Ethics and animal experimentation: what is debated?

Ética e experimentação animal: o que está em debate?

Rita Leal Paixão [1]
Fermin Roland Schramm [2]

[1] *Departamento de Fisiologia, Instituto Biomédico, Universidade Federal Fluminense. Rua Hernani Melo 101, Niterói, RJ, 24210-130, Brasil. mflrlpp@vm.uff.br*
[2] *Departamento de Ciências Sociais, Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz. Rua Leopoldo Bulhões 1480, 9a andar, Rio de Janeiro, RJ 21041-210, Brasil.*

Abstract *The purpose of this article is to raise some points for an understanding of the contemporary debate over the ethics of using animals in scientific experiments. We present the various positions from scientific and moral perspectives establishing different ways of viewing animals, as well as several concepts like 'animal ethics', 'animal rights', and 'animal welfare'. The paper thus aims to analyze the importance and growth of this debate, while proposing to expand the academic approach to this theme in the field of health.*
Key words *Bioethics; Animal Rights; Animal Welfare; Laboratory Animals*

Resumo *Este artigo tem por objetivo fornecer alguns elementos para a compreensão do debate atual sobre a questão ética no que diz respeito à utilização de animais de laboratório. Nessa perspectiva, o que se pretende é apresentar as várias posições no campo das reflexões científicas e morais, que delimitam diferentes áreas de consideração para com os animais, assim como categorias distintas, tais como ética animal, direito animal e bem-estar animal. Portanto, visa-se demonstrar a importância e o crescimento de tal debate, propondo-se uma necessária ampliação da abordagem acadêmica sobre o tema na área da saúde.*
Palavras-chave *Bioética; Direitos dos Animais; Bem-Estar Animal; Animais de Laboratório*

Introduction

The publication of the book *Animal Liberation* by Australian philosopher Peter Singer in 1975 was neither the beginning nor the end of a debate, but it was undoubtedly a milestone. Since Singer's book was published, echoes have been heard from previously isolated voices of philosophers, scientists, and animal protection groups debating the scientific and moral legitimacy of animal experimentation. There has been a major diversification of philosophical positions regarding the moral approach to animals. So-called 'animal protection' groups have actively and even sometimes aggressively expressed their demands. More laws and guidelines have emerged. New and crucial scientific arguments have been introduced into the field (as we will see in the course of this paper). However, in the midst of such intensification and evolution per se, the debate was faced with a contradictory situation, summed up in the statement by Wolfensohn & Lloyd (1995:11): "*All use of animals in scientific research for human benefit creates a dilemma – the justification for using the animal depends on it being different from the human, while the validity of the results obtained depends on the similarity of the animals and their responses to those of the human*."

This contradictory relation was the basis on which Singer stated, "*If possessing a higher degree of intelligence does not entitle one human to use another for his own ends, how can it entitle humans to exploit non-humans for the same purpose?*" (Singer, 1977:26).

The reasons cited are of two different orders: scientific and ethical. And although there are multiple approaches to the 'dilemma', in fact they are located on a continuum between two well-defined poles: one establishes a watershed between humans and animals and thus recognizes the legitimacy of animal experimentation, while the other negates such a demarcation and thus affirms that such use of animals is illegitimate. What really matters is to review the various positions between these two poles, since the growing debate over the last twenty years has shown that simplistic, extreme stances are untenable.

In order to clarify what we mean by 'the untenability of simplistic, extreme stances', we could say the following: 1) for those who view animal experimentation as an inalienable right of the human species, this right corresponds increasingly to certain concomitant rights for animals, since 'cruelty' should always be combated, given that it is kind of behavior pertaining to the sphere of morality and 2) based on evidence from the scientific domain itself, animal well-being has a positive influence on the results of experiments. On the other hand, opponents of animal experimentation are urged by the current debate to address the following question: what animals are we talking about? From microorganisms to us, human animals, where does one make the cutoff point for equal moral consideration? Should only the use of primates cease immediately, as some demand? In the ethical domain, the concept of sentient beings is important, while in the scientific terrain the search for differences and similarities between humans and animals is as old as it is surprising, which explains why we can increasingly affirm that we are "*merely one more single species*", since oneness is a characteristic of all species (Foley, 1993:20).

This article aims to review various positions, concepts, and arguments in the debate, besides providing brief background on the use of animals in experiments, a fundamental theme for demonstrating how the borders of the area of moral concern have expanded for various reasons, while seeking to encompass other species besides humans. In order to understand this expansion it is important to observe the contributions by scientific progress to the current state of events, particularly those mobilized for this debate, i.e., allowing for the incorporation of the 'animal welfare' concept into theory and practice. Furthermore, scientific progress itself has increased our difficulty in clearly delineating between humans and animals, thereby further fueling the 'animal rights' issue.

Evidence for the debate

Evidence that the ethical debate over experimentation has intensified can be viewed in various ways. One is the volume of publications on the theme, raising concerns and providing arguments for further discussion. MEDLINE®, frequently used by health researchers, shows a growth in the number of articles published in recent years, as reflected by the figures 1, 2 and 3.

Figure 1 shows that the animal welfare issue was incorporated into the scientific field beginning in the 1980s. There was also an increase in the number of publications on ethics and animal rights in the sphere of scientific publications, as noted in Figures 2 and 3. Initially (until the 1990s), more attention was paid to the animal ethics issue. However, beginning in the 1990s, 'animal rights' occupied a more central position in the debate, probably due to the greater focus on rights as compared to morals.

Figure 1

Number of articles on MEDLINE with the key word “animal welfare”.

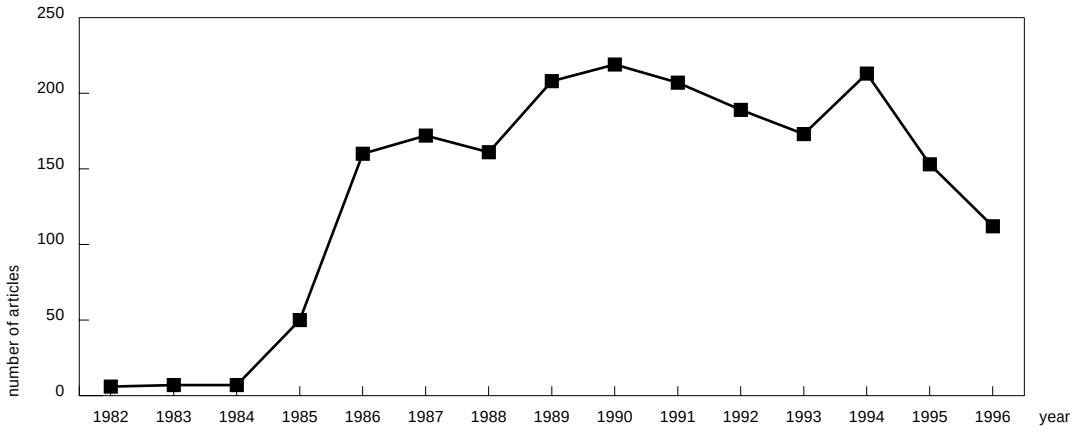
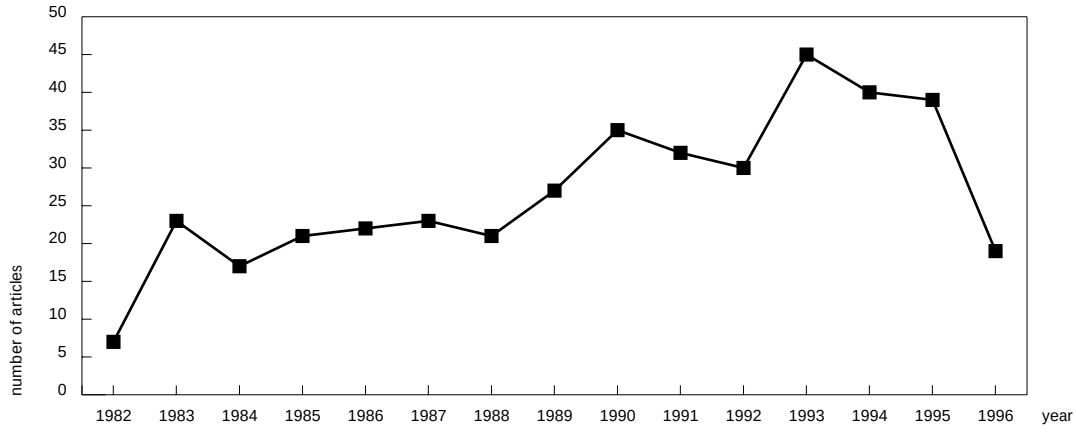


Figure 2

Number of articles on MEDLINE with the key word “animal” and “ethics”.



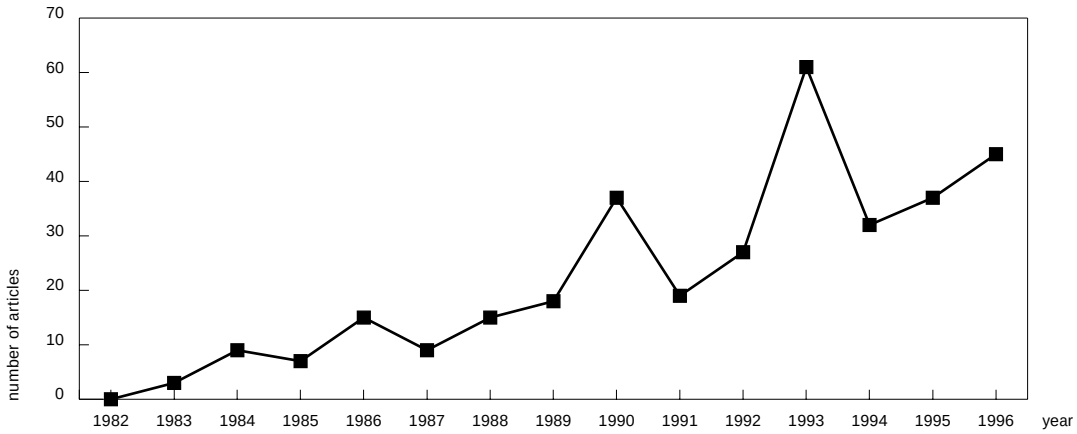
A brief history of animal experimentation

Even in prehistoric times, humans skillfully observed animals, to the point of taking advantage of what was then our limited knowledge of animals’ organic characteristics. Cave paintings show that prehistoric humans identified the heart as a vital organ to be hit in a successful hunt, as shown in a painting of a bison with arrowheads piercing its heart at the Niaux cave in Ariège in southern France.

Dating to around 500 BC are the older records of real anatomical observations, in notes by Alcmaeon, a native of the Greek colony of Croton. He dissected animals, forming a positive base for medicine and allowing his various followers to perform anatomical investigation in animals. Various animal-based studies were presented in the treatise *On the Sacred Disease*, part of the Hippocratic collection (c. 400 BC). The erroneous notion that arteries contain air demonstrates that such studies were done on dead animals, in which such

Figure 3

Number of articles on MEDLINE with the key word “animal rights”.



blood vessels are indeed empty (Singer, 1996: 19-30).

Studies on animals were also a central part of Aristotle’s work (384-322 BC). He probably never dissected a human body, although he is believed to have dissected over 50 species of animals and is considered the founder of comparative anatomy. In his concepts on the nature of life, he made the distinction between three orders or types of life principles (psyche/soul): vegetative or nutritive and reproductive; animal or sensitive; and rational or intellectual. According to Aristotle, there was an intrinsic finalism in all of nature: plants for the good of animals and the latter for the good of man (Dunlop & Williams, 1996:146-149).

In the early third century BC, in the Alexandria School, Herophilus was apparently the first to publicly dissect animals and Erasistratus was the first to perform experiments on live animals, proving that when arteries are cut they contain blood. Erasistratus is considered the founder of experimental physiology and the first vivisectionist (Singer, 1996:48-52). The term vivisection derives from the Latin *vivus* (living) and *sectio* (cut; cross-section), thus meaning ‘to cut a living body’, while the term dissection means ‘to cut a dead body’. Note that vivisection occurred in non-anesthetized animals, since anesthetic drugs had still not been discovered. Herophilus and Erasistratus were also accused of performing vivisection on human beings, although the evidence is contradictory (Singer, 1996:54).

Galen (129-199 AD), considered ‘the prince of physicians’, routinely performed research on living animals for his study of muscles, particularly with the so-called Barbarian monkey. He is also considered the first to have performed public demonstrations on living animals, using pigs, monkeys, and other species. After Galen died, research virtually stopped, and experiments on animals were not reported again until the mid-15th and 16th centuries, when Vesalius (1514-1564), a professor at the University of Padua, publishes his masterpiece: *De Fabrica Corporis Human* (Singer, 1996:136). At the end of this book there is a chapter entitled *On the Dissection of Living Animals*, dealing with the methods of physiological experimentation available at the time. The author lists various experiments, including excision of the spleen, loss of voice by cutting the recurrent laryngeal nerves, slices of spinal column, and perforation of the ribcage, demonstrating that animals can be kept alive if the lungs are ventilated (Singer, 1996).

Some time later, the work of William Harvey (1578-1657), especially his masterpiece *An Anatomical Dissertation on the Movement of the Heart and Blood in Animals*, published in Frankfurt in 1628, showed on the basis of animal vivisection how the entire concept of human anatomy was modified (Singer, 1996:194-208). From then on, physiological questions evolved and experimentation on animals expanded, acquiring philosophical and scientific reasons with Claude Bernard (1813-1878), considered the greatest physiologist of all time. Au-

thor of *Introduction à l'étude de la médicine expérimentale* (1865, *apud* Théodoridès, 1984: 89), he stated that to study a given parameter in an organism, all other variables should be kept constant, thus laying the groundwork for modern experimental research. According to Bernard: "*Animal experimentation is an integral, absolute right. The physiologist is not a man of the world; he is a wise man, a man involved and absorbed by a scientific idea that he pursues. He does not hear the cry of the animals, neither does he see the blood that flows. He only sees life and observes how organisms hide problems that he seeks to unveil*" (1865 *apud* Bernard, 1994:145). He went on: "*A wise man should only be concerned with the opinion of the wise, who understand him, and should only derive rules of conduct from his own conscience*" (1865 *apud* Bernard, 1994:145). Claude Bernard's statements already reflected his response to the growing criticism aimed at vivisection, since in the scientific sphere the use of animals was gaining ground and until then there had been a fertile philosophical atmosphere for this practice.

Francis Bacon (1561-1626) had already declared the usefulness of vivisecting animals to increase our knowledge of the human body, thereby obviating the need to perform this practice on criminals, which was considered morally repugnant. This typically Christian anthropocentric argument had been developed previously by Saint Thomas of Aquinus in *Summa theologica* (1225-1274), identifying the presence of a soul only in human beings, whence animals existed only to satisfy human needs and were thus considered mere objects, devoid of any personality or rights (Ryder, 1989:32-33).

Philosopher René Descartes (1596-1650) had a major impact on this description of animals as objects. He conceived of the animal body as a machine or automaton, like a watch, capable of complex behavior, but incapable of speaking, reasoning, or even having feelings. According to Descartes, the human body was also an automaton, yet different from that of animals because it had a mind, and thus a soul separate from the body. Therefore, only man could simultaneously possess matter and spirit. According to the Cartesian doctrine, animals did not feel pain, and thus a dog's whimpering (when beaten) did not reflect pain, but rather sounded like an organ being played (Thomas, 1988:40-41).

Nevertheless, such scientists as Robert Boyle (1627-1691) and Robert Hook (1635-1703), who used animals in their experiments, stated that they observed intense suffering in them and that they would prefer not to repeat the same experiments (Ryder, 1989:57). By 1665, Edmund O'Meara (1614-1681) was already stating that the agony suffered by animals distorted the research results (Ryder, 1989:58).

Outrage was expressed by 18th-century writers like Alexander Pope (1688-1744), who in becoming an antivivisectionist asked what gave us the right to kill a dog, a creature so close to us. In the philosophical domain, Voltaire (1694-1778) also combated the practice of vivisection, directly attacking the Cartesian idea that animals are incapable of suffering. This period also witnessed the emergence of a pioneering scientist in the search for alternatives to the utilization of animals in experiments, James Ferguson (1710-1776), who criticized the suffering of animals used in experiments on respiration. In his public demonstrations, he used a balloon model to simulate the lungs (Ryder, 1989:64). Also in the philosophical field, Kant (1724-1804) introduced an argument for not simply mistreating other species: the argument of cruelty. According to Kant, mistreating animals would lead us to mistreat human beings. However, nothing in the animal itself was relevant from the moral point of view (Kant, 1963: 239-241). Kant's argument was thus anthropocentric, since encouragement of benevolence was more of a self-defense of the human species than a recognition of the intrinsic values and rights of other species. Jeremy Bentham (1748-1832), in his utilitarian philosophy, followed another line of argument that exerted great influence on the debate, focusing on the capacity to suffer (1780 *apud* Ryder, 1989:156).

We thus entered the 19th century with diverging ideas on the debate: on the one hand, animal experimentation was spreading and becoming institutionalized with the work of Claude Bernard, while on the other there was already a surprising concern over animal welfare in the scientific field. In 1831, neurologist Marshall Hall (1831 *apud* Paton, 1993:1) laid down principles on which physiological experiments should be based for physiological science to limit uncertainty and cruelty and for such experimentation to be seen as an important branch of knowledge and scientific research. Hall's principles included the notion that animal experimentation should only performed when simple observation could not provide the answers. In addition, unnecessary repetition of experiments should be avoided, and all experiments should be conducted with a minimum of suffering for animals. This period (1824) also witnessed the founding of the first Society for the Prevention of Cruelty to An-

imals (SPCA, currently RSPCA) aimed at tackling the animal issue from various angles and which, while raising objections to vivisection, recognized that some experiments were justifiable, if conducted in a humane fashion (Ryder, 1989:89-92).

Dating to November 24, 1859, was the publication of *On the Origin of the Species and Natural Selection* by Charles Darwin (1989). While presenting humankind with the history of its own evolution, Darwin's work also contributed to the debate over the similarity versus difference between man and animals and thus to the emergence of the moral dilemma over the legitimacy of animal experimentation. In Darwin's England, the debate over using animals in research contributed to the approval of the first legislation aimed at regulating animal experimentation: *The Cruelty to Animals Act 1876* (Ryder, 1989:116). In the wake of this Act, various other protectionist institutions were founded, new legislation was approved in other countries, and the debate spread and evolved in both the scientific and philosophical fields, as we shall see next in the next section.

The scientific approach: the animal welfare issue

By taking a scientific approach to the issue of animal experimentation, our intent is to review the developments and impasses, analyzing what has occurred in this debate even when there is no *a priori* moral orientation and considering to what extent one can isolate facts from the values at stake.

Taking as the point of departure the current definition of 'animal experimentation', one notes that such experimentation in the health field has been performed from various perspectives, including the following:

- In toxicity tests on widely varying substances, including therapeutic drugs, cosmetics, and many others such as detergents and pesticides.
- For the production of vaccines and sera for both human and veterinary use.
- For teaching purposes, including practical classes and demonstrations in various courses from the health field, even in introductory biology courses.
- For experimentation per se, involving the discovery of organic mechanisms and the effect of drugs and procedures (e.g., transplants) in the medical field.
- Recently, the production of transgenic animals, *knock-outs*, and clones, with a view towards promoting discoveries in the field of genetic engineering and its applications, including those on humans, with the full scope of potential uses still not totally assessed.

Although the uses vary widely, the term 'animal experimentation' has been used generically. According to Paton (1993:24), this approach makes better reference to the wealth and diversity of scientific research. Even when aimed at simple observation, such work entails a series of interventions such as the choice of one's object of observation and procedures, ranging up to more sophisticated forms of intervention. However, animal protection groups prefer the term vivisection and claim that scientists use the term 'experimentation' so as not to reveal what is really going on (Schar-Manzoli, 1996:3). There is also a broader point of view suggested by Berlinguer (1993:62), making a distinction between constant experimentation and experimentation in the narrow sense. From this perspective, so-called constant experimentation began with the raising and domestication of animals. For the purposes of this article we will only deal with experimentation in the narrow sense, but it is important to emphasize that the analogies with other ways of utilizing animals in our society are frequently cited in the debate, and that such analogies make the issue all the more complex.

Within the realm of the scientific debate, when the question is raised as to whether we should utilize animals in experimentation, we find two positions: those for and those against.

Criticism against animal experimentation is based on the supposition that it is but one more among a number of research techniques, and as such is inadequate at present. It should be stressed that this stance does not question the usefulness of experimentation in previous periods (another discussion entirely), but rather states that sciences now has better methods available. The arguments against animal experimentation are based mainly on the concept that animal 'models' may even establish analogies with human conditions, but that no theory can be proven or disprove by analogy. This can be demonstrated by a series of errors in the biomedical field during the time in which it was still based on animal experimentation (Barnard & Kaufman, 1997). In addition, according to this view, the attention given to animal research diverts the focus from other more effective methodologies for combating health-related problems (Sharpe, 1989:111).

Others highlight the importance of research in animals (Botting & Morrison, 1997). Their arguments are based on the various benefits

accruing from animal experimentation for both human and animal health (AMA, 1989; Smith & Boyd, 1991:25-44; Paton, 1993:55-107). As to whether animals are a 'model' for the human species, there appears to be a consensus that the 'ideal model may not exist', but that there is this 'most appropriate available model'. This can be shown by the biological *continuum* between the species, the knowledge accumulated from animals, and the adoption of given criteria for validation of these models (Held, 1983: 13).

This position (that science needs to use animals) is undoubtedly hegemonic in the scientific field, where we find a more intense debate over another issue: should there be limits or conditions to animal experimentation?

However, before analyzing the scientific community's answers to this question, we should consider what allowed for such questioning from the scientific perspective itself. Studies in the field of animal behavior had a major impact, especially in the 1950s, when the explanatory monism of the behaviorist school was criticized. In the words of Lorenz (1993: 103): "*When...behaviorists place experimental pigeons inside an opaque box that prevents their perception of any information except the time and frequency at which the animal presses a bar, I cannot avoid thinking that they prefer not to see pigeons' various other activities because they are afraid that it might diminish their belief in their own explanatory monism*." We realize how a 'vision of other activities' occurs especially with primates, showing that the latter are capable of displaying behaviors previously considered exclusively human. Among such exclusive activities, we could cite the example of tool-making capacity (Goodall, 1991: 23), learning and acquisition of language (Savage-Rumbaugh & Lewin, 1994), and aspects of social interaction (Dethier & Stellar, 1988).

Such new forms of knowledge have converged on, and in a sense contributed to, science's recognition of such important issues as pain, anxiety, stress, suffering, and welfare in animals. For a better investigation of these phenomena one needs a two-pronged approach: one focusing on the biochemical, physiological, and anatomical mechanisms similar to those of humans as displayed through such experiences, and another consisting of how such experiences occur in animals, that is, how similar they are to the human sensation of suffering, which involves complex cognitive processes and conscience (Smith & Boyd, 1991:46).

In the case of the first approach, i.e., relating to the existence of given mechanisms in animals, there is already a description of criteria contributing to the experience of pain, like the presence of receptors for opioids found in the central nervous system, amongst others (Smith & Boyd, 1991:62). Veterinarian Gerald F. Gebhart's statement is also in this direction, that the apparatus for feeling pain is the same in all vertebrates (1996, *apud* Mukerjee, 1997:73).

As for the second approach, referring to animals' subjective experience in this process, some scientists believe that such knowledge is impossible, while some critics of scientists believe that it is very easy to tell when an animal is suffering (Bateson, 1992:30). According to Bateson (1992), even in humans this experience varies from one individual to the next and from one moment to the next. An approximation can be achieved by using signs observed in association with the sensation of pain in humans as a criterion for assessing pain in animals. This approach to the 'subjective experience' raises the challenge of understanding some of the complexities in the cognitive processes of certain animal species, referring one to the issue of conscience and self-awareness. A study by Gordon Gallup (1990, *apud* Denton, 1993:60) showed that chimpanzees were capable of examining parts of their bodies with the help of a mirror, recognizing as 'different' the areas that had been painted while they were under anesthesia. According to the author, this proves the animal's self-awareness. According to Rogers (1995), different forms of perception by animals are relevant for admitting the possibility that animals have other feelings and emotions, and that different animal species have different forms of conscience, following a long evolutionary pathway.

Science took such observations as the basis for adopting certain stances towards the existence of given conditions for performing animal experimentation, stating that "*the presence of pain can produce a range of undesirable physiological changes which may alter the rate of recovery from surgical procedures, and these changes may affect the results obtained*" (Wolfensohn & Lloyd, 1995:174). Thus, 'animal welfare', beyond ethical considerations, became an important aspect of scientific methodology and allowed for the introduction of *The Principles of Humane Experimental Technique*, developed since 1959 (Russel & Burch, 1992), aimed at achieving the three *r's* ('replacement', 'reduction', 'refinement') in the utilization of animals for scientific purposes. Once the concepts of 'animal welfare' and the three *r's* had been introduced, perspectives on the issue var-

ied even more widely than before and the debate heated up further.

After all, just what is meant by 'animal welfare'? The first attempts at a definition emerged some 30 years ago, when Brambell (1965, *apud* Hutson, 1994:48) referred to "*a broad term embracing the animal's physical and mental well-being*". More recently, Broom (1986: 524) stated that animal welfare can be defined as "*its state as regards its attempts to cope with its environment*". The author stated further that it was its own characteristic, and not something provided by man. In this sense, according to Zanella (1994:51), "*due to the inherent complexity of human beings, especially with regard to their adaptive processes, a multidisciplinary approach is recommended that considers various indicators of welfare*". In fact, we can observe that in the face of the difficulties involved in achieving animal welfare, what has been performed in the scientific domain is a definition "*identifying and scoring components of severity of scientific procedures*" (Laboratory Animal Science Association Working Party, 1990:101). Thus Milburn (1989:78) expresses the following concern: "*I believe that science should be called upon, not to prove suffering, as at present, but to prove lack of suffering.*" It is the possibility of suffering that leads to guidelines aimed at controlling the degree of severity of the experiment. Here, the three *r's* take the forefront, with both their advantages and limitations.

The first *r*, 'replacement', suggests that one should seek to replace the use of vertebrates with methods employing other, non-sentient materials, including plants, microorganisms, etc. (Russel & Burch, 1992:69). The search for alternative methods, also known as substitute or complementary ones, had relevant effects on the development of such techniques as cell cultures, cultures with multiple cell types, and three-dimensional cultures (where contact occurs between the cell and the extracellular matrix). Such techniques allow for a greater approximation with the complexity of the living organism, while increasing the validation of such so-called 'alternatives' (Adolphe, 1995). There is already a recommendation by the European Economic Community (EEC) forcing the cosmetic industry to refrain from using animals after January 1, 1998, wherever alternative methods have been validated. However, while in the scientific domain such methods appeared to be a useful stage, some authors have found them insufficient for replacing animal experimentation. For some cases they were more adequate, while for others they suffered limitations, like the fact that they were too simplifying (Adolphe, 1995). Still, from another point of view, the 'fear of the new' hampered the development of new alternative methods, while scientific and economic evidence suggests that greater investments in this field would have led to a broader range of such methods (Langley, 1991).

The second *r*, 'reduction', recommends that one attempt to reduce the number of animals used in a given experiment through "*the right choice of strategy*" (Russel & Burch, 1992:105). According to this view, science benefits from better experimental design, and even in the field of statistics the dialogue with scientists has led to innovation in strategies and contributed to the improvement of both fields: biomedicine and statistics (Geller, 1983:29).

The third *r*, 'refinement', recommends that one seek to minimize the amount of animal discomfort or suffering (Russel & Burch, 1992:134). The use of anesthetic or analgesic drugs is relevant in this sense (Paton, 1993:129).

However, when making reference to the limitation of suffering, i.e., when we pursues animal welfare, we realize that science alone cannot provide the answers needed by researchers. Even when science indicates how painful a procedure is, which criteria matter (and for whom? humans and/or animals?) in the assessment of the cost-benefit relationship in an experiment? Without a doubt, beyond the field of science, the animal welfare issue also belongs to the field of ethics, as we shall see in the next section, and decisions made in the laboratory should also be ethical decisions. A philosophical approach thus allows us to understand whether we should utilize animals and how they should be treated.

The philosophical approach: ethics or animals rights?

In the course of the philosophical debate, reflections on the use of animals for scientific ends leads to several questions:

a) Is the use of animals in experiments morally legitimate?

b) Does man have some moral obligation towards animals?

c) Do animals have rights like we humans?

The approach to these questions with regard to non-human beings may already appear strange to some people, in which case it is worthwhile to recall that "*no new scientific or technological development can claim immunity from ethical scrutiny*" (Reiss & Straughan, 1996: 6) and that our moral principles are an integral

part of how we see and interpret the world, which in turn helps form our choices and behaviors. To speak of choices is to reveal both the decision-making process human beings detain and their way of acting. We act not only as the rational beings we are, but also as subjects of passions and affections. As Descartes said: "*The principal effect of all passions in men is that they incite or dispose their souls to wanting things for which they prepare their bodies; such that the feeling of fear incites one to want to flee, the feeling of daring to want to struggle, and so on*" (1649 *apud* Moser, 1992:123). We thus view ethics and philosophy in this context in the search to reflect on the relationship between humankind and other species, i.e., vis-à-vis the world around us.

Still, it is Cartesian philosophy that denies this ethical approach to other species, since according to Descartes animals are automatons, mere machines, devoid of pain or suffering (*apud* Thomas, 1988: 40). According to this view, animals are completely alien to the sphere of moral concerns, revealing one of the positions we underscored in the introduction, with virtually no one to defend it today, since science itself has shown how animals feel pain and pleasure. It is interesting to highlight that the Cartesian view of animals loses ground as one rises in the evolutionary scale, such that a clear distinction is made between vertebrates and invertebrates, with the Cartesian view still prevailing for the latter in the view of many. This observation underscores the importance of the contemporary debate over the concept of sentient beings, i.e., those capable of feeling pain and pleasure, and also reveals the quest for a criterion to orient moral conduct. Should it be suffering, rationality, intelligence, or the species? What is the basis for a moral theory to classify living beings? Bentham (1780 *apud* Ryder, 1989:156) questions what may be read as the point of departure for our reflections: "*The question is not can they reason? Nor, can they talk? But can they suffer*?"

With regard to a moral perspective on animal suffering, different positions emerge for human conduct towards animals. According to Kant (1963), animals do not belong to the sphere of human morality, but as we have already seen he introduced the argument of cruelty from within an anthropocentric view. That is, cruelty to animals should be avoided, not because man has a moral obligation towards animals, but as a way of preventing cruelty towards human beings, since in this case the examples would begin with conduct towards animals. According to Kant, since animals are not rational, they are not an end in themselves, but rather means, which would justify their use for human purposes. In this case, attempts to reduce animal suffering would be desirable, which also justifies the quest for the three *r's* according to the anthropocentric view. For a Kantian, any experiment can be performed, no matter how painful for the animal. Neither is there any difference in choosing between a chimpanzee or a mouse, since both are merely means to a given human end. From this perspective the privilege of reason becomes evident as a moral criterion, since as Kant would say, only humans constitute an end in themselves, and are thus the only ones with moral autonomy. But is the utility obtained by human beings through animal experimentation a morally relevant argument or merely an act of exploitation? This questioning reveals the existence of other perspectives, gaining new dimensions from the 1970s on, featuring the arguments of those considered the most important philosophers of the animal liberation movement: Australian Peter Singer and North American Tom Regan, within the philosophical framework of utilitarianism.

Interest in the animal issue in the 1970s was favored by a series of events, such as interest in civil rights, the feminist movement, the issue of racism, and the environmental crisis calling attention to the exploitation of all of nature (Carlsson, 1986:53). According to Ferry (1994: 29) the issue of 'animality' is at the center of contemporary debate mainly because of the growing love for animals amongst the throngs of pet owners and the challenge to the devaluation of nature that has emerged with the ecological movement. In this case, "*...as one moves from man to the universe, as demanded by both deep ecology and utilitarianism, one moves first through the animal world*" (Ferry, 1994:29).

When utilitarianism enters the debate, i.e., when the maximization of total happiness is pursued, sentience becomes a relevant moral criterion. Thus, suffering and pleasure become the vital characteristics for accepting a moral code, thereby dissolving the clear Kantian demarcation between men and animals in the moral sphere, since theretofore protection of animals was a problem of relationship with humankind itself and not with animals.

According to Singer (1977), the capacity to experience suffering is what gives animals equal interests to those of humans, and moral judgments should be based on interests rather than race, genus, or species. The premise for having interests is the capacity to feel pain and pleasure, and the existence of an interest in

turn becomes the foundation for morality or moral respect. Thus, the mere exploitation of other animal species should be considered speciesism, which is not morally justifiable. In the words of Singer (1994:68), speciesism is comparable to racism: "*Human speciesists do not admit that pain is as bad when felt by pigs or rats as it is when human beings feel it.*" However, within his utilitarian principles, one must consider in the process all the animal suffering involved and all the human benefit, such that under given circumstances, for a large human benefit an animal experiment would be justifiable (Singer, 1977:85). This perspective takes into account the differences between the respective species, since the suffering caused to a given animal can be greater than that caused to other species. Singer illustrates the issue as follows: "*If I slap a horse's flank with my open hand, it may be startled, but it probably will not feel a great amount of pain. Its skin is thick enough to protect it from a simple slap. But if I slap a baby in the same way, it will cry and will almost certainly feel great pain, since its skin is more sensitive. Thus, it is worse to slap a baby than a horse, as long as both slaps involve the same force*" (Singer, 1994:69). He admits further that there is no precision when one compares suffering amongst different species, just as there can be no exactness in the comparison amongst different individuals (Singer, 1994:71).

Tom Regan takes a different stance, defending the issue of 'animals rights' and opposing any kind of animal experimentation. In fact, the first animal rights theory was formulated in 1892 by Englishman Henry S. Salt (*apud* Carlsson, 1986:52). However, Regan (1983) was to become the issue's main exponent, contending that animals possess 'a value in themselves' and thus have rights and cannot be utilized as mere means in animal experimentation. According to Regan, the only acceptable reason for submitting individuals to painful experiments would be to benefit these very same individual, or through their own will. For example, this would justify performing therapeutic procedures in animals, as well as in children and people with disabilities that cannot express their consent (Regan, 1989:27).

In the face of the various 'animal rights' perspectives, different critics take the defense of anthropocentrism. Ferry (1994:72-76) considers freedom (or according to Kant, practical reason) the only faculty that allows us to establish moral values and distinguish them as such from simple interests, which, when they do not correspond to our own, cause us mere indifference. Thus, the author does not see room for normative ethics in the absence of freedom, which according to him is not taken into account in Singer's argument. According to him, "*If I do not have the capacity to separate myself from my selfish interests in order to rise to the consideration of the whole, how could I find the slightest reason for obeying the principles of utilitarianism?*"(Ferry, 1994:74). In this sense, other authors, taking a Kantian point of view, have preferred to make a distinction between a moral agent and the object of morals, where only men play the role of moral agent (Fox, 1981:38). Others, like Cohen (1986), contend that there is confusion as to the meaning of 'right' and 'avoidable suffering', since rights are not inherent and correspond to duties in a society, while 'avoidable suffering' by animals would entail much more suffering for men. In fact, more and more arguments enter the discussion: one the one hand, there are those who defend anthropocentrism, and on the other, those who defend sentientism and respond to the effervescence of the current moment with a phrase by John Stuart Mill: "*Every great movement must experience three stages: ridicule, discussion, adoption*" (1957, *apud* Regan, 1983:vi).

Other perspectives that broaden the moral sphere even further include those of Schweitzer and Aldo Leopold. According to Schweitzer, any form of life is sacred and thus deserves moral consideration. Therefore, according to this 'reverence towards life' view, to cause death or pain to any other living being would only be justifiable through unavoidable need (Schweitzer, 1966). According to Aldo Leopold (1949, *apud* Ferry, 1994:95), considered the father of deep ecology, the moral circle should be even larger, going beyond living beings to encompass the environment itself, the entire ecosystem. It is important to emphasize that in this philosophical approach we follow not a chronological order but the lines of thinking towards an expansion of the moral sphere. This allowed us to side with Schweitzer and Leopold, who in fact were forerunners in including animals in the moral circle, while presenting a moral sphere of the greatest breadth.

Final remarks

In reviewing the main scientific and philosophical influences in the ethical debate over animal experimentation, we covered the issue of animal welfare, the Cartesian position (whereby humans are the only beings possessing value and rights), the Humanist or Kantian posi-

tion (according to which humans are still the only beings with rights but are expected to refrain from causing useless suffering to animals), the thinking of Singer (that man should share with all sentient beings in the protection of interests for maximization of the sum total of happiness), the thinking of Regan (aimed at the abolition of any and all animal experimentation, since the rights of all sentients are equal), and reverence for life as espoused by Schweitzer. Questions and challenges arise with all of this perspectives. How can one continue to admit the Cartesian perspective, in which one conceives of an animal as a mere machine? In the Kantian perspective, how does one guarantee so many privileges for a single species and classify the utilization of all other species according to a graded evolutionary scales? According to Singer's perspective, how can one assess (or who can assess) the extreme need for a given experiment? Could it be possible, as Regan would have it, to one day abolish any and all animal experimentation? How far does reverence for all forms of life extend? In the face of so many obstacles and doubts over differences and similarities between human and non-human animals, we should recall that oftentimes we do not merely choose facts, but see possibilities. We do not merely explain or lay the foundations for situations. Rather, we are capable of changing reality and can thus creating new situations. To build new ethics requires that we perceive others and the passion that is part of us and so often becomes compassion. We must confront both our doubts and the certainty that the worst of all perspectives is that which does not face challenges, or that provides no room for new issues. Stengers (1990) thus reminds us, 'Who raises the questions?' and provides us with an important clue: "*Seek, in scientific training, in the institutional rules, in the types of interests raised by the sciences or that they themselves attempt to build, in epistemological readings, all that which creates obstacles to our attention. There you will find the seat of power, in the sense that it actively opposes risk-taking, relevance, and the issue of the new*" (Stengers, 1990:172). And this leads us to ask: but who will provide the answers? We can but offer a clue: seek among those who raise the questions. It is with this thought that we reaffirm our belief in the importance of expanding the debate on ethics in animal experimentation.

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