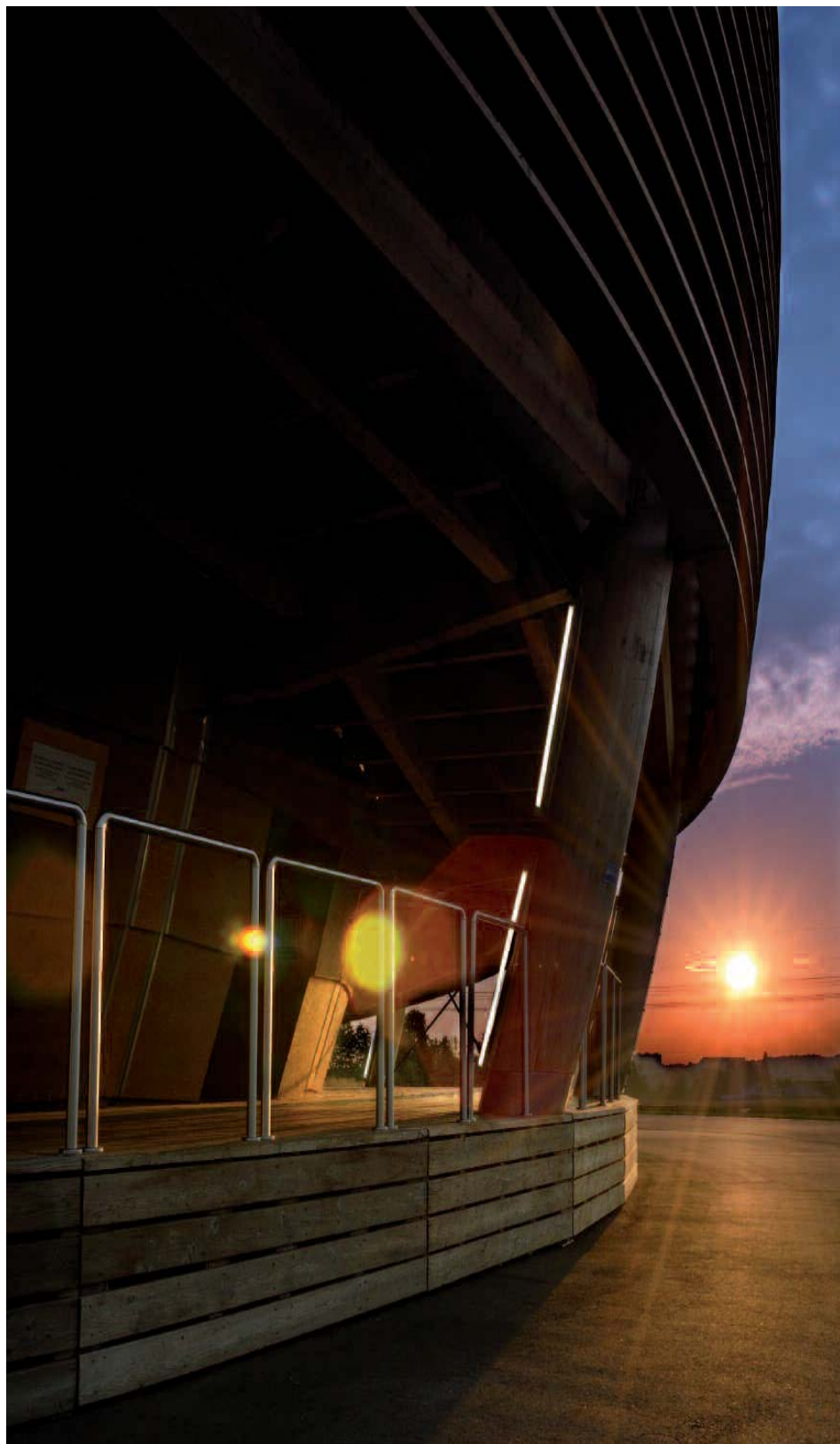


# *Should the direction of research be democratised?*

Robert Doubleday and Philip Moriarty disagree



Research for understanding: CERN's Globe of Science and Innovation © CERN

Dear **Philip**,

Nanotechnology research has been allocated additional public funds over the next three years. This extra money was won by arguing that nanotechnology can deliver public benefits. Academic scientists must now take up the challenge to think carefully about how their research on nanotechnologies can contribute to the public good.

This is no easy task. A report by the Royal Society and Royal Academy of Engineering in 2004 pointed out that future developments in nanotechnologies pose social and ethical questions that cannot be addressed by scientists alone. It called for a public debate about the direction of nanotechnology research.

The government has since supported a handful of experimental public engagement projects, and many scientists have participated. But scientists themselves should now reflect on and make use of the findings of public engagement projects. How are these debates going to make a difference to their research?

Public engagement has to be more than an effort to generate public support and increase applications for university courses. It is not good enough to leave the design and analysis of public engagement to science communication professionals. Scientists need to take part in wider public discussion about how their work contributes to society. Is filing the occasional patent enough? Is it OK to leave it to others to decide how to regulate the effects of a new technology once it has been developed? The future of science as a vocation depends on scientists taking these questions seriously and engaging in a public debate about the purposes of science.

Yours,

**Robert**

Dear **Robert**,

I agree that we need significantly more debate about the role of science in society.

The government views scientific research as nothing more than a driver for economic growth. To paraphrase Charles Clarke's infamous statement shortly after he was appointed Minister of Education, the

prevailing view is that 'science for science's sake is a bit dodgy'. Research Councils UK (RCUK), driven by its eagerness to show alignment with the Department for Innovation, Universities and Skills policy, increasingly expects researchers to demonstrate the short-term economic benefits of their work. Societal benefit has therefore been narrowly defined in terms of short-term economic impact.

This conflation of societal and economic impact is, however, both ideologically and economically flawed. Science is so much more than the technology it underpins. Is Darwin's theory of evolution worthless without commercial exploitation? True innovation and key scientific advances do not arise from top-down managed applied research driven by short-term economic motivations.

During the public engagement events with which I've been involved, I've been struck by the support of non-scientists for basic science aimed at addressing the big questions.

Science works best, however, when scientists are free to pursue research motivated simply by a desire to understand. The challenge that faces scientists, policy-makers, and science communicators is how to develop 'upstream' public engagement when so much world-changing science relies on serendipitous discovery.

Yours,

**Philip**

Dear **Philip**,

There is a problem with arguing that world-changing science relies on serendipity and therefore scientists should be free to follow their desires. You overlook the essentially social nature of science. It is not a solitary pursuit but a communal activity of collaborating, competing and sharing results. Science also depends on financial and cultural support from wider society.

Take physics during the past two-thirds of a century. As a discipline it has been shaped first by the Second World War and then the Cold War. What counts as an interesting question to science depends in part on the funding available and the value accorded to the knowledge produced. Since the end of the Cold War it is perhaps global economic competition that has driven the direction of research in applied physics. It is no coincidence that an early iconic image of nanotechnology, published in 1990, is the use of individual atoms to spell out 'IBM'.

Science does help shape our world. Given that the direction of science is already shaped by consideration of its social uses, the important question posed to scientists is how

can this process be made more democratic? It is to this question that scientists must turn if they wish to renew their 'social contract'.

Yours,

**Robert**

Dear **Robert**,

I must admit that I do not see the same conflict as you between a scientist being driven by a desire to understand and the scientist's social contract. Without the ambition to unlock the secrets of Nature via science, society will not only be culturally and intellectually impoverished, it will ultimately stagnate. Moreover, the desire to extend the limits of understanding – without any prior consideration of the potential application of that knowledge – has led to countless scientific and technological advances. Indeed, the seminal IBM nanoscience to which you refer was driven solely by curiosity.

Where we agree, however, is on the importance of the sociology of scientific activity. The collaboration, competition, and communalism to which you allude are embedded in every scientist's work.

This, however, raises a key issue with regard to the democratisation of science. Expert peer review is part-and-parcel of the scientific process and necessitates a solid knowledge base from which to draw appropriate conclusions as to the validity and/or potential of a piece of scientific research or a grant proposal. The general public – or, indeed, scientists without the relevant expertise and background – lack this knowledge base. This would appear to be a fundamental barrier to truly democratic decision-making in science.

Yours,

**Philip**

Dear **Philip**,

The idea of non-specialists participating in the day-to-day work of science is a red herring. What I am suggesting is that we move beyond the false choice between science directed by short-term economic targets on one hand and science directed by curiosity-driven scientists on the other.

It is historically inaccurate to suggest that the development of science can be explained by the summation of individual scientists' desires to understand. Disciplined knowledge requires agreement about what is to be understood and how. The answers to these questions affect the form and function of scientific knowledge, which we both acknowledge has world-changing potential.

It is not possible for humankind to research all possible questions, even if everyone became a scientist. Therefore choices are

made. Why does genomics take precedence over soil science (or other so-called 'Cinderella sciences')? This may well be the right choice, but in a democratic society it is right that the wider public have some say. I accept that this is difficult and likely to be messy in practice.

Which is exactly why scientists themselves need to reflect on the historical development of their disciplines and the relationship between even apparently curiosity-driven science and the world beyond the lab.

Yours,

**Robert**

Dear **Robert**,

I did not propose that the desire to understand has been solely responsible for the course of science. Science, technology, innovation and their associated sociopolitical drivers are of course all interrelated components of a complex feedback loop. Nevertheless, history confirms that in very many cases truly world-changing developments (eventually) arise from curiosity-driven research which would initially have been thought of as 'useless'.

This rather politically unpalatable observation means that governments, mandated by the electorate, need to think very carefully about imposing what may appear to be beneficial short-term goals on academic research.

The possibility of non-specialists, such as government ministers, influencing the day to day work of science is far from a red herring! Indeed, in laying the groundwork for the MRC in the 20th century, the dangers of direct government influence on the scientific process were clearly recognised, leading to the Haldane Principle of research council autonomy.

Publicly-funded scientists of course have a moral obligation to provide a return on the taxpayers' investment in their work and to address societal needs. Counter-intuitively, however, curiosity-driven science is statistically much more likely to change the world beyond the lab, than the low-risk, near-market research that research councils increasingly expect of academic scientists.

Yours,

**Philip**

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