From knowledge-inquiry to wisdom-inquiry: is the revolution underway?

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In the final paragraph of his 1984 book *From knowledge to wisdom*, *a revolution in the aims and methods of science*, the philosopher Nicholas Maxwell boldly declared that an intellectual revolution was underway in the aims and methods of science, and academic inquiry in general, from what he termed knowledge-inquiry to wisdom-inquiry. Twenty years later, this article discusses to what extent this revolution has taken place.

Introduction

For more than 30 years, Nicholas Maxwell has argued that we need a revolution in the aims and methods of academic inquiry. Instead of giving priority to the search for knowledge, or knowledge-inquiry, academia should devote itself to wisdom-inquiry; seeking and promoting wisdom by rational means, wisdom being understood to mean the capacity to realize what is of value in life, for oneself and others (wisdom thus including knowledge but much else besides).

What is knowledge-inquiry? At its most basic, it is simply the search for knowledge, or truth, but in its more common, more humane form, it can best be summed up by Farrington's description of Francis Bacon's 'great idea':

> The idea is a commonplace today, partly realized, partly tarnished, still often misunderstood; but in his day it was a novelty. It is simply that knowledge ought to bear fruit in works, that science ought to be applicable to industry, that men ought to organize themselves as a sacred duty to improve and transform the conditions of life. (Farrington, 1951, p. 3)

Thus knowledge-inquiry may be characterized as having two basic aims: (1) the acquisition of knowledge; and (2) the use of that knowledge to help people, society, the environment, etc.

Maxwell is critical of knowledge-inquiry because it does not give priority to articulating, and improving the articulation of, our problems of living, and proposing and critically

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assessing possible solutions and possible actions. And so academic inquiry pursued in accordance with knowledge-inquiry, whilst it can often be wonderfully beneficial, can also sometimes be enormously harmful:

> It is hardly too much to say that all our current global problems have come about because of the successful scientific pursuit of knowledge and technological know-how dissociated from wisdom. The appalling destructiveness of modern warfare and terrorism, vast inequalities in wealth and standards of living between first and third worlds, rapid population growth, environmental damage—destruction of tropical rain forests, rapid extinction of species, global warming, pollution of sea, earth and air, depletion of finite natural resources—all exist today because of the massively enhanced power to act (of some), made possible by modern science and technology. Nevertheless, science as such is not the problem, but rather science dissociated from the pursuit of wisdom. (Maxwell, 2003, p. 24)

In contrast to knowledge-inquiry, wisdom-inquiry would give intellectual priority to the personal and social problems we encounter in our lives as we strive to realize what is of value, problems of knowledge and technology being intellectually subordinate. In this way, says Maxwell, wisdom-inquiry is better able to help us to resolve the global problems described above.

Aim-oriented empiricism, aim-oriented rationality and wisdom-inquiry

There is no doubt that wisdom-inquiry *has* been put into practice, at least to some degree, in ignorance of Maxwell's detailed discussion of the explicit steps needed to be taken to put it into practice. (Maxwell himself uses the example of Albert Einstein in *From knowledge to wisdom* and elsewhere.) There have always been individuals more aware of the wider implications of their work, just as there are those who only see as far as the next experiment.

Nor is there any doubt that Maxwell's ideas have, on the whole, been well received; over a 30-year period, a number of his central arguments have been endorsed by academics in a wide variety of disciplines. The philosopher George Kneller was an early and enthusiastic supporter:

> Maxwell's theory of aim-oriented empiricism is the outstanding work on scientific change since Lakatos, and his thesis is surely correct. Scientific growth should be rationally directed through the discussion, choice, and modification of aim-incorporating blueprints rather than left to haphazard competition among research traditions seeking empirical success alone. (Kneller, 1978, p. 84)

Kneller concluded that 'No other theory provides, as Maxwell's does in principle, for the rational direction of the overall growth of science' (Kneller, 1978, p. 91).

When *From knowledge to wisdom* was first published it received many favourable reviews.[1] The late Professor Christopher Longuet-Higgins, physicist, chemist and cognitive scientist, wrote a glowing review in *Nature*, concluding that 'There are altogether too many symptoms of malaise in our science-based society for Nicholas Maxwell's diagnosis to be ignored' (Longuet-Higgins, 1984, p. 204). The philosopher Mary Midgley described *From knowledge to wisdom* as 'this powerful, profound and important book' (Midgley, 1986, p. 427).

And over the years Maxwell's work has influenced scholars in a range of disciplines, including anthropology (Harris, 1979), psychology (Dixon, 1987; Chisholm, 1999; Katzko, 2004), literature (Lodge, 2002), economics (Blaug, 1980), philosophy (Harré, 1986; Midgley, 1989; Dennett, 2003), environmentalism (Burrows *et al.*, 1991), technology studies (Martin, 1997), engineering (Elms, 1989), rhetoric (Crowley, 1989) and education (Hargreaves & Hargreaves, 1983; Awbrey & Scott, 1994; Elliot, 1989, 1990).

To give some specific examples from education, John Elliott, Professor of Education within the Centre for Applied Research in Education at the University of East Anglia has explored in some detail the relationship between Maxwell's view of inquiry in general and the development of a theory of educational action research (Elliott, 1989). He also favourably mentioned Maxwell's work in his Presidential Address to the British Educational Research Association (Elliott, 1990).

In 1994, Lee Shulman, now president of The Carnegie Foundation for the Advancement of Teaching, and the late Donald Schön, of the Massachusetts Institute of Technology, both gave presentations praising Maxwell's work (especially Maxwell, 1992) to the American Association for Higher Education Conference on Faculty Roles and Rewards (Shulman, 1994; Schön, 1994). Shulman recently stated in a personal communication to the author that 'I continue to find the ideas expressed as sadly sensible'.

Susan Awbrey, now Vice-Provost for Undergraduate Education, Oakland University, and David Scott, former Chancellor of the University of Massachusetts Amherst, have also favourably discussed Maxwell's work (Awbrey & Scott, 1994) and not only agree that a revolution of the sort he describes is necessary, but that 'the university [of Massachusetts Amherst] has already begun a transformation to the philosophy of wisdom'. They go on to state:

> Essentially, Maxwell is saying that universities must move from a limiting philosophy of knowledge to a philosophy of wisdom. We believe that this broader vision must be found if we are to inhabit a world in which people are prepared and willing to deliberate about issues that affect their lives and to take responsibility for the decisions that will maintain and enhance democracy.

Unfortunately, having quoted with approval Maxwell's basic message—that problems of knowledge and understanding need to be tackled as rationally subordinate to intellectually more fundamental problems of living—the authors then decide to take quite a different tack. In considering how a change to wisdom-inquiry might impact upon their university they state that 'it is first necessary to say what one means by wisdom', even though Maxwell himself makes it abundantly clear that when talking about wisdom-inquiry, wisdom should be taken to mean the capacity to realize what is of value in life, for oneself and others. A general discussion of the meaning of wisdom is not only unnecessary, it can actually be counter-productive, as in this instance. Awbrey and Scott, having discussed several different conceptions of wisdom, settle upon one that is quite far removed from Maxwell's meaning of the term. It is based upon a seven-stage model of reflective judgement developed by Karen Kitchener and P. M. King (Kitchener & Brenner, 1990):

1. Knowledge simply exists and therefore, does not need justification.
2. Knowledge is absolutely certain, or certain but not immediately available.

3. Knowledge is absolutely certain or temporarily uncertain.
4. Knowledge is idiosyncratic since situational variables dictate that we cannot know with certainty.
5. Knowledge is contextual and subjective.
6. Knowledge is personally constructed via evaluations of evidence, opinions of others, etc, across contexts.
7. Knowledge is constructed via the process of reasonable inquiry into generalizable conjectures about the problem at hand.

Awbrey and Scott state that 'in these last stages we see the emergence of wisdom'. Maybe so, for one meaning of wisdom, but nowhere in this model does there appear to be an awareness that problems of knowledge and understanding need to be tackled as rationally subordinate to intellectually more fundamental problems of living, as Maxwell's wisdom-inquiry requires. It is just knowledge-inquiry described as wisdom-inquiry.

Consequently, when Awbrey and Scott conclude that 'To construct a university based upon the philosophy of wisdom will require us to move to stage seven of Kitchener and King's model,' they are unfortunately mistaken. Although such a move might make the University of Massachusetts Amherst a better institution, is not really moving it towards wisdom-inquiry in the way described by Maxwell.

But I do not wish to be critical, as Awbrey and Scott clearly do appreciate the importance of Maxwell's argument that there is a need fundamentally to transform academic inquiry. And this is more than can be said for most academics. Indeed, it is not an exaggeration to say that the vast body of academic work has proceeded on its way entirely unaffected by Maxwell's work. The evidence that a revolution has taken place, or is doing so, remains decidedly mixed, at least as far as the detailed steps of Maxwell's revolution are concerned.

For example, consider the situation with regard to scientific inquiry specifically. Wisdom-inquiry does not simply require scientists to be a bit more forward looking in their research; to bear in mind ethical or environmental implications, that sort of thing. Rather, it requires that science abandons the orthodox view that the intellectual aim of science is truth per se, the basic method being to assess claims to knowledge impartially with respect to the evidence. Instead, scientists need to acknowledge that the real aims of science inherently involve problematic assumptions concerning metaphysics, values and politics. Scientists then need to adopt and put into practice what Maxwell calls aim-oriented empiricism, a conception of scientific method that creates a framework of relatively unspecific, unproblematic aims and methods within which much more specific and problematic aims and methods may be improved as scientific knowledge improves. Aim-oriented empiricism can be generalized to form aim-oriented rationality, a conception of rationality specifically designed to help us achieve worthwhile, problematic aims whatever we may be doing. Here, too, a framework of relatively unspecific, unproblematic aims and associated methods is created within which much more specific and problematic aims and methods may be improved as we proceed. Finally, social inquiry and the humanities have the task of helping humanity discover how to put aim-oriented rationality into the fabric of social life, into all other institutions besides science. The outcome of all this is wisdom-inquiry.

But what this means in practice is that scientists are being asked to transform the way in which they work, and this will clearly be a very difficult thing for a successful, practising scientist to do, especially when the message is coming from a non-scientist. And I have to say more generally that I have found very little evidence that any academic or institution is trying to transform their work along the lines advocated by aim-oriented empiricism or aim-oriented rationality. However, if one takes a more general outlook, if one regards wisdom-inquiry as putting social, ethical, environmental and other *human* considerations at the very heart of academic inquiry, then many of the signs are much more favourable.

Interdisciplinary research initiatives

Over the last few years a number of interdisciplinary initiatives have been specifically set up in order to tackle some of the major social and environmental problems confronting mankind. These initiatives do not just involve research groups from different departments of the same academic institute, but research groups from different institutes.

Perhaps the most impressive example of this is the Tyndall Centre for Climate Change Research (www.tyndall.ac.uk). Founded in 2000 by 28 scientists from various different research institutes, it is based in six universities, has links with six others, and is funded by three research councils; the Natural Environment Research Council (NERC), the Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC).

The Tyndall Centre brings together scientists, economists, engineers and social scientists, who work together to develop sustainable responses to climate change through trans-disciplinary research and dialogue on both a national and international level - not just within the research community, but also with business leaders, policy advisors, the media and the public in general.

Such inter-departmental and inter-university cooperation, to tackle global problems of living, is a vital part of the move towards wisdom-inquiry. And the Tyndall Centre is not alone in such an approach.

The UK Energy Research Centre (www.ukerc.ac.uk) was established in 2004 following a recommendation from the 2002 review of energy initiated by Sir David King, the Government's Chief Scientific Advisor. Their mission is to be the UK's pre-eminent centre of research, and source of authoritative information and leadership, on sustainable energy systems. The Energy Research Centre comprises over 80 researchers based across the UK at various universities and institutions and, like the Tyndall Centre, is funded by the EPSRC, the NERC and the ESRC.

Similar initiatives exist at both Oxford and Cambridge universities. At Cambridge, there is the Cambridge Environmental Initiative (www.cei.group.cam.ac.uk). Launched in 2004, it aims to facilitate and support interdisciplinary environmental research within the University of Cambridge and to provide research-driven colloquia to promote networking and communication between academics with related research interests. The members of the Cambridge Environmental Initiative Steering Group include representatives of each of the six academic schools in the University: Arts and Humanities, Biological Sciences, Clinical

Medicine, Humanities and Social Sciences, Physical Sciences and Technology. It is thus truly interdisciplinary.

At Oxford, there is the Oxford University Centre for the Environment (www.ouce.ox.ac.uk). Launched in 2005, it consists of the academic department of the School of Geography and two established research centres; the Environmental Change Institute and the Transport Studies Unit. There are over 30 academic staff members in the Centre engaged in research and teaching and more than 50 researchers. The Centre has strong links with both the Tyndall Centre for Climate Change Research and the UK Energy Research Centre.

Other more modest groups exist at other universities. They have been created in order to carry out research into, and so find solutions to, some of the major social and environmental problems confronting mankind. To this end, they are to some extent representative of a wisdom-based approach to inquiry.

Professional bodies

As I write, work is currently underway to produce the third edition of *On being a scientist: responsible conduct in research* (second edition available online at http://books.nap.edu/readingroom/books/obas/). First published by the Washington-based National Academy of Sciences in 1989, and updated in 1995, *On being a scientist* sought to describe the ethical foundations of scientific practices and some of the personal and professional issues that researchers encountered in their work.

It cannot be denied that the booklet concentrates on the responsibilities of scientists for the advancement of science—chapter headings include 'Conflicts of interest', 'Misconduct in science' and 'Responding to violations of ethical standards'—but there is also recognition that scientists have additional responsibilities to society:

> Even scientists conducting the most fundamental research need to be aware that their work can ultimately have a great impact on society. Construction of the atomic bomb and the development of recombinant DNA—events that grew out of basic research on the nucleus of the atom and investigations of certain bacterial enzymes, respectively—are two examples of how seemingly arcane areas of science can have tremendous societal consequences.

However, although the booklet states clearly that if they find that their discoveries have implications for some important aspect of public affairs, scientists have a responsibility to call attention to the public issues involved, it falls short of suggesting that scientists might consider curtailing or abandoning their work if it has unwanted implications or recognizing that the public can play an active part in helping to articulate the aims and methods of science. It clearly puts the science first, and society second, and as such is more oriented towards knowledge-inquiry than wisdom-inquiry. Whether the third edition will expand upon the role of the scientist in society, time will tell.

If it did, it would certainly bring it more into line with current thinking at other scientific bodies, such as the British Association for the Advancement of Science and The Royal Society. There are elements of wisdom-inquiry in the recent Presidential Addresses of both organizations. The British Association's President for 2004–2005 was Professor

Robert Winston and he used his Presidential Address (available online at www.the-ba.net/ the-ba/Events/FestivalofScience/FestivalNews/_BAPresidentialAddress2005.htm) to discuss the future of science and the role of the scientist in society. Throughout the address, he emphasizes the social nature of science. He begins by making the point that 'whether scientists like it or not, technological advance is now increasingly seen as a massive threat—to mankind, and to our planet. And rightly'. In other words, a clear recognition of the problems which arise from science pursued in accordance with knowledge-inquiry.

He goes on to criticize the direction in which science is being pushed by the Government:

> We have recently seen that the UK Government is committed to scientific research because it is convinced that it will make Britain more economically competitive. … In the UK, economic reasons seem almost entirely the only stated reason for the increased funding— science is seen as a financial investment. … Science is no longer seen as an essential part of our culture or as an important expression of essential human inquisitiveness.

In other words, the essential social element of science is being compromised for the sake of economic considerations. But it is this social element that is vital for science, says Winton. Scientists need to take greater notice of public concerns, and relate and react to them. He argues that the time is right for academically examining the means and the details of public engagement. He describes a recent publication from the UK think tank, Demos, which has argued the case for so-called 'upstream public engagement'. It recently suggested that lay members of the public should be much more involved in deciding which scientific research is done and how it is conducted, something which is at the very heart of wisdom-inquiry.

Winston is also not afraid to admit that many people do not consider that scientists take the ethical implications of their work seriously enough. As the geneticist Elof Axel Carlson recently noted: 'Scientists sometimes argue that their job is to solve the technical or scientific problems, and it is not their responsibility how that knowledge is put to use' (Carlson, 2006, p. 15). For Winston, this is unacceptable; ethical considerations should be a fundamental part of science (which is another element of wisdom-inquiry):

> Nowhere are science undergraduates routinely taught ethics. Few budding scientists and engi- neers have formal training in thinking about the public implications of what they are learning. My impression, in lecturing and giving seminars in many British and overseas universities, is that young scientists are eager to understand the ethical aspects of the technology for which they may be responsible. … Every university teaching science should include compulsory modules which are concerned with the ethics of conducting science and the consequences of not considering the social implications of new technology.

Winston ends his address with a number of 'challenges for scientists'. There are several that are relevant to wisdom-inquiry. In the first challenge, Winston makes the point that sometimes the public may be absolutely right that the technology that scientists create is not to be fully trusted and that scientists need to accept this. New technologies can undoubtedly lead societies into danger, and scientists need to be more modest in openly accepting these risks. In Challenge 5, Winston states that scientists need to help Govern- ments to research how much engagement contributes to public trust and what are the best ways of conducting it: 'If the public truly owns science, then we have a duty to find

out how they want to use it'. And in Challenge 7 he states simply that 'Scientists need to be educated in ethics and demonstrate more understanding of ethical issues'.

Several of the points made by Professor Winston are also to be found in Lord May's 2005 Anniversary Address to the Royal Society (available online at www.royalsoc.ac.uk/publication.asp?year=2005&id=2181). May begins by arguing that the advances in scientific understanding that are the legacy of the 'deliberately experimental and fact-based Enlightenment' have resulted in today's world being 'the best of times and the worst of times'. It is the best of times because we are healthier, better fed, and with more energy subsidies than ever before; it is the worst of times because the well-intentioned actions that gave us better health, more food and more energy all have unintended adverse consequences, which we are only just beginning fully to appreciate. (For Maxwell, this is at least partly as a result of science being pursued in accordance with knowledge-inquiry.)

May's next point is most interesting. He argues that because the problems that we face are global in nature, 'the involvement of the scientific community—in basic understanding, in practical measures, and in policy recommendations—needs to transcend national boundaries'.

In saying that scientists have a significant role to play in the resolution of these problems, there is the clear recognition that science is part of the cause. This is a notable change from the past, when scientists were ready to accept praise for the good things that came from science, and yet quick to deny blame for the bad, putting the blame instead upon certain individuals or humanity in general. Carlson again:

> Some scientists walk away from personal responsibility, believing that they only provided the know-how and were not authorized to make the decisions that harmed others. That is generally true for those whose research is not intentionally applied and who were only seeking to understand nature. It is almost certainly false for those who work to apply science for human use. (Carlson, 2006, p. 16)

May's address is further evidence of the growing appreciation by scientists that science is very much a part of society, and can contribute both good and bad to that society. This is best illustrated by the following passage:

> In everything I have said above there is the implicit, but hugely important, assumption that the scientific community has an obligation to explain itself—its agenda, its achievements, and their potential applications—to the public. This means individual scientists engaging more with wider society, explaining what they do and why, and responding through dialogue and debate to the interests, concerns and aspirations of the public. Such engagement is not always easy, in part because it often requires simplifying things (usually painful to researchers for whom the details can be entrancing), and must always avoid distortion. This dialogue between researchers and the general public—or, more accurately, the many and varied 'publics'—has in recent years been seen as an integral part of the scientific process. The UK has, I believe, been a leader in this, partly as the result of unfortunate earlier experiences (BSE in particular). The Royal Society hopes that, through its 'Science in Society' programme and other activities, it has been creative in its exploration of such engagement.

As was mentioned earlier, active involvement of the public in scientific research is at the heart of wisdom-inquiry and the Science in Society programme to which May refers (available online at www.royalsoc.ac.uk/page.asp?id=1988) is a significant step towards achieving

this. The programme was set up by The Royal Society in 2000 in response to controversies over BSE and genetically modified foods. It has five main aims:

1. To develop a widespread, innovative and effective system of dialogue with society.
2. To involve society positively in influencing and sharing responsibility for policy on scientific matters.
3. To embrace a culture of openness in decision-making.
4. To take account of the values and attitudes of the public.
5. To enable the Society to promote the national science policy.

It can be seen from these aims, and especially Aims 1, 2 and 4, that if the Science in Society programme gains widespread acceptance by scientists, and is acted upon, it could help to bring about a significant shift from knowledge-inquiry towards wisdom-inquiry.

Pressure groups

The examples above are from what may be regarded as the official representatives of science; the National Academy of Sciences, the Royal Society and the British Association. But what of more unofficial representatives?

The International Network of Engineers and Scientists for Global Responsibility (www.inesglobal.com) is an independent non-profit organization concerned about the impact of science and technology on society. The INESGR was founded in 1991 and now has a network of over 90 member organizations and individual members in 40 countries. They have recognized for some time the important point only recently been voiced by the scientific establishment in Britain (in the Presidential Addresses of Lords Winston and May), that engineers and scientists have played a key role both in the processes that threaten international security and those that provide hope for the future. They aim to encourage and facilitate international communication among engineers and scientists seeking to promote international peace and security, justice and sustainable development and working for a responsible use of science and technology. To this end, they work for the reduction of military spending and for the transfer of resources to the satisfaction of basic needs, promote environmentally sound technologies while taking long-term effects into account, and raise the awareness of ethical principles among engineers and scientists and to support those who have been victimized for acting upon such principles.

A similar group is Scientists for Global Responsibility (www.sgr.org.uk), a UK-based organization which was formed in 1992 from several smaller organizations which had all been set up to campaign to reduce the widespread use of science and technology for military purposes. The break-up of the Soviet Union and the end of the Cold War lead to the organizations deciding to merge and widen their focus. A general concern about the misuse of science and technology in threatening human life and the wider environment became their central aim.

Like the INESGR, Scientists for Global Responsibility have recognized and publicly stated that many of the problems facing society today are as a result of science and technology and that this has lead people to become disillusioned with science and technology. They too stress the social nature of science, the importance of promoting constructive

dialogue between scientists and non-scientists, and that any problems that arise from science and technology will require a combination of scientific, economic and political solutions.

There are various areas of our lives that they believe would benefit from more science and technology funding: the clean, sustainable production of energy, and its efficient use; the development and application of biological and medical knowledge to the benefit of all; the study of social and economic affairs with the aim of improving the lot of all; and the use of information technology to increase energy efficiency, reduce the need for transportation, eliminate unnecessary labour, and promote access for all to humanity's pool of knowledge.

All of these points can be seen as aspects of wisdom-inquiry, in that they acknowledge the social nature of science, call for science to be more open in its work and to explicitly target its work for the benefit of mankind.

The same can be said of another, more recent, group, The Independent Science Panel (www.indsp.org). Founded in 2003, they comprise some 30 scientists from a variety of disciplines who are committed to 'the Promotion of Science for the Public Good'. They believe that science should be accountable to civil society and that all sectors of civil society should participate in making decisions on all issues related to science, from scientific research to policies regarding science and technologies. They also hold that science should contribute to the physical, social and spiritual well-being of all in all societies and they reject scientific endeavours that serve aggressive military ends, promote commercial imperialism or damage social justice.

By bringing together like-minded scientists from a wide variety of backgrounds, engaging the public, and creating media attention, these pressure groups are perhaps even more representative of wisdom-inquiry than the research groups mentioned earlier, such as the Tyndall Centre and the Cambridge Environmental Initiative. Whether they will be able to affect real change, or be viewed as mere fringe groups to the official scientific bodies, remains to be seen, although they do enjoy the support of some heavyweight scientists and academics.

Is the revolution underway?

What this discussion has shown is that there are reasonable grounds to be optimistic that wisdom-inquiry, in the general sense of putting social, ethical, environmental and other *human* considerations at the very heart of academic inquiry, is taking place to some degree.

Specifically, we can make the following points:

1. There is now a clear admission amongst scientists that many of the problems facing society today are as a result of science and technology.
2. It is recognized by academics that a multidisciplinary approach, both inter-departmental and inter-university, is necessary to solve the problems that face mankind and, more importantly, key steps have been taken to put this approach into practice.
3. The scientific community has realized that in promoting the public understanding of science, the communication should not just go from scientist to public. There appears

to be a genuine appreciation that a two way dialogue is both desirable and necessary and that scientists can and must learn from the public.

4. Related to Point 4, there is a clear understanding of and emphasis upon the social nature of science.

5. There is a recognition of the importance of teaching ethics to scientists, and not just those involved in medical or applied sciences, but all scientists.

As far as Maxwell's more specific hopes for wisdom-inquiry are concerned—that there needs to be a fundamental reorganization of academic inquiry so that it gives priority to articulating, and improving the articulation of, our problems of living, and proposing and critically assessing possible solutions and possible actions—the evidence is less optimistic. Indeed, in this regard, things do not seem to have moved on appreciably in the last twenty years.

But perhaps this should come as no surprise. When a man calls for a revolution, and not just a revolution in the aims and methods of something as complex and specialized as science, but a revolution in the aims and methods of the whole of academic inquiry, it is easy to find reasons to be dismissive. Even if one understands what is being called for—a comprehensive intellectual revolution, affecting to a greater or lesser extent all branches of academic inquiry—and even if one agrees with the need for such a revolution, one may despair at the enormity of the task ahead.

One may argue that academic inquiry is too well entrenched in its ways to change, that scientific inquiry is too powerful and successful to contemplate the notion that there is a fundamental error at the very heart of scientific inquiry, or that scientists will be too quick to conclude that this is yet another attempt to discredit science, to possibly contemplate the revolution in question. Individual academics may occasionally offer informal approval of the need for a revolution of the sort in question, or of parts of the revolution, but academia as a whole will not change, will not see the need to change, and will resist calls for such a change with all their might.

But such a reaction would be unwarranted. What we have seen is that parts of the academic community can change, that they can recognize where they have gone wrong before and appreciate the need to change the way they work in the future. And as such, more clearly than ever one can see the beginnings of a shift from knowledge-inquiry to wisdom-inquiry.

Acknowledgements

Notes

1. For favourable reviews of Maxwell (1984) see Collingridge (1985), Easlea (1986), Foss (1986), and Richards (1985); for Maxwell (1998) see Chakravartty (1999), Juhl (2000), Muller (2004), Roush (2001), Shanks (2000) and Smart (2000); for Maxwell (2001) see Hodgson (2002) and Newton (2003); and for Maxwell (2004) see Grebovicz (2006), Iredale (2005), Schiff (2005), McHenry (2006) and McNiven (2005).

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