The Great Lead Water Pipe Disaster. *By Werner Troesken.* Cambridge: MIT Press, 2006. x + 318 pp. Index, notes, bibliography, tables, figures, appendix. Cloth, $29.95. ISBN: 0-262-20167-4.

Reviewed by Mark Aldrich

This slim, gracefully written, thoroughly researched book will interest economic and medical historians and historians of technology, as well as those concerned with public works and the urban environment. While lead poisoning has attracted the attention of a number of recent writers, Werner Troesken's focus—the use of lead in the water-service pipes that connect the main pipe to a dwelling—has been almost entirely ignored. However, I do not find his argument that lead pipes constituted an environmental disaster altogether convincing.

The book comprises a prologue, nine chapters that are either case studies or examinations of some of the technical aspects of lead poisoning, three econometric appendices, an index, and a stunning bibliography.

To get a flavor of Troesken's approach, consider the arguments contained in the prologue, entitled "Exhuming Michael Galler," and the second chapter, "A House for Erasmus." Michael Galler died mysteriously in New York City in 1868. Suspicions of foul play led to his exhumation and autopsy, which suggested massive lead poisoning. Galler's physician misdiagnosed the problem, a common occurrence in those days, according to Troesken; he notes that an analysis of lead in the city water carried out at the time produced readings of levels 125 times greater than the modern standards issued by the Environmental Protection Agency (EPA). Yet nothing was done to correct the situation until 1992—123 years later. Later chapters suggest that this would become the standard pattern.

In "A House for Erasmus," Troesken describes the efforts of Erasmus Fenner, a New Orleans physician, to alert authorities to the problems of lead water pipes in the 1850s. Trosken uses Fenner's inability to persuade government officials to take action as a vehicle to detail the technical difficulties of identifying chronic lead poisoning. The

consequences affected multiple systems in a nonlinear way: they varied with age and sex; and they entailed a confusing mélange of symptoms, ranging from diarrhea to constipation. This chapter illustrates the author's irritating habit of constructing unhelpful titles. This one, for example, needs a subtitle to clarify his point, perhaps something like "the complexities of identifying lead poisoning."

In other chapters, Troesken briefly provides the context for his topics, argues that lead may induce eclampsia, and supplies case studies drawn from Britain and the United States. In one chapter, he investigates the interaction between lead and the hardness of the water and briefly outlines water treatment that reduced lead solvency. He presents the data on lead levels in water relative to the modern EPA standard, which is almost surely extraordinarily protective. More historically interesting is his comparison of the lead intake that would accompany drinking a certain amount of water with the ingestion of "Dr ___'s Famous Female Pills," an abortifacient whose active ingredient was lead. It is sobering to realize that the typical resident of Middleborough, Massachusetts, by drinking 5.7 ounces of water a day, consumed the equivalent of a dose of abortifacient (p. 58). (This raises the question of why there were any live births at all in this city.) Another chapter discusses lead poisoning in law, describes substitutes for lead pipe, and addresses the problems consumers faced in gaining information that prevented them from adopting protective measures.

Although I am enthusiastic about what Troesken has achieved in this book, I would suggest three steps he might have taken to strengthen his argument. First, he does too little with the statistics presented in Appendix A, where he estimates the effect of lead on infant mortality in Massachusetts around 1900 and in England in the 1880s. Although in chapter one he tells us that lead raised infant mortality rates by 8 percent to 25 percent in these regions (p. 15), he barely discusses the degree to which these figures were representative. To support the claim that lead pipes were a "disaster," he might have integrated these risk findings with exposure data (which he discusses briefly in chapter one) to provide measures of lead's impact on aggregate infant mortality. Since these findings are the result of cross-sectional data, it is not clear how long they persisted. A minor statistical problem is the author's assumption that the entire population of cities

with lead service pipes was exposed, since in most cities some fraction of the population continued to rely on wells. This imparts a downward bias to his statistical findings.

Second, I wish the author had paid more attention to chronology. As it is, the chapters jump back and forth between 1850 and 1930, making it impossible to discover changes or trends. When did cities begin to use lead? Did chemical treatment to reduce lead solubility become common in the United States? When and why did lead water pipes go away? Or did they? The *Municipal Index* for 1924 asserts that lead "has been given up" in many places (p. 305), yet the 1962 edition of *Water Supply Engineering* by Harold Babbitt only notes that lead's "subtle physiological dangers . . . have created prejudice against its use" (p. 245). There is some evidence to support such claims, but it is not presented systematically. Were there cycles of concern, such as those Christopher Warren, in *Brush with Death* (2000), suggests occurred in other kinds of lead poisoning? Occasionally, Troesken's tendency to skip around raises questions about the evidence. For example, he cites an analysis by Harvard chemist Eben Horsford of lead in Boston's water in the1840s (p. 70), but he then refutes it with evidence drawn from 1899, buttressed with statements by an authority writing in 1889 (p. 71). His examples may be appropriate, but he needs to explain them more carefully.

Finally, Troesken might have better integrated his own work into the broader scholarship that exists on lead poisoning and on public health and medical history. His analysis suggests, but does not fully support, the claim that urban environmental historians have overlooked an important adverse consequence of the public health movement. In addition, he would have strengthened his analysis by incorporating modern conceptions of disease. Troesken bases his explanation for the persistence of lead pipes largely on the difficulty of diagnosing low-level lead poisoning, especially in children, although he briefly mentions economic concerns as well. Yet many other diseases were difficult to diagnose, including tuberculosis in its early stages. Most historians now argue that diseases are in part social constructs. Both John Burnham, author of the article "Unraveling the Mystery of Why There Was No Childhood Lead Poisoning" published in the *Journal of the History of Medicine and Allied Sciences* (2005), and Christopher Warren assert that the diagnosis of poisoning from lead paint was in part socially shaped, as physicians were yet to become "lead conscious." William

Rothstein, in *American Physicians in the Nineteenth Century* (1972), quotes a doctor who, as late as 1902, was warning physicians "not to get involved in medical science" (p. 265). Thus, some explanation of how physicians at the time understood science and disease, and how their understanding evolved, would have shed some light on the question of why lead pipes persisted.

Despite these concerns, I consider *The Great Lead Water Pipe Disaster* an important piece of scholarship that should command a broad audience.

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