

Metaphysics Z 17's Ontological Deduction of the Εἶδος as Principle and Primary Substance through the Analysis of the Becoming

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This research represents another of the various different versions of the Hylomorphism of the third millennium (some closer and some less close to the thought of Aristotle). Its aim is to find the most profound and basic intrinsic explanation of the being of the sense-perceptible substance, by means of a systematic approach to the theory of substance developed in the central books of Aristotle's *Metaphysics*. The theory of substance is based on the hylomorphic conception of the sense-perceptible substance, and reaches its culmination in Chapter 17 of *Metaphysics Book Zeta*, where Aristotle develops the definitive deeper argument that demonstrates the essence of substance. The argument is developed through a rigorous analysis of the sense-perceptible thing and its elements during the existence of the thing and after its corruption. The result obtained by this analysis is that none of the material components of a sense-perceptible thing, nor the sum of all of them, explain the constitution of the sense-perceptible thing, or its nature. And the final conclusion is that there exists an entity distinct from all of the material components, which is the arrangement and the essence of the sense-perceptible thing, that is, its form. The form also emerges as the primary cause of the being of the sense-perceptible thing and the primary substance, because it acts as the cause of matter and of the hylomorphic compound, and possesses the characters of substantiality in the maximum degree, being separate (τὸ χωριστὸν) and being "a this" (τὸ τόδε τι). To take another angle, the soul is the form of biological organisms and man; and this investigation ends by establishing how the Aristotelian argument applies to a biological organism, and demonstrates that the soul is the first cause of this and the primary substance, by means of the distinction of the proximate matter and remote matter of the living being.

Keywords: primary substance, definition of substance, form, matter, Hylomorphism, becoming, cause, Aristotle

Introduction

The different versions of the Hylomorphism of the third millennium, grouped in Neo-Aristotelianism and Analytical Hylomorphism, seek a sufficiently rigorous and profound explanation of the being of the sense-perceptible substance (non-living entities, biological organisms, and man). Efforts in this direction are called to provide a cogent philosophical view of the sense-perceptible entity and the physical universe, which may be useful as a solid, secure foundation for the theoretical endeavor and experimental analysis of the sciences of the third millennium (physics, chemistry, biology, and neuroscience).

This research moves in the same direction, and seeks to find an answer to the metaphysical question about the sense-perceptible substance: What is the cause that ultimately explains the being of the sense-perceptible substance? The main response to this question, in the conceptual framework of Aristotle's thought, can be found in the theory of substance which he formulates through a deep, complex, multiform research enterprise carried out above all in *Metaphysics* Book *Zeta*, complemented by Book *Eta*. This enterprise aims to achieve exhaustive knowledge of substance, understanding the essence of substance, and arriving at a definition of it (Berti, 2006, p. 88).¹

Aristotle is convinced that a rigorous knowledge of substance sufficiently reveals the essence of being *qua* being. As he says himself, the question “‘what is being?’ is in other words ‘what is substance?’” (Aristotle, 1924, Book Z, Chapter 1, 1028 b 4).² Indeed, if we want to know exhaustively what is being *qua* being, which is the subject matter of Aristotle's first science, “we must consider chiefly and primarily and (so to say) exclusively what it is that is in this way (*in the way of substance*)” (Aristotle, 1924, Book Z, Chapter 1, 1028 b 4-7). In addition, it is also true that for him an exhaustive knowledge of substance is the basis from which it is possible to arrive, after a long journey, at the crowning moment of Aristotle's first philosophy, that is, its theology.

Now, the final and most exhaustive demonstration of substance, that is, the one that defines it, is carried out in the last chapter (Chapter 17) of *Metaphysics* Book *Zeta*, which the author analyzes in the following section.

The order of presentation of this work is as follows:

The next section, which is the second, presents the main lines of the great Aristotelian enterprise of the theory of substance and the content of the concepts of matter, form, and compound, which have been marshaled by Aristotle from the reflections set out in the books of *Physics* to play a leading role in the demonstration of Chapter 17 of *Metaphysics* Book *Zeta*, in relation to the concepts of separateness (τὸ χωριστὸν) and concretion or being “a this” (τὸ τόδε τι). In addition, the second section highlights the order followed by this demonstration in accordance with the model of Aristotelian science; and, finally, it deals with the substantive content of that demonstration, which concludes with form as the first cause of the being of the sense-perceptible substance and as primary substance, by means of an analysis of the sense-perceptible thing and its elements during its existence and after its corruption.

The third section develops the Aristotelian thesis of the potentiality of the elements, and how it leads to an understanding of the distinction between organic components and the soul of the living substance.

The fourth section establishes the terms in which the demonstration of form as the primary substance of things is applied to the case of the biological organism, through the notions of proximate matter and remote matter.

The Deduction of Form as the Primary Substance in Chapter 17 of *Metaphysics* Book *Zeta*

According to the Aristotelian model of science, an exhaustive knowledge of the subject matter of a science is achieved by understanding the causes that explain that subject matter, because the definition and an

¹ Enrico Berti rightly comments that the Greek formula “*tis hē ousia*, what is the *ousia*, ...does not only mean what is the substance, but it also means, we could say today, Who is the substance, which is the substance? What is the true substance? Who?” In Italian: “*tis hē ousia*, che cos'è l'*ousia*, ...non significa solo che cos'è la sostanza, significa anche, oggi potremmo dire, chi è la sostanza, qual è la sostanza? Qual è la vera sostanza? Chi?” Berti, 2006, p. 88. All translations from Italian are mine.

² All the translations from Greek are mine.

exhaustive knowledge of the essence of a thing are reached by means of an understanding of the causes on which that thing depends. So the great research project undertaken in different ways throughout *Metaphysics* Book *Zeta* seeks a definition of substance and an understanding of the essence of substance, through an investigation that seeks to know what entity is the cause of substances and therefore the primary substance.

Enrico Berti rightly comments that throughout Book *Zeta*, Aristotle proceeds to search, among the various candidates identified by the most accepted opinions of his time, which one “can be the true *ousia*, i.e. the primary *ousia*, the *prôte ousia*, where being ‘primary’ makes it the principle of the *ousiai*, because for Aristotle the principle is always the cause” (Berti, 2006, p. 89).³

It is quite clear that this investigation of the essence of substance follows the Aristotelian model of science, because the definition of substance, the exhaustive knowledge of its essence, is sought by investigating which sense of substance is the cause on which the others depend.

From Chapter 4 onwards in Book *Zeta*, Aristotle proceeds in different ways to evaluate the different candidates that are designated by most people as the substance of things. Throughout Book *Zeta*, there are at least four starting points of the multiform enquiry that seeks to define substance, all of them oriented towards a single objective that is reached at the end of Book *Zeta*: to establish whether the primary substance and cause of the (other) substances is the form or not. As Myles Burnyeat says, “the aim of Aristotle’s procedure is to show that each of his four starting points leads *independently* to the same conclusion: substantial being is form” (Burnyeat, 2001, pp. 4-5).

The investigation that seeks the definition of substance reaches its peak moment in the last chapter (Chapter 17) of Book *Zeta*, where Aristotle demonstrates, definitively and more rigorously, what is the main sense of substance, according to which substance can be defined. Substance understood in this sense must be the cause of the other senses of substance and, therefore, the primary substance.

But, before analyzing the aforementioned demonstration, it is helpful to dwell on the three entities that Aristotle collects from his discussions of the books of *Physics*, and that are considered in Chapter 3 of Book *Zeta* as the three senses of the substance understood as subject (ὑποκείμενον), that is, matter, form, and the thing composed of both; because these three entities play a role of first importance in the final demonstration of Chapter 17 of *Zeta*. There Aristotle says that the subject (ὑποκείμενον) has three senses: “Now in one sense matter (ὕλη) is said to be the subject, and in another, the form (μορφή), and in still another the compound of these (τὸ ἐκ τούτων)” (Aristotle, 1924, Book Z, Chapter 3, 1029 a 1-3).

Which of these three senses of subject is the primary substance? Aristotle thinks that the criterion, according to which the substance is first of all the subject understood in the sense of the ultimate subject of predication, is insufficient, because, if it were, then either the matter would be substance in the maximum degree, or only the matter would be substance. This conclusion Aristotle rejects for the following reason:

because, in fact, both being something separate (τὸ χωριστόν) and being something concrete and determinate (τὸ τόδε τι) seem to belong primarily to substance, and therefore the form and the thing composed of both (matter and form) seem to be substance more than matter. (Aristotle, 1924, Book Z, Chapter 3, 1029 a 27-30)

The Aristotelian expression “being something separate (τὸ χωριστόν)”, as Enrico Berti explains very well,

³ “I candidati sono quattro; nel resto del libro *Zeta* Aristotele discute ciascuno di questi candidati per vedere quale di essi può essere la vera *ousia*, cioè la *ousia* prima, la *prôte ousia*, dove l’essere ‘prima’ la fa essere principio delle *ousiai*, causa dell’*ousia*, perché il principio è sempre causa per Aristotele”. Berti, 2006, p. 89.

means that a thing “exists in itself and not in another, that in order to exist it does not need to be in another, but exists in itself, separately from the rest” (Berti, 2006, p. 89).⁴ However, care must be taken to distinguish clearly between the different senses that separateness has for Aristotle, because he attributes it proportionally to matter, form, and the compound of both.

Matter has separateness and “a this” insofar as it is merely substance in potentiality, and not substance in actuality, because, as Aristotle says in *Metaphysics* Book *Eta* Chapter 2: “That which is substance as what underlies and as matter is generally accepted; and this is that which is potentially” (Aristotle, 1924, Book *H*, Chapter 2, 1042 b 9-10). On the other hand, form is actuality, and the compound is actuality plus potentiality (Aristotle, 1924, Book *H*, Chapter 2, 1043 a 26-28). Consequently, the attributes of separateness and “a this” are in the form actually, and not merely potentially. Since actuality has being to a greater extent than potentiality, it is evident that form, and the compound of matter and form, possess the substantial attributes of separateness and “a this” to a greater extent than matter.

But, in addition, form has being in a greater degree than the compound and matter: “if the form (τὸ εἶδος) is prior to matter and is being to a greater degree, for the same reason it will also be prior to the thing composed of these” (Aristotle, 1924, Book *Z*, Chapter 3, 1029 a 5-7). And, consistent with this thesis, throughout the central books of *Metaphysics*, Aristotle clearly manifests the superiority of form over matter and the compound. As Giovanni Reale says, Aristotle “throughout books *Z* and *H* reiterates the superiority of form and act [entelechy] with regard to σύνολον, which includes matter and potentiality” (Reale, 2004, p. LXXXV).⁵

In the context of *Metaphysics* Book *Zeta*, the statement by Aristotle that form has being to a greater extent than the compound substance and matter is equivalent to declaring that form is substance in a higher degree than the composite thing of matter and form, and than matter. And the reason is that knowledge of the substance is sufficient to reach an exhaustive knowledge of being *qua* being. As Aristotle says in Book *Zeta* Chapter 1: The question “‘what is being?’ is in other words ‘What is substance?’” (Aristotle, 1924, Book *Z*, Chapter 1, 1028 b 4). And almost immediately then he concludes: “And so we too must consider chiefly and primarily and (so to say) exclusively what it is that is in this way (*in the way of substance*)” (Aristotle, 1924, Book *Z*, Chapter 1, 1028 b 4-7). From this point of view, the substance is a cause in the highest degree and, for this very reason, has being in the highest degree. Therefore, if form is substance in a higher degree than matter and the compound of both, then it is necessary that form itself has being in a higher degree than them.

Now matter is less separate than form and the hylomorphic compound, because, being merely potential, indefinite, and indeterminate, it lacks the determinate character that it would need in order to subsist by itself in the natural world, as an entity independent of other substances. And, of course, neither is matter τὸδε τι, except as mere potentiality. Or, as Giovanni Reale says:

Matter has neither of these two characteristics. In fact, it cannot exist separately from form, that is without form ... and it is just the opposite of something determinate, since it is a potential being, therefore indeterminate (and can therefore be a τὸδε τι only in potency, virtually). (Reale, 2004, p. 1007)⁶

⁴ “... ‘separata’ vuol dire che esiste in sé e non in altro, che per esistere non ha bisogno di essere in altro, ma esiste in sé, separatamente dal resto”. Berti, 2006, p. 89.

⁵ “...per tutto il corso dei libri *Z* ed *H* ribadisce la superiorità della forma e dell’atto rispetto al sinolo, che include invece materia e potenzialità”. Reale, 2004, p. LXXXV.

⁶ “La materia non ha né l’una né l’altra di queste due caratteristiche. Infatti non può esistere separatamente dalla forma, cioè senza la forma (...) ed è proprio opposto dell’alcunché di determinato, poiché è un essere potenziale, quindi indeterminato (e può essere, pertanto, un τὸδε τι solamente in potenza, virtualmente)”. Reale, 2004, p. 1007.

This concept of matter, understood as a purely indeterminate and potential entity, is the one that operates in Book *Zeta* Chapter 3: “By matter I mean that which in itself is neither a particular thing nor a quantity, nor anything else by which being is determined” (Aristotle, 1924, Book Z, Chapter 3, 1029 a 20-21).

And in Book *Eta* Chapter 1 Aristotle says:

Now these are the sensible substances, and all sensible substances contain matter. And the subject is substance; in one sense matter (by matter I mean that which is not a this [τόδε τι] in actuality, but is a this [τόδε τι] potentially). (Aristotle, 1924, Book H, Chapter 1, 1042 a 25-29)

Matter is not something determined, “a this” [τόδε τι] in actuality, except as a mere possibility. For this reason, matter lacks the capacity of possessing its being by virtue of itself, and is an indeterminate substratum, incapable of subsisting by itself in actuality, except by virtue of a form. The substantiality of matter and, therefore, its entity, is exhausted by the fact that it is merely an undetermined substratum that underlies all mutations. Consequently, matter has substantiality to a much lesser degree than form and compound.

Since matter is not a determination, it is incapable of determining and qualifying anything else. In itself and by itself matter is not defined as a substance separate from other things, nor as a concrete and determined reality (τόδε τι). For this same reason, matter cannot determine the compound in any way, nor is it the cause of its being. The form itself is the cause of the being of each sense-perceptible thing because it is the principle that specifically determines a thing and makes it what it is.

This determination, which is precisely the form, is expressed by the formula by which our intelligence defines the sense-perceptible thing that it knows. Matter, being indeterminate, cannot bring any determination to the thing, and, therefore, is not included in the definition of the thing, nor is it capable of influencing the specific determination of the thing itself. For this reason, matter cannot determine or have any influence on the property of separateness, which depends on form, and not on matter.

On the other hand, form itself is a substance separate from all other things in actuality. As Michael Frede and Günther Patzig aptly say: “The form is separate in the sense that in its being it does not presuppose another thing” (Frede & Patzig, 2001, p. 56).⁷ Although it is true that the form is in the matter, this fact does not prevent the form from being separated from other things without the intervention of matter; because the matter in which it is found, being indeterminate, does not influence the form as if it were a determination or a prior specification that pre-orders the specific content of the form, but, rather, the opposite occurs. Giovanni Reale correctly points out that “the form... is a condition of matter and not vice versa, and, as such, has more being, and therefore, in a certain sense, has more autonomy than matter” (Reale, 2004, p. XCVIII).⁸

The form establishes the specific content of the thing composed of matter and form and is the specific determination that makes the matter a determinate sense-perceptible substance. As Frede and Patzig point out, it is “true the form of an object of perception is always and only realized in matter, but this matter does not constitute an autonomous object distinct from form, as if it was preordained to it” (Frede & Patzig, 2001, p. 56).⁹

The reason why matter is not an autonomous entity of form, nor is it capable of actively influencing it, is that matter is merely potential. As Reale says, the being of matter “is potential being and, therefore, only

⁷ “La forma è separata nel senso che essa non presuppone nel suo essere di un'altra cosa”. Frede & Patzig, 2001, p. 56.

⁸ “...la forma, come abbiamo già ricordato, è condizione della materia e non viceversa, e, come tale, ha *più essere*, e quindi, in un certo senso, ha più autonomia della materia”. Reale, 2004, p. XCVIII.

⁹ “È pur vero che la forma di un oggetto di percezione si realizza sempre e solo nella materia, ma questa materia non costituisce un oggetto autonomo distinto dalla forma, che quasi le fosse preordinato”. Frede & Patzig, 2001, p. 56.

capable of receiving determinations (and therefore not referable to anything else, because it cannot determine or qualify anything else, precisely because it is potential being)” (Reale, 2004, p. 1006).¹⁰

As noted by Frede and Patzig, the fact that matter does not determine the specific content of the form of the thing “finds expression in the fact that the definition of the form and the definition of the object, which consists in a definition of the form, does not concern matter” (Frede & Patzig, 2001, p. 56).¹¹ Indeed, Aristotle in Book *Zeta* Chapter 11 argues that material parts are not included in the definition of the form, which is also the definition of the compound. This is the case of the definition of the soul, which is also the definition of man and does not include material parts (Aristotle, 1924, Book *Z*, Chapter 11, 1037 a 24-30).

In Chapter 1 of Book *Eta* Aristotle states that the second sense of substance understood as subject “is the formula (λόγος) and the form (μορφή) (which is ‘a this’ (τόδε τι) and is separable in formula)” (Aristotle, 1924, Book *H*, Chapter 1, 1042 a 29-30). It is evident that these words have a clear ontological content, because the conceptual expression that the form has in the mind, its formula, expresses the specific content that the form received in matter has while it exists in the natural world. The specific content that the form has in its extra-mental existence determines the independence and separation of the form with respect to all other substances. Therefore, Aristotle explains the autonomy of the form in its natural constitution with respect to matter and its separation from all other substances, by the fact that the specific content of the form is determined in itself and without the intervention of the matter with which the form is associated. The proof of this is that the formula by which our intelligence knows the form does not include matter.

Finally, Aristotle explains the third sense of substance understood as subject, which is the σύνολον, that is, “what is compounded from these [matter and form] (and this alone can come to be and cease to be, and is separable without qualification...)” (Aristotle, 1924, Book *H*, Chapter 1, 1042 a 30-32). And what Aristotle means here by arguing that the σύνολον is fully separable, is that it does not exist in anything other than itself, as does the form, which in fact exists in matter.

However, Aristotle does not mean by this that the σύνολον is separated in a higher degree than the form, because the truth is that the σύνολον is separated because of the form, and because the form is separated by itself, and not by virtue of a principle different from itself. Therefore, for Aristotle, the form is separated to a greater degree than the substance composed of matter and form (σύνολον) and matter; and, therefore, the form seems to be substance and to have more being than the compound substance and than matter.

The ontological priority of form over the compound substance and over matter becomes progressively more apparent through the 17 chapters of *Metaphysics* Book *Zeta* and its complement Book *Eta*. In all of them, we can see clearly that Aristotle has chosen form as the privileged object of his investigation into the essence of substance, whose objective is to determine whether or not the form is the first cause of the being of sense-perceptible things and the primary substance. Myles Burnyeat comments that Book *Zeta* “has a single positive purpose, to which all its dialectical ingenuity is directed: to show that substantial being is form” (Burnyeat, 2001, p. 3). In fact, Aristotle himself argues that his investigation into the essence of substance in Book *Zeta* has to focus on form, because it is less familiar to our cognitive powers, and less well-known than compound and matter:

¹⁰ “(1029 a 22) L’essere della materia è diverso, perché è essere potenziale e, per questo, solo capace di ricevere determinazioni (e quindi non riferibile ad altro, perché non può determinare o qualificare altro, appunto in quanto essere potenziale)”. Reale, 2004, p. 1006.

¹¹ “Ciò trova espressione anche nel fatto che la definizione della forma e la definizione dell’oggetto, che consiste in una definizione della forma, non riguarda la materia”. Frede & Patzig, 2001, p. 56.

However, the substance compounded from both, I mean from matter and form, we may disregard; for it is posterior and clear. Matter also is in a way evident. But we must investigate the third kind of substance, i.e. form, for this is the most puzzling. (Aristotle, 1924, Book Z, Chapter 3, 1029 a 30-33)

This last text is important because it leads to an understanding of Aristotle's way of proceeding in his search for the primary substance. In fact, in accordance with the model of Aristotelian science, the research method consists of starting with the realities that are more familiar to our cognitive powers and progressing from them to reach other realities that are more difficult to know but by their nature have being and intelligibility in a greater degree. As Aristotle says:

What is intelligible to a man at first will often be only slightly intelligible, and will have in it little or nothing of reality. Nevertheless we must start from what we do understand, though we only understand it badly, and try (as I have said) to advance by means of this to an understanding of what is entirely intelligible. (Aristotle, 1924, Book Z, Chapter 4, 1029 b 8-12)

Aristotle follows this procedure throughout Book *Zeta* in his search for the primary substance of things, oriented towards form as the first cause of the being of the sense-perceptible thing. In fact, form has being in a higher degree than the compound and matter, and is by nature more knowable than they are, but is less familiar to our cognitive powers; consequently, knowledge of form requires starting from other entities that are more familiar to our cognitive powers but that by their nature have being to a lesser degree than form does. These entities are the substance composed of matter and form, and matter. Therefore, the investigation of the substance, which aims to reveal form, has to start from a clear knowledge of the compound and matter, which are more familiar to our cognitive powers than form.

And this is precisely the procedure followed by Aristotle in *Metaphysics* Book *Zeta* Chapter 17, in its final and most rigorous demonstration of the primary substance, which concludes with the form as the first cause of the other senses of the substance. His argument develops from the viewpoint of the cause, through an analysis of the hylomorphic compound insofar as it is subject to becoming. A few chapters before Book *Zeta* Chapter 17, in Book *Zeta* Chapter 7, Aristotle had already advanced his opinion: “(and by the form I mean what being is for each thing and its primary substance)” (Aristotle, 1924, Book Z, Chapter 7, 1032 b 1-3). But it is only in *Zeta* 17 that he deploys the clearly ontological central argument that exhaustively demonstrates this conclusion, from a new perspective—that of the cause. There he announces:

Let us now take a fresh starting-point and say what, and what kind of thing, substance should be said to be. For these considerations will perhaps also make clear the nature of that substance that is separated from the perceptible substances. Let us start, then, from the fact that substance is a principle and a cause of some sort. (Aristotle, 1924, Book Z, Chapter 17, 1041 a 6-10; Reale, 2004, pp. 1079-1080)

This fresh starting point of the investigation into the primary substance and the principle of substances are characterized by being centered on the substance understood as principle and cause, by means of an analysis of the sense-perceptible substance that is subject to its natural becoming, from an ontological point of view (Bostock, 2003, p. 237).¹² On the other hand, Chapters 4 to 16 of Book *Zeta* are developed from a more logic-focused point of view. In their commentary on Book *Zeta* Chapter 17, Frede and Patzig highlight the fact that the idea of investigating the substance from the point of view of the cause is “a thought that already

¹² David Bostock comments: “Aristotle proposes to attack the question ‘What is substance?’ from a new angle... The new angle begins from the idea that substance ‘is a principle and a cause of some sort’”. Bostock, 2003, p. 237.

resonated earlier in the course of *Z*, but only now emerges in its integral meaning to be dealt with in a systematic way” (Frede & Patzig, 2001, p. 458).¹³

Now, according to this new approach, the question that opens the investigation into the substance that is the cause of the other senses of substance, aims to find the cause that makes indeterminate matter a completely defined compound substance. The answer to this question is that form is the cause sought:

...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. Why is this—or rather this body in this—a human? Thus what we are seeking is the cause (and this cause is the form (εἶδος) in virtue of which the matter is a definite thing; and this is the substance (οὐσία). (Aristotle, 1924, Book *Z*, Chapter 17, 1041 b 4-10)

Myles Burnyeat comments: “We can fruitfully seek the cause of the matter’s being so and so. And to find the cause of some matter’s *being* so and so is to find the substantial being that makes the composite the substantial being it is” (Burnyeat, 2001, p. 59). If we focus our attention on the aforementioned example of a man, the question posed presupposes clear prior knowledge of the following fact: The matter of a man, that is, his body, is that which becomes an entirely defined, determinate man. Therefore, the question “What is the cause of a body endowed with tissues and organs being a man”, presupposes that the following information is previously known: a) knowledge of the concrete and determined substance that, in this case, is a man, b) knowledge of the matter of that man, which is the body understood as a set of the different organs and tissues that constitute man, and, finally, c) knowledge of the fact that this set of components is a definite man. So the question “What is the first cause of the being of things and the cause of the other senses of the substance”, presupposes the previous, certain, clear possession of this triple information, that is, of items a), b), and c).

It is easy to see, then, that the itinerary that Aristotle follows in his research aimed at formulating his theory of substance, proceeds from the entities that are most familiar to our cognitive powers, which are the compound and matter, in order to progress from them along their demonstrative path to reach the form, which is the peak of Aristotle’s investigation into substance; for, as he had already argued in *Zeta* 3, form is less well-known and less familiar to our cognitive powers than compound and matter; although it is by nature more intelligible and ontologically superior, as demonstrated in *Zeta* 17. This is precisely the reason why now, in Book *Zeta* Chapter 17, Aristotle follows his model of science, according to which all scientific research starts with an analysis of the entities which are most familiar to our cognitive powers, which, in the investigation into substance, are the whole compound and the material components, with the aim of progressing towards the entity that is more difficult to know because it is less familiar to our cognitive powers, which is precisely the form; in spite of the fact that the form has of itself, that is, by its nature, more being and intelligibility than the compound and matter.

In the previous Aristotelian text of Book *Zeta* Chapter 17 (1041 b 4-10), it may be noticed that there are two entities that have to be thoroughly known from the beginning of any research that seeks to define substance by means of an analysis of a particular sense-perceptible thing. The first of those two entities is the determinate sense-perceptible thing, which in the text is a man, and the second is the set of components or parts that make up this man, that is, the body of this man, his matter. Knowledge of these two entities leads to knowledge of the form, which, in the case of man, is his soul, and is the cause that explains the fact that the body is a man.

¹³ “Si tratta di un pensiero già risuonato in precedenza nel corso di *Z*, ma che solo ora emerge nel suo significato integrale per essere affrontato in modo sistematico”. Frede & Patzig, 2001, p. 458.

The body of a man is composed of multiple components; and, as Enrico Berti clearly explains, “an organic body is composed of organs (heart, lungs, brain), these are composed of tissues (for Aristotle flesh, bones, blood); the tissues are composed of elements (for Aristotle water, air, earth, fire)” (Berti, 2011, p. 173).¹⁴ An examination of the material components of a man, which constitute the organic body, and a comparison of them with the determined substance constituted by them, is the foundation from which it is possible to progress towards finding the cause of the being of the sense-perceptible thing, and thus arrive at a deduction of the existence of the entity less familiar to our cognitive powers, which is the form. Only then does the form emerge as the first cause of the substance composed of matter and form, from the previous reasoning that demonstrates that the organic body, or the set of material components of a man, is the indeterminate material subject of man, that is, his subject. And matter is only one of the two constituent principles of the human being (matter and form); and only after this it is possible to conceive the human being as a hylomorphic compound, as a substance composed of matter and form. The result of this demonstration is the form understood as primary substance (Aristotle, 1924, Book Z, Chapter 17, 1041 b 4-10).

Therefore, the demonstration of the form as the first cause of the being of the sense-perceptible thing, requires prior, clear, exhaustive knowledge of the following: First, knowledge of the thing defined, which, in Aristotle's example, is a man, insofar as it is a completely defined, determined thing; second, knowledge of the material components of the sense-perceptible thing insofar as it is undefined matter, which, in Aristotelian example, is the body of a man; and, third, knowledge of the contrast between man as a definite and determined entity, and the body as indefinite subject, that is, indeterminate matter. This triple information is what leads through the investigation of *Zeta* 17 to the discovery of form as the first cause of the being of the sense-perceptible thing. In this way, the demonstrative procedure deployed in *Zeta* 17 is aimed at concluding that the form is the essence of each thing, the cause “in virtue of which the matter is a definite thing”, and the substance (οὐσία) of things (Aristotle, 1924, Book Z, Chapter 17, 1041 b 4-10).

However, this conclusion can only be reached, if the following has been previously demonstrated: First, that the sense-perceptible substance as a holistic system and completely determined entity is not the mere sum of its material components or elements; second, that the elements are not the cause of the sense-perceptible substance being a definite, determined thing; and, third, that no element, nor the sum of all of them, is the essence of the determinate sense-perceptible thing made up of them.

Now, the final demonstration of Book *Zeta*, which, in the final part of Chapter 17 concludes that the form is the first cause of the being of the sense-perceptible substance, follows a special procedure that starts by demonstrating the following: The elements of a sense-perceptible substance are not the cause which makes that substance a definite thing and what it is. As we will see, the result of this procedure has a general scope that includes all sense-perceptible substances, because it is possible to appreciate that all of them have elements that remain after their dissolution.

The argument is set out through an analysis of two physical entities, which are the syllable and the flesh, during their existence and after their dissolution, that is, insofar as they are subject to becoming, and it is applied by way of proportionality to the sense-perceptible substance existing in the natural world.

These entities have in common that each is a grouping or synthetic composition (σύνθετον) unified as a

¹⁴ “Solo la materia propriamente è composta di parti, per esempio un corpo organico è composto di organi (cuore, polmoni, cervello), questi sono composti di tessuti (per Aristotele carne, ossa, sangue), i tessuti sono composti di elementi (per Aristotele acqua, aria, terra, fuoco)”. Berti, 2011, p. 173.

whole made up of multiple elements or component parts (στοιχεῖα) intrinsically linked together; by contrast with entities whose material components are linked together merely by a unity of order that is not intrinsic to them. In effect, Aristotle limits the investigation into the first substance to those “things that are compounded in such a way that the whole is a unity, not like a heap but like a syllable” (Aristotle, 1924, Book Z, Chapter 17, 1041 b 11-12).

A syllable is constituted by different material components linked together by the same intrinsic character that configures them. On the other hand, the stones that make up a pile are joined together merely by the place that each occupies with respect to the others, and not by what the stones are by themselves and essentially.

Now, the analysis of the syllable and the flesh that Aristotle makes to demonstrate the distinction between the form and the elements of each sense-perceptible thing begins in the following way:

And the syllable is not its elements, nor is BA the same as B and A, nor is flesh fire and earth; because after dissolution the compounds no longer exist, e.g. flesh or the syllable, but the letters exist, and so do the fire and the earth. So the syllable, then, is not only its elements (vowel and consonant) but something else besides; and flesh is not only fire and earth, or the hot and the cold, but something else besides. (Aristotle, 1924, Book Z, Chapter 17, 1041 b 12-19)

The first entity that is analyzed in this argument is the syllable. The syllable is a unified whole that is composed of two different elements, which are the letters B and A, and is the entity that in this case is more immediately and easily known, as it is the most familiar to our cognitive faculties. The elements of the syllable, the letters B and A, are also immediately and easily known. Therefore, according to the Aristotelian model of science, it is necessary to progress from these entities to reach the form of the syllable, which is an entity in a greater degree and more intelligible by its very nature than the syllable and its elements; but less knowable for our cognitive faculties.

After the dissolution of the syllable BA, its two elements remain, that is, the letters B and A, even though the syllable no longer exists; consequently, in the syllable BA, there must exist an entity distinct from the elements B and A that make it up. Enrico Berti comments that

...with the same letters A and B, the syllable BA can be formed, but also the syllable AB, which is different from BA. These two syllables, though composed of the same letters, are therefore more than the sum of their parts, and this “more” is precisely what distinguishes one from the other, that is, their respective form. (Berti, 2011, p. 173; Burnyeat, 2001, p. 61; Bostock, 2003, p. 243)¹⁵

And something similar happens with the flesh, because, after its dissolution, its elements, fire and earth, continue to exist, and, therefore, it is necessary that, before the dissolution of the flesh, there exists another entity other than fire and earth that, together with them, constitutes the flesh. In all corruption of a sense-perceptible thing, the elements that form it remain after its dissolution; and, therefore, it is necessary that in the sense-perceptible thing there is an entity distinct from the elements into which it is dissolved. What, then,

¹⁵ “...con le stesse lettere, A e B, si può formare la sillaba BA, ma anche la sillaba AB, che è diversa da BA. Queste due sillabe, pur essendo composte dalle stesse lettere, sono dunque qualcosa di più della somma delle loro parti e questo ‘di più’ è precisamente ciò che distingue l’una dall’altra, cioè la rispettiva forma”. Berti, E. (2011). “L’ilemorfismo da Aristotele a oggi”. *Rivista di filosofia neo-scolastica*, 103(2), 173. “A compound such as a syllable, then, will consist of certain elements (the letters) in a certain arrangement. The arrangement cannot be ignored, since one can destroy the compound by destroying the arrangement, and without destroying the elements”. Bostock, D. (2003). *Aristotle metaphysics book Z and H*. J. L. Ackrill and L. Judson, (Eds.). Translated with a commentary by D. Bostock. New York: Oxford University Press, p. 243. And Myles Burnyeat comments: “The order of the letters in a syllable is something quite real and distinct, even though it is not a component on a par with letters into which the syllable can be dissolved”. Burnyeat, M. (2001). *A map of metaphysics zeta*. Pittsburgh USA: Mathesis Publications, Inc., p. 61.

is that entity?

Aristotle raises the hypothesis according to which an entity that is different from the elements into which a sense-perceptible thing is dissolved, is also an element or group of elements; and, in tracing the consequences that derive from such a hypothesis, he demonstrates its inconsistency:

Since then this something else must be either an element or composed of elements, (a) if it is an element, the same argument applies again; for flesh will be composed of this and fire and earth, and again of another element, so that there will be an infinite regression. And (b) if it is composed of elements, clearly it is composed not of one (otherwise it will itself be that element) but of several; so that we shall use the same argument in this case as about the flesh or the syllable. (Aristotle, 1924, Book Z, Chapter 17, 1041 b 19-25)

Thus if the entity that is different from the elements into which the flesh is dissolved, must be a different element from them, so that the flesh is constituted, then it will be necessary to have another element or set of elements that is different from that other element, in a process of endless calculation whose result is an infinite number of constituent elements of the flesh. However, the flesh could not be constituted by the sum of these infinite elements, since none of them could be the element that ultimately constitutes it. Which is absurd, since the assumption is based on the fact that the flesh exists in reality as a fully constituted sense-perceptible entity. Therefore, it is necessary to conclude that the entity that is different from the elements into which the flesh is dissolved cannot be an element. And this same conclusion is applicable to the syllable, to the sense-perceptible substances and to every sense-perceptible entity constituted as an absolutely undivided whole that is composed of elements.

But if the aforementioned entity that is in each sense-perceptible substance and is different from the elements into which such a substance is dissolved, cannot be an element or material component, then what kind of entity is it?

It is only possible to answer this question having previously recognized that every sense-perceptible substance or entity is something, that is, an entity that consists of something, an entity that has an essence. Since none of the elements into which each sense-perceptible thing is dissolved, nor the sum of all of them, is the cause that makes a sense-perceptible thing to be what it is, then the essence or essential cause must be an entity which is in a sense-perceptible thing and is different from the elements that make up that sense-perceptible thing. Of course this cause is the Aristotelian εἶδος, the form and essence of the thing:

It would seem, however, that this “something else” is something that is not an element, but is the cause that this matter is flesh and that matter a syllable, and similarly in other cases. And this is the substance of each thing, for it is the primary cause of its existence. (Aristotle, 1924, Book Z, Chapter 17, 1041 b 25-28)

Thus, the entity that is distinct from the elements (earth and fire) into which the flesh is dissolved cannot be an element, and is the cause that makes the matter of the flesh. The matter of the flesh, that is, its material components or elements, is not this cause. This cause is the arrangement that determines fire and earth, making them flesh; and this cause is evidently the form. Aristotle mentions that the same thing happens with the syllable, and extends the application of this reasoning to other cases, the main one of which is the sense-perceptible substance.

When Aristotle in the previous passage argues that the aforementioned cause that makes a thing what it is, “is the substance of each thing”, he is considering the word substance—οὐσία—as the primary substance, because it is evident that for him the cause that makes a thing be what it is, “is the primary cause of its

existence". And, since for Aristotle the substance is a cause in the maximum degree, the cause that makes a thing be what it is, is the primary substance and at the same time, is the first cause of the being of the sense-perceptible thing. This cause is precisely the form. Or, as Frank Lewis says: "A form is (*primary substance*), and the *substance* of this or that individual substance, in virtue of its role as the cause of being for individual substances" (Lewis, 2013, pp. 292-293). As we have seen before, Aristotle had already stated in Book *Zeta* Chapter 7: "by the form I mean what being is for each thing and its primary substance" (Aristotle, 1924, Book Z, Chapter 7, 1032 b 1-2).

In effect, the form is the substance of the thing, because it is the cause and the principle by virtue of which each thing is what it is, and is, therefore, the nature (φύσις) of each thing. This nature, which is the form, is the first substance of things because all substances are constituted according to this nature and by this nature: "And since, although some things are not substances, all substances are constituted in accordance with and by nature, substance would seem to be this 'nature,' which is not an element but a principle" (Aristotle, 1924, Book Z, Chapter 17, 1041 b 28-31).

So the form, which is the primary substance, is a principle, and not an element.

The Parts of Sense-Perceptible Substance Are Matter and Potentiality

The final sentence of *Metaphysics* Book *Zeta* clarifies the notion of element or material component that operates in the central argument of *Zeta* 17. Aristotle argues that, in the context of this argument, the element or material component is considered as "what is present in the thing as its matter, and into which it may be divided, as for instance A and B are the elements of the syllable" (Aristotle, 1924, Book Z, Chapter 17, 1041 b 31-33). Therefore, the letters A and B are in the syllable BA as the matter of the syllable.

Something similar happens in a biological organism, such as, for example, Socrates, because its components are present in it as its material. Enrico Berti comments: "An organic body is composed of organs (heart, lungs, brain), these are composed of tissues (for Aristotle flesh, bones, blood), and the tissues are composed of elements (for Aristotle water, air, earth, fire)" (Berti, 2011, p. 173).¹⁶

Today we can say that the organs, tissues, bones, cells, molecules, atoms, and microparticles that constitute Socrates are his matter. Now, the matter is clearly distinct from the soul of Socrates, which is his form; although both matter and form are closely united to each other. In any biological organism, the organic body and the soul, which is the form of the biological organism, are closely united, forming a holistic system made up of material components, i.e., a whole. This holistic unity is demonstrated in biology, and is not just a finding of metaphysics (Oderberg, 2017, p. 210).

Enrico Berti comments that "the form is not a 'part' of the compound, but rather it is the way in which its parts are organized, the order in which they are found" (Berti, 2011, p. 173).¹⁷ About this same point, Giovanni Reale writes: "The substance is the primary cause of being and, therefore, it is not the elements but the formal structure that unites them" (Reale, 2004, p. 1080).¹⁸

¹⁶ "Solo la materia propriamente è composta di parti, per esempio un corpo organico è composto di organi (cuore, polmoni, cervello), questi sono composti di tessuti (per Aristotele carne, ossa, sangue), i tessuti sono composti di elementi (per Aristotele acqua, aria, terra, fuoco)". Berti, 2011, p. 173.

¹⁷ "La forma non è una 'parte' del composto, ma è il modo in cui le sue parti sono disposte, l'ordine in cui esse si trovano". Berti, 2011, p. 173

¹⁸ "La sostanza è la causa prima dell'essere e quindi essa non è gli elementi ma è la struttura formale che li liga". Reale, 2004, p. 1080.

Aristotle in *Metaphysics* Book *H* complements these ideas with the notion of being in potentiality: “That which is substance as what underlies and as matter is generally accepted; and this is that which is potentially” (Aristotle, 1924, Book *H*, Chapter 2, 1042 b 9-10).

So matter is substance understood as substrate—what underlies—, and is more familiar to our cognitive powers than form, and, for this very reason, its existence is generally accepted. Since the final sentence of Book *Zeta* identifies the component parts of corruptible substances with matter, we can conclude that the elements or component parts of each corruptible substance are the same as the substance understood in the sense of substrate and matter, and they are something that potentially exists, because matter is being in potentiality; while the form is the substance understood as actuality, that is, “that which is the substance of perceptible things as actuality” (Aristotle, 1924, Book *H*, Chapter 2, 1042 b 10-11). This teaching is present in *De Anima*, a work of Aristotle’s mature years, where we find the central thesis of hylomorphism clearly and solidly formulated. There he states: “Matter is potentiality, while form is actuality” (Aristotle, 2016, Book 2, Chapter 1, 412 a 9).

We also find the above-mentioned thesis of the materiality of component parts in the following text of *Metaphysics Zeta* 13, which proves the thesis according to which within a substance there cannot be many substances in actuality: “It is impossible for a substance to be composed of substances present in it in actuality [Ἐντελεχείῃ]” (Aristotle, 1924, Book *Z*, Chapter 13, 1039 a 3-4).

And the reason for this impossibility is the following:

For what is in actuality two things cannot also be in actuality one thing, though a thing may be one and at the same time potentially two [δυνάμει]. (For instance, a line that is double another line is composed of two halves, but only potentially; for the actuality of the two halves separates them from each other [sc. and so destroys the line].) Therefore, if a substance is one thing, it cannot be composed of substances present in it for this reason also. (Aristotle, 1924, Book *Z*, Chapter 13, 1039 a 4-8)

As we can see, the argument is based on the notion of unity. Frank Lewis comments on the argument that “Aristotle is explicit that the unity of substance is a controlling factor in these different cases” (Lewis, 2013, p. 223).

The argument operates by analogy of proportionality, applied to the cases of the line and the sense-perceptible substance composed of parts: Just as it is not possible that a line is constituted by two halves existing in it in actuality, because then the two halves would be separated each other and would not constitute the line, similarly, it is not possible for a sense-perceptible substance to be constituted by many substances existing in it in actuality, because they would be divided and separated from each other and would not constitute the sense-perceptible substance. Michael Frede and Günther Patzig comment:

Just as the line does not consist of two lines in actuality but only two possible lines, so also the *ousia* does not consist of a certain number of *ousiai* in actuality or effectively, but at most a certain number of possible *ousiai*. (Frede & Patzig, 2001, p. 411)¹⁹

The explanation of this fact is that entelechy (the realization of potential, or actuality) separates one

¹⁹ “Una *ousia* (vale a dire un’*ousia* nel senso del concreto) può comunque essere molte *ousiai* almeno, non è più una, ma molte. Analogamente, anche una retta della lunghezza di due unità consiste solo in potenza di due rette della lunghezza di un’unità. Se questa potenzialità viene realizzata bisecando la retta non si avrà più una retta, ma due. Così come la retta non consiste di due rette attuali ma solo di due rette possibili, così anche l’*ousia* non consiste di un certo numero di *ousiai* attuali o effettive, ma tutt’al più di un certo numero di *ousiai* possibili”. Frede & Patzig, 2001, p. 411.

substance from another. Two substances in actuality are absolutely separated from each other, and cannot constitute a single substance, which is necessarily absolutely one and undivided. Let us look at a contemporary example.

If we observe a mixture of hydrogen and oxygen gases that are in a container, it is possible to deduce that each hydrogen atom and each oxygen atom of the mixture exists in actuality independently of the others. However, if these gases are subjected to the chemical reaction of water synthesis, they undergo a transformation; and chemists can demonstrate that, after the synthesis of water, the hydrogen and oxygen atoms acquire new properties and modes of action that can only be explained by the appearance of a new specific arrangement that is distinct from the arrangement and specific character that each hydrogen atom and each oxygen atom had before the chemical reaction that generates the water. That new specific arrangement is the hydric form. And this form is the arrangement that configures the two hydrogen atoms and the oxygen atom of each molecule, making the three atoms together be water, replacing the form “hydrogen” and the form “oxygen”, which had those same atoms before the chemical reaction.

Therefore, the two hydrogen atoms and the oxygen atom that make up a water molecule are specifically different before and after the chemical reaction that synthesizes water. This specific mutation of the component atoms of a chemical compound is experimentally demonstrated in chemistry. Giovanni Villani writes: “From the scientific point of view, it is clear today that the atoms within a molecule are specifics: they are not identical to the free atoms and one talks about ‘atoms *in situ*’” (Villani, 2014, p. 117).

Chemists deduce the specific character that each atom has at a given moment through the experimental analysis of the properties that it manifests when it is transformed and becomes part of a chemical compound. This analysis reveals the specific mutation that is caused by the chemical reaction of dissolution of the chemical compound.

For this reason, the reductionist project of deducing the properties, behavior, and specific character of a chemical compound, exclusively from the properties that show the different components that make it up when they exist isolated from each other, is an impossible task, because such information does not explain at all the new properties that emerge from the holistic system constituted by the components of the chemical compound.

The new properties that arise from a natural inorganic holistic system that has been generated by a chemical reaction reveal to the chemist that the component parts of the system are specifically different after that chemical reaction.

In this regard, Giovanni Villani refers to the case of the specific change suffered by a mixture of hydrogen and oxygen gases as a result of the influence of the chemical synthesis reaction that produces water. Experimental analysis reveals a fundamental change in the property of the volume of hydrogen and oxygen gases, when subjected to the chemical reaction of water; from which the chemist deduces the specific mutation in the hydrogen and oxygen atoms (Villani, 2017, p. 80).²⁰

In chemistry, emergentists correctly judge that the new arrangement and specific systemic character that shape the microscopic particles that form a chemical element, cause behaviors and properties that cannot be

²⁰ It is necessary to bear in mind that Aristotle thought that water was an element, that is, a simple sense-perceptible entity without parts. Today we know that each molecule of water is a substance composed of different material components, that is, two hydrogen atoms and one oxygen atom. So the example we have been analyzing is an example of a sense-perceptible substance composed of different component parts. Aristotle calls this type of substance a mixed body, so it is valid to use the example of water as an example of a mixed body and to apply Aristotle's hylomorphic theory to this case. Villani, 2017, p. 80.

deduced from the particular specific arrangements that shape those same microscopic particles when they do not form the chemical element in question. As Eric Scerri says,

The kinds pertaining to a special science, such as chemistry, are said to have the power to influence microscopic motions of particles in ways that are not anticipated by the laws governing the microscopic particles. Emergentism is thus committed to the possibility of “downward causation”. (Scerri, 2007, p. 921)

By contrast, the reductionist project, which seeks to build a mechanistic chemistry, is based on the conviction that analysis of the behavior and properties of the microscopic particles that make up a chemical element when they exist in isolation from each other, leads to an exhaustive deduction of the behavior and the properties that these same particles manifest when they form the chemical element in question. From this point of view, the systemic character can be fully and exhaustively explained by the lower microscopic levels of perceptible entities.

However, this thesis is not correct. The reductionist project, seeking to build a mechanistic chemistry, tries to do the impossible: to learn the specific nature of a holistic system by analyzing the specific nature of its component parts when they do not constitute the holistic system. As Eric Scerri says, paraphrasing Broad,

...if mechanistic chemistry were true it should be possible to deduce the chemical behavior of any element from the number and arrangement of such particles, without needing to observe a sample of the element in question, which is something that is clearly not the case. (Scerri, 2007, p. 921)

In effect, the analysis of a sample of a chemical element reveals to the chemist the existence of new properties that are acquired by the microscopic constituent particles when they are joined together to constitute the chemical element in question. In turn, the new properties and the new behavior of the microscopic particles constituting a sample of a chemical element lead to knowledge of the specific mutation of the chemical element synthesized.

Now, the cause of the specific mutation of the atoms in a mixture of hydrogen and oxygen gases, when the chemical reaction that synthesizes water from them is produced, is that all those atoms acquire a new arrangement that configures them, which is the substantial form of water. And the two hydrogen atoms and the oxygen atom that make up each molecule of water synthesized cannot be substances that exist in actuality, because if they were they would be absolutely divided and separated from each other, and would not constitute the water molecule in question that has absolute indivisibility and substantial unity. The profound reason that explains this fact is that entelechy and actuality separate one thing from another, preventing a new substance from being constituted.

On the other hand, the being in potentiality and the substance in potentiality do not separate one thing from another, because only something that is determined and defined has the virtue of separating and dividing, and a substance in potentiality is merely something indeterminate and undefined. In effect, only the entity in actuality is defined and determined, because only the actuality and the form is something determinant that defines. On the contrary—according to Aristotle in *Metaphysics* Δ, 4—“the being in potentiality and not in entelechy is indefinite or undetermined” (Aristotle, 1924, Δ (5), 4, 1007 b 28-29). In effect, the being in potentiality is nothing more than the capacity to be determined by an actuality or form.

Now, the components of a sense-perceptible substance are its matter, and, for this same reason, they are something indefinite and indeterminate, since none of them is defined or determined as a substance in actuality independent of the others, since they are merely possible beings. For this same reason, the material components

lack a fundamental property of the substance that is expressed in the technical language of Aristotle with the words “a this” (τόδε τι); which mean “this concrete reality”.

In fact, an amino acid that forms part of the tissues of Socrates, is merely in potentiality the biological substance that Socrates is, and, for this same reason, is not “a this” (τόδε τι), which means this concrete and determined reality.

Aristotle argues in *Metaphysics Zeta 3* that matter possesses the properties of substance (separability and concreteness) in a different sense and in a lesser way than form and compound possess them, and, for this reason, form and compound appear to be substance to a greater degree than matter does. As Aristotle says:

In fact both separateness (τὸ χωριστόν) and being “a this” (τὸ τόδε τι) seem to belong most of all to the substance, and because of this the form and the thing composed of both would seem to be substance more than the matter is. (Aristotle, 1924, Book Z, Chapter 3, 1029 a 6-7)²¹

Furthermore, in *De Anima*, Aristotle clearly states that matter is not “a this”: “We say that among the things that exist one kind is substance, and that one sort is substance as matter, which is not in its own right ‘a this’ (τόδε τι)” (Aristotle, 2016, Book 2, Chapter 1, 412 a 6-7).

This thesis, that matter is not “a this”, seems to be the basis for the following statement that appears a little later in the aforementioned text of *Metaphysics Zeta 3*: “So if form is prior to matter, and more a being than matter is, it will also be prior to the compound of both, for the same reason” (Aristotle, 1924, Book Z, Chapter 1, 1028 b 4).²²

A body member, such as a hand, or an organ, such as a liver, is not a substance in actuality or a concrete and determined reality, that is, it is not τόδε τι. The form and the compound are τόδε τι, as being substance in actuality and something determined and defined. The matter and the material components of Socrates are not something determinate and definite, but exist as mere possibility.

For this reason, the way of expressing the matter of which any corruptible entity is made is different from the way of expressing the natural entity that possesses the matter in question as a component part. About this point, Aristotle argues:

Some things, when they have come into being from a certain matter, are said to be, not *that* (ἐκεῖνο) from which they came, but rather *of that*, or *thaten* (ἐκεῖνιν); for instance, a statue is not said to be [some] stone, but rather *of* stone. (Aristotle, 1924, Book Z, Chapter 7, 1033 a 6-9)

This mode of expression follows from the fact that corruptible things are not defined by the matter of which they are made. And when we express the material of a sense-perceptible entity, we do not express what it is, or the character that has such an entity. Aristotle’s analysis of the stone statue emphasizes the fact that the stone is not a statue, because the stone can be determined by a different shape of statue, for example, by a cubic shape, without ceasing to be stone. From the point of view of the character of a statue, stone is something indeterminate and undefined, and is not τόδε τι in actuality.

A little after the previous text, Aristotle explains that we should not say “that the statue is wood, but with a

²¹ In Zeta 4 the essence of each thing is the substance and τόδε τι: “For indeed what a thing is signifies is in one way the substance of the thing and *a this* (τὸ τόδε τι)”. Villani, 2017, p. 80.

²² Alan Code comments: “Yet matter is neither χωριστόν nor τόδε τι, and hence is not primary substance. Since form is prior to matter, argues Z3, it is prior to the composite (σύνολον), and so the composite is posterior to form. This eventually leads to the view that *form* is primary substance”. Code, 1986, p. 433.

change of ending that it is *wooden* (or of wood), and not that it is bronze but that it is bronzen (or of bronze), not that it is stone but that it is of stone” (Aristotle, 1924, Book Z, Chapter 7, 1033 a 16-20).

In effect, a wooden statue is a statue, and it is not wood, because wood is merely a potential statue, and not in actuality. When we say that the statue is made of wood, what we express is precisely this, that is, that wood is the material of the statue, and that it is in potentiality the statue. For this reason the wood of which the statue is made is not a concrete and determined reality, it is not “a this” (τόδε τι), precisely because only in potency is it something definite, which is precisely the statue.

The same applies to all other artifacts and, analogously, to substances. No matter is “a this”, that is, a concrete and determined reality, because matter is an undetermined and undefined entity with respect to the actuality that determines and defines it, which is the form, with which it joins to constitute the hylomorphic compound which is every corruptible substance. In *Metaphysics Eta* 1 Aristotle says the following about matter: “by which I mean that which is not *a this* [τόδε τι] in actuality, but is *a this* [τόδε τι] potentially” (Aristotle, 1924, Book H, Chapter 1, 1042 a 27-28). In effect, matter is substance and entity in potentiality, and, as we have seen, according to *Metaphysics Δ* 4, “the being in potentiality and not in entelechy is indefinite or undetermined” (Aristotle, 1924, Δ (5), 4, 1007 b 28-29).

Concerning the matter of a man, that is, the set of material components that constitute him, Alan Code explains the following:

If we call that of which Socrates is composed (say the set of his bodily organs) “*that*”, we may apply this general point as follows. Socrates is not *that* (whatever *that* may be), rather he is *thaten*, or *of that*. If, when pointing at Socrates, I were able to correctly say that this (to which I point) is *that*, then the matter would indeed be a “this”. However, we cannot correctly say that “this is *that*”, but must say that “this is *thaten*”. *That*, the matter, cannot be the “this”. (Code, 1986, p. 433)

The set of organs, tissues, and other component parts of Socrates is the matter of which Socrates himself is made, and such components are not a concrete and determined reality, they are not “a this” (τόδε τι). On the other hand, Socrates himself *is* a concrete and determined reality, that is, τόδε τι. Therefore, Socrates cannot be the same as his component parts, but these are merely the material of which he is made. And this matter is the body of Socrates, while the form that configures this body is the soul of Socrates.

According to Aristotle, the soul is the form of natural entities endowed with life; that is, the form that configures biological organisms. We have seen that the final argument of *Metaphysics Zeta* 17 shows that the form and arrangement of natural things is the primary substance. Since the soul is the form of biological organisms, it is necessary to conclude that the soul is the primary substance in these cases. In *Metaphysics Zeta* 11 Aristotle holds the following about the higher biological organism, man:

It is also clear that the soul is the primary substance that the body is matter, and that man or animal is the compound of the two taken universally...; but if Socrates means simply this soul and this body, the individual is composed similarly to the universal. (Aristotle, 1924, Book Z, Chapter 11, 1037 a 5-10)

This same idea is present in the previous chapter, that is, in *Metaphysics Zeta* 10, in relation to animals: “Now in animals the soul—which is the substance of any living thing—is the substance given by the formula, i.e. the form and what being is for bodies of this sort” (Aristotle, 1924, Book Z, Chapter 10, 1035 b 14-16).

As regards all biological organisms in general, Aristotle states in *De Anima* 2 that “every natural body having life is a substance, and a substance as a compound” (Aristotle, 2016, Book 2, Chapter 1, 412 a 15-16, p.

22). Here the word body means the biological organism understood as a hylomorphic compound of organic body and soul.

Immediately afterwards he makes use of the term body in a broader sense which means both the hylomorphic compound and the matter of it when he says:

...the soul could not be a body; for the body is not among those things said of a subject but rather is spoken of as a subject and as matter. It is necessary, then, that soul is a substance as the form of a natural body which has life in potentiality. But substance is actuality; hence, the soul will be an actuality of a body of such a sort. (Aristotle, 2016, Book 2, Chapter 1, 412 a 16-22, p. 22)

The central axis of this argument is the notion of subject. However, Aristotle does not directly tell us what he means by subject in the previous text, because, according to the text itself, the reason why the soul is not the body in which it is, is that the soul is not the subject of which it is predicated, which is precisely the body; while the body is not predicated of a subject other than itself.

Christopher Shields highlights the following apparent lack in the Aristotelian text that we have been analyzing: “Aristotle needs to show why the soul belongs to a subject in a manner in which the body does not” (Shields, 2016, p. 170). And the truth is that Aristotle does not say directly in what sense he is using the term “subject”, although the text itself sheds enough light to help us in the task of understanding the meaning in which the term is used, from the internal coherence and logical consistency of the argument presented in the text.

In fact, the argument has consistency only if the term “subject” means the receptive material subject that, precisely because it is material, does not behave as an actuality or form of another material subject preceding and different from itself.

The term “subject” understood in this way still admits of two analogous different meanings discernible when the subject is predicated of the body; because, in fact, the term body has two different meanings: On the one hand, the body is the physical substance composed of matter and form, and on the other side the body is only the matter of the hylomorphic compound that does not contain the form itself. The body considered according to these two meanings is a subject, because it does not behave like an actuality received by a material subject preceding and different from itself.

Unlike the body, the soul itself is form and actuality received by a material subject, and, therefore, is predicated of a potential receptive subject from which it is distinct. This subject is the receiving matter of the soul, and is the organic body of the biological substance. In addition, the soul is substance as form and, for this reason, it is substance in actuality; while the body of the living organism is substance as matter and, therefore, is substance in potentiality.

Now, the body of the biological organism is not comparable to the body of non-biological physical-chemical substances. The body of the biological organism is the organic body. As Aristotle says: “This sort of body would be one which is organic” (Aristotle, 2016, Book 2, Chapter 1, 412 b 1-2, p. 23). And also: “...the soul is the first actuality of an organic natural body” (Aristotle, 2016, Book 2, Chapter 1, 412 b 5-6, p. 23).

Aristotle calls the organic body that body whose component parts are arranged and conditioned in such a way that they can have the soul and executes vital operations that arise from the soul as from its original source. Christopher Shields comments: “Many commentators understand him [Aristotle] to mean that the sort of body appropriately arrayed for life is one which is equipped with organs capable of implementing life functions”

(Shields, 2016, p. 171). Aristotle calls bodies of this kind organic bodies.

When the organic body loses the conditions that dispose it to have a soul, it ceases to be an organic body, the soul ceases to exist in the biological organism, and the living being dies. Therefore the corporal matter that remains after the death of the biological organism is not the organic body, but the matter into which the living substance dissolves. This last matter is present in the corpse and lacks the necessary conditions that enable it to be the potential subject of the soul; it lacks the capacity to have life. This matter is devoid of the implementation that is necessary for the execution of the vital operations performed by each organism in virtue of the soul, because it lacks the capacity to receive the soul.

The soul ceases to keep the biological organism alive when the organic body loses the conditions that make it apt to have the soul, and then the soul, which is the vital actuality of the organic body, ceases to be in the body and thus the living being is dissolved. Consequently, the biological organism dies because it ceases to have a soul, and it ceases to have a soul because its body loses the conditions that are necessary to have it and the organic implementation that enables the organism to execute the vital operations that it specifically performs by virtue of its soul.

The Soul: First Cause of the Biological Organism and Primary Substance

To summarize what has been covered so far, according to Aristotle, the biological organism is a hylomorphic compound, and the soul is the form of the hylomorphic compound, and the organic body its matter. In addition, the organic body—the matter of the biological organism—is a complex system composed of multiple organic components, which are the material components of the biological organism. And the question that the author now proposes to discuss and investigate in the light of Aristotle's hylomorphic theory is this: Why is the soul the first cause of the biological organism and distinct from its material components?

To find a solution to this question with sufficient rigor and from the perspective of the “first philosophy”, we need to recall the central argument of *Metaphysics Zeta 17* discussed above, according to which the form is different from the material components in which each sense-perceptible substance is dissolved. This same demonstration can be done with respect to the form of the biological organism, that is, the soul. In what follows the author will develop the demonstration that concludes that the soul is the first cause of the biological organism and primary substance distinctly different from the material components of the organism.

As we can recall, in the previous section we have seen that according to *De Anima 2*, the matter of the biological organism is the organic body. This body is of a kind that is endowed with the material conditions necessary to have soul and the necessary implementation for the execution of vital operations. The organic body has life in potentiality because its components have the capacity to have life in actuality, which is precisely the soul. On the other hand, the corpse of a biological organism has no life in potentiality and, for this same reason, lacks the capacity to have life in actuality and soul. However, there are some questions that arise and demand an answer. The first of these is the following: What are those conditions that make the components of a biological organism have life in potentiality and a capacity to receive life in actuality, which evidently are not in the components of the organism after death?

The answer to this question requires the contribution of the experimental sciences. Biochemistry is the science that works to find experimental evidence of the thermodynamic properties and other physical and chemical conditions that condition the component parts of each specific class of organism, for life. The biochemist investigates the necessary relationships between the aforementioned material conditions of an

organism and the vital operations executed by it, because the experimental evidence of the vital operations leads the biologist to discover the existence of a living substance. Also the biochemist gathers experimental evidence of the lack of the necessary conditions for life and vital operations in the corpse.

Now, there is experimental evidence that the corpse of a biological organism lacks the conditions that are necessary for life; and, consequently, the material components are in a different state before and after the death of the organism. Now, if we want to show that the soul is distinct from the material components of the organism, the argument to prove it requires that such components remain the same before and after the death of the organism, because only in this way is it possible to prove that the soul is not one of the material components of the organism, nor the sum total of them, nor a new material component other than all of them. Therefore, the questions that are raised in the face of these reflections are the following:

Is it possible to demonstrate that the soul is not one of the material components that make up an organism, if such components are in a different state before and after the dissolution of the organism?

Is there any sense in the expression “material components” according to which they remain the same before and after the dissolution of an organism?

One way to approach the solution to this problem is to study Aristotle’s treatment of animal parts in certain places in the Books *Zeta* and *Eta* of *Metaphysics*. Here we can look at what they are.

Aristotle argues in *Metaphysics Zeta* 10 that the material components of an animal “cannot exist separated from it (It is not a finger in any and every state that is the finger of an animal; a dead finger is a finger only in name.)” (Aristotle, 1924, Book Z, Chapter 10, 1035 b 23-25).

The starting point is a fact that is evident through experimental observation: A finger separated from an animal is not specifically a part of it, and lacks life and, therefore, soul. In addition, it is evident that the separated finger, although it still has the material components that formed it when it was attached to the animal, has lost the life it had, because those components have been affected by important changes in the physico-chemical conditions that endowed them with the fitness to have life that they had while they were attached to the rest of the animal.

For the rest, a thesis that Aristotle dwelt on is that the body part of an animal can only be defined by means of the vital operations that the animal is specifically equipped to perform: “At least, no part of such a body [of an animal] can be properly defined without reference to its function, which it could not have in the absence of perception” (Aristotle, 1924, Book Z, Chapter 10, 1035 b 16-18).

Each part or organic component of an animal performs vital functions. It is not possible to define a part of an animal, if there is no reference to the sensory perception function. The separated hand of an animal is not endowed with sensory perception and cannot be defined as part of an animal.

Now, a material part of an animal, such as a hand, keeps its specific being unaltered as an organic part of the animal, only if it keeps the thermodynamic conditions and other physical and chemical conditions that are necessary to have life. A separated hand evidently lacks those conditions. The proof lies in the fact that the separated hand lacks perception and other vital operations, including nutrition and growth.

In *Metaphysics Zeta* 16 Aristotle also refers to the parts of animals:

It is clear that even of the things that are commonly thought to be substances the majority are potentialities; both the parts of animals (for none of them has a separate substantial existence; and when they are separated, although they still exist, they exist as matter), and earth and fire and air; for none of these is a unity, but as it were a heap, until they are concocted and some unity is formed from them. (Aristotle, 1924, Book Z, Chapter 16, 1040 b 5-10)

Aristotle here rejects the view, popular in his time, according to which the component parts and elements of animals are included on the list of things that are substances.²³ Evidently, at this point, Aristotle is using the term substance in a stricter sense, because he seems to maintain that only things that exist in actuality and not merely in potentiality are substances. Aristotle thinks that the parts of animals and their elements are mere potentialities and matter. As David Bostock says, “when Aristotle says ‘potentiality’ what he means is just ‘matter’” (Bostock, 2003, p. 225). The potentialities that Aristotle speaks of in the text are the matter of the animal, its organic parts. As William D. Ross rightly says, these organic parts of the animal “are not actual substances but components capable of contributing to the life of the whole body” (Ross, 1975, p. 218).

In addition, the previous Aristotelian text harmonizes with the argument put forward by Aristotle in *Metaphysics Zeta* 13, already analyzed in the previous section, according to which the multiple material components of a physical substance can exist in it only if they are merely potentiality and matter, and not multiple substances divided and separated from each other in actuality (Aristotle, 1924, Book Z, Chapter 13, 1039 a 3-4), because each has its own form that separates it from the others, and so they would not form a unity.

According to the text of *Metaphysics Zeta* 16 that we have been analyzing (1040 b 5-10), the thesis according to which parts of animals are beings in potentiality and matter, is demonstrated by means of the analysis of what happens with the unity of each organic part of an animal while it is attached to it and after it has been separated from the animal.

In effect, any part of an animal preserves the internal unity that unites its constituent parts, only while it is joined to the rest of the animal in question. But, once the part has been separated from the rest of the animal, the part not only loses its union with the animal, but also loses the internal unity that it has while it is attached to the animal. Once the part of the rest of the animal is separated, its components are merely like a pile, that is, an aggregation of different things independent of each other, devoid of the soul that unifies them.

This is also the interpretation of Michael Frede and Günther Patzig, when they say that “...the parts of the animal have unity only as parts of the whole” (Frede & Patzig, 2001, p. 448).²⁴ They explain this by the example of the separated hand of a man:

A hand is a unity only as part of an animal, and if it were detached it would be divided in the various materials of which it is composed, which only thanks to the form of the whole are able to become a hand. Moreover, the “are concocted” should refer first of all to the transformation of organic matter produced by the decomposition of the animal. (Frede & Patzig, 2001, p. 448; Ross, 1975, pp. 218-219)²⁵

Indeed, Aristotle thinks that the different materials and elements that make up an organic part of man that has been separated from him, as in the case of a hand, are divided and separated from each other, are

²³ Ross comments: “In this chapter Aristotle abandons his own fourfold list of the things that might be considered to be substances (ch. 3 *ad init.*), and returns to criticize the popular views about substance expressed in Ch. 2, according to which the parts of living things, and the four elements, are among the things that have the most obvious claim to be substances”. Ross, 1975, p. 218.

²⁴ In Italian: “...le parti dell’animale hanno unità solo in quanto parti del tutto”. My translation.

²⁵ In Italian: “Una mano è un’unità solo in quanto parte di un animale, e se la si staccasse si diferebbe nei vari materiali di cui è composta, i quali solo grazie alla forma del tutto sono in grado di diventare mano. Inoltre, il ‘far cuocere’ dovrebbe riferirsi in primo luogo alla trasformazione di materia organica prodottasi dalla decomposizione dell’animale”. Frede, M., & Patzig, G. (2001). *Il libro Z della Metafisica di Aristotele*. Milan: Vita e Pensiero, p. 448. My translation. Ross uses the same example to explain this point: “The hand while it is in the body is not separately existent, and therefore not a substance but simply a material constituent, isolable in thought, of a substance. And when removed from the body, then too it is not a substance, with an activity of its own, but a mere collection of *omoiomere*, skin, bone, and flesh”. Ross, W. D. (1975). *Aristotle’s metaphysics*. A revised text with introduction and commentary by W. D. Ross. London: Oxford Clarendon Press, pp. 218-219.

independent of each other, and are grouped merely as a pile of elementary substances (today we would say molecules and atoms), without forming a substantial unity.

According to this interpretation of Michael Frede and Günther Patzig, Aristotle is talking about the decomposition of the organic part of an animal into its elementary components. The elementary components of a hand that has been separated from a man, lack the qualitatively superior unity that is proper to every human being; and, in this new state, such components lack human life.

In addition, the components of a separate hand and, in truth, any group of independent elementary substances among themselves, are in such a situation that they can be subjected to successive chemical transformation processes that can lead to a superior synthesis, that is to say, the generation of a new biological organism, and even to form the organs of a man, as a result of the operation of nutrition.

As we can see, Aristotle is aware of a fact about which there is experimental evidence in biology: The components of each part of an animal are not in the same state when the part of the animal is separated from the animal itself, because such components do not conform a unity; and, therefore, the part lacks the internal unity that it does have when it is joined to the rest of the animal. A separate part of an animal does not have an absolute unity, because the material components that constitute it (bones, nerves, cells, molecules, etc.) are merely a bunch of components that are not fundamentally linked together. Any aggregation of elementary substances that are not absolutely united with each other is in this state. Aristotle explains that this is the state of the components of the parts of the animals and the elements before they are substantially transformed and come to constitute a higher level substance that has a higher and perfect unity, as a part of an animal, through the process of nutrition.

Aristotle repeatedly uses the technical term “concocted” to express the process of transformation of different elements that are endowed with a lower level unit to obtain a substance endowed with a higher level unit, such as an animal or part of an animal, through processes such as nutrition or the generation of an animal. This is an idea very matured by Aristotle. David Bostock writes: “‘Concoction’ is Aristotle’s regular word for the chemical transformation of a less developed into a more developed material” (Bostock, 2003, p. 226).

For the rest, the example of the hand separated from a man is explained by Aristotle some chapters earlier, in *Metaphysics Zeta* 11:

For the animal is sense-perceptible, and cannot be defined without reference to change, nor therefore without reference to the state of its parts (For it is not a hand in any and every state that is a part of a man, but only a living hand, which can fulfill its function. A hand which is not living is not a part of a man.). (Aristotle, 1924, Book Z, Chapter 11, 1036 b 28-31)

A living hand is a hand endowed with life in potentiality and is specifically configured by the human soul. A separate hand is a dead hand, has no life in potentiality, and is not specifically configured by the soul. Therefore, the separation of a hand is not only the cause of a specific transformation of the hand, but it is also a cause that removes the conditioning that gives the hand its aptitude to have life in actuality. A living hand has life in potentiality, because it has real and direct capacity to have the intellectual soul, which is the actual life of man.

The text of *Metaphysics Zeta* 16 continues to establish what is the reason that explains why animal parts are mere potentialities: “for none of them has a separate substantial existence; and when they are separated, although they still exist, they exist as matter” (Aristotle, 1924, Book Z, Chapter 16, 1040 b 7-9).

This text assumes the validity of the thesis already analyzed of *Metaphysics Zeta* 13, according to which: “It

is impossible for a substance to be composed of substances present in it in actuality [*ἐντελεχεία*]” (Aristotle, 1924, Book Z, Chapter 13, 1039 a 3-4).

In fact, any substance existent in actuality has a separate substantial existence; and if in a substance there were many substances in actuality, all of them would have a separate existence, and could not constitute a single substance endowed with undivided natural unity. Therefore, no part that is integrating an animal can be a substance existent in actuality or have a separate substantial existence. This is the first foundation proposed by Aristotle to explain that the parts of animals can only be potentialities.

The second foundation on which this thesis is based can be understood as follows: When the parts of animals have been separated, they happen to “exist as matter”. And the matter alluded to in this text seems to be the matter already stripped of the conditioning that makes the material parts organic parts endowed with the aptitude to have life in actuality.

When a man's hand is separated, only inanimate materials remain. Those inanimate materials underlie the organic body as a remote matter that constitutes man's proximate matter, which is the organic body. Alan Code explains in this regard: “Although in a sense, a man is composed of inanimate materials (earth, air, fire, and water), the *proximate matter* of a man is a body having organs (more precisely, a set of bodily organs), and this cannot exist separately” (Code, 1986, p. 434).

The parts of animals exist in potentiality as organic parts that are endowed with a natural unity and continuity. And the sensitive soul is the cause of the natural unity of the parts of animals. For this reason, Aristotle concludes the text of *Zeta* 16, with the following words relating to the parts of animals: “it is only potentially (*ἀλλ' ὁμοῦς δυνάμει πάντ' ἔσται*) that all of them will exist when they are one (*ἓν*) and continuous by nature (*συνεχὲς φύσει*) and not by force or grafting; for this sort of thing is malformation” (Aristotle, 1924, Book Z, Chapter 16, 1040 b 10-16).

From the previous reflections, it is possible to deduce that the parts of animals are potentiality and matter in a very different sense than the material components into which the animal or the organic part of the animal is dissolved. So there are at least two kinds of matter in each biological organism. If we think of the example of a living man we find at least the following two kinds of matter:

1. First, a more indeterminate matter that serves, in turn, as matter for the constitution of another more elaborate matter, which is the organic body of man. We can discover the existence of this more indeterminate matter, when experimental evidence reveals that there are material components that remain after the death of a man, or that remain after the separation of a part of man. Aristotle refers to this matter when he talks about the material components or elements that remain after the dissolution of any sense-perceptible substance in *Metaphysics Zeta* 17.

2. There is a second matter that is less indeterminate, because it is properly conditioned by thermodynamic properties and other physical-chemical properties that give it fitness to have life. This matter is what Aristotle calls the organic body, and it does not remain after the death of a man, nor do the organic parts remain, when they are separated from the living man. This more elaborate matter is the closest to the soul and only exists in the living man; and not in the corpse. Aristotle, in *Metaphysics Zeta* 10, uses the term ultimate matter, as the matter properly arranged to have life in potentiality and receive the soul: “But individually Socrates is already composed of ultimate matter; and similarly in all other cases” (Aristotle, 1924, Book Z, Chapter 10, 1035 b 30-31).

This ultimate matter is the human body, which is constituted by different organs or organic parts and already includes the physical-chemical conditions necessary for life and the necessary implementation for the

execution of vital operations. Now, the existence of this ultimate matter requires the existence of a different matter that integrates the organic body. This matter is the remote matter of the human body, which is constituted by the material components that remain after the death of man or after the separation of an organic part of man, such as a hand.

Therefore, in man we find the matter for another matter, because the remote and non-ultimate matter of man (the material components into which the organism dissolves) is the matter that forms, in its turn, the ultimate matter of man (the organic body.)

The remote matter of man, that is, the physico-chemical components into which the body of a man such as Socrates is dissolved, remain after death in the corpse of Socrates.

By contrast, the organic body of Socrates is his proximate matter, and it does not continue to exist after the death of Socrates. Alan Code says: "Socrates's body cannot exist without Socrates" (Code, 1986, p. 434).

Aristotle in *Metaphysics Eta 4* holds that causes, including the material cause, that is, matter, have several meanings: "When one is seeking the cause, then, since causes are spoken of in many ways, one must mention all of the possible causes. For instance, what is the cause of a man as matter? The menstrual fluid, perhaps" (Aristotle, 1924, Book *H*, Chapter 4, 1044 a 34-35).

But the cause of a thing that must first be established is the cause that is most specific and proximate to the thing. Aristotle thinks that the "menstrual fluid" is apparently the proximate and most specific cause of the man who has been generated, unlike the elements (water, earth, air, fire) that are also present in man as another kind of matter, as remote matter: "And one must give the most proximate causes. It will not do to say that matter is fire or earth; one must give the matter peculiar to the thing in question" (Aristotle, 1924, Book *H*, Chapter 4, 1044 b 1-2).

The "fire" and the "earth" are the remote and not immediate or specific matter of man. Remote matter is present in the interior of the living man, and is a more primitive matter, less elaborate and, therefore, common to living and non-living substances. Therefore, Socrates not only possesses proximate matter, but also in himself is a less elaborate and more elementary matter, which is the remote matter. This remote matter is, for Aristotle, "fire or earth", that is, the elements that constitute the proximate matter of the man that is generated.

Aristotle thinks that the elements are the matter of the proximate matter of a man like Socrates, and this last matter is in this case the organic body. As Alan Code says: "Although in a sense, a man is composed of inanimate materials (earth, air, fire, and water), the *proximate matter* of a man is a body having organs (more precisely, a set of bodily organs), and this cannot exist separately" (Code, 1986, p. 434).

An organ of Socrates cannot exist when it has been separated from Socrates himself, because separation removes from the organ the necessary condition of being able to be vivified by the soul and thus be what it truly is while it is united with Socrates, that is, the organ of a man. This transformation causes the organ to stop being an organ. The organ, while attached to Socrates, is the proximate and specific matter of Socrates. On the other hand, the organ separated from the rest of the body is no longer the organ in question and is merely a part of the remote matter of Socrates (according to Aristotle, earth and fire or other elements). This same remote matter is already present in the living organ. So the elements, that is, the remote matter of Socrates, are the matter for a different matter, which is the proximate matter of Socrates himself.

Aristotle in *Metaphysics Eta 5* also alludes to this distinction between proximate matter and remote matter, and to the existence of remote matter in the proximate matter as its constituent, that is, as matter for matter, in the cases of an animal and wine:

It is not the animal but the matter of the animal that is also, by decay, the matter and potentiality of the corpse; and it is not the wine but the water that is the matter of the vinegar. They come to be from the animal and the wine only as night comes from day. All things that change into one another in this way must revert to their matter. For instance, if an animal comes from a corpse, the corpse first reverts to its matter and from there becomes an animal, and vinegar first turns to water and from there becomes wine. (Aristotle, 1924, Book *H*, Chapter 5, 1045 a 1-6)

In the case of wine, the proximate matter ceases to exist when the wine becomes vinegar. And, on the other hand, the proximate matter of the vinegar lacks aptitude to be the proximate matter of the wine; and it is necessary for the proximate matter of the vinegar to cease to exist, and the remote matter of the vinegar, which is the water, to remain so that, through successive processes of transformation and synthesis, the water again constitutes wine, which also has water as its remote matter, and not the proximate matter of the vinegar.

Something similar happens with the body of an animal, because the organic body is the proximate matter of the animal. And the organic body is a matter constituted by another matter different from itself, which is the remote matter of the animal. The remote matter of the animal is identified with the constituent elements of the organic body. The elements are thus the matter of animal's proximate matter. And this constituent matter of the animal's proximate matter is its remote matter.

The data offered by contemporary biochemistry provides the available information that the philosopher needs to distinguish the remote matter of the animal from the proximate. Today we know that earth and fire are not the remote matter of the animal, but rather the remote matter of the animal are the molecules and atoms that constitute the organism. Biochemistry today offers abundant experimental evidence that is available to philosophy to determine the conditions (thermodynamic and, in general, physico-chemical) that distinguish the proximate matter of an animal from its remote matter, which is also internal to the animal.

In addition, the proximate matter of the corpse is distinguished from the proximate matter of the living animal, which is the organic body. And also the proximate matter of the corpse is distinguished from the remote matter of it. This last matter is also present in the living animal, as a constituent material of the living animal's proximate matter. For this same reason a corpse can become, after successive substantial transformations, an animal and, vice versa, an animal a corpse.

Now, as we have seen in section 2 of this chapter, the central argument of *Metaphysics Zeta 17* demonstrates with rigorous explanatory force that form is the first cause of things and the cause of the other senses of the substance, through the analysis of the becoming of the sense-perceptible thing. And this final conclusion is the goal towards which all the sections of the Book *Zeta* point. *Zeta 3* already announced that the investigation of the substance in the different sections of Book *Zeta* focuses its attention on the form. Indeed:

However, the substance compounded from both, I mean from matter and form, we may disregard; for it is posterior and clear. Matter also is in a way evident. But we must investigate the third kind of substance, i.e. form, for this is the most puzzling. (Aristotle, 1924, Book *Z*, Chapter 3, 1029 a 30-33)

The final argument that concludes that form is the primary substance, in *Zeta 17*, is approached from the point of view of the cause and follows the Aristotelian model of science, according to which a subject matter can only be understood sufficiently by knowing the causes that explain it, starting from the things that are most familiar to our cognitive faculties but come later in the order of being, with the aim of reaching the realities that are higher and more intelligible by their nature, but which are more difficult to know by our cognitive faculties. Now, this is the procedure followed by the argument of *Zeta 17*, according to the Aristotelian model of science.

In fact, the argument of *Zeta 17* starts from an analysis of the substance composed of matter and form and

its material components, that is, the matter of the hylomorphic compound, which are the meanings of substance closest and most familiar to our cognitive faculties, with the objective of finding the cause that makes the indeterminate material components or elements of the sense-perceptible thing a determinate sense-perceptible substance. This scientific question leads the researcher to conclude that there is an entity distinct from such elements or material components, which makes them a determinate substance. This cause is of course the form or essence of the thing: “Thus what we are seeking is the cause (and this cause is the form—εἶδος—) in virtue of which the matter is a definite thing; and this is the substance (οὐσία)” (Aristotle, 1924, Book Z, Chapter 17, 1041 b 4-10).

However, Aristotle is fully aware that this argument faces a stumbling block that has to be overcome. In fact, the form or essence which is deduced from an analysis of the elements or material components (the matter of the hylomorphic compound in becoming) is the internal arrangement that configures such material components in which the demonstrative procedure has begun, and, therefore, it is necessary to clarify whether that arrangement, which is the Aristotelian form-substance, is or is not a material component added to all the others, or whether it is the sum of all of them. This is a question that Aristotle resolves, with the aim of removing a difficulty that can impede a straightforward, clear understanding of the form as the first cause of the sense-perceptible thing and cause of the other meanings of substance.

Aristotle solves this problem in the final argument of *Zeta 17*, as explained in section 2 of this chapter, by analyzing the material components of a syllable and of flesh, during their existence and after their dissolution. This analysis is applied, by analogy of proportionality, to all things, including the sense-perceptible substance. The conclusion attained by the argument is that the form cannot be any of the material components of the sense-perceptible thing, although the form itself is the internal arrangement of those components. This analysis leads Aristotle to conclude strongly that the form is the first cause of the sense-perceptible substance, because it is the cause that makes the thing be what it is, from the analysis of flesh and of a syllable:

It would seem, then, that this something else does exist, and that it is not an element, and that it is the cause of this thing here being flesh and that thing there being a syllable. And similarly in other cases. And this is the substance of each thing, because it is the primary cause of its being.

But since not all objects are substances, but only those that are formed naturally and in accordance with their nature, it would appear that this nature is their substance. And it is not an element of them, but it is their principle. (Aristotle, 1924, Book Z, Chapter 17, 1041 b 25-31)

In the case of a biological organism, the soul is the form and essence of the organism that is clearly distinguished from the material components into which the organism dissolves. These components are the remote matter of the organism.

Since the soul cannot be any of the material components of the organism, nor the sum of all of them, nor an additional and distinct material component that unites the other components of the organism, then neither is the soul the same thing as the organic body, because the organic body is necessarily constituted by the material components into which the organism dissolves, which are the remote matter of the biological organism.

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