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### Dust to Dust: Aristotle's Account of Generation and Desctruction

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For SAGP Meeting  
 American Philological Association  
 New York, Wed., December 30, 1:30-4:00 pm

DUST TO DUST:  
 Aristotle's Account of Generation and Destruction

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God said to Adam:

In the sweat of your face  
 you shall eat bread  
 till you return to the ground  
 for out of it you were taken;  
 you are dust,  
 and to dust you shall return.  
 (Genesis 3:19)

I believe Aristotle could endorse God's statement to Adam as reflecting his own theory of generation and destruction. Complex bodies, such as living organisms, are generated out of earth, and to earth they will ultimately return. In this paper I will argue that Aristotle defends a cyclical model of generation and destruction which starts and ends with some simple stuff. I will call the model the "construction model." The construction model underlies many of Aristotle's claims about substantial generation and destruction, but he presents the main theory in *Metaphysics* H.5, a text that is curiously neglected in recent discussions of his theory of matter and generation.

I

We should begin by noticing that the structure of generation and destruction is importantly different from that of nonsubstantial changes. Typical changes--changes of quality, quantity, and place--display a standard pattern. Aristotle describes such changes as involving a pair of opposed terms housed in one of the nonsubstance categories of quality, quantity, or place, and a subject housed in the category of substance. In the course of a change, one opposed term replaces the other and the subject remains the same as the subject it is. For example, a man remains a man when he travels from Athens to Thebes or alters from pale to dark or from healthy to sick. Such changes can be described as linear because the opposed terms occupy the same ontological level within a particular category. The opposed terms--the termini of the change--can be described as contraries that fall under the same higher genus, as pale and dark under color; and we can usually specify a series of intermediate entities, which occupy the same ontological level, between them, for example, a series of shades between pale and dark or a series of locations between Athens and Thebes. In a change the subject passes from one terminus to the other by traversing the intervening states or locations. Such changes are typically reversible. A man can travel back and forth between Athens and Thebes; he can be now healthy, later sick, and then recover again. The model Aristotle uses to describe nonsubstantial changes is traditionally called the "replacement model."<sup>1</sup>

According to *Metaphysics* H.5, substantial generations and destructions are not linear and they are not reversible. As I understand Aristotle's theory,

the opposed terms, which serve as termini of the change, stand at different ontological levels: one terminus is more complex than the other. For example, a human being is generated out of female blood, called the *καταμήνια*, and is destroyed into a corpse. The human being is more complex than either the material from which he is generated or the material into which he perishes. Furthermore, a human being, once generated, cannot be reduced to *καταμήνια*, nor can a human being be recovered from a corpse. Generation and destruction observe a definite direction that is irreversible. Simpler matter is worked up into an entity of greater complexity, and the complex entity degenerates into simpler matter. The question on which I shall focus is this: does Aristotle envisage a continuant through the transition of levels and, if so, what sort of continuant?

I begin with a text, *Physics* V.1, in which Aristotle differentiates changes from generation and destruction. I then discuss our main text, *Metaphysics* H.5, and suggest how we should understand the role of matter in Aristotle's theory of substantial generation.

## II

In *Physics* V.1 Aristotle considers the structural difference between changes (*κινήσεις*) and generation and destruction. The chapter lists four possible modes of transition. One transition is from positive to positive,<sup>2</sup> a second from positive to negative, a third from negative to positive, and a fourth from negative to negative. He immediately excludes the fourth option on the grounds that a change involving two negative termini lacks an appropriate opposition between contraries or contradictories.<sup>3</sup> So there are three acceptable modes of change. Aristotle identifies transitions from negative to positive and from positive to negative as transformations between contradictories, and calls the one a destruction, the other a generation. A generation can be either simple or qualified: a generation is simple if the terminus *ad quem* is a substance and the terminus *a quo* its contradictory, qualified if the terminus *ad quem* is a positive nonsubstantial term, such as white, and the terminus *a quo* its contradictory (not-white). Likewise a destruction is simple or qualified depending upon whether the terminus *a quo* is a substance or nonsubstance. Transitions from positive to positive are transitions between contraries or intermediates: both termini of the transition have a positive designation, as white and black.

Aristotle restricts *κίνησις* proper to transitions from positive to positive<sup>4</sup> but points out that transitions in quality, quantity, and place all count as *κινήσεις*.<sup>5</sup> Such processes involve contrary termini. A nonsubstantial change can also count as a qualified generation or destruction, if one of the termini is specified as the contradictory of the other. But even if the termini are so described, they can regularly be redescribed as contraries. For example, a transition that takes place between not-white and white can be redescribed as a transition between black (or grey) and white. And so a qualified generation or destruction can regularly be redescribed as a proper change. Such changes are linear, between opposed terms at the same ontological level. And this fact is not altered by the way we describe the termini.

But in the case of unqualified generation and destruction, even if we redescribe the negative terminus as positive, the maneuver does not secure the termini of such processes as contraries. For Aristotle insists that a substance has no contrary.<sup>6</sup> The termini of substantial generation and destruction occupy different ontological levels. And for that reason such changes are not linear and not reversible.

### III

With this observation let us turn to *Metaphysics* H.5. Here Aristotle raises the question about how matter is related to two opposed terms. He offers two alternatives, and the first seems to fit the replacement model, the second not:

There is a difficulty concerning how the matter of each thing stands to the opposites. For example, (1) if the body is potentially healthy, and sickness is the opposite of health, is [the body] potentially both? And is water potentially wine and vinegar? Or (2) is it the matter of one [opposite] in virtue of a positive state (*καθ' ἕξιιν*) and in virtue of the form (*κατὰ τὸ εἶδος*), and the matter of the other in virtue of a privation (*κατὰ στέρησιν*) and destruction contrary to nature (*φθορὰν τὴν παρὰ φύσιν*)? (1044<sup>b</sup>29-34)

If matter is conceived in the first way (1044<sup>b</sup>30-32), the matter has a potentiality for each of a pair of opposed terms. The body is potentially healthy and sick; water is potentially wine and vinegar. Each member of the pair of opposites is treated as a positive goal of the subject's potentiality. And a transition from one state to the other can readily be described in the terminology of *Physics* V.1 as a change, a transition from positive to positive. The pair of opposites have an equal standing as goals of a potentiality possessed by the matter. And so a transition between the two states is linear because the opposed terms have an equal status.

The second conception (1044<sup>b</sup>32-34) regards the opposed terms as having a different status. Aristotle suggests that water, for example, is the matter for one of the pair of opposed terms in virtue of a positive character (*καθ' ἕξιιν*) and in virtue of the form (*κατὰ τὸ εἶδος*), and the matter for the other in virtue of a privation (*κατὰ στέρησιν*) and destruction contrary to nature (*φθορὰν τὴν παρὰ φύσιν*). So one term of the contrasted pair is positive and the other is a privation of it. Now a transition between such a contrasted pair might be linear, or it might not. If the positive term and the item specified as its privation are contraries within a particular category, the change is linear even though one term is specified as positive and the other as its privation. *Physics* V.1 calls such transitions qualified generations and destructions. But I remarked that such transitions can regularly be re-described as proper changes, as transitions from positive to positive. Unqualified generations and destructions, on the other hand, are transitions between contradictories, and Aristotle insists in *Physics* V.1 that such transitions are not proper changes from positive to positive. One term is positive and the other negative. According to the second conception in *Metaphysics* H.5, only the positive term serves as the goal of a subject's potentiality. If the subject is in the positive state, it is potentially in that state *καθ' ἕξιιν*. If it fails to be in that state, it is still potentially in that state but *κατὰ στέρησιν*. For example, if water is actually wine, it is potentially wine *καθ' ἕξιιν*. If the water actually fails to be wine (and is actually vinegar), the water is still potentially wine but *κατὰ στέρησιν*.

In the rest of *Metaphysics* H.5 Aristotle offers an account of destruction and generation based on the second conception of matter's relation to the opposed states. He apparently envisages a whole cycle of generation and destruction that begins and ends with some simple stuff:

There is a certain difficulty also why the wine is not the matter of vinegar nor potentially vinegar (even though vinegar comes to be from it) and why an animal is not potentially a corpse. In fact they are not, but the destructions are accidental, but the matter itself of

the animal is in virtue of destruction (κατὰ φθοράν) a potentiality and matter of the corpse, and the water of vinegar. For they [the corpse, vinegar] come to be from these [the animal, wine] as night from day. And as many things as change into each other in this way [i.e., as night from day] must return to the matter, e.g., if an animal comes to be from a corpse, there must first be a return to the matter, and only then an animal comes to be; and vinegar must first return into water and only then wine comes to be. (1044<sup>b</sup>34-1045<sup>a</sup>6)

Although vinegar comes to be from wine, wine is not the matter of vinegar, and although a corpse comes to be from an animal, the animal is not the matter of the corpse. The water, which was the matter of wine, comes to be the matter of vinegar; and similarly, the matter of a human being comes to be the matter of a corpse. Moreover, vinegar comes to be from wine, but wine cannot come to be directly from vinegar. If the change were linear--that is, if wine and vinegar stood at the same ontological level--wine should be available from vinegar just as vinegar is available from wine. Linear changes are reversible. I can be now in New York, later in Pittsburgh, and then in New York again. But the changes Aristotle here envisages are not reversible. The vinegar must perish into simple water before wine can be reproduced. The positive term and the various terms that are its privations differ in level. Wine is more complex than vinegar or water. A living organism is more complex than a corpse or the simple matter into which the corpse disintegrates. And the changes are irreversible because there is an order among the privative terms, some leading to the positive term and some away from it. Wine is available from water but not from vinegar.

In this passage Aristotle conceives of destruction as the degeneration of a complex body into some simpler stuff. Similarly, generation is the construction of a body of greater complexity out of some simpler ingredient. And there is, as Aristotle describes it, a whole cycle of construction and degeneration that begins and ends with some simple stuff. Wine emerges from water, then degenerates into vinegar; the vinegar degenerates into water, and finally the cycle begins anew. Since the opposed terms differ in level of complexity, the model is not one of simple linear replacement. This is the construction model.

We should distinguish two strands of this analysis. According to the construction model, wine is "from" (ἐκ) water in two ways. First, wine comes to be from water in the way that vinegar comes to be from wine. Water is an earlier stage in the production of wine. And the water is lost when the wine comes to be, just as the wine is lost later when the vinegar comes to be. Second, wine is from water because if we analyzed wine, using the sorts of procedures Aristotle describes in his chemical treatise, *Meteorology* IV, we would find water as a major component.<sup>7</sup> Water conceived as an ingredient of wine is somehow preserved through the cycle and finally exists simply.

#### IV

A passage in *Generation of Animals* I.18 helps to clarify the construction model. In this passage Aristotle describes four ways in which one entity comes to be "from" (ἐκ) another. The first two situations illustrate the two ways in which wine is from water. And Aristotle contrasts these two situations with a third, which involves contraries at the same ontological level. The third case belongs to the replacement model, the first two to the construction model. (I ignore the fourth mode which concerns efficient causes.) He describes the first three cases as follows:

But there are many ways in which one thing comes to be from another (ἄλλο ἐξ ἄλλου)--for [something comes to be from another] in one way (1) as we say night comes to be from day and a man from a boy, because the one comes after the other; in another way (2) as a statue comes to be from bronze and a bed from wood; and for as many other things as we say are generated things that come to be from matter, the whole is from something that remains within it and altered in form (ἔκ τινος ἐνυπάρχοντος καὶ σχηματισθέντος τὸ ὅλον ἐστίν). And in another way (3) as the unmusical (man) is from the musical and as the sick (man) is from the healthy and generally the contrary from the contrary. (724<sup>a</sup>20-28)

The first way in which one thing comes to be from another, Aristotle says, is that in which night comes from day or a man from a boy. The one comes *after* the other. It is in this way that vinegar comes from wine, a corpse from a human being, or a human being from *καταμήνεια*. Such processes are not reversible because the stages of production and degeneration are ordered.<sup>8</sup> So such processes differ from cases of linear replacement as described in (3). (1) captures Aristotle's construction model of *Metaphysics* H.5. Wine perishes into vinegar, vinegar into simple water, and only then can wine be produced again. When we consider the ordered production of entities, the simple water, which exists on its own at the end and beginning of a cycle, is lost when the wine comes to be. The water, which exists on its own at an earlier stage, is used up in the generation of wine.

But in another way the water is not lost. For wine is from water in the second sense as well, in the way that a statue is from bronze or a bed from wood. If we analyzed wine we would find the behavior of wine to be largely explained by its watery nature. Water is an ingredient of wine that "remains within" (ἐνυπάρχον) the wine but "altered in form" (σχηματισθέν). The water is an ingredient of wine yet somehow altered. Aristotle's claim that the matter is altered in form suggests the matter *itself* undergoes a change in the course of construction.

The idea that in contexts of construction the matter both remains within the product yet altered in form may seem paradoxical. One might argue that the matter's alteration in form is merely an accidental change in the matter. One might urge that the bronze, which was previously unshaped, remains present in the statue but now shaped. If alteration in form merely affects the matter's accidents, then the matter remains intact in the product as the matter it was. But if this is Aristotle's point, why does he not use "ἐνυπάρχον" alone of the matter? For if the matter were merely accidentally changed, the critical difference in form should concern, not the matter present in the composite, but the resulting composite. The resulting composite would differ in form from the preexisting composite, the unshaped bronze. But this is not what Aristotle says. He combines "ἐνυπάρχον" with "σχηματισθέν" and uses both words in a parallel genitive construction with ἐκ τινος. So both expressions plainly apply to the matter: the matter from which the composite is generated remains present in the composite yet altered in form. Aristotle evidently envisages a change in the matter itself. I suggest the matter undergoes an essential change and because the matter is essentially changed Aristotle claims the matter is altered in form. The thesis is paradoxical: Somehow the matter from which the product emerges remains present in the product as the matter it was, but somehow the matter is altered in form. The task is to reconcile the two parts of this thesis into a coherent theory of generation.

I suggest Aristotle's solution to the problem is this: The matter out of which a composite is generated remains present in the product *potentially* but *actually* transformed. A number of texts can be cited for this thesis. In his discussion of chemical combination in *Generation and Corruption* I.10, for example, Aristotle claims that the ingredients of a *μίξις*, which originally existed separately, and which can be extracted from the combination again, are preserved in the combination *potentially* but not *actually* (327<sup>b</sup>20-31).<sup>9</sup> A similar claim occurs in *Physics* I.9:

In a sense it [the matter] comes to be and is destroyed, but in a sense not. For as *that in which* (τὸ ἐν ᾧ), in itself (καθ' αὐτό) it is destroyed (for the thing destroyed, the privation, is in this); but as *potential* (κατὰ δύναμιν), in itself (καθ' αὐτό) it is not [destroyed] but must be undestroyed and ungenerated.

This passage claims that the matter is both in itself (καθ' αὐτό) destroyed, and in itself (καθ' αὐτό) preserved. As that in which the privation is located the matter is in itself destroyed; but as potential it is in itself preserved. Now Aristotle is not claiming that the matter is merely accidentally destroyed because the privation in it is destroyed. The matter is *in itself* destroyed when the privation in it is destroyed. The water, for example, which is worked up into wine, is destroyed as what it is in itself, namely water. The water is *actually* transformed in the production of wine. Still, in another way, the water is in itself preserved. For water's potentiality survives.

How are we to understand the proposal that matter in generation is *actually* transformed but its potentiality preserved? Does Aristotle just mean that the matter can be reproduced from the generated product? I think he means more than this. Both in the passage we looked at from *Generation of Animals* and in the discussion following the passage I quoted from *Physics* I.9 Aristotle claims that the matter from which the product is generated is *present in* (ἐνυπάρχοντος) the product.<sup>10</sup> And this suggests that the matter somehow persists in the product.

I suggest Aristotle's theory can be understood in the following way. A composite product is generated out of some definite matter. For example, wine is generated from water. The water does not survive as the definite subject it is but is transformed into the wine. Still, the properties of the water survive to characterize the resulting product. Water is cold wet stuff that is heavy relative to air and light relative to earth. The behavior of the generated wine is partly explained by the surviving coldness and wetness, and by wine's heaviness relative to some products (such as oil and wood, which contain air<sup>11</sup>) and lightness relative to other products (such as clay, which are preeminently earthen<sup>12</sup>). But the properties preserved from the preexisting material are not the ones that identify the emergent product as the entity it is. The identity of wine is determined by certain new properties acquired in the generation. And the residual properties of water, while they characterize the wine, are not part of wine's essential nature. I suggest that the properties that determined the essential nature of the simpler matter out of which a product is generated survive as *accidents* of the generated product.

Consider a box made out of wood. The essential properties of the preexisting wood--its combustibility, hardness, fissibility, and so on--are preserved and characterize the box. But the proximate matter of a box is not just wood, but wood that has been arranged, joined, and finished in such a way that certain functional capacities--those capacities that make the object a

box--can be realized. The nature of a box is determined by a set of functional capacities, and the lower dispositional properties preserved from the construction materials merely subserve those higher functions. In *Metaphysics* 0.7 Aristotle endorses the linguistic practice, typical in Greek, of calling a box "wooden" rather than "wood." And he calls attention to the fact that in ordinary practice Greek speakers prefer adjectives to nouns both in specifying an object's nonsubstantial accidents and the matter out of which an artifact is made. Just as Greek speakers call a man "musical," not "musicality," so they call a box "wooden," not "wood." Aristotle's sanction of ordinary practice on this linguistic point has important implications. For presumably, if the preexisting material out of which a product is made were preserved intact in the product, it would be quite correct to use a noun to specify the product with reference to that material.<sup>13</sup> But the matter is not preserved intact. Instead, the preexisting matter is actually transformed into the body of the artifact. And so people correctly use an adjective to specify a product with reference to its constituent matter to indicate that the product retains the properties that identified the earlier material, but they avoid the noun because the product is not itself identified as what it is by those residual properties. The identity of the product is determined by a new set of properties acquired in the transformation.

But *Metaphysics* 0.7 apparently approves two analogies, one linguistic, the other metaphysical. According to the linguistic analogy, matter resembles nonsubstantial accidents because both matter and accidents depend on a definite subject to modify. We speak of a man as "musical," and we speak of a box as "wooden." But Aristotle mentions another analogy as well. He points out that when a nonsubstantial property is predicated and the subject is specified adjectivally with reference to it, the final thing is substance. But when a certain form or *this* (τόδε τι) is predicated, the final thing is matter and substance in the material sense (1049<sup>a</sup>34-36). So the linguistic analogy suggests a parallel between matter and nonsubstantial accidents as predicates that depend on a subject to modify; while the metaphysical analogy suggests a parallel between matter and substance as subjects, and nonsubstantial accidents and form as predicates. So there is a curious crisscross between the two analogies. According to the linguistic analogy matter is a predicate that depends on something else as a subject; according to the metaphysical analogy, matter is a subject and form is the entity predicated.<sup>14</sup>

Now I believe we can resolve the conflict between the two analogies by supposing a different relation between substance (as subject) and accidents (as predicates), and matter (as a subject) and form (as predicate). I have argued that matter does not survive intact in the generation of a complex product. The properties that identified the definite preexisting matter survive to characterize the product. The matter persists as potential because the array of surviving properties that modify the complex product can, once the composite is destroyed, identify a definite subject again. But while they modify the complex product they identify what we may call an *indefinite* subject or material *genus*. The relation between matter and form is not the standard relation between subject and property. The relation is that of a material genus and the form that differentiates that genus.<sup>15</sup> If this is correct, the relation between matter and form is radically different from that between substance and accidents. A substance as subject partakes of its accidents. But matter as subject is a genus differentiated by form.<sup>16</sup> And the product of the differentiation--the composite--is specified adjectivally with reference to that genus.

I suggest we understand the construction model as follows. Some simple



matter, such as water or earth, gets worked up or combined to yield a product of greater complexity. The simple matter, which existed on its own as a definite subject prior to the production, is transformed into something else in the course of that production. But the simple matter is preserved potentially as a material genus. Or to put the point another way, the properties that identified the preexisting material are preserved to modify (but not to identify) the complex product. So, for example, earth and water are combined and worked up into bronze. Bronze is identified as what it is by dispositional properties not possessed by the earth and water, but the behavior of bronze is in part explained by its constitution out of earth and water. And so bronze is properly called "watery" and "earthen" with reference to the matter out of which it was made. The generated bronze is a definite subject. But it can be worked up further into a product of greater complexity, such as a statue. The statue is identified as what it is by a new set of properties not possessed by the bronze, but the properties of bronze persist to modify the statue, and some of the statue's behavior is explained by those properties. Thus properties that were sufficient to identify the simpler matter as some definite subject are preserved at the next level up; but at the higher level these properties identify an indefinite subject or material genus and merely modify but do not identify the higher level complex as the thing that it is. When an object degenerates, the process is reversed. The higher order properties are lost and the lower level properties are sufficient to identify a simpler subject. Thus, for example, a statue may degenerate into bronze. And bronze may degenerate into water and earth. On the interpretation of generation and destruction that I am proposing, matter is preserved through the transformations but not as a definite subject. The matter is actually transformed but its potentiality--the set of properties that determined the simpler matter as the definite stuff that it was--is preserved.

## VI

I turn finally to the complex problem of organic generation. In *Metaphysics* H.5 Aristotle applies the cyclical construction model to the organic case. An animal, he says, perishes into a corpse, and a corpse into some simple matter, and only then can an animal be generated again. H.5 does not identify the simple matter that results from organic degeneration. But in *Meteorology* IV.1 Aristotle explains that a body that decays first loses its internal heat, and with the loss of heat, the body's moisture evaporates (since heat attracts moisture). So as a body becomes colder it also becomes drier until simple earth is left (379<sup>a</sup>16-26). A corpse may retain for some time--even for a long time--the outward appearance of the body it earlier was. But, as Aristotle remarks, ancient corpses suddenly turn to dust in their tombs (IV.12, 390<sup>a</sup>22-24). Earth is the simple matter into which an organism degenerates.

And earth is the simple matter from which a new organism ultimately emerges. *Metaphysics* Θ.7 focuses on the question of when the matter out of which a product--whether natural or artificial--is generated should be designated as potentially that product; and Aristotle opens the discussion on the topic of earth in organic generation. Is earth potentially a human being? Or not yet, but only once it has become seed? Is seed potentially a human being, or must seed be worked up further before there is something that is potentially a human being (1049<sup>a</sup>1-3)? Aristotle answers both questions in the negative. Neither earth nor seed is yet potentially a human being, for the entity that succeeds as potentially human must already have in itself its own principle of generation (1049<sup>a</sup>13-16). The construction model involves a series of levels leading to and away from the complex organism. Apparently, in the

case of organisms, the cycle begins and ends with simple earth. But earth is not yet potentially the organism, though if earth is worked up into something else, and if that entity is worked up further, eventually there will be something that succeeds as potentially the organism. Apparently the entity that succeeds as potentially some definite organism is matter that has been worked up to such an extent that the matter contains in itself a principle of its own further development. The question of what the entity is that succeeds as potentially a human being is an interesting one, but this is a question which I cannot pursue here.<sup>17</sup>

Instead I want to focus on the role of earth in organic generation. One might well ask how the cyclical model maps onto Aristotle's actual account of organic generation in *Generation of Animals*. For animals that reproduce sexually are supposed to be generated by the action of the male semen on the female *καταμήνια*. The male contributes the form, the female the matter, to the new creature. Is there any sense to be made of the idea that organisms are generated ultimately from earth?

I think there is. We need to trace the account of organic generation beyond the point at which a new creature is conceived in reproduction. We need to ask about the generation of the male and female residues, semen and *καταμήνια*, involved in sexual reproduction. Both male semen and female *καταμήνια* are worked up blood.<sup>18</sup> Semen and *καταμήνια* differ from each other in that semen is more concocted (and therefore hotter) than *καταμήνια*. Blood, from which semen and *καταμήνια* are both generated, is identified as food in its final form<sup>19</sup>--the product of food that has been concocted first in the stomach and then in the heart. And the food for an animal is another living organism, either animal or plant. But whether an animal lives directly on plants or other animals, the food for all animals derives ultimately from plants. And plants derive their nourishment from earth and water.<sup>20</sup> So, if one follows the thread of organic generation back to its ultimate source, it appears that the ultimate product of organic degeneration--earth--is also the starting-point of a new cycle of organic generation.

And so, if my story is right, organisms are ultimately generated from earth and are finally destroyed into earth. And earth is preserved throughout the cycle but not as the definite stuff that it is. Earth is actually transformed at the first stage of generation, but its potentiality survives. Earth's potentiality survives not only because the complex entity will finally be reduced to earth but also because certain aspects of the behavior of the complex entity are explained by its constitution from earth. But the distinctive behavior of the entity is due not to earth but to the higher order properties acquired in its generation. And these acquired properties determine the entity as the entity it is.

#### NOTES

<sup>1</sup> Aristotle's account of the replacement model is usually traced to *Physics* I.7.

<sup>2</sup> *Phys.* V.1, 225<sup>a</sup>3-7.

<sup>3</sup> *Phys.* V.1, 225<sup>a</sup>7-12.

<sup>4</sup> *Phys.* V.1, 225<sup>a</sup>34-b5.

<sup>5</sup> *Phys.* V.1, 225<sup>b</sup>5-9.

<sup>6</sup> *Cat.* 5, 3<sup>b</sup>24-27; *Phys.* I.6, 189<sup>a</sup>32-33; V.2, 225<sup>b</sup>10-11.

<sup>7</sup> *Meteor.* IV.1-11 provides a rich account of the elemental constitution and dispositional properties of many uniform stuffs. For the watery nature of wine and some of wine's other features, see, e.g., *Meteor.* 382<sup>b</sup>13; 384<sup>a</sup>12-14;

388<sup>a</sup>30-b<sub>9</sub>; 389<sup>a</sup>7-11; 389<sup>a</sup>25-27.

<sup>8</sup> On the difference between reversible and irreversible processes, cf. *Met.* α.2, 994<sup>a</sup>22-b<sub>3</sub>.

<sup>9</sup> Cf. *De Cae.* III.3, 302<sup>a</sup>15-25, where Aristotle claims the elements out of which uniform bodies are made are potentially present in the compounds. Not only did the elements exist separately before entering into the combination, but they can apparently also be extracted from the combination by some physical procedure.

<sup>10</sup> At *Phys.* I.9, 192<sup>a</sup>31-32, Aristotle says: "By matter I mean the first subject for each thing from which something comes to be, which is present in (ἐνυπαρχοντος) [the thing that comes to be] not accidentally." Cf. 192<sup>a</sup>29-30.

<sup>11</sup> See *Meteor.* IV.7, 383<sup>b</sup>21-26 (on oil) and 384<sup>b</sup>15-16 (on wood).

<sup>12</sup> See, e.g., *Meteor.* IV.7, 384<sup>b</sup>20-21.

<sup>13</sup> But cf. *Met.* Z.7, 1033<sup>a</sup>5-23, where Aristotle gives a different justification for the use of adjectives rather than nouns to specify the matter out of which an artifact is made. As I understand the passage in *Metaphysics* Z.7, Aristotle gives a reason why the linguistic practice exists, but then indicates that the practice is misleading because it suggests that the matter out of which a product is generated does not persist intact (1033<sup>a</sup>19-22). I believe Aristotle holds a different view about the persistence of matter in Z.7 and Θ.7. In Z.7 he seems to think the matter persists actually and so suggests language would more accurately reflect the metaphysical fact if we called a statue "bronze"; in Θ.7 he thinks matter persists merely potentially and so endorses the correctness of ordinary usage.

<sup>14</sup> Jacques Brunschwig, in his paper "La Form, Prédicat de la Matière?" *Etudes sur la Métaphysique d'Aristote*, Ed. by P. Aubenque (Paris, 1979), 131-166, points out the conflict between the two analogies as they are usually construed.

<sup>15</sup> Cf. Brunschwig's interpretation of the relation between form and matter in *Metaphysics* Θ.7 (paper cited above, n. 14). Brunschwig argues that form predicated of matter yields a definition, not a proposition. So our views are similar in the sense that we both take the form-matter relation to be a genus-differentia relation. Yet because Brunschwig takes the result to be a definition, he faces a difficulty (which he points out (155)) that Aristotle elsewhere claims that neither element in a definition is predicated (κατηγορεῖται) of the other (e.g. *Po. An.* II.3, 90<sup>b</sup>34-38). On my view the result does not yield a definition because a material genus is not the sort of genus involved in definitions: the relation between sphere and (generic) bronze is quite different from that between sphere and (generic) shape or between biped and (generic) animal. The material genus is not the genus of the differentiating form. And the properties contributed to the composite by the generic matter are, on my view, accidental.

<sup>16</sup> Cf. *Met.* Z.12, 1037<sup>b</sup>10-21, where Aristotle contrasts the relation between a typical genus and its differentiae and that between a subject and predicate, such as white man. Whereas man partakes of its nonsubstantial properties, a genus does not partake of its differentiae. Although I think a material genus is importantly different from a typical genus (see above, n. 15), they are similar in that neither sort of genus should partake of the differentiating form.

<sup>17</sup> I believe the entity that succeeds as potentially a human being is a foetus once it has acquired a heart.

<sup>18</sup> See, e.g., *GA* I.19, 726<sup>b</sup>5-11; 726<sup>b</sup>30-727<sup>a</sup>2.

<sup>19</sup> See, e.g., *PA* II.3, 650<sup>a</sup>34-b<sub>3</sub>; II.4, 651<sup>a</sup>13-15.

<sup>20</sup> See, e.g., *PA* II.3, 650<sup>a</sup>21-23; II.10, 655<sup>b</sup>33-37.