

implied that he used pulse tracings to “interpret the blood pressure” which is certainly not the case. He thought, as late as 1908, that “the trained finger” was better than sphygmography in estimating blood pressure. Apart from this, and the failure to mention Thomas Young as the inventor of the kymograph (although he seems never to have used one) many years before Ludwig, no comment is needed on the factual content of the book.

Above all, as has been said, the book is valuable for its appendix, which could be a useful source of reference for those concerned with the history of medical instrumentation. The bibliography and index are comprehensive and the book is nicely produced.

P R Fleming, London

**John Krige and Dominique Pestre** (eds), *Science in the twentieth century*, Amsterdam, Harwood Academic Publishers, 1997, pp. xxxv, 941, illus., £80.00, \$120.00 (90-5702-172-2).

The importance of science in our modern world cannot be underestimated. Yet, what this science constitutes and how it has affected society are continually debated. John Krige and Dominique Pestre’s new edited volume on science in the twentieth century, illustrates the many different historical interpretations of science and its influence. Covering a wide range of disciplines from the physical and natural sciences to mathematics, social sciences and medicine, the book highlights the complex relationships between people, objects and institutions involved in scientific endeavour and its application to social issues.

The book is divided into a number of sections: the first examines the image of science; the second looks at the interaction between science and society; the third explores the ways in which scientists conduct their research; and the last section investigates how the scientific enterprise has varied by region and nation in terms of government priority and funding.

Each chapter is extremely diverse in subject matter and treatment of what can be counted as science. Scientific management, for instance, is included as a matter of science alongside that of physics and biochemistry. In some cases the reader can feel that the editors and authors have gone too far in their “refusal to adopt a single definition of science” (p. xxv). While this has allowed for a wide variety of subjects within the volume, the approach can leave the reader with the idea that almost any research enterprise or subject in the twentieth century can be defined as a science.

Similarly some authors confuse the motivations of scientists with the steps it was necessary for them to carry out at any particular historical moment to achieve their goal. By conflating the two issues some authors give the impression of a conspiracy on the part of scientists. This is illustrated in some of the chapters exploring scientific medicine. Some authors claim that medical researchers utilized certain methods and models for their work in order to gain funding. While in some cases this might have been true, such an argument risks promoting the view that finance and issues of professional status drove scientists alone. This ignores the motivation of some of the scientists who might have been equally driven by their desire to solve a particular problem like disease. Similarly, such an approach negates the fact that in many cases the methods deployed by scientists were defined by the state of knowledge at the time.

Some of the strongest chapters in the volume are those that concentrate on the ways in which scientists have worked and how they have been affected by changes in scientific knowledge and funding. One of the most interesting chapters in this respect is Kamminga’s exploration of the emergence of biochemistry. The strength of Kamminga’s piece lies not only in her willingness to define the boundaries of biochemistry, but also her demonstration of how its rise was dependent on developments in a range of other disciplines. Additionally, she shows how new scientific outlooks shaped the field, and what consequences this had for research objectives and training as well as for funding.

## Book Reviews

For anyone interested in the history of science in the twentieth century, the volume provides good summaries of a variety of subjects. Some chapters would be disappointing to experts within their own fields. The book, however, is an invaluable source of reference for anyone wishing to dip into the history of science.

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**Volker Hess** (ed.), *Normierung der Gesundheit. Messende Verfahren der Medizin als kulturelle Praktik um 1900*, Abhandlungen zur Geschichte der Medizin und der Naturwissenschaften Heft 82, Husum, Matthiesen Verlag, 1997, pp. 226, illus., DM 69.00 (3-7868-4082-2).

Towards the end of the nineteenth century, “norms” became prominent in sciences from physiology to psychiatry, anthropology to genetics, criminology to embryology, and in such rationalizing movements as Taylorism and eugenics. *Norming health: medical measuring as a cultural practice around 1900*, based on a workshop organized by Volker Hess in Berlin in September 1996, is a collective attempt to develop a medical historical approach to this phenomenon. That is a tall order, one measure of the difficulty of which is the complexity of relations even between “norm” and the other “nor”-concepts, “norming”, “normal”, “normality” and “normalization”. The most influential models are Georges Canguilhem and Michel Foucault. Canguilhem critiqued the nineteenth-century reframing of disease as quantitative deviation from a medically defined norm, which he argued did not do justice to the norms proper to other ways of life. According to Foucault’s concept of “biopower”, disciplinary technologies came to constitute the individual, e.g. as a subject of psychometric testing, while regulatory technologies constituted the population, and sought, e.g. through eugenics, to reduce the proportion of those who deviated from psychometric norms.

Engaging critically with Canguilhem and Foucault, and embracing recent studies of setting standards and agreeing measures in scientific practice, this stimulating volume explores the construction of biomedical norms and their articulation with wider “cultural practices” a hundred years ago.

Chapters of various perspectives and qualities, each followed by a commentary, deal with the rise of the concept of normal value (Johannes Büttner), norms in psychiatry (Heinz-Peter Schmiedebach), the semantics and aesthetics of the electrocardiograph (Cornelius Borck), and photographing criminals (Mariacarla Gadebusch Bondio). But it is of clinical thermometry, the focus of Hess’s own work and a theme in several other contributions, that we are given the most sustained and satisfying discussion, and one which takes us interestingly beyond the Anglo-American studies such as Stanley Joel Reiser’s *Medicine and the reign of technology*.

In 1868 the Leipzig clinician Carl Wunderlich pronounced that “Not everyone is healthy who has a normal temperature; but everyone is sick whose temperature, upwards or downwards, exceeds the limits of the norm” (p. 170). Hospitals soon took up thermometry as a means of managing ever more patients; temperature charts organized other “practices of objectification” (p. 176) such as taking the pulse and weighing. Michael Martin describes sanatoria which caricatured what this could mean: taking temperatures became the central preoccupation of lives obsessed with systematically observing the minutest of bodily changes. Wunderlich had had such confidence in the self-registering power of thermometers that he was prepared to allow laypeople to read them, leaving the physician to interpret the temperature. Measurement in the sanatoria, typically every two hours, was increasingly entrusted to supervised patients. But some doctors warned of “metromania”, and would hand out only “dumb thermometers”, which patients warned for a nurse or physician to add a detachable scale (pp. 155–6).

The dominance of thermometry in total medical institutions is well known. More