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'We live in the midst of death': Medical Theory, Public Health, and the 1793 Yellow Fever Epidemic

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'We live in the midst of death': Medical theory, public health,
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(TITLE)

BY
Alyssa A. Peterson

THESIS
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Abstract

Much has been written on the history of disease in early America, especially surrounding the 1793 yellow fever epidemic that ravaged Philadelphia. The stories of the men and women who lived through and were affected by it, including the physicians who treated the victims, have been thoroughly covered by historians. What has yet to be discussed is the medical context in which this epidemic existed. Medical education, scientific thought, and particularly past experiences came together during this outbreak to influence both the medical establishment and governments’ decisions regarding their appropriate response. Doctors’ medical education predisposed them to beliefs and preferred treatments, including the understanding of disease. But it was a doctor’s prior experience with tropical diseases that influenced how they reacted during this epidemic. Those like Philadelphian Benjamin Rush, who practiced in a single town, were unlikely to come into contact with yellow fever and were less likely to accept new theories concerning it. Physicians such as Frenchman Jean Devèze, a physician in Haiti with the French army, not only had more clinical knowledge overall but were also open to different methods based on their prior experiences. Devèze’s use of autopsy and empirical medicine came as a result of his background and was something Rush did not have exposure to. Using the 1793 epidemic and these two prominent doctors, I will demonstrate that physicians’ formal education in fact formed a small role in how they treated yellow fever, while their prior experience throughout the Atlantic played a significant role in medical personnel’s response to the epidemic than is currently addressed. In doing so this thesis will expand the history written on the 1793 epidemic beyond the standard social history and place the event within the larger context of medical history, as well as contribute to the medical and public health history of early America.
Acknowledgement

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# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Chapter One   Scientific Thought and Medical Education in Early America</td>
<td>10</td>
</tr>
<tr>
<td>Chapter Two   The Battle over the Appropriate Treatment of Yellow Fever</td>
<td>30</td>
</tr>
<tr>
<td>Chapter Three Knowledge Transmission and Public Health History</td>
<td>53</td>
</tr>
<tr>
<td>Conclusion</td>
<td>70</td>
</tr>
<tr>
<td>Appendix</td>
<td>74</td>
</tr>
<tr>
<td>Bibliography</td>
<td>76</td>
</tr>
</tbody>
</table>
INTRODUCTION

“Medicine often killed, where illness could have been cured...”¹ This phrase, written by French doctor Jean Devéze during the 1793 yellow fever outbreak in Philadelphia, aptly describes the problems with the medical field in the middle and late eighteenth century. Physicians during this time had little real understanding of how illness and disease affected the body or how to effectively treat ailments. Instead, they relied on medical knowledge little changed from the time of the ancient Greeks. Although the Enlightenment encouraged more scientific investigation within medicine, practical changes to the treatment of illness and disease were very slow to develop. Medical education remained relatively the same throughout the different medical schools across Europe and focused on instilling in graduates a theoretical but not practical understanding. By the time of the 1793 epidemic, the majority of doctors had relatively similar medical educations. Why, then, were there numerous different treatments and beliefs professed by multiple different doctors during this famous epidemic?

Experience was the deciding factor. While a medical education established the foundation for a physician’s knowledge, it was a doctor’s later practical experience that largely influenced his ideas (in the eighteenth century doctors were almost all men) on disease and subsequent treatments. The lives of two doctors, Philadelphian Benjamin Rush and Frenchman Jean Devéze, demonstrate this important point. Rush was educated in Edinburgh, Scotland, and practiced solely in Philadelphia, with a brief stint in the Continental Army during the Revolutionary War. Jean Devéze was educated in Paris and traveled to Haiti multiple times with the French army, eventually setting up a hospital and practicing in San Domingue before being forced to flee to Philadelphia in early 1793. One of only two physicians in Philadelphia who conducted autopsies on his patients and to practice a more empirical kind of medicine, Devéze was strongly influenced in his treatment decisions during the 1793 outbreak by his ‘hands-on’

experience in the Caribbean. Rush and Devéze may have had similar European medical educations, yet they had radically different ideas of treatment during the yellow fever epidemic. It was their earlier experiences in the Americas that played the largest role in determining each man’s understanding of yellow fever and what each thought was the best treatment for those afflicted by the disease.

These decidedly different viewpoints also influenced the public’s and governments responses, as well as the public health policies, implemented in response to the epidemic. The disagreement by the medical community on the disease’s origin played a large role in Philadelphia’s and surrounding governments’ attempts to prevent the spread of yellow fever during the 1793 outbreak. Whether yellow fever was imported or home grown, and whether or not it was contagious led to the employment of multiple different strategies in an attempt to stop the disease. Quarantines and lazarettos (quarantine stations) were established, just in case the disease was imported or contagious. Sanitary health measures, such as street cleaning and clean water initiatives, were also employed, in the event the disease was home grown. Faced with the strong disagreements within the medical community local governments, instead of relying on the opinion of a single physician, hedged their bets by developing responses to multiple theories. But these responses changed over time, from a reactionary measure employed after the beginning of an outbreak to preventative actions used in the hopes of preventing such problems. With successive outbreaks this disagreement reoccurred and continued to shape public health policies as well as the public health movement that began at the end of the eighteenth century.

The yellow fever epidemic that spread through Philadelphia in 1793 and the role of two of the main doctors involved in the epidemic, Rush and Devéze, demonstrate how medical background, and, most of all, physicians’ previous experience heavily influenced medical treatment and public health policy during epidemics. These two doctors’ approach to yellow fever also make evident the lack of exchange of medical information that took place across the Atlantic and demonstrate that despite the European training of American doctors, European views of proper treatments had very little effect on
the America’s developing medical profession and public health movements in the late eighteenth century. The study of epidemics cannot be complete without an understanding of the role medicine and doctors had within the response to such diseases. And as medicine and physicians do not exist in a vacuum, it is equally important to understand the influences and backgrounds behind them, as these shaped both the treatments and understanding of the disease that was then passed on to the public and government. Studying the response to epidemics without understanding the medical background to such responses would fail to recognize the motivating factors behind the decisions. Therefore, in order to have a full and complete picture of an epidemic, we as historians must also look at medical history and understand it as an influencing factor for the time.

The current literature on the 1793 yellow fever epidemic is one largely focused on social history. Immediately following the conclusion of the epidemic, pamphlets circulated describing the events in anecdotes and stories. Physicians published their own accounts, which usually included a description and defense of their methods. Historians have used these accounts to study the social impact the disease had on the city and its people, generally relegating any medical aspects to brief background explanations. J.H. Powell, in *Bring Out Your Dead*, was the first to incorporate these accounts into a descriptive narrative of the epidemic.² A compilation of essays in *A Melancholy Scene of Devastation: The Public Response to the 1793 Philadelphia Yellow Fever Epidemic* focused on social aspects of the epidemic: African-Americans, politics, and demographics.³ Academic articles have similarly focused on the social side of disease history.⁴ One of the preeminent scholars of the 1793 yellow fever, Billy G.

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² Powell, *Bring Out Your Dead*.
Smith, has focused on the movement of the disease and its impact on the population, especially the lower classes. In his studies, Smith has pioneered the use of maps and geographic information systems (GIS) to detail the yellow fever outbreak and its impact on the poor and working classes. While Smith’s work on the outbreak is innovative and informative, his scholarship concentrates solely on the disease’s unequal impact among different social groups. There is a lack of scholarship on how medical and scientific thought influenced response to the 1793 epidemic.

This thesis will focus on the Philadelphia’s 1793 yellow fever epidemic as a case study to unpack how and why the medical profession developed differently across the Atlantic and how medical knowledge was transported and communicated during this time. It will place the epidemic within a larger discussion regarding the circulation of scientific knowledge within the Atlantic that has recently developed. In doing so the thesis will also place the Rush-Devéze dispute within a larger discourse.

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among eighteenth-century scientists regarding what constituted ‘credible’ knowledge and to what degree the new medical profession should incorporate indigenous medicinal ideas and practices.8

Overall, much more has been written on the history of public health in America, usually focused on small towns and local governmental decisions. While this literature is more robust, it fails to fully explain the transition from reactionary to preventative public health measures. In the 1960s, John Blake wrote on the history of Boston’s public health laws and John Duffy wrote of New York City public health regime.9 Both described the series of health laws the two cities put into place from the middle seventeenth century up to the middle of the nineteenth century. Often times, these laws were enacted in reaction to a disease outbreak of some kind. Both authors discuss the general scientific ideas behind the implementation of these different laws, including the contagion and miasmatic (bad air) theories. But because of the depth of each history, the authors focused only on the history of one town, and comparisons between different towns at the time were not undertaken. As a result, readers did not know whether or not the laws and systems put into place were somewhat revolutionary and ahead of their time, or if the particular town had fallen behind the rest of the country with regards to public health. Duffy attempted to fill this historiographic hole with his 1992 work The Sanitarians.10 It provides a good comparison between cities and their public health responses to the frequent yellow fever outbreaks from 1793 until the end of the century. While comparing the newly implemented sanitary measures put in place by the cities in response to the 1793 and subsequent epidemics, his research seems to suggest that the cities moved from a reactionary stance towards epidemics to a more proactive one. This issue is not addressed in any subsequent literature. More recent scholarship also has ignored or glossed over any connection between American public health and sanitation laws and those

that were enacted in Europe or its colonies, specifically in the United Kingdom, France, or the West Indies. While America inherited some public health laws while still part of the British Empire, after the Revolutionary War the former colonies were on their own when enacting these types of laws. Public health laws and the understanding of cleanliness and disease changed and developed after the separation from Great Britain, as seen in the advances of the Royal Navy regarding ship board health. However, no scholar addresses whether or not American states or city governments knew of these advances and how much of a role, if any, these changes had on the evolution of American laws. This thesis will attempt to fill some of the gaps in the historiography of early American public health with an explanation of why Philadelphia changed from employing reactionary laws to enacting proactive laws, and place the city's public health approaches within a larger Atlantic context. To do so this thesis addresses three main interrelated topics: the history of medical science and education, the medical treatment of yellow fever, and the public health policies of local governments.

Chapter I explores scientific thought and medical education in early America to provide a context for understanding how Americans and the medical profession responded to the 1793 Philadelphia yellow fever outbreak. To do so it will outline the history of how the disease has been understood, medical education in America and in Europe, competing the views of tropical diseases (including but not limited to yellow fever), and a brief description of the epidemic in Philadelphia in 1793.

Chapter II covers the disagreements over the treatment of yellow fever, including a discussion about the competing causes of the disease and the two main groups of doctors supporting these ideas. It will take a close look at two of the leading doctors in each group, Benjamin Rush and Jean Devéze, and how their backgrounds, education, and, most importantly, their experiences resulted in differing ideas of treatments. This chapter will look at changes in scientific thought and development and how these changes impacted the different treatments professed by Rush and Devéze.
Chapter III looks at the public health history surrounding the 1793 outbreak. It will discuss the response by local governments, including a look at the quarantine and sanitation laws put into place in Philadelphia, the surrounding areas, and overseas, including how medical thought influenced these laws. It will discuss the changes made in public health following the epidemic, including new laws, health and sanitation changes, and the continued use of quarantines. This chapter will also touch on possible reasons of why cities changed their laws from a reactionary stance to laws that were more proactive, as well as discussing the effect and importation of knowledge, or lack thereof, of other public health laws from other countries and colonies.

Global responses and international cooperation to medical crises like epidemics are not a new development. The Atlantic world in the eighteenth century was one of strong international ties and a well-developed communication system which allowed for the transfer of knowledge between different doctors and countries. Trans-Atlantic responses to such situations already began to emerge in the second half of the eighteenth century and increased in pace with increased globalization. With the increase in global connections today and the dramatic decrease in the time it takes to travel the globe, disease and epidemics make these topics even more important. As the recent Ebola epidemic in West Africa has demonstrated, problems with scientific understanding, quarantines, mistrust of medical knowledge from outside a region, and infective public health laws can greatly shape the impact of epidemics. While cliché, there is much we can learn from past epidemic outbreaks, such as that in Philadelphia in 1793, and public health failures in responding to these health crises.
Chapter Two  
Scientific Thought and Medical Education in Early America

Prior to the twentieth century medical knowledge varied greatly from nation to nation. Where a doctor trained and his experiences as a young doctor greatly influenced his scientific beliefs and practices as a mature doctor. There is no better example of this than Philadelphia’s 1793 yellow fever outbreak. Doctors trained in different European schools had preconceived notions of disease based on their education. This early medical knowledge was shaped by practitioners across Europe, which were then slowly spread throughout the continent by their students. However, where these doctors subsequently practiced and the resulting knowledge that they then brought with them to Philadelphia led to conflicting approaches to yellow fever and how to treat the disease during the 1793 epidemic.

Medical Knowledge and Treatment in the Eighteenth Century

Medicine by the eighteenth century had changed relatively little from the time of the ancient Greeks. In the eighteenth century most doctors and laypeople believed that everybody possessed four elements, or humors, which corresponded to the elemental qualities of water, earth, air, and fire. An imbalance in these humors was believed to cause illness and disease, and treatments were designed to bring the humors back into balance within the body.¹¹ These imbalances were often attributed to personal factors, such as “poor initial physical endowment, neglect of hygiene, [or] over-indulgence.”¹² Later theories of disease built upon this concept.

Two physicians influenced the medical community’s view of disease in the late seventeenth to early eighteenth centuries. The first was Thomas Sydenham (1624-89), an English doctor often called the

“English Hippocrates” because of his emphasis on observation and avoiding speculation. He accepted and practiced the Hippocratic view of medicine, which used “careful observation, logical deduction, experimentation and record-keeping” to try to understand illness and devise treatments. Despite practicing this method, Sydenham was “unable to correlate epidemics with specific weather patterns,” a commonly held assumption at the time. Because of this, he became convinced that diseases were caused by changes in the air that resulted from miasmas and effluvia. His miasmic theory was quickly accepted, particularly because it could easily be incorporated into the traditional view that “temperature, humidity, prevailing winds,” and other environmental factors caused disease. His book, Observationes Medicae, published in 1676, became practically required reading for any student of medicine and his theories spread across Europe.

The second physician, Herman Boerhaave (1668-1738), was one of the most renowned professors at Holland’s University of Leiden. He believed the human body to resemble a machine, in that health was a state of “hydrostatic equilibrium, a balance of internal fluid pressures.” Any changes in these pressures could cause disease or illness and he distinguished between disorders of the “solids” and those of “blood and humours.” Sydenham’s miasmic theory fit neatly into this concept as the reason for an imbalance of the “internal fluid pressures.” Boerhaave expounded this theory while at Leiden from 1709 to 1738. During his tenure, more than one-third of his students were British and subsequently took his concepts back to England and Scotland, where it influenced many of the faculty at the University of Edinburgh at least through the 1760s.

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16 Miasma was a poisonous, unpleasant smelling vapor or mist emanating from nature or decaying substances. Effluvia are offensive exhalations or smells and often times are said to make up the miasma.
One of the professors at Edinburgh who was greatly influenced by Boerhaave was William Cullen (1710-1790). Cullen became one of the most famous professors of his day at the University of Edinburgh. During his tenure at Edinburgh he developed a medical theory that evolved from Boerhaave’s, which focused on the cardiovascular system, to a scheme based on the nervous system. He believed that the human body existed by “nervous power” and that muscles were a continuation of the nerves.\(^\text{18}\) Cullen thought that malfunctions in the nerves caused illness and disease and these malfunctions could be seen through spasms and fevers, with fever specifically caused by “spasms in the extreme arteries” or capillaries.\(^\text{19}\) In 1777, he published his ideas in *First Lines of the Practice of Physic*, which became a popular textbook in Britain and, later, the United States.\(^\text{20}\) Because of this, his prominence at Edinburgh, and the popularity of the school in the eighteenth century, it is thought that Cullen’s medical beliefs continued to influence the English-speaking medical community for at least fifty years after he taught his last class.\(^\text{21}\)

It was from these theoretical foundations that the doctors of the eighteenth century set up their medical practices. When a patient fell ill, the first step was to diagnose their ailment. The traditional reasoning at this time put an emphasis on the patient’s own personal description and history of the complaint, and while doctors did minimally observe patients, they saw no reason to perform complete physical examinations. Generally, physicians diagnosed using the “five senses...they would feel the pulse, sniff for indications of decay, taste urine, listen for breathing irregularities, and observe skin color.”\(^\text{22}\) This system of diagnostics was normally taught during a doctor’s time in medical school. John Rutherford (1695-1779), a professor at the University of Edinburgh, imparted this diagnostic system to


\(^{20}\) “William Cullen.”


\(^{22}\) Conrad et al., *The Western Medical Tradition*, 403.
his students, emphasizing the need to inspect patients’ appearance, especially the face, in order to correctly diagnose them.²³

From the diagnoses a course of action was then decided upon by the physician. Traditionally this involved issues of “temperance and hygiene.” Patients would need to look for and control factors such as “good air, diet, evacuations, sleep, exercise, and peace of mind.”²⁴ If the patient was sick enough, additional treatments and medicines would be added to this regimen. One treatment that slowly gained popularity was blood-letting. Doctors began using the therapy in the eighteenth century, but it became an immensely popular option, at least in the United States, after the 1793 epidemic in Philadelphia, thanks in large part to the work of Benjamin Rush. The effectiveness of blood-letting was often based on the accepted idea of humors but almost every physician found a way to explain and incorporate blood-letting into their diagnoses, despite what they held as the root cause of illness. For those who believed in the humors, blood-letting helped to stabilize the imbalance within the body. Supporters of Boerhaave saw five advantages to the practice which aligned with their cardiovascular theory: “it reduced heat, allowed secretion to become easier, relieved tension in the head, eased the action of the heart, and enabled free passage of blood through the lungs.”²⁵ Practitioners who were trained by Cullen, like Rush, saw blood-letting as an “inflammatory stimulus” that helped to lessen the spasms of the blood vessels that were causing the illness.²⁶ Regardless of the doctor’s reasoning, the practice was often popular with patients and was seen as an active, instead of passive, way to treat their ailment.²⁷ It was common for

²⁴ Conrad et al., The Western Medical Tradition, 417.
²⁵ Harrison, Medicine in an Age of Commerce and Empire, 125.
²⁷ Patients, as we still see today, wanted a remedy that gave signs of its effectiveness as proof that it was working. And as many of them were paying the physicians for medical advice and treatments, they wanted tangible proof of what they their money was being spent on.
those who were sick to “breathe a vein” without a doctor present, and more than a few people saw annual or biannual bloodletting as a good way to maintain their health.\textsuperscript{28}

Often used in conjunction with blood-letting, purges and evacuations were a staple treatment option at the time. Medicines were prescribed to assist with these movements, the most popular being mercury and calomel (mercury chloride). The excessive salivation, vomiting, and bowel movements caused by large doses accomplished the doctor’s goals, but are actually the effects of mercury poisoning.\textsuperscript{29} Excessive amounts of mercury could also cause a loosening of the teeth, bleeding from the gums, and if taken long enough, neurological damage. It was often given in conjunction with jalap, a natural purgative from the root of the Jalap plant.\textsuperscript{30} Dehydration and electrolyte depletion were common side effects of these treatments.\textsuperscript{31} The purges and evacuations were seen as yet another way to balance the body and stop the negative responses occurring within, whether those were thought to occur in the cardiovascular or the nervous systems.

Sometimes doctors knew enough to prescribe medicine with the intent of treating the illness itself instead of just its symptoms. Digitalis, discovered in 1785, was often prescribed to treat “dropsy,” or edema and for which it is still used today.\textsuperscript{32} Cinchona bark, containing quinine, was a known treatment for “intermittent fevers” (malaria). However, physicians prescribed it for all fevers and as a result there was no agreed upon standard dosage and the drug was therefore ineffective in some cases. The hit-and-miss results often turned doctors off to the drug, and many times, when it was prescribed

\textsuperscript{28} Conrad et al., \textit{The Western Medical Tradition}, 417.
\textsuperscript{31} Breslaw, \textit{Lotions, Potions, Pills, and Magic}, 46.
for any kind of fever, it was dismissed entirely when it did not work.\textsuperscript{33} Despite this, it was well known as a cure for malaria and was still frequently used in that way. Opium and laudanum, a liquid derivative, were used to treat pain as well as diarrhea. There was little else outside of these four drugs that were proven to treat illness or its symptoms, but combined with other treatments and the obvious concern of the doctor, it is possible that many patients were made well by the placebo effect resulting from these actions.\textsuperscript{34}

Medicine at this time was uncertain and limited and multiple theories existed as to the causes of illness and disease. The available treatments and medicines were known to the majority of practitioners, but their application and rational differed from physician to physician. Often times, treatment could be worse than the ailment and cause permanent damage, as often happened with mercury. Doctors were limited in what they could realistically treat and even the best course of action could fail. Overall, physicians did the best they could with the knowledge and tools they had available.

\textit{Medical Education in Europe and North America}

North American colonial settlements relied greatly upon imports, especially the British colonies. Thanks to the limitation on trading partners imposed upon the colonies by the Navigation Acts, they relied on imports from Britain for almost all of their needed commodities, from sugar and cloth to tea and consumer goods. They were also dependent on imported medical knowledge. With medical schools established in British North America only in the latter half of the eighteenth century, the vast majority of the colonies’ doctors were educated in Europe. So many doctors in British North America were European trained that they were described as raw material that was exported to Europe, and returned

\begin{footnotesize}
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\item[33] Breslaw, \textit{Lotions, Potions, Pills, and Magic}, 38. Some physicians, especially those in the tropics, understood that cinchona bark worked only for “intermittent” fevers. However, this information does not seem to have made an impact on some of the doctors in North America. Why this information was limited to the more tropical regions of the Americas and did not take hold in America is an interesting topic for further research.
\item[34] Ibid., 100.
\end{itemize}
\end{footnotesize}
as “finished” products. The center of this exchange of medical knowledge was Edinburgh, Scotland, where numerous advantages and advancements made it the preferred educational center for Americans. The training the students received included the most advanced understandings of the time and prepared them for their future medical careers in the colonies. The education of physicians, however, was limited to the treatment of disease, and the education received in Edinburgh emphasized this fact. Because the majority of early American doctors were trained in Scotland, American medicine and medical education was greatly influenced by the scientific principles that predominated there.

Medicine in America in the early period was a European tradition, and would not form its own American tradition until in the nineteenth century. Americans relied heavily on the University of Edinburgh, as well as other European schools, to educate their physicians — yet another required import for the colonies. This reliance also shaped the indigenous medical schools, which were founded under the strong influence of European tradition. Early American medicine cannot be fully understood unless its foundations are also understood, and its foundations were centered at the University of Edinburgh.

Physicians during this time were not focused on finding cures for diseases. Scientific research resulted in minimal advances to help the sick, and all emphasis during a doctor’s education was on private practice that focused on treating individuals, normally the middle and upper classes. Instead, medical students were taught how to treat a patient’s symptoms. This focus on treatment over research was reflected in the route students took to become physicians, as well as in their education once in medical school. The majority of students followed similar paths, including John Morgan, founder of Philadelphia’s first medical school, and Benjamin Rush, famous patriot and doctor, who later taught at the University of Philadelphia. For each, a bachelor degree from a university came first. Some received

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37 Bell, *The Colonial Physician & Other Essays*, 43.
a degree in the arts, while others received a bachelor’s of medicine (until American universities abolished the M.B. in 1789). At the time, a classical education, focused on literature and ancient languages, was viewed as an important foundation for the study of medicine, despite the fact that it lacked any scientific preparation. Instead, classical education prepared future physicians to read the ancient texts, like those of Hippocrates, which were still highly influential in the world of medicine. By the eighteenth century, the art of medicine had not changed much from ancient times and these texts and their teaching were still used as the basis of medical education and practice.

Apprenticeships followed, normally requiring five to seven years of working with a physician. However, the system in the colonies, and later the states, were much more lax than in the United Kingdom and often times the apprenticeships lasted for a year or less, possibly because of the high demand for physicians. The apprenticeship system for physicians was similar to that for artisan craftsmen. Boys around the age of fifteen, sixteen, and seventeen were apprenticed out to physicians to begin their careers, some later if they had first completed some formal education. Some students received better education through their apprenticeships than others, but all students wanting to attend medical school had some training of this kind. For students who traveled overseas to school before completing an apprenticeship, they were often deferred in their program and sent to work with local physicians before being fully admitted. There were also students who did not receiving any formal schooling, but instead traveled to Europe after completing only an apprenticeship.

42 For example, Benjamin Rush apprenticed with John Redman, a prominent Philadelphia physician, who gave Rush training with medicines, nursing, accounting, clinical practice in the Pennsylvania Hospital, and access to a large medical library. This was most often not the case with the majority of apprenticeships. Kaufman, American Medical Education, 9.
43 Bell, The Colonial Physician & Other Essays, 43–44.
In Edinburgh, where most colonists and the majority of Philadelphian doctors attended, students would receive their medical training, as well as some more intense study in anatomy. Even after the founding of medical schools in America, students wanting a more complete education were advised to travel to Europe for preparation, for the “variety of operations and those frequent dissections which are common in older countries” were still thought to be lacking in indigenous universities. The vast majority of medical students who arrived in Europe from America headed for Edinburgh. The University of Edinburgh’s medical school started in 1726 with three medical professors and, by the end of the eighteenth century, was one of the leading medical schools in Great Britain.

While the prestige and quality of education received were certainly important, many students were drawn to Edinburgh University for more practical reasons. To start, all classes were taught in English, a first for the study of medicine. There was no entrance requirement or screenings, as there were in England’s medical schools, which would have screened out those without a strong background in mathematics or ancient languages. There was no religious requirement, as there was at Oxford or Cambridge, which required membership in the Church of England to receive a degree. It was also inexpensive, with students paying only for the classes they took, and there was no obligation to graduate. In fact, a considerable number of those who studied at Edinburgh never took a degree. For example, between 1760 and 1790, twenty-seven Virginians received degrees from the school, while at least eighteen others from Virginia studied there but did not graduate. Some who did not finish chose

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44 Ibid., 44.
46 Sloan, _The Scottish Enlightenment and the American College Ideal_, 204.
47 Thomas Neville Bonner, _Becoming a Physician: Medical Education in Britain, France, Germany, and the United States, 1750-1945_ (New York: Oxford University Press, 1995), 64.
49 Porter, _The Greatest Benefit to Mankind_, 291.
50 Sloan, _The Scottish Enlightenment and the American College Ideal_, 188–189.
to graduate from Glasgow, where the cost was less and a Latin thesis was not required. Others saw their time at Edinburgh merely as another experience for their own education. Between 1765 and 1825, only one in every five students who attended Edinburgh graduated, and later fewer than two in five graduated from the University of Pennsylvania’s medical school in Philadelphia. Many students at this time organized their own education and incorporated different instruction through apprenticeships, “walking the wards of a hospital, perhaps taking a course in a private home or hospital, serving in the army or navy, and attending a school of surgery or military medicine.” Students often attended lectures as an addition to their prior experiences and did not see a need to graduate with a medical degree, implying that medicine was still an unregulated and undefined profession.

Early on, a large draw was Edinburgh’s practice of granting degrees in absentia. Anyone who “presented a letter of recommendation from two physicians, offered a suitable thesis, and paid the necessary fees” could obtain a medical degree. No classes or exams were required. A University of Edinburgh degree could be seen in two ways: “a degree...might represent very excellent training, as good as any in the world if the candidate had faithfully spent his time in residence; or it might represent no training at all but merely the possession of some complaisant friends, if the degree was bestowed in absentia.” By the middle of the eighteenth century, however, the university began making in absentia degrees harder to obtain and in 1767 enacted a rule requiring those seeking a medical degree to complete a three year course and have been in residence in Edinburgh for at least a year. Compared to the long and inflexible medical programs at Oxford and Cambridge, which could take as long as fourteen years to complete, the Scottish school offered a more inviting curriculum.

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52 Bonner, Becoming a Physician, 44.
53 King, The Medical World of the Eighteenth Century, 27.
55 Bonner, Becoming a Physician, 39.
For those that did matriculate, the medical school offered one of the best educations in Great Britain, including classes in “anatomy, surgery, chemistry, medical theory and practice.”\textsuperscript{56} It was one of the first schools that insisted on testing its candidates, requiring both a full completion of the medical science course and a thesis, in both English and Latin, which had been “read, corrected, and approved by one of the professors.”\textsuperscript{57} Edinburgh was also the first school to include clinical lectures, with a special ward set up in the town’s infirmary in the 1750s for more hands-on instruction for students.\textsuperscript{58} The University’s reputation for a quality medical education, as well as its affordability, quickly spread and by the 1780s it was attracting roughly two hundred students a year, with 17,000 medical students having studied there in the first century of the school.\textsuperscript{59} Edinburgh, then, was one of the most popular and respected medical schools in the United Kingdom.

While Edinburgh was the center of American medical education, some students did travel to London for medical education, particularly its private anatomy schools. To compensate for what was not being taught in English medical schools, physicians and university professors began instructing students outside of established schools. First started by William Hunter in the 1740s, the idea quickly grew to more than twenty classes a year in the 1780s. These classes focused on anatomy, but also included “practical physic, materia medica, chemistry, and specialisms like obstetrics.” These private schools became popular with medical students as they offered lessons in practical anatomy and dissection, courses not often offered in large universities.\textsuperscript{60} The classes could be more demanding than formal university training. Hunter ran a series of “112 meetings, held six days a week for three and a half months, ensuring comprehensive coverage of anatomy, practical surgery and midwifery.”\textsuperscript{61} It was in

\textsuperscript{56} Porter, \textit{The Greatest Benefit to Mankind}, 291.
\textsuperscript{57} Sloan, \textit{The Scottish Enlightenment and the American College Ideal}, 191–192.
\textsuperscript{58} Porter, \textit{The Greatest Benefit to Mankind}, 292.
\textsuperscript{59} Ibid., 291.
\textsuperscript{60} Conrad et al., \textit{The Western Medical Tradition}, 456.
these private classes that medical students were able to gain a more complete understanding of anatomy, and many, including Benjamin Rush, traveled to London in order to partake in them.

Anatomy and the best way to study the body, dissection, often caused friction between the medical schools and local sensibilities. Religion at this time placed great importance upon the dead body and believed that there was a connection between the body and soul. It was believed that only when it was determined where the soul would be spending the afterlife did it depart from the body. It was imperative, then, that the body be protected after death in order for the soul to reach its final destination. This belief made it difficult to procure corpses for dissection by medical students. Bodies were procured, however, in different ways. In some cases, executed criminals were condemned to dissection. Normally reserved for those found guilty of murder, dissection after execution was seen as one of the worst punishments, as it “den[ied] the wrongdoer a grave” and, as mentioned above, could prevent the soul from reaching its final judgment. Such a cruel punishment is depicted in William Hogarth’s *The Reward of Cruelty*, showing an executed criminal that was condemned to dissection by physicians (See Figure 1). The image, originally meant to “deromanticise” criminals, shows the unpleasant posthumous examination and exemplifies the idea that such a punishment could last past death.

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63 Ibid., 67.
Viewers at the time would have understood that the dissected man would have been refused a Christian burial and was likely to be displayed afterwards, as demonstrated by the skeletons in the upper corners. 64 This type of punishment was seen as worse than death itself. Some cadavers were bought from grave robbers or stolen by students themselves. Most graves robbed were “immigrants and blacks, the poor and unattached strangers, buried on the outskirts of the churchyard or outside the church burial grounds altogether in a potter’s field.” 65 The issue reached its peak in 1788 when a riot broke out in New York City over supposed grave robbing. The incident started after some surgical students waved a dissected arm out the window at a group of young boys on the street. One of the boys climbed a ladder up to the window and was told that the arm was his mother’s. The boy, whose mother had recently died, ran home to tell his father, who proceeded to the graveyard and found his wife’s body missing. The father informed his friends of what had happened and a mob began to form. The mob set out for the hospital, ransacked it, and went looking for the surgical students. The militia was called out to disperse the mob, but rioting continued for three to four days, until the mayor ordered the soldiers to fire into the mob, killing five and injuring many more. 66 This led directly to the 1789 Act to Prevent the Odious Practice of Digging up and Removing for the Purpose of Dissection Dead Bodies Interred in Cemeteries or Burial Places. 67 The lack of available bodies for dissection impacted the education of medical students, resulting in many physicians in the late eighteenth century having little practical experience in anatomy or dissection.

By the middle of the eighteenth century, many of the physicians who were educated in Edinburgh began to establish indigenous medical schools in the colonies. The first of these schools was

65 Ibid., 72.
67 Myrsiades, *Medical Culture in Revolutionary America*, 74.
established at the University of Pennsylvania in Philadelphia in 1765, followed closely by a medical school at King’s College in New York City (later Columbia University) in 1767. Because those who found and taught at the new medical schools were educated in Scotland, the schools were strongly influenced by the Scottish university system. John Morgan, educated at the University of Edinburgh, founded the medical school at the University of Pennsylvania and had Edinburgh in mind when he established it. He believed that a medical school was important in order to educate those who could not afford to study abroad: “Some there are indeed, and not a few, who cannot by any means afford the expense of crossing the Atlantic, to prosecute their studies abroad. The proposed institution will therefore prove highly beneficial to every class of students in Medicine.” He incorporated many of the same classes, such as “anatomy, materia medica, botany, chemistry, theory of physic, physiology, pathology and practice of medicine.” He also kept the prerequisite of apprenticeships, requiring every student to have “served a sufficient apprenticeship with a reputable practitioner,” as well as having some knowledge of pharmacy. The university would also keep with Edinburgh’s tradition of clinical medical instruction, holding lectures and demonstrations at the Pennsylvania Hospital. The medical school established in New York at King’s College was also fashioned after the Edinburgh model. Samuel Bard, the school’s founder, was a student at Edinburgh, who returned to New York City with the desire to establish a school similar to Scotland’s and Philadelphia’s. There were even student medical societies at both schools patterned directly on those in Edinburgh. The first of America’s medical schools were

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72 Ibid., 21.
75 Bell, *The Colonial Physician & Other Essays*, 222.
direct examples of Edinburgh’s medical school, founded by men who had experienced the school first hand and believed it to be the best system for medical training.

Morgan also hired fellow Edinburgh graduates as professors, including William Shippin, Jr. as professor of anatomy and surgery, and Benjamin Rush as professor of chemistry, and later of medicine. This hiring pattern further incorporated Scottish medical philosophy into the school, as the men were often devotees of their professors from Edinburgh, especially of Dr. Cullen, who was one of the most prominent physicians of his time and influenced an entire generation of American doctors. These theories were not only taught by American professors, like Morgan, whose lectures were often “Cullen’s lectures [that] were taken down by Morgan in Edinburgh,” but they were championed by men like Rush. Rush believed particularly in one of Cullen’s treatments for fever, blood-letting, and used it on almost every case of fever he came across, advocating its use for most patients during the 1793 yellow fever epidemic in Philadelphia. Bard also hired fellow Edinburgh graduates for King’s College staff, with half the faculty graduating from the university, disseminating similar ideas that originated in Scotland. Thus, after the establishment of American medical schools, many students who could not travel abroad to Edinburgh still received an education founded in the Scottish ideas and traditions.

By the time of Philadelphia’s epidemic at the end of the eighteenth century, men no longer needed to travel to Europe to complete their formal medical education. But the men in charge of these new indigenous schools had been trained abroad and brought back preconceived notions on the body and disease. It was also these same men who developed a strong “American” view of medicine following the Revolutionary War, which impacted the whole of the 1793 outbreak.

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77 Ibid., 262.
79 Ibid., 23.
Yellow Fever and the 1793 Epidemic

In 1793 Philadelphia was the capital of the newly formed United States and a fast growing city full of immigrants, merchants, laborers and free blacks. Late in the summer of that same year, one of the greatest outbreaks of yellow fever in history swept through the city. It quickly spread and affected every aspect of life.

Yellow fever was one of the most notorious diseases in the eighteenth century. Yellow fever is a member of the group of viruses known as flavivirus, which also includes West Nile, dengue and Japanese encephalitis. After one becomes infected with yellow fever, it can take three to six days for symptoms to appear. These symptoms begin as chills, a headache, and high fever. Many recover after three days, but if they do not, symptoms more traditionally associated with the disease appear. The liver and kidney begin to shut down, producing pronounced jaundice in a victim’s skin and eyes. The internal organs begin to hemorrhage and the patient begins vomiting up what looks like coffee grounds: coagulated blood, the most recognized sign of yellow fever. After two to three days, the patient dies from organ failure or a secondary infection due to bone marrow failure. The strain that caused the epidemic in 1793 seemed to be especially virulent, as it was often noted that many patients died on the second or third day of the disease.

The disease is carried and spread through mosquitoes. One breed of mosquito in particular, the Aedes aegypti, flourished in Philadelphia’s climate and the boggy areas to the south of the city. We now know that thirteen different species of mosquitoes are capable of carrying yellow fever, some of which

were found in the city at that time.\textsuperscript{84} Their eggs are normally laid on the damp sides of containers or in other wet, calm areas, like stagnant mud puddles, water barrels and drinking troughs. The window for a mosquito to pick up the disease from an infected individual is small and only occurs if it bites during the first three days of the infection. Even then, only between five to twenty percent of infected mosquitoes transmit the disease to other people.\textsuperscript{85} The idea that the mosquito, or any insect, could carry or transmit a disease was not considered until the late nineteenth century, and was only confirmed by Dr. Walter Reed in 1901. Reed also conclusively proved that people’s “things” (i.e. clothing, bedding, suitcases) were not contagious and could not spread the disease.\textsuperscript{86} However, this information was not discovered or proven until more than a century after Philadelphia’s 1793 epidemic.

Philadelphia was originally designed by William Penn to be a “green country towne,” a healthy city and the complete opposite of the crowded and sickly London he knew. Penn wanted a town that was neatly divided into square lots, with wide roads and parks, to provide open spaces and prevent the crowded conditions he saw in England’s metropolis. Instead, people flocking to the city wanted to live close to employment and amenities, turning Philadelphia into a “city crowded next to the shore.” Eventually by 1700, the majority of the town lived within three or four blocks of the river, living on “much smaller, narrower, and more congested lots” than originally planned.\textsuperscript{87} This congested environment also meant that the city was more prone to disease and epidemics, thanks to its crowded and dirty streets, than Penn had originally hoped for.

Yellow fever began to infect Philadelphia late in the summer of 1793. The disease first manifested itself in a boardinghouse down by the wharves, which housed numerous boarders from

\textsuperscript{84} S. J. Watts, \textit{Epidemics and History: Disease, Power, and Imperialism} (New Haven: Yale University Press, 1997), 216.
\textsuperscript{86} Crosby, \textit{The American Plague}, 191–192.
different backgrounds. First, a seaman died, then an Englishman. Then an Irish boarder and the managers of the boardinghouse expired, followed closely by a French sailor. Doctors were called but could find no cure and residents continued to die. One doctor finally consulted Rush, who declared the disease to be yellow fever. As soon it was named, those who could leave the city did. Almost a third to a half of the city’s population left, with the estimated number of residents dropping from roughly 51,200 before the outbreak to 31,600 during.

During the epidemic, business and commerce in the city came to a standstill. There were too few merchants and workers either in the city or willing to work, and the majority of traders stayed away for fear of the infection. The lack of business not only meant a paucity of jobs for many lower class men, but also a shortage of common needs. As Rush wrote to his wife during the outbreak: “the sick suffer from the want not only of physicians, bleeders, nurses, and friends, but from the want of the common necessaries of life.”

City operations also came to a halt for a time. Those in charge of the business of the city, such as magistrates, councilmen, and judges, fled or fell ill. Constables and night watchmen failed to show up for work. Street cleaning stopped and those carting the dead started to dwindle in number. Even most of the men in charge of the city’s poor relief, the Guardians of the Poor, fled the city. The federal government also halted many operations, with men from departments like the Treasury and the Customs Service either falling ill or fleeing. Mail delivery stopped and was only available for daily pick-up during much shortened hours. As a response to this shut down, the mayor of Philadelphia issued an

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88 Smith, Ship of Death, 188.
89 Powell, Bring Out Your Dead, 8–9.
93 Smith, Ship of Death, 203.
94 Ibid., 209.
address to the public requesting help in running the city and caring for those affected by yellow fever. The men who volunteered formed the Committee on Malignant Fever, who took charge of city safety, created a hospital for the poor, formed an orphanage to care for children left behind by the death of their parents, and handed out relief to those in need. This committee helped Philadelphia through the end of the epidemic and restored a sense of order during a time of chaos.

The deaths due to yellow fever began to decline as fall arrived. In the first week of November, the city saw its first night of frost, which would have killed any remaining mosquitos and put the larva into hibernation. Yellow fever proved no exception to the general understanding of the time that autumnal fevers slowly disappeared when it turned cold. The majority of deaths after the last week of October were of those who had caught the fever earlier and "were mostly of those long sick." Shortly after the first frost those who had fled the city at the beginning of the outbreak began to return.

Despite everything that was done by doctors, nurses, or committees during the epidemic, deaths continued until that first frost. There has been a large range of death tolls. Record keeping broke down during the epidemic, and a combination of underreporting, numbers that include non-yellow fever deaths, and those who died after leaving the city make precise numbers hard to obtain from available records. Contemporary counts from the time range from the Committee on Malignant Fever’s total of 3,293 to 5,019 recorded by the Christ Church. Some crude death rates range between 64 and 98 per

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97 Ibid., 64.
thousand people (or six to ten percent) to one in ten of the population.\textsuperscript{99} These deaths, however, were confined to Philadelphia and those who had been in the city during the outbreak.

As will be discussed further in Chapter Three, during the epidemic in 1793, Philadelphia imposed a quarantine. The state legislature, in a hurry to leave the city at the beginning of the outbreak, did not even stop to correct old language from previous laws. Instead, an earlier quarantine act was copied and with few modifications introduced as a bill “to prevent infectious disease being brought into the province.” The process was done in such a hurry that the measure failed to reflect the change of Pennsylvania from a ‘province’ to a ‘commonwealth.’ Rushed through, the measure was quickly sent to Governor Mifflin for signature, received back, and implemented immediately.\textsuperscript{100} Other cities surrounding Philadelphia also imposed quarantines to prevent its spread. In a way, they were successful. Philadelphia was the only city that year to have an outbreak of yellow fever.

Conclusion

The diffusion of medical knowledge happened slowly over the eighteenth century, but picked up with the rise and popularity of medical schools like the University of Edinburgh. Theories progressed and changed as they traveled. The awareness of different treatments and medicines spread throughout the English-speaking medical community. But despite the differences in ideas and practices, physicians were all looking for better explanations for what they were experiencing and better methods of treatment for their patients. The physicians of Philadelphia, with their differing views on the disease and its treatment, were trying to understand the outbreak and discover the best course of action. In the next chapter, I will discuss how the educational background and past experiences influenced the way doctors went about finding the best way to treat the ill.

\textsuperscript{99} Ibid.; Smith, \textit{Ship of Death}, 212. See Graph 1 in Appendix for a map of where individuals died of yellow fever in 1793.

\textsuperscript{100} Powell, \textit{Bring Out Your Dead}, 71.
Chapter Two
The Battle over the Appropriate Treatment of Yellow Fever

Disease was a contested field in the eighteenth century. Competing viewpoints existed on the origin and contagious nature of illnesses, which in turn influenced the treatments used by physicians. Those who experienced tropical diseases firsthand often used different therapies compared to the ‘standard’ practice in more temperate regions. Information on tropical diseases and their treatments, written by physicians practicing in the West and East Indies, was readily available to European medical circles through both books and correspondence. Early on, the modes of transportation and communication delayed the accessibility of this information, but towards the end of the century, as these two facets of the Atlantic became more reliable, the burden of finding and acquiring this knowledge fell instead on the physician himself. This information and experience contributed to the scientific theories surrounding the origins and spread of diseases, which often became politicized in the late eighteenth century.

Two physicians, Benjamin Rush and Jean Devèze, came to practice and represent the opposing theories that existed about disease in 1793. Rush, an Edinburgh educated physician who had only practiced in and around the Philadelphia area, came to the conclusion that all fevers were a single disease and that yellow fever was both home-grown and contagious. Based on his readings of other native physicians (and seeming to ignore the advice of doctors from the tropics), he determined that yellow fever required an aggressive form of therapy, to included frequent purging and blood-letting. On the opposite side was Devèze, a Bordeux educated French doctor who had multiple years’ experience in the West Indies as a physician for the French army. He concluded the opposite of Rush, that the disease was one of many and not contagious, based on his experience as the lead physician at Philadelphia’s Bush Hill. His time in Haiti led Devèze to treatments that were mild in nature and often included cool baths, wine, and rest. These two doctors came to represent the two main camps as to the
appropriate medical treatment during the epidemic and their views can be seen as the consequence of firsthand experience and stubborn inexperience. These disagreements also played out publically in the local newspapers, resulting in a lack of confidence by the general public.\textsuperscript{101} The work of those with firsthand experience, like Devèze, were generally ignored, while those who gained “experience” during the 1793 continued to push their therapies well into the nineteenth century. The combination of education and experience resulted in different theories and attitudes about yellow fever, which in turn directly impacted how the general public received treatment for the disease and the nature of public quarrels about what treatments were appropriate.

**Communication in the Atlantic**

Knowledge and medical advancements were spread by two main forms of communication, either printed books and journals or personal letters. In the eighteenth century, an increasing number of books were being printed and imported and was one of the main forms of communication between the Americas and England.\textsuperscript{102} This transmission of information on new treatments of tropical illnesses educated the medical community back in Europe and prepared those physicians who might work in warmer climates. The movement of medical knowledge across the Atlantic was not limited to Britain and its colonies. Dutch colonists in Brazil and Spanish settlers in the West Indies sent back published books and pamphlets that included medical knowledge gained from local Indian tribes.\textsuperscript{103} Specialized medical texts like these were imported into the American colonies and could often be found only a year after being published. Medical journals were also available to physicians, and treatises such as London’s

\textsuperscript{101} In the eighteenth century public disputes between elites, such as that between Old Light and New Light ministers during the First Great Awakening, had the effect of undermining the “deference that governed provincial life” and in doing so helped usher in “a new age of contentiousness.” Patricia Bonomi, *Under the Cope of Heaven: Religion, Society, and Politics in Colonial America* (Oxford: Oxford University Press, 2003), 132-33.


Royal Society’s *Philosophical Transactions*, Edinburgh’s *Medical Essays*, and the English *Medical Observations and Inquiries* could usually be found at printers and apothecaries.104

By the end of the century, there was an entire category of medical texts for those interested in diseases and treatments in “warm climates.”105 This genre included books like James Lind’s 1768 *Essay on Diseases Incidental to Europeans in Hot Climates*, which went through multiple editions and was translated into German, Dutch, and French.106 British naval physicians with experience in the tropics also published medical texts on disease and Sir Gilbert Blane, a physician to the British fleet, published two tracts on disease. His 1781 title, *Memorial to the Admiralty – Proposing Means for preventing the Sickness and Mortality prevailing among His Majesty’s Seamen in the West Indies*, was followed in 1785 by *The Diseases of Seamen*, which ran through several edition.107 These were just a few of the many medical publications on “warm climate” diseases that proliferated the literature at the time. The information was available but it was up to the practicing physicians to find and use it; some did and others did not.

Some communication concerning the treatment of yellow fever were in the form of letters between doctors. Many British physicians maintained a correspondence with doctors practicing in the tropical colonies. Sir John Pringle of the Royal Navy regularly exchanged letters with doctors working in the Indies.108 Lind went so far as to recommend the use of bark (Peruvian bark or cinchona) for the treatment of tropical fevers based on his communication with fellow doctors in both the East and West Indies.109 Even physicians such as Rush, who believed yellow fever was “home-grown,” consulted with doctors working in the West Indies, such as Dr. Stephens from Saint Croix or Dr. George Davidson from

106 Ibid., 72. The author was the cousin to the more famous James Lind, who later discovered the cure for scurvy.
109 Ibid., 131.
St. Vincent’s, on how to treat tropical diseases. By the time of the 1793 epidemic in Philadelphia, there was a steady stream of correspondence between physicians in the tropics and those in more temperate areas.

Modes of communication by the time of the epidemic in Philadelphia had become more dependable than they had been earlier in the colonies’ history. In the late seventeenth and early eighteenth centuries, mail across the Atlantic was difficult in both directions and no standard service existed. Postmaster positions were not established in the colonies until the late seventeenth century, and even then they only in the largest cities. Mail was often sent by packet ships, or ships that traveled from port to port carrying the mail. These packet ships could take as long as five months to arrive during the winter, if they arrived at all. They were vulnerable to capture by enemy ships during times of war as well as to the forces of nature, such as the Lady Hobart, which struck an iceberg and was lost with all her mail on board. Only in 1755 was a licensed packet service with regular delivery to the colonies was established. When letters were able to be sent, there was still a chance they would not find their intended recipient unless they were a well-known citizen, as many North American residents either did not have or did not know their own address. If all went right and the letter made it to its final destination, the recipient was then responsible for the cost of postage before they could take possession of the mail. With some fees in the late eighteenth century being around forty cents for a one-page letter, large amounts of mail and packages were not feasible for the lower classes. By the

114 Dierks, In My Power Letter Writing and Communications in Early America, 49.
end of the eighteenth century, transatlantic delivery had become more reliable and the postal system established after the Revolutionary War sought to standardize the delivery of mail throughout the new states. Packages and correspondence arrived faster and more frequently, allowing for the increased flow of information between America and the Atlantic medical community.

There was a limit, however, to the knowledge that flowed into America, especially after the Revolutionary War. Immediately following the war, many in the new nation shunned any connection to the “old” European institutions that had previously influenced the colonies, including the European and British medical communities and their practices. Believing that they had created a “more perfect government,” American physicians also believed they could engineer a better system of medicine and began looking for a system that was “distinctively American.” Some doctors went so far as to conduct national surveys of climates and diseases, as Dr. William Currie did, under the belief that European medical practices could not be applicable because the health and illnesses in America differed greatly from anything seen in Europe. Instead of leading to a scientific breakthrough, this nationalist thinking led to increased separation from the European medical communities, just as Europe was moving towards a focus on clinical observation, statistical analysis, and the identification of specific diseases.

This insular thinking was at the early edge of what would become a popular school of thought in the Jacksonian era in the early nineteenth century. Instead of a reliance on education and the sharing of knowledge between America and other parts of the Atlantic, a much more egalitarian and “anti-intellectual” style of medicine moved to the forefront of society, part of which can be seen by Samuel Thomson’s success with the sale of his herbal remedies. The spread of medical knowledge post-war

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117 Ibid., 104.
118 Ibid.
119 Ibid., 103.
narrowed from a river to a slow drip and decreased the amount of exposure American doctors had to knowledge on tropical diseases.

The flow of information around the Atlantic, while difficult early on, became more dependable by the end of the eighteenth century. Letters were less likely to be lost and it was easier and cheaper to ship medical texts from overseas. Physicians corresponded with their colleagues around the ocean, especially those practicing in the West Indies. With the large amount of information available, it was hard for a doctor to claim ignorance on tropical diseases, even if they had not come into contact with it themselves. When yellow fever struck Philadelphia, many of the physicians, including Rush, had never personally experienced it, but there was an abundance of information and people that they could consult if they so choose.

**Competing Theories and Views on Disease**

By the eighteenth century, it was recognized that the practice of medicine in Europe and the tropics differed greatly due to the “climatic and epidemiological” differences. From these differences arose the medicine of “‘warm’ or ‘hot’ climates,” seen as its own a distinctive branch.121 Doctors who practiced in these warm climates came to different conclusions and developed alternate treatments than those back in Europe. The West Indian colonies in the Atlantic experienced disease on a regular, almost continual basis. Yellow fever, while common, was not the only illness that made its way through the tropics. Ailments like smallpox, malaria, pneumonia, pleurisy, quincey, cholera, dysentery, and many other unnamed disorders were rampant throughout the year. Doctors dealt with these diseases on a daily basis, giving them valuable experience their northern Atlantic colonial colleagues did not have. For instance, William Hillary, a doctor in Barbados in the middle of the eighteenth century, wrote of the different diseases and treatments he had experienced, as well as advice for doctors from non-tropical

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advocated for the use of local herbal remedies over aggressive blood-letting and calomel use. He also courted favor from Rush on his therapies, but Rush died before stating his position on Thomson’s remedies.

regions. Based on his familiarity, Hillary stressed the differentiation of treatments between patients. He believed that dissimilar constitutions required different treatments, even when treating the same disease, and that doses depended on the patient.\textsuperscript{122} Physicians in the tropics, especially those at colonial hospitals, were more apt to pursue autopsy as well, giving them an advantage when it came to hands-on, practical experience and allowing them to see the outcome and effects of their treatments.\textsuperscript{123}

Physicians practicing outside of the tropics, such as Rush, depended on their formal education and the experiences gained during their practice in more temperate regions, where tropical diseases were rare. After years of practice in and around Philadelphia, Rush came to the conclusion that all fevers were actually a single fever despite their diverse causes. He compared the idea of his single fever to that of fire: "Thus, fire is a unit, whether it be produced by friction, percussion, electricity, fermentation, or by a piece of wood or coal in a state of inflammation."\textsuperscript{124} He believed that all fevers were a result of “convulsive” actions of the blood vessels, which meant that, regardless of what started this action, all fevers were essentially the same.\textsuperscript{125} Much of this was based on his Edinburgh education under William Cullen, who described fever as "spasms in the extreme arteries or capillaries."\textsuperscript{126} Others came to different conclusions. Currie, another Philadelphia physician, believed that yellow fever was one of the “varieties of putrid fever” that occurred in the city each year.\textsuperscript{127} He also advocated for a gentler form of treatment, based upon the pulse of the patient, which did not differ greatly from the rest of the

\textsuperscript{122}William Hillary, \textit{Observations on the Changes of the Air and the Concomitant Epidemical Disease, in the Island of Barbadoes; To Which Is Added A Treatise on the Putrid Bilious Fever, Commonly Called The Yellow Fever; And Such Other Diseases as Are Indigenous or Endemial, in the West India Islands, or in the Torrid Zone.}, 2nd ed. (London: L. Hawes, W. Clarke, and R. Collins, 1766), 5. Deveze would take a similar stance during the epidemic in Philadelphia.

\textsuperscript{123}Harrison, \textit{Medicine in an Age of Commerce and Empire}, 64.


\textsuperscript{125}Ibid., 51.


physicians at the time. Where a physician practiced medicine mattered greatly and often resulted in different opinions on disease and therapies.

**Home-Grown vs. Importation and the Issue of Contagiousness**

While doctors disagreed on the theories of disease and their treatments, they also disagreed on the origins of disease and its ability to spread. Some, like Rush, believed illness to be "home-grown," meaning they came about through the negative elements within the surrounding city or environment. Others saw disease as being imported from the outside, be it another city or country. Most believed in some combination of the two. While the discussion on the origins of diseases was often not black and white, this thesis will focus on the two main theories advocated at the time as they show how education and experience could influence the conversation surrounding disease. It should be noted that the discussion on the origins of disease was a dispute wholly based within the medical community. The majority of the population, excluding physicians, believed disease could be, and was, imported. Disagreements also arose concerning the communicability of yellow fever, or whether or not the illness could be spread. Here the disparity between the two differing views was even greater, as the majority of American doctors believed yellow fever to be contagious, while a small dissenting group argued otherwise. Disease origins and communicability were additions to the long line of scientific disagreements that existed within the medical community.

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128 It is important to point out that many historians disagree with the restrictive labeling that past writers have placed on these two categories, seeing them as too "anachronistic and simplistic" when medical theories on epidemics at the time were "many-faceted and eclectic." Lawrence I. Conrad et al., eds., *The Western Medical Tradition: 800 B.C.-1800 A.D* (Cambridge, Eng.; New York: Cambridge University Press, 1995), 407–408.

129 John Duffy, *The Sanitarians: A History of American Public Health* (Urbana: University of Illinois Press, 1992), 49. The question of why this was a common thought among the non-medical population is beyond the scope of this paper, but is an interesting problem that speaks to the medical education of the general population and is something I hope to address in future research.

Although historians believe yellow fever was imported into the City of Brotherly Love by what means it was introduced into the city has not been conclusively demonstrated. Billy G. Smith has argued that the slave ship *Hankey* was the single source of the disease. Smith, *Ship of Death*, 187. The problem with Smith's theory is not his argument that the disease was brought by ship from the West Indies, but rather his specificity in pointing to the *Hankey* as the single source of the yellow fever epidemic. There was significant shipping traffic into Philadelphia from the West Indies. In July of 1793 59 ships returned from the West Indies, including ships like the *Betsy*, which made three trips down to the islands that month. See Appendix, Table 1.
The two competing viewpoints differed in where diseases start. Those who argued for a home-grown model were influenced by Thomas Sydenham and his miasmic theory, which set out the idea that noxious gases emanating from decomposing matter caused illness. During the 1793 outbreak, Rush attributed the origin of yellow fever to rotting coffee that was left on a local wharf. He argued that miasmas were known to affect those living within a large radius from the source, so it was not impossible for the putrid coffee to impact those living further away from the docks. Rush’s argument against the idea of importation focused on the fact that the disease did not spread outside of Philadelphia, even by those who fled the city, and that those who claim it to be imported cannot give specifics of where, when, or how the disease arrived. Rush concluded that the only logical explanation was that it arose from the conditions within the city. The opposing theory focused on importation. Many physicians noticed the similarities between the fever striking Philadelphia and the yellow fever that had taken hold of the West Indies earlier that summer. They concluded that those who had arrived from foreign ports brought the disease with them. While similarities existed, its origin in the West Indies was not a foregone conclusion and there was also a disagreement as to where the disease came from. Some argued that it did indeed arrive with refugees from Cape Francois in the West Indies. Others believed a vessel from Marseilles, France, carried the disease. One writer, Mathew Carey, went so far as to say that the Irish had brought it over. As Rush pointed out, while his theory could pinpoint the

130 Ibid., 20. See Chapter I, pg. 11.
131 Rush, An Account of the Bilious Remitting Yellow Fever, 11–12.
132 Ibid., 25.
133 Ibid., 157, 164.
135 Jean Deveze, An Enquiry Into, and Observations upon the Causes and Effects of the Epidemic Disease Which Raged in Philadelphia from the Month of August till towards the Middle of December, 1793. (Philadelphia: Parent, 1794), 12. Deveze argues against the rumors that this particular ship, the brig Mary, brought the disease, as he himself was a passenger on it.
136 An Account of the Rise, Progress, and Termination of the Malignant Fever, 5. Marseilles experienced an outbreak of yellow fever in the 1720s and were rumored to have an epidemic fever currently in the city.
137 Matthew Carey, A Short Account of the Malignant Fever, Lately Prevalent in Philadelphia: With a Statement of the Proceedings That Took Place on the Subject, in Different Parts of the United States. To Which Are Added,
exact cause, those who argued for importation could not, and this lack of agreement gave Rush's criticism some weight. But physicians proposing an outside source argued that rotten coffee could not have been the cause, as the streets and wharves were no cleaner and no freer of rotting vegetation that it had been in the past, and yet there had not been an outbreak in the previous years. Importationists saw connections between diseases around the Atlantic and argued that they had been brought to America because, to many, it was implausible that such a disease could have originated in an American town like Philadelphia. The argument would not be decided in favor of importation until the end of the epidemic, and even then some physicians, like Rush, continued to argue against the idea.

It did not take long for these theories to become politicized. Thomas Jefferson and his followers (later called Republicans), disliked and distrusted the emerging urban culture and therefore sided with the home-grown theory that implicated unhealthy city environments as the cause. Alexander Hamilton and his followers (later called Federalists), were wary of the radial influence of newly arrived French refugees and so blamed them for the importation of the disease. Therapies also quickly became associated with political parties. Rush's aggressive therapies became linked to his Republican background and were seen as a Republican cure. The gentler alternatives were then the Federalist treatment, and this connection was furthered by a letter published in the paper by Alexander Hamilton supporting the less aggressive form of treatment he personally received. Medical theories ended up influencing more than just treatments or the medical community and became politicized during the epidemic.

Accounts of the Plague in London and Marseilles; and a List of the Dead, from August 1, to the Middle of December, 1793, 4th ed. (Philadelphia, 1794), https://archive.org/stream/shortaccountofmam00care#page/n3/mode/2up.

An Account of the Rise, Progress, and Termination of the Malignant Fever, 8.


J. N. Hays, Epidemics and Pandemics: Their Impacts on Human History (Santa Barbara, Calif: ABC-CLIO, 2005), 187–188.

Ibid., 190; Rush, An Account of the Bilious Remitting Yellow Fever, 214–216.
A separate but linked debate arose as to whether or not the disease was contagious. Many physicians agreed that yellow fever, regardless of its origins, was contagious and could be spread through the effluvia of the sick.¹⁴² Like other fevers, close contact and unventilated rooms could lead to contracting the disease.¹⁴³ It was especially contagious if one was in a mental or physical state that allowed the fever to act on the body.¹⁴⁴ Despite the fact that not everyone who attended to the sick fell ill, the idea of fever’s contagiousness was seen as common knowledge among the American physicians. Even the College of Physicians, Philadelphia’s foremost medical society, agreed to its communicability and published steps the public could take in order to avoid falling ill.¹⁴⁵ But not everyone in the city agreed with this notion and Devèze spoke out against this idea. He published a letter stating his opinion and experience of the noncontagious nature of the disease and argued that, despite he and his fellow Bush Hill workers’ almost constant contact with the sick, none of them had fallen ill.¹⁴⁶ The nurses had been dressing the wounds of the sick and those who transported the poor to the hospital often came into direct contact with the victims, yet none had fallen ill. Not only did Devèze treat patients at the hospital, but he also personally autopsied many who succumbed to the disease, and yet the Frenchman remained healthy.¹⁴⁷ How could the disease be contagious if none of his staff has fallen ill after direct contact, he questioned. Based on both his experiences in Haiti and Bush Hill, Devèze concluded that yellow fever was not the contagious disease the rest of the Philadelphia medical community believed it to be.¹⁴⁸ He received no response from the College of Physicians to his public letter. He surmised that

¹⁴³ Harrison, *Medicine in an Age of Commerce and Empire*, 262.
¹⁴⁵ Ibid., 22–24.
¹⁴⁷ Deveze, *An Enquiry Into*, 24–34. It was thought that Devèze contracted yellow fever during his first trip to Haiti in 1775, which would have given him immunity for the rest of his life. It is possible that this is why he never contracted the disease while in Philadelphia. However, other Bush Hill employees working alongside him failed to fall ill, which helped to prove his point. Bush Hill was also further away from the wharves and areas with standing water, keeping the mosquito population, and the likelihood of infection, down.
¹⁴⁸ Powell, *Bring Out Your Dead*, 172.
the College could not respond to his allegations without agreeing to a study or experiment that could prove them wrong.\textsuperscript{149} Devèze became one of the practitioners who espoused the anti-contagion idea, even when he was in opposition with a majority of Philadelphia’s medical community.

As with disease origins, the idea of contagion became politicized. Those who believed the disease to be contagious wanted to impose quarantines, both in port and on land. Rush argued against quarantines, despite the fact that yellow fever was contagious, as it he believed it was caused by the miasma from the wharves and the city and therefore quarantine would have no benefit. This anti-quarantine stance was popular with merchants and Republicans who did not want a loss of commerce during the epidemic.\textsuperscript{150} Devèze, by claiming the disease not to be contagious, insinuated that the city was the cause and offended both citizens and politicians.\textsuperscript{151} Instead of arguing about quarantine, he recommended several sanitation and public health reforms to correct what he saw to be the cause of the illness. Because yellow fever was not contagious, he claimed, only these public health solutions could truly rid the city of the epidemic.\textsuperscript{152} Even the basic understandings of disease, such as where it came from and whether or not it was contagious, could not be agreed upon by the city’s quarrelsome physicians, further dividing Philadelphia’s medical community.

\textit{The Difference Between Benjamin Rush and Jean Devèze}

All the topics that have been addressed so far came together to influence how doctors treated patients with yellow fever. Educational backgrounds, the ability to communicate new medical knowledge, and the views on tropical diseases made different doctors prone to certain types of treatments. Whether or not a practitioner used an aggressive or nonaggressive therapy depended on

\textsuperscript{149} Myrsiades, \textit{Medical Culture in Revolutionary America}, 97.

\textsuperscript{150} Harrison, \textit{Medicine in an Age of Commerce and Empire}, 262.

\textsuperscript{151} Myrsiades, \textit{Medical Culture in Revolutionary America}, 68–69. Rush, even though he also blamed the unhealthiness of the city, received less backlash on this topic, possibly because of his prominent position in Philadelphia and that it may have been easier to attack Devèze, as a foreigner, for his ideas on Philadelphia as an unhealthy city.

\textsuperscript{152} Deveze, \textit{An Enquiry Into}, 136–138.
what he believed the cause to be, which was often determined by their education and past experience. Those with minimal familiarity with an illness like yellow fever could, and often would, consult other sources, either in books or via personal correspondence. But because doctors behaved alike or had access to similar information regarding different diseases does not suggest that they came to comparable conclusions. As a comparison of Rush’s and Devèze’s lives can show us, a doctor’s background and firsthand experience could play a large role in his approach to disease and its treatments.

As we have seen, Benjamin Rush was influenced heavily by his education in Edinburgh. He followed and expanded upon his professor’s, William Cullen, idea of fever being a reaction of the circulatory system. He believed that fever was due to the “irregular convulsive excitement” of the blood vessels and capillaries and thought it necessary to reduce this action. He carried the theory further, stating that the body’s only response to disease was excitement in the circulatory system. \(^{153}\) When yellow fever hit Philadelphia, Rush did not refer to works by physicians from the tropics. While he did consult with them, he instead turned to an account of a yellow fever outbreak in Virginia in 1741. In that account, the treating physician, Dr. Mitchell, describes the treatments he employed that seemed to have worked, which included aggressive purges and blood-letting. \(^{154}\) Rush also employed the same use of calomel and jalap that he had witnessed Dr. Thomas Young employ during the Revolutionary War. \(^{155}\) Neither of these doctors had spent any time in “warm” climates and developed their methods from a combination of education and trial and error. It was these American, non-tropical doctors that Rush based his similarly aggressive medical treatments on. Rush also rarely performed autopsies, and while he cites the results of autopsies performed by other physicians, nowhere does he write on his own experience with the practice, meaning that he never saw what different treatments did to the body and


\(^{155}\) Ibid., 200–201.
had no firsthand experience as to the effects of yellow fever. His reliance on fellow American physicians, his reluctance in relying on tropical practitioners, and his hesitancy to perform autopsies all shaped how he treated yellow fever patients. Outside of a short stint with the Revolutionary Army, Rush had only ever practiced medicine in Philadelphia. His stubbornness, mixed with his desire to leave his own mark on the medical world, meant that he rarely took advice from other physicians, instead incorporating only the parts that he deemed useful or ignoring them wholesale when they did not work on the first attempt. Rush’s background and attitude towards alternate treatments heavily influenced his methods and decisions during the epidemic and demonstrate his reluctance to use outside sources within his practice.

Seemingly opposite of Rush’s approach was that of the French physician Jean Devèze. Less is known and has been written about Devèze, likely because American physicians at the time were threatened by such a foreign practitioner. What little we do know about Dr. Devèze supports the idea that background and experiences mattered in a physician’s practice. Devèze was born in France and educated at Bordeaux before going to Saint Domingue with the French army in 1775. There it is believed he contracted yellow fever and survived. He returned afterwards to Paris to continue his studies for a couple of years before leaving again for Haiti, where he was the Chief Surgeon of the Army at Cape François in 1778. Here Devèze was in charge of the hospital and treated French troops for yellow fever on a regular basis. His French medical schooling emphasized the physician’s responsibility to evaluate and listen carefully before prescribing treatment, and the principle that treatment should assist nature

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156 Rush, An Account of the Bilious Remitting Yellow Fever.
158 Myrsiades, Medical Culture in Revolutionary America, 50; Rush, An Account of the Bilious Remitting Yellow Fever, 196.
159 Powell, Bring Out Your Dead, 169–170. There is no real explanation why so little has been written on Devèze, but he left his own account on the disease before returning to France, where he wrote the dissertation Traité de la Fièvre Jaune in 1804, about his experience with yellow fever in Philadelphia. The field is open to research concerning this French physician and is a topic I hope to look into in future studies.
160 Ibid., 168–169.
and not work against it.\textsuperscript{161} Devèze believed that a doctor should act only when the body was in need of assistance:

“I set myself about the study of [the disease] in order to prevent my acting against nature, when she was successively destroying the morbidic cause; she often alone acts sufficiently to explode and destroy the cause which oppresses her; it is true she acts sometimes in certain cases with too much violence, and in others too slowly; it is then art should assist in increasing or diminishing strength, or in bringing it to a salutary crisis; in short, it is for art to produce this crisis, when nature, overcome by the force of the disease, remains without action. It is when nature is inactive, art should shew itself...”\textsuperscript{162}

He continues, writing that it is only through experience with the disease that a physician can know when to act and “render medicine a really useful science.” However, those who will “force nature by the rules of the method he has adopted” will likely do more harm than good, and are more of a plague upon mankind than disease itself.\textsuperscript{163} Thanks to his education, Devèze strongly believed in working with nature and his experience while with the French army instilled an understanding about his options for therapies, something that would strongly influence his actions during the epidemic in Philadelphia.

In contrast to Devèze, Rush’s treatments were a direct result of his beliefs of both fever being a vascular spasm and that the body had a singular response to disease. After trying multiple calmer therapies at the beginning of the epidemic, Rush came to rely on his single choice of therapy and prescribed it to every patient that came down with yellow fever. But according to his own account, he treated only four patients with methods suggested to him by West Indian physicians before he decided that they did not work.\textsuperscript{164} When devising his new, more aggressive treatment, however, he relied on a single successful case before declaring it the method to use.\textsuperscript{165} His limited means of testing different therapies suggests his reluctance to utilize the therapies of others, despite the experience of the doctor, in lieu of a treatment he could claim as his own. He called his treatment 15/10 (fifteen grams of jalap

\textsuperscript{161} Breslaw, \textit{Lotions, Potions, Pills, and Magic}, 99.
\textsuperscript{162} Deveze, \textit{An Enquiry Into}, 48.
\textsuperscript{163} Ibid., 50.
\textsuperscript{164} Rush, \textit{An Account of the Bilious Remitting Yellow Fever}, 196.
\textsuperscript{165} Ibid., 201–202.
and ten grams of calomel), which was to be given three times a day, along with regular bleedings. If the patient did not respond well, the amount of blood drawn was to be increased. Rush argued that this treatment would draw off the “putrid and excess matter” within the system and that blood-letting removed the “inflammatory stimulus” of the blood vessels. Autopsies, in the rare instances he was around when they were performed, showed blood in the intestines, a common symptom of yellow fever, but it proved to Rush that there was too much blood in sick patients and that his methods were correct.

When other physicians questioned his universal application of this therapy, Rush countered that other diseases, like smallpox and pneumonia, had standard remedies and yet yellow fever was more uniform than smallpox and affected more vital organs than pneumonia. His previous experience using a standard treatment for diseases predisposed his belief that the same situation would be appropriate for yellow fever, and it would have been had his doing not been so drastic. Rush’s therapies had the advantage of producing evidence, in the form of purges and blood-letting, that direct action was being taken to treat the patient. This gave the public the sense that the treatment was “working” because something was being expelled from the body and could possibly have had a placebo-type effect on some of those undergoing the treatment. The therapies were also never blamed when a patient died. Not once in his writings did Rush attribute a patient’s death to the use of aggressive therapies. Instead, he credited their death to old age, the refusal to take his medication, lack of adherence to his directions, or that patients “had been worn down by previous fatigue.” The aggressive therapies used by Rush spoke to his education more than to any experience he or his sources had with foreign diseases. It could also be said that his eagerness to set himself apart from other physicians led him to quickly discredit

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166 Ibid., 193–202. For definitions of jalap and calomel, see Chapter I, pg. 45.
167 Breslaw, Lotions, Potions, Pills, and Magic, 98.
169 Breslaw, Lotions, Potions, Pills, and Magic, 100.
170 Rush, An Account of the Bilious Remitting Yellow Fever, 316.
suggestions from experienced doctors and instead pioneer a therapy without thoroughly questioning its
effectiveness.

Jean Devèze was also influenced by his medical education, but had experience with yellow fever
that affected how he approached disease and the therapies he used. He did not believe in a single
treatment for the disease and instead developed individual therapies for each patient based on their
background and progression of symptoms. He thought it a mistake to assume a single remedy would
work for every patient: “It was an error to believe, what succeeded well in one case, would have the
same success in all others, though they appeared alike; because often an infinite number of hidden
circumstances produced a change in the animal economy. I have seen a remedy that has cured one,
done good to a second, and hurt a third.”171 Devèze used multiple types of treatments in different
combinations depending on the patient, including blisters, wine, easy foods like gruel, warm liquids like
broth, cool baths, and light bleeding.172 Contrary to what would be expected, Devèze did use blood-
letting, but only in small amounts so as to save a patient’s strength. He saw Rush’s bleeding as “mortal”
and dangerous.173 He frequently used “water acidulated with fixed air,” a remedy that he had employed
“with great success at St. Domingo.”174

Devèze did not only employ simple observation to confirm the effectiveness of his treatments,
although he did use this method. He kept detailed case notes and frequently autopsied victims to better
understand the disease and how his therapies worked. In his notes, he recorded a description of the
patient, how long they had been ill, what remedies they had tried, and then made note of every therapy
he attempted and the frequency. If the patient died, he would take meticulous notes on the state of the
internal organs. No two patients received the same treatment. One thirty-four year old man was bled
twice and given a cool bath and lemonade. Another twenty-six year old man was given lemonade with

171 Deveze, An Enquiry Into, 58.
172 Ibid., 55–60.
173 Ibid., 54.
174 Ibid., 56. “Fixed air” was most likely carbonated water.
nitre, clysters, and had him bled. Both patients had waited at least five days before presenting at the hospital, had tried calomel and jalap, and despite Devèze’s attempts, both died from the fever. In both cases, the men were autopsied to discover what organs were most affected and if there were any similarities between the two that would aid in developing better treatments.\textsuperscript{175} Another twenty-eight year old woman came to the hospital two days after falling ill and was given a cool bath, a bleeding, and a combination of water, salt of tartar, camphor and lemon juice. After a day, she was given strong broth and creamed rice and another day after that had no fever and was released from the hospital after two more days of observation.\textsuperscript{176}

Devèze’s notes suggest that he was constantly tailoring his treatments based on how the symptoms progressed and not applying a single, standard method. His regular postmortem analysis shows that he was continually questioning his remedies and their effectiveness, while at the same time trying to better understand how the disease affected the inside of the body. His work at Bush Hill only confirmed what he had seen prior to leaving Cape Francois: that yellow fever was not contagious and that a doctor should aim to assist nature instead of opposing it.\textsuperscript{177} The records at Bush Hill were meticulously kept, registering those admitted, those released and those who died. They show a survival rate of roughly fifty percent, a more than respectable number when compared with the twenty-five percent survival rate of other physicians and treatments.\textsuperscript{178} If nothing else, those that did perish at Bush Hill were in less pain than those subjected to more aggressive regimens. Devèze’s medical education predisposed him to methods that would work with the body instead of aggressive measures that could harm it. It was his prior experience, however, that told him what methods to use, to treat each patient individually, and to constantly question those methods. With his case notes and autopsies, Devèze could

\begin{footnotes}
\footnotetext{175} Ibid., 80–88.
\footnotetext{176} Ibid., 100–104.
\footnotetext{177} Powell, \textit{Bring Out Your Dead}, 172.
\footnotetext{178} Breslaw, \textit{Lotions, Potions, Pills, and Magic}, 99.
\end{footnotes}
better understand what treatments worked under what circumstances, and exactly the type of damage yellow fever had on the body.

The differences between Rush and Devèze led to two very different ways of thinking about disease and, subsequently, their methods of treatment. Both doctors had different perspectives on the cause of yellow fever and the purpose of physicians. Rush had limited experience with the disease and relied heavily on his education and the writings of American physicians. While he did consult with doctors from the West Indies, any theory that did not fit within his framework was discarded. He supported his new treatment without reservation and applied it to patients universally. Devèze, on the other hand, relied on his firsthand experience in Haiti to diagnose and treat the sick. His prior dealings with yellow fever had taught him which methods did and did not work, and his notes and autopsies give him better insight into his therapies and the disease itself. Experience, or the lack thereof, played a key role in each doctor’s choices when it came to treating the disease.

Public Rivalry and Arguments in Print

From the beginning of the disease at the end of July until the end of the year, physicians published articles in local newspapers, as well as their own pamphlets, concerning their thoughts and opinions on all aspects surrounding the epidemic. The majority of these articles contradicted each other, attempted to refute other authors, and attacked other doctors for their treatments. The numerous medical theories over the origins of disease, its contagiousness, and the possible treatments resulted in a fractured medical community that bickered in the public sphere. The inability of physicians to agree, sometimes on the disease itself, frightened the public and caused a general lack of confidence in the medical community as a whole.

At the height of the epidemic, physicians openly disagreed with each other over different aspects of the disease. After the College of Physicians published their article of suggestions of how to avoid the disease, Rush published a letter describing his findings as to the cause of the fever. This
resulted in numerous responses against Rush’s theory, including one by the College stating their opinion that the disease was imported. After he discovered his aggressive therapy, he published a letter in the paper, the General Advertiser, outlining his treatment and how it was to be administered, for the benefit of all citizens, especially those who could not afford a physician or who did not have access to one. Another physician, Dr. Adam Kuhn, also issued a letter following Rush’s that prescribed a much milder method of treatment and included the use of wine, bark, tea, cool air, and cold baths. The next day, Rush responded with “an account of the ill success what had attended the use of the remedies recommended by Dr. Kuhn” and instead proposed his form of therapy, claiming that the use of Kuhn’s remedy would assist in “desolating three fourths of our city.” Alexander Hamilton wrote a letter that lauded the mild treatment he received from Dr. Stevens while sick with yellow fever and how it aided in his recovery. This letter was followed closely by a letter in the Federal Gazette from Dr. Stevens himself, outlining his methods, which were similar to that of Kuhn and Devèze. Rush responded to these with yet another article, stating that the use of these methods would only lead to more deaths. The public bickering between the city’s doctors continued in this manner throughout the outbreak.

Treatments were not the only issue in the public debate. A letter by Dr. William Currie argued that the majority of those who had fallen ill in fact did not have yellow fever, but instead were suffering from the normal seasonal fevers compounded with influenza. Rush again felt the need to respond and correct the public on this “error” in medical theory, stating that it was a known fact that “two epidemics of unequal force” cannot exist at the same time (original emphasis). The situation continued throughout the epidemic and past its end in October, as many of the physicians published pamphlets of their experiences and opinions on the epidemic, including Rush, Currie, Devèze, and the College of

179 Rush, An Account of the Bilious Remitting Yellow Fever, 26, 146.  
180 Ibid., 205.  
181 Ibid., 207–211.  
182 Ibid., 211–212.  
183 Ibid., 214–224.  
184 Ibid., 230–234.
Physicians. Philadelphia’s medical community often professed to publishing letters for the good of the public, but the public debate took on the appearance of squabbling and forced many citizens to question the profession itself.

Doctors were not the only ones having their opinions published in the papers. Citizens wrote in, often to lament the fragmented opinions of their town’s doctors. Some blamed the public disagreement for causing fear among the citizens, writing that “No circumstance has added more distress to the present calamity than the disagreement of the physicians about the disease. They at first differed as to the mode of the cure, but now it appears they do not yet agree in determining what is and what is not the yellow fever (original emphasis).” Others were fed up with the constant bickering, as one anonymous writer stated: “For God’s sake! For the sake of those who daily wait for the publication of the Federal Gazette, with anxiety! Let your readers be no more pestered with disputes.” Another anonymous author by the name of “Citizen” wrote what most at the time were probably thinking: “consider the perturbation, the extreme anxiety, the distress with which those publications have filled the minds of their fellow citizens – this is no time, Sir, for party disputes, prejudices to the old or new method should immediately give way, and that one be unanimously adopted which experience has proved to be the most eligible, and most conducive to the public good.” Citizens did take note of the public disagreements between doctors and attempted to chide them in the same forum, in the hopes that they would either work to come to a single conclusion or at least cease publishing their contrary views.

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185 See Rush, An Account of the Bilious Remitting Yellow Fever; Currie, A Description of the Malignant, Infectious Fever; An Account of the Rise, Progress, and Termination of the Malignant Fever; Deveze, An Enquiry Into.
187 Ibid., 334.
188 Ibid., 335.
Rush agreed with the complaints of the citizen and blamed the public arguments for increased suffering among the public as well as a decrease in the confidence of physicians. Of this last part he was certainly correct. The split within the medical community led to a loss of confidence with physicians in general. As one historian aptly phrased it, “If doctors could not agree on therapies, or even the cause of the disease, how could any of them be trusted?”

Devène, despite his prominence as the lead physician at Bush Hill, never participated in the public arguments and refused to participate in “contentious exchanges or in self-advertisement” in general. He accepted his “lack of...popularity with good grace, understanding that he was a foreigner among proud and exclusive professional men,” and felt no need to publish antagonistic letters in public forums. Devène, however, was guilty by association by the simple fact that he was a doctor. This lack of confidence also left a lasting mark on the profession. After the epidemic, as we will see in Chapter Three, public health boards were established in Philadelphia, among other cities. No doctors were appointed to the board in Philadelphia, a trend that was repeated in cities around the country. When physicians were consulted, advice from “quarrelsome” doctors were generally ignored. Physicians, then, managed to shoot themselves in the foot: while trying to prove their theory or treatment was the correct one to be trusted, they inadvertently tarnished the reputation of the medical community as a whole.

Knowledge about yellow fever was readily available by the time the epidemic hit Philadelphia. Much had been published regarding fevers of “warm” climates and many physicians had gained experience through their work in the West Indies. Physicians around the Atlantic corresponded with each other, often consulting back and forth on different diseases. But the availability of knowledge does

191 Myrsiades, *Medical Culture in Revolutionary America*, 95.
not mean that doctors took advantage of it. After the Revolutionary War, American physicians began to emphasize a kind of “American medicine,” and it could be said that Rush was emblematic of this new type of medicine. Instead of consulting British medical texts or relying on the knowledge of experienced European doctors, Rush based his reactions on his medical education and other American physicians. While he did have a European education, his time practicing in Philadelphia had changed and shaped his understanding of disease and illness in a way that greatly differed from the contemporary European ideologies. His conclusion that there was but a single fever was based off his years of practice in Philadelphia and prejudiced his understanding of yellow fever. On the other side was Jean Devèze, whose travels in the Atlantic gave him firsthand experience with tropical diseases as well as exposed him to a different model of disease treatment. He had seen many fevers, including yellow fever, and knew them to be different from each other and that they required different treatments. This experience, along with his educational background emphasizing a “do no harm” mentality, greatly influenced the therapies he employed when treating patients. His willingness to continually question his therapies and to use autopsy as a means to better inform himself shows the beginning of a more forensic style of medicine, something that had yet to take hold in America. A doctor’s education may have influenced how disease and the body were understood, but it was experience, or the lack thereof, that directly impacted patients. The therapies used during the 1793 epidemic directly resulted from a physician’s prior encounter with yellow fever. Rush’s stubbornness in refusing to rely on more experienced doctors can be seen as a mixture of naïveté due to his lack of prior knowledge about the disease and a belief that American diseases were different than those in “warm” climates. Devèze’s prior dealings with the disease in Haiti educated him as to what did and did not work, and exposed him to different methods to achieve a better end result. The yellow fever epidemic, therefore, cannot be fully understood without looking into the background of physicians and their decisions, which demonstrates the benefit of experience when it came to treating yellow fever.
Chapter Three
Knowledge Transmission and Public Health History

Medical knowledge, whether brought over from Europe or formed in America, influenced not only the practice of medical practices, but also the public health responses and policies that cities developed in reaction to diseases like yellow fever. The laws that had existed prior to the 1793 epidemic, as well as quarantine laws put into place during the outbreak, rested on the miasmic theory and the idea that such diseases were contagious, either through human transmission or from spoiled cargo brought by ships. The United States was not unique in this approach; they had acquired the idea from the British during colonization and Americans continued the practice after the Revolutionary War. European governments had devised the quarantine and continued to use it throughout history, and passed the information on through the establishment of quarantine laws in their colonies, such as those put into place in Philadelphia in 1793 and 1794. European navies, especially Britain’s, had developed procedures to deal with disease at sea as early as the 1750s. Often times these responses included sanitary measures meant to stave off illness or prevent the spread once it arrived. While this information seems to have circulated in the Royal Navy, it appears to have had little impact on the practice of disease prevention in America. Quarantines were primarily used during epidemics like Philadelphia’s, but sanitary measures slowly took hold in the aftermath. Sanitary reforms were based on current medical knowledge and focused on obtaining clean drinking water and ridding cities of harmful miasma and effluvia that were thought to cause disease. Boards of Health were established in cities across the country in an effort to enforce these new sanitation laws as well as to react to new epidemics in the best way they knew how: by enforcing quarantines. The years following the 1793 epidemic at Philadelphia saw a great rise in sanitary reform and efforts to keep cities clean and healthy, but when those actions appeared to fail, American cities fell back on quarantines as an established reaction that was based fully on the current medical understandings that existed in the country.
Established Health Laws

By the time of Philadelphia’s famous epidemic, public health and quarantine laws had been on the books in the colonies for decades. These laws, as one public health historian put it, often fluctuated between “apathy and sharp reaction to periodic health crises.” Colonial health-related laws were meant to keep noxious smells that were thought to cause diseases within the towns. In Charleston, South Carolina, a law passed in 1704 requiring the removal of garbage from the streets and forced slaughterhouses to the outskirts of the city, all in the name of preventing “bad air.” Similarly, in New York City, the first fifty years of English rule saw continual complaints about the condition of the streets, the constant garbage, and the general “epidemic atmosphere” that existed in the city. Quarantine laws were also established, such as Boston’s Act for the Better Preventing of the Spreading of Infectious Sickness, enacted in 1699, which fined ships that arrived from sick ports and docked without permission. Oftentimes, these laws were put into place as a result of an outbreak of illness within the community. However, throughout most of the eighteenth century the laws made little real impact. During colonial times and into the Early National period, repeated “decrees, ordinances, and laws on this subject in every town and colony” indicated either lax adherence or frequent temporary fixes, or a combination of both. New York City, for example, passed a street cleaning law in 1731, which remained unchanged until after the Revolutionary War. In 1788, the city enacted another ordinance which reiterated laws that were already on the books. The city’s government was brought to court multiple times over the years for its reluctance to enforce its own health laws, including a grand jury indictment of the city in 1788 for the “dirty appearance of the Streets,” claiming that many of them

196 Ibid., 16.
200 Duffy, A History of Public Health in New York City, 1625-1866, 41–42.
201 Ibid., 79.
were also impassible. Further legal issues arose in 1792 and again 1795, when the city was indicted for "filthy streets."\textsuperscript{202} In 1792, Constable James Culbertson was indicted by a grand jury for "his indulgence or neglect in compelling the Inhabitants to clean the Streets," referring to an ordinance already on the books that required residents to clean the street in front of their residences.\textsuperscript{203} Citizens believed that it was the government’s job to keep their streets clean, either through direct action or by stricter enforcement of the sanitation laws. These constant legal battles show how ineffective the public health laws and officials were at the time. These laws in the eighteenth century, up to and including 1793, were enacted on a somewhat cyclical basis, with laws enforced during outbreaks and then forgotten or ignored after the fear had faded. The multiplicity of these laws, as well as the legal action taken by citizens against their cities, show that instead of a gradual learning process throughout the years, old laws were forgotten and “new” laws issued only when a crisis occurred.

Quarantines were the standard reaction to any epidemiological crisis. But this customary response did not develop in a vacuum; instead, it developed from centuries of previous use in Europe before being established in America. Quarantines in England can be traced back to the plague of 1576.\textsuperscript{204} Starting in the seventeenth and through the eighteenth century, quarantines focused on objects instead of people as the carriers of disease. While it was understood that people, once sick, had the ability to infect others, they were not seen as originators of epidemics. Instead, it was often the miasma of bad cargo that led to illness. Because of this mindset, laws in England starting in the seventeenth century required that all cargo be aired out, in order to give the air time to “nullify the contagious elements of the cargo.”\textsuperscript{205} This idea made its way across the Atlantic and into colonial laws. For example, a 1717 law enacted in Boston, required all ships from infected ports to land in the harbor at Bedlow Island in order

\textsuperscript{203} Duffy, \textit{A History of Public Health in New York City, 1625-1866}, 79.
\textsuperscript{204} John Booker, \textit{Maritime Quarantine: The British Experience, c.1650-1900} (Burlington, VT: Ashgate, 2007), 1.
\textsuperscript{205} \textit{Ibid.}, 15.
to remove cargo that could “convey infection” and to take sick passengers to the lazaretto’s hospital.\textsuperscript{206} This idea that airing out ships’ cargoes could protect port city residents did not change from the beginning of the century to the end. In a 1795 dissertation on yellow fever and its prevention, putrid cargo was named as the direct cause of the disease, and quarantine on lazaretto was suggested as the best means of preventing the illness.\textsuperscript{207} Another measure adopted from Europe was the bill of health, a document obtained from the departing port that certified a ship to be healthy and if they had arrived from an infected city or not. This system first developed in the port of Marseille and was quickly adopted throughout the rest of Europe.\textsuperscript{208} It was quickly taken up in the colonies as well, with Pennsylvania’s \textit{An Act to Prevent Sickly vessels from coming into this Government} in 1700, which required a bill of health in order to land within a mile of any town with a one hundred pound fine for noncompliance.\textsuperscript{209} Quarantines regulatory ideas and regulatory schemes traveled quickly from Europe to America, influencing the laws in the colonies and later the early republic. Unlike England, however, the United States did not have uniform quarantine regulations until 1866, meaning that each state developed and enforced their laws independently of each other.\textsuperscript{210} While Europe, and largely England, greatly influenced the quarantine regulations in America, medical knowledge influenced the ideas that led to quarantine, and eventually spread to the United States.

\textit{Quarantines and Health at Sea}

Great Britain’s naval power and frequent campaigns in tropical regions gave its navy a familiarity with diseases like yellow fever. As a result, the Royal Navy enacted health regulations aimed at preventing and limiting tropical diseases, often through the use of sanitary measures in conjunction with

\textsuperscript{206} Blake, \textit{Public Health in the Town of Boston, 1630-1822}, 35.
\textsuperscript{207} William Chalwill, \textit{A Dissertation on the Sources of Malignant Biliary, or Yellow Fever, and Means of Preventing It} (Philadelphia: Way & Groff, 1799), 17–18, 28. Chalwill was a student of Benjamin Rush’s and also believed that yellow fever was part of a single, contagious fever.
\textsuperscript{209} Ibid., 1246.
\textsuperscript{210} Ibid., 1248.
some quarantines. While the American navy was not established until 1798, British naval physicians had published their findings and recommendations in the middle of the eighteenth century; there was more than enough time for this knowledge to make its way to American doctors.\textsuperscript{211} Similar to early American quarantine laws, British quarantine laws were forgotten about or relaxed by its navy under different circumstances.\textsuperscript{212} Many naval captains before the nineteenth century did not understand quarantines, saw them as pointless, and routinely impressed men from ships regardless of their quarantine status.\textsuperscript{213} There are multiple recorded instances of naval captains impressing men from quarantined ships. The captain of the \textit{HMS Deal Castle} impressed men from one such ship, causing his vessel to be quarantined and their tour cancelled. As described by Billy G. Smith in \textit{The Ship of Death}, sailors were also impressed from the \textit{Hankey} and \textit{Salus}, ships with known infections. This practice of naval officers ignoring seamen’s quarantine status often had deadly consequences. During the Seven Years War, two seemingly healthy men from a Dutch Man of War entered onto a naval vessel at Spithead, only to have one die the next day and the second to fall gravely ill and subsequently infect a large portion of the crew.\textsuperscript{214} Quarantine, especially when it came to naval fleets, was only as effective as its enforcement, which was often lacking when naval officers felt compelled to impress men to complete their ships’ complements.\textsuperscript{215}

The British navy relied much more on preventative sanitary measures than on quarantines. Sanitary measures used by “enlightened naval captains” like James Cook were usually a “comprehensive ‘managerial’ strategy of cleanliness” which included actions such as washing, fumigation, whitewashing,

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\item \textsuperscript{212} Booker, \textit{Maritime Quarantine}, 11.
\item \textsuperscript{213} Ibid., 16.
\item \textsuperscript{214} For Smith, see Chapter II, page 37; Ibid., 49, 256; James Lind, \textit{An Essay on the Most Effectual Means of Preserving the Health of Seamen in the Royal Navy. and A Dissertation on the Fevers and Infection} (London: Strand, 1774), 103.
\item \textsuperscript{215} During times of war, the British Royal Navy increased the strength of its force almost completely through the use of impressment and the practice was therefore an important part of the war effort. For more on the Royal Navy’s need for impressing men during a time of war, see Denver Brunsman’s \textit{The Evil Necessity: British Naval Impressment in the Eighteenth-Century Atlantic World} (Charlottesville: University of Virginia Press, 2013).
\end{thebibliography}
sprinkling with lemon juice or vinegar, ventilation, and good morals and discipline.\textsuperscript{216} Sir Gilbert Blane, Physician of the Fleet from 1779 to 1783, wrote that good order and discipline was as important to the health of a ship as were the sanitary regulations themselves.\textsuperscript{217} Dr. James Lind, well known for his prevention and treatment of scurvy, also wrote on how to most effectively prevent disease on ships and general naval sanitation. He strongly believed in preventative measures when it came to illness, suggesting such actions as increased rations of fresh fruit and vegetables when in port and a decreased use of salted meats, instead providing fresh meats at least four days a week when they were in port.\textsuperscript{218} He recommended that crewmen air out their chests, bedding, and clothing frequently to prevent the molding of these items in damp and warm climates and fumigating between decks when in port.\textsuperscript{219} Lind believed “Filthiness [to be] a great source of infection, and Cleanliness a great Preservative,” and many of his recommendations included different ways to clean and disinfect the ship at sea and in port.\textsuperscript{220} On the chance that these sanitary measures did not stop disease, Lind’s suggested washing the ship with vinegar and a strong fumigation with smoke of tar, pitch, nitré, camphorated vinegar, or gunpowder, which he believed to be the most effective.\textsuperscript{221} The terms used by the British navy leaders reinforced the focus on prevention. Regular stops in harbor were called “refreshments” and were meant to provide an opportunity for fresh air and exercise for the men, as well as a thorough cleaning for the ship.\textsuperscript{222} For the leaders of the British navy, prevention was more important than containment, and policies were

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\footnote{\textsuperscript{216} Lawrence I. Conrad et al., eds., \textit{The Western Medical Tradition: 800 B.C.-1800 A.D} (Cambridge, Eng.; New York: Cambridge University Press, 1995), 408–409.}
\footnote{\textsuperscript{218} An Essay on the Most Effectual Means of Preserving the Health of Seamen in the Royal Navy, and A Dissertation on the Fevers and Infection, 3; Erica M Charters, “The Intention Is Certain Noble’: The Western Squadron, Medical Trials, and the Sick and Hurt Board during the Seven Years War (1756-63),” in \textit{Health and Medicine at Sea, 1700-1900} (Rochester, NY: The Boydell Press, 2009), 24.}
\footnote{\textsuperscript{219} Lind, An Essay on the Most Effectual Means of Preserving the Health of Seamen in the Royal Navy. and A Dissertation on the Fevers and Infection, 42, 70.}
\footnote{\textsuperscript{220} Ibid., 88, 94–100.}
\footnote{\textsuperscript{221} Ibid., 88–89.}
\footnote{\textsuperscript{222} Charters, “The Intention Is Certain Noble’: The Western Squadron, Medical Trials, and the Sick and Hurt Board during the Seven Years War (1756-63),” 23.}
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implemented toward this type of thought.

Fumigation was by far the most favored response by the British when it came to preventing or containing disease. While exposure to the open air was the preferred method, often there was not enough time for a ship to sit while its contents decontaminated, and authorities were unsure of just how long such a process took. Because of this, fumigation was seen as the quickest and best way to disinfect a ship. Lind’s suggested fumigation choices were only some of those used during his time and others included sulfur with charcoal, sulfur with arsenic, and wood. Vapors from boiling liquids were also used for the purpose, and it was suggested that vinegar, either alone or with camphor, or tar, be boiled below deck.²²³ At the end of November in 1795, a British hospital ship, the Union, had a breakout of “fever” on board and was directed to fumigate the ship twice daily with nitrous acid. By the first week in December, the fever was no longer spreading and only one patient remained ill.²²⁴ By 1799, it was thought that burning sulfur was the most effective means of disinfecting a ship, and that “[t]he vapour produced by the burning of sulphur, is known to be the volatile vitriolic or sulphureous acid, one of the most powerful in the mineral kingdom, the effect of which in destroying contagion has long been established,” although it was harmful to those that were exposed. Instead, nitrous acid killed contagions without harming patients unable to leave the ships.²²⁵

There was no differentiation between diseases when it came to fumigation and it seemed as though ships used whatever was on hand. Instead, it was the fumigation itself that was supposed to have made the difference. Along with the Union’s “fever,” nitrous acid was also used against an outbreak of “malignant fever” onboard Russian Man of War ships that were working with the Royal


²²⁴ Ibid., 53–62.

²²⁵ Ibid., 27–28.
British hospital ships began using it on dysentery wards, fever wards, surgery wards, and anywhere else sickness prevailed. Blane recommended fumigation, at sea if need be, of sulfur and nitre for any illness that arrived on a ship. The act of fumigating a ship was seen as the action that cleaned and prevented the spread of illness, regardless of what disease had taken hold.

Not all who made their livelihood on the water treated disease the same way that the Royal Navy did. Slave ships through their travels around the Atlantic would have had the opportunity to obtain knowledge of and treatments for disease and, being in such close quarters with large numbers of crew and slaves, would have had the motive to use sanitation and other means to prevent disease. However, the vast majority of slave ships treated disease as a normal but unwelcome part of the job and a loss of life, while unfortunate, was to be expected. Slave ship captains made “cold calculations” that their crews would suffer premature deaths and thus hired large crews. While the slaves were physically examined before boarding, in the hopes of taking only the strong, healthy slaves across the Atlantic, such exams rarely prevented the spread of disease once onboard. As historian Sowande’ Mustakeem has observed, “Out at sea, slave ships were perhaps the most isolated environment within the broad spectrum of bondage...they eventually became their own unique mobile spaces, harboring a wide range of bacteria, pathogens, and deadly diseases emanating from their particular set of unhealthy conditions often unseen on land.” But instead of treating or preventing the problems of disease and sanitation of board, if for nothing other than economic reasons, captains and medical personnel onboard slave ships seemed to ignore sanitary issues, despite the knowledge that was present at the time. Non-medical advice for preventing the spread of disease had existed since at least the beginning of the eighteenth century.

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226 Ibid., 69–75.
227 Ibid., 99.
228 Blane, Observations on the Disease of Seamen, 271–274.
231 Ibid.
century and included suggestions such as special areas for sick slaves, separate tubs for food and excrement, and cleaning slaves’ sleeping quarters regularly. But much of this advice was simply ignored, many slave ships did not isolate sick slaves and ship surgeons were often not able to implement these practices because of interference by the captain.\footnote{Robin Haines and Ralph Shlomowitz, “Explaining the Mortality Decline in the Eighteenth-Century British Slave Trade,” \textit{The Economic History Review} 53, no. 2 (May 2000): 271–273.; Rediker, \textit{Slave Ship}, 274.} Instead, slaves and bondsmen were frequently traded from ship to ship, carrying and spreading disease as they went.\footnote{Ibid., 484; Richard Sheridan, “The Guinea Surgeons on the Middle Passage: The Provision of Medical Services in the British Slave Trade,” \textit{The International Journal of African Historical Studies} 41, no. 4 (1981): 615.} Scurvy affected many of the slaves crossing the Atlantic, despite the knowledge of its prevention.\footnote{Mustakeem, “I Never Have Such a Sickly Ship Before: Diet, Disease, and Mortality in 18th-Century Atlantic Slaving Voyages,” 479.} Dysentery and smallpox were also continual problems and while treatments for these illness were known, they do not seem to have been frequently used when at sea.\footnote{Ibid., 486–488.} Sanitation and disease prevention was not the priority aboard slave ships as it was on ships of the British navy. Even with the requirement of physicians on British slavers, little impact was made on the spread of disease while at sea.\footnote{Sheridan, “The Guinea Surgeons on the Middle Passage: The Provision of Medical Services in the British Slave Trade,” 625.} While disease and sanitation were taken seriously by the Royal Navy, not all those who crossed the Atlantic treated illness in the same way.

Diseases were treated differently at sea than they were on land. Because of the close quarters, sanitation regulations on naval ships were strictly enforced. Naval hospital ships were kept clean through the “airing, washing, and fumigation of bedding, [and] the cleaning of nursing utensils and similar matters.”\footnote{Louis Roddis, \textit{James Lind: Founder of Nautical Medicine} (New York: Henry Schuman, 1950), 25.} The sick were housed in the gun room, as the portholes allowed for ventilation and easier cleaning after the illness had passed.\footnote{Ibid., 85.} This can be compared to the advice given to those on land by physicians, which often blamed the air for illness and recommended that the sick be kept shut up in
rooms as to prevent further spreading. The lived experiences of those onboard naval vessels led to different conclusions than those who practiced medicine on land. Illness aboard a ship was also one of the rare times that captains would put their vessels under voluntary quarantine, and the British navy recommended at least thirty days after the end of the illness in order to ensure that all the men were indeed healthy before setting sail again. The money invested by the Royal Navy for the care of their seamen, either through the provision supplied or the salary of the ship physicians and their tools, demonstrates how important the health of the men was to the navy. Ships treated disease in a much differ manner than physicians on shore and this can largely be explained by the multiple experiences ships had with disease, in comparison to physicians on land.

*Disease Transmission, the Law, and Ecological Forces*

Governments put laws in place in response to epidemics and they were based on the then current medical knowledge. Because medical thought saw disease as contagious, in some form or another, quarantines were the standard methods employed when illness broke out. Cities implemented quarantines as a response and only when they were needed, a tradition that was carried over from England. In their long history of quarantines, England only applied them in times of need, such as the fourteen day quarantine imposed on all ships arriving from Philadelphia, Delaware, and New Jersey in 1793 and early 1794. The heavy emphasis on contagion prevention also led to the establishment and use of lazarettos, or quarantine stations, at major port cities. These sites were established early in the eighteenth century, but often fell into disrepair during the time between outbreaks. Boston was one of the few cities that had a working pest house early in its history and kept it up with regular use and

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241 Charters, ““The Intention Is Certain Noble’: The Western Squadron, Medical Trials, and the Sick and Hurt Board during the Seven Years War (1756-63),” 34.
maintenance. Charleston, despite its somewhat regular occurrence with diseases, only established a temporary lazaretto in 1712, and only then as a reaction to a particularly devastating case of yellow fever. Falling in between these two governmental approaches to epidemics, Philadelphia was a much more typical case. The city built a quarantine station in 1742 in response to yet another outbreak, but by 1749, the station was already in disrepair and was not ready for a ship full of sick immigrants when they landed.\(^{243}\) Based on the contagion theory, which was professed by physicians and was the best explanation of disease at the time, quarantines were used only when needed and as a reaction to a current outbreak.

These quarantines did little to stop the actual spread of disease, even if they were based on the best medical and scientific information at the time. While government implemented measures that they believed would help stop the spread of illness, there were actually geographical and ecological limits that prevented yellow fever from spreading outside of the Philadelphia area during this time. For instance, the availability of water in the city was something normally found in abundance. Most houses had their own wells and public pumps were accessible to passersby.\(^{244}\) The summer of 1793 was a particularly dry one, which led to most of the wells falling below pump level. The need for water cisterns and water transportation was of sudden importance to the city's residents, and led to ideal conditions for mosquitoes. These dry conditions, however, were only a cause of concern for Philadelphia. Surrounding cities obtained their water from different sources, including the Delaware River and other streams. Because of this lack of dependence, other surrounding towns did not need to transport water from the Philadelphia area, keeping the fever from being spread beyond the capital by movement of contaminated water barrels. With only a small range of flight, the only way mosquitoes (and yellow fever) would have reached neighboring towns like Wilmington, Burlington, Trenton, and Salem would


have been to physically transport them. Refugees from Philadelphia flooded into Wilmington at the
beginning of the epidemic. Despite the large number of Philadelphians entering Wilmington -
"Philadelphians by the hundreds flocked there, houses were jammed, rents rose to the sky" - the
Delaware city did not experience an outbreak of yellow fever. This was due to the fact that the
incursion of Philadelphians involved only people and not infected water sources entering the city. As a
result, Wilmington remained healthy. In fact, of the eight or ten Philadelphians who died in Wilmington
from yellow fever, only one was sent to the hospital. "The others were nursed and attended in the
houses where they fell sick." Therefore, geographically the surrounding towns were far enough apart
to prevent the spread of the disease. Ecologically, these towns had the ability to obtain their own fresh
water, eliminating the need to transport infected water from Philadelphia. These limitations are what
prevented yellow fever from running rampant across North America, not imposed quarantines or
restrictions on the movement of peoples.

Public Health and Sanitation Developments

While the yellow fever outbreak in Philadelphia did not lead to scientific breakthroughs
regarding the theory of disease, it did lead to positive changes and an emphasis on sanitation.
Europeans and Americans had an idea of cleanliness that differed greatly from today's notions.
Cleanliness was not a focus on personal hygiene. In fact, after the sixteenth century, bathing was seen as
evil and dangerous to one's health. It was believed that "dousing the body in water opened the pores to
evil forces which might come in and upset the balance of the humors, causing illness or death."247

Bathing also upset the balance of the body by exposing it to extreme heat, cold, and wetness. These

245 J. H. Powell, Bring out Your Dead: The Great Plague of Yellow Fever in Philadelphia in 1793 (New York: Arno
Press, 1970), 244.
246 Matthew Carey, A Short Account of the Malignant Fever, Lately Prevalent in Philadelphia: With a Statement of
the Proceedings That Took Place on the Subject, in Different Parts of the United States. To Which Are Added,
Accounts of the Plague in London and Marseilles; and a List of the Dead, from August 1, to the Middle of December,
247 S. J. Watts, Epidemics and History: Disease, Power, and Imperialism (New Haven: Yale University Press, 1997),
103.
different states could throw off the equilibrium within the body, causing excessive sweating that could make one more susceptible to disease, although washing the hands, face, and neck were eventually seen as acceptable.\textsuperscript{248} Dirt was seen as a protectant layer on the skin, keeping the body safe from dangerous outside forces.\textsuperscript{249} Instead, clean clothes were seen as the standard for cleanliness and the outward appearance of spotlessness conveyed the important message of good hygiene.\textsuperscript{250} Linens and undergarments were thought to remove dirt from the skin by the constant contact with the body, thereby protecting the body from “putrefaction and disease” without disturbing the humors.\textsuperscript{251} The idea was so important that steps were taken to ensure clean clothing, as one French-Indian man did, by including a laundry clause in his work contract.\textsuperscript{252} Clean linens displayed not only one’s cleanliness, but frequently also came to represent one’s access to a laundress and one’s wealth.\textsuperscript{253} The French-Indian man was not only concerned with his health and appearance, but also the appearance of his status. This was in contrast to Indian tribes who washed their bodies but not their clothing, and were therefore seen as unclean by Europeans.\textsuperscript{254} The idea did not change in the eighteenth century, and personal cleanliness was not an issue that Americans troubled themselves with. Indeed, the commanders during the Revolutionary War found it hard to keep army camps clean and were frustrated by even the lack of simple hygiene, such as the men that were “indifferent to the need to separate their food preparation from where they deposited bodily wastes.”\textsuperscript{255} Personal cleanliness was not seen to have an impact on health and therefore was not included in public health discussion by physicians or government officials.

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\textsuperscript{248} Kathleen M. Brown, \textit{Foul Bodies: Cleanliness in Early America} (New Haven: Yale University Press, 2009), 33.
\textsuperscript{249} Ibid., 21.
\textsuperscript{251} Brown, \textit{Foul Bodies}, 26.
\textsuperscript{252} White, \textit{Wild Frenchmen and Frenchified Indians}, 177.
\textsuperscript{253} Brown, \textit{Foul Bodies}, 31.
\textsuperscript{254} White, \textit{Wild Frenchmen and Frenchified Indians}, 198.
Instead, cleanliness and sanitation measures sought to keep “air clear of noxious odors and pollutions” because “[s]mell was the common denominator of filth, disease, corruption, and disgust”.256 People went so far as to wear sachets of herbs and perfumes, and even pomatums (“scented fat placed on the head that melted slowly into the hair and scalp”) in order to smell pleasant and, therefore, clean.257 To smell unpleasant would risk being called dirty or even unhealthy. The same held true for the surrounding environment and cities. Following the outbreak in Philadelphia, yellow fever made appearances in other major American cities, including New York and Boston. After an episode in New York City in 1796, the city’s Medical Board urged a cleanup of the streets, as the “stench” from the docks and wharves was believed could cause illness.258 Two years later, New York repealed all existing health laws and replaced them with a single state law that gave broad powers to the Health Office.259 The temporary committee that had lead Philadelphia through the outbreak was made into the official board of health in 1797.260 In 1799, following an outbreak of yellow fever, Boston appointed a twelve man Board of Health.261 Baltimore established its own board of health in 1797 and placed the administration of sanitary laws under the city commissioner.262 These health boards predate any similar establishments in England by at least fifty years, demonstrating the unique need the states had for these boards due to the lack of any centralized governmental regulation in America during the eighteenth century.263 These cities, which had previously depended on the work of temporary committees, came to the realization that there was a need for the prevention of disease and not just reactive policies. The boards created a

256 Linda S. Myrsiades, Medical Culture in Revolutionary America: Feuds, Duels, and a Court-Martial (Madison: Fairleigh Dickinson University Press, 2009), 58; Brown, Foul Bodies, 10.
257 Brown, Foul Bodies, 33.
258 Duffy, The Sanitarians, 42.
259 Koeppel, Water for Gotham, 62.
261 Duffy, The Sanitarians, 45.
262 Blake, Public Health in the Town of Boston, 1630-1822, 155.
full time body whose main goal was to prevent outbreaks, which at that time meant keeping the cities clear from harmful miasmas.

Part of these new sanitation measures included constructing underground sewer and water systems to clear the streets of miasma-causing debris and to bring healthy, clean water to the cities. Following the multiple outbreaks in the last decade of the eighteenth century, the residents of Philadelphia petitioned the government to take action to clean the streets and provide clean drinking water, both issues that they believed caused yellow fever. The citizens were not alone in this thinking. Immediately following the 1793 outbreak, Devéze suggested bringing fresh water from the Schuylkill as a way to prevent future outbreaks. In 1799, a “Watering Committee” formed with the task of developing a plan to transport water into the city. The committee hired Benjamin Latrobe, a renowned architect and engineer and designer of the United States Capital, to design its water system, which included an aqueduct, wooden pipes, and a steam engine for pumping water throughout the city. This designed was finished and in use by 1801. Other cities also began similar sanitation projects. After 1793, New York City had multiple recommendations for installing underground sewers and a water supply system that would bring in fresh water from outside the city, since fresh water was “one of the most powerful...means of removing the causes of pestilential disease.” Actions were taken at the beginning of the nineteenth century to implement these recommendations. Boston also took steps to provide clean water, and in 1795 chartered the Boston Aqueduct Corporation, who was to bring fresh water from Jamaica Pond in Roxbury to the city. By 1798 the aqueduct was in place and working.

264 Jean Deveze, An Enquiry Into, and Observations Upon the Causes and Effects of the Epidemic Disease, Which Raged in Philadelphia from the Month of August till towards the Middle of December, 1793. (Philadelphia: Parent, 1794), 140.
266 Duffy, The Sanitarians, 47.
267 Ibid., 44.
268 Ibid., 47.
Underground sewer and water systems were an accepted form of disease prevention across the country and were actions taken by large cities in attempts to keep their citizens healthy.

All these developments were taking place at the same time in the late eighteenth and early nineteenth centuries when the medical profession began to change. European physicians started giving clinical studies and statistics greater attention, and found new disease as a result. They began to connect these studies with autopsies and initiated new therapies based upon their findings.\(^\text{269}\) Scottish doctors began suggesting that some fevers were contagious and that physicians were helping to spread them. Dr. Alexander Gordon, from Aberdeen, warned physicians that attended childbirths for the need for good hygiene, including washing hands, clothes, and instruments in order to avoid spreading infection.\(^\text{270}\) In France, too, there developed a more pathological practice of medicine, where autopsies were used to corroborate diagnoses. Diseases were no longer seen as individualistic, where the disease differed in each person, and instead symptoms in general were used to diagnose and treatments became more standardized. The French called their method the “anatomico-pathological” system in order to differentiate it from the old humoral system.\(^\text{271}\) America, however, was left out of these medical advancements. The exceptionalist attitude of American doctors, combined with the heavy influence of American physicians like Rush, led to a continued ignorance (or flat out rejection) of the new teachings and developments taking place in Europe.\(^\text{272}\) The United States, while more advanced than many countries in their establishment of sanitation laws and practices, still fell behind in regards to overall medical knowledge.

These public health measures based on sanitation and the miasma theory had the unintended consequence of reducing the number of places for mosquitoes to reproduce and helped reduce the

\(^\text{270}\) Ibid., 122. Many physicians at the time were offended by these accusation that they were the ones spreading illness, although Gordon turned out to be correct.
\(^\text{271}\) Ibid., 306–307.
\(^\text{272}\) Ibid., 105.
number of outbreaks of yellow fever in North American cities. They also introduced the idea of
government regulation in the prevention of disease and promotion of health, which can be seen as the
beginning of the sanitation movement within the United States, and was one area of health where the
country stood out. These measures were not new ideas, as we can see from naval officials’ reactions to
disease outbreaks. Sanitation and cleanliness were staples of British navy’s response to outbreaks but
were not well translated by those on land. Instead, the ideas of sanitation seemed to develop differently
and through different means. It was only after this and subsequent outbreaks in the 1790s that the
emphasis on sanitation and public health took hold in the country.
Conclusion

During Philadelphia’s 1793 yellow fever epidemic, experience trumped education. Prior knowledge of the disease greatly impacted treatments and, therefore, the general population. Education, however, was not unimportant and laid the foundation for how many physicians would see and study disease. Those who attended medical school in Edinburgh, especially during the time of Cullen, saw disease differently than those who studied in Montpellier or Boudreaux. Each school also trained their students differently when it came to their future investigations regarding disease like yellow fever, with some heavily emphasizing the scientific method that came with the Enlightenment. But overall, the largest factor in the different opinions during the outbreak was experience. Physicians who had previous contact with tropical disease, such as those who had practiced in the West Indies, were the ones most likely to offer gentler treatments based on what they had experienced. Many had the opportunity to conduct autopsies in the tropics, something that was much less likely to occur in the United States itself. From these autopsies, tropical doctors like Jean Devèze continually questioned their methods and were able to use forensics to diagnose and prescribe better treatment options. Those without such experience instead depended heavily on their education and their experience with non-tropical disease, resulting in less favorable treatments like mercury and blood-letting. The knowledge of disease held by leading physicians influenced the decisions of the government in regards to quarantines and other public health regulations. Differing ideas on the contagiousness of yellow fever and its origin led to strong quarantine laws and less stringent sanitary measures meant to resolve the problem based on the alternate theories. These laws influenced later sanitation laws that were put into place across the country. While the majority of the work done on this epidemic has focused on its social history, the medical background and experience of the doctors involved played a large role in determining the treatments and governmental policies that came out of this epidemic, with the prior experience of
physicians making a difference and prompting public discussion on the origin and management of the
disease.

This study also highlights the significant differences between the traditional medical practice of
the time and the emerging focus on forensic study. Benjamin Rush, like many doctors, avoided autopsies
or were unable to conduct them due to religious objections and the cultural opposition. When they
were performed, postmortems were often used only to confirm the diagnosis or to discover the cause of
death. It wasn’t until later in the eighteenth century that physicians like Devèze began conducting
autopsies not only as a way to confirm the diagnosis, but also as a means of determining the effects
treatment had on the patient and their body. From these studies, treatments would be adjusted for
future patients. In the 1793 epidemic we can see these two different thought processes come together
in a single outbreak and result in different treatments and understandings for yellow fever.

This study also demonstrates that where a doctor practiced and his resulting experiences
mattered more than where they were educated. Education was still an important factor, as physicians
fell back on their education when presented with a disease for which they had no previous experience.
However, those who had previous interactions with diseases, in this case yellow fever, approached
treatment far differently than those with no prior knowledge. Physicians like Devèze, among others, had
practiced in the West Indies and, as a consequence, had treated many cases of yellow fever. Their
experience showed that harsh treatments did not work and therefore gentler remedies were
recommended. This was in sharp contrast to local doctors like Rush, who had never practiced outside of
the United States. Rush relied on his education and came to the conclusion that all fevers were actually
a single illness, which allowed him to use his prior knowledge of other fevers to treat yellow fever
victims. Because all fevers were the same, they could all be treated the same, which resulted in an
aggressive form of treatment for every yellow fever patient. Lack of any prior experience with the
disease meant that Rush was forced to fill in this void with what he could use from his prior schooling.
Doctors, such as Devèze, had an education similar to Rush’s but their first-hand experience made the
difference when it came to treatments and any general understanding of yellow fever.

The large differences seen between doctors like Rush and experienced physicians such as
Devèze present a difficult question, especially when one considers the considerable numbers of
publications on about tropical disease and the vast correspondence Rush conducted with physicians
practicing in both the West and East Indies. Was Rush willfully ignorant of the developments in tropical
diseases and the medical discussion surrounding yellow fever? There was a lot of information circling
the Atlantic by the time of Philadelphia’s outbreak. Physicians from the West Indies published manuals
on tropical disease, as well as corresponded with other physicians in Great Britain and the United States.
Rush himself wrote to at least one West Indian physician during the epidemic, yet he remained steadfast
in his view of the disease and his treatments. Perhaps he stubbornly chose to ignore the information
because it did not fit within his single-fever theory. Even so, he fails to even mention the existence of
any information about yellow fever and relies solely on the medical notes of another Philadelphian
physician. He could have been one of the many American physicians who saw the country as exceptional
and therefore outside medical information was inapplicable to the epidemic. As one studies the
physicians and their response to the outbreak, it is hard to ignore Rush’s lack of tropical sources when
compared with other doctors at that time.

There were many other questions that arose that were outside the scope of this paper but are
open to future research. While work has been done on the spread of scientific information, namely
biology and the natural sciences, there has been little study into the spread of medical information
throughout the Atlantic. While this paper looks at some of the transmission of knowledge from
Edinburgh to Philadelphia, knowledge also traveled back to Europe and included information gained
from the West Indies, Native Americans, and the increasing slave population. More work needs to be
done concerning the involvement of these groups and areas on the spread of medical knowledge within
the Atlantic. Many of the scientific manuals written in the late nineteenth century were aimed not at physicians, but at the general public, and the public, in many cases, seemed to be almost as well educated in medical matters as some of their physicians. Just how educated the general population was about medicine and how popular these texts were still needs to be researched. Lastly, throughout the research process, I was unable to find any discussion or writing on Jean Devêze outside of brief mentions within other biographies. Many historians have published entire books on different aspects of Benjamin Rush, but no such work exists for Devêze, despite being known as the expert on yellow fever during his time. He wrote prolifically after the outbreak and continued writing after he returned to France, and his dissertation on yellow fever has yet to be translated into English. For a man that is often portrayed as Rush’s foil during the 1793 epidemic, surprisingly little has been written on him.

The issues addressed by this thesis do not exist solely in the past. The continued increase in globalization means that disease can be transmitted from country to country faster than ever. The issue of quarantine is still a political one and it is even more important to implement the correct safety measures based on modern medical knowledge rather than rely on practices such as quarantine out of fear. Instances such as the recent Ebola outbreak demonstrates that governments are still imposing measures based on fear instead of scientifically baked evidence. Public health laws continue to be strongly influenced by the medical profession and still face the problems of enforcement, but instead of being concerned over dirty streets, public health officials must face issues that are harder to enforce, such as the required vaccination of children. The partnership between the medical community and public health is not a new issue and faces the same types of challenges seen in the late eighteenth century.
Appendix

Yellow Fever Deaths 1793

Map 1. Movement of yellow fever through Philadelphia, with darker colors equating to higher death rates. Map produced by Billy G. Smith and Paul Sivitz, Montana State University. 
http://philadelphiaencyclopedia.org/archive/yellow-fever/.

Arriving Ship to Philadelphia

Table 2. Graph showing arrival of ships from the West Indies, as well as those from the island of Hispaniola. With the arrival of numerous ships, it is hard to point to a single ship as the cause of the epidemic. General Advertiser, Google Newspaper Archives, http://news.google.com/newspapers?nid=U073gGg-K-4C. Created by Alyssa Peterson.
Table 3. Graph of population change between federal censuses. The population in Philadelphia dropped by 3.21%, while the other towns increased by at least 5.5%, some as much as 28.8% as seen in Wilmington. "Census of Population and Housing," United States Census Bureau, [http://www.census.gov/prod/www/decennial.html](http://www.census.gov/prod/www/decennial.html). Created by Alyssa Peterson.
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