Commerce and freedom of inquiry

While threats against research laboratories make the headlines, freedom of research is under more serious attack from commercial pressures

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On New Year's Day 2000, I learned that some of my colleagues were allegedly in league with the Devil. The previous evening, the Earth Liberation Front (ELF) had firebombed the office of the Director of the Agricultural Biotechnology Support Project (ABSP) at Michigan State University (MSU; East Lansing, MI, USA). This project was the primary route for the US Agency for International Development to invest in agricultural biotechnology. As part of its activities, the ABSP was organizing a conference in Africa on intellectual property rights, and had accepted US\$8,000 from Monsanto (St Louis, MO, USA) to bring African leaders and scientists to the conference. Because many anti-biotechnology activists seem to believe that Monsanto is the incarnation of the Devil, they felt that the ABSP needed to be taught a lesson in the form of arson. The ELF later claimed responsibility in a fax, which justified the attack by citing the dissemination of transgenic crops by the ABSP to developing countries, although the activities of the ABSP have not yet led to the commercialization of any such crops. However, the project had a high profile and was frequently mentioned in the news, which might have contributed to the choice of the ABSP as a target of the ELF.

The separation between the office of the Director of the ABSP and my own is thin and comprises only an electrical closet. Luckily it had a reasonable amount of insulation—in any case, it prevented my office from suffering any damage. The arsonist probably walked past my display case in the hall outside. Earlier that week, I had asked my secretary to change the display to highlight some of the work of the Biotechnology Interest Group that I had recently founded, but the new display was not ready. As I

Damage to Michigan State University Agriculture Hall caused by an arson attack on 31 December 1999. Image courtesy of Greg Deruiter/Lansing State Journal (Lansing, MI, USA)

receive no funding from Monsanto, I was presumably safe, although I wonder whether the bomber would have added my office to his list, had the display case contained information on biotechnology.

I now do what the ELF and other such groups want all researchers to do—consider the connection between my research and their political and social agendas. However, the ELF is just one of many pressure groups that try to influence research agendas by directly dissuading scientists from certain lines of research, by putting political or economic pressure on university administrations or by lobbying governments. All research is subject to these pressures, but biotechnology has become

a particular focus for external groups. It is a relatively new area of inquiry that potentially has direct effects on people, raises significant ethical questions, relies heavily on the interface between the public and private sector, and has a partially formed research agenda that is susceptible to political manipulation.

Terrorism is surely among the most despicable forms of pressure, but it rarely forces a scientist to abandon his or her research agenda. By contrast, political pressure, although it is less violent and more socially acceptable than ecoterrorism, has a much greater influence. The most insidious manner in which political pressure is exerted

on public research is through funding mechanisms. Following a strategy that serves only to reinforce the stereotypical image of myopic university administrators, university scientists are now required—to qualify for tenure, promotion or increased pay—to bring in greater amounts of external funding. Grant monies that are earned by the research staff must now pay for student, postdoctoral and non-tenured staff salaries, laboratories, experiments, travel and other standard research expenses. This allows external organizations to influence the research agenda by offering grants, contracts or other financial incentives.

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Clearly, gone are the days when a researcher would present an interesting research agenda and then set out to search for funds with which to conduct this work. The redistribution of money to meet fluctuating social goals and increased competition for grants mean that the successful grant applicant tailors his or her research agenda to the availability of funds. The US Council on Food, Agricultural and Resource Economics (Washington, DC, USA), which was originally created to promote economically valuable but low-profile agricultural research, now gives tips for grant seekers such as: "Look at research areas that are in great demand by funding agencies." Need money? Start working on bioterrorism-related research.

Most of the publicly funded agricultural research in the USA is conducted under the 1887 Hatch Act, which was passed with the goal of establishing a US agricultural industry. In 1955, it was amended to include the goal of sustaining rural communities. However, the agricultural industry has a much stronger political base than declining rural communities, and traditionally the bulk of the research has centred on improved and more economically efficient methods of agricultural production. Therefore, the research agenda is dictated to some extent by politics.

The influence of industry groups is notable. At MSU, the Michigan Agricultural Experiment Station runs an initiative to match producer groups and their needs with researchers in a grant programme. I have applied for, and taken, money from this

programme, and can attest to the fact that it influenced my research agenda. In fact, influencing the research agenda to be more responsive to producer needs is one of the goals of the programme—although it could be argued that this is an inaccurate objective. National producer groups, the agricultural industry and large corporations also provide money through grants, endowments and other programmes. There is no doubt that these monetary contributions allow the exploration of research areas that would otherwise be underfunded or neglected, particularly with respect to specialty crops that do not command sufficient market value to entice private corporations to fund research.

Controversy arises because of the perceived right of farm and industry groups to control the research agenda—including research that is funded by the public. As a result of the magnitude of the funds that are involved, university administrations sometimes acquiesce to this pressure. Nearly half a century ago, two young scientists at Iowa State University (ISU; Ames, IA, USA) were asked to investigate consumer acceptance of a new product called margarine. They published a pamphlet that described their results—namely, that margarine was a close and acceptable substitute for real butter, and required fewer resources to produce. To put it mildly, the dairy industry was livid. Under industry pressure, ISU withdrew the pamphlet. In protest of this violation of academic freedom, both scientists left ISU for the University of Chicago (UC; IL, USA) and went on to develop distinguished careers: Theodore W. Schultz won the 1979 Nobel Prize in Economics for his work on human capital, and D. Gale Johnson has had several influential roles, including Chairman of the Department of Economics (UC), Director of the East Asian Studies Center (UC), Dean of the Division of Social Sciences (UC), President of the American Economic Association (Nashville, TN, USA) and President of the Board of Trustees of the National Opinion Research Center (Chicago, IL, USA).

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The perception that industry has a right to influence research agendas is even more visible in the continuing controversy over cotton subsidies. The USA provides more than US\$1.5 billion per year in subsidies to the US cotton industry, which has helped the country to become the largest producer and exporter of cotton in the world—US exports constitute 40% of the world cotton trade. Many developing countries feel that this unfairly burdens their producers and lowers the global price of cotton. The USA argues that their subsidies help farmer incomes but do not affect production decisions, and therefore have no effects on exports or trade. After years of trade negotiations, Brazil filed a complaint with the World Trade Organization (WTO) claiming that the US subsidy was a violation of free trade and the WTO rules.

To prove their point, Brazil had to provide evidence of the harm that had been done to their cotton producers. The Brazilian Government hired Daniel Sumner, who is both Professor of Agricultural and Resource Economics and Director of the Agricultural Issues Center at the University of California at Davis (UCD; CA, USA) and a former Undersecretary of Agriculture, as an economic consultant. Using economic models and data from the US Department of Agriculture, Sumner argued that in the absence of subsidies, US cotton exports would have declined by 41% and the world price would have risen by more than 12%. Brazilian farmers were consequently harmed by the lower global price that they received owing to US subsidies.

This evidence was sufficient for the WTO to rule in favour of Brazil, although the USA might appeal (Becker, 2004). It also enraged cotton producers in the USA. The *Washington Post* reported the industry reaction: "[Sumner] joined forces with the enemy to cut the heart out of our farm program," said Don Cameron, Vice Chairman of the California Cotton Growers Association and Chairman of the California Tomato Growers Association Inc. He said such an act was "unethical" because Sumner is an employee of California's public university system. "There are research projects that he's been involved with in the past that we'll direct elsewhere" (Blustein, 2004).

Earl P. Williams, President of the California Cotton Growers Association, likened the actions of Sumner to treason and called for all financial supporters of UCD to "step back until this issue is

The Michigan State University Agriculture Hall ablaze after the firebomb attack on the Agricultural Biotechnology Support project offices. Image courtesy of Chris Holmes/Lansing State Journal (Lansing, MI, USA)

resolved" (Blustein, 2004). Not only did cotton growers stand to lose US\$1.5 billion in payments, but they also felt betrayed by one of their own.

Unfortunately, the reaction of the UCD administration was less than exemplary. Despite the backing of other agricultural economists who supported the analysis presented by Sumner, Neal Van Alfen, Dean of the College of Agricultural and Environmental Sciences at UCD, said "I question [Sumner's] judgment. It's a matter of, in any organization, if you have close working relationships with a broad group of people, you want to think twice about developing relations with their competitor, and doing it in such a public way" (Blustein, 2004).

Clearly, the industry feels that by funding some research they have the right to veto other projects that are conducted by a university or its staff, and the university administration does not wholly disagree. As biological research becomes a more complex and costly endeavour, the pressure on universities to accept funds from all sources will only increase—even if the university is then indebted to those donors.

This is not the only factor that is increasingly limiting the freedom of research for university scientists. In a misguided attempt to control their staff and research expenditure, many US universities are reducing the proportion of tenured staff members. They are moving to a model in which the staff

comprises relatively few high-profile professors along with postdoctoral students and non-tenured staff members who handle the day-to-day laboratory and teaching activities, all of whom are funded externally. One of the many problems with this model is that staff members become increasingly beholden to external funds.

A second, and perhaps equally important, problem is that many administrators feel that they need to 'make a mark' or create a signature programme, which entices them to focus their attentions and funds on high-profile areas that will give them the recognition they crave. Staff are then pressured, or hired, to conduct research in these areas. However, it is not easy to determine what research will eventually become high

profile—penicillin and the transistor both languished before eventually transforming contemporary life. Moreover, is it difficult to determine which researchers will eventually contribute high-profile results—Einstein wrote his 1905 relativity paper while working for the Swiss patent office because he did not get a university job. In addition, it is unclear whether high-profile work is in fact the best outcome—the story goes that when asked what his most important policy contribution was, the Nobel economic laureate Kenneth Arrow replied that it was his economic analysis of potential US investment in the Concorde supersonic passenger plane (the US followed his recommendation not to invest). At the other extreme, health research is driven partly by the desire to solve high-profile problems and partly by the huge costs of this type of work. The result? Ninety per cent of health-research expenditure is targeted towards diseases that affect only 10% of the world population (Leahy, 2002).

In the past two decades, US universities have increasingly become ‘platform monopolists’. This concept arose in the context of information technology, wherein a platform, such as Microsoft Windows™, draws on the services of diverse engineers to write software that serves the needs of diverse clients. The platform is essentially a set of logical rules that allow both the designer and the user to be sure that the software will perform as expected. For it to be successful, the monopolist must simultaneously convince enough engineers to develop software that will run on the platform, and enough users to purchase the platform and at least some associated software.

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The university acts as a platform monopolist when it brokers money between public policy needs and research agendas. To be successful, the university must access enough funds for its research programmes, and convince enough scientists to reorient their work towards meeting the funding requirements. For example, state government

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officials might be faced with a policy issue—such as urban blight, suburban land use or declining agricultural industry—that could be helped by science or social science. The university identifies several research or other outputs that might be of sufficient interest to the government that pays for these products, and various research scientists or other staff members who would be willing to produce these outputs, if given funding sufficient to conduct the research. The platform is the set of university rules and regulations regarding research conduct, tenure and promotion. These rules are successful if they help to assure the funding agencies that they will get something useful in return for their money, and staff members that they will receive salary raises, promotions, tenure and recognition for their research.

There is no doubt that a platform monopolist offers a useful service in matching paying ‘clients’ with researchers who are in need of funds. However, two questions arise. First, is the platform monopoly the most efficient way of providing this service? The economics literature indicates that, at least in theory, the answer is no (Rochet & Tirole, 2003), although it is still too early to answer this question definitively. An interesting example is the agreement between the University of California at Berkeley (UCB; CA, USA) and Novartis (Basel, Switzerland), which was publicized most notably in *The Kept University* (Washburn, 2000) and was well studied by Busch and colleagues (Busch *et al.*, 2004). In this case, the agreement itself—with rules and regulations for access to money, databases and research outputs—is the platform. The abridged version of the story is that Gordon Rausser, who was Dean of the UCB College of Natural Resources, saw that UCB was lagging behind private industry in agricultural biotechnology research, owing to a lack of funds, a lack of access to proprietary research tools owned by the private sector and a lack of access to expensive databases (Busch *et al.*, 2004).

Rausser requested bids from the private sector for a research collaboration that would address these needs. Novartis put together the winning bid: a 5-year contract that included US\$25 million funding for UCB research and access to the Novartis database.

“Almost to a person, the faculty of [the Department of Plant and Microbial Biology] said that the combination of funds, equipment and information, enabled them to explore research questions that they otherwise would have foregone or postponed. While it was repeatedly emphasized that these shifts in direction were not dictated by Novartis, the faculty clearly acknowledged that many of the changes would not have occurred without [the UCB–Novartis agreement]” (Busch *et al.*, 2004).

So, by acting as a platform monopolist, the administration influenced the research agenda. Whether this influence was positive or negative is not clear, with Busch and colleagues (2004) finding some benefits and “very little harm”. However, the Busch report also indicated that the agreement led to a homogenization of the research agenda. This is, in fact, what is expected from a platform monopolist that is trying to enlist people to use its research platform—homogenization of the research agenda to make use of the tools that are available in the platform and/or to generate results that are of interest to its users.

This leads to the second question: should universities act in this manner? There is no doubt that by matching funds and researchers, universities have facilitated research that was not possible before; however, at the same time, they have neglected other topics. Moreover, the homogenization of departments or research agendas is not new: witness the characterization of the department of economics and the business school at the University of Chicago as ‘Chicago School Economics’, or the use of the cyclotron particle accelerator at the MSU for medical, rather than physics, research. In a world that is filled with universities, there seems to be only mild harm if a university produces a relatively homogeneous research product, rather than trying to be everything for everyone using limited resources. Nonetheless, this homogenization raises the issue of how we maintain the diversity of thought that is so important for critical inquiry, not just in the homogenized research agenda of a single

university, but across the range of universities that contribute to our base of scientific knowledge and public policy debates. What systems or forces will distinguish the homogeneous university from an issue-orientated 'think tank'?

Does ecoterrorism affect the university research agenda as much as the search for monies does? The former head of the ABSP cut down on her travel and workload, and eventually moved to another university to take up a position that was not clearly linked to biotechnology. Certainly, some ABSP activities were delayed or foregone during reconstruction and document recovery, although research continued. However, objective science that is conducted as part of the search for truth and for the public good will survive the threat of violence—that threat is too obvious and scientists are too stubborn to be deterred.

Has the ABSP changed its research agenda? Not in response to the terrorist attack. The overall objective remains to assist poor countries in developing and commercializing agricultural biotechnology to provide better food sources and incomes for the poor. Activities at MSU continue, although not necessarily under the auspices of the ABSP, which now has its headquarters at Cornell University (Ithaca, NY, USA). Johan Brink, Associate Director of ABSP II and International Coordinator of the Genetically Modified Potato Project, stated that the ELF attack served to confirm that their research is successful and energized the scientists to move forward with their research, albeit in a less high-profile manner. One of their present activities is the commercialization of a transgenic potato in South Africa, which was developed, in part, with Monsanto intellectual property. This activity will require the negotiation of a commercial and/or humanitarian license from Monsanto for their intellectual property; however, no

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funds have been sought or accepted from Monsanto since the firebombing.

More generally, the MSU firebombing is largely a forgotten incident on campus. There are no new security measures and the ABSP offices have no special alarms. Similar to anywhere else, MSU staff members are concerned with parking, excessive spending on athletics, salary erosion, problems with the administration and so on. It is unclear whether this is because they are too stubborn to give up their research agenda or too egotistical to think that another firebombing—perhaps with more serious consequences—could occur. In any case, terror in the university is not even on the MSU 'radar screen'.

Unlike the private sector, which can relocate in response to economic incentives—including the economics of remaining safe from ecoterrorists—universities are mostly fixed in their locations and in their commitments to pursue high-profile research, including biotechnology. Ecoterrorism might be able to scare away a few researchers at a time, but it is unable to stop research or to alter the research agenda in any significant way. Instead, in universities, as in the private sector, it appears that economics is driving the agenda.

As researchers, most of us look for a system with reasonable and well-articulated rules within which we can successfully conduct our work. Despite the trends of decreasing public support for universities, administrative focus on acting as a platform monopolist and increasing costs of cutting-edge research, scientists still generally think of universities as good places to work. But as we become increasingly responsible for

generating external funds to pay for our salaries and those of our research assistants, our laboratories and our travel, as well as large kickbacks to the university in the form of overheads, the question arises: what does the university really offer to the scientist? If the present trends continue, ultimately the university research scientist will lose control of the research agenda. The real threat is not ecoterrorism; rather, it is a research agenda that is held hostage to the economic needs of a financially deteriorating university system.

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