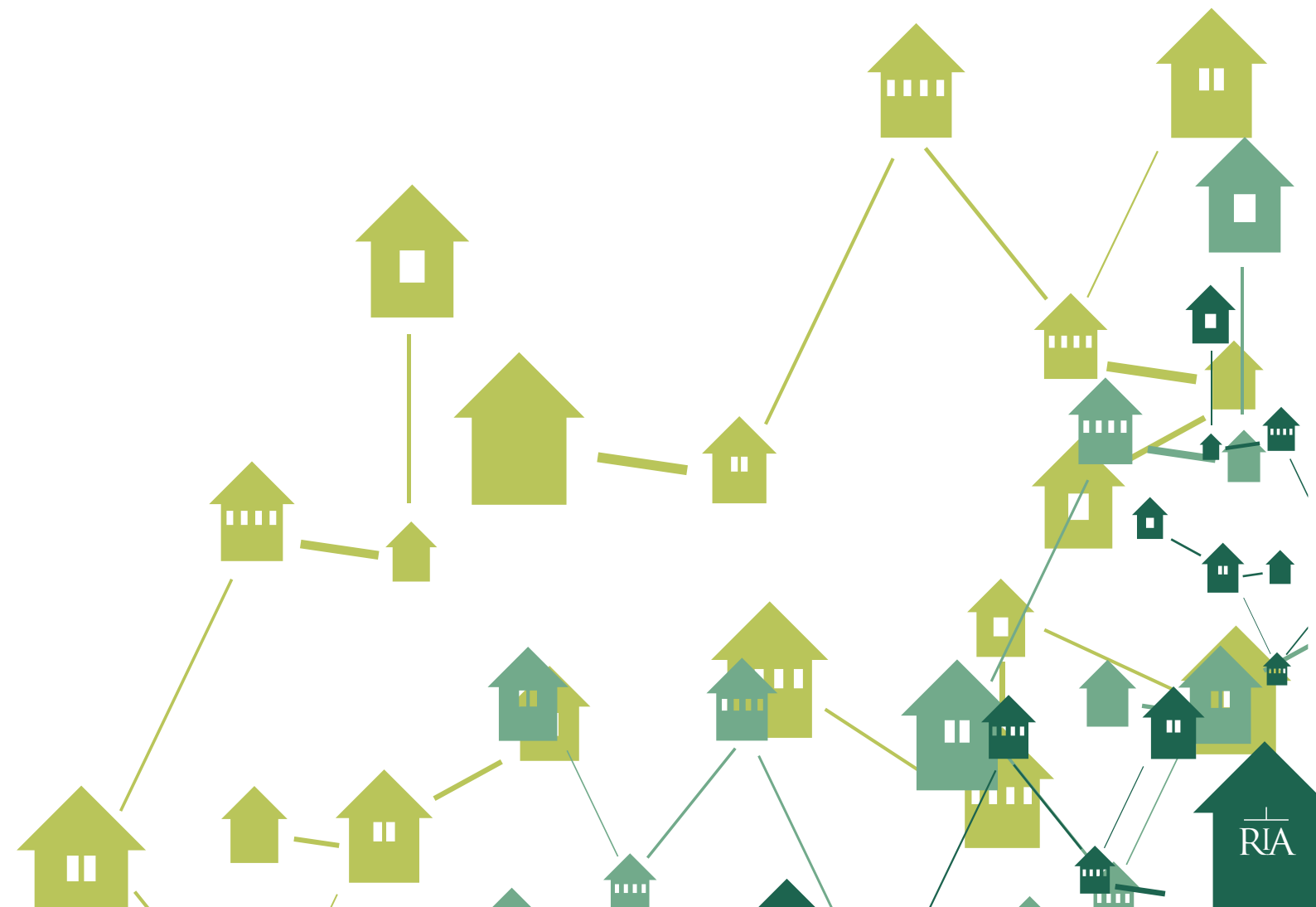
ACADEMIES, VALUES AND VALUE

Presidential address to the Royal Irish Academy

by Luke O'Connor Drury

17 February 2014



The presidential discourse is one of the more daunting tasks that I have had to face as President, especially following the magisterial performance by my predecessor in office, Nicholas Canny, three years ago. I did consider giving a standard talk relating to my research, but I have already done that in my McCrea lecture and it would in any case have been of somewhat limited interest. I have decided, therefore, to take the opportunity to speak on the role of academies, and more generally on the value of academic work, and the implications for public policy in Ireland. I should emphasise that, while I believe that what I have to say will find broad support within the academic community, these are my personal views and should not be taken as the official position of the Royal Irish Academy. Let me begin by borrowing a title from Cardinal Newman.

THE IDEA OF AN ACADEMY

The original Academy was a pleasant, wooded public area with some sports facilities in the outskirts of Athens, perhaps not unlike Herbert Park in Dublin, except that the trees were supposed to have been propagated from cuttings of the sacred olive tree of Athens and the site had a religious as well as a secular function. It was here that, starting in about 387BC, Plato and his friends began to meet on a regular basis. The site has been reliably identified by modern archaeologists, but little remains today. This rather beautiful map by the great French geographer and pioneer of historical cartography, Jean Denis Barbié du Bocage, is interesting because it is exactly contemporaneous with the foundation of the Royal Irish Academy in 1785 and shows how an eighteenth-century French intellectual envisaged the Academy as being laid out in the style of a formal French garden.

This fundamental concept, of a group of people with a shared interest in intellectual ideas, meeting to exchange views, to learn from each other and to stimulate and disseminate research, remains at the heart of modern academies and finds its most beautiful and iconic expression in the great fresco painted by Raphael between 1509 and 1511 in the Vatican's Stanza della Segnatura and generally know as 'The school of Athens'. This extraordinary work of art brings together in one composition all the individuals at the heart of the European academic tradition with at its centre the commanding twin figures of Plato and Aristotle. Plato is depicted pointing upwards towards a transcendent world of ideas and abstract theories; Aristotle by contrast is shown reaching out into the world. Aristotle was of course a keen observer, a great biologist (though a poor physicist), the first political scientist and literary theorist, a man passionately interested in the variety of the real world. This creative tension between abstract theory, epitomised by Plato, and practical application, epitomised by Aristotle, remains the driving force at the heart of academies. [1]

The revival of interest in humanistic studies and experimental science in the early modern period, starting in Italy from the mid-sixteenth century, led to the foundation of an extraordinary number of 'academies'. The excellent digital humanities project 'The Italian Academies 1525–1700' documents some 600 that were established in Italy alone between those years. Many were small and transient of course, and some were quite

[1] I should emphasise that I am using Plato to represent a type of intellectual analysis that favours abstract ideas, formal theories, mathematical models and a priori arguments, not the extreme position of Platonic realism adopted by Plato himself and some mathematicians; equally, I use Aristotle to characterise those interested in the variety of the real world, in taxonomies and data while ignoring his many contributions to abstract thought, especially formal logic.

specialised, but others survive to this day. What is generally regarded as the first modern scientific academy was the Accademia dei Lincei established in Rome in 1603 and having as its most famous member Galileo Galilei; however, it disappeared around 1651 before being revived in 1874. The oldest scientific academy in continuous existence is the Royal Society of London established in 1660, although a close second is the Académie des Sciences of France, founded in 1666 by Louis XIV. It is interesting to note that while the Royal Society was what we would now call a bottom-up organisation, formed by a group of friends who began meeting on an informal basis in Gresham College, and only subsequently acquired a royal charter and patronage, the French Academy was a top-down construct explicitly created by the king to provide him and his ministers with a circle of scientific advisers and to reflect the intellectual pre-eminence of France. Indeed, in the early days the French Académie des Sciences held its meetings in the king's private library.

Throughout the eighteenth century national academies, preferably with a few high-profile intellectuals, were seen as essential components of the Enlightenment nation-state. Thus, Frederick I of Prussia established the *Königlich-Preußische Akademie der Wissenschaften* in 1700 with Leibnitz, Voltaire and Maupertius as star attractions. In 1725 Peter the great of Russia outbid Frederick and persuaded Leibnitz to move to his new city of St Petersburg to found the St Petersburg Academy, which subsequently became the Russian Academy. Peter's greatest acquisition however was undoubtedly the great Swiss mathematician Euler, an amazing man who was still publishing high-quality mathematical papers at a rate of one a week into his seventies, despite having gone totally blind. More in the bottom-up tradition of the Royal Society, the Royal Swedish Academy of Sciences was founded in 1739 by, among others, the great taxonomist Linnaeus, and of course our own Academy was founded towards the end of this period in 1785 by Lord Charlemont and his friends, including Richard Kirwan, a chemist of European reputation whose works were translated and studied by no less than Lavoisier, and the great humanities scholar and founder of serious Shakespearean scholarship, Edmond Malone.

A gradual shift occurred through the nineteenth century as academic research became more a professional activity based in the growing number of universities and less the preserve of wealthy, and usually aristocratic, amateurs. This change did not, of course, happen overnight, nor without opposition. The tensions are immediately obvious if one reads the fascinating and scathing attack on the Royal Society published by Charles Babbage in 1830 in his 'Reflections on the Decline of Science in England and on Some of its Causes'. The full text is freely available from Project Gutenberg and is well worth a read; Babbage does a fine line in Victorian sarcasm and writes well. He also usefully reminds us of some of the ways that an academy can fail, and much of what he says will resonate today with anyone who has been involved with strategic planning in an academy. Specifically he warns of the dangers:

- Of becoming a club for the 'right sort of people' rather than a strictly meritocratic organisation with limited membership.
- Of falling under the influence of a small clique of officers or, worse, an autocratic president.
- Of getting involved in petty quarrels with other organisations, such as professional associations and societies, rather than recruiting them as allies.

Of course, the transition to a more middle-class professional base did not occur instantaneously, and aristocrats such as our own Earl of Rosse and Lord Rayleigh continued to be significant contributors

to science and leading members of the Royal Society throughout the nineteenth century, but the key change was that the Royal Society reformed its membership procedures to ensure that only people of genuine and proven scientific merit were elected (with the exception of members of the British Royal family, who may be elected under a special rule). It is now widely regarded as one of the leading scientific academies of the world and the model that many others aspire to emulate.

As we move into the twentieth century we encounter an unusual development, the Soviet-style academy. In 1917 Sergey Fedorovich Oldenburg entered into what, in retrospect, was a Faustian bargain with Lenin to make the Russian Academy the main funder and organiser of scientific research in return for supporting the construction of the new Soviet Union. This led to an enormous increase in the power and wealth of the Russian Academy. At its peak the 500 full members of the Academy controlled over 500 large research institutes, employing some 55,000 scientists as well as support staff. This model was widely copied throughout the area under Soviet domination during the cold war era, but is now seen as excessively centralised and unwieldy. In Russia itself in the last year the Russian Academy has been subject to a hastily enacted and very controversial 'reform' law.

THE MODERN NATIONAL ACADEMY AND ITS VALUES

The modern national academy is defined by ALLEA (the federation of All European Academies, established in 1994 and with currently 54 member academies in 42 countries) in terms of three main criteria.

- Self-governing communities of scientists and scholars electing their own membership.
- Learned societies with a broad, multi-disciplinary scope and of national importance.
- Recognised internationally by bodies such as the International Council for Science (ICSU) or the International Academic Union.

It is instructive to take the ALLEA on-line tour of all its member academies, which gives some idea of the scope and extent of the European network of academies (and this, of course, is only part of the larger global network). While times have changed, and many of the functions of academies have evolved, their core values have not, and it is this that gives academies their special status and ultimately, I argue, their value. The core values of academies are and have always been:

- Curiosity — a wide-ranging openness to new ideas and a willingness to experiment.
- Intellectual honesty — a profound respect for the truth, rigorous scholarship and hard evidence.
- A commitment to the public dissemination of knowledge and the free exchange of ideas.
- Civic responsibility and a non-jingoistic patriotism — making knowledge useful for the societies in which we are embedded.
- Independence and autonomy, especially in selecting new members. A key criterion for membership of ALLEA.
- A certain streak of anti-authoritarianism — academies (and academics) do not like being told what to do and jealously guard academic freedom.
- Internationalism — being part of a global academic network even if locally embedded as a national academy.

Deriving from these values academies carry out a wide variety of functions.

- Recognise excellence through membership as well as by awarding prizes and medals (such as the Royal Irish Academy's own gold medals).
- Publish proceedings, monographs, reports, etc. — the RIA is the longest established academic publisher in Ireland.
- Act as, or on behalf of, funding agencies — a major role for many of our sister academies.
- Provide independent expert advice to policy-makers — this was a primary motivation of the state in establishing the French Academy, and in America the National Academy of Sciences.
- Stimulate civic debate through discourses, statements and public engagement.
- Run research projects or research institutes.

An interesting survey of the work done by academies from the perspective of the Royal Society of New Zealand is given by Dianne McCarthy and Marc Rands in 'Learned societies: a bridge between research, policy making and funding', *Studies in Higher Education* 38 (3) (2013), 470–83.

THE VALUE OF ACADEMIES AND OF ACADEMICS

Let me now turn to a discussion of the value of academies, and more generally of the value of academic studies. At one level we should not even have to ask this question. Science and scholarship have immeasurably improved our lives over the last few hundred years. Indeed, if it were not for modern science-based medicine most of us would be dead. My father trained as a medical doctor back in the 1930s and I well remember him telling me of his sense of amazement and awe at the introduction of penicillin; patients that you knew were almost certainly going to die suddenly recovered within a few hours. Of course, this is only one particularly dramatic event, and we may perhaps see another one in the not too distant future with the advent of personalised medicine based on individual genomic analysis. There have also been a vast number of less dramatic improvements all of which cumulatively have led to a remarkable increase in our life expectancy. That this is in large part due to our improved understanding of fundamental biology is self-evident.

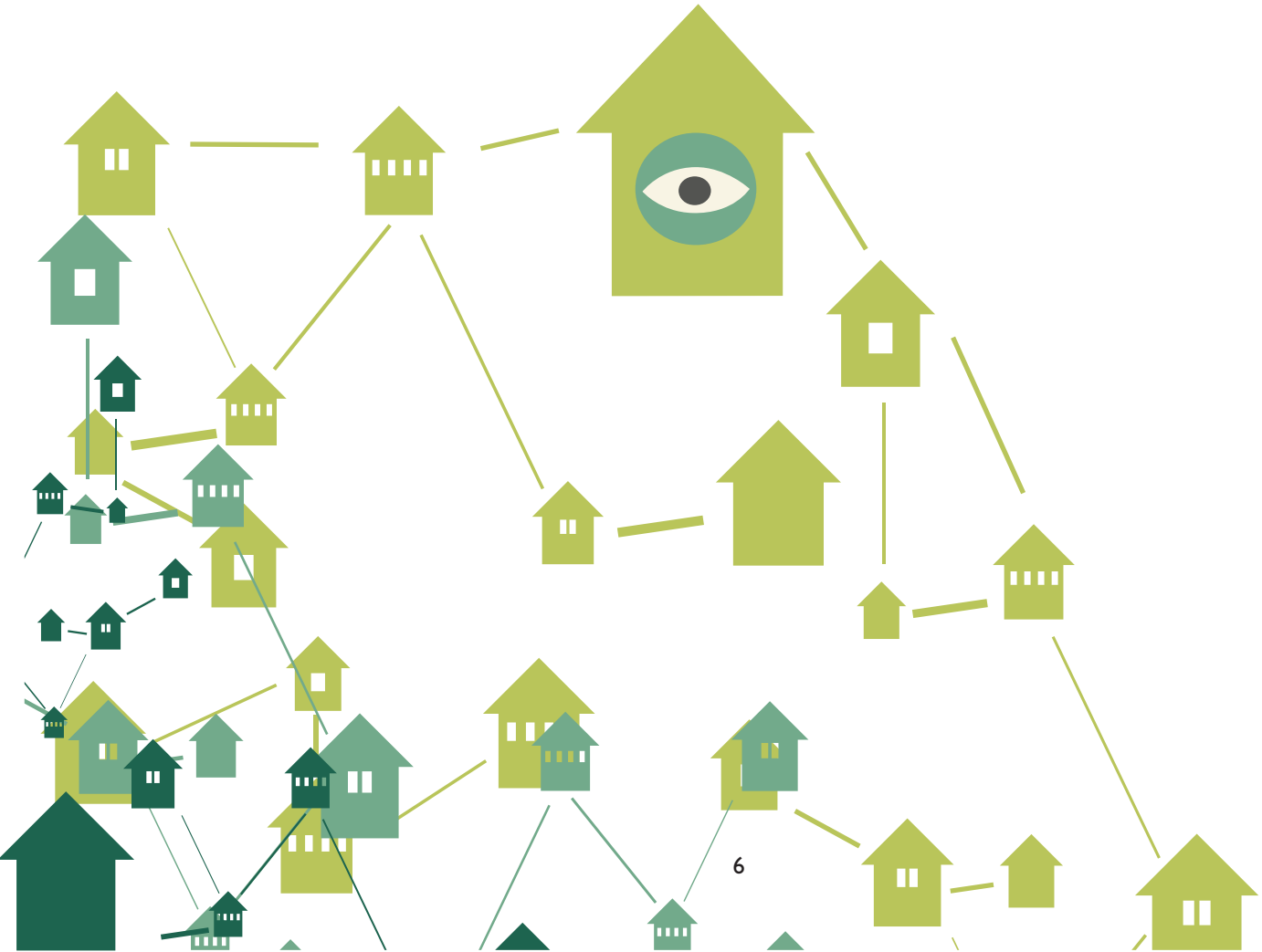
Equally dramatic has been the improvement in the technological resources and comforts at our disposal. We think nothing of being able, with relative ease, to travel to all parts of the world, and to communicate with anyone from almost anywhere. Most of us have iPads and computers at home which are substantially more powerful than the first modern supercomputer, the Cray-1, was when it was introduced in 1976 (the Cray-1 sold for about $6,000,000 and had a peak performance of 80MFLOPS (million floating point operations per second); the iPad2 costs $400 and could run the standard LINPACK test of computing power at 1.5GFLOPS). Nobody doubts that this technology relies ultimately on our understanding of physics, and in particular the quantum mechanics of electrons in materials.

But in addition to the natural sciences, the humanities and the social sciences have also profoundly improved our lives. This is perhaps less obvious, but it is worth reflecting on the fact that if one of us has the misfortune to be involved in a murder, we may be arrested and questioned, but we will not be subjected to torture. We will receive a trial conducted in accordance with recognised legal standards.

And in the worst case, even if convicted, we will not face the death penalty. Now throughout most of human history it was very different. The renunciation of torture, the abolition of slavery and the repudiation of the death penalty in most of the civilised world is a relatively recent phenomenon, and it is certainly not due to any change in our biology. The only plausible explanation is that it is due to the spread of Enlightenment ideas regarding human rights, the philosophical basis for ethics, developments in political theory, etc. The general reduction in violence is well documented by Steven Pinker in his recent book *The better angels of our nature: why violence has declined* (2011; Viking Books), in which he attributes a significant part of this to the influence of abstract intellectual concepts. A specific example is noted by our member Ian Robertson in a recent article in the excellent on-line journalism project The Conversation, 'If there is hope for the Syrian peace talks, it is in the injection of abstract ideals into the carnage and self-defeating psychology of revenge, terror and dehumanisation of the enemy'.

In addition, of course, the humanities have greatly increased our capacity to appreciate and understand our lives. They inform our reading of history and sense of identity, crucial aspects of our social and political lives. Through critical studies they enable us to appreciate the creative arts better, to read books with more pleasure and to see great paintings with fresh eyes. They teach us to see through the rhetorical and psychological tricks used by advertisers and mass media in their attempts to influence us.

At a high-level then, the value of academic research and studies is not in doubt. Abstract scientific ideas, mediated through applied science and technology, have immeasurably improved our material life. Abstract humanistic ideals mediated through legal systems and cultural norms have had an equally dramatic impact on the quality of our social and artistic lives. When Plato works with Aristotle the impact is enormous and of unquestionable benefit to us all.



There is, however, a problem, which is the general problem associated with 'public goods'. Abstract knowledge is the perfect example of what economists like to call a 'public good'. Public goods have two key characteristics that distinguish them from private goods. First, they are freely available to everybody and nobody can be prevented from using them (that is they are non-excludable). Second, their use by one person does not prevent their use by others (they are non-rivalrous). Science and scholarship clearly have these characteristics. Private science does not work and esoteric knowledge is rightly seen as the preserve of conspiracy theorists and occultists. There have been attempts, most notably in the secret weapon laboratories of the cold war, to develop some few specialist branches of science in private. But these have never been very successful. Science thrives on the public sharing of information and the stimulus of competition among the global community of scientists. No small group can hope to compete with the global community of scientists for very long, and because such groups are protected from the harsh criticism of peer review by their competitors (because their work is subject to strict non-disclosure and secrecy rules) they easily fall into the trap of doing weak science. Similarly in the humanities, it is the power of globally shared ideas that has pushed us forward, and the fantasy that there is some valuable body of esoteric knowledge handed down from ancient times is best left to the Freemasons and other such bodies. It has no place in modern scholarship.

The problem is, who is responsible for the production of such public goods that benefit the whole of humanity? One can certainly make an ethical argument that we should do our fair share of what is in effect a global project. And it can certainly be justified on cultural grounds and in terms of national reputation. However, as pointed out by Sir Paul Nurse, the President of the Royal Society of London, when he addressed the RIA in 2013, these arguments will at best get you the same level of support that grand opera gets. For better or worse we need economic arguments to justify public support for academic research if we want to receive even modest levels of public funding.

Let me immediately dispose of one possible answer to this problem which is to attempt to monetise knowledge through the introduction of 'intellectual property rights'. Leaving aside the fundamental problem that knowledge and ideas are not property in any conventional sense, such an approach only works in areas that are already very close to application. It is impossible to capture the high-level abstract knowledge, symbolised by the figure of Plato in Raphael's image, in this way, and yet it is precisely this very abstract knowledge that drives academic work forward and makes it so profoundly transformative and valuable.

The temptation, of course, is simply to free-ride on the work of others. I well recall hearing the vice-president of a major multinational corporation openly stating that his policy was to fund search and not research. Research was, in his view, far too wasteful and expensive, and his approach was to hire people to search out where good research was being done (at public expense) rather than fund the research himself. This is clearly a serious issue. How do we justify spending Irish public money to produce a global public good where the benefit may accrue to someone in Korea or Brazil as easily as to someone in Ireland? The problem is of course exacerbated by the small size of Ireland, and it is interesting to note that the larger the political unit, the less of a problem this is. Nevertheless the question remains, can we find economic arguments that work at the national level to justify investing in a global public good.

One attempt that is often made to finesse this problem involves what I like to call the chocolate fallacy. It basically involves a simplistic assumption that there is a direct relationship between invest-

ment in research and economic performance, accompanied by some misleading use of statistics. A diagram is presented in which some measure of economic performance is shown to correlate positively with investment in research and development as a percentage of GDP for a series of nation-states, e.g. the member state of the EU. The assertion is then made that clearly the solution to improving the economy is to invest more in research (this was recently done at the Irish launch of Horizon 2020). There are obvious logical flaws in this assumption, but perhaps the easiest and most amusing way to illustrate its weakness is to refer to another diagram, published in a highly respectable peer-reviewed journal recently by F. H. Messerli. In a paper entitled 'Chocolate consumption, cognitive function and Nobel laureates', in *New England Journal of Medicine* 367 (16) (18 October 2012), 1562–4, he plotted annual chocolate consumption per capita against the number of Nobel laureates per ten million population for various countries and obtained a statistically highly significant positive correlation. His argument was that chocolate (along with red wine) is known to be rich in certain naturally occurring compounds called flavonoids, which are thought to have a range of health benefits, including improving cognitive ability. This should, in a large population, be reflected in a higher rate of winning Nobel prizes, and indeed this is exactly what his study shows (perhaps not entirely by coincidence Switzerland emerges as having the highest chocolate consumption as well as the greatest number of Nobel laureates per capita; Messerli is of course himself Swiss).

Now, it is amusing to contemplate an imagined world in which academics receive as part of their emoluments a kilo of best-quality Swiss chocolate and a case of good red wine a month, but no one would seriously advocate this as public policy. The problem of course, as any scientist knows, is that inferring causation from correlation is very difficult. Correlations are as likely to be with third variables, such as disposable income or educational level, and even where there is a causal connection, the direction of causation is not obvious. If we want an evidence-based public funding policy in support of research, a much more rigorous analysis and a discussion of plausible causal mechanisms are required, not just a statistical correlation.

This leads me to what I think is the key issue, often overlooked; the importance of human capital and education. Investment in research generates not just ideas (which form part of the global public good of humanity) but trained researchers and, in as much as most of the research is conducted in third-level institutions, well-educated graduates who have been inspired by research-active teachers. Now the national pool of graduates and researchers is definitely not a public good. Research trained people are an excludable resource; if they are working in Ireland they are not working in Korea (at least not easily). They are also a rivalrous resource; if they work for Google they are not working for Facebook or Intel. Thus, in the pool of trained researchers and scholars we have what we are looking for: a national private good that is not a global public good. This justifies (and indeed requires) state support for academic research and ultimately for the academy itself in purely economic terms and at national level.

The argument is thus for a strong but indirect effect of publicly supported research on the national economy through the pool of human capital. High added value industries, both in the tech sector and in the services sector, need access to a pool of skilled people who are creative researchers and thinkers. In this context the humanities and the social sciences (the HSS subjects) are to the services sector what science, technology, engineering and mathematics (the STEM subjects) are to the tech sector and are thus equally deserving of support. Similar conclusions were reached some time ago by A. J. Salter and B. R. Martin in 'The economic benefits of publicly funded basic research: a critical

review', *Research Policy* 30 (2001), 509–32. They identified six channels through which publicly funded academic research benefitted the British economy and concluded that the most important factors were those related to human capital and social networks. The ability of firms to exploit research outcomes at an early stage where they still yield a commercial advantage depends crucially on their recruiting trained graduates who understand research and the research process. This also depends on having career structures and social networks that facilitate this absorptive capacity of firms and increase their ability to interact with academic researchers. As the president of Stanford pointed out a few years ago in an address at the American Embassy in Dublin, by far the most effective form of tech transfer undertaken by universities is that each year they send the bulk of their fresh graduates out to work in industry. Of course, this presupposes that the students have been taught by research-active staff and understand both the content, and more importantly the methods, of cutting-edge research.

The primary justification for public support of academic work in a small, open economy must therefore be based on the generation of a national good of trained human capital and its impact on the ability of firms to exploit the public good of knowledge generated by research, not so much on the public good itself. There are, however, perfectly valid secondary arguments that can be used in certain areas. A very important one is research for policy. This takes two forms: prospective, in the sense of studies collecting the evidence base on which to formulate public policy, and retrospective, in the form of critical evaluations of the success of policy decisions in delivering their stated objectives. Both areas need urgently to be developed in Ireland. Another secondary argument is that there are certain areas and issues that are peculiar to Ireland, or where Ireland has a special interest that justifies a specific research effort. Obvious examples in the sciences are our agricultural and marine resources, but equally in the health area Ireland has anomalously high rates of certain diseases and it would be entirely appropriate for the state to support research on these. In the humanities, it is equally entirely appropriate that we support research on the Irish language, the history of Ireland and more generally Irish cultural studies, because these define our identity and our understanding of our place in the world.

If we agree then that academic work is deserving of public support and of genuine value, can we infer that our Academy itself is also of value? Unlike the early modern period, there are now many institutions in which research is conducted (and indeed I have just argued that the bulk of research should be conducted in, or in close collaboration with, teaching institutions). There are also now many channels through which research is disseminated, although the transactions and publications of learned societies still play an important role. In terms of advancing specific disciplines, there are professional associations that have this as their primary aim. The unique value that the Academy brings to the system is that it represents in one body all areas of academic study and gives concrete expression to the shared academic values underpinning and validating them. The Academy alone can speak with authority for all academic disciplines in the civic space, and recognition by the Academy is the ultimate touchstone for the reliability of research and of the quality of researchers. In addition, through its participation in the international network of academies, the Academy plays a representational role for Ireland and informs public policy formation at trans-national level (European and global) as well as at the national level.

PRIORITISATION AND THE IMPACT OF RESEARCH

These ideas have clear implications for the current discussions around research prioritisation and impact. Nobody, I believe, objects to some level of prioritisation of publicly funded research. The state clearly has

the right, and arguably even the duty, to decide that certain areas are of particular importance and should therefore receive preferential support. What I and many others do object to is the idea of 100% prioritisation, which is close to what we appear to have at the moment in Ireland. In discussing the impact of research we should focus much more on the human capital outputs and the impact on education, and less on the technological outputs. It is worth recalling that Ireland's strong base in the ICT, pharmaceutical and medical devices sectors was established long before research prioritisation was ever thought of, and that the leaders of these industries have consistently cited the quality and skills of the Irish workforce as a key factor in their locating and remaining here. In this context we need to recognise that the HSS are as important to the service sector of the economy as the STEM subjects are to the tech sector, and to support them appropriately. We need flexible, creative and agile graduates inspired by research-active teachers in all areas. We certainly do not want degree-mills turning out cloned graduates who can recite all the standard dogmas, but have no ability to think for themselves (I remind you that one of the values of the academy is a streak of anti-authoritarianism, well captured in the motto of the Royal Society of London, *Nullius in Verba*, which roughly translates as 'Take nobody's word for it').

Prioritisation is a difficult task and one where committees do not have a great track record; it is not easy to pick winners, and the tendency is to produce a list of the 'obvious suspects'—which everyone else is backing as well. There is an interesting alternative: evolution driven by competition and natural selection. Anyone who has evaluated grant proposals knows that really good proposals tend to come from good and active groups, and that it is rare, but not unknown, for a really good proposal to come from nowhere. An open and competitive funding system will, over a few cycles, naturally self-select strong centres and disciplines and preferentially support them without any need for top-down prioritisation. The evidence from evolutionary biology as well as the economics of regulated free markets is that this strategy is very hard to beat and generally delivers better and more stable results than top-down planning. The ideal system should probably combine elements of both approaches; there are, as argued above, areas that the state should prioritise for various reasons, but in parallel it should allow the organic emergence of new areas of strength through an open, competitive system driven by selection on the basis of excellence.

I argue that we should not focus too much on technological outputs, but if one is interested in driving technological progress it is worth noting that this is often driven by the impossible technological demands of big science. A good example is that in order to build accelerators of the size and power of the Large Hadron Collider, particle physicists were forced to develop not just the world wide web, but also a totally new superconducting magnet technology, which now finds routine application in hospital MRI scanners. One can make a very good case for participation in big science projects purely on the basis of the industrial contracts and the resulting drive to industry to adopt cutting-edge technologies. Finally, of course we should always remember Rumsfeld's 'unknown unknowns'; disruptive discoveries have come in the past from the most unexpected areas and will certainly do so again in the future.

THE FUNDING OF RESEARCH

What does this imply for the design of funding schemes? The first obvious point is that there is no one-size-fits-all solution. We need a range of schemes covering the full spectrum, from individual studentships and fellowships, to small projects, to major projects and centres. In particular, there is a major and serious gap at the moment in Ireland in the lack of support for small projects. This is seri-

ously harming the prospects of young Irish researchers seeking support from the European Research Council; they are competing against applicants from other countries who have usually held small national grants at a level that allows them to hire a few students and one or two postdoctoral researchers for a few years and thereby demonstrate their ability to manage a grant and a research group. In many countries such schemes are run through national academies, or with the assistance of the national academy, and the Royal Irish Academy would be delighted to fulfill this role in Ireland.

As argued above, we need a hybrid system where, in addition to specific targeted actions in support of priority areas, we also have programmes open to all areas and selecting on the basis of excellence and strong competition. This would align our policies much more closely with those of Europe, with obvious implications for our ability to draw down support under Horizon 2020.

We need to pay much more attention to the impact of research funding on the quality of teaching in our third-level institutions, and to the central importance of human capital outputs. At the moment we have perverse incentives whereby our best university researchers are encouraged to buy themselves out of teaching. Of course they should not be so burdened with teaching that they can no longer conduct research, but there is a happy medium and it is important that we recognise the value of research-informed teaching. Equally we need to promote realistic career paths for researchers that emphasise that only a very few can expect to enter permanent academic positions and that the bulk will go into industry or other non-academic positions. Our aim should be to increase the pool of people with research skills and understanding outside the traditional academic areas, not to grow large academic silos.

There is, of course, a place for large grants to large programmes and centres, and such schemes are attractive to funders because they look impressive and are easier for the funding agency to administer than many small schemes. But at the macro level what one is doing is simply outsourcing the administrative burden from the funding agency, a body specialised in administration, into the research centres, bodies run by academics. Nor is it obvious that in all cases big is better. The rationale for such large centres needs to be examined carefully on a case by case basis.

Finally, and an issue I feel strongly about, we need to avoid forcing grant applicants into making exaggerated claims about the impact of their proposed research. This is very dangerous and potentially corrosive, because it runs directly contrary to one of the key academic values, the absolute respect for truth. If we encourage applicants to spin and exaggerate in their funding applications, we should not be surprised if they start spinning the research outcomes, and once this starts you are on a very slippery slope that leads ultimately to wholesale research fraud. We cannot advocate rigorous standards of research integrity and at the same time encourage researchers to over-sell the impact of their work.

Of course it is reasonable to expect that applicants explain what they want to do and why; where appropriate what the societal impact and value of their research will be; and that they justify their budgetary requests. Nobody would, I think, argue for a return to the style of the famous grant application submitted by Otto Warburg in 1921 to the Notgemeinschaft der Deutschen Wissenschaft, which consisted of the single sentence 'I require ten thousand marks' and which was apparently funded in full (he did go on to win the Nobel prize for physiology, so the grant committee was correct in its judgement – clearly the decision was based on knowledge not contained in the application itself). But we should be prepared to support applications on the basis of their intrinsic interest, and we should trust the judgement of fellow academics to identify this. The famous exchange between Senator Pastore and Bob Wilson at the Atomic Energy Commission Congressional hearing in 1969 is illuminating in this regard.

Bob Wilson was representing a consortium of scientists who were proposing to build a new particle physics accelerator near Chicago, at what later went on to become Fermilab. They were requesting $250million and Senator Pastore wanted to know what the implications of this would be for the defence of the United States (this was at the height of the cold war, and the American physics establishment was still heavily linked to the nuclear weapons programme).

> **SENATOR PASTORE.** Is there anything connected in the hopes of this accelerator that in any way involves the security of the country?
>
> **DR. WILSON.** No, sir; I do not believe so.
>
> **SENATOR PASTORE.** Nothing at all?
>
> **DR. WILSON.** Nothing at all.
>
> **SENATOR PASTORE.** It has no value in that respect?
>
> **DR. WILSON.** It only has to do with the respect with which we regard one another, the dignity of men, our love of culture. It has to do with those things.
>
> It has nothing to do with the military. I am sorry.
>
> **SENATOR PASTORE.** Don't be sorry for it.
>
> **DR. WILSON.** I am not, but I cannot in honesty say it has any such application.
>
> **SENATOR PASTORE.** Is there anything here that projects us in a position of being competitive with the Russians, with regard to this race?
>
> **DR. WILSON.** Only from a long-range point of view, of a developing technology. Otherwise, it has to do with: Are we good painters, good sculptors, great poets? I mean all the things that we really venerate and honor in our country and are patriotic about. In that sense, this new knowledge has all to do with honor and country but it has nothing to do directly with defending our country except to help make it worth defending.

It is a sad comment on current attitudes to research funding that it is almost impossible to imagine such an exchange today. The vision expressed so eloquently by Bob Wilson—that good painters, great sculptors, and great poets shared something with great scientists that was of enormous intrinsic value and made the country worth defending—is surely one to which we should seek to return. Admittedly,

if one reads further in the transcript there is a discussion of how the construction of the accelerator will provide jobs in a deprived area, and of its impact on the local economy, but there is no attempt to pretend that these are anything other than ancillary arguments.

WHAT NEEDS TO BE DONE?

I began by borrowing a title from Cardinal Newman; let me conclude by borrowing one from another highly influential, if slightly more controversial, thinker, Vladimir Lenin, 'What needs to be done' in Ireland today. I believe strongly that we need to build a smart society worth defending, in the sense of Bob Wilson, and not just a smart economy. Ultimately, politics is about forming a society in which citizens can live happy and fulfilled lives, and while the economy is an important part of that, it is only a part. We need to celebrate and promote creativity in all the artistic and intellectual spheres, to make Ireland one of the most exciting places in the world to live and work, and if we do that then surely we will attract the brightest minds from around the world to innovate and build a smart economy embedded in and nurtured by a smart society. This was the vision that motivated the founders of the Royal Irish Academy in 1785, and it remains our vision today.

Ultimately, the value of this and every academy lies in the core academic values it stands for, their translation into public policy and their promotion in civic society. In language modelled on that of our eighteenth-century founders we need Platonic idealism working with Aristotelian realism to the increase of useful knowledge, the betterment of society and the honour of the island of Ireland.