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Artefacts and Living Artefacts

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ABSTRACT

The concept of an artefact is central to several bioethical arguments. In this paper, I analyse this concept with respect to living and also non-living entities. It is shown that a close relationship between bringing an entity into existence and its intentional modification is necessary for its artefactuality. The criterion is further improved by analyses of the nature of intentionality in artefact production and the differences between artefacts and their side-effects. Further, in order to clarify the meaning of the term 'bring into existence', issues related to sortal terms and functions of artefacts are considered. As the result of these analyses, the criterion for being an artefact is founded on the following double condition: (1) An entity x is an artefact only if x has been intentionally brought into existence by intentionally causing the coming artefact x to have certain properties. (2) An entity x is an artefact only if causing x to have certain properties has led x to have some new functions – that is, functions that are not present in the raw materials of x. The double condition is used for clarifying the status of several biotic entities such as gardens, commercial fields, polluted natural areas, ecosystems including alien species, restored ecosystems and transgenic organisms.

KEY WORDS

Artefact, living artefact, function, intention, side-effect

1. INTRODUCTION

Human beings can and do change features of ecosystems, species, organisms and other biotic entities in many different ways. We alter ecosystems by causing species to move into new surroundings, to disappear from certain places or even

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to become extinct. The genetic construction and properties of species and individuals are modified by breeding, genetransfers, and also less directly by causing changes in their environment and climate. Because of the differences in the extent and types of human activities, our impacts on biotic entities varies from one extreme to another. Deep sea organisms are only indirectly and accidentally affected by humans – for example, human caused climate change and pollutants may have caused changes in them. On the other hand, some transgenic laboratory animals are the result of long product development. Between these extremes there exists a multiple variety of living entities: traditional domestic and semi-domestic animals, cultivated plants, pests and collected or hunted wild organisms. Similarly, human affected ecosystems vary from different types of modern fields and gardens to restored ecosystems, conserved land areas, and ecosystems of unexplored remote places.

It has been stated that some of these biotic entities are artefacts. Moreover, their artefactuality plays an important role in several bioethical arguments. For example, according Robert Elliot and Eric Katz, a restored ecosystem is an artefact and therefore less valuable than a physically similar, naturally evolved area. Elliot (1982: 86) states that 'there will be cases where we rightly judge that it is better to have the natural object than it is to have an artefact'. Similarly, Katz (1997a: 227) argues that 'there is a moral obligation to preserve non-artefactual natural value, even as it exists independently from human projects, plans and interests'. J. Baird Callicott goes even further. Not only does he claim that naturalness is morally superior to artificiality, he also states that domestic animals are artefacts and thus unsuitable objects for some moral considerations.

> Domestic animals are creations of man. They are living artifacts, but artifacts nevertheless, and they constitute yet another mode of extension of the works of man into ecosystem. […] There is thus something profoundly incoherent […] in the complaint […] that the 'natural behavior' of chickens and bobby calves is cruelly frustrated on factory farms. It would make almost as much sense to speak of the natural behavior of tables and chairs. (Callicott 1995: 245.)

Moreover, artefactuality is central to some biodiversity[1] issues. Scientists and philosophers disagree as to whether living artefacts are components of biodiversity and objects of biodiversity conservation. Some argue that the concept of biodiversity should be restricted to natural diversity only (see for example Angermeier 1994, Angermeier and Karr 1994: 692). Others maintain that at least some artefacts are an important, though often undervalued, part of biodiversity (see for example Perlman and Adelson 1997: 60, Jeffries 1997: 84–86).

In what follows, I will analyse the common central concept of these bioethical questions: namely the concept of artefact. In other words, I will consider the conditions for an entity being an artefact. The analysis will be carried out with respect to both living and non-living entities, for I am convinced

that if the notion of artefact is to be used about living beings, then the use of the term has to happen consistently with its use in other philosophical contexts. Otherwise 'living artefact' might become an ontologically empty concept, which is used only in emotionally appealing ways to draw people's attention. I also think that the conception 'living artefact' should be defined non-normatively – as free of moral considerations as possible. Whether something is or is not an artefact is not a question of ethics but of ontology – even though being an artefact may have moral consequences. The analysis will be restricted to physical entities. I will not explicitly consider the artefactuality of such human products as performance art works[2] or belief systems[3]. However, my views might be applicable to them too.

2. INTENTIONAL MODIFICATION

Artefacts differ from other entities by their histories. The properties of any artefact have been intentionally modified by a human being or by a group of humans.[4] When a human being modifies the properties of an entity, he or she causes it to have some new features or to lose some of its features. For example, a writer modifies his or her novel by adding sentences and words to it and by extracting them from it.

Biotic entities are often intentionally modified by humans. Their features are usually changed by adding (or taking away) some lower level biotic elements. For example, cows and sheep that produce human proteins in their milk have been produced by adding human genes into their genome[5], and features of the 'oncomouse'[6] have been enhanced by disabling some of its genes. Similarly, an ecosystem may be modified by adding new species to it or by extracting a species from it. Angermeier probably has this kind of modification in his mind when he 'consider[s] artificial diversity to be generated by any addition of biotic elements to wild systems through direct manipulation by humans' (Angermeier 1994: 600). However, a biotic entity can turn into an artefact if non-biotic elements are added. This might happen, for example, when human beings intentionally add numerous plastic trees and foam rubber stones to a forest making it thereby a pleasure ground and 'a magic forest'.

Not all intentional additions and extractions of lower level biotic elements turn biotic entities into artefacts. Suppose that an agent adds one sunflower to a field in which hundreds of similar flowers are growing. The procedure does not turn the field into an artefact. Moreover, even intentionally produced *qualitative* changes are not always sufficient for artefactuality.[7] Some natural (biotic and non-biotic) entities can be intentionally qualitatively modified without causing them to become artefacts. An ornithologist may ring birds, and yet this new feature (of being ringed) does not turn the birds into artefacts. Similarly, a skier can intentionally modify a forest by adding a ski track to it. This can be done

simply by skiing through the forest, thereby adding a new property (the property of having a ski track) and bringing about a qualitative change to the forest. Claiming that every forest in which someone has intentionally added a ski track is an artefact would be quite odd.

Thus, not every intentional modification of an entity turns that entity into an artefact. Moreover, not even every intentional human produced qualitative change is sufficient for the modified entity to become an artefact.[8] Thus, the condition of modification is not sufficient for artefactuality. Something else is needed too.

3. BRINGING ARTEFACTS INTO EXISTENCE

According to Keekok Lee, an artefact 'does not exist in the absence of human manipulation and intervention, but is deliberately created by humans […]' (Lee 2003: 4). Risto Hilpinen argues along the same lines: 'an artifact necessarily has a maker or an author, or several authors, who are responsible for its existence. […] Artifacts are products of intentional making' (Hilpinen 1995: 138). According to both Lee and Hilpinen, an entity should be considered to be an artefact only if it is intentionally produced by a human being.

Neither Hilpinen nor Lee claims that being created by a human being is sufficient for an entity to be an artefact. Not all entities which are intentionally brought into existence by humans are artefacts. Inter-human relationships may be intended products of human action, but they are not artefacts (Katz 1997a: 122). Similarly, intentionally produced sweat (for example in sauna) is not an artefact or an artificial substance. Therefore, it might be suggested that a sufficient condition for artefactuality were found by combining the condition of creation with the condition of modification.

(C1) An entity x is an artefact, if and only if (a) x is intentionally brought into existence by a human being or a group of human beings; and (b) x is intentionally modified by a human being or a group of humans in a way that some new properties are added to x or some properties are extracted from x.

Counterexamples for C1 can be found. It can be taken for granted that at least some – if not most or all of – newborn babies are not artefacts. That the parents of an infant have intentionally brought him/her into existence (that is they have been in sexual intercourse in order to have a baby) is not sufficient for his/her artefactuality. Neither do most of the intentional modifications the parents make on their baby – in its simplest form modification may mean giving food to the infant or teaching him/her to speak in a specific language – turn the infant into an artefact. I short, some or most infants are not artefacts regardless of the fact that they may be both intentionally brought into existence and intentionally

modified by other human beings.[9] Therefore, the combination of the creation condition and the modification condition does not perfectly separate artefacts from non-artefacts. Condition C1 needs to be either modified or replaced by another condition.

The difficulties caused for C1 by the infant example can be settled by a closer analysis of the history of a typical artefact. There exists an important difference between the histories of an intentionally produced and modified infant and a typical artefact, say a chair. In the case of the infant, bringing about his/her existence and his/her modification are two separate activities. Typically, a baby is first brought into existence and intentionally modified (i.e. intentionally caused to have new features or to lose some features) only after that. Modern medicine and gene technology enable the intentional modification of foetuses and embryos, but even then, the modification and the bringing into existence are two separate activities and the bringing into existence is possible without *intentional* modification. The case of the chair is different. The intentional modification of properties of the coming chair is closely and necessarily tied in the process of bringing about the existence of that chair. It is literally impossible to bring about the existence of a chair without *intentionally* causing it to have some specific properties.[10] Moreover, some intentional modification of the properties of the coming chair is necessarily tied to bringing about its existence, and cannot be separated from it. Bringing about the existence of a chair and causing the prospective chair to have some specific properties are not two separate activities but a single procedure to which both descriptions can be sensibly given. According to Donald Davidson (1980a: 4–5), it is not uncommon that several different true descriptions can be given to a single action, performance or event. For example, the same action can be described as turning on the light and as flipping the switch. Similarly 'bringing about the existence of a chair' and 'causing the prospective chair to have certain properties' are two descriptions that can be sensibly and truthfully be given to the same intentional human activity.[11]

As a matter of fact, bringing about the existence of a chair consists of causing that future chair to have some properties. The intentional modification of the properties of the coming chair is how that chair is brought into existence. (Similarly flipping the switch is how the lights are turned on.) In other words, every specific chair is brought into existence *by* intentionally modifying properties of that coming chair (i.e. by causing it to have certain properties).[12] I propose this is true for all artefacts and thus suggest the following condition.

(C2) An entity x is an artefact if and only if x has been intentionally brought into existence by intentionally causing the coming artefact x to have certain properties.

C2 offers a solution to the problem set by the infant example. Even though the baby in the example is intentionally brought into existence by humans and also

intentionally modified by humans, he or she is not an artefact. The reason is that the process of modification and the process of bringing into existence are two separate activities. The infant in the example is not brought into existence *by* modifying properties of the prospective infant. C2 also solves the status of some human modified biotic elements. It excludes from the sphere of artefacts those biotic entities which are modified by human beings but not brought into existence by them. For example, polluted natural areas, fed wild animals, and even many forests under active forestry are not artefacts. On the other hand, some biotic elements clearly fulfil the conditions set by C2. Gardens and modern commercial fields are examples of ecosystems that are artefacts. Their history involves modifications (additions and extractions of species) by which their existence were brought about. A garden or a field was brought into existence by the intentional modification of properties of the prospect ecosystem.

4. ARTEFACTS AND THEIR SIDE EFFECTS

Condition C2 is not without problems. First, an explanation is needed to explicate how it is possible to modify properties of a prospective entity – that is of an entity that does not exist at the moment of shaping but will only exist later. Suppose, an agent is bringing about the existence of a garden. A garden is made by planting trees, bushes and flowers, by sowing a lawn and by eliminating unwanted plants from the area. By these procedures, the agent both brings about the existence of the garden and causes that coming garden to have certain properties. As long as the making of the garden has not been finished, the modified properties are not really the properties of the garden. Neither are they the properties of the coming garden: since the future garden does not exist yet, it cannot have properties either.

Nevertheless, causing future entities to have certain properties is certainly possible. Artefacts are always made from certain raw materials and modifying these – or modifying the properties of these – is, of course, logically unproblematic. There exists a strong and necessary connection between an artefact and its raw material. Artefacts do not pop into existence from nowhere; they are rather 'built' from their raw materials. Moreover, bringing about the existence of an artefact is always an intentional activity in the sense that the author of an artefact intends to 'build' a certain kind of an object.[13] Because of this goal directed nature of any artefact production, the author knows that he or she is modifying something that will be later considered as a property of a certain artefact. Moreover, he or she is aware of the fact that, because of his or her current activities, the future artefact will have certain properties. Most importantly, he or she is shaping the properties in order to produce a specific artefact and in order to cause that specific artefact to have certain properties. Therefore, it is just to claim that he or she is modifying properties of the prospect artefact – namely the artefact he or she is bringing into

existence by his or her current activities.

The second and more severe problem of C2 is that it does not seem to separate artefacts from their side effects. Bringing about the existence of an artefact often involves bringing about some side effects. For example, when a carpenter makes a wooden chair, he or she also produces some sawdust. Similarly, smog and pollutants are side effects of certain types of artefact production. Some side effects come into existence even unnoticed by their producer, whereas others are fully expected, foreseen and accepted. Both types of side effects should be excluded from the conception of an artefact (Hilpinen 1993: 156, Dipert 1993: 16–17).

The maker of an artefact is often *aware* and *expects* that he or she also produces some side effects like sawdust or pollutants. Moreover, he or she usually also realises that the method of making an artefact affects the properties of the side effects. For example, different ways of carving and cutting wood produce different kinds of sawdust. Bringing about the existence of a side effect and modifying properties of the coming side effect are not two separate activities but a single procedure to which both descriptions can be given. Side effects are brought into existence by modifying their properties. But does this all happen intentionally?

The crucial question is whether all expected and foreseen effects of our actions are also intended. If they are, C2 cannot separate artefacts from their side effects and needs to be modified. Nevertheless, some philosophers find the negative answer self-evident. Hilpinen, for instance, writes:

> [W]hen people build a house, they produce the house […] as well as lot of scrap which is used for nothing. This example suggests a distinction between two kinds of […] objects: Some of these objects are produced *intentionally*; they are intended products of human activity, whereas others are produced unintentionally. (Hilpinen 1992: 60)

Randall R. Dipert agrees. According to him, the side effects are not brought about intentionally. The side effects are not desired either as a means or as an end. They may be considered as part of the 'cost' of producing the artefact. If they are severe enough, they may regretted or they may even constitute a reason *against* the activity that produces them. Moreover, even when the side effects are found to be desirable, they – unlike artefacts – are not the goals of the activities by which they are produced. Artefacts, on the other hand, are the reason *for* the activities by which they are produced; the activities are performed in order to produce them. An artefact is the end for which the agent strives (Dipert 1993: 34–5).

According to Dipert and Hilpinen, only those results of activities which are also their goals and (final) reasons, are intended. I will not judge whether the concepts of 'being intended' or 'being intentionally brought about' should be limited this way. Nevertheless, I agree that this kind of intentionality separates artefacts from their side effects. Artefacts are never just expected and foreseen,

but always the goals of the activities by which they are produced. Therefore, it can always be asked whether an agent succeeded in producing an artefact. To ask this about the side effects would, at most, be humorous.[14] Thus, as long as the concept 'intentionally' is understood in the strict sense suggested by Dipert and Hilpinen, condition C2 does successfully separate artefacts from their side effects. For the rest of this paper, I will use the term 'intentional' in this sense.

The analysis of the intended nature of artefacts reveals an interesting fact. As long as artefacts are associated with intentionality in the sense described by Dipert and Hilpinen, it is not sensible to contrast artefacts with natural entities; rather things should be divided into artefacts and non-artefacts. Non-artefacts may be non-manipulated living organisms (for example zebras and dandelions) or parts of non-living nature (for example, waterfalls and boulders). However, the class of non-artefacts also includes other types of entities. In addition to the side effects of artefact production, unintentionally ruined natural entities, such as polluted forests and ecosystems suffering from the impacts of unintentionally introduced alien species, are not artefacts. Even those deserted areas which are unintended products of human-caused erosion, fail to be artefacts. However, this result is not noxious to the ethical debate concerning naturalness, rather it may clarify the discussion. The lines between natural and unnatural may be drawn differently from the ones between artefacts and non-artefacts. Therefore, the natural–unnatural distinction is also needed in discussions about human impact on nature, and it should be clearly separated from the artefact–non-artefact contrast.

5. ARTEFACTS, FUNCTIONS, AND SORTAL DESCRIPTIONS

Even with the above clarifications, C2 does not perfectly solve some questions concerning the status (of being an artefact or an non-artefact) of entities. Most difficulties, especially the ones concerning biological entities, seem to follow from the inaccuracy of the term 'bring into existence'. Are for example genetically modified bacteria and transgenic mammals brought into existence by human beings? What about traditional domestic animals and cultivated plants? Further questions are raised by entities such as restored ecosystems, conserved land areas, fallow lands, etc.

When we cause an entity to exist or bring about its existence, we create something that is different from its raw materials. By the raw materials I do not mean just 'simple materials' like clay or wood, but anything that an agent can by modifications turn into something else. For example, an area of land and the seeds of different plants can be the raw materials for a garden. According to Hilpinen (1993: 156), when we make something that is different from its raw materials, we affect or use machines to affect an entity in such way that a new sortal term can be given to it. Sortal terms are count nouns such as 'horse' and

'river' or mass nouns such as 'water' and 'gold'. Sortal terms are often associated with the criteria of identity. They are then taken to denote species and genera, in other words sorts and kinds (Lowe 1989: 10, 13, 30). For example, when a forest is cut down and turned in to an area where corn is grown, a change in suitable sortal terms happens. It is no longer appropriate to refer to the area with the sortal term 'a forest', rather a new sortal term 'a field' should be used about it.

Not every intentional human-caused change in an entity justifies a new sortal description. Suppose an agent paints his or her chair, or pads it. By these procedures, he or she adds some new features to the chair and brings about a state in which some new *adjectival* descriptions (like 'red' and 'softer than before') can be sensibly given to it. However, he or she does not bring about a state in which any new *sortal* term should be given to it. Therefore, following C2, the agent does not bring about the existence of an artefact. Of course the chair is an artefact. The point is that the modifications do not lead into existence of a *different kind or a different sort* of artefact.

When should we give a new sortal term to an entity? When does the intentional modification of properties of an entity lead to the existence of (a new sort of entity) an artefact? According to Hilpinen,

> this depends on the concepts (the type descriptions) used for describing objects, that is, on the way in which we choose to slice up the world into objects. If an agent's work on certain object has as its result the existence of an object of kind F, where F is a type description, the agent has made a new object. (Hilpinen 1992: 65)

However, this suggestion needs to be further restricted. Suppose a criminal wants to take revenge on his accomplice (who has defrauded him). In order to do so, the criminal intentionally shoots his accomplice in the knee and thus, also intentionally, makes the accomplice unable to move easily for the rest of her life, in other words, he makes her a cripple. It seems sensible to say that the criminal has intentionally modified the properties of the accomplice in a way that justifies giving the new[15] sortal term 'cripple' to the accomplice. In other words, the criminal has intentionally caused his accomplice to have certain properties because of which it can be sensibly said that a new cripple has been brought about. Nevertheless, it would be quite odd to claim that the shooting procedure has turned the poor accomplice into an artefact.

It might be suggested that the problem raised by the cripple example could be solved by restricting the criterion of new sortal descriptions to certain kinds of new sortal terms – namely to those simple[16] sortal terms that describe functions. It is quite common to claim that artefacts differ from other entities with respect to their functions (see for example Brennan 1984, Varner 1990, Katz 1997b, Lee 1999). According to Andrew Brennan (1984: 41), both artefacts and natural entities may have functions. The function of a painting, for example, is to provide aesthetic experiences; scissors are made for cutting; and the purpose

of a chair is to be sat on. Accordingly, the function of a heart is to pump blood and species have functions in their ecosystems. However, there exists an important difference between the functions of artefacts and the functions of non-artificial entities. Even though hearts and species can be said to have functions, they do not have designed functions. No one created or brought about the existence of a heart in order for it to fulfil a certain purpose. Artefacts, on the other hand, are made for fulfilling certain purposes. Of course many non-artificial entities – for example worms in compost heaps – are used for fulfilling human needs. Artefacts, however, are not just used for human purposes; the human purposes are the reason for their existence (Brennan 1984: 41–2). In other words, artefacts have been brought into existence for fulfilling some human set goals. As Eric Katz (1997a: 122) notes, '[artifacts] are tools for the achievement of human tasks … [T]he artifact would not exist at all if some purpose had not seen for it; artifacts are created to meet a specific human need'. Keekok Lee (1999: 2) agrees: 'artefactual … has come into existence and continues to exist only because of human purpose and design'.

The intimate connection between being an artefact and having a designed function is often revealed by the sortal descriptions we use for describing artefacts. Many sortal descriptions of artefacts such as 'chair' and 'pen' immediately tell us what the purpose and the designed function of an entity is. Therefore, it might be suggested that the criterion of sortal descriptions should be restricted to functional sortal descriptions. By functional sortal descriptions I mean simple sortal descriptions that describe a function of an entity. 'Chair', 'painting', 'scissors' and 'curtains' are clearly functional sortal terms whereas terms such as 'mountain', 'bird', 'snow' and 'cripple' are not functional because they as such do not refer to or give any information about the functions and purposes of the entity (if it has any). According to this line of thought, the intentional modification of the properties of an entity leads to the existence of a (new sort of) artefact only if the modification has made it sensible to refer to the entity with some new functional sortal description. The suggestion is in line with Hilpinen's solution. He notes that '[t]he type description which determines the identity of artefact is normally associated with the intended function of the artefact …' (Hilpinen 1993: 161). Moreover, he writes that

> [a]rtifacts carry along certain type-descriptions in terms of which they are identified. … such descriptions are normally associated with the function the artifact serves in culture. We can say that an artifact as an artifact is a sign of its culturally determined functional type. (Hilpinen 1992: 67)

The restriction does not exclude the possibility of using non-artificial entities for human purposes. Moreover, an entity's status as an artefact does not imply that *only* functional descriptions could be given to that entity. Following Aristotle and Thomas Aquinas, a knife (an artefact) can also be taken and described as a piece of metal (Aquinas 1999: 142).

However, the suggestion of restricting the criterion of sortal descriptions to functional sortal descriptions runs into problems. There exist entities which self-evidently are artefacts and to which no functional sortal descriptions can be applied. The lack of suitable functional descriptions seems to be especially true about certain biological entities that are intentionally produced by human beings. For example, the famous goat/sheep hybrid is an artefact lacking a functional description (Jeffries 1997: 86). The goat/sheep hybrid has been intentionally brought into existence by intentionally modifying properties of the coming 'species' in order to produce a hybrid of goat and sheep. Moreover, because of the modification, a change in suitable sortal descriptions also happens. In would not be appropriate to call the hybrid 'a sheep' or 'a goat'. However, the new sortal description 'goat/sheep hybrid' (or a suggested term 'geet') does not refer to any designed functions of the animal. Nevertheless, the hybrid certainly has functions in science and in agriculture. Should we thus deny that the hybrid species is an artefact? I do not find this sensible.

Further examples about artefacts lacking functional descriptions can be given. It has also been claimed that some artefacts do not just lack functional descriptions but are actually functionless. Hilpinen describes a case in which a person intentionally cuts a triangular figure from a piece of cardboard without any further purpose. According to Hilpinen (1992: 63), the triangular figure is an artefact regardless of the fact that it cannot be defined by its intended function or purpose. No functional sortal descriptions can be applied to the triangle. Worse still, it does not seem to have any functions at all; we cannot identify any functions to it. The lack of functions can, nevertheless, be questioned. Cutting a triangle from cardboard is clearly an intentional action. The possible motives behind the activity can be divided into two different classes. First, a person might cut the triangle, because he or she wants to have a cardboard triangle. Such being the case, the agent has a reason for wanting to have cardboard triangle: he or she desires the existence of this type of an entity for aesthetic, scientific, practical or other purposes. In all cases like this, the triangle actually has a function, which is revealed from its author's reason for finding the existence of a triangle desirable. Such being the case, the cardboard triangle is not a functionless object and with respect to its functions, it may be an artefact. (Nevertheless, the cardboard triangle might still lack a suitable functional sortal description.)

However, I do not think that this is what Hilpinen (1992: 63) has in mind; he explicitly states that the agent cuts the triangle without any further purpose. Thus, the motive or goal behind this activity is not a desire to have a triangle. Even though the agent does not desire the existence of a cardboard triangle, he or she finds the exercise of cutting a triangle from cardboard desirable. Such being the case, the cardboard triangle is a functionless object in a sense that it does not have any designed functions. However, if this is the case, the triangle is not the goal of the cutting exercise and neither it is an *intended* product of the cutting. The triangle is similar to side effects of producing artefacts. It is like sawdust

produced by a carpenter: known, predicted and accepted, but not the goal of the action. As stated before, predicted side effects are not artefacts. Only entities that are intentional products in the sense of being the goals and reasons for the productive activity are artefacts. The cardboard triangle is not the goal of the action and, thus, the cardboard triangle is not an artefact.[17]

The analysis given for the cardboard triangle can be applied to other entities too.[18] In short, an entity has a function if its producer (at the time of the production) has an explicit reason for wanting to have (not just to produce) an entity of its type. The function is revealed by the reason. Moreover, having a function is a necessary condition for an object being an artefact; every artefact has a human designed function. However, the intended function of an artefact is not always revealed by the sortal descriptions that can be sensibly given to it. Language does not always perfectly correlate with the known facts of the world. Rather, a functional sortal description should be taken as an indication that the entity has a function. The lack of suitable functional sortal descriptions, nevertheless, does not imply that the entity is functionless.

Thus, since restricting the criterion of sortal description to functional sortal description would make the sphere of artefacts too narrow, the restriction does not solve the problem set by the cripple example. Therefore, I suggest that instead of the criterion of functional sortal description, another criterion referring to functions is added. Thus, the criterion for being an artefact is formed by the following two conditions:

(C2) An entity x is an artefact only if x has been intentionally brought into existence by intentionally causing the coming artefact x to have certain properties.

(F) An entity x is an artefact only if causing x to have certain properties has led x to have some new functions.

I propose that all entities fulfilling these two conditions are artefacts. In other words, this double condition offers a sufficient condition for an entity being an artefact. Nevertheless, some entities outside the self-relevant realm of the double standard may be artefacts, too. The most obvious advocates are physically non-modified natural entities that are used similarly to artefacts. For example, a strong limb of a tree might be used as a walking stick or a beautiful stone as a paperweight. Bioethically interesting cases are human cell lines and those unmanipulated nucleotide sequences that are used for coding and preparing useful proteins. If these types of entities are artefacts, we may have to accept that the criterion formed by C2 and F does not offer a necessary condition for an entity being an artefact. Another possibility is to understand the notion ‘modify’ very loosely to refer, besides physical modification, also to some non-physical type of modification.[19] Whatever the case concerning these special cases, the double standard of C2 and F can nevertheless clarify issues concerning the status of some physically modified biotic entities.

6. EXAMPLES OF BIOTIC ARTEFACTS AND NON-ARTEFACTS

Transgenic organisms offer a fine example about how being an artefact depends on the double condition. Suppose a plant species – for example corn – is genetically modified in a way that makes it grow faster or gives it a better resistance against pests. These plants certainly have been strongly and intentionally modified by human beings. Nevertheless, they do not fulfil the standards set by C2 and F. No new kind of an entity has been brought into existence by the modifications. In other words, causing the corn to have certain properties has not led the corn to have new functions. It is still used for the same purposes – and most importantly only for the same purposes – as before the gene transfer. Thus, the modification has not led into existence of a new artefact.[20]

Suppose, on the other hand, that corn is intentionally genetically modified in such way that eating it causes a fall of the cholesterol value. Thus, this genetically modified corn has possible uses which the traditional corn has not. The corn may be eaten for the purpose of lowering cholesterol values and thus acquiring important health benefits. Such being the case, this genetically modified corn type is a new artefact. The new type of corn has been intentionally produced by intentionally causing certain changes in corn's genome. Moreover, causing the corn to have some new properties has led it to have a new function (the function of lowering cholesterol) – which is not present in the original corn.

Similarly, transgenic animals may either be or fail to be artefacts. Their status depends on the effects of the gene transfer. If the gene transfer causes the animal to have new functions, which seems to be true for example for the famous oncomouse, the animal type is an artefact. On the other hand, if gene transfer does not cause new functions to the manipulated animal, but only makes it more suitable for the functions for which it is currently used, the animal is not an artefact. Such is the case, for example, when a mouse gene is added to sheep in order to make sheep's wool thicker, in other words, in order to make the sheep produce more wool.

Restored ecosystems offer another example as to how being an artefact depends on the double condition. Suppose, an ecosystem – for example a meadow – is totally destroyed by a mining company. As a result of its activities, almost all the flora and fauna and typical ecological functions of the meadows disappear from the area. After the mining operation, the area is perfectly restored.[21] It is now physically identical to the original one. Is the restored area – as Katz (1997b: 126–7) claims – an artefact? I think it is. The current meadow has been intentionally brought into existence by intentionally causing the coming meadow to have certain properties. Before the restoration operations, the area could not have been sensibly called a meadow and, thus, the modification has clearly led to a change in suitable sortal terms. But, as the cripple example shows, this is not sufficient for area's artefactuality. The crucial question is, has the modification of the properties of the area led it to have new functions – that

is, functions that were not present in the ruined area. Returning to the cardboard triangle example, a conservationist restoring an ecosystem is not usually motivated by the pleasure of the restoration activity alone. Rather, he or she usually has an explicit reason for wanting to have an ecosystem of a certain type and the function of the restored ecosystem is revealed from that reason. Sometimes the reason can be rather vague: in the case of the restored meadow, the designed function might be something like 'contributing to local and global biodiversity and providing ecosystem services'. However, even then the reason for bringing a certain type of an ecosystem into existence is based on benefits its existence may cause. Causing those benefits is the function of the restored ecosystem. It should be noted moreover, following Yeuk-Sze Lo (1999: 253), that artefactuality does not presuppose that the designed function is anthropocentric. Many artefacts, for example doghouses and bird boxes, do have functions that are not primarily human centric; these artefacts are not used solely for the service of human good. However, being an artefact presupposes that the function is *anthropogenic*.

Nevertheless, not all restored ecosystems are artefacts. Suppose, that even though human activities have damaged the well-being of an ecosystem, it has not lost its identity as a certain kind of an ecosystem (for example as a forest). In other words, the ecosystem still has the composition and functions typical to the original ecosystem type. Restoration of this ecosystem does not mean bringing a new kind of entity into existence. Even though the conservationists intentionally cause the ecosystem to have new properties that promote its well-being, the ecosystem is not brought into existence through them. Thus, this kind of a restored ecosystem is not an artefact.

7. CONCLUSION

I conclude that there is no easy, straightforward way to classify living beings into artefacts and non-artefacts. Claiming that all genetically modified organisms are artefacts or that none of them are an artefact, for example, is not sensible. Similarly, a restored ecosystem can, depending on its history, be either an artefact or a non-artefact. Nevertheless, questions about the artefactuality of living beings can be clarified by the double condition of C2 and F:

(C2) An entity x is an artefact only if x has been intentionally brought into existence by intentionally causing the coming artefact x to have certain properties.

(F) An entity x is an artefact only if causing x to have certain properties has led x to have some new functions.

The double condition successfully indicates the fact that all artefacts have been brought into existence by modifying the properties of the becoming entity.

Moreover, it can separate artefacts from their side effects and acknowledges the functionality and the intentional nature of artefacts. Most importantly, C2 and F can easily be applied to living beings. It separates living artefacts from other living beings as well as it separates more conventional artefacts from other entities. The double condition thus fulfils my goal of defining living artefacts consistently with other philosophical uses of the term. Moreover, the double condition remains neutral on moral issues connected to living artefacts. Therefore, it will clarify the bioethical discussion by offering a valuable basis for all – also normative – questions related to artefacts.

NOTES

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[1] The term 'biodiversity' is often interpreted very broadly as the richness, variety and variability of life. A common feature of most biodiversity definitions is the acknowledgement of the hierarchical structure of its components. Biodiversity can manifest itself in all levels of hierarchy of life from nucleotides to an entire biosphere. Usually biodiversity is described on the levels of genes, species and ecosystems (Koricheva and Siipi, forthcoming).
[2] For a discussion on this issue, see Dipert 1993.
[3] For a discussion on this issue, see Hilpinen 1995.
[4] Perhaps some constructions of non-humans, for example, dams of beavers, should be considered as artefacts. Even if they should, they are marginal cases of non-living artefacts and beyond the scope of this paper.
[5] The proteins are separated from the milk and used as medicines.
[6] An oncomouse is a genetically modified mouse that has a strong tendency to develop different kinds of tumours. It is used as a cancer model in medical laboratories.
[7] Drawing the line between qualitative and quantitative changes is difficult because quantitative changes seem to amount to qualitative ones. For example, cutting one tree in a large forest usually causes only a quantitative change in the number of trees. However, when the number of the cut trees becomes large enough, the change also becomes qualitative: the ecological type of the area is changed. Nevertheless, clear cases of both qualitative and quantitative changes can be found.
[8] The issue of sufficiency of intentional modification is relevant to some current conservation policies. In 1999, the native panthers of southern Florida numbered only 50 and continued to dwindle towards extinction. The extinction of the species threatened southern Florida's ecosystem: the loss of a top predator was predicted to cause dramatic changes, even the loss of the whole ecosystem type. The Texas panther – a taxonomically very similar species – was introduced to supplement the native stock of Florida panthers. This management strategy involved intentional addition of a biotic element (the Texas panther) into a wild system (the southern Florida ecosystem). The crucial question is

whether the management method turned the non-artefactual ecosystem into an artefact (Bowen 1999: 6).

[9] According to Donna Haraway, because of the wide uses of technology most citizens of western civilisations are already cyborgs, human artefacts (Haraway 1997: 51, 60, 223). My example is not incompatible with Haraway's views. Even if we accepted that most human beings are cyborgs and thus human artefacts, we could still hold the view that at least some intentionally produced and intentionally modified infants are not artefacts. Even if common biotechnical and biomedical procedures – such as vaccinations and surgeries – would turn human beings into an artefact, we can still find – or at least imagine – infants who are modified only in non-technological ways such as breast feeding and types of teaching which are free of modern technologies. Thus, Haraway's point does not contradict my example.

[10] The opposite is of course not true. We can shape properties of entities without bringing any new artefacts into existence.

[11] This can be easily seen in following conversation. A: 'What are you doing?' B: 'I am making a chair.' (Bringing about the existence of a chair) A: 'Yes, but what are you exactly doing?' B: 'I am carving the seat of the coming chair in a way that it will be very comfortable to sit on.' (Modifying the properties of the coming chair.)

[12] It is not uncommon for two truthful descriptions of a single activity to be joined together with a by-relation. We can for example say that an agent turns on the lights by flipping the switch. (Davidson 1980b: 56–59.)

[13] I will return to this point later on this section.

[14] The nature of the producer's intention sometimes seems to be the only way to separate artefacts from their side effects. Suppose a somebody is visiting a foreign culture: he or she observes a native performing complicated procedures which lead in the existence of two equally complicated entities that both look strange and unfamiliar to the observer. The only way he or she can separate the side effect from the goal of the activities (i.e. the artefact) is to find out about the intentions of the producer.

[15] By the newness of a sortal description, I mean that the description could not have been sensibly given to the raw materials before the human-made modifications.

[16] Sortal terms can be divided into simple and complex ones. Simple sortal terms are count nouns like 'horse' and 'river' or mass nouns such as 'milk' or 'gold'. Complex sortal terms are qualified by adjectives or adjectival phrases such as 'wild horse', 'boiling water' or 'a tree which sheds its leaves in winter'. (Lowe 1989: 30.) In order for an entity to be an artefact, the change in complex sortal term is not enough.

[17] Even a cardboard triangle with this kind of history might later become an artefact, if it were adopted for some use – in other words, if somebody were to give a function and purpose to it.

[18] The cripple example, set up on page 15, does not seem to be a pure instance of either of the two described motive types. The agent is not motivated solely by the pleasure the horrible action of shooting into a knee provides for him. As stated in the example, the criminal shoots his victim in a knee in order to make her cripple. However, the shooter has no purpose or use for the cripple; the cripple (the person who is cripple) does not have functions designed by the criminal. Rather it seems sensible to think that the action of making the victim a cripple (i.e. the action of shooting her into the knee) has a function – namely revenge for the accomplice. Such being the case, the view that the shooting does not turn the victim into an artefact can be still maintained. However, as pointed out by the anonymous referee, what still remains to be solved is the status of the cripple in the

following case. Imagine that a criminal who causes his victim to become a cripple is doing so in order for the victim to become an effective beggar under his aegis. In such a case, the shooter has use for the cripple and it may even be said that the cripple has a function designed by the criminal. Should it be accepted that this cripple (as a beggar) is an artefact?

[19] Hilpinen offers a solution of this type. According to him, natural objects are often adopted as cultural objects and this kind of 'adoption' can be regarded as a limiting case of making an artefact. The adopted entity undergoes intentional modification, which is not physical but something called 'Cambridge modification' (Hilpinen 1992: 68–9). I take Cambridge modification to mean a modification in which none of the physical or mental properties of an entity are changed. The entity, nevertheless, acquires new properties which are due to new functions conferred upon it by some agent. Cambridge modification is closely related to Cambridge change. During a Cambridge change, an entity acquires a new property without any change in its conditions. For example, agent S's mother turning pale, may cause a Cambridge change in agent S. When S's mother turns pale, S acquires the property of being such that his or her mother is pale. Nevertheless, S himself or herself does not really change; there is no change in any of his or her physical or psychological conditions (Wagner 1999).

[20] As a cultivated species genetically non-manipulated corn may be an artefact. Nevertheless, my point is that whatever the status of the 'raw material', a *new* artefact has not been brought into existence in this corn example.

[21] Perfect restoration is probably impossible. For the sake of the clarity of the example, I assume that it could be done.

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