances *are* compounds of matter and form, while ridiculing dualism. To put it more generally:

in virtue of the logically individuated relationship between matter and form (or, which is the same, between potentiality and actuality and between the irreducible types of causes) Aristotle can consistently maintain that physicalism is true, while denying that everything is explicable in terms of matter alone.

III. The Ontology of Analysis

I have indicated that matter-form distinction is the keystone of Aristotle's philosophy and suggested that its identifications with the potentiality-actuality distinction on one hand and with the irreducible plurality of causes on the other hand witness this distinction to be logical in character.

Both form and matter are levels of analysis crucial in order to be able to successfully analyze substances but Aristotle rejects the idea that they exist *as such* in things: if so, he thinks, this would

³⁹⁶ DA II 1, 412a 5-9.

threaten the unity of substances and hylomorphism would be an odd and somewhat blurry dualism.³⁹⁷ As I have shown, in the *De Anima* Aristotle ridicules dualism taking into account examples of substances (such as a living body and an artifact) which he regards as analyzable in terms of the matter-form relationship.³⁹⁸ In the *Metaphysics*, Aristotle defends the same idea: it should be clear that matter and form (or, which is the same, potentiality and actuality) constitute a unity *in re*.

«The last matter and the form are one and the same thing, the one potentially, the other actually. Therefore to ask the cause of their being one is like asking the cause of unity in general; for each thing is a unity, and the potential and the actual are somehow one».³⁹⁹

Aristotle is maintaining that if we consider an actual substance (such as a candle or a body) matter and form simply *are* that substance. Therefore it is impossible to separate matter and form in an ostensive way. If matter and form are not distinguished in things, which is then the sense of their distinction? In light of the previous analysis, I take it to be the following:

Matter and form are (i) incapable of separate existence and, at the same time, they are (ii) distinguishable by means of the individuation of their relationship, namely potentially constituents-actually constituted. We do distinguish between matter and form ascribing them different causal powers at the logical level of analysis of substances.

As I see it, this is a cornerstone of Aristotle's philosophy, as well as the key to understand his conception of final causation. I understand it as being twofold, that is, entailing both a logical and an ontological thesis.

· *Logical Distinction Thesis*: on one hand, the distinction between types of causal powers is stressed. By means of this irreducible distinction Aristotle ascribes to matter and form different causal powers (for instance, the decay due to age to the former, and growth according to a bodily plan to the latter). In his view, such a distinction is a fundamental tool in order to gain knowledge about substances and the processes in which they are involved. The subsequent identifications of matter and form Aristotle suggests are to be understood at this logical level. Matter-form distinction is logical in character.

· *Ontological Unity Thesis*: on the other hand, matter and form (as well as their identifications with types of causes and with potentiality-actuality) undoubtedly constitute a unity *in re*. His hylomorphism warns us against the hypostasis of matter and form: Aristotle ridicules those who

³⁹⁷ See the first chapter of this work, in which I analyze and criticize some dualistic interpretation of Aristotle's hylomorphism.

³⁹⁸ *DA* II 1, 412b 5-9. Nussbaum (1978) refers to this passage as follows: «I say quite clearly that the soul is the form of a living body, and that it is wrongheaded even to *ask* whether the soul and the body are one», emphasis as found.

³⁹⁹ *Metaph.* H 1045b 17-21.

wonder whether matter and form are a “real” unity in substances since he is sure that matter and form *are* an ontological unity in substances.

Aristotle’s way to reconcile these two thesis is that the ontological unity of substances should be analyzed by different and irreducible levels of analysis.

This view is strengthened if we consider the fact that he equates the matter-form distinction with other distinctions. As I have recalled, depending on the context Aristotle modifies his analysis (regarding matter and form either as potentiality-actuality or as irreducible causes or, more often, explicitly as both). This shows that matter and form are not perceptible empirical entities, but rather levels of analysis. According to these remarks, *posing the distinction between matter and form at the analytical level counts as the statement of their unity in perceptible substances.*

I regard this as the most correct interpretation of Aristotle’s analysis of substances in terms of the matter-form relationship. In particular, I regard its *logical character* as the key to consistently understand the seemingly antinomy of final causation, and consequently to be able to utilize it in our contemporary naturalistic speculations.

Yet a question immediately arises. If we allow that matter-form distinction is logical in character are we, consequently, reducing the four causes to mere epistemological tools? More specifically, according to this view how could Aristotle ascribe causal efficacy to formal-final causation, given that it is logical in character? Is it inconsistent to hold that the term of a logical distinction has causal powers?

No doubt, Aristotle consistently ascribes *causal efficacy* to formal and final causes. This is consistent with the thesis I ascribe him, namely that the matter-form relationship is logically identified. The balance of this chapter will consists of arguments in behalf of this main thesis.

The Priority of Final Cause

Throughout the corpus Aristotle maintains the thesis that the fully actualized form is prior to its material constituents and parts.⁴⁰⁰ Even limiting ourselves to the living organism and its parts, this claim can be interpreted in at least two ways. The first way is to interpret it as *a) a piece of linguistics*, entailing that we cannot define the concept of *part as such* unless we refer to the whole of which it is indeed a part. As Hankinson rightly points out, this thesis does not have immediate metaphysical implications: it might be that we cannot describe things as parts unless we refer to the whole but, at the same time, that does not entail that we cannot refer to them at all. The other possible interpretation is *b) regarding the priority of form as a metaphysical thesis*, claiming that the

⁴⁰⁰ cf. for instance *PA* I 1, 640a 33 ff.; *Pol.* I 1-2, 1252a 1-1253a 38; *Metaph.* Z 11.

whole is metaphysically prior to its parts. In which sense are we supposed to interpret such an Aristotelian doctrine?

What is at stake is, of course, the issue of reduction of form. Allowing that the actualized form of the mature organism has (some sort of) priority over the parts that constitute it, we are assigning to it an explanatory role prior over its material constituents and its parts. In Aristotle's view this entails that an explanation that relies solely on matter is not able to account for the thing in question. Thus the priority of form to matter entails that matter, on its own, is insufficient to *explain* or *account for* its own outcomes. In order to do this, we need to take into account form as well. The form is prior in the «order of substance» but is posterior only in the (in Aristotle's metaphysics, very limited) sense of the chronological point of view.

«Now the order of development and the order of substance are always the inverse of each other. For that which is posterior in the order of development is antecedent in the order of nature, and that is genetically last which in nature is first».⁴⁰¹

Form is the last thing which is brought about by the process of development precisely for the reason that it is the *end* toward which the process tends. Aristotle is arguing that, although form is chronologically the last thing to come on the scene, it has a priority under any other respect. But, at least for the modern conception of causation, what seems difficult is exactly arguing in favor of an order different from the mere chronological one. Insofar as we accept a naturalistic view of the physical world, which other "order" besides that in time should we be willing to accept? Seemingly, none. The modern conception of causality maintains, at least, that when we define the *cause* A of an *effect* B, A is *chronologically antecedent* to B. Thus, causes precede their effects. The notorious Hume's treatment of the issue in *Treatise of Human Nature* (Book I, Part III) assumes such a chronological order (causes preceding the effects which necessarily follow them), before suggesting that causation is but a cognitive associative principle in our minds, rather than a real relation between events.

However, the idea that causes follow (rather than precede) their effects seems just an absurd hypothesis. Despite the appearances, my aim is to argue not only that, in his times, Aristotle had good reasons for supporting final causes, both also that today we do. Thus my task is elucidating what I regard as some misleading misconceptions of Aristotle's final causality. The most fundamental to be addressed, in my view, is the thesis of Material sufficiency, which holds that every physical event has a physical sufficient cause necessitating it. This thesis argues that tracing back the causal history of any physical effect, one need to appeal only to physical material constituents, which are sufficient to cause (i.e. to necessitate) their effects. The thesis of material

⁴⁰¹ PA II 1, 646a 25-27.

sufficiency goes also under the name of Completeness thesis, since it holds that the physical world contains in itself the physical factors which can explain it and is, in this sense, it is causally complete. Given that within this framework formal and final causes do not have any genuine causal role to play, they have been interpreted either, blaming Aristotle, as naturalistically unacceptable (for they causally overdetermine the effect, whereas the latter has already a material sufficient cause which fully account for it); or as epistemological (or mere heuristic) principles, useful insofar as they orient our understanding, but nowise real and causally active in things.

The Material sufficiency thesis relies on the minimal version of modern conception of causality I have roughly recalled and in what follows I shall attempt to challenge it and compare it to Aristotle's view.⁴⁰²

Aristotle's Conception of Cause

Aristotle does not have the concepts of cause and effect as we understand them today.⁴⁰³ The doctrine of the four causes relies rather on a wider conception of knowledge: in Aristotle's view there is more than one type of explanation to be given in order to have knowledge of something. Knowing something is to know its causes, and causes are various and irreducible aspects of the thing we hold responsible for it. They are types of answers to different why-questions.

«Now that we have established these distinctions, we must proceed to consider *causes*, their character and number. *Knowledge* is the object of our inquiry, and men do not think they know a thing till they have *grasped the why of it* (which is to grasp its primary cause). So clearly we too must do this as regards both coming to be and passing away and every kind of natural change, in order that, knowing their principles, we may try to refer to these principles each of our problems».⁴⁰⁴

Aristotle's goal is providing the canonical form a genuine explanation ought to have in order to satisfactorily provide knowledge of the explanandum in question. In his philosophy, there is not an adequate conceptual translation of "effect" as we understand it today. His inquiry focuses rather on a more comprehensive concept the object of explanation. *Thus, rather than a doctrine about the one-to-one cause-effect relationship, Aristotle formulates a broad doctrine about multiple causes-explanandum relationship.* When are we justified to think we know a thing?, asks Aristotle in the aforementioned passage. When we can provide answers to several questions, those questions which

⁴⁰² For an overview of the issue of causation in the context of the mind-body problem, cf. Robb, D. and Heil, J. (2009).

⁴⁰³ cf. Berti, E. (2005), pp. 39-67, p. 44; cf. Charlton (1970) warns: «*Aition* is traditionally translated "cause" and I follow that practice, but we should be careful not to be misled by it. We talk of causes operating, and producing effects. Aristotle has no such expressions [...]. The Greek word *aition* (connected with the verb "to blame", "hold accountable") is used considerably more widely than the English "cause"», p. 98.

⁴⁰⁴ *Phys.* 194b 16-23.

address the aspects responsible for the thing in any way whatever. And how can we address all the aspects responsible for the explanandum? When we consider all the relevant causes providing a framework which is complete from an explanatory point of view. Aristotle thinks that the causes can be reduced to four: they are the matter a thing is made of, its essence, that is, the form it is realizing, the source of change or rest and, finally, its end. Depending on which object we are attempting to draw an explanation of, different types of causes ought to be taken into account in order to explain that thing. Thus the modern conception of causation suggested by Hume is not appropriate if we are to understand Aristotle's four causes and, more generally, his view of what it is to have a complete knowledge of something.⁴⁰⁵

An opponent of Aristotle's view can admit that for us to *know* something is to provide answers at different levels of discourse and description, maintaining, at the same time, that genuine causal chains take place solely at the physico-chemical level. Also an advocate of Aristotle, eager to find a way to make him compatible with our contemporary views, might hold the same view. Indeed, this was Putnam's strategy: relying on the notion of *functional isomorphism*, a portion of matter can count as "mind" as long as it is able to express the relevant set of functional states, preserving the functional relations among mental states.⁴⁰⁶

Accordingly, Aristotle would be right on the *epistemic* level, specifying the conditions to be met by a satisfactory, complete explanation for us, but this would not affect the *ontological* level of things, at which genuine causal effectiveness is ascribed solely to matter.

Not only Aristotle does not argue in favor of such a division between what we can grasp through our cognitive skills and how things in the world really happen, but rather he argues in favor of the contrary view. *We gain knowledge by means of formal-final explanations* because they are regarded as *actual sources of change in the world outside us*. Moreover, not only formal-final causes work side by side to material-efficient one but, from a logical point of view, they are even prior to them: «For that which is posterior in the order of development [i.e. actualized form] is antecedent in the order of nature».⁴⁰⁷

How can we make sense of this, given that the outcome of a material process should be the last thing to come about with regard to causal successions?

Succession in Time

The issue of chronological order of cause and effect can be a misleading one. Typically we think of causes producing, and hence preceding in time, their effects. Rather Aristotle regards causes as

⁴⁰⁵ cf. Berti (2005), p. 43.

⁴⁰⁶ Putnam (1975).

⁴⁰⁷ *PA* II 1, 646a 26.

aspects which can be hold accountable of the explanandum. Thus he does not have any concern about to the place in time of causes in respect of their explanandum. Only matter, the thing out of which the thing comes to be, has to precede the thing itself, insofar as it could not constitute it unless it existed in advance. But actualized formal-final causes follow in time their explanandum and Aristotle does not seem to recognize any difficulty about their place in time. His discussion of *aitia* is not affected by empiricism's discussion of causal connection; it is rather «an attempt to distinguish and classify different kinds of explanation». ⁴⁰⁸

Thus, considering the doctrine of four *aitia* we must be aware that when Aristotle speaks of what we translate as “cause”, he is looking for types of answer we can give to questions such as “*X*, on account of what?” or “What is responsible for *X*?”. These questions are more widely conceived than our commonsense conception of causation, according to which every event is necessitated by some antecedent conditions, which are sufficient to cause it. Aristotle is looking for no causes in this sense, but rather for relevant explanatory factors. Hence, with regard to processes which are goal-directed, he conceives the end, or goal, of the process as an indispensable explanatory factor.

Suppose we are to account for the artistic production of a statue and that one man thinks that we have to consider the metal out of which the statue is made (plus, probably, the conditions of the environment together with the laws of nature), while another man thinks we have to regard the will of the artisan to mould that material and her ability to do so, while another man thinks that in order to account for the statue we have to look to the finished product, in sight of which the process is the way it is. Aristotle thinks that these explanations are not in competition:

«Thus the art of statue-making and the bronze are both causes of a statue, and causes of it, not in so far as it is anything else, but as a statue; they are not, however, causes in the same way, but the latter is cause as matter, and the former as that from which the change proceeds». ⁴⁰⁹

Each factor of change accounts for a particular aspect of the process and hence the four causes are *not* mutually exclusive. A sign of this is that, if correct, they are – and indeed, in Aristotle's view, have to be – true at the same time. Taking into account solely the material cause would provide for Aristotle an incomplete explanation which could be (in part) causally true, but not explanatory. ⁴¹⁰

Relying on the Primary Use Thesis, an even more perspicuous example is that supplied by natural generation. In such a process, the formal-final cause is what leads and organizes the process of development toward a new, mature individual belonging to the kind, that is, toward a species-specific individual form embodied in some suitable matter. Not only, in Aristotle's view, the *final*

⁴⁰⁸ Charlton (1970), p. 99.

⁴⁰⁹ *Phys.* II 3, 195a 5-8.

⁴¹⁰ cf. Hankinson (1995), esp. pp. 131-132, who argues against a mere heuristic interpretation of final causation and in favor of the thesis that final cause are real and active in the world.

cause of the generation process overlaps with the fully realized *form*, but it plays also the role of *efficient* cause, being that which sets up the appropriate movements in matter in order to shape a new embryo. He states this in the *Physics* and with regard to natural generation.⁴¹¹ Code argues that Aristotle's account of embryological development is the attempt to see it «as natural in the sense that its *efficient cause* is the nature internal to the developing embryo.»⁴¹²

Thus the formal-final causes of the process of generation account for it in a way which is irreducible to the material-efficient one.

Although strictly connected, the four types of cause are irreducible to each other because each of them concerns a different aspects of the answer to the question “Why?” or “On account of what?”. Thus, Aristotle has no concern about the chronological order of causes and effects because he does not regard *aitia* as causes in the contemporary-minded sense but, rather, as irreducible explanatory factors, which together can account for change, both as regards human action and, above all, natural change.

The Coinciding of Form, End and Moving Cause

In *Metaphysics* Aristotle maintains that form (or actuality) is prior to matter (or potentiality) in formula, in substance and, in a sense, in time.⁴¹³ Aristotle is specifying that form is prior to matter from several points of view, or levels of description, which he draws up as logical, ontological and, in a sense, even chronological.

«That this is so is manifest by induction; for a house does not exist for the sake of bricks and stones, but these materials for the sake of the house; and the same is the case with the materials of other bodies. And the same thing can be shown by argument. For generation is a process from something to something, from a principle to a principle – from the primary efficient cause, which is something already endowed with a certain nature, to some definite form or similar end; for man generates man, and plant generates plant, in each case out of the underlying material».

⁴¹⁴

The relation between hypothetical necessity and final causation corresponds to Aristotle's statement that “that for the sake of which” is prior in *logos* to efficient cause.⁴¹⁵ In order to give an explanation of these phenomena we need to make reference to their goals. The priority of final cause is established both with regard to artistic production and to natural processes, such as generation.

· With regard to artistic production, according to Aristotle the artisan has to begin with an

⁴¹¹ *Phys.* II 7, 198a 24-26: «[...] the matter, the form, the mover and that for the sake of which. The last three often coincide [...] For man begets man».

⁴¹² Code (1987).

⁴¹³ cf. *Metaph.* Θ 8 for Aristotle defending the thesis of priority of actuality over potentiality.

⁴¹⁴ *PA* II 1, 646a 28 - 646a 36.

⁴¹⁵ *PA* I 1, 639b 15-20.

understanding of the *logos* of the object to be produced. *Logos* overlaps with artifacts' essence, function and definition, which *is* the expression of the *essence*. As Code points out: «the term *logos* is not used to indicate a linguistic phrase, but instead stands for the essence signified or expressed by a definition of *ousia*». ⁴¹⁶ In order to achieve a certain result, the artisan has to assume as hypothesis what must be done. ⁴¹⁷ This coincide with the *conceptually priority* (and the chronological posteriority of the actualization) of final causation, which Aristotle expresses like this: «where there is an end, the successive things which go before are done for it». ⁴¹⁸

· The priority of form in natural generation entails that the end is prior to the efficient causes of the organism coming to be. In natural generation, the priority of actuality is threefold: actuality is prior to potentiality with regard to *ousia*, knowledge and *logos* and, in one sense, even to time. ⁴¹⁹ The end coincide with the actuality. Indeed, with regard to the priority of actuality to potentiality, Aristotle claims: «the actuality is the end, and it is for the sake of this that potentiality is acquired». ⁴²⁰ As Code puts it: «a scientific account of the efficient cause of living things requires a prior account of the nature towards which such causes are directed». ⁴²¹

As I have stressed, according to several influential scholars, Aristotle regards living organism as the paradigm for the taking place of final causation. While in artistic production the form is transmitted from something like a mental image ⁴²² to some kind of suitable material which is not similar (and will not be) to the the artisan; as regards living organism, generation and embryological development entail that the same *essential form* should be carried from the parents to the offspring. Unless in cases of hybrids and monstrosities, to which Aristotle unsurprisingly devotes much attention, the transmission of essential form is the *regular natural outcome*, that is, the actualization of form is the end of natural generation. To sketch it, generation goes as follow: it takes two principles, the male (active) which transmits the potential form, and the female which supplies the matter (passive) suitable to acquire the relevant form, which is typical of the species in question. The form starts to “move” the matter supplied by the female in a way such that to shape it accordingly to the actualization of the vital processes and functions which, if nothing hinders, will bring about a new mature, functioning individual. Hence, when Aristotle repeats his refrain that man begets a man, he is referring to the transmission of essential form in generation and emphasizing that form (“man”) is an essential element of the process, being that toward which the

⁴¹⁶ Code (1997), p. 135.

⁴¹⁷ cf. *Metaph.* VII 7 and *EN* III 3.

⁴¹⁸ *Phys.* II 8, 199a 8.

⁴¹⁹ cf. *Metaph.* Θ 8, 1049b 10-1050a 4 ff.

⁴²⁰ *Metaph.* Θ 8, 1050a 10.

⁴²¹ Code (1997), p. 135.

⁴²² Demonstrating this would require a discussion which is beyond the scope of this chapter.

process of genesis tends. Hence with regard to natural generation form is:

- the efficient cause: given that the form transmitted by the father actively “moves”⁴²³ the passive principle supplied by the female (matter), form is the active principle responsible for the formation of parts and organs in the embryo;
- the formal cause: Aristotle’s theory about epigenesis witnesses in favor of the fact that form directs and controls step by step the unfolding development of the new organism;
- final cause: the end, toward which the process of generation tends to, is the actualization of the essential form in a mature individual.

The Primary Use Thesis has lead us to look how final causation is at work with regard to organisms and we have seen that, at least in this context, Aristotle regards final causation to be *empirical* in character.⁴²⁴

These remarks shows that those scholars which neglect that final causes are effective in the physical world, are reducing Aristotle’s natural teleology a mere explanatory device. On the contrary, in Aristotle’s view, they are explanations *because* they are source of change.

The role of form and end as regards natural generation shows that we gain knowledge through formal-final explanations because the logical relationship (by means of which we distinguish them with respect to unformed matter) ascribes them efficient roles to play as regards changes in the physical world.

IV. Logical Compatibilism: A Proposal

Aristotle repeatedly denies that matter alone can account for a teleologically explicable result.⁴²⁵ It has been argued that, in his view, this claim amounts to maintain that material elements are causes *insufficient* to necessitate their outcomes. If so, Aristotle’s natural teleology would be anti-naturalistic, since it would introduce forms and ends as transcendent entities, not reducible to their material constituents.

Although it is true that in Aristotle’s view form and end are not reducible to their material constituents, it does not follow that they are transcendent entities. On the contrary, they are realized or embodied in matter and hence they are enmattered, but not in a way such that their causal powers can be accounted for taking into account solely the causal powers of matter.

Once again, the keystone in order to understand Aristotle’s view is the distinction between the

⁴²³ cf. Code (1987) argues that Aristotle treatment of the generation of a living thing is straightforward with regard to his more general treatment of *kinesis* (movement), which Code summarizes as follows: «When the mover and mobile are distinct entities, *dynamis* is an incomplete actuality of a passive *dynamis* in a patient by contact with an agent having a corresponding active *dynamis*», p. 57.

⁴²⁴ cf. *GA* II 1, 734b 19 ff.; *GA* IV 3, 768b 4-16.

⁴²⁵ cf. *Phys.* 200a 6, 9, 33-34; *GA* 734b 27-735 a 4, 778b 5-6; 789 6-7; *DA* 416a 9-18.

analytical level and the *ontological* one. By introducing “form” Aristotle is not arguing for the existence of a transcendent element but rather for the necessity of employing irreducible levels of analysis in investigating nature. If we accept this, it will become apparent that he ascribes both to matter and to form effective *causal powers*. He is not arguing for a form of causation by which the future determines the past but, rather, for a form of causation able to account for material processes which do not happen by chance but are rather *directive* toward an end state. The distinction between matter and form amounts to that between the causal powers of the elements (fire, earth, water and air) and the causal powers of structures in themselves (such as, for instance, the form “man”). Aristotle’s point is that matter does not define the compound, but rather it is defined by the compound’s form. It is for the sake of that form that material elements organize themselves thus-and-thus. Hence, form is the end of the necessitating material processes which are directed toward it and, consequently, form is the essence of a compound. Essence is linguistically expressed in the compound’s definition, in which form is expressed separately from matter.⁴²⁶ This can be consistently maintained, along with a physicalist view, by which everything is made up of material elements.

«Our account of the formation of the homogeneous bodies has given us the elements out of which they are compounded and the classes into which they fall, and has made it clear to which class each of those bodies belongs. *The homogeneous bodies are made up of the elements, and all the works of nature in turn of the homogeneous bodies as matter.* All the homogeneous bodies consist of the elements described, as matter, *but their essence is determined by their definition.* This fact is always clearer in the case of the later products, of those, in fact, that are instruments, as it were, and have an end: it is clearer, for instance, that a dead man is a man only in name».⁴²⁷

Although Aristotle’s doctrine of causes allows for physicalism, it remains controversial. Typically, when we think of cause, we mean a fact or event sufficient to bring about an effect: to put it simply, the fact that it is raining is the cause of my raincoat to get wet and, similarly, the cause of my car to start is that I turn the key.⁴²⁸ These examples are quite uncontroversial insofar as they exemplify efficient causation. But, as we have seen, Aristotle allows for formal and final causation as well.

⁴²⁶ I deal with issues about form, function and essence in chapter 2 as regards the debate about homonymy, to which Aristotle non accidentally hints in this context (389b 29 ff.).

⁴²⁷ *Meteor.* IV 12, 389b 25-29.

⁴²⁸ Obviously, there are thousands of other relevant causal factors both for the rain to wet my clothes and for the car to turn on. Very simply, even if it is raining outside, as long as I am at home I would not get my clothes wet. Likewise, my car would not start if I am turning the key in the air, like a child playing with fantasy. Not only my personal situation is relevant, but also some overall conditions are, ranging from general ones (e.g. the atmosphere surrounding our planet) to special ones (e.g. the proper operation of my car’s engine). In this vein, we can broaden our vision in a Lagrangian fashion in order to regard as relevant at *t*’ all the conditions of the entire universe. Nevertheless, these remarks are not directly relevant here. I just want to point out what we regard as “cause” and emphasize the difference with Aristotle’s doctrine of causes. From this point of view, a narrow and broad theory of causation do not differ in a relevant sense.

Thus, it is not surprising that a broad debate have been prompted by Aristotle's formal and final causes, given that today the only type of causation we are willing to accept is the efficient one. It has been argued that such a resistance to Aristotle's account of causes has been sparked because we think of causes as events or facts, while Aristotelian forms, ends (and even matter) are entities.⁴²⁹

There are the two main lines of interpretations which have been offered with regard to the doctrine of the four causes. In light of previous remarks, I shall sketch them before suggesting mine position.

“Sufficientist” Thesis: Final Cause as an Epistemological Tool

The first line of interpretation is to regard as “real” cause only Aristotle's material one, which is obviously interpreted as thoroughly material. If material constituents are sufficient to bring about their effects, then ends are forms are just *epistemological* tools which Aristotle takes from the analysis of natural language insofar as they are able to capture some aspects of the explanation's formal expression missed by material accounts. Even though the formal and final “causes” are indispensable for providing complete explanations, in this view they lack causal efficacy and are regarded as “concepts of reflection”.

Wieland has argued for this interpretation a comprehensive and effective way. In his book devoted to Aristotle's *Physics*, Wieland rejects the thesis of cosmic teleology arguing that «*die Teleologie ist für Aristoteles nicht selbst wieder ein Gegenstand der Forschung, sondern eine Kategorie, ein Reflexionsbegriff, mit dessen Hilfe natürliche Dinge erforscht werden sollen*». ⁴³⁰ On the same line Nussbaum, who defines teleology as an anti-reductionist way of *explaining* processes in living things, whereby it is a tool to mention the end-state toward which they tend.⁴³¹

Much effort has been devoted for developing an account of teleology in which Aristotle can consistently be interpreted as referring to it, while neglecting formal-final causal efficacy. Lewis, for instance, has developed an interpretation in which every material-efficient causal chain fully necessitate its effect. These chains make room for the formal-final cause only in order to *explain* the regularity of the process. Hence, form is supported in terms of form-free causal chains to which it has a non-causal relation: its role is just explanatory.⁴³²

⁴²⁹ cf. Frede (1987), p. 126, points out that even matter (the apparently less controversial among causes) is difficult to grasp by means of our modern and contemporary conception, given that it is an entity and not an event nor a fact.

⁴³⁰ Wieland (1961), p. 268. The translation of the passage is: «teleology is for Aristotle not itself a further object of investigation, but a category, a concept of reflection, with whose aid natural things should be explored», p. 152 of the English translation.

⁴³¹ cf. Nussbaum (1978), esp. pp. 59-99.

⁴³² cf. Lewis (1988).

“Insufficientist” Thesis: Final Cause as a “Thing in the World”

The second line of interpretation attributes to Aristotle’s defense of final causation the corollary of the falsity of the Material sufficiency thesis. Aristotle indeed denies that the material elements make (*poiein*) that parts of animal, thus we may conclude that, in his view, mere material constituent are not sufficient to bring about teleological outcomes. So, if we consider just material elements and their properties with regard to processes in which final causation is at work, we see that effects are *underdetermined*. Gotthelf argued for this stating that: «if this potential [for form] is to be reducible, there will have to be a way of specifying the series of heatings, coolings, and movings around of material in the developing embryo which this heat effects, without referring to form»:⁴³³ but such a specification is, in Aristotle’s view, not available.

Thus, for these scholars, formal and final causation are not epistemological tools but causes endowed with causal powers.

«And just as we should not say that an axe or other instrument or organ was made *by the fire alone*, so neither shall we say that foot or hand were made by heat alone. The same applies also to flesh, for this too has a function. While, then, we may allow that hardness and softness, stickiness and brittleness, and whatever other qualities are found in the parts that have life and soul, may be caused by mere heat and cold, yet, when we come to the *principle* in virtue of which flesh is flesh and bone is bone, that is no longer so; what makes them is the *movement set up by the male parent, who is in actuality what that out of which the offspring is made is in potentiality*. This is what we find in the products of art; heat and cold may make the iron soft and hard, but what makes a sword is the movement of the tools employed, *this movement containing the principle of the art*. For the art is the starting-point and form of the product; only it exists in something else, whereas the movement of nature exists in the product itself, issuing from another nature which has the form in actuality».⁴³⁴

In giving this argument, Aristotle uses what is an usual analogy for him, that is, that between the works of art and living beings. An artifact results also, but not only, from material elements and their properties which are involved during his production. What, in Aristotle’s view, we should not forget to take into account is the artistic form, which from *outside* the artifact (the craftsman) leads the process toward its end, i.e. the artifact in actuality. Similarly, the process of development of a living body does result also, but not only, from the material elements and their properties which intervene during his growth, since we should not forget to take into account the form which the parent transmitted to the embryo through the seed which from *inside* leads the process toward its end, i.e. the living body in actuality. What distinguishes the processes of artistic production and organic development is that in the former case the form is «in something else», i.e. in the craftsman, whereas in the latter case the formal cause is «in the product itself». The embryo is characterized by the species-typical form, which operates as an intrinsic cause and which is issued through the seed

⁴³³ Gotthelf (1976), p. 242.

⁴³⁴ *GA* 734b 27-735a 4.

by the father, who has it as an intrinsic cause as well.

Those who hold that Aristotle's natural teleology is incompatible with the thesis of material sufficiency argue that, if Aristotle was committed to the latter, then he should have maintained the opposite thesis, that is, that material constituents and their properties are sufficient to necessitate their results, both as regards living things and, *a fortiori*, artifacts production. So if Aristotle argues for natural teleology denying that material elements are sufficient to bring about their result, then natural teleology is incompatible with the thesis of material sufficiency. In this framework, formal and final causation do have some sort of causal efficacy but, being somewhat mysterious and transcendent, they cannot be accepted in the our contemporary naturalistic framework.

Logical Compatibilism

I think some fundamental elements are missing from both the accounts I have just sketched. The main misinterpretation is that Aristotle does *not* contrast the material sufficiency thesis and its denial. Let me elaborate on this point.

It is well-known that Aristotle repeatedly denies that matter is the only relevant cause of a goal-directed process. But it would be a mistake to take his claim as the demonstration that he is introducing some other causal type other than the efficient one. He is not trying to demonstrate that the future result has the power to cause the past process in some mysterious way. The rival thesis Aristotle is rejecting holds not only that material elements are the only efficient causes of living things and their parts, but also (and this is in Aristotle's view the problematic point) that their result come about accidentally, that is to say, for the sake of nothing but just by coincidence. What is at stake for him is to (i) introduce the *essential form of the mature individual as the cause which naturally leads toward its own actualization and, hence*, (ii) *to conceive it as a relevant explanatory factor of the process itself*. Indeed both Aristotle's natural teleology and the thesis which he attributes to his opponents are *compatible* with the thesis of Material sufficiency. Simply, the material sufficiency thesis is not the problematic point.

I take my interpretation to count, on one hand, as *compatibilist*, since I deny that Aristotle's natural teleology contrasts with the Material sufficiency thesis, and, on the other hand, as *logical*, since so far I have argued that the matter-form distinction (as well as the potentiality-actuality distinction, the fourfold classification of causes and their division into two main types of causation) is logical in character. Thus, as I interpret him, Aristotle is arguing for a *logical relationship between causal (and hence explanatory) factors*.

Even though Meyer does not hint to what I conceive as the logical part of my position, she has

impressively defended the compatibilist position.⁴³⁵ According to her, by defending natural teleology, Aristotle is contrasting:

· the *phusiologi*'s thesis (Democritus, Empedocles and Anaxagoras).⁴³⁶ On one hand, we have the thesis of necessity, which Meyer describes as «the thesis that natural phenomena result of necessity from the activities of the material elements».⁴³⁷ This is what Aristotle opposes, for instance, in *De Generatione Animalium*, where he denies that neither an artifact nor an organism are made «by the fire alone».⁴³⁸

· the natural teleology thesis. On the other hand, we have the teleological thesis that nature acts for the sake of something, by which Aristotle means that parts, functions and the overall structures of organisms are ends, that is, they happens because they are the good outcomes of a species-specific process which is directed toward the actualization of a mature organism itself. Thus, they do not come about coincidentally but for the sake of it.

The regularity of the species-specific outcome is contrasted with accidentalness of outcomes which are a result of chance: these are “caused” as well but they do not happen in a regular way such that we can infer that the previous steps are for the sake of their result. In this sense Aristotle supplies the example about the two men which coincidentally meet at the market place, contrasting it with generation and decay regarded as regular outcomes.⁴³⁹

Therefore Aristotle is not denying the material sufficiency thesis (nor, thereby, what we regards as the proper chronological succession of causes and effect).

He is maintaining a weak physicalist thesis and arguing against a stronger one:

- 1) *Weak physicalist thesis*: the natural development of an organism is completely *caused by* material necessitation.
- 2) *Strong physicalist thesis*: the natural development of an organism is completely *accounted for* by such material necessitation.

Aristotle denies this latter thesis on the basis of his logical distinction between the causal powers of matter and form. Material elements, in his view, cannot account for the job that final causes are supposed to be ascribed for. The point is that, in Aristotle's view, mere material elements necessitate *chance* outcomes. Thus, even though each substance is reducible to its material constituents, these do not account for the regularity of natural outcomes, which are rather determined by the «innate

⁴³⁵ Meyer (1992).

⁴³⁶ For references in Aristotle's corpus to the *phusiologi* as regards this thesis, cf. *Phys.* II 8 for Empedocles, *GA* V 8 for Democritus and *Metaph.* I 4 for Anaxagoras.

⁴³⁷ Meyer (1992), p. 792.

⁴³⁸ *GA* 734b 27.

⁴³⁹ *Phys.* II 4, 195b 31-196a 16.

impulse to change»,⁴⁴⁰ their intrinsic natures. Nature, in Aristotle's view, is an active principle responsible for the natural activities which are performed when the *end* of the process is reached, that is, when the *form* is actualized in the mature organism.

Hence, considering the issue from our contemporary point of view, we do not have to interpret Aristotle as claiming that material causes underdetermine their results and are such in need of some other mysterious causation. The point is the *logical distribution of causal powers ascribed to matter and form*: matter is unformed and form structures it, suppling an essence and relevant functions. Are these functions immaterial? Aristotle's answer is no, they *are* material. The question is rather: if we consider just the unformed matter, are we able to explain what is responsible for regular outcomes? Matter can be ascribed for doing just the material-efficient job, but where such a causation entails a regular outcome (such as species-typical reproduction) or an intentional one (such as the artistic production of an artifact) formal and final causes are ascribed to account for them.

Aristotle can consistently deny 2), that the natural development of an organism is completely *accounted for* by material necessitation, while holding 1), that the natural development of an organism is completely *caused by* material necessitation. In order to account for what Aristotle regards as teleological processes, we have to allow that the material elements do not interact in just a chance way that happens to be good but rather that they interact in a *directive* way, that is, toward an end (which, as regards living things, is the actualization of the species-specific form). If we recall that the Primary Use Thesis of natural teleology (the one Aristotle repeatedly shows to have in mind while treating the subject), that is, its application to living things, their parts and their natural functional processes (such as reproduction, development and growth) we may conclude that Aristotle is not arguing for any mysterious causation but rather for the existence of some natural processes which regularly proceed toward a species-typical end.

⁴⁴⁰ *Phys.* II 1, 192b 18.

Appendix

Aristotle and Darwin on Functional Explanations: a Naturalistic Defense

This appendix is devoted to suggest that, as Darwin himself seemed to have acknowledged, his and Aristotle's investigations share a keystone, that is, the *functional analysis* of the living organism. An entire work could be devoted to this issue, so I do not aspire to demonstrate it here. Rather, I just aim to outline some elements pointing in this direction.

It is better to say at once that it is beyond doubt that Aristotle does share one of the most important elements of Darwin's analysis, namely, Aristotle does not think that the transmission of form *essentially* involves variations. On the contrary, he holds that the process of generation by which the essential form is transmitted is finalized to transmit it *as it is* from the father to the offspring.

I shall argue that, in spite of this and other remarkable differences, the ways in which Aristotle and Darwin approach the investigation of living organisms display an important point of contact, that is, that the form is *irreducible* to the lower-level paths of material constituents. Therefore, the study of biological phenomena is not reducible to physics and chemistry but rather requires to take into account higher-level causes which figure in evolutionary explanations. Even though the causal roles that both Aristotle and Darwin ascribe to the organism's functions are differently declined in their overall theoretical efforts, both of them approach such a key notion in a similar fashion.

First of all, I shall highlight the differences between the evolutive account of the origin of the species and the hylomorphic analysis Aristotle applies to living organism. Then, I shall highlight which Aristotelian notions Darwin used to develop his theory.

Aristotle, Evolution and the Fixity of the Species

Aristotle did not believe in evolution. To put it better, he could not even imagine the idea of evolution of the species. Thus, the first difference between Darwin and Aristotle is that the latter argues for the fixity of species or, better, for the transmission of the essence (or form) typical of the species to which both the parents and the coming-to-be animal belong. According to fixity of the species theory, even though individual animals are subject to decay and death, the species achieve eternity in time through reproduction⁴⁴¹, by means of which they transmit their essential form to the offspring.⁴⁴² Thus, contrary to Darwin's theory of evolution, Aristotle's natural teleology does not

⁴⁴¹ cf. *DA* II 4, 415b 1-10.

⁴⁴² cf. Lennox (2001): «The view that Aristotle defends is not that species are eternal, but that through reproduction, the partakes in the eternal», p. 128.

account for the *origin* of species but rather for their continued *existence*.

More surprisingly, some scholars claim that Greek biology formulated a theory somewhat *close* to that of evolution of the species through natural selection and that Aristotle's fault would have been to reject such a theory. In fact, in *Phys.* II 8 198b 16-32 Aristotle attributes to Empedocles a theory which has been often regarded as a brilliant anticipation of Darwin's theory of evolution of the species through natural selection.⁴⁴³

Yet the theory Aristotle attributes to Empedocles is not equivalent to the theory of evolution, as it exaggerates the role of random variations and neglects the causal bond between ontogeny and phylogeny. On the contrary, natural selection is not a «theory of accidents».⁴⁴⁴

Thus, even though Aristotle did not himself formulate a theory close to that of evolution, at least there is no evidence that he explicitly rejected it. Simply, such a theory was not available at his times. Nonetheless, Aristotle and Darwin did share some commitments which are *not* equivalent to the theory of evolution as such but, still, they can be traced to some common ground in analyzing living organisms.

Darwin's Hypothetical Necessity

Aristotle faced an alternative at his times: according to his master Plato, if we are to deny that the order and perfection of the physical world are the necessary result of chance, then we have to introduce an intelligent agent into the system.⁴⁴⁵ Aristotle solved the problem in *Physics* II 9, introducing the notion of *hypothetical necessity*: teleological processes can *not* be accounted for solely in terms of matter but, given a certain goal, some material processes are necessary on the *hypothesis* that that end is to be obtained. So it can be argued that both Aristotle and Darwin acknowledge that organisms (have to) fit their environmental conditions. In this sense, as Charlton points out, Darwin made free use of the Aristotelian notion of hypothetical necessity.⁴⁴⁶ In the *Origin of the Species* he wrote that the «same general end», namely the *survival* and the *reproduction* of the organism, is obtained by «an almost infinite diversity of means» throughout nature.⁴⁴⁷ It is worthy to point out that hypothetical necessity is a *teleological* notion, since it connects material structures with functions and natural purposes, such as survival and reproduction.

⁴⁴³ Ross (1923, p. 78) is in favor of the interpretation of Empedocles as an evolutionist. Against is Charlton (1970, pp. 121-122) as well as Sorabji (1980, pp. 176-181).

⁴⁴⁴ cf. Depew (2009), unpublished.

⁴⁴⁵ Hankinson (1995), p. 127.

⁴⁴⁶ cf. Charlton (1970), pp. 121-122.

⁴⁴⁷ Darwin (1866), p. 556.

The Explanatory Priority of Function and the Darwinian Picture

Why does Aristotle repeatedly state that nature does nothing in vain?⁴⁴⁸ It has been stated that, since biology is a science of animal parts and their functional relations, the teleology of nature should be interpreted as an heuristic to the discovery of functions.⁴⁴⁹ Aristotle sets out a *functional analysis* of the living organism. For instance, his investigation of embryological development focuses on the realization of form.⁴⁵⁰ In Darwin's theory of evolution one of the central notions is the compatibility between the trans-generational accumulation of random variations and the survival of the organism, which is brought about by material necessity. Species are evolving trans-generational forms in constant struggle with the surrounding circumstances. The organism face the environment according to the activities and functions it can perform. Therefore Aristotle and Darwin share the priority of physiology (function) over anatomy (organ). In a Darwinian spirit, Aristotle emphasizes that the set of functions which express the essence of the organism is finalized to the *life* of the organism, by which he means also the existence of the species, achieved by means of reproduction.⁴⁵¹ The main discovery Aristotle makes in biology is that, as there is a *function*, an *explanation* in terms of mere material constituents (that is, specifying the physical-chemical processes that bring it about) may be *causally true, but not explanatory*. The perspicuous *explanatory factors are in terms of function*.⁴⁵² Since for both Aristotle and Darwin it is beyond doubt that biological functions are enmattered, such a distinction between lower-level (physical-chemical) and higher-level (biological) is *logical* in character.⁴⁵³

Mechanicism Vs. Teleology

Darwin's view is traditionally interpreted as against teleology insomuch as natural selection is interpreted as a purely mechanical process.⁴⁵⁴ Yet Darwin himself did not regard his own theory in such a way. A correspondence between Darwin and a William Ogle, the translator of Aristotle's *De Partibus Animalium*, shows that Darwin regarded Aristotle as a great systematist and an advocate of comparative functional explanation, which may have reflected insights on Darwin's part into the teleological aspect of Aristotle's thought.⁴⁵⁵

⁴⁴⁸ cf. *De Caelo* I 4, 271a 33; *PA* II 13, 658a 9; *GA* II 5, 741b 13, etc.

⁴⁴⁹ cf. Hankinson (1995), p. 123, p. 129.

⁴⁵⁰ cf. *GA* V 1, 778b 4-5; *PA* 640a 15-16

⁴⁵¹ cf. *PA* I 5, 645a 20

⁴⁵² cf. *GA* II 1, 734b 19 ff.; cf. Gotthelf 1976, p. 244.

⁴⁵³ cf. Pellegrin (1986).

⁴⁵⁴ cf. Mayr (1988) p. 58; Ghiselin (1994); Hull (1969).

⁴⁵⁵ cf. Gotthelf (1999).

Aristotle and the Argument of Intelligent Design Theory

The Intelligent Design Theory has gained much attention in recent years. It maintains that (i) an undirected process such as evolution cannot have caused the complexity and diversity of the external world and living things and hence that (ii) we must admit (the possibility of) an intelligent, presumably divine, cause.

In light of my analysis, it should not be surprising that Aristotle, as I understand him, would partially agree with this argument. He would agree the external world is characterized by following regular patterns throughout time, in behalf of his remarks about regularity of natural processes. By stressing the notion of hypothetical necessity, he also maintains that an undirected process cannot cause such regular patterns. Mechanical necessity produces fortuitous events, while the processes characterized by hypothetical necessity bring about regular outcomes, which he calls natural ends. Moreover, substituting the expression “intelligent cause” in (ii) with the noun “teleology” (and admitting that Aristotle did not know the theory of evolution), we would come up admitting that Aristotle has much in common with advocates of the Intelligent Design Theory: Aristotle would agree that a undirected process cannot fully account for the complexity and diversity of life on the planet.⁴⁵⁶

So, is there a difference between Aristotle’s teleology and the Intelligent Design Theory? As I see it, there is a very crucial one. In light of analysis I have offered in this chapter, it should be clear that the natural teleology Aristotle applies to the organism is *not-intentional* (he investigates organism looking for an «etiological because»⁴⁵⁷) whereas the advocates of the Intelligent Design Theory argue for an *intentional* teleology: they explain regular patterns in nature by means of the teleological model of action explanation.

Final Remarks

Plato faced the alternative between pure chance and intentional teleology. So do today the advocates of the Intelligent Design Theory. Both Aristotle and Darwin suggested a third way, that is, natural teleology. This entails: (i) a theory about the form of explanations; (ii) scientific pluralism (biology is not reducible to physics and chemistry); therefore (iii) a non-reductive naturalism.

⁴⁵⁶ cf. Oparin (1956) and Hoyle (1983).

⁴⁵⁷ cf. Wright (1973).

Conclusions

«Many still regard Aristotle's theory as offering an attractive middle course, which avoids the extremes of both extravagant dualism and crude materialism».

Victor Caston, *Aristotle's Psychology*

Taking into account its Aristotelian roots, I have highlighted how, on one hand, functionalism correctly grasps the functional roles of matter and form in Aristotle's hylomorphism; whereas it does not properly comprehend how the logical character of matter-form distinction allows Aristotle to attribute causal efficacy to forms and ends.

In the *De Anima* Aristotle claims that if the eye were an animal its *psuche* would be what enables it to see and that the form of an axe is what enables it to cut. Analogously for Aristotle the form, or *psuche*, of a living body is whatever enables it to perform its essential functions. So the *psuche* is what enables plant to live, grow and reproduce, what enables animals to perceive and, as regards men, what enables them to act and think. For Aristotle, the *psuche* is a substance only in a pre-Cartesian sense and, conceived as a whole, it is not separable from the body.⁴⁵⁸

To the extent that functionalism in philosophy of mind is the thesis that maintains that a mental states does not depend on its internal constitution, but rather on the role it plays in the system to which it belongs, it is said to be rooted in Aristotle's hylomorphism. The Stagirite holds that the *psuche*-body relation is to be analyzed as a special case of form-matter relation: the *psuche* is the form of the body organizing it in a way such that to enable it to perform the essential functions. This conception entails that the *psuche* is not a substance but rather the set of essential abilities. Within this framework, it is not the matter by which the body is constituted that defines its essential activities but, on the contrary, it is the set of essential activities which defines the compound. This counts as the metaphysical connection between functionalism in philosophy of mind and Aristotle's analysis of *psuche*.

The functionalism by Putnam and Nussbaum holds the merit of having included some essential features of the doctrine of hylomorphism and of having translated them in the terms of

⁴⁵⁸ Some remarks should be added to this statement. Although I shall not get into the details I have illustrated throughout the work, I recall them briefly: first, there has been much argument about whether Aristotle holds that the *nous* is separable from the body. Even if this would be the case, it is beyond doubt that he holds that the *psuche* conceived as a whole is not separable from the body: this suffices to hold the unity of *psuche* and body, and to interpret Aristotle's concern about the *nous* to derive from his theory of sense perception. Secondly, Aristotle explicitly maintains that the *psuche* is a substance but only in the derivative sense in which form, as well as matter, are substances, along with compounds: this statement is clearly not to be interpreted in a Cartesian sense.

contemporary philosophy of mind. On the one hand, the dualistic interpretation correctly reveals how important it is for Aristotle to “save” higher cognitive functions from the reduction to mere physiological activities. On the other hand the physicalist interpretation, paying special attention to the theory of perception, points out that the hylomorphism of Aristotle should be considered a proposal pertaining to the family of physicalism. Functionalism proves itself able to embrace both these aspects, updating and combining them in a consistent view. Properly grasping the relationship between mind and body as a special case of the relationship between matter and form, functionalism correctly read Aristotle’s philosophy as a “middle path” that can avoid the extremes of reductive physicalism and of substances dualism. I devoted the first chapter to illustrate how the functionalist interpretation meets the concerns of both those scholars who suggested a dualistic interpretation (whose main interest was to emphasize the inconsistencies which would arise from supposing that higher-level capacities are subject to physiological constraints) and of those scholars who suggested a strong physicalist interpretation (whose main interest was to assert that, in order to explain the mind, there is no need to suppose anything more than the brain, with which the mind is identified). Starting from the functionalist interpretation of Aristotle, I have proposed an analysis of his hylomorphism and his psychology. I largely agree with the core of Aristotle’s functionalist interpretation. Indeed, functionalism maintains that the mental is, in a sense, the physical from which it arises, whilst denying the strict identity of these two elements: indeed the mental is physically multiply realizable, insofar as a mental state is defined by the causal role it plays. As I have already hinted, I have not got into the details of the varieties of functionalisms, as I think that Aristotelian roots of functionalism are to be identified in its core rather than in its detailed proposals.

In the second chapter I offered an analysis aimed to show that hylomorphism entails both ontological and predicative aspects, which is the aspect, I think, functionalist interpretation correctly grasps. Yet the fact that the logical character of Aristotle’s distinctions is consistent with them being endowed with causal efficacy is analyzed in the third chapter, in which I attempt to show that formal and, in particular, final cause do play a genuine causal role while being compatible with the material sufficiency thesis. Curiously, functionalists fail to grasp this aspect of Aristotle’s thought, thus overlooking what I regard as one of the most interesting features of his philosophy. The logical character of his matter-form distinction enables Aristotle to split causal powers between lower-level and higher-level capacities, thus preserving the causal efficacy of both the physical and the mental.

My work brings out that Aristotle offers a non-reductive naturalistic picture of life and mind. His doctrine of four-fold causation witnesses in favor of such a non-reductionist view: indeed, such an

irreducibility is to be understood as the non-explainability of biological, as well as psychological, concepts and laws through the laws of physics. Aristotle brings into the picture genuine, irreducible formal and final causal factors. Not only does Aristotle draw a line between physics and biology, but also, *a fortiori*, between physics and psychology and, I think, nature in general.

Usually this type of anti-reductionism is combined with a theory of emergentism stating the unpredictability and novelty of mind and, more generally, life,⁴⁵⁹ although it is doubtful whether emergentism can consistently be attributed to Aristotle without running the risk of anachronism.⁴⁶⁰ What is certain is that Aristotle formulates a view about the living bodies which is at the same time complex and simple: as I have showed in the first chapter, Aristotle does not appeal to dualism, even though he does share with this position the conviction that mind is not reducible to the physical, as long as it is not identifiable with the phenomena which strictly follow the laws of physics. Nor does Aristotle appeal to identity theory, even though he is convinced that psychological phenomena are, even though contingently, based on the physical phenomena from which they originate.

Thus hylomorphism sets up as an anti-reductionist physicalist theory of life and mind to the extent that it holds that physical and chemical laws are related to psychological and biological phenomena as matter is related to form, that is, *necessarily* – in the sense that a form can only be realized, or embodied, in matter – and, at the same time, *contingently* – insofar as a form, at least in line of principle, can be realized by different types of matter. For Aristotle, the priority of form is to be understood as being the essence of matter, that is, it is the form that organizes and defines matter and that is truly predicated of it. There is a famous *proto*-functionalist example to be mentioned, that Aristotle provides in *Metaphysics Z 11*: as we are used to find in our experience the form “circle” realized in different materials, e.g. bronze or stone or wood, so we cannot exclude the possibility that also the form “man” might be realized in material different from flesh and bones. This counts as a metaphysical possibility. Homonymy, to which I have devoted to second chapter, is fundamental in this framework, insofar as it establishes that the ability to perform the relevant functions counts as the essence of the compound and, hence, it is prior over the mere material configuration. Turing would have been satisfied with much less.

For Aristotle physical concepts and laws are sufficient to originate higher-level capacities but are not sufficient to provide exhaustive and genuine explanations for them. What Aristotle regards as the talk about form – namely, the biological as well as the psychological works – is the analysis of the psychobiological “appearances” which cannot be reduced to the analysis of their material

⁴⁵⁹ cf. Feigl (1968), p. 374.

⁴⁶⁰ cf. McLaughlin (1992).

constituents. I have dealt with this main issue in the third chapter.

Throughout the work, I confined myself to considering the functionalist aspect I hold as the most interesting one for my purposes, that is, the *return* to Aristotle as the direction to take in order for the philosophy of mind to progress. Mind and physical world are portrayed by Aristotle as fitting together. So Nussbaum and Putnam wrote that:

«the question about unity really *is* one that the Aristotelian ought to repudiate as ill formed. The soul is not a thing merely housed in the body; its doings are doings of the body. The only thing there is one natural thing».⁴⁶¹

As I show in the second chapter, Burnyeat proposed an opposite reading. Not only in his view Aristotle is not the first functionalist, but his philosophy «cannot be understood apart from» his obsolete and pre-scientific physics, that makes impossible to accommodate his conception of life with our own, irreversibly shaped by the Cartesian conception of matter. Therefore, Burnyeat claims, we cannot go back to Aristotle and the only thing we have to do is to «junk» him.⁴⁶² I agree with Nussbaum and Putnam's response: Aristotelian "*psychology*" is tenable even in the context of modern science. As «Aristotle hylomorphism starts from a general interest in characterizing the relationship, in things of many kinds, between their organization or structure and their material composition», nobody is justified in believing that «out possession today of a theory of matter different from Aristotle's alters in a fundamental way the manner in which these questions should be posed, or makes the Aristotelian reply one that we cannot take seriously».⁴⁶³ Accordingly, we can commit ourselves to Aristotle's metaphysics and psychology, without running into any conflict with the modern theory of matter. Indeed Burnyeat seems to think that any explanation about the mind must proceed from up-to-date physical data, but Nussbaum and Putnam think this is an empiricist assumption. The functionalist point is that within an empiricist picture it is far from clear which kind of information is *relevant* in order to explain the mind: indeed, even if we were to have every physico-chemical data about the functioning of brain, this would not solve our metaphysical embarrassment of how to make them fit with a *theory* about mind. Thus it seems straightforward that functionalists are willing to consider higher-level information, which they think Aristotle gathers under the notion of form. It follows that Aristotelian psychology is, so to speak, "physics-proof" not because of any argument from *auctoritas*, but rather because it isolates higher-level relevant data in order to account for mental activity.

It is apparent that the functionalist interpretation has been just the *starting point* of the present work.

⁴⁶¹ Putnam (1994), with Nussbaum, p. 43, emphasis as found.

⁴⁶² cf. Burnyeat (1992).

⁴⁶³ Putnam (1994), with Nussbaum, pp. 24-26.

On one hand some functionalist intuitions are valuable and subtle, such as the functional roles Aristotle attributes to matter and form in the context of his hylomorphism. On the other hand, I think that functionalism does not correctly grasp some fundamental and original features of Aristotle's philosophy: for instance, it is not a detail that the logical distinction between matter and form does not prevent Aristotle to attribute genuine causal powers to the latter. Maybe this it to ascribe to the fact that, as Caston points out, «insofar as it studies vital capacities as well as mental one, psychology has for Aristotle a broader scope than philosophy of mind has for us».⁴⁶⁴ Functionalism in philosophy of mind would have narrower purposes than Aristotle in formulating his "*psuchology*". Aristotle provides a theory of life and mind which still valuable to allow us to be part of the physicalist family, without being committed to a reductionist picture.

What I regard to be the fundamental theoretical finding of the present work is that Aristotle's hylomorphic matter-form distinction is to be understood in the following terms: *the ontological unity of substances is to be analyzed by means of irreducible levels of analysis which are logical in character*. On one hand, my thesis resumes the functionalist interpretation of Aristotle to the extent that it regards matter and form as playing typical functionalist roles: it does not count which physico-chemical constituents they are made of, what matters is the role they play within the system they belong to, namely the living organism. Thus there can be no ontological reduction to the physical or physiological level. On the other hand, I think that my thesis shows better than functionalism how Aristotle can consistently attribute, not only to matter, but also to form genuine causal efficacy. The logical character of the distinction does not prevent, but rather allows to attribute causal roles to higher-level capacities – or, as Aristotle puts it, allows for the existence of formal-final causes. This allows us to understand the reason why Aristotle is so sure about the causal efficacy of the *psuche* in the field of science of living things, as well as of the final cause in the domain of natural regularities, while maintaining an overall physicalist framework within which matter and form are one and the same thing.

⁴⁶⁴ Caston (2009), p. 317.

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