Matter, Elements and Substance in Aristotle

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In Aristotle's philosophy, are the simple bodies, earth, air, fire and water, substances? Are they composed of substantial form and matter? What serves as the formal dimension for such bodies, and what kind of "primary" matter underlies it?

In the beginning of his analysis of substance in Metaphysics VII # 2, Aristotle writes: "Substance seems to occur most clearly in bodies (and so we say that animals and plants and their parts are substances, and also the natural bodies like fire and water and earth and all similar things, and whatever are parts of these or made up of them, whether of certain ones or of all, such as the heaven and its parts, the stars and moon and sun)" (1028b8-13) This is a list of things commonly accepted as substances.\(^1\) Aristotle goes on to say that we must test them to find whether or not common opinion is correct, whether all of these are indeed substances, or only some of them, or none at all. In the pages that follow he develops his own philosophical theory of substance. In # 16 he turns back to his point of departure in common opinion and decides: "It is clear that of those things that seem to be substances, most are potentialities: the parts of animals (for none of them is separated; when separated all of them are like matter) and earth and fire and air; for none of these are one, but they are like a heap until they are concocted and some one thing comes out of them" (1040b5-10). Thus critical philosophical analysis shows that in the main common opinion is wrong; most of what it takes to be substances are really not such in the full sense, including the simple bodies, earth, air, fire and water. These are substances only potentially. Aristotle does not discard common opinion entirely; he does not say that simple bodies fail to be substances in any sense at all. But they are not substances in the full sense.

Three points must be stressed in this conclusion: (a) The reason the simple bodies are not fully substance is that they lack the unity needed for this: "for none

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\(^1\) The "common opinion" Aristotle examines is not just popular opinion but also the belief of the physicist-philosophers who tried to explain things in terms of their parts and the stuff they are made of. These materialistic conceptions about what is real seem to Aristotle to be reflected in common, popular opinion. In contrast the mathematical concept of substance is credited "to certain persons" (1028b16) as is belief in the Ideas. The same contrast between belief in the substantiality of bodies as a common opinion, and the esoteric concept of mathematical and Ideas as held by only a few, is found in Metaphysics VIII ≠1 (1042a7-12)
of them are one, but they are like a heap.” (b) By implication, the simple bodies can be considered substances in the sense of substratum or foundation (hypokeimenon), since they must be “concocted” or properly disposed and worked into the unity of a single thing; that is, they must receive a form, and thus act as a substratum or foundation for that form. For Aristotle, substance can be said in many ways: as form, as substratum or foundation, and as the compound of both. Form or essence is the primary sense of substance, but this does not prevent foundation from being called substance in a derived sense. It is precisely as foundation that matter and the simple bodies can be called substance (c) In terms of act and potency, matter and the elements are substance only potentially, but this is true whenever substance is taken as foundation. Only form or essence is substance in actuality.

Since the Metaphysics indicates that simple bodies are not substances in the ordinary sense, our problem is to determine how they are substances at all. Our treatment breaks down into two major sections: #1-#3 examine what serves as the “formal” dimension in simple bodies, while #4-#6 discuss the “material” dimension, the prime matter that underlies the elements. Concluding comments are made in #7.

#1. Substance, form and elements in the De caelo

Aristotle’s statement that earth, air, fire and water are only potential substances conflicts with most medieval and some modern interpretations of his cosmology. It has been held that each of these bodies is a substance in its own right, with a substantial form, primary matter, and certain properties. Fire, for example, is supposed to have the eidos of fire informing prime matter, with the proper qualities of hot and dry and a motion upwards flowing from the eidos. Fire and

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2 The term hypokeimenon is usually translated by “substratum” or some equivalent of “underlying.” The word “foundation” is preferable however because it expresses the relationship between the “underlying substratum” and essence more explicitly. Both “substratum” and “underlying” imply an inert principle beneath form or essence, with connotations of substance as understood by Locke. These terms conceal the rapport that the substratum is supposed to have to its form or essence; it is there “for” the form or essence, it is not merely underneath it. “Foundation” keeps this sense, because a foundation is set down for a purpose, for a reason or sense, and must be understood in this referential way. We will therefore use “foundation” along with the customary terms “substratum” or “the underlying.”

3 Some places where Aristotle says form, matter and compound are all substance: Metaphysics VII #10, 1035a2; VIII #2, 1043a27-28; XII #3, 1070a9-12; De anima II #1, 412a6-11; #2, 414a14-17. Metaphysics VII #3, 1029a30-33 should also be included; here Aristotle says the compound is clearly substance, and so is form, and matter too is “clear” in a way; i.e., matter also appears as substance in a certain way.

4 In Metaphysics VIII #1 Aristotle recapitulates the argument of Book VII and once again cites the common opinion about what is substance: “The physical [things] are generally agreed upon, such as fire, earth, water, air and the other simple bodies, then plants and their parts, and animals and the parts of animals, and finally the heaven and the parts of heaven” (1042a7-11). The explicit reservations Aristotle states about common opinion and the elements in VII #16 are not repeated in VIII, but are implicit in what he does say. In 1042a24-26 he says he will first examine the commonly accepted substances, and they all have matter. In 1042a26-b8 he discusses in what way matter can be substance, and the conclusion in 1042b9-11 is the same as that in VII #16, for matter is accepted as substance only as foundation and as potentially substance.
all the elements should be considered substances in the full sense, since they possess a substantial form. We will call this the classical interpretation of Aristotle's doctrine of the elements. As against this interpretation, we argue that in Aristotle the elements do not have strict substantial forms, and for this reason they are substances only potentially. We already have some support for this in Aristotle's remarks in the *Metaphysics*; we now turn to the *De caelo*, and later to the *De generatione et corruptione*, for further evidence.

There are a number of passages in the *De caelo* which seem to support the classical interpretation. In discussing the possibility of other worlds besides our own, Aristotle says that any fire that might exist in such worlds would have to be similar in its *eidos* to the fire we know (I 8, 276b5-6). This argument implies that the element of fire has a specific form and thus would be a substance in the primary sense of the term. Further on in the same chapter, Aristotle says that this form remains the same no matter how far a given element is removed from its proper place (276b24-25). And so since all instances of fire have the same form, they will all be drawn to the same place (276b30-31). In the lines that follow Aristotle stresses over and again the fact that all instances of a given element are identical in their form wherever they may be found (276b32, 277a1, 3, 8). Thus in *De caelo* I 8 the concept of a "form" for material elements is emphasized and is made the basis of Aristotle's argument that there can be only one world. The form is conceived as the source of the local motion proper to the element; fire is moved by

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*See* O. Hamelin, *Le système d'Aristote* (Paris, 1931), pp. 265-266; on p. 362 Hamelin says that in mixtures the forms of elements leave and new, more complex forms replace them. A. Mansion, *Introduction à la physique aristotélicienne* (Louvain, 1945), pp. 97-99, takes the opinion stated in *Metaphysics* VII 12 as Aristotle's own position and does not mention the correction Aristotle makes in VII 16; Mansion often says that simple bodies are composed of prime matter and specific form; cf. pp. 161-166 and 241, note 5. However he realizes this leads to difficulties in speaking about elementary bodies; cf. p. 162.

C. Baumker, *Das Problem der Materie in der griechischen Philosophie* (Münster, 1890), also assumes that simple bodies are substances (pp. 230, 235, 237), 238, 240-241, 243, 246, 271, 272, 273. Like Mansion, he sees difficulties with this view; cf pp. 247-261, esp. 250-251. His remarks on p. 260 are especially interesting; he admits that some passages in Aristotle speak about qualities as though they were forms for the elements, but says that this reflects Aristotle's incapacity to sustain his concept of matter as pure possibility (which is how Baumker interprets it). For St. Thomas see *De potentia*, q. 4, a. 1, c. and ad 3; q. 4, a. 2, c. and ad 3; q. 5, a. 8, c; Commentary on Aristotle's *Physics* (ed. M. Maggiolo; Turin, 1954), Book 5, lect. 3, #663; Commentary on *De generatione et corruptione* (ed. R. Spiazzi; Turin, 1952), lect. 2, #14; lect. 8, #59-62; *Quaestio disputata de anima*, a. 9, ad 10.

its form to the outer limits of our cosmos, while earth seeks the center. Since any instances of fire or earth that might conceivably be found “outside” our cosmos would be identical in form with our fire and earth, they too would seek the same place by nature and a single cosmos must result. Such usage of the term *eidōs* seems to corroborate the traditional interpretation of the nature of physical elements; they seem to be substances with matter and form.

However in other places Aristotle speaks of form and substance in ways which are impossible to reconcile with the classical interpretation. When talking about the cosmos as a whole in I # 9, he calls it a “substance” (*ousia*) and admits it must have a “form” (*eidōs*) that might conceivably be actualized in many individuals (278a18-20). The uniqueness of our cosmos comes from the fact that all available matter is assumed by our present universe; although the form of the cosmos could be realized in other instances, there would be no matter to act as a base for it, so our world is the only one that is (278a25-b8, 279a6-11). Is Aristotle speaking critically and philosophically when he uses “substance” and “form” to talk about the cosmos? Does he consider the universe a single substance, like an organism? An indication he is using these words in a relaxed, nonmetaphysical sense is given in this very chapter, where Aristotle speaks about the substance of spheres and circles, which are certainly not substances in the rigorous sense (278a2-4). He is using the word according to the “common opinion” expressed in *Metaphysics* VII # 2, where indeed one of the things taken as substance is the heaven or cosmos (1028b12-13).

Aristotle’s use of the term *eidōs* is even more at odds with the traditional interpretation in *De caelo* IV # 3-# 6, where he discusses the problem of the absolutely heavy and light. By its nature fire is the absolutely light element, being carried to the outer rim of the universe, while earth is absolutely heavy, moving by itself to the center. In developing this argument Aristotle mentions that the motion of an element to its proper place is motion toward its proper form (# 3, 310a33-b1). The proper place is said to be the form that defines a thing, a claim that seems quite indifferent to customary distinctions between substance and accident, and between what is intrinsic and what extrinsic to bodies. In other perplexing statements Aristotle says that a surrounding body serves as the form to the body it contains, and that a body which is higher in the cosmos is a form to the body immediately beneath it (# 3, 310b9-15; # 4, 312a12-13). The surrounding body is also said to be “substance” to the “matter” of the body that is surrounded (II # 13, 293b14-15). Finally there is a use of *ousia* in which Aristotle says that the matter of the heavy and light is “closest to *ousia*” and that local motion is the primary motion “according to *ousia*” (IV # 3, 310b31-311a1).

The presence of such jagged uses of “substance” and “form” indicates that Aristotle is not using these terms in their technical metaphysical sense in the *De caelo*. Confirmation of this conclusion is given by Aristotle himself; at the

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7 A use of *eidōs* and its compounds to mean shape or form in the ordinary, nonmetaphysical sense is found in the frequent mention of *sphairēides*, especially in II # 3, # 4, # 11, and # 14. Other compounds of *eidōs* are found in II # 4 (287a20), # 11 (291b20, 22), and # 13 (293b34-294a1). Also in IV # 3 (310a24) Aristotle refers to motion in regard to *eidōs* and the lines following (310a27-28, b22-23, 311a5-6) clearly show he is talking about
beginning of III # 1 he says, "I call substances the simple bodies, such as fire and earth and the things arranged under these and those composed of these, such as the heaven as a whole and its parts, and again animals and plants and their parts ..." (298a29-32). This passage is almost a literal repetition of what we have cited from Metaphysics VII # 2 as the expression of the common opinion about substances, but here Aristotle makes it his own. He leaves out of consideration the metaphysical approach which disqualifies some of these items as substances in the strict sense. It seems evident therefore that Aristotle, in the De caelo, is writing according to common acceptance and not according to his own rigorous metaphysical understanding. Whatever scientific aims he has in the De caelo can be reached, in his opinion, without resorting to the level of accuracy sustained in the Metaphysics. Thus the remarks he makes about the substantiality of earth, air, fire and water should be taken in a loose, informal sense. There is no basis in this work for asserting substantial form for each of the four elements.

# 2. Further dimensions of the problem in De generatione et corruptione.

We can go farther in Aristotle's De generatione et corruptione, where we have positive evidence that the four elements cannot have a substantial form and therefore cannot be substances in the full, critical sense.

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a form of quality or state, not a substantial form. The same is true of III # 1, 299a20-21 and #4, 302b30. Some places where eidos could be meant as the classical interpretation takes it are: I # 2, 266b29; 8, 276b5-6, b25; II # 4, 286b32; III # 5, 302a18, #4, 302b19 (the last two deal with Aristotle's definition of elements as bodies that cannot be cut into others "different in eidos")

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6 Several reasons could be given for the discrepancies between De caelo and the Metaphysics (1) The De caelo is generally considered an early work of Aristotle, so the conception of substance may be still unrefined and unmetaphysical. This would also account for the passage where Aristotle seems to consider the entire cosmos a substance; it could be a Platonic influence on the early Aristotle, since Plato considers the cosmos a living organism; cf. I. Elders, Aristotle's Cosmology (Asen, 1966), p. 7. Against this reason, however, we have the fact that in the passage we cite (298a29-32), Aristotle speaks with almost the same words he uses in Metaphysics VII # 2, so at least some parts of De caelo are contemporary with this book of the Metaphysics. (2) P. Moraux, "La méthode d'Aristote dans l'étude du ciel," in Aristote et les problèmes de méthode (Louvain, 1961), p. 193, says that Aristotle is not rigorous in his treatment of the cosmos, and that he never really clarified his own thinking about this subject. This general imprecision would be reflected in his conception of substance and form. In "Recherches sur le De caelo d'Aristote," Revue Thomiste, vol. 51 (1951), p. 196, Moraux says both the De caelo and De generatione et corruptione were destined only for lectures and probably had many additions, changes and duplications over the years, with many obscurities and even contradictions resulting (3) Without discarding the first two reasons, I would propose a methodological one that is compatible with and perhaps basic to them, and accounts for the similarity between 298a29-32 and Metaphysics VII # 2. In De caelo Aristotle is thinking and speaking on a lower level of abstraction, on a level of inquiry which assumes certain principles as given, and which must accept common opinion and the formulations of common opinion as one of the witnesses of the phenomena. In other words he must restrict himself to the level of opinion which he describes in Metaphysics VII # 2 because the phenomena he studies are available only on that lower, more naive level. This level of analysis cannot give a rigorous meaning to oinosia; in fact the awareness of the difference between essential and accidental speech, between speaking of things in themselves and speaking of them by coincidence, could be considered as that which constitutes the metaphysical attitude as opposed to ordinary opinion. The imprecisions in Aristotle's speech during his empirical studies arise because he is not yet doing metaphysics, but when he does begin first philosophy the imprecisions appear as such and are criticized.
In the *De caelo* Aristotle derives the existence of four elements through the two simple motions of up and down and the two intermediaries these must have. In the *De generatione et corruptione* he again deduces four elements, this time on the basis of the possible combinations of the four elementary powers of hot, cold, fluid and solid. The meaning of these powers must be clarified at the outset. For Aristotle they are not just the four tactile qualities, not just derived from sense perception. Rather Aristotle derives them from the dynamic interactions that can exist among bodies. "But hot and cold and fluid and solid are so named because the first [pair] are active, the second passive. For hot is what combines homogenous things (for to separate, which they say fire does, is to combine things of the same kind; what is foreign is then removed); cold is what gathers together and combines alike both things of the same class and those not of the same kind; fluid, though easily bounded, is not determinate in its own boundary; solid, though its limits are hard to adapt, is well determined in its own boundary" (II # 2, 329b24-32). Solid and fluid are capacities to receive pressures; solid resists pressure and keeps definite boundaries, fluid is malleable and is not secure in its own limits. Hot and cold are capacities to act on other bodies; the hot fuses homogenous things together and filters out other things, cold congeals everything, it "freezes" everything together, whether what it acts on is homogeneous or not. Of course, when we, as sentient beings, come in contact with these powers, we feel different "qualities," but Aristotle's deduction of the four powers comes basically from the interactions that exist among bodies. It is primarily a cosmological analysis.

So Aristotle derives the four bodies, earth, air, fire and water, from possible combinations of the contrarieties hot-cold, solid-fluid. What is the relation between the four bodies and the four powers? The classical interpretation sees no difficulty here; it takes the four elements as simple substances with primary matter and substantial form. The powers are properties of these substances; hot and solid are the proper characteristics of fire, hot and fluid belong to air, cold and fluid to water, and cold and solid to earth. The powers follow upon the form and substance of the elements.

The issue is not nearly so clear in Aristotle. The following passage implies that the powers of hot, cold, fluid and solid, far from being consequent upon the elements, are really more fundamental. Rather than follow upon the form of the simple bodies, they constitute the form: "Therefore first what is perceptible body potentially is a principle, secondly the contrarieties—I mean for instance heat and cold—and thirdly fire and water and the like" (II # 1, 329a32-35). The contrarieties come "between" matter and the simple bodies; they do not follow upon the simple bodies. The contrarieties are immediately present in the underlying matter, and the simple bodies like earth and fire are the result of the fusion of

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9 It is difficult to find four English words to convey the sense of Aristotle's four powers. Joachim discusses the problem in *Aristotle on Coming-to-be and Passing-away* (Oxford, 1922), pp. 201 and 208. Good terms for the couple "fluid-solid" or "moist-dry" are especially hard to find. We will continue to use "hot, cold, fluid, solid," understanding them in the technical sense given by Aristotle.

10 "In itself" it is a cosmological analysis; in his process of exposition "for us" Aristotle begins by appealing to the four powers as tactile qualities (De generatione et corruptione II # 2) but the explanation based on the things themselves is cosmological.
the elemental powers and underlying matter. The contrary powers constitute the simple bodies; they are not merely properties of such bodies. Aristotle seems to say the reverse of what the classical doctrine holds.11

This doctrine is confirmed by the way Aristotle uses the word “element” (stoicheion). Very frequently, when he applies this term to earth, air, fire and water, he qualifies it by calling them “the so-called” elements, as though he did not share in the conviction that they really are elements or ultimate constituents of material reality. A passage in the De partibus animalium brings this out clearly: “Of the three compositions, one might posit as first that out of what some persons call elements, such as earth, air, water, fire. But perhaps it is better to say of the powers, and not even out of all of these, as has been stated elsewhere and earlier. For fluid and solid and hot and cold are matter for composite bodies; the other differences follow upon these, such as heaviness and lightness and firmness and looseness and roughness and smoothness and the other similar attributes of bodies” (II ≠ 1, 646a12-20). The most primitive and irreducible components are not the so-called elements, earth, air, fire and water, but the powers. If we are to make a final “chemical” analysis of things, the most fundamental constituents are the four basic contrary powers of hot, cold, solid and fluid. Thus Aristotle takes up the problem of Empedocles, the analysis of material reality into its ultimate constituents, and resolves it in a different way. The so-called elements of Empedocles are not the true ultimate; they must be made up of still more basic factors, the elementary powers.

If we examine Aristotle’s use of stoicheion in the entire De generatione et corruptione, we find further confirmation that the powers constitute the simple bodies. In this work Aristotle uses the term in three different ways: (a) He often uses it without any qualification (i.e., without saying “so-called” elements) in reference to earth, air, fire and water; but the context is almost always an explanation of someone else’s theory of elements, usually that of Empedocles.12


12 This usage is found eight times in I ≠ 1, where other theories, especially those of Empedocles and Anaxagoras, are expounded; once in I ≠ 2, where Plato is discussed, three times in I ≠ 6, where “others who speak vaguely about bodies” are treated (322b6-7, b11); twice in I ≠ 8 concerning Empedocles; once in II ≠ 3 where Aristotle refers to “all those who make the simple bodies elements” (330b7-8), a phrase which clearly shows the
(b) Aristotle sometimes uses the phrase, "the so-called elements," to refer to earth, air, fire and water. The use of this formula shows that he does not agree with the theory that considers these four things the simple elements of physical reality. This formula occurs most frequently in Book II #1, where Aristotle begins a frontal attack on the problem of how earth, air, fire, and water are transformed into one another. This question is the heart of the entire treatise, and Aristotle is about to present his own doctrine on the subject after having given a long survey of the problem and its history in Book I. The repeated use of the qualification "so-called" shows that his analysis will now veer toward a solution different from that of his predecessors. (c) Finally, he sometimes uses the term "elements" to refer to the powers of hot-cold, solid-fluid. Without warning, he suddenly begins to use it this way in Book II #2, just as he gets into his own theory of physical composition: "We must first distinguish how many primary differences and contrarieties there are of the tangibles. These are contrarieties according to touch: hot-cold, solid-fluid, heavy-light, hard-soft, viscous-brittle, rough-smooth, coarse-fine. Of these heavy and light are not active or passive... But elements must be mutually active and passive; for they mix and change into one another. But hot and cold, and fluid and solid are so named because the former are active, the latter are passive" (329b16-26). Another passage occurs in II #3: "Now the elements are four, and of the four there are six combinations; but opposites cannot be coupled, for it is impossible for the same thing to be hot and cold and again solid and fluid. It is clear that there will be four combinations of the elements, of hot and solid, and hot and fluid, and cold and fluid, and cold and solid. And according to theory they correspond to the four seemingly simple bodies: fire and air and water and earth" (330a30-b3). In these and other places, Aristotle calls the basic powers "elements" and even contrasts them to what he now calls "the seemingly simple bodies," earth, air, fire and water.

The equation of simple bodies and elements is not his own doctrine; four times in II #6 concerning Empedocles, and twice in II #7 where he either uses the term in a formal, general way (334a16) or refers to atomistic theories (334a29). Three instances of this usage are found in II #1. The first is a formal usage, referring to basic constituents whatever they may be (329a5-6) and the other two deal with Plato (329a15, 22). These three instances coexist in the same chapter with three instances of "the so-called elements." H. Diels, Elementa (Leipzig, 1899) studies the history of the word "element" and discusses various ways it is used (for Aristotle, pp 22-34), but does not examine the relation of physical elements to substance.

13 This formula is used once in I #6 (322b1) and three times in II #1 (328b31, 329a16, a26). Other instances in other works are listed by Bonitz, Index Aristotelicus, 702b5-7, although the reference to Metaphysics XI #10 (1066b36) does not seem to belong here, and De generatione animalium I #1 (715a11) may be added to the list. Probably the best instance of this usage is that in De partibus animalium II #1 (646a13), and an interesting variation occurs in Metaphysics XI #1 (1059b23), where it appears to mean metaphysical principles.

14 Other places where Aristotle uses "elements" to mean powers: II #2 (329b13, and see Bonitz, 702b10, for confirmation); II #4 (331b27-28); and three instances in II #7 (334b17-18, b25) At 334b17-18 the Loeb translator (p. 302) finds it difficult to see what Aristotle means by identifying "opposite powers" and "elements," and suggests deleting the word for elements. The translator does not notice that "element" does not always mean simple body in this work, and often uses the term in the English rendition where it is not warranted by the Greek text. The use of "element" by Aristotle in II #5 (333a12) should also probably be taken to mean powers; finally the last remaining instance in this work, II #4 (331a14-15), is very hard to classify. On Aristotle's doctrine itself, cf. C. Kahn, Anaximander.
This is his own doctrine about the irreducible, primary factors, the true elements in a chemical analysis of the material world.

Aristotle's use of the term "simple bodies" or "first bodies," which he uses to name earth, air, fire and water, reflects the change that the meaning of the word "element" undergoes. Throughout the first book Aristotle uses the word "element" to name earth, air, fire and water, because he is essentially concerned with other thinkers' ideas. In Book II he begins his own doctrine, so the word "element" starts to mean hot-cold, moist-dry; it is precisely at this point that Aristotle introduces a new term, "simple bodies," and sometimes "first bodies," to name earth, air, fire and water. Repeated use of this terminology occurs in II # 3 and # 4. Aristotle needs this new set of names because the word "element" is no longer available, having been given a new use in his own theory.

If each simple body is composed of underlying matter qualified by two powers, it is impossible to claim that such bodies are substances with prime matter and substantial form. How can a substantial form be composed of two factors, like the hot and solid? A "form" in the strict metaphysical sense is indivisible and cannot be composed of two parts. Some other interpretation of the substantiability of simple bodies must be found.

The difficulty is made sharper by Aristotle's explanation of how simple bodies change into one another. Transformation of one body into another occurs when one or both of the two powers constituting the body are changed, having been replaced by their opposite powers. Water, which is constituted by the cold and fluid, becomes air when the cold becomes hot while the fluid remains (II # 4, 331a12-b2). When water becomes fire, both components change: the cold becomes hot and the fluid solid. Since there is more to be changed in such a case, the transformation is more difficult and takes more time (II # 4, 331b4-11). It is clear from this that the two powers do not serve literally as a substantial form for the simple bodies; how could one half of the form be changed while the other remains the same?

A variation on this difficulty occurs in Aristotle's theory of mixtures, the formation of bodies intermediate to earth, air, fire and water. Homoeomeresous matter, such as bones or flesh, is constituted when various powers are realized in intermediate stages. There exists a continuum of possible stages between the opposites. If one contrary is changed into its polar opposite, a complete change of one simple body into another will result. But the change need not go all the way to the opposite. It is also possible for the power of cold to be only partially overcome by the hot; the result is a balance somewhere on the continuum between hot and cold. In this way some homogenous body results which is not

and the Origins of Greek Cosmology, p. 120: "What Aristotle properly designates as an 'element' is the primary, simple ingredient of a composite thing. In his view, the true elements of the natural world are not these concrete bodies of earth, water, and the rest, but the four chief physical opposites: Hot, Cold, Dry, and Wet." Düring, De partibus animalium, p. 124, says the qualities are called elements because they are "in a deeper sense at the bottom of things" than the simple bodies.

15 See II # 3, 330b6-8 and # 4, 331a7, b2-3. An interesting usage occurs in II # 3, 330b2-3, where Aristotle refers to "the apparently simple bodies, fire and air and water and earth," thus indicating that these bodies are not ultimate constituents.

16 On mixtures as intermediate states of the continuum between contrary powers, see
one of the simple bodies. “Thus first the elements change, and out of them flesh and bones and the like, when the hot becomes cold and the cold hot, when they arrive at a mean; at that point there is neither [hot nor cold], but the mean is broad and not indivisible. Similarly, the solid and fluid and the like make flesh and bone and the rest according to a mean state” (II #7, 334b24-30; cf. 334b8-24). Of course, fire and earth can again come out of the compounds when these intermediate stages are changed back into the simple opposites.

How can this chemical analysis be reconciled with the belief that simple bodies have substantial forms? The individual powers are supposed to be capable of degrees of “more or less,” but there can be no more or less for a substantial form. If simple bodies were fully substances, we could not say that the form of hot and solid (or the form of fire) might be modified in varying degrees to bring about mixtures. Nor could we say that there can be an infinity of different substantial forms on the continuum extending, for instance, between fire and water. Substantial forms are discrete units for Aristotle. Any attempt to posit substantial forms for the simple bodies conflicts with what Aristotle says about mixtures.

The De generatione et corruptione gives us many reasons for denying substantial form in earth, air, fire and water: first, Aristotle says that the simple bodies are constituted by dual powers, which could not be a form in the metaphysical sense; secondly, the transformation of one body into another when one power replaces another cannot be reconciled with the presence of a substantial form; thirdly, Aristotle’s doctrine on mixtures also excludes such forms. Now if these bodies do not have substantial forms, they are not substances in the strict sense because form is the primary principle of substantiality.

3 The formal dimension in simple bodies.

Although the simple bodies lack a true substantial form, there is a sense in which they have a formal dimension. There is a distinction in them between the underlying matter and the dual powers that determine it. The powers do function after the fashion of form, but in such a dissipated way that use of “form” or “essence” in their case is more by metaphor than strict philosophical speech. Whereas form is a unitary principle, the powers are always irreducibly dual in a body, like the hot and solid in fire. Whereas form is indivisible and discrete, the powers are elastic; they can take on a whole continuum of intensities or stages, for instance, anywhere between the extremes of simply hot and simply cold.


17 Both forms and definitions, like numbers, are unified and discrete, with no possibility of being more or less. See Metaphysics VIII #3 (1043b32-1044a11). However, as Aristotle implies at the end of this passage, substances with matter can be more or less what they are if they have not yet reached maturity, i.e., have not yet dominated the matter that is their foundation. To the extent they have not yet realized themselves, they may not be what they are. Cherniss relates this imperfection in being to Aristotle’s theory of evil; see Aristotle’s Criticism of Plato, p. 353, n. 263.

18 Taking the basic powers as continua may help us explain Aristotle’s perplexing comment that the earth, air, fire and water we actually experience are not the simple bodies his theory talks about (De generatione et corruptione II #3, 330b21-30). A theoretical simple
Whereas form exercises dominion over the matter associated with it, guiding mechanical forces towards an organic end, the dual powers simply qualify the matter that underlies them. This matter is dull and inert, it has no mechanism or dynamism in itself apart from the powers that inform it. Thus in the simple bodies the dual powers carry out some of the functions of form, but in a very tenuous way.

These reflections can help us interpret the status of local motion as a natural attribute of the simple bodies in Aristotle's cosmology. Each body tends to move toward its proper place in the cosmos, fire toward the outside, earth toward the center, the others to intermediary positions. The bodies move this way by nature, and the motion toward a body's proper place is the actualizing of a potentiality. Does this imply that the motion of simple bodies manifests a substantial form, an actuality that defines what they are? Does this teleological motion express an essence and form in simple bodies?

Once again the internal source of motion in elemental bodies is something like a form, but not in the strict metaphysical sense. The teleology of a true form involves the maturation of the being itself, the ripening and perfection of the being whose nature is expressed in the form. But local motion is not a maturation of simple bodies themselves; it is merely a relocation, a rearrangement of the bodies in relation to other things or to the cosmos as a whole, but not a development in the way the bodies exist in themselves. Local motion is an actualization, but it does not serve to assemble the moving thing into the dignity and unity of one being, as a substantial form is supposed to do. It is not the expression of a substantial form in the literal sense, any more than the dual powers constitute literally a form for the matter that underlies them.

In *De caelo* IV # 3 Aristotle says: "Even more than these do the heavy and light seem to have the beginning [of motion] in themselves, because their matter is closest to being [ousia]. A sign of this is: local motion belongs to beings that are cut loose, and it is the last of the motions in coming to be, so that this

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...
motion is the first in respect to being [ousia]" (310b31-311a1). Local motion is the last thing a being can do; it is a sign of the completion or independence of a thing. Real substances acquire their own mobility when they are independent and capable of existing by themselves. However simple bodies get this motion first of all; as Aristotle goes on to say in the next few lines, as soon as fire is engendered from water, it begins to move upward. This means that local motion is all that simple bodies have; there is no perfection of being in them that must be developed prior to their being cut loose and allowed to move by themselves, as a fetus must develop into a certain organic unity before it can exist and ultimately move itself. For simple bodies, “their matter is closest to being” in the sense that almost nothing has to be done to finish it off. The fact that simple bodies start to move as soon as they are generated is a sign of the paucity of their being, of the weakness of their “substance.” Their motion is not the expression of a formal teleology within their being itself.

In Meteorology IV 12 Aristotle discusses the teleology present within bodies, which is manifest by the work (ergon) that they do. In higher and more complex beings, he says, this formal dimension is easy to discern and becomes quite vivid by its absence when the being dies and loses its capacity to work. The difference between the remaining heap of matter and the former living being is its work or logos, that for the sake of which it existed.

The farther we descend in the hierarchy of complex beings, the harder it is to discern the action or work for which a being is: “These are less clear for flesh and bone. And still less for fire and water; because the ‘that for the sake of which’ is least clear here, where there is most matter” (390a2-4) Aristotle does admit that even simple bodies like fire and water have some formal work or teleology, even though it is not very impressive because of the domination of matter (390a5, 15). The work or logos for which simple bodies are is simply the state in which such bodies are found, the condition of the powers that modify the underlying matter. This feeble work or eidos is all they are capable of in themselves; it is so tenuous metaphysically that when an element changes its state, its prior eidos does not leave anything behind to which it could be compared in its absence (as an animal leaves its corpse when it ceases to be an animal).

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19 The authenticity of Book IV has been questioned but there is a solid opinion at present accepting it as the work of Aristotle. For a survey of opinions and literature, see I. Düring, Aristoteles (Heidelberg, 1966), pp. 349-350 and 384; and H. Happ, “Der chemische Traktat des Aristoteles,” pp. 304-313.

20 Happ, ibid., p. 301: “Man könnte meinen, eidos sei hier, als ‘körperliche Zustand’ gefasst, jedes metaphysischen Sinnes, insbesondere jeder Verknüpfung mit einem Telos an Alexander sah jedoch tiefer, wenn er bemerkt, dass bei den Körpern des Naturbereichs gerade in diesem Körperzustand (eidos) schon das Telos liege.”

21 Several French commentators on Aristotle have exploited Meteorology IV 12 to develop the interesting theme that the essence or form of something is apparent only after that being has ceased to exist, i.e., after its death. Thus being cannot be defined while it is still in the process of existing; thought and its definitions look to what has been P. Aubenque, Le problème de l’être chez Aristote (Paris, 1962), pp. 467-472, relates this to the imperfect tense of the Aristotelian formula to i’ en einai. Other authors are given on p. 471, n. 1. H. Carteron, La notion de force dans le système d’Aristote (Paris, 1924), p. 74, is often quoted by authors: “Il nous manque la mort du feu—ou de chacun des autres éléments—qui, seule, pourrait nous révéler son âme.” Of course this does not mean that fire or elements have a soul or form that remains hidden from us; rather the elements are incapable
However the very weakness of elemental forms gives them a certain endurance which higher forms do not have, for it enables them to remain what they are within higher substances. When a plant is eaten by an animal it ceases to be a plant, but a chemical assumed into an organism remains what it is; it keeps its conditions and capacities, but they are now organized into the teleology and work of a higher being. Thus the weakness of elemental forms is what allows simple bodies to be substance potentially and as foundation, since such bodies can remain what they are and still support the existence of full metaphysical essences. This is possible because what they are is almost nothing and not substance in the full sense.

# 4. The underlying matter.

Aristotle does not admit a substantial form for the simple bodies. Instead each body is constituted by the coupling of appropriate powers, but these powers are present in some sort of matter that underlies them. What can be said about the underlying matter?

The existence of such matter is asserted by Aristotle in order to explain the transformation of simple bodies into one another. Something hot and solid (fire) works upon something cold and solid (earth) and changes it chemically when the hot overcomes the cold and makes the body hot. Then earth becomes fire or some other intermediary body. But in this change we do not have a pair of suspended contraries overcoming one another; in any change an underlying base must be present to allow continuity. When something cold becomes hot, it is really an underlying matter that is first cold, then warmer, and finally hot.

of dying because they are not substantial enough to live or die. They do not lose a form when they change, they merely rearrange qualitative powers.

22 The metaphysical status of elemental *eidos* is reflected in our speech; when we are given merely the simple bodies, no necessity in speech follows because none of the qualities are ever said of the underlying matter in itself. But when elements are incorporated into higher substances, we can speak of them with a certain “hypothetical” necessity, i.e., we can say that such and such states must be given if an animal is to be itself. Hypothetical necessity is by definition a shared, heteronomous necessity (just as Kant’s hypothetical imperatives are heteronomous), but simple bodies are capable of no more than this. They share in the necessity of higher substances, just as they share in their substantiality.

23 H. R. King’s controversial essay, “Aristotle without Prima Materia,” *Journal of the History of Ideas*, vol. 17 (1956), pp. 370-389, has provoked new interest in this subject. King denies that Aristotle holds anything like the traditional notion of prime matter, a substratum underlying simple bodies. Words for primary matter or underlying matter in Aristotle should be taken to mean matter before it is changed from one state to another (proximate matter), or in some cases the cosmic mass of earth, air, fire and water as the final components of material reality. King says that in changes among simple bodies one of the contrarieties remains as the substratum while the other changes (p. 378). He says neoplatonic commentators introduced the notion of *prima materia* in Aristotle as a replacement for Plato’s receptacle. King develops his argument by analyzing places where *prima materia* is supposed to be taught and tries to show that no evidence is given in them for such doctrine; some passages, he says, are incomprehensible if we try to find the idea of prime matter in them. Essays critical of King are: F. Solmsen, “Aristotle and Prime Matter: A Reply to H. R. King,” *Journal of the History of Ideas*, vol. 19 (1958), pp. 243-252, and A. R. Lacey, “The Eleatics and Aristotle on Some Problems of Change,” *Journal of the History of Ideas*, vol. 26 (1965), pp. 451-468, esp. pp 462-467. A nod in his favor: R. Rorty, “Matter and Event,” in *The Concept of Matter*, ed. E. McMullin, p. 516, n. 33. I think King does not dispose of underlying matter in Aristotle, and that the critics above meet his objections to this
The underlying matter is never found apart from the contrary powers. It is not itself an "element" or "simple body" that can exist apart. However it is different from the powers because "in itself" it is identified with none of them exclusively; it is not essentially hot, cold, fluid or solid, but can receive any of these qualifications. It is this universal receptivity of the underlying matter that makes it possible for all the simple bodies to be transformed into one another. Furthermore, just as this underlying matter is not essentially joined to any specific basic power, it is also free of any specific mathematical dimensions. It can take on any shape or size and still remain "what" it is.

In Metaphysics VII #3 Aristotle performs a thought experiment in which he thinks away all qualitative and quantitative determinations and is left with the underlying matter, which he describes as follows: "I call matter that which in itself is said [to be] neither 'this kind' nor 'so much' nor anything else by which being is determined" (1029a20-21). It is important to note that Aristotle says matter is none of these things "in itself." It is none of these things *per se*, the way I am human essentially, in myself, *per se*. But Aristotle does not deny that underlying matter can have attributes by accident. This or that piece of matter can be qualified by the hot and fluid, and may be marked off into a determinate size, but all this occurs only accidentally. The same piece of matter can change its qualities and dimensions and still remain itself, because it is none of these things in itself. The capacity of matter to receive accidental predicates is shown in another passage from Metaphysics VII #3: "So that the ultimate is in itself neither 'this kind' nor 'so much' nor anything else; nor [is it] the negations either, for these also belong by accident" (1029a24-26). Here Aristotle admits that matter can receive negations as accidental predicates, and his statement that "these also belong by accident" implies that besides these negations, other affirmative qualities can be predicated of matter, but always simply by accident.²⁴

Hence Aristotle can write: "It [matter] is something of which each of these [categories] is predicated and whose being is different from that of each of the categories" (VII #3, 1029a21-23). Matter can receive the various categories as predicates, but its being always remains essentially irreducible to and different from them. They are always only predicated accidentally. In essential predication, the being of subject and predicate must be one and the same; if "man" is predicated of me essentially, it is because my being is to be a man. I and my essence are one and the same in being, according to Aristotle. There is no otherness between me and my humanity. No attributes belong to matter in this way; nothing can be said of matter essentially and in itself. But in accidental predication the being of subject and predicate remain irreducibly different even though the subject receives the predicate. If "musical" is said of me, it is only accidentally stated because

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my being is not essentially musical. I can lose musicality and still remain myself (though I cannot lose humanity and remain myself). Musicality remains other than me, even when it is within me. In this latter sense, matter can receive predicates accidentally while remaining irreducibly different from them in its being. Hence all attributes, qualitative and quantitative, can be stripped away and yet leave matter what it is “in itself,” formless, undetermined stuff.

# 5 Matter and extension.

A further question can be put to Aristotle’s text: is the underlying matter extended? It does not have any special qualities or determined dimensions in itself, but is it extended? In *Metaphysics* VII # 3 Aristotle says, “But when length and breadth and depth have been taken away, we do not see anything left over, unless there is something bounded by these” (1029a16-18). The matter left over is something bounded by determined dimensions. In itself it does not have any specific dimensions, but it is capable of receiving them, i.e., capable of being marked off into determinate sizes. This implies that matter already has extension in itself. The powers of hot and cold, fluid and solid modify the state of matter, but they do not give it its primary extension. Even the powers of solid and fluid do not extend matter originally; they merely determine the firmness of its presence in a given place. Aristotle admits that the density of matter may vary as chemical changes take place, so that a given mass of matter may be compressed into a smaller space or expanded into a larger one (*Physics* IV # 9, 217a26-b12). However the matter in a given place can never be compressed into a point without extension.

There is a text in *Physics* IV # 2 which indicates that Aristotle felt matter and extension were indistinguishable. Aristotle is attempting to determine the nature of place and tries to find whether place is matter or form. In talking about other opinions, particularly that of Plato, he says: “To those who look at it in this way, the place of each [thing] is the form; but if place seems to be the extension [interval; *diastēma*] of a magnitude, it is the matter; for this [the extension] is other than the magnitude, it is that which is bounded and determined by the form, e.g., by a plane and a limit; such a thing is matter and the undetermined; for when the limit and the attributes of the sphere are taken away, nothing is left besides the matter” (209b5-11). Although this text appears within an examination of Plato’s concept of place, with which Aristotle does not agree, the principles by which he draws inferences do express his own ideas. The text says clearly that when the boundaries and attributes of a given piece of matter are taken away, only the matter is left and this matter is extended. It fills an interval.

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25 Cf. Joachim, *Aristotle on Coming-to-be and Passing-away*, p. 124; “We must rather conceive *hylē* as a material capable of filling space with all possible degrees of intensity, or capable of expanding or contracting without a break in its continuity.” Others who say the underlying matter is extended and continuous: Tugendhat, *Ti kata tinos*, p. 74: “Dagegen gehört es zum Wesen des unmittelbar Vorliegenden (der *hylē*), dass es als Unbestimmtes ein schlechtthin mannigfaltiges Auseinander ist, ein dreidimensionales Kontinuum.” Cherniss, *Aristotle’s Criticism of Presocratic Philosophy*, p. 154: “So the void is reduced to Aristotle’s prime matter, space is sunk in this matter as extension.”
In another passage Aristotle seems at first to distinguish matter from an extended interval; he says, “There are just four things of which place must be a certain one: the form or the matter or a certain interval between the extremities or the boundaries themselves ...” (Physics IV #4, 211b6-8). Here the interval or extension seems to be listed as distinct from the matter. But a little further on Aristotle says that no such interval independent of matter can exist; if there is any interval or extension, it is simply the material body: “Because what is enclosed and separated can change many times while the enclosure remains, as when water [is poured] from a vessel, what is in between seems to be a certain extension, as though it were something beyond the body that is displaced. But this [extension] does not exist; there is only the body that happens to fall in place ...” (211b14-19). Thus for Aristotle there is no extension or spatiality except body.

Aristotle’s conviction that there is no void supports this. A void would involve extension without body; since this is impossible, the only type of extension conceivable is that of the extended continuum of matter.

But if we grant that matter is necessarily extended, does this not give at least one attribute which belongs to it in itself? How can this be reconciled with Aristotle’s claim that matter receives no predicates in itself? For Aristotle extension is not a predicate or an attribute. If it were it would have to be a predicate of non-extended matter, but nonextended matter is a contradiction. There can be nothing prior to extension; there can be no substratum or foundation prior to extension and capable of receiving it. Such a nonextended foundation makes no sense for Aristotle. Only later in the history of philosophy when matter is conceived as dependent upon a still deeper foundation (the patterns in the neoplatonic Nous or the ideas in the mind of God), or when matter becomes transformed into a metaphysical principle, does it become necessary to explain extension as something consequent upon matter and not equivalent to it. For Aristotle the under-
lying matter is simply formless, unqualified, space-filling stuff. Its extension is not an attribute, quality or predicate, but is as primary as matter itself.

In fact to find something analogous to extension in Aristotle we should not look for a predicate or accident that is attributed to matter; the closest analogy is found in Aristotle’s doctrine of intelligible matter, specifically that which is taken as the foundation for geometrical realities. Aristotle speaks of two types of intelligible matter: a genus is said to be the intelligible matter for its species, and a certain intelligible matter is said to be that which supports mathematical entities like circles, cubes, squares, or lines. That is, mathematical matter is not something that belongs to our concepts or exists only in our mental power of imagination; it is not a part of mind; it is matter, stuff, but taken in abstraction from any perceptual qualities. It is taken simply as that which is needed as a foundation for circles, squares, points and lines. Cubes and circles do not exist only in our ideas, minds or imagination, any more than time, as a measure of any motion, exists simply “in our minds.” In the case of time, the motion that is counted is real for Aristotle, and our counting or measuring is an operation that we perform upon this reality. Moving things are the foundation for time. Similarly, in geometry cubes and circles are actualized by thought upon the foundation of matter. They are drawn on matter and can even be attributed to matter as the limits of certain parts of it.

However everything that has to be said about circles and cubes can be stated with no mention of perceptual qualities. Hot, cold, solid and fluid are all irrelevant when we speak about mathematical entities. Thus the matter that serves as the foundation for geometrical “bodies” can be considered apart from its function of supporting the tactual qualities and their derivations. Since all these qualities are excluded from consideration, the perceptibility of this matter is also not mentionable; hence Aristotle calls it intelligible matter and explicitly contrasts it to perceptual matter. It is intelligible matter because it appears only as a substrate for a type of being (the mathematical) which comes to be only in response to intellectual performance. Cubes and circles are not actualized by efficient causes, sperm, movers, hot or cold forces, nor even by the maturation of a substantial form that defines their being; they are actualized only by thinking. However Aristotle’s foundation for them is intelligible matter because circles and cubes arise only on the foundation of space-filling stuff. They happen to material things and can even be said of material things, just as the measurement of time.

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For intelligible matter as genus, see *Metaphysics* VIII #6, 1045a34-36; as mathematical matter, VII #10, 1036a9-12; #11, 1037a4-5. The expression “matter of the mathematical” appears in XI #1, 1059b16. The relationship between intelligible matter as genus and as a base for mathematics is not easy to determine; cf. Ross, *Aristotle’s Metaphysics*, vol. II, pp. 185-186 and 199-200 (where Ross cites Alexander as identifying mathematical matter with extension). One way in which this problem should not be solved, however, is by taking mathematical matter as a genus for geometrical figures like circles and cubes. This would be like taking bricks and stones, or matter in general, as genus for house. (The latter seems to be done by St. Thomas, who declares that “body” can be interpreted as a genus for animal; cf. *De ente et essentia*, #2) Such a procedure destroys the dialectic, the otherness between matter and form, between foundation and essence, and reflects a neoplatonic tendency to make matter a constituent of the form instead of its foundation (for to be a genus means to be part of the form). In the case of mathematics, “figure” could be a genus for “triangle,” but intelligible matter is its foundation, not its genus.
happens to moving things. They are not just "ideas" in our minds. Their "place in the world" is guaranteed by the matter which serves as their foundation, and which could not be merely a part of mind.

Therefore intelligible mathematical matter is the same thing as the matter that underlies the contraries, but it is considered in a different function. The matter of the contraries is taken in rapport with the powers that make it tactile, visible, audible, etc., to us, and also capable of interacting on itself among its several parts. The matter of the mathematicalis is this same underlying matter taken in rapport only with the geometrical limits that can be conceived upon it, with no essential reference whatsoever to the contrary powers. The sameness of the matter for the contraries and the matter for the mathematicalis is vividly shown by the thought experiment Aristotle performs in *Metaphysics* VII #3; in analyzing substance as foundation he thinks away the predicates of foundation in two steps: first he removes the "affections, workings and powers" (1029a13) of bodies, that is, the contrary powers, both active and passive, and all that they can bring about in bodies. Secondly he removes "length and width and depth" (1029a14), which are the "so much," the dimensions of bodies, the mathematical limits of things. The unknowable, undetermined stuff that remains after all this has been removed serves both as the underlying matter for the contraries, and as the foundation for mathematical bodies—the matter that is bounded by length, width and depth, and is extended in itself.

Likewise in *Physics* IV #2 Aristotle speaks of "the matter of the magnitude" (209b4). He goes on to identify this with "the interval of the magnitude, the matter" (209b6-7), calling it that which is bounded by geometrical limits; what is bounded is, he says, "the matter and the undetermined" (209b9). Then he performs a thought experiment very similar to that of *Metaphysics* VII #3, with very much the same result: "For when the limit and the affections of the sphere are removed, nothing remains beyond the matter" (209b9-11). The double removal of "limit" (mathematical predicates) and "affections" (perceptual qualities associated with the material of the sphere) is parallel to the double removal of predicates in the *Metaphysics*. What is left over is the underlying, extended matter which can be considered either in its function of supporting mathematical entities, or in its function of supporting the perceptual qualities; but in itself it is undetermined, extended, space-filling stuff.

# 6. Matter as continuum; its lack of separability and thisness.

Furthermore the extended matter underlying the basic powers and the mathematicalis is a continuum. But many distinctions must be made here, so we treat the
problem of the continuum by taking matter under two viewpoints: matter as cosmic, and matter in a particular piece of material body.

(a) Taking matter from the cosmic point of view we consider the sum of matter contained in the world beneath the celestial spheres. When Aristotle argues that there can be no void, he implies that this mass of sublunary matter has no empty spaces within itself. In this respect it is a continuum. However this cosmic matter does have some breaks; differences occur within the world when certain parts of matter are affected by certain contrary powers, and other parts by other powers. Thus the mass of matter is differentiated into earth, air, fire, water, bones, flesh, mountains, trees, clouds, etc. Sublunary matter is not homogenous. In this respect it is not a continuum. There is a break between a mass of water and a mass of air next to it, and there is a break between a rock and the water that covers it. The two "beings" in such cases have boundaries touching one another, but they do not share the same boundary. There is a cut between them, although there is no empty space between them. ³⁰

Material things in contact with one another in this way are always acting on one another because of the aggressivity of their opposite powers. The hot overcomes cold, for instance, and changes of shape are always going on. There is no hope that these conflicts will ever end in the sublunary world because, as Aristotle says in the last two chapters of De generatione et corruptione, the accession and recession of the sun on its ecliptic journey keeps the powers in constant disruption. The seasonal cycle of the year keeps mixing powers in our world so that a balanced stillness is never reached. Thus any material body, like a segment of earth or water or stone or flesh, is never assured that its boundaries are safe; there is always the possibility that it will come into contact with something that "overcomes" it in its surrounding world.

(b) Let us consider such a segment of material body, such as a piece of earth, an amount of water, a stone, a piece of wood. If such a body is homogenous it is also a continuum, and in a more accurate sense than cosmic matter is. There are no breaks within a piece of earth itself. It is homogenous between its extremities, a true continuum. It is unified in a way cosmic matter is not, because the same powers dominate in the same degree throughout the space it occupies. It does not have the differentiations that cosmic matter has because of the varied distributions of powers.

So material bodies like earth and water have a certain unity, the unity of a continuum. But why does Aristotle say, in Metaphysics VII 16, that earth, air, fire and water are only potentially substances because they lack the unity that substances must have? Aristotle's position is that the mere unity of a continuum is not enough to constitute the unity of a substance. The unity of a continuum is just a concatenation of parts outside of parts, sheer externality. It is a heap, a mass of matter, which is homogeneous and has no breaks within it but is still not

³⁰ See Cherniss, Aristotle's Criticism of Presocratic Philosophy, p 10, n. 43: "Aristotle, in fact, never notices that since potential matter is continuous there is a difficulty in supposing that the four bodies should be discontinuous with one another. His own doctrine unwittingly makes spatial discontinuity a result of qualitative change in the continuous substrate."

assumed into the teleology and unity of "one being." Continuous unity is not substantial unity.

Reflection on the continuous unity of matter will help us understand why Aristotle says in *Metaphysics* VII # 3 (1029a26-28) that matter alone cannot be substance because "separability" and "thisness" belong especially to substance, and matter does not have them: "To any who think this way it follows that matter is substance; but [this is] impossible; for 'separability' and 'thisness' especially seem to belong to substance, hence the form and the [compound] of both seem to be substance more than matter."

Why should separability and thisness be necessary for something to be substance? They are needed because they express the independence and hence the unity of a thing. It a thing can be referred to as a "this," it can then be picked out from its environment as a discrete, unified entity. A being which loses its thisness, its identifiability as a single entity, melts into its surroundings and is no longer an independent being, no longer one substance. It becomes resubmerged into the ebb and flow of sheer material powers and forces. For instance, as long as an animal is alive it exists as a "this," as something discretely marked off from its surroundings. It is in contact with its surroundings because there is no void between the animal and what envelopes it, but the animal's unity and entelechy only dominate to a certain point in space, to a certain boundary, outside of which there is the "other" matter. As long as the animal remains marked off in this way from the mass of matter surrounding it, it remains a substance. But if the animal dies the remnants, the material components that once were parts of the living substance, melt back into the surroundings. The unity, the independence, the entelechy, the nucleus of substance are gone. The parts blend back into material continua; they no longer belong to "this" substance, no longer are "separated" from sheer matter. Thus every substance must be a "this" and "separable" because it must be one being.\(^{51}\)

But isn't matter also marked off as a discrete unity, with boundaries that break it off from its surroundings? Isn't a stone or a pool of water a "this" that can be referred to, something that is "separated" and isolated from its environment? Yes, but not in the same way that real substances are.

For matter is never a "this" in itself. It has no identity or discreteness which belongs intrinsically to itself. For example: in the case of an authentic substance like an animal, the thisness is determined by what the animal is in itself. We cannot arbitrarily say the leg is "this animal," or that any other part is "this animal." The thisness of the animal is determined by the animal itself, and if we are to speak truly about the animal we must submit our language to the unity

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51 Separability is said in many ways in Aristotle; we interpret its use here in the sense in which a composite substance (*to ex amphoin*, *Metaphysics* VII #3, 1029a29) can be separated, i.e., exist as a discrete unit distinguishable in itself (and not merely by convention) from the material continuum that surrounds it. Matter does not even have this fundamental spatial separability. Separability is an expression of independence; Platonic forms are separable because they are said to be independent of matter in existence; some forms are separable in speech for Aristotle because they can be spoken of with no mention of matter. Composite substances are separable from their environment because their environment is not a part of them; as beings they are independent of it.
that the animal-substance manifests to us. The being, the substance of things rules our speech. The case is entirely different with simple matter in any form. Consider a mass of water. Water has no determined, discrete thinness in itself. Any selection of a portion of water, and any reference to it as “this water,” depends entirely on the arbitrary decision and convenience of the man who uses the word “this” while referring to it. In itself water need not be a paifful, ocean, river, or drop. All these can be referred to by a speaker as “this water,” but in each case the decision to call this much a unity, to refer to it as “one,” is arbitrary and man-made. We could even take a certain mass of water, like a paifful, as “this water,” and then take a part of this, a cupful, and legitimately call the new amount “this water.” We do not have to subject our speech to being or to the substantiability of things, because these things are not substances in the full sense. There is no “truth of being” for us to submit to. But we are not given such freedom when we deal with bona fide substances like animals; then the thinness is given to us by the thing itself, precisely because it is a substance; it is ontologically one being.

This statement is true only because Aristotle is not an atomist. If he felt that there were atomic particles of water, then these pieces would be the true water and we would speak accurately only when we referred to them as “this water.” Only the atoms would have thinness in themselves. Then when we would refer to a paifful or cupful as “this water,” we would be speaking only according to convention or convenience and not according to the nature of being, and we would realize that our speech was illusory in this way. But since Aristotle is not an atomist, there is no privileged unit of water or any other element which has thinness in itself; hence no particular use of “this” is more accurate than any other. W. J. Sellar, in “Substance and Form in Aristotle,” Journal of Philosophy, vol. 54 (1957), p. 697, observes that when we talk about matter we don’t say “this wood” or “this statue,” but must say “a piece of leather” or “a chunk of marble.” That is, we must isolate a part of the matter for our reference. No independent being is given to us. This essay is reprinted in Philosophical Perspectives (Springfield, 1967), where the themes in it are elaborated in the larger essay, “Aristotle’s Metaphysics: An Interpretation.”

On the meaning of thinness (tode ti) see J. Owens, The Doctrine of Being in the Aristotelian Metaphysics (Toronto, 1963), pp. 386-395. Owens observes that there is no problem of individuation in Aristotle because the Aristotelian form is neither singular nor universal in itself. Aristotle does not have the Platonic problem of reconstructing individuals out of universal principles of being. The expression tode ti does not refer only to what can be pointed to in immediate physical presence; Aristotle also uses it to mean immanent realities like Platonic separated forms, which cannot be pointed to or directly encountered (Metaphysics VII #14, 1039a30-32; XI #2, 1060b1-3) As Tugendhat observes, tode ti primarily expresses the “independence” or “subsistence” of a being (Selbstständigkeit; Ti kata tinos, p. 25, n. 22; p. 31; he also criticizes Owens and others for taking tode ti as individuality instead of independence). It is a metaphysical term, cohesive with eusia (Metaphysics VII #4, 1039a5-6). Tugendhat adds that we should avoid the ordinary interpretation of tode ti, as meaning specifically the direct, sensible “this-thing” we experience. However in doing this he eliminates a dimension of ostensibility which should be retained in the meaning of this term. When we deal with material substances, a sign of their independence is precisely their ostensibility, their capacity and their demand to be meant as one being. If they were not independent, distinct, unified beings, we would not be forced by the truth of things to refer to them as “this” reality. The metaphysical sense of tode ti is primary, but we should not lose the notion of ostensibility that comes from the ordinary use of the demonstrative pronoun tode.

Finally, whether or not the nature or essence of the thing meant is explicit in tode ti, it is certainly implicitly meant. For we never could indicate something as “this,” even in a purely formal way, unless we knew “what” we were referring to. This always means this house, this dog, this man, etc. Without such determination the term could not refer at all; nor, of course, could any being subsist unless it were of a certain nature. We cannot separate “this” from being (Metaphysics VII #1, 1038a11-12, and W. Bröcker, Aristoteles, p 118: “Ohne ein bestimmtes Was ist kein Dies als solches möglich”).
What we have said of matter in a given state, such as water or earth, is all the more true of undifferentiated matter. The underlying matter, stuff pure and simple, also has no identifiability as "this." It does not present the unity or teleology of one being to us. Therefore it cannot be called a substance.

These reflections explain why Aristotle says, in *Metaphysics* VII # 16, that earth, air, fire and water are only potentially substances because they do not have the required unity. In that passage he adds that these bodies become substances actually only when they are "concocted and some one thing comes out of them." This means that only when the simple bodies are assumed into higher synthesis, such as that of a living being, do they become actual components of substance.

# 7. Reflections on matter

For Aristotle the underlying, foundational matter is extended and in its actual existence it is modified everywhere by various combinations of the powers hot-cold, solid-fluid. This level of material being is the realm of sheer mechanical necessity. The powers react on one another with blind mechanical force, with no teleology or meaning. This is the domain of the pre-substantial, of the mass of matter which is just potentially capable of being assumed into the unity, teleology and meaning of substance. True substantial forms are added to this material foundation. The forms control the necessity of mechanical forces and organize them to serve the preservation of substance.

In all material substances, for Aristotle, there is a dialectic between form and matter, between essence and foundation. Without matter embodied forms could not exist because their being consists in organizing a foundation into the actuality and unity it only anticipates potentially by itself. But without form, matter would be a disorganized heap of forces without unity or meaning in itself. Matter and form, or foundation and essence, each have a special role in material being which is irreducible to that of the other. Material being exists only in this bifurcated way. Furthermore, the cooperative dialectic between matter and form (form gives matter meaning and matter allows form to exist) also entails a tension that is partially hostile, for the matter that supports a form also constitutes a constant threat to its being. A man's existence, for example, is in constant peril not because of his form of humanity but because of the matter that supports this form, since the matter is always capable of betraying him and becoming something else. It is not the man or the form of humanity that becomes something else, but the matter in him that does so. Just as it was once the source of his coming to be, so it can always turn into the source of something else, with the corresponding dissolution of this man's being. Matter remains other than form and so independent of it that it can always disrupt the very existence of the form.

In medieval interpretations of Aristotle this dialectic between matter and form is lost. Form is given such a priority that it overcomes the special status of matter. Many medieval philosophers accept a version of the *forma corporeitas*, a formal factor that is considered necessary to give the principle of primary matter spatiality or three-dimensionality. Then other forms are added to constitute the elements and other substances. In the philosophy of Thomas Aquinas, who was the first to
question the tradition of a plurality of forms, there is no distinct *forma corporeiatis*, but extension or dimensionality is an accident that follows immediately upon the single substantial form that actuates nonextended primary matter. Material substance is thus reconstructed as the combination of two metaphysical principles, matter and form, neither of which is extended in itself. In such interpretations of material being the place of matter or foundation is minimized to the benefit of form or essence, which becomes responsible even for extension in sensible things. This doctrine reflects a neoplatonic tendency to dematerialize being, to stress the entitative function of form and to deemphasize the irreducibility of matter in being.

In contrast Aristotle's philosophy leaves a distinct role to matter, which is conceived in a much more "material" or "stuffy" way than in medieval thought. Even the ultimate underlying matter is stuffy in that it fills space. It is not dissolved into the status of a metaphysical principle. It is stuff or matter, separated in thought from the powers and dimensions that modify it in actual existence, but still understood as real and extended. This basic matter establishes a spatial spread in material being. It constitutes the stage upon which the natural powers exercise their mechanical force on one another, and within which substances are actuated. In this entitative function matter is the ultimate foundation for being, because it receives other attributes but is itself never received into anything more basic and other than itself. When considered in rapport with man and his inquiry, the underlying matter provides the "thereness" of the world, the spatial spread of material things that becomes the foundation for man's questioning into being.

But if the underlying matter is extended, do we not have an attribute, extension,

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34 This is so because any accidental actualities a material substance has can belong to it only after it is given its first actuality by substantial form; cf Summa theologiae I, q. 76, a. 6; see J. Hobik, "La doctrine de saint Thomas sur l'individuation des substances corporelles," Revue philosophique de Louvain vol. 51 (1955), pp. 5-41, esp. 28-29. J. Deninger, "Wahrheit Sein in der Philosophie des Aristoteles" (Meisenheim, 1961), p. 131, says matter must have a function as foundation. Owens briefly remarks in an appendix to "Matter and Predication in Aristotle," in The Concept of Matter, ed. McMullin, p. 114, that matter and form are needed to explain extension, even though Aristotle himself reached matter and form through substantial change. But this seems to be a scholastic interpretation, for even in principle it is not necessary to explain extension in Aristotle's philosophy.

35 Although neoplatonic and medieval interpretations of matter tended to reduce it to form, other more recent commentators also indicate reductionist inclinations of other sorts; Baeumner considers underlying matter to be "hypostatization of possibility" (Problem der Materie, p. 253; see also pp. 232-234, 240-241, 251). N. Luyten, "Matter as Potency," in The Concept of Matter, ed. McMullin, p. 131, moves in the same direction when he says that primary matter is "pure potency" and "an intrinsic, constitutive inadequacy (potentiality) in actual, existing being." A. Rivaud, Le problème du devenir et la notion de matière dans la philosophie grecque (Paris, 1906), is aware of the dangers of forcing a system on Aristotle (p. 369) but tends to understand matter primarily as change or at least the condition for change (pp. 383-384, 389, 393, 423-433; on p. 452 he says: "Matière première, elle est le devenir instable où se fixent tour à tour les qualités et les formes . . ."). Certainly Aristotle relates matter to potentiality and change, but does he identify it with one or the other? Reductionist tendencies such as we have examined seem to remove some of the factors that belong to matter; the simple "stuffiness" and "thereness" of matter are not accounted for by saying that matter is potentiality or change. Another interesting question is, which is prior? is there potentiality and change because there is matter, or is there matter because there is potentiality and change? It is hard to assign clear priorities because the notions are so primitive, but it would seem that Aristotle takes the first alternative, while neoplatonists would take the second.
that is predicated essentially of it? Does matter then acquire an essence, since it has something said of it in itself? This is not the case for Aristotle; he does not consider extension as an attribute of matter. Extended matter is not matter plus extension; extension is not conceived as a predicate which is received by something prior to and more fundamental than itself. A sort of unextended matter for Aristotle matter is intrinsically spatial, but when we have said this much about it, we have not said anything about what it is. Spatiality or extension does not reveal the nature of underlying matter. It tells us nothing about it. Only when other predicates are attributed to it do we begin to speak with information about matter, but of course none of these predicates ever say what matter is in itself, because all of them are only accidentally predicated, as sheer matter of fact. The spatiality or extension of matter is not an attribute, but a condition for all attributes. No material predicates could be applied to matter if it were not extended, but extension itself is not a predicate in Aristotle’s understanding of matter.

Even when matter is qualified by powers and exists as a perceptible body, nothing can be said essentially of it because it is still not fully a substance. The distinction between essential and accidental disappears in the case of simple matter; nothing belongs to it in itself, hence everything belongs to it by accident or by coincidence.

This lack of essentiality, substance, or selfhood in matter (since there is nothing that it is itself) is obvious if we consider causal relationships among purely material things. Suppose fire is brought to powder and an explosion ensues. What is the cause here? Does the fire cause the powder to explode, or does the powder cause the fire to expand and explode? Either is acceptable. We can consider it any way we wish, according to our convenience (which will usually prompt us to say the fire causes the explosion). In itself, either item can be taken as the cause, and there is no truth of being for us to submit to. We can even include the surrounding air in this example, which at first sight appears to be merely a necessary standby condition for the explosion (without oxygen the fire could not cause the powder to explode) But why not consider the air the cause, since it brings about rapid oxidation, and take the fire or the proper temperature as merely the condition? If we had the powder in an oxygen-free place at a very high temperature, then the introduction of oxygen or air would be considered the “cause” of the explosion. And this would be justifiable, because in sheer material events causes and conditions are not determined by the things themselves, but merely by our convenience in naming the event and its ingredients. In places where man is not present to use the materials and events, such as in the galaxies or exploding stars, what is the cause and what are conditions for the physical events going on? They are all perfectly interchangeable in themselves. This is not the case in real substances however; if a man generates man, if an animal eats a plant, if an animal is killed by a bullet, then there is no question which is the cause, what is the effect, and what are mere standby conditions. This is so because we are dealing here with full substances, with beings that give us an absolute

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36 One of the ways Aristotle says we can speak *kath auton* is by expressing necessary causes; cf. *Posterior Analytics* I #4, 73b10-16
point of reference in our speech. We do not speak merely according to our convenience, but according to what is in itself; the substantiality of these beings grounds a necessity in the speech in which we express what is going on. These characteristics in speech about causes and events is analogous to our use of the term “this,” which can be applied by convenience to matter, but must be used according to being when indicating true substances.

This theme can be continued by examining the attributes of parts of matter themselves, apart from causal action. Water is rigid at minus thirty degrees, flows at sixty degrees above zero, and is vapor at three hundred degrees. Which attribute—rigid, flowing, vaporous—belongs “essentially” to water? None of them belongs to water in itself; once again it depends on our convenience. Water can be rigid, flowing, or vaporous and still be water. If we try to “define” water (i.e., say what it is itself) as that which flows at sixty degrees, then we are describing it in terms of the states of bodies around it, and not saying what it is in itself. In fact, this is the only way we can describe various types of matter, but it involves a vicious circle, because we must go on “defining” the other bodies in terms of still others, without ever getting to what any of them is in itself. So once again our convenience determines what we will consider “essential” to water; to consider its state at three thousand degrees as normal would be useless for us, but to consider it normal at about the temperature span in which we live is useful, so we take that as “essential.” But in itself, no given state has any priority over any other. Once again, the case is entirely different with true substances, for they are what they are in any frame of reference or in any conditions. Man and animal can be defined in the same way entirely apart from the conditions of the surrounding world, because the substantiality of their being is the basis of necessity in our speech about them. But matter is not a substance and does not allow us to speak about it as it is in itself.

Unlike Plato’s receptacle, however, Aristotelian matter is not a stranger to substances because it does become a part of their being. It must be properly

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57 Then the problem arises about the material parts, e.g., the flesh and bone that enter into the composition of man. They are not parts of his form or definition, being related to it only as foundation, so a formal definition of man can speak of him entirely apart from his environment. But if the definition is extended to encompass his physical parts as substratum, a statement of their nature (what flesh and bone are) would force us to speak about the state of the surrounding matter again. This is a consequence of Aristotle’s attempt to immanentize Platonic forms.

58 Our reading of Aristotle would entail some similarities between his underlying matter and Plato’s χώρα in the Timaeus, but to explore this fully would demand more analysis of Plato than is possible here. Cf. J. Sinnige, Matter and Infinity in the Presocratic Schools and Plato (Assen, 1968), 18. Sinnige says the χώρα of the Timaeus is not like Aristotle’s υλή and Aristotle misinterprets when he says it is, but the apeiron in the Philebus is a good antecedent to υλή; Sinnige’s reasons are that χώρα is a spatial concept while the apeiron is a metaphysical principle, and also that χώρα operates in the context of the theory of Ideas while the apeiron does not (p. 212). Limiting my comments to his first reason, I find Sinnige’s radical distinction between a spatial concept and a metaphysical principle much too strong. It reflects modern academic distinctions in philosophy more than the Greek total view. If spatiality is irreducible, it is a “metaphysical principle.” Other opinions of Sinnige allow favorable comparison between χώρα and υλή. He says Plato is the first Greek thinker to posit a homogeneous substratum for all physical objects in the cosmos, and does so in order to account for the mutual transformations of the elements and their common unity (pp. 182-183, 194, 203), functions which Aristotle’s underlying matter
disposed by the elemental powers, but once this is done it is potentially substance and becomes actuated as substance when it serves as a foundation for form. But this foundational role can never be accomplished by a form. It can only be done by matter. This is why Aristotle cannot credit the simple bodies with substantial forms of their own. They are constituted by opposing powers which are not forms, strictly speaking. Matter, even with its proper qualitative dispositions, still is not actualized as substance and hence is able to serve as the foundation for a true substance.

The incorporation of matter into substance can be explored in two ways. First, specific substances can be examined to see how certain forms require certain material conditions in order to exist, for instance, how some animals may require a specific type of bone structure by hypothetical necessity. This method examines how the mechanical, necessary, compulsive forces operative in the material foundation are coordinated and assumed into a harmony, working towards the preservation and development of the form they support. Aristotle carries on such research extensively in his “empirical” works, especially in his biological studies. The second way of examining the relationship between matter and form is to focus on the relationship itself; that is, not to use it heuristically in empirical pursuits but to examine the formal structure of the rapport itself. This is done primarily in Aristotle’s *Metaphysics*. Aristotle examines matter and form from the viewpoint of foundation and essence, and shows how this problem relates to the nature of substance and to human inquiry into being. The analysis is carried out especially in Books VII and VIII; Aristotle shows how foundation is a necessary condition for substance and essence, how it functions in the coming to be of substance, how it is present as a part of substance and the definition of substance, and how it serves as a basis for asking questions about being. In Book VIII he reduces the problem of foundation and essence, or matter and form, to the problem of actuality and potency. All these dimensions of the problem must be treated before we can fully answer the question with which this essay began: are the simple bodies substances in Aristotle’s philosophy?  

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also performs. However Plato accounts for the transmutability and the attributes of elements through mathematical structures (pp. 194-196) while Aristotle accounts for them by the *dunameis*. Plato and Aristotle would be similar in that both say simple bodies are not substantial and lack “thisness”; Plato says “the elements are not a ‘this’ but a ‘such,’ not substances but conditions of an underlying substrate” (p. 204). (However we should note that although Plato’s *chôra* itself can be called “this”—*Timaeus* 49E-50A—Aristotle’s ultimate matter lacks “thisness”)

39 I wish to express my thanks to the Center for Hellenic Studies, Washington, D.C., for use of its library and for the helpfulness of its staff.