

fertilizers, including pilchards in Cornwall. There is also a photograph of Tyntesfield, an impressive Victorian Gothic Revival mansion built near Bristol between 1863 and 1866, financed largely with money from the guano trade. And there is a description of a frustrated British inspection of the world's first ammonia plant in Oppau, Germany, in 1919 with the intention of reverse-engineering it in Britain. Leigh conveys a great deal of information in 220 pages of text, and does so in an easy-to-read, clear and accurate style. This is altogether a fine book.

Those who would like to know more about the key protagonist of the nitrogen story, yet are unable to read German, can finally get an (abridged) English translation of Dietrich Stoltzenberg's massive 1994 biography *Fritz Haber: Chemist, Nobel Laureate, German, Jew* (Chemical Heritage Foundation, 2004). ■

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Freedom from smallpox?

The Life and Death of Smallpox

by Ian Glynn & Jenifer Glynn

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Hugh Pennington

"The world and all its people" have "won freedom from smallpox", declared resolution WHA 33.3, signed on 8 May 1980 at the eighth plenary meeting of the 33rd World Health Assembly. The assembly was right to congratulate itself on the success of a campaign by its parent body, the World Health Organization, to eradicate smallpox as a "natural" disease.

There had been many difficulties. Money was often short. There were sceptical experts whose influence had to be countered. In the final stages of the programme, the virus went to ground in Somalia and Afghanistan, not the easiest places to hunt it down. In many ways, the virology was the easiest part — despite its reputation, smallpox couldn't spread as quickly as other viruses, such as measles, so it could be stopped in its tracks by isolating victims and using vaccination to create cordons sanitaires. It was also easy to track because of its highly visible and distinctive rash. Ali Maow Maalin, a hospital cook in Marka, Somalia, was the last person to receive a natural case of smallpox, developing his rash on 17 October 1977. The campaign had finally been successful.

But the people of the world have not "won freedom from smallpox". Unlike the dodo and the dinosaur, it is not extinct: it survives



in frozen form in laboratories at Atlanta, Georgia, and Koltsovo in the Novosibirsk region of Russia. And it also survives as a threat in the minds of bioterrorism experts and the politicians they advise, as there is a worry, unproven, that Koltsovo might have been leaky — they consider that the value of smallpox to a terrorist lies not in its lethality but in its ability to panic the public.

The Life and Death of Smallpox explains why. It starts by describing the recorded impacts of the disease in ancient times, and how it replaced plague as an epidemic killer. The book's focus then shifts to the immunological attack on the virus, with the appearance of Lady Mary Wortley Montagu. She was an early promoter in England of variolation — the deliberate infection of the young with smallpox from a mild case — having seen it in operation in Turkey.

Jenifer Glynn is a historian, so although the account of Lady Mary is somewhat anglocentric, it contains nice touches. Lady Mary lost her eyebrows after an attack of smallpox that damaged her beauty and, no doubt, stimulated her interest in the disease. And we learn of her elopement with Edward Wortley Montagu to avoid an arranged marriage with Clotworthy Skeffington. But the overall account of variolation is certainly not anglocentric. As the book records, variolation persisted right up to the end of natural smallpox, changing from a practice that had some merit in the eighteenth century (its mortality was lower than that of randomly acquired disease) to one that helped the wild virus to persist in the mid-1970s.

Edward Jenner is the hero of the book, of course. Most of the chapters are devoted to describing his introduction of vaccination,

its spread and its successes, finishing with the eradication campaign, which depended on it. More generally, the trials and tribulations of vaccination also feature in the book. Britain is currently having trouble with its immunization policy, for example. Because of a perception that the combined measles-mumps-rubella vaccine may be linked to autism, some parents are rejecting it, leaving their children unprotected. Others are opting for unofficial alternatives. *The Life and Death of Smallpox* provides an excellent account of similar events a century and more ago. A group of people opposed to vaccinations was active then and, in 1898, compulsory vaccination in England was abandoned — 'conscientious objectors' to vaccination could apply for an exemption certificate.

As a historical account of smallpox, the Glynn's book is excellent. It attends to vaccination controversies and personality clashes in a masterly fashion. Virus-related policy events in the aftermath of the terrorist attack of 11 September 2001 are covered well. But those who look for a definitive account of the origins of vaccinia, the vaccine virus, will be disappointed. To virologists this will be no surprise, because its history is shrouded in mystery and its molecular genealogy is puzzling. As a former poxvirologist, I was a little disappointed not to read more about the molecular and cell biology of the virus itself, but its virological quirks and peculiarities, and those of its relatives, are striking and complex enough for another book. This one is for the general reader. ■

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