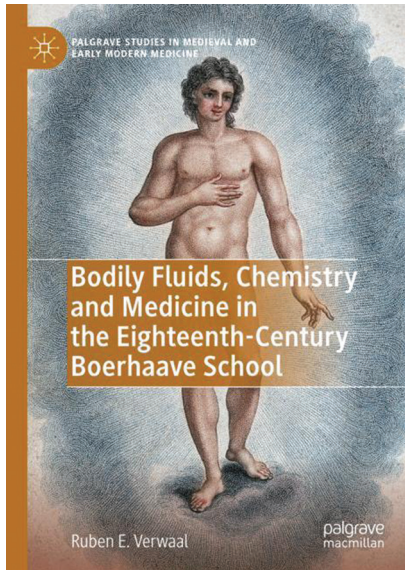


Review

Ruben E. Verwaal, *Bodily Fluids, Chemistry, and Medicine in the Eighteenth-century Boerhaave School*, Cham, Palgrave, 2020, 295 pp. ISBN 9783030515416.



Ruben Verwaal's *Bodily Fluids, Chemistry, and Medicine in the Eighteenth-century Boerhaave School* is a well-written and insightful contribution to the history of medicine, particularly of physiology. The figure at the heart of the book is the Leiden professor of medicine, botany, and chemistry Herman Boerhaave (1668-1738), who, Verwaal claims, trained his students in a style of physiology with a unique and robust reliance on chemical analysis. As his students dispersed to careers across Europe, they brought with them a new physiology of bodily fluids based on chemical analysis that was influential into the nineteenth century. While historians have located the rise of medical chemistry in the nineteenth century, Verwaal demonstrates the importance of the eighteenth-century 'Boerhaave school' in establishing new methods of examining and paradigms of explaining the nature of bodily fluids.

True to its title, each chapter of *Bodily Fluids* focuses on a different bodily fluid of interest to medicine: saliva, blood, urine, milk, sweat, and semen. Verwaal does an excellent job articulating the questions and problems each of these fluids raised, both practically – for instance, with bladder stones – and more philosophically, for instance the question of whether blood was alive. For each fluid, Verwaal shows how Boerhaave and those who followed in his tradition used methods in chemistry – i.e., distillation – to understand bodily fluids according to their components and qualities. This, in turn, allowed them to reconceptualize diseases as conditions arising from specific changes to the chemical qualities of a fluid's healthy state. While Boerhaave had great admiration for the medical chemistry of alchemists like Paracelsus, he also sought to use chemistry not only in the *treatment* of disease but to understand the causes of disease. Dissection and anatomy might give one insight into the body's structure, but Boerhaave saw bodily fluids as essential to understanding physiology, or the processes of life. As such, his approach to physiology subjected bodily fluids to chemical analysis with the belief that doing so would proffer insights into

specific bodily functions. Verwaal uses textbooks and student dissertations not only to examine the knowledge produced by this medical chemistry but also how it defined a novel approach to physiology.

The strongest chapters are those on urine and milk, which deftly blend the worlds of academic medicine, the practising physician, and the public. 'Crying over Spilt Milk' offers a compelling sideways view into eighteenth-century debates over gender roles, motherhood and the family, and public health concerns over infant health and mortality. Chemical analysis of milk in the university laboratory demonstrated its nutritional value to infants, but Verwaal shows how scientific insight into milk as a fluid could not easily be disentangled from views about the importance of breastfeeding to motherhood and, as a result, social debates about a woman's role within the family. While other chapters rely mainly on academic texts, Verwaal here draws on popular poetry and women's writings about motherhood to show how bodily fluids implicate larger, more complex phenomena extending far outside the laboratory. A prize competition run by the Holland Society of Science seeking essays on the best way to increase the flow of a mother's milk allows Verwaal to show how the worlds of academic medicine and patients could be mediated to produce authoritative guidance on issues that straddled State and personal concerns, such as infant nutrition. The chapter on urine, 'Piss Prophets and Urine Matters', offers a great deal to historians of medicine for its careful analysis of a transition in how urine was used diagnostically. Physicians had long been interested in using the qualities of urine – identified through the physician's senses, including smell and taste – to glean insight into the interior of a patient's body, a practice called uroscopy. Verwaal convincingly argues that Boerhaave and his pupils ushered in a fundamentally different approach to the analysis of urine – urine chemistry – that sought to understand the *cause* of a specific condition, such as bladder stones, rather than simply to diagnose.

Verwaal's attention to how chemistry enabled a fundamentally novel approach to pathology, as seen in the chapters on urine but also sweat and semen, is perhaps the book's most compelling contribution to the history of medicine. Pathology is so firmly associated with anatomy and with nineteenth-century France that Verwaal's focus on chemistry and the Dutch Republic offer fresh texture to the well-trod historical narrative about medical interest shifting toward pathology over the course of the eighteenth century. While Verwaal's argumentation for the novelty of Boerhaave's approach is convincing, his argumentation around the 'Boerhaave school' feels comparatively undercooked. While the strongest remnants of his legacy are found in his Leiden successors, Verwaal otherwise relies on textual acknowledgements to demonstrate the reach of his influence. Rather than focusing on the ubiquity of these acknowledgements, I would have felt more convinced if Verwaal had focused on a few core examples outside of Holland and showed, across chapters, how these individuals incorporated and built upon Boerhaave. As it is, it's not clear how one should distinguish professional deference from substantial influence; this would have been more clearly shown by more extended attention to fewer examples.

Each chapter feels self-contained and compelling in a way that makes this an easy text to teach in a variety of formats. Yet that same quality means that, at times, the cohesion of the book's focus or argumentation suffers. The above critique about the Boerhaave school is one example of an instance in which having a consistent touchstone for the argument

in each chapter (i.e., a specific set of individuals) would help the reader draw connections across chapters. Another example is Verwaal's interest in how the chemical approach to physiology offers a new way of understanding the period's tension between vitalism and mechanism – while this was promised in the introduction and was convincingly discussed in the chapter on blood, it otherwise fades away. As Verwaal's analysis on this issue was novel and interesting, I would have liked to see more attention to bringing it through to the analysis of other fluids (especially semen).

This is a strong book with much to offer historians of science and medicine, particularly those who are not familiar with the Dutch context. It brings the reader right inside the rich and fascinating world of eighteenth-century Dutch medicine and convincingly argues that chemistry deserves a place right alongside anatomy in our historical understanding of the period's medical science.

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