Correspondence

Hawking, Sulston and science in Europe

As well as championing open and accessible research, physicist Stephen Hawking and biologist John Sulston were part of a long tradition of British engagement with European science (for obituaries, see *Nature* **555,** 444; 2018 and *Nature* **555,** 588; 2018). As chief scientific advisers to the European Commission, we feel strongly that this tradition must not end — irrespective of where the future takes the United Kingdom.

Science for the greater public good depends on openness of mind, of spirit and of borders. Sulston and Hawking did much to uphold these ideals and to promote the importance of basing policy decisions on strong scientific evidence. Both recognized that society benefits from integrated scientific endeavour. Indeed, European projects built on this premise — such as the intergovernmental research organizations CERN (Europe's particle-physics laboratory near Geneva, Switzerland) and the European Molecular Biology Laboratory — have strengthened science by stimulating the movement of ideas across the continent and beyond.

These great scientists shared a strong sense of social decency and encouraged a profound respect for expertise, each of which are more important now than ever.

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Nobel principles hold true after 123 years

Nils Hansson and colleagues suggest that Nobel committees in 1901–66 were persuaded to award the Nobel Prize in Physiology or Medicine based on the potential research impact of a single discovery or innovation, rather than on a distinguished research record (*Nature* **555,** 311; 2018). As secretary general of the Royal Swedish Academy of Sciences, I can confirm that this is still the case.

The Nobel prize is not a lifetime achievement award. In his last will of 1895, Alfred Nobel stipulated that the Physiology or Medicine prize should go to "the person who shall have made the most important discovery within the domain"; in physics should be for "the most important discovery or invention within the field"; and in chemistry should be awarded for "the most important chemical discovery or improvement".

It is reassuring that the assessment of hundreds of nominations by Nils Hansson (no relation of mine) and colleagues confirms that past committees have rigorously upheld Nobel's will.

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How philosophy was squeezed out of PhD

Gundula Bosch's argument for putting the philosophy back into the PhD is a breath of fresh air (*Nature* **554,** 277; 2018). It is interesting to look back and see how broad critical thinking came to be eased out of the doctorate, squeezing academic enquiry into narrow disciplines.

The process started in the early 1970s in the United States, prompted by a suspicion that intellectual artefacts of the 'soft' sciences, as they were then called — such as sociology, anthropology and philosophy — were stimulating campus unrest.

This conveniently dovetailed with the idea that if industry outsourced its research and development departments to universities by setting (and funding) curricula, then students would have ready-made jobs in industry on graduation. These mechanistic conceits looked good on paper and fitted well with reductionists' educational metrics. However, they all but killed students' curiosity for serendipitous scientific enquiry.

My father designed stellar-inertial guidance systems for reconnaissance aircraft and, after he retired, would often present his work to physics and engineering students. When they asked him what they should study to prepare for such a career, he would reply: "Read the classics," by which he meant Aristotle, Ralph Waldo Emerson, Jean-Jacques Rousseau and Blaise Pascal.

The best scientific and technical progress does not come out of a box. It is more likely to emerge from trying to fit wild, woolly and tangential ideas into useful societal and economic contexts.

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Sciences unite for Spain's prosperity

As Spain's economy recovers, the strategic application of science could help to stimulate prosperity and to attract much-needed investment. In an unusual move in a world of specialization, the Spanish scientific community has formed a meritocratic, all-sciences advisory council within the Gadea Foundation for Science in Madrid, a non-profit body of leading scientists that works to improve Spain's science system. The council's aim is to galvanize politicians and the public into promoting research that will ensure social progress (see www.gadeaciencia.org).

Spain ranks ninth in the world for scientific production and has 58 scientists in the 2017 Clarivate Analytics Highly Cited Researchers list (see go.nature.com/2j77ctb). The application of research results for the benefit of society is still disturbingly low, however, owing to meagre public support and too few industries based on science and technology.

The advisory council's first forum was held in October 2017 to develop a strategy for improving this situation. It was framed around four cornerstones: health, life sciences (including philosophy, mathematics and astrobiology), Earth (including materials and water, food and energy, and climate change and biodiversity) and society (including science policy and the economy). The forum's founding declaration emphasizes the importance for advancing society of knowledge, training, talent and academic–industrial interaction in all of these areas. Our view is that science is not just for scientists — it is a human right.

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Encouraging trend in US astronomy

Aswin Sekhar remarks on the low proportion of female astronomers in many countries (*Nature* **555,** 165; 2018). A career in science can often exceed 50 years, meaning that the total average number of women (and minorities) will remain low for another half a century, even if we achieve parity now among early-career scientists. What matters as much as where we've been is where we're going.

As the chair of the International Astronomical Union's US committee for membership applications, I can report that we are doing much better than the grand averages would suggest. Women comprise around 40% of the latest US intake of 212 individuals, with 43% of those having gained their PhDs after 2010. This is an encouraging trend.

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