
UNNATURALNESS

ALAN HOLLAND

ABSTRACT. A popular objection to various applications of biotechnology is that they are 'unnatural.' The objection is usually dismissed by academics and policy-makers alike. Sometimes it is treated by them as a mere expression of distaste. At other times 'being unnatural' is confused with 'being artificial,' a confusion which then feeds the misguided observation that if you object to unnaturalness as such, you will end up objecting to almost everything that humans do. Either way, the supposed consequence is that the objection can safely be ignored. In response, this paper takes some initial steps towards rescuing the concept of unnaturalness as a potential term of critical appraisal in public policy. First, an analysis of the concept is offered that differentiates it from concepts with which it is commonly confused and identifies that feature of a thing, event or action that the term is commonly used to designate. Second, this analysis is used to illustrate the kinds of discrimination that the term, thus understood, might usefully be deployed to express. It is concluded that the concept of 'unnaturalness' could mark out a valuable space for critical reflection both in the environmental sphere and, increasingly, in the sphere of medical technology.

KEY WORDS. Artificial, nature, natural, culture, biotechnology, medical interventions, critical reflection, norm of nature, normal, abnormal, ordinary, extraordinary.

INTRODUCTION

In reflecting on the way in which philosophical considerations 'join the political discussion,' Bernard Williams writes that "Too often, philosophers' contributions seem designed only to reduce the number of thoughts that people can have, by suggesting that they have no right to some conceptions that they have or think that they have. But equally philosophy should be able to liberate, by suggesting to people that they really have a right to some conception, which has been condemned by a simple or restrictive notion of how we may reasonably think ¹." What follows is an exercise in liberation of precisely the kind that Williams recommends.

Emeritus Professor of Applied Philosophy, Philosophy Department, Lancaster University, UK. / a.holland@lancaster.ac.uk

A POPULAR OBJECTION

A popular objection to a range of technological innovations is that they are 'unnatural.' Among the targets for this objection are various applications of biotechnology, such as the genetic modification of crops, the genetic modification of animals, xeno-transplantation and interspecies crossing of the kind involved in producing the fluorescent rabbit ², where the genes of a jellyfish were used to create fluorescence in a rabbit and, more recently, the spider goat where spider genes are used to make (very strong) spider thread extractable from goat's milk ³. The objection is also leveled against a variety of actual and projected medical interventions. The use of ovarian tissue from aborted fetuses to assist procreation, for example, was colorfully described by Melanie Phillips as 'taking an axe to the natural order ⁴.' Cloning is frequently referred to as unnatural, as are proposals to bring about the radical prolongation of human life. Another set of examples is illustrated by the leaflet put out by Compassion in World Farming in 2008 where, under the headline of 'Unnatural Confinement' they highlight the plight of pigs across Europe, and in particular the continued use of sow stalls and farrowing crates—metal cages that allow little or no room for movement—in intensive breeding systems. These are systems which effectively thwart almost all of a sow's maternal instincts.

Corroboration for the claim that this is a 'popular' objection is provided by some recent empirical research looking at people's attitudes to the genetic modification of animals ⁵. Although the study covered a wide variety of perspectives, concerns about naturalness and unnaturalness were recurring themes. Among the remarks recorded, from a diversity of speakers, are the following: "[the genetic modification of animals] has no regard for this thing called nature. It's just totally saying 'sod nature';" and again, "it's too much messing with nature;" or, "it's just taking away nature, isn't it ... none of it's natural," and "I don't agree with using organs off animals for transplants ... it's so unnatural ⁶."

A COMMON RETORT

Academics and policy-makers alike, however, are apt to dismiss the use of the term 'unnatural' as misguided, irrational or at best, as based purely on some religious or quasi-religious perspective. In any event, it is something they can safely ignore. For example, in their report on genetically modified crops, a UK non-governmental advisory body—The Nuffield Council on Bioethics—writes that: "The 'natural/unnatural' distinction is one of which few practicing scientists can make much sense ⁷." The reason they give is that 'unnaturalness' expresses feelings "less of moral concern than of disgust and revulsion ⁸." In consequence, they conclude as follows: "We think that the decision about what is unnatural cannot be one for public

policy, but that the freedom of choice of consumers must embrace the ability to refuse what they reject as 'unnatural' ⁹." In effect, then, they view the term as having no normative force whatever, but as a term that expresses nothing more than a subjective consumer choice.

Academics can be found who treat the term with similar disdain. For his part, the philosopher Steven Vogel, echoing the puzzlement of the 'practicing scientists' referred to above, writes generally about the concept of 'nature' that: "the conceptual situation... seems to me to be almost hopelessly confused ¹⁰" and concludes: "terms like natural or unnatural are simply useless under present conditions, more trouble indeed than they are worth ¹¹."

A further problem lies in the fact that the concept of unnaturalness is undoubtedly a 'contaminated' concept. As we shall see, it has been used to express opinions that many would judge to be wholly unjustified, or even unsavory. One can therefore understand the view that this is a concept that one would do well to steer clear of.

FOOD FOR THOUGHT

Suppose we regard the range of uses of the term 'unnatural' that we have cited thus far as 'problematic.' After all, the policy-makers and academics might well be correct in their claim that the concept of the 'unnatural' makes little sense; apparent sense can of course, on further examination, turn out to be non-sense, and vice versa.

In face of this impasse an obvious and simple recourse is to look for uses of the term in other contexts that are hopefully less problematic and that might shed light ¹². When we do this, we notice that appeal to the unnatural is not restricted to its role in criticizing certain technological innovations. There is a range of other contexts where its use is by no means uncommon. Sometimes admittedly the purpose here, too, is critical. Thus, if children mistreat their parents, such behavior might well be condemned as 'unnatural.' Even more warranted would be characterizing as unnatural mistreatment that takes some extreme form, such as unprovoked violence, or murder. But sometimes also the term is used in a purely descriptive, or even resigned, way. Thus, we can use the term also simply to refer to the circumstance of children pre-deceasing their parents. This, we sometimes say, is an unnatural event. If this observation is correct, we can perhaps already see a chink in the Nuffield analysis; for when we say this, it is unlikely that we are expressing disgust or revulsion.

However, section 8 of the Nuffield Council report contains another line of attack: even if the natural/unnatural distinction makes sense, they argue, the distinction is of little use since natural and unnaturalness are

parts of a seamless spectrum. The argument can be roughly summarized like this:

- i) Naturalness and unnaturalness are parts of a spectrum.
- ii) At one end of the spectrum, the results of genetic modification are indistinguishable from the results of natural selection.
- iii) No principled objection can be made to the results of natural selection as such.
- iv) There is no clear dividing line along the spectrum.
- v) So, no principled objection can be based on the appeal to unnaturalness as such.

Two defenses at least may be offered against this line of attack, one logical, the other scientific.

a) The logical problem with this argument is that it relies on a form of the *Sorites* paradox. Thus, if you take one strand of hair from a person's head, there is no significant difference between the first state of the person's head and the second. But if you repeat the operation a sufficient number of times, the person will end up bald. And there clearly is a significant difference between this end state and the initial state. So, from the fact that there is no clear dividing line at any point of a spectrum, it does not follow that there is no significant difference between points at either end of the spectrum. This is because the relation '...is not significantly different from...' is not transitive. If A is not significantly different from B, and B is not significantly different from C, it does not follow that A is not significantly different from C.

b) Furthermore, premise (iv) of the argument has also recently been challenged from within the research science community itself. Schouten, et al.¹³, are troubled by the fact that what they regard as relatively innocent cases of genetic modification are subject to exactly the same strict regulatory regime as more extreme forms. They therefore propose a distinction between 'cisgenesis' and 'transgenesis.' Cisgenesis (in relation to plants) is described as 'the genetic modification of a recipient plant with a natural gene from a crossable—sexually compatible—plant.' Transgenesis is described as 'the genetic modification of a recipient plant with one or more genes from any non-plant organism, or from a donor plant that is sexually incompatible with the recipient plant.' They comment¹⁴ that cisgenesis respects species barriers "and in this sense differs fundamentally from transgenesis," which may well pose a threat to the fitness of the recipient organism. On the other hand cisgenic plants, they say, "are similar to traditionally bred plants," their advantage being that they avoid the 'linkage drag' that can affect traditional breeding, i.e., the introduction of deleterious genes along with the desired gene. Arguing in similar vein, Nielsen¹⁵ advances a more refined version of this distinction and offers

an interesting additional comment. Transgenic approaches, he says, have been labeled as 'brute-force' because they use "distantly related genes with little consideration for the multiple evolutionary changes that have occurred in the biochemical networks separating species." True, in making their distinctions these authors do not specifically endorse the use of the term 'unnatural,' but they do endorse the point that there is a conceptually significant distinction to be drawn between different forms of genetic modification, thus challenging premise (iv) of the Nuffield Council's argument.

Returning now to other—and also hopefully less problematic—contexts of use, we see that the term 'unnatural' is used quite readily by two writers who, one would imagine, are perfectly capable of differentiating sense from non-sense, namely Charles Darwin and William Shakespeare. Moreover, in both authors, the use of the term is quite careful, rather than merely casual.

Take Shakespeare's *King Lear*, first, where the term occurs at least eight times. Edgar's alleged plan to murder his father, for example, is described by Edmund as an 'unnatural purpose' ¹⁶. Also 'unnatural' is Cordelia's alleged offence against her father ¹⁷. And though sorrow is a natural enough emotion, a sorrow deep enough to drive King Lear mad is described as 'unnatural' ¹⁸. In similar vein, when Gloucester attempts to follow his natural inclinations and come to Lear's aid, Lear's daughters prevent him, leading Gloucester to reflect on 'this unnatural dealing' ¹⁹.

Then take *Hamlet*, where Shakespeare has the ghost of Hamlet's father beg Hamlet to 'Revenge his foul and most unnatural murder.' He then adds 'Murder most foul, as in the best it is; But this most foul, strange and unnatural' ²⁰. The passage is a most significant one for our purposes. For what the ghost of Hamlet's father is saying is that murder is always foul, but that this murder in particular—the murder of one brother by another—is not simply foul but also 'unnatural.' The message is clear—that unnaturalness is an additional and distinct property of the act. So far, perhaps, the Nuffield Council could stand their ground. The ghost of Hamlet's father finds all murder disgusting and revolting, they might say; it's just that he finds his own murder particularly so! But here is another point. From the fact that a term is used to express disgust and revulsion, it does not follow that it 'merely' expresses disgust and revulsion. We might refer to a person or act as cruel and might thereby be expressing our disgust and/or revulsion. It does not follow that there is no further content to the concept of cruelty.

And this is where Darwin's use of the term 'unnatural' is particularly instructive. For it lacks all trace of disgust and revulsion, and hence might begin to point us towards what that content, if there is any, might be. It is also of further interest in three ways: first, in that he associates the concept

with some sort of 'extreme;' second in that he associates the concept with abnormality; third, in that he appears to have no problem with the idea of unnatural phenomena turning up in the context of natural (as opposed to artificial) selection. Thus, referring to greyhounds, bloodhounds, bulldogs, Blenheim spaniels and terriers, (which he also refers to as 'extreme forms') he says: "Hardly anyone has been bold enough to suppose that such unnatural forms ever did or could exist in a wild state... they betray a distinct and abnormal origin²¹." The point is that, although he is denying that these forms did or could occur in a wild (i.e. natural) state, he is not saying that anyone who was bold enough to make the supposition in question would be describing something impossible. Elsewhere, he tends to use the term 'unnatural' to refer to 'extreme' forms produced by the accumulation of 'pronounced deviations of structure' (equal to 'monstrosities'). Here, it is important to note that although "all those who have studied monstrosities believe that they are far commoner with domesticated than with wild animals and plants²²," nevertheless they do occur in the wild, especially where they result from 'reversion,' which, he claims, is "an integral part of the general law of inheritance²³." Given that, for Darwin, unnaturalness is some extreme form of abnormality or monstrosity, we can infer that along with abnormality and monstrosity it, too, is found 'in the wild,' i.e., in what is natural as opposed to artificial.

LOCATING THE CONCEPT

In attempting to locate, and eventually define, a concept, it is sometimes helpful to approach the task negatively, and disentangle it from those concepts with which it might be, or sometimes is, confused. Thus, first, it is fairly clear that 'unnatural' does not equate with 'supernatural.' The two terms mark out entirely separate domains. And although, for example, inserting a jellyfish gene into a rabbit, or a spider gene into a goat, may be described as 'playing God,' it could never be described as 'performing a miracle.'

It is far more important to make clear that 'unnatural' does not equate, either, with 'artificial,' despite the fact that this is a common assumption even among philosophers. An obvious place to look for clarification of this distinction, if there is one, is in the environmental philosophy literature, which contains many discussions of the concept of nature and its various contrasting terms. One may peruse this literature with some care, however, without finding even a hint that there could be an important distinction here. An instructive example is afforded by Holmes Rolston's classic and influential essay "Can and ought we to follow nature?" where, he writes: "There are no unnatural energies... Our deliberative energy only manages to shift the direction of these natural forces, and it is that inter-

vention which we call unnatural²⁴." Hence medically attended childbirth, farming and clothing are all described as 'unnatural,' while any parents who 'plan' their children are said to "act unnaturally in the artefactual sense²⁵." A similar view is repeated more recently, in an essay by Paul Moriarty, where, in a section headed 'Is it bad to be "unnatural"?', he writes: "In making the distinction between nature and culture, or natural and unnatural, I do not mean to suggest that anything that is natural is good and anything that is unnatural is bad. Clothing, eyeglasses and jazz are all unnatural (i.e. they are products of human culture), but I would not wish to do away with any of them²⁶." For her part, in her essay 'Dimensions of naturalness²⁷, Helena Siipi draws a number of useful and important distinctions, but the distinction between the artificial and the unnatural is not one of them. Indeed, her discussion is conducted throughout in terms of a contrast between naturalness and unnaturalness, as if there were no distinction at all between unnaturalness and artificiality. Looking elsewhere, for example at the literature on ecological restoration, the most we find is a recognition that there are degrees of naturalness, or of artificiality, and that unnaturalness might be located somewhere along such a continuum. Thus towards the end of his essay 'The big lie' we find Eric Katz remarking first that "the concepts of 'natural' and 'artifactual' are not absolutes; they exist along a spectrum." But then, in response to some observations of Andrew Brennan, he admits a sense in which human actions can be judged to be natural—namely those "that exist as evolutionary adaptations, free from the control and alteration of technological processes." On the other hand, he claims, human activity is to be judged unnatural to the extent that it "goes beyond our biological and evolutionary capacities²⁸." The implication is that human action becomes more unnatural, the more it involves technological manipulation. Another leading critic of ecological restoration, Robert Elliot, favors 'non-natural' as the term to contrast with 'natural.' But he shows little inclination to allow that there might be meaningful distinctions to be drawn within the sphere of the 'non-natural.' Thus, responding to a suggestion of Peter Losin, that "human action should not always be seen as unnatural," he insists that "even the harmonious transformation of nature drains it of significant intrinsic value, contaminating it with human purposiveness²⁹." For Elliot, it is the fact of human intervention rather than its manner, that constitutes the 'contaminant.'

But these analyses, or lack of them, seem far from satisfactory. It just won't do to suppose that the ghost of Hamlet's father is protesting merely at the artificiality of his own demise. And we can already begin to see, from the example of children who pre-decease their parents how implausible it is to equate 'unnatural' with 'artificial.' Children dying before their parents do can hardly be spoken of as an 'artificial' event. One reason is

that artificial things and events are, typically, things that humans do, make, or bring about. Unnatural happenings, on the other hand, are apparently by no means always things that we instigate; they are often things that we undergo. But consider this, too, that we can describe an artificial watercourse such as a canal as ‘unnaturally straight’ where it is clear that we are not simply repeating the point that it is artificial. We can also describe some forms of artificial lighting, such as halogen lights, as unnaturally strong, where again we are certainly not simply repeating the point that they are artificial. And to take an environmental example, when Richard Lewontin ³⁰ describes the cultivated corn cob as ‘unnatural’ he is not, trivially, remarking that it is an artifact, but drawing attention to the fact that it is incapable of dispersing its seed (and therefore has no ecological or evolutionary future). Conversely, we might describe perfectly natural landscapes, or landscapes where artificial influences are at a minimum—the depths of an old oak forest, for example—as ‘unnaturally quiet.’

Thinking back, now, to the example of children who pre-decease their parents, what might strike you as significant about this is that children do not ordinarily, commonly or normally die before their parents ³¹. This sends us back to the Darwinian suggestion referred to earlier, that the unnatural is, or has some connection with, ‘what is out of the ordinary, uncommon or abnormal.’ In fact, the suggestion is pre-Darwinian, and picks up David Hume’s observation, in his discussion of what he calls ‘definitions of natural and unnatural’ that “nature may also be opposed to rare and unusual; and in this sense of the word, which is the common one, there may often arise disputes concerning what is natural or unnatural ³².” The other senses that he has distinguished, incidentally, are those that contrast with (a) miracles, and (b) artifice.

Notice straight away that perfectly natural (as opposed to artificial) things can be out of the ordinary, uncommon or abnormal—frost in June, for example in certain parts of the northern hemisphere. However, and thinking back again to our Shakespearian examples, the unnatural does not seem to equate with the abnormal, either. For example, it might be abnormal for a child to dishonor or even murder its parents, but calling it unnatural surely hints at something more—that this in some way goes beyond or against nature. Even Darwin seems to reserve ‘unnatural’ for what is an ‘extreme’ deviation of some sort, rather than a mere abnormality. Or consider bestiality (sexual relations between human and non-human beings), which is at least a candidate for being described as an unnatural practice. Such a practice is no doubt abnormal, that is, uncommon, unusual or out of the ordinary. However, anyone who calls the practice unnatural is surely aiming to say something more; they are not simply remarking on its rarity.

Based on the discussion so far, then, we can say that:

- i. 'supernatural' and 'unnatural' are entirely distinct concepts, i.e., there is no overlap in their application;
- ii. 'artificial' and 'unnatural' are distinct concepts, and where they overlap, things are not unnatural by virtue of their being artificial;
- iii. 'abnormal' and 'unnatural' are distinct concepts, and where they overlap, things are not unnatural by virtue of their being abnormal.

DEFINING THE CONCEPT

In offering a definition of the term we are not offering to explain all of its actual uses. As already noted, there is no doubt that the term has frequently been misappropriated and that this fact contributes to people's unwillingness to use it in debates on matters of public policy. All that is being claimed is that the definition offered does at least explain many aspects of its use that we have noted in our discussion so far. Thus, it has the status of an explanatory hypothesis. It also marks out a distinct conceptual space that is occupied by no other term.

In order to approach a definition, let us begin with Mill, whose hostility to the concept of the unnatural is well documented. It is, for him, a highly contaminated term, as is clear from the brief appearance that it makes towards the end of his classic essay on nature where, you will recall, the two main senses of the term 'natural' that he identifies are: (i) the natural as opposed to the supernatural—"a collective name for all facts actual and possible³³;" (ii) the natural as opposed to the artificial—"what takes place without the agency, or without the voluntary and intentional agency, of man³⁴." As he embarks on his peroration he repeats his main theme: "Conformity to nature has no connection whatever with right and wrong." To illustrate his point and with an unnerving anticipation of the position adopted by the Nuffield Council, he then invites us to consider "the phrase by which the greatest intensity of condemnatory feeling is conveyed in connection with the idea of nature – the word unnatural³⁵." For good measure he implies also a doubt as to whether "any precise meaning ... can be attached to the word³⁶." Not, one would think, the most fertile territory upon which to attempt a resuscitation of the concept.

Now let us look elsewhere, and in particular at his essay on "The subjection of women." And let us look with some care at what he has to say here about the meaning of the term unnatural. I quote: "unnatural generally means only unc customary ... The subjection of women to men being a universal custom, any departure from it quite naturally appears unnatural... To Englishmen [rule by a queen] does not seem in the least degree unnatural, because they are used to it; but they do feel it unnatural that women should be soldiers or members of Parliament³⁷." One sees at

once, of course, why he so detests the term—namely, the extent to which, in his day, it was deployed to impede the advancement of women.

Nevertheless, it bears remark that in a continuation of the very passage in which Mill gives ‘uncustomary’ as the ‘general meaning’ of ‘unnatural,’ he himself deploys it in a wholly different sense, as when he writes: “What is now called the nature of women is an eminently artificial thing—the result of forced repression in some directions, unnatural stimulation in others ³⁸.” The question is what can he possibly mean here by the term ‘unnatural stimulation.’ One thing is for sure, he cannot possibly be understood to be speaking of ‘uncustomary’ stimulation. He seems to mean, rather, ‘stimulation that is contrary to women’s natural instincts.’ This same sense is clearly intended in a later passage of the same work where he writes: “[Women] have always hitherto been kept, as far as regards spontaneous development, in so unnatural a state, that their nature cannot but have been greatly distorted and disguised ³⁹.” Thus, whatever Mill’s official position, he would appear to have conferred his unofficial blessing, as it were, upon a quite distinct understanding of the term ‘unnatural.’ And it needs only the slightest modification, I suggest, to transform this notion of the unnatural (which has Mill’s unofficial blessing, as it were) into a more general—and workable—concept of the unnatural that can be applied to our engagements with nature: the step from ‘contrary to (a person’s) natural instincts’ to ‘contrary to nature’s instincts.’

The suggested definition then, first in a metaphorical version inspired by Mill, is as follows:

D1. a thing is unnatural *iff* it is contrary to nature’s instincts.

A suggested elucidation of this metaphor is as follows:

D2. a thing is unnatural *iff* it is at odds with, or contrary to, the norms of nature.

Proffering a definition is relatively easy. The hard work lies in attempting to explain and justify it. In particular, the definition raises two questions:

Q1. what do we mean by ‘norms’ of nature? (do such norms even exist?)
and

Q2. what do we mean by saying that something is ‘contrary to,’ as opposed to a ‘departure from,’ a norm?

QUESTIONS ARISING

Q1. *What do we mean by ‘norms’ of nature? (do such norms even exist?)*

The first point to make is that we are not talking here about a prescriptive or ‘normative’ norm. We are not talking about the way in which nature ought to behave. The second point is that we are not talking here in terms

of a numerical average, i.e., about what is numerically typical or normal. There is no doubt that norms in this sense do exist. But a numerical average can be purely fortuitous in the sense that it need have no underlying causal explanation. The sales of a particular newspaper, for example, might hover at around 300 000 over a period of three months; hence 300 000 might be a 'norm' for the period. But the reason why the sales are around 300 000 on any particular day during that period might vary wildly. The third point is that a *norm* of nature, in the sense we are attempting to identify, is different from a *law* of nature. A law is invariable, but a norm is not. In consequence, one crucial point of difference is that a law of nature will support conditional assertions of various kinds whereas a norm of nature will not. If it is a law of nature that electrons are negatively charged, then if this is an electron it will be negatively charged. If it is a norm of nature that human beings result from sexual reproduction, this does not warrant the assertion that, for any X, if X is a human being, then X is the (direct) result of sexual reproduction. For X might have been cloned. Moreover, whatever happens courtesy of a law of nature, will happen only *ceteris paribus*—its operation is sensitive to the slightest variable. As Nancy Cartwright observes, "what happens is more like an outcome of negotiation between domains than the logical consequence of a system of order ⁴⁰." Thus, for a bridge to be built, no one law can hold sway; the operation of a variety of laws needs to be brought into equilibrium: a bridge is a locus of such negotiation. Norms, by contrast, are patterns that persist despite considerable variation. Sexual selection, for example, is a pattern that nature has settled upon for very many species despite considerable variation in the conditions of its operation. The same can be said of the homologies between widely diverging species—persisting commonalities of pattern that helped in turn to persuade Darwin and his contemporaries of the reality of 'descent with modification.' On the other hand, and this is a fourth and final point, the possibility of norms depends upon, and is ultimately explained by, the existence of laws.

To illustrate this last point, consider Darwin's theory about the formation of coral reefs. In his beautiful monograph on the topic, published in 1842, Darwin argues that the three most commonly encountered coral reef formations—the fringe reef, the barrier reef, and the atoll—are in fact stages of a single continuous process that involves both the elevation of the coral and the 'prolonged subsidence' of the intervening land ⁴¹. We should further notice that a key role is played, both in Darwin's account and in the phenomenon described, by the fact that 'in ordinary cases, reef-building polypifers do not flourish at greater depths than between 20 and 30 fathoms ⁴².' Thus Darwin's achievement is, first, the identification of a persistent ecological pattern (or norm) that underlies the formation of the coral reef. Secondly, he is also able to explain this norm by reference

to the constraints imposed by the operation of outlying principles, or even laws, from other fields such as chemistry, physics, geology and physiology.

Hence, in our definition of the unnatural (D2), we are talking about norms that are contingent, but not accidental; they do have some underlying causal explanation. In particular, we are talking, typically, about norms that are causally underpinned by evolutionary and ecological constraints. To put it informally, we can say that nature shows a tendency, in given conditions, to 'favor' certain sorts of structure, certain sorts of order, or pattern, where the sorts of structure, order or pattern may vary depending on the conditions. The term 'favor' is used deliberately, rather in the way that Hume speaks of nature's 'customs' or 'habits,' to avoid any suspicion of essentialism. We are referring to *de facto* tendencies; we are not saying that this is how nature must be. Nor are we referring to *de facto* tendencies in all possible biospheres, only in the biosphere pertaining to the planet earth. (If there were a biosphere on a planet with a significantly different gravitational force, for example, then the norms of nature for that biosphere might be significantly different, even though the laws of nature were the same.)

Having attempted to characterize norms of nature, and to explain how they are possible, it is time to offer some putative examples, which hold at least for this biosphere:

(a) It is a norm of nature in the sense outlined that individual living organisms are quite markedly clustered into what we call species, varieties etc. Indeed, the clustering is so marked that for a long time species were thought to embody a fixed essence. But it is also a norm of nature that within species, at least sexually reproducing ones, and individual members differ. Here it is crucial not to confuse levels of description, and consequently levels at which the concept of a norm is applied. Many members of a species will depart from the 'norm' for the species—be abnormally long, short, fat, thin, and so on. It is absolutely normal for a species to contain these kinds of variation. Moreover, as Darwin shows, the existence of these variations is absolutely essential to the process of natural selection.

(b) It is a norm of nature in this sense that at least some members of a species live long enough to reproduce—barring accidents. But accidents do happen, and during major extinction events it may not be a norm, but rather the exception, that at least some members of a species live long enough to reproduce. Moreover, in some species, e.g., species of social insects, the vast majority of members are sterile⁴³, so it is not true that most members of the species live long enough to reproduce. So the norm in question might rather be described as a 'functional norm' or, in other words, something necessary if the species is to continue.

(c) It is a norm of nature in this sense that individual organisms belonging to a particular species develop along particular lines, grow old and die. But there will be abnormalities in development, just as there are abnormalities in features. Some individuals will mature abnormally early, others abnormally late, and so forth.

(d) Charles Elton's concept of the 'food chain,' along with the associated concepts of food size, niche and the 'pyramid of numbers,' might be thought of as a set of norms of nature in the required sense⁴⁴. For he held that together they helped ensure certain constancies in the structure of animal communities—the fact, for example, that they invariably contain, 'producers,' 'consumers' and 'decomposers.' If so, it serves to bring out three aspects of the concept. The first is that a norm is not exceptionless since, as Elton himself points out, the relation between whales and plankton, for example, fails to fit the standard pattern of the food chain, which is said to be determined by 'bite-size.' The second is the way in which norms are underpinned by more fundamental 'laws,' as is shown by later analysis of the food chain in terms of the capture and transmission of energy from the sun⁴⁵. The third is recognition that 'norm of nature,' though not inconsistent with scientific data, is a lay concept rather than a strictly scientific one. Together, the norms of nature roughly constitute, or at least are intended here to constitute, what many people have traditionally thought of as 'the natural order.'

Q2. What do we mean by saying that something is 'contrary to,' as opposed to a 'departure from,' a norm?

This distinction is intended to capture the apparent difference in meaning between 'abnormal' and 'unnatural' that we remarked earlier. To answer the question, we need to make a further distinction. We need to distinguish between norms *in* nature—norms regarding the longevity of the members of a species, norms regarding particular species characteristics etc.—and norms *of* nature, such as those described above. With the help of this distinction we can see where the real difference between what is abnormal and what is unnatural lies.

Norms *in* nature are defined with reference to the standard characteristics of a population of a given species. These will tend to fall within certain parameters along any given dimension—of color, length of neck and so forth. Abnormalities, sometimes also called 'sports of nature,' are significant departures from norms *in* nature, in this sense. They can, and indeed must co-exist with norms, for they presuppose the existence of norms. Typically they are accentuations of the more regular deviations from a norm—what Darwin terms 'natural variations'—which in turn define the norm.

Norms *of* nature, on the other hand, are recurring structural themes thrown up by natural selection. Departures from norms in this sense do occur (cf. the role of whales in the food chain) but they are rare. Unnatural phenomena are those that run counter to the norms *of* nature and are unlikely to be able to co-exist, or co-exist for long, with these norms. As things stand, and because the norms of nature are underpinned by evolutionary and ecological constraints, unnatural phenomena are unlikely to have an evolutionary or ecological future. The ‘geep,’ for example—the laboratory created chimera that was half sheep and half goat—was both sheep and goat yet neither sheep nor goat. It was not an abnormal creature, since there was no norm from which it was a departure. Rather, its existence ran entirely counter to one of the prevailing tendencies of natural selection, in this case a fairly universal tendency, to gather organisms into groups of sufficiently similar individuals ⁴⁶. It was, precisely, an unnatural creature.

Although the unnaturalness of the *geep* stems from its running counter to one of the general tendencies of natural selection, there is nothing in the concept of a norm of nature itself that precludes such norms from being phylum, genus or even species specific. For as one would expect, many of the tendencies of natural selection are context-specific. Take the case of mammals. It is not simply normal for a mammal to have relatively few offspring rather than, say, ten thousand; it is, rather, a manifestation of a norm of nature for mammals, which in turn reflects the workings of ecological and evolutionary constraints. On the other hand, to have a few thousand offspring would be entirely in accordance with the norms of nature exemplified by dandelions, thistles and indeed many species of plant. In general, and inasmuch as norms of nature are a function of evolutionary and ecological constraints, there are bound to be wide variations in many of these norms.

SOME APPLICATIONS

Next, let us consider how the account of the unnatural that has been offered would fare in sorting out some of its more contentious applications, whether these are actual or merely projected:

(i) First, conventional medical interventions, which simply seek to enable individuals to live out their natural lives, would not count as unnatural. An abnormally long life is quite distinct from an unnaturally long life. Note that this distinction entirely subverts a standard and depressingly common rejoinder to concerns over the aspiration to defer mortality, that if you object to the prolongation of life you must object to all medical interventions.

(ii) Furthermore, it is a norm of nature that abnormalities and even ‘monstrosities’ regularly occur—for example, conjoined twins, humans

with webbed feet and so forth. None of these conditions is properly described as unnatural. They are simply major variations. As R. A. Fisher notes ⁴⁷, major variations are likely to prove disadvantageous. However, very occasionally they do set the trend for a new species.

(iii) The cloning of mammals, on the other hand, and despite the apparent precedent of identical twins, can be argued to be unnatural. One reason is that it introduces asexual reproduction into species that natural selection has 'decreed' should reproduce sexually, and therefore runs counter to what is a norm of nature so far as mammals are concerned. And no matter how alike two clones are to identical twins, this is entirely irrelevant. The issue is not one of similarity but of history. And the fact is that one twin was not asexually and deliberately reproduced from the other, as is the case in cloning. (Note that this last remark registers a conceptual distinction between clones and twins; it is not offered as a further reason for regarding cloning as unnatural.)

(iv) Equally unnatural, if in a lesser way, would be interventions at a genetic level designed to produce uniformity or standardization across individual members of a species, such as are increasingly practiced in animal and plant breeding. The same would apply were such interventions to be practiced on humans, with the aim perhaps of attaining 'the perfect body,' or 'perfectly formed teeth.' This is because it is a norm of nature across all species that their members should exhibit what Darwin calls 'slight variations.' Cosmetic interventions of this kind would not be unnatural, however, at least insofar as they were indeed 'purely cosmetic.'

(v) The attempt, or at any rate the aspiration, to prolong (individual) life indefinitely could be argued to be unnatural, because it runs up against the norms and patterns of birth, development and death that are reinforced by natural selection. The case is not clear-cut, however, and it is possible to imagine arguments on the other side. But the point here is not to settle such an argument. It is simply to observe, contrary to the claims of The Nuffield Council, that a debate about the unnaturalness or otherwise of such a proposal would be a perfectly sensible debate to have.

(vi) Of particular interest is the case of so-called 'human admixed embryos,' whose creation has been approved by a number of legislatures, including that of the UK. These are embryos that contain a mix of human and non-human DNA. In some cases indeed, the mix is heavily weighted towards the human, since the embryo comprises the denuded egg of a rabbit or a cow into which a nucleus of human DNA has been inserted. The standard objection to the creation of such embryos is that it would contravene principles regarding human dignity and the sanctity of human life. But such an objection is difficult to sustain. Let us grant—though many would not—that the human embryo is a human being right from the time of conception. Let us further grant—though again, many would

not—that the embryonic human being is entitled to substantially the same degree of protection as the adult human being. But without further argument it is difficult to see how these beliefs have any relevance at all to the case of the hybrid beings whose creation was approved. For, the human being to whom this dignity and sanctity is (exclusively) attributed is the gamete resulting from the union of human egg and human sperm, whereas none of the hybrids being entertained comes close to fitting this description. The belief that they do appears to stem from the illicit conversion of statements of the form ‘x and y share n% of their genes’ into statements of the form ‘x is n% y.’ Statements of this latter form are simple nonsense. Thus it makes no sense to say that such and such a hybrid embryo is, say, 98% human, any more than it makes sense to say that humans are 41% banana, on the basis that humans share 41% of their genes with bananas. None of the hybrid embryos being proposed should count as a human being because, quite simply, the lineage is wrong. What is true, however, at least on the analysis being proposed, is that human admixed embryos are unnatural. If, therefore, there is a principled objection to be made to the creation of such embryos, then the claim that they are unnatural might prove to be a sounder basis for the objection.

CONCLUDING REFLECTIONS

The question that remains is whether the fact that an action, object or situation is unnatural in the sense described constitutes any kind of reason for desisting from doing it, or bringing it about. One thing is certain, that it will not always constitute an overriding reason. This is clear if we consider the case of a child whose immune system is malfunctioning and who, for her own safety, must be kept in a ‘bubble’ that isolates her from the rest of the world. Her environment is undoubtedly highly artificial. Yet it is more than this; it is highly unnatural. Overall, of course, it is not a bad thing for her to be kept like this, for otherwise she will die. But notice that, without that important proviso, it would be reprehensible to keep a child in such conditions. Not (necessarily) because she suffers, for perhaps she does not. But how far it is because her situation is unnatural still remains to be determined.

In identifying a feature that the term ‘unnatural’ is commonly used to designate, we have taken at least a first step toward such a determination. It would seem to be a response to—it would seem to be ‘tracking’—a real feature of things. Hence, already, it would seem to be unlike a ‘mere expression of disgust or revulsion,’ for which one would not expect to find some answering common feature; it is unlikely that the class of ‘disgusting things’ could be so clearly circumscribed. Given that the term is typically used to express some form of what Hume describes as ‘unease,’ we are

also in a position to take a further step. We can formulate a more refined version of the question to which we are seeking an answer. How far is unease an appropriate response to actions or situations that run counter to the norms of nature (where this unease is in turn understood to provide a *prima facie* reason to desist from instigating such actions and situations)? And this leads on directly to a third step—the suggestion that the search for an answer to our question might usefully be conducted in the context of discussions about what might be termed the ‘doctrine of appropriate response.’

What we are calling the doctrine of appropriate response can be traced as far as Aristotle. In the *Nicomachean Ethics*, for example, time and again he speaks of the virtuous person as doing the right thing, in the right way, at the right time—a learned ability that might well be summed up as the ‘doctrine of appropriate response’⁴⁸. It is the mark of a virtuous person, in other words, that they respond appropriately to a situation displaying the right amount of fear, anger, and so forth in the process⁴⁹. In more modern times the position is associated chiefly with David Hume and it is a version of this position that is developed by David Wiggins in his essay “A sensible subjectivism?”⁵⁰. In a rendering of what Hume ‘could have said,’ as distinct from what he did say—meaning, I take it, a position that is at least compatible with what he did say—Wiggins volunteers the suggestion that: “*x* is good/right/beautiful if and only if *x* is such as to make a certain sentiment of approbation appropriate”⁵¹. I read this as implying, among other things, that the normativity of evaluative terms (i.e., their ability to guide and justify action) lies in the appropriateness of their link with certain natural responses, whether of ‘approbation’ or ‘unease’ (Hume’s terms). As Wiggins further observes, the idea certainly accords with something Hume does say, in “Of the standard of taste,” parag. 16, namely: “It must be allowed that there are certain qualities in objects which are fitted by nature to produce particular ... feelings”⁵². Discussion of the approach is ongoing, and very much alive, as we see from Katie McShane’s recent and excellent guide to the subject, “Neo-sentimentalism in environmental ethics”⁵³, which urges the advantages of the approach while at the same time giving an honest appraisal of the challenges which it faces.

Let us return now to our question—how far unease is an appropriate response to actions or situations that run counter to the norms of nature. The answer is far from obvious, and depends in large part on how we understand the notoriously elusive term, ‘appropriate.’ It appears, first, that we must avoid two ‘extreme’ positions. One is the view that a response is appropriate just insofar as it is normal. The problem with this view is that it gives us no reason for endorsing the response. The other is the view that a response is appropriate just insofar as it is the response that we ought to have. The problem with this view is that it introduces a

circularity. The concept of appropriateness was intended to explain normativity; it cannot itself therefore be explained, using a normative term. A middle position which shows some promise is the suggestion that an appropriate response is one that is warranted⁵⁴. But what sources of warrant might there be for unease in face of objects, actions or situations that run counter to the norms of nature? At least three possible sources come to mind.

A first source of warrant might consist in some adaptation of those considerations thus far advanced in the environmental ethics literature as reasons, *ceteris paribus*, for minimizing *any* form of human intervention. The availability of such a source follows simply from the fact that the unnatural is, generally speaking, a subclass of the artificial and, generally speaking, a more pronounced form of it. One thinks here, for example, of Paul Taylor's notion of 'respect' for nature, Robert Elliot's emphasis on the distinct value and historical significance of the natural, Robin Attfield's highlighting the significance of natural flourishing or Eric Katz's insistence on the importance of nature's autonomy, to mention but a few. If these considerations have force, then this force is likely to be re-doubled in the case of unnatural interventions, as we have explicated that term, since unnatural interventions cut deeper.

A second source of warrant might consist in all that undertow of human centered considerations that invariably accompany the calls for us to respect nature's autonomy, value, historical significance, and the rest. The availability of this source flows from the fact that what we have called the 'norms of nature' are precisely those, admittedly contingent, constants that give shape and (relative) stability to the natural world as we know it, and whose disruption therefore inevitably carries some risk to all human endeavor.

A third source of warrant might be found in further articulation of the notion of 'Promethean fear' put forward by Bernard Williams⁵⁵. This invokes the notion of respect, but in a sense that differs from the notion advocated by Paul Taylor. This author is referring to something akin to reverence whereas Williams is referring to what he calls a 'healthy respect,' such as we might have for a wild beast or a raging sea. In some ways, it is close to what Aristotle might have counted as an 'intellectual' virtue, some sort of combination of caution and prudence, or even a sort of practical wisdom (in Greek, *phronesis*). As Williams explicates his concept, it embodies at least three things: (i) a fear of taking our relations to nature too lightly; (ii) a recognition that "nature is independent of us, something not made, and not adequately controlled," (iii) a sense that is likely to be "pervasively connected to things that we value, to what gives life the kinds of significance that it has⁵⁶." Building on Williams's insight, the argument would be that the instigation of unnatural actions or situations is likely to involve

taking our relations to nature too lightly, treating nature as something we can adequately control, and threatening the deep-seated kinds of significance that we find there.

We have managed to sketch only the beginnings of an account of how the investigation of our question might proceed, leaving much still to be done. We have at least identified some possible sources of warrant for the claim that 'unease,' of a properly action-guiding kind, is an appropriate response to unnatural interventions—perhaps enough to indicate that further investigation might be worthwhile. We conclude by pointing to one further ramification of the views advanced here. In the environmental ethics literature at least, much attention has been paid to the significance, or otherwise, of the natural/artificial distinction. At the same time many have struggled to find significance in the mere fact of human intervention. In contrast, and on the account offered, unnatural interventions are found to be not 'mere' interventions, but to have also a distinct character. Accordingly, one of the main aims in drawing attention to the natural/unnatural distinction is to advance the idea that it may not be the fact, so much as the manner, of human intervention that is important. In short, in both the environmental and medical spheres, and perhaps more widely, the boundary between the natural and the unnatural may prove to be at least as significant as the boundary between the natural and the artificial, if not more so.

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NOTES

- 1 Williams, Bernard (1995), *Making Sense of Humanity* (Cambridge, Cambridge University Press) pp. 233-4.
- 2 Emma Young (2000), 'Mutant bunny', *New Scientist*, 22 September.
- 3 Adam Rutherford (2012), 'Synthetic biology and the rise of the "spider-goats"', *The Observer*, 14 January.
- 4 Norman, Richard (1996), 'Interfering with Nature', *Journal of Applied Philosophy*, 13,1, p. 1.
- 5 Macnaghten, Philip (2004), 'Animals in their nature; a case study of public attitudes to animals, genetic modification and "nature"', *Sociology* 38: 533-551.
- 6 *Ibid.*, pp. 545-547.
- 7 Nuffield Council on Bioethics (1999), 'Genetically Modified Crops: the ethical and social issues' (London, Nuffield Council on Bioethics), p. 15.
- 8 *Ibid.*, p. 13.
- 9 *Ibid.*, p. 17.
- 10 Vogel, Steven (2002), 'Environmental philosophy after the end of nature', *Environmental Ethics* 24, p. 27.
- 11 *Ibid.*, p. 29.
- 12 It is possible, of course, that the term is ambiguous; hence that these other uses will not shed light. But for the moment, we shall treat that possibility as a last resort.
- 13 Schouten, H. J., Krens, F. A., & Jacobsen, E. (2006), 'Cisgenic plants are similar to traditionally bred plants', *European Molecular Biology Reports* 7, 8: 750-753.
- 14 *Ibid.*, p. 753.
- 15 Nielsen, K. M. (2003), 'Transgenic organisms—time for conceptual diversification?', *Nature Biotechnology* 21, March: 227-28.
- 16 Act 2, scene 1: 50.
- 17 Act 1, scene 1: 219.
- 18 Act 3, scene 1: 38.
- 19 Act 3, scene 3: 2.
- 20 Act 1, scene 5: 25-28.
- 21 Darwin, C. (1899), *The Variation of Animals and Plants under Domestication*. 2nd edn., 2 vols., London, John Murray, vol. 1, p. 35.
- 22 *Ibid.*, Vol.2, p. 241.
- 23 *Ibid.*, Vol.2, p. 31.
- 24 *Environmental Ethics* 1 (1979): 12.
- 25 *Ibid.* 12, 13.
- 26 'Nature naturalised: a Darwinian defense of the nature/culture distinction', *Environmental Ethics* 29, 2007: 241.
- 27 *Ethics and the Environment* 13, 2008: 71-103.
- 28 Katz, Eric, (1997), 'The big lie', in *Nature as Subject* (Lanham, Rowman & Littlefield) p. 104.
- 29 Elliot, Robert (1997), *Faking Nature* (London, Routledge) p. 149.
- 30 Lewontin, R. (2000), *It Ain't Necessarily So: The Dream of the Human Genome and Other Illusions* (London, Granta Books), pp. 345-6.
- 31 I am a little reluctant to abandon this claim even though, as Baird Callicott has rightly pointed out to me, there are many societies in which this is a perfectly routine occurrence. First, I am not persuaded that something's being a routine occurrence entails its being seen as normal. Second, such an occurrence does at any rate retain an uncommon power to shock, as Darwin himself would have testified in relation to the loss of his daughter, Annie. But

- clearly, this is more explanation than justification, and much more remains to be said.
- 32 Hume, D. (1978), *A Treatise of Human Nature*, L. A. Selby Bigge (ed.), 2nd edn. revised by P. H. Nidditch (Oxford, Clarendon Press), Book III, Part I, Section II, pp. 474-475.
 - 33 Mill 1874: 6
 - 34 Ibid: 9
 - 35 Mill 1874: 62
 - 36 Ibid: 62
 - 37 Mill 1975: 441
 - 38 Ibid: 451
 - 39 Ibid: 494
 - 40 Cartwright, Nancy (1999), *The Dappled World: A Study of the Boundaries of Science* (Cambridge, Cambridge University Press), p. 1.
 - 41 Darwin, C. (1984) [1842], *The Structure and Distribution of Coral Reefs* (Tucson, University of Arizona Press), p. 147.
 - 42 Ibid., p. 86.
 - 43 In practice, anyway, even though individuals may remain physiologically capable of reproduction.
 - 44 Elton, Charles (1927), *Animal Ecology*.
 - 45 Lindeman, R (1942), 'The trophic-dynamic aspects of ecology', *Ecology* 23.
 - 46 I have argued elsewhere that there is no such thing as *the* tendency of natural selection: Holland (2000), 'Ecological integrity and the Darwinian paradigm', in D. Pimentel, Laura Westra and Reed Noss (eds.), *Ecological Integrity* (Washington D.C., Island Press); Holland (2009), 'Darwin and the meaning in life', *Environmental Values* 18: 506-509.
 - 47 Dawkins, R. (1988), *The Blind Watchmaker* (Harmondsworth, Penguin), p. 231.
 - 48 Aristotle (1999), *Nicomachean Ethics* 2nd edn. translated by Terence Irwin, (Indianapolis, Hackett Publishing Company, inc.).
 - 49 Op. cit., passim, but see especially 1115b 15-20 for the notion of 'appropriate' fear, & 1126a 3-8 for the notion of 'appropriate' anger.
 - 50 Wiggins, David (1998), *Needs, Values, Truth: Essays in the Philosophy of Value* 3rd edn. (Oxford, Clarendon Press), pp. 185-214.
 - 51 Ibid., p. 187.
 - 52 Ibid., p. 194.
 - 53 *Environmental Ethics* 33, 2011: 5-23.
 - 54 McShane, op. cit. p. 22.
 - 55 Williams, op.cit. p. 239.
 - 56 Williams, op. cit. p. 239.