

universal (96 percent) to hear on rounds a question that takes the form, "How often is such-and-such associated with so-and-so?" Occasionally (22 percent), there are data mandating a specific answer to such a question, but usually (74 percent), the reply must be qualified to the case at hand. Sometimes (36 percent) the question is asked skeptically, in criticism of an otherwise likely (86 percent) diagnosis ("But how often do you see . . . ?"). If I am convinced that the expected (74 percent) diagnosis is indeed most likely (83 percent), my favorite reply is "It's rare but not uncommon!" (7 percent).

ROBERT GREENWALD, M.D.
Long Island Jewish
Medical Center

New Hyde Park, NY 11042

The above letters were referred to the authors of the article in question, who offer the following reply:

To the Editor: Axelrod and Nakao's study and that of Roberts and Gupta make welcome additions to the list of references that correspondents have kindly sent us since our paper appeared. The emphasis by Axelrod and Nakao on variation among individuals suggests to us the great need for and value of codification, though not for less use of numbers. In a future study, we hope also to assess the variation in usage that individuals regard as reasonable — for example, Dr. Jones may regard 0 to 5 percent as a reasonable range for the use of "rarely," but 20 percent as unreasonable. Roberts and Gupta add to our information about group differences.

Vaisnys, like Axelrod and Nakao, urges the use of numbers rather than qualitative expressions in medical contexts. We do, too. Nevertheless, even with solid numbers, we find many occasions for using qualitative expressions. Greenwald's amusing illustrative conversation shows a variety of usages that could benefit from a codification. At the same time, some casual usages may not be worth trying to quantify, and some events may be so poorly defined that making their probability more precise is fruitless. Codification would not replace the use of numbers, but would offer a supplementary tool for the medical or other scientist.

The danger that a quantitative codification of probabilistic expressions might reduce the use of numbers is, we think, balanced by the possibility that codification would heighten awareness of the need for numeric meaning for these expressions. This additional sensitivity might make the use of numbers more, rather than less, frequent.

AUGUSTINE KONG, A.M.
FREDERICK MOSTELLER, Ph.D.
CLEO YOUTZ, M.S.
Harvard University

Cambridge, MA 02138

G. OCTO BARNETT, M.D.
Massachusetts General Hospital

Boston, MA 02114

THE CASE FOR THE USE OF ANIMALS IN BIOMEDICAL RESEARCH

To the Editor: Professor Cohen's entire argument (Oct. 2 issue)* seems to be based on three premises: that humans are moral agents, that no nonhuman animals are moral agents, and that only moral agents have any rights. Nothing even vaguely resembling objective scientific evidence was offered to support any of these premises. To support the first premise he cited seven references, all of which were philosophical or religious in nature, with not one scientific paper among them. Such references are of interest as opinions, but they carry no weight as scientific evidence. What does the scientific evidence show?

The evidence shows that human hearts, brains, and kidneys all evolved through a long history of nonhuman ancestry. Nonhuman animals that are our contemporaries have hearts, brains, and kid-

neys very much like our own. The same can be said for any human organ and for all the physiologic processes in which our organs are involved. In fact, animals are of value in biomedical research only because their organs and physiologic processes are like our own. The anatomical and physiologic differences between humans and other animals represent only minor differences in details. One cannot name even one organ or one physiologic process that is unique to humankind.

Recent research in the relatively new science of ethology is showing that all kinds of human behavior also evolved from nonhuman ancestors and have behavioral counterparts in contemporary nonhuman animals. This is particularly true of social behavior, and morality is one of our social behaviors. Baboons, wolves, and various other species show social behavior that has striking similarities to that in primitive human societies.

If, as Cohen contends, humans have some unique thing that makes them moral agents, and no other species are moral agents, then what is the source of this unique characteristic? It could not have evolved, because if it did, then this same quality should be found to some extent in those species that share with us a common ancestor. But Cohen says that no nonhuman animal has this quality. Does he believe that moral behavior appeared spontaneously sometime in the very recent history of our species? If so, this spontaneity is a phenomenon that has no parallels in nature.

If humans have any fully developed organ, characteristic, or quality that does not exist in any other species, then the only explanation for it would be special divine creation.

BOB TRUETT
Birmingham, AL 35223

The Birmingham Zoo

To the Editor: Although Professor Cohen is to be commended for his thorough treatment of the animal-use issue, I would like to suggest a different approach to the nature of rights. The philosophical argument that capacity for moral judgment is necessary for entitlement to rights could be viewed by some as merely a rationalization and the special exception for the mentally dysfunctional as a further weakness. The case for animal use is stronger when it is based on consideration of the sources of rights instead of their recipients.

The legal and moral sources mentioned by Cohen may be viewed as constituting one source: society. In any society, rights are conferred or denied as the society sees fit within its moral framework. Consideration of moral capacities is not required, and since the distinction between "rights due" and "treatment due" is easily blurred, it is entirely possible for a society to confer rights on the unborn, comatose persons, or lower animals. The cultural variations are large, ranging from sacred status for cattle to denial of all rights for slaves or women.

Often, potentially embarrassing decisions are indeed rationalized after the fact. Kings had divine rights and black slaves had no souls because of political and economic expediency, not considerations of moral capacity. Can we avoid even the appearances of such rationalizations when we discuss rights?

Through simple awareness that society itself is the source of the rights within it, we can take care that such rights reflect the goals and values of the society, not those of zealots or demagogues. Freely discussing these goals and values during the decision-making process eliminates the need for later rationalization, and special cases are seen as uniform applications of the same principles to differing circumstances.

Currently, our society depends on animal research to achieve two goals that it holds quite dear: human safety and freedom from disease. However, we value humane behavior and we are sufficiently advanced so that most research can be conducted with minimal pain to the animals. Thus, we accord animals the right to freedom from needless pain but not the right to self-determination. Undoubtedly, the rights of animals will expand as technology and understanding reduce our reliance on them, but we need not apologize for the higher value we place on humans.

ROBERT I. MASTA
Ann Arbor, MI 48109

University of Michigan

*Cohen C. The case for the use of animals in biomedical research. *N Engl J Med* 1986; 315:865-70.

To the Editor: As one involved in animal research, I concur with Professor Cohen in his defense of animal experimentation when he asserts that using animals for research purposes is not less reasonable than killing animals for other purposes. However, he also attempts to supply a philosophical justification for our practice and argues that it is not merely a fact that we humans use other living species for our advantage but, indeed, that we are entitled to do so. In my view, his argument that only humans have "rights" not only falls short but is distasteful in its anthropocentrism. Of course, one's position on this issue necessarily reflects one's individual beliefs, and — Cohen's references to saints and philosophers notwithstanding — the issue will remain unresolved for the collective.

Cohen comes closer to a clear appraisal of the real reasons we use animals for research when he speaks of the investigator's duty to "do to animals what the service of humans requires." That is, we do it when, in our own self-interest, we are able to. This has nothing to do with "rights" but rather with maximizing the advantages that we as a species have for competition in the environment. Similarly, we raise animals to slaughter for food, destroy forests for wood products, and eliminate natural habitats to make space for human expansion. In the recent past, the capacity to do these things has tremendously increased human comfort and prosperity, but I for one am uncomfortable arguing that humans have a unique "right" to comfort at the expense of the rest of the natural world.

The ethical dilemma resulting from our use (unprecedented in the history of the earth's species) of the resources around us is not easily resolved. However, the argument that what is good for humans is good for the universe is simply not acceptable. The pursuit of science offers a glimpse of the vast complexity of the natural order and also provides an opportunity for humility. I submit, Professor Cohen, that as a species we could use a bit more.

Seattle, WA 98115

TIMOTHY C. EVANS, M.D., PH.D.
807 N.E. 62nd St.

To the Editor: Professor Cohen mischaracterizes the current controversy over the use of animals in biomedical research. His principal points address a contrived situation in which the ethical choices are either to impose a nearly or completely total ban on animal research or to grant absolute freedom to scientists using animals. Many participants in the debate fail to share this black-and-white view of the issue. They instead seek moderate reform that would accord greater importance to the welfare of laboratory animals without substantially reducing the benefits animal research confers on others.

In his article, Cohen does suggest that human beings have an obligation to treat animals humanely, but he omits any definition of this obligation. Through developing principles governing specific aspects of research, professional and regulatory groups are now formulating standards and procedures to ensure that laboratory animals are treated humanely. The overall aim is not to halt all animal research but rather to refine experiments to minimize animal pain, suffering, and distress; to reduce the number of animals used; and to replace animals with insentient material.* These modifications are generally endorsed solely when they will not interfere with a protocol's scientific goal.

It is unfortunate that the search for moderate reform in animal research is so often ignored in favor of the more flamboyant arguments at either extreme. Most members of our society believe that there are morally important differences between humans and animals, but few would argue that these differences bestow on humans complete freedom in their treatment of animals. The real challenge lies in determining an ethically defensible intermediate position regarding our duties toward nonhuman animals.

Houston, TX 77030

REBECCA DRESSER, J.D.
Baylor College of Medicine

*Russell WMS, Burch RL. The principles of humane experimental technique. London: Methuen, 1959.

To the Editor: Professor Cohen denies animals membership in moral communities (and hence rights) because they lack some essential quality (call it X) conferring such membership. But if X is

not defined in a question-begging way, it will either be too narrow (and deny rights to some humans such as mentally retarded or comatose patients) or too broad (and give rights to some nonhumans such as chimpanzees).

Analogies with racism and sexism are not "atrocious." Women, blacks, and American Indians supposedly lacked some X and were denied rights, and the question is just begged more abstractly by saying that humans are the only kind of beings with rights. Women, blacks, American Indians, and retarded persons are just as much "kinds" as are chimpanzees. Defining kinds by species begs the exact question at issue.

Professor Cohen also somewhat misrepresents Professor Singer's position. It is not that animal suffering should count equally with that of humans but that animal suffering should count for something ("So it would not necessarily be speciesist to rank the value of different [animal] lives in some hierarchical order"¹). Second, the number of animals involved also counts. Put the two together and some experiments are unjustified.

Practically speaking, animals "count" when experiments are so poorly designed or carried out that researchers lose funding, as happened with Dr. Genarelli's research,² or when people can order 10, 100, or 1000 rabbits, pigs, or rhesus monkeys from an animal supply house and do anything they want with them, no matter how painful or stupid.

I do agree with Professor Cohen that it is easier to attack animal researchers than to look close to home. Probably as many animals suffer from irresponsible pet owners as from scientists, and it is easier to attack the (Hollywood-created) "mad scientist" than to confront the family next door who goes on vacation and leaves its dogs to fend for themselves. Nevertheless, Cohen's ad hominem point about critics not eating meat is hardly a reductio ad absurdum. Most of the people Cohen attacks are vegetarians. That most people think vegetarianism is eccentric or difficult is merely ad populum.

Having served for 10 years on an institutional review board reviewing 1200 protocols a year and for 10 months on a new animal-use committee, I know the latter position is much rougher. Nevertheless, the new animal committees say in effect that animals *do* count — without ceasing experimentation and without satisfying zealots on either side. I just wish someone would take my place.

GREGORY E. PENCE, PH.D.
The University of Alabama
in Birmingham

Birmingham, AL 35294

1. Singer P. Practical ethics. New York: Cambridge University Press, 1980: 90.
2. Culliton BJ. HHS halts animal experiment. Science 1985; 229:447-8.

To the Editor: Is it preferable to investigate human diseases by studying the problems themselves or by working on an animal model — quite possibly one of questionable validity? A vast amount of data from ongoing clinical and pathological studies of patients (which are collected anyway for the benefit of patients) are lost to adequate scientific evaluation because of the diversion of resources to experiments in animals. The futility of much of this work with animals can readily be seen by reviewing any large aggregation of abstracts of experimental biologic studies. All too frequently an answer is provided to a nonexistent question by an ill-conceived, badly executed, and improperly interpreted experiment that never results in a publication. Each year vast sums of public money and the efforts of numerous investigators are devoted to the mindless perpetuation of such activities on the basis of the highly dubious paradigm of "proving it in animals."

What is needed is better intellectual justification of the use of animals in biomedical research on a project-to-project basis. It should be demonstrable that the experiments are needed to answer a new and reasonable question, that the experiment is well designed and will be properly executed, and that the obligations of the experimenters to the rights of the animals will be observed. Furthermore, we need more vigorous support for the use of the ocean of clinicopathological data on humans that already inundates us. A

philosophy must be developed that values observation, analysis, and interpretation of existing biomedical information and materials more highly.

GROVER M. HUTCHINS, M.D.
Baltimore, MD 21205 The Johns Hopkins Medical Institutions

To the Editor: Dr. Cohen's article is disturbing in that he misses the essential point — namely, that we impose unnecessary suffering on animals. No amount of "logic" changes this.

I recognize, as do most animal advocates, the need to use animals in research. But I am enough of a realist about the human animal to want a detailed account of what happens in the laboratory and why.

PAUL BEARMON, M.D.
Minneapolis, MN 55419
5308 Humboldt Ave. S.

To the Editor: Bravo! Professor Cohen's carefully reasoned arguments are a welcome relief from the confused rhetoric of "animal-rights" activists, who condemn medical researchers for being insensitive to animals' needs but are curiously silent about the thousands who shoulder rod or rifle every year for a bit of "sport." I applaud Cohen's courage in voicing his conclusion that the use of animals in research is not only a necessity but an obligation.

R.W.J. FORD, M.D., PH.D.
Vancouver, BC V6H 3N1, Canada
Shaughnessy Hospital

To the Editor: Although Professor Cohen is probably correct in supposing that only humans can conceptualize rights, he is wrong in believing that one must be able to conceptualize rights in order to possess them. Rights are a human invention, but they are a function of consensus and power, not tangible, immutable moral entities. Rights can be granted or claimed by those with the power or potential power (by proxy) to do so. Infants have rights only to the extent that our society recognizes agents who can claim those rights by proxy. A human fetus does not possess the same rights now that it once did because of insufficient support from society — not because of any change in the fundamental nature of the fetus.

In our society, in spite of Cohen's statements to the contrary, certain animals do have rights that have been legislated by Public Health Service regulations, the Animal Welfare Act, and various state anticruelty acts. Animal-rights extremists would increase the scope of those rights to the level of equality with humans. Some extremists in the biomedical community would eliminate all animal rights. Most of us take positions somewhere in between. We use animals in research because we perceive potential suffering that can be prevented through the judicious use of animals. There is no cosmic right or wrong about this. It is a priority that we have set because we are in a position to do so. Most of our society has agreed that it is wrong to use humans in painful or life-threatening research and that when research must be done, it is preferable to use animals. But if it is wrong to use humans, it is not right to use animals — only preferable.

This is the root of the question of the propriety of using animals in research. It is the lesser of two evils. Research in animals should not be abandoned — it is important — but neither should it be taken for granted. It is our responsibility to see that every study using animals is exhaustively justified and humanely conducted in its every detail. There is ample room for improvement in the exercise of both.

R. BRENT SWENSON, D.V.M.
Stone Mountain, GA 30083
5235 Stone Trace

The above letters were referred to Professor Cohen, who offers the following reply:

To the Editor: My thoughtful critics deserve detailed replies, but space limitations unhappily preclude argument. Instead, I merely offer some suggestions about the directions in which continuing controversy might go.

To Bob Truett: Neither human evolution nor the likeness of some human behavior to that of animals is at issue. The moral differences between humans and animals remain very great; their source may be divine but need not be. In either case the consequences of this moral gap must be confronted.

To Robert Masta: Society, through legislatures and courts, may confer or recognize legal rights. Important moral rights are natural, not constructed, and possessed by humans but not by animals — whatever "society" may say or do.

To Timothy Evans: The splendor of the natural order is undeniable; what is "good for the universe" is very difficult to determine; and humility is a great virtue, with a human locus. Moral judgments do surely reflect beliefs, but one's beliefs may or may not be rationally grounded.

To Rebecca Dresser: To minimize animal pain and distress is a most worthy enterprise. In pursuit of it, as we seek to determine the limits of the obligations owed to animals, it remains very important to understand why those obligations are not based on claims of right and why the denial of the moral differences among species is a serious error.

To Gregory Pence: The quality and quantity of animal suffering does count; causing it does require justification. Nevertheless, the vegetarianism entailed by a coherent rejection of all animal uses in medicine is so far-reaching and would so stultify modern life as to be a true *reductio ad absurdum*.

To Grover Hutchins: Ill-conceived and badly executed experiments using animal models are properly condemned. But so great has been the value and so frequent the successful uses of animals in medical advances that to call the current defense of such uses their "mindless perpetuation" is not just.

To Paul Bearmon: We rightly seek to know how and why animals are used in the laboratory. Whether the suffering there imposed on animals is, in any given case, "unnecessary" is a serious question whose answer must not be assumed.

To R.W.J. Ford: That the use of animals in biomedical research is an obligation as well as a necessity is a point rightly emphasized; physician-investigators assume the duty not to refrain from doing what they can to relieve human misery and pain. Hunting for sport has no such justification; it is widely and rightly condemned.

To R. Brent Swenson: Rights are most certainly not "a human invention," nor is it true that we have rights "only to the extent that our society recognizes" them. The rights of slaves in chains or Jews in ovens were not "a function of consensus and power." Heaven protect us from such views! But we do have weighty obligations to animals, as I argued at length; we must ensure that our uses of them are justifiable and humane. That burden need not be feared.

To the hundreds of readers who have written to the *Journal* and me, I express heartfelt thanks and great respect for their love of animals.

CARL COHEN
Ann Arbor, MI 48109 University of Michigan Medical School

REASSURANCE REGARDING PROBLEMS ON PENNSYLVANIA AVENUE

To the Editor: The letter of Toltzis et al. (Sept. 25 issue)* may be a source of concern about radiation hazard among people who live with patients who have undergone testing using thallium-201. We used a custom-made whole-body counter to measure radioactivity in a woman participating in a nutritional-research project, after she had had a thallium stress test. Our value for the biologic half-life, based on seven measurements made 35 to 78 days after the test, was 13.4 days — in close agreement with the value given in the package insert accompanying the drug. The amount of radiation emitted from the thallium made it impossible to measure her potassium-40 radiation value accurately for 35 days.

The dose of radiation received by someone standing within arm's length of the patient for one week would be less than 0.2 μ Sv (1 Sv

*Toltzis RJ, Morton DJ, Gerson MC. Problems on Pennsylvania Avenue. *N Engl J Med* 1986; 315:836-7.