

WellBeing International

WBI Studies Repository

2007

Overcoming Ideology: Why It Is Necessary to Create a Culture in Which the Ethical Review of Protocols Can Flourish

Bernard E. Rollin

Colorado State University

Follow this and additional works at: https://www.wellbeingintludiesrepository.org/acwp_arte



Part of the [Animal Experimentation and Research Commons](#), [Animal Studies Commons](#), and the [Design of Experiments and Sample Surveys Commons](#)

Recommended Citation

Rollin, B. E. (2007). Overcoming ideology: Why it is necessary to create a culture in which the ethical review of protocols can flourish. *ILAR journal*, 48(1), 47-53.

This material is brought to you for free and open access by WellBeing International. It has been accepted for inclusion by an authorized administrator of the WBI Studies Repository. For more information, please contact wbisr-info@wellbeingintl.org.



Overcoming Ideology: Why It Is Necessary to Create a Culture in Which the Ethical Review of Protocols Can Flourish¹

Bernard E. Rollin
Colorado State University

KEYWORDS

animal pain, science and ethics, scientific ideology, threats to science, value-free science

Introduction

My objective in this commentary² is to describe and discuss a major threat to the continued thriving of science in our society, which is all the more insidious because it is largely unrecognized by those in the scientific community who are in a position to rectify the problem. Astute people in that community are well aware of many threats to science that include but are not limited to the following: appalling public scientific illiteracy; the unfortunate resurgence of “magic thinking”—reflected in turn in the reappearance of Creationism, which is hostile to evolution—and the billions of dollars spent on evidentially baseless “alternative medicine”; the fact that more cryptozoology books are sold than all bioscience books; young students, particularly women, being unwilling to enter biomedical research out of fear of being compelled to “hurt animals”; and, as I have discussed elsewhere, ubiquitous iconic Frankensteinian imagery that informs public reactions to scientific advances in biotechnology. These latter issues are detailed in my book on the ethics of biotechnology (Rollin 1995). The one threat that I describe below—Scientific Ideology—has escaped serious mainstream attention.²

Personal Experience

I begin by relating in approximately chronological order a series of 10 shocking anecdotes whose unifying thread I then discuss. I ask readers to try and think through that thread before I explain it. I hope to elicit the shock of recognition from readers by following Plato’s dictum that when dealing with adults and ethics, one cannot teach, one can only remind.

Anecdote #1

In the late 1970s, virtually every veterinary school taught surgery by performing multiple survival procedures. At Colorado State University (CSU³), animals were used for practice surgery a minimum of eight times over 3 weeks to more than 20 times at some institutions. The intent of this practice was to save money. The ethical issues were never discussed, and the students did not dare to raise them until my 1978 ethics class at CSU, which later ended this odious practice.

In 1980, when I was well into teaching this ethics course at the veterinary school, I learned that the first laboratory exercise required of the students in the *third week* of their first year was to feed cream to a cat

and then, using ketamine hydrochloride (which is not an effective analgesic for visceral pain but instead serves to restrain the animal), perform exploratory abdominal surgery, ostensibly to see the transport of the cream through the intestinal villa. When I asked the teacher to explain the point of this experience (which horrified students because the animals vocalized and showed other signs of pain), he told me that it was designed to teach the students that they are in veterinary school and need to be tough, and that if they were “soft,” to get out early.

As late as the mid-1980s, and even into the current century, many veterinary and human medical schools used dogs as models of hemorrhagic shock, and students were *required* to participate. Although the CSU veterinary school abolished its shock laboratory in the early 1980s for ethical reasons, the department head who abolished the laboratory was defending the same practice 10 years later, after moving to another university, and explained to me that if he did not, his faculty would force him out.

In Charles LeBaron’s (1981) autobiographical book, *Gentle Vengeance: An Account of the First Year at Harvard Medical School*, which deals with an older student going through Harvard Medical School, the author remarks in passing that the only purpose for the dog laboratories that he and his peers could see was to assure the students’ divestiture of any shred of compassion that might have survived their premedical studies.

Anecdote #2

The first textbooks of veterinary anesthesia that were published in the United States (Lumb 1963; Lumb and Jones 1973) do not even mention felt pain, even as a reason for anesthesia, while they do list positioning the limbs, avoiding being hurt by the animal, and so forth. In addition, the American Physiological Society volume of 1982, in part designed to assure the public of science’s concern with animal pain, and titled *Animal Pain: Perception and Alleviation* (Kitchell and Erickson 1982), does not talk about perception or alleviation, but instead focuses on the “plumbing”—electrochemistry and physiology—of pain, with only one small reference to its alleged purpose in a paper by Lloyd Davis (Davis 1983).

Anecdote #3

In 1979, I attended a conference on animal pain convened by the Humane Society of the United States in Orlando, Florida, in which I debated a prominent scientist. I defended the view that animals could feel pain while he denied that claim. I thought we had enjoyed an amicable discussion until I returned to CSU, whereupon I learned that after the debate he had called the Dean of Veterinary Medicine and had told him that I was “a viper in the bosom of biomedicine” who should not be allowed to teach in a veterinary program!

Anecdote #4

In the early 1980s, I was actively involved in developing and pressing for the federal legislation for laboratory animals that was eventually adopted in 1985 (PL 99-198 1985). I was invited by the American Association for Laboratory Animal Science (AALAS3) to discuss my reasons for supporting legislative constraints on science on a panel with six eminent laboratory animal veterinarians. As a way to make my point, I asked them all to identify the analgesic of choice for a rat used in a limb-crush experiment, assuming that analgesia did not disrupt the results that were being studied. The consensus response was, in essence, “How should we know? We don’t even know for sure if animals feel pain!” Interestingly, 5 years later, after the laws passed, I telephoned one of those veterinarians, pointing out that as of now, he was *required* to know the answer to my question. He then rattled off five different analgesic regimens. I asked him, “You were agnostic 5 years ago, where did you get your information?” “From the drug

companies!” he said. Puzzled, I asked if they now worked on rat analgesia. “No,” he said, “but all human analgesics are tested on rats.” The point is that he knew this 5 years earlier, but did not then see it as relevant to rat pain!

Anecdote #5

Again, in the early 1980s, when significant progress had been made toward drafting the key concepts of proposed federal laboratory animal legislation, Colorado Representative Pat Schroeder committed her support of the proposal. We were told by congressional aides that we needed to provide clear evidence for the need for such law both because the medical research community was a major financial contributor to congressional campaign war-chests and because that same community claimed to be already controlling pain in research animals. In essence, I was charged with disproving their claim. I did so by performing a literature search on analgesia for laboratory animals or, indeed, any animals. My search revealed a *total* of two references, one of which noted that there should be papers on this issue, and one reporting that the current information was essentially confined to aspirin and morphine. If analgesia were indeed widely used, I told Congress, I would have been able to find a significant literature on its theory and practice.

Anecdote #6

In the mid-1980s, not long after passage of The Improved Standards for Laboratory Animals Act (PL 99-198 1985), I attended a lecture in which Robert Rissler, then-Chief of the US Department of Agriculture (USDA) Animal and Plant Inspection Service, spoke to a large group of people. When Dr. Rissler asked a staff member of the primatology branch of the American Psychological Association to help define “psychological well-being of primates,” he was told, “Don’t worry, there is no such thing.” To that, Dr. Rissler classically replied, “There will be after January 1, 1986, whether you people help me or not.”

Anecdote #7

For the American Veterinary Medical Association panel on pain, which Dean Hiram Kitchen convened in 1986 at the request of Congress, I was asked to write the prologue to the panel’s report. When I presented the prologue to the panel, I approvingly pointed out that according to the great *skeptical* philosopher David Hume, few things are as obvious as the fact that animals have thoughts and feelings, and that this point does not escape “even the most stupid.” A representative from National Institute of Mental Health stood up indignantly and declared, “If we are going to talk mysticism, I am leaving.” The individual left the meeting and did not return.

Anecdote #8

In approximately 1990, the then-Director of the National Institutes of Health (NIH³)—arguably the chief representative of biomedicine in the United States—was visiting his alma mater. While talking informally to a group of students, he was apparently unguarded in his remarks and did not realize that a student reporter for the school paper was present. His reply to the students’ questions about the ethical issues associated with genetic engineering was astonishing: “. . . though scientific advances like genetic engineering are always controversial, science should never be hampered by ethical considerations.”

Anecdote #9

In 2001, I was part of the World Health Organization group that was charged with setting guidelines for the use of antibiotics in animal feeds because their indiscriminate use was driving evolution of resistance to antimicrobials and endangering human health. I was asked to give the keynote speech and to define

the ethical dimensions of the issue. After delivering the speech, I asked for questions. One veterinarian who was in fact the US Food and Drug Administration (FDA³) staff member in charge of managing the issue leapt up and said to me, “I am offended!” “By what?” I asked. “By the presence of an ethics talk at a scientific conference. Ethics has nothing to do with this issue! It is strictly a scientific question!” Stifling an urge to respond angrily, I calmly said, “Let me show you that you are wrong. Suppose I give you an unlimited research budget to determine when to stop or curtail the use of antibiotics in feeds. We do the research and find out that current use levels kill (or sicken) one person in 500, 5000, 50,000, 500,000, or 5,000,000. Even when we know these data, they do not tell us when to discontinue such antibiotic use. That is an ethical decision!” The FDA employee was then quiet for the rest of the conference!

Anecdote #10

As written in the Talmud, “the last is the most beloved,” so I will conclude with one of my most beloved anecdotes. A few years before the creation of Dolly the cloned sheep was announced, I received a Saturday afternoon call from a research official at the Roslin Institute, asking me to chat about the ethics of “hypothetically” producing a cloned animal. I told him that there were two major concerns: whether cloning harms the animal, and whether it creates any social, ecological, or disease dangers. However, even more important than these legitimate concerns, I continued, was what I called “A Gresham’s Law for Ethics” (Rollin 1995). Recall that Gresham’s Law in economics asserts that “Bad money drives good money out of circulation.” In the same way, “Bad Ethics drives good ethics out of circulation.” So, for example, after World War I, German currency (the Deutschemark) was so inflated that it took a wheelbarrow full of them to buy a loaf of bread. In such an economy, rational people pay their outstanding debts with Deutschemarks, not with gold, which they hoard. So too in ethics, I continued. Any new technology, be it the computer or biotechnology, creates a vacuum in social ethical thought, and fear. “What effect will this have on our lives? Is it good or bad? What do we need to control?” If the scientists do not inaugurate rational discussion, that void will be filled by doomsayers with vested interest, such as antibiotechnology activist Jeremy Rifkin. “So,” I concluded, “that is your biggest worry. You must create an educated populace on cloning, and help them define the issues, or the public will be told that it “violates God’s will”—and how can you respond to that?”

My point was illustrated some years later, when the creation of Dolly was announced to a completely uninformed public. Time/Warner (CNN/Time 1997) conducted a survey 1 week after the announcement, and fully 75% of the US public affirmed that cloning “violated God’s will”!

Summary of Anecdotes

These anecdotes, I hope, establish a common universe of discourse for readers. All of these anecdotes illustrate the prevalence of what I call Scientific Ideology or, alternatively, The Common Sense of Science because at the time of each of these examples, it was as ubiquitous in science as ordinary common sense is in daily life.

Characteristics of Ideologies

Ideologies operate in many different areas—religious, political, sociological, economic, ethnic. Thus it is not surprising that an ideology would emerge with regard to science, which is, after all, the dominant way of knowing about the world in Western societies since the Renaissance.

Indeed, knowing has had a special place in the world since antiquity. Among the pre-Socratics—or *physikoi* as Aristotle called them—one sometimes needed to subordinate one’s life unquestioningly to the precepts of a society of knowers, as was the case with the Pythagoreans. The very first line of Aristotle’s *Metaphysics*—or First Philosophy—is “All men by nature desire to know.” Thus the very *telos* of humanity,

the “humanness” of humans, consists of exercising the cognitive functions that separate humans from all creation. Inevitably, the great knowers such as Aristotle, Bacon, Newton, and Einstein believed it necessary to articulate what separated legitimate empirical knowledge from spurious knowledge, to guard and defend that methodology from encroachment by false pretenders to knowledge.

Thus the ideology underlying modern (i.e., postmedieval) science has grown and evolved along with science itself. And a major—perhaps *the* major—component of that ideology is a strong positivistic tendency, still occurring today, to believe that real science must be based in—and only in—experience because the tribunal of experience is the objective, universal judge of what is really happening in the world.

If one asks most working scientists what separates science from religion, speculative metaphysics, or shamanistic world views, I believe that they would reply without hesitation that it is an emphasis on validating all claims through sense experience, observation, or experimental manipulation. This component of scientific ideology can be traced directly back to Newton, who proclaimed that he did not “feign hypotheses” (“*hypotheses non fingo*”) but operated directly from experience. The fact that Newton in fact *did* operate with nonobservable notions such as gravity or, more generally, action at a distance, and absolute space and time, did not stop him from issuing an ideological proclamation affirming that one should not do so. The Royal Society members apparently took him literally and actively gathered data for their commonplace books, fully expecting major scientific breakthroughs to emerge.

Logical Positivism

The insistence on experience as the bedrock for science continues from Newton to the twentieth century, when it reaches its most philosophical articulation in the reductive movement known as “logical positivism.” This movement was designed to excise the unverifiable from science and, in some of its forms, to axiomatize science so that its derivation from observations was transparent. A classic and profound example of the purpose of the excisive dimension of positivism can be found in Einstein’s rejection of Newton’s concepts of absolute space and time, on the grounds that such talk was untestable. Other examples of positivist targets were Bergson’s (and other biologists’) talk of life force (*élan vital*) as separating the living from the nonliving, or the embryologist Driesch’s postulation of “entelechies” to explain regeneration in starfish.

Although logical positivism took many subtly different and variegated forms, the message, as received by working scientists and passed on to students (including myself), was that proper science should not allow unverifiable statements. This was no doubt potentiated by A. J. Ayer, the British philosopher and logical positivist who wrote *Language, Truth, and Logic* (Ayer 1946). This book is easy to read, vastly popular (for a philosophy book), aggressively polemical in its defense of logical positivism, and still in print. The author is highly critical of wool-gathering, speculative metaphysics, and other soft and ungrounded ways of knowing. From the time of its publication and throughout the 20th century, the book was used in introductory philosophy courses, and it represented in many cases the only contact with philosophy that aspiring young scientists—or even senior scientists—enjoyed.

The positivist demand for empirical verification of all meaningful claims has represented a mainstay of scientific ideology from the time of Einstein to the present. Insofar as scientists thought at all in philosophical terms about what they were doing, they embraced the simple, but to them satisfying, positivism described above. Through it, one could clearly and in good conscience dismiss religious claims, metaphysical claims, or other speculative assertions not merely as false and irrelevant to science, but also as meaningless. Only an entity that could be verified (or falsified) empirically was meaningful. “In principle” meant “someday,” given technological progress. Thus although the statement “there are

intelligent inhabitants on Mars” could not in fact be verified or falsified in 1940, it was still meaningful because we could see how it could be verified (i.e. by building rocket ships and going to Mars to look). Such a statement stands in sharp contradistinction to the statement “There are intelligent beings in heaven” because however our technology is perfected, we do not even know what it would be like to visit heaven because it is considered to be a metaphysical, rather than a physical, place.

Relevance of Ethics

How closely does the preceding discussion relate to ethics? I believe that the relationship is very close. The philosopher Ludwig Wittgenstein, who greatly influenced the logical positivists, once remarked that if you take an inventory of all *facts* in the universe, you will not find it a *fact* that killing is wrong (Wittgenstein 1965). In other words, ethics is not part of the furniture of the scientific universe. You cannot, in principle, test the proposition that “killing is wrong.” It can neither be verified nor falsified. So in Wittgenstein’s view, ethical judgments are meaningless both empirically and scientifically. From this reasoning, the author concluded that ethics is outside the scope of science, as are all judgments regarding values rather than facts. The slogan that I in fact learned in my science courses in the 1960s, which has persisted to the present and is still being taught in too many places, is that “science is value free” in general and “ethics free” in particular. (I do not, of course, wish to suggest that the influence of positivism was the only reason for scientists’ denial of ethics and consciousness in their ideology, but it is a major and largely unrecognized influence.)

The denial in particular of the relevance of ethics to science was taught both explicitly and implicitly. One could find it stated explicitly in science textbooks. For example, in the late 1980s when I was researching a book on animal pain, I looked at basic biology texts, two of which a colleague and I actually used, ironically enough, in an honors biology course we team-taught for 25 years. In the course, we attempted to combine biology and the philosophical and ethical issues that it presupposed and generated. In the widely used Keeton and Gould (1986) textbook, for example, there is a statement in what one of my colleagues calls the “throat-clearing introduction,” wherein the authors pay lip service to scientific method, a bit of history, and other “soft” issues before discussing the parts of a cell and the Krebs cycle. In this introduction, the authors declare that “science cannot make value judgments . . . cannot make moral judgments” (p. 6). In the same vein, Mader (1987), in her popular biology text, asserts that “science does not make ethical or moral decisions” (p. 15). The conventional statement affirms that science at most provides society with *facts* relevant to making moral decisions, but never itself makes such decisions.

Additional Thoughts

I have argued that the logical positivism that informed scientific ideology’s rejection of the legitimacy of ethics dismissed moral discussion as empirically meaningless. That is not, however, the whole story. Positivist thinkers felt compelled to explain why intelligent people continued to make moral judgments and continued to argue about them. They explained the former by saying that when people make assertions such as “killing is wrong,” which seem to be statements about reality, they are in fact describing nothing. Rather, they are “emoting,” expressing their own revulsion at killing. “Killing is wrong” actually *expresses* “Killing, yuk!” rather than describing some state of affairs. And when we appear to debate about killing, we are not really arguing ethics (which one cannot do any more than you and I can debate whether we like or do not like pepperoni), but rather disputing each other’s facts. Therefore a debate over the alleged morality of capital punishment is my expressing revulsion at capital punishment while you express approval, and any debate we can engender is over such factual questions as whether or not capital punishment serves as a deterrent against murder.

It is therefore not surprising that when scientists were drawn into social discussions of ethical issues, they were every bit as emotional as their untutored opponents. It is because their ideology dictates that these issues *are nothing but emotional*, that the notion of rational ethics is an oxymoron, and that he who generates the most effective emotional response “wins.” Thus, for example, during the 1970s’ and -80s’ debates on the morality of animal research, scientists either totally ignored the issue or countered criticisms with emotional appeals to the health of children. For example, in one film titled “Will I Be All Right, Doctor?” (the question asked by a frightened child of a pediatrician), made by defenders of unrestricted research, the response was “Yes, if *they* leave us alone to do what we want with animals.” So appallingly and unabashedly emotional and mawkish was the film that when it was premiered at the AALAS meetings at a subsection gathering of laboratory animal veterinarians—a putatively sympathetic audience—the only comment from the audience was from a veterinarian, who affirmed that he was “ashamed to be associated with a film that is pitched lower than the worst antivivisectionist clap-trap!”

Other advertisements placed by the research community affirmed that 90% of the animals used in research were mice and rats, animals that “people kill in their kitchens anyway.” At times, questions raised about animal use elicited the reply that “animal use is not an ethical question, it is a scientific necessity”—as if it cannot be, and is not, both.

Scientific Ideology

My premise, then, is that an ideologically ubiquitous denial of the relevance to science of values in general and ethics in particular created blinders among scientists to issues of major concern to society. An additional major component of scientific ideology that harmonized perfectly with the value-free dictum was the positivistic/behavioristic thesis that science could not legitimately talk about consciousness or subjective experiences. That thesis led to a question about their existence. (John Watson, the founder of Behaviorism, came close to saying that we do not have thoughts, we only think we do!) These two mutually reinforcing components of scientific ideology, taken together, have caused incalculable damage to science, society, and objects of moral concern in science’s failure to engage ethical issues. The preceding anecdotes exemplify some of the ways that animals have suffered.

The second component of scientific ideology, which affirms that scientists should be agnostic about subjective states in people and animals, led to the denial of the scientific reality of pain that in turn ramified in events such as the following: open heart surgery performed on neonatal humans until the late 1980s using paralytic drugs, not anesthetics; failure to provide adequate analgesia to all human patients, as recounted in Marks and Sacher’s famous journal article (Marks and Sacher 1973); and failure to control animal pain in research at the expense of both animals and science. A healthy dose of philosophy of mind (as well as legislation) was needed to even begin to correct this situation, which has hurt not only innocent creatures but also science itself by a failure to control pain and stress variables. All such related events ramified in the practice of both human and veterinary medicine in major neglect of pain control (Chapter 9 of Rollin 2006 is devoted to this neglect).

In the area of human research, the abuses of humans have been legion, from the Tuskegee studies, to the recent death of Jesse Gelsinger, to the radiation studies performed by the Department of Energy, to the release of microbes in subway systems, to Willowbrook, and more. And the results for science have been equally pernicious: the federal imposition of draconian rules for researchers; rules that change with political correctness (e.g., allowing pregnant women to serve as research subjects; a flurry about what to call Indians when they are the subjects of research [the government insisted on “Native Americans” until they actually *asked* the Indians]; and requesting that alcoholics be on committees evaluating study of alcoholics). The net effect is that researchers view these rules as bureaucratic hoops to jump through with

absolutely no grasp of the ethical issues, further creating hostility toward the proper performance of human research!

I contend that a good part of the reason that society has moved from 1950s optimistic, naive Buck Rogers, Jetsonian adoration of a science-shaped future to the current wholesale skepticism about science is the Gresham's Law for Ethics described above (see Anecdote #10). Such skepticism is evidenced in movements like alternative medicine, neofundamentalist anti-Darwinism, rejection of stem cell technology, and especially in Europe, the large-scale rejection of biotechnology. Without scientists to articulate the dangers and moral issues raised by science, opportunists such as theologians, Rifkins (also in Anecdote #10), and Luddites will leap into the breach and fill the gap with lurid, uninformed, but highly marketable pseudoethical issues, as we saw in the Dolly case. Unless science begins to engage ethics in serious ways, the forces of irrationality and anti-intellectualism (which threaten all societies) will prevail. George Gaskell has revealingly documented that Europeans reject biotechnological modalities for reasons of moral concern, not out of fear as is widely believed (Gaskell 1997).

Summary and Concluding Thoughts

I believe that there is only one way to resolve the malignancy described above—through education of a new generation of scientists who will have been trained to think of ethics and science together. Only education can displace, uproot, and supplant ideology. When I participated in the work of drafting the federal laws for laboratory animals, it was not to create a regulatory bureaucracy or, as I described it then, to put “a cop in every lab.” I am enough of a 1960s product to realize the lesson I learned from Martin Luther King and Lyndon Johnson: Just because we may have too many laws in some areas does not mean that we have enough in others! We drafted our laws the way Wittgenstein saw his philosophy—as a ladder to reach a higher plane, which later can be discarded. Just as King envisioned a generation possessed of racial tolerance and not needing marshals or paratroopers to escort children to school, so I see the animal welfare laws as forcing animal researchers to reflect in ethical terms so that eventually the laws will not be needed. The progress to date is measurable: From two meager papers on animal pain that I found in 1982, the literature has grown to between 5 and 10 thousand in 20 years! And of course institutional animal care and use committees routinely discuss ethical issues.

This ideology that separates science and ethics is definitely not as ubiquitous as it was 20 years ago. A number of additional positive signs indicate that the hold of the Scientific Ideology described above is diminishing. These signs include Public Health Service policy principles; the most recent edition of the *Guide for the Care and Use of Laboratory Animals* (NRC 1996), which includes a strong recommendation for environmental enrichment; the USDA's undertaking to regulate control of research animal distress; increasing numbers of articles on ethics, paradigmatically illustrated by the 1999 *ILAR Journal* issue titled *Bioethics of Laboratory Animal Research* (McCarthy 1999); and numerous biomedical journals that have adopted policies for the ethical use of research animals (e.g., *Journal of Bone and Joint Surgery* and *Veterinary Comparative Orthopedics and Traumatology*). Many journals will not publish foreign manuscripts that have not undergone an ethics review.

Nevertheless, it is important to recall, and note well, that during the 1980s a different bill was being pressed by activists—the “Research Modernization Act”—which would have cut the federal research budget by up to 60% and put the money into “alternatives.” As its chief proponent, Eleanor Seiling, when asked to define “alternatives” in the late 1970s, once said, “Oh, you know; plastic dogs that howl when cut and bleed ketchup so they can do their experiments.” Such exaggeration and lack of understanding constitute the potential price of ignoring ethics.

It appears that the NIH understands to some extent the need for ethics training because courses in science and ethics are now mandated for institutions where students receive training grants. I believe that they were prompted to take this action due to an increasing number of reports of data falsification, plagiarism, and what is generically termed “misconduct in science.” As I pointed out to some NIH officials in the early 1980s, “you can’t teach students that science is value free in general and ethics free in particular, and then fault them for not behaving ethically!”

I have been teaching science and ethics in some form steadily since 1976. For more than 20 years, as mentioned above, I and a biologist colleague were instructors of a year-long honors biology course in which we taught that ethical and conceptual issues that arise in science are integrally related to the science—as cake, not icing. The course was wildly successful. To this day, my colleague and I still receive communications from former students who are researchers, physicians, and faculty members who thank us for opening their eyes. I receive the same response from my students in the NIH graduate course and other graduate courses, including some positive responses from faculty members.

Although I was often accused of being antiscience when I championed the cause of laboratory animals, nothing could be farther from the truth. How on earth could I, who love learning above all else besides family, oppose the best route to knowledge ever devised? I used to be called antiscience when I discussed ethical issues in animal research. Ironically, I am now attacked by others as being too prescience because I coauthored a book attacking alternative medicine as not standing on a solid basis of scientifically garnered evidence, even by some of my veterinary colleagues.

In any case, the only way to escape the quicksand into which support for science is sinking is to create educational requirements in ethics for every graduate and undergraduate student who majors in any area of science. (Too many undergraduates are still taught the mantra that “Science is value free.”) We can rest only when examination of ethical issues that are presuppositional to and generated by science are as much second nature to scientists as are the double helix or the Krebs cycle, and only when we fully expunge the pernicious ideology described above. Only in this way can we assure an academic universe that accords serious attention to animal ethics and protocol review. Increasingly Draconian regulation of the sort we have seen in the human area can only alienate researchers. Especially for thinking people, ethics is far more valuable than regulation.

¹ The author presented a version of this Commentary as the keynote speech at the annual Public Responsibility in Medicine & Research (PRIM&R) meeting held March 2006 in Boston, MA.

² These stories represent the author’s personal experiences related to a problem that he encountered frequently during 30 years of work in the fields of science and ethics, and in writing and defending what became the 1985 federal laws for laboratory animals (PL 99-198 1985).

³ Abbreviations used in this Commentary: AALAS, American Association for Laboratory Animal Science; CSU, Colorado State University; FDA, Food and Drug Administration; NIH, National Institutes of Health; USDA, US Department of Agriculture.

References

Ayer AJ. 1946. *Language, Truth, and Logic*. London: Victor Gollancz. CNN/Time. 1997. CNN/Time poll, “Most Americans Say Cloning Is Wrong,” March 1, 1997. Available online (<http://www.cnn.com/TECH/9703/01/clone.poll/index.html>), accessed September 22, 2006.

- Davis L. 1983. Species differences in drug disposition as factors in alleviation of pain. In: Kitchell RL, Erickson HH, eds. *Animal Pain: Perception and Alleviation*. Bethesda: American Physiological Society. p 161-178.
- Gaskell G. 1997. Europe ambivalent on biotechnology. *Nature* 347:845.
- Keeton WT, Gould JL. 1986. *Biological Science*. New York: W.W. Norton.
- Kitchell RL, Erickson HH, eds. 1982. *Animal Pain: Perception and Alleviation*. Bethesda: American Physiological Society.
- LeBaron C. 1981. *Gentle Vengeance: An Account of the First Year at Harvard Medical School*. New York: Putnam.
- Lumb WV. 1963. *Small Animal Anesthesia*. Philadelphia: Lea & Febiger.
- Lumb WV, Jones EW. 1973. *Veterinary Anesthesia*. Philadelphia: Lea & Febiger.
- Mader S. 1987. *Biology: Evolution, Diversity, and the Environment*. Dubuque: W.M.C. Brown.
- Marks RM, Sacher ES. 1973. Under-treatment of medical inpatients with narcotic analgesics. *Ann Intern Med* 79:173-181.
- McCarthy CR, ed. 1999. *Bioethics of Laboratory Animal Research*. *ILAR J* 40:1-37.
- NRC [National Research Council]. 1996. *Guide for the Care and Use of Laboratory Animals*. 7th ed. Washington DC: National Academy Press. PL [Public Law] 99-198. 1985. Food Security Act of 1985, Subtitle F—Animal Welfare. Also called "The Improved Standards for Laboratory Animals Act" and enacted December 23, 1985. Washington DC: GPO.
- Rollin BE. 1995. *The Frankenstein Syndrome: Ethical and Social Issues in the Genetic Engineering of Animals*. New York: Cambridge University Press.
- Rollin BE. 2006. *Science and Ethics*. New York: Cambridge University Press.
- Wittgenstein L. 1965. Lecture on ethics. *Phil Rev* 74:1, 3-12.