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2024

## Aristotle's Ontology of Artefacts

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### Recommended Citation

Katayama, Errol G., "Aristotle's Ontology of Artefacts" (2024). *Philosophy and Religion Faculty Scholarship*. 142.

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*Aristotle's Ontology of Artefacts*. By Marilù Papandreou. Cambridge: Cambridge University Press, 2023.  
Pp. 320. \$110 (Hardcover). ISBN 978-1009340502.

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In *Aristotle's Ontology of Artefacts*, Marilù Papandreou ascribes to Aristotle the view that artefacts, as thehylomorphic compounds, are neither accidental beings nor objects that are reducible to mere matter because they undergo unqualified coming-to-be and consequently they would count as substances in the *Categories*. However, artefacts are not substances *at all* in the *Metaphysics* because they fail to meet the unity criterion – for unlike natural substances, their parts remain actual and retain their identity independently of the whole. Her audience is contemporary metaphysicians and historians of philosophy, and the goals of her book are to serve ‘as a guide for the contemporary (neo-) Aristotelian debate’ (1), to offer a ‘coherent account of artefacts’ (1), and to propose a novel solution as to why artefacts are ‘ontologically inferior to living beings’ (1).

*Aristotle's Ontology of Artefacts* is the second book-length treatment on Aristotle's metaphysical view on artefacts; the first one was mine (Katayama, *Aristotle on Artifacts: A Metaphysical Puzzle*. Albany: SUNY, 1999). Papandreou makes significant advances by incorporating Platonic background in detail, by taking the relevant literature from the past two-dozen years into account on a variety of related issues – such as, art analogy, Aristotle's concept of *technê*, his principle of synonymy as well as homonymy, his notions of unity, to name a few - and by making connection to the contemporary discussion. Throughout her book, she makes a number of informative and insightful points; but I shall not highlight them in this review. Nor will I respond to her objections to my positions – to her interpretation of Aristotle's polemics against Plato as the rationale to dismiss the existence of an argument against the substantiality of artefacts (61-66 and 170-174), to her argument against eternity as the criterion of substantiality (73-74 and 174-180); or to her reinterpretation of H3 passages (178-179). Instead, I shall challenge her main

thesis by raising two issues: one from the perspective of physicists and artisans (who primarily focus on the functional account of artefacts) outlined in Chapter 6; and the other from the perspective of metaphysicians (who primarily focus on the relationships between matter and form as the parts and the whole) outlined in Chapter 7.

The first issue is concerned with the distinction of diachronic matter – ‘the matter ex quo’ or ‘the matter out of which something comes into existence’ (187) – that she draws between artefacts and natural substances. Based on her examination of H 4, 1044a25-32 passage, Papandreou argues that the proximate matter of artefacts exhibits the following three features: F1 – ‘the matter is not unique to just one object’; F2 – ‘the matter is related to a limited range of objects’; and F3 – ‘one object does not require just one kind of matter’ (194). Since F2 can be understood as articulating the general principle of hypothetical necessity, ‘according to which a particular object cannot be made out of any matter whatsoever’ (196), she concedes that this feature is applicable to both artefacts and living beings but insists that F1 and F3 apply only to artefacts.

The combined application of F1 and F3 to the artefacts means that their diachronic matter enjoys the many-to-many relationship with their form. The example of F1 provided by Aristotle himself is that wood can be a box and a couch; and the example of F3 provided by Papandreou (since Aristotle does not give one in the passage) is that a couch can be made out of either wood or stone (199). In contrast, F1 and F3 are not applicable to ‘the *katamênia*’ (or menstrual fluid) – that is, the proximate matter – of a human being because its *katamênia* is limited to ‘being of only one object’ (201) and a human being cannot be generated from a different *katamênia*. This difference in the nature of diachronic matter has a direct impact on her discussion of synchronic matter – ‘the constitutive matter, the matter in which something consists’ (187) – because the diachronic matter that entertains the many-to-many relationship with the form of the object ‘translates into an accidental relation between synchronic matter and the form of the object’ (180). In other words, in contrast to artefacts, living beings enjoy *essential* relationship between

their synchronic matter with their form because their diachronic matter obtains the one-to-one relationship with their form. I shall now present a number of counterexamples to dispute her analysis.

Papandreou herself addresses the counterexample for both F1 – mules, and F3 – spontaneously generated animals. The problem is that her footnote discussions for both are far from adequate. Here is her discussion of mules: ‘One might reply that the horse’s menstrual fluid is suitable for a horse as well as a mule. However, first of all, the mule is an exceptional case, which is also defined as being against nature. Second, Aristotle seems to suggest the possibility of a genus to which both horses and mules belong. One might also mention the case of hybrids as counterexamples that are completely natural. But, according to Aristotle, hybrids end up resembling more closely the female parent (i.e. the material contribution)’ (201n54).

Her three-point responses here do not help her case. The first point about mules being unnatural does not seem to be relevant. Since she uses the terms, ‘natural substances’ and ‘living beings’, as if they are interchangeable, she seems to be faced with the following dilemma: either the one-to-one relationship obtains only in the case of natural substances and the reason why such a relationship does not hold for the mule is because it is unnatural. But if so, she is not justified in inferring that the one-to-one relationship holds for living beings (that is, *all* living beings); or the one-to-one relationship indeed holds for all living beings, but if so, then whether or not they happen to be natural or unnatural is irrelevant. Her second point of having a common genus between horses and mules is not helpful because a higher common genus also exists for artefacts. A box and a couch may also share a common genus: a household belonging. As for her third point about the ‘natural hybrids’ ending up ‘resembling more closely the female parent’ (presumably she has in mind *Generation of Animals* II.4, 738b27-36, where Aristotle points out that in the successive generations of hybrids, eventually, the offspring will revert to the species to which mother belongs), the relevance once again is unclear. Whether or not the offspring will eventually resemble the female parent or revert to the species of their mother, the hybrids are all living

beings. They may be 'unnatural' in the sense that their *katamênia* prefers to be concocted by the male sperm of the same species. But then Papandreou is faced with the same dilemma as the mule example.

As for spontaneously generated animals, according to her (201n55), they come into being because 'the matter can move by its own agency in the particular way'. They are problematic 'if we imagine different species coming out of the same mud or rotting material'. However, it seems to her that 'one kind of putrefaction allows for one kind of species' and cites the comment by Asclepius of Tralles to support her view. Unfortunately, she fails to take the passages from *Generation of Animals* into account and relies exclusively on Z 9 (101 and 146). At II.3, 737a1-7, Aristotle mentions that the heat of the sun causes generation and at II.6 743a32-35, Aristotle explicitly identifies the efficient cause of their generation as the movement and heat of the 'climate conditions' (τῆς ὥρας). So, it appears that we have here the many-to-one relationship – many proximate materials and one form. Just as the father (who has the form) and the artisan (who has the form in his mind) are respectively related to their semen and tools and through their movements create their respective products, offspring and artefact (143-147), so the sun (that has the form) is accordingly related to its heat and through its movements create many different animals depending on the different kind of matter. So, in the cases of both natural and spontaneous generations, although their principles respectively exist in their *katamênia* and putrefied materials, they do not move by their own agency as such but require formal and efficient cause to generate living beings.

In fact, both the many-to-many and the one-to-one relationships obtain analogously for both artefacts and living beings, if we identify the appropriate corresponding levels of matter and form. Let's take a natural kind, dog, with its many breeds: Chihuahua, poodle, bulldog, German shepherd, etc. Could we not say that just like an artificial kind, couch, can be made from different proximate matter (stone, wood, etc.), so can the natural kind, like dog, be made from different proximate matter (the *katamênia* of Chihuahua, the *katamênia* of poodle, the *katamênia* of bulldog, etc.)? Why are not these instances of the many-to-one relationship or more precisely, of the many-to-many relationship, since any given breed

can reproduce with any other breed? Suppose the one-to-one relationship does obtain at the level of species, that is the form of dog has one-to-one relationship with its matter *qua* species (225), that is the *katamênia* of all breeds have some common feature in virtue of which they are all *katamênia* of dog. But can we not also say the same thing about the couch, that both stone and wood have the common feature (or some common passive capacities (107)) in virtue of which they are all the same proximate matter *qua* couch? In *Parts of Animals* 1.1, 642a9-11 (199n51), Aristotle gives the example of an axe – that it can be made of either bronze or iron, but the common feature mentioned is the ‘hardness’ (cf. her discussion of the saw from *Physics* 2.9 (197)). So, we have here the one-to-one relationship between the ‘hard’ proximate matter of an axe with its form. Contrary to Papandreou’s view, then, both in the case of artefacts, like axe, and living beings, like dog, the one-to-one relationship obtains at the level of species but the many-to-one (or the many-to-many) relationship at the level of sub-species.

My second issue is concerned with her analysis of artefacts from the metaphysical perspective. In contrast to *the matter/form reading* [the *MF* reading] that emphasizes the essential relationship that obtains between the form of properly unified objects and the matter at all levels (220) and investigates matter ‘*chemically*’ (226), she proposes *the parts/whole reading* [the *PW* reading] that focuses only on ‘the uppermost level of matter’ (220) that investigates matter ‘*mechanically*’ (226). According to this reading, artefacts are not substances at all because their proximate parts, unlike those of natural substances, are in fact actual and not potential. In other words, the proximate parts of artefacts allegedly violate the criterion of substantiality stated in Z 13: ‘no substance can be composed out of substances existing in actuality’ (238). To be a truly unified whole, the identity of its parts ‘must be swallowed up by the whole’ (238). In contrast, the parts of artefacts remain independent from the whole.

The basic problem, from standpoint of evaluating whether her view is correct, is that she failed to articulate *explicitly* the necessary and sufficient condition of the identity criterion of the parts based on

which we can ascertain whether the parts are actual (that is, retain their nature (244) independently of the whole) or potential (that is, 'swallowed up by the whole'). So, I shall instead examine two relevant examples she gives. The first one is this: '... the cogwheels could be made part of another device and be no less cogwheels. None of this, however, can be said of a human heart or the human flesh' (261). The second one occurs back in Chapter 6 (207-214) where she argues that the homonymy principle applies strictly only to the living beings because their diachronic and synchronic matter are both primarily functional – that is, their identity is essentially related to the whole, but the homonymy principle does not apply to the parts of artefacts because their identity is independent from the whole such that their diachronic and synchronic matter are primarily compositional. Here is the example: '... the matter and parts of artefacts can be reused once they are taken away from the whole. ... A separated eye ceases to be an eye and does not ever have the chance to become an eye again. By contrast, a separated stone does not cease to be a stone; hence, it can be a stone without being the matter of anything or it can be reused as the matter of another artefact' (209).

From the contemporary standpoint (that interest metaphysicians), the proposed difference between the cogwheels and a human heart (or for that matter other human organs) is false. An organ transplant is a counterexample. It is possible to mechanically remove a heart from one human being and be transplanted to another; that is, it is possible to reuse human parts such that they 'could be made part of another' human being. Hence, the identity of human parts throughout the procedure seems retained in the same way as any reused artificial parts. But since this is an anachronistic example, let me instead turn to the example with which Aristotle himself was familiar. *On Youth and Old Age* III, 468b16-28, Aristotle mentions grafting (ἐμφυτεία) – a transplanting of a part of one plant onto another plant, and cutting (ἀποφυτεία) – a planting of the part of a plant into the soil (see Katayama, 'Aristotle's *Physics* II 1 and Cultivated Plants', *Science in Context* 31 [2018] 405-419). Both are examples of a mechanical separation of the parts of plant, but they are reused for two different purposes: becoming a part of

another plant or growing as an independent plant. In addition, they can be 'reused' (via hybridization) for different kind of plants (cf. Theophrastus' *Causis Planatarum* 5.5.4.).

Her explanation of why, in contrast to artefacts, natural substances are really unified lies in the location of their respective principle: nature is an internal principle whereas art is an external one. As a result, the parts of the ensouled beings are all unified by their internal principle – their soul (255), but the parts of artefacts failed to be unified internally because they are brought into existence by the influence of their external principle such that their parts will always remain external to the whole (258-259); that is, they remain an actual part and hence retain their identity as a part. Irony here is that, according to Aristotle, grafting and cutting are possible precisely because the parts of plants retain its inner principle (ἀρχή). What seems to be the case is that although the parts of plants (with many branches that possess the principle) are a unified whole in the sense that their inner principles collectively work together to sustain the life of the whole plant, these principles seem to be dispersed throughout the whole in such a way that some of the parts seem to be capable of their own identity and hence seem to be actual *in the way* Papandreou illustrates in her examples.

In sum, although I agree with Papandreou's scalar view of unity – that artefacts are *less* of a unity than natural substances – and her binary view of substantiality – that artefacts are not substances *at all*, her novel solution to the problem of Aristotle's ontological status of artefacts (as presented in her book) needs further development with respect to providing a clear-cut demarcation between artefacts and living beings (natural or otherwise).

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