T. BRUNS

Some of the scientific riches confined to storage at the Berlin Medical Historical Museum.

MUSEUMS

Out of the cellar

Thomas Schnalke calls on Germany to turn its historical scientific collections into centres for object research.

Many universities in Germany are centuries old. Their institutes, labs and clinics are treasure troves of historical objects, from eighteenth-century gynaecological instruments and nineteenth-century wax moulages of diseases used for clinical teaching, to pathology specimens spanning 300 years. Often these collections are locked away in dark and dusty cellars. There is little space for scholars to work with them, or for the public to view them. The riches are hidden.

A huge opportunity to change this situation has arisen with the recommendations of the German Council of Science and Humanities on using scientific collections for broader research (see *Nature* **470,** 5–6; 2011). Realizing these recommendations is the central topic of a national collections conference to be held next week at the Phyletic Museum in Jena. The council has provided helpful suggestions for how to improve matters. It suggests: determining the status of each collection on the basis of defined criteria; installing a collections spokesperson in each university; developing concepts for a systematic continuation of collecting; generating a self-organized network among the collections; developing instruments to finance and support scientific collections; and developing common standards for analysing, managing and conserving the collections.

These suggestions are welcome, but we must think bigger. The decentralized nature of these university collections hinders many improvements. The stocks must be brought together within each university — virtually and physically. Object archives, analogous to those for text and images, need to be established in universities with rich collections, such as those in Berlin.

One model is Museum Boerhaave in Leiden, the Netherlands. It holds some 40,000 objects, ranging from late-medieval herbals to modern electron microscopes. Just 6% of the entire collection is on display. But three years ago, the 94% not on show moved to a huge, research-friendly, centrally located depot. And a number of objects are searchable on the museum's website.

Similarly, the Whipple Museum of the History of Science at the University of Cambridge, UK, makes good use of its 7,000-plus objects — mainly sundials, mathematical instruments and early electrical apparatus. Since 1944, they have been on public display and used for undergraduate and graduate teaching by the university's history and philosophy of science departments. Its website (go.nature.com/cb7cwg) features articles, images and interactive displays.

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To get such institutions of material studies going, ambitious research programmes should be embedded within associated graduate schools. One model is the object-research community established at the Deutsches Museum in Munich. Since 2004, the museum has run a scholar-in-residence programme for four researchers at a time to work on their holdings for up to a year. The scholars benefit from a thriving academic atmosphere, working alongside some 50 conservators, archivists and librarians, and with around 50 other scholars from the Munich Centre for the History of Science and Technology close by.

SHOW AND TELL

What are the features of an object archive? First, an institution must have an online database for a researcher to consult — such as those provided at the Boerhaave museum or at the Deutsches Hygiene Museum in Dresden. Researchers can then come and physically inspect objects that are of interest to them. Larger objects are consulted in established depots; smaller artefacts are brought from the archive's storage rooms. After signing a form promising good handling practice, the researcher is left to study their chosen objects in an adequately equipped study chamber. Just as in a conventional text and picture archive, researchers can handle, observe, describe, measure, take pictures and make notes. A good object archive also provides associated sources such as technical drawings, photographs, handwritten manuscripts and letters, and printed primary and secondary literature such as related company catalogues, patents, historical journals and monographs.

What object might one study in such an archive? At Berlin's Charité, it might be a gallstone in a labelled glass jar from around 1796, originally from the private Berlin Anatomical Museum of Johann Gottlieb Walter and his son Friedrich August Walter. The anatomists cut the stone in half, categorized it using their own classification system according to its beautifully striped inner surface, and interpreted its growth from the still-visible darkish central density. The attached label links the stone to a catalogue, revealing the Walters' interest in combining humoral thinking — based on ancient medical concepts — with modern chemical experiments.

At my institution, the Berlin Medical Historical Museum, also at the Charité, one can examine the first functioning photocystoscope — an instrument designed for internal examination of the bladder. Developed in the early 1890s by Berlin urologist Max Nitze, the endoscope is equipped with a cylindrical camera that shot 10 round photographs, each 3 millimetres across, on bromide gelatine plates. Although the first

images, published by Nitze in 1894, were just a cloudy mix of light and shade, one can see why he was pleased with the "objective representation of reality" in his images.

In Germany, such archives would be possible in various university cities beyond Berlin. Jena, Halle, Tübingen and Erlangen, for instance, all hold unique stocks from archaeology to zoology. Plugging these collections into a network of similar existing or soon-to-be established institutions in Cambridge, Leiden, London, Paris and Boston, Massachusetts, would be a great boon to the study of material culture in the history of the sciences, medicine and the humanities.

A pilot project in Berlin would need a large building with, say, four floors measuring 1,000 square metres each. Converting an existing building would probably cost around €15 million (about US$21 million); a new building would cost double that. Another €1 million a year would be necessary to maintain the building, with a team of at least 15 professionals to run the archive. All this would have to be provided by a joint venture of top research-funding organizations, such as the Deutsche Forschungsgemeinschaft (DFG), the Fritz Thyssen Foundation and the Volkswagen Foundation. Experience at the Boerhaave and the Whipple museums shows that the job may take as little as three to five years.

At the same time, there needs be an impulse to implement research with objects on a wider scale. A good path to take here, aside from linking object archives with related university departments and institutes, would be to establish or engage associated graduate schools, which would encourage multidisciplinary work on and with objects. Structures developed successfully at the Berlin Max Planck Institute for the History of Science could serve as a model. Its research-network project in the history of scientific objects, which ran from 2005 until 2010, linked 18 scholars worldwide. The institute also recruited 15 pre- and postdocs to participate in an eight-week 'wandering seminar' on scientific objects in 2006, touring through substantial museums and collections within Europe. The seminar produced essays, an exhibition, a conference and an informative website (go.nature.com/4farzv).

The first step towards realizing this ambitious overhaul of Germany's hidden collections will require the universities and the research-funding organizations to discuss setting up one or more pilot projects. If these can be funded, the universities will need to act quickly to develop workable concepts — otherwise, their holdings might be lost to research for ever. ■

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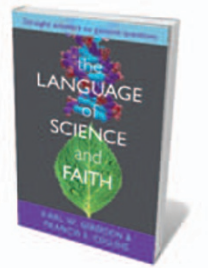
Books in brief

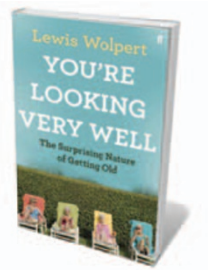
The Sorcerer's Apprentices: A Season at elBulli
Lisa Abend SIMON AND SCHUSTER *304 pp. £18.99 (2011)*
Similar to star scientists, top chefs are an exacting breed. So what is it like to work in the kitchen of the restaurant voted as the world's best for three years in a row? In a behind-the-scenes peek, Lisa Abend relates her experience of enrolling in chef Ferran Adrià's culinary laboratory at his restaurant elBulli in Catalonia, Spain. Abend describes how she adapted to the innovative and technological cooking techniques, and how she and other apprentices learned to push themselves to the extreme of their abilities in order to achieve perfection night after night.



The Language of Science and Faith: Straight Answers to Genuine Questions
Karl Giberson & Francis Collins SPCK PUBLISHING *224 pp. £12.99 (2011)*
For scientists who hold religious beliefs, it can be hard to disentangle the two world views. Geneticist Francis Collins follows on from his 2006 best-seller *The Language of God* (Free Press), in which he reconciled his scientific knowledge with his Christian faith, joining with physicist Karl Giberson to answer questions about Charles Darwin, evolution and the age of Earth and the Universe. Pointing out that the Bible is not a scientific text, they aim to satisfy the spiritual mainstream while challenging atheists and creationists.

Britain's War Machine: Weapons, Resources and Experts in the Second World War
David Edgerton ALLEN LANE *464 pp. £25 (2011)*
By putting resources, machines and experts at the centre of a global story of the Second World War, historian of science David Edgerton paints a different picture of British military success in the mid-twentieth century. Far from being the plucky underdog, the wealthy nation was a great power at the heart of a global production system. Strategic in its thinking about technology, and ruthless in the pursuit of its interests with formidable arms, Britain's victory was ultimately a cheap one, Edgerton argues.

Chinnovation: How Chinese Innovators are Changing the World
Yinglan Tan WILEY *288 pp. £19.99 (2011)*
It is often said that China makes products but does not invent them. Business professor Yinglan Tan dispels that myth through case studies of Chinese companies that are leading the way in entrepreneurship. Businesses in technology-related fields are overcoming barriers to innovation, scaling up rental networks of hybrid cars nationwide or offering user-led travel and restaurant guide websites. He discusses harnessing resources, navigating legal restrictions, dealing with risk and the attraction and retention of talent in China.



You're Looking Very Well: The Surprising Nature of Getting Old
Lewis Wolpert FABER AND FABER *256 pp. £14.99 (2011)*
Considering it is something we must all endure, most of us know remarkably little about ageing. In researching his book, developmental biologist and octogenarian Lewis Wolpert admits that much of it came as a surprise even to him. He explores the implications of an ageing population, explains why we age through cellular wear and tear and examines attitudes to death and euthanasia. He also raises concerns that we are not doing enough to plan for our old age, either individually or as a society.