BOOKS: BIOETHICS

Knowledge to Heal, Knowledge to Injure

M. Susan Lindee

Undue Risk
Secret State Experiments on Humans
by Jonathan Moreno
Freeman, New York, 1999. 367 pp. $24.95. ISBN 0-7167-3142-8.

Biomedical research, national sovereignty, and human bodies intersect at a point that illuminates some of the most pressing problems in bioethics. Research conducted with human subjects under military auspices has sometimes been grounded in a deep benevolence and caring, in commitments to alleviate human suffering felt by both researcher and subject. And it has sometimes been a manifestation of what is most dehumanizing and distant from the embodied recognition of pain. The radical lack of empathy that Elaine Scarry associates with political torture has also been played out in the scientific laboratory, where human beings have been frozen, infected, dissected, suffocated, and terrorized to produce new knowledge (*1*). The intermingling of brutality and love that characterizes the 20th-century scientific enterprise is nowhere more transparent than in the history of human-subjects research funded by the state and tied to the organized violence of war.

Complicating the assessment of such research is the fact that the state's claims on the body of the soldier have historically reinforced its claims on the bodies of the poor, the imprisoned, the racially marked, or the institutionalized. Nazi racial hygienists (*2*) proposed that if Germany's finest young men could be asked to die on the battlefield, could not its mentally retarded children legitimately be asked to die also? And in *Buck v. Bell*, the infamous U.S. Supreme Court eugenics case of 1927, Justice Oliver Wendell Holmes proposed that just as the state could "call upon the best citizens for their lives" in war, so too could it call upon those who "already sap [its] strength" (the mentally retarded) for the lesser sacrifice of involuntary sterilization (*3*). Scientific research involving human subjects, and conducted in accordance with military priorities, can literally be seen as an extension of state sovereignty, from the soldier to the prisoner to the dying cancer patient. The ethical quandaries posed by such research have recently been the focus of considerable scholarly interest, as Jonathan Moreno's *Undue Risk* makes clear.

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Moreno is a biomedical ethicist at the University of Virginia who served on the research staff of President Clinton's Advisory Committee on Human Radiation Experiments. In that capacity, he had one of the first looks at newly declassified records documenting human-subjects research in the United States, an archive that promises to keep historians busy for decades. He also had an opportunity to see at close hand the complexity of retrospectively applying bioethical principles to research practices of the 1940s and 1950s, when standards and expectations were not consistent with those of the 1990s.

Subjects of convenience. Extensive research operations at Philadelphia's Holmesburg Prison included studies of skin-hardening for the U.S. Army and tests of psychoactive substances such as LSD.

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His book provides a broad overview of the shifting and culturally specific standards for human-subjects research in the United States since 1940, with a particular emphasis on the internal assessment of radiation-related studies supported by the Atomic Energy Commission. Moreno offers basic narrative details about many different kinds of human-subjects research, including some projects that would not technically count as such. For example, the intentional releases of radioisotopes into the atmosphere at the Hanford Nuclear Facility, including the Green Run in late 1949, were not undertaken to provide information about the effects of radiation on human subjects. Moreno's inclusion of these kinds of experiments, and his tendency to downplay the distinctions between clinical research and other kinds of studies, suggest his fundamental concerns. He wants to understand why and how scientists and administrators made sense of their decisions to expose people to radiation or other things that could harm them. He is interested in the logic underlying the infliction of harm.

Many pressures facilitated the use of human subjects in scientific and military research, as Moreno suggests. These included the pressures of war, which often justified the most egregious practices, and the exploitation of "experiments of opportunity" that drew on conveniently available, pliable, sometimes ignorant, populations, including prisoners, mentally retarded children, extremely ill patients who were expected to die soon, and so on. Not surprisingly, soldiers, too, have often been human subjects, and one of the strengths of Moreno's book is its exploration of the breadth of research and of exposure involving military personnel. Soldiers have been sent into bomb tests, given psychoactive drugs, asked to fly through mushroom clouds and to participate in "flash-blindness" studies, generally without anything resembling informed consent.

Much of the information about the radiation studies was published in some form in the Advisory Commission report (*4*), and for scholars in the field Moreno presents little new information. Yet he does construct an agenda for public discussion and, unlike some commentators, he explicitly promotes the legitimacy of continuing military research with human subjects, even in a post–Cold War world.

Echoing recent pronouncements from the Clinton Administration, Moreno em-

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phasizes the potential destructive power of biological weapons and argues that defending populations and troops from such weapons will require scientific research, some involving human subjects. With this in mind, he sketches out a model for ethical military research. He describes the practices and policies of an elite research group at the Fort Detrick, Maryland, laboratory where biological weapons and infectious diseases are studied with the help of a corps of volunteers serving three-year tours as research subjects. "Of all the amazing things I learned in writing this book," Moreno writes, "nothing surprised me more than that dozens of soldiers of both genders are still used as normal volunteers in biological experiments."

In an evocative unpublished essay, the historian of science Larry Owens explores the development of wound ballistics, the "branch of terminal ballistics having to do with the phenomena that occur when a missile strikes and penetrates the body" (*5*). At a Princeton laboratory funded by the Office of Scientific Research and Development during World War II, cats and dogs were anesthetized and shot with scaled-down bullets. The shootings were recorded, photographed, and used to construct a "standardized wound event" characterized by a retardation equation. This equation, Owens proposes, represents "civilizing reason," not a failure of modernization but a characteristic expression of it, and a manifestation of the "infliction of harm in good conscience" (*6*).

Many of the human-subjects research projects carried out in the United States during the Cold War involved, in Owens's terms, the infliction of harm in good conscience. Such projects often provided information that could facilitate both healing and further injury. E. Newton Harvey's 1948 essay (*5*) made it chillingly clear: Wound ballistics research could suggest ways to increase the destructive power of projectiles. Knowledge of the body can facilitate both healing and injury. To turn our attention to this, and to try to understand why and how it came to be, seems to me a worthwhile enterprise.

In the wake of the 17 September 1999 death of 18-year-old Jesse Gelsinger in an experimental gene therapy trial at the University of Pennsylvania's Institute for Human Gene Therapy, questions about the integrity of the research process have a particularly sharp edge. It is critically important to understand the ideas and practices that have shaped experimentation with human subjects. Moreno is certainly correct in proposing that such research is here to stay, and his book is a contribution to the public debate.

References and Notes

1. See E. Scarry, *The Body in Pain: The Making and Unmaking of the World* (Oxford Univ. Press, Oxford, 1985), especially pp. 27–59, but also her discussion pp. 60–81 of the relation between the injuring of war and the injuring of torture. Recent works exploring research with human subjects include S. H. Harris, *Factories of Death: Japanese Biological Warfare 1932–45 and the American Cover-Up* (Routledge, New York, 1994); A. M. Hornblum, *Acres of Skin: Human Experiments at Holmesburg Prison* (Routledge, New York, 1998); and S. Lederer, *Subjected to Science: Human Experimentation in America Before the Second World War* (Johns Hopkins Univ. Press, Baltimore, 1995).
2. Robert Proctor, in *Deviant Bodies*, J. Terry and J. Urla, Eds. (Indiana Univ. Press, Bloomington, IN, 1995), pp. 170–196.
3. *Buck v. Bell*, 274 U.S. 200 (1927).
4. Advisory Committee on Human Radiation Experiments, *The Human Radiation Experiments* (Oxford Univ. Press, Oxford, 1996).
5. E. Newton Harvey, "Studies on Wound Ballistics," in *Advances in Military Medicine Made By American Investigators...*, E. C. Andrus *et al.*, Eds. (Little, Brown, Boston, 1948), pp. 191–205.
6. L. Owens, "The Infliction of Harm in Good Conscience: A Cold War Fable," essay presented at the Massachusetts Institute of Technology, Cambridge, MA, 9 December 1998.

BOOKS: TECHNOLOGY

Tales of Cooling

David Goodstein

In the summer of 1620, a hustler named Cornelis Drebbel offered to amaze the English royal court by producing a roomful of winterlike cold. King James I took up the challenge and chose Westminster Abbey on a particularly warm day. We know Drebbel succeeded to the satisfaction of the king because the feat is mentioned in passing by Francis Bacon, philosopher of science and sometimes lord chancellor to James I. With this episode, Tom Shachtman begins the tale he calls *Absolute Zero and the Conquest of Cold*.

Absolute Zero and the Conquest of Cold
by Tom Shachtman
Houghton Mifflin, Boston, 1999. 271 pp. $25. ISBN 0-395-93888-0.

Shachtman, the author of some 25 books (although none of the others are about science), has pulled off a trick almost as neat as Drebbel's. He's written a page-turner about the history of cold. There are really two stories here, the commercial history and the scientific history. Shachtman wisely tells them both, side by side, in roughly chronological order. The result, unfortunately, is flawed because he failed to get someone better versed in science than he to read through the entire manuscript.

The scientific story is the one promised by the title. It involves the mastery of thermodynamics, the liquefaction of gases (culminating in the race to liquefy hydrogen and helium), the discoveries of superconductivity and superfluidity, and more, right up to the recent advances in laser cooling of trapped atoms. The commercial history involves the worldwide trade in stored natural ice in the 18th and 19th centuries, the development of artificial refrigeration and air conditioning, and the effects of artificial cooling on nutrition (including the story of Clarence Birdseye and his quick-frozen fish) and on where people can live in reasonable comfort.

All of this is genuinely fun to read. Shachtman is an enthusiast about the adventure of conquering the frontiers of cold, and he knows how to tell a story. The problem is, the author frequently gets in over his head when he tries to explain matters scientific. Let me give you just one example:

"It had long been known that a magnet's force could be amplified by means of electric current coursing through wire wrapped around it. When it became possible to make wires that were superconducting, and wrap them around magnets, the resulting current raised the power of the magnets even more."

It must have occurred to Shachtman that this gem seemed to contradict something that he wrote elsewhere because he decided to add a footnote:

"While the application of a magnetic field to a superconducting material could make that material lose its superconductivity, when an insulated superconductor was wrapped around a magnet, amplifying the magnet's power, the superconductor was not affected adversely by the magnet."

Unfortunately for Shachtman, superconducting magnets do not have iron cores, and they are not immune to the magnetic fields they produce. It wouldn't have taken the author much to get someone to explain to him what superconducting magnets are all about, but he didn't bother—not in this instance and not in countless others scattered through the book.

That's a real pity, because Shachtman has seen the history of low temperatures through fresh eyes and written what could have been a fine book. Moreover, although there are many similar errors, they would all have been easy to fix. Had General Motors put out a product like this, the company would issue a general recall for repairs. Houghton Mifflin ought to do the same for this book.

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