

Comment

For the good of the state

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"It is by my order and for the good of the state that the bearer has done what has been done."

Cardinal Richelieu, in *The Three Musketeers*
by Alexandre Dumas

In the largely liberal circles in which I, and most other academic scientists, travel there is a perception that the present US government is slowly eroding - or at any rate would like to erode if it thought it could get away with it - many of our basic civil liberties. There is also the concern that, eventually, in the name of 'national security' or 'the war on terrorism', 'they' will be allowed to get away with it, because the public is afraid. Regardless of one's politics, we can probably all agree that people are more fearful than they were, say, ten years ago, but I don't think it's just terrorism that the public is afraid of. Another big component of this swelling fear is the rapidly accelerating pace of scientific and technological progress.

The unknown usually provokes anxiety, and the closer the unknown comes to touching us directly the greater the anxiety becomes. Recent advances in biology and medicine, from the sequence of the human genome to the cloning of mammals to the engineering of bacteria and viruses for biowarfare as well as for therapeutic purposes, have made many lay people profoundly uneasy about the future of humanity. In this climate of unease, the public seems willing to accept restrictions on many things, including science. President Bush's decision to limit the supply of stem cells available for medical research was one such restriction.

In an attempt to forestall more of them, on 9 October 2003 a panel convened by the National Research Council (NRC), a component of the US National Academy of Sciences, recommended voluntary prior review, at both the university and federal levels, of experiments in seven areas of genetics, biochemistry and microbiology. These areas were chosen because they represent types of research that could conceivably provide terrorists or hostile nations with information or material useful for the creation of biological weapons.

The proposal from the panel, which was headed by yeast geneticist Gerry Fink of the Whitehead Institute (Cambridge, USA), calls for self-regulation by scientists through a review process that would operate at several levels. The first is local: rather than the creation of a new machinery, it recommends using the existing system of institutional biosafety review committees, which already must approve any research that involves genetically engineered organisms or ones deemed hazardous, such as human pathogens. These local review boards are meant to ensure that experiments are conducted in a manner that protects the scientists involved and the community in which they work. In the Fink panel's proposal, these committees would also be given the additional job of issuing, or withholding, approval for projects whose results might conceivably be misused by terrorist organizations or rogue states.

As a second tier, the report proposed that rulings of the local committee could be appealed to the federal Recombinant DNA Advisory Committee (RAC), a body set up by the National Institutes of Health in the late 1970s as a result of public concern about the possible release into the environment of genetically modified organisms produced by recombinant DNA technology. The RAC would also serve as a resource for local committees that were unable to come to a decision. Perhaps the most important suggestion of the NRC panel was the creation of a final level of review, a new advisory committee for the Department of Health and Human Services - note, not the Department of Homeland Security - involving both biologists and security experts that would coordinate the scientific aspects of biodefense across many different federal agencies. This committee would help to ensure that scientific information was properly taken into account in any decisions involving the possible misuse of biological research.

A key element of the proposed system of self-regulation is that it would be entirely voluntary. The Fink panel, which consisted of lawyers, public policy experts and former high-ranking security officials as well as scientists, agreed that

peer pressure and the humanity of most scientists would be enough to ensure compliance. Although the report focused on research carried out in universities and medical schools, the Fink panel also recommended that pharmaceutical and biotechnology companies submit voluntarily to such prior review as well.

What about research that was approved but whose findings might later be deemed by some to constitute a risk? Significantly, no specific restrictions on the publication of completed research results were proposed. I think this is a wise decision. Most biological research - with the exception of the seven areas specified in the report (which include, for example, experiments aimed at engineering microbes to avoid the human immune system) - has great potential benefits for human health as well as a small possibility of misuse. Given that, in biology especially, those who make a discovery are almost never those who eventually turn it into some practical application, widespread dissemination of research findings is essential for those benefits to be realized.

By these recommendations, life scientists have taken the lead in trying to prevent dangerous research from being carried out in the first place - a policy more sensible, and less erosive of liberty, than censorship of publication (which, as the panel notes, is unlikely to prevent others from learning about it anyway). The Fink panel's report attempted to strike a balance between the need to reassure a public that is increasingly anxious and suspicious about biological research and the desire of scientists to avoid excessive government intrusion into their freedom to conduct that research. The stem cell debacle is a good illustration of why scientists are right to believe that the present US government, in particular, may wish to restrict some research for purely political or religious reasons, and might try to use the public's fear of bioterrorism to aid in doing so.

Few forms of human endeavor depend as much on freedom - freedom of thought, inquiry, action and communication - as does basic scientific research. Unlike applied research, basic research is conducted largely to satisfy the curiosity of the individual investigator. Yet it is from just such research that nearly all breakthroughs emerge. The best-selling anti-cancer drug, cisplatin, was discovered serendipitously in a basic research project studying not cancer but bacteria (see *Genome Biology* 2001, 3:comment1001.1-1001.2), and the entire biotechnology industry is based on a series of discoveries by molecular biologists and biochemists who were studying bacterial processes that everyone, including themselves, thought had no practical significance. It is not a coincidence that those countries that lead in the advancement of knowledge and the creation of new industries from that knowledge are also the world's most free. Although the panel's recommendations will strike some scientists as starting biology out on the slippery slope to governmental control, and others as not going far enough to keep our discoveries out of the hands

of would-be bioterrorists, I believe they are a measured and appropriate response to the twin threats of misuse of science and government interference.

In *The Three Musketeers*, Cardinal Richelieu gives one of his agents a letter that excuses any act of villainy, even murder, as being for the good of the state. In a fine piece of irony, this letter falls into the hands of D'Artagnan, who uses it to escape the Cardinal's vengeance for having helped to kill that same agent. Likewise, the umbrella of 'national security' or 'the war on terrorism' can, ironically, be used to shelter the very abuses that it is meant to protect us from: repression and tyranny. Thus are our swords, as Brutus says at the end of Shakespeare's *Julius Caesar* (another tale of patriotic impulses gone wrong) sometimes turned "into our own proper entrails."

Voluntary restrictions, when no longer needed, are usually easily lifted; but when a government takes freedoms away it is much harder to regain them. I believe that many of those who would impose censorship and restrict our liberties do so with the best intentions. But one of the things that history teaches is that some of the worst things imaginable have been done with the best intentions. It makes it even harder to bear, if one loves one's country, that such actions are carried out by other patriotic people for the good of the state.