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ARCHAEOLOGY OF DISEASE AND MEDICINAL PRACTICES IN 18<sup>TH</sup>-CENTURY  
BOSTON, MASSACHUSETTS

A Thesis Presented

by

KAITLYN N. BALL

Submitted to the Office of Graduate Studies,  
University of Massachusetts Boston,  
In partial fulfillment of the requirements for the degree of

MASTER OF ARTS

December 2021

Historical Archaeology Program

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ARCHAEOLOGY OF DISEASE AND MEDICINAL PRACTICES IN 18<sup>TH</sup>-CENTURY  
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A Thesis Presented

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KAITLYN N. BALL

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## ABSTRACT

# ARCHAEOLOGY OF DISEASE AND MEDICINAL PRACTICES IN 18<sup>TH</sup>-CENTURY BOSTON, MASSACHUSETTS

December 2021

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Directed by professors David B. Landon and Heather B. Trigg

This research explores the knowledge of medical techniques during the early 18<sup>th</sup> century in Boston, Massachusetts, a period of modernization and changing attitudes toward disease. By analyzing archaeoparasitological samples, written accounts, and artifacts associated with medicinal practices, I shed light on attempts to treat parasitic diseases encountered by those living in urban Boston. The collections I have selected to analyze are samples of urban Boston life and provide ideal contexts for parasite preservation. I analyze samples from the Parker-Emery household privy (c. 1720-1750) in the North End and compare them to samples from the early 18th-century Town Dock landfill in downtown Boston. This analysis contributes to information of public responses to diseases during a period of increasing urban modernization, by connecting parasite disease load to medicinal

practices and material culture. Additionally, this research uses an archaeological perspective to address a gap in medical history literature that is absent in historical documentation.

## DEDICATION

In memory of J.R., for the reason I know what archaeology is.

## ACKNOWLEDGEMENTS

Special thanks to the UMB Historical Archaeology program and the Fiske Center staff for endless opportunities, projects, and education. I never imagined I could learn and grow so much in a few short years.

To my graduate committee, Drs. Heather Trigg, David Landon, and Stephen Mrozowski. You each have helped me inform my research and find my place in academia. I could not have done it without your expertise and guidance.

To Joe Bagley, for access to lab space and artifacts at the City Lab of Boston, as well as engaging in numerous conversations discussing my project.

To Alicia Paresi and the whole gang at NMSC, the encouragement and laughs during lab meetings certainly made archaeology during a global pandemic more joyful.

To Kristin Landau, for inspiring me both as an archaeologist and a person. I would not be where I am today without your support, ideas, and listening ear.

Last but not least... to my family, close friends, and cohort for honoring my excitement over 300-year-old parasite infections and other gross things far too often. Love you always.



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## CHAPTER I

### INTRODUCTION

This research addresses the extent of knowledge the public had regarding modern medicinal practices during the 18<sup>th</sup> century in Boston, which was a progressive time for medicine in the colonies of New England (Estes 1981). By using parasites as a proxy to understand how people thought about and treated disease, coupled with material culture and written accounts to identify practices, medical techniques and knowledge are analyzed. I specifically address disease and medicinal knowledge archaeologically with the following questions: Are there preserved human parasites in the contexts that can be recovered and identified? What ideologies, practices, and materials were associated with health and disease in the 18<sup>th</sup> century? Is it possible to recognize medicinal remedies in the artifact assemblages? After answering these basic questions, I address the following research questions with my analysis, Is there an archaeologically visible period of change in 18<sup>th</sup>-century Boston regarding how the public addressed health and medical treatments? Specifically, did people tend to use commercially produced medicines as they became readily available, or did the use of traditional home remedies suffice? Additionally, what can the presence or absence of attempts to treat ailments caused by identified parasitic diseases conclude about how people used and thought about medicine? My methodology targets

significant lines of evidence through analysis of (1) specialized parasitological analysis, (2) artifacts related to medical uses, and (3) historical documentation.

Archaeologically, health is commonly addressed through the analysis of human remains, which is not always the best indicator of disease (Gallagher 2010:237; Jones and Hall 1983:66). Current archaeological ethics often discourage the analysis of human remains, especially those associated with living descendant communities. Reinhard (1992:233) argues that archaeoparasitology offers an alternative method to study human health without consulting human remains. While many studies analyzing parasite data in the archaeological record contribute to population, sanitation, or environmental issues (Mrozowski 2006; Reinhard 2007; Trigg et al. 2017), very few cases focus on medical practices implemented in response to disease, which are more commonly examined through analysis of material culture or occasionally botanical remains. Additionally, most investigations of health do not address parasites, or even the vectors or causes of disease. Intestinal parasites are an ideal proxy for health because they are extremely common in human populations and are known to cause disease. Historical documentation suggests that many home and professional remedies were created to combat ailments (Gallagher 2010). Parasitic and artifactual remains are essential in this study because they provide independent lines of evidence that can either complement or challenge written accounts that may not accurately reflect the lived experience of most people.

Besides archaeological materials, I also used historical documentation as a line of evidence in this case study. The documents I examined include 18th-century publications such as popular medical books, writings by known physicians in Boston, public records of

sanitation regulations, personal communications, and journals. With the beginning of the 18<sup>th</sup> century came a period of intellectual innovation called the Age of Enlightenment (Estes 1981). This revelation included the formation of medical societies in Boston, public access to medical literature, the first inoculations, and in the 1740s – the appearance of apothecary shops within the city. With the increasing population in Boston came an abundance of opportunities to test medical treatments for disease. However, most scientific explanations of medical problems remained unanswered for at least another century. Based on the lack of detailed physician notes on the subject, Estes (1981:1042) states, “We have little information about the impact of non-fatal disease on 18<sup>th</sup>-century New England communities”. With this observed gap in the literature of medical history, this project has the potential to add information from archaeological research that is absent in historical documentation.

Chapter II continues a discussion of health and medicine in 18<sup>th</sup>-century urban Boston, as well as providing an overview of the research sites and materials. First, an introduction to colonial Boston provides a historical background to in which this case study takes place. As the town of Boston starts its foundation, increases in population, and becomes a crowded urban space, the need for health and sanitation measures becomes a necessity. The culture of health and medicine in 18<sup>th</sup>-century Boston is discussed, along with beliefs held by practicing physicians and the public. Next, the research sites are introduced. Parasite samples and material culture are analyzed from two archaeological sites in Boston, the Parker-Emery House privy, and the Town Dock. The Parker-Emery House is in the North End neighborhood of Boston, adjacent to the Old North Church. An 18<sup>th</sup>-century double-barrel style privy lined with clay was located in the Parker-Emery House yard during excavation,



providing excellent preservation for archaeoparasitological analysis. Originally a port that served as a commercial center in the 17<sup>th</sup> century, the Town Dock inlet collected trash over time and was filled in due to sanitation reasons during the 18<sup>th</sup> century. The most recent excavation of the Town Dock took place in 2010, which exposed early 18<sup>th</sup> to 19<sup>th</sup>-century layers of fill with waterlogged and well-preserved timbers in a clay matrix at the bottom. Botanical, faunal, and insect data from the excavated contexts show that the landfill deposit displays evidence of both household and commercial waste (Meyers 2011; Landon et al. 2016). The landfill deposit provides a rich assemblage of personal artifacts, botanical, and faunal remains, with the presence of parasite eggs observed in pollen samples (Jacobucci and Trigg 2011).

Chapter III starts by framing the research in a biological perspective, introducing parasites present in the archaeological record such as *Ascaris lumbricoides*, *Trichuris trichiura*, and *Taenia* sp. Infections, symptoms, and identifying characteristics for each taxon help situate archaeoparasitological data with the biology and nature of parasite lifecycles and habitats. Secondly, the chapter takes readers through a review of archaeoparasitology literature, and specific case studies carried out in the Northeast region. Providing a foundation for my research, methods are introduced through the works of Jones and Hall (1983), Jones (1985), Pike (1967), Reinhard (1990;1992). An extensive explanation of the laboratory methods used in this study for processing parasite samples is presented, allowing the research to be easily reproduced. Quantification methods are then employed to allow for interpretation and comparison with other sites. An analysis of the data is carried out, with a

complete discussion of the samples with regards to their stratigraphic nature and archaeological context.

Chapter IV discusses the analysis of medical material culture present in the archaeological record at the Town Dock and Parker-Emery House. Starting with a simple exploration of the objects and tools used relating to medicine and hygiene in the 18<sup>th</sup> century, a review of similar case studies allowed for a consideration of the types of artifacts important for this research. A discussion of artifacts of the apothecary provides a material and historical background framework using excavated artifacts as examples from the Town Dock and the Parker-Emery House privy. A comprehensive catalog of all the medicinal related artifacts can be found in Appendix B. Coupled with historic documents and parasite data, the medical material culture adds a physical dimension to this case study.

Chapter V uses paleography methods to transcribe written documents concerning medical knowledge in the 18<sup>th</sup> century. The formulas and treatments for dealing with parasitic worms from various physicians are discussed with an analysis of historical content, as well as descriptions of the biological properties found in the medicinal plants and herbs mentioned. All transcribed documents date from the final half of the 17<sup>th</sup> century to the end of the 18<sup>th</sup> century. Letters of cases and symptoms sent between doctors and physicians discussing patients dealing with a weakened immune system from parasitic infections, provide an additional perspective to how individuals felt physically.

Chapter VI starts with the discussion of public health in Boston. With a growing urban town and increasing population, it was during the 18<sup>th</sup> century that government officials saw a greater need for implementing and enforcing sanitation regulations to reduce

diseases. These regulations contribute insight into the perspective the public had regarding health and disease during this era. Also significant, is a push for greater medical education among European officials and colonial physicians trying to establish the field of scientific medicine in 18<sup>th</sup>-century Boston. Finally, the analyzed parasite data, medical material culture, and historical documentation are brought together to revisit each objective and question of this research study. Content that are analyzed throughout the chapters is then revisited and condensed, concluding with suggestions for future directions. A discussion of how these three sets of data coexist and complement each other unify a narrative concluding how the people of 18<sup>th</sup>-century Boston thought about health and treated common diseases with knowledge and medicine

## CHAPTER II

### HISTORICAL BACKGROUND

By the 17<sup>th</sup> century, the seaport of colonial Boston was well established as a significant part of the trans-Atlantic trade network (Meyers 2011). With European exploration and colonization of the New World came the transfer and spread of infections and disease. In the 17<sup>th</sup> century, very few physicians were recorded to have practiced in Massachusetts. Notably, Puritan Deacon Samuel Fuller served as a physician aboard the Mayflower voyage to Plymouth Colony although he did not hold a medical degree (Donegan 2002; Viets 1935). Fuller was recognized by Plymouth Governor William Bradford and became widely known in the Massachusetts Bay Colony, Plymouth Colony, and Salem, combining his religious background and medicinal knowledge to assist early colonists. During the early settlement of the colonies, citizens relied on their knowledge of medicinal plants and herbs from the Old World, using traditional home remedies to treat illnesses and ailments (Sumner 2004).

Although there are very few recorded physicians accompanying the earliest ships from Europe to America, colonists brought with them the cuttings and seeds of known medicinal plants to establish the medieval practice of English herbalism in the colonies (Sumner 2004:229). Tending to the sick and medical care was often the responsibility of

women, who were the ones planting and tending to the herbs, gardens, and household matters. Although women during this era were not formally educated as licensed medical doctors, the knowledge of several women in colonial New England became well respected in the medical field. For example, midwife and healer Martha Ballard assisted many practicing doctors with obstetrical matters, keeping a diary of her work (Thatcher Ulrich 1990). Additionally, woman entrepreneur and first female pharmacist Elizabeth Gooking Greenleaf opened an apothecary shop in Boston, learning from Nicholas Culpeper's 1683 *Pharmacopoeia Londinensis* (Sumner 2004, Zabroski 2015:115). Books known as an "herbal," "pharmacopoeia," "Materia medica," or "physick" were often published by practicing physicians and doctors in London, which were carried to the New World and served as the basis for medical information among colonists.

The 18<sup>th</sup> century brought the developments of a medical profession in Boston with the creation of the Massachusetts Medical Society, scientific and medical education at Harvard University, and medical literature available to the public. Although physically removed from Europe, the culture in a major port town such as Boston was greatly influenced by newspapers, books, and educational happenings in England, especially among the elite. Those in Boston who were interested in receiving a medical training often traveled to Europe to broaden their techniques and medical knowledge, especially during the early 18<sup>th</sup> century when the medical profession was just starting to be established (Brock 1978:109). Prominent in Boston's history, Zabdiel Boylston (1676-1766) trained in England and practiced in Massachusetts, introducing the practice of inoculation during the smallpox epidemic of 1721 (Toledo-Pereyra 2006; Zebroski 2015:115). He also ran an apothecary shop in Boston where

he lived in Dock Square, advertising his herbs in the Boston Gazette newspaper, including “saffron, jalap, cassia, and juniper berries” (Zebroski 2015:115). As medical practice was still tied very closely to religious matters in the 18<sup>th</sup> century, Reverend Cotton Mather (1663-1728) made important contributions to the medical field with his book *The Angel of Bethesda*, which explained illnesses in a spiritual context (Kopperman and Abrams 2016). Mather also wrote about his interest in Indigenous medicines, believing that God had placed botanic remedies where they were needed on the earth, and because the Indigenous people were in America first, they were gifted the medicinal cures God planted on the land (Gifford 1978:272). Although plants and treatments familiar to the Europeans were widely accepted by the colonists, the example of Mather’s impact shows that plants indigenous to Northeast America were also learned about and used for medicine.

Botanical ingredients were vital to recipes for both home remedy treatments and medicines purchased or prescribed from apothecaries. Botanical and mineral based medicines were often the most reliable treatments available at the time, as colonial remedies often included harsh methods such blood-letting or superstitious rituals (Sumner 2004:229). Central to the use of botanicals in medicine during this period is the Doctrine of Signatures, or the belief that a plant will provide a sign indicating what it could help treat. Attributes such as shape, color, smell, and taste have been used as indicators. For example, walnuts (*Juglans regia*) were found to be good for curing ailments of the head because they resemble the brain, or the leaves of Saint John’s wort (*Hypericum calycinum*) resemble the pores of the skin so it may help treat wounds (Pearce 2008:51). Being a seaport town, the city of Boston

had access to both temperate plants introduced from Europe as well as indigenous North American taxa, and shipments of medicinal plants, barks, and oils from abroad.

Many diseases plagued the colonies during the first few centuries such as yellow fever, smallpox, and malaria. Epidemic diseases were often studied extensively by those in medicine at the time, but common diseases that colonists dealt with in their everyday life received little attention. As Estes (1981) states, there is not a great amount of available information on the treatment and impact of 18<sup>th</sup>-century diseases that did not result in fatalities. Living in urban Boston in the 18<sup>th</sup> century often presented plenty of opportunities to contract a very common ailment – internal parasitic diseases. The colonists were aware of encounters with various parasitic worms during this era (Figure 2.1) but lacked a basic understanding of how infections could be contracted. Parasitic diseases could be contracted easily through hand to mouth transmission, so working in the yard was a major form of transmission. Poor sanitation, contaminated water or food, and consumption of produce fertilized with infected nightsoil further transmitted and infected individuals. Geoparasites spend part of their lifecycle in soil, enter the human host, and are then expelled through feces. These parasites do not cause death in healthy adults but can contribute to a weakened immune system and make the host vulnerable to other health issues and diseases.

Archaeologically, the eggs of internal parasites have been well preserved in contexts containing human nightsoil, such as privies, and can be used to indicate disease (Fisher et al. 2007; Gallagher 2010; Pike 1967; Reinhard et al. 1990). The following two archaeological sites - the Town Dock and the Parker-Emery House (Figure 2.2) both contain preserved parasite eggs, indicators of disease to be treated in 18<sup>th</sup>-century Boston.

fig. 11

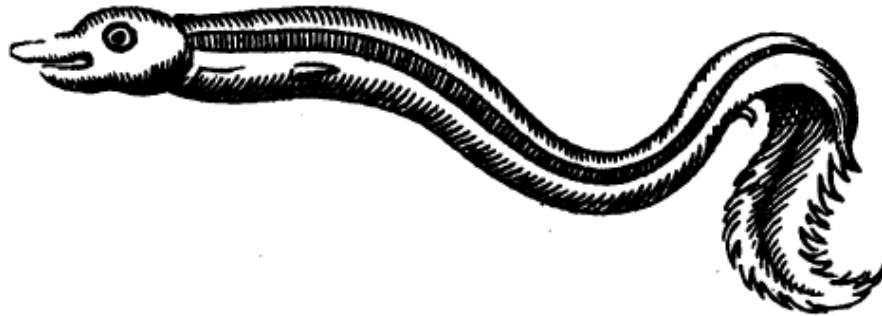


Figure 2.1. Illustration of a Roundworm, *An Account of the Breeding of Worms in Human Bodies*, N. Andry, 1701.



Figure 2.2. Map of Boston, John Bonner, 1722. Map reproduction courtesy of the Norman B. Leventhal Map & Education Center at the Boston Public Library.



## **Boston's Town Dock**

Originally a port that served as a commercial center in the 17<sup>th</sup> century, the Town Dock inlet collected trash over time and was eventually filled in for sanitation reasons in the 18<sup>th</sup> century. The most recent archaeological excavation of the Town Dock took place in 2010 at the current location of Faneuil Hall (Figure 2.3). Reasons for the 2010 excavation included building upon the 1990 archaeological project that determined the deposits underlying Faneuil Hall were characteristic of an urban fill site, as well as collecting environmental and stratigraphic data in an area not previously excavated. The 2010 excavation took place on the north side of Faneuil Hall, with a collaboration URS, the Fiske Center for Archaeological Research at the University of Massachusetts Boston, and the National Park Service. Over 6000 household and personal artifacts were recovered, along with the collection of pollen, parasite, botanical, and insect samples for analysis. The scope of the project consisted of a single 10-foot by 10-foot unit divided into sub-quadrants. During excavation, architectural features and buried utility lines restricted the proposed project area, resulting in the final unit size measuring 7 feet north/south by 8 feet east/west (URS 2013). The excavation stopped 11 feet below the modern ground level, exposing a waterlogged timber context representing elements of landmaking structures and providing excellent preservation (Figure 2.4.).



Figure 2.3. Faneuil Hall project location (Source: Boston South, MA 7.5' Topographic Quadrangle, MyTopo 2008). From URS Report, 2013.



Figure 2.4. Historical grillage complex, facing North. Primary grillage is at the center of the excavation, western grillage is below the photo-chalkboard, and the north grillage is below the north arrow. From URS report, 2013.

Stratum III was the first historic fill horizon, representing an original deposit disturbed during an 1805 construction project at Faneuil Hall. In the north half of the unit Stratum V and VI consisted of dense brick, ash, and charcoal deposits, representing a fire that

took place in 1761. Stratum VIII between IV and the preserved timbers consisted of a dense clay with recovered artifacts dating to the early 18<sup>th</sup> century. In the south half of the unit below Stratum III, Strata VII and XI above the layer of timbers consisted of silt/clay, recovering artifacts dating to the second half of the 18<sup>th</sup> century. Stratum IX capped the layers of timbers, with Stratum X consisting of the soil matrix between the timbers which contained early 18<sup>th</sup> century and late 17<sup>th</sup>-century artifacts. Stratum XI was the deepest deposit, which continued to the base of the excavation and two additional feet below the base as determined by an auger sample. Strata XII and XIII were located only in the northwest quadrant, dating to the 17<sup>th</sup> and 18<sup>th</sup> centuries.

The 13-strata landfill deposit provides a rich assemblage of personal artifacts, botanical, and faunal remains, and preservation of parasite eggs (Jacobucci and Trigg 2011) providing insight into the broader community of Boston's Town Dock. Parasite analysis was not a part of the 2010 Faneuil Hall research plan, but sediment was retained for parasite sample processing and analysis. I chose to process and analyze a selection of 14 of these samples, based on evidence indicating preserved parasites in the pollen report (Jacobucci and Trigg 2011). The macrobotanical analysis reports that a large percentage of the taxa found are related to archaeological contexts containing nightsoil, evident by the recovered raspberry and blackberry seeds present in 63% of the samples (Meyers and Trigg 2011:30). The presence of human parasites identified in previously analyzed pollen samples strengthened the suggestion of fecal material (Jacobucci and Trigg 2011:23). Interpretations of the site conclude that the area excavated was an ideal location for waste disposal to fill in the inlet and the area around Faneuil Hall. The trash in the historical fill layer deposits (Figure 2.5)

date to the 18<sup>th</sup> century and contain the largest concentration of domestic artifacts and animal bones from the nearby Town Dock businesses, households, and taverns (Landon et al. 2016; Meyers 2011).

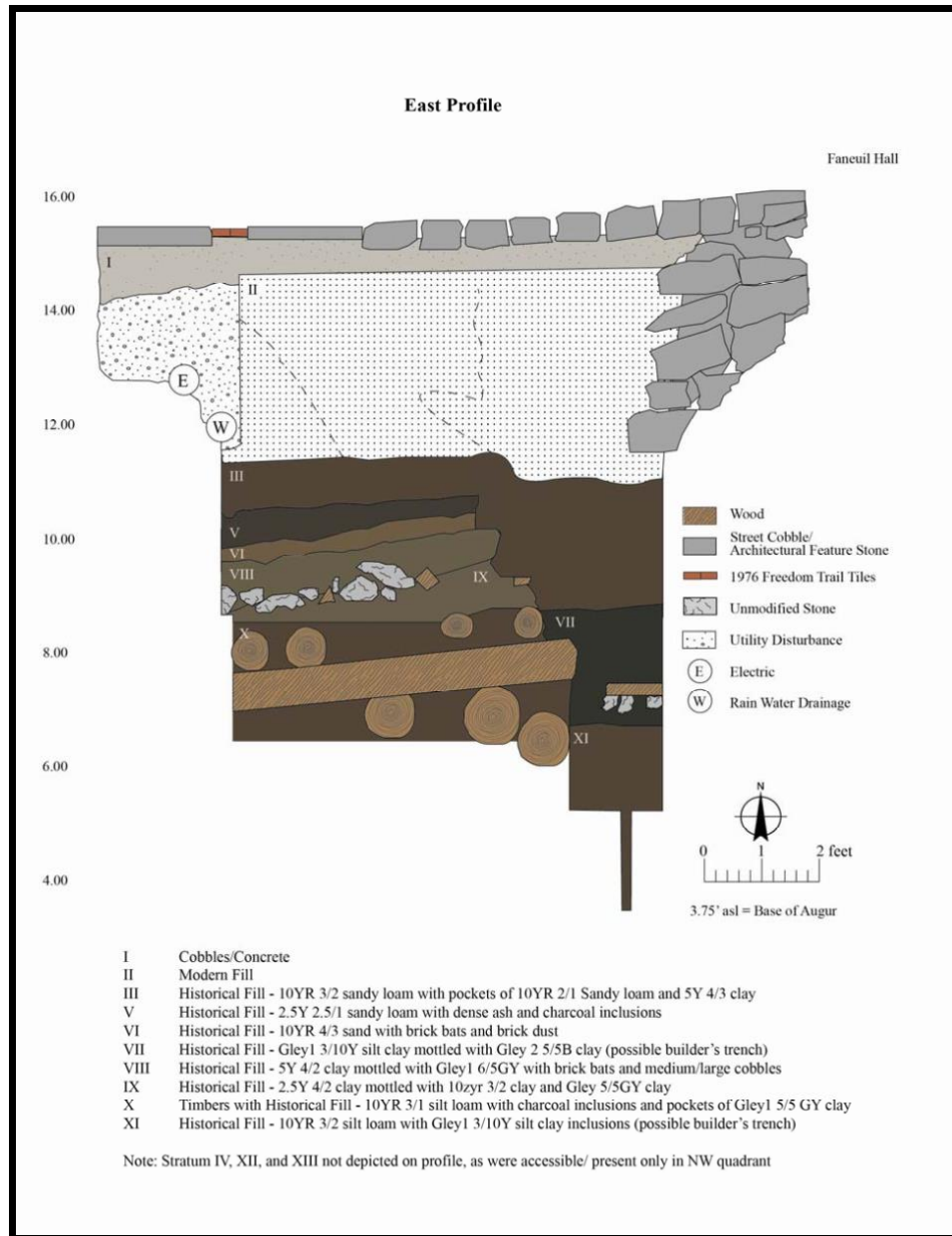


Figure 2.5. East soil and timber profile of Faneuil Hall TIHP excavation. From URS report, 2013.

## **The Parker-Emery House**

The Parker-Emery site is in the North End of Boston at 23 Unity Street (Figure 2.6), in what had been the yard of the Parker family home during the 18<sup>th</sup> century. In 2019, the current homeowner of 23 Unity Street reached out to the City Archaeology Program of Boston before a home construction project to develop the open space remaining behind the building. Directed by City Archaeologist Joseph Bagley, the emergency recovery excavation took place in the winter of 2019. The project area was a rectangular shape in the rear yard of the 100 square meter property, with the surveyed area measuring 5 meters wide by 3 meters long, plus a small extension measuring 1x3 meters in the northeast corner. As close as a 100% sample of the site was taken as space constrictions allowed for. The excavation revealed an intact 18<sup>th</sup>-century yard in a 4 square meter area, with a 1x2 meter clay deposit containing a mid-18<sup>th</sup> century double-barrel privy feature placed approximately 6-8 feet from the rear of the house. This is significant, as the size of the property was relatively lengthy. Additionally, a 1x1 meter area confirmed the location of a 19<sup>th</sup>-century privy.

Historical documentation establishes that Ebenezer Clough, who owned the land in the early 18<sup>th</sup> century, sold the underdeveloped property to bricklayer Ebenezer Kimball in 1717. Kimball likely built the house, which stood until the 19<sup>th</sup> century. After Kimball, the house is sold in 1725 to blacksmith Caleb Parker (Figure 2.7) and remained in the Parker family for 153 years. Caleb and Mary Adams had four children while living at 23 Unity Street, and the information in Caleb Parker's 1771 will indicated the presence of an enslaved

African or African American man (Bagley 2019:18). Based on this evidence, we know that the Parker family had at least one enslaved man at 23 Unity Street.

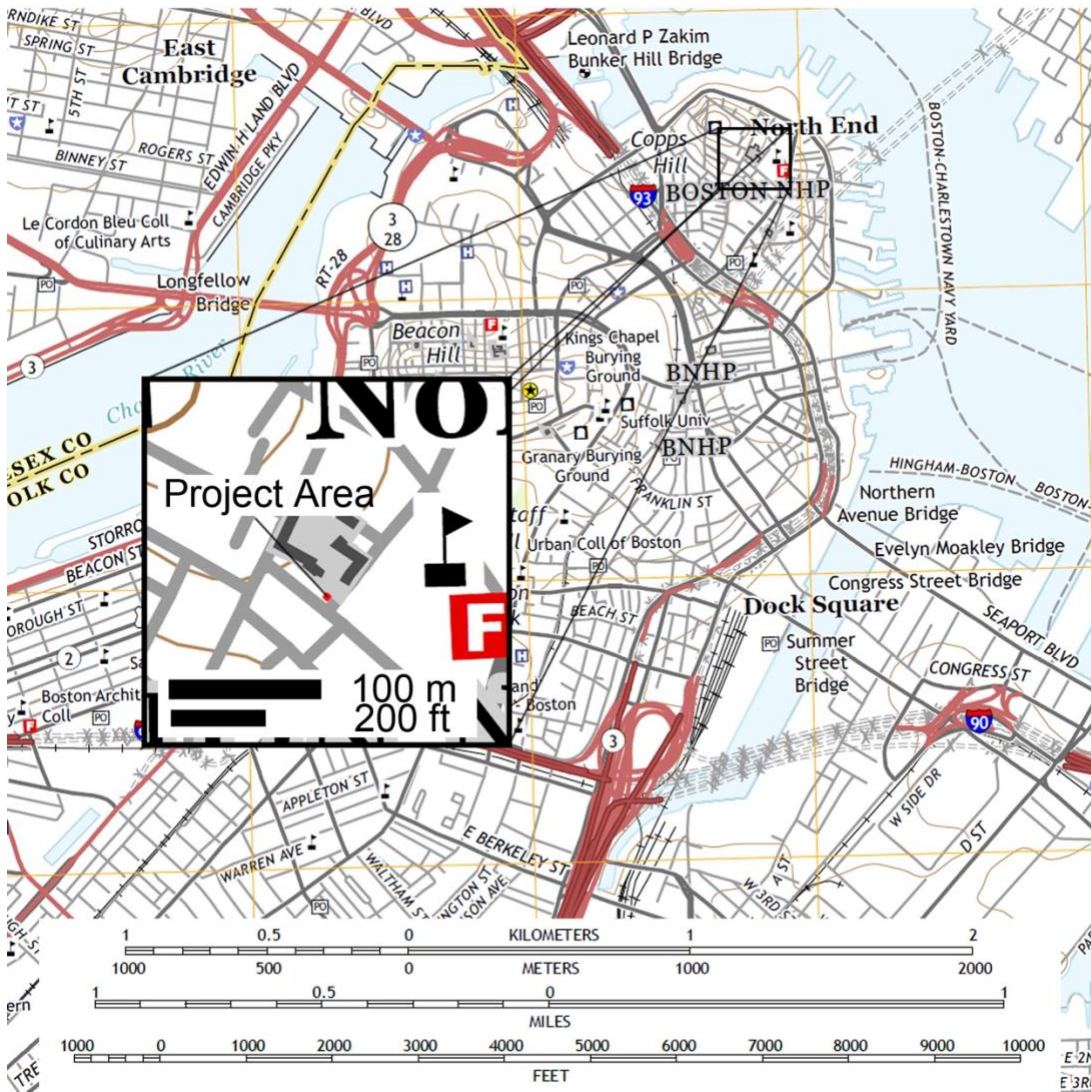


Figure 2.6. “Map of 23 Unity Street project area (red) on USGS South Boston quad map”. From proposal. Image courtesy of City Lab of Boston.

The Parker family appears to be well off financially, as indicated by lavish mahogany furniture and a wedding gift crafted by a silversmith currently both on display today at the

Boston Museum of Fine Arts. Additionally, Parker's son Jedediah attended Harvard University and worked as a scribe when he inherited a portion of the property in 1771. Jedediah Parker lived at 23 Unity Street, married Lydia Eells, and had a daughter Mary Adams Parker in 1786. After Jedediah's first wife passed away, he married Susanna Bradshaw. In 1806, Thomas Knox Emery married Mary Adams Parker shortly before his death of typhoid fever in 1815. Mary Adams Parker-Emery moved back to her father Jedediah's home at 23 Unity Street after her husband's death. Jedediah Parker died in 1827, after which the property is listed as owned by his heirs including Mary until her death in 1878 and Susannah Parker (Bagley 2019:20). A portion of the property in the rear of 23 Unity Street was sold by the women to a new owner in 1827. The deed from the sale included a drawing which contained a portion of the excavated project area.



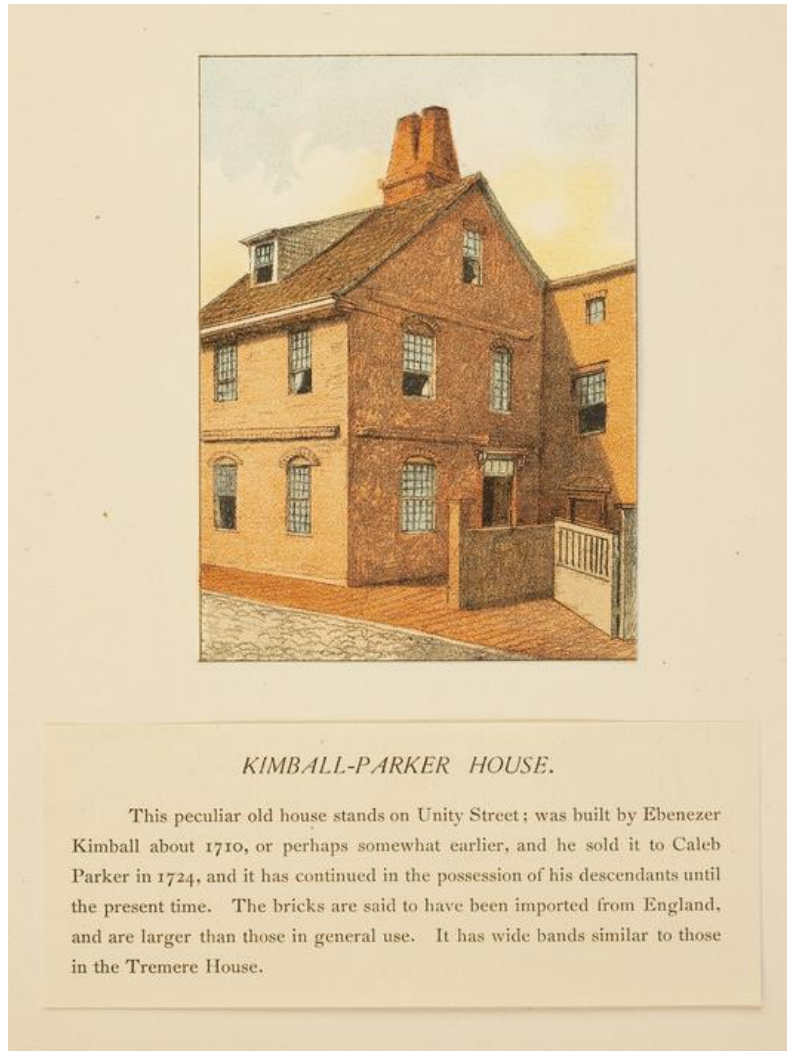


Figure 2.7. Painting of the Kimball-Parker house. From "Homes of Our Forefathers in Boston, Old England and Boston, New England" by Edwin Whitefield, 1889. Image courtesy of Historic New England via Digital Commonwealth.

The historic deed drawing of the rear lot from 1827 contained a labeled privy, where the yard remained undeveloped to the present (Bagley 2019:34). The City Archaeology Program located and excavated this 19<sup>th</sup>-century privy (known as Feature 2), along with the earlier 1x2 meter double-barrel style privy lined with clay (Figure 2.8), providing excellent

potential for archaeoparasitological analysis. Features 5 and 6, the clay-lined double-barrel privy deposit, is dated to the mid-18<sup>th</sup> century. The assemblage of artifacts recovered from the early double-barrel privy is an incredible selection of faunal remains and ceramics, supporting the conclusion that the Parker family was very wealthy.



Figure 2.8. Image of double-barrel privy Feature 5 at 23 Unity Street excavation. Image courtesy of the City Lab of Boston.

With the archaeological evidence collected from both the Town Dock and Parker-Emery House sites, the following chapters analyze parasite samples, medical material culture, and historical documentation including medicinal recipes and physician's journals. These various lines of evidence are brought together into a single narrative exploring the knowledge of health and medicine in 18<sup>th</sup>-century Boston.

## CHAPTER III

### ARCHAEOPARASITOLOGY

#### **Archaeoparasitology Literature**

Reinhard (1990) is responsible for the term archaeoparasitology and publishing a plethora of articles with methods that serve as the basis for many case studies, established through previous work done in the United Kingdom by Gooch (1978), Jones and Hall (1983), and Pike (1967). Parasite worms are rarely preserved in an archaeological context, so our evidence is from the ova, which have high levels of preservation success in contexts such as privies. The environment and conditions of the archaeological context plays a significant role in what species of parasites may be preserved, as explained by Jones (1985). Although Jones's research is based in England, the description of environmental factors and soil conditions is useful for research in the Northeast region of the United States as well. Jones (1985) notes that evidence of two parasites commonly found in archaeological contexts, *Trichuris* sp. ova survive well in moist soil, whereas *Ascaris* sp. ova have a higher chance of preservation in hot and dry conditions. Another issue that must be accounted for in archaeoparasitological research is determining if the host was human or a domesticated animal, especially when the eggs are present outside of privy contexts (Gooch 1978; Jones and Hall 1983; Reinhard 1992).

Specific to the Northeast region of the United States, Reinhard et al. (1986; see also Mrozowski 2006) conducted a study in 18<sup>th</sup>-century Newport, Rhode Island, finding a correlation of parasite load with occupation and status. Gallagher (2010) added a perspective to the Newport case study regarding sanitation measures and parasite load, in addition to occupation and status. Fisher et al. (2007) examined parasites in 18<sup>th</sup> and 19<sup>th</sup>-century Albany New York, collected from privies and other features. Fisher et al. also demonstrated that there was a correlation between parasites and status. City residents of higher status had access to increasingly better sanitation practices and access to medical treatments in the 19<sup>th</sup> century. Reinhard (1994) traced the development of sanitation measures through three different privies at Harper's Ferry. The privies ranged in dates from the 19<sup>th</sup> to 20<sup>th</sup> century, and parasite evidence concluded that there was a resistance to sanitation measures in the town, as parasitic infections were maintained over time.

Trigg et al. (2017) amassed the largest quantifiable historic parasite dataset and determined the changing environment due to cultural and environmental factors resulted in changes to the nature of the taxa of parasite assemblages. The shifting percentage observed from *Trichuris* to *Ascaris* over the 17<sup>th</sup> to 19<sup>th</sup> centuries also provides a baseline and collection of similar site patterns. Significant to this case study for comparative purposes, Trigg et al. (2017) serves as a valuable model of archaeoparasitology research carried out across the Northeast region of the United States during the colonial period. These works are used as a guide to establish methods and address issues of preservation in the analysis of the Town Dock and Parker-Emery House privy soil samples.

## Samples

During the 2010 Town Dock excavation, 48 sediment samples from various levels of the 13 strata unit were collected for parasite processing. The 14 Town Dock samples I have chosen to process for this case study represent the strata that appeared to have the best preservation, were from the 18<sup>th</sup> century, or contained macrobotanical remains such as berry seeds that may be indicative of the presence of human feces (Jacobucci and Trigg 2011). The two parasite taxa noted in Town Dock pollen samples processed in 2011 were *Ascaris* and *Trichuris*. Within the pollen samples analyzed, parasite ova were found in Strata III, VI, VII, XI, and X, with egg counts totaling 6 *Ascaris* and 23 *Trichuris* (Jacobucci and Trigg 2011:23). The recovery of parasites provide evidence that human waste was incorporated into the Town Dock fill (Jacobucci and Trigg 2011:30).

Stratum III, the primary 18<sup>th</sup>-century fill level of the excavation, was mixed with the expansion fill from the construction of Faneuil Hall in 1805. Interpreted as trash from local businesses and households surrounding the Town Dock, the inlet filling was a convenient place to dispose of waste, “broadly reflecting the activities in the surrounding area” (Landon et al. 2016:83). From Stratum III, Sample 9 was collected in Level 5 of the southeast quadrant. Sample 18 is also from Stratum III, Level 1 of the northwest quadrant. Sample 18 was chosen for analysis being the second richest context at the site for macrobotanical remains. From the Stratum V and VI, the contexts associated with the 1761 fire debris, two samples were selected. Sample 10 was taken in Level 2 of the northwest quadrant, and

Sample 11 is from Level 4 of the southeast quadrant, although parasites were not expected to be present in these samples.

Two samples from Stratum VII were processed, dating to the second half of the 18<sup>th</sup> century. Sample 12 from Level 7 of the southeast quadrant and Sample 20 from Level 6 of the southwest quadrant were chosen based on the macrobotanical analysis reporting raspberry and strawberry seeds in Stratum VII. Level 5 of Stratum VIII provided Sample 13 and 9. Stratum VIII dated to the first half of the 18<sup>th</sup> century with Sample 19 coming from the south balk under a plank, noted for having good preservation and the presence of raspberry and strawberry seeds.

Stratum IX is the context containing wood cribbing (Figure 2.4), dating from the late 17<sup>th</sup> to early 18<sup>th</sup> century. From this stratum, two samples were selected, Sample 14 from Level 5 of the southeast quadrant, and Sample 17 taken from Level 5 of the northeast quadrant. Sample 14 and 17 were chosen based on Stratum IX being the richest context in macrobotanical recovery, containing raspberry and strawberry seeds, and cherry pits. Stratum X is also part of the wood cribbing, lying below Stratum IX where Sample 15 came from Level 6 of the southeast quadrant.

Stratum XI is the context at the lowest depth of the excavation, where an auger sample was also taken at the base. Sample 21 from Level 10 of the southeast quadrant was chosen, being from a context with a variety of fruit seeds and containing *Dysphania* sp. Stratum XIII dates from the 17<sup>th</sup> to 18<sup>th</sup> century and consists of a mixture of nightsoil and natural local sediment. Stratum XIII is the richest stratum in recovered macrobotanical remains that are associated with night soil (raspberry/blackberry, strawberry, and blueberry

seeds) comprising most of the sample (URS 2013:117). The Archaeoentomological study also revealed the presence of insects that are associated with wet and decaying wood (URS 2013:117). From Stratum XIII, Sample 16 from Level 10 of the southwest quadrant and Sample 22 from Level 10 of the northwest quadrant were chosen.

From the 2019 Parker-Emery House excavation, 10 soil samples were taken for parasite analysis, all of which I have processed for this case study. Of the 10 samples, 7 were from Features 5 and 6, the 18<sup>th</sup>-century double-barrel privy, 1 sample from Feature 1 the clay liner of this privy, and 2 samples from Feature 2 which was from another double barrel privy excavated on site dated to the 19<sup>th</sup> century.

Features 5 and 6, the two barrels of the 18<sup>th</sup>-century privy, displayed very dark brown soil, and well-preserved samples as remnants from the barrels were intact, including metal barrel rings and some of the wood (City of Boston Archaeology Lab field notes 2019). The barrels were clay lined as well, aiding in preservation. Sample 1 was taken from the eastern half of Feature 5, Stratum 1 (130-135 cmbd), and Sample 2 taken from the eastern ½ of Feature 5, Stratum 1 (140-145 cmbd). Sample 3 is from the deepest of the Feature 5 barrel, from the eastern ½ of Stratum 2. The clay liner of the double-barrel privy, Sample 4, was taken from Stratum 1 in the northern ½ of the feature, although parasite eggs were not expected to be present in this sample. All from Feature 6 are Samples 5, 6, 7, and 8. Sample 5 was taken from the northern ½ of Stratum 1. Sample 6 came from the northern ½ of Stratum 2, Sample 7 is from Stratum 3 in northeast ½, and Sample 8 from Stratum 4 in the northeast ½.

Feature 2, which is the other Parker-Emery House double-barrel privy from the 19<sup>th</sup> century was processed for analysis as a comparison in this case study. Sample 23 from Feature 2 was taken at the northern ½ of Stratum 4 (200-210 cmbd). Sample 24 from Feature 2 was taken just below in Stratum 5 (200-210).

### **Laboratory Methods for Processing Parasite Samples**

Archaeoparasitological data is a key contributor to providing evidence on the health, disease, sanitation and possibly status of the occupants from the Town Dock and 23 Unity Street sites. This research employed a parasite extraction procedure modeled off of palynological extraction method without acetolysis, as that step in pollen sample processing can distort parasite eggs (Pike 1967). This method has been accepted and used in multiple archaeoparasitology studies (Bain 2001; Gallagher et al. 2008; Jacobucci 2009; Reinhard 2000; Warnock and Reinhard 1992). Compared to other methods for processing parasite samples in archaeological sediments, Romera Barbera et al.'s (2020:7) article demonstrates that a palynology derived method using hydrochloric acid, a swirl sedimentation, and hydrofluoric acid achieves the best results to identify and tabulate *Trichuris* and *Ascaris* eggs.

Town Dock and Parker House samples were refrigerated until processed. First, they were allowed to dry out overnight in petri dishes under a fume hood. Then approximately 10 g of each soil sample were measured into glass beakers. Two *Lycopodium* sp. tablets from batch #483216 were added to each sample as a control tracer. The *Lycopodium* sp. spores



allow calculations of density, concentration, and sample preservation. The known *Lycopodium* spore count for each tablet contains 18583 spores, therefore each sample x2 tablets equals a count of 37166.

Under a fume hood, 50 milliliters of ACS grade 37% hydrochloric acid were added to each beaker and stirred with glass rods. The samples sat for an hour before stirring again, then let to sit for an additional hour. After the sediment settled for an hour, the hydrochloric acid was decanted off into a glass waste container. The sample beakers were then filled with 150 ml of deionized water to dilute the HCl and raise the pH.

Three days later, the hydrochloric acid was decanted again, and pH values were checked. Approximately 150 ml of deionized water was added to each beaker, swirled with a glass rod, and left to sit 1 minute until it stopped swirling. The samples were then decanted through a 150 µm mesh screen into plastic beakers. The swirling and decanting process was repeated 2-3 times. The screen was washed in between each sample to avoid cross-contamination. The remaining residue was discarded.

After allowing the samples to settle for 2 hours, the beakers were decanted again. The samples each had 50ml of 51% hydrofluoric acid added, and then were stirred with plastic rods. The samples then rested overnight.

On the following day, the hydrofluoric acid was decanted off the samples. The sediment remaining was transferred to plastic centrifuge tubes. The centrifuge tubes were filled with deionized water and centrifuged for 5 minutes at 2000 RPM, and the liquid decanted. The pH levels were then checked, and the samples were centrifuged until the pH was neutral.

After the final centrifuging, the residue of each sample was extracted to glass vials. A few drops of 91% isopropyl alcohol for preservation and a few drops of glycerol were added to each vial. The microscope slides were prepared for analysis by pipetting a drop of glycerol in the center of a glass slide. A drop of the sample was then extracted from the glass sample vials and pipetted on top of the glycerol on the slide with a plastic pipette. A microscope slide cover slip topped each prepared slide. All samples were scanned with a Nikon Biological Microscope ECLIPSE E200 at 400x, calibrated with a Swift objective micrometer CAT #MA663 No. 10. Parasite eggs were identified and counted by the time 100 *Lycopodium* spores were counted in each sample. Parasite eggs were identified by comparing with the University of Massachusetts Boston type collection, and published sources on parasitology (Ash and Orihel 1990; Bain 2001; Blacklock and Southwell 1966; Leventhal and Cheadle 1979; Sloss and Kemp 1978; Stitt et al. 1938). The number of parasite eggs per gram of soil was calculated with the formula used by Mahar (1981) where: parasite eggs/g dry sediment = ([eggs counted/*Lycopodium* counted] × known *Lycopodium* tablet count)/sediment weight.

### **Town Dock Results**

Of the 14 processed samples from the Town Dock, 12 contained preserved parasite eggs. From Stratum III, both Sample 9 and 18 resulted in the presence of *Ascaris* and *Trichuris* in small numbers (Table 3.1). Although not the highest resulting density from the Town Dock, presence of parasites in Stratum III is contemporary with the garbage context

where a variety of fill would be expected, likely including parasite infested soil and garden waste or nightsoil from nearby households and businesses.

From Strata V and VI, associated with the 1761 fire, Sample 10 resulted in the identification of only a single *Trichuris* egg. Sample 11 contained lots of woody debris as expected from the nature of the context and did not recover any parasite eggs.

From Stratum VII dating to the second half of the 18<sup>th</sup> century, both samples 12 and 20 contained low densities of parasites. These samples were chosen based on the context's presence of raspberry/blackberry seeds indicating fecal contamination.

Representing the first half of the 18<sup>th</sup> century, Sample 13 from Stratum VIII did not recover any parasite eggs. Also from Stratum VIII, Sample 19 from under a plank in south balk with the presence of raspberry and strawberry seeds, resulted in low densities of *Ascaris* and *Trichuris*.

The two samples dating from the late 17<sup>th</sup> to early 18<sup>th</sup> century (Sample 14 from the southeast quadrant and Sample 17 from of the northeast quadrant) from Stratum IX Level 5 both recovered *Ascaris* and *Trichuris*. Also dating to this period, Sample 15 from Level 6 of Stratum X's southeast quadrant, recovered both *Ascaris* and *Trichuris*. Sample 21 from Level 10 of Stratum XI which contained a variety of seeds including *Dysphania* sp., only recovered a single *Trichuris* egg (Table 3.1).

From Stratum XIII, Sample 16 from Level 10 of the southwest quadrant recovered the highest density of parasite eggs from the Town Dock samples, at 362.60 ova per gram of soil (Table 3.1). Both *Ascaris* and *Trichuris* were present. Sample 22 from Level 10 of the northwest quadrant also recovered both *Ascaris* and *Trichuris* eggs. The addition of evidence

from identified parasites recovered from Stratum XIII further support the interpretation that this context is a mix of household, natural, and privy waste deposits.

Table 3.1. Recovered parasite eggs from Town Dock samples.

<b>Sample</b>	<b>Context-Quad/Strata/Level</b>	<b>Date</b>	<b><i>Ascaris</i> sp.</b>	<b><i>Trichuris</i> sp.</b>	<b>Density, ova/gram</b>
<b>9</b>	Quad SE/Strat. III/ Level 5	18 <sup>th</sup> c./1805 fill	1	6	257.59
<b>10</b>	Quad NW/Strat. V/Level 2	1761	0	1	36.19
<b>11</b>	Quad SW/Strat. VI/Level 4	1761	0	0	0
<b>12</b>	Quad SE/ Strat. VII/Level 7	2 <sup>nd</sup> half 18 <sup>th</sup> c.	3	3	219.19
<b>13</b>	Quad SW/Strat. VIII/Level 5	1 <sup>st</sup> half 18 <sup>th</sup> c.	0	0	0
<b>14</b>	Quad SE/Strat. IX/Level 5	late 17 <sup>th</sup> -early 18 <sup>th</sup> c.	2	4	213.93
<b>15</b>	Quad SE/Strat. X/Level 6	late 17 <sup>th</sup> -early 18 <sup>th</sup> c.	5	2	258.61
<b>16</b>	Quad SW/Strat. XIII/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	2	8	362.60
<b>17</b>	Quad NE/Strat. IX/Level 5	late 17 <sup>th</sup> -early 18 <sup>th</sup> c.	1	1	73.16
<b>18</b>	Quad NW/Strat. III/Level 1	18 <sup>th</sup> c./1805 fill	1	1	73.45
<b>19</b>	Strat. VIII/Level 5	1 <sup>st</sup> half 18 <sup>th</sup> c.	2	2	147.78
<b>20</b>	Quad SW/Strat. VII/Level 6	2 <sup>nd</sup> half 18 <sup>th</sup> c.	0	2	72.87
<b>21</b>	Quad SE/Strat. XI/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	0	1	36.94
<b>22</b>	Quad NW/Strat XIII/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	2	2	139.33

At a context level, results were as expected for the Town Dock excavation, with samples associated with the 1761 fire being of lowest parasite egg densities, and samples that had identified macrobotanical remains and good preservation to contain the highest densities. Both *Ascaris* and *Trichuris* were identified throughout the unit, with a greater proportion of

*Trichuris ova*, which may be expected for 18<sup>th</sup>-century sites with fill contexts (Trigg et al. 2017). Overall, both taxa of parasite eggs identified in the Town Dock samples appear to be consistent with the excavation unit and strata being of fill nature.

### **Parker-Emery House Results**

From Feature 5, the first barrel of the 18<sup>th</sup>-century privy, Sample 1 was taken from the eastern half of Stratum 1 (130-135 cmbd). The parasite count in Sample 1 was low; only a single *Trichuris* egg was recovered (Table 3.2). Sample 2 taken from the eastern ½ of Stratum 1 (140-145 cmbd) yielded a slightly higher parasite density than Sample 1, although only *Trichuris* eggs were recovered. Sample 3, the deepest of the Feature 5 barrel from the eastern ½ of Stratum 2 resulted in the highest total density of this feature (Table 3.2). Identified in Sample 3 were *Ascaris*, *Trichuris*, and *Taenia* eggs, with *Trichuris* being the most abundant taxa. Sample 4 consisted of the clay liner in Stratum 1 of the 18<sup>th</sup>-century privy. Parasite eggs were not expected to be present in the sample, which analysis confirmed with zero evidence of parasites.

Feature 6 contained the second barrel of the 18<sup>th</sup>-century privy. Sample 5 from the northern ½ of Strata 1 contained a single *Ascaris* egg. Sample 6 from the northern ½ of Stratum 2 contained no parasites. As discussed with the samples in Feature 5, Feature 6 also resulted in evidence for the greatest density of parasite eggs at the lowest depth of the privy barrel. Sample 7 from the northeast ½ of Stratum 3 did not contain *Ascaris* eggs but had a density of 1,185.75 eggs per gram of soil from *Trichuris* eggs alone (Table 3.2). Sample 8

from the northeast ½ of Stratum 4 also contained a high concentration of *Trichuris* eggs, with a small proportion of *Ascaris* eggs (Table 3.2). With a density of 1696.07 parasite eggs per gram, Sample 8 resulted in the highest total parasite density from the Parker-Emery House excavation.

Feature 2 which constituted the 19<sup>th</sup>-century privy resulted in trace amounts of *Ascaris* eggs. Sample 23 from the northern ½ of Stratum 4 (200-210 cmbd) resulted in identification of a single *Ascaris* egg, and Sample 24 from Stratum 5 (200-210 cmbd) resulted in a slightly higher density, but taxa were limited to *Ascaris*.

Table 3.2. Recovered parasite eggs from Parker-Emery House samples.

<b>Sample</b>	<b>Context- Feature/ Strata/Level</b>	<b>Date</b>	<b><i>Ascaris</i> sp.</b>	<b><i>Trichuris</i> sp.</b>	<b><i>Taenia</i> sp.</b>	<b>Density, ova/gram</b>
<b>1</b>	Feat. 5/strat. 1 E½/ 130-135 cmbd	Mid-18 <sup>th</sup> c.	0	1	0	36.94
<b>2</b>	Feat. 5/strat. 1 E½/ 140-145 cmbd	Mid-18 <sup>th</sup> c.	0	3	0	109.63
<b>3</b>	Feat. 5/strat. 2 E½	Mid-18 <sup>th</sup> c.	4	16	2	803.98
<b>4</b>	Feat. 1/strat. 1 N½	Mid-18 <sup>th</sup> c.	0	0	0	0
<b>5</b>	Feat. 6/strat. 1 N½	Mid-18 <sup>th</sup> c.	1	0	0	111.28
<b>6</b>	Feat. 6/strat. 2 N½	Mid-18 <sup>th</sup> c.	0	0	0	0
<b>7</b>	Feat. 6/strat. 3 N½	Mid-18 <sup>th</sup> c.	0	32	0	1185.75
<b>8</b>	Feat. 6/strat. 4 N½	Mid-18 <sup>th</sup> c.	3	43	0	1696.07
<b>23</b>	Feat. 2/strat. 4 N½/200-210 cmbd	19 <sup>th</sup> c.	1	0	0	34.00
<b>24</b>	Feat 2/strat. 5 N½/ 220-230 cmbd	19 <sup>th</sup> c.	2	0	0	73.82

## Parasitology

Intestinal parasites whipworm (*Trichuris trichiura*) and roundworm (*Ascaris lumbricoides*) are the two most common species of human host parasites reported in archaeological contexts (Reinhard 1994), reflected in the analyzed samples from the Town Dock and Parker-Emery House. Both these parasites are soil-transmitted helminths (parasitic worms) that infect humans through contaminated soil. Infections in humans occur in locations where sanitation and hygiene are poor, especially during the warmer seasons. Soil-transmitted helminths live in the intestine of the host, and their eggs are passed through the feces of infected hosts. Urban Boston in the 18<sup>th</sup> century provided a perfect environment for parasite infections to spread, as night soil from privies were regularly used to fertilize crops and gardens. When the feces from infected hosts are used as fertilizer, eggs are deposited in the soil and become infective in the soil as they mature. People are infected when the parasite eggs are ingested through hands contaminated with dirt, or produce that has not been washed, peeled, or cooked. People with light infections show mild discomfort and symptoms, whereas heavy infections can cause a variety of issues such as abdominal pain, diarrhea, rectal prolapse, cognitive disorders, and loss of blood, protein, and vital nutrients (CDC 2020b). Death is unlikely from these parasitic infections alone, but lasting symptoms can deteriorate health and contribute to further complications.

*Ascaris lumbricoides* is currently the most common parasitic worm worldwide, and *Ascaris suum* from pigs may also infect humans as well. Adult *Ascaris* worms infest the lumen of the small intestine and have a lifespan of up to two years (Figure 3.1). A female

worm may produce 200,000 eggs each day, which are passed in the feces. With the feces ending up in soil, the eggs can continue their lifecycle for more than 14 years (Fisher et al. 2007:187). The worms can grow to a length of up to 12 inches (30.5 cm) with a diameter of  $\frac{1}{4}$  of an inch (0.1 cm). *Ascaris* may also travel outside of the intestines to other organs, causing more complicated health problems such as perforated organs or fatality from suffocation if the worms reach the esophagus. In infants and children, infections may be more serious, causing malnourishment and stunted growth. Fertilized eggs measure 55-75  $\mu\text{m}$  by 35-50  $\mu\text{m}$  (Figure 3.2) and tend to be a yellow-brown color displaying a mamillated thick shell and in the one-cell stage when passed in feces. The infertile eggs are 85-95  $\mu\text{m}$  by 43-47  $\mu\text{m}$ , and are more elongate, with thinner shells that vary from mamillated to a smooth surface. The internal contents of the egg appear as a “mass of disorganized, highly refractive granules” (Ash and Orihel 1990:134).



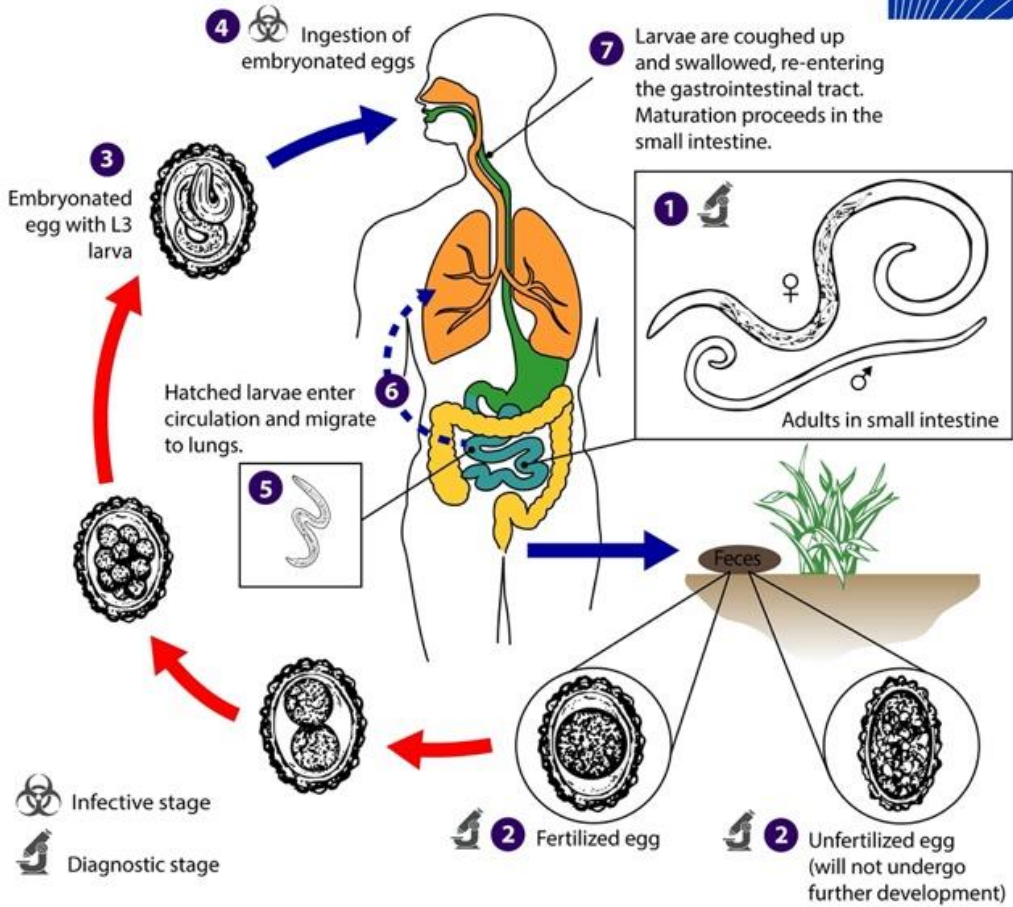


Figure 3.1. Lifecycle of *Ascaris lumbricoides*. Image courtesy of the Center for Disease Control.



Figure 3.2. *Ascaris* egg. Photograph by Susan Jacobucci, Fiske Center for Archaeological Research at the University of Massachusetts Boston.

*Trichuris trichiura* worms are much smaller than *Ascaris*, measuring 1-2 inches (2.5-5 cm) in length. Eggs hatch in the small intestine, which release larvae that mature into adults in the colon (Figure 3.3). The adult worm lifespan is around one year, and females can shed 3,000-20,000 eggs each day. In soil, eggs can remain infective for 1-2 years. Like *Ascaris*, infected hosts can suffer light or heavy infections, and symptoms may include stool containing mucus, water, and blood. Heavy infection in infants and children can also cause serious growth and cognitive health problems. *Trichuris* eggs are 50-55 µm by 22-24 µm

(Figure 3.4). Eggs are barrel shaped with thick smooth shells, and a yellow or brown color. Eggs are single celled and unembryonated when passed in feces. Distinct colorless polar “plugs” occupy each end of the egg but may be absent in archaeological samples. Internal contents of the eggs are granular in appearance if found in feces, or if embryonated can contain an infected larva after undergoing development in soil for a few weeks (Ash and Orihel 1990:138).

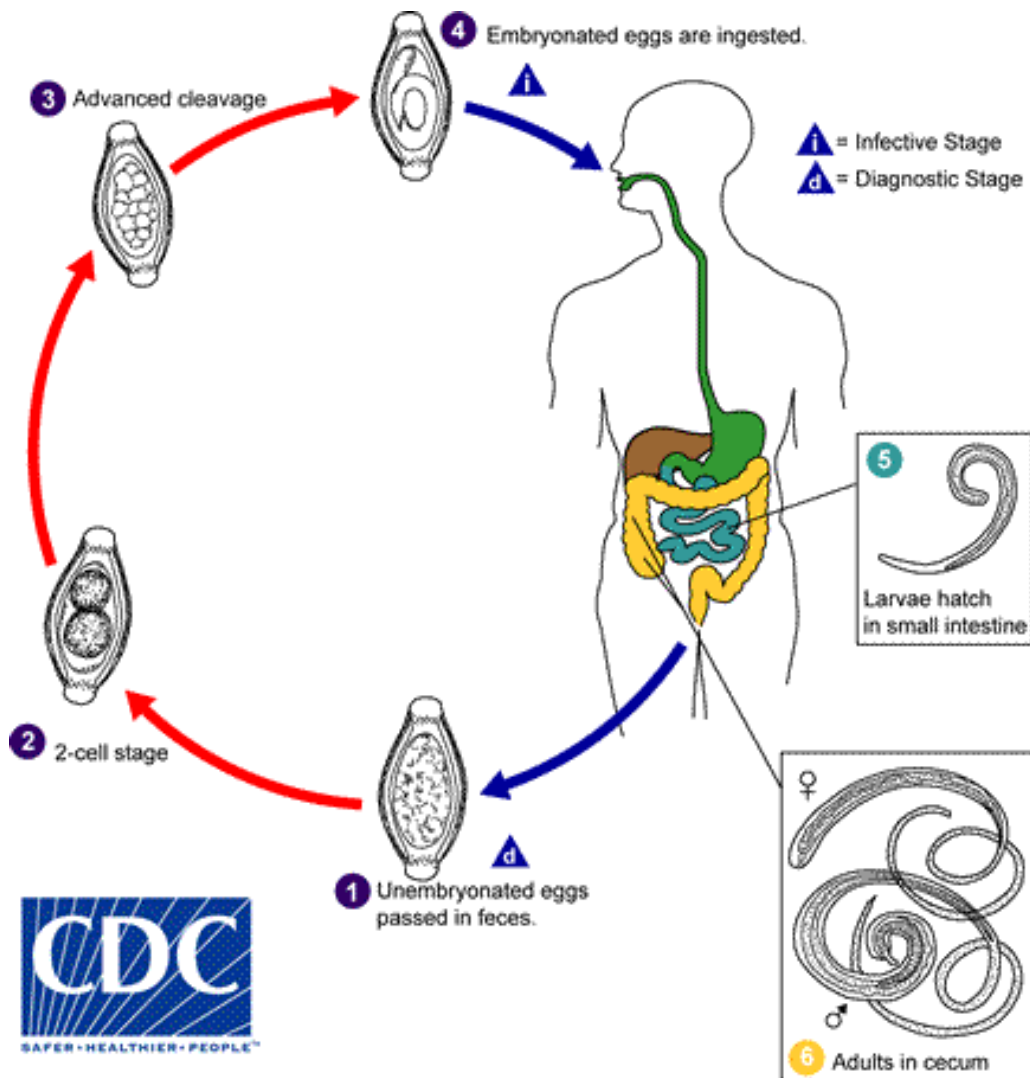


Figure 3.3. Lifecycle of *Trichuris*. Image courtesy of the Center for Disease Control.



Figure 3.4. *Trichuris* egg from the Cross Street Privy in Boston. Photograph by Susan Jacobucci, Fiske Center for Archaeological Research at the University of Massachusetts Boston.

Human tapeworms (*Taenia* sp.) are passed from cattle and pigs to human hosts through ingestion of raw or undercooked meat that has been infected. *Taenia* grow to 6.5-22.9 feet (2-7 m) in length on average, with a lifespan of up to 30 years. The worms break into up to 1000 sections known as proglottids, where each can produce 50,000-100,000 eggs (CDC 2013). Infections can cause mild symptoms, including abdominal pain, appetite loss, weight loss, and an upset stomach. The worm proglottids are visible when passed in the feces. *Taenia* eggs measure 31-43 µm and are yellow brown in color from bile stains. The

eggs are spherical, and the shell is thick and has radial striations, containing an embryo with six hooks. Diagnostic problems in archaeological samples include proper identification, as *Taenia* eggs can appear very similar in size and color to common pollen grains, so it is crucial to visualize the six-hooked embryo and radial striations. Eggs of *Taenia saginata* (beef tapeworm) and *Taenia solium* (pork tapeworm) appear identical and are indistinguishable from each other (Ash and Orihel 1990:221).

## Discussion

Critical to the interpretation of data is the density of parasite eggs. Jones (1985) created a metric using *Trichuris* eggs to determine if samples are primarily fecal or background matter. A density below 200 *Trichuris* eggs per gram is considered typical urban background, above 500 eggs per gram denotes that the sample contains a substantial amount of fecal matter, and over 20,000 eggs per gram indicates a fecal deposit. Specific to this study, the metric is useful to determine overall sanitation in the research areas. Using Jones's metric, all the sample densities from the Town Dock would be considered typical urban background. Most of the Parker-Emery privy samples would also be considered background deposit or containing a substantial amount of fecal matter. However, Jones's model was created for the types of environments specific to that analysis and may not be applicable to the nature of the sites I have analyzed. As Jones carried out his research in the United Kingdom, *Trichuris* eggs were used for density calculations because they were known to survive in the archaeological record, so counts of *Ascaris* and other taxa of parasite eggs are

not taken into the account of the density calculation. Additionally, samples taken from both sites analyzed in this research have been confirmed as primarily fecal. Compared to parasite densities reported in other New England case studies (Table 3.3), the Town Dock samples had *Trichuris* density levels similar to the 18th-century non-privy deposits in Albany (Kirk 2001). The Parker-Emery privy has a surprisingly low total density, with less than half the density levels reported at the 18<sup>th</sup>-century privy in Newport, Rhode Island owned by the elite Brown family (Mrozowski 2006). The Town Dock *Trichuris* densities were closest to what was reported at the African Meeting House (Gallagher et al. 2007), however the more dangerous *Ascaris* had a much higher density in the same context at the African Meeting House, consistent with Trigg et al.'s (2017) study observing this trend in the 19<sup>th</sup> century. This comparison is also true of the 19<sup>th</sup>-century Albany (Kirk 2001) *Trichuris* density presenting similar levels as observed in the Parker-Emery House 18<sup>th</sup>-century privy.

Table 3.3. Cross-site Comparison of Parasite Densities from New England Sites

Site	Source	Nature of sample	Date	<i>Ascaris</i> density = ova/gram	<i>Trichuris</i> density = ova/gram
Cross Street Boston, MA	Driscoll 1995	Privy	17 <sup>th</sup> c.	N/A (present)	600-10,900
Brown Newport, RI	Mrozowski 2006	Privy	18 <sup>th</sup> c.	200	5,600
Tate Newport, RI	Mrozowski 2006	Privy	18 <sup>th</sup> c.	10,300	15,500
SUCF Albany, NY	Kirk 2001	Non-privy	18 <sup>th</sup> c.	844	244
SUCF Albany, NY	Kirk 2001	Privy	19 <sup>th</sup> c.	69,731	2,912
African Meeting House Boston, MA	Gallagher, Jacobucci, Trigg 2007	Privy	19 <sup>th</sup> c.	1,364	206
<b>Parker-Emery House Boston, MA</b>	Ball 2021	Privy Sample 8	18 <sup>th</sup> c.	111	1,582
<b>Parker-Emery House Boston, MA</b>	Ball 2021	Privy Sample 24	19 <sup>th</sup> c.	74	0
<b>Town Dock Boston, MA</b>	Ball 2021	Non-privy, garbage fill Sample 16	18 <sup>th</sup> c.	73	290

Concerning samples taken from privies, Fisher et al. (2007:174) suggest that parasite eggs can appear as diffused throughout strata rather than isolating at the top or the bottom of the privy, but they also acknowledge that privies were often emptied out for cleaning by nightsoil men while they were in use, so eggs may appear concentrated at the bottom of privy features. This is true of the analyses done at the African Meeting House (Gallagher et al. 2007) and Newport privies (Mrozowski 2006). Perhaps the Parker-Emery House privy barrels were cleaned out during a period of use when people were infected with parasites,

which could explain the nature of the strata of Features 5 and 6. As a result, Samples 3, 7, and 8 taken from the bottom of the barrels of 18<sup>th</sup>-century privy at the Parker-Emery house seems to represent a greater percentage fecal content, where the nightsoil deposit remains in situ. However, once infected with parasites cleaning out the privy did not completely eliminate the presence of parasite eggs. In 18<sup>th</sup> century Boston, privies were emptied out periodically for sanitation purposes and to eliminated odor, failure to abide to public health regulations resulted in a fine (see more on page 84). Most likely, the upper layers of the privy barrels were filled after the period of use, resulting in fewer parasites in the upper strata of Features 5 and 6.

Important to note is the comparison between the Parker-Emery House 18<sup>th</sup> and 19<sup>th</sup>-century privies and their contrast of parasite taxa and densities. Parasite eggs were preserved and had twice the density in the 18<sup>th</sup>-century privy, whereas the total density was far lower in the 19<sup>th</sup>-century privy. Overall, the parasite densities from the Parker-Emery privies are quite low when compared with data from other New England privy sites (Table 3.3). Because eggs were identified in both privies which seem to both have ideal preservation, the greater presence of parasites in the 18<sup>th</sup>-century privy may be attributed to the household having higher levels of infection. Features 5 and 6 from the 18<sup>th</sup>-century privy display both a higher total parasite density, and percentage of taxa being *Trichuris* (Figure 3.5), whereas only *Ascaris* were present in the 19<sup>th</sup>-century samples. These results concerning the higher proportion of *Trichuris* and lower *Ascaris* prior to the late 18<sup>th</sup> century, and the reverse nearing the 19<sup>th</sup> century appear common among other sites during this period (Trigg et al. 2017).



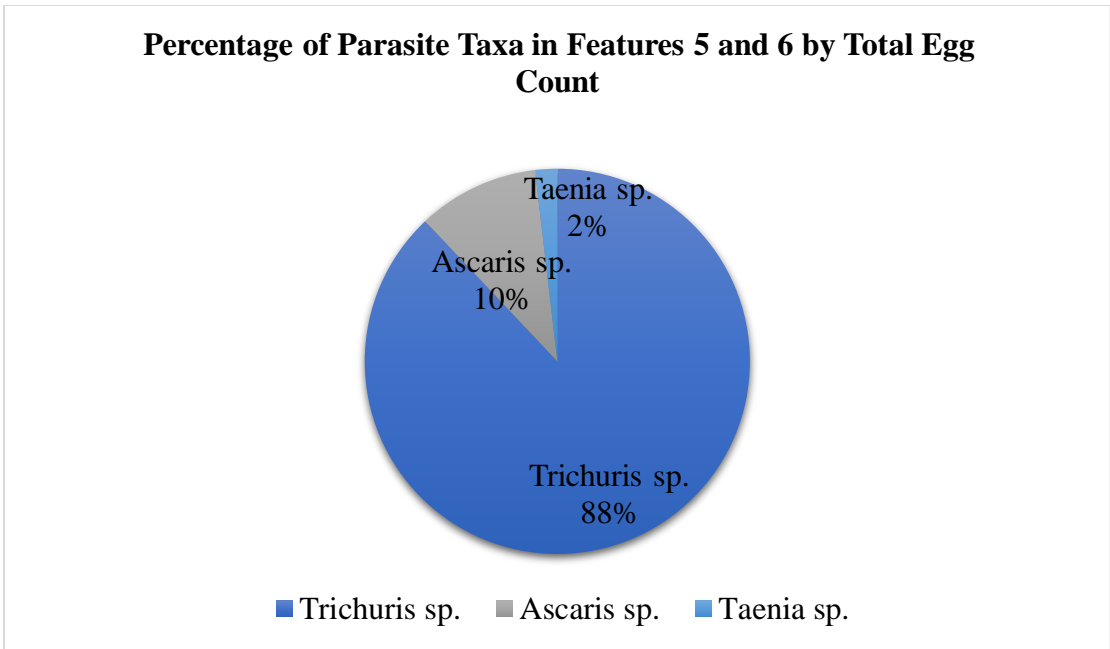


Figure 3.5. Pie chart showing the percentage of different parasites identified in samples from Features 5 and 6, the 18<sup>th</sup>-century privy at Parker-Emery House.

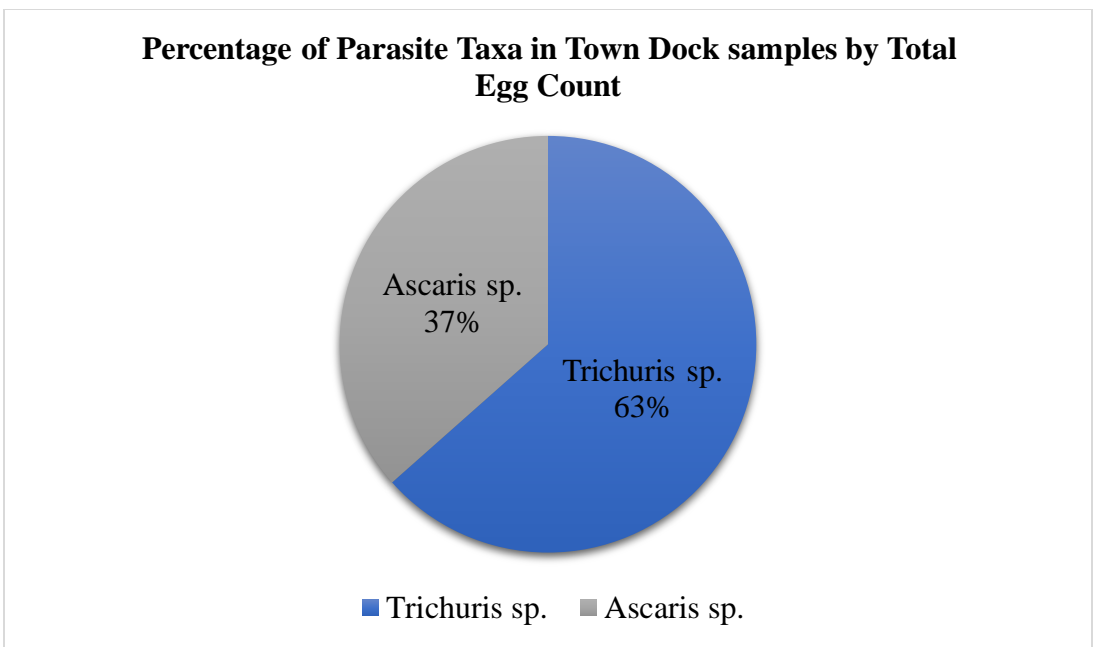


Figure 3.6. Pie chart showing the percentage of different parasites identified in samples from the Town Dock.

Consistent with the nature of historic fill deposits, the Town Dock parasite samples are reflective of fill discarded in a community setting, containing a variety of disposed materials from various households and businesses. Therefore, the Town Dock samples included a low concentration of human waste as indicated by identified parasite eggs in the archaeological record. Consistent with Trigg et al.'s (2017) observations, *Trichuris* is also the highest reported parasite taxa in the Town Dock samples (Feature 3.6). As contrast, the Parker-Emery House privies represent samples with a high content of human waste at the household level, where the greater concentration of fecal matter yields a higher parasite density. Appendix A shows a complete table of all parasite processing and analysis data from both the Town Dock and Parker-Emery House samples.

## CHAPTER IV

### MATERIAL CULTURE: MEDICINAL ARTIFACTS

“Gum Camphor”  
“Sal armoniac”  
“Vial Corks – 4 doz.”  
“Juggs”  
“2 Vials”  
“1 pott”

-Itemized bill from apothecary Aston Thomas  
to Doctor James Hawse, Boston, 1762.

What kinds of objects and tools did people use in the 18<sup>th</sup> century to make and sell medicines, care for the sick, and maintain cleanliness and overall health? Historical documentation such as this written receipt, along with advertisements and medical handbooks provide insight as to what kinds of material culture was related to medicine and health in the 18<sup>th</sup> century. To develop a sense of what might be present in the archaeological record, case studies analyzing artifacts relating to medical practices were reviewed to provide background on material culture similar to the 18<sup>th</sup>-century deposits at Town Dock and Parker-Emery House privy.

Historical documentation is useful because it provides a broader view of medical material culture, and the US Northeast region’s archaeological record is much less likely to

contain certain artifacts that were commonly used by physicians, at apothecaries, and for home medical care. Carley (1981) discusses medical artifacts at a 19<sup>th</sup>-century fort site, comparing historical inventories to what is likely to be found in archaeological contexts. For example, items that are likely to appear in archaeological contexts include ceramic and glass medical containers, cupping jars, pint pots, mortar and pestles, vial corks and glass stoppers, and syringes (Carley 1981:25). Carley argues that items such as surgical instruments that would have been rarely replaced are less expected in the archaeological record.

Larsen (1994) uses medicine bottles and glass vials from a 19<sup>th</sup>-century privy at Harpers Ferry to explain that a larger percentage of bottles that contained prescribed medicines (indicated by embossed or paper labels) would suggest a greater reliance on professional medicine. Bonasera and Raymer (2001) define the difference between ethical medicine, consisting of bottles prescribed by physicians or apothecaries, and proprietary medicine, which was typically patented and sold over the counter in embossed or labeled bottles. However, it must be noted that these 19<sup>th</sup>-century examples of medicine bottles would differ from those I expect to find in 18<sup>th</sup>-century contexts, where bottle shape and size are more likely to indicate medicinal use, rather than labels or embossing on the bottles. As discussed, these sources all examined artifact assemblages relating to medical practices. Although several cases that studied 18<sup>th</sup>-century New England privy deposits and included an interpretation of analyzed parasites, none make a connection between the medicinal artifacts and parasite data.

Any excavated artifacts from the features examined as part of my thesis research that have the potential to be related to medicine or medicinal practices were examined in this case

study. Artifacts expected to be of particular interest include glass medicinal bottles or vials, which indicating that the container once held store-bought or physician-prescribed medications, usually associated with an urban, wealthy population. Small mortars, pestles, and pots may suggest the use of medicine made at home, as well as the presence of macrobotanical or faunal remains that could have been used in medicinal recipes (further discussed in Chapter V). Personal care items that provide evidence of healthcare and hygiene were included as well, such as brushes, combs, and chamber pots. All artifacts identified and analyzed were compared with type collections in the University of Massachusetts Boston artifact laboratory, and cited artifact handbooks were consulted for further information. For the full inventory of artifacts analyzed in this case study, see Appendix B.

## **Artifacts of the Apothecary**

### *Glass Pharmaceutical Bottles*

Beginning in the late 16<sup>th</sup> century, English manufacturers started producing pharmaceutical glassware. Early glass pharmaceutical bottles from the mid-1600s display a very prominent conical base kick-up such as the vial from Feature 5 from the Parker-Emery House privy (Figure 4.1) and broad flattened lip, which becomes gradually less pronounced over the following century (Noël-Hume 1969:74). An example of a mouthblown wide flattened lip is visible in the finish of an aqua-colored bottle found at the Parker-Emery House 18<sup>th</sup>-century privy from Feature 5 (Figure 4.2). Globular and cylindrical vessel forms

also became more angular starting in the mid-17<sup>th</sup> century. Glass pharmaceutical vessels ranged in color with aqua and colorless being the most common, but also included amber, olive, pale green and blue, with deep green and blue appearing in the mid-17<sup>th</sup> century (Noël-Hume 1969:74).



Figure 4.1. Small base of mouth-blown aqua medicine bottle. From the 18<sup>th</sup>-century Parker-Emery House privy, Feature 5, W $\frac{1}{2}$ , Stratum 2, Level 17, 160-165cmbd. Photograph courtesy of Lauryn Poe, City of Boston Archaeology Lab.



Figure 4.2. Flattened lip and fragments of mouth-blown aqua medicine bottle. From the 18<sup>th</sup>-century Parker-Emery House privy, Feature 5, W $\frac{1}{2}$ , Stratum 2, Level 16, 150-155cmbd. Photograph by K. Ball.

Most commonly found on archaeological sites are small cylindrical glass vials or “phials.” Found at the Town Dock in various strata (3, 6, and 8) are examples of aqua cylindrical vials (Figure 4.3). The wide flattened lip and small base kick up suggest these vials were manufactured in the early to mid-18<sup>th</sup> century. Similarly, a small aqua-colored vial from the Parker-Emery House 18<sup>th</sup>-century privy found in Feature 6, which appears to be free-blown with a blowpipe (Figure 4.4). These small vessels were used to distribute medicines from apothecaries and doctors’ storage containers to the individual to purchase, transport, and use the medicine in their households. Because the vials were used by their distributors for all types of medicine and often reused, and they did not display an embossed

or paper label like proprietary or patent medicines, it is not possible to conclude from the vials alone what they might have contained.



Figure 4.3. Base and lip fragments of small aqua vials. From the Town Dock. From left to right: Base from Stratum 7, Level 6, SW quad. Center neck and body portion from Stratum 8, Level 5, South bulk. Right patinated lip flare from Stratum 3, Level 2, SW quad. Photograph by K. Ball.





Figure 4.4. Free blown patinated aqua medicine vial, base and body fragments. From the 18<sup>th</sup>-century Parker-Emery House privy, Feature 6, S½, Stratum 3, Level 14-17, 135-165cmbd. Photograph by K. Ball.

The glass of pharmaceutical vessels was very thin into the 17<sup>th</sup> century but starts becoming thicker over time in the 18<sup>th</sup> century as vessel shapes change, but because of this, full bottles made before the 18<sup>th</sup> and 19<sup>th</sup> centuries are rarely found in the archaeological record (Matthews 1971:58). Examples of well-preserved 19<sup>th</sup>-century medicine bottles were recovered from the Parker-Emery House 19<sup>th</sup>-century privy, Feature 2 (Figure 4.5). As a

majority of the pharmaceutical glass from both the 18<sup>th</sup>-century Parker-Emery House privy and the Town Dock is very fragmented, analysis further than recording vessel type and gauging possible pharmaceutical glass based on thickness and vessel type was not possible but is included in the medicinal artifact catalogs (Appendix B).



Figure 4.5. Collection of medicine bottles from the 19<sup>th</sup>-century privy at the Parker-Emery House. Feature 2, various strata, 85-210cmbd. Photograph by K. Ball.

*Turlington's Balsam of Life*

One of the embossed medicine bottles excavated in Stratum 5 of Town Dock is Turlington's Balsam of Life, the patent bottle version which was produced in 1754 (Figure 4.6). Patent medicine maker Robert Turlington (1697-1766) of London made a distinctive

bottle for his Balsam of Life to prevent imitations from other vendors (Figure 4.7).

According to Turlington, the violin-shaped bottles were created "to prevent the villainy of some persons who, buying up my empty bottles, have basely and wickedly put therein a vile spurious counterfeit sort" (Griffinhagen and Young 2009). The colorless glass bottles were embossed: BY THE KING'S ROYAL PATENT GRANTED TO / ROBT TURLINGTON FOR HIS INVENTED BALSAM OF LIFE / JANUY 26 1754 / LONDON. Two sizes of Turlington's Balsam of Life were available in the 18<sup>th</sup> century, the small was approximately ½ oz. or 15ml. costing 1s. 9d, and the larger 1oz. or 30ml. and costing 3s. 6d. (Jones and Vegotsky 2016:20). The bottles were blown in a two-piece mold with a third base part (Jones and Vegotsky 2016:18). To further prevent imitation, Turlington's bottles were wrapped in a paper Bill of Directions and sealed with a wax stamp containing his coat of arms.

Turlington's medicine was first patented in 1743/44 in London, and later 1748 in the North American colonies (Jones and Vegotsky 2016:3). The liquid medicine started off containing 27 ingredients in an alcohol base, but the number of ingredients shortened over time. During the 18<sup>th</sup> century, many patent medicines sold by people like Turlington who were not in the medical profession were considered to be quackery by the public.

Turlington's advertisements boasted a wide range of ailments treated by the Balsam of Life, each ingredient considered appropriate for treatment by the general cures being used in medical practice. Ailments the medicine claimed to cure included stones and gravel, colic, tuberculosis, worms, jaundice, nausea, gastrointestinal problems, respiratory diseases, rheumatism, gout, cuts and sores, heart disease, fever, and paralysis (Jones and Vegotsky 2016:44). Medicinal ingredients included Gum Arabic, St. John's Wort, Myrrh, Gum

Benzoin, Balsam Peruv., Aloes Socot, Angelica, and Cort. Cinnam. (Jones and Vegotsky 2016:38). Specifically, regarding the treatment of intestinal parasites, ingredients in Turlington's Balsam of Life that were consistent with medical recipes found in historical documentation (Culpeper 1653) are St. John's Wort as a de-wormer, and aloe as a purgative. Additionally, ingredients such as Gum Arabic, Myrrh, Gum Benzoin, Balsam Peruv., Angelica root, and Cinnamon were stated to aid in stomach ailments and purging, as expelling contents of the digestive tract was encouraged for the treatment of worms. Chapter V, "historical documentation" contains a more in-depth discussion of medicinal recipes and ingredients.



Figure 4.6. Clear Turlington's Balsam of Life patent medicine bottle, hinge mold, embossed. From the Town Dock, Stratum 5, Level 2, NE quad. Photograph by K. Ball.

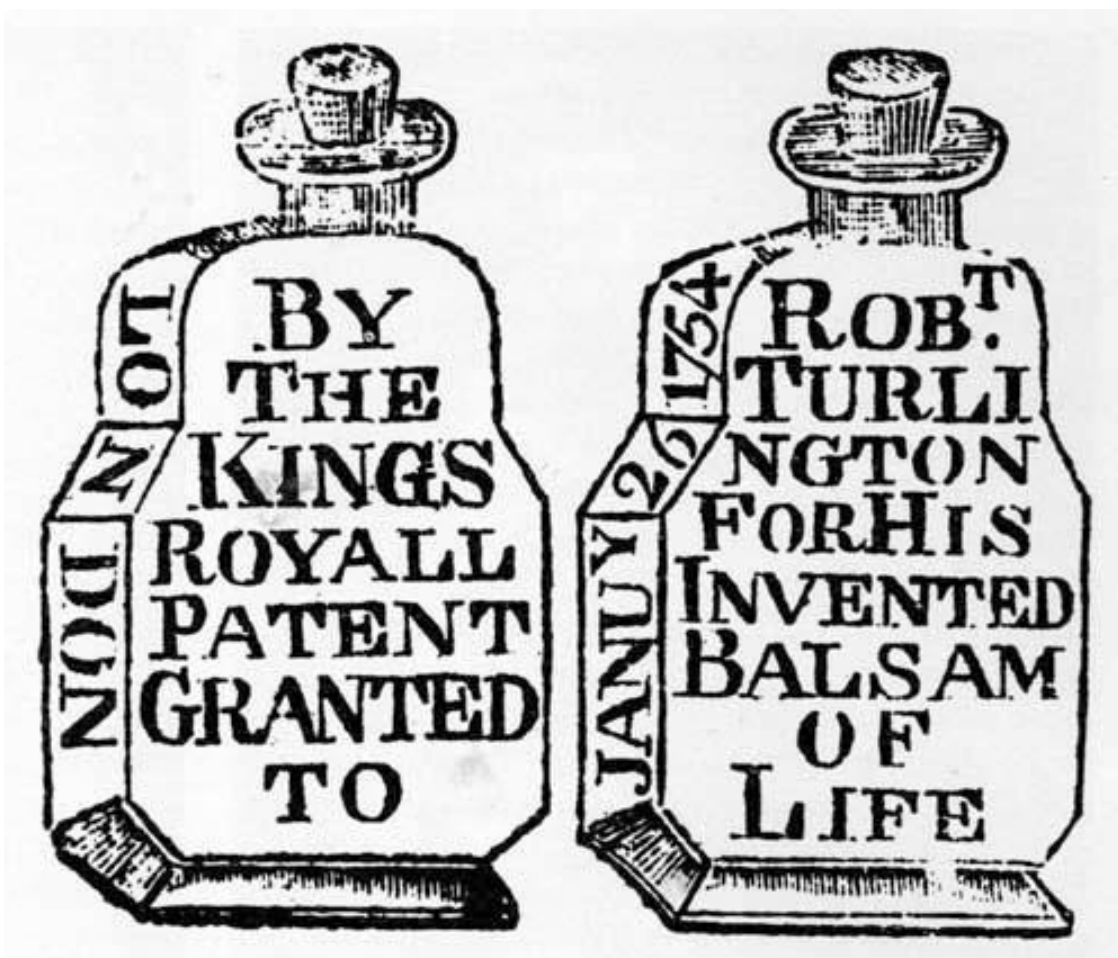


Figure 4.7. Turlington’s Balsam of Life bottle illustration from a 1750s brochure. Image courtesy of The Project Gutenberg eBook of Old English Patent Medicines in America, by George B. Griffenhagen and James Harvey Young.

#### *Ointment Pots*

Small colorful tin-glazed pots and jars became popular for use in apothecaries during the 15<sup>th</sup> century. Termed “gallipots” in England, these vessels were originally thought to be introduced by Mediterranean galleys made from tin-enameled maiolicas in Italy and Spain

(Noël-Hume 1969:203). Purpose and sizes of the vessels ranged from medium storage or dispensary jars that would be used in the apothecary, and smaller pots that ointments and elixirs were sold in. Ointment pots were decorated in white or light-colored glazes and polychrome paint that was typically blue, orange, purple, and sometimes green (Noël-Hume 1969:203). Although more elaborately designed in earlier centuries, most commonly found designs after the mid-17<sup>th</sup> century featured Delftware blue bands encircling the pot near the base and rim, and sometimes the blank section in between featured a label or apothecary name. According to Noël-Hume's (1969) Delftware pharmaceutical vessel-shape chronology, ointment pots became smaller, thicker, and shallower over time. The ointment pots featured a pinched-in base and slightly concaved rim, starting with a cylindrical shape and later becoming more cup-shaped in the 18<sup>th</sup> and 19<sup>th</sup> centuries. The three vessel fragments (Figure 4.8) excavated from the Town Dock timber strata display characteristics aligning with Noël-Hume's typology for ointment pots and apothecary wares.

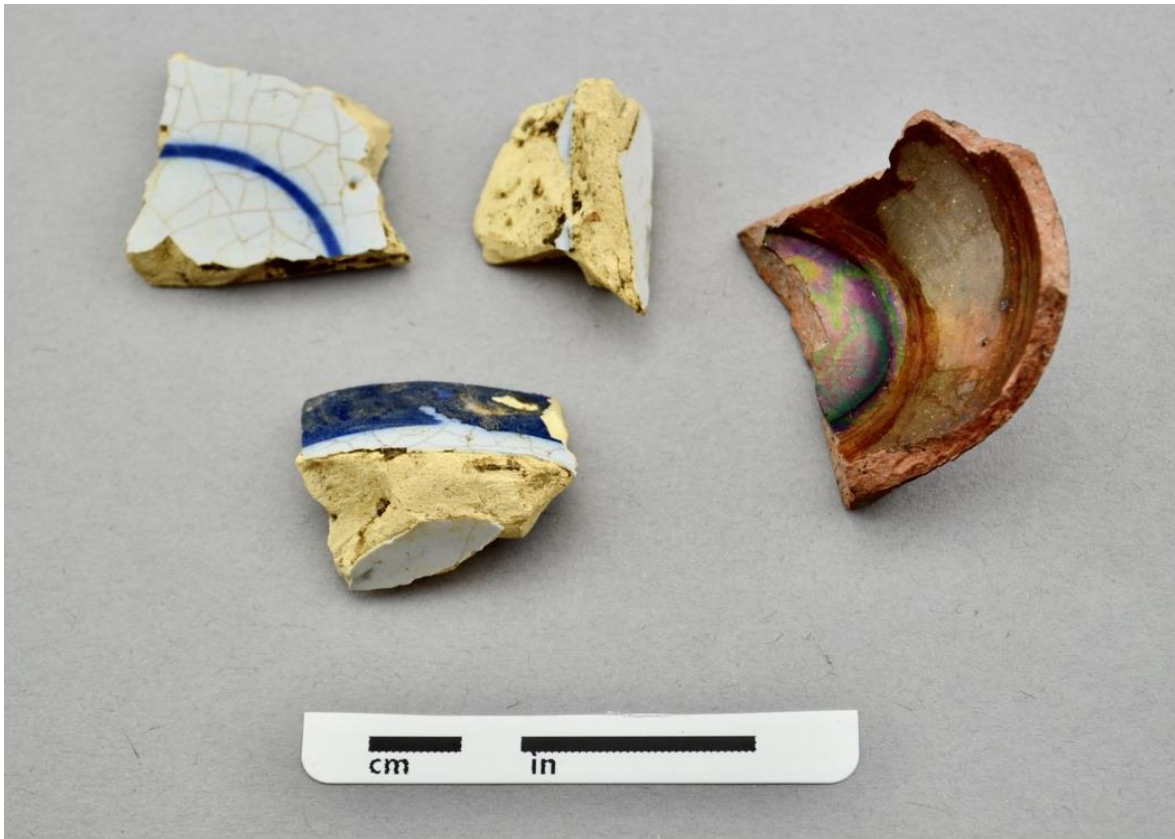


Figure 4.8. Possible ointment pots from the Town Dock. Tin-glazed hand-painted Persian blue from Stratum 7, Level 8, SE quad. Lead-glazed redware from timber 1, 2, and back dirt. Photograph by K. Ball.

### *Scales and Weights*

Clerks at markets and apothecaries used standard weights to measure ingredients for recipes and sales. In the 17<sup>th</sup> century, lead and iron weights were common. In the 18<sup>th</sup> century, bronze and brass weights also became common, and weights were often standardized by local authority and marked with an impress or stamp to indicate the weight to minimize fraud (Matthews 1971:31). The lead weight excavated at the Town Dock from

Stratum 13 has no markings or indications of weight and appears to be worn down (Figure 4.9). Measured with a modern scale, the lead artifact weighs 1.29oz. Using preimperial-based British apothecary weights which was the system used in 18<sup>th</sup>-century Boston, the lead weighs 1.29oz. (ʒ), equivalent to 10.32 drams (ʒ), 28.2 scruple (ʒ), or 564.375 grains (gr). For further discussion of the apothecary weight system and conversions see Chapter V (Figure 5.1). However, it is not clear that this lead artifact was used for measurement by a local business.

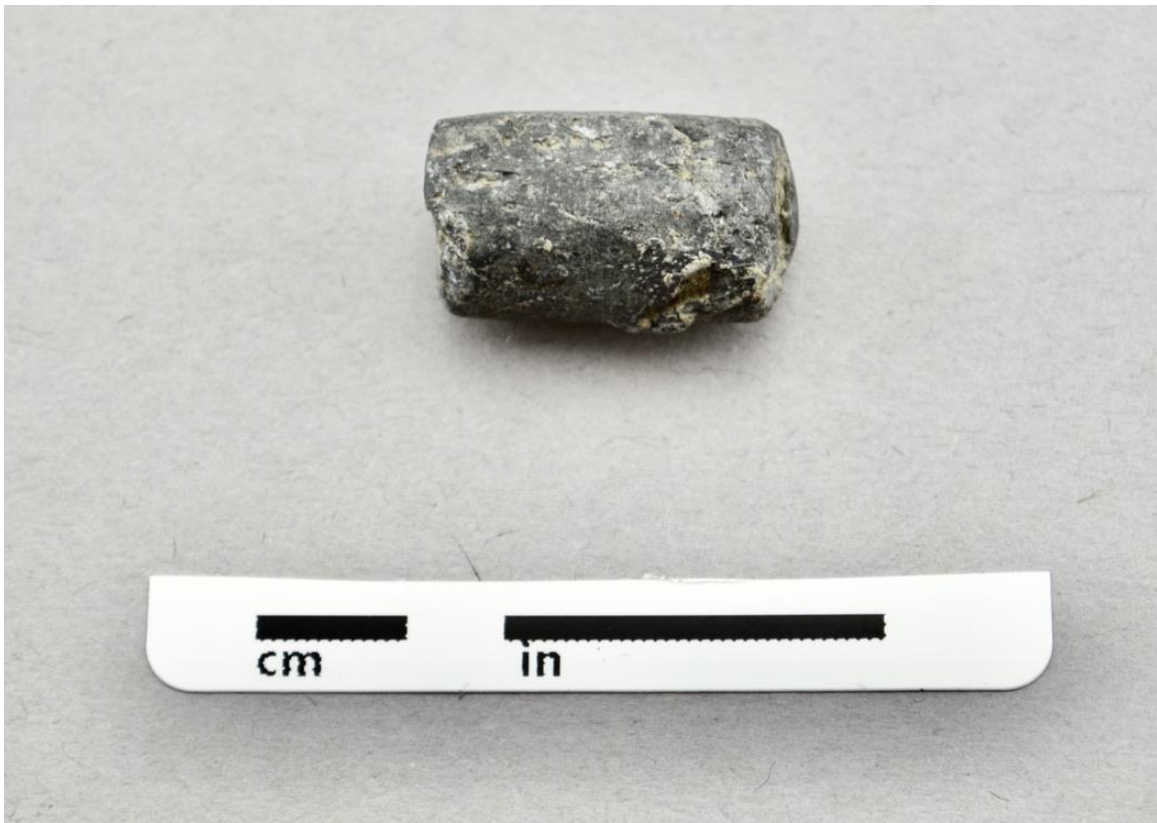


Figure 4.9. Cylindrical lead weight. From the Town Dock, Stratum 13, Level 10, SW quad. Photograph by K. Ball.



## Artifacts of Personal Hygiene

### *Chamber Pots*

On the Charleston waterfront near the Town Dock, Parker-Harris pottery produced the popular lead-glazed redware known as “Charleston Ware” (MHC 2014). Isaac Parker purchased the land in 1714 and built pottery making facilities with his wife Grace, his family business quickly became wealthy and successful producers of Charleston Ware until the Battle of Bunker Hill in 1775. Around the 1740s the public preference for utilitarian ceramics started to shift from redware to including stoneware, which Parker also accommodated at his pottery. Ceramic vessel types manufactured at the Parker-Harris pottery include utilitarian wares such as plates, pots, tankards, jars, milk pans, and chamber pots. Charleston Ware artifacts were often decorated with different color clay slip across the vessel before glazing, with designs of dots, lines, flower, writing, or curves. Vessels decorated as such were known as “metropolitan ware”, which imitated British design (MHC 2014).

Because the Parker-Harris Charleston Ware is so distinct with its decorative designs, these vessels can be identified down to the manufacturer, which is not common among identifying redware artifacts at archaeological sites. A Charleston Ware chamber pot excavated at the Parker-Emery House privy (Figure 4.10) displays a design with brushed slip dashes as seen on the rim. Chamber pots in the 18<sup>th</sup> century were commonly a coarse lead-glazed earthenware such as redware, and appearance ranged from a plain glaze, to being decorated as displayed by the Charleston Ware. The vessels themselves are large squat pots

used as indoor toilets, with a handle and a wide rim that was angled upward or appeared as a rolled or folded lip in the later 18<sup>th</sup> century (Noël-Hume 1969:146). The Charleston Ware chamber pot from the Parker-Emery House would have been used inside the household for times of convenience and later the waste was emptied into the privy, then the vessel itself would eventually be disposed of in the privy at the end of its use. It is important to note that Isaac Parker of Parker-Harris pottery has no genealogical relation to the Parker family of the Parker-Emery House (Bagley 2019).



Figure 4.10. Charleston Ware chamber pot, incised bands on rim fragments. From the 18<sup>th</sup>-century Parker-Emery House privy, Feature 6, S½ Stratum 3, Level 14-17, 135-165cmbd. Photograph by K. Ball.

### *Toothbrushes, Hairbrushes, and Combs*

Other personal hygiene artifacts found at both the Town Dock and the Parker-Emery House privy included toothbrushes, hairbrushes, and combs. A commonly found artifact in archaeological waste deposits, dressing combs were a personal hygiene tool used by most for basic grooming of the hair, as well as fine-tooth combs for removing common vermin such as lice. Combs were often made with materials such as bone, ivory, and horn (White 2005:104). The fine-tooth lice comb from the Parker-Emery House excavation Feature 1 of the 19<sup>th</sup>-century privy context is made from bone (Figure 4.11). As a result of the good preservation in stratum 10 of the Town Dock, a hairbrush head made from hardwood was preserved (Figure 4.11), with four drilled holes that contain fibrous material. The green toothbrush handle made from carved bone also came from the Town Dock, Stratum 5, and features a cross hatching design with lines and an “X” carved down the length of the handle (Figure 4.11).



Figure 4.11. Handle fragment of green worked bone toothbrush from Town Dock, Stratum 5, Level 2, NE quad (Left); hardwood hairbrush head fragment with 4 drilled holes containing fibrous material (Right). From Town Dock, Stratum 10, Level 5, SW quad. Photograph by K. Ball.

In addition to my methodology based on the observations by Carley (1981) regarding the types of 18<sup>th</sup>-century medical material culture that can be expected in the archaeological record, it is also significant to discuss artifacts in local historical documentation that are absent from the contexts examined. The nature of both the Town Dock and Parker-Emery House privy deposits are comprised of artifacts that were likely meant to be discarded once they were used or broken. Both sites, a fill site used to dispose of garbage, and a household

privy contained evidence of occupants using medicine and artifacts to promote hygiene and sanitation measures in 18<sup>th</sup>-century urban Boston.

Although a majority of the medicine bottles and vials recovered do not provide evidence of what they once contained, they align with what material culture was expected from 18<sup>th</sup>-century sites, with un-embossed and label-less bottles. The Turlington's bottle along with glass medicine vials suggests that popular early proprietary medicines were available in the port city of Boston at the Town Dock, sold at local apothecaries such as Boylston's Town Square shop (Mager 1975). The Charleston Ware chamber pot also demonstrates that the Parker family purchased and used locally available wares. Examining the archaeological contexts of the 18<sup>th</sup>-century Parker-Emery House privy, indicates a correlation between lower strata and greater quantity of artifacts. Similarly, discussed in reference to the parasite samples, there was a correlation between depth in the privy and higher density of parasite eggs per gram of soil. I interpret this to be further evidence that the privy was likely cleaned out, leaving the lowest levels excavated to contain greater density of parasite eggs and artifacts. The higher density deposits in the lowest levels of the privies indicate that during daily use the privies contained a greater amount of material that was subsequently removed. Therefore, I argue that the lower privy levels with higher densities of artifacts and parasites are more representative of what the Parker family privies were like during their periods of use. Along with artifacts, parasite data is further interpreted in the next chapter with evidence of historical medicine recipes and ingredients, coupled with macrobotanical and pollen remains from Town Dock (Jacobucci and Trigg 2011).

## CHAPTER V

### TO “KILLETH WORMS”

Written sources such as medical publications, letters and journals, pharmacopoeias, apothecary formularies, and advertisements provide key information to aid in the interpretation of recovered archaeological artifacts and parasite samples. The documentary sources analyzed for this case study were either written by people considered to be medical professionals in Boston and the Northeast region or are sources known to be used by these professionals. Local advertisements, personal correspondence letters, and receipts also provide evidence on medicinal practices and treatment methods. Because of the abundance of medical related historical documentation in 18<sup>th</sup>-century Boston, the treatment of parasitic worms remains the main focus, refined to fit the relevance of the archaeological evidence from this case study.

Paleography methods outlined in guides and tutorials from the National Archives (UK National Archives 2021) and a guide to apothecary measures from the University of Michigan aided the transcriptions in this chapter (Figure 5.1). Seen in many recipes and receipts from 18<sup>th</sup>-century medical documents are measurements written in apothecary symbols. A subset of the Ancient Roman weight system, the apothecaries' system measures units in mass and volume, was used in the United Kingdom and its North American colonies

until the 20<sup>th</sup> century. As seen with corresponding symbols in Figure 5.1., the system divides a pound into 12 ounces, an ounce into 8 drachms, a drachm into 3 scruples, and a scruple into 20 grains. Various alternatives of writing the symbol are taken into account, as handwriting was not standardized across Europe and the American colonies.

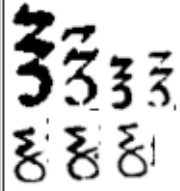
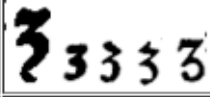
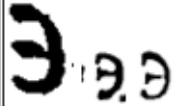

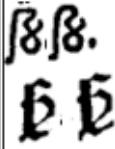

Symbol	Example	Meaning
℥		ounce (apothecaries' unit of measure)
ʒ		dram or drachm (apothecaries' unit of measure)
℥		scruple (apothecaries' unit of measure)
℔	℔	Pounds (weight or money)
℞	℞ ℞	"Recipe" ('take ...') in recipes and prescriptions
℥		"Semis" ('half') with units of measure
		"Semis" ('half') with units of measure--variant forms
[various alterations of q]		quart, quarterne, or quarter (as unit of measure)

Figure 5.1. *Apothecaries' symbols commonly found in medical recipes.* Image courtesy of University of Michigan.

## Formularies, Letters, and Receipts from New England, in Alphabetical Order

Elijah Dix (1747-1809) recorded medicinal formulas while studying under Dr. William Greenleaf of Boston (Harvard Countway Medicine Library Digital Collections). Dix started independently practicing medicine in 1770, and later opened an apothecary shop in Boston. Dix's recipe for a vermifuge from his 1768 formulary appears below.

R for Pulvis Vermifuge –

Take worm seed ½ ounce Rhubarb: 1 dram rub them together in a mortar then add [illegible] 2 drams

Steep in Westindia Rhum half a pint –

This recipe is consistent with common ingredients used to treat worms in the 17<sup>th</sup> and 18<sup>th</sup> centuries. Vermifuges, or vermicides work as an anthelmintic, expelling intestinal parasites from the body without harming the host. A pulvis is a powdered substance, where ingredients are pulverized with a mortar and pestle (Dunglison 1842). Wormseed (*Dysphania ambrosioides* var. *anthelminticum*) commonly grew in the eastern United States during the colonial period, a weedy, stocky plant with tiny black seeds. Wormseed does not kill worms, but rather paralyzes and purges them from the host (Narva 1995:87). It is unknown if Europeans learned about American wormseed from Native Americans, but the local species is similar to those found in England.

Because North America did not have all of the same plants that Europeans were accustomed to using, by the mid 17<sup>th</sup> century it was common knowledge to prepare a treatment from plants where the disease originated (Narva 1995:81). New approaches were much simpler, and treatments focused around one main plant or ingredient that was often



locally available or easily obtained through overseas trade from an apothecary. The use of wormseed to treat parasitic infections is common in New England by the early 18<sup>th</sup> century. Boston minister and physician Cotton Mather was the first to describe the use of wormseed in 1722 (Sumner 2004:250) suggesting that that this “most surprising worm-killer” was used by all social classes, and stating that it was a “poor, mean, homely medicine” (Narva 1995:84). Sumner claims that the widespread availability to all social classes allowed wormseed to become “especially popular with southern plantation owners who dosed their families and their slaves seasonally to cure them of roundworms and tapeworms, which may have been more of a health issue in the southern colonies” (Sumner 2004:251). The seeds were dried and crushed then used as an ingredient in pills and syrups which could be made at home, or from a pharmacy or apothecary as demonstrated in Dix’s recipe. Later in the 19<sup>th</sup> century, more was understood about the chemical properties of wormseed, in which the active ingredient is ascaridole, found in the oil of the seeds (Narva 1995:87). Starting in 1801, more pharmacists started isolating the oil and commercially selling wormseed oil. The line between an effective and toxic dose was rather thin, especially when treating children (Sumner 2004:251). Also seen used in Dix’s recipe is rhubarb, which is commonly added to medicinal recipes during the colonial period, known for its diuretic, purgative, and laxative effects (Culpeper 1653:291). West India rum was a type of strong liquor made with cane sugar from Barbados and was produced in Boston as early as the 1680s (Morse-Earle 2019:103). The addition of alcohol would increase the shelf life of the medicine and is seen used throughout many colonial recipes when steeping or boiling plants and herbs.

In a letter to Dr. Ebenezer Hartshorn, Abraham Haskell recommends treatments to remedy a more stubborn case of worms.

Sir,

I received yours of the 10<sup>th</sup> instant, respecting Mrs Tarbell's case, which you suppose to be *Ascarides*; - in which, it seems, you have employed a Number of the most celebrated vermifuges without any lasting advantage.

As the *Ascarides* infest the rectum ^ [& grose intestines] chiefly, I have found Aloetics of singular use; especially when assisted by bitter, antiseptic Clysters with Oil; such as gentian, Chamomile, & with sallad oil. - In general, as a vermifuge course, the [pul. illegible] in large doses, repeated night and Morning & continued for a considerable time, with a brisk Cathartic of jalap & Calomel interposed every third or fourth morning, together with a plentiful use of a tea of the Carolina pink; are what, in my opinion, may safely be relyed on, & generally prove efficacious. Peruvian Bark or chalybeates I employ occasionally to keep up the tone of the system.

Whether anything here suggested as a remedy for Worms, is applicable to Mrs Torbell's case, I submit to your better judgement & thorough knowledge of the symptoms & circumstances attending it; and am, for, with sentiments of amity, your very obedient & humble serv<sup>t</sup>.  
19 Sept. 1786.

Abraham Haskell

Doct<sup>r</sup>. Eben. Hartshorn.

Seen in this letter is a variety of suggestions to treat a severe case of worms where treatment goes beyond the "most celebrated vermifuges," indicating that these methods may have been less commonly used. *Ascarides*, an infection of the small intestine caused by *Ascaris lumbricoides*, is thought to be the diagnosis in this case. Haskell starts by recommending "Aloetics," plural for a medicine containing mainly aloes. *Aloe vera* came from the West Indies and was used as a vermifuge in the colonial period (Sumner 2004:247). Plants like *Aloe vera* often cost more because they had to be imported, but were common and well

known in apothecary shops, especially in port towns like Boston. With a variety of medical uses, aloe was likely used as a laxative in a recipe treating worms. The second method suggested was using a clyster on the patient, which is a historic term for an enema or suppository. “Clysters with oil” were to be administered using a mixture of *Gentian*, which is a common medicinal herb with bright blue flowers used to aid digestion, with chamomile as an anti-inflammatory.

Cathartics, a purgative, were also a common treatment for parasites in the 18<sup>th</sup> century (Sumner 2004:249). Used in Haskell’s recipe, Jalap (*Ipomoea purga*) from the morning glory family would have been imported from Mexico. The tuberous roots of Jalap were used as a strong cathartic drug. Also suggested as a cathartic is calomel, a white powder of mercurous chloride  $Hg_2Cl_2$  widely used as a purgative by early colonial physicians (Sumner 2004:251). Calomel became popular from Dr. Benjamin Rush, doctors often used as a cure-all to cleanse the body, an increasingly abused drug in the 18<sup>th</sup> century. With the jalap and calomel cathartic, Haskell recommends using with a tea of Carolina pink (*Spigelia marilandica*), a wildflower native to North America. The root of Carolina pink, also called pinkroot, is known to be an anthelmintic used in Native American medicine to destroy worms. Also suggested by Haskell “to keep up the tone of the system” is the use of Peruvian Bark and chalybeates. Peruvian bark (*Cinchona succirubra*) was imported from South America and India and introduced into European herbals and pharmacopoeias in the 17<sup>th</sup> century, containing alkaloids and quinine. Chalybeate is an obsolete medical term for water from a natural mineral spring that contain iron salts, or a therapeutic agent that contains iron. Although Haskell’s letter contains more unusual and some rare curing methods for worms, it

shows the extent of severity parasitic infections could have, to the point where physicians networked to share suggestions of various treatments to attempt clearing up an extreme case of a common complaint and ailment among urban colonists.

Francis Kittredge, a Massachusetts physician, recorded multiple treatments for worms in his receipt book from 1780.

To Kill Worms –

Take wormwood seed an ounce; elleacam-  
pain an ounce; flower of brimstone an ounce;  
Mix them all together with  
Melases [sp., molasses] give them thru  
Morning [illegible] thru nine  
In the hole: give them some rubarb

To Kill Worms

Wormwood water it consumeth  
And breaketh wind mightily  
It hinderith vomiting very  
Good against the pain of  
the head & cold & good cordial

In the first recipe, Kittredge uses wormwood (*Artemisia absinthium*) which is a different plant than wormseed, also used as a vermifuge. Wormwood is an herb with a distinct smell, native to Europe and introduced to North America by the colonists. Wormwood contains thujone which is the primary active ingredient that can be toxic in excess, along with the bitter compound absinthin and related molecules (Sumner 2004:237). Absinthin is the bitter chemical agent used to flavor the green spirit absinthe, which was banned in 1912 due to adverse effects being considered a potential poison and hallucinogen. Santonin, also an anti-helminthic compound, is found in dried flower buds of wormwood, the active principle in “santonine,” wormwood-infused candies and lozenges that were sold as a vermifuge in the

19<sup>th</sup> century (Sumner 2004:237). Also used in the first recipe, elecampane is a sweet and fragrant herb where the root is used in medicines for conditions concerning the respiratory system and intestinal worms. There is no scientific evidence that support the chemical compounds of elecampane being effective in curing these ailments, but the plant does have anti-microbial properties. Flowers of brimstone (also known as flowers of sulfur) turned into a yellow powder was used as an insecticide in the garden and historically as a vermifuge that was popular among pharmacists and apothecaries. As seen in Dix's recipe for a vermifuge, rhubarb is used as a laxative.

John Perkins, a physician practicing in Boston, wrote *Observations Medical and Chirurgical* from the years of 1724-1774. Although treatments are not suggested, his writings provide insight to observations of patients and their symptoms that occurred with infections of parasitic worms.

#### Worms

M<sup>r</sup> Lord ^at head of the H.L. Daughter about 7 years old had a great number of the Lati

Symptomes were often & distressing pain at Stomac; sometimes pains in the Limbs; The colour of her face was horrid. She was well fleshed: and rest with very lax nerves.

One Woodin's young son at Wills Hill 1727.  
Eat garlic freely & voided a great number of worms & remains well.

1746 Mrs. [Hawke] some disorders in the bowels & morning diarrhoea, sometimes, after y worms came away. Had a small chain of Lymbrice Lati came away aug. 20<sup>th</sup>.

Diarrhoea vid [XXX] 157.

... Hazlshorn of Charlston loyuer was some years affected with ^one two or three stools in a day which were very large & often follow'd with swooning they were sharp and petting to the rectum

and his urine often sharp. Nothing helped him till he drank water for it which finding he lect by he did in larg quantity, when he found himself most ailing and upon the approach of his diarrhoea which by the way was not constant and he knew it threatening by wind, rumbling in his stomach, a [illegible] of water wd ward it off, by thus he got rid of it.

This account refers to the worms observed as “lati” meaning wide, and “Lymbrice” (probably lumbrice) a vocative term in Latin meaning worm. Edward Tyson (1683:113) writes of Lumbricus Latus or the “Joynted worm” in the 17<sup>th</sup>-century, read before the Royal Society. Tyson referred to an earthworm, whereas the intestinal parasites observed by Perkins were likely tapeworms, due to them being the largest common parasitic worm, very noticeable in the stool.

Dr. Charles Pynchon’s Commonplace book includes descriptions of symptoms and cures of parasitic infections in children. Pynchon was a Massachusetts physician between the 1730s and 1780s, the transcribed portion below was written in 1741.

Many children have been cured of the disease, w<sup>ch</sup> many times puts the physicians to y<sup>r</sup> [illegible] in w<sup>th</sup> the infants pine away with ghostly countenances, skin clinging to y<sup>r</sup> bones, y<sup>r</sup> natural moisture being consumed so that they pine to death. This disease hath been cured by giving y<sup>r</sup> 3 times a scruple of castoreum Tempered w<sup>th</sup> milk, they voided by stool a thick worm like those we see in rotten cheese after which they began to fatten again. For Castoreum purges fatty flegm, and by its strong smell potently killeth worms,

this lacutus [illegible] expend.  
extracted from Doct<sup>r</sup> Mather, writing  
by Doct<sup>r</sup> Bliss.

Pynchon's descriptions from this journal entry demonstrate how life-threatening parasitic infections could be for infants and children, easily causing symptoms such as dehydration, malnutrition, and a poor immune system. Minister and physician Cotton Mather is mentioned, who first wrote about curing parasitic infections with wormseed as discussed previously. Pynchon notes that the worms passed in stool were thick, "like those we see in rotten cheese," indicating contamination of foods and poor level of sanitation that likely existed in urban Boston. As a treatment, Pynchon writes of purging with castoreum. A yellow syrupy secretion found in the preputial sacs of beavers, castoreum was used in early medicine, and also as a sweet vanilla-like food flavoring until the early 20<sup>th</sup> century. There is no scientific evidence to support the effectiveness of castoreum, and the sweet smell likely did not kill worms.

Benjamin Rush (1746–1813) served as a physician and trained medical students in Philadelphia. Rush is perhaps best known as a signer of the Declaration of Independence (Sumner 2004:251). The writings below are student notes (no name) from Rush's medical lectures on worms.

Worms –  
They are found in every part of the  
Body 1. Liver. 2. Bladder 3. Throat. 4  
They have been detected in the frontal  
Sinuses. 5 brain. 6. Alimentary canal which  
Is their most usual situation. The kind  
of worms are Lumbricates or round worm  
2. Ascarides. 3. Tenia or tape worms. This  
Last prosper many parts. How are worms

formed? Of the milk of the child's mother. I think it is as natural to conclude they are produced in features from the liquor in which they float as in children from the mother's milk. I say worms necessarily exist in the body. I mean the round worm. The diseases produced by them are chiefly confined to the alimentary canal. They are the effects and not the cause of fever. Mistaking effects for a cause has produced many idolators in medicine

“just like the Indian whom untutored mind  
“sees gods in clouds or hears him in the wind”

My opinion have derived great support by their being adopted by the late Dr. M<sup>r</sup> Hunter. Dr. Saunders & many other Physicians in Europe & in this country. They are sometimes the cause of chronic diseases. They produce many anomalous symptoms. Worms & catamenia should never be lost sight of. The first in children - the last in women - Anomalous substances taken into the alimentary canal, lungs, nose & skin are not unfrequently causes of disease as copper lead, [illegible]; stones from the matter getting into the lungs produce disease & often death. They are the out posts of the system & prevent many enemies inhaling it... Buttons needles & pins swallowed produce as ease – the 2 last for many years after they are swallowed will work into the muscles in different parts of the body.

The information from Rush's lecture appears to contain mostly opinion statements without factual evidence, not particularly helpful for training physicians to treat patients with parasitic infections. This set of notes is an interesting example of how a physician in the 18<sup>th</sup> century thought infections of worms were contracted, formed “in the milk of the child's



mother.” Rush was also known for holding the claim that there was no hope in *Materia medica* from Native Americans (Narva 1995:82). However, Rush did agree that diseases contracted by worms could become chronic. Most significant to note is the types of worms listed are consistent with the three most common taxa of intestinal parasites that colonists were likely to contract, and those that were discussed and found in the archaeological record.

Physician Lyman Spaulding of New Hampshire kept medical notes dated 1798-1821, also listing varieties of worms.

Worms, varies

1 ascarides

2 teres

3 taenia

Cause of worms in other things

Thomas 872. par 2.

Symptoms par 4.

Cure, variants, [illegible], tin,

Chemical, liniments, pink

bark, iron, bitters, etc

The types of worms listed in Spaulding’s notes are also the three most common intestinal parasitic worms, as in the notes from Rush’s lecture. The term “teres” is used in historic writings, and was used interchangeably with long roundworm, whereas *Ascaris* is seen as the short roundworm. Ingredients for treatments listed by Spaulding are very broad yet can include ingredients used in the recipes from other physicians seen throughout this chapter.

Massachusetts physician Cotton Tufts’ receipt book contains medicines he prescribed to patients from 1773-1784. Tufts studied at Harvard College and received an honorary M.D.

from Harvard in 1785, he was also a founding member and fourth president of the Massachusetts Medical Society.

Syrp. Vermifuge

RX wormseed one ounce Rum & simmer  
Together untill one half of w Rum is  
wasted strain & add jalap, aloe one ounce  
molasses & boil into a syrup  
a spoonfull may be given ^to a child  
of two years old

Balls Vermifuge powder

Jalap scammony & calomel equal parts  
Double refined loaf sugar the weight of the  
Whole\_ all to be deduced to a very fine powder  
[illegible] 10 to 20 grains for a dose to a child  
60 [grn] to an adult

The first recipe for a vermifuge syrup contains ingredients seen in Dix and Haskell's medicines above, using anthelmintic wormseed and jalap as a purgative, and aloe as a laxative. As in Kittredge's vermifuge, molasses is added to boil the recipe to a syrup consistency, and likely to make the medicine more appealing to the young toddler Tufts wrote the recipe for. The second recipe for Ball's vermifuge powder uses jalap and calomel, both cathartics seen paired together in Haskell's recipe. The jalap and calomel are accompanied by scammony (*Convolvulus scammonia*), an anthelmintic plant in the morning glory family. When the roots of scammony are dried, it may be used as a strong purgative. Unlike the syrup vermifuge, the powder vermifuge recipe includes dosages for both adults and children.

Benjamin Wadsworth (1670-1737) of Boston received both his B.A. and M.A. from Harvard College, also serving as the minister of the First Church in Boston, and later

becoming the president of Harvard. Wadsworth kept a medical account book containing a collection of remedies and treatments from 1702-1733.

Mrs. Bayley of Roxberry, her

Worm-Powder

Worm Pow     One ounce of Jollap.  
-der.            Quarter of an ounce of Rhubarb.  
                  Quarter of ounce mercurius[a] dulcis.  
                  All powdered.

The worm powder ingredients in Mrs. Bayley's recipe are fairly standard, with jalap as acting as a purgative and rhubarb as a laxative. Mercurius dulcis, or mercury chloride, is also more commonly known as calomel as discussed above with Haskell's recipe. As seen in this recipe for worm powder, many recipes in Wadsworth's account came from women. This is significant, as many domestic recipes were recorded and prepared by women of a household and passed along through generations and networks. A common 18<sup>th</sup>-century ailment such as worms could have often been treated at home if the ingredients were readily available, especially if the household was middle or lower-class and may not have been able to afford a doctor's visit.

### **Pharmacopoeias and Herbals**

Households, communities, and practicing physicians often had guidebooks to learn the preparation of herbal remedies. Eighteenth-century Boston apothecaries Elizabeth Greenleaf and Zabidel Boylston made extensive use of *Culpeper's Complete Herbal* (1653) and *Pharmacopoeia Londinensis* (1618) from the Royal College of Physicians. In *Culpeper's*

*Complete Herbal*, treatments for worms include the herbs commonly found in the recipes discussed throughout this chapter and widely used in the 17<sup>th</sup> and 18<sup>th</sup> century, such as gentian, scammony, vervain, elecampane, and St. John's wort (Culpeper 1653). Also mentioned was a method to destroy worms using tobacco ingested by clyster (Culpeper 1653:372). Culpeper also argued that wormwood was a better treatment than wormseed from a shop (1653:393). Similarly, the *Pharmacopoeia Londinensis* includes treatments for worms using rhubarb, wormwood, jalap, and castor oil as a purgative (1618).

Many colonial household gardens in New England contained common herbs for medicinal purposes, several medicinal-related seeds were recovered and reported from the 2010 Town Dock excavation. The Town Dock macrobotanical report indicated the presence of both native plants and those planted during European settlement, which were introduced and naturally growing in the region by the 17<sup>th</sup> and 18<sup>th</sup> centuries (Table 5.1). Specifically, for the treatment of intestinal parasites, the table reports several plants that were historically documented to treat worms. Purslane, (Culpeper 1652:61) a weedy plant and common colonial herb used as a vermifuge for children, would have naturally grown around Town Dock (Meyers and Trigg 2011:23). *Dysphania* is "native to the Americas and was a useful cure for the intestinal parasites that plagued colonial settlers" (Meyers and Trigg 2011:23). The species of *Dysphania* is unknown but could be wormseed. A common weed was available to all social classes, wormwood was a panacea for the "continual problem of roundworms and tapeworms" (Narva 1995; Sumner 2004:250-251). Saint John's wort was a plant introduced to New England in the 17<sup>th</sup> century and had many uses including use as a vermifuge (Sumner 2000:73). Nightshade or Jimsonweed are indicators of disturbed land and

colonization and are also weedy plants. Known as a narcotic for recreation and medicinal uses among early settlers, several varieties were growing in the region by the 17<sup>th</sup> century. Jimsonweed seeds were recovered from macrobotanical samples taken from the Brown privy in Newport, RI (Mrozowski 2006:41). Vervain is also recorded to have been used as a vermifuge (Culpeper 1652:188). In colonial period Boston, common medicinal plants are often grown in household gardens, and between houses in urban areas, like Dr. Zabediel Boylston who had a medicine garden for his apothecary that included wormseed (Benes 1995:38).

Table 5.1. Herbs and Medicinal Plants Recovered from the Town Dock Excavation. From Meyers and Trigg (2011).

<b>Plant Name</b>	<b>Medicinal use</b>	<b>Recovered seeds</b>
<i>Dysphania</i> (Formally <i>Chenopodium</i> ) (goosefoot or Wormseed)	Worm powder	63
<i>Portulaca</i> (purslane)	Vermifuge	138
<i>Hypericum</i> (St John's Wort)	Vermifuge	5
<i>Verbena</i> (vervain)	Vermifuge	1

### Advertisements

This Massachusetts Centinel Newspaper dated Oct 28<sup>th</sup>, 1789, offers a glimpse into the goods available at local apothecaries.

Drugs and Medicines

Of the first quality, just imported in the last vellels from Europe,  
At No. 49, Marlborough-Street,

One door North of the Buck and Glove.  
Among a variety of other articles too tedious to  
Mention, are the following, viz.  
Red Bark of the first quality,  
Friar's Balsam, Cephalic Snuff, genuine Hooper's and  
Anderson's Pills, Dr. James's fever Powders and  
Analeptic pills, Turlington's Balsam, Vermicelli,  
Tapioca. Elegant cut-glass smelling bottles assorted,  
Best scented lavender water, and a fresh  
supply of essence of spruce.  
Medicine chests for ships and families put up  
At the shortest notice, and physician's prescriptions  
Made up with the greatest accuracy at all hours.  
N. B. – Physicians, surgeons, and others  
supplied with medicines and drugs, fresh from Europe,  
every six months.  
Dr. Peters's respectful compliments to his  
Friends and the publick, and returns with gratitude  
The favours he has received, and hopes from  
Attention and the quality of his medicines to  
Merit a continuance of them. Oct. 7, 1789.

Found in the 1789 Boston directory, Alexander Abercrombie Peters is listed as a physician at the address of 49 Marlborough Street, just a few blocks away from the Town Dock. This advertisement shows how an apothecary in Boston near a seaport allowed for access to imports and proprietary medicines, especially taking advantage of announcing available goods from Europe, where colonists could purchase medicines familiar from home.

Turlington's Balsam, one of the proprietary medicines listed in this advertisement, matches the early embossed patient bottle recovered from the Town Dock excavation (Figure 4.6), furthering evidence that patents and advertisements of proprietary medicine impacted urban Boston, specifically merchants and middle to upper-class consumers.

The historical documents discussed provide a wealth of 18<sup>th</sup>-century medicinal knowledge, bolstering a stronger connection to accompany the parasite and material culture

evidence for this case study. Recipes and formulas for treatments, coupled with information of botanical and chemical compounds allows for an interpretation of how the medicines worked to treat worms. Additionally, journals and notes of physicians observing the symptoms and feelings of people experiencing intestinal parasitic diseases provides insight as to how common ailments could have an effect on people's overall health, attitudes, and lifestyles.

## CHAPTER VI

### DISCUSSION AND CONCLUSION

#### **18<sup>th</sup>-Century Public Health in the Town of Boston**

In 1691, the local government first started showing concern for sanitation in Boston, developing a system attempting to control disease (Blake 1959:23). The biggest sanitation regulation implemented during this period was the quarantine of arriving ships to prevent epidemic diseases from spreading. Ships with diseased passengers had to dock at a nearby “hospital island,” as smallpox and yellow fever was understood by colonists to spread through the air. Still tied very closely to England, the Royal Society was responsible for relaying progress and scientific developments to the colony, who frequently communicated with English doctors and scientists. However, sanitation regulations were few until gaining more attention and need with the turn of the century.

Public health practices put in place in the 18<sup>th</sup> century were based on those of the earlier period where colonists held belief that disease could spread in unsanitary places. “It was not fresh medical knowledge but the common trends of Massachusetts society which brought this new phase in the history of the colony’s public health” (Blake 1959:24). What



was likely responsible for the greater attention on health regulations was a broadening of commercial activity in the 18<sup>th</sup> century, with increasing numbers of ships and ports, heavy traffic in the streets, more retail shops, and printed newspapers, “Another aspect of the new era was a general increase in governmental activity” (Blake 1959:26). As Boston grew in population and size, water continued to be largely a private matter, where digging wells even for neighborhood use was up to the people directly concerned and was not funded by the town. Drainage quickly became a problem, as well as sewage. The town did forbid anyone to throw garbage in public places, with the offence for disposal of household wastes punishable with a fine indicating the practice was widespread enough to warrant the public health regulation and fine. The maintenance of streets and city cleanliness also was largely dependent on individual efforts. The town did start assigning locations outside the common area for trades such as slaughterhouses and butchers so they would offend others, as “ill stench tend to breed infection” (Blake 1959:30). The population of Boston more than doubled between 1700-1740, and yet sanitary regulations were not revised. The Board of Health determined what was dangerous to the public based on smell, “periodically it cleaned out the Town Dock, which was an outlet for common sewers and accumulated all manner of filth” (Blake 1959:204). Public sanitation in the city streets of 18<sup>th</sup>-century Boston was a horrible breeding ground for bacteria and disease; Alexander Hamilton visiting Boston in 1744 “described the Town Dock at low tides as a ‘very stinking puddle’” (Blake 1959:104). Evident from archaeological excavations at the Town Dock, citizens did indeed use the outlet as a public garbage dump for household garbage as well as human waste, indicated by the analysis of present parasite eggs and macrobotanical remains throughout various strata. Even

with attempts to keep Boston and the Town Dock clean, it is clear from historical documentation and the archaeological record that the efforts in place were not enough to avoid unsanitary conditions and the spread of disease.

Examining Boston's sanitation regulations in place at the household level, individuals were unsurprisingly expected to maintain the cleanliness of their properties with input from officials being little to none, unless unsanitary conditions were extreme and reported to the local government. The first public health guideline regarding privies was written in the Selectmen's order of 1652, "prohibiting on pain of a twenty-shilling penalty the placement of a privy within twenty feet of a highway or neighboring house, unless properly constructed with a vault six feet deep" (Blake 1959:14). It was not until 1799 that the board of public health also decided that any privy vault would be "considered a nuisance if its contents were within eighteen inches of the surface of the earth" (Blake 1959:168). As discussed previously in Chapter III, privies were often cleaned out by nightsoil men, and the waste may have been used to fertilize gardens. Evident from the parasite eggs indicating infection at the Parker-Emery house, it is clear that although the cleaning out of a privy would have reduced volume of the contents although it did not completely eliminate parasitic activity in the nightsoil. Cleaning the privy may have also introduced parasites onto the ground surrounding the privies if the nightsoil men spilled during removal. Additionally, moving the waste to a location for use as fertilizer would continue the lifecycle of parasitic infections, contributing to the unsanitary conditions in the overpopulated streets of Boston.

Few physicians practicing in 1700s Boston had medical degrees or licenses. As a result, medical information distributed to the public was not always reputable or accurate.

This is reflected in many of the writings of physicians analyzed in Chapter VI. The Selectmen of Boston worked closely with local physicians to communicate information with citizens, leading to misinterpretation and false understandings of diseases and how they spread. Bostonians wanting a medical degree had to travel to Europe to study at the hospitals and universities in London, Paris, or Edinburgh. However, progress of medical science in Boston began to pick up during the 18<sup>th</sup> century, mainly in the form of improvement in local medical education (Blake 1959:44). Medical and anatomy lectures were held at Harvard as early as 1714, although they did not have a medical school until 1782. Small medical clubs and societies also started establishing themselves in the city, but these small organizations did not last long term. Physicians in the colonies asking for advice on a difficult case often had to send letters to Europe via ship to ask advice of licensed medical professionals, waiting months for a response which delayed treatment and may have contributed to more severe disease. However, even licensed doctors in Europe did not always have scientifically sound understandings of most medical conditions in the 18<sup>th</sup> century. Further complicating communication of medicine between Europe and Boston was a disconnect in available plants to be used in treatments. Fortunately, colonists quickly built their own repertoire of medicinal plants, bringing familiar species such as wormwood (*Artemisia absinthium*) from England, and learning of new plants in the northeastern region of the United States, possibly from Native Americans.

## Conclusion

Examining disease and medicinal knowledge archaeologically proved to be successful in building a foundation of evidence relevant to analyze a multitude of hypotheses. As previously discussed, most studies of the archaeology of medicine and health treatments focuses on the material culture. Additionally, archaeoparasitology is a very specialized field and is not usually incorporated into integrated research like this case study. Demonstrated throughout the analysis carried out in my research, Reinhard (2017) argues that parasite samples destroyed from the archaeological record are only of value if they are interpreted alongside the archaeological context, to help address a specific research question. The datasets I analyzed are amplified within the context I have given the data. Each of my datasets – parasite samples, material culture, and historical documentation coexist and complement each other, with each providing specific information and context to create a unified narrative. First, the parasite eggs recovered from the Town Dock samples and the Parker-Emery House privy confirmed that intestinal parasitic infections plagued 18<sup>th</sup>-century Boston from both a household perspective and the general town population. All parasite eggs I encountered during analysis were identifiable and consisted of common and expected taxa in an 18<sup>th</sup>-century urban space. Town Dock inhabitants and the Parker family at 23 Unity Street had infections from *Ascaris lumbricoides*, *Trichuris trichiura*, and *Taenia* sp. The poor sanitation, over-crowding of an urban space, and lack of sanitation regulations and publicly available scientific information about how parasitic diseases spread led to the continuation of infections.

Ideologies, practices, and materials remains associated with health and disease in the 18<sup>th</sup> century were visible in various means through the parasite samples, material culture, and historical documentation analyzed. Each of these categories provided complementary evidence to address the research objectives allowing for a multi-source interpretation. Starting with evidence from the parasite analysis, the densities of samples from various contexts suggest that the household of the Parker-Emery privy had cleared out the barrels over time, although parasite infections still persisted. Recognizing medicinal artifacts and remedies to treat diseases is possible from the assemblages collected from both sites. The medicinal artifacts analyzed were in the form of medicine bottles, vials, ointment pots, and personal hygiene artifacts including lice combs, chamber pots, and toothbrushes. All of these artifacts were intentionally disposed of in the waste of either the Town Dock dump, or the Parker-Emery double-barrel privy. Although the exact remedy, treatment, or type of medicine used was not identifiable from a majority of the bottles and vials analyzed, the macrobotanical analysis of the Town Dock identified plants that could have been used to treat the parasitic infections. Historical documentation also provided substantial evidence to examine the macrobotanical species recovered, indicating that several possible medicinal herbs were present in the samples that were used in 18<sup>th</sup>-century recipes to treat parasitic infections. Historical documentation also provided evidence as to how the citizens of Boston were informed about and perceived matters of disease and sanitation, as demonstrated in the previous discussion of this chapter. The transcribed collection of letters, journals, and recipe books written by Boston's physicians in the 18<sup>th</sup> century provide insight to how they advised, treated, and dealt with patients.

The 18<sup>th</sup> century was a time of advancement for public health, sanitation regulations, and medicinal knowledge in Boston. Although medical science and understanding of diseases would not start progressing more quickly until the 19<sup>th</sup> century, 18<sup>th</sup>-century Boston underwent a period of change that influenced Bostonians' ideas of health and medicine. European medical professionals established a push for medical education that was to be implemented by officials and physicians in the colonies. Apparent from the narratives of various physicians' writings and documentation, medical training became very important in the 18<sup>th</sup> century, when the public began praising and giving greater merit to those with experience training under European doctors or obtaining a license or degree. Because of Boston's push for better medical education in the 18<sup>th</sup> century, lectures, tutorials, societies, and advertisements regarding health and medication began to increase. Especially influential to public citizens of Boston was the sanitation measures that were put in place by the local government to prevent poor health and the spread of infectious diseases. From what I examined from the archaeological record, it is clear that the public surrounding the Town Dock and the Parker household attempted to maintain good personal hygiene, by using medicines to treat ailments, disposing their garbage and waste in a designated area, and cleaning out privies as needed. Even if their measures were not as effective as hoped for, the acknowledgement that poor sanitation led to disease and bad health was progress from the very limited regulations in place during the late 17<sup>th</sup> century.

Additionally, Bostonians both used commercially produced medicines as they became readily available and continued practicing traditional home remedies. Evident from apothecary and physician recipes, the ingredients used in commercial medicines were often

botanical in nature, which were often the same or similar to those used in home remedies. At the very least, if a household did not have a specific herb in their personal garden, it would have been obtainable from a neighbor or local pharmacy such as Dr. Boylston's apothecary at Dock Square, which sold medicinal herbs from his well renowned medicinal garden. The most significant material impact on medicine during this era was the boom of businesses and shops as 18<sup>th</sup>-century Boston increased in size and population. The trade port town of Boston had access to a wide variety of medicinal imports and the rise of patent and proprietary medicines eventually became popular during this period, as noted in 18<sup>th</sup>-century newspaper advertisements such as the Massachusetts Centinel Newspaper discussed in Chapter V. This rise in commercial medicines is also visible from the recovered medicine bottles and vials found in the archaeological record, specifically the Turlington's Balsam of Life (Figure 4.6), indicating that its user would have been wealthy enough to afford a "cure-all" proprietary medicine imported from England. Evident from the Parker family household assemblage and Boston's population that disposed items into the Town Dock fill, material culture indicates behavior and strategies to treat disease that were unlikely available to all due to financial constraints. However, I argue that these "strategies" embodied by artifactual evidence are part of an emerging reality, fitting into the larger picture of Boston's growing population density. The boom of shops and businesses in 18<sup>th</sup>-century Boston cultured a push for marketing of proprietary medicines, leading to popularity and a progressive shift towards commercial medicines throughout the century.

A crucial piece of evidence examined in my case study that is not visible in historical documentation is the dimension of class. Subsequent research (Mrozowski 2006) identified a

higher concentration of parasites in the lower-class Tate household privy compared to the higher-class Brown household privy in 18<sup>th</sup>-century Newport, RI. A comparison of my analysis with the works completed by Mrozowski (et al. 1986, 2006) and Trigg et al. (2017) situates this case study in the broader contexts of New England 18<sup>th</sup>-century urban environments and health. A key observation comparing these sites is that the difference in parasite data lies in density rather than variety of taxa. Trigg et al. (2017) found a higher percentage of *Trichuris* relative to *Ascaris* prior to the late 18<sup>th</sup> century and a shift to a greater proportion of *Ascaris* starting in the 19<sup>th</sup> century which is consistent with samples analyzed here. *Trichuris* and *Ascaris* dominate the archaeoparasitological record, amplifying that the differences observed lie in density rather than taxa variation, which can be attributed to the larger issue of class and available resources for healthcare.

Looking at commonalities and departures in data between the Newport privies and the privy at 23 Unity Street, the dimension of class is exhibited in many aspects. Both Newport and Boston sites share the equivalence of being a densely occupied mixed commercial city (Mrozowski 2006), providing a perfect environment for poor sanitation and parasite infections. Much like Caleb Parker of Boston, William Tate was also a blacksmith. Although both artisans, Parker and Tate were from different classes. Historical documentation establishes that Parker was a wealthy Bostonian who owned at least one enslaved man, sent his son to Harvard University, and possessed many lavish custom pieces of material culture that are currently on display in the Boston Museum of Fine Arts. On the other hand, blacksmith Tate worked for an economically powerful Newport merchant and slave trader, John Banister (Mrozowski 2006). Along with providing his services as a blacksmith, Tate



and his wife took in boarders as an economic strategy (Mrozowski 2006:27). Based on historical documentation, it is clear that Banister controlled Tate with his economic power, from providing materials and a market for his services as well as owning the property the Tate's resided at, and even threatening to evict Tate (Mrozowski 2006:34). The archaeology further emphasizes the lower-class lifestyle the Tate's experienced, with macrobotanical and faunal analyses concluding that kitchen gardens and animals were part of the Tate's yard, causing the high density of parasite eggs present (Mrozowski 2006:40). As demonstrated with my chapter on parasitology, the environment in which these households worked and lived play a crucial role in access to contracting parasitological diseases.

Dissimilar from the Tate's, the Brown household had a wealth comparable to the Parker's. Not only was the Brown privy parasite data highly comparable to the parasite data from the Parker privy, but parallels of class are also visibly archaeologically in the material culture. Identified in the assemblage from the Parker privies, characteristic artifacts indicate the use of commercial medicines, which the Browns also took advantage of. Although small, the Brown privy assemblage included a commercial pharmaceutical bottle, personal care items, and the presence of jimsonweed seeds, which could have been attempts to combat ailments resulting from parasitic infections (Mrozowski 2006:56).

The comparisons between the households of different classes in both Newport and Boston demonstrate parasitic infections did not completely discriminate based on class. Clearly the sanitation measures put in place were not sufficient in the overcrowded city of Boston, and even the upper-class Parker family who could afford physician care and commercial medicines had parasitic infections. Compared with other colonial New England

sites, the parasite densities at the Town Dock and even the Parker-Emery House privy were quite low (Table 3.3). Written accounts from well-known home guidebooks to medicinal remedies, to letters and records of the general public using treatments to treat parasitic infections indicate that many had knowledge of plants and remedies known to treat symptoms. The presence of medicinal artifacts analyzed concludes that the general public represented by the Town Dock assemblage had the knowledge and means to treat illnesses and symptoms of diseases with medicine. The more intimate household-level analysis of the privy used by members residing at the Parker-Emery House provided archaeological evidence that the inhabitants did indeed make use of commercial medicines and products. It is unclear if the preference for medicines across both sites was strictly commercial or homemade, but I argue it is likely a combination of both. However, the indication of commercially sold medicines in the archaeological record allow for a conclusion that the increasing urbanization and progress of establishing rigor in the field of medicine in 18<sup>th</sup>-century Boston is contemporary with the documentary record analyzed.

APPENDIX A

PARASITE SAMPLE COUNTS AND CALCULATIONS

<b>Sample</b>	<b>Sample ID</b>	<b>Provenience</b>	<b>Context date</b>	<b>Weight (grams)</b>	<b>Date processed</b>
<b>1</b>	PEH.090	Feat. 5/strat. 1 E½/ 130-135 cmbd	18 <sup>th</sup> c. (mid)	10.06	11/6/20
<b>2</b>	PEH.093	Feat. 5/strat. 1 E½/ 140-145 cmbd	18 <sup>th</sup> c. (mid)	10.17	11/6/20
<b>3</b>	PEH.097	Feat. 5/strat. 2 E½	18 <sup>th</sup> c. (mid)	10.17	11/6/20
<b>4</b>	PEH.110	Feat. 1/strat. 1 N½	18 <sup>th</sup> c. (mid)	10.2	11/6/20
<b>5</b>	PEH.115	Feat. 6/strat. 1 N½	18 <sup>th</sup> c. (mid)	10.02	11/6/20
<b>6</b>	PEH.116	Feat. 6/strat. 2 N½	18 <sup>th</sup> c. (mid)	10.04	11/6/20
<b>7</b>	PEH.117	Feat. 6/strat. 3 N½	18 <sup>th</sup> c. (mid)	10.03	11/6/20
<b>8</b>	PEH.118	Feat. 6/strat. 4 N½	18 <sup>th</sup> c. (mid)	10.08	11/6/20
<b>9</b>	Faneuil Hall FS#55	Quad SE/strat. III/ Level 5	18 <sup>th</sup> c. fill/1805 fill	10.1	11/6/20
<b>10</b>	Faneuil Hall FS#19 Flot#3	Quad NW/strat. V/Level 2	1761 fire/demo debris	10.27	11/6/20
<b>11</b>	Faneuil Hall FS#79 Flot#23	Quad SW/strat. VI/Level 4	1761 fire	10.16	11/6/20
<b>12</b>	Faneuil Hall FS#70 Flot#20	Quad SE/ strat. VII/Level 7	2 <sup>nd</sup> half 18 <sup>th</sup> c.	10.17	11/6/20
<b>13</b>	Faneuil Hall FS#97 Flot#29	Quad SW/strat. VIII/Level 5	1 <sup>st</sup> half 18 <sup>th</sup> c.	10.31	11/6/20
<b>14</b>	Faneuil Hall FS#159 Flot#45	Quad SE/strat. IX/Level 5	Late 17 <sup>th</sup> -early 18 <sup>th</sup> c.	10.41	11/6/20
<b>15</b>	Faneuil Hall FS#162 Flot#46	Quad SE/strat. X/Level 6	Late 17 <sup>th</sup> -early 18 <sup>th</sup> c.	10.06	11/6/20
<b>16</b>	Faneuil Hall FS#153 Flot#43	Quad SW/strat. XIII/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	10.25	11/6/20

<b>Sample</b>	<b>Sample ID</b>	<b>Provenience</b>	<b>Context date</b>	<b>Weight (grams)</b>	<b>Date processed</b>
<b>17</b>	Faneuil Hall FS#156 Flot#44	Quad NE/strat. IX/Level 5	Late 17 <sup>th</sup> - early 18 <sup>th</sup> c.	10.16	2/3/21
<b>18</b>	Faneuil Hall FS#4 Flot#2	Quad NW/strat. III/Level 1	18 <sup>th</sup> c. fill/1805 fill	10.12	2/3/21
<b>19</b>	Faneuil Hall FS#104 Flot#31	Strat. VIII/Level 5	1 <sup>st</sup> half 18 <sup>th</sup> c.	10.06	2/3/21
<b>20</b>	Faneuil Hall FS#58 Flot#17	Quad SW/strat. VII/Level 6	2 <sup>nd</sup> half 18 <sup>th</sup> c.	10.2	2/3/21
<b>21</b>	Faneuil Hall FS#181 Flot#57	Quad SE/strat. XI/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	10.06	2/3/21
<b>22</b>	Faneuil Hall FS#150 Flot#42	Quad NW/Strat XIII/Level 10	17 <sup>th</sup> -18 <sup>th</sup> c.	10.67	2/3/21
<b>23</b>	PEH.074	Feat. 2/strat. 4 N½/200-210 cmbd	19 <sup>th</sup> c.	10.93	2/3/21
<b>24</b>	PEH.075	Feat 2/strat. 5 N½/ 220-230 cmbd	19 <sup>th</sup> c.	10.07	2/3/21

Counts and Calculations

<b>Sample</b>	<b>Tablet Batch #</b>	<b>Tablet count x2</b>	<b><i>Lycop- odium</i> count</b>	<b><i>Ascaris</i> count</b>	<b><i>Trichuris</i> count</b>	<b><i>Taenia</i> count</b>	<b>x</b>	<b>x/gram = density</b>
<b>1</b>	483216	37166	100	0	1	0	371.66	36.94
<b>2</b>	483216	37166	100	0	3	0	1114.98	109.63
<b>3</b>	483216	37166	100	4	16	2	8176.52	803.98
<b>4</b>	483216	37166	100	0	0	0	0	0
<b>5</b>	483216	37166	100	1	0	0	371.66	111.28
<b>6</b>	483216	37166	100	0	0	0	0	0
<b>7</b>	483216	37166	100	0	32	0	11893.12	1185.75
<b>8</b>	483216	37166	100	3	43	0	17096.36	1696.07
<b>9</b>	483216	37166	100	1	6	0	2601.62	257.59
<b>10</b>	483216	37166	100	0	1	0	371.66	36.19
<b>11</b>	483216	37166	100	0	0	0	0	0
<b>12</b>	483216	37166	100	3	3	0	2226.96	219.19
<b>13</b>	483216	37166	100	0	0	0	0	0
<b>14</b>	483216	37166	100	2	4	0	2226.96	213.93
<b>15</b>	483216	37166	100	5	2	0	2601.62	258.61
<b>16</b>	483216	37166	100	2	8	0	371.66	362.60
<b>17</b>	483216	37166	100	1	1	0	743.32	73.16
<b>18</b>	483216	37166	100	1	1	0	743.32	73.45
<b>19</b>	483216	37166	100	2	2	0	1486.64	147.78
<b>20</b>	483216	37166	100	0	2	0	743.32	72.87
<b>21</b>	483216	37166	100	0	1	0	371.66	36.94
<b>22</b>	483216	37166	100	2	2	0	1486.64	139.33
<b>23</b>	483216	37166	100	1	0	0	371.66	34.00
<b>24</b>	483216	37166	100	2	0	0	743.32	73.82

APPENDIX B

MEDICINAL ARTIFACTS BY SITE

**Town Dock**

Site	Catalog #	Context	Object	Material	Color	Part	Qty	Notes	Photo
Town Dock	FHU.00 01.035	Strat. 2, 14.67cm, east half	Bottle	glass	dark green	base	1	Molded, embossed “...r’s”/”...ters” rectangular	
Town Dock	FHU.00 14.035	Strat. 3, Level 1, SW quad.	Possible vial fragments	glass	aqua	body	3	Multiple vessels, curved thin glass	
Town Dock	FHU.00 27.077	Strat. 3, Level 2, SW quad.	Possible flask	glass	aqua	base	1	Molded	
Town Dock	FHU.00 27.081	Strat. 3, Level 2, SW quad.	Possible vial	glass	aqua	body	2	Mouth-blown, thin, possible vial	
Town Dock	FHU.00 27.082	Strat. 3, Level 2, SW quad.	Possible vial	glass	aqua	body	1	Curved, possible vial	
Town Dock	FHU.00 27.083	Strat. 3, Level 2, SW quad.	Possible vial	glass	aqua	body	1	Mouth-blown, possible vial	
Town Dock	FHU.00 27.084	Strat. 3, Level 2, SW quad.	Medicine bottle	glass	aqua	finish	1	Mouth-blown, trumpet/flare	Figure 4.3
Town Dock	FHU.00 29.078	Strat. 5, Level 2, NW quad.	Bottle	glass	olive	base	1	Molded, paneled bottle, body, and shoulder piece	
Town Dock	FHU.00 29.089	Strat. 5, Level 2, NW quad.	Bottle, possibly medicine	glass	clear	neck	1	Molded, rectangular, circular neck pinched at base	
Town Dock	FHU.00 29.090	Strat. 5, Level 2, NW quad.	Bottle	glass	clear	body	1	Hinge mold, embossed, Turlington’s bottle	Figure 4.6
Town Dock	FHU.00 30.022B	Strat. 5, Level 2, NE quad.	Bottle	glass	clear	body	1	Molded, embossed partial letters	

Town Dock	FHU.00 50.082B	Strat. 3, Level 5, SW quad.	Bottle, possibly medicine	glass	aqua	body	1	Mouth-blown, possibly base, not patinated	
Town Dock	FHU.00 56.031	Strat. 7, Level 6, SW quad.	Vial	glass	aqua	base	1	Mouth-blown, nearly complete base, thick, light patinated	Figure 4.3
Town Dock	FHU.01 80.008	Strat. 11, Level 10, SE quad.	Bottle, possible vial	glass	aqua	body	1	Mouth-blown, lightly patinated	
Town Dock	FHU.01 28.020	Strat. 10, Level 7, NW quad.	Bottle	glass	dark green	body	4	Mouth-blown, thin bodied	
Town Dock	FHU.01 06.045B	Strat. 8, Level 5, South bulk	Medicine bottle	glass	aqua	finish	1	Mouth-blown, wide prescription, complete neck, and body	Figure 4.3
Town Dock	FHU.00 87.016	Strat. 6, Level 3, NE quad.	Possible vial	glass	aqua	body	1	Mouth-blown, possible neck fragment	
Town Dock	FHU.01 72.012A	Strat. 7, Level 8, SE quad.	Ointment pot	ceramic	blue	body	1	Tin-glazed, hand painted Persian blue, red/pink bodied	Figure 4.8
Town Dock	FHU.01 72.012B	Strat. 7, Level 8, SE quad.	Ointment pot	ceramic	Blue	base	1	Tin-glazed, hand painted Persian blue, red/pink bodied	Figure 4.8
Town Dock	FHU.01 72.012C	Strat. 7, Level 8, SE quad.	Ointment pot	ceramic	blue	base	1	Tin-glazed, hand painted Persian blue, red/pink bodied	Figure 4.8
Town Dock	FHU.01 96.034	Timber 1,2, and back dirt	Ointment pot	ceramic	dark brown	base	1	Dark brown lead- glazed redware	Figure 4.8
Town Dock	FHU.01 17.032	Strat. 10, Level 5, SW quad.	Hairbrus h	hardwood		frag.	1	4 drilled holes containing fibrous material	Figure 4.11
Town Dock	FHU.00 30.080	Strat. 5, Level 2, NE quad.	Tooth- brush	bone	green	handle	1	Worked bone, cross-hatching, holes, parallel lines, incised X	Figure 4.11
Town Dock	FHU.01 52.002	Strat. 13, Level 10, SW quad	Lead weight	metal		frag.	1	Cylindrical lead	Figure 4.9

## Parker-Emery House

Site	Catalog #	Context	Object	Material	Color	Part	Qty.	Notes	Photo
PEH	PEH-080-004	Feat. 5, W½, Strat. 2, Level 16, 150-155cmbd	Medicine bottle	glass	aqua	finish	1	Mouth-blown	Figure 4.2
PEH	PEH-080-007	Feat. 5, W½, Strat. 2, Level 16, 150-155cmbd	Medicine bottle	glass	aqua	finish	2	Mouth-blown, refit to PEH-080-004	Figure 4.2
PEH	PEH-080-008	Feat. 5, W½, Strat. 2, Level 16, 150-155cmbd	Medicine bottle	glass	aqua	body	10	Mouth-blown, refit to PEH-080-004	
PEH	PEH-081-002	Feat. 5, W½, Strat. 2, Level 16, 155-160cmbd	Medicine bottle	glass	aqua	body	8	Thin bottle glass	
PEH	PEH-082-006	Feat. 5, W½, Strat. 2, Level 17, 160-165cmbd	Medicine bottle	glass	aqua	base	1	Mouth-blown, possibly free blown, thin glass, tall kick-up	Figure 4.1
PEH	PEH-082-007	Feat. 5, W½, Strat. 2, Level 17, 160-165cmbd	Medicine bottle	glass	aqua	body	7	possibly free-blown, thin glass, possibly same as 081/082	
PEH	PEH-100-007	Feat. 5, E½, Strat. 2, Level 17, 165-170cmbd	Bottle, possibly medicine	glass	olive	body	1	panel molded, mouth-blown, possible medicine or alcohol case bottle	
PEH	PEH-101-010	Feat. 5, E½, Strat. 2, Level 18, 170-175cmbd	Bottle, possibly medicine	glass	aqua	finish	1	flared prescription finish, thin	



PEH	PEH-113-029	Feat. 6, S½, Strat. 3, Level 14-17 135-165cmbd	Possible vial	glass	aqua	body	3	mouth-blown vial fragments	
PEH	PEH-113-030	Feat. 6, S½, Strat. 3, Level 14-17 135-165cmbd	Vial	glass	aqua	body	2	mouth-blown vial fragments, same vessel as all from 113	
PEH	PEH-113-031	Feat. 6, S½, Strat. 3, Level 14-17 135-165cmbd	Vial	glass	aqua	body	3	mouth-blown vial fragments, same vessel as all from 113	
PEH	PEH-113-032	Feat. 6, S½, Strat. 3, Level 14-17 135-165cmbd	Vial	glass	aqua	base	1	mouth-blown vial fragments, same vessel as all from 113, flattened base	Figure 4.4
PEH	PEH-122-004	Feat. 6, N½, strat. 4, Level 14-17, 165-185cmbd	Hairbrush	bone		fragment	1	single bone brush tooth, length 17mm	
PEH	PEH-122-043	Feat. 6, N½, strat. 4, Level 14-17, 165-185cmbd	Vial	glass	aqua	body	3	thin curved glass, possibly same vial as 113	
PEH	PEH-120-018	Feat. 6, N½, strat. 2, Level 14-17, 131-157cmbd	Lice comb	bone		fragment	1	worked bone, smooth rounded edge, appears to have fine teeth	
PEH	PEH-113-036	Feat. 6, S½, strat. 3, Level 14-17, 135-165	Chamber Pot	ceramic	brown	rim	2	lead-glazed redware, incised banding	Figure 4.10

PEH	PEH-113-037	Feat. 6, S½, strat. 3, Level 14-17, 135-165	Chamber pot	ceramic	brown	body	1	lead glazed redware, brush slipped, same as 113-036	
PEH	PEH-027-014	Feat. 2, S½, strat. 2, Level 9, 85-90cmbd	Medicine bottle	glass	aqua	base	1	post-bottom mold, common rectangular shape, embossed "...UID..."	Figure 4.5
PEH	PEH-030-006	Feat. 2, S½, strat. 2, Level 10, 90-95cmbd	Medicine bottle	glass	clear	body	1	cup mold, oval with side straps, probably union oval pharma bottle, refit to PEH.030.007	Figure 4.5
PEH	PEH-030-007	Feat. 2, S½, strat. 2, Level 10, 90-95cmbd	Medicine bottle	glass	clear	body	1	cup mold, oval with side straps, probably union oval pharma bottle, refit to PEH.030.006	Figure 4.5
PEH	PEH-031-001	Feat. 2, S½, strat. 3, Level 10, 90-95cmbd	Medicine bottle	glass	clear	near intact	1	cup mold, Whithall, Tatum & Company embossed on base: "W T & Co"/"AC USA"; Whithall, Tatum & Co. 1890-1984. Philadelphia oval shape, tooled finish body seams ending on the neck	Figure 4.5

PEH	PEH-066-027	Feat. 2, S½, strat. 5, Level 23, 220-230cmbd	Medicine bottle	glass	clear	near intact	1	cup mold, Philadelphia Oval with one flattened side probably for label, patent/tooled finished with vertical seams disappearing on neck, embossed on outside/center of base "H"	Figure 4.5
PEH	PEH-079-104	Feat. 2, N½, strat. 5, Level 23, 220-230cmbd	Medicine bottle	glass	aqua	body	1	thin molded mouthblown multi-paneled bottle	
PEH	PEH-037-010	Feat. 2, S½, strat. 3, Level 11, 100-105cmbd	Medicine bottle	glass	clear	base	1	bottle or vial base, probably empontiled, mouth-blown	
PEH	PEH-037-013	Feat. 2, S½, strat. 3, Level 11, 100-105cmbd	Medicine bottle	glass	aqua	body	1	mouth-blown, thin curved neck or body fragment	
PEH	PEH-041-009	Feat. 2, S½, strat. 1, Level 12, 110-120cmbd	Bottle	glass	aqua	body	1	paneled bottle, likely medicine, molded	
PEH	PEH-076-007	Feat. 2, N½, strat. 4, Level 21, 200-210cmbd	Medicine bottle	glass	aqua	finish	1	wide prescription, finish tooled, molded	Figure 4.5
PEH	PEH-066-028	Feat. 2, S½, strat. 5, Level 23, 220-230cmbd	Medicine or alcohol bottle	glass	amber	intact	1	union oval, double ring, embossed "S" in circular depression	Figure 4.5
PEH	PEH-107-007	Feat. 1, N½, strat. 1, Level 15, 140-150cmbd	Lice comb	bone		fragment	6	worked bone, refits	

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