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perfused organs to examine sugar catabolism and metabolism, Holmes underscores the relationship between the laboratory elucidation of a significant intermediate compound like acetone and the clinical knowledge of ketone body production in diabetes. But, he concludes, the early-twentieth-century integrative optimism evaporated, to be re-formulated in the 1930s with the announcement of the “Embden-Meyerhof” pathway and the “Krebs” cycle—the eponymous titles themselves pointing up the inherent difficulties in separating contributions to the field as a whole. However, by the middle of the twentieth century the “ongoing investigative stream” is much broader, and it moves more swiftly. Whilst the definition of a research field may remain as an analytical goal, its achievement becomes more difficult, and in assessing this period Holmes’ “research field” contracts, two notable exclusions being A. V. Hill and Walter Morley Fletcher. But in a short book, such shortcomings can be excused. As he acknowledges finally, Holmes raises many questions, but provides few answers. This is no crime, as those questions are thoughtful, and thought-provoking. The book may suffer from its apparently narrow title, which hides a broad, sweeping account that can be widely recommended.

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FRANK HUISMAN, *Stadsbelang en standsbesef: Gezondheidszorg en medisch beroep in Groningen 1500–1730* [City interest and sense of class: health care and the medical profession in Groningen 1500–1730], Pantaleon reeks No. 8, Rotterdam, Erasmus Publishing, 1992, pp. 477, illus., Dfl. 79.50 (90–5235–037–X).

This volume is a landmark in Dutch medical history. It gives a meticulous account of the evolution of health care and medical practice in early modern Groningen, a market and service town situated in the north of the Netherlands. Its significance lies not just in the wealth of information it contains, based on painstaking archive study—a not untypical attribute of a doctoral thesis—but in the presentation of this material in a convincing analytical framework. Dr Huisman makes judicious use of secondary works emanating from England, France, and Germany, without falling into the trap of using this literature indiscriminately to offer models for the Dutch situation.

Stadsbelang en standsbesef explores what are now well-established themes, including the medical marketplace, the vague boundaries between orthodox and unorthodox practice, and the patient’s view (with the mandatory apology for the absence of sources). The volume is divided into three chronological sections: the sixteenth century; the period 1594–c. 1650, which saw the establishment of a surgeon’s guild and university in Groningen; and c. 1650–1730, when the various medical groupings became arranged hierarchically, with the physicians on top, culminating in the formation of a *collegium medicum* in 1728. Within each section various themes are treated: disease and measures taken to combat it, medical poor relief, licensed medical practitioners and changes in their regulation and education, and unlicensed practice.

The municipal government is located at the centre as negotiator between patients and medical practitioners, and between different groups of practitioners, a negotiator which demanded in different periods different qualities and tasks from local doctors, particularly those engaged in the town service. Towns were powerful units in the Netherlands during these two centuries, and Groningen sought means of promoting the well-being of its population and the economic interests of its doctors, while at the same time attempting to control the movements and activities of all its citizens. The town surgeons moved, for example, from being informers reporting wounds inflicted during fights to the town authorities in the sixteenth century, to members of a powerful guild after 1594, vital agents of poor relief, and finally to play second fiddle to the physicians in the second half of the seventeenth century. While stressing the critical role of town government in influencing shifts in power between practitioners, Dr Huisman avoids monocausal explanations, and other factors shaping the town’s medical services, not least the role of the university and the Calvinist church, are also sought out.

Some groups of practitioners fare better than others in this account. The trio of physicians, surgeons, and itinerants forms the main focus, while pharmaceutical practitioners are more sketchily treated, and women healers and carers, including the important group of midwives, also fare less

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well. Endemic disease is left aside in favour of the more dramatic and better documented epidemic diseases. The care of the mentally ill, chronically handicapped, and old receive relatively little attention. We are left wondering about Groningen's typicality, and the volume does not seek to enlighten us much on this. Yet *Stadsbelang en standsbesef* compensates for any gaps by its overall sweep which brings to light medical care in a town that was strengthening its authority on all fronts. Dr Huisman demonstrates above all what a small role therapeutics played in comparison with political, economic, social, and religious influences, and the poverty of attempting to describe changes in medical groups—their roles, power, and economic fortunes—without placing them in a wider framework. Well produced, and richly illustrated, it has a price that other publishers might like to note. A minor gripe is the absence of a subject index. A major regret is that, while this volume rightly belongs alongside other important studies of early modern medicine—most recently that of Mary Fissell—unless translated, it will remain inaccessible to most medical and social historians.

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WILLIAM PATON, *Man and mouse: animals in medical research*, Oxford University Press, 1993, 2nd edition, pp. xvi, 304, £7.99 (0-19-286146-8).

The first edition of this thoughtful book appeared in 1984. The author, a distinguished pharmacologist and then the Honorary Director of the Wellcome Institute of the History of Medicine, gave a compassionate justification for the responsible use of animals in medical research. It was greeted with considerable acclaim for "its fair and balanced presentation" (*Med. Hist.* 1986, **30**, 101-2). Now the book has been extensively revised, and considerably expanded to take note of the developments in medicine and science, in the relevant legislation, and in society in general, most notably the rise of violent animal liberation groups, in the past nine years. Each chapter has been amended in some way, and some sections have been radically rewritten, thus indicating areas of significant change in medical research and society's expectations of, and concerns about, that research.

The use of living animals in medical experiments has attracted intermittent debate for centuries, and been a contentious issue, especially in Britain, for well over a hundred years. In recent years, the utility argument has satisfied many people with regard to basic research, but not in the context of what is perceived as the non-essential use of animals in regulatory testing. Paton provides an entirely new chapter on toxicity testing, beginning with an assessment of the concepts of safety and risk. He discusses recent developments in *in vitro* techniques for classifying and screening toxic materials, and includes a succinct account of the development and use of the *in vivo* LD₅₀ test, which had the death of 50 per cent of animals tested at a particular drug dose as its end point. With the development and introduction, on the initiative of the British Toxicology Society, of the "fixed-dose procedure", in which a sequence of up to four standard doses are assessed for toxicity, the LD₅₀ test has been superseded in most situations. After a brief summary of the history of cosmetics and toiletries, this important new chapter grapples with the problems raised by using animals to test cosmetics and their ingredients. With the care that characterizes the entire book, Paton reflects on the difficulties of distinguishing between medicinal and non-medicinal compounds. Where in the spectrum do sun-tan lotions, insect repellents, and contact lens solutions fit? He argues that the almost exclusively frivolous associations given to cosmetics ignore the important medical and psychological benefits that derive from, say, the use of a protective barrier cream, or a tinted powder to disguise a blemish. One particular procedure associated with cosmetics testing has provoked considerable protest, and Paton examines the evolution of the Draize test, and its controversial use on the eyes of rabbits. As with his analysis of the LD₅₀ test, the development of the Draize test is discussed both within its historical context as the U.S. Food and Drug Administration in 1944 commissioned a rigorous procedure to evaluate skin and mucous membrane toxicity, and within its scientific context—why cannot local anaesthetics be given to the rabbits? Why is it so difficult to formulate an appropriate alternative? There are no easy, glib answers to these or the many other complex questions that are posed throughout the book. What is provided is a considered reflection of the dilemmas by an author whose scientific credentials are matched by a record of public service, including membership of the Home Office Advisory Committee on Animal Experiments.