to leave Wellcome's palatial London headquarters on the Euston Road for the uncertain pleasures of Whitehall strongly indicates that he has won satisfactory assurances from Prime Minister David Cameron and, perhaps, from chancellor George Osborne that they will actually listen to him. As such, the appointment itself seems to confound the widespread belief that the top echelons of Britain's Conservative–Liberal Democrat coalition government have minimal interest in science.

The chief scientific adviser's role in the UK government is a flexible one, not spelt out in legislation, and to a great extent the job is what the holder makes of it. The incumbent, population biologist John Beddington, has sought to strengthen networking between scientists and engineers inside government, and to encourage the appointment of scientific advisers in every government department. His public profile has been most strongly associated with two issues — climate change and food security — that were higher priorities for the previous, Labour government than they are for the coalition.

Walport's footprint can also be expected to reflect his own background. At Wellcome he has implemented a large and contentious shift away from small project and programme grants, and towards generous, long-term support for a few excellent researchers. He also had a key role in securing government backing for the planned Francis Crick Institute in central London (previously known as the UK Centre for Medical Research and Innovation).

These two efforts provide ample indication of what Walport can be expected to work for in government: heavier concentration of grant funding in the hands of the very best scientists and greater emphasis on 'translational' research. In both cases, Walport's perspectives seem to match those of David Willetts, the Conservative science minister.

It should be noted, of course, that the post of British chief scientific adviser — unlike its US counterpart — is a non-political appointment. Walport will take up the position even in the unlikely, but possible, event of Cameron, Osborne and Willetts being voted out of power before next April.

He will arrive in the job some six months ahead of the next comprehensive spending review, which will determine the shape of British science in the medium term. The last such review, in 2010, allowed the Medical Research Council to grow its budget with inflation, by freezing (and so cutting, in real terms) other fields of science. There will be no easy options in 2013, but Walport's appointment will in itself raise hopes that some form of ring-fencing will continue to protect the overall science budget.

"To a great extent, the chief scientific adviser's job is what the holder makes of it."

On the international scene, Walport will be expected to guide the government through some painful choices over global projects, such as Europe's Extremely Large Telescope, many of which Britain endorses but may be unable to pay to participate in.

As chief scientific adviser, Walport can also take a lead on issues within science itself, such as research misconduct and open-access publishing. In both areas, the research and university-funding councils have been criticized for failing to take any sort of stance. Walport can either tell them to do so or simply do it for them.

There are, of course, serious limitations on what one man, in a single office buried away in the Department for Business, Innovation and Skills, can do to change entrenched ways of thinking inside the British government — never mind in Britain itself. Still, in taking on the post, Walport lends much-needed credibility to the view that the chief scientific adviser might, indeed, make a difference. ■

Print preview

The printing press changed the world; three-dimensional printing could do the same.

No science-fiction spaceship is complete without a replicator: a machine that, when fed with some nameless goo, can produce anything from a nutritious and delicious meal to a high-powered plasmatic continuum flux generator.

The real-world equivalent of the replicator is the three-dimensional (3D) printer, which can mass-produce replicas of everything from molecular structures to rare fossils. Not too long ago, 3D printing was extremely costly and time-consuming, and used a variety of exotic chemicals. These days, as the News Feature on page 22 reveals, it is a little less costly and takes less time, and can use a variety of 'inks', including silicone shower sealant.

It is hard even to guess the effects that 3D printing might have, not just on science, but also on manufacturing, construction, the economy and how we live our lives. Why go to a shop — or even online — to buy a gizmo, when you can print one at home? One can imagine the conflicts about intellectual property, similar to those that have changed the music industry beyond recognition and are now doing the same in publishing.

Still, if two-dimensional (2D) printing is anything to go by, the 3D version will suffer a number of teething problems before it gets to that stage. Engineers, after all, have yet to invent a cheap 2D printer that doesn't cost a fortune in ink cartridges or go wrong every five minutes.

Printing first came to Europe in the fifteenth century, when, as George Sampson said in *The Concise Cambridge History of English Literature* (Cambridge University Press, 1941), "upon the outworks of obstinate medievalism, rang out a series of hammer-strokes that shook the old world to pieces".

Johannes Gutenberg's first printed Bible appeared in Mainz, Germany, in 1455. "The coming of print is the most important event of the fifteenth century," said Sampson, because "as the pen is mightier than the sword, so the press is mightier than the pen". The earliest books in Europe were in Latin. But when William Caxton set up the first press in England, in 1476, he started to print books in English — often his own translations, with scholarly prefaces.

Soon, authors were queuing at Caxton's door to cast their own works into this dramatic medium. "After that I had accomplished and finished divers histories, as well of contemplation as of other historical and worldly acts of great conquerors and princes," wrote Caxton in the preface to his 1485 edition of Thomas Malory's *Le Morte D'Arthur*, "many noble and divers gentlemen of this realm of England came and demanded me many and oft times". These early printed books were, therefore, custom products, and their distribution was wide only relative to the hand-copied editions that had gone before them.

The rest, as they say, is history. Printing was perhaps the greatest driver of literacy there has ever been, and its effect on English was profound. Before printing, English was a collection of mutually almost unintelligible dialects, and those authors who used it wrote as they spoke. That modern readers can understand Geoffrey Chaucer's fourteenth-century *Canterbury Tales* without too much help is testament not to our cleverness, but to the fact that modern English grew out of the dialect spoken in London, where Chaucer wrote. *Sir Gawain and the Green Knight*, written by an anonymous contemporary of Chaucer in the north-west of England, would have puzzled Chaucer and is much harder work for us today. But thanks to printing, written English as we now know it had became more-or-less standardized by the seventeenth century.

Caxton's 2D printing set up was probably plagued with technical and mechanical problems, just as ours are. But the effect of printing on society, economics and language has been both profound and spectacular. Printing in three dimensions promises another such revolution, although in an entirely orthogonal direction. ■

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