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Aristotle's *Physics* II 1 and Cultivated Plants

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Argument

The aim of this paper is two-fold: to offer an interpretation that preserves the natural reading of *Physics* II 1 – that Aristotle is drawing a stark distinction between what is natural and what is artificial; and to show how there is logical room for a *tertium quid* – a category for things that are products of both nature and art. This aim is attained by highlighting two important qualifications Aristotle makes about the products of art in relation to an innate internal principle of change and pointing out that the proper understanding of the significance of the essential-accidental distinction that Aristotle draws must be viewed in the context where he identifies two kinds of nature – form and matter. Based on these analyses, the following three logical categories are shown to be consistent with the passage: 1) purely natural things; 2) essentially artificial objects; and 3) essentially natural things with artificial aspects.

1. Introduction

In *Physics* II 1, because Aristotle sets up a stark distinction between what is natural and what is artificial in terms of whether or not the things (τὰ ὄντα) in question possess an innate internal principle (ἀρχή) of change *essentially* (καθ' αὑθό) – that is, either the things are natural if they possess the principle essentially or they are artificial if they possess it accidentally (κατὰ συμβεβηκός) – there seems to be no room for living things that are products of both nature and art, such as cultivated (or domesticated) plants. For example, Robert Wardy (in *The Mysterious Aristotelian Olive*) points out that the cultivated olives are not obviously natural, for left on their own without constant attention, they "swiftly run riot and go to seed" and revert back to wild ways; nor are they obviously artificial, for unlike beds they do possess an innate internal principle of change (Wardy 2005, 77). In other words, Aristotle does not seem to provide us with conceptual room to categorize what appears to be a "curious *tertium quid*" (ibid., 82) – things that are produced by both natural and artificial causes.

In this paper, I shall argue that a close reading of the chapter, however, suggests otherwise. Although Aristotle indeed draws a stark distinction between what is natural and what is artificial, he also makes a number of noteworthy points that provide us with

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the key to discovering the elusive *tertium quid* – the third category. The crucial points that I shall highlight are these: that Aristotle makes two important qualifications about the products of art in relation to an innate internal principle of change; and that he draws the essential-accidental distinction in the context where he identifies two kinds of nature – form and matter. So, the aim of my paper is two-fold: i) to provide an interpretation that preserves the stark natural–artificial contrast Aristotle draws in the chapter; and at the same time ii) to show that nevertheless there is conceptual space for the third category.

There are two main parts to my paper. In the first part, I shall identify three logical categories that are consistent with the opening chapter of *Physics* II: 1) purely natural things; 2) essentially artificial objects; and 3) essentially natural things (but with some artificial aspects to them). In the second part of the paper, I shall explore how to categorize the products of the art of agriculture (such as cultivated olives).

2. The *Tertium Quid*

The pertinent description of artificial objects found in the chapter is as follows:

> A bed, on the other hand, or a coat, or anything else of that sort, qua (ᾗ) satisfying such a description, and in so far as (καθ' ὅσον) it is the outcome of art (ἀπὸ τέχνης), has no innate tendency to change, though considered as concurrently (συμβέβηκεν) made of stone or earth or a mixture of the two, and in so far as it is such (κατὰ τοσοῦτον), it has. This suggests that nature is a sort of principle (ἀρχῆς τινός) and cause of change and remaining unchanged in that to which it belongs primarily and of itself (καθ' αὑτό), that is, not by virtue of concurrence (κατὰ συμβεβηκός). (192b16-23; Charlton's translation in Aristotle 1970a with slight modifications)[1]

Before discussing the crucial points that I want to highlight about this passage, as a preliminary to the discussion, it will be helpful to clarify the scope of what Aristotle means by ἀπὸ τέχνης. I have so far deliberately avoided the use of the term "artifacts" because Aristotle does not use such a term in the opening passage of *Physics* II 1; instead, he introduces them (that is, what we normally refer to "artifacts") with a couple of examples, a bed and a coat, and generalizes them as a sort or a kind (γένος) of things that are outcome or product of art (ἀπὸ τέχνης). The closest to the Greek term that

[1]There are other important issues (and their implications) that are raised in *Physics* II 1 than merely drawing a distinction between the natural and the artificial (e.g. how art is used as the model for understanding nature, ontological implications of natural things and artificial objects in terms of the internal-external distinction of the principles of changes, whether the view of nature he articulates in *Physics* II 1 is consistently maintained in other passages, the discrepancy of the list of natural substances in *Physics* II 1 and elsewhere, etc.). They are all outside the scope of this paper. I have, however, examined some of them. See Katayama 1999 (and the relevant literature). For a more recent discussion on some of the topics, see, for example, Leunissen 2015 (and the relevant literature).

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Aristotle uses in this chapter that can be translated as an "artifact" is τὸ τεχνικόν (193a32).[2] It is variously translated, for example, as "artificial" (Charlton in Aristotle 1970a), "artistic" (Apostle in Aristotle 1980), or "a work of art" (Hardie and Gaye in Aristotle 1984).[3] But however we translate the term, we should understand it in the wider sense of the term that does not exclusively refer only to physical objects, like beds and houses, for the products of art mentioned in this chapter includes the following: a bed (192b16, 193a11, 13, 34–35, b9, 11), a coat (192b16), health (192b24-6, 193b14), a house (192b30), and a statue (192a12). In other words, the phrase "ἀπὸ τέχνης" also includes a quality, like health. This wider usage of the phrase is also found elsewhere in Aristotle's text (see, for example, *Met* Z 7, 1032a32-b9). So, throughout this paper, I shall understand the phrase "ἀπὸ τέχνης" to refer to all artificial objects and products, and the term "artifacts"[4] will be employed in this wider sense.

Let me now turn to three important and inter-related points made in this passage that are worth considering separately: 1) a qualification of things that are the outcome of art (ἀπὸ τέχνης) made in terms of the qualifiers "qua" (ᾗ) and "in so far as" (καθ' ὅσον); 2) a qualification of an innate internal principle of change made in terms of the phrase "in so far as it is such" (κατὰ τοσοῦτον); and 3) a distinction between "of itself" (καθ' αὑτό) and "concurrence" (κατὰ συμβεβηκός) – that is, in terms of the essential-accidental contrast – that is employed to explicate how an innate internal principle of change exists in natural things in contrast to artificial objects. Let us take each of them in turn.

Aristotle's qualifiers, "qua" (ᾗ) and "in so far as" (καθ' ὅσον), in describing any given artificial object, both imply that an object in question is artificial only with respect to a certain *aspect*. Even though Aristotle later on mentions that we produce the matter of artificial objects (*Phys* II 2, 194b7-8) (for example, builders will have to produce the materials for building a house, such as bricks that are baked and planks of wood that are sawed from the lumber that is cut down), materials are not created *ex nihilo*. However complex an artificial object maybe, it was ultimately built from some raw materials that

[2]Aristotle uses this term when he is drawing the analogy between τέχνη and φύσις in the context of introducing the notion of form as nature (in contrast to matter). The analogy he draws is as follows: just as τὸ κατὰ τέχνην and τὸ τεχνικόν are called τέχνη, so τὸ κατὰ φύσιν and τὸ φυσικόν are called φύσις (193a31-32).

[3]Ross also glosses it as "a work of art" in Aristotle 1936a, 349.

[4]The other possible term that can be translated as "artifacts" is τῶν χειροκμήτων at 192b30, the term which is variously translated as "[things] made by human hands" (Charlton in Aristotle 1970a), "manufactured products" (Apostle in Aristotle 1980), and "products of manual labor" (Hardie and Gaye in Aristotle 1984). A house is mentioned as an example of such things. This term, however, is a narrow sense of "artifacts" and it is a kind of τῶν ποιουμένων (a wider sense of "artifacts") mentioned at 192b28. And it is in this wider sense (which includes health) that Aristotle articulates the principle of art as "something else and external (ἐν ἄλλοις καὶ ἔξωθεν)" (192b29). The fact that Aristotle uses the term in a wider sense can be seen at *Met* Z 7. In fact, there he uses the term αἱ ποιήσεις in a very broad sense, which includes not only "ἀπὸ τέχνης" but also "ἀπὸ δυνάμεως and "ἀπὸ διανοίας" (1032a26-7). Recognizing this broad sense of the term used elsewhere, Ross specifies the term, τῶν ποιουμένων, used in the context of this chapter with the following comment: "sc. by art" (Aristotle 1936a, 501).

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were available in nature. In other words, there is no such thing as a *purely* artificial object that is completely artificial all the way down to its ultimate material; there is always some natural aspect to any artificial object. In contrast, there are *purely* natural things (such as horses and olive trees) that exist without any artificial aspects. So although Aristotle is drawing a stark contrast between what is natural and what is artificial in articulating an innate internal principle of change (and I shall suggest later how he is drawing this distinction), he is not contrasting *purely* natural things and *purely* artificial objects. To capture this point, I shall introduce what I call the *aspectual* doctrine: Every artificial object is natural in some aspect such that it must possess the innate internal principle of change.

The other qualifier, "in so far as it is such" (*κατὰ τοσοῦτον*), which Aristotle uses to describe the possession of an innate internal principle of change by artificial objects implies that there can be varying degrees of combination between natural and artificial components in any given thing that has an artificial aspect to it. This is not a surprising implication because as we have pointed out the contrast Aristotle is drawing is not between purely natural things and purely artificial objects but between purely natural things and objects that have both artificial and natural aspects. So we should expect that there will be a varying degree of mixture between the artificial and natural aspects or we should expect that the extent to which objects are artificial will differ. For example, what I call complex artifacts require that their immediate parts must also be artifacts, as in the case of houses that we mentioned earlier. Or, to take a more contemporary example, computers require not only that their immediate parts (such as monitor, keyboard, power cord, etc.) must be artifacts but the parts of parts (such as plastic, screens, electronic devices – which in turn are made up of transistors, silicon chips, metals, etc.) also need to be artificial. So many complex artifacts are extensively artificial and minimally natural. On the other hand, what I call simple artifacts, such as sculptures that are made from marble, rocks or even ice do not require their parts to be artificially created; sculptors can simply sculpt the desired shapes onto available natural materials.[5] Again, to take a contemporary example, pet rocks require very minimal decoration (like painting or gluing eye buttons on them). So simple artifacts come into being with a minimal amount of artificial influence and their materials retain much of their original nature. In other words, any given thing with any artificial aspect to it can have that aspect in various degrees – from a minor modification to a major transformation. As a result, the thing in question will possess an innate internal principle of change to the extent that it remains natural. I shall call this second point the *extent* doctrine: In any thing that has some aspect that is an outcome of art, to the extent that the thing remains natural it possesses an innate internal principle of change.

[5]Of course, I do not mean to imply here that all sculptures should be classified as the simple artifacts. An obvious counter example is a bronze statue: since bronze is an artificially created alloy of copper and tin, any artifact made of it will be complex.

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Finally, let us turn to the distinction between "of itself" (καθ' αὑτό) and "in virtue of concurrence" (κατὰ συμβεβηκός) – that is, the essential-accidental distinction. Aristotle's drawing of this distinction in his explication of how nature can belong to a thing seems to imply that there are only two kinds of things, which he explicitly mentions in *Physics* II 1 – they are: 1) things whose nature belongs primarily and of themselves; and 2) things whose nature belongs in virtue of concurrence. As a result, it appears as though there is no room for any third category. However, when we understand his discussion of the essential-accidental distinction in its proper context, we see that in fact there are two more logical categories.

To see how that is so, let us examine more carefully how Aristotle argues for the view that artifacts such as beds have their nature in virtue of concurrence. It is because he says they are made up of stone or earth or a mixture of the two; that is, it is because of their matter that they possess nature. In other words, Aristotle here is implying the distinction that he is about to address in the rest of the chapter; namely, that there are two kinds of nature: form and matter.

Aristotle introduces the idea of matter as a nature by presenting the views of others who have defended it. For example, he refers to Antiphon's thought experiment that if one were to bury a bed and if its decomposition acquires the power to send up a shoot, the result will not be a bed but wood (193a12-15). Aristotle in this chapter does not explicitly either endorse or reject Antiphon's thought experiment (although we shall see later that Antiphon's thought experiment is not inconsistent with what Aristotle defends elsewhere – and I will come back to the import of this thought experiment later on); but he does agree here that matter is nature. However, the point that he wants to drive home in the rest of the chapter is that the form is also nature; in fact, it is more (μᾶλλον) of nature than matter (193b6). The reasons he provides why that is so are not directly pertinent to our discussion, so I will set it aside. The key point that I would like to stress though is that both form and matter are nature, for Aristotle.

So it is because artifacts (such as beds) are hylomorphic composites, it is possible for them to possess nature only *qua* matter (that is, accidentally) but not *qua* form (that is, essentially). For example, if a bed falls from a cliff, it is falling down (that is, it is being moved) not *qua* bed but *qua* the earthy materials. It is these materials from which the bed is made up of that possess the natural tendency to be at their natural downward place. But could we not say the same thing about the natural things like animals and plants? In other words, do they have nature not only essentially but also accidentally as well, in the same manner as the artifacts he mentioned? Note by matter here, I am not referring to their immediate matter, such as their bodies and organs that are parts of the essential nature (just as we noted in the case of complex artifacts, their immediate parts are artificial as well); but by matter here, I am referring to the ultimate materials (at the level of elements – what Aristotle refers to as simple bodies such as earth, fire, air and water (192b10-11)). The natural tendency of elements is contrary to the composites they are part of, regardless of whether the composites in question are natural or artificial. In *de Caelo* II 6, 288b13-18, Aristotle mentions that the cause of

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old age and deterioration is due to "impotency" (ἡ ἀδυναμία), which is contrary to nature, that is caused by elements not being in their proper places. So just as in the case of artifacts, also in the case of animals, the natural tendency of elements is not eradicated. For example, when a horse gallops, eats, and sleeps, it does so *qua* horse; but if it were to fall from a cliff it does so for the very same reason a bed will fall – because of its earthy materials.[6] So, although Aristotle describes these natural things as having nature essentially and *not* accidentally at 192b22-3, in light of our analysis, this statement seems to be misleading or at best imprecise. More accurately, they do have nature essentially and not accidentally but only *qua* form and maybe *qua* immediate matter; that is, they also have it accidentally *qua* matter or most certainly *qua* ultimate matter.

Let us now examine logically then the hylomorphic structure using the artificial/natural distinction. The following is the schema for the four logical categories:

Schema A:

1) From – Artificial; Matter – Artificial
2) Form – Artificial; Matter – Natural
3) Form – Natural; Matter – Artificial
4) Form – Natural; Matter – Natural

An example of category A1 is a purely artificial object and that of A4 is a purely natural thing. But as the aspectual doctrine tells us that there is no such thing as purely artificial matter (the ultimate matter is always natural), so the category A1 has no member; it is a null class. But for the same reason, we can also eliminate category A3. That would leave us with only categories A2 and A4. Hence, there is an appearance of a jointly exhaustive and mutually exclusive contrast between what is natural and what is artificial. However, the logical schema presented is not precise, since matter can indeed be natural but it could also be a mixture of what is natural and artificial (for example, its immediate matter can be artificial while the ultimate matter remains natural). So, in fact logically, we have the following schema instead:

Schema B:

1) Form – Artificial; Matter – Natural
2) Form – Artificial; Matter – Artificial & Natural
3) Form – Natural; Matter – Natural
4) Form – Natural; Matter – Artificial & Natural

What is the difference between categories B1 and B2? Both are essentially artifacts; but the difference lies in their complexity. The members of category B1 are the simple

[6]I have extensively and in detail analyzed Aristotle's view on elemental motion in Katayama 2011. In fact, some of the examples here illustrated are taken from that work (see, especially, 178-9).

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artifacts we mentioned earlier, where the materials have no artificial aspect to them. In contrast, the members of category B2 are complex artifacts such that their immediate materials themselves are artificial (e.g. houses, computers, etc.). Both are essentially artifacts, and since the distinction is not really relevant to our topic and it does not seem to pose any controversial problems (that I am aware of), I shall place them into one single category called essential artifacts. The revised logical schema then is as follows:

Schema C:

1) Form – Artificial; Matter – either Natural or Artificial & Natural
2) Form – Natural; Matter – Natural
3) Form – Natural; Matter – Artificial & Natural

The members of category C2 are of course purely natural things that we have already identified. In contrast, the members of category C3 are composites whose form is natural but whose matter is a combination of what is natural and artificial; that is, they will possess nature both essentially and accidentally but some of their aspects are artificial as well (that is, there are also *accidental* artificial aspects to them). This third category is the crucial *tertium quid* of this paper.

At this point, one may wonder (just as in the case of matter) whether or not it is possible for the form itself to be a combination of what is natural and artificial rather than either it must be one or the other, as I have assumed in all of my schemata. Although logically that may be possible, in this paper I shall assume that the form cannot (but only matter can) be both. The reason for holding this assumption is that it has the advantage of adequately attaining the two aims of this paper at the same time: 1) it can preserve the natural reading of *Physics* II 1 that Aristotle is indeed drawing a stark distinction between what is natural and what is artificial – that it does so by pointing out that Aristotle is drawing the distinction in terms of their *forms* (so the stark distinction is between essentially natural things and essentially artificial objects, rather than purely natural things and purely artificial objects); and 2) it can explain how there can be a *tertium quid* – that the combination of natural and artificial aspects occurs in respect to their *matter*. In other words, the advantage of my interpretation is that a stark contrast between what is natural and what is artificial is preserved, and at the same time we do not have to commit to a jointly exhaustive and mutually exclusive option that leaves no room for the third category.

Having now discovered the *terium quid*, let me now illustrate by way of examples the things that are essentially natural but possess some accidental aspects that are artificial. Health provides us with a number of such examples. It is an interesting natural condition of a living thing because it can be produced, according to Aristotle, also by art and by chance (see, for example, *Met* Z 7, 1032b21-26 and Z 9, 1034a9-10). Let us use the working definition proposed by Aristotle in his *Metaphysics* that health is "the uniform condition" (τὸ ὁμαλυνθῆναι; *Met* Z 7, 1032b19) of a body. Normally, such uniformity

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is a natural condition of a living thing that is internally and naturally maintained by the organism itself. However, when it becomes sick or injured, sometimes its own body fails to heal itself on its own and requires an external cause, which can be either by art or by chance. Here is an example Aristotle himself illustrates: a recovery from illness requires warmth. A doctor based on his medical art can produce it by means of rubbing (see *Met* 7, 1032b26). But if the person happens to get sick and get better few days later due to hot weather caused by a heat wave, then in that case health is a product of chance. Of course once the full recovery takes place, regardless of whether or not a sick person is cured by art or chance, its own body will naturally take over the maintenance of its own health. So, here we have an example of a medical art assisting the body temporarily. So a sick person required a certain period of time, an external artificial cause, to recover his health.

But what about in the case where the illness or injury is permanent; that is, what about the case in which a constant artificial external cause is necessary to maintain one's health? For example, a person's body is incapable of producing a certain chemical in her body so that she is required to take medication every day. Or, a person lost his limb and requires a prosthetic limb? Herodotus reports of the story of Hegesistratus who, after being captured by Spartans, escaped the bonds by cutting off a part of his foot, which he later on replaced with a wooden foot (ξύλινον πόδα) (Herodotus 2015, *Historiae* IX 37). Or, for a more contemporary example, a person needs an artificial implant like a pacemaker for his heart to perform its function. Certainly in all these cases, we are dealing with essentially natural beings but with some permanent accidental artificial aspects to explain their health and the maintenance of their existence.

So, I submit that there is room for three logical categories of things as regards the distinction between nature and art that Aristotle articulates in *Physics* II 1. They are as follows: i) Purely natural things, like animals and plants, that have their innate internal principle of change essentially (but also accidentally);[7] ii) Things that are an outcome of an external[8] artificial principle of change essentially but possess an innate internal principle of change accidentally, such as artifacts like beds and houses; and iii) Things that have innate internal principle of change essentially but some of their matter is due to the external artificial principle of change, like a person who depends on constant medication or some permanent artificial devices.

The difference between the categories ii) and iii) can be captured by the two doctrines I introduced: the aspectual and the extent doctrines. The aspectual doctrine tells us that what is artificial will possess nature in some way. So the things that belong to category ii) like beds, coats, and houses will possess nature *qua* matter; but the things

[7]Accidentally because (as mentioned earlier) they are also made up of ultimate simple bodies with their own natural tendencies that are not completely eradicated (even when they are part of the composites) and their destructive tendencies are constantly working against the natural tendencies of living things to continue living as unified organisms.

[8]The principle of art is "something else and external (ἐν ἄλλοις καὶ ἔξωθεν)" (192b29). Cf. note 4.

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that belong to category iii) like a person with a prosthetic limb, since he is essentially natural, will possess nature *qua* form. The extent doctrine tells us that a thing with an artificial aspect will possess nature to the extent that it remains natural. In the case of things that belong to category ii), the degree in which the objects are the outcome of art is quite extensive such that transformations of materials are involved, such as a destruction of trees to create planks of wood or a chemical transformation of raw materials to create bricks as the parts required to build a house. So they will remain natural *qua* their ultimate matter. But in the case of things that belong to category iii), the artificial modification is insignificant or minimal. The changes that the underlying subjects undergo are only accidental, for example, a sick person becoming a healthy person due to the medical art. As the result, they will continue to remain natural *qua* their form. In other words, the difference in extent to which things are artificial between the members of categories ii) and iii) can be captured in terms of two different kinds of changes that Aristotle introduced in *Physics* I: substantial versus accidental changes. The underlying matter undergoes substantial changes of some kind in things that belong to category ii) but only accidental changes occur in things that belong to category iii).

3. Cultivated Plants

Based on the categorical schema outlined in section 2, I shall now turn to the problem identified by Wardy: what to do with cultivated plants that are products of both what is natural and what is artificial. The problem I submit is no longer about whether or not there is a *tertium quid* (since we have identified three logical categories); but rather, it is about whether cultivated plants should be classified as essentially natural or essentially artificial. Having now relocated Wardy's problem, I shall now explore how to classify cultivated plants.

But there is a caveat. Our discussion will be only exploratory; that is, I shall not offer the definitive solution to the problem, because in order to be able to do so, we need to understand Aristotle's essentialism as applied to living things. It is outside the scope of this paper to thoroughly discuss the topic, especially since the topic is controversial and scholars have not reached any settled consensus. On the one hand, the received traditional view of essentialism based on fixed species[9] has been challenged by the likes of David Balme, who argues for the view that Aristotle's biology was not essentialist (Balme 1987). On the other hand, there is a debate between David Charles and James Lennox on Aristotle's essentialism (see Charles 2010b and Lennox 2010). Charles defends it in terms of the unity of essence-based explanation (which was based on Charles's careful analysis of *Analytics* and *Metaphysics*) but when it comes to

[9]I have, however, argued for the view that despite the actual practice found in his biological works that seem to indicate otherwise, it is still premature to give up Aristotle's theoretical commitment to the traditional view of essentialism based on the fixed species. See Katayama 2017.

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biology he finds that Aristotle fails to locate a single unifying feature that defines a kind that would account for all of its distinctive features; as a result, Charles provocatively proclaimed that there was a crisis in Aristotle's thinking about definition (see Charles 2000). Lennox defends what he calls "teleological essentialism" that is applied at the different level of universality (since the terms "form" and "genus" are purportedly not fixed terms). Aristotle's essentialism, then, is understood as "the notion of sub-groups within kinds which are *formally identical*" (Lennox 2010, 353; emphasis in the original).

So what I hope to accomplish here is very modest: to simply provide some suggestions, using some examples that hopefully will not be too contentious. Let me begin with an abstract level. A living thing will be essentially natural and will only possess some accidentally artificial aspects if no substantial changes are made to its nature by an external artificial cause; that is, if the changes in question are made only with respect to its superficial properties; that is, if only an accidental change has occurred. A living thing, however, would be essentially artificial if there was a substantial change made to its nature by an external artificial cause. So far, I appealed to two kinds of art to draw a distinction between essentially natural things and essentially artificial objects: the art of production (such as the art of building and the art of sculpture) that creates the products that are essentially artificial; and the art of medicine that artificially produces a condition for things that are essentially natural. But what about "the art of farming (τῆς γεωργικῆς τέχνης)" (see Aristotle 1961, *Proptrepticus* fr. 13.8)? What kind of product does it produce? I think the answer is: that depends on the technology in question. If a given agricultural technique does not alter the nature of plants or their principle (ἀρχή) in any significant way, then these cultivated plants are essentially natural and only accidentally artificial; otherwise, if a technique does indeed alter their nature substantially, then they will be essentially artificial. Let us take some specific examples.

I shall begin with the mysterious olive that Wardy discusses. He notes that wild and domesticated varieties of plants, although related (like cousins), are not the same. This fact is sometimes reflected by having different names: for example, "olive" (that is, the domesticated or cultivated one) in Greek is ἐλάα in contrast to "wild olive" which is ἀγριέλαιος or κότινος (Wardy 2005, 77). Of course having different names *per se* does not indicate that we are dealing with two essentially different kinds of living things. For example, Athenians and Spartans are two names for Greeks who live in different regions of Greece; or Greeks and Persians are two races of people who live in different geographic areas (or perhaps the distinction Greeks made in in terms of Ἕλληνες in contrast to βάρβαροι may aptly capture the distinction between cultivated Greek speakers and wild (or uncultivated) non-Greek speaking people, at least from their standpoint). All of them are human beings and their differences are only accidental and not essential.

Furthermore, it is not clear whether the distinction of Greek terms ἥμερη, (variously translated as "cultivated", "domesticated" or "tame" depending on the context) and ἄγρια ("wild") is a legitimate essential nature of given species. In *History*

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of Animas I 1, Aristotle does introduce this pair as one of the contraries but also points out that the same kind of animal exists in these two states; some of the examples he gives are horses, oxen, swine, men, sheep, goats, and dogs (488a27-32). In *Parts of Animals* I 3, in criticizing Plato's method of dichotomous division – Plato himself uses his division in terms of tame and wild in his *Statesman* (264aff) – Aristotle uses the example of tame and wild to illustrate that they may or may not be appropriate differentiations to capture the essential difference (643b5-9). Also, Theophrastus, in *De Causis Plantarum* 1.16.13 points out that the nature of many animals and plants can be distinguished in terms of tame and wild, although few thrive in both states (4-14). In *De Historia Plantarum*, Theophrastus claims that animals and plants that are incapable of domestication are "wild by nature (ἄγριον τῇ φύσει)" (3.2.2). So both Aristotle and Theophrastus seem to hold the view that the ἥμερη– ἄγρια distinction may capture the essential nature of many animals and plants but not all of them.

So what about the case of olives? What are the differences between the cultivated and wild olives? Surely, olive trees are cultivated to produce olives with desired properties for human consumption and uses: such as their texture, flavor, fragrance, etc. Theophrastus contrasts them by pointing out that although the wild olives bear more fruit, the cultivated ones bear better fruit, sweeter and with better flavor (*Historia* 1.4.1). In terms of their appearance, both their leaves and fruit differ (*Historia* 1.14.3-4). But despite their appearances, are the differences merely accidental qualities of olives, or do these appearances indicate essential differences?

One of the significant facts about cultivated olives that Theophrastus mentions and Wardy points out is that they will revert back to the wild kind when left on their own (*Historia* 2.3.1). This fact seems to indicate that the art of agriculture has only changed the superficial properties of the olive and that an innate internal principle of change responsible for maintaining and reproducing an olive tree remains intact. One of the crucial differences between artifacts and natural living things that Aristotle highlights in *Physics* II 1 is the reproductive capacity: that is, a human being is generated from a human being but a bed is not generated from a bed (ἔτι γίγνεται ἄνθρωπος ἐξ ἀνθρώπου, ἀλλ' οὐ κλίνη ἐκ κλίνης) (193b8-9).[10] A comparison with Antiphon's thought experiment mentioned earlier is instructive here. Whether Aristotle agrees with Antiphon or not, Antiphon's bed is potentially a tree (wood?) in a different sense than a seed is potentially a tree; for it is not Antiphon's bed that acquires such a power but rather its decomposition (ἡ σηπεδών) (193a13). It is not unlike the point Aristotle stresses in *Met* H 5, 1045a3-6, where he points out that in order for a corpse to become an animal or vinegar to become water, they must first go back to their matter (εἰς τὴν ὕλην δεῖ ἐπανελθεῖν). No such "going back to the matter" (that occurs in the cases

[10] Although at *Met* Z 9, 1034a23, Aristotle states that "in a way" a house comes from a house, he is referring to the essence of house that exists in the mind of a craftsman that generates a house. So strictly speaking, it is a human being that generates a house.

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of substantial change just mentioned by Aristotle) occurs in the case of a cultivated olive reverting back to the wild one.

What happens in the case of a bed is that first a tree has to be cut down and then pieces from it must be sawed. In the process, an innate internal principle of change of the tree is destroyed in creating wooden parts needed to produce a bed. But in the case of cultivating an olive tree, no such drastic destruction occurs. Only superficial changes seem to take place due to the art of agriculture. An innate internal principle of change in a cultivated olive remains intact. So, it seems that cultivated olives are essentially natural with accidental artificial properties; that is, the cultivated and the wild are merely two different states of the same kind of living thing (just like human beings and other animals Aristotle mentions).

What about the more intrusive agricultural technique, such as grafting (ἐμφυτεία) and cutting (ἀποφυτεία)[11] that Aristotle mentions in *On Youth and Old Age* 468b16–28? Aristotle's description of the location of the principle (ἀρχή) is informative. According to Aristotle, it is located in the middle of a plant (just as in the case of the heart for an animal). By ἀρχή I presume Aristotle has in mind an innate internal principle of change. In order for grafting and cutting to be successful, one cannot destroy the principle that exists in the branch. Otherwise, grafting and cutting will result in failure. So again the destruction of an innate internal principle of change is absent and it is not clear to what extent the nature in question has been substantially altered. Although it appears as though these farming techniques are rather intrusive, they only seem to make some accidental changes to the plants in question; that is, the growth and the production of flowers or fruits are both primarily responsible by their ἀρχή.

However, the topic of grafting may lead one to question the possibility of the hybridization of plants.[12] Instead of transplanting a part of plant onto another of the same species, the technique of grafting can be applied to a different species, creating hybrids. Are these hybrids essentially natural or essentially artificial? To answer this question, since Aristotle does not directly address the hybridization of plants,[13] it is instructive to turn our attention to his discussion of animal hybrids. I have discussed

[11]Aristotle here seems to be mentioning two different agricultural techniques: grafting, which is a transplanting of a part of one plant onto another plant; and cutting, which is a planting of the part of a plant into the soil (I thank one of the referees who pointed this out to me). But, since in this passage Aristotle himself discusses both of them collectively to illustrate the location of an ἀρχή, I have not emphasized the distinction in my discussion.
[12]I would like to thank one of the referees, who raised this issue.
[13]Theophrastus, on the other hand, does mention hybridization of plants by grafting in *De Causis Planatarum* 5.5.4 but he is silent on the subject when he discusses grafting in some detail in I.6 (cf. 2.14.5, 2.17.6 and *Historia* 2.1.4). See also one of the letters of Julian referred to in Pease 1933 (but apparently with a wrong textual reference) (70). These plant hybrids, however, are discussed as the products of τέχνη in the passage because Theophrastus believed that it is natural for like to always produce like (*Causis* 1.16.12; see also 1.6.2). Even when he points out that it is possible for anything alive to "coalesce" (σύμφυτον) with what is alive, he emphasized the fact that this is especially so with the plant of "the same kind" (τὸ ὁμογενές) (*Causis* 5.5.2). So, Theophrastus seems to classify plant hybrids as essentially artifacts, which is the view that I shall argue that Aristotle also held.

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their defectiveness elsewhere in detail (see Katayama 1999, especially 59–60 and 104; and Katayama 2008). For the purpose of our discussion, highlighting the following pertinent points should suffice. Hybrids are unnatural animals that could come into existence in two ways (just as in the case of health we examined earlier) – by chance and by art. They can be produced by chance, just as indicated in the proverb about Lydia (where something new is always produced); that is, due to drought, having gathered together to a place where there is still water, different species end up cross-breeding (See *GA* 2.7, 746b8-12 and *HA* 7.28, 606b19-23). They can also be produced by art; Aristotle mentions that the breeders use a trick to produce mules (*HA* 6.23, 577b15-18). Regardless of whether the hybrids are generated by chance (that is, are accidental living beings) or by art (that is, are living artifacts), most of them are infertile (that is, most lack the *natural* reproductive capacity); and some that do reproduce will eventually cease to exist as a hybrid of two species since the subsequent generations of the offspring will revert back to one of the species (*GA* 2.4, 738b27-36) (that is, unlike the cultivated olives here we have an instance of "going back to the matter"). In other words, there is no permanent ἀρχή in nature to sustain the existence of hybrids, only an external unnatural ἀρχή could account for their existence. Thus, hybrids of plants that came into being by artificial means (like grafting) are essentially artificial plants, since it is τέχνη, as the external unnatural ἀρχή, which is essentially responsible for their existence. In sum, if through grafting or cutting or any other agricultural method (for example, genetic engineering) we have altered the fundamental nature of the plants (as in the case of hybrids), these cultivated methods will yield essentially artificial products.

Finally, I want to discuss an interesting example from Greek literature: Odysseus's rooted olive bed.[14] Is it essentially a bed (that is, an artifact) or essentially an olive tree (that is, a natural thing)? When Odysseus comes back to Ithaca after twenty years of wandering in the sea and he meets his wife Penelope, she is not certain whether or not the man who stands in front of her is really her husband. To test him, she asks her servant to bring from her chamber the very bed Odysseus himself made. But when Odysseus hears this, he immediately gets angry and explains how he himself crafted the bed. He built the chamber around an olive bush and carved a bed from the trunk of an olive tree with its roots still intact. So it will not be possible for anyone to simply move the bed unless someone first cuts down the olive tree. Hearing this answer, Penelope is convinced that the man standing in front of her is indeed her husband (for they were the only ones who knew about the secret of their bed).

Now back to our question: is the bed essentially an artifact or essentially a natural living tree? Or, does it turn out to be an example of what Wardy called the "curious *tertium quid*"? And if so, is it possible to categorize the bed by means of the schema introduced in this paper? Could it be neither essentially natural nor essentially artificial but truly a combination of nature and art? In other words, does this example seriously

[14]See Homer 1967, *Odyssey* 23, 175-204. Lang 1992 also discusses this interesting example (see 31-34).

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challenge the basic assumption of the interpretation offered in this paper: that the form of a composite must be either natural or artificial and only matter can be both? If you recall, the aim of this paper is two-fold: to offer an interpretation that preserves the natural reading of *Physics* II 1 that Aristotle is indeed drawing a stark distinction between what is natural and what is artificial; and at the same time to show how there is logical room for a *tertium quid* – a category for things that are products of both nature and art.

Is there then a way to account for Odysseus's bed that is consistent with my basic assumption? I think the answer to the question posed is this: that it depends on how Odysseus was able to carve the bed from the olive tree. If, in the process he destroyed the ἀρχή of the olive tree (that is although its roots are still in the ground), it can no longer flourish as an olive tree, then I think it is essentially an artifact, even it if it is alive – that is, it will be an instance of a living artifact. But if, somehow, Odysseus managed to carve the bed without destroying the ἀρχή of the olive tree such that it still grows, flourishes, and produces fruit, then I think it is essentially a natural living thing with an artificial shape of bed (that is, an artificial deformity) attached to it.

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