

reference work on *Drosophila* cell culture. Cross-references to vertebrate cell culture systems and techniques put the topic in a wider perspective. May the book inspire many scientists to establish new cell lines, and so help to bridge the gap between vertebrate biochemistry and *Drosophila* genetics. □

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Doing the right thing?

Research Ethics: A Reader

edited by Deni Elliott and Judy E. Stern
University of New England Press: 1997.
Pp. 336. \$25, £18.95 (pbk)

The Ethics of Scientific Research: A Guidebook for Course Development

by Judi E. Stern and Deni Elliott
University of New England Press: 1997.
Pp. 128. \$15, £10.95 (pbk)

John Galloway

There is an interesting tension between the romantic view of research as a disinterested quest for truth and the anything-but-disinterested motives of those actually doing the research. Science is as good a way to fame and occasionally fortune as any other sphere of human activity, and just as vulnerable to human frailty: greed, vanity, envy, jealousy and corruption. But does science have enough distinct problems to warrant its own moral and ethical code to guide — or control — the behaviour of its practitioners? After all, moral and ethical codes are defining features of other recognized professions such as medicine and law. Cynical observers will recognize the formulation of such codes as key 'public relations' steps on the ladder to professional status — and power.

Science's moral issues provide the theme of *Research Ethics*. This collection of essays and articles is accompanied by *The Ethics of Scientific Research*, a manual for setting up a teaching course in the subject. They cover the ground, although, inevitably given the format, unevenly; and both suffer from a general lack of cohesion.

Science poses fundamental ethical problems that the books can only attempt to address because these problems have no definitive solution. The human condition rules it out. Science continually subverts the moral codes by which we all live, dictates how we live, and how and when we die. The pace of scientific progress outstrips society's ability to cope with it. Scientists have to acknowledge that they have the potential to create evil as well as good — and that all progress must be paid for.

Recently, the media have been only too happy to add 'sin in science' to the long list of the world's other sins that they feel the public

need to know about. Institutions have also responded to the realization that there may be serpents in the scientific Garden of Eden. The penalty now, as then, for those caught transgressing is being cast out.

Guidelines on scientific conduct and the way to deal with suspected misconduct proliferate. Scientists face the same problems in dealing with dishonesty as society does in general. Misconduct needs to be defined and not just left for experts to recognize; there is also the small problem of proving fraud once it is suspected. Even more difficult is knowing how to deal even-handedly with those involved, particularly when the stakes are high. Inevitably there will be a tendency for scientists to see little wrong when their behaviour profits them personally. Nor is science separated from the rest of the world by some moral cordon sanitaire. It overlaps with, and is part of, other social systems — business, national security, politics — whose codes of behaviour are removed from those of an idealistic scholar pursuing truth for truth's sake. And science has its own politics — unavoidable once large sums of money are competed for, spent or made — with its own combination of self-interest and self-delusion.

Research Ethics brings out all these issues, although they are not always dealt with entirely objectively. Some of the articles seem too personal and self-justifying, as in the attack on the US Office of Scientific Integrity, apparently for not prosecuting cases impartially. Whether or not this criticism is justified, such an attack is surely out of place in a book such as this.

Scientific research creates new knowledge about the world — 'data' as scientists call it. And the demon that drives scientists is the challenge of being the first to make a particular discovery. As Peter Medawar pointed out, no one gets any credit for coming second. It is not surprising then that misconduct involving data is the equivalent of being caught horse-stealing in the Wild West, with similar consequences. Your career may be 'lynched', even if you are not. Most cases of scientific fraud involve scientists who are too creative with their data, taking liberties with their findings, helping them along if they do not support their pet theory — and occasionally just making them up. Guidelines increasingly focus on the need for scientists and laboratories to keep accurate records about their work and methods. *Research Ethics* describes a number of recent instances.

For those embarking on a career in research, their first experience of a moral issue may be one of ownership — whose research is it? Are the research findings you seem to have made yours, or do they belong to your supervisor or even the director of the laboratory? There are scientists who insist that their name appears on everything published from their laboratory, irrespective of

their input. Occasionally this behaviour results in the perpetrator being hoist with his own petard when his name appears on a paper later proved to be fraudulent. The patron saint of postdocs probably smiles broadly. There is an issue here, and one that science is starting to address even though the issue is not entirely straightforward. Perhaps the nearest counterpart to laboratories are the workshops of Renaissance painters. As the art critic Brian Sewell comments about the artist Lucas Cranach, "he commanded a considerable workshop... and his hand must have been rare in the many variants and replicas that were the staples of his business". And as the head of the Oxford laboratories where I worked said, "Be realistic, the only thing that matters is what I say about you and your work". He was probably right.

It is not obvious that dishonesty in science is inherently more serious than in any other walk of life, although clearly it manifests itself in particular ways. It is also worth remembering that if the results of research are important, any deception will invariably come to light. Dishonesty in science is therefore probably more stupid than wicked when one considers the price paid for being caught. But this is no excuse for science not keeping its own house in order. Stupidity can cause as much damage as deliberate dishonesty. That said, it is important to keep a sense of proportion. A clear message from these books is how easily things can get out of hand if procedures designed to deal with these problems are not tempered with common sense. □

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