philosophies to discern how the *belief* in this *effect* was achieved. To tell more, however, would be to spoil a good story. The chapters on the other machines are equally well done if having slightly less of the flavour of the detective story. In two chapters the authors desert their genre and pursue the precursors of modern devices: graphs and photographic depictions. Both of these chapters are informative and theoretically interesting, especially the latter, which includes a useful discussion of how photographic (and other) images in the past were regarded as either natural (realist) or conventional representations. According to which approach was adopted unusual images could be designated as either unnatural distortions of nature or extensions of vision. Such a decision has had important consequences in the history of science as in the debate over Galileo's telescope. Let this volume be a lesson to historians of medicine and let us see contextual studies not just of odd ideas but of odd machines: Perkin's tractors or the Pulvermacher Belt, for instance.

Christopher Lawrence, Wellcome Institute

Lance Day and **Ian McNeil** (eds), *Biographical dictionary of the history of technology*, London and New York, Routledge, 1996, pp. xiii, 844, £85.00 (0-415-06042-7).

This dictionary includes nearly 1,300 entries covering those who have contributed to "the advance of technology" from antiquity. They are, the editors state, largely male white Europeans and North Americans, but Day and McNeil have, it seems, done their best to assess the contribution of women and non-white people. The justification, and the unitary theme for the volume, is that contributors to technological innovation are what count. This is not a dictionary of technologists, but of inventors. However, the editors are not consistent: my eye fell on the entry for Sir James Lithgow, an important British shipbuilder who, on the evidence of the entry, was not responsible for a single innovation. The entries are short: just over half a page on average. There are more entries for aerospace than for agriculture and food; more on railways than on weapons. But medicine is well represented with eighty-four entries. One wonders what judgements were made about what is important.

The quality of the volume is, to be frank, low. One very noticeable feature is how out-of-date the suggestions for further reading are. The most recent bibliographic reference for Joseph Lister dates from 1948; Howard Florey's entry has no secondary literature. The entry on Henry Ford does not include any reference to the literature produced by professional historians of technology. This is by no means unusual: the contributors to the volume seem unaware of most of the professional history of technology over the last twenty or so years. The entry on Edison, for example, has no reference to the work of T P Hughes. The entry on Sir Alaistair Pilkington does not refer to the well-known history of the Pilkington firm. And so on. It is thus not surprising to find very few professional historians of technology among the contributors. The book is thus neither a guide to recent knowledge, nor does it give any access to it. Its only use for the historian of technology is as a quick reference guide, and as a poignant reminder of what the history of technology used to be like.

D Edgerton, Imperial College, London

J Rosser Matthews, *Quantification and the quest for medical certainty*, Princeton University Press, 1995, pp. x, 195, £32.00, $39.50 (0-691-03794-9).

The launch of the journal *Statistics in Medicine* in 1982 marked, by one set of criteria, an important step in the emergence of medical statistics as an established medical specialty. In the folk memory of that young discipline, its modern origins are very precisely dated to 1937, the year in which Austin Bradford Hill published in the *Lancet* the

lectures which later became his *Principles of medical statistics*. It is widely recognized that in the forty-five years between textbook and journal, statistics became both a universal tool of medical research and a final court of appeal for new procedures and therapies. It should not be surprising, therefore, that the relationship between statistics and medicine has become a focus of interest for historians of twentieth-century medicine in recent years, and that a flourishing school of students of the clinical trial is now at work. At its broadest, this interest in quantification spills over into consideration of the cultural meanings of objectivity in western societies, as in Theodore Porter's *Trust in numbers* (1995); in the narrower medical context, Rosser Matthews' *Quest* seeks to give the clinical trial a "proper" contextual history, by tracing debates about the use of comparative statistics in therapeutics back into the nineteenth century.

Matthews has selected three "crucial" debates for study: that surrounding the numerical method of Pierre Louis in early nineteenth-century France; that provoked by Louis among German physiologists in the 1850s; and that between bacteriologists and biometricians over the opsonic index in early twentieth-century Britain. A central theme of this last case-study, which Matthews rightly highlights, is the part played by Major Greenwood, later Professor of Epidemiology and Vital Statistics at the London School of Hygiene and Tropical Medicine, in softening up the receptivity of his medical colleagues to statistical methods—a preparation which was essential to the eventual impact of Bradford Hill's more concerted attempt to reconcile the profession to the use of statistics. The unifying theme of Matthews' work is, indeed, the profound antipathy which medical men of all kinds nourished towards the adoption of statistical methods. It was an antipathy which Bradford Hill later emphasized in his unpublished 'Memoirs': he did not discuss randomization in the first edition of the *Principles* because "you have to teach the clinicians to walk before they can run". Drawing on the work of Christopher Lawrence, Matthews attributes medical reluctance to deal in statistics to the dominance of "incommunicable knowledge", the traditional blind of the doctors' art, his expert judgement. In Matthews' view, it took the highly publicized crisis over thalidomide in the early 1960s to force acceptance of quantitative methods on the profession: thalidomide for the first time made a public issue of the doctor's professional judgement. It is a conclusion that fits well with Theodore Porter's general argument that quantification "becomes most important where elites are weak, where private negotiation is suspect, and where trust is in short supply", but one that does not really acknowledge the fundamental reluctance of the non-mathematically minded to become entangled with numbers. This is a thoughtful, clearly-expressed, and carefully contextualized contribution to the history of the clinical trial; there is, however, also the most delicate whiff of Whiggery in Matthews' several references to "the triumph of the clinical trial", and the final section drawing comparisons between past and present debates might well have noted in passing modern critiques of the clinical trial—expensive, cumbersome, time-consuming and not, in the final event, always a trustworthy indicator of the practical value and long-term therapeutic implications of the treatments assessed.

Anne Hardy, Wellcome Institute

Kurt Goldstein, *The organism: a holistic approach to biology derived from pathological data in man*, New York, Zone Books, 1995, pp. 422, £22.95 (0-942299-96-5). Distributed by The MIT Press.

This is a quality reprint of the 1963 American edition; the book was originally published in German in 1934. The neurologist Kurt Goldstein established his reputation with detailed studies of the symptoms and recovery of brain-damaged patients during World War I. In the 1920s, he was known as a leading critic of particulate theories of the localization of