

Produced to Use: Combining Two Key Intuitions on the Nature of Artefacts

Wybo Houkes

Department of Philosophy and Ethics of Technology,
Eindhoven University of Technology

and

Pieter E. Vermaas

Department of Philosophy,
Delft University of Technology

Abstract

In this paper we examine the possibilities of combining two central intuitions about artefacts: that they are functional objects, and that they are non-natural objects. We do so in four steps. First we argue that, contrary to common opinion, functions cannot be the cornerstone of a characterisation of artefacts. Our argument suggests an alternative view, which characterises artefacts as objects embedded in what we call use plans. Second, we show that this plan-centred successor of the function-focused view is at odds with the non-naturalness intuition. Third, we show that this intuition can be developed by defining artefacts as produced or human-made objects, but that the resulting definition might collapse into the plan-centred view, and has trouble distinguishing artefact types or kinds. Finally, we propose a division of labour between production and use plans: among objects in general, artefacts are distinguished as human-made objects; within the domain of artefacts, types or kinds are characterised by the use plans in which artefacts are embedded.

Keywords: artefacts; artefact kinds; production; use plans; functions

Introduction

Intuitively, artefacts are non-natural objects. When we see a wren flying over a deserted heath, we infer that a small population of birds lives there; when we find a working watch with a name inscribed, we conclude that someone produced it and that someone lost it. These judgements may be contested, but one can hardly deny that we make them: we routinely and perhaps irrepressibly distinguish artefacts from natural objects, conceptualising the former in terms of productive, primarily human activities and the latter in terms of natural processes such as reproduction.

People not only tend to distinguish artefacts from natural objects, but also make different descriptive and evaluative claims about the distinguished objects. This leads, among other things, to debates about the status of objects that cannot be unambiguously classified as artificial or natural. May, for instance, genetically modified organisms be taken as the products of design, and thus be copyrighted? Do restored landscapes count as parts of our natural environment, to be preserved from further human interference? Intuitions regarding these specific types of objects differ, but all parties in these debates appear to share the opinion that there is something at stake in distinguishing natural objects from artefacts.

A philosophical analysis that explicates the intuition that artefacts are non-natural objects may illuminate the grey area between artefacts and natural objects, and thus resolve the debates mentioned above. Likewise, it may show what exactly is at stake, descriptively or evaluatively, in

distinguishing artefacts and natural objects. In short, it makes sense to introduce the intuitive distinction between artefacts and natural objects as an important constraint and challenge for a philosophy of artefacts.

In some philosophical analyses this distinction has been contested. It has been argued that biological organisms such as domesticated animals and cultivated plants, which are typically taken as natural objects, are artefacts as well (Sperber 2007), and that natural kinds in chemistry such as purified iron actually may be positioned somewhere at a continuum between artefacts and natural objects, a continuum at which there are no principled points for drawing metaphysical distinctions (Grandy 2007). We do not directly address these arguments in this paper. Instead, we note that the distinction between artefacts and natural objects is sufficiently common in philosophy and elsewhere to warrant proposals to explicate it, and to put the burden of proof on detractors of the distinction to refute the proposals. In particular, there is a strong intuitive distinction between objects that are the products of engineering¹ and those that exist independently of human interference. This distinction is regularly taken as a starting point of philosophical characterisations of artefacts, as illustrated by the following encyclopaedia entries, one of which refers to the Aristotelian origin of the distinction:

Any object produced to design by skilled action. (...) Artefacts contrast with natural objects. (Simons 1995, p. 33)

Aristotle divided things into those that “exist by nature” and “products of art” or “artificial products” (*Physics*, Book II, 126b). Artifacts are contrasted to natural objects; they are products of human actions. (Hilpinen 2004. sect. 1)

Yet most philosophers who examine the nature of artefacts start from a different perspective, namely that artefacts are primarily functional objects. The intuitive appeal of this starting point is readily apparent: in most languages, a large number of artefacts is characterised in functional terms, such as ‘screwdriver’, ‘computer’, and ‘paperclip’. In some cases, this ‘function focus’ has led to the view that functions are the essences of artefacts (Kornblith 1980; Wiggins 2001). This function essentialism plays a major role in the debate whether artefact kinds are real or nominal (e.g., Millikan 2000; Elder 2004; 2007),² and in attempts to determine the persistence conditions of artefacts (Baker 2000; 2004; 2007). Furthermore, attempts to bring artefact functions into the fold of general function theories carry a strong suggestion of capturing a central feature of artefacts in doing so (Millikan 1984; Neander 1991; Preston 1998; Krohs 2009; Longy 2009).

The focus on functions in philosophical analyses of artefacts is not necessarily at odds with the equally intuitive characterisation of artefacts as non-natural. However, since both have been used to carve out the domain of artefacts within that of objects in general, an analysis of their relation seems in order: do the intuitions lead to co-extensive characterisations, do they conflict, or – perhaps most interesting – are they complementary?

In this paper, we analyse the relation between the non-natural and functionality intuitions regarding artefacts. We argue for the complementarity of these intuitions, in four steps. First, we consider the philosophical focus on artefact functions. We draw upon the results of some of our earlier papers to show that function essentialism – the extreme form of function focus – is unstable, in the sense that it is undermined by a phenomenologically adequate notion of artefact function. These results suggest an alternative view, which characterises artefacts as embedded in what we call use plans, and which salvages the functionality intuition. The second step in our argument is that a plan-centred view of artefacts, just like the original function-centred view,

seems at odds with the intuitive characterisation of artefacts as non-natural. In the third step, we explore this apparent conflict by considering one plausible way of developing the non-naturalness intuition. We argue that the resulting characterisation of artefacts as intentionally produced or human-made objects has problems of its own. It easily collapses into the plan-centred view, which would mean that it is equally useless in developing the non-naturalness intuition; and it does not lead to a sufficiently flexible and discriminative characterisation of artefact types or kinds. In the final step, we therefore propose a division of labour between the non-naturalness intuition and our use-plan analysis: among objects in general, artefacts are distinguished as human-made objects; within the domain of artefacts, types or kinds are characterised by the use plans in which artificial objects are embedded. Only the combination of these two views provides a solid basis for an analysis of the nature of artefacts.

1. Function essentialism

The view that artefacts are primarily or even essentially functional objects is almost a commonplace among philosophers who attempt to characterise artefacts. Still, this high regard for functions has not led to detailed interest: just like artefacts themselves, artefact functions are not often considered to warrant specific analysis. Authors may, on the one hand, commit themselves to an apparently strong claim, namely essentialism with regard to artefact functions, but may on the other hand characterise these essences in a fast and loose way,³ or not at all. Philosophers who seek to analyse the notion of function typically focus on the biological domain, and treat the domain of artefacts as a relatively unproblematic spin-off.⁴

Detailed attention to artefact functions shows that they are neither unproblematic nor essential. The line of argumentation that we have developed in some earlier publications can be summarised as follows. First, if one wants to account for some basic aspects of artefact use and design in terms of functions, a small set of specifications for a successful theory of functions can be derived.⁵ Most etiological theories of functions – in fact, all such theories currently in existence – fail to satisfy these specifications.⁶ Hence, the most popular general theory of functions does not, at the moment, apply to artefact functions. Second, it is possible to construct a characterisation of artefact functions that does satisfy the small set of specifications. This construction, which we have proposed under the heading of the *ICE-function theory* of artefact functions,⁷ involves action-theoretical, physical, epistemological, and social notions. In concise form, this ICE-theory reads as follows:

An agent a justifiably ascribes the physicochemical capacity to ϕ as a function to an item x , relative to a use plan p for x and relative to an account A , iff:

- I. a believes that x has the capacity to ϕ ;
- a believes that p leads to its goals due to, in part, x 's capacity to ϕ ;
- C. a can justify these beliefs on the basis of A ; and
- E. a communicated p and testified these beliefs to other agents, or a received p and testimony that the designer d has these beliefs.

Finally and, for our present purposes, most importantly, this characterisation of artefact functions by means of the ICE-theory undermines function essentialism. The reason is that the ICE-theory subordinates functions to what we called 'use plans'. These plans are series of (considered) actions, which someone takes in order to realise a goal, and which include manipulations of other objects than the body of the plan-executing agent. Thus, a use plan may consist of putting water into a coffee pot, filling a filter with coffee grounds, and other actions, which taken consecutively

realise the goal of making a fresh cup of coffee;⁸ and this plan is a use plan for all the objects involved, such as the percolator and the grounds. On our characterisation, use plans constitute the background of function ascriptions in two important ways. Most obviously, they set the context in which agents ascribe ‘practically relevant’ capacities to artefacts, i.e., capacities that are supposed to contribute to the realisation of a practical goal. Without such a practical context, there are no artefact functions. In addition, the use plan provides a historical context for function ascriptions; some people, the designers of the plan, have selected objects to play a role in that plan, and they have communicated the plan, including the role of the objects, to other people – the potential users of artefacts. This historical context distinguishes artefact functions from, to put it colloquially, ‘other things that the artefact can do’; to give one example, it distinguishes a car’s function to transport people from its polluting and noise-making features.

In short, we have shown that some basic aspects of artefact use and design may be adequately described in terms of functions. But this phenomenological adequacy comes at a price, namely that artefact functions require a background of use plans. Therefore, we can derive a dilemma regarding function essentialism: either functions are not the key concepts in describing basic aspects of use and design, making them phenomenologically non-fundamental; or functions are themselves characterised in other terms and thus conceptually non-fundamental. In other words, staying true to the phenomenology of artefact use and design in a theory of artefacts and their functions compromises one’s commitment to function essentialism.⁹ Thus, grounding one’s characterisation of artefacts on functions only seems wise as long as the issue is not closely considered; otherwise, it soon becomes clear that the chosen cornerstone does not, in fact, uphold the structure.

The phenomenological advantages of the use-plan analysis mainly concern evaluative aspects of use and design. Once functions are defined in terms of use plans, one can start distinguishing between proper and alternative use, and accounting for the possibility of malfunctioning in terms of functions; alternative function theories do not do this job. Accommodating these evaluative aspects requires a reconstruction of artefact use and design and the introduction of explicit standards for these activities. Here, use plans and the possibility of evaluating plans with respect to their (practical) rationality do all the work. Artefact use may be reconstructed as carrying out a use plan. Designing is, primarily, the construction and communication of such a plan and perhaps, secondarily, the description of currently non-existing items that are manipulated while executing this plan; if such a description is an additional goal of the design process, we call this process ‘product designing’ to distinguish it from designing in general.¹⁰

On the basis of these two characterisations of agent activities, several evaluative notions can be defined. Rational or effective use amounts to the execution of a practically rational plan; proper or standard use is the execution of a use plan that has been socially institutionalised, typically because it is constructed and communicated by socially acknowledged designers; and malfunctioning is accounted for by, roughly speaking, the fact that effective and proper use are not necessarily co-extensive: designers may make mistakes that undermine both the effectiveness of a use plan and their status as socially acknowledged experts. The notion of artefact function is redundant in analysing all these evaluative aspects of use and design.

2. Plan relativism

In the previous section we argued that function essentialism is either phenomenologically inadequate or self-defeating, and we defined artefact functions in terms of use plans. This suggests that function essentialism can be replaced with a view that characterises artefacts in

terms of plans. In this section, we test this suggestion, mainly by looking whether a use-plan characterisation can distinguish between artefact types or kinds, and between artefacts and natural objects.

This plan-based characterisation takes artefacts to be objects embedded in use plans, i.e., objects that are justifiably believed to be useful. More precisely, it takes artefacts to be described implicitly in our reconstructions of use and designing. The resulting ‘useful-material’ characterisation of artefacts reads:

An object is an artefact (more specifically, a ϕ -er) if and only if manipulation of the object is part of (executing) a use plan, which is designed, communicated and evaluated in accordance with the use-plan analysis, and in which the object is justifiably ascribed the capacity to ϕ as a function.

Hence, fresh, running water is an artefact, more specifically a cooling agent, in the context of generating nuclear electricity, just as it is an artefact, more specifically a cleaning agent, in the context of washing one’s hair. In the same way, a piece of steel and plastic is a screwdriver when building a garden shed, and an opener when opening soda bottles; a complicated configuration of various materials is an airplane when flying across the Atlantic, and a museum piece once it has gone out of service and is on exhibit. On this view, everything to which our use-plan analysis applies is an artefact by definition.¹¹ One may at this point object that fresh water is clearly not an artefact. We acknowledge this when we confront the plan-based characterisation with the non-naturalness intuition later.

On this characterisation, artefacts have a plan-relative nature. Aspirin, for example, is nowadays produced, marketed and used for two different purposes: to alleviate pain by taking an incidental, high dosage, and to prevent cardiovascular problems by taking a daily, lower dosage. These ways of using Aspirin involve different use plans, because they have different goal states. Consequently, on our useful-material characterisation, a tablet of Aspirin is a painkiller when it is swallowed in the context of executing the more traditional use plan to alleviate pain. But the very same object is a blood thinner when it is swallowed in the context of executing the more recently designed and communicated plan to prevent blood clots.

In this way, the useful-material definition can be used to determine the persistence conditions for artefacts – one of the standard tasks of the ontology of a domain. The persistence conditions of useful-material artefacts are related to the use plans for these artefacts and to the aggregates that are manipulated in these plans; thus, they have one foot in the intentional, and one in the physical realm. Consequently, determining artefact persistence becomes as context-sensitive as determining the differences between plans. One might, for example, be inclined to say that an object ceases to be a ϕ -er as soon as it becomes impossible, or at least generally irrational, to execute the use plan to which the object contributed by ϕ -ing. A car that is wrecked beyond repair in a crash is then no longer a car, but a twisted aggregate of steel and plastic. Similarly, when the white, fresh-smelling stuff that comes in tubes is used to fill a small crack in a wall, it ceases to be toothpaste – assuming that no-one in his right mind would use it as such – and becomes filler instead. In both cases, the persistence of the artefacts is intimately connected to realising goals by means of material objects.

This indicates how a useful-material ontology of artefacts may be developed. We now explore some further features of our characterisation. It turns out that, although all features can be

presented as problems, none of them shows that the useful-material characterisation is indefensible or unstable.

One feature concerns the identity criteria of artefacts. Like their persistence conditions, these criteria must derive mainly from the use plans for artefacts. Although such plans might be told apart on the basis of having different goal states or different actions in different orderings, these criteria are far from exhaustive. Artefacts, when defined in terms of use plans in which they are manipulated, would be rather indeterminate entities. Suppose, for instance, that someone uses a tea bag by moving it up and down in the tea, making a quick cup of tea, and that someone else uses a tea bag in a teapot, letting the tea draw for some time before pouring a cup. The actions included in these plans seem sufficiently distinct to tell them apart. Yet it is unclear whether we ought to regard the tea bags manipulated in them as different artefacts; the answer would depend on intuitions about proper use, personal beliefs about the quality of the tea produced and other context-sensitive factors.

Quine's slogan 'No entity without identity', which is widely adopted as a barrier for candidate abstract objects,¹² may be imposed with its usual force: if one seeks to define a category of entities, but one does not succeed in giving precise criteria for claiming when two entities in this category are the same, one must seek another definition or admit that the sought category is ontologically disreputable. In these lights, plan-relative artefacts can be discredited because they are inherently vague – just like mental properties and events. Those who sympathise with Quine's physicalism and general distrust of abstract terms¹³ may argue that this metaphysical Puritanism is as bloodless as trimming a very unkempt beard. Others might conclude that the program sacrifices too many *bona fide* entities to an elusive ideal of metaphysical rigor and parsimony, and might therefore not object to such vague objects as plan-relative artefacts. We just note that this feature of our useful-material definition is not necessarily an objection.

A second feature is that the plan-relativity of artefacts may be mitigated by considerations of proper use. Some use plans are socially privileged and play a role in a network of responsibilities and requirements; other use plans are merely recommendations for use that feature in useful knowledge. Categorising an object as token of a functional artefact type or kind (i.e., as token of the ϕ -ers) may be one way of expressing that, among all known plans, a specific use plan is privileged; the useful-material characterisation is easily modified to accommodate this suggestion.

This appeal to proper use, which is part and parcel of our evaluative approach to artefacts, limits the relativity of useful-material artefacts. It may, for instance, be said that a screwdriver is not a paint-can opener, although it is occasionally used as such. For other items and in other situations, however, relativism still looms large. The river Rhine, for instance, is in some places properly used as an industrial cooling agent, in the sense that people are not allowed to swim or fish in it; in other places, it is properly used as swimming water, but may not be used for diving or draining industrial waste. In all cases, there are regulations and responsibilities, suggesting that we might just as well say that the Rhine has been designed as and is properly used as a cooling agent in one place, and for recreational purposes in the other. Similarly, items that are equipped with ever more functionalities, such as cell-phones and organisers, would be many things simultaneously: they play a role in many determinate use plans, or none clearly, and their context of use is very open-ended.

This remaining plan relativism of artefacts may be taken as a curious consequence rather than a *reductio* of the useful-material definition. It does, however, commit one to a thesis of relative

identity with respect to artefacts. It is an open question whether such a thesis, on which two objects can be the same ϕ -er without being the same ψ -er (e.g., the same cooling agent, but not the same recreational artefact), is sustainable, and whether it is needed to account for other language use. It would be fair to say that relative identity is believed to be innocent only by a minority, although the jury still has to reach unanimity.¹⁴

Although both of the features discussed raise problems, these are the topics of current and unresolved debates in general metaphysics. They are not internal problems such as those that we uncovered for function essentialism in the previous section. More specifically, they do not offer grounds to suppose that the useful-material characterisation is either conceptually or phenomenologically non-fundamental. Hence, we may tentatively conclude that it is a defensible, albeit problematic successor of function essentialism.

This means that we can turn to our original question of combining the two intuitive starting points of characterisations of artefacts: functionality and non-naturalness. Now that the former has been included in the useful-material characterisation of artefacts, the tension with the latter intuition becomes clear. For it is impossible to make a fixed and principled distinction between useful-material artefacts and natural objects. As soon as there is a designed, communicated, and justifiable use plan in which an object is manipulated, that object is an artefact. Hence, there is at best a fluid, agent-dependent or community-dependent line between natural objects and artefacts. Natural objects become artefacts as soon as an agent constructs and communicates a use plan for them, and artefacts cease to exist once an agent (or a community of users) discards or forgets this plan.¹⁵

Defining artefacts as useful materials leads to a kind of global instrumentalism, since there is hardly any object, natural or non-natural, which we cannot imagine using deliberately for some purpose. Just like most of us know how to use staplers to join stacks of paper, some of us know how to use planets to accelerate interplanetary probes. Others can use their fingers for playing 'Für Elise'. We may even be said to use taxi drivers to get from the airport to a hotel. This view is not entirely without precedent in philosophy. Heidegger's (1977) question concerning technology, or at least his apparent answer, leads in a similar direction: he uses power plants on the river Rhine and some other examples to show that all objects are 'standing reserves' (*Bestände*) in a world-encompassing, inescapable technological system called 'the enframing' (*das Gestell*). But despite this precedent, pan-instrumentalism is clearly at odds with the intuitive understanding of artefacts as non-natural, which places them in a more or less fixed and limited domain.

One may conclude from this that the non-naturalness intuition is incompatible with the intuitions about use and design that the useful-material definition can accommodate. Or one might consider the possibility to devise other categories within the use-plan analysis to make relevant distinctions within the all-encompassing class of artefacts (e.g., 'improvised', 'permanent', 'goal-enabling', 'self-producing'), and thus save all intuitions simultaneously, in a roundabout way. We choose to regard the conflict between functionality and non-naturalness as a challenge for further analysis. Apparently, the non-naturalness intuition sets effective boundaries for understanding the nature of artefacts, in the sense that a characterisation that seems promising in other respects fails to meet it. However, further analysis is needed to go beyond this negative conclusion. After all, the match is not even: the non-naturalness of artefacts must be developed beyond the intuitive stage to find out exactly how this feature conflicts with the useful-material definition, and to use this conflict more productively.

3. Human-made material

It may not come as a surprise that the plan-based characterisation of artefacts conflicts with a key intuition. In fact, the problem appears to precede the useful-material definition at the start of the previous section. The notion of designing that we introduced at the end of section 1 is already at odds with an intuitive characterisation of this activity – a characterisation that is intimately related to the understanding of artefacts as non-natural objects.

Our notion of designing puts the spotlight on the construction and communication of use plans, and turns the description of new objects into a secondary, optional activity. We emphasise the instrumental side of designing, its contribution to practical purposes by providing means, over its productive side. This shift of focus has many advantages. Yet these are bought at the price of the intuition that designing is primarily productive. This intuition is easily converted into one about artefacts by defining artefacts as the products of designing. The intuitive understanding of designing then yields the characterisation of artefacts as non-natural, i.e., intentionally produced objects.

This means that the non-naturalness intuition can, like the useful-material definition above, be developed in terms of intentional actions, as follows:

An object is an artefact (more specifically, a ϕ -er) if and only if the object has been intentionally produced for the purpose of ϕ -ing by an agent.

Let us call this the ‘human-made’ characterisation of artefacts, although it leaves open the possibility that bird nests and beaver dams are artefacts, in case non-human animals can be called ‘agents’.

Non-naturalness is now rephrased in terms of an action, namely production. In itself, this does not clarify the relation between the functionality and non-naturalness intuitions. It does, however, shift it entirely to the realm of actions. This shift turns our main question from one concerning a possible conflict between two central intuitions about artefacts to one concerning the best way of bringing out the importance of two types of activities – instrumental and productive – in a characterisation of artefacts.

Furthermore, the human-made definition has three problems: it is insufficiently flexible and insufficiently discriminative as a characterisation of artefact types or kinds, and it easily collapses into the plan-centred view of the previous section, once further inquiry is made into the meaning of ‘production’.

The inflexibility problem is closely related to the considerations about proper use discussed earlier. Like function essentialism, a characterisation of artefacts that focuses exclusively on their history of production cannot accommodate the dynamics of (proper) artefact use. Many artefacts, such as Aspirin, acquire new uses that co-exist peacefully with the old ones; others, such as plate armour, acquire uses that replace their traditional purpose. For each of these artefacts, there is a highly specific story to be told about the establishment of its new use in a small or larger group of users. The use-plan analysis, which divorces designing from the production of artefacts and therefore does not identify designers with creators, allows for such changes in the characterisation of artefacts, artefact functions, and artefact use. However, the human-made definition of artefacts

rules out in advance such changes in the nature of artefacts, because the original production of an artefact determines it to be a ϕ -er once and for everyone.¹⁶

The discrimination issue shows up once one looks into the notion of intentional production. Developing an appropriately hands-on notion of producing or making is no mean feat.¹⁷ If one requires an artefact to be produced from raw materials, then products of assembly, such as the stereotypical driftwood raft, are not artefacts. Alternatively, if producing implies that something is physically changed to serve a practical purpose, a prototypical natural object such as Jupiter is an artefact on the human-made definition: using this planet to accelerate probes changes its orbit ever so slightly. Furthermore, every episode of use results in wear and tear, leading to an enormous variety of use-related physical modifications. These physical changes are, of course, side effects rather than the goal of production or use. Yet spelling out this intuitive judgment requires a distinction between intentions that are relevant and those that are irrelevant to the production process. Such a distinction between relevant and irrelevant intentions is also needed to develop the human-made definition as an account of artefact types or kinds. Some cell-phones may have been produced to enlarge a company's share of the cell-phone market, but this should not lead us to classify such cell-phones as market-share-enlargers, in one category with cars and laptop computers that were produced for the same purpose. The use-plan analysis is the only account currently on offer that avoids this problem while retaining the reference to agents' intentions.

The collapse problem is an immediate corollary of the last point. It turns out to be difficult to analyse the notion of 'production' in such a way that its difference from the useful-material definition is retained. Suppose we develop the useful-material definition as sketched in the previous section. Then, an artefact comes into existence as soon as an agent constructs and communicates a use plan in which an object is to be manipulated. It does not matter whether the object existed before this manipulation: the artefact, if not the material that constitutes it, is created by its inclusion in a use plan. The Aspirin case, for example, can be analysed in terms of a quantity of acetylsalicylic acid, which once exclusively constituted a painkiller, but may now also constitute a blood thinner, as soon as another use plan is designed and executed. Hence, as long as the human-made definition does not get its hands dirty, i.e., as long as it says nothing about physical modifications of an object and the intentions involved in that activity, it may collapse into the useful-material definition.

To illustrate this point, consider the following condition for being an artefact, proposed by Hilpinen (1992): 'An object o is an artefact made by an agent Ag only if it satisfies some type-description D included in the intention I_A which brings about the existence of o '. At first glance, this condition seems to express the human-made definition. However, it can also be interpreted as expressing the useful-material definition: D may be identified with the goal-contribution term ' ϕ -er' (e.g., 'cooling agent'), the productive intention I_A with the intention that is central to our general notion of designing, i.e., to contribute to other agents realising their goals, and the 'bringing into existence' may be explained by means of the constitution view.

Despite these problems, the human-made definition has one marked advantage over the useful-material definition: it provides a basis for distinguishing between artificial and natural objects. Determining whether something is an artefact or not, i.e., identifying something as an artefact, rather than as a token of an artefact type or kind, seems an absolute matter, which does not vary among agents or change in time. One may increase one's abilities to discriminate between artefacts and natural objects, but it would be counterintuitive to relativise this distinction to the abilities of an agent or group of agents (e.g., trained archaeologists). If it is possible to develop

the notion of production in such a way that it is clearly distinct from the use-plan notion of design, characterising artefacts as intentionally produced provides the requisite absolutism: on this characterisation, an object becomes an artefact on its original production, once and for everyone.

4. Producing a useful combination

The advantages and drawbacks of the useful-material and human-made definitions, and their mutual focus on intentional actions, suggest that a combination of both may provide a satisfactory characterisation of artefacts. The human-made definition serves, to some extent, to make an absolute distinction between artefacts and natural objects. However, it cannot be developed to distinguish types or kinds of artefacts without collapsing into the useful-material definition. This latter definition can be used to characterise types or kinds of artefacts, albeit in a highly context-sensitive manner; yet it performs poorly in distinguishing artificial and natural materials. Although the human-made definition still has to be developed into one that makes a fully plausible distinction – the driftwood-raft and Jupiter examples indicate some of the problems awaiting in this process – it does show considerably more promise than the useful-material characterisation. Thus, the two views may be complementary, and may account for both the functionality and non-naturalness intuitions simultaneously. The characterisation of artefacts as human-made objects might be used to single out within the domain of application of the use-plan analysis the domain of artefacts (understood as non-natural objects), in which artefact types or kinds can then be defined by means of the useful-material definition (which develops the functionality intuition). This retains relativism at the level of artefact types or kinds, without undermining an absolute distinction between artefacts and natural objects.

The human-made and useful-material definitions may be integrated into the following ‘produced-to-use’ definition:

An object is an artefact, more specifically a ϕ -er, if and only if: (1) the object has been intentionally produced for the purpose of ψ -ing¹⁸ by an agent; and (2) manipulating of the object is part of a use plan, which is constructed and communicated by an agent¹⁹ and in which the object is justifiably ascribed the capacity to ϕ as a function.

In this definition, the productive and instrumental activities appear to play different roles in characterising artefacts, but in practice they may still coincide. The artefact may, but need not have been produced for a different use than that to which it is put later. Thus, Aspirin may have been produced as a painkiller, but it may also be used as a blood thinner – and thus, on the view developed in section 2, constitute a blood thinner. This case requires two groups of designers, who justifiably believe that two artefact capacities contribute to two constructed and communicated use plans. However, the definition allows for cases in which the mentioned agents, as well as the mentioned capacities, are identical. Aspirin, to return to the example, may be both produced and used as a painkiller.

The ‘dual-activity’ characterisation of artefacts still conceals one major analytical challenge. As we argued in the previous section, developing the notion of intentional production requires a distinction between relevant and irrelevant intentions. There is reason to suppose that this distinction must rely on the notions used in the use-plan analysis, but this reliance should not be so great that production becomes equivalent to design. This leads to significant constraints on developing an appropriate notion of production – constraints that we can just note in this paper.

Whatever the results of analysing production may be, questions about the nature and classification of artefacts are, on our proposed definition, intimately connected to questions about agents and their beliefs and activities. Productive activities may be followed by different use-oriented activities: artefacts may be redesigned by engineers or by users, who might promote uses that supplement or replace those envisaged by the original designers. This may lead to reclassification of the artefacts, or to classifying them as hybrid objects. These issues can, moreover, not be resolved by armchair metaphysics: one needs to consider, among other things, how a community of designers and users standardises artefact use. The conflict between the non-naturalness intuition and the plan-centred characterisation – which succeeds the functionality intuition – is thereby moved to the area of intentional actions, namely production, design and use.

In sum, it is possible to combine the human-made and useful-material definitions and their underlying activities into an encompassing, produced-to-use definition. This definition may be regarded as the successor of plan relativism, which was itself a successor of function essentialism. The produced-to-use definition is phenomenologically adequate in the sense that it accommodates both the intuitions about artefact use and design that proved fatal to function essentialism, and the non-naturalness intuition that caused problems for plan relativism. As a third-generation definition, it provides a broad and diverse basis for a characterisation of artefacts; its basic elements are proper and effective use, the physical structure supporting this use, and the history of design and/or production of the item.²⁰ It does not, however, contain artefact functions as an essential element: unlike the use-plan analysis, which is still an integral part of the produced-to-use view of artefacts, the focus has shifted from functions to actions in the course of our reflections.

These reflections have shown a number of things. We argued that the intuition that artefacts are non-natural objects conflicts with the plan-relativist characterisation of the nature and classification of artefacts, which is the natural successor of function essentialism. On a more positive note, we argued that plan relativism and the non-naturalness intuition may be combined in what we called the ‘produced-to-use’ definition. On this definition, productive and instrumental activities may jointly provide a characterisation of artefacts. There is a natural division of labour between these two activities: production distinguishes artefacts from other types of objects, and instrumental actions carve out artefact types or kinds within the domain set by production. Finally, we showed that there are significant constraints on developing the appeal to production in this dual-activity characterisation. Philosophers may have examined the nature of artefacts in some detail, but a satisfactory analysis of production is still in its infancy.

Acknowledgements

Research by Wybo Houkes and research by Pieter Vermaas was supported by the Netherlands Organisation for Scientific Research (NWO).

References

- Ariew, A., R. Cummins and M. Perlman, eds. 2002. *Functions: New Essays in the Philosophy of Psychology and Biology*, Oxford: Oxford University Press.
- Baker, L.R. 2000. *Persons and Bodies*, Cambridge: Cambridge University Press.
- Baker, L.R. 2004. “The Ontology of Artefacts,” *Philosophical Explorations*, 7: 1-14.
- Baker, L.R. 2007. *The Metaphysics of Everyday Life: An Essay in Practical Realism*, Cambridge: Cambridge University Press.

- Barsalou, L.W., S.A. Sloman and S.E. Chaigneau. 2004. "The HIPE Theory of Function," in: L. Carlson and E. van der Zee, eds., *Functional Features in Language and Space: Insights from Perception, Categorization and Development*, Oxford: Oxford University Press, 131-148.
- Bloom, P. 1996. "Intention, History, and Artefact Concepts," *Cognition*, 60: 1-29.
- Bloom, P. 1998. "Theories of Artefact Categorization," *Cognition*, 66: 87-93.
- Elder, C.C. 2004. *Real Natures and Familiar Objects*, Cambridge, MA: The MIT Press.
- Elder, C.C. 2007. "On the Place of Artifacts in Ontology," in: E. Margolis and S. Laurence, eds., *Creations of the Mind: Theories of Artifacts and Their Representation*, Oxford: Oxford University Press, 33-51.
- Garbacz, P. 2002. "The Logics of Relative Identity," *Notre Dame Journal of Formal Logic*, 43: 27-50.
- Geach, P.T. 1967. "Identity," *Review of Metaphysics*, 21: 3-12.
- Grandy, R. 2007. "Artifacts: Parts and Principles," in: E. Margolis and S. Laurence, eds., *Creations of the Mind: Theories of Artifacts and their Representation*, Oxford: Oxford University Press, 18-32.
- Heidegger, M. 1977. "The Question Concerning Technology," in: *The Question Concerning Technology and Other Essays*, New York: Harper and Row.
- Hilpinen, R. 1992. "Artefacts and Works of Art," *Theoria*, 58: 58-82.
- Hilpinen, R. 2004. "Artifact," in: E.N. Zalta, ed., *The Stanford Encyclopedia of Philosophy* (Fall 2004 Edition), Available [Online]: <http://plato.stanford.edu/archives/fall2004/entries/artifact>
- Houkes, W. and A.W.M. Meijers. 2006. "The Ontology of Artefacts: The Hard Problem," *Studies in the History and Philosophy of Science*, 37: 118-131.
- Houkes, W. and P.E. Vermaas. 2004. "Actions versus Functions: A Plea for an Alternative Metaphysics of Artefacts," *The Monist*, 87: 52-71.
- Houkes, W. and P.E. Vermaas. 2009. *Useful Material: An Action-Theory of Artefacts and Their Functions*, Manuscript.
- Houkes, W., P.E. Vermaas, K. Dorst and M.J. de Vries. 2002. "Design and Use as Plans: An Action-Theoretical Account," *Design Studies*, 23: 303-320.
- Ingold, T. 2000. *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*, London: Routledge.
- Kornblith, H. 1980. "Referring to Artefacts," *The Philosophical Review*, 89: 109-114.
- Krohs, U. 2009. "Functions as Based on a Concept of General Design," *Synthese*, online first.
- Longy, F. 2009. "How Biological, Cultural and Intended Functions Combine," in: U. Krohs and P. Kroes, eds., *Functions in Biological and Artificial Worlds: Comparative Philosophical Perspectives*, Vienna Series in Theoretical Biology, Cambridge, MA: MIT Press: 51-67.
- Losonsky, M. 1990. "The Nature of Artefacts," *Philosophy*, 65: 81-88.
- Lowe, E.J. 1995. "The Metaphysics of Abstract Objects," *The Journal of Philosophy*, 92: 509-525.
- Millikan, R.G. 1984. *Language, Thought and Other Biological Categories*. Cambridge, MA: The MIT Press.
- Millikan, R.G. 2000. *On Clear and Confused Ideas*. Cambridge: Cambridge University Press.
- Neander, K. 1991. "The Teleological Notion of "Function"," *Australasian Journal of Philosophy*, 69: 454-468.
- Preston, B. 1998. "Why is a Wing like a Spoon? A Pluralist Theory of Function," *The Journal of Philosophy*, 95: 215-254.
- Preston, B. 2000. "The Functions of Things: A Philosophical Perspective on Material Culture," in: P. Graves-Brown, ed., *Matter, Materiality and Modern Culture*, London: Routledge, 22-49

- Preston, B. 2003. "Of Marigold Beer: A Reply to Vermaas and Houkes," *British Journal for the Philosophy of Science*, 54: 601-612.
- Quine, W.V.O. 1960. *Word and Object*, Cambridge, MA: The MIT Press.
- Quine, W.V.O. 1969. "Speaking of Objects" (original: 1958), reprinted in: *Ontological Relativity and Other Essays*, New York: Columbia University Press, 1-25.
- Simons, P. 1995. "Artefact," in: J. Kim and E. Sosa, eds., *A Companion to Metaphysics*, Oxford: Blackwell, 33-35.
- Sperber, D. 2007. "Seedless Grapes: Nature and Culture," in: E. Margolis and S. Laurence, eds., *Creations of the Mind: Theories of Artifacts and their Representation*, Oxford: Oxford University Press, 124-137.
- Vermaas, P.E. and W. Houkes. 2003. "Ascribing Functions to Technical Artefacts: A Challenge for Etiological Theories of Functions," *British Journal for the Philosophy of Science*, 54: 261-289.
- Vermaas, P.E. and W. Houkes. 2006. "Technical Functions: A Drawbridge between the Intentional and Structural Natures of Technical Artefacts," *Studies in the History and Philosophy of Science*, 37: 5-18.
- Wiggins, D. 2001. *Sameness and Substance Renewed*, Cambridge: Cambridge University Press.

Endnotes

- 1 Our focus is on *technical* artefacts, material objects that are typically designed by engineers and used for immediate practical purposes. Hence, our analysis is meant to apply to screwdrivers and cell-phones; we leave it to others to determine whether or not art works such as Michelangelo's David and social artefacts such as the First Amendment fall inside its scope.
- 2 Function essentialism is not exclusive to philosophers: in cognitive science, where artefact categorisation has recently become a topic of interest, it is maintained by Paul Bloom (1996; 1998).
- 3 David Wiggins claims, for instance, that 'Artefacts are collected up [...] under functional descriptions that are precisely indifferent to specific constitution and particular mode of interaction with the environment. A clock is any time-keeping device, a pen is any rigid ink-applying writing implement, and so on.' (2001, p. 87). The first full sentence expresses a commitment to function essentialism, the second loosely (and not too consistently, since rigidity describes the constitution of objects) characterises the notion of artefact function via two examples.
- 4 In, for instance, the introduction to (Ariew, Cummins and Perlman 2002), a volume on the topic that deals by its subtitle explicitly with biology and psychology, functions are introduced as entities that typically and unproblematically pertain to artefacts.
- 5 The specifications, derived in Vermaas and Houkes (2003), are: (1) that the theory distinguishes proper functions from accidental features; (2) that the theory leaves open the possibility that artefacts malfunction, i.e., do not fulfil their function; (3) that the theory makes explicit the relation between artefact functions and underlying physical characteristics; (4) that the theory leaves open the possibility for radically innovative functionalities.
- 6 Beth Preston (2003), in defence of her pluralistic etiological approach, argues that one might give up on (one of) the specifications.
- 7 An early version of this ICE-theory is presented in the final section of Vermaas and Houkes (2003). An improved version is given in Houkes and Vermaas (2004) and, in increasing detail, in Vermaas and Houkes (2006) and Houkes and Vermaas (2009).
- 8 Some more details of this use plan, along with many other examples, can be found on 'How To' websites such as www.wikihow.com.
- 9 This result is conditional: if there would be theories of artefact functions that satisfy our specifications and in which functions are primitive features (i.e., not relative to use plans or other items), function essentialism may be upheld.
- 10 An early version of the use-plan analysis of artefact use and design can be found in Houkes *et al.* (2002); a modified and less schematic account is presented in Houkes and Vermaas (2004).
- 11 The useful-material definition of artefacts may be developed into a full-fledged ontology by means of Lynne Baker's (2000; 2004; 2007) constitution view. One of us has argued elsewhere that Baker's own application of the constitution view to artefacts rests on function essentialism, and has problems dealing with the phenomenology of artefact use (Houkes and Meijers, 2006).
- 12 The slogan is originally found in Quine (1969, p. 23). For a recent defence of its application, see Lowe (1995).
- 13 An expression of this distrust is: 'Once we start admitting abstract objects, there is no end.' (Quine 1960, p. 123)

- 14 The thesis of relative identity is primarily associated with Geach (1967), and is vehemently attacked by, among others, Wiggins (2001, ch. 1). Garbacz (2002) has recently presented a proposal for the logical representation of statements of relative identity.
- 15 This result is not specific to the plan-based view; it also holds on a view in which artefacts are nothing but functional items. There, natural objects – e.g., water in the river Rhine – become artefacts as soon as they acquire functions.
- 16 Preston (2003) presents a similar argument to criticise theories that characterise artefact functions exclusively in terms of author's intentions.
- 17 The lack of appropriate notions of production, as well as the problems in developing them, are discussed by, e.g., Preston (2000) and Ingold (2000; chs. 18 and 19).
- 18 The capacities to ϕ and to ψ may, but need not be, identical.
- 19 The agents mentioned in the characterisation may, but need not, be identical.
- 20 In philosophy, a similar starting point is suggested by Lososky (1990), who identifies physical structure and the purpose and manner of use as determining the nature of artefacts. We would add the distinction between proper and effective use and considerations about design and production to this list. In cognitive science, Barsalou *et al.* (2004) have proposed the HIPE-theory. On this theory, design History, Intended use, Physical structure, and the Events resulting from use are the relevant elements in artefact categorisation. Again, production (and therefore a way of accommodating the non-naturalness intuition) is lacking.