

WILL UPSET THE BALANCE OF NATURE”
“Natural ingredients are more healthy”
“It doesn't feel right, it's dangerous – it's disturbingly unnatural to clone an animal”
“MOTHER NATURE KNOWS”
“Natural ingredients are more healthy”

Ideas about naturalness in public and political debates about science, technology and medicine

REVIEW OF NUFFIELD COUNCIL
ON BIOETHICS REPORTS

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“GM CROPS WILL UPSET THE BALANCE OF NATURE”
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1 Introduction

As part of the Nuffield Council on Bioethics' project on naturalness, evidence was sought on the ways that ideas about naturalness feature in public and political debates about science, technology and medicine. One strand of the evidence gathering activities involved reviewing how the Nuffield Council on Bioethics has itself engaged with ideas about naturalness in its previous work.

Since its beginnings in 1991 the Nuffield Council has conducted inquiries into a number of topics for which the concept of naturalness is relevant. This review summarises the ways in which the notion has been used, cited and discussed within these reports as a whole and explores whether and how the notion has informed the Nuffield Council's thinking about relevant topics.

This summary provides an overview of how ideas about naturalness have been discussed within previous reports of the Nuffield Council and how different working parties have viewed naturalness and its usefulness in informing ethical perspectives on advances in science, technology and medicine.

2 Review of previous work

There are six Nuffield Council reports which make mention of or discuss arguments relating to naturalness. Ideas about naturalness are most directly and extensively addressed in the report *Genetically modified crops: the ethical and social issues* (1999). The reports *Animal-to-human transplants: the ethics of xenotransplantation* (1996), *Novel technologies for the prevention of mitochondrial DNA disorders: an ethical review* (2012), *The ethics of research involving animals* (2005), *Biofuels: ethical issues* (2011) and *Emerging biotechnologies: technology, choice and the public good* (2012) also engage with the issues.

There are two kinds of attention that the topic of naturalness receives in these reports. Firstly, the reports outline and critique arguments made, whether by bioethicists, scientists, politicians, the media or others, on the basis of naturalness. These sections critically engage with the idea that naturalness should be seen as a morally relevant feature of science, technology and medicine, evaluating the strength of arguments making use of the notion. Secondly, on occasion the reports adopt, or imply, certain positions on naturalness; on how the terms *natural* and *unnatural* should be applied, whether naturalness should be viewed as an ethically significant feature in the context of the particular topic, and of the usefulness of the notion in bioethics debate more broadly.

There is, notably, no conception of naturalness that associates the natural with value within Nuffield Council reports. Outside of the discussions of the concept of naturalness, reports do not use the expressions *natural*, *unnatural* or *nature* in value-laden ways in any instances. Uses are instead confined to expressions incorporating the term *natural* such as 'natural conception', 'the natural world' or 'natural selection' and to other purely value-neutral uses and to the discussions cited above.

3 Critical engagement

Reports examining issues for which the concept of naturalness is relevant engage with the concept directly to differing extents. A range of ideas are discussed in these contexts including whether the natural can be properly distinguished from the unnatural; whether 'unnatural' interventions disrupt natural essences, functions or undermine natural boundaries; whether nature has an intrinsic value, or has rights; that disgust reactions underlie objections to the unnatural; and the connection between naturalness and religious belief.

3.1. Distinction between the natural and unnatural

One idea concerning naturalness featuring across Nuffield Council reports is the notion that it may be difficult to sensibly distinguish between the natural and the unnatural. For example, the views of scientists are discussed in *Genetically modified crops* in the following way:

*The 'natural/unnatural' distinction is one of which few practising scientists can make much sense. Whatever occurs, whether in a field or a test tube, occurs as the result of natural processes, and can, in principle, be explained in terms of natural science. When human abilities to transform the world are limited, the distinction between nature and artifice seems fairly clear. It has often made better sense to accommodate ourselves to the forces of nature than to fight them. Is a plant acceptably natural or 'organic' if it has been successively bred to have a particular gene complement, but unnatural and not 'organic' if precisely the same gene complement has been arrived at through laboratory processes? We can see no reason in ethics to draw a distinction.*¹

And within the context of a discussion about genetic modification in animals:

*The natural/unnatural boundary: critics of GM technology itself often state that this methodology provides the breeder with the opportunity to make unnatural combinations of genes. Presumably the perceived boundary between natural and unnatural lies at the limits of sexual compatibility, since the introduction of exotic genes from wild relatives of rice, wheat or Brassica crops has raised no difficulties in the past. What then when the technology is used to move native genes more efficiently through a breeding programme? Is this 'unnatural'?*²

When the idea is expressed that "...there are no clear cut solutions, that such issues can only be settled on a case-by-case basis and that this falls within the remit of an overarching body,"³ this is suggestive of a scepticism about the significance of the natural and the existence of any principled, ethically relevant distinction between the natural and unnatural.

¹ Nuffield Council on Bioethics (1999) *Genetically modified crops: the ethical and social issues*, available at: <http://nuffieldbioethics.org/wp-content/uploads/2014/07/GM-crops-full-report.pdf>.

² Ibid.

³ Ibid.

3.2. Natural functions, essence and species boundaries

One idea appealed to in *Xenotransplantation, The ethics of research involving animals* and *Genetically modified crops* is that views about naturalness may involve concerns about animal natures or essences and the transgression of natural boundaries. This line of argument maintains that species boundaries are important and should be respected, and that using technologies which transgress or undermine those boundaries is wrong. Animal natures or essences may also be closely connected to what is good for animals and be linked to how they are able to 'flourish'.

The moral relevance of animals' capacity to flourish, and its connection with species, is considered in *The ethics of research involving animals*, where it is explained that one:

*... basis of moral concern, associated with Aristotle, is the idea of animals having a telos, a good, or alternatively having interests or species-specific needs. If the animals are able to satisfy these needs, one might say that they flourish. This concept enables us to say that things may go well or badly for an animal depending on how specific environmental conditions relate to its usual species-specific development.*⁴

It may be part of an animal's nature that they live in certain kinds of environment, eat certain kinds of food or reproduce in certain ways. 'Unnatural' environments may be bad for animals living in laboratories, or in farms, since these environmental conditions may undermine their welfare, in frustrating their ability to flourish.

If species are characterised by their unique natures, essences or functions, which are connected to what is good for them, then distinctions between species will be non-arbitrary, morally significant divisions. And this may be part of what concerns people about the use of techniques that transgress these boundaries. The report outlines this concern:

*Another extension of the concept of flourishing relates to considerations about the moral value of a species. This may be especially relevant to issues raised by selective breeding and the genetic modification of animals. These processes usually aim at altering an aspect of the genotype of a species in a targeted and often unprecedented way.*⁵

This idea is prominent in *Xenotransplantation*, where much of the discussion about naturalness concerns transgenesis and the development of transgenic pigs (which have had human genes introduced to their genetic makeup to facilitate more straightforward transplantation of organs into human beings).

Some see the production of transgenic animals as an unnatural act that attempts to change the nature of animals and violates species boundaries.

⁴ Nuffield Council on Bioethics (2005) *The ethics of research involving animals*, available at: <http://nuffieldbioethics.org/wp-content/uploads/The-ethics-of-research-involving-animals-full-report.pdf>.

⁵ Ibid.

*According to this view, genes have a particular significance because they contain the information that determines the essence of any one species. To move genes around is to destroy the integrity of species as natural kinds, and to create unnatural hybrids.*⁶

The concern is that xenotransplantation requires the production of an ethically problematic and unnatural 'hybrid' human-pig species. The Working Party that developed this report resists this conclusion, arguing that the kinds of genetic changes involved in transgenesis do not alter the species pig in any meaningful way, since the introduction of very small numbers of genes obtained from a human source do not represent or embody anything essential to the human species since:

*...it is only in combination with all the other genes that make up the human genome that a particular gene contributes to the specification of features characteristic of the human species.*⁷

Additionally it is pointed out that even if it were conceded that these genetic changes did alter species boundaries, the genetic changes involved in creating transgenic pigs are so targeted that any resulting alteration to the species and its nature would be minimal. Describing this process at the time, the report argues that:

*...currently, it is unlikely that more than one or two genes of human origin will be incorporated into transgenic pigs. Since the pig genome probably contains in the order of 50,000 – 100,000 genes this is proportionately a very small change.*⁸

Another defence against charges of unnaturalness invoked in more than one Nuffield Council report involves resisting the idea that there is anything fundamentally new about the influence that genetic modification techniques exert over natural boundaries. In *Xenotransplantation* it is pointed out that species boundaries are “*not inviolate*”⁹ but can be changed slowly over time by natural processes (as in the case of certain kinds of bacteria) or by traditional breeding techniques and that “*some regard transgenic techniques as no more than an extension of traditional breeding techniques that artificially produce new animal breeds.*”¹⁰ This argument is also used in *Genetically modified crops* in which it is pointed out that:

*...the world into which GM crops are being introduced is one in which farming is already in many ways a decidedly unnatural activity” and is “already a world where human beings have transformed plants, animals and the soil itself.*¹¹

Genetically modified organisms (GMOs), it is said, are in fact a “*rather marginal addition to the scientific manipulation of nature over the past half century.*”¹² This

⁶ Nuffield Council on Bioethics (1996) *Animal-to-human transplants: the ethics of xenotransplantation*, available at: <http://nuffieldbioethics.org/wp-content/uploads/xenotransplantation.pdf>

⁷ Ibid.

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Nuffield Council on Bioethics (1999) *Genetically modified crops: the ethical and social issues*, available at: <http://nuffieldbioethics.org/wp-content/uploads/2014/07/GM-crops-full-report.pdf>.

¹² Ibid.

idea can be used to defend a range of novel scientific techniques against charges of unnaturalness, by conceding that natural species boundaries are altered over time as a result of human interventions, but maintaining that this is not distinctive to genetic modification since traditional breeding methods, used in farming for many hundreds of years, also have this effect. The Working Party that developed this report thereby conveys a scepticism about the significance of this form of unnaturalness as a guide to ethics since many kinds of human activity regarded as unproblematic are 'unnatural' in this respect.

Beyond defending GMOs from charges of unnaturalness, the report raises a question as to whether the preservation of animal natures, and the natural boundaries between them, should anyway always be considered desirable or right, and it is tentatively suggested that endeavours to maintain natural states of affairs can also serve malign ends. It is proposed that racism and murder have in the past been motivated by the idea that 'pollution' of the natural is wrong.

*Racism is an extreme, though, widespread, symptom of the desire for purity. Indeed, many of the yearnings for natural purity have little or no justification. Tribes that kill twins at birth appear to do so out of a sense that human beings are rightly born singletons and that only animals have multiple births, but they seem to take these drastic measures much thought about exactly what would go wrong if they did not do so.*¹³

A further defence marshalled against the argument that genetic modification gives rise to the violation of natural species boundaries relates to disagreement and implicitly cites the need for specialised or technical knowledge to back up the claim that a given technology involves the violation of a natural boundary. As it is noted:

*...the problem with taking account of such views is that, in the absence of detailed knowledge about the technology, people may not be able to say precisely what boundary is being breached, and feelings about those boundaries will differ from person to person.*¹⁴

In *Xenotransplantation* the idea that any unnaturalness realised by altering the pigs' nature through species boundary violation in the case of transgenic pigs is ultimately rejected, with the Working Party for this report posing:

*Will the nature of the pig change in any way that is ethically important? For the reasons set out above, the Working Party does not consider that the introduction of very small numbers of human genes into transgenic pigs makes the pigs in any sense human or creates a hybrid species.*¹⁵

3.3. 'Natural' rights and the intrinsic value of nature

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Nuffield Council on Bioethics (1996) *Animal-to-human transplants: the ethics of xenotransplantation*, available at: <http://nuffieldbioethics.org/wp-content/uploads/xenotransplantation.pdf>

Explored in more than one Nuffield Council report is the idea that certain applications of science involve making mere instrumental use of the natural world and fail to respect nature's intrinsic value, or the rights of nature.

In *Genetically modified crops*, the view that the natural environment has its own rights, which may be transgressed or violated by certain kinds of science and technology, is addressed but is not considered credible:

*Some people argue that the environment, or perhaps the living organisms that comprise it, have rights of their own. This is a difficult argument. Entities that possess rights usually, although not always, possess the ability to waive their rights and to make choices about how they exercise them. Plants and animals certainly cannot pass that test.*¹⁶

A connected line of argument is that certain kinds of intervention in the natural world might undermine or detract from its intrinsic value, and that this is what is problematic about 'unnatural' science and technology.

There is a general scepticism about wholesale, uncritical acceptance of nature across Nuffield Council reports. It is pointed out in *Novel technologies for the prevention of mitochondrial DNA disorders: an ethical review* that many unnatural 'artificial' interventions, such as kidney dialysis, are uncontroversial and, it is implied, not wrong:

*In regards to 'tampering with nature', the Working Group is aware that some instinctively find the 'natural' preferable to the 'artificial' in respect of reproduction. It is worth noting, though, that many uncontroversial medical interventions – the provision of kidney dialysis, say, or the allocation of a controlled diet to sufferers of phenylketonuria (PKU) – are highly artificial in the sense that they are the product of intentional technical design.*¹⁷

The implication is that we value different aspects of the natural world, which include disease and other problems, differently. Leon Kass, well known opponent of human cloning and critic of reproductive technologies, is cited as conceding this very point:

...Even Leon Kass, the former chair of the US President's Council for Bioethics, who is noted for his appeals to the 'wisdom of repugnance' in the domain of reproductive ethics, has pointed out that the mere fact that some process is natural, and in this sense a 'gift', leaves open the question of "which gifts are to be accepted as is, which are to be improved through use of

¹⁶ Nuffield Council on Bioethics (1999) *Genetically modified crops: the ethical and social issues*, available at: <http://nuffieldbioethics.org/wp-content/uploads/2014/07/GM-crops-full-report.pdf>.

¹⁷ Nuffield Council on Bioethics (2012) *Novel techniques for the prevention of mitochondrial DNA disorders: an ethical review*, available at: http://nuffieldbioethics.org/wp-content/uploads/2014/06/Novel_techniques_for_the_prevention_of_mitochondrial_DNA_disorders_compressed.pdf

*training, which are to be housebroken through self-command or medication and which opposed like the plague.*¹⁸

Xenotransplantation also engages with the distinction between intrinsic and instrumental value, in which it is said that the use of animals as sources of cells, tissue and organs may arouse objections since they involve:

*...adopting a wholly instrumental attitude towards nature, and of failing to recognise that humans are part of the natural world and have responsibilities for it.*¹⁹

This idea is contrasted with the notion of 'stewardship' according to which "*human beings should not seek to dominate nature but should instead stand in a relationship of care and concern for its continued flourishing.*"²⁰ If humans are the stewards of nature, it is said, there would be certain ways of treating the natural world which would be unethical. This argument is taken seriously by the Working Party

*For some people, these views would be compatible with the limited use of animals in medical procedures where the benefit was clear, demonstrable and large. For others, these views might entail a direct prohibition on the use of animals for medical purposes.*²¹

Ideas about stewardship are also explored in the 2011 report *Biofuels: ethical issues* and linked with ideas about sustainability and intergenerational justice. The ways in which we use and alter the world it is said should not negatively impact people of the future:

*A sustainable approach to biofuels development thus requires that we do not deplete the world's natural resources without regard to the legitimate interests of future generations. The concept of environmental sustainability thus leads to the idea of stewardship. Sustainability requires us to act as stewards of the natural world, with legitimate rights to use it but also with obligations to leave it in a fit state for future generations.*²²

3.4. Disgust and repugnance

The idea that resistance to unnatural science may be based on feeling or instinctive response is another idea represented in Nuffield Council reports. These are issues, it is said in *Genetically modified crops*, that "*arouse great passion...[and] are 'ethical'*

¹⁸ Ibid.

¹⁹ Nuffield Council on Bioethics (1996) *Animal-to-human transplants: the ethics of xenotransplantation*, available at: <http://nuffieldbioethics.org/wp-content/uploads/xenotransplantation.pdf>

²⁰ Ibid.

²¹ Ibid.

²² Nuffield Council on Bioethics (2011) *Biofuels: ethical issue*, available at: http://nuffieldbioethics.org/wp-content/uploads/2014/07/Biofuels_ethical_issues_FULL-REPORT_0.pdf

*in a different way*²³ and “*arouse feelings less of moral concern than of disgust and revulsion*”²⁴ or can provoke “*wave[s] of unease.*”²⁵

In the report *Emerging biotechnologies: technology, choice and the public good* the Working Party for this report noted that perceptions about naturalness and ‘distaste’ - or the ‘yuck factor’ that some technology holds for some - can have a powerful influence on how people react to new science and technology:

*Notions of natural order, harmony and ends are deeply engrained in almost all cultures, and bind groups and societies together. The term the ‘wisdom of repugnance’ has been coined to evoke and enjoy a shared sense of distaste for certain biotechnological practices that appear ‘contrary to nature’ in this sense.*²⁶

But it is also noted that relying on intuitions of different individuals or groups about the naturalness of such technologies to determine policy and law can be problematic, since they will not be shared by all:

*Where such sentiments are widely shared they can form a powerful basis for moral restraint and, indeed, for positive legislation; however, where there are moral disagreements, moral arguments can quickly reach an impasse (since my sentiment towards a given action does not logically contradict your different sentiment).*²⁷

3.5 Naturalness and religious belief

Acknowledged in more than one Nuffield Council report is the idea that ‘unnatural’ science and technology may be objectionable to some as a result of other views they hold about nature as the creation of God. This would make wrongness of using ‘unnatural’ science, technology and medicine a symptom of the wrongness of undermining a divine natural order or subverting the will of God. It is said for instance in *Genetically modified crops* that:

*...from a Judaeo-Christian perspective, it is an important truth that God created nature for His own purposes, not merely for our uses, and that these purposes are important, indeed that it is mandatory for us to respect nature as part of that creation.*²⁸

However, the Working Party for this report also points out that a case for human intervention in nature, as well as ‘abstinence’, might be offered made on religious

²³ Nuffield Council on Bioethics (1999) *Genetically modified crops: the ethical and social issues*, available at: <http://nuffieldbioethics.org/wp-content/uploads/2014/07/GM-crops-full-report.pdf>.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Nuffield Council on Bioethics (2012) *Emerging Biotechnologies: technology, choice and the public good*, available at, http://nuffieldbioethics.org/wp-content/uploads/2014/07/Emerging_biotechnologies_full_report_web_0.pdf

²⁷ Ibid.

²⁸ Nuffield Council on Bioethics (1999) *Genetically modified crops: the ethical and social issues*, available at: <http://nuffieldbioethics.org/wp-content/uploads/2014/07/GM-crops-full-report.pdf>.

grounds since “*biblical premises yield positive duties as well as restrictions on what we may do with the world.*”²⁹

It is reported that the consultation exercise elicited a response from Church of Scotland and the Office of the Chief Rabbi which emphasised the duty of human beings to reshape nature in appropriate ways: “*God’s gift is a grant of sweeping authority to use the raw materials of nature wisely...*”³⁰ and that there may be a responsibility for humanity to “*cultivate and reorder nature.*”³¹

4 Conclusions

- Nuffield Council reports do not associate naturalness with value – the terms *nature*, *natural* and *unnatural* are not used to convey ideas about what is good or bad. The notion is discussed critically whenever the concept is deployed by others as an objection.
- There is a wariness of relying on criticisms of technologies relating to unnaturalness ‘unpacked’. The reports advocate use of more targeted, precise arguments relating to objectionable ‘unnatural’ features.
- There is a general scepticism about the existence of any distinction between ‘natural’ and ‘unnatural’ technologies that might entail that, for example, genetic modification and transgenesis are unnatural but allow that other, more traditional or established farming methods are natural.
- There is an interest in the ideas underlying charges of unnaturalness, a willingness to engage with these lines of reasoning, and an attempt to to analyse and understand the concerns to which they are related.

²⁹ Ibid.

³⁰ Ibid.

³¹ Ibid.