

## **The Shrinking Difference Between Artifacts and Natural Objects<sup>1</sup>**

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Artifacts are objects intentionally made to serve a given purpose; natural objects come into being without human intervention. I shall argue that this difference does not signal any ontological deficiency in artifacts qua artifacts. After sketching my view of artifacts as ordinary objects, I'll argue that ways of demarcating genuine substances do not draw a line with artifacts on one side and natural objects on the other. Finally, I'll suggest that philosophers have downgraded artifacts because they think of metaphysics as resting on a distinction between what is "mind-independent" and what is "mind-dependent." I'll challenge the use of any such distinction as a foundation for metaphysics.

### **Artifacts as Ordinary Objects**

Artifacts should fit into any account of ordinary objects for the simple reason that so many ordinary objects *are* artifacts, We sleep in *beds*; we eat with *knives and forks*; we drive *cars*; we write with *computers* (or with *pencils*); we manufacture *nails*. Without artifacts, there would be no recognizable human life.

On my view—I call it 'the Constitution View'—all concrete objects, except for "simples" if there are any, are ultimately constituted by sums (or aggregates) of objects. Technical artifacts—artifacts made to serve some practical purpose—are, like nonartifacts, constituted by lower-level entities. Constitution is a relation of unity-without-identity. Unlike identity, constitution is a contingent and time-bound relation. To take a simple-minded example, consider a wooden rod and a piece of metal with a

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<sup>1</sup> An earlier version was presented to the Society of Philosophy and Technology, Chicago APA, April 20, 2007.

hole just slightly bigger than the diameter of the rod. When the aggregate of the rod and the piece of metal are in certain circumstances (e.g., when someone wants to make a hammer and inserts the rod into the hole in the metal), a new object—a hammer—comes into being. Since the rod and the piece of metal existed before the hammer did, the relation between the aggregate of the rod and the piece of metal and the hammer is not identity. It is constitution.

Typically artifacts are constituted by aggregates of things. But not always: a paperclip is constituted by a small piece of thin wire; and a \$50 bill is constituted by a piece of paper. Nevertheless, the piece of thin wire and the piece of paper themselves are constituted by aggregates of molecules, which in turn are constituted by aggregates of atoms. So, even those artifacts (like paperclips) that are constituted by a single object are, at a lower level, constituted by aggregates of atoms. For simplicity, I'll consider artifacts to be constituted by aggregates of things, not by a single object. Any items whatever are an aggregate. The identity conditions of aggregates are simple: Aggregate *x* is identical to aggregate *y* just in case exactly the same items are in aggregate *x* and aggregate *y*.

### **Differences Between Artifacts and Natural Objects**

Technical artifacts have proper functions that they are designed and produced to perform (whether they successfully perform their proper functions or not).<sup>1,2</sup> Indeed, the general term for a kind of artifact—e.g., polisher, scraper, life preserver—often just names the proper function of the artifact. 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.<sup>3</sup> Moreover, artifacts have their persistence conditions in virtue of being the kind of artifact that they are. Put an automobile in a crusher and it—*it*—goes out of existence altogether. The metal and plastic cube that comes out of the crusher is not the same object (your old clunker of a car) that went in. Since artifacts have intended functions essentially, they are what I call ‘intention-

dependent' or 'ID' objects: they could not exist in a world without beings with propositional attitudes.

Natural objects differ from artifacts in at least three ways: (1) Artifacts (and not natural objects) depend ontologically—not just causally—for their existence on human purposes. (2) Relatedly, artifacts are “intention-dependent” (ID) objects that could not exist in a world without minds. Natural objects, which can be deployed to serve human purposes, would exist regardless of human intentions or practices. (3) Artifacts (and not natural objects) essentially have intended proper functions, bestowed on them by beings with beliefs, desires, and intentions.

### **The Ontological Status of Artifacts**

Many important philosophers—from Aristotle on—hold artifacts ontologically in low regard. Some philosophers have gone so far as to argue that “artifacts such as ships, houses, hammers, and so forth, do not really exist.”<sup>4</sup> Artifacts are thought to be lacking in some ontological way: they are considered not to be genuine substances. Although the notion of substance is a vexed one in philosophy, what I mean by saying that things of some kind (e.g., hammers, dogs, persons)—Fs in general—are genuine substances is that any complete account of what there is will have to include reference to Fs. I shall argue that there is no reasonable basis for distinguishing between artifacts and natural objects in a way that renders natural objects as genuine substances and artifacts as ontologically deficient.

I shall consider five possible ways of distinguishing between natural objects and artifacts, all of which are mentioned or alluded to by David Wiggins.<sup>5</sup> On none of these, I shall argue, do natural objects, but not artifacts, turn out to be genuine substances. Let the alphabetic letter ‘F’ be a placeholder for a name of a type of entity.

- (1) Fs are genuine substances only if Fs have an internal principle of activity.
- (2) Fs are genuine substances only if there are laws that apply to Fs as such, or there could be a science of Fs.

(3) Fs are genuine substances only if whether something is an F is not determined merely by an entity's satisfying a description.

(4) Fs are genuine substances only if Fs have an underlying intrinsic essence.

(5) Fs are genuine substances only if the identity and persistence of Fs is independent of any intentional activity.

Let us consider (1) – (5) one at a time.

(1) The first condition—Fs are genuine substances only if Fs have an internal principle of activity—has its source in Aristotle.<sup>6</sup> Aristotle took this condition to distinguish objects that come from nature (e.g., animals and plants) from objects that come from other efficient causes (e.g., beds). But this condition does not rule in natural objects and rule out artifacts as genuine substances. A piece of gold is a natural object, but today, we would not consider a piece of gold (or any other chemical element) to have an internal principle of change; conversely, a heat-seeking missile is an artifact, but it does have an internal principle of activity. So, the first condition does not distinguish artifacts from natural objects.

(2) The second condition—Fs are genuine substances only if there are laws that apply to Fs as such, or there could be a science of Fs—also allows artifacts to be genuine substances. Engineering fields blur the line between natural objects and artifacts. Engineering schools have courses in materials science (including advanced topics in concrete), traffic engineering, transportation science, computer science—all of which quantify over artifacts. Since something's being of an artifactual kind (e.g., *computer*) does not preclude a science of it, the second condition does not make artifacts less than genuine substances.

(3) The third condition is semantic: Fs are genuine substances only if whether something is an F is not determined merely by an entity's satisfying a description. Demonstrative reference is supposed to be essential to natural-kind terms.<sup>7</sup> The reference

of natural-kind terms is said to be determined indexically; the reference of artifactual-kind terms is said to be determined by satisfying a description.<sup>8</sup>

Membership in a natural kind, it is thought, is not determined by satisfying a description, but rather by relevant similarity to stereotypes.<sup>9</sup> The idea is this: First, Fs are picked out by their superficial properties (e.g., quantities of water are clear liquids, good to drink, etc) Then, anything that has the same essential properties that the stereotypes have is an F. So, natural kinds have “extension-involving sortal identifications.”<sup>10</sup> By contrast, artifactual terms (like those I used earlier—‘beds’, ‘knives and forks’, ‘cars’, ‘computers’, ‘pencils’, ‘nails’) are said to refer by satisfying descriptions: “A clock is any time-keeping device, a pen is any rigid ink-applying writing implement and so on.”<sup>11</sup>

I do not think that this distinction between how words refer captures the difference between natural objects and artifacts.<sup>12</sup> The distinction between referring indexically and referring by description, with respect to natural kind terms, is only a matter of the state of our knowledge and of our perceptual systems.<sup>13</sup> However gold was originally picked out (e.g., as ‘stuff like *this*’), now we can pick it out by [what are taken to be] its essential properties: For example, Gold is the element with atomic number 79. Not only might natural kinds satisfy descriptions, but also we may refer to artifacts in the absence of any identifying description. E.g., archeologists may believe that two entities are both artifacts of the same kind, without having any identifying description of the kind in question. (Were they used in battle or in religious rituals?)

Thus, the third condition—Fs are genuine substances only if whether something is an F is not determined merely by an entity’s satisfying a description—does not distinguish natural kinds from artifactual kinds, nor does it rule out artifacts as genuine objects.<sup>14</sup>

(4) The fourth condition—Fs are genuine substances only if Fs have an underlying intrinsic essence—also fails to distinguish natural from artifactual kinds. Although some familiar natural kinds—like water or gold—have underlying intrinsic

essences, not all do. For example, wings (of birds and insects), mountains, and planets are all natural kinds, but none of them has an underlying intrinsic essence. Their membership in their kinds is not a matter of underlying intrinsic properties. Something is a wing, mountain or planet not in virtue of what it is made of, but in virtue of its relational properties. For that matter, something is a bird or an insect in virtue of its relational properties—its genealogical lineage. So, having an underlying intrinsic essence does not distinguish natural objects from artifacts.

(5) The fifth condition—Fs are genuine substances only if the character of F is independent of any intentional activity—is the most interesting. According to some philosophers, the “character of [a] substance-kind cannot logically depend upon the beliefs or decisions of any psychological subject.”<sup>15</sup> Unlike the first four conditions, the fifth does distinguish between artifactual and natural kinds. An artifact’s being the kind of thing that it is depends on human intentions. Conceding that the necessity of intention is a difference between an artifact and a natural object, I ask: Why should this difference render artifacts deficient?

If you endorse what Jaegwon Kim has called ‘Alexander’s Dictum’—To be real is to have effects—there is no doubt that artifacts are real. When automobiles were invented, a new kind of thing came into existence: and it changed the world. Considering the world-changing *effects* of the automobile (and countless other kinds of artifacts), artifacts have as strong a claim to ontological status as natural objects.

What generally underlies the fifth condition, I believe, is an assumption that Fs are genuine substances only if conditions of membership in the substance-kind are set “by nature, and not by us.”<sup>16</sup> But it is tendentious to claim that the existence of artifacts depends not on nature, but on us.<sup>17</sup> Of course, the existence of artifacts depends on us: but we are part of nature. It would be true to say that the existence of artifacts depends not on nature-as-if-we-did-not-exist, but depends on nature-with-us-in-it. Since nature *has* us in it, this distinction (between nature-as-if-we-did-not-exist and nature-with-us-in-it) is no satisfactory basis for a verdict of ontological inferiority of artifacts.

## The Insignificance of the Mind-Independence/Mind-Dependence Distinction

There is a venerable—but, I think, theoretically misguided—distinction in philosophy between what is mind-independent and what is mind-dependent. Anything that depends on our conventions, practices or language is mind-dependent (and consequently downgraded by those who rest metaphysics on a mind-independence/mind-dependence distinction). All ID objects, including all artifacts, are by definition mind-dependent, inasmuch as they could not exist in a world without beings with beliefs, desires and intentions. Nothing would be a carburetor in a world without intentional activity.<sup>18</sup> The mind-independent/mind-dependent distinction is theoretically misguided because it is used to draw an ontological line in an unilluminating place. It puts mind-independent insects and galaxies on one side, and mind-dependent afterimages and artifacts on the other.

A second reason that the mind-independent/mind-dependent distinction is unhelpful is that advances in technology have blurred the difference between natural objects and artifacts. For example, so-called “digital organisms” are computer programs that (like biological organisms) can mutate, reproduce and compete with one another.<sup>19</sup> Or consider “robo-rats”—rats with implanted electrodes that direct the rats’ movements.<sup>20</sup> Or for another example, consider what one researcher calls ‘a bacterial battery’:<sup>21</sup> These are biofuel cells that use microbes to convert organic matter into electricity. Bacterial batteries are the result of a recent discovery of a micro-organism that feeds on sugar and converts it to a stream of electricity. This leads to a stable source of low power that can be used to run sensors of household devices. Finally, scientists are genetically engineering viruses that selectively infect and kill cancer cells and leave healthy cells alone. *Scientific American* referred to these viruses as “search-and-destroy missiles.”<sup>22</sup> Are these objects—the digital organisms, robo-rats, bacterial batteries, genetically engineered viral search-and-destroy missiles—artifacts or natural objects? Does it matter? I suspect that the distinction between artifacts and natural objects will become increasingly fuzzy; and as it does, the worries about the mind-independent/mind-dependent distinction will fade away. More particularly, as the distinction between

natural objects and artifacts pales, the question of the ontological status of web-based objects, for example, becomes more acute.

## **Conclusion**

No one who takes artifacts of any sort seriously, ontologically speaking, should suppose that metaphysics can be based on a distinction between mind-independence and mind-dependence. In any case, technology will continue to shrink the distinction, and with it, the distinction between artifacts and natural objects.<sup>23</sup>



<sup>1</sup> There is a lot of literature on functions. For example, see Crawford L. Elder, "A Different Kind of Natural Kind," *Australasian Journal of Philosophy* 73 (1995): 516-531. See also "Ascribing Functions to Technical Artifacts: A Challenge to Etiological Accounts of Functions," by Pieter E. Vermaas and Wybo Houkes, *British Journal for the Philosophy of Science* 54 (2003): 261-289. As Vermaas and Houkes point out, some philosophers take the notion of biological function to be basic and then try to apply or transform theories of biological function (which since Darwin are non-intentionalist, reproduction theories) to artifacts. I believe that Vermaas and Houkes are entirely correct to liberate the theory of artifacts from the notion of function in biology.

<sup>2</sup> For a thoughtful discussion of functions, see Beth Preston, "Why is a Wing Like a Spoon? A Pluralist Theory of Function," *Journal of Philosophy* 95 (1998): 215-254.

<sup>3</sup> More precisely, a nonderivative artifact has its proper function essentially. The constituter of an artifact inherits the nonderivative artifact's proper function and thus has it contingently (as long as it constitutes the nonderivative artifact).

<sup>4</sup> Joshua Hoffman and Gary S. Rosenkrantz, *Substance: Its Nature and Existence* (London: Routledge, 1997): 173.

<sup>5</sup> All the conditions either follow from, or are part of, the basic distinction that Wiggins draws between natural objects and artifacts. There is a complex condition that natural objects allegedly satisfy and artifacts do not: "...a particular constituent x belongs to a natural kind, or is a natural thing, if and only if x has a principle of activity founded in lawlike dispositions and propensities that form the basis for extension-involving sortal identification(s) which will answer truly the question 'what is x?'" According to Wiggins, natural objects satisfy this condition and artifacts do not. David Wiggins, *Sameness and Substance Renewed* (Cambridge: Cambridge University Press, 2001): 89. I am not claiming that Wiggins denies that there exist artifacts, only that he distinguishes between natural and artifactual kinds in ways that may be taken to imply the ontological inferiority of artifacts.

<sup>6</sup> A substance has "within itself a principle of motion and stationariness (in respect of place, or of growth and decrease, or by way of alteration)." Aristotle, *Physics* 192b8-23.

<sup>7</sup> This claim is similar to the notion that natural-kind terms, but not artificial-kind terms, are rigid designators. (A rigid designator has the same referent in every possible world.) However, what makes the difference between 'whale' and 'bachelor' is not that only the former is rigid. Rather, only the former term "has its reference determined by causal contact with paradigm samples of the relevant kind." There is no reason that the terms cannot both be rigid. See Joseph LaPorte, "Rigidity and Kind," *Philosophical Studies* 97 (2000): 304.

<sup>8</sup> Although Wiggins is an Aristotelian, this is not Aristotle's view. For Aristotle, nominal definitions are reference fixers, used to identify objects for scientific study; they contain information that a scientist has before having an account of the essence of the objects. Real definitions are discovered by scientific inquiry and give knowledge of the essences of objects identified by nominal definitions. Nominal and real definitions are not accounts of different types of entities. Rather, they are different types of accounts of the same entities. Members of a particular natural kind have the same essence (underlying structure). See Robert Bolton, "Essentialism and Semantic Theory in Aristotle: *Posterior Analytics*, II, 7-10," *The Philosophical Review* 85 (1976): 514-544.

<sup>9</sup> E.g., Wiggins, *Sameness and Substance Renewed*, pp. 11-12.

<sup>10</sup> Wiggins, *Sameness and Substance Renewed*, p. 89.

<sup>11</sup> Wiggins, *Sameness and Substance Renewed*, p. 87.

<sup>12</sup> Aristotle would agree with me on this point, I believe. His reason for downgrading artifacts ontologically is that artifacts have no natures in themselves.

<sup>13</sup> Moreover, indexicality should not be confused with rigidity, which does not concern how a term gets connected to a referent. For criticism of Putnam's confusion of the causal theory of reference and indexicality, see Tyler Burge, "Other Bodies" in *Thought and Object*, Andrew Woodfield, ed. (Oxford: Oxford University Press, 1982): 97-120.

<sup>14</sup> Joseph LaPorte also holds that some kind expressions (both natural and artifactual) designate rigidly, and some designate nonrigidly. See his "Rigidity and Kind," *Philosophical Studies* 97 (2000): 293-316.

<sup>15</sup> Joshua Hoffman and Gary S. Rosenkrantz, *Substance: Its Nature and Existence* (London: Routledge, 1997): 173.

<sup>16</sup> In "A Different Kind of Natural Kind," *Australasian Journal of Philosophy* 73 (1995): 516-531, Crawford L. Elder discusses this point. For an alternative that I find congenial, see Amie Thomasson, "Realism and Human Kinds," *Philosophical and Phenomenological Research* 68 (2003): 580-609.

<sup>17</sup> In Chapter One of *The Metaphysics of Everyday Life* (Cambridge: Cambridge University Press, 2007), I argued that a distinction between what depends on nature and what depends on us is neither exclusive nor exhaustive.

<sup>18</sup> See a lengthy discussion of artifacts (specifically, of carburetors) in my *Explaining Attitudes: A Practical Approach to the Mind* (Cambridge: Cambridge University Press, 1995): 195-96.

<sup>19</sup> *The Chronicle of Higher Education: Daily News*, May 8, 2003.

<sup>20</sup> *The New York Times*, May 5, 2002.

<sup>21</sup> *The New York Times*, September 18, 2003. The lead researcher, Derek Lovley, who coined the term 'bacterial battery', is a microbiologist at the University of Massachusetts at Amherst.

<sup>22</sup> Email update from *Scientific American*, September 23, 2003.

<sup>23</sup> Parts of this paper appeared as “The Ontology of Artifacts,” *Philosophical Explorations* 7 (2004): 99-111; other parts will appear in “The Metaphysics of Malfunction,” *Artefacts in Philosophy*, edited by Pieter Vermaas and Wybo Houkes (forthcoming).