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# Getting Real: Ockham on the Human Contribution to the Nature and Production of Artifacts

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**Abstract:** Given his known predilection for ontological parsimony, Ockham's ontology of artifacts is unsurprisingly reductionist: artifacts are nothing over and above their existing and appropriately ordered parts. However, the case of artifacts is notable in that they are real objects that human artisans produce by bringing about a real change: they spatially rearrange existing natural thing(s) or their parts for the sake of some end. This article argues that the human contribution to the nature and production of artifacts is two-fold: (1) the artisan's cognitive grasp of her expertise and her decision to deploy that expertise are the two efficient causes necessary to explain the existence of an artifact, and (2) the purpose that the artisan had in mind when she decided to make an artifact fixes the function(s) of the artifact such that an artisan's purpose is the final cause necessary to explain what an artifact is. Artifacts indeed exist, owing what they are and that they are to intelligent and volitional human activity, which Ockham never denies. The article submits that a myopic focus on Ockham's indisputable reductionism does not exhaust what is metaphysically interesting and relevant about artifacts.

**Keywords:** Ockham; artifacts; ontology; efficient causality; final causality; ends; spatial arrangement; difference-making



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## 1. Introduction

Ockham's view on the ontology of artifacts is expectedly reductionist. Ockham holds that artifacts, concrete material objects, such as bronze statues, baths, and houses, are nothing over and above their existing and appropriately ordered parts. On this view, as Ockham contends, the work of artistic production merely consists in the re-configuration of existing stuff, not the production of some new thing (*res*). Artisans, therefore, are stuff manipulators, not creators. He argues for this view in various commentaries on Aristotle's *Physics*, and his account of the ontology of artifacts is dominated by a clear preoccupation with the metaphysical constitution of artifacts, as reductionist as this is.<sup>1</sup>

At first glance, this view is seemingly pessimistic about the productive power of human beings to make artifacts because artifacts are not new things. Nevertheless, as Zupko points out, Ockham draws significant attention to the "contribution of human artisans" since "artifacts are essentially rearrangements, via human agency, of already existing things [ . . . ]" [1] (p. 88). The principal aim of this paper is to analyze the human contribution to the nature and production of artifacts. I want to answer the questions, what do human artisans actually do, to what extent does their contribution figure in an explanation of what artifacts are, and how artifacts come to exist? Having recapitulated the main lines of Ockham's account of artifacts (§ 2), I show that the human contribution is two-fold. First, the artisan's cognitive grasp of her expertise and her decision to deploy that expertise are the two efficient causes necessary to explain the existence of an artifact (§ 3). Second, the purpose that the artisan had in mind when she decided to make an artifact is the final cause necessary to explain what an artifact is and why it exists in the first place (§ 4). I further show that artifacts acquire their function(s) in reference to the

purposes with which their makers made them. To establish this, I turn to a rather different sort of artifactual object, aggregate sciences, where Ockham explicitly argues that the end of scientific knowledge is the end of the scientist insofar as she acquires that scientific knowledge (§ 5).

The thought guiding my interpretation is that Ockham's indisputable ontological reductionism about artifacts does not exhaust what is metaphysically interesting about artifacts. Despite his repeated insistence that artifacts are nothing more than spatially re-configured natural things, artifacts are an excellent example of objects that do indeed exist, owing what they are and that they are to intelligent and volitional human activity. Artifacts are real and yet dependent on the minds of those who make them.<sup>2</sup> They may not be new things in the ontology, but they are a witness to our power to effect a real change in how things in the ontology exist, specifically, as we shall see, in how things in the ontology are spatially arranged.<sup>3</sup> And this, it seems to me, is not metaphysically negligible.<sup>4</sup>

## 2. Ockham's Reductionist Ontology of Artifacts

In this section, I present Ockham's view on the ontology of artifacts in the case of quotidian artifacts such as bronze statues, baths, and houses. He develops his view over three commentaries on *Physics*, composed in this chronological order: the early *Summula Philosophiae Naturalis*, the exposition commentary *Expositio in libros Physicorum Aristotelis*, and the late *Quaestiones Physicorum*. I draw particular attention to Ockham's argumentation, which is notable for relying on a principle frequently appealed to in other contexts to determine when it is necessary to posit the existence of a really distinct thing and when not. He tends to use this principle—which is distinct from the razor—to settle the putative existence of some categorial thing as a really distinct item in the ontology, and he employs the same principle here to argue against the existence of some new artificial form that the artisan makes by means of artistic production. Artifacts, then, represent yet another instance where Ockham applies this principle, and its application here precisely is what allows him to maintain his reductionist ontology of artifacts.

Here is Ockham's central claim about the ontology of artifacts:

*[W]e should know that when the artisan works to produce artificial things, he does not produce an absolute form that inheres in a natural thing [ . . . ], with the result that when a house, an image, a statue, a bed, and the like are made, there is no new thing produced in its entirety.*<sup>5</sup>

To see this claim in its proper context, we must note the view that Ockham is rejecting, which is that "[ . . . ] the form of an artifact [*artificialium*] is an accidental form distinct from matter and advenient to it by means of art [ . . . ]".<sup>6</sup> It is not clear who held this view and where Ockham is getting it from [3] (pp. 115–118). However, as Ockham sees it on this view, the production of an artifact is explained by the artisan's making a new accidental form that she confers onto existing material elements in a process guided by her expertise in crafting the relevant artifact. Such a form is a constituent of the artifact along with its material elements and is necessary to account for the identity and existence of the artifact, namely what it is—that it is the kind of object that it is—and that it exists. Ever reticent to grant some item that others have deemed explanatorily necessary without a fight, Ockham wonders if the form of the artifact is entirely distinct from any natural thing.<sup>7</sup> His response, as we might anticipate given the passage above, is resoundingly negative: in building a house or casting a statue, neither the builder nor the sculptor produces a new accidental form that she confers onto existing material elements (wood, bricks, and tiles in the case of the house or bronze in the case of the statue) and that subsequently inheres in the resulting artifact as one of its constituents.

The underlying motivation for Ockham's negative claim is his characteristic predilection for parsimony and the unmistakable application of the razor, which we find in the *Quaestiones* discussion. While the razor is most frequently articulated as the maxim that *one ought not posit plurality without necessity*, which is reiterated in the opening arguments of

q. 118, its most sophisticated articulation in Ockham is: *no plurality should be posited unless it can be proved by reason, experience, or infallible authority*, [12] (c. 29, pp. 157–158, ll. 10–13).<sup>8</sup> That is, we must not accept a claim positing a plurality of items in the ontology unless that claim can be established to be true on the basis of rational argument, one’s own experience, or an authority that cannot err, namely the Bible and the writings of the saints and the church fathers.

Ockham considers the following claim about artifacts: “artificial things add something over and above natural things”. According to the view he rejects, this claim would be taken to mean that there is some distinct item in the ontology that is not a natural thing but is conferred onto a natural thing(s) in order to produce an artifact. Ockham asserts that there are no grounds for accepting this claim as true. We cannot know that the claim is true on the basis of knowing its terms (*per se nota*), for one can doubt that it is true (his skepticism is a case in point). Nor is it a conclusion that we can rationally establish on the basis of prior truths that we do know on the basis of knowing their terms since the arguments purporting to prove the claim include false or dubious premises (so he seems to think). Nor is it known through experience (which he takes to be obvious). He does not mention the authority clause, which is hardly surprising here in the midst of philosophical work.<sup>9</sup> He wants to conclude that since nothing compels us to accept the claim as true, we should, therefore, reject it in favor of a claim about artifacts that does not posit such an undesirable item, such as: “artificial things are nothing over and above natural things”.<sup>10</sup>

Ockham’s negative claim, stated on its own, is hardly an adequate, let alone satisfying, explanation of what an artifact is and how one comes to be made. Yet, he himself never denies that artifacts are objects of a sort that come to exist. The argument that Ockham gives for his negative claim, reiterated in all three of our texts, reveals the outlines of a positive account of the nature and production of artifacts. This explanation is evidently inspired by another principle that he evokes to settle the putative existence of an item in the ontology. Whereas the razor is typically construed as a methodological principle that allows us to adjudicate between competing claims about items in reality, this principle, though equally concerned with parsimony, is better thought of as a metaphysical principle bearing directly on items in reality, [15] (p. 4) but compare with [16] (pp. 126–127). He appeals to this principle in the *Expositio* in the context of artifacts, but the principle, which Susan Brower-Toland calls a “difference-making” principle, is far more widespread throughout his corpus, [9] and cf. with [5] (p. 684). In the *Expositio*, he states that:

*When some contradictories can be verified of the same thing, either one must posit the destruction or production of a thing or local motion. And so, when contradictories of this sort can be successively verified [of the same thing] merely on account of local motion alone, it is not necessary to posit such an absolute thing.*<sup>11</sup>

This is precisely the principle that Ockham leans on to argue *for* the existence of sensory qualities, such as whiteness and heat, and *against* the existence of shape and position, such as the curvedness of a bow and Socrates sitting, see [17] (VII, q. 2, p. 707, ll. 11–18 and q. 7, p. 724, ll. 15–24). When a statement about some item in reality is true at  $T_1$  but false at  $T_2$ , the change in truth value must be explained by virtue of either the production or destruction of a really distinct thing or the spatial rearrangement of an already existing thing(s) and its parts. In some articulations of this principle, he includes the passage of time as well. If spatial rearrangement is sufficient to explain the change in the truth value of the statement at issue, then there is no need to posit the production or destruction of some really distinct thing. As Brower-Toland has put it, spatial rearrangement is a real change, making a real difference in *how* things, in reality, are even if it does not change *what* things there are in reality. In the case of sensory qualities, Ockham believes that we have to posit really distinct qualities to explain why “Socrates is pallid” is true in, say, December but false in August when he is tanned: he has acquired a new and really distinct quality that he did not have in December. Conversely, “this bow is curved” is true when an archer draws his bow but false when he does not, since then the bow is straight. What accounts for the

curvature of the bow is only that the parts of the bow have been brought closer together, hence spatially rearranged, by virtue of the archer's draw.

In the conclusion of his argument for the negative claim that there is no artificial form in any way distinct from the natural things that constitute an artifact, Ockham affirms that spatial rearrangement is sufficient to explain how artifacts come into existence and, by extrapolation, their passing out of existence. By way of denying that artificial forms exist at all, he points toward his own view that artifacts are reducible to their existing and appropriately configured parts.

His argument runs as follows, cf. [10] (II, c. 1, pp. 217–218, ll. 50–83) and [11] (I, c. 20, pp. 209–210, ll. 17–35).<sup>12</sup> Suppose there was an artificial form that comes into existence upon the production of an artifact. Ockham's example is a house where the built house would be the subject of the artificial form. Let us call this the house form. There are two ways that the artificial form might inhere in its subject. (1) It might inhere in an existing subject as a whole in the whole subject and as a whole in each part of the subject. Ockham immediately discounts this possibility on the grounds that no material accident (i.e., form), which is extended and has parts, can inhere in an extended whole in this way. Only immaterial forms can exist in a subject in this way. The house form cannot inhere as a whole within each material part of the house, for the roof of the house is not the whole house, nor are its beams the whole house, nor are its foundations the whole house. (2) Alternatively, the artificial form might inhere in an existing subject as a whole in the whole subject and as a part in a part of the subject. Here indeed, the house form would be spread out, as it were, part for part over the whole of the house: the roof part of the house form would inhere in the slate tiles of the roof, the beam part of the house form would inhere in the wood of the beams, etc.<sup>13</sup>

Given that (1) is inadmissible in the case of the house form, Ockham then proposes a further distinction granting (2). Either (a) "each part of the [artificial] form already exists in its subject" such that one part of the house form already exists in the slates that will be the roof, another in wood that will be the beams, and so on and so forth for all the parts of the house. Or (b) "each part of the [artificial] form is newly present in its subject" when the house is built out of these material parts.<sup>14</sup> If (a) were the case, then it would follow that when a house is built, i.e., newly exists, no new thing is produced at all, which is exactly what Ockham himself maintains. However, if (b) were the case, then whenever a house newly exists, each material part of the house would have its own new absolute form that it did not have prior to the house being built. This, Ockham states, is false.<sup>15</sup>

Why? Here Ockham evokes the difference-making principle: the only change that the material parts of a house undergo when the house is built is that they are spatially rearranged, they are moved from one place to another: from the forest or the quarry to the warehouse to the building site to their final arrangement as appropriately configured house-wise, whence they are the constitutive parts of the built house. Even if one material part is not spatially rearranged, say you build against the side of a cliff-face that would serve as the wall of the house, this part does not receive any new form by virtue of which it has become a wall of the house—not a new substantial, quantitative, or qualitative form, including its shape.<sup>16</sup> Spatial rearrangement is, therefore, sufficient to explain the production of a house. He concludes:

*And so, when a house comes to be nothing real is newly produced in its entirety. Rather, a house is said to come to be when its parts are changed only with respect to place and they are spatially ordered in a determinate way.<sup>17</sup>*

Ockham's use of the house as an example in this argument is not arbitrary but nor is it paradigmatic for all types of artifacts. In fact, Ockham distinguishes between three modes of spatial rearrangement by virtue of which different types of artifacts come into existence: assemblage of parts, removal of parts, and reconfiguration of parts. The house is an example of the first, a complex artifact where existing material elements are assembled or combined together in a particular way. Not all artifacts are complex in this way, and not

all artifacts are produced like this. I will return to these three modes in the next section of this paper. For now, however, here is the more general conclusion that Ockham provides further on in the *Expositio*:

*For this reason, we ought to say that artificial things do not come to be through the production of a new thing. Rather, in order for artificial things to be produced, it is sufficient to spatially move the same thing or it is sufficient to bring diverse natural things closer together in a certain way or [it is sufficient to] separate them spatially.<sup>18</sup>*

Having dispensed with the necessity of positing an artificial form to explain what an artifact is and how an artifact comes into existence, Ockham is left endorsing the following positive claim about artifacts in the *Summula*: an artifact is identical to its existing parts that have been unified and ordered toward one another in some appropriate and determinate way.<sup>19</sup> Taking the house again, a house is its existing parts, namely wood, stone, and so on, which are natural substances and of a kind that is appropriate for the construction of houses. However, although having existing parts of the right kind is necessary to explain the identity and existence of a house, it is not sufficient. For, as Ockham explains, the parts of the house might exist, and yet the house itself does not in the event that its parts are not arranged and united in the right way.<sup>20</sup> There is no house if its existing parts are not ordered house-wise. It is, then, also a necessary condition for the identity and existence of the house that its existing parts are ordered in some particular way, which is their being so spatially arranged.

The view that Ockham espouses is evidently reductionist and, in this regard, consistent with his broader mereological views on the constitution of any type of composite whole, including most notably natural substances. However, just as crucial on my reading is the emphasis that he places on the ordering of an artifact's parts to count as an artifact at all. The production or destruction of an artifact implies that the right kind(s) of existing material elements are spatially arranged in the right kind of way. This is true both for complex artifacts that are composed of material elements that differ in kind, such as houses, as well as for non-complex artifacts such as carved marble statutes, whose material parts are the same in kind and are nonetheless spatially configured in a particular way.<sup>21</sup>

At this point, one can object that the spatial (re)arrangement of existing material elements of the right kind is not sufficient to explain what an artifact is nor how an artifact comes into existence. For, it is surely part of the nature of an artifact to be produced *by an artisan and for a purpose*. On the view examined thus far, it would seem that if a gust of wind knocked a tree onto its side over a river, the sentence "a bridge exists" would be true since the fallen tree now allows for crossing the river without getting wet. However, no artisan lies at the origin of the change that results in the *bridge's* coming into existence. We might balk at the thought that the naturally-occurring spatial rearrangement of existing and suitable material elements is sufficient to explain artifacts. Moreover, suppose the tree was knocked over by a park ranger clearing a pathway in the forest rather than having been felled in order to allow for crossing the river. It would not, then, have the function associated with bridges, which we might be inclined to think is necessary for an artifact to be of the sort that it is.

In the next section of this paper, we will see that Ockham is very much aware of the necessity of including the human contribution in explaining what artifacts are and how they come to exist. This contribution is two-fold: (1) the artisan, in conjunction with and guided by her expertise, is the efficient cause of spatially rearranging the existing and suitable material elements that are necessary for the production of artifacts, and (2) the function of the artifact is the purpose that the artisan had in mind when she chose to produce the artifact, what she intends the artifact to do. This purpose, which is sourced to the internal and intentional activity of the artisan, is the artifact's final cause. While Ockham is reasonably clear about the efficient causal role of the artisan when it comes to artifacts, he is less so about the final causal role of the artisan's purpose in fixing the function of



the artifact. I contend, however, that this is implied in the texts on artifacts and then quite explicitly affirmed in connection to another sort of artifactual object, aggregate sciences.

### 3. The Human Contribution, Part One: The Efficient Cause of Artifacts

At the very beginning of the *Expositio*, Ockham explains that Aristotle distinguishes between various types of producible things (*factibilia*): those that are produced (1) naturally, (2) by chance, and (3) by other causes. Having noted that animals, their parts, plants, and simple bodies including earth, fire, air, and water are natural things insofar as “we say that they are and come to be by nature,” he re-draws the distinction as one between natural things and artificial things, which are those things that can be produced by other causes.<sup>22</sup> By this, he writes, Aristotle means the expertise (*artem*) and will (*voluntatem*) through which a human artisan produces an object. More precisely still, Ockham specifies that these two causes are the intellection (*actum intelligendi*) that is the expertise possessed by the artisan instructing her as to how to make an artifact as well as the volition (*actum volendi*) that is her decision to make that artifact in order, I take it, to fulfill a purpose.<sup>23</sup>

Consider bow-making. A bowyer is an artisan who has mastered the craft of bow-making. Her craft is a particular type of practical knowledge that Ockham considers merely instructive, telling the bowyer how to go about making a bow.<sup>24</sup> This includes the kind of materials most suitable for the production of bows and the steps necessary to produce them, from tillering the wood, braiding the bowstring, etc. If one of the causes of the existence of a bow is the bowyer’s expertise in bow-making, conveyed by Ockham’s “an act of understanding,” the other cause is the bowyer’s willingness to make a bow—her decision or “act of willing” to act on her expertise—for the sake of hunting for sport, or nourishment, or even for the sake of selling in order to make money. Both mental acts stand as the joint partial efficient causes of an artifact, explaining how the artifact comes into existence.

In a recent article, Margaret Cameron defends the view that for Aristotle, the “intrinsic moving cause of an artifact’s generation” is expertise as deployed by the artisan. As such, neither the expert nor her expertise on their own provides the “fundamental and essential explanation of the generation of the artefact”. Rather, she seems to think that the efficient cause of an artifact coming into existence must be both, and so “We can thus think of the artefact itself as the hylomorphic expression or instantiation of the expertise possessed and exercised by the artist” [20] (p. 72). Ockham arbitrarily switches between expertise (*ars*) and artisan (*artifex*), making it likely that, had the question been put to him, he would have agreed: the one without the other cannot be the sole efficient cause of an artifact. However, because the internal intellectual and volitional acts of the artisan are joint partial efficient causes of the production of an artifact, Ockham certainly intimates that the artisan herself might more aptly, if loosely, be described as its efficient cause rather than just her expertise. He would, I think, privilege an explanation of the production of an artifact in which the artisan herself centrally figures as the expert-agent.

What, then, does the artisan actually do? In what does her efficient causal activity consist? Spatially rearranging existing suitable material elements into a new configuration thus results in an artifact. In both the *Quaestiones* and the *Expositio* texts, Ockham responds to the objection that his reductionist account conflicts with Aristotle’s contention that “there is no generation without the acquisition of a new form, and so because artificial things are generated, it is necessary that there is something new in this case”.<sup>25</sup> In his reply, Ockham distinguishes between two types of generation. On the first, generation does indeed occur by means of the acquisition of something new that had not previously existed, and this is unqualified generation (*generatio simpliciter*).<sup>26</sup> On the second, generation is understood to be “a real transformation by virtue of which a thing becomes of such a sort that it was not previously”.<sup>27</sup> This is qualified generation (*generatio secundum quid*), a transformation on account of which we can now form a true sentence that expresses that such a thing exists. This transformation is exactly a change in the spatial arrangement (*transmutatio localis*) of a natural thing(s) or its parts, namely spatial rearrangement.<sup>28</sup>

Ockham is again evoking his difference-making principle now to distinguish between unqualified and qualified generation. While qualified generation does not introduce new items in the ontology to the extent that it does not change what exists, it nevertheless affects a change as to how existing things in the ontology are spatially arranged. This difference, he insists, is real, tracked by a concomitant change in the truth value of existential sentences about those items. The sentence “the house exists” or “there is a house” is now true that was not true previously when the material elements of the house had not yet been moved into their appropriate configuration. Indeed, he specifies that the sentence “the house exists” is equivalent to the sentence “these natural things are spatially conjoined in this way”.<sup>29</sup>

There are three modes of qualified generation that are, in effect, three modes of artistic production: (1) the artisan produces an artifact by *removing* parts from an existing natural thing, such as chiseling off pieces of marble to sculpt the statue of David or carving up a piece of wood to make table legs; (2) the artisan produces an artifact by *assembling* a composite object out of various natural things, such as building a house; and (3) the artisan produces an artifact by *reconfiguring* existing natural things or its parts, such as casting a bronze statue to depict a woman (Ockham’s example).<sup>30</sup> All three modes are subsumed beneath spatial rearrangement—the movement of a natural thing(s) or its parts in place. This is how artifacts are generated in the qualified sense, and it counts as a real transformation even though it does not involve the production of a new thing.<sup>31</sup>

Ockham’s language is striking. By emphasizing that such spatial rearrangement makes something of a sort that it was not previously, Ockham implies that even though this process does not generate a new thing in its entirety, the rearranging of existing things and their parts generates objects—artifacts—that are different in kind from what they were before being so-arranged. (To argue that he is opening up a space for artificial kinds would be a stretch, but he does suggest that spatial rearrangement brings about a difference in kind and he cannot mean a difference in *natural* kind. This begs the question: what sort of kind then?) This is not a trivial accomplishment. Indeed, the efficient causal activity of the artisan is not negligible, for the production of material artifacts is an instance of a real and hence, dare I say it, a metaphysical change in how objects in the world exist with significant consequences, not least for our lived experience and social existence. However, it is true that the artisan is essentially a master arranger, a manipulator of existing material stuff. Artificial production is not comparable to creation, even shorn of its divine connotation. Nevertheless, artificial production involves an artisan whose knowledge how and decision to rearrange spatially existing and suitable material elements in any of the foregoing three modes are the joint partial efficient causes of an artifact. The artisan as an expert must be included in the explanation of what an artifact is and how it comes into existence, and so a tree that has been knocked over a river by a gust of wind is not an artifact.

#### 4. The Human Contribution, Part Two: The Final Cause of Artifacts

The purpose, or that for the sake of which we produce artifacts, is the second part of the human contribution to artifacts. Purposes, or ends (*finis*) in medieval terminology, explain why the artisan chooses to produce an artifact and fix the function(s) of artifacts. In this regard, they serve to explain in part what an artifact is since an artifact’s function is a feature of its nature. Here is Lynne Rudder Baker explaining the notion of a proper function of an artifact:

[ . . . ] artifacts have proper functions that they are (intentionally) designed and produced to perform (whether they perform their proper functions or not) [ . . . ] a proper function is a purpose or use intended by a producer [ . . . ] Thus, an artifact has its proper function essentially: the nature of an artifact lies in its proper function—what it was designed to do, the purpose for which it was produced [21] (p. 102).

Ockham does not mention ends in the material on artifacts that we find in his *Physics* commentaries. However, I think that we can read ends into a passage in the *Summula* when

he discusses how we might be able to distinguish between a natural and an artificial bath. He is responding to the objection that his reductionist account of artifacts cannot explain the distinction between natural things and artificial things. For, in denying that the artisan produces some new artificial form, an artificial thing just is a natural thing or a collection of natural things assembled together.<sup>32</sup> What, then, is the salient difference between the two?

Ockham's response is characteristically dead-pan: there is no difference between the two. This is slightly disingenuous because he goes on to explain that while there is no intrinsic difference between a natural and an artificial thing, there is indeed an extrinsic difference. True to form, he certainly allows there to be a semantic difference between the terms 'natural thing' (*'naturalia'*) and 'artificial thing' (*'artificialia'*), and emphasizes the metaphysical indistinguishability of a natural and artificial thing by listing a number of sentences that should be granted as true, such as "natural things are artificial things," "the bronze is the statue," and "the wood is a bed".<sup>33</sup> The terms 'artificial thing' and 'natural thing' have different nominal definitions, for "something is posited in the definition of one that is not included in the definition of the other".<sup>34</sup> Ockham is cagey about what this could be, but presumably, the nominal definition of the term 'artificial thing' includes a term referring to expertise or to the artisan who decides to deploy her expertise to produce an artifact.

In the *Summula*, Ockham draws on the example of water to argue that there is only a numerical distinction between two volumes of water where the one and not the other is made into an artificial bath by an external agent—a human, intelligent and voluntary agent who understands how to go about producing a bath and decides to produce one. Ockham explains that what Aristotle means by the claim that "an artificial thing is not a natural thing" is that "a thing is not naturally of the sort that it can become through expertise".<sup>35</sup> Imagine a naturally-occurring rock pool that may be warm, fragrant with sweet-smelling herbs. Compare this rock pool with a tub of water that is at the very same temperature and to which the same herbs have been added. Both are exhaustively made up of natural things, the water itself, the heat in the water, and the herbs floating in it, and yet, only one is considered artificial.<sup>36</sup> Why and on what grounds? Ockham states that the only way to differentiate between the two volumes of water is by appealing to an external agent who turns the one and not the other into an artificial bath by means of her expertise and "a concurrent act of willing".<sup>37</sup> This agent is, of course, the artisan-bather, whose internal mental acts include (1) her intellectual grasp of what it is to be a bath (e.g., having an appropriate receptacle, being at a warm temperature, having the right herbs added) and (2) her volitional decision to deploy this knowledge. The concurrent act of willing that Ockham refers to here, on my reading, is the artisan-bather's decision to produce an artifact, and this decision is performed *for the sake of some end*. To be sure, the artisan-bather performs various volitions as she goes through the steps that her expertise informs her are necessary for producing artificial baths, such as deciding to heat the water to a certain temperature, deciding which herbs to add and which to avoid, etc. However, each of these volitions is secondary, subordinate to a primary volition, that is, the willingness to produce a bath in the first place. Moreover, *this* volition she performs for a purpose, viz., the end that she desires to satisfy by means of the production of an artificial bath.<sup>38</sup>

To my mind, the bath example is puzzling. Ockham conspicuously *does not* mention the spatial rearrangement or relocation of any natural thing(s) or its parts in the production of the artificial bath. On the contrary, he mentions place but only as a feature of the two volumes of water that he immediately discounts as irrelevant for differentiating between them. One way to interpret the bath example is that Ockham thinks the artisan-bather's knowledge of what it is to be a bath and her decision to use a body of water for some purpose, namely to clean herself, is sufficient to make that body of water become an artificial bath. This would suggest that spatial rearrangement is not necessary to explain the existence of every artifact. A natural thing—a rock pool—can artificially become something that counts as an artifact—a bath—just in case the external agent understands it can be used as a bath and decides to use it as such.



This interpretation is problematic for three reasons. First, it goes against his previous statements about the nature of artistic production and the importance he places on spatial rearrangement. Second, it threatens to turn all natural things into artifacts just in case we use them for some end, and this may be far more permissive than we should like. If I come to a tree that has been knocked over a river by a gust of wind or cut down by a park ranger, and I decide to use that tree to cross the river to avoid getting wet, it is true to say that “a bridge exists”. This was not true prior to my happening upon it and deciding to use it for that purpose. However, is this really plausible? Third, it implies that something can become an artifact even in the absence of any real change on the part of the natural thing itself, which may conflict with our intuitions about what is involved in artifactual production. Kathrin Koslicki wonders

*[ . . . ] is it possible to create a new artifact simply by ‘converting’ a piece of driftwood into a bench? If so, then apparently a process can qualify as an intentional making or producing, even if no physical work is required on the part of the agent responsible [ . . . ] and the underlying material from which the new artifact is apparently made [ . . . ] need not undergo any intrinsic change [23] (p. 218).*

She thinks that this act of conversion is insufficient to explain what artifacts are and how they come to exist. In the case of houses and statues, Ockham would surely agree. After all, we saw in the previous section that he holds artistic production to be an instance of real change on the side of the object, the natural thing(s) or its parts that are spatially rearranged by the artisan, and this is what accounts for the existence of the artifact. However, this does not happen in the bath case, where there is no real change on the side of the volume of water that our bather decides to use for the sake of cleaning herself. We would be understandably reluctant to admit that this could be an instance of artistic production.

An alternative interpretation of the bath example that diffuses these worries is that what Ockham has in mind is that the artisan produces a receptacle to hold a volume of water for the purpose of cleaning one’s body by means of spatially rearranging a natural thing(s) or its parts into a particular configuration, namely, a *bathtub* (or indeed arranges wood in such a way as to build a fire to heat the water or sprinkles herbs from a jar into the water; these are both examples of spatial rearrangements). When commenting on Averroes and Ockham on final causality, Robert Pasnau writes about hammams rather than baths.<sup>39</sup> The former has the advantage of being less ambiguous than the latter: hammams are complex and engineered edifices built by human beings in which to clean bodies. The term ‘bath’ does not have the same connotation even though we colloquially use it to mean what Ockham calls here an artificial bath. Once a bathtub is filled with water, the result is an artificial bath. By contrast, our naturally-occurring rock pool, which a hot, sweaty hiker might use in order to clean herself if she happens upon one on a forest trail, is a natural bath. This interpretation fits better with Ockham’s insistence on spatial rearrangement to account for the existence of artifacts and, as such, places some restriction on what counts as an artifact that the sole use of a natural thing(s) does not. Finally, it saves a more substantive notion of the labor and craftwork implied in artificial production, which brings about a real change on the side of the object.

In any event, the point I wanted to make with the bath example is Ockham’s inclusion of the artisan–bather’s act of willing by which she decides to produce a bath. This act is performed in order to obtain some end, and this end is the final cause of the artifact. Ockham describes a final cause as something that “is loved and desired efficaciously by an agent so that an effect is brought about because of the thing that is loved”.<sup>40</sup> Strictly speaking, a final cause is something—typically God, ourselves, or those we love—that, insofar as we love or desire them, instigate us to bring about some effect. Classic examples include walking to church for the sake of worshipping God or changing one’s diet for the sake of one’s health. God is the final cause of why we walk to church; walking is the effect that our loving God brings about. The unhealthy person herself is the final cause of why she changes her diet; eating different foods is the effect that her wanting to be healthy, her loving herself, brings about. In short, ends explain why we do what we do, and this, it

seems to me, is evident in the case of artifacts. A bath is a volume of water in a bathtub that is used by a bather in order to clean herself; a bow is used by a hunter in order to feed herself; and a standing stone is carved in order to worship some deity. As a consequence, we can say that a function of baths is to clean bodies, a function of bows is to hunt, and a function of standing stones is religious worship.

To see the connection between ends, purposes, and functions, I propose turning to a very different context in which Ockham argues that the end (*finis*) of scientific knowledge is the end (*finis*) of the scientist.

## 5. Ends and Functions

To forestall the obvious objection that scientific knowledge is not an artifact, let me start this section by stating that I am not claiming that scientific knowledge is an artifact. The point is to argue by analogy from what Ockham says about the connection between the ends of the scientist and scientific knowledge to the ends of the artisan and the artifact. For Ockham, scientific knowledge is typically conceived of as an aggregate of discrete items of scientific knowledge. So, it is more accurate to speak of bodies of scientific knowledge or simply sciences, which is often the more congenial option given English grammar, to accentuate the collective and pluralist connotation of Ockham's conception of scientific knowledge. We do not say "knowledges" in English. Science is a collection of intellectual habits and their corresponding acts by virtue of which a scientist evidently cognizes the principles and conclusions of demonstrations bearing on a given object and its properties.<sup>41</sup> Sciences are at least artifactual in the sense that, like complex artifacts produced by assembling different existing natural things, sciences have only a collective and thus accidental unity. Both are aggregate wholes composed of parts that are different in kind. The parts of a science—literally the scientist's cognitive habits—are unified into one science on the basis of an ordering principle that allows for distinguishing between sciences. Whereas the ordering principle for complex material artifacts is spatial, it is logical in the case of scientific knowledge, established by reference to the subject and predicate terms of the necessary truths that the scientist grasps.

In this section, I show that the end of the scientist, that for the sake of which the scientist acts to acquire scientific knowledge, is conferred onto the very science that she seeks to acquire as its end. Consequently, the end of the one determines the end of the other. While Ockham recognizes that some purposes may be more fitting for motivating scientists to acquire scientific knowledge if such a purpose does not, in fact, motivate a scientist while another does, however banal or modest or ill-intentioned, that purpose is the scientist's, and it fixes the function of the science. My aim here is to show that this view analogously supports my contention that the artisan's purpose in producing an artifact fixes its function.

Suppose a student learns mathematics for the sake of ensuring her financial success or her status and reputation in society, given that she needs to know various branches of mathematics to obtain a degree in, say, engineering. Wealth and status are the final causes of the student's learning mathematics because she learns mathematics precisely for the sake of—the purpose of—obtaining financial success or social capital. This stands in contrast to the view that Ockham opposes, defended by Henry of Ghent, according to which wealth and status are the end(s) of the student but not of the science, which rather ought to be something like truth or scientific knowledge for its own sake. Henry insists on the distinction between the two, and while he would agree that wealth and status are the *per accidens* ends of mathematics, they are not the *per se* end of mathematics itself [28] (Prologue, q. 11, p. 303, ll. 3–10). Ockham dismisses this view and makes the remarkable claim that wealth and status are the ends of mathematics just in case they are the purposes that the student has in mind when she sets about learning mathematics. Here is Ockham:

[ . . . ] I claim that the end of scientific knowledge properly speaking is that which, being loved by the student [ . . . ], moves him to learn and to acquire that scientific knowledge.

*Therefore, the very same thing is without qualification the final cause of the scientist and scientific knowledge.*<sup>42</sup>

Contrary to Henry, Ockham thinks that the student's end is transmitted to the science she acquires, so we can say the end of the science is determined by the end of the student. To use the terminology I have adopted here, the purpose of the scientist fixes the function of the science.

The reason for this transmission is the causal connection and ontological dependence between the student as the agent who, by virtue of desiring financial success, status, or purely for the love of knowledge, acquires scientific knowledge. That is, while wealth, status, and the truth are possible final causes of the science she learns, her volitional desire(s) to procure those ends stands as the efficient cause(s) of her setting about acquiring it, e.g., [11] (II, c. 5, p. 226, ll. 28–31). Ockham is quite clear that science ontologically depends on the purposes of the scientist, going so far as to state that “[...] scientific knowledge really and essentially depends on the end of the scientist, since without that end it simply would not exist”.<sup>43</sup> Ockham thinks that this ontological dependence is what grounds the transmission of ends from the scientist to the science.

In the *Ordinatio*, he articulates the more general view that an intelligent agent's purpose, that which she intends when she performs some act, becomes (1) the end of her act or (2) the end of an inferior agent's operation that she moves to serve her purpose.<sup>44</sup> By “intelligent” he means those agents who are capable of acts of understanding and willing—human beings, angels, and God—since it is only this sort of agent that can properly have intentions and purposes. We are intelligent and voluntary agents, and our characteristically human and intentional acts are susceptible to a teleological explanation that refers to the purposes in light of which we perform those acts.<sup>45</sup> (There is a mitigated sense in which the acts of non-rational animals that have sensory cognition and appetites can also be said to act for the sake of ends, but I will not discuss their case here.) So, our purposes fix the functions of our acts, including the acquisition of scientific knowledge: the student's desire for financial success makes it the case that the function of mathematics is the procurement of wealth.

Our purposes also fix the functions of the operations that inferior agents perform under our direction. Thanks to us, objects operate for the sake of the ends that we fix for them; hence, they have ends but only derivatively.<sup>46</sup> We see this in the *Summula* when Ockham wonders whether we can attribute final causality to the operations of inanimate objects. He explains that when such an operation is directed by an external cognizing and desiring agent, the end of the external agent can, in some sense, be said to be the end of the object's operation.<sup>47</sup> He is thinking, in this instance, of motion. A hunter shoots his arrow at a moose in order to kill the animal for sustenance. Ockham states that the final cause of the arrow is to kill the moose (the moose is my addition) even though, of course, to kill the moose is not what *the arrow* intends but rather what *the hunter* intends. Properly speaking, the hunter intends to kill the moose, but his aim of killing the moose is transmitted onto the operation of the arrow, its shooting through the air toward the animal.<sup>48</sup>

Extrapolating from the case of scientific knowledge to artifacts, the purpose with which the artisan produces her artifact fixes the artifact's function, and insofar as it does, the artisan contributes to determining what the artifact is supposed to do. The arrow example, however, raises an interesting point: artifacts, as external objects, are available to be used by others. In this regard, they are public, indeed social, in a way that scientific knowledge is not, since the latter, for Ockham, is a private affair internal to the mind of the scientist.<sup>49</sup> The social potential of artifacts entails that there may be a difference between the *maker's* purpose and the *user's* purpose. A consequence of this is that arrows can have multiple distinct functions.<sup>50</sup> We might say that the artisan produces arrows for the sake of making money while the hunter shoots arrows for the sake of killing animals. Ockham does not have any difficulty with the admission that something can have various ends,<sup>51</sup>

so this is not an objection to the view that artisan purposes fix artifact functions. Ockham would agree, I think, that user purposes can also fix artifact functions.

The question surely is, as Henry of Ghent and Lynne Rudder Baker would no doubt insist, that one of these functions is more pertinent than the other, that one is the proper function or *per se* end of the artifact while the other is not. Moreover, ironically in this case, one could argue that the hunter—the user—fixes the proper function of the arrow rather than its maker since we would spontaneously say that the nature of arrows is to kill and perhaps only secondarily to make money for those who make them. We could respond on Ockham's behalf that arrows were originally designed for the purpose of killing animals so that this function is both genealogically and metaphysically primitive, whatever other functions arrows may end up acquiring through social use. However, this would take us somewhat beyond the text. Ockham's overt disinclination to privilege one purpose and one function over another is a consequence of the causal link between, in his text, scientists and scientific knowledge and, by analogy, between artifacts and their makers or users. I think this is evidence of the contingent, multi-faceted, and human-fixed nature of artifacts. And this does not detract from the point that we impose our purposes onto artifacts with the result that what artifacts are, crucially including what function(s) they have, is derived from us.

## 6. Conclusions

Zupko writes that “[Ockham's] emphasis on the contribution of human artisans seems to leave questions about the ontological status of their agency open” [1] (p. 88). In this paper, I have shown what this contribution amounts to, namely that the intellectual and volitional acts of the human artisan provide the efficient and final causes of an artifact and that this two-fold causal contribution is a necessary part of the explanation of what artifacts are and how they come into existence. What is distinctive about Ockham's account of the ontology of artifacts is his reductionist view, according to which artifacts are nothing over and above their existing and appropriately configured parts. However, exclusively focusing on the reductionism of his account without considering the human contribution risks ignoring the significant metaphysical difference between worlds in which there are artifacts and worlds in which there are not. Human agency is not powerful enough to produce entirely new things in the ontology, but it is powerful enough to change how things exist in the ontology and how they are spatially arranged. The case of artifacts shows to what extent it lies within our power to rearrange and manipulate naturally existing things and their parts for our own desires and purposes. There is a lot more metaphysical mileage that we can get out of this view once we consider the human contribution.

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## Notes

- <sup>1</sup> See [1,2] for introductions to Ockham's view of artifacts. In [3], Majcherek focuses on “Ockham's master argument concerning artefacts made by composition” (p. 114), which I discuss in far less detail here. The ontology of artifacts is the subject of Majcherek's unpublished PhD dissertation in which Ockham figures prominently. Majcherek generously sent me a copy of his dissertation while I was in the process of revising this paper, which I have only been able to look at cursorily.

- 2 For a contemporary account of artifacts that likewise emphasizes their dependency on the intentions of their makers and how relevant this is for their metaphysical status and constitution, see [4]. Thomasson argues that “[...] the mind-dependence of artifacts and artifactual kinds should in no way be taken to interfere with accepting that such entities exist” (p. 54).
- 3 This qualification is important in order to avoid the suggestion that Ockham admits modes in his ontology, since this is far from clear. On the status of modes, especially as opposed to accidents, in medieval and into early modern philosophy, see [5,6] (pp. 244–275). For Ockham in particular, see [7] (esp. pp. 181–182).
- 4 I am indebted to the current research as yet unpublished by Susan Brower-Toland on Ockham, ontological commitment, metaphysical explanation, and what she calls the “difference-making principle”. The distinction between *what* things exist as opposed to *how* those things exist is one that she evokes and I owe this formulation to her (but also see [7] (e.g., p. 179). She defends her interpretation in both [8,9].
- 5 Ref. [10] (II, c. 1, p. 217, ll. 31–37): “[...] est primo sciendum quod quando artifex operatur producendo artificialia, non producit aliquam formam absolutam inhaerentem rei naturali [...] ita quod quando fit domus vel idolum vel statua vel lectus et huiusmodi, non est aliqua res de novo secundum se totam producta”. Cf. [11] (I, c. 20, p. 209, ll. 10–11). All translations are my own unless otherwise stated.
- 6 Ref. [11] (I, c. 20, pp. 208–209, ll. 4–5): “[...] forma artificialium est forma accidentalis distincta a materia et sibi per artem adveniens [...]”.
- 7 Ref. [11] (I, c. 20, p. 209, ll. 7–9): “[...] est hic nunc breviter disserendum an forma rei artificialis sit secundum se totam distincta a qualibet re naturali”.
- 8 For a short history of the razor with references to some of the main literature, see [13].
- 9 Ref. [14] (q. 118, p. 716, ll. 8–13): “Ad istam quaestionem [utrum possit sufficienter probari quod artificialia addant aliquid super naturalia], dico breviter quod non. Cuius ratio est quia haec propositio ‘artificialia aliquid addunt super naturalia’ non est per se nota, quia multi dubitant de ea. Nec potest probari ex per se notis, quia in omni ratione probante accipitur aliquod falsum vel dubium multiplex. Nec est nota per experientiam—manifestum est; igitur etc.”.
- 10 But as Susan Brower-Toland has pointed out in private correspondence, we could provide other arguments whose premises include principles that are not self-evident (*per se nota*) to establish that the claim “artificial things add something over and above natural things” is true.
- 11 Ref. [10] (II, c. 1, p. 226, ll. 340–344): “[...] quando aliqua contradictoria possunt successive circa idem verificari, vel oportet ponere corruptionem vel productionem alicuius rei vel motum localem. Et ideo quando talia contradictoria possunt successive verificari propter solum motum localem, non oportet ponere talem rem absolutam”.
- 12 For a clear analysis and defense of this argument in context, including reactions to it by Walter Burley and Paul of Venice, see [3] (starting at p. 119).
- 13 Ref. [14] (q. 119, p. 720, ll. 33–37): “Quod probatur, quia quando fit domus, quaero: aut illa forma domus est tota in toto subiecto praeesistente et tota in quaelibet parte, aut est tota in toto et pars in parte. Non primo modo, quia nullum accidens materiale potest esse in toto extenso et in quaelibet parte secundum se totum”. In the *Summula*, Ockham countances a third way that the house form could exist in its subject, namely as existing only in the artificial part (*parte artificiatu*) of the house, [11] (q. 20, p. 209, l. 20). This option does not appear in either the *Expositio* or the *Quaestiones* version of the argument and Ockham does not bother to argue against it the *Summula*. Perhaps he thought this option begs the question insofar as it suggests that there already is an artificial part of the house, and what could this be other than the artificial form the existence of which is precisely what the argument is supposed to settle?
- 14 Ref. [14] (q. 119, p. 720, ll. 37–40): “Si secundo modo, aut igitur quaelibet pars praefuit in suo subiecto, ita quod una pars illius artificialis praefuit in lignis domus, alia in lapidibus, et sic de aliis partibus domus, aut quaelibet pars de novo est in suo subiecto”. Translation with modification from [3] (p. 121).
- 15 Ref. [14] (q. 119, p. 720, ll. 40–45): “Si detur primum, habetur propositum quod quando domus est de novo nulla res est res nova absoluta quin quaelibet pars eius prius fuerit. Non potest dari secundum, quia tunc quandocumque fieret domus, oporteret quod quilibet lapis et quodlibet lignum ex quibus fit domus haberet in se formam unam absolutam quam prius non habuit. Quod falsum est”.
- 16 Ref. [14] (q. 119, p. 720, ll. 45–51): “Quod falsum est: tum quia iste lapis in nullo mutatur nisi secundum locum, quia possibile est quod non incidatur in aliquo nec etiam aliquo modo mutetur nisi secundum locum; tum quia possibile est quod lapis non mutatus secundum locum concurrat ad constitutionem domus, et tunc non habet novam substantiam, nec novam quantitatem vel qualitatem, nec novam figuram, et per consequens nullum novum absolutum in se recipit”.
- 17 Ref. [10] (II, c. 1, p. 218, ll. 77–80): “Et per consequens quando domus fit, non est aliquid reale secundum se totum de novo productum; sed ideo dicitur domus fieri, quia partes tantum secundum locum transmutantur et modo determinato localiter ordinantur”.
- 18 Ref. [10] (II, c. 1, p. 219, ll. 102–105): “Ideo dicendum est quod non fiunt artificialia per talem productionem novae rei, sed ad producendum artificialia sufficit movere localiter idem vel sufficit diversa naturalia modo certo approximare localiter vel separare aliqua localiter”.



- 19 Ref. [11] (I, c. 19, p. 206, ll. 38–43): “Sed ad artificialibus est aliud [from natural composite substances], quia una pars potest manere distincta ab alia, ita quod partes possunt simul esse in rerum natura quamvis non sint unitae, ideo illud totum non semper et necessario est illae partes existentes, sed tunc solum est illae partes existentes quando partes sunt debito modo unitae et localiter situate et convenienter”. For further discussion on the importance of ordering for aggregates in general, including complex artifacts and social groups, see [18].
- 20 Ref. [11] (I, c. 19, pp. 206–207, ll. 43–49): “Quando autem sunt separatae vel inconvenienter ordinatae secundum locum, tunc totum, puta domus, non est illae partes; et quia hoc est possibile quod illae partes manentes sint quandoque debite ordinatae et situate et quandoque a se divisae, ideo haec est vera quandoque ‘domus est illae partes’ et quandoque est falsa; tamen quandocumque illae partes sunt debito modo ordinatae secundum locum, tunc domus est illae partes”.
- 21 Ockham accepts exceptions. He distinguishes between arts that work with nature to produce a new form and arts that do not, like building houses, painting images, and carving statues. Arts of the first kind consist in facilitating a natural process by moving natural things into sufficient proximity so that their active and passive causal powers produce some new substantial or accidental form. His examples are medicine and agriculture. See [14] (q. 119, p. 719, ll. 11–14) and [11] (I, c. 20, p. 209, ll. 13–16). On this, see [3] (pp. 111–112).
- 22 Ref. [10] (II, c. I, pp. 213–214, ll. 25–31): “Circa primam partem primo dividit factibilia et exemplificat de uno membro, dicens quod de numero entium quae sunt factibilia, quaedam fiunt ex natura, hoc est naturaliter, alia autem a casu, alia autem propter alias causas. Et exemplificat de illis quae sunt natura. Quia omnia animalia et omnes partes eorum, similiter plantae et corpora simplicia cuiusmodi sunt terra, ignis, aer, et aqua, dicimus esse et fieri natura, hoc est omnia illa sunt naturalia. Intelligendum est quod Philosophus intendit istam divisionem quod quaedam sunt artificialia et quaedam naturalia”.
- 23 Ref. [10] (II, c. 1, p. 214, ll. 35–37): “Secundo sciendum est quod Philosophus per ‘alias causas’ intelligit artem et voluntatem, hoc est actus intelligendi et actum volendi, quia mediantibus istis homo operatur”. It is important to point out that Ockham immediately qualifies his claim to include agents who make things by means of some cognition (*per cognitionem*), which is meant to extend to non-rational agents like birds building nests. Nests are not naturally producible things but are produced through the sensory cognition and appetitive desires of birds. This being said, Ockham tends to imply that artifacts are produced by human artisans, since he cites their intellectual and volitional acts. The latter act is simply unavailable to non-rational animals who lack the requisite rational soul to be able to perform them.
- 24 For a recent article on Ockham’s conception of craft, see [19].
- 25 Ref. [10] (II, c. 1, p. 219, ll. 110–112): “Sed contra ista videtur esse intentio Aristotelis et ratio. Nam numquam est generatio nisi per acquisitionem rei novae; ergo cum artificialia generentur, oportet ibi esse aliquid novum”. Cf. [14] (q. 118, p. 716, ll. 15–17).
- 26 Ref. [14] (q. 118, p. 717, ll. 27–31): “Ad primum istorum [objections] dico quod generatio accipitur dupliciter: uno modo pro generatione alicuius rei novae secundum se totam, et ista potest dici generatio simpliciter, si ista res prius non fuit, et talis generatio semper est per acquisitionem alicuius rei novae”.
- 27 Ref. [14] (q. 118, p. 717, ll. 31–34): “Aliter accipitur pro transformatione aliqua reali qua res fit alicuius qualis prius non fuerat, ita quod propter talem transformationem realem possit formari propositio de novo vera qua denotatur res talis esse, et ista vocatur generatio secundum quid”.
- 28 Ref. [14] (q. 118, p. 717, ll. 34–36): “Et ad talem generationem non requiritur nova res secundum se totam, sed sufficit transmutatio localis aliquorum vel alicuius”.
- 29 Ref. [14] (q. 118, p. 717, ll. 43–48): “Et propter illam transmutationem localem formatur ista propositio de novo vera ‘ista naturalia sunt domus’, hoc est ista naturalia sunt taliter coniuncta localiter. Similiter per talem transmutationem verificatur ista propositio ‘domus est’, quae aequivalet isti ‘istae res naturales sunt taliter coniunctae localiter’; quae nunc est vera et prius non erat vera”.
- 30 Majcherek discusses these three modes briefly but not exclusively in Ockham, and notes that this third mode of artistic production is the process of molding, citing the example of melting down iron to make a sword [3] (p. 114).
- 31 Ref. [14] (q. 118, p. 717, ll. 36–43): “Primo modo loquendo de generatione [unqualified generation], sic artificialia quae fiunt per abstractionem, sicut figura concisa, vel per compositionem, sicut domus, vel per transfigurationem, sicut virgo depicta, non generantur, quia in productione talium nulla res nova secundum se producitur. Sed loquendo secundo modo de generatio [qualified generation], sic artificialia generantur, quia ibi nova res non producitur sed tantum novus locus acquiritur, eo quod res sunt in aliquo loco in quo prius non fuerunt”. The same three modes with examples are repeated throughout [14] (q. 119, pp. 719–721) and [10] (II, c. 1, p. 217, ll. 41–49). The two types of generation and the verification of sentences are also discussed in [10] (II, c. 1, p. 220, ll. 130–148).
- 32 Ref. [11] (I, c. 20, p. 210, ll. 40–43): “Contra istam opinionem potest multipliciter argui: primo, quia artificialia distinguuntur a rebus naturalibus; sed si nulla res nova esset, quaelibet res esset naturalis, et ita nulla esset distinctio inter naturalia et artificialia”. Cf. [14] (q. 118, p. 717, ll. 20–22).
- 33 Ref. [14] (q. 122, p. 726, ll. 34–40): “[...] dico quod de virtute sermonis omnes istae propositiones sunt concendendae [...] ‘naturalia sunt artificialia’, ‘aes est statua’, ‘lignum est lectus’, et omnes consimiles”.
- 34 Ref. [14] (q. 118, p. 718, ll. 60–65). Cf. [10] (II, c. 1, p. 222, ll. 200–213).

- 35 Ref. [11] (I, c. 20, p. 211, ll. 60–62): “[ . . . ] per talem propositionem ‘res artificialis non est res naturalis’, intendit [Aristotle] dicere quod talis res non est naturaliter talis qualis fit per artem”.
- 36 Ref. [11] (I, c. 20, p. 211, ll. 65–74): “Similiter aqua non est naturaliter balneum, sed aqua per artem fit balneum; et tamen hoc non obstante nulla res est balneum vel in balneo nisi res naturalis: in nullo enim differt aqua ista ab alia aqua nisi quia habet calorem vel quia miscetur cum herbis vel quia est in aliquo loco determinato, quae omnia nullam rem aliam dicunt in illa aqua a re naturali. Unde si poneretur aqua in aliquo loco et postea per naturam fieret calida, totum esset naturale et esset balneum, et tamen in nullo distingueretur ab alio quod per artem fit balneum, sicut quaedam dicuntur balnea naturalia et quaedam artificialia”.
- 37 Ref. [11] (I, c. 20, p. 211, ll. 74–78): “Quamvis forte aliquo modo diversificentur, tamen si in nullo diversificarentur nisi quantum ad agens extrinsecum, puta quod unum fit a natura et aliud non fit balneum nisi arte et voluntate concurrente, vere unum diceretur balneum naturale et aliud artificiale, hoc est una aqua fit balneum naturaliter et alia artificialiter”.
- 38 I am grateful to an anonymous reviewer for pressing me on my interpretation. In [22] I discuss the role of ends and final causality in connection to human (intentional) action. There, I argue that, in effect, whenever we decide to use some external object (e.g., a volume of water!), we are doing so for the sake of some end that we desire. We choose to deploy our expertise and we decide to use external objects for a purpose, which stands as a reason—a desire—for why we act the way that we do.
- 39 Pasnau’s interest is the ontological status of final causes, not the one that I am making here. See [24] (pp. 98–99).
- 40 Ref. [17] (IV, q. 1, p. 294, 22–23): “[ . . . ] definitio causae finalis est esse amatum et desideratum efficaciter ab agente, propter quod amatum fit effectus”. Cf. [11] (II, c. 4, p. 223, ll. 77–80). Translation in [25] (p. 245) with a minor modification.
- 41 For discussion of aggregate sciences in Ockham, see [26] (pp. 26–38) and [27], which has a more precise focus. Both discuss the logical order of aggregate sciences.
- 42 Ref. [28] (Prologue, q. 11, p. 307, ll. 1–5): “[ . . . ] dico quod finis scientiae proprie loquendo est illud quod amatum ab addiscente [ . . . ], movet ipsum ad discendum et ita ad acquirendum scientiam. Et ideo idem est simpliciter finis quae est causa finalis scientis et scientiae [ . . . ]”. Cf. [11] (II, c. 5, p. 226, ll. 19–21).
- 43 The whole argument reads: [28] (Prologue, q. 11, p. 305, ll. 17–24): “[ . . . ] illud a quo res dependet essentialiter, ita quod sine illo res non haberet esse reale, videtur esse causa essentialiter illius rei. Sed a fine scientis dependet ipsa scientia realiter et essentialiter, quia sine illo simpliciter non foret. Sicut ponatur quod aliquis non addisceret scientiam speculativam nisi propter lucrum vel propter aliquid tale: nisi ille tunc hoc intenderet simpliciter nihil foret illa scientia. Igitur illud habet rationem a causae, et non nisi rationem causae finalis; ergo etc.”.
- 44 Ref. [28] (Prologue, q. 11, pp. 304–305, ll. 21–26): “[ . . . ] idem est finis agentis, hoc est intentus ab agente, et actionis suae [ . . . ], quia omnis finis cuiuscumque actionis est finis intentus. Aut ergo ab isto agente a superiori dirigente illud agens inferius, sicut in naturalibus idem est finis agentium inferiorum et intelligentiae dirigentis. Et a quocumque intendatur, sequitur quod idem sit finis agentis, hoc est intentus ab agente, et actionis suae”.
- 45 On a teleological explanation of human acts, see [22].
- 46 See [29] (p. 147) on the distinction between intrinsic and derivative final causality in Ockham.
- 47 Ref. [11] (II, c. 6, p. 228, ll. 25–32): “Propter quod videndum est quomodo respectu inanimatorum est causa finalis. De quo videtur mihi esse dicendum quod, secundum principia Aristotelis, si inanimata a nullo cognoscente finem regantur seu moveantur, quod in eis non est causa finalis, quia tunc sunt mere agentia ex necessitate naturae nihil proprie intendunt. Si autem regantur a cognoscente et desiderante, in illis ponenda est causa finalis, quae cause finalis non est proprie intenta nec desiderata ab agente inanimato sed a dirigente vel movente”.
- 48 Ref. [11] (II, c. 6, p. 228, ll. 32–36): “Dicitur tamen proprie causa finalis illius actionis sive operationis, sicut quando aliquis sagittat ad aliquem terminum, dirigens sagittam vel volens aliquem interficere, illa interfectio est vere causa finalis motus sagittae, quae tamen a sagitta proprie non intenditur, sed proprie intenditur a sagittante”. Also see [29] (pp. 145–146) for commentary on this passage.
- 49 My thanks to Claude Panaccio for raising this point.
- 50 For a discussion about the conflict between “original author-intentions” and “user-intentions”, see [23] (pp. 227–230).
- 51 On this, see [28] (Prologue, q. 11, pp. 309–310, ll. 17–2) and [11] (II, c. 4, p. 222, ll. 49–55).

## References

1. Zupko, J. “Nothing in Nature is Naturally a Statue”: William of Ockham on Artifacts. *Metaphysics* **2018**, *1*, 88–96. [[CrossRef](#)]
2. Panaccio, C. *Ockham’s Nominalism. A Philosophical Introduction*; Oxford University Press: Oxford, UK, 2022; *in press*.
3. Majcherek, K. Why is a House Nothing More than Stones and Pieces of Wood? Ockham’s Argument and its Critics. *Rech. Théol. Philos. Médiév.* **2022**, *89*, 109–144.
4. Thomasson, A.L. Artifacts and Human Concepts. In *Creations of the Mind. Theories of Artifacts and Their Representation*; Eric, M., Stephen, L., Eds.; Oxford University Press: Oxford, UK, 2007; pp. 54–73.
5. Normore, C. Accidents and Modes. In *Cambridge History of Medieval Philosophy*; Robert, P., Ed.; Cambridge University Press: Cambridge, UK, 2011; Volume 2, pp. 674–685.
6. Pasnau, R. *Metaphysical Themes. 1274–1671*; Oxford University Press: Oxford, UK, 2011.

7. Adams, M.M. Things versus 'Hows', or Ockham on Predication and Ontology. In *How Things Are. Studies in Predication and the History of Philosophy and Science*; Bogen, J., McGuire, J., Eds.; D. Reidel Publishing Company: Dordrecht, The Netherlands; Boston, MA, USA; Lancaster, UK, 1984; pp. 175–188.
8. Brower-Toland, S. Deflecting Ockham's Razor: A Medieval Debate about Truth and Ontological Commitment. Unpublished manuscript.
9. Brower-Toland, S. Ockham's Metaphysical Commitments: The Case of Locomotion. Unpublished manuscript.
10. William of Ockham. Expositio in Libros Physicorum Aristotelis. Prologus et Libri I-III. In *Opera Philosophica IV*; Richter, V., Leibold, G., Eds.; Franciscan Institute: St. Bonaventure, NY, USA, 1985.
11. William of Ockham. Summula Philosophiae Naturalis. In *Opera Philosophica VI*; Brown, S., Ed.; Franciscan Institute: St. Bonaventure, NY, USA, 1984.
12. William of Ockham. Tractatus de Corpore Christi. In *Opera Theologica X*; Grassi, C., Ed.; Franciscan Institute: St. Bonaventure, NY, USA, 1985.
13. Jenny, P. Ockham's Razor. In *Encyclopedia of Philosophy of Religion*; Goetz, S., Taliaferro, C., Eds.; Wiley-Blackwell: Hoboken, NJ, USA, 2021.
14. William of Ockham. Quaestiones in Libros Physicorum Aristotelis. In *Opera Philosophica VI*; Brown, S., Ed.; Franciscan Institute: St. Bonaventure, NY, USA, 1984.
15. Keele, R. Formal Ontology in the Fourteenth Century: The Chatton Principle and Ockham's Razor. Ph.D. Thesis, Indiana University, Bloomington, IN, USA, 2002.
16. Maurer, A. *The Philosophy of William of Ockham in Light of Its Principles*; PIMS: Toronto, ON, Canada, 1999.
17. William of Ockham. Quodlibeta Septem. In *Opera Theologica IX*; Wey, J., Ed.; Franciscan Institute: St. Bonaventure, NY, USA, 1980.
18. Pelletier, J. Kingdoms and Social Groups: William Ockham on the ontology of social groups. *Br. J. Hist. Philos.* **2021**, *29*, 24–44. [[CrossRef](#)]
19. Pelletier, J. William of Ockham on Craft: Knowing How to Build Houses on the Canadian Shield. In *Women's Perspectives on Ancient and Medieval Philosophy*; Chouinard, I., McConaughy, Z., Ramos, A.M., Noël, R., Eds.; Springer Nature Switzerland AG: Cham, Switzerland, 2021; pp. 303–318.
20. Cameron, M. The Moving Cause of Artefacts: The role of *techne* in metaphysical explanation. *Anc. Philos. Today* **2019**, *1*, 64–83. [[CrossRef](#)]
21. Baker, L.R. The Ontology of Artifacts. *Philos. Explor.* **2004**, *7*, 99–111. [[CrossRef](#)]
22. Pelletier, J. From Psychological to Factual Use: Acting Intentionally in Ockham's Thought. *Rech. Théol. Philos. Médiév.* **2022**, *89*, 77–108.
23. Koslicki, K. *Form, Matter, Substance*; Oxford University Press: Oxford, UK, 2018.
24. Pasnau, R. Teleology in the Later Middle Ages. In *Teleology. A History*; McDonough, J.K., Ed.; Oxford University Press: Oxford, UK, 2020; pp. 90–115.
25. William of Ockham. *Quodlibetal Questions*; Freddoso, A.J.; Kelley, F.E., Translators; Yale University Press: New Haven, CT, USA, 1991.
26. Pelletier, J. *William Ockham on Metaphysics. The Science of Being and God*; Brill: Leiden, The Netherlands, 2013.
27. Pelletier, J. William Ockham on the Mental Ontology of Scientific Knowledge. In *The Ontology, Psychology and Axiology of Habits (Habitus) in Medieval Philosophy*; Faucher, N., Roques, M., Eds.; Springer Nature Switzerland AG: Cham, Switzerland, 2018; pp. 285–297.
28. William of Ockham. Scriptum in Librum Primum Sententiarum. Ordinatio. Prologus et Distinctio Prima. In *Opera Theologica*; Gál, G., Brown, S., Eds.; Franciscan Institute: St. Bonaventure, NY, USA, 1967.
29. Schmid, S. Potentialities in the Late Middle Ages—The Latin Tradition. In *Handbook of Potentialities*; Engelhard, K., Quante, M., Eds.; Springer Nature Switzerland AG: Cham, Switzerland, 2018; pp. 123–153.