

THE ROYAL SOCIETY'S 350TH ANNIVERSARY



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The Royal Society's 350th anniversary has offered us a pretext to learn more about its origins, and to appreciate more fully how science and technology have transformed everyone's lives.

At the Society's earliest meetings Christopher Wren, Robert Hooke, Samuel Pepys, and other 'ingenious and curious gentlemen' (as they described themselves) viewed all kinds of experiments, sometimes rather gruesome ones – blood transfusions and the like. They peered through newly-invented telescopes and microscopes; they heard travellers' tales, and dissected weird animals. They were, in Francis Bacon's phrase, 'merchants of light' – seeking knowledge for its own sake. Their curiosity seemed boundless. But for Bacon, discovery had a second motive: 'the relief of man's estate'. And our founders were indeed immersed in the practical agenda of their era – improving navigation and the navy, exploring the New World, and rebuilding London after the Great Fire.

350 years later, human horizons have hugely expanded; no new continents remain to be discovered. Our Earth no longer offers an open frontier, but seems constricted and crowded – a 'pale blue dot' in the immense cosmos.

The Royal Society is also a vastly different institution, but its

essence actually hasn't changed. Today's Fellows – and all the young scientists we support – have the same motivations as their forebears. They probe nature and nature's laws for their intrinsic value. And their engagement with society and with public affairs is still strong – though today's focus is of course not just on London, but on issues that are often global.

Science itself is a global culture that should transcend all national differences – and all faiths too. But it's more than that. A former President, George Porter averred that 'There are two kinds of science: applied and not yet applied'. He was echoing Francis Bacon's sentiment in different words. And of course the insights of Newton, Faraday, Maxwell, Rutherford and others on the distinguished roll-call of our Fellowship – have spawned technologies that have transformed lives worldwide.

Indeed innovations happen with staggering speed. Many things we take for granted would have seemed magic even 50 years ago. The World Wide Web is only 20 years old – and we're proud to have its inventor, Tim Berners Lee, as a Fellow. Computers double their power

every two years. Spin-offs from genetics could soon be as pervasive as those from the microchip have already been.

Although the Royal Society's priority has been the backing of individuals, it also advances research by its publications – printed and electronic – and by its high-quality discussion meetings on topical scientific themes. But its reach extends beyond the professional community – into science education, and public engagement.

In the past the Society wasn't much engaged with school-level education.

However, there's now a crisis that we surely cannot ignore. We risk falling behind other nations at all skill levels – top-rate postgraduates, but also highly competent technicians and apprentices. There's an ageing population of experts in areas such as the nuclear industry, and it's not clear that there will be enough replacements of the same quality. Young children are generally fascinated by at least some aspects of science – whether it be space, dinosaurs, or tadpoles. But too many bright pupils turn elsewhere in their teenage years, because the curriculum and teaching don't inspire them. The Society intends to provide expert advice on the science curriculum to policymakers and to support efforts to enhance the flow of good scientists into teaching. I

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had the privilege of serving last year on Alan Milburn's panel on 'access to the professions'. In science (unlike in law and banking, for instance) the worst inequalities occur before age 18. The playing field is fairly level for those who have secured entry into a high-quality university course. But that opportunity is foreclosed to all those – perhaps half the population – who never encounter specialist science teachers. Ensuring that all children receive a high quality science education is essential to sustaining the UK's edge as discoverers and innovators. Key creative ideas of the coming decades should germinate here, and we must make sure that we have the skills and resources to exploit them.

It's the Society's responsibility, as an independent body, to provide independent advice to governments, and – through the media – to the public. We cherish our independence – advice is offered, via our recently expanded Science Policy Centre, whether asked for or not. We must confront widely-held anxieties that the uses of genetics, brain science and artificial intelligence may 'run away' too fast. To stem the risk of environmental degradation; to adopt clean energy, and sustainable agriculture, to prevent pandemics, it's essential to develop appropriate technology, and to apply it optimally in all parts of the world. The Royal Society should be at the forefront of these projects – our Fellowship spans the Commonwealth; our distinguished Foreign Members hail from all over the world. We join forces with all the world's academies, through the Interacademy Panel and other collaborations, to promote these goals.

Our recent policy reports have dealt with topics as diverse

as synthetic biology, climate geoengineering and nuclear security. In March we published a report 'Our Scientific Century: Securing our Future Prosperity', which was widely cited during the election campaign. And our well-established 'pairing scheme' between young scientists and MPs can, in a modest way, help to convey some scientific and technical background among 'generalist' parliamentarians.

The Society celebrated its anniversary with a year-long series of events, exhibitions, and publications to increase both the public's involvement in and the profile of science. Our scientific programme aimed to address the most important cutting-edge topics: ageing, biodiversity, consciousness, energy, web science, risk analysis, and so forth. A series of special publications and surveys have been published: in particular, Bill Bryson edited a very well-received book, 'Seeing Further', which offered the perspective of 20 high-profile authors on scientific topics. We made special efforts to highlight the Society's history, as well as a range of programmes delivered with regional museums and cultural centres. A BBC radio series by Melvyn Bragg reached a wide audience.

The anniversary activities peaked with a ten-day science festival at Southbank Centre which attracted 50,000 people: its centrepiece was a 'convocation' in the Royal Festival Hall attended by HM the Queen and several other members of the Royal Family along with representatives of scientific organisations from around the world.

One of the highlights of the year was the conversion of Chicheley Hall, a grade I listed house in Buckinghamshire, into a residential centre for the advancement of science – a

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'scientific Ditchley'. In recognition of a major donation from American philanthropist Fred Kavli, the centre will be known as The Kavli Royal Society International Centre. It will permanently enhance the Society's footprint, both metaphorically and literally.

The UK is strong in science – second only to the US, and by some measures number-one in 'brain for the buck'. And it's not coincidental that the UK is the only country apart from the US with several universities in the premier league. This success is achieved despite the fact that OECD comparisons reveal us as low spenders on R and D compared to the US – and also compared to our new competitors in Asia.

It would be tragic to jeopardise our competitiveness. Moreover (and this is crucial in the context of the current cuts) other countries have singled out R and D for enhanced 'stimulus' funding despite the overall squeeze. The UK has already become less attractive relative for investment to the US than it was two years ago, and the Far East is rising fast. Additionally, the market for top talent is global. Any leading laboratory, whether it is run by a university or by a multinational company, contains a similarly broad mix of nationalities wherever it is located. The UK has had some 'brain gain' in recent years: talent attracts talent. But if public support for UK science is perceived to be heading downwards when it's being boosted elsewhere, it will become far harder to attract and retain mobile talent. The most

savvy and ambitious young people will conclude that this country offers poor prospects for careers in world-class science and engineering. This would seem an 'own goal' at a time when the government accepts the need to boost graduate recruitment (in quality as well as volume) in these subjects.

Planning in R and D has to be long-term; the tap cannot be turned on and off. In a global context where other nations are forging ahead, even cuts of 10 per cent are hard to recover from. An atmosphere of 'confidence' – intellectual as well as economic – is essential if our society is to sustain vibrant and innovative science, technology and engineering. The perception that the UK is losing ground and lacking commitment compared to other nations will destroy this confidence. There are all too few areas where this country is as high as number two in the world; it is surely foolish to jeopardise any that remain – especially one that is so crucial to the nation's long-term prosperity.

350 years ago, the Royal Society helped pioneer a new mode of thought – an enlightenment, where evidence would trump traditional authority. It's a mindset that has changed the world. We can't now be polymaths as our founders were. As knowledge expands, we need to specialise. We're mindful of how much we owe to our predecessors, but also of how much opportunity our science base can offer – given the right support.

