

▶ and the lab's Radio Astronomy Group, led by Martin Ryle, had a series of successes, most famously the discovery of pulsars by Jocelyn Bell Burnell in 1967, working with her supervisor Antony Hewish (A. Hewish *et al.* *Nature* 217, 709–713; 1968). By this time, the Cavendish was so large that its director was not so much a powerful commander-in-chief as chair of a company, as Longair aptly describes it.

The lab's research had outgrown its space: the number working there had risen from around a dozen in the 1870s to some 40 times that number. In 1973, the next director, Brian Pippard, moved the Cavendish to much larger premises in West Cambridge, the workplace of about 1,000 people. Longair chronicles this move and presents the achievements of Pippard and his successors as Cavendish Professor of Physics, Sam Edwards and Richard Friend, with detail that will satisfy the most assiduous reader of annual reports. The breadth and depth of the areas of physics now being explored by the laboratory are remarkable: all its previous specialities, as well as everything from optoelectronics to medical physics, thin-film magnetism and the physics that underlies studies of the sustainability of the global economy.

Longair's history is in the form of a well-organized modern physics book, most of its 22 sections replete with charts, tables and lucid technical explanations presented neatly in boxes. Abundant diagrams, photographs, line drawings, floor-plans and facsimiles of historical documents give fascinating insights into the lab's development. Very much the account of an insider, the book would have benefited from a wider international perspective.

It would also have been interesting to hear more about the challenges that the lab faces to preserve its eminence. Rutherford kept an eye on almost every research project — no longer feasible for even the most energetic director — and took personal responsibility for keeping his fiefdom fleet of foot so that it could respond quickly to developments. The main challenge of directing the laboratory today, I imagine, is to ensure that the elephant can keep dancing. ■

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MEDICAL RESEARCH

Citizen medicine

Sally Frampton and Sally Shuttleworth explore a show on public involvement in the evolution of vaccination.

The introduction of vaccination in the late eighteenth century is often viewed as a defining moment, when modern medicine began to stem the ravages of disease. But it has not just been down to pioneering doctors: members of the public have been significant in shaping the development of vaccination, both as practitioners and as critics. *Vaccination: Medicine and the Masses*, an exhibition at the Royal College of Surgeons' Hunterian Museum in London, seeks to unravel those threads with photographs, letters, pamphlets, specimens and medical devices.

The exhibition is part of Constructing Scientific Communities (<http://conscicom.org>), a project on citizen science past and present for which we are researcher (S.E.) and principal investigator (S.S.). In 1798, physician Edward Jenner published *An Inquiry into the Causes and Effects of the Variolæ Vaccinæ* (a draft manuscript features in the exhibition). It showed that protection from the deadly, disfiguring disease smallpox could be conferred by exposure to the much milder cowpox. Jenner's experiments convinced fellow medics, but were themselves inspired by the observations of farming communities in southwest England that milkmaids (prone to cowpox infection, acquired by handling the udders of infected animals) hardly ever caught smallpox.

Local knowledge and volunteers remain key to successful vaccination programmes. The Global Polio Eradication Initiative, for example, has involved more than 20 million volunteers since it began in 1988, many working in dangerous conditions (H. J. Larson and I. Ghinai *Nature* 473, 446–447; 2011). One story highlighted in the exhibition focuses on Ali Maow Maalin, the Somali cook who was the last person to be infected with naturally occurring smallpox. After he recovered, Maalin campaigned for polio eradication. He died of malaria in 2013, while carrying out polio vaccinations.

But public resistance has also dogged vaccination, as the exhibition makes clear. In the nineteenth and twentieth

A nineteenth-century 'shield', used to protect vaccination sites.

Vaccination: Medicine and the Masses
Hunterian Museum, London.
Until 17 September 2016.

centuries, pamphlets from Britain's National Anti-Vaccination League and others played on fears that the procedure poisoned children's blood and

laid them open to a host of diseases. Resistance grew to the British government's compulsory smallpox-vaccination programme, established in 1853. By 1907, the programme was effectively abolished.

The diseases have changed, but scepticism remains dangerous — not least because of the lingering impact of Andrew Wakefield's discredited work hinting at a link between the measles, mumps and rubella (MMR) jab and autism, published almost 20 years ago. US and UK outbreaks of measles in recent years have had a strong correlation with vaccine refusal.

As highlighted by Constructing Scientific Communities, citizen science now benefits from digital platforms such as Zooniverse, which enable projects that range from identifying galaxies to analysing cancer cells. That potential makes it timely now to look back to when barriers between professional and amateur science had not yet been erected. Researchers are looking, for instance, at mass involvement in Victorian public-health movements such as the drive to stop air and water pollution, and at the local natural-history groups whose records still serve as benchmarks. With Zooniverse, we are creating projects drawing on historical records of the era: *Diagnosis London*, for instance, will enable people to analyse reports of the nineteenth-century Medical Officers of Health for London.

Like *Vaccination*, these projects offer fascinating insights into the lives of people faced with an array of public-health challenges, and into the medical science that is running to keep up with them. ■

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