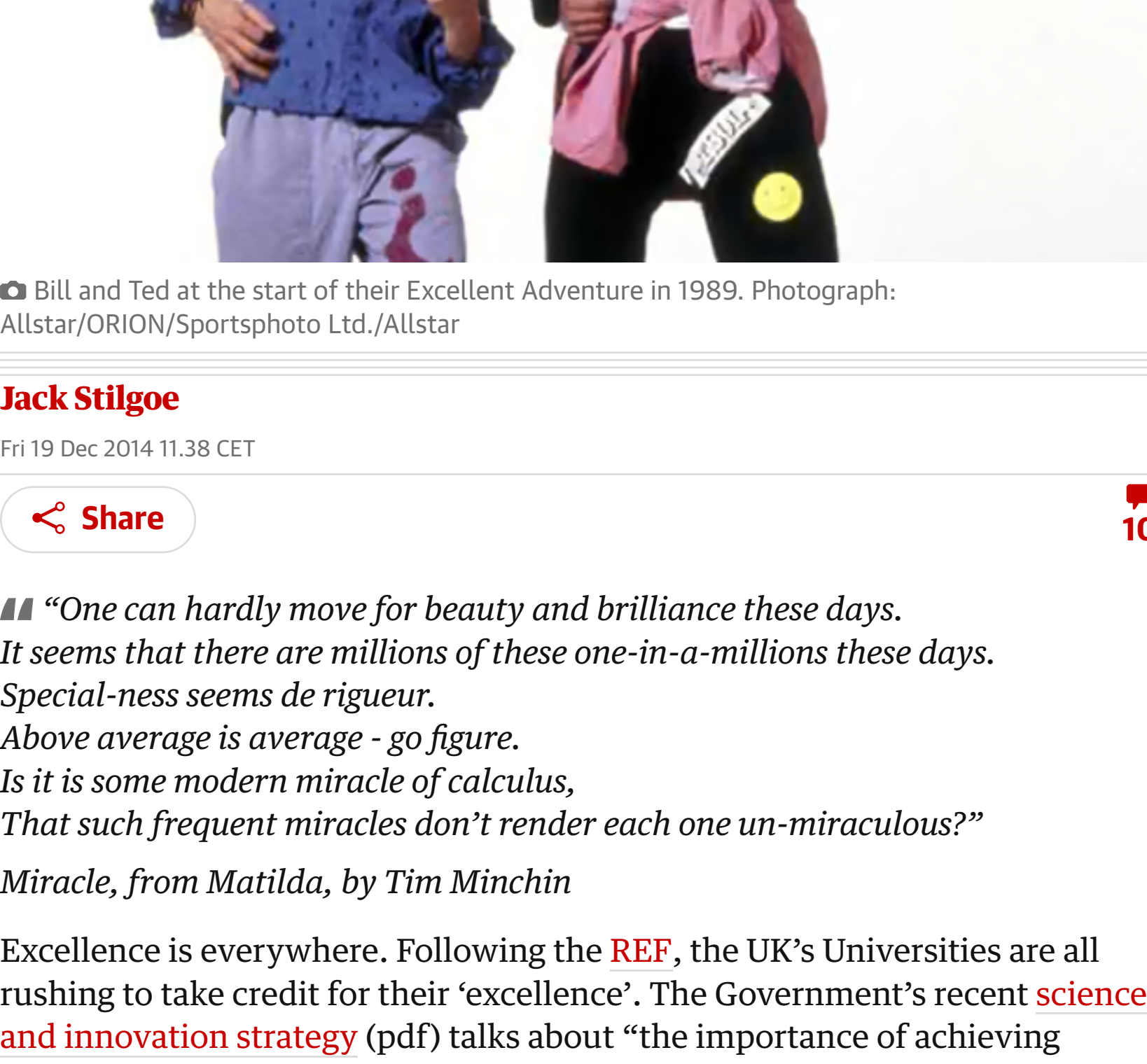


Political science

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Against Excellence

Universities are currently agonising about the Research Excellence Framework. Jack Stilgoe doesn't have a problem with research assessment. He thinks that the real trouble lies with the word 'excellence'.



Jack Stilgoe

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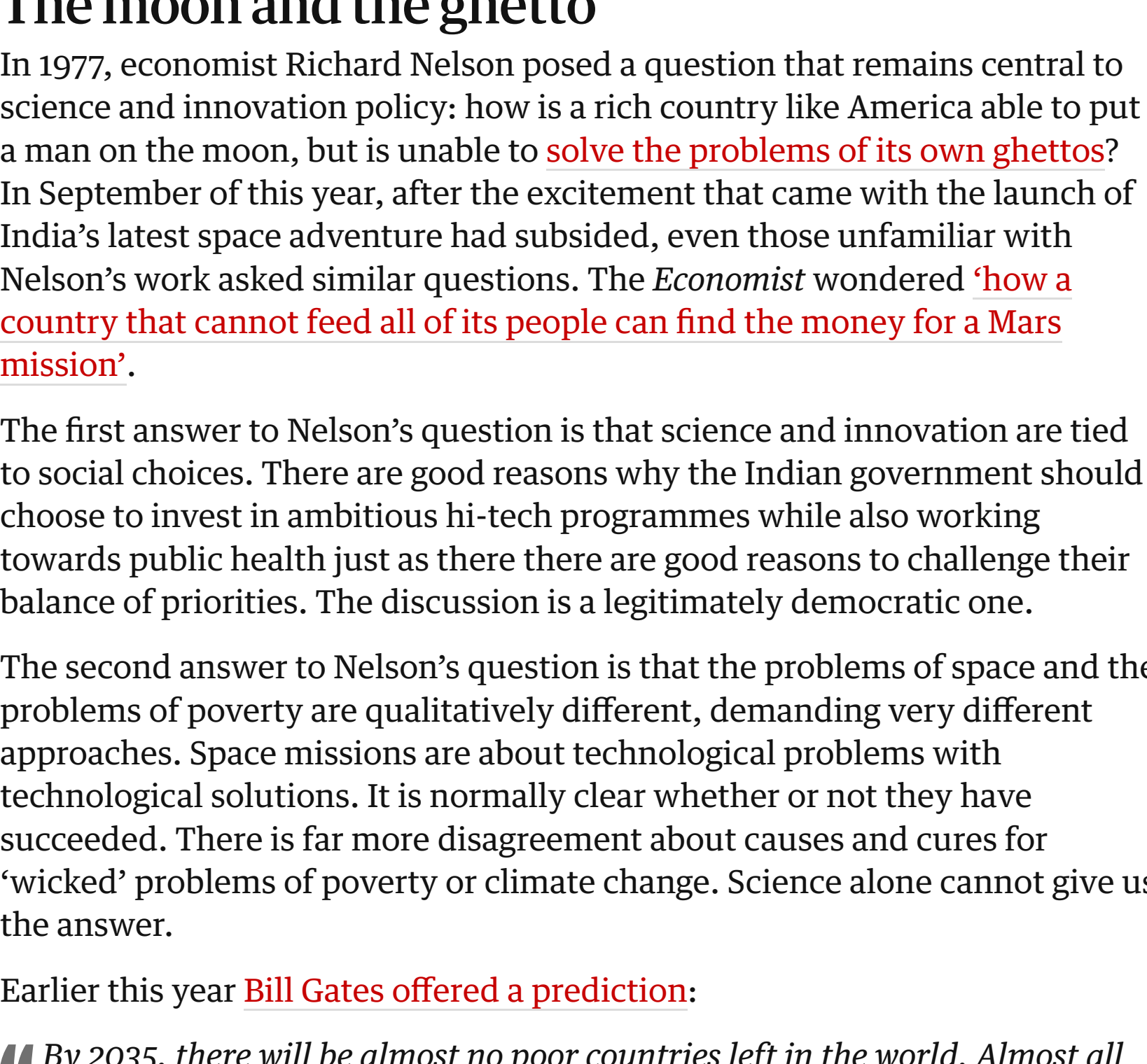
“One can hardly move for beauty and brilliance these days. It seems that there are millions of these one-in-a-millions these days. Special-ness seems de rigueur. Above average is average - go figure. Is it is some modern miracle of calculus, That such frequent miracles don't render each one un-miraculous?”

Miracle, from Matilda, by Tim Minchin

Excellence is everywhere. Following the REF, the UK's Universities are all rushing to take credit for their 'excellence'. The Government's recent science and innovation strategy (pdf) talks about “the importance of achieving excellence”. Who'd be against that? If quality is good then surely excellence is better? I'm not so sure.

Responsible research and innovation

Last month saw the launch of ‘Rome declaration’ (pdf), as part of Italy's presidency of the European Union. The statement, which I helped to draft, calls for Europe to embrace ‘responsible research and innovation’, in the service of big social problems global health, environmental sustainability, and securing food, energy and water supplies. It has become commonplace to argue that science should set its sights on the twenty first century's Grand Challenges. But there is a growing sense that, as with policies to tackle climate change, we now need to move beyond rhetoric.



Responsible research and innovation has become a defining theme of the European Horizon 2020 funding programme. Its resurgence in policy discussions is in recognition of the need for scientists and innovators to take more care of the futures that they help create. Following controversies over Smart Meters in the Netherlands, medical data in the UK and genetically modified crops throughout the continent, European policymakers now know that members of the public will not necessarily share scientists' ideas of a desirable future. Looking ahead, technologies such as geoengineering, synthetic biology and self-driving cars look set to raise new questions of responsibility. Few would disagree with the principle of responsible research and innovation. But it is unclear what it would mean in practice. I worry that one of the major obstacles to responsibility will be the way in which we talk about scientific ‘excellence’.

The moon and the ghetto

In 1977, economist Richard Nelson posed a question that remains central to science and innovation policy: how is a rich country like America able to put a man on the moon, but is unable to solve the problems of its own ghettos? In September of this year, after the excitement that came with the launch of India's latest space adventure had subsided, even those unfamiliar with Nelson's work asked similar questions. The Economist wondered ‘how a country that cannot feed all of its people can find the money for a Mars mission’.

The first answer to Nelson's question is that science and innovation are tied to social choices. There are good reasons why the Indian government should choose to invest in ambitious hi-tech programmes while also working towards public health just as there are good reasons to challenge their balance of priorities. The discussion is a legitimately democratic one.

The second answer to Nelson's question is that the problems of space and the problems of poverty are qualitatively different, demanding very different approaches. Space missions are about technological problems with technological solutions. It is normally clear whether or not they have succeeded. There is far more disagreement about causes and cures for ‘wicked’ problems of poverty or climate change. Science alone cannot give us the answer.

Earlier this year Bill Gates offered a prediction:

By 2035, there will be almost no poor countries left in the world. Almost all countries will be what we now call lower-middle income or richer. Countries will learn from their most productive neighbors and benefit from innovations like new vaccines, better seeds, and the digital revolution.

From the litany of bad predictions made by technological optimists, Gates would have done well to recall that in 1959 CP Snow had made a similar one, albeit with a longer deadline:

This disparity between the rich and the poor has been noticed... Whatever else in the world we know survives to the year 2000, that won't.

These statements suggest great faith in the power of science to cure social ills. Needless to say, the gap between rich and poor has grown since Snow's day. Poor people have got better-off thanks in part to the benefits of science and innovation, but the rich have benefited more, and the problems of poverty persist. Tackling grand challenges means going beyond what Evgeny Morozov calls ‘solutionism’, in which problems are redefined by technologists to suit the tools they have available.

One need only look at neglected diseases to realise the disparity between scientific research and human needs. Early policy reports identified a 10/90 gap – only 10% of the world's health research funding goes to 90% of the world's disease burden. Thomson Reuters found that the disparity is even more stark when we consider published research. The number of papers on elephantiasis and intestinal worms, which together affect more than a billion people, is less than a tenth of the figure for diabetes and HIV/AIDS.

With a rising tide of public science spending, it is easy to overlook social choices about how money should be spent. But even as spending on university science grew in Europe and the US through the 90s and 2000s, budgets in strategic areas like agriculture, defence and energy were allowed to ebb away. As Nanoscientist Richard Jones argued in a recent lecture and in a policy report last year, the effects of this shift for innovation in energy have been disastrous. Just as our awareness of climate change was demonstrating the need for new sources of green energy, the UK and others were cutting off major sources of innovation and expertise. We are spending next to nothing on energy research because nobody is taking responsibility for it. As science budgets across the world flatline or decrease, hard choices about priorities can no longer be avoided.

Wishful thinking and scientific excellence will not counter neglect. We need, first, to acknowledge that there are problems with systems of funding, reward and recognition in science and, second, to encourage new models of inter-disciplinarity, so that different perspectives can negotiate problems and innovate with various responses.

The trouble with excellence

No scientific organisation is complete without an aspiration towards excellence. The Royal Society promotes ‘excellence in science’. Conferences bear titles like ‘Excellence 2012’ (with the strapline ‘Excellence revisited - the value of excellence’). Places from Nairobi to New York are looking to build ‘centres of excellence’. Developing countries, with the encouragement of bodies like the World Bank and the Commission for Africa, construct copycat science policies that aim to catch up with the world's scientific leaders in a form of race, downplaying local needs and strengths.

In October my institution, University College London, celebrated two events that are both in my view excellent: a Nobel Prize for neuroscientist John O’Keefe and the launch of an Engineering Exchange, working with local communities to conduct research projects relevant to their needs that. Only one of those would satisfy the standard criteria for excellence set by many institutions.

‘Excellence’ is an old-fashioned word appealing to an old-fashioned ideal. ‘Excellence’ tells us nothing about how important the science is and everything about who decides. It is code for decision-making based on the autonomy of scientists. Excellence is judged by peers and backed up by numbers such as h-indexes and journal impact factors, all of which reinforces disciplinary boundaries and focuses scientists’ attention inwards rather than on the problems of the outside world. Scientometrics work by Ismael Rafols and colleagues has revealed how journal rankings discourage interdisciplinarity by systematically evaluating disciplinary research more highly. When added to the other institutional pressures of reward and recognition in science, we might regard ‘excellence’ as something worthy of policy scrutiny rather than blind support.

Prioritizing ‘excellent’ research perpetuates the reproduction of scientific elites and the concentration of scientific research in particular disciplines and places. Sociologist Robert Merton called it the Matthew Effect after the Gospel relating Jesus’s parable of the talents: ‘unto every one that hath shall be given... but from him that hath not shall be taken away’.

The European Research Council (ERC) claims it uses “excellence to recognise excellence”. It is ironic that the ERC’s erstwhile president, Helga Nowotny, has long wrestled with the definition of excellence as a science policy scholar. In 2012 she claimed “excellence itself is multidimensional”. After standing down in 2013 she acknowledged that narrow criteria of excellence would indeed tend to concentrate research funding.

Twenty years ago, Nowotny and her co-authors recognized in a book that if academic research was to serve society there would have to be “a redefinition of excellence among academics, of their career aspirations, of their disciplinary contributions, and their institutional loyalties.” Their book described science moving from ‘Mode 1’ to ‘Mode 2’:

“Success in Mode 1 might perhaps be summarily described as excellence defined by disciplinary peers. In Mode 2 success would have to include the additional criteria such as efficiency or usefulness, defined in terms of the contribution the work has made to the overall resolution of transdisciplinary problems.” (p. 33)

They went on to argue that, as universities reconsider their place in societies and economies, there needs to be “a redefinition of excellence among academics, of their career aspirations, of their disciplinary contributions, and their institutional loyalties.” (p. 156)

That has not happened. Instead our sense of excellence has narrowed. In response to growing pressure on scientists to demonstrate their relevance, ‘excellence’ has taken on a negative definition, as the opposite of ‘impact’. In Britain, Research Councils and the REF now talk about ‘excellence with impact’. Researchers are asked to show how their work influences the real world but ‘impact’ is an end-of-pipe idea. There is no consideration upstream of socially-important important research or, as Nature put it in a 2013 special issue, ‘the science that matters’.

We need the ERC and other blue-skies funding as part of the innovation ecosystem. The danger is that, by identifying this as ‘excellence’, it damns everything else, including applied science, user-driven innovation, open science, meta-analysis, regulatory science, social innovation and engagement with policymakers and the public, to mediocrity. In the last thirty years, our sense of ‘excellence’ has narrowed, not broadened. Against the assumption that quality is one-dimensional, it becomes harder to make the case for diversity in science, which is so important not just for responsible research and innovation but also for the representation of women and minorities in the scientific community as well as the encouragement of interdisciplinary research.

It is important to have elite scientific research, but we should not pretend that the interests of scientists perfectly overlap with the public interest. By presuming that innovation is all about pace rather than direction, publicly-funded science risks following rather than counterbalancing private sector interests. The structure of what Michael Polanyi called the ‘republic of science’ makes it easy for scientists to offload responsibility. Polanyi’s science is self-organising and devoted to the pure pursuit of knowledge. As philosopher Heather Douglas describes it, the general responsibilities of scientists to society are trumped by their role responsibilities towards their disciplines. While Polanyi would not argue for irresponsibility, he would have been relaxed about scientists being divorced from social responsibilities. Polanyi had this response to those who would direct science: ‘You can kill or mutilate the advance of science, you cannot shape it’.

There are plenty of reasons to challenge Polanyi’s prescription as well as his description of scientific activity. Science and innovation can be directed towards social goals. Indeed they always have, particularly when it comes to national defence. Since Polanyi’s day, the growth of big, expensive science has meant that society justifiably demands some measure of accountability beyond ‘trust the experts’. And the history of science is full of scientists going beyond the call of duty in consideration of their wider responsibilities. Take Joseph Rotblat, who, after leaving the Manhattan Project founded the anti-nuclear group Pugwash, earning himself and his organisation a Nobel Peace Prize. Or Jonas Salk and Tim Berners-Lee, who chose not to patent their creations, the Polio Vaccine and the World Wide Web respectively. However, we cannot rely on heroic individuals. Responsible research and innovation demands institutional change.

Revisiting the moon/ghetto problem in 2011, Nelson asked “can we reorient our innovation systems so that the advances we get are better directed to meeting society’s most pressing needs?” There are two obvious levers. The first is measurement. The second is funding.

What next?

Responsible research and innovation urgently needs new ways of measuring how science is making a difference in the world. Crucially, these measures need to be multidimensional. Rafols and colleagues have suggested broadening the basis for science and innovation policy with new metrics (pdf). These present alternative pictures of scientific quality by resisting the temptation to add everything up to a single figure. The UK government has commissioned an independent review of metrics, chaired by James Wilsdon of this parish, in preparation for the next Research Excellence Framework, due to take place in 2020. The review is unlikely to conclude that interesting tools such as Rafols’s scientometrics, ‘Altmetrics’ or ‘Impact story’ are ready for use as definitive measures, but researchers should be encouraged to use them to construct narratives around their work. Having been forced to consider end-of-pipe impact in the last few years, we might hope that, next time around, researchers consider questions of responsibility further upstream.

According to Stefan Kuhlman and Arie Rip, responsible research and innovation in the service of grand challenges also means transforming the way we fund science. In many ways, this means revisiting models used in the past but forgotten with the rise of ‘excellence’. Kuhlman and Rip look back at efforts like the Green Revolution that transformed global agriculture after World War 2, which was a revolution not just in science but also in the organisation of scientific activity within and between countries. Governments, scientists and charities came together with a clear sense of purpose and substantial funding. As Dan Sarewitz has argued in Nature, science funders could learn lessons from the achievements of the military-industrial complex, which successfully commissioned successful science during the Cold War, to fund meaningful science in other areas

The case of neglected diseases shows that alternatives are possible. Campaigners and scientists have drawn attention to the issue, funding has grown, charities such as the Gates Foundation have changed the landscape and companies have begun not just to open up their intellectual property but also redirect their research resources. Public-private partnerships will be required to tackle grand challenges, but we should not underestimate the ‘social work’ of organisation and institutional change required to make a difference, alongside the scientific work.

The Rome Declaration calls on research institutions throughout Europe to integrate responsible research and innovation into their work through training, funding, monitoring and identifying and addressing barriers. As the declaration makes its way into European policy negotiations, the hope is that we can begin a more honest conversation about priorities. Responsible research and innovation is possible, but it is far harder than it sounds. If we cannot find a way to expand our sense of what counts as scientific excellence, let’s stop using the word.

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