The tension between common sense and scientific perception of animals: recent developments in research on animal integrity

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Abstract

A distinction can be made between aesthetic or intuitive perception in holistic biology and in daily life, and reductionistic scientific perception based on the search for causal mechanisms. Going from our observations of animals in daily life to observations of animals in scientific experiments implies a transformation. Scientific experiments exclude all values that are important in daily life. For research on the concept of animal welfare it can be shown that excluding values is impossible as this issue lies too close to our daily experience. This means that the empirical and the moral domain of the concept cannot in fact be separated. And by means of the moral domain, background theories about man's relation to nature, about the role of natural science, and about what is morally relevant play a role in definitions of animal welfare. This is illustrated for two bioethical theories: zoocentrism and biocentrism. In the zoocentric theory, only sentient animals are morally relevant. Some consider the argument that genetic engineering violates the integrity of an organism not a moral issue, but an aesthetic one. In a biocentric ethical theory, all living beings have moral relevance; moral and aesthetic issues are then closely related. In such a theory the characteristic nature of an animal is respected and knowledge of this nature is intimately related to a more aesthetic and holistic perception of animals. This paper shows that the ethical attitude towards nature is directly linked to the way human beings perceive nature. In experimental reductionistic science, nature is seen as a material object, subject to mechanistic analysis: when animals are subjected to scientific experiments it is impossible to completely avoid ethical issues, but they are restricted to utilitarian ones. The genetic engineering of animals enhanced awareness of ethical issues directly relating to the technology itself and to the attitude towards nature underlying it, irrespective of the consequences. These issues only come up when the animal is perceived in a holistic way, which comes close to our perception of animals in our daily life.

Additional keywords: animal welfare, biocentric view, extrinsic values, intrinsic values, value-freedom of science, zoocentric view

Introduction

The Swiss zoologist Portmann (2000) – for English speaking readers Grene (1968) – was very much aware of the growing gulf in biology between what he called the analytic biotechnical approach and the comparative holistic approach. With the comparative approach one looks at 'authentic' phenomena directly visible by the human senses, and compares these phenomena to find out their meaning within a larger whole. The analytic biotechnical or reductionistic approach leads to a causal analysis, discovering the mechanisms behind what is seen with the eyes. Understanding these mechanisms allows us to control nature.

The following example of cattle breeding may illustrate some practical consequences of this difference. The history of cattle breeding can be described as a process in which the animal's own role in reproduction is completely taken away from it and brought under human control through the application of reductionistic scientific knowledge. The stages in this process are clear: artificial selection, artificial insemination, embryo transplantation, genetic engineering and finally cloning. This development also affects the farmer. Before science began to intervene in the process, animal breeding was a purely intuitive matter, based on the farmer's own perception of and experience with his cows. Since the rise of modern genetics, bit by bit the phenotypic properties of the animals are being reduced to chromosomes, and finally to pieces of DNA (genes). Together with this, breeding comes to lie in the hands of specialized scientists and institutes. The experiential knowledge of the farmer becomes obsolete, and the farmer loses control over animal reproduction. In organic farming, genetic engineering and cloning are forbidden and in many fields of research the experiential knowledge of the farmer is taken seriously. Baars & De Vries (1999) and Baars (2002) refer to such research as *experiential science*. The concept of experiential science is based on the assumption that a farmer already has implicit knowledge based on his experience. If a scientist is asked for advice when there is a problem on the farm, the scientist works together with the farmer, making use of this implicit knowledge.

Portmann (2000) distinguishes between a 'theoretical' and an 'aesthetical' function of the human mind. With the theoretical function the mind tries to transform qualitative phenomena into quantitative data through rational thinking. With the aesthetic function the scientist does not try to explain what is directly given in our perception through mechanisms that are postulated inside an organism, but according to Portmann such an aesthetic and more intuitive perception of organisms teaches us something about what is 'essential'. This aesthetic kind of perception is essential in the so-called Goetheanistic-phenomenological method of research (Heusser, 2000). This method is practised in some fields of biodynamic and organic agriculture. The phenomenological method wants to be as close as possible to nature as it is experienced.

In the reductionist-experimentalist approach, scientific knowledge of the primary qualities is considered knowledge of the real world, and knowledge of the secondary qualities of our sensuous perception is considered subjective. Portmann takes the opposite view. What we experience in our world of everyday life comes first and is considered the primary world, and what the scientist finds in the laboratory is secondary and is considered derived. Portmann was concerned about the fact that in biology the

emphasis shifted more and more towards the causal-analytic approach. He was convinced that further alienation from nature, the result of the latter approach, could only be prevented if people would have a direct experience of the richness and diversity of biological forms, especially in scientific education.

In this article I want to discuss the tension between reductionistic scientific observation of animals and perception in daily life. Some examples are given of this tension, related to the study of animal consciousness, the use of anthropomorphic language, and the distinction between the naturalistic and the analytic animal in laboratory research. The tension also manifests itself in the relation between facts and values. The question will be whether scientific research about animal welfare can be value-free. With respect to discussions about ethics and the genetic engineering of animals the tension comes back in the difference between intrinsic and extrinsic arguments against genetic engineering, the intrinsic arguments being closely related to a holistic perception of animals.

Common sense perception and scientific perception

In connection with the study of animal consciousness, Rollin (1990) describes in detail how science has become increasingly remote from common sense and ordinary experience. He shows that science rests on its own philosophical and ideological presuppositions, which are seldom examined. These presuppositions determine what counts as real, as facts, as legitimate data and explanations. According to these presuppositions, data about conscious experience or the animal's mind are not considered legitimate data. The mental phenomena have to be reduced to neurophysiological or chemical data. The tension between human experience in the world of everyday life and laboratory data is present everywhere in Rollin's book. The direct and often anecdotal evidence of animal consciousness and animal pain in everyday life is denied in the very artificial setting of the laboratory, where the first aim of research is control. In addition, the moral relevance of experiential data about animal consciousness is largely absent in the laboratory setting. The reductionistic objectification of science leads to the separation of science and ethics.

Hearne (1987) gives another example of the discrepancy between our experience in the world of everyday life and the scientific objectification of animals. Hearne (1987) is a professional trainer of dogs and horses. Entering academia with an interest in philosophy, she was surprised to find out that professors specifically denigrated students' language describing animals in subjective terms, that is, anthropomorphically. In her opinion the anthropomorphic language of everyday life, the language that is also used by trainers, is true to the nature of the animals as we experience them, and is, in that sense, perfectly objective. She refers here to the definition of objectivity as "being true to the nature of the object studied". In laboratory science, however, objectivity means that the results are repeatable and controllable. Similarly, Wieder (1980) describes how researchers studying chimpanzees' behaviour in the 'behaviouristic' tradition dealt with animals outside the experimental context. The chimpanzees were treated as if they were experiencing subjects, as embodied consciousness, and not as material

objects (mere bodies). In this community-experience, subjectivity was apprehended directly in face-to-face encounters. Once such animals become objects of research, however, all subjective references are truncated. A new order of events is created, the order of pure objectivity that stands above and opposite to the order of everyday life.

Very illustrative in this connection is the work of Lynch (1988) and Arluke (1988; 1992). Lynch distinguishes between the 'naturalistic' animal of the common-sense perspective and the 'analytic' animal of the laboratory scientist. The naturalistic animal is the subject of anthropomorphic identifications. In the process of research this animal is transformed into the analytic animal, into data. In the scientific system of knowledge, the analytic animal is seen as the real animal. According to Lynch (1988; p. 270) the laboratory procedures as such "assure the removal of the characteristics that make up the naturalistic animal". How this is done, and the ambiguities involved in this process, is also described by Arluke (1988; 1992). Arluke (1988; p. 100) writes about 'counter-anthropomorphism' when inanimate qualities are attributed to living things. Analytic animals are de-individualized and treated as anonymous beings. Social norms in the laboratory prevent scientists and animal technicians from treating laboratory animals as pets; instead they are treated as models, as supplies in grant proposals. Arluke (1992; p. 34) believes that this objectification or detachment is necessary for self-protection. Objectification breaks the interconnectedness between subject and object. As a result moral constraints are nullified. Arluke (1992) thinks that this process of objectification seldom succeeds completely. Many animal experimenters have emotional difficulties with invasive animal experiments. However, in the laboratory setting an open discussion of these problems is seldom possible. In general, feelings about animal use in the laboratory remain private and extraneous to the 'real work' of the laboratory.

Wolpert (1993) considers scientific concepts showing a strong tendency to get divorced from our world of common sense, from the world of our immediate experience of nature and of animals, characteristic of science. If such a divorce does not take place it is not science. To be scientific, the research method must abstract from values, feelings and from our common sense experiences. According to Wolpert (1993) the green colour we experience in our daily life is not the green colour of the physicists. All examples used by Wolpert come from fields in which the reductionistic approach has been very successful: physics, chemistry, molecular biology. The so-called value-freedom of this knowledge is reached by abstracting from all values of our world of daily life. It is the result of applying a specific (analytic, reductionistic) methodology. But this methodology at the same time creates a kind of knowledge that can be used for technological solutions to problems in our daily world. Reductionistic scientific knowl-edge comes back into the life world through technology. Such a technological solution that is based on a reductionistic approach to nature may not be the best solution for all problems. One can think here of problems that are directly related to the experiential aspects of human, animal and environmental health and well being. Because such fields are very close to our daily experience it is much more difficult to dissociate the empirical and the moral aspects, and thus to push out lay people's world views, and replace them by the scientific world view. An example of this will be given in the next section about the animal welfare concept.

It is interesting that Wolpert (1993) called his book 'The unnatural nature of science', by which he means that the scientific concept of nature gets dissociated from our 'natural', that is our common sense experience of nature. Wolpert thinks that there can only be one kind of science, the 'unnatural' one. Kass (1988) takes a different view. He called his book 'Towards a more natural science', a way of doing science close to our daily experience of nature, where 'objective' means close to reality as experienced (instead of predictability). This implies that the reductionistic method of natural science as defined by Wolpert is not the only way of learning about the empirical aspects of nature.

Animal welfare research

In the previous section it was argued that the so-called value-freedom of science is the result of applying a reductionistic approach in which the scientist abstracts from all values in the process of doing research. It was also indicated that it is difficult to reach this value-freedom when doing research about issues that lie close to the world of everyday life. Animal welfare is such an issue.

Tannenbaum (1991) is one of the first authors who rejected what he called the 'pure science model' used by most researchers in the field of animal welfare. According to this model the scientist can do without value-judgements in animal welfare research. Animal welfare is believed to be a certain state of the animal that can be described objectively by scientists. Regarding ethical issues these researchers believe that everyone is entitled to an opinion, whereas making statements about animal welfare is seen as the field of scientists. Tannenbaum (1991) mentions a number of 'cracks' in this pure science model:

- Scientists take an interest in the welfare of an animal only if they believe that its welfare ought to be respected to some extent.
- In the case of veterinary treatment of wild animals there is no moral consensus among researchers. Generally it is believed that human beings have no moral responsibility towards the welfare of wild animals.
- External factors (values) often have an influence when scientists have to choose between minimal welfare conditions or higher levels of welfare (optimal welfare). It is an ethical issue to decide which level of welfare ought to be provided to the animals.
- Many examples can be given of ethologists expressing moral judgments about certain housing conditions of animals. They do present these statements as scientists, not as citizens in general, as would be implied by the pure science model.
- There is disagreement about the question whether the culling of animals is an animal welfare issue; here again a value judgement is involved.
- The very concept of welfare already implies a normative component. To ask what is animal welfare is to ask what is good for an animal. Value-judgments are involved in the choice of criteria or decisions on the relative weight of the different factors involved in animal welfare. Defining welfare as absence of suffering (the negative definition) also influences the kind of research done by animal welfare scientists; it excludes research directed towards the promotion of a positive mental status.

Tannenbaum (1991) concludes that ethicists as well as philosophers should participate in animal welfare studies. Normative choices should be made explicit, also because the hidden value-judgements affect the objectivity (neutrality) of scientific results.

Normativity of animal welfare concepts

Sandøe & Simonsen (1992) take another approach to the normativity of animal welfare concepts. They think that scientific knowledge about animal welfare 'does not by itself provide relevant, rational and reliable answers to the questions concerning animal welfare typically raised by the informed public', which has to do with the prevailing pure science model. Strictly speaking, natural science cannot say anything about the subjective experiences of animals, because the use of the value-free method excludes it. Rollin (1990) discusses this issue at some length in his book 'The hidden cry'. But exactly these subjective experiences are at the central core of the lay-public's definition of animal welfare.

Subjective experiences cannot be measured directly: all that can be measured are objectively assessable (pathological, physiological, behavioural) parameters. It is especially with the inference from measured parameters to the experiences of the animal that choices are made. The step back from measurement to judgment about the welfare state of the animal involves an interpretation that is not value-free. Sandøe & Simonsen (1992) are of the opinion that the concept of welfare itself lies beyond the general theoretical framework used by scientists. To avoid difficult philosophical discussions about analogies and homologies between animals and humans, welfare-scientists usually adopt a minimalist strategy relating welfare to the avoidance of states of pain or frustration. This leads to a bias against positive welfare.

Defining animal welfare

Stafleu *et al.* (1996) take the way of reasoning by Sandøe & Simonsen a few steps further. They distinguish between lexical, explanatory and operational definitions of animal welfare. Typical lexical definitions come from our common-sense perspectives of animal welfare as they function in our world of everyday life. Examples are:

- Welfare is a state in which an animal feels good.
- Welfare is the absence of pain and suffering.
- The famous definition by Lorz (1992), which says that animal welfare is a state of physical and psychological harmony between the animal with itself and its surroundings.

Lexical definitions also define the political and social frame of reference for scientific research, the social relevance of scientific approaches to animal welfare. Explanatory definitions have the explicit purpose of fitting the concept within some scientific theory as part of a particular scientific discipline. Moral aspects or feelings are usually excluded. An example is Broom's definition of animal welfare as the possibility to cope with the environment (Broom, 1991).

In operational definitions a concept is defined in terms of specific experimental procedures, such as measurement of the corticosteroid level. At this level a diversity of parameters may be developed, parameters that again have to be interpreted so that they become relevant for policy decisions on animal welfare. In this process from lexical to operational definitions not only the moral aspects, but also the subjective feelings are lost in a diversity of objectively measurable parameters. These 'gaps' have to be bridged again if the scientific concepts of animal welfare are to be made morally and socially relevant. That this bridging cannot be done objectively is also mentioned by Fraser (1995).

Animal welfare and animal health are traditional subjects in animal ethics. The concept of animal integrity has only come up recently in connection with the genetic manipulation of animals. Here the focus is on another aspect of the tension between the everyday observation and the scientific observation of animals.

Ethics and the genetic engineering of animals

Some of the reasons of the public's resistance against the application of genetic engineering are related to the tension between common-sense perception of animals and a technology that is very far removed from this. These are the so-called intrinsic reasons, which do not relate to the risks (extrinsic reasons). The technology is experienced as very 'unnatural' (in the sense as mentioned by Wolpert, 1993). In the Netherlands, for instance, the concept of animal integrity has been introduced to indicate that there are moral aspects involved in genetic engineering that go beyond animal welfare and animal health. Gene technology was considered to be a qualitatively new step in the instrumentalization ('makeability') of animals, in human scientific control over nature. Violation of the integrity of an animal did not first of all refer to the consequences for the animal, but to a human attitude towards nature in which animals themselves are considered to have a value-of-their-own (intrinsic value). Taking again the example of the history of cattle breeding, one might say that step by step the technology applied becomes more and more unnatural.

In this chapter, two aspects of the violation of the integrity of animals through genetic engineering will be discussed. The first one refers to the bioethicist Rollin (1996) who does not see violation of the integrity of animals as an ethical but as an aesthetic problem: a problem in human perception. The second aspect is about the relation between the concept of integrity and the characteristic nature of animals. It will be argued that morally relevant knowledge of this 'nature' is knowledge that remains close to our common-sense perception of animals.

The zoocentric approach of Bernard Rollin

Above, Rollin (1990) was mentioned as an author who saw the importance of the discrepancy between our common-sense perception of animals and the scientific perception in which animal consciousness is reduced to what can be measured, preferably in the laboratory. The latter approach neglects the importance of anecdotal evidence

about animal behaviour, because it does not lead to knowledge that can be generalized. This is important for Rollin because he adheres to a zoocentric bioethical theory. For an overview of different bioethical theories see Verhoog *et al.* (2004) and Verhoog (2005).

To adhere to a zoocentric bioethical theory for Rollin (1986) means that only higher animals with some form of consciousness are morally relevant and have to be protected. Rollin (1986; p. 295) introduced the concept of 'telos', which he defined as: "the set of needs and interests, physical and psychological, genetically encoded and environmentally expressed that makes up the animal's nature...It is the pigness of the pig, the dogness of the dog". Rollin (1996; p. 159) called it the species-specific nature of animals: "animals like humans have natures, and respect for the basic interests that flow from those natures should be encoded in our social morality". A zoocentric theory obliges us morally to take into account the interests that are believed to be essential and constitutive of the animal's nature. This is not a matter of being kind to animals, Rollin wrote, it is our moral duty.

For Rollin, the presence of consciousness (sentiency) is a necessary and sufficient condition for moral relevance. Sentient animals are said to have an intrinsic value. They cannot be looked upon as if they were mere instruments for human goals. Also feelings of happiness are of intrinsic value to these animals [see Verhoog (1992) for the different meanings of 'intrinsic value']. If the presence of consciousness is a *necessary* condition it implies that an entity without consciousness will not be morally relevant; moral agents will have no direct responsibilities towards them. To be a *sufficient* condition means that being conscious implies moral relevance, but being conscious is not necessarily the only criterion for inferring moral relevance. But Rollin is not only thinking zoocentrically, he has combined it with a consequentialist interpretation of it, which can be shown by looking at his view on genetic manipulation.

Characteristic for a zoocentric theory, in contrast to a biocentric theory, is that it is not the telos itself that is respectful, but the interests determined by it. According to Rollin, genetically engineering animals, for instance, is not wrong in itself. Crossing species barriers, the creation of chimeras or the induction of leglessness in animals is not a morally relevant intervention because species are not morally relevant. Only individual animals that can suffer as a result of genetic engineering are morally relevant. Species cannot suffer. Therefore, the animal's telos is not sacred. "I never argued that the telos itself could not be changed", Rollin wrote (1996; p. 171). To change the telos of chickens through genetic engineering so that they no longer have an urge to nest, means to remove a source of suffering for animals held in battery cages. They are better off than before. Rollin agreed that it may be better to change the housing conditions, but as long as this is not expected to occur in our present societies, it is better to decrease the suffering, even if this has to be achieved by means of genetic engineering. However, it should not be forgotten that the genetic engineering, needed to reach the goal of less suffering in animals, itself involves many animal experiments.

From a zoocentric to a biocentric theory

In Rollin's view, gene technology by itself is a morally neutral technology; morality is

only involved if the application of the technology leads to the suffering of the animal. To understand why violation of the integrity of animals is a moral problem one has to switch from a zoocentric to a biocentric ethical theory. An example of a biocentric theory is given by Taylor (1984; 1986). According to Taylor all living organisms have 'inherent worth', which he defines as follows:

> *"The value something has simply in virtue of the fact that it has a good of its own. To say that an entity has inherent worth is to say that its good (welfare, well-being) is deserving of the concern and consideration of all moral agents and that the realization of its good is something to be promoted or protected as an end in itself and for the sake of the being whose good it is."*(Taylor, 1984; p. 151).

The domain of morally relevant natural entities is widened to all animals and also to plants, indeed to all living beings ('teleological centres of life'). Plants do not *have* interests such as sentient animals, but we can say that something that contributes to their good is *of interest* to them. Having a 'good life of its own' emphasizes the 'own-ness', the identity, or species-specific nature (telos) of the living entity. If being sentient is part of the species-specific nature, this will be taken into account when dealing with such animals. In this biocentric theory sentiency is clearly a sufficient, but not a necessary condition for moral relevance.

The concept of animal integrity fits into this biocentric ethical theory, and is closely connected with the meaning of 'naturalness' in this theory. Rutgers & Heeger (1999) give the following definition of animal integrity: "The wholeness and completeness of the animal and the species-specific balance of the creature, as well as the animal's capacity to maintain itself independently in an environment suitable to the species".

Several criteria mentioned in this definition can be related to the following levels of the 'nature' of an animal (Verhoog, 1998; Visser & Verhoog, 1999):

- The wholeness and completeness of the animal refers to the level of the individual animal. Integrity presupposes the existence of an 'organism', a living whole with interconnected parts. It is the interconnectedness, the balanced harmony of the parts of the whole, which is somehow linked to the concept of integrity. Taking away the horns of cows, even if it is done painlessly, is not morally irrelevant in a biocentric theory, because it violates the characteristic nature of cows. It somehow disturbs the organismic 'wholeness'. The moral relevance of 'individuality' (autonomy) is highest (reaches its highest stage) in human beings.
- The species-specific balance refers to the species-specific nature of the animal, the natural characteristics at the level of the species. When we say, as we do in organic agriculture, that animals should be able to perform their natural behaviours, we refer to this level. A species always fits into an environment that can be more or less specific, dependent on the species. The ability to adapt to a particular environment is part of the species-specific nature of an animal.
- The animal's capacity to maintain itself independently can be related to the third level of naturalness: for instance, what does it mean to be an animal and not a plant? When, in discussions about housing conditions, we say that animals should be able to explore their environment, this refers to almost all animals. It goes beyond the species level.
- The last level of the 'nature' of an animal is that it is alive, just as plants are alive. It

has characteristics of life, which it shares with all living beings (capacity to grow, to reproduce, self-regulation, etc.). In line with the levels mentioned here, Lammerts Van Bueren *et al.* (2003) discussed the intrinsic value and integrity of plants in relation to plant breeding, and distinguished phenotypic integrity, genotypic integrity, planttypic integrity and integrity of life.

Aesthetic perception and ethics

In the foregoing it was stated that violation of the integrity of animals was not a moral problem for Rollin (1993) because he adhered to a zoocentric bioethical theory. Rollin nevertheless was worried about changing the nature of animals by means of genetic engineering, but for aesthetic, not for moral reasons. Switching to a biocentric theory makes it understandable why it is considered a moral issue in this biocentric theory, and why aesthetic and moral issues are closely related here.

When we look at the different levels of the 'nature' of an animal, we see that they all refer to holistic (or aesthetic if you wish) characteristics that are close to the world of our common-sense perception and experience. Respect for the intrinsic value of living entities involves respect for their specific nature (they have a 'nature of their own'). Hauskeller (1999) argued that moral consciousness is triggered if we really see the otherness of living nature (or an animal), with all its specific details, in an aesthetic mode of perception. Through the aesthetic experience of beauty we can learn that there are things that are worthy of preservation for their own sake. In the experience of beauty, nature appears to us in its immediate reality as an image. In such an image the inside (our consciousness) and the outside (the living organism that appears in consciousness) are no longer separated. To have this experience we must abstract from nature's instrumental value, its usefulness for us. Then one can experience nature's dignity. So we need an aesthetics that takes immediate sensuous perceptual experience seriously, as was long ago also argued by Portmann.

What is described here by Hauskeller (1999) comes close to what Cooper (1998) called the virtue of humility: selfless respect for reality, letting-be, an exercise to 'unself', to resign and to look away from one's own concerns, and take the ends of other creatures seriously. Without humility we experience a sense of being cut-off from nature, a sense of alienation. Now we can also understand Cooper's statement that those who violate the integrity of nature also violate themselves. Inside and outside are no longer separated. Through this we can also better understand Vorstenbosch (1993) when he wrote that the concept of integrity directly appeals to human responsibility.

In short, such a more aesthetic way of perceiving organisms can become a source of moral inspiration, in the sense that through it we can become aware where we transcend certain moral boundaries. In connection with genetic engineering we can say that this source of moral inspiration relates to intrinsic concerns about genetic engineering: playing God, the unnaturalness, the violation of the animal's integrity or its intrinsic value. These concerns have to do with our immediate sensuous experience of nature. And this experience is open to any person in the world of common sense. To be able to experience nature's intrinsic value, or better its inherent worth (dignity), one needs another mode of perception than the reductionistic one of experimental science.

Conclusions

From the examples given above it becomes clear that the human-animal relationship changes in the process of objectifying animals through the application of a reductionistic scientific methodology. It is also clear that applying the scientific method is based on a particular view of the relationship between man and animals. Once the animal has become an object of scientific research, methodologically it only has an instrumental value and is perceived quite differently from how it is perceived in common-sense experience. Perception in our daily world is much closer to what Portmann calls aesthetic and intuitive perception. It is characteristic of the aesthetic mind that it wants to leave the object as it is, to appreciate it for its own sake, and in connection with living beings: to respect its intrinsic value. A concept such as the intrinsic value of an animal is directly related to what is essential for the life of the organism involved. It sensitizes us to what is real about animals, independent of the instrumental use we may have of them.

It is not surprising that scholars such as Wolpert (1993) wrote that moral / ethical issues only arise afterwards, with the applications of scientific knowledge in our daily life. Wolpert already defined the scientific method as a method that rules out all values. This creates a strong bias towards applying a consequentialistic ethical theory, which looks at the positive and negative consequences (benefits and risks) of science and technology (the results), rather than at the moral attitude of the scientist (virtue ethics) or the technology itself (experimental interventions). Wolpert believes that the empirical domain is the domain of science and the moral domain the domain of ethics or politics. Science is said to be value-free, describing and explaining objectively what we find in nature, without any recourse to moral values. Values, on the other hand, are considered to be subjective. This tradition in natural science, to keep the empirical and the ethical domain totally separated, becomes difficult to uphold when the issues are closer to our world of daily experience. This was illustrated with the issue of animal welfare. The crux of this article is the argument that there is a direct relation between the ethical attitude towards nature and the way nature is perceived by human beings. In experimental reductionistic science, nature is seen as a material object, subject to mechanistic analysis. This corresponds to a utilitarian (consequentialist) ethical theory, because the scientific method has been made value-free. Values and ethics only come in afterwards, when the results are applied. When animals are subjected to scientific experiments it is not possible to completely avoid ethical issues. But the ethical issues are restricted to utilitarian ones: does the animal suffer from the experiment and is the suffering outweighed by the benefits delivered by the expected results. Through the genetic engineering of animals many ethicists and others have become aware that other ethical issues should play a role as well, issues that directly relate to the technology itself and to the attitude towards nature underlying it, irrespective of the consequences. These issues only come up when the animal is perceived holistically or phenomenologically. Such a more aesthetic way of perceiving animals comes close to our perception of animals in our daily life.

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