Chapter 8

Patenting of Animals—Ethical Considerations

"I know I'm not supposed to get on a soapbox, but how can anybody say this kind of development is unethical or wrong?"

Donald J. Quigg
Commissioner of Patents

"In one regulatory stroke, the Patent Office reduced the entire animal kingdom to the lowly status of a commercial commodity, indistinguishable from electric toasters and automobiles."

Jeremy Rifkin
Foundation on Economic Trends

". . . Congress intended statutory subject matter to include anything under the sun made by man."

Chief Justice Warren Burger
majority opinion, *Chakrabarty v. Diamond*

"What has been is what will be, and what has been done is what will be done; and there is nothing new under the sun."

Ecclesiastes 1:9

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INTRODUCTION

A number of ethical issues have been raised in discussions regarding the patenting of animals. This chapter summarizes arguments regarding the patenting of animals that have been offered publicly and which claim to have an ethical component. A substantive evaluation of these arguments is beyond the scope of this chapter. Many arguments claiming a moral or ethical basis have, by their own admission, not been fully formulated to date (hence, one rationale for a legislative moratorium on the granting of patents on animals) (15).

The range of opinion on the rights and wrongs of using animals to satisfy human needs is as broad as the political spectrum itself. Interest in the moral status of animals and the rights, duties, and obligations owed by humans to animals has been long debated from religious and philosophical viewpoints (30). The ability to patent animals introduces a new legal concept in the notion of ownership of animals—a limited, exclusive, intangible property right–-that did not exist previously. Some argue that such a property right differs little from previous notions of accepted human ownership and control of animals; others disagree, claiming that profound issues are raised.

In considering various ethically founded arguments, the question is raised: Is this issue one that is uniquely related to patenting of animals? In other words, would the issue exist independently of any debate on animal patenting?

ARGUMENTS FOR PATENTING TRANSGENIC ANIMALS

Patent Law Regulates Inventiveness, Not Commercial Uses

Patent law defines what is a patentable invention and describes the process that applicants must undertake in applying for a patent (see ch. 3). **The patent statute, though detailed in procedural requirements regarding the application, issuance, maintenance, and reexamination of a patent, is silent on subsequent use or commercial application of a patented invention. This stems in part from the constitutional roots of patent law, as compared to constitutional powers permitting Congress to regulate commerce. The constitutional role of patents is "to Promote the Progress of Science and useful Arts." Other congressional powers, most importantly the right to regulate commerce, have been** used to enact statutes regulating health, safety, the environment, and market forces. Some proponents of animal patenting argue that it is beyond the reasonable scope of patent law to regulate the use of the invention, and that the Patent and Trademark Office (PTO) is ill-equipped to make ethical determinations regarding the possible uses of the more than 4 million patents it has granted.

The lone statutory exception to the proposition that patents should be denied for inventions is the Inventions Secrecy Act (35 U.S.C. 181-188), allowing the withholding of patents in cases where their issuance is deemed to be detrimental to national security. This law has been used to withhold patents involving the use of special nuclear material or atomic energy and inventions having significant utility in the conduct of aeronautical and space activities (7). Department of Defense agencies have responsibility under the act for reviewing relevant patent applications and asking PTO for a secrecy order.

Other than under the narrow confines of the Inventions Secrecy Act, the only way to stop the issuance of a patent on public policy grounds is to show that the invention has no possible use (utility is a requirement of patentability). In one case, a court determined that a drug had no utility because "of extreme toxicity to the point of immediate death under all conditions of its sole contemplated use" (l). As for suggested illegal or immoral uses of patented inventions, limited court rulings (mainly involving patents on gambling devices) suggest that patents can be denied only if the invention has absolutely no other use other than an illegal or immoral one. This standard is extremely difficult to meet (6,19).

Using patent law to regulate a specific technology (in this case, the issuance of patents on living inventions) could have unforeseen consequences. One issue is whether potential adverse consequences are even relevant to patenting. Should, for example, patents be denied to certain inventions that are useful but potentially harmful (e.g., a new cigarette filter, a firearm)? If commercial consequences are to be a relevant factor for determining patentability, who should make such decisions? The patent system could be used to regulate the use of the technology by denying to inventors the usual rewards of inventiveness-hindering science and the useful arts, as opposed to promoting them. A precedent could be set that could be used to hinder the development of technologies not yet foreseen. Unless it can be shown that patented animals are so inherently dangerous or illegal as to have no possible utility or threaten the national security within the meaning of the Inventions Secrecy Act, it appears that laws regulating commerce, not the patent law, are the proper statutory venues for addressing the ethical questions surrounding the uses of patented animals.

Some opponents of patenting animals are troubled by arguments based on what body of law is appropriate for regulating possible consequences of animal patenting on the grounds that such discussion avoids substantive discussion of animal patenting per se (2).

Patenting Promotes Useful Consequences

The basic purpose of the patent laws is found in the section of the Constitution that authorizes the creation of such a system. Congress is given the power "to Promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries" (U.S. Constitution, Article 1; Section 8).

Proponents of animal patents argue that granting patents increases the incentives for inventors to develop useful inventions. Some would see this argument as a purely pragmatic one, appealing to considerations of social policy and lacking any ethical component. Others would disagree with such a characterization. Defending social institutions on the grounds that they lead to desirable consequences (such as encouraging inventions) is a form of ethical reasoning, usually called **consequentialist reasoning, that has substantial ethical significance, even if** most would agree that it is only one of many different ethical arguments that should be considered.

Consequentialist reasoning that outlines the benefits of patenting animals is the basis of the most widely used argument by proponents of patenting. In testifying before Congress on June 11, 1987, the Assistant Commissioner for Patents asserted:

> By granting the right to exclude others, the law provides an incentive for those who create and develop new technology . . . The grant of patent rights has in fact encouraged research and provided useful new products including research into solutions of problems such as those associated with genetic disorders and increasing food yields (29).

Similar claims have been advanced by others on behalf of the biotechnology industry (12,13), some segments of the agricultural community (27), and some research scientists (5,32).

By their nature, consequentialist arguments provide greater or lesser support for a social policy depending upon the probability of the outcome (the higher the probability, the stronger the support) and upon the perceived desirability of the outcome (the more desirable the outcome, the stronger the support). This feature makes their support difficult to assess in particular cases, since it is often difficult to predict how desirable the outcomes will be and how likely they are to occur.

Such a situation exists with respect to patenting animals. Will benefit accrue from the development of biotechnologically derived animals that are patented? How likely is it that such benefits will actually be produced, and how soon? To what degree would such developments fail to take place if patenting is not permitted? The answers to these questions are unknown. Nevertheless, the rapid expansion of biotechnology suggests that many individuals and companies are prepared to invest time and capital on the assumption that biotechnology in general, and transgenic animals in particular, hold promise for useful, marketable advances. Coupled with the U.S. experience that patents

generally encourage inventions, many argue there is substantial consequentialist support for the patenting of transgenic animals.

Yet, considering the logic of such consequentialist reasoning demands that possible harms also be considered. Animal suffering, hardship for the small farmer, and reduction in genetic diversity are all potential consequences cited by opponents of animal patenting.

Patenting Is Necessary for the United States To Compete in an International Marketplace

Arguments for patenting transgenic animals on consequentialist grounds usually refer to such direct beneficial consequences as improving the food supply, providing animal models for the study of human diseases, and providing a means to produce pharmaceuticals more efficiently. **Additionally, some proponents of animal patents often argue that allowing such patenting is necessary if the Nation's biotechnology industry is to be able to compete internationally.**

> America's competitiveness is the centerpiece for international trade discussions today. Intellectual property is a prominent component of that ability to compete. America's competitiveness can be strengthened by providing more effective legal protection for American technology. Congress would be going in the wrong direction to consider limiting protection for biotech inventions . . . (12)

Again, some would see this argument as purely pragmatic, appealing to social policy considerations and lacking an ethical component, and that it is appropriate for a society to adopt measures for promoting economic growth in an increasingly competitive international marketplace. If patenting transgenic animals could make a significant contribution to promoting such growth, an additional line of consequentialist reasons for supporting the patenting of such animals would result. At present, however, the precise legal situation governing the patenting of animals throughout the world is unclear.

Patenting Is Preferable to Trade Secrets

A final consequentialist argument revolves around the fact that patents are not the only way to protect intellectual property. With inventions from biotechnologies, the most likely alternative would be to view such developments as trade secrets. If patents, for example, are not allowed for transgenic animals, then inventors could attempt to protect their commercial value by treating them as trade secrets. Some argue that this could have negative consequences for society.

These individuals propose that such negative consequences would flow from a central provision of patent law: disclosure. In order to obtain a patent, one must submit a complete specification, which is a description that would enable one skilled in the relevant art to make and use the invention. In order to aid disclosure, one can deposit the invention in depositories that will provide samples on request after the patent is issued (see ch. 9). In either case, this so-called enablement requirement provides new information that can be, and historically has been, used by scientists and competing companies to develop alternatives to and improvements on the patented invention. **If companies resort to trade secret protection of intellectual property rights in transgenic animals because patent protection for animals is unavailable, then information sharing could be limited.** Further, trade secret protection may be a more limited option when animals can reproduce the trait (35).

Patenting, therefore, can promote research by contributing to the growth of publicly available knowledge. Science works in a building block fashion—one discovery building on another-and scientists must have access to the discoveries. Thus, patents, even with the delays involved in publishing, are probably preferable to trade secret protection (27). One example involves cortisone, the pioneering patented discovery in the steroid hormone field. Cortisone was promptly followed by a host of noninfringing competitive inventions by others, each of which was stimulated by the initial disclosure by the cortisone inventor (1 1).

It is argued by some opponents of animal patents that research and development of new animal varieties has occurred in the absence of patent protection. If patent protection does not extend to animals per se, patent protection would still exist for related processes. Further, trade secret protection would provide some measure of intellectual property protection for inventions of new animals.

Patenting Rewards Innovation and Entrepreneurship

The arguments for patenting animals presented to this point have been consequentialist arguments. This section examines a nonconsequentialist line of reasoning reflected in the following:

> The moral justification for legal practices like patenting and copyright have received scant attention in the literature of ethics. The general rationale for both the copyright and patent systems is that they encourage the investment of time and energy in the act of creating . . . Unless and until these revered systems produce serious harm to human or animal welfare, they should be preserved intact as an ethically appropriate way of acknowledging the initiative and creativity of authors and inventors (33).

Two different ethical justifications for patenting lie within these remarks. The first, a fundamental consequentialist argument, is that the system of patents encourages greater public knowledge by creating a contract between the inventor and the Government, rewarding those who disclose their inventions. The second is the nonconsequentialist argument that inventors are entitled to patents as an acknowledgment of their efforts; it is this line that is further explored.

Several different ethical bases for any system of property rights exist and each can be applied to intellectual property rights as well. One discussion (14) divides them into forward looking arguments (the appeals to consequences discussed above) and backward looking arguments. The latter justify property rights as entitlements to the fruits of one's labor and draw upon themes derived from John Locke's seminal discussion of property rights (20). Applied to the area of patenting transgenic animals, the conclusion can be reached that inventors are entitled to patent rights as a way of giving them the fruits of their labor when that intellectual labor is for the promotion of science.

Although many would agree with this conclusion, two points are raised by it. First, it introduces into patent law amoral theme not normally present in this area of the law. Nevertheless, it could be a legitimate theme to introduce and seems to capture some of what those working in the field say about their rights to a patent.

Second, such entitlements could make less sense in the context of corporate and university research, especially federally funded research, than in the area of individual research(3). In any area, an entitlement to the fruits of one's labor needs to be balanced against considerations of public need to the fruits of that labor. Perhaps, however, that balancing is already accomplished by satisfaction of the enablement requirement, which allows others to use the information to develop other ways of meeting public needs without infringing on the patent.

ARGUMENTS AGAINST PATENTING TRANSGENIC ANIMALS

Metaphysical and Theological Arguments Opposing Patenting

Many fundamental arguments opposing patenting draw upon metaphysical (i.e., abstract or transcendental philosophical concerns about the fundamental nature of reality) and theological claims to support their position. They raise questions about the meaning of and relations among living creatures and the world they inhabit. This section examines concerns articulated by a range of opponents to animal patents.

Shortly after the *Chakrabarty* decision, in which the Supreme Court ruled that a living microorganism was patentable, a number of questions about the patentability of living organisms of any size or complexity were raised. For example:

> Consider first the implicit teaching of our wise men, that a living organism is no more than a composition of matter, no different from the latest perfume or insecticide. What about other living organisms—goldfish, bald eagles, horses? What about human beings? Just compositions of matter? Here are deep philosophical questions to which the Court has given little thought, but in its eagerness to serve innovation, it has, perhaps unwittingly, become the teacher of philosophical materialism (18).

This argument rests on the fact that the majority in *Chakrabarty* found the organism to be a manufacture or composition of matter. Still, the statute authorizing patents refers to " . . . any new and useful process, machine, **manufacture, or composition of matter" as patentable objects, and the**

Photo credit: American Philosophical Society

Eugenics Building, Kansas Free Fair, 1929. Livestock judging occurred at this site.

relevant micro-organism only fell under this description. This aspect of the decision was also the basis of criticism by a working party of the World Council of Churches:

> The U.S. Supreme Court decision on patenting of life forms rested upon a specific, highly reductive conception of life, which sought to remove any distinction between living and nonliving matter that could serve as an obstacle to the patenting of living but unnatural organisms (34).

It cart be argued that it would be inappropriate for society to adopt a policy advocating a materialistic conception of life. It is true that all material objects, including human beings, are compositions of matter, even if they are much more than that. The Court, however, was required to regard living organisms as such compositions for purposes of patenting them; that is, they saw their material composition as the crucial statutory factor, as opposed to other factors that are not part of the patent statute (e.g., their changing nature, ability to reproduce, etc.) (21).

A second, separate argument is raised in the following passage:

> The combining of human genetic traits with animals, with the results to be patented and owned, raises unique moral, ethical, and theological questions, such as the sanctity of human worth, which must be examined (25).

One example is the introduction of genes for human growth hormone into farm animals to produce more rapid rates of growth. **The sanctity of human worth is a fundamental moral principle of society, standing behind society's beliefs, for example, that humans cannot be killed or mistreated and are entitled to freedom from enslavement.** A sanctity of human worth principle seems to encompass at least the following two elements:

. the life of the entity in question is of sufficient value that it can be taken only in the most extreme circumstances (e.g., self-defense); and
• the individual is free to act as it desires, for it should not be treated as a mere means for others to attain their ends.

By using animals for food, most of society ascribes less significance to the lives of animals than to humans. By allowing animals to be owned by humans who can raise them for use as food, for breeding, as a source of various byproducts (e.g., wool), as objects to be entered into competitions, or as pets, most of society demonstrates that it is sometimes or often willing to treat animals as means to human ends while also insisting that unnecessary animal suffering be eliminated. Overall, as currently constituted, society appears able and willing to distinguish between human and other animal life.

, Does recombinant DNA technology break down barriers between human and other animal life? If it were possible (and it is neither possible now nor likely possible in the foreseeable future) to genetically alter animals so they had more of those capacities and features (e.g., the capacity to form moral judgments or the capacity to experience the beautiful and the sublime) seen as distinctive to humans, then society could face difficult ethical questions as to how these creatures should be treated and as to whether a sharp distinction between humans and other animals can be maintained. At present, these issues do not appear to be raised by any of the genetic alterations of animals that will likely be produced in the foreseeable future (see ch. 6). Still, rapid advances in genetics have fostered debate regarding a most sensitive issue--could human beings be patented? Although no attempts have been made to test this issue, PTO has publicly stated that living matter must be nonhuman in order to be patentable subject matter, and the House of Representatives has passed a bill prohibiting the patenting of human beings (H.R. 4970, 100th Congress).

Another set of interconnected arguments centers on humanity's control over nature, its responsibility toward nature, and the need to preserve individual animals and protect species integrity. These lines of reasoning are central issues of metaphysical and theological disquiet about patenting animals, and are reflected in the following:

> When the National Council of Churches has issued this statement of concern, it comes from the background of Judeo-Christian thinking about how we relate to the natural environment. In a nutshell that background says that we have a responsibility for preserving the integrity of the creation, and for working with it in order to preserve its intrinsic values. . . the doctrine of trust in legal parlance is synonymous to what we are talking about theologically or religiously when we think about the relationship of the creation to humanity. The Judeo-Christian view says that the creation is, in essence, held in trust; there are limitations on what we can do. We have a responsibility to see that its integrity is preserved. This background has led to legislation such as endangered species laws, animal welfare laws, [and] laws regarding environmental quality (15).

Although this reflects one viewpoint, others argue that a traditional Judeo-Christian image is that of man's dominion over nature (24). Calvin, for example, repeatedly commented on the fact that God created all things for man's sake. **It is in recent years that the theme of stewardship over nature emerged as an idea of increasing importance.** The traditional concept of a steward or trustee is the idea of a person who manages property for the benefit of other persons (present and future) who are its owners. The traditional concept of stewardship or trusteeship suggests that property held in trust can be radically transformed by trustees if it serves the best interest of its human owners, present and future. One humanistic notion of stewardship--one sufficient to defend environmental protection statutes and perhaps endangered species laws (23)—is the concept that humans must treat the property they own as a trust for those human beings who will follow in future generations. The Judeo-Christian view of stewardship of creation is not management of property for other persons; rather, that all creation

belongs to God, and is to be managed with that in mind. Opinions vary as to degree of management, from a reverential view that seeks to avoid consumptive use to a position that endorses responsible use of the earth's resources for human ends (4), Religious notions view stewardship as a way to thank the Creator (22).

Some have reinforced these theological considerations by appealing to the metaphysical concept of the "telos" (nature) of animals (26). Some opponents of animal patents claim that animals have a right to have their "telos" respected, and that patenting of transgenic animals is immoral because it sanctions an immoral violation of this right to an inviolable "telos."

One group of ethicists, environmentalists, animal rights advocates, and theologians met in April 1988 to urge a moratorium on the patenting of animals as "a matter of deep philosophical and spiritual concern." The group issued a statement addressing genetic engineering and the patenting of animals (box 8-A).

Patenting Involves inappropriate Treatment of Animals

In the current debate surrounding patenting animals, the animal welfare community has assumed a leadership role opposing such patenting. Several members of this community have presented a number of arguments in testimony before Congress. This section considers three of these arguments.

Argument One

Developing transgenic animals, encouraged by patenting, will lead to more animal suffering than changes produced through selective breeding and crossbreeding.

Some advocates of this point of view claim that genetic engineering, unlike traditional breeding practices, permits the rapid exchange of genes between unrelated species, resulting in experiments with unpredictable results and increased suffering by animals (16). This argument appeals to an ethical claim that animal suffering is wrong and should be avoided. It is an argument that is consonant with most moral views about animals.

The present body of knowledge describes a diversity of attitudes towards animal suffering (30). Cartesian (followers of the French mathematician and philosopher, René Descartes, 1596-1650) have been least sympathetic to any concern about such suffering. Thomas Aquinas and Immanuel Kant viewed the ethical significance of humaneness toward animals as due to the way in which it encourages humans not to be cruel to each other. The Benthamite tradition (after the English philosopher Jeremy Bentham, 1748-1832), however, sees animal suffering and human suffering as morally similar to each other. Some contemporary Benthamites allow for significant differences in degree. Finally, some contemporary thinkers have advanced the idea that animals have a presumptive right not to be harmed (25).

Despite the range of opinions, recent Federal legislation (including the Animal Welfare Act of 1985) and regulations (including the 1985 Public Health Service policy) covering animal research indicate that U.S. society accepts the idea that animal suffering has ethical significance and that inhumane treatment of animals should be avoided. These actions mandate costly improvements in animal care, and thus, likely indicate that society accepts that human interests do not always outweigh animal interests. Nevertheless, the fact that the conduct of the research per se is not regulated, except for rules covering anesthetizing animals, could be interpreted as meaning that our society believes that human interests, on balance, take precedence over animal interests. Thus, arguments regarding animal suffering could be evaluated in light of current Federal policy, keeping in mind that those who ascribe even greater ethical significance to animal suffering will continue to be troubled, While current regulatory mechanisms protect some animals against inhumane treatment in the research that patenting will encourage, not all animals are treated equally. The Animal Welfare Act, for example, does not apply to rodents, birds, and farm animals intended for use as food or livestock (30). The Public Health Service regulations apply only to federally funded research (30). Thus, Federal coverage of animal welfare is arguably incomplete. One observer points out:

Box 8-A-Statement, Consultation on Respect for Life and the Environment

On Ethics and Theology

We affirm that humanity and all of nature live in a relationship of mutuality and interaction in covenant with the Creator.

We recognize that the human species is not in right relationship with the rest of creation; and that our transgression lies in our continued abuse of the creation and our desire to remake it in our own image as a means of satisfying exclusively human ends. Redemption includes not only personal salvation but also the restoration of the natural world and establishment of a relationship that will protect the integrity of creation,

The ethical, environmental, socioeconomic and theological ramifications of genetic engineering and patenting of life are profound. They point to the probability that the integrity and future of creation will be placed in even greater jeopardy if our power over the genes of life is not exercised prudently and with reverence to help to restore the covenant: to heal the Earth and ourselves,

On the Patenting of Animals

We urge that a moratorium should be declared on the patenting of animals.

1. The 1987 ruling by the U.S. Patent Office made possible the patenting of genetically altered animal life forms. This decision is a matter of deep philosophical and spiritual concern. It portends fundamental changes in the public's perception of, and attitude towards animals, which would be regarded as human creations, inventions, and commodities, rather than as God's creation and subjects of nature.

2. The decision was hasty, preempting the necessary debate. There was not a sufficient number of public hearings, the concerns found in some of the reports (such as those from the National Council of Churches and the Humane Society of the United States) were not adequately addressed, and the relevance of philosophical and ethical considerations was not weighed sufficiently.

Matters needing sustained public debate include: the current practice of combining human with nonhuman genetic material, unknown risks to human life, the probable suffering of the animals in question, provision for their humane care, the risk of adverse environmental impacts, and the possibility of deleterious economic and social effects on farmers and consumers worldwide.

New Creation Institute
Missoula, MT

National Council of Churches
New York, NY

International Network for Religion and Animals
Silver Spring, MD

Foundation on Economic Trends
Washington, DC

Department of Environmental Justice and Survival
United Methodist Board of Church & Society
Washington, DC

Center for the Respect of Life and the Environment
The Humane Society of the United States
Washington, DC

Presbyterian Church (USA)
New York, NY

> The ethical issues related to interspecies gene transfers or the patenting of animals will probably be clarified if they are distinguished analytically from the animal welfare question . . . Further, the goal of securing more humane treatment can be, and is being, approached directly through such means as legislation and regulations . . . (33).

Some have suggested that genetic engineering of farm animals could minimize animal suffering by engineering disease-resistant traits into farm animals (17). An example of this would be the attempt to engineer chickens to be resistant to the avian leukosis virus. However, it is not yet apparent whether patents will result in increased animal suffering. Although the first patent (U.S. 4,736,866) was seen by many as an aid to cancer research, the mammals which are the subject matter of that patent are designed to be genetically engineered to more easily develop cancer. One view centers on the possibility that more animals will be subjected to induced cancer. An opposing view is that fewer animals will be needed, since fewer genetically engineered (and hence, patentable) animals will be needed in order to achieve statistically significant

research results previously obtained by using nonpatented mice.

Argument Two

Patenting reflects an inappropriate sense of human control over animal life and an underestimation of the value of nonhuman life.

Argument Three

Patenting animal life is the first step towards a decline in the belief in the sanctity and dignity of life.

Unlike the first argument, which appeals only to the ethical claim that animal suffering is wrong and should be avoided, the second and third arguments appeal to the inherent respect or sanctity of every unique being. Under this viewpoint, patenting of animals reflects a human arrogance toward other living creatures and ignores the spiritual interconnectedness of all life (16). Supporters of this view generally ascribe great value to every creature's continued existence and flourishing. Opponents of this viewpoint argue that a society that generally uses animals for food cannot be viewed as committed to a belief in the inherent sanctity of every unique being, or that an overriding moral imperative (e.g., fighting hunger, disease) requires the use of animals in a manner which permits patenting.

Opposition to Patenting From an International Perspective

Several opponents of patenting animals have raised concerns that draw upon the observation that U.S. decisions about patents must be seen in global perspective. This section examines two concerns arising from this perspective: the argument that patenting of transgenic animals must be wrong because so many countries have explicitly banned the patenting of new types of animals; and the argument that patenting will only exacerbate the problem of inequality between developed countries and developing countries, Each concern is examined separately.

Opponents of patenting note that most countries in the developed world do not permit animal patents, especially members of the European Patent Convention (EPC) (see ch. 10). This argument could have some ethical significance in debating the argument that patenting is required to maintain American competitiveness. Those opposing this argument note:

- the present lack of certainty as to how many countries would permit such patents,
- that other countries have not yet fully debated the subject of animal patenting, and
- that ethical issues are not defined nor settled by counting how many countries do or do not allow a particular practice.

For example, a practice accepted by many countries even for a long period of time (e.g., slavery) may nevertheless be profoundly immoral, while a practice rejected by many countries even for a long period of time (e.g., divorce) may nevertheless be morally acceptable. Still, there is some force to the argument, and this suggests that the basis of widespread legal prohibition on the patenting of animals should be examined to analyze the deliberations of countries that have banned the practice. At present, however, ethical lessons from international consideration of the issue are inconclusive because of uncertainties about the extent and basis of international opposition.

The second ethical concern raised pertains to whether patenting animals is inappropriate because of potential adverse economic implications for the Third World. For example:

> One (issue) is applying high technologies like agricultural biotechnology to countries that might not be able to afford them-or the social and economic consequences they spawn. The genes of high-tech agriculture lodged in every new crop variety or livestock breed can carry with them high capital and extensive infrastructure costs . . . Secondly, there are questions of access. If, for reasons of competitiveness, we begin to hoard scientific advances for commercial and/or political reasons, and only make such discoveries and developments available for a price, that can only breed mistrust and anger and invite charges of technological imperialism from other nations (10).

This argument has both a consequentialist component (patenting and the biotechnology it encourages will lead to bad results for underdeveloped countries) and an equity component (it is unfair for more

developed countries to imperialistically exploit less developed countries through biotechnology and its patenting). Difficult ethical and factual issues are raised by such claims. For example, some proponents of animal patenting claim that many of the potential results of animal patents (e.g., new vaccines, disease resistant animals) will more benefit developing nations than developed nations. Further, no consensus exists regarding a well-developed or generally accepted theory of justice for the international context, one that would enable evaluation of the ethical aspects of the relations between the developed and developing worlds. And despite concerns, the Patent and Trademark Office is probably not the most appropriate place to structure a morally appropriate program for the international economic order. At the least, such a measure lacks precedent.

Patenting Promotes Environmentally Unsound Policies

The development of transgenic animals encouraged by a system of patenting is also a concern of some opponents of animal patents. Two different environmental issues have been raised in connection with patenting animals,

The first concerns the environmental impact of releasing transgenic animals into the wild. Some believe that the encouragement offered by patenting should be withheld at least until better environmental protection laws are passed. The question of possible environmental impacts of genetically engineered organisms has been examined by OTA elsewhere in detail (31). While potential problems could arise, adequate review offers a high likelihood of preventing or preempting such problems. Furthermore, nothing now being pursued seems likely to result in any environmental problem that would be unique to transgenic animals, widespread, or difficult to control. Indeed, it has not been demonstrated that patenting animals is at all likely to increase the probability of an environmental problem. It is possible, however, that as the technology advances, applications of engineered organisms may emerge that could carry a higher probability of producing an environmental problem than anything now contemplated. If and when such a situation develops, appropriate regulatory or legislative remedies could be applied.

A second argument has been raised by some, that biotechnology developments fostered by a system of patenting (including transgenic animals) could lead to a dangerous decline in the genetic diversity of important animal populations (8). On the other hand many argue that increased diversity could be a result of biotechnological advancements (9).

Patenting Produces Excessive Burdens on American Agriculture

America's agricultural community is divided over the question of the patenting of transgenic animals. What are the arguments used by the opponents of patenting within the agricultural community and what are their ethical, theological, or philosophical dimensions? Three prominent arguments include:

1. animal patents will result in increased costs to consumers as producers are forced to pay royalties to the owner of animal patents;
2. animal patents will result in an unfortunate concentration in the production of animals as small farmers are forced out by the high costs of the royalties; and
3. patent holders will reap unfair benefits from their royalties as they obtain royalties on the succeeding generations of the patented animals when they reproduce themselves.

In the case of increased costs to consumers, three ethical components can be identified: unfavorable consequences of consumers having to pay more for their food; the injustice of consumers transferring wealth to the more affluent corporations; and the injustice of a few corporations controlling the food supply. These arguments rely upon an economic assessment of the impact of patented animals on consumer prices (see ch. 6). If food costs increase because of animal patents, then this line of reasoning could be important. Defenders of patenting argue that economic evidence indicates that costs do not rise due to patents and that even if costs did rise, they would reflect added value being voluntarily chosen by consumers. The arguments of increased consolidation within the agricultural industry is similarly rooted in economics. Because no consensus exists about the positive or negative impact industry concentration has had on agriculture, it is difficult to judge the ethical consequences of such concentration.

The third argument raised is, however, unique. It challenges the legitimacy of animal patents on the grounds that self-reproducing animals should not be patented, because breeders would unfairly have to pay a fee each time the patented animal they purchased reproduces. At present it is unclear whether patent rights are enforceable over future generations (see ch. 7), although some would argue that there is something unfair about patent rights being enforceable over future generations and about the royalty fee covering future breeding rights. Some proponents of patenting, however, claim that farmers will make an economic judgment on whether the patented animal is preferable to the unpatented animal.

SUMMARY

Arguments with ethical components for and against the patenting of animals have been summarized. There are significant consequentialist arguments for allowing such patenting. They are balanced by consequentialist concerns about the effects that could occur if animals are patented. Because they are based on factual assertions that have yet to be proven, these consequentialist arguments are speculative. Other arguments based on philosophical, metaphysical, and theological considerations are likewise difficult to evaluate since they usually require the assumption of certain presuppositions that may not be shared by other persons. Such arguments are not likely to be reconciled between persons holding opposing and often strongly held beliefs.

Most consequentialist arguments that have been raised both for and against the patenting of animals concern issues that would be materially unchanged whether patents are permitted or not, since most arguments center on issues that existed prior to the current patenting debate (e.g. animal rights, the effect of high technology on American agriculture, the distribution of wealth, international competitiveness, the release of novel organisms into the environment). **It is unclear that patenting per se would substantially redirect the way society uses or relates to animals. Some argue that this uncertainty supports the notion of a moratorium or prohibition of animal patenting. Others argue that any practical and consequentialist concerns raised by the patenting of animals can be addressed by** appropriate regulations or possibly statutes, rather than by amendments to patent law.

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