

Commercial influences on the pursuit of wisdom

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This essay examines the effects of commercialization on education with particular focus on corporatization of academic research. This trend results from a business model of education, which I identify as profit-based inquiry. I contrast profit-based inquiry with Nicholas Maxwell's conception of wisdom-based inquiry and conclude that the business model fails to achieve enduring value and results in a promotional or ideological emphasis rather than one that stresses the importance of critical rationalism. In order to make my case for this failure, I focus attention on the current state of commercialization in research of medicines.

Commercialization of the Academy

The university of the twenty-first century has lost its way. Guided by a corporate model of research and education, it can no longer lay claim to being the guardian of truth and wisdom. This misguided state of affairs is easily traced to the 1980s when the demographic of students entering university in the US changed and educational institutions began to compete for a shrinking student population by presenting themselves as consumer-oriented (Krimsky, 2006). About the same time, legislation offered the opportunity for partnerships between academic institutions and industry, hence the appearance of the academic businessman since the 1990s pursuing grants and consultancies with profit-oriented business relations.¹ University administrations openly embraced manufacturing models of management such as 'TQM' (total quality management) and directed their faculty to approach their craft as appealing to their 'student clients'.² It is not at all odd to find in such institutions a carpet salesman as the university president or the salary of a football coach that far exceeds the entire budget of a humanities department.

We have entered a period in which academic leadership is no longer meaningful at the majority of educational institutions. Deans who reached their positions by virtue of

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distinguished contributions to their academic disciplines have been replaced with fundraisers and academic managers, many of whom have degrees in university administration, business or educational pedagogy rather than first-order disciplines such as mathematics, biology, physics and history. This has produced a demoralizing situation in which the faculty is led by means other than the example of academic excellence.

Within this context I argue that: (1) the university has become profit driven in a way that did not exist 30 years ago; and (2) this state of affairs has worsened university-based research and the educational mission. While (1) does not seem to be in doubt since this is precisely what its chief architects had in mind, the question is whether (2) is true. Proponents of the free market economy aim to demonstrate how minimal Government regulation and the laws of supply and demand serve society best. They regard the university as a business and its students as clients or consumers of the educational product. Aside from the failure to recognize the value of education as an end in itself and the importance of critical, open inquiry to the pursuit of truth, this view has serious consequences for the common good of humanity. My goal is to focus attention on corporate-sponsored research in order to show how a business-model fails to achieve anything of enduring value. While I doubt the existence of a pristine past in which universities pursued 'pure' research within an atmosphere of complete academic freedom, the current situation has taken us even further away from the ideal of free inquiry driven by the pursuit of truth.

Nicholas Maxwell has long advocated a revolution in the entire structure of academic inquiry by focusing attention on the contrast between the aims of wisdom-inquiry vs. knowledge-inquiry (see especially Maxwell, 1984, 2005). His work does not directly address commercialization of the academy; however, his view of a wisdom-based goal has profound implications for seeing our way clearly to the sort of free inquiry that gives wisdom rather than economic expediency the primary place in the very mission of the academy. Here I modify Maxwell's view by contrasting wisdom-inquiry with profit-inquiry. Knowledge-inquiry is the basis for profit-inquiry, since the industries that liaise with universities are knowledge based, including but not limited to biotechnology, chemistry, pharmacology, geology, computer technologies and engineering. There is, however, a critical difference between the wisdom/knowledge-inquiry and wisdom/profit-inquiry dichotomies. The human use and value of scientific knowledge lies outside the scope of knowledge-inquiry as long as genuine knowledge is acquired, whereas profit-inquiry does make such value judgments. The problem is that the motive of profit most often results in the wrong choice with regard to how the use of knowledge will enhance the overall quality of life.³ Maxwell's wisdom-inquiry raises the important issue of what exactly constitutes the right choice.

As Maxwell makes the point:

The central task of inquiry is to devote *reason* to the enhancement of *wisdom*—wisdom being understood here as the desire, the active endeavour, and the capacity to discover and achieve what is desirable and of value in life, both for oneself and for others. (Maxwell, 1984, p. 66)

In what he calls 'rationalistic neurosis', we seem to know quite well that our goal is a more civilized world, yet our institutions are designed to do very little to achieve this goal

(Maxwell, 2005, pp. 2–4). The pursuit of knowledge as a primary goal does not address the question of what is valuable or how to achieve it. Inquiry devoted to the goal of a more civilized world would give primary focus to solving the real problems which Maxwell identifies as the development of an ecologically sustainable world in which people do not die unnecessarily for lack of food, sanitation, medical care, a world in which there is more just distribution of land, resources, and wealth among people than at present, control of population growth, solutions to urgent environmental problems, a stop to the proliferation of nuclear, chemical and biological weapons and the spread of armaments throughout the world, and the elimination of ruthless dictatorships (Maxwell, 1984, p. 67; 2005, pp. 131–132). He therefore argues that wisdom must be built into the structure of our social and political institutions so that we remain focused on the primary task of helping us solve the main problems of humanity and discover what is ultimately valuable in life (Maxwell, 1992). The point of Maxwell's work is so obvious that it has escaped notice, yet he appears to be a lone voice for wisdom in an age devoted to a piece-meal approach to knowledge and commercial profitability.

Profit-inquiry resulting from the corporate model of the university has transformed the ethos of university life and the very ideal of intellectual inquiry. Instead of making decisions about the curriculum and research based on the most important needs of humanity, the primary focus is what will result in significant revenue. There is a persistent danger that business and management studies set the model for the entire university rather than classics, philosophy, physics or biology, especially when departments are forced to show how they are profitable or how they can attract corporate sponsors and outside grant money (see especially Siegel, 2006; Andrews, 2006). One must wonder about the future of pure mathematics, symbolic logic, cosmology or Latin in a world in which business wins the day. One must wonder how this situation will produce another Bertrand Russell or Albert Einstein to inspire future generations with models of greatness.

A case of corruption in research of medicines

One place to observe the ill effects of the corporate model of the university is academic medicine. While there is little doubt that other disciplines such as physics, engineering, biology, chemistry, geology, agriculture and economics have been influenced by corporate interests in ways that do anything but promote wisdom-inquiry and solutions that aim for the betterment of humanity, the interference with medical research has demonstrated how the profit motive has produced a corruption of the very goal of medicine—'to put the life and health of [the] patient first'—which has been the professional oath of physicians beginning with Hippocrates.

Since the 1990s, one dominant theme in the medical literature is conflict of interest and the failure to disclose industry relations that bias the results of medical research (see Angell, 2000; Bekeiman *et al.*, 2003; Nature, 2001). The proliferation of connections between physicians and industry has produced an unprecedented crisis of credibility, namely, a lack of confidence in the studies that are published in the journals and in clinical medicine more generally (see Fava, 2006). Pharmaceutical companies, for example, are allowed to test their own drugs in clinical trials that are then selected for publication. In

what is now well known as the 'file drawer phenomenon', the companies select the trials that show their drugs have passed a minimal test and file away the rest that have failed. Since the companies have intellectual property rights to the data that they generate, they control the dissemination of information. The result, however, is a distorted profile of the drugs that are available to prescribing physicians⁴. The companies hire contract research organizations to conduct the clinical trials, academic researchers to design the trials and act as clinical investigators, medical communication companies to ghostwrite the publications and public relations firms to promote and advertise the drugs to the public. In many cases the lead academics who are the clinical investigators in the trial and who become the 'authors' of the publications have been on the sponsor company's payroll as 'key opinion leaders' due to their influence on prescribing habits of physicians and for the prestige that their university affiliation brings to the company's products. They will also present the results of the trial at professional conferences and promote the drugs in continuing medical education lectures. When the drugs face product liability suits in the courts, these same individuals will serve as expert witnesses in defense of the manufacturer.

Thus far this situation may not seem altogether different from the sort of relationship academics have with the publishing industry in that they will engage in a consultancy with one or more companies and join the advisory board as experts in the field, but this analogy neglects the most egregious problems of the corruption of research by manipulation of scientific results and a distortion of research priorities. There is also a significant difference between a consulting arrangement in which an academic provides an independent evaluation of the quality of a book or a series and one in which an academic promotes a product and in many cases owns stock in the company that produces it. The drug companies do not retain key opinion leaders for the acute, critical evaluation of their drugs.

Since the companies invest enormous sums to bring new drugs onto the market, failure is not an option. Aside from suppression of data in publication results, the very design of the trial is often manipulated in subtle ways that escape detection in the peer-review process. Conducting the trial drug against a treatment known to be inferior, testing it against too low a dose of the competitor drug, excluding placebo responders in the wash out phase of the trial, or using multiple endpoints in the protocol in order to select for publication the ones that produce favorable results are all common strategies of ensuring success (see Smith, 2005). When it comes to writing up the results, the sponsor company's marketing department contracts with the public relations firm and the medical writers to produce the manuscript. This typically involves several drafts of the article that are then inspected by the academic 'authors' and the sponsor company's marketing and legal departments for approval. The marketing department in connection with the public relations firm or the medical communication firm will also select the target journal well in advance of the trial results, respond to criticism from the peer-review process and in letters to the editor post-publication, and organize the distribution of journal reprints to the pharmaceutical sales force. When the article appears in the target journal, the ghostwriter either disappears or is acknowledged in the fine print as having provided 'editorial assistance'. The job of the ghost, after all, is to remain invisible in order to conceal conflicts of interest with industry and create the appearance of objective science. In some of the worst instances, the academic co-conspirators in this process are simply paid to have their

names appear on papers in which they played no role at all (see Fugh-Berman, 2005; McHenry, 2005; Kassirer, 2005). In this manner, the much esteemed peer-review process has devolved into an information-laundering operation for the pharmaceutical companies (Horton, 2004). Medical journal articles reporting on drug trials have become little more than advertisements (Healy, 2004b).

While some of the editors of the leading medical journals have fought to expose the degree to which their literature has been infiltrated by industry, there is enormous pressure on editors to adopt positions that favor the companies (Horton, 2004, p. 7; also see Lexchin & Light, 2006). The publishers or scientific societies that own the medical journals derive enormous revenue from the pharmaceutical advertising and the commercially valuable content which nets the journal handsome sums in the sale of re-prints (Smith, 2006; Glassman et al 1999). Universities that profit from the clinical trial revenue also play a part in maintaining this situation since there is little motivation to investigate their own academics for scientific misconduct or for inflating their CVs with the ghostwritten publications. For one of many such conflicts of interest, see Bass (1999). How this behavior serves as a model for students who might feel the pressure to cut corners or fudge research results is disturbing, especially in a field in which the consequences are potentially fatal.

We all become guinea pigs in post-marketing surveillance given the failure to convey honestly the results of research that brings the drugs to market. The stories of the painkiller, rofecoxib (Vioxx), and the anti-depressants such as paroxetine (Paxil, Seroxat) have been exposed in the lay press, but they are merely two examples of the general problem with corporate-sponsored research and a failure of Government to regulate (see Kesselheim & Avron, 2007). It would seem that rigorous testing of their drugs would be in the company's best, long-term interest, but as long as the corporate structure is led by marketing rather than science there is very little that will alter the goal of maximizing the value of their shareholder's stock. Even the probability of expensive litigation is calculated into the cost-benefit analysis of bringing a new drug on the market.

Another major issue of concern in medicine related to the influence of the pharmaceutical industry is marketing strategies designed to increase artificially the number of patients on their drugs. This occurs in a number of ways: first involving the creation of patient support groups and patient compliance programmes, both of which are fronts for the companies; second in the way that the companies liaise with medical organizations in defining diseases or treatment; and third in the attempt to gain regulatory approval or promote off-label use for many indications of the same medicine.

Pharmaceutical companies operate behind the scenes by sponsoring support groups and compliance programs to make sure as many people as possible become consumers of their products and remain on these products for as long as possible. Since the companies realize that the doctors are crucial to expanding these markets, development of key opinion leaders serves the goals of creating awareness of the dangers of undiagnosed 'disease' and introducing the drugs into as many hospital formularies as possible. What appears to be in the best interest of patients, however, is in reality a marketing strategy designed to convince people that something is wrong with them that requires pharmacotherapy. A recent UK House of Commons report on the influence of the pharmaceutical industry identifies this phenomenon as 'the medicalization of society', namely, the 'trend towards categorizing

more and more individuals as “abnormal” or in need of drug treatment’ when in fact the so-called diseases requiring treatment are merely ordinary conditions of life (House of Commons Health Committee, 2005, pp. 100–101). When does worry become ‘general anxiety disorder’ or shyness become ‘social anxiety disorder’? When is inability to concentrate ‘attention deficit disorder’ or premenstrual syndrome ‘premenstrual dysphoric disorder’? While there is an important question in medicine about whether and when patients should be on medications to treat high blood pressure or high cholesterol, in psychiatry the categories of illness multiply with each appearance of a new edition of the *Diagnostic and statistical manual of mental disorders* (DSM) (American Psychiatric Association, 2005). The committees formed to provide the definitions in this bible of psychiatry are composed of psychiatrists who have extensive ties to industry, including key opinion leaders. This has led to the charge of ‘disease mongering’ in a profession that is almost entirely dependent on the pharmaceutical industry (see Moynihan & Cassels, 2005; McHenry, 2006).

Once a drug is tested in clinical trials and gains regulatory approval it is licensed for an ‘indication’, major depressive disorder, for example. But the company might also test the same drug for social anxiety disorder, pedophilia or compulsive shopping. In the parlance of industry this is known as ‘evergreening’. In order to develop ‘green’ pastures for potential markets, regulatory approval of several indications means more patients taking the same drug. One investigation into the process of approval showed in the case of antidepressants the standard ‘better than nothing’ means a clinically negligible advantage of the drug over placebo. In some studies, placebo control groups duplicated 80% of the response to medication (see Smith, 2000; Krisch *et al.*, 2002). Even when the drugs are not approved, they can still be prescribed ‘off-label’, if the prescribing physician believes the drug will benefit the patient. While it is illegal for the companies to promote their drugs off-label, key opinion leaders will engage in their promotional efforts for them by presenting the results of the trials at scientific conferences and signing on to the ghostwritten articles that claim the drugs are safe and effective.

Finally, instead of focusing attention on the greater medical needs of the world’s population, the profit motive of pharmaceutical research gives priority to the development of blockbuster drugs that are promoted and sold to the wealthy first-world countries (Chirac & Torreele, 2006). Here again the markets are created and expanded by advertising campaigns and promotional efforts described above. The drive is to develop similar chemical compounds that are already manufactured by competing companies for what, in many cases, are relatively trivial conditions or lifestyle problems. So, for example drugs that treat heartburn, obesity, hair loss, toenail fungus, sexual performance, depression, allergies, high cholesterol, and the like will provide enormous profits to the companies while other important drugs that are less profitable will not be developed or will be discontinued. Examples of this latter group include certain anesthetics, antivenins, antidotes for drug overdoses, anticlotting drugs, antibiotics, and vaccines against flu and pneumonia, many of which are lifesaving treatments (Angell, 2004, pp. 91–93). While newly-developed drugs to treat HIV/AIDS might be thought of as a counter-example to the view argued for here, a deeper investigation of such advances reveals that the real source of success was not profit-inquiry via key opinion leader development, but rather liaisons between government, universities and other non-profit research before the compounds were handed over to private drug

companies for further development, manufacture and distribution (see Angell, 2004; National Institutes of Health, 2000; Consumer Project on Technology, 2000).

In summary then the general complaint heard in both the mainstream medical journals and in the urgent need to warn the public in the lay media is that marketing has usurped science as the results of rigged clinical trials have infiltrated the peer-reviewed literature and disinformed physicians about the true risks and benefits of medication (in addition to Angell, Kassirer, Healy, and Moynihan and Cassels above, see Avorn, 2004; Law, 2006). Academics have compromised the integrity of their fields by becoming a party to scientific fraud and the attempt of industry to gain complete control of medicine by manufacturing consensus. Message-driven models of public relations strategy have become the standard against data-driven science due to the simple fact that industry is the funding source. This is a serious problem in what is meant to be an age of evidence-based medicine. Moreover, there is the central problem concerning the manner in which commercial pressures distort priorities of research, which in the case of developing medicines results in choices driven by maximizing profit rather than greater medical needs. In both of these aspects—scientific testing and establishing priorities—we see how profit-inquiry fails to produce anything of lasting value for humanity. What value there is at present is largely the result of breakthroughs made decades ago. As David Healy makes the point: ‘We are living off scientific capital accumulated in an earlier age’ (Healy, 2006, p. 17).

The focus of my case against the corruption of medicine is industry-sponsored clinical research, the involvement of academics in lending credibility to biased testing, and promotion masquerading as science. This malpractice should not, however, be understood to apply to the whole of medicine, including practising doctors and nurses who adhere to their professional duties with utmost concern for principles of altruism.

The relevance of Popper’s critical rationalism

In a world in which medicine is sponsored by GlaxoSmithKline, Eli Lilly, Pfizer and Merck, geology by Exxon, British Petroleum, and Chevron, nutrition by the McDonalds Corporation and Kraft Foods, and physics by Rockwell Aerospace and General Electric, the common good of humanity is replaced by competition of special interests, all of which are engaged in marketing and promotion rather than a critical assessment of ideas. How far one can extrapolate from the example of academic medicine is unclear. Some relations between industry and the academy will have less corruptive effects. As Arthur Schafer points to the negative effects of commercialization on biomedical and fossil fuel energy research, he argues:

The fundamental ethos of contemporary scientific research has evolved so rapidly during the past few decades that it would scarcely count as hyperbole were one to describe the process as a ‘revolution,’ or perhaps as a ‘commercial revolution’.... Although no branch of inquiry, from agriculture to climate change, has escaped the revolution, the change has been more dramatic in the field of biomedicine than in any other area of university research. (Schafer, 2004, p.14)⁵

The broad consequence of this situation, which I believe is very close to what we have at present, is that our ideal of an open, democratic society is threatened by an oligarchy of

corporations. I argue that the university must assume the responsibility of the common good of humanity and the pursuit of truth above and beyond special corporate interests. Instead, universities deprived of proper funding from Government have become instruments of industry by doing their research for them or serving as agents for the promotion of their products.

In this context, I suggest that a combination of Karl Popper's critical rationalism and Maxwell's philosophy of wisdom would restore the integrity of the university. In place of the propaganda model, which Popper viewed as an integral part of the closed, totalitarian society, he argued that true intellectual advance depends on rigorous criticism, first in the genuine testing of scientific hypotheses and second in the assessment of ideas more generally. The freedom to advance ideas and have them properly tested is the basis of our cherished open, democratic society (Popper, 1945). But it appears that we merely pay lip service to the ideal of democracy when corporate interests dominate aspects of our society where they do not belong.

For Popper it is always easy to get confirmations of scientific hypotheses—especially, I would add, when industry is in control of the process—but a genuine test must risk falsifying the theory being tested. Protecting the hypotheses by ad hoc modifications or by designing experiments that make them immune from refutation always lowers the scientific status of the views advanced or puts them into the same category as pseudo-science (Popper, 1963). As a methodology of science, Popper's falsificationist theory has been embraced as the most accurate description of the aims of rigorous science. Applying Popper's ideas to the case of industry-sponsored research of medicines, when knowledge is viewed as the intellectual property of the industry that has sponsored the research, we have nothing but the marketplace itself as the test. Yet the current state of medicine has shown the marketplace has generally failed to expose the extent of the corruption, or to reveal the flaws in products fast enough to protect patients from serious harm and death. Industry is not programmed to do the critical, scientific testing; rather it is designed to circumvent the process to minimize financial loss, eliminate competition and suppress criticism.

Popper would have certainly viewed the activities of the pharmaceutical industry as a decisive step backwards, as a sort of promotional ideology rather than a serious science, and as a failure of Government to protect science from those political forces that favor the interests of industry. In *The poverty of historicism*, he imagines conditions under which scientific progress would be arrested, and with uncanny vision into our current situation, he discusses the control of laboratories for research, suppression of control of scientific periodicals, and the suppression or control of scientific conferences and universities. Science cannot advance when certain theories, hypotheses and views are protected, and especially when the testing itself is manipulated such that falsification is impossible. Popper recognized ultimately that 'progress depends very largely on political factors; on political institutions that safeguard the freedom of thought: on democracy' (Popper, 1961, p. 155). The free market cannot trump the interest of the open society in scientific progress.

When Popper generalized his falsificationist conception of scientific method to social and political problems in his critical rationalism, it became clear that he had foremost in mind

the benefits of intellectual honesty and some form of rational testing for a liberal democracy. Truth does not come easy. The proper job of the university is to guard against facile, superficial, or commercialized conceptions of the good life. Indoctrination in ideology and promotional models of business are not education. But Popper's critical rationalism does not quite take us far enough to the pursuit of wisdom. His focus was the objectivity of knowledge and as such he embraced a form of what Maxwell called 'knowledge-inquiry' or the 'philosophy of knowledge' by construing social problems as problems of the social sciences aimed at the discovery of scientific social laws. As Maxwell writes:

Popper's line of argument has the effect of prohibiting the one social change that is now so urgently needed if humanity is to discover, little by little, how to tackle its common problems in more cooperative and humane ways—namely a change in academic inquiry, and above all in social inquiry, from knowledge to wisdom ...

According to the philosophy of wisdom, it is the fundamental intellectual obligation of every teacher, every social inquirer, every scientist and scholar, in his or her professional work, to put forward and criticize proposals for cooperative action intended to promote the realization of what is of value in life and to encourage others to do this. ... The vital point is to promote in a society the *habit* of putting forward and criticizing proposals for action intended to help achieve what is of value. (Maxwell, 1984, pp. 196–197)

While the proponents of knowledge-inquiry such as Popper have a legitimate complaint against the manipulation of scientific results, profit-inquiry remains silent. Where the flaws are most obviously revealed in knowledge-inquiry, however, is with respect to assigning priorities to research, for here there is nothing that directs us to promoting human welfare or working for the relief of avoidable suffering. Maxwell's wisdom-inquiry addresses both problems of corruption of the scientific process by commercial influences and the misaligned goals of research that result from profit-inquiry.

Conclusion

Socrates is the anti-corporate hero in commercially prosperous but wisdom impoverished Athens in the fifth century BC. He devoted his life to the achievement of wisdom and exhorted his fellow citizens to pursue what is of ultimate value in life rather than material pleasures and the pursuit of moneymaking. This became one essential part of Plato's vision of the ideal state in his *Republic*. Plato saw quite clearly that the guardians of wisdom had to be protected from commercial influence. They were therefore selected for their intellectual vigor rather than their appetite for property (Plato, *The Republic*, chapters 10 and 11). Western democracies have failed to take notice of the relevance of this mechanism for preventing corruption in our political leadership. Popper famously rejected Plato's idea of the philosopher-kings as a totalitarian betrayal of Socrates since the morals of the *polis* were to be protected by a strict censorship and the commands of the philosopher-kings enforced by a special class of guardians (Popper, 1945). However, there is most certainly agreement here about the need to protect intellectual inquiry from the special interests of industry. The university must guard against becoming an extension of these interests. What we gain in long-term service to humanity is far greater than what we lose in monetary embellishment of the institution.

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Notes

1. The Bayh-Dole Act or Patent and Trademark Law Amendments Act of 1980 for example gave US universities intellectual property control of their inventions that resulted from federal Government-funded research. For a discussion of the effects of Bayh-Dole and the privatization of knowledge, see Horton (2004).
2. While I write from the point of view of an academic in the US, my impression is that universities in the UK are on a similar path even if the details of the emergence differ. Six books that address the erosion of scholarly independence in the market model university and the threat to the future of intellectual inquiry in North America include: Lawrence C. Soley, *Leasing the ivory tower: the corporate takeover of academia* (1995), Sheila Slaughter and Larry L. Leslie, *Academic capitalism: politics, policies and the entrepreneurial university* (1997), Neil Tudiver, *Universities for sale: resisting corporate control over Canadian higher education* (1999), Geoffrey D. White and Flannery C. Hauck (Eds) *Campus, Inc. corporate power in the ivory tower* (2000), Derek Bok, *Universities in the marketplace: the commercialization of higher education* (2004) and Sheldon Krimsky, *Science in the private interest: has the lure of profits corrupted biomedical research?* (2003).
3. Whereas Maxwell's focus is the quality of human life, I should include both human and non-human animals in the calculus. I assume here that Maxwell would object to the knowledge resulting from vivisection or other painful experiments on non-human animals even if this knowledge were to benefit humans.
4. The cases of David Healy, Nancy Olivieri and Aubrey Blumsohn have shown the consequences to medical careers for those who refuse to read the results of research in the manner prescribed by the sponsor companies. For Healy, see his *Let Them Eat Prozac* (2004a); for the case of Olivieri, see Schafer (2007, pp. 111-115); for the case of Blumsohn, see Baty (2005, p. 9). Schafer explicitly connects the biomedical scandals of Healy and Olivieri with corporate sponsorship of research in his 'Biomedical conflicts of interest: a defense of the sequestration thesis—learning from the cases of Nancy Olivieri and David Healy' (2004, pp. 8-24).
5. Aside from biomedical research, Schafer points to the British government's 'subsidizing the oil and gas industry's profits to the tune of 40 million pounds every year through the "capture" of some of Britain's most respected academic institutions'.

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