

obvious. In fact the author does not wholly avoid any of these pitfalls. Yet, despite his professed agenda, the book is no turgid discourse in abstruse theory but, in the main, a stimulating and lively example of the social history of science. It is only in the more extreme genuflections towards sociology that the narrative wobbles and loses conviction.

One example must suffice. When Davy learned that the newly invented Voltaic pile could be used as an agent of electrolysis we are told “it had to be ‘black-boxed’—that is, transformed from a subject of experimental investigation into an unproblematic tool for further research”. (p. 206) It *had* to be shown that water is decomposed into hydrogen and oxygen only (as Davy did in 1807); otherwise the pile “could not function as an instrument of analysis at all”. But this is to confuse the nature of the “black box” (the pile) with its effects (electrolysis). Furthermore in two areas that Davy arguably regarded as most significant there was no evolution of hydrogen at all. One was a long series of experiments with what must have been a mercury cathode (where overvoltage precludes discharge of hydrogen ions); the other was his immensely important work on non-aqueous media as fused alkalis, from which sodium, potassium and other new elements were obtained. What was really determinative was Davy’s own electrochemical theory, not some rhetorical flourishes about the nature of the equipment. Then again, it is suggested that Davy’s quite sophisticated technical refinements, created from the generous resources of the Royal Institution, meant that “investigators who lacked these resources would no longer need to be taken seriously” (p. 212) and Davy’s authority would be unchallenged. But if that really were Davy’s intention it would eliminate what Golinski rightly and repeatedly asserts as a characteristic of acceptable science, its reproducibility (“replication”). And it is pure assumption that Davy had anything like this in mind.

The trouble with arguments like this is that they ignore the facts of scientific creativity and put the sociology of science into its own “black box” thereby creating another “unproblematic tool” whose basis is not to be questioned. However blemishes of this kind are relatively few and should not be allowed to deter even the most sceptical readers. The book is an account of far-reaching scientific discoveries skilfully woven within the rich tapestry of equally far-reaching social changes. It enables us to hear opinions of not only the famous but also the obscure, to re-examine the strategies of chemical researchers and to catch some glimpse of what it must really have been like to see science in action at such a time. To read it without prejudice can be a richly rewarding experience. It is warmly recommended.

Colin A. Russell, The Open University

CHARLES G. ROLAND, *Courage under siege: starvation, disease and death in the Warsaw ghetto*, New York and Oxford, Oxford University Press, 1992, pp. x, 310, illus., \$30.00 (0-19-506285-X).

In the last world war the Jews of Eastern Europe were all but destroyed. Only a few thousand of the three million in Poland survived. Many lived in Warsaw where, a few months after their military victory in September 1939, the Germans created a ghetto. Half a million people were compressed into half a square mile. A wall was built and check points created. Anyone trying to get out without permission was liable to be shot. Conditions were intolerable and got worse, until in 1943 the Germans shot the few remaining Jews or sent them to Treblinka to be gassed. During the two and a half years of the ghetto, doctors, nurses and others tried to keep a medical service going in spite of hideous difficulties and shortages. They even managed to create a medical school for a year and to do research on starvation; there was no shortage of clinical material.

One would have thought that so little and so few survived that a detailed account of the ghetto would be impossible, but not so. Charles Roland has been able to read a large number of accounts and interview many survivors and witnesses, who provide an horrific record. The abomination of Nazi race policies applied to the death is familiar enough, but the story of children being killed is still sickening and incomprehensible. How could German doctors behave in the way that most of them did? The six years of Nazi propaganda proclaiming that Jews were sub-human seems to have done its work. But it was only six years—apparently enough to wash away everything that a doctor should stand for. The German medical record was not good.

We read of experiments in which Jews were deliberately infected with typhus and then various treatments, or none, given. The results (showing no effect of the medication) were then published in an old-established German medical journal.

Charles Roland is a professor of the history of medicine at MacMaster University and the study is appropriately scholarly. But it is flat and in places almost dull. The figures and tables of mortality rates from typhus and other diseases seem to me inappropriate here, almost pedantic in a story of human evil and nobility of epic if not unique quality. The book reads, as in large part it is, like a report of a number of interviews. Although the stories are traumatic and awful, the treatment somehow reduces the scale and sweep almost to paltry proportions. It should not be necessary to devote one quarter of such a book to references and notes. But perhaps in criticizing Professor Roland's lack of emotional range I am being unfair, and am under-estimating the service he has done to humanity, and particularly to the greater medical profession, in recording the medical story of the Warsaw ghetto. It is an object lesson on where racial prejudice mercilessly applied can lead. It is a lesson we need to remember today and always.

There is an unbearably poignant cover picture of a young boy in a street cradling a man's head in his hands and looking at the camera. He is doing the only thing he can to help. The man is dead.

David Pyke, Royal College of Physicians, London

BARBARA BATES, *Bargaining for life: a social history of tuberculosis, 1876–1938*, Studies in Health, Illness, and Caregiving in America, Philadelphia, University of Pennsylvania Press, 1992, pp. xii, 435, £43.50 (hardback, 0–8122–3120–1), £17.95 (paperback, 0–8122–1376–X).

Slowly the historiography of tuberculosis is getting its due. Barbara Bates's *Bargaining for life* is as indispensable and beautifully written as the earlier books by Bryder and Smith but this time the focus is particularly sharp: the experience of Philadelphia between 1876 and 1938, made possible when Bates (a physician at the University of Pennsylvania) came across an unexplored collection of letters written to and by Dr Lawrence F. Flick, one of the great pioneers in the campaign against tuberculosis in the USA.

Born in 1856, Flick had developed tuberculosis in 1874 while still at school. Nevertheless, his health eventually improved and on resuming practice he found that tuberculous patients were attracted to a doctor with personal experience of the disease. In the 1880s Flick was unusual in arguing that tuberculosis was contagious and also that experience in England and Wales showed that special hospitals reduced the death rate. Until then the care of indigent patients in the USA had followed a traditional evolution: most had died at home or been cared for in the almshouse or latterly in a dedicated department at the Philadelphia Protestant Episcopal City Mission. In 1895, helped by local Roman Catholic organizations, Flick developed the concept of the Free Hospital for the poor with advanced disease. Initially this paid for beds in various city hospitals, and then in 1901 he imitated developments in Europe and elsewhere in the USA by starting work on a sanatorium in the nearby mountains of Eastern Pennsylvania. A third element was added in 1903, when a wealthy industrialist sponsored the Henry Phipps Institute in central Philadelphia, where research, inpatient treatment, and an outpatient dispensary could all be combined.

Some of the revelations in the earlier books are mirrored across the Atlantic in Bates's work. The inpatient stays at the sanatorium were remarkably short (at first 70 per cent of patients leaving within the first month), discipline was strictly enforced, false hopes were continually raised by new "cures", routine treatments were useless and bizarre, and some requirements were thoughtlessly cruel (every patient on admission having to sign a consent to autopsy). The statistics suggest that a third of the patients discharged as improved in the first two years returned in the third, while most of the doctors and nurses (who had usually themselves "recovered" from tuberculosis) were dead within six years.

Nevertheless, Bates's account differs from the others in three major respects. Firstly, the locality studied was relatively small. Secondly, though, it was far from homogeneous, and three races were unusually susceptible—the Russians, the Irish, and the Blacks. Bates devotes a particularly valuable chapter to the special problems of the last, who on racial grounds were often excluded from hospitals and sanatoria, despite their having double the mortality of whites from tuberculosis (and Flick's role in