CHAPTER 8

The Physics and Metaphysics of Artefacts

The analysis of artefacts as hylomorphic compounds constituted of parts in actuality – thus failing to be substances due to the status of their parts – is susceptible to further enquiry. We might wonder why parts remain in actuality despite there being a form, or, in much the same way, why the form, once it is imposed by the artisan, does not turn the parts into potential parts. The answer to such questions takes the discussion back to the externality of the efficient cause. This time, however, the efficient cause at issue is not the maker but the user. This final chapter shows how further enquiry into artefacts' metaphysics forces us to return to artefacts' physics. At the same time, this further enquiry is in turn shown to fall outside the interests of a metaphysician and to be the task of a natural philosopher. For this reason, the chapter looks at artefacts as objects of inquiry and distinguishes between the perspective of the natural scientist, the maker and the user on the one hand, and the perspective of the metaphysician on the other. This discussion allows us to wrap up the results, to reassess the relationship between the *Physics* and the *Metaphysics*, and to evaluate the respective contributions of these works to Aristotle's ontology of artefacts.

8.1 The Dynamic Picture: Maintenance and Performance

We have seen that artefactual parts are in actuality and co-exist with a form that makes them into a hylomorphic compound. From this static perspective, I now move to a dynamic perspective that takes into account their life. Since artefacts are inanimate beings, the notion of life employed here has nothing to do with the soul, but rather concerns a system of motions whose existence is already implied by the static account of the part-whole relationship in artefacts. This different perspective also yields an explanation for why the form of the object as a whole is not able to actively change the identity and nature of its parts in such a way as to make them potential parts.

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We must first distinguish between *differentiae*, on the one hand, and art, on the other. *Differentiae* are formal causes inherent in an object, whereas, as was argued earlier, art is the efficient form in the mind of the artisan. Adopting a dynamic perspective shows that the artefactual parts remain in actuality, because the principle of the simplicity and continuity of the motions present in an artefact is external to its parts. To the question of why the *differentiae* make the artificial compounds unities to a lesser degree, one ought to answer as follows: despite being responsible for the unity and continuity of the object, the *differentiae* do not reside *in* the parts; and it is in this sense that they are external.[1] The object is still unified, but the principle of unification lies outside of the object's parts – leaving behind a complex system comprising various motions and lives.

One indication of this is the discussion of the one in the first chapter of Book Iota.[2] It focuses on the question of what it is for something to be one. Aristotle begins by setting aside accidental unity, and proceeds with an enquiry into per se unity, which is examined via a set of cases that fall under this type of unity. Some of the actualities listed in H 2, such as gluing (*kollêi*), nailing (*gomphôi*) and tying (*sundesmôi*), are causes of continuity and wholeness in I 1, and therefore causes of unity.

> There is the continuous, either in general, or most of all, that which is continuous by nature and not by contact nor by tying; and of these, those whose movement is more indivisible and simpler are more one and prior. Furthermore, that which is a whole and has a certain shape and form is such to a higher degree; and most of all if a thing is of this sort by nature, and not by force like the things which are unified by gluing or nailing or by tying together, i.e. if it has in itself the cause of its continuity. (*Met.* I 1, 1052a19–25)

One is said in many ways. Per se, 'one' can be said with reference to what is either (i) continuous or (ii) whole. Regarding the continuous (i), Aristotle distinguishes between what is continuous *haplôs* and what is continuous *malista*. On the one hand, it seems reasonable to take being continuous *haplôs* to be a very general characterisation that would include any objects displaying a particular ontological structure, which is the cause of the parts' sticking together. On the other hand, being continuous *malista* seems to be a specification that picks out what is specifically said to be continuous. At this point, Aristotle says that what is specifically continuous is what is such

[1] The way in which *differentiae* are external to matter is different from the sense in which art is an external principle: art remains external not only to the matter, but also to the object produced.

[2] The discussion in Iota relies upon the discussion in Δ 6, since, in the former (*Met.* I 1, 1052a15–16), we find what appears to be a reference to the latter.

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by nature as opposed to what is such by contact (*haphêi*) or by being bound together (*desmôi*). This opposition might seem to suggest that whatever is made continuous by contact or by a bond is not, in fact, continuous at all, including artefacts. However, it is equally conceivable that Aristotle aimed to spell out what he meant with 'by nature'.[3] If this is the case, Aristotle would not be implying that only objects that are continuous by nature can be regarded as continuous, but he would be saying, as in the case of the whole, that continuity makes natural beings one to a higher degree than artificial beings. Regarding the whole (ii), Aristotle first claims that a whole is more (*mallon*) one than what is merely continuous. Note the explicit mention of the presence of form and shape (*morphên kai eidos*), which was identified as the factor differentiating wholeness from mere continuity. Second, Aristotle claims that natural wholes are wholes *malista*, as opposed to wholes by force (*biai*), such as what is unified by glue, nails or being tied together.

This passage mentions both continuity and wholeness. Furthermore, it mentions (i) the lesser degree of unity of artefacts (produced by tying) and (ii) things unified by force. Given the examples that he uses (*hosa kollêi ê gomphôi ê sundesmôi*), it seems that Aristotle is including artefacts among the wholes that are by force.[4] There are three details that ought to be noted: (i) the wholeness produced by our initial *differentiae* is said to be by force; (ii) continuity is spelled out in terms of simplicity of motion; and (iii) the wholeness that is by nature is said to have an internal cause of its continuity (*alla echei en hautôi to aition hautôi tou suneches einai*).

(i) In *Physics* 8.4, 254b24–7, Aristotle explains that being by force is like being *para phusin*, because things that are by *biai* are arranged or moved differently than they would naturally arrange and move themselves. Stones, for instance, would not cluster together on their own in order to produce a house.[5] Let us consider the case of a natural substance, such as a man, and the case of an artefact, such as a house. The natural parts of a man are unified according to their

[3] This is also the view of Castelli (2018).

[4] Surely, in the production of a given artefact, there might be phases that do not strictly require forcing the matter against its natural tendency. It is, however, the whole that is 'by force'. For instance, perhaps the material for the foundations of a house need not be forced to the ground. However, the whole house is a product of forcing the matter into an unnatural overall composition. In response, one might think about a case in which the whole does not make violence to the parts: for instance, I need not make violence to the Lego bricks to put them on top of each other. However, the bricks would not by themselves arrange in such a way as to make the Allianz Arena model.

[5] Z 9, 1034a14–18.

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nature (i.e. their impulse). In other words, it is the very nature of the parts of a man to be unified in such a way as to form a man. By contrast, the parts of a house are unified in opposition to their own nature. I take the mention of force, instead of *technê* (which was used in Δ 6 and Δ 26), to be intended to emphasise that the parts maintain their own nature despite external intervention (i.e. to stress their passivity over their activity). In *Met.* Δ 23,[6] among the ways in which 'having' is said, Aristotle mentions the way in which the continuous (*to sunechon*) holds together things that would 'otherwise separate, each according to its own impulse'.[7]

(ii) Aristotle distinguishes between things that are continuous unqualifiedly and things that are continuous by nature. However, he also introduces a sort of criterion for establishing degrees of continuity and unity: 'of these, that has more unity and is prior, whose movement is more indivisible and simpler' (1052a20–2). Continuity is spelled out in terms of simplicity of motion, and simplicity of motion in terms of a criterion for unity. A simple movement is one that is not formed by the conjunction of different motions in different directions, and which is not formed by the conjunction of different kinds of change. If a given item has a simple motion, it is indivisible in movement.[8] It would thus seem that the simpler the motion, the more unified the object. However, this claim needs to be treated with the same caution as the continuity criterion. Simplicity of motion can, in fact, be ascribed to a range of items, and especially to items that constitute a unity only on the basis of their motion, but not in the sense of being a shaped structure on the ontological level. Let us consider the case of an anhomoiomerous part belonging to an animal. In a sense, the motion of the arm is simpler than the motion of the human body as a whole. Not only that, but the motion of the forearm appears even simpler than the motion of the arm. While the motion of a human body can be divided into many different motions, the motion of the forearm seems not to be liable to division into further motions. Once again, there is a way in which things that are not substances to the highest degree are more continuous than a substance in the proper sense, such as a human being. Taking

[6] *Met.* Δ 23, 1023a17–23.
[7] For a more detailed discussion of this passage, see De Ribera-Martin 2017.
[8] In the summary of I 1 (1052a34–1052b1), Aristotle also affirms that being one has to do with indivisibility. For the individual and the universal are indivisible in account and in thought, whereas what is naturally continuous (*to te suneches phusei*) and the whole (*to holon*) are indivisible in motion.

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motion as criterion for continuity requires us to exercise some caution: the unity that results from continuity alone does not suffice for wholeness. In order for a given being to be called a whole, its form must be the relevant factor holding together its parts. Wholes that have an internal cause for their own continuity are both whole and one to a higher degree: natural living beings possess an internal principle ensuring the cohesion of their parts. These wholes have a simpler motion. As stated in a passage we will soon consider (Δ 4, 1014b18–26), their parts grow together. The cause of the unity of a substance, such as a living being, is the soul, and the soul is also the cause of the unity of motion exhibited by that substance.[9] The degree of indivisibility in place and time of a given motion corresponds to the degree of unity of the relevant item. Certainly, what is most unified and has the simplest and most indivisible motion is the heavenly spheres. In the sublunary world, by contrast, natural substances have more complex motions than the heavenly spheres, but less complex motions than artefacts.[10] This last point is explained by the fact that the parts of a living being grow together, whereas the parts of an artefact can develop independently, and, hence, have independent motions. The overall Aristotelian discussion about continuity as indivisibility of motion seems to suggest that the indivisible motion of natural substances is connected to growth and development. In artefacts, the relatively independent lives of their constituents can be inferred from the complex motions they display. Thus, if we consider once again the passage in I 1, we can expand the static discussion about the lesser degree unity of artefacts into a dynamic one about their lives. Let me spell this out: Aristotle claims that natural beings have an internal principle of continuity, which means that natural beings also have an internal principle governing the simplicity of their movement. The opposite applies

[9] In *DA* 2.4, 416a6–20, Aristotle explains that the principle in virtue of which fire and earth are united and do not separate from each other by moving in their respective natural directions is the soul as cause of growth and nutrition. Against the view that fire alone suffices to account for nutrition and growth, Aristotle clarifies that fire would grow to infinity – or for as long as it can – whereas, in the case of natural beings, there is a limit and a proportion to their growth and size, which depends on the soul. The topic of limit and proportion introduces the relevant sense in which the soul is a principle not only of motion, but also of rest.

[10] Certainly, a hammer seems less complex than a human being. However, the indivisibility of the movement in time and place has to do with the metabolism of an entity. Living beings have complex movements insofar as they are made up of parts. However, they have simpler movements insofar as the complex movements of their parts are indivisible in place and time (i.e. the parts grow together).

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to artefacts. Artificial things lack an internal principle of continuity, and, above all, they can in no way be said to have an internal principle of motion. The static features I discussed earlier are reflected in a dynamic picture in which ontological status is determined by the presence or absence of a principle of motion. Artefacts have no internal principle of motion, and this is true with regard both to locomotion and to forms of motion such as growth.

(iii) Wholeness by nature is said to have an internal cause of continuity. Aristotle re-introduces here the distinction between an internal and an external principle. The discussion concerning continuity is crucially linked to the definition of nature as a principle inherent in a thing qua itself in *Phys.* 2.1.[11] All natural things have an internal principle of change, and this principle belongs to these things primarily and per se. Nature, as a principle, is internal to the thing of which it is the principle – not accidentally, but primarily and essentially. Although a couch undergoes changes that do not necessarily come from without, these changes are internal in a very loose sense: it is not the couch itself that changes, but its materials. If there is something natural in artefacts, this is their matter. Antiphon's provocative statement[12] in this regard is well-known: if a couch were to sprout, it would generate wood, rather than another couch. In order for the couch to change itself, an external agent is required. By contrast, in the case of artefacts, the source is either in something else (*en allois*) and external (*exôzen*), as in the case of building a house, or it is in the thing, but not in the thing qua itself, as we saw in the case of the doctor healing themselves.[13] As discussed in the previous chapter, nature is internal in the sense that it resides in the matter of a natural being, whereas art is external in the sense that it resides outside of the matter of the artefact.

Nature as an internal principle of motion is at issue in *Met.* Δ 4 as well, a chapter in which Aristotle enquires into the several meanings of 'nature'. It seems that one of these meanings of nature is quite close to what we find in the discussion of I 1. Indeed, Aristotle introduces the same important concepts, namely contact, unity and continuity:

> That from which the primary motion in each of the natural thing is present in it in virtue of its own essence. Those things are said to grow which derive

[11] For a detailed discussion of art as an external principle as opposed to nature as an internal principle, see Chapter 5 (Section 5.1).
[12] *Phys.* 2.1, 193b8–12 (see Chapter 6). [13] *Phys.* 2.1, 193b27–32.

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> increase from something else by contact and either by organic unity, or by organic adhesion as in the case of embryos. Organic unity differs from contact; for in the latter case there need not be anything besides the contact, but in organic unities there is something identical in both parts, which makes them grow together instead of merely touching, and be one in respect of continuity and quantity, though not of quality. (*Met*. Δ 4, 1014b18–26)

Nature is once again an internal principle and natural things are said to grow. Growth is a sort of increase due to either contact,[14] organic unity or organic adhesion with something else. Aristotle contrasts mere contact with organic unity (i.e. touching with growing together). In the case of organic unity, the two things involved are not really two separate things. In both of them, there is something identical which makes them one in actuality, because they are continuous and identical in quantity, though not in quality. This point is very important. Aristotle is saying that, in the case of an organic unity, there is one thing (*ti hen*) that is present in an identical way in all of the parts (*to hauto en amphoin*). For instance, in a human being there is one thing, which is *nature*, that is present in an identical way in their legs and their arms. Because nature is present in the same way throughout the parts of a natural being, the parts grow together, assuring natural continuity through time as well. When Aristotle affirms that these parts are one with respect to continuity and quantity, but not with respect to quality, he means that nature makes the parts continuous (*hen kata ton suneches*), turning them into a single, unified thing (*kai poson*), while maintaining their qualitative differences (*mê kata to poion*). The one thing that is present in the same way in the parts is, in fact, nature as a principle of motion, continuity and the cohesion of these parts.[15] In Z 16,[16] Aristotle explains that the parts of living beings can be wrongly taken for parts that also are in actuality, precisely because the principle of motion is in their joints.[17]

In the case of artefacts, we still talk about something which is 'besides the contact' (*para tên haphên*) but it seems mistaken to say that in both parts there is something identical. If the parts of artefacts are in actuality, each of

[14] Increase due to contact is nutrition.

[15] Nature as a principle of motion and rest is, in living beings, the soul. In *DA* 2.2, Aristotle says that in plants the soul is actually one, but potentially many (413b18–20).

[16] Z 16, 1040b10–13.

[17] This is most frequent in the case of separated animals and plants (like in *DA* 2.2). In *PN*, *On Length and Shortness of Life* 6, plants resemble insects in that they are able to continue living even if they are divided – although insects can do this for a shorter time than plants. Plants can survive for a longer time because they possess 'potential root and stalk in every part of it' (467a23–4). On divided plants and insects, see also *PA* 4.6, 682b28–30.

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them possesses its own form. Artefacts do not constitute a dynamic unity: their principle assures a sort of continuity, but not the unity necessary to make the parts grow together and form a single thing in the fullest sense. This picture remains unclear, however, in the absence of further specifications. In the case of an organic unity, there is a single thing (*ti hen*) that is present in an identical way in the parts (*to hauto en amphoin*). This thing has been identified with *nature* as efficient cause – which, in case of natural substances, coincides with the inherent form. However, the case of artefacts is less clear, for their form does not coincide with an efficient cause. Moreover, in H 2, gluing and fastening are presented as formal causes or *differentiae* (analogous to actualities) in that they are causes of unity. In I 1, they are introduced as causes of continuity as opposed to nature – hence suggesting that they are like *technê* (i.e. efficient causes). Thus, this reconstruction seems to produce an inconsistency and a point that is unclear. The inconsistency lies in the fact that gluing and fastening are first formal causes and then efficient causes. The point that is unclear concerns that which, in the artificial case, is *not* present in an identical way in the parts – whether an efficient cause or a formal cause.

The apparent inconsistency can be explained with reference to Aristotle's point. The discussion of H 2 applies to artefacts, as well as to natural beings: the emphasis is on the inherent form as the cause of unity. Gluing and fastening are inherent forms, as structuring formal principles. The glue, for instance, is inherent in – or let us say internal to – the object as such, while being external to the matter. The various parts are glued together, but do not have glue inside of them. The passage from I 1 emphasises the difference between natural and artificial things, hence the stress is on the externality of the structuring principles to the matter. Like the *technê* itself, the formal structuring principles of artefacts, such as gluing and fastening, are external to the matter; but unlike *technê*, such principles are not efficient causes and are internal to the object – although not present in an identical way *in* the parts. Precisely because the efficient cause and principle of the form (i.e. *technê*) is external to the parts, the inherent form (e.g. gluing), although inherent in the object as a whole, is found *between* or *around* the parts, but not *in* the parts. That which, in the artificial cause, is *not* present identically *in* the parts is therefore the structuring formal cause, whose principle (i.e. *technê*) is not present in the matter.

H 2 left unexplained an urgent question: why are the actualities of artefacts only analogous to the actuality of substances? It is not because they are not necessarily related to matter, as the *MF* reading suggests. The

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structuring principles of H 2 are merely analogous to the actualities of substances for two related reasons: (i) because they are not efficient causes and (ii) because they are not *in* the thing's matter.[18] The actualities of artefacts are analogous to the actuality of substances because they are principles of unity, continuity and simplicity of motion, but they are *merely* analogous because they are not efficient causes residing in the relevant matter – as is the case with the soul. A bond is the structuring formal principle of a bundle, that is, the cause of its unity and continuity. However, a bond is merely analogous to the soul, since, deriving from a principle external to the matter, it does not structure the matter from within.

As the dynamic picture suggests, the motion whose principle is *technê* is not only coming-to-be, but also development and growth.[19] Other motions, whose principle is *technê* is what I shall call 'maintenance' and 'performance'. Maintenance is what it takes to preserve the object in a state sufficient for it to be able to perform its functions. Performance is carrying out the functions or the typical activity of the object. Both maintenance and performance have an external principle in the case of artefacts. Both motions can, in principle, be carried out by either the maker or the user. Typically, however, maintenance and performance will be the task of the user. Thus, the proper activity of a given artefact crucially depends on the intervention of a capable user.[20] The maintenance of a house and its performance as a house are motions that originate externally, in the user. For the house to be preserved as something capable of protecting people and belongings, at times the user needs to intervene by, for instance, replacing a brick. In order for the house to perform its proper activity, someone needs either to live in it or to put their belongings in it. The same goes for highly self-sufficient objects, such as a clock.

The *differentiae* of artefacts are analogous to actualities of substances, because actuality applies to them to a lower degree. As we said, the form of

[18] The use of the term *diaphôra* might also be meant to cover different cases. The cases at issues in H 2 are the following: (i) forms that are actualities (forms of substances); (ii) forms that are analogous to actualities in being principles of unity, continuity and simplicity of motion (forms of artefacts); (iii) forms that are analogous to actualities in being picked out to answer (albeit improperly) the 'what is it?' question (conventional forms; i.e. qualities, such as time in the case of dinner and breakfast).

[19] On a certain account, one might say that development and growth are the same as coming-to-be. For instance, a human being really comes-to-be once it becomes an adult, not yet when it is a foetus or a kid. A house really comes-to-be once there is more than just the foundations. With the due qualifications, coming-to-be and development as completion might or might not coincide. In the view I developed in Chapter 4, I argue that the parts of a house in the process of housebuilding are already a house.

[20] 'Capable' because one ought to use it correctly. See the example of the strigil in *Top.* 145a20–7.

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artefacts is an actuality insofar as it makes the whole one and turns a plurality of matter into a unified object. The form is not, however, an efficient cause: the form is not the principle of their coming-to-be as much as it is not the principle of their maintenance or their active performance. To this extent, artefactual forms are merely analogous to the actualities of substances, which, by contrast, are able to maintain and activate themselves. *Technê*, as the efficient cause of all such motions, is responsible for elevating the actuality of artefacts to a higher level. The user is ultimately responsible for an artefact reaching full actuality, while a living being is ultimately responsible for its being a perfected or complete substance (growth and development) and for actively using its powers (performance). To this extent, I agree with Witt's (2003, 74) view that actuality admits of degrees and that a being is actual in the fullest sense when it is continuously exercising its fully completed and perfect powers. But I also agree with her claim that Book Θ, where actuality and potentially are chiefly discussed, is not intended to solve the problem of the unity of matter and form in sensible substances. This also means that whether something can exercise its powers straightway and independently does not yet address our concerns about the substantiality, at least not directly. For the problem of the substantiality of sensible substances is a problem of unity and, in the case of artefacts, it has to do with the actuality of the parts primarily, and only secondarily with the activity of the object. While my reading does not intend to deny the importance of *energeia* for an object's existence, it does depart from the position that artefacts' lower degree of *energeia* eliminates our concerns about their ontological status. This is much the same as what we saw in our discussion of the *MF* reading.

It is important to clarify that here we are introducing another sense of actuality, more in line with the discussions of Witt and Kosman.[21] The way in which artefactual parts are in actuality, on my account, is that they are what they are independently of being parts of a given artefact. By contrast, the way in which the form of an artefact is not an actuality *in the full sense* is that it is not responsible for the execution of the object's activities. Moreover, the flip side of the coin is that parts of living beings, in this sense, are far from being in potentiality, for parts of substances only achieve

[21] Kosman (2013) distinguishes between *energeia* as *kinesis*, which is an incomplete mode of activity, and *energeia* as *energeia in the strict sense*, which is a complete mode of activity. The former is a change or motion whose realisation uses up and therefore extinguishes the ability (*dunamis*). An example of *energeia* as *kinesis* is the motion of wood being made into a lintel. The latter is a realisation coinciding with the full exercise of an ability (*dunamis*), a realisation that does not destroy the capacity but, on the contrary, brings it to its full being. An example of proper *energeia* is a builder who is building.

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their fulfillment (*entelecheia*) as the sort of matter they are as parts of the particular substance there are parts of. The wood of the box, by contrast, is no less wood inside or outside the box. Even taking a highly self-sufficient artefact, such as a clock, 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. *Energeia* as activity, in this sense connected to the fulfillment of a being's nature, explicates, according to Kosman's account, the nature and unity of substance. On my view, this sense of *energeia* tightly related to *entelecheia* instead *mirrors* the higher degree of unity of substance without yet telling us that animals are substances and why this is the case. Moreover, as I will explain in the next section, the activity of the object or of the essence (as Kosman puts it), as the range of functions and performances typical of the item in question, primarily concerns the object's behaviour and thus is the primary object of interest of sciences other than metaphysics or first philosophy. In other words, the fact that the form is not fully activated until the user intervenes does not mean that the artefact exists only in potentiality. The house is an actual house also when it is not being used, so long as the form is there structuring and unifying the matter. Again, the activation of the form in terms of use and explication of characteristic activity is not the metaphysician's business. I will return to this point in Section 8.3.

8.2 Back to the *Physics*?

In Chapter 3, we saw that the *Physics* serves as a fruitful starting point for reconstructing Aristotle's theory of artefacts. Far from providing two unrelated, or even incompatible, accounts of artefacts, the *Phys*. and *Met.* are linked to a significant degree. We can glean from the *Physics* the building blocks for Aristotle's account of artefacts. Indeed, there we find the discussion of the art analogy, the theory of the four causes and an explicit statement of the salient difference between artefacts and natural beings. These building blocks establish that artefacts can be accounted for by reference to all four causes, possess intrinsic ends and lack an inner efficient cause. Turning to the *Metaphysics*, we discover that artefacts possess parts in actuality – which cannot become potential parts – because the efficient cause is external to their matter. The static picture drawn in Chapter 7 translates into the dynamic picture of Section 8.1, which circles back to the fact that *technê* is the efficient cause and is external to the artefact. The route of such a reconstruction makes us wonder whether the *Phys.* provides from the outset all we need to know about artefacts, and

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the *Met.* is there only to draw the consequences of these building blocks in terms of substantiality.

Surely, the explanation of why artefacts lack the degree of unity required to be a substance refers to their lack of an inner principle of motion and rest. Chapter 5 (Section 5.3) argues that forms of artefacts are not efficient causes, but that this is not the immediate reason why artefacts are not substances. The immediate reason was identified in Chapter 7, which argues that artefacts are not substances at all because their parts are in actuality. Chapter 8 expands this result by showing that parts remain in actuality, because an artefact's efficient cause is external to the object as a whole, and an artefact's form is external to its matter. It might seem that the *Phys.* provides considerably more than just the building blocks of Aristotle's ontology of artefacts. Perhaps it offers Aristotle's ontology of artefacts, but this is just not what we are looking for when we read it. Three considerations of increasing significance need to be advanced in order to dispel our doubts.

The first consideration goes back to Chapter 5 (Section 5.3), where the possession of an inner efficient cause was shown not to be a decisive factor for whether something counts as a substance or not. While it is true that everything that lacks an inner principle winds up not being a substance, it is also true that not everything possessing an inner principle turns out to be a substance. Entities such as elements and parts of animals are equipped with an inner principle of motion and rest, but still fail the substantiality test in *Met.* Z 16. This means that whether something satisfies the criterion of substantiality cannot be straightforwardly deduced from having an internal or external principle.

The second consideration involves taking a broader look at physics and metaphysics, as disciplines and will be addressed in more detail in the next section. Simply put, the *Phys.,* as inquiry into motion, is silent on the question of whether artefacts are substances. The criterion of substantiality is presented only in the *Met.* While in the *Phys.* the salient difference between natural beings and artefacts is the principle governing their behaviour, in the *Met.* the problem of substantiality is importantly a problem of unity, such that the lesser degree of unity of the artefacts primarily has to do with their possession of actual parts. It is indeed quite plausible to assume that the unity has to do with the externality of the cause, as an external cause does not achieve the same kind of unification. After all, what it means to have actual parts is that a given part has its own independent nature, for if the cause were internal, the part would not retain its own independent nature. As the cause is external, the parts do not

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lose their nature. Of course, it is conceptually possible for the cause to transform the nature of the parts – think, for instance, of a divine being making a human being. This is, however, possible only conceptually, for an external cause cannot turn the actual parts into merely potential parts.[22] The salient feature of artefacts in the *Phys.* and their non-substantiality in the *Met.* can be integrated, for an external cause does not deliver the right sort of unification, which is necessary for something to be a substance. However, this result had not yet been reached in the *Physics*; the problem of substantiality and the criterion that artefacts fail to meet are presented only in the *Met.* Moreover, if the criterion is unity, the immediate reason why artefacts are not substances must refer to their unity first. Only a further explanation of that unity will then have to refer to the externality of the principle.

The third consideration goes further than merely stating that the *Phys.*, as an enquiry into motion, is silent on the problem of substantiality and does not provide us with the criterion of substantiality that artefacts fail to meet. If this were the whole story, we might think that if we knew the criterion of substantiality, we could answer the question of what things are substances in the *Phys.* We might think that, since we know from the *Phys.* that artefacts have an external principle, we can draw the conclusion that artefacts are not substances, because external principles do not properly unify things. However, if we were to rifle through the *Metaphysics* in an attempt to find the relevant substantiality criterion and, once we discover it, simply borrow it for a moment and turn it back to the *Phys.*, we still could not grasp Aristotle's ontology of artefacts. In order to know that artefacts fail to meet the unity criterion, we would need to know *that* artefacts are not fully unified. In other words, in order to know that artefacts are not substances, because their parts are in actuality, we would need to know that the parts of artefacts are, in fact, in actuality. Inferring from the externality of the efficient cause as presented in the *Phys.* that artefactual parts are in actuality requires extra help from the *Met.* In the best-case scenario, we might infer from Antiphon's example that form and matter are accidentally related in artefacts. While this is indeed a promising, if not the right, path, it has the same shortcomings as the *MF* reading. Moreover, if we take a broader look at the *Phys.*, the result that artefacts are not unified in the relevant sense can even be said to be hindered. It takes the help of the *Met.* to understand not only that artefacts

[22] Or, for that sake, also the case of a mixture, which in fact turns out to be a natural being like the human being made by God.

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are not substances, but also that the parts of artefacts are in actuality. Indeed, the ascription to artefacts of the theory of the four causes, intrinsic ends, unqualified coming-to-be and per se continuity, all seem to rather point to the direction that parts of artefacts do not differ from parts of natural beings. Only the *Met.* tells us that continuity yields a lesser degree of wholeness in artefacts, or that unqualified coming-to-be needs to be reconditioned in light of the artefactual case.

8.3 Artefacts as Objects of Inquiry

One of the reasons why the *Physics* does not deliver Aristotle's ontology of artefacts is that the enquiry into nature entails a perspective that takes on a different angle. Aristotle's ontology of artefacts certainly requires the building blocks of the *Physics*, but is seen from the perspective of the metaphysician, thus taking on a different but complementary angle. In what follows, I present the content of Chapter 6 as corresponding to the perspectives of the natural scientist, the artisan and the user, whereas I present the content of Chapter 7 as corresponding to the perspective of the metaphysician. The disjunction between two main perspectives by which the same object is seen means, to not beat around the bush, that I take artefacts to be amenable to different kinds of explanation and the respective disciplines to be concerned not so much with a specific object as with a way of viewing a specific object.[23] I might be enquiring into a house as a housebuilder, as a natural scientist or as a buyer and user. But I might also be enquiring into the house as a metaphysician, asking what a house is insofar as it is some *one* thing. I would therefore be asking what a house is insofar as it is a house. The answers to those questions might be different or only partially overlapping, but neither answer is wrong or deficient. Indeed, I do not mean to tease apart the physical and the metaphysical approach. After all, the very reconstruction of Aristotle's ontology of artefacts presented in this book had to take on both perspectives. However, in this section, I am going to separate the two approaches for the sake of clarity. Contemporary metaphysicians, I suggest, might want to take Aristotle's ontology of artefacts to coincide with the resulting

[23] The application of such a distinction to the case of artefacts has also been entertained by Cameron (2019). She too distinguishes between the domain of the natural scientist (i.e. nature and its parts), the domain of the metaphysician (i.e. being) and the domain of the medical doctor, for instance, which is healing and health. She shifts the focus from the final cause to the efficient cause, and I find her approach highly promising. I depart from it to the extent that I maintain that the shift is not sufficient to account for the ontology of artefacts.

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perspective of the metaphysician. In other words, teasing the two approaches apart serves a couple of purposes tailored to two types of readerships. The historian of philosophy can overcome the confusion Aristotle creates by offering different definitions of the same artefact, for instance the definition of house as either a shelter or composition. On the other hand, the demarcation of a purer metaphysical perspective can be handed over to the contemporary metaphysicians, who are divided between assigning more authority to the agent or to the existing object when it comes to account for artefacts' essences.

Both physical and metaphysical perspectives differ from the mathematician's take. As we read in the first book of *DA*, the natural scientist ought to define the affections of the soul by considering they are expressed in matter, 'with such an end in view' (1.1, 403a27).[24] Sometimes different attributes are the business of the expert, such as the carpenter or the doctor (the maker). However, affections considered in separation from the matter (i.e. in abstraction) are the only province of the mathematician. The metaphysician is said to consider the attributes not in abstraction from matter but insofar as they are separable (i.e. to the extent to which they are separable from matter), however large or limited this extent might be. If the object at stake is a house both the metaphysician and the physicist will fail to give proper definitions or capture the nature of the object if they speak solely of the form (i.e. a type of covering or composition respectively).

8.3.1 The Physicist, the Artisan and the User

Chapter 6 dealt with the relation between matter and form in artefacts and the identification of artefactual forms with functions. The perspective adopted by the chapter is that of the natural philosopher, the artisan and the user. What is specific to this perspective is the interest in the behaviour of artefacts more than their being as such. For different reasons, the natural philosopher, the artisan and the user are interested in the final cause of artefacts and in how the parts of an artefact contribute to its end as its proper activity.[25] Certainly, physics concerns itself with nature and natural beings, such that artefacts should fall outside its scope, or only be taken into account with regard to their matter. For this reason, either there is no science of artefacts whatsoever or there is a science of the artificial that is at

[24] See also *Phys.* 2.1, 194a1–5, which I shall discuss in the next section.

[25] By 'proper activity' I mean something along Kosman's (2013, 97) lines, when he defines 'function' as 'proper activity' or 'to be doing the work'.

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least analogous to natural philosophy. To claim that there is no science of artefacts would force us to ignore a conspicuous number of passages where Aristotle seems to go as far as to suggest the existence of several sciences of artefacts.[26] By this, I mean the distinction between the knowledge of the artisan, of the user and of the natural philosopher. The possession of *technê* itself comes with the knowledge of the object to produce. The main possessor of *technê* is the artisan. In *Phys.* 2.2, Aristotle distinguishes between two arts, one concerned with use and the other with production. Both arts rule over matter and know it, but the art concerned with use knows the form and is thus architectonic: 'For the captain knows what sort of form the rudder should have and prescribes it, whereas the other knows what sort of wood and by what movements' (194b5–7). The user's knowledge rules over that of the maker.[27] It seems like the user ultimately poses the end and the producer makes the matter for that end. Although the end is given by the prospective user, this does not mean that the artisan does not know the form. On the contrary, the artisan is informed about the form by the user *prior* to production. The artisan must indeed know the form and the end according to which the matter is fashioned. Moreover, the artisan needs to know how to develop it so that it behaves according to the user-established and then maker-embraced end. Only at a later point, once the production is completed, will the user bring the artefact to full activity. To be clear, the prospective user ought to be a capable user. For a strigil to be brought to full activity, the user must use it in relation to its 'natural correlative' (*pros ho pephuken*), to scrape off dirt and sweat, instead of pouring water for instance. A capable or wise user (*phronimos*) will indeed use the strigil 'according to the science appropriate to each thing' (*peri hekaston oikeia epistêmê*; *Top.* 145a26–7). This passage not only ties the nature of an artefact to its function from the user's perspective, but also explicitly states that there is a science appropriate to each object. Although the user might lack expertise about the matter and its proper movements, the artisan's knowledge, which embraces the user's end, is knowledge of the matter and form as function.

Aristotle stresses that in the case of artefacts 'we produce the matter for the sake of the function, whereas with natural things the matter is already present' (194b14–15). The implication seems to be that as much as there is an account of natural matter, there is also an account of 'matter for the sake

[26] For the view that there is no science of artefacts, see Bolton 2018, 2021.

[27] See also *Pol.* 3, 1277b28–30: 'The excellence of the subject is certainly not wisdom, but only true opinion; he may be compared to the maker of the flute, while his master is like the flute-player or user of the flute.'

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of a certain artefact'. I fail to see how such an account could not amount to a science of the artificial. What is more, such an account could also be the target of a user or a maker, as well as of a natural philosopher. *Phys.* 2.2 ends with a reflection on the knowledge of the natural scientist. As opposed to mathematics, natural science understands natural bodies together with movement, as flesh, bone and human are not without movement. The natural scientist is not concerned with matter alone, but natural bodies are like snubness (i.e. they are with matter). Since art imitates nature, and the doctor as well as the builder know both matter and form, the natural scientist too will consider both matter and form. Aristotle clearly moves from the artisan's knowledge to the physicist's knowledge, both of which must take into account matter and form. This once again suggests that a science of the artificial analogous to physics is the science of matter and form of a given artefact, where the form is that for the sake of which. While the natural scientist studying a certain animal, say dogs, will be interested in explaining how dogs are insofar as they behave in accordance with their nature, the scientist studying houses will be interested in explaining how houses are insofar as they behave in accordance with their nature (i.e. their proper activity).[28] At the end of the chapter, Aristotle raises the question of the point up to which the natural scientist must know the form. The limit is once again that for the sake of which. To this extent, for the natural philosopher, the user and the maker, the form is primarily functional. As was said, the natural philosopher is interested in explaining how houses are insofar as they behave in accordance with their nature, which is their function (or final cause).[29] This means, conversely, that the natural scientist must consider their nature or form insofar as it is primarily a function dictating their behaviour. For the natural scientist, the nature of a house is primarily its sheltering function; thus, they ought to consider the house's form as structural principle only secondarily; that is, in the case in which they further wonder about the details of how exactly the matter is made able to perform that function (i.e. in this case, by being composed in a certain way). In other words, when looking at an artefact, the natural scientist will understand it in terms of its functionality first, considering its structural being only in the attempt to retrospectively reconstruct the artisan's work. As I suggest in the next section, the opposite is the case for the metaphysician. Another difference between the artisan/user's

[28] Coope (2021, 123) draws a difference in exceptional cases: 'an expert in the science of tree frogs can explain how tree frogs are *in so far as they are developing and behaving in accord with their nature*.'

[29] Note that Aristotle calls forms of artefacts 'natures' only when he refers to functions (i.e. the notion the natural philosopher is interested in).

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knowledge and that of the physicist emerges more sharply in the case of artificially produced members of natural kinds, such as chemical compounds.[30] While it remains true that the natural scientist targets the forms primarily as functions, in the case of the more specialised chemist, the final cause cannot always be found, for the things that are more 'mattery' escape this kind of explanation (*Meteor.* 4.12, 390a2–4). If, however, the artisan or the user needs to reproduce a certain compound for a particular purpose, the function comes in even in the case of chemicals. For instance, the doctor might need to reproduce the mixture of honey-water for the sake of health (i.e. with a healing function). The chemist, however, in understanding honey-water, will be interested in explaining its active and passive capacities without introducing the healing function.[31]

8.3.2 The Metaphysician

Phys. 2.2 ends with the question of the extent to which the natural scientist must know the form, and concludes that 'the way the separable is, and what it is, is the function of primary philosophy to determine'. The question of the extent to which a science must know the form can also be addressed to the metaphysician, who, by focusing on being qua being and the separable, must target the form. Chapter 7 presented the relation between parts and whole in artefacts and the identification of artefactual forms with structural principles (rather than functions). In Chapter 6 (Section 6.1), I argued that forms of artefacts are like forms of living beings in that they are functions. We have now reached a point where this thesis demands qualification, especially since, in Chapter 7, forms of artefacts were identified with structuring principles rather than functions. Thus, there is a sense in which forms of artefacts are functions and a sense in which they are not – or, at least, not yet. The sense in which they are not *yet* functions explains why multifunctional objects do not have several forms, but only several functions. Those instances in which Aristotle identifies forms of artefacts with functions range from the art analogy to the definitions provided in *DA* and *An. Post*. What these passages have in common is that they assume the perspective of the natural philosopher, who ought to consider both formal and material aspects, taken *together*, of the object in

[30] Chemical compounds are, however, natural beings, not artefacts – even those artificially made (see Introduction).

[31] For an illuminating discussion of the differences and analogies between scientific knowledge and productive knowledge, see Coope (2021), who also stresses, among other things, the ability of the producer to deal with exceptional cases.

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question as functional. When faced with a house, the natural philosopher will not have an appropriate grasp of the bricks and stones before them, if they think in terms of 'composition' rather than 'being a shelter'. The importance for the natural philosopher of taking matter into account is revealed by the primacy of the final cause over the formal structuring cause.[32] Suppose that the natural philosopher is interested in knowing about what a house does: the fact that it is a composition of bricks and stones does not help them, whereas the fact that it a composition of bricks and stones arranged for the purpose of providing shelter might help them to understand why it is so resistant to rain and wind. The final cause is what ultimately dictates the structuring principle at work. From the natural philosopher's standpoint, bricks and stones are put together for the sake of providing shelter. By contrast, suppose that the metaphysician is interested in knowing what the house is insofar as it is: the fact that it is for the sake of providing shelter simply adds a further specification (H 2) in cases where the mention of the structuring cause does not sufficiently narrow down the field to the one thing we are pursuing. This is why, in the discussion of sensible substances in the middle books of the *Metaphysics*, and especially in H 2, the mention of the structuring cause suffices in most cases.[33] For instance, in order to understand what honey-water is, it is enough for a metaphysician to know that honey-water is honey and water blended together. By contrast, this account is unsatisfying, at the least for the natural philosopher, who would be foolish (or lazy) to answer the question of why honey-water is useful for a patient with a fever (*Met.* E 2, 1027a20–4) by saying 'because it's honey and water blended together'. However, Aristotle says, 'in some cases the final cause goes in' even in the account

[32] The natural philosopher reasons in the same way as the maker, but in the opposite direction. See Chapter 4 (Section 4.1.1).

[33] With this, I am not endorsing the claim that the form of an artefact is its shape. The form of an artefact is its shape only if shape is its structural principle, as in the case of a statue. A statue comes-to-be through the actuality-inducing action of shaping the matter. What makes a lump of bronze a statue is, in fact, its shape – human, for example. In this case, the human shape is also the structuring principle of that lump of bronze. The reason why Aristotle never mentions the final cause of a statue lies precisely in the fact that knowing that the statue is a human-shaped lump of bronze is enough to fully account for the statue's existence and being as one single new thing. While certainly the chosen shape as such, say Hermes-shape, might already tacitly bring in the final cause, it is upon further inspection that the statue is a Hermes-shaped bronze in honour of Hermes. The only reason to specify that, say, it is shaped in this way for the sake of honouring would be in order to distinguish one specific statue from another statue made for another purpose. Hence, one can easily see that Aristotle is unable to apply the same theory to all artefacts, in the sense of claiming that the forms of artefacts are in all cases shapes or configurations. For instance, shape is not a structural principle of a house. If shape were a structural principle of a house, the house would only have the shape of a house and hence it would be a depiction of a house.

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provided by the metaphysician; that is, when the structuring principle needs further qualification in order to pick out a single kind. To take Aristotle's example, in order to understand what/whether a house is, it is not enough for a metaphysician to know that a house is 'bricks and stones composed in a certain way', because bricks and stones composed in a certain way – without the further specification to the effect that they are composed in such a way as to provide shelter – could apply to things other than houses, including walls and other constructions. Hence, for the metaphysician, the structuring formal principle has primacy over the final cause.[34] While they still agree with the natural philosopher that bricks and stones undergo composition for the sake of providing shelter, all they want to know is what a house is, insofar as it is or exists (i.e. insofar as it is one). Thus, they would not be foolish to say that honey-water is honey and water blended together.

The metaphysician shares some common interests with the natural scientist. They both have to distinguish between per se causes and incidental causes and pick out per se causes. In their endeavour, they also have to focus on prior causes rather than posterior causes and attain the right level of generality. The latter task amounts to providing an account that is tailored to the question, whether it concerns general kinds (houses), more specific kinds (a type of house) or a specific particular object (that particular house). These distinctions must be considered with reference to each of the four causes. Just like there is a physics for natural bodies, it is hardly deniable that there is a metaphysics of sensible substances, chiefly developed in *Met.* H. Form or actuality is the factor common to divine substances, matter-form compounds and mathematical objects. The metaphysician of sensible substances will focus on the prior, general, per se, formal cause in terms of structural principle (i.e. framed as a question of why a certain plurality is one single thing). The function is therefore not fundamental to the explanation of an artefact's being qua being, as the *telos* is part of the efficient cause.[35] There is indeed a way of specifying what an object is – even an artificial object – which is prior to the way it comes into existence. And this way generates no tension: there is no tension between stating that a house has a certain *function* insofar as its materials are *structured* in this way and affirming that a house has a certain *structure* insofar as its materials contribute to this *function.*

[34] See *Met.* B 1, 998b1–3: if the metaphysician examines the nature of a couch, they will know the parts from which it is composed and the way in which they are put together (*ex hôn moriôn sunestêke kai pôs sunkeimenôn*).

[35] Cameron 2019, 75.

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8.3.3 The Cheap Coppersmith and the Spit-and-Lampstand

The formal cause of artefacts is both functional and structural, but whether it is *primarily* functional or *primarily* structural depends on the question we are asking, that is, on the perspective we are examining it from. In fact, if the question concerns how the parts of the artefact contribute to its end, then naturally one ought to mention the final cause. However, this is a question of behaviour, not of being, and in this sense, it is a question that the artisan, the user and the natural philosopher would raise. By contrast, those studying being qua being and the artefact qua being are studying an artefact qua being one. The question a metaphysician would then ask is how the plurality of matter is one single thing. For this purpose, the mention of a structuring principle will do the job in most cases. The case of multifunctional objects illustrates this state of affairs well.

A particular form might contain several functions, if the artisan has several arts and forms in their mind. For instance, a keychain bottle-opener presumably possesses a form containing two functions, that of a keychain and that of a bottle opener. This sort of thing cannot happen in living substances, such as animals and plants.[36] Despite our use of a modern example, Aristotle can be shown to have contemplated this possibility. In the natural kingdom, this possibility is found only at the level of parts. In *PA* 4.6, in the context of a discussion of the parts of insects, Aristotle states the so-called principle of the 'division of labour'[37] asserting that 'it is better, when it is possible, that one and the same organ should not be put to dissimilar uses' (683a20–1) and that 'whenever it is possible to employ two organs for two pieces of work without their getting in each other's way, Nature provides and employs two' (683a22–3). This is not, however, always possible and it happens that Nature 'employs the same organ to perform several pieces of work' (683a25–6). For instance, in small two-winged insects, the tongue fulfils the functions of nourishment and protection. Nature would, however, keep these two functions separate and performed by two distinct organs (or parts) if it were at all possible. It is precisely in this sense that Nature does not act like a cheap coppersmith who makes a spit-and-lampstand (*obeliskoluchnion*).[38] The spit-and-lampstand is

[36] Living beings are multifunctional too, but it is one form (i.e. the soul) that is responsible for all functions. In the case of artefacts, we might think of both a case in which one form, say composition, is responsible for the house to shelter and perhaps some other function, and a case in which two forms are applied to the same matter.

[37] On the principle of the 'division of labour' in living organisms, see Tipton 2014, chapter 6. Leunissen (2010, 147) calls it the 'principle of economical distribution'.

[38] 683a24–5: 'a device used in military encampments as a spit to cook over a fire and as a lamp-holder' (Lennox 2001, 307).

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an instance of two functions packed into a single object. The example recurs also in the *Politics*, where Aristotle compares offices in small communities to a spit-and-lampstand, in that they encompass several different functions (*Pol.* 4.15, 1299b8–12). At the beginning of the political works, one can find the principle of the division of labour stated in *PA*. Nature distinguishes between female and slave, in this way acting differently from the smith who fashions the Delphian knife, giving it many functions (*Pol.* 1.2, 1252b1–3).[39] The reasoning behind Aristotle's devaluing of multifunctional objects is that something serving a single purpose would fulfil its proper function in the best way (*Pol.* 1.2, 1252b3–5). At any rate, what is interesting in this discussion is not so much the axiological qualification of multifunctional objects – since Aristotle like Plato does not base his metaphysical account on considerations of value (see Chapter 1, Section 1.3.2)[40] – rather, it is that Aristotle takes multifunctional objects as a theoretical possibility revealed by empirical evidence. This fact raises a couple of problems that will allow me to establish key conclusions, as well as to revisit and confirm certain suppositions made as early as in Chapter 3.

The first problem is the following: if forms are functions and some artefacts are multifunctional as wholes, some artefacts have several inherent forms. If this is the case, some artefacts are heaps. Since artefacts are not heaps, either multifunctional objects are not artefacts after all, or some artefacts are indeed heaps – in which case, further explanation is needed. The final two horns are equally unappetising, as I have spent much time arguing for the sharp opposition between artefacts and heaps on the basis of the presence of an inherent form – which does not allow for a *tertium quid* between artefacts and heaps. On the other hand, claiming that multifunctional objects are not artefacts leaves us to wonder what else they could be, if not heaps. More importantly, the two horns result from the assumption that the forms of artefacts are functions. In the case of sensible substances, the form is indeed the answer to the question of why a given plurality is one single thing. While the scientist studying houses will be interested in explaining how houses are, insofar as they behave in accordance to their function, a metaphysician will be interested in

[39] I am not sure what the functions of the Delphian knife might have been. Rackham (1932, 4) wonders 'a dagger and carving-knife or knife and spoon in one?' Franks (2009, 48) compares it to a Swiss Army knife and says that 'it was usable as a knife, a file, and a hammer, packing all those uses into one tool for the sake of being cheap'. Frank (2005, 66) explains that 'Aristotle criticizes the practice of making a knife to be used also as a file and a hammer. It is made to so many ends, Aristotle implies, so that it can be exchanged for many things'.

[40] Moreover, the extent to which a given artefact turns out to be up to the task – as long as it is, in fact, up to the task – is an accidental attribute (see *Met.* E 2, 1026a6–10).

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explaining how houses are, insofar as they are one. For this reason, unlike the natural scientist, the maker and the user, a metaphysician would primarily define a house as a composition of bricks and stones. Only if 'composition of bricks and stones' applies to kinds other than the kind house will they need to specify the composition itself (i.e. a composition for the sake of sheltering). However, the further specification of the form is not the subject matter of first philosophy, but of whatever a hypothetical science of houses would be called.[41] By the same token, the reason why the ascription of several functions to an artificial object does not reduce it to a heap with several forms is that the inherent form remains one and can be further specified into one or more functions should this be necessary.

A problem arises: if some artefacts possess several functions, it is not clear why the case of found-objects cannot be accommodated within the same metaphysical account. Chapter 4 introduced the concept of found-objects, i.e. things that come-to-be with a particular function, but that are later employed with another function (user-based). One example from the Aristotelian corpus is the strigil, which is made with the function of scraping off dirt and sweat, but which can subsequently be used to drink water. Another example is the case of a shoe, which is produced to be worn, but which later on can be employed to make money. If there is the theoretical possibility that one and same artefact possesses several functions, found-objects seem to be a pertinent case. Found-objects cannot, however, be accommodated within the same metaphysical account I proposed for artefacts. Whether the functions attributed to the object come into play in the productive process itself or only subsequently makes a significant difference. As was previously explained, found-objects do not undergo an unqualified coming-to-be. Their matter does not experience an intrinsic change that introduces an actualisation. This means that found-objects are not new items populating the world: the strigil used to drink is not a new item for drinking, but still just a strigil. If the user-intended function is not accompanied by an intrinsic change in the matter of the object, the new intention alone does not suffice to impart a new function. One might use the strigil to drink, but the function of drinking neither replaces the function of scraping off dirt and sweat nor is it added to it. For a new object to come into existence (i.e. for a new function to be embedded

[41] Something along these lines yet importantly different is suggested by Kosman (2013, 97), who focuses on the threshold case and suggests there is a science concerned with threshold that we may call 'limenology'. I make a similar point, but depart from the specific example of the threshold, which, on my account, does not qualify as a new object if the stone undergoes a mere change of location.

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in an object), the object needs to undergo an unqualified coming-to-be, as a result of which many parts are made into one in light of the function. While a user-intended function does not destroy or change the object, but only represents a kind of accidental use, a maker-intended function is a different story. If the function – whether one or many – drives production and determines the actuality-inducing action, resulting in an intrinsic change in the matter, then it brings about the creation of a new object.[42] Despite being adopted for several different uses, found-objects are not multifunctional artefacts. The former are not new items – thus, they do not have nor add a new form – while the latter possess a form that is specified into two or more functions. The spit is not simply reused as a lampstand, but a new spit-and-lampstand is produced.[43] In other words, there is a spit-and-lampstand, not a spit used as a lampstand or that becomes a lampstand. For the spit to become a lampstand, the matter (in this case, the spit) must undergo an intrinsic change through an actuality-inducing action. For the spit-and-lampstand to come-to-be, the matter (whatever the material of such a thing is) must undergo an intrinsic change through an actuality-inducing action that turns the plurality of matter into the unity of a single thing – i.e. the form must be the cause of why matter is that one kind of thing. Nothing prevents the form from being specified into several functions. Indeed, the metaphysician will gladly specify them, but only for the sake of distinguishing a spit from a spit-and-lampstand.

Additionally, we can also look back at the case of inadvertently made objects. The metaphysician will be unable to distinguish a seat that came-to-be by chance from an artificially made seat – unless they assume the role of a natural scientist. However, strictly speaking, that distinction falls outside their area of interest. Their chief interest as a metaphysician will be rather to understand why the stone is a new *one* item, presumably

[42] An anonymous reviewer presented me with the case in which two items look identical and are both made from the same kind of matter. However, they were made with two different functions. The question is how we would tell whether we are not using a given artefact according to its function as specified by its form. The case of replicas might be helpful. One ship was made for sailing, another was made for display, and never meant to be sailed. According to Aristotle, the user who tries to sail the ship in the museum would not be a wise user. Certainly, there are cases in which the context would not help the user disambiguating between two identical things. However, not only is it possible for a user to get things wrong – as in the case of a strigil being used to drink from – but a wise user would then enquire into the coming-to-be of the object to pragmatically help themselves. To this extent too, the roles of the maker, the user and the natural philosopher are widely fluid among each other.

[43] The same applies to the Delphian knife. Meikle (1997, 56) says, 'What is wrong with the Delphian knife is not that it is used in exchange, but that it is made to be exchanged and is bad at its job for that reason . . . Its use value has been compromised and diminished by design out of considerations of exchange value.'

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pointing at its change of shape. Whether the relevant change of shape (i.e. the projecting parts being smoothed out) occurred by chance or by art does not contribute to the type of knowledge they are primarily concerned with. By means of the difference between the physics and the metaphysics of artefacts, one might even be able to settle the problem of replicas or the problem of how to distinguish between a ship for the sake of sailing and a ship able to sail but made for the sake of exhibition – problems the metaphysician might seek to avoid. But the role of the natural scientist does not emerge only *after* the metaphysician takes interest in further explanations. To even be able to ask metaphysical questions about material objects, the natural scientist or the maker must *first* establish that these bricks and stones are indeed a house. If it is a house we are talking about is not for a metaphysician to tell, for 'the fact that *x* is *y* must be clear, for if this is not the case, there is nothing to inquire' (*Met.* Z 17, 1041a23–4). The metaphysician starts from the fact that there is a house, and investigates why the plurality of matter is a new single item populating the world.

Finally, we might look back at what the book itself ended up staging. Setting out from a purely metaphysical problem, such as that of artefacts' substantiality, required us to assume at times the perspective of the *Physics* to get the full picture and understand its underpinnings. We might as well have guessed that artefacts are not substances and why they fail to be so solely within the *Metaphysics*. However, in order to fully grasp Aristotle's ontology of artefacts, our gaze had to move to the *Physics* too. To get a grip on the hylomorphic status of artefacts, we might venture into their coming-to-be; to further understand their non-substantiality, we might want to look at parts and wholes as matter and form. Thus, we shall not tear apart the two approaches in Aristotle: the metaphysics of artefacts inescapably involves their physics. It is only the question of their substantiality that requires a fresh start.

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