Biomedical Research and Animal Welfare: Traditional Viewpoints and Future Directions

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It has been twenty years since C.P. Snow first presented the concept of "The Two Cultures"; referring to the "culture" of scientists and the "culture" of literary intellectuals (mainly writers), Snow said (1969):

> *...constantly I felt I was moving among two groups — comparable in intelligence, identical in race, not grossly different in social origin, earning about the same incomes, who had almost ceased to communicate at all, who in intellectual, moral and psychological climate had so little in common...*

In some ways, "Two Cultures" goes far to characterize the current state of affairs surrounding those whose scientific endeavors involve the use of animals and those who oppose such use. On the other hand, Snow carefully drew attention to the errors of simply dividing people or ideas into two groups ("Two is a very dangerous number."), and it is indeed an oversimplification to do so in this discussion.

The Use of Animals in Research

Scientists began to employ the study of animals in the fields of physiology and medicine in a major way in the middle of the 19th century. Claude Bernard, the French physiologist, not only led this movement, but wrote about his perception of the issues in his *Experimental Medicine* (Bernard, 1927):

> *Have we the right to make experiments on animals and vivisect them? As for me, I think we have this right, wholly and absolutely. It would be strange indeed if we recognized man's right to make use of animals in every walk of life, for domestic service, for food, and then forbade him to make use of them in his own instruction in one of the sciences most useful to humanity. No hesitation is possible; the science of life can be established only through experiment, and we can save living beings from death only after sacrificing others. Experiments must be made either on man or on animals. Now I think that physicians already make too many dangerous experiments on man, before carefully studying them on animals. I do not admit that it is moral to try more or less dangerous or active remedies on patients in hospitals, without first experimenting with them on dogs; for I shall prove, further on, that results obtained on animals may all be conclusive for man when we know how to experiment properly. If it is immoral, then, to make an experiment on man when it is dangerous to him, even though the result may be useful to others, it is essentially moral to make experiments on an animal, even though painful and dangerous to him, if they may be useful to man. (Emphasis added).*

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This utilitarian argument succinctly states the general view of present-day society and most of its scientists. Note that in Bernard's opinion it was science itself which depended on experiments on animals. Louis Pasteur, Bernard's contemporary, studied animal species ranging from silkworms to sheep, but in his studies of rabies in dogs we catch a glimpse of the conflict between animal studies and his personal attitudes (Duclaux, 1920). Pasteur's colleague Roux, wrote:

> *...Pasteur, who had been obliged to sacrifice so many animals in the course of his beneficent studies, felt a veritable repugnance toward vivisection. He was present without too much squeamishness at simple operations such as a subcutaneous inoculation, and yet, if the animal cried a little, Pasteur immediately felt pity and lavished on the victim consolation and encouragement which would have been comical if it had not been touching. The thought that the skull of a dog was to be perforated was disagreeable to him; he desired intensely that the experiment should be made, but he dreaded to see it undertaken. I performed it one day in his absence; the next day, when I told him that the intracranial inoculation presented no difficulty, he was moved with pity for the dog: 'Poor beast! His brain is without doubt wounded. He must be paralyzed.' Without replying, I went below to look for the animal and had him brought into the laboratory. Pasteur did not love dogs; but when he saw this one full of life, ferreting curiously about everywhere, he showed the greatest satisfaction and straightway lavished upon him the kindest words. He felt an infinite liking for this dog which had so well endured trepanning, and thus had put to flight for the future all his scruples against it.*

While these two anecdotes from Bernard and Pasteur clearly do not describe the objectives of science, they do illustrate that scientists a century ago did at least have the same mixture of attitudes that exist today among scientists who believe that science in some part depends on the study of animals.

The Art of Scientific Investigation by W.I.B. Beveridge (1950), Cambridge University's distinguished veterinary pathologist, has been standard reading for graduate students for nearly 30 years. In it, Beveridge observes:

> *Science as we know it today may be said to date from the introduction of the experimental method during the Renaissance. Nevertheless, important as experimentation is in most branches of science, it is not appropriate to all types of research. It is not used, for instance, in descriptive biology, observational ecology or in most forms of clinical research in medicine. However, investigations of this latter type make use of many of the same principles. The main difference is that hypotheses are tested by the collection of information from phenomena which occur naturally instead of those that are made to take place under experimental conditions.*

It is against the background of these differences in approach that individual scientists try to make personal decisions as to the type of research they do. But in a sense, the decision whether to utilize animals is as much a function of the type or nature of the knowledge gained or needed as it is of personal choice. The popular American educator, John Holt (1970), wrote in his book, *What Do I Do on Monday?:*

> *This might be a good place to say, by the way, that the scientist or mathematician or thinker very rarely goes out collecting information or evidence just to see what turns up, but not caring what turns up. This is not what his "objectivity"—such as he has—consists of. He goes out there looking for something. The scientist is not indifferent. His objectivity consists of this, that when the evidence begins to show him that his hunch was no good, that what he was looking for is not there, he thinks, "So be it," and starts looking for or thinking about something else. He does not lie to himself or others about what the evidence is telling him.*

Thus even the best scientists may find their use of animals more dependent upon what it is they study than their own preferences.

Another scientific concern is the so-called numerical basis of testing hypotheses. A criticism of animal use in research is that seemingly vast numbers of animals are used when small numbers might suffice. Many scientists are guided in this by Lord Kelvin's hoary dictum, "When you can measure what you are speaking about and can express it in numbers you know something about it, but when you cannot measure it, when you cannot express it in numbers your knowledge is of a meager kind."

The outgrowth of this has been, in the medical and biological sciences, a reliance on statistical tests. I have neither the time nor the competence to address this aspect of science except to observe that if animals are to be studied at all, scientists believe that enough of them need to be studied to draw valid conclusions.

Today, the catch-phrase is the study of what are known as animal models. In a recent workshop sponsored by the Institute of Laboratory Animal Resources, the following definition of an animal model was offered (Wessler, 1976):

> *...a living organism with an inherited, naturally acquired, or induced pathological process that in one or more respects closely resembles the same phenomenon occurring in man. Animal models, in this sense, never provide final answers but offer only approximations, for no single animal model can ever duplicate a disease in man. Thus, animal models should not be expected to be ideal, nor to be universally suited to all foreseeable uses. On the other hand, for a model to be a good one, it must provide a new insight, have relevance to a particular problem and respond predictably.*

My only argument with this is that animal models are also used in the study of diseases or phenomena in other animal species, as well as in man.

I apologize for using so many quotations, but the methods of scientific research can often be best inferred from what scientists have done or written.

Animal Welfare Societies

Among the hundreds of local, regional, national, and international organizations concerned with animal welfare, objectives vary widely. Some are oriented toward all issues affecting one particular type of animal, such as primates, cats, whales, or wild horses. Others are concerned with single issues involving several species: vivisection, trapping, sealing or bullfighting. And many are involved with all issues and several species.

Just as it is difficult to determine who speaks for science, no one person or organization can speak for all animal welfare organizations. Some of these organizations oppose all animal use in scientific research, but surprisingly few fall into this category. In my opinion, there can be no reconciliation between these organizations and biomedical research interests: They must beg to differ.

I view the positions of the remaining majority of humane organizations as being along the following lines: Where animal studies can be justified by appropriate and controlled means, and where personnel and facilities genuinely appropriate to the proper conduct of such studies exist, and where the minimum number of animals can be legally acquired and most beneficially cared for, then such studies should go forward until scientifically acceptable nonanimal alternatives are available. In my opinion, this goal is shared by many scientists as well as nonscientists. Conflicts still arise in this middle ground, of course, mainly because of difficulties in defining words like "appropriate," "minimum," and "scientifically acceptable."

Two persons involved in establishing animal welfare organizations in the United States at about the same time Bernard and Pasteur were working in France were Henry Bergh and George T. Angell. Bergh established the New York-based American Society for the Prevention of Cruelty to Animals, while Angell was instrumental in establishing the Massachusetts Society for the Prevention of Cruelty to Animals, whose Angell Memorial Hospital now bears his name. Angell (1884) was involved in many of the leading issues of his day, including pure food and drug laws, working conditions, and of course, protection of animals. His views were, in my opinion, remarkably advanced. In 1891 in the magazine *Our Dumb Animals,* Angell wrote:

> *Our antivivisection friends have now been at work in Europe some twenty years, and in America some ten. What have they accomplished? In Continental Europe there has been an enormous increase of vivisection, and, so far as we can learn, not a single case ever prevented. In America the same. In England where some laws have been enacted, an enormous increase of vivisection.*
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> *When, in our good city of Boston, it is impossible, by the payment of $1000, to obtain evidence to prove a single case of the docking which is still practised (though, we are glad to say, not by our best citizens), how can humane societies expect to stop medical students, instructed to believe they are acting in the interests of medical progress, from performing vivisections? — or obtain any practical limitations of them unless they can win the approval and assistance of the best men of the medical profession?*
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> *And is there not great danger that in anathematizing the professors and teachers of our medical schools, and the men who largely lead that profession, they may arouse antagonisms which will do more harm than good?*
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> *It is not possible that our antivivisection friends, in their zeal to prevent suffering, have already aroused antagonisms which have tended to produce rather than repress the enormous increase of this practice?*
>
> *The world's history shows that very little can be gained by denouncing those who, without criminal intent, differ with us in view of right. Is there not a better way? We think there is. We believe there are lots of good and*

humane men in the medical profession who, if convinced, will go as far as any one to prevent unnecessary cruelty.

Conclusions

The positions of most animal welfare organizations and biomedical research organizations with respect to the use of animals are more similar than many would have us believe. If scientists will make an effort to discern among the many humane societies and join one or more whose stance they find near their own, and if humane organizations will accept such people and their knowledge into their decision-making processes, much can be accomplished. Until the fabric of American society is prepared to recognize or award (as the case may be) animal rights, the enlightened middle ground must prevail. I am reminded of a newspaper column by Ellen Goodman (1978) in the *Boston Globe:*

...people who are moderate politically are usually moderate psychologically. If they harbor a questionable true belief, it is in the power of reason. They are the interpreters and conciliators of the world, the people who project into the lives and minds of others. Their ability to see the other side of the story leaves them more vulnerable, even more confused.

Moderates tend to define their politics in terms of daily realities rather than abstract ideals. So when you pit an extremist against a moderate, you have a debate between an immovable force and a malleable object.

It's the true believers who persist against odds. But it's the others who often decide, as one put it, that 'trying to reason with irrational people is in itself irrational,' and they quit.

Maybe, though, instead of early retirement or medical leave they should just take a lesson in the immoderate pursuit of moderation. What we need now are some good, solid, dyed-in-the-wool moderates — sensible people with iron bladders.

I would like to conclude by proposing the establishment of what might be called a "Third Force" in dealing with issues related to the use of animals in research. There are hundreds of veterinarians who have acquired by training and experience special knowledge in the care of animals in the laboratory. Nearly 300 of them have subjected themselves to additional competency examinations by the American College of Laboratory Animal Medicine. These people are the ones who must deal daily with issues we have been discussing at this conference.

I know from personal experience that there is a community of interest between most of them and most animal welfare organizations. If these veterinarians and their scientist-colleagues whose research involves animal use could more regularly listen to and participate in animal welfare discussions like this one, a new era can begin.

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