

# SCIENCE AND ETHICS

Bernard E. Rollin

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## Science and Ethics

In *Science and Ethics*, Bernard Rollin historically and conceptually examines the ideology that denies the relevance of ethics to science. Providing an introduction to basic ethical concepts, he discusses a variety of ethical issues that are relevant to science and how they are ignored, to the detriment of both science and society. These issues include research on human subjects, animal research, genetic engineering, biotechnology, cloning, xenotransplantation, and stem cell research. Rollin also explores the ideological agnosticism that scientists have displayed regarding subjective experience in humans and animals and its pernicious effect on pain management. Finally, he articulates the implications of the ideological denial of ethics for the practice of science itself in terms of fraud, plagiarism, and data falsification. In engaging prose and with philosophical sophistication, Rollin cogently argues in favor of making education in ethics part and parcel of scientific training.

Bernard E. Rollin is University Distinguished Professor of Philosophy, Biomedical Sciences, and Animal Sciences and University Bioethicist at Colorado State University in Fort Collins. He is the author of fourteen books, including *The Frankenstein Syndrome: Ethical and Social Issues in the Genetic Engineering of Animals* and *The Unheeded Cry: Animal Consciousness, Animal Pain and Science*.



# Science and Ethics

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*To Linda and Mike*



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To my science colleagues at Colorado State University, with thanks for your friendship and collegiality, when lesser people, with lesser vision, might well have responded to my work with anger and enmity. My debt to you is incalculable. You eloquently taught me that Plato is right; thought is dialogue, people in lively discussion, not Rodin's isolated Cartesian.



## Preface

In a sense, my whole career can be viewed as an attempt to articulate the legitimate role of ethics in science, on both a theoretical and a practical level. With my appointment to the Colorado State University College of Veterinary Medicine as the person charged with developing and teaching the field of veterinary medical ethics and, shortly thereafter, serving as an “ombudsman for animals” charged with achieving consensus on animal use issues in science came a unique opportunity for testing theory in practice and for almost daily interaction with scientists on ethical issues. This activity in turn meshed well with my working with colleagues in the 1970s to write legislation protecting laboratory animals, in a real way articulating the emerging social ethic for animal treatment in a manner that would benefit animals without harming research and, ideally, *improving* it by underscoring the control of hitherto ignored deforming variables resulting from uncontrolled pain and distress in animal subjects.

Ever since I was a biology student in the 1960s, I had also chafed under science teaching that ignored ethical and conceptual issues raised by biological science. Funding from the National Science Foundation in the mid-1970s allowed me, together with molecular botanist Murray Nabors, to develop a year-long, five-credit honors biology course in which ethics and philosophy were taught as part and parcel of biology. We team-taught the course for twenty-five years and were gratified when many of our students went on to become researchers, physicians, veterinarians, professors, government officials, and scientists,

and would unfailingly return to thank us for the “multidimensional” view of biomedicine we had instilled.

Some ten years ago, I was asked to develop a Science and Ethics course for Ph.D. candidates in the sciences, as required by the National Institutes of Health for people receiving training grants. The course has been quite successful, albeit causing tension between my desire to keep it small yet to accommodate increasing numbers of interested science students from many fields. Interestingly enough, I found that today’s students are far less willing than was my generation to accept the ideology that science was “ethics-free” and “value-free” and are much further along in this area than I was.

I also began to believe that creating ethically sophisticated scientists was a necessary condition for continued social acceptance of and support for science, a point I develop in my discussion of biotechnology.

This book is a confluence of all the aforementioned vectors. If it does not stimulate student reflection on the full range of how ethics is enmeshed in the fabric of science, as well as provoke student interest in applying ethical questioning to their own area of science, I will have failed in what I tried to do. For this reason, my style is sometimes unorthodox, mixing accounts of what I have lived through with accounts of the issues.

I am grateful to my scientist colleagues for their openness and receptivity to my gadfly role. They have treated me as a friend, giving me appointments in two science departments and the opportunity to teach in numerous science programs, and they have encouraged me to share their research and undertake my own in areas ranging from animal cognition to immunological castration of beef cattle. The same is true of my students, who are the future.

I want to thank Linda Rollin for exasperating but trenchant criticism and Michael Rollin for illuminating dialogue over twenty years.

## The Waxing and Waning of Faith in Science

Those of us who grew up during the 1950s and early 1960s can still vividly recall the seemingly unbridled enthusiasm that society displayed toward science and technology. Sunday supplements, radio, television, and newspaper advertisements, television and radio shows, world's fairs, comic books, popular science magazines, newsreels, and, indeed, virtually all of popular culture heralded the vision of a golden age to come through science. One popular Sunday evening program sponsored by Dupont featured Ronald Reagan promising – with absolutely no irony – “better things for better living through chemistry,” a slogan that evoked much hilarity during the drug-soaked 1960s.

In an age where TV dinners were symbols of modern convenience, rather than unpleasant reminders of cramped airplane trips, nothing seemed beyond the power of science. The depictions of science-based utopia – perhaps best epitomized in the Jetsons cartoons – fueled unlimited optimism that we would eventually all enjoy personal fliers, robotic servants, the conquest of disease. Expanding population? No problem – scientists would tow icebergs and desalinate water to make deserts bloom. The Green Revolution and industrialized agriculture and hydroponics would supply our nutritional needs at ever-decreasing costs. Computer gurus such as Norbert Wiener promised that cybertechnology would usher in “the human use of human beings.” We would colonize the asteroids; extract gold from the sea; supply our energy needs with “clean, cheap” nuclear power; wear disposable clothing; educate our children according to sound

“science-based” principles; conquer disease and repair nature’s deficiencies and mistakes. “City planning,” based in science, would create utopian “communities.” Vestiges of this science-dependent vision have endured into the twenty-first century. Drug companies promise the design of individually targeted drugs and treatments based in biotechnology. The biotech industry still trumpets an end to famine and nutritional deficiency by way of genetic manipulation. The information technologies expand exponentially. But one no longer finds the unqualified social optimism in a science-driven future, and expressions of faith in such a future ring hollow. (Indeed, *that* vision became the stuff of numerous nostalgia coffee-table books at the advent of the millennium, perhaps because of our awareness that such a world view was born of a never-to-be-recaptured innocence and naïveté.)

One can certainly argue that our disappointments are a function of a vision too naïve and a set of unreasonable expectations regarding what science can do. Further, social reflection on increased human knowledge and its attendant control over nature well before the scientific revolution has been unrelentingly plagued by the question of whether humans have the wisdom to manage such increases in knowledge. The Tower of Babel story; the legends of Icarus and Daedalus; the Talmudic account of those rabbis who sought Cabbalistic knowledge and found only madness, apostasy, and ruination; and the story of the Golem and the Sorcerer’s apprentice out of control all bespeak deep-rooted fears about advancing human knowledge and control over nature not being unequivocal goods. Indeed it is not an accident that the Bible’s first moral lesson concerns the fall resulting from eating of the apple resulting in true knowledge.

With the advent of the scientific and industrial revolutions, these cautionary tales increased and intensified, with Mary Shelley’s *Frankenstein* a vibrant symbol of modern concerns and, indeed, of contemporary concerns, given the endless and unabating proliferation of variations on the Frankenstein story pervading popular culture in the twentieth century.

Those reflections suggest that – even amid the most Pollyana-ish enthusiasm about science that pervaded American culture from the 1940s to the 1960s – there was a dark dimension and an ambivalence about human ability to manage proliferating knowledge and the power it conferred. And thus, even as we dreamed the Jetsonian future, we

were never blinded to the strong suspicion that there could also be monsters. For this reason, our world-view of science as curer of ills and slayer of dragons was quick to shift in the face of evidence that not all was as promised.

Beginning in the 1960s, traditional American anti-intellectualism (of the sort that dismissed Adlai Stevenson's presidential candidacy because he was an "egghead") began to direct itself toward science and technology (the two have never been clearly distinguished in the American public's mind, in part because science is often promoted in terms of the technology flowing from it). "Better living through chemistry" was belied by air and water pollution. One river in Ohio – the Cuyahoga – was in fact so infused with chemical waste that it could be set on fire! People became aware that industrialization was a mixed blessing; the factories that created wealth and jobs fouled the air and water, giving flesh to William Blake's gloomy and prophetic description of them as "dark satanic mills." The automobile and the network of roads that carried it, initially the archetypes of technological blessing, became major sources of social disappointment, as cognizance of urban air pollution and traffic snarls grew. By the late 1960s, eight-lane highways and eight-lane gridlock became a favorite butt of jokes, as did the "smog" they engendered.

The growth of environmentalism in the late 1960s contributed to the demise of earlier scientific optimism. What were traditionally seen as boundless natural resources to be exploited at little cost by technology in pursuit of wealth and the science-based good life were now seen to involve hidden costs, from toxicity of air and water to loss of species and degradation of ecosystems.

The rapid growth of environmentalism, incidentally, must be viewed along with civil rights and feminism as one of the remarkably rapid and dramatic twentieth-century changes in social ethics that few anticipated. I recall a 1965 poll of 1964 graduates conducted by Phi Beta Kappa at the City College of New York, wherein the graduates were asked to rank the major problems confronting American society. Of all the hundreds of respondents, only one person listed environmental despoliation as an issue. Yet by 1969, the first massively supported Earth Day marked this major change in social gestalt, a perspective that has been enhanced, rather than diminished, by the passage of time, to the point that over 60 percent of Americans count themselves

as “environmentalists,” and “evil industrial polluters” have become an action movie cliché. So powerful, in fact, is the environmental mind-set that it trumps even personal freedom and property rights, historically bedrock American values, as when concern about “second-hand smoke” leads to legislated antismoking bans, and concern about endangered species of any sort, not only “charismatic mega-fauna,” can hold up land development (*vide* the snail darter and the Preble’s jumping mouse). A rancher friend of mine was banned from haying part of his land because he might bale a jumping mouse, though none had been found on his property.

Naïve beliefs about biomedical science conquering disease and biomedical scientists as dragonslayers have given way to cynicism about the motives of scientists, drug companies, and the medical establishment and the embracing of magic-think via “alternative medicine.” This disillusionment has been fueled by multiple factors: the exposure of iatrogenesis in modern medicine by critics such as Ivan Illich;<sup>1</sup> the failure of medicine to concern itself with quality of life and its tendency to increase life at all costs regardless of suffering; the attendant failure to control pain in the terminally ill for fear of “addiction”; the failure of the much-touted “war on cancer” to defeat cancer (though it did augment basic biological knowledge); the periodic flip-flops by the medical community on what constitutes a “healthy diet”; what I have called the “medicalization of evil,” as when child abuse, youth violence, gambling, obesity, and alcoholism are labeled diseases by the medical community, a move that blatantly defies common sense; and the revelations about cavalier scientist treatment of human and animal research subjects. These have collectively eroded the view of biomedicine as a moral science, and set what we shall shortly call the common sense of science at loggerheads with ordinary common sense.

One highly touted techno-scientific advance was the so-called green revolution: the attempt to increase crop yield by use of scientific principles. A parallel movement in animal agriculture led to the change in that field from seeing itself as based in animal husbandry – care for animals – and instead as animal science – defined in textbooks as “the application of industrial methods to the production of animals.” These congruent developments, initially met with public enthusiasm,

<sup>1</sup> See Illich, *Medical Nemesis*.

have in fact become identified in the public mind with generating Frankensteinian results from scientists' hubris. Modern agriculture is now widely seen as being based in avaricious petrochemical consumption and thus as not "sustainable"; as being thereby a major cause of air and particularly water pollution; as relying on economies of scale that lead inexorably to corporate domination of agriculture and to the loss of family farms and rural communities; as degrading farm labor; as putting small operators and farm workers out of business; as eroding food quality and increasing dangers coming from the food supply by reliance on herbicides, pesticides, hormones, and antibiotics; as depleting the land and hurting the animals; and as generating monoculture.

At the same time, public confidence in scientific reassurances has precipitously diminished as a result of an apparently endless list of scientific prognostications gone afoul. The escape of "killer" bees, the *Challenger* disaster, Three Mile Island and Chernobyl, blackouts and brownouts, manipulation of scientific data by cigarette companies, thalidomide, Fen-Phen, Vioxx, the University of Pennsylvania head-injury videotapes of baboon abuse, and the well-publicized cases of people hurt and killed in research have all diminished our faith in "trust me – I'm a scientist" and nurtured the resurgence of the Frankenstein view of scientist as dangerous, whether through misguided good intentions (Dr. Frankenstein's intentions were to augment life), incompetence, corruption, or simply biting off more than he or she can chew.

Another factor associated with diminished confidence in science is the advent – or resurgence – of a mystical streak in society. (I use the phrase "associated with" because it is difficult to tell whether the draw of the occult is a cause or an effect of diminished faith in science, or perhaps both cause and effect.) The key point is that, for whatever reason, beliefs inimical to a skepticism forged in science have reached epidemic proportions. Thousands of educated women now affirm a belief in Wicca, the primary manifestation of witchcraft, allegedly an ancient body of wisdom suppressed by male domination. Millions pursue astrology, unfazed by either its predictive failures or its vacuity ("Your life will change"). Millions of others sport crystals or minerals for their "positive energy." Most impressively, "alternative" medicine and alternative veterinary medicine are thriving – according to the American Medical Association, in one year the U.S. public spent

\$29 billion on such unproven therapies whose efficacy, safety, and batch consistency remains unproven and usually untested. It seems that if a putative treatment modality comes from Asia, it is particularly valued – witness the huge success of acupuncture, acupressure, and Reiki. Treatments that violate all known laws of science flourish anyway; witness the resurgence of homeopathy or Bach flower essences, where substances are diluted to the point where they are chemically incapable of any biological activity, or the “healing touch.” Others, such as magnet therapy, flourish despite having been demonstrated to show no effect.

Cults, sects, and hermetic traditions are a growth industry, as are books on allegedly magic texts of the “The Kabbalah and You” ilk. Perhaps most astounding is the resurgence of exorcism among both Catholics and Protestants, as well as among some psychiatrists, who admonish all of us to mark the difference between mental and behavioral problems that represent genuine illnesses, versus the easily mislabeled cases of *demonic possession* with which mental illnesses may be confused!<sup>2</sup>

In my mind, however, the most critical factor leading to social disenchantment with science has been the singular failure of the scientific community to engage the myriad ethical issues emerging from scientific activity. This is particularly problematic in an age that is suffused with ethical concern, a situation that paradigmatically characterizes the United States during the last half-century.

There is an ancient curse that is most appropriate to the society in which we live: “May you live in interesting times.” From the point of view of our social ethics, we do indeed live in bewildering and rapidly changing times. The traditional, widely shared, social ethical truisms that gave us stability, order, and predictability in society for many generations are being widely challenged by women, ethnic minorities, homosexuals, the handicapped, animal rights advocates, internationalists, environmentalists, and more. Most veterinarians now realize, to take a very obvious example, that society is in the process of changing its view of animals and our obligations to animals. Laboratory animal veterinarians have probably seen the most clearly articulated evidence of such a changing ethic, but it is also patent to any companion

<sup>2</sup> Cuneo, *American Exorcism*.

animal practitioners, food animal practitioners, or zoo veterinarians who take the trouble to reflect on the new social expectations shaping and constraining the way they do their jobs.

It is very likely that there has been more and deeper socio-ethical change since the middle of the twentieth century than has occurred during centuries of an ethically monolithic period such as the Middle Ages. Anyone over forty has lived through a variety of major moral earthquakes; the sexual revolution, the end of socially sanctioned racism, the banishing of IQ differentiation, the rise of homosexual militancy, the end of “*loco parentis*” in universities, the advent of consumer advocacy, the end of mandatory retirement age, the mass acceptance of environmentalism, the growth of a “sue the bastards” mind-set, the implementation of affirmative-action programs, the rise of massive drug use, the designation of alcoholism and child abuse as diseases rather than moral vices, the rise of militant feminism, the emergence of sexual harassment as a major social concern, the demands by the handicapped for equal access, the rise of public suspicion of science and technology, the mass questioning of animal use in science and industry, the end of colonialism, and the rise of political correctness all are examples of the magnitude of ethical change during this brief period.

With such rapid change come instability and bewilderment. Do I hold doors open for women? (I was brought up to do so out of politeness, but is such an act patronizing and demeaning?) Do I support black student demands for black dormitories (after I marched in the 1960s to end segregation)? Am I a bad person if I do not wish to hire a transsexual? Can I criticize the people of Rwanda and Bosnia for the bloodbaths they conduct without being accused of insensitivity to cultural diversity? Do I obey the old rules or the new rules? Paradoxically, the appeal to ethics and the demand for ethical accountability have probably never been stronger and more prominent – witness the forceful assertion of rights by and for people, animals, and nature – yet an understanding of ethics has never been more tentative, and violations of ethics and their attendant scandals in business, science, government, and the professions have never been more prominent. There is probably more talk of ethics than ever – more endowed chairs, seminars, conferences, college courses, books, media coverage, journals devoted to ethical matters than ever before – and yet, ironically,

most people probably believe that they understand ethics far less than their progenitors did. Commonality of values has given way to plurality and diversity; traditions are being eroded; even the church is no longer the staunch defender of traditional ethical norms.

Thus ethics is in the air; “ethics sells,” as one textbook salesman crassly put it to me. “Applied ethics” courses, virtually nonexistent in the 1960s, are a growth industry and saved many philosophy departments during the mercenary 1980s. Indeed, the rise of medical ethics, and particularly of medical ethics “think-tanks,” was, at least in part, a self-defense move to protect the medical community. Historically accustomed to not being questioned, the medical community found itself dealing with a public that, thanks to television and other media coverage, was fairly well versed in issues of medical ethics.

Unfortunately, medical ethics, which in my view has been very establishment-oriented and tame, must still be seen as exhibiting moral sophistication compared with science in general. (One of my friends, a pioneer in medical ethics in the 1970s, explained bitterly that medical ethicists tamely focused on “high visibility” issues such as pulling the plug on the irreversibly comatose Karen Ann Quinlan, while totally avoiding the far more important issue of fee for service.) For, by and large, the research community has failed abysmally to engage virtually any ethical questions flowing from its activities. For example, issues that were manifest to the general public in biomedical research – invasive and abusive use of human and animal subjects – were essentially invisible to the research community. One can search scientific journals, conferences, textbooks, and the like and find almost no solid discussions of the ethical issues raised by experimentation. When the research community did finally engage the question of animal research in the early 1980s, upon its realization that much-dreaded legislation was a real threat, it did so in a highly emotive way that was in fact not that far from the style utilized by its antivivisectionist opponents, with frankly outrageous claims that any constraints on animal use would unequivocally forestall medical progress and harm the health of children. This was in turn a reflection of the view that ethical issues can be approached only emotionally, never rationally, which was rife in the scientific community.

We shall elaborate on these issues and the mentality that led to their mishandling as we proceed through our discussion. For now, it

suffices to point out that the research community's mind-set on ethics is still largely unchanged, despite the lessons that should have been learned from the animal experimentation issues in the 1980s. The area of biotechnology provides a profound – and troubling – current example of the way in which the scientific community fails to engage ethical issues, which in turn leads to public rejection of the science or technology in question, for bad reasons. This has occurred with genetic engineering, genetically modified foods in Europe, cloning, and stem cell technology. This, in turn, gives further evidence that willful ignoring of ethical issues is one of the major reasons for public disenchantment with science.

Any new technology will create a lacuna in socio-ethical thought, and the newer and more powerful the technology, the greater the vacuum. Will a given technology improve our lives or degrade them? In what ways? Which aspects of the technology need to be controlled, regulated, accepted, or rejected to assure that it is a force for good, not for ill? Will it erode or enhance our autonomy? So it is surely incumbent upon those who develop a technology and best understand its strengths and limitations to help society think such issues through. If they fail to do so, the ethical implications vacuum may be filled by doomsayers: political, religious, or other vested interests who may totally distort, exaggerate, or minimize the issues occasioned by the technology and induce in society fear that leads to irrational rejection of the technology or to naïve enthusiasm that leads to imprudent acceptance of it.

This is exactly what happened with biotechnology, leading to its summary rejection in Europe and to lesser but significant social concern in the United States. The research community totally failed to articulate the ethical implications of cloning, genetic engineering, genetically modifying food, BST (bovine somatotropin) use in cattle, developing biomedical animal models for human genetic diseases, and so on, leaving a vacuum in social thought. Religious leaders and apocalyptic doomsayers such as Jeremy Rifkin immediately filled that lacuna with worst case but meaningless slogans – genetic engineering is against God, cloning is against nature, biotechnology has man “playing God” or usurping his role, and so on, illustrating what I have called a Gresham's law for ethics: bad ethics driving good ethics out of circulation, analogous to Gresham's realization that “bad money”

in circulation (e.g., valueless paper deutsche marks) leads to hoarding of “good money” (e.g., gold). No one will pay a debt with gold if they can pay with near-valueless currency.

Research funding was displaced by public fear; laws were quickly passed against cloning. Leaders of the regulatory community steadfastly refused to mandate labeling of GM foods, affirming that they do not differ from normal foods save in the “process” of formation – the product is the same. No one discussed ethics rationally, since the research community tends to believe that one cannot do so, and the other side didn’t try to – it was doing fine with sloganeering. Regulators strongly downplayed the risks of biotechnology while ignoring excellent research showing that ethics was of far greater concern (at least to the European public) than risk. The net effect? Substantial portions of the European Community are dead set – and powerfully – against genetically modified foods, and the U.S. public cannot yet see the enormous power for good potentially inherent in biotechnology, the most powerful technology ever devised. Even Monsanto, which spent a fortune on developing and marketing BST for increasing milk production, failed to consider the ethical dimensions of the technology as perceived by final milk consumers, rather than by producers. In our discussion below, we explore many of these neglected ethical issues in depth. If we do not produce a generation of scientists who can think in ethical terms and lead public ethical discussions of science, we may lose countless real benefits of scientific advances, as well as public support of science.

## Scientific Ideology and “Value Free” Science

Before exploring specific ethical issues that the scientific community has mishandled or failed to handle, we must first address a basic question: Why does the research community have such a bad track record in dealing with ethics? Why has it consistently missed the mark set by society for rational ethical discussion and explanation? And what should it be doing instead? In my view, the problem grows out of strongly and unquestioningly held beliefs in the scientific community about science and ethics, beliefs that are never questioned to the extent that they constitute a hardened and unshakeable ideology that I have called “scientific common sense” or “scientific ideology,” which stands in the same relationship to scientists’ thinking that ordinary common sense does to the thinking of nonscientists. It is to this ideology we now turn.

What is an ideology? In simple terms, an ideology is a set of fundamental beliefs, commitments, value judgments, and principles that determine the way someone embracing those beliefs looks at the world, understands the world, and is directed to behave toward others in the world. When we refer to a set of beliefs as an ideology, we usually mean that, for the person or group entertaining those beliefs, nothing counts as a good reason for revising those beliefs, and, correlatively, raising questions critical of those beliefs is excluded dogmatically by the belief system. (As David Braybrooke has stated it, “ideologies distort as much by omitting to question as by affirming answers.”)<sup>1</sup>

<sup>1</sup> David Braybrooke, “Ideology” in *Encyclopedia of Philosophy*, vol. 2, p. 126.

The term is most famously, perhaps, associated with Marx, who described capitalist ideology (or free market ideology) as involving the unshakeable beliefs that the laws of the competitive market are natural, universal, and impersonal; that private property in ownership of means of production is natural, permanent, and necessary; that workers are paid all they can be paid; and that surplus value should accrue to those who own the means of production.

Though most famously associated with the Marxist critique of capitalism, we all encounter ideologies on a regular basis. Most commonly, perhaps, we meet people infused with religious ideologies, such as biblical fundamentalism, who profess to believe literally in the Bible as the word of God. I have often countered such people by asking them whether they have read the Bible in Hebrew and Greek, for surely God did not speak in antiquity in English. Further, I point out, if they have not read the original language, they are relying on interpretations rather than literal meaning, since all translation *is* interpretation, and interpretation may be wrong. To illustrate this point, I ask them to name some of the Ten Commandments. Invariably, they say, "Thou shalt not kill." I then point out that the Hebrew in fact does not say, "Thou shalt not kill"; it says "Thou shalt not *murder*." This then should be enough to convince them that they do not believe the Bible literally, if only because they cannot read it literally. Does it do so? Of course not. They have endless ploys to avoid admitting that they can't possibly believe it literally, for example, "The translators were Divinely inspired," and so on.

We of course are steeped in political ideology in grade school and high school, for example, on issues of "human equality." Ask the average college student (as I have done many times) what is the basis for professing equality, when people are clearly unequal in brains, talent, wealth, athletic ability, and so on. Few will deny this, but most will continue to insist on "equality" without any notion that "equality" refers to a way we believe we ought to treat people, not to a factual claim. If they do see equality as an "ought" claim, almost none can then provide a defense of why we believe we ought to treat people equally if in fact they are not equal. And so on. But virtually never will such a student renounce the belief in equality.

Of late, students have been steeped in the ideology of diversity and multiculturalism, affirming that no culture is superior to any other,

and an admixture of cultures is always best. Few can respond to the query I tender: "What? Are you telling me that a culture where clitorectomies are performed without consent or anesthesia on helpless female children is as good as a culture that disavows such mutilations?"

Similarly, surely no one would argue that the Taliban culture, wherein women were not allowed to be educated and were beaten for laughing in public, and men were beaten for flying kites or listening to music, is as good a culture as ours. Similarly, I point out that the price of diversity is often friction and tension. No sane New Yorker leaves his or her apartment unlocked; in rural Wyoming that is *de rigueur*: People share common grazing land and someone may be rounding up cattle when a storm strikes, so everyone leaves their ranches unlocked in case someone needs refuge. A person in trouble is expected to enter the empty home, use the bed, make a meal, tidy up, and leave. In return, one does the same thing for others. Similarly, if one has an accident or car trouble in Wyoming, everyone stops to help. In my view, this is made possible by virtue of the fact that the culture is monolithic rather than diverse, and everyone shares the same values, beliefs, and expectations.

Thus, despite one's ability to provide cases where ethnic multiplicity or diversity have downsides, and other cases where common sense shows that some cultures are worse than others, students who have been ideologically brainwashed simply filter out such arguments, even as Marxists filter out and ignore counterexamples to their basic ideology, and fundamentalists do the same.

Ideologies are attractive to people; they give pat answers to difficult questions. It is far easier to give an ingrained response than to think through each new situation. Militant Muslim ideology, for example, sees Western culture as inherently evil and corruptive of Islam; the United States as "the Great Satan" and fountainhead of Western culture that in turn is aimed at destroying Islamic purity. The United States is thus automatically wrong in any dispute, and any measures are justified against that country in the ultimate battle against defilement.

What is wrong with ideology, of course, is precisely that it truncates thought, providing simple answers and, as Braybooke indicated in the passage quoted earlier, cutting off certain key questions. Intellectual subtlety and the powerful tool of reason, making distinctions, are

totally lost to gross oversimplifications. Counterexamples are ignored. I recall working in a warehouse where the preponderance of blue-collar employees was strongly possessed of racist ideology, particularly antiblack ideology. It was universally believed that blacks were lazy, unintelligent, sneaky, crooked. One day I had an inspiration. There was in fact one African American (Joe) who worked in the warehouse and was well liked. I raised this counterexample with them. "Surely," I said, "this case refutes your claim about *all* black people." "Not at all," they said. "Joe is different – he hangs around with us."

But it is not only that ideology constricts thought. It can also create monsters out of ordinary people by overriding common sense and common decency. We have seen this manifested plainly throughout the history of the twentieth century. The recent experiences of Eastern Europe and Africa make manifest that ideologically based hatreds, whose origins have been obscured by the passage of time, may, like anthrax spores, reemerge as virulent and lethal as ever, unweakened by years of dormancy. Most strikingly, perhaps, the work of historian Daniel Goldhagen has demonstrated the enormous power of ideology to overwhelm and obscure both common sense and common decency, even among the most civilized of people.

In his monumental work, *Hitler's Willing Executioners* (1996), Goldhagen has shown that under the Nazis, ordinary Germans willingly and voluntarily engaged in genocidal activities, even when it was patently open to them to refuse to do so without fear of recriminations. The killers studied by Goldhagen were neither sadists and psychopaths of the sort attracted to the SS nor the sort of street brawlers and bullies that composed the ranks of Ernst Röhm's SA. Rather, they were normal, largely nonviolent family men, who operated neither out of fear of punishment for disobedience (one standard explanation) nor out of the blind obedience suggested by Stanley Milgram<sup>2</sup> and often invoked to explain Nazi killing. According to Goldhagen, neighbors became killers because of their immersion in two centuries of ideological dogma depicting Jews as pathogens in the body politic, rendering that body ill and infirm and demanding radical excision of the disease-causing organisms. As absurd as this seems to those of us unsteeped in similar ideology, it was common sense to Goldhagen's Germans and

<sup>2</sup> Milgram, *Obedience to Authority*.

a straightforward justification for actions they would recoil from in nonideological contexts.

As we have seen, 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. And 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 in exercising the cognitive functions that separate humans from all creation. Inevitably, the great knowers, such as Aristotle, Bacon, Newton, and Einstein, felt it necessary to articulate what separated legitimate empirical knowledge from spurious knowledge and jealously 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 regnant today, of believing that real science must be based in experience, since 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, they would unhesitatingly reply 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 experiences. (The fact that Newton in fact *did* operate with nonobservable notions such as gravity or, more generally, action at a distance did not stop him from ideological proclamations affirming that one should not do so.) The Royal Society members apparently took him literally, went around gathering data for their commonplace books, and fully expected major scientific breakthroughs to emerge therefrom. (This idea of

truth revealing itself through data gathering is prominent in Francis Bacon.)

The insistence on experience as the bedrock for science continues from Newton to the twentieth century, where it reaches its most philosophical articulation in the reductive movement known as logical positivism, a movement that was designed to excise the unverifiable from science and, in some of its forms, formally 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 ought not to allow unverifiable statements. This was no doubt potentiated by the fact that the British logical positivist A. J. Ayer wrote a book that was relatively readable, vastly popular (for a philosophy book), and aggressively polemical that defended logical positivism. Entitled *Language, Truth, and Logic*, it first appeared in 1936 and has remained in print ever since.<sup>3</sup> Easy to read, highly critical of wool-gathering, speculative metaphysics and other soft and ungrounded ways of knowing, the book was long used in introductory philosophy courses and, in many cases, represented the only contact with philosophy that aspiring young scientists – or even senior scientists – enjoyed.

Be that as it may, the positivist demand for empirical verification of all meaningful claims became 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 we have described. Through it, one could clearly, in good conscience, dismiss religious claims, metaphysical claims, or other speculative assertions not merely as false and irrelevant to science but as meaningless. Only what could *in principle* be

<sup>3</sup> Ayer, *Language, Truth, and Logic*.

verified (or falsified) empirically was meaningful. “In principle” meant “someday,” given technological progress. Thus, though the statement “There are intelligent inhabitants on Mars” could not in fact be verified or falsified in 1940, it was still meaningful, since we could see how it could be verified, that is, by building rocket ships and going to Mars to look. Such a statement stands in sharp contradiction to the statement “There are intelligent beings in Heaven,” because, however our technology is perfected, we don’t even know what it would be like to visit Heaven, it not being a physical place.

What does all this have to do with ethics? Quite a bit, it turns out. The philosopher Ludwig Wittgenstein, who greatly influenced the logical positivists, once remarked that if you take an inventory of all the *facts* in the universe, you will not find it a *fact* that killing is wrong. 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, empirically and scientifically, ethical judgments are meaningless. From this, it was 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, and which has persisted to the present, is that “science is value-free” in general, and “ethics-free” in particular.

This denial in particular of the relevance of ethics to science was taught both explicitly and implicitly. One could find it explicitly stated 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 a honors biology course we team-taught for twenty-five years attempting to combine biology and the philosophical and ethical issues it presupposed and gave rise to. The widely used Keeton and Gould textbook *Biological Science*, for example, 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 getting down to the parts of a cell and the Krebs cycle, loudly declares that “science cannot make value judgments . . . cannot make moral judgments.” In the same vein, Mader,<sup>4</sup> in her popular biology text, asserts that “science does not make ethical or moral decisions.” The standard

<sup>4</sup> Mader, *Biology: Evolution, Diversity, and the Environment*.