Sulphuric Utopias uses the story of a machine that you probably have never heard of, the Clayton apparatus, to explore the role of maritime fumigation in resolving the political and economic problems posed by quarantine. Big claims are made about the significance of this machine at times. In the words of the authors, it was “a technology that enabled a global political economy and drove the success of global trade, thus constituting a forgotten pillar of globalization” (p. 5). It also functions in Sulphuric Utopias as a way of grasping the intersections between epidemic disease, etiological theories, expanding international trade, the politics of quarantine, and the vision of a rat-free environment in the decades after 1890. The machine is both endowed with considerable power as a historical agent, while also being used as a way to organize this story so we see clearly what was at stake for a range of actors concerned with trade, disease, and politics at a particular historical moment. I think it works extremely well in the latter case, as a device (a narrative one) to make us reconsider our understandings of the history of germ theory and pest control and their relationship with the practical and political problems raised by increasing movement of people and goods through ports around the world. This is a book deep in conversation with the scholarship, always alert to the implications of its arguments for the historiography related to quarantine, disinfection, bacteriology, imperial rivalry, and maritime history. Interestingly, however, while it makes some very big claims for the impact of the Clayton machine, it is not particularly concerned with the work that has been done by historians of technology around the question of how we establish “significance”. [1]

Sulphuric Utopias tells how the Clayton machine was the innovation of Thomas Adam Clayton, a Scot who had settled in America as a cotton farmer before joining the State Board of Health of Louisiana in 1891. Clayton built on previous work done on using gases for maritime hygiene to create a machine for fumigating the interior of ships with sulphur dioxide. While originally seen as a method of disinfection, capable of killing the pathogens that lurked in the crevices of a ship, Clayton’s machine was later valued for its efficacy in killing rats. At its height, Clayton’s companies had offices around the world, in New York, Paris, Egypt, and London, and the fumigation apparatus was used in ports as far afield as America, Britain, Denmark, Peru, Argentina, French Indochina, and the Middle East. The Clayton machine promised a utopia of seamless global trade and the end of time-consuming, expensive, and controversial quarantine practices.

What was modern about the Clayton machine was its use of fumigation—the pumping of gases
into a closed compartment to eliminate the cause of disease. Chapter 1 shows how the antecedents of ship-based fumigation can be found in two traditions. One was therapeutic fumigation, focused on bolstering the constitution of an individual rather than protecting the health of a wider community. The other was hygienic fumigation, which was a practice of disinfection, aimed at eliminating the agents that caused disease by purifying the air. *Sulphuric Utopias* shows that the rise of bacteriologic understandings at the end of the nineteenth century did not mean a wholesale shift away from affording a role to objects and environments in disease transmission and toward the human body as the source of epidemic disease. Instead, the history of maritime fumigation is a study of the work done to rid surfaces of pathogenic microbes as well as being a history of various mechanical “contraptions” for creating and circulating gases in an enclosed space. Later, the book tells us that the Clayton machine did not represent a perfection of fumigation as a disinfecting procedure and pest-control technique. The utopia it promised was not fully realized; sulphur dioxide has an offensive smell and can taint metal fittings, and it does not rise well to fill the full height of any space, so rats could climb to avoid its effects. Nonetheless, the main vision underpinning its creation, that of machine-driven chemical fumigation as a key practice in germ and pest control, was taken up by others, including the creator of Zyklon B.

The main argument of the book is that maritime fumigation afforded a resolution to the tension produced by the increasing movement of goods across borders in the nineteenth century, and the need to protect the nation against imported disease. Quarantine was a threat to commerce and the prosperity of nations; every day a ship was detained cost money. Chapter 2 focuses on the port of New Orleans as the context to the development of Clayton’s apparatus for fumigation. New Orleans was a significant site for innovation in the practices of surveillance and detention of ships and crew, and chemical treatment, as it experienced regular, and sometimes devastating, outbreaks of yellow fever over the course of the 1800s. Prior to the launch of the Clayton machine, there had been a number of experiments with the use of sulphurous gases to remove disease in the 1870s. The most basic method was to generate gases by burning sulphur in pans. This was then improved by using a furnace on a tugboat to heat the pans and pump the resulting gas into a ship. It was this technique that was perfected, and then patented and exported, by Thomas Clayton.

Chapters 3 and 4 show the fate of the Clayton machine as it moved beyond New Orleans to Europe and the Ottoman Empire. We are shown something of the reach of the Clayton machine as Clayton established companies first in New York in 1899 and then West Virginia, followed by Paris, Egypt, and London. We see the competition that the process faced from alternative methods of disinfection that used carbonic acid or carbon monoxide. Detailed experiments were carried out by Britain and France to test the efficacy of the Clayton machine against a backdrop of disputes about quarantine laws, rivalry between nations, and debate about the mechanism of disease transmission. In chapter 5 the authors tell us how the 1903 International Sanitary Conference in Paris should be seen as key moment in which we can see the “stabilization of fumigation.” In the context of discussion about the threat posed by rats on ships, the conference agreed to recommend fumigation as the preferred mode of control. This chapter is one point in the book where we also see very clearly the limitation of presenting the Clayton machine as the significant “game-changer” in the history of disinfection, disinsectization, and deratization, or of global trade. The Paris conference did not solely focus on this particular apparatus but named fumigation with sulphur dioxide as one possible method, alongside the use of carbonic acid or carbon monoxide. Fumigation had achieved official recognition, rather than the Clayton machine. The same chapter provides a description of the geographically wide variety of
places where the Clayton machine was adopted, under the heading “Globalizing the Clayton.” The question not answered, however, is what alternative methods of disinfection and fumigation were being used by port authorities across the globe. We are invited to see the Clayton machine as key, but without substantiation of this point through an exploration of the relative extent of its uptake. Indeed, later in chapter 7 the authors tell us that many shipping companies refused to agree to fumigation and also that the Clayton machine was considered expensive in contrast to the practice of burning sulphur in pans in the hold of a ship. This pot method” is described as being in widespread use.

Chapter 7 follows the history of fumigation onto dry land through an exploration of the use of a competitor to the Clayton machine. The Aparato Marot used electricity to generate ionized sulphur dioxide, a lighter gas that could easily fill large spaces. Christened the Sulfurozador, it was used to cleanse homes, warehouses, streets, and the sewage system in Buenos Aires. Fumigation was incorporated, then, into a public health vision in which perfectly hygienic cities were the foundations of modern nations. The final chapter describes the demise of Clayton’s companies around 1910 and the eventual eclipse of sulphur dioxide by cyanide-based methods.

This is a valuable book about the technique of fumigation, at sea and in the urban environment, that provides us with an interesting account of the way that this process began as a method for killing microbes and ended as a technique for disinestation. Its key historiographical intervention, to my mind, is in showing us that the history of pest control should not be reduced to the history of chemicals. We have many books about DDT, for example, but there is little focus on the history of “spraying” as an approach with its own technological history that both predates and exceeds the application of synthetic insecticides after 1945. By focusing on more than chemicals but also machines and procedures, Sulphuric Utopias encourages us to consider the significance of the history of application techniques. The Clayton apparatus works in Sulphuric Utopias as an emblematic machine; a window into a bigger, wider history of fumigation apparatuses and techniques. What the book cannot do is demonstrate the significance of the Clayton machine in terms of driving global trade, as this would require a different book, one that dealt with economic data, or comparative figures on the use of different techniques across the globe.

Note

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